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Our Ref: PSM4815-004L Rev3

24 January 2023

Senior Project Manager
JBS&G
Level 1, 50 Margaret Street
Sydney NSW 2000
mdelandro@jbsg.com.au

Attention: Michelle Delandro

Dear Michelle

RE: RESIDENTIAL DEVELOPMENT, EDMONDSON PARK SOUTH – RESULTS OF GEOTECHNICAL INVESTIGATION

1. Introduction

This letter presents the results of the geotechnical investigation undertaken by PSM for the proposed residential development in Edmondson Park South. This work has been undertaken in accordance with our proposal, PSM4815-001L Rev1, dated 29 June 2022.

2. Background

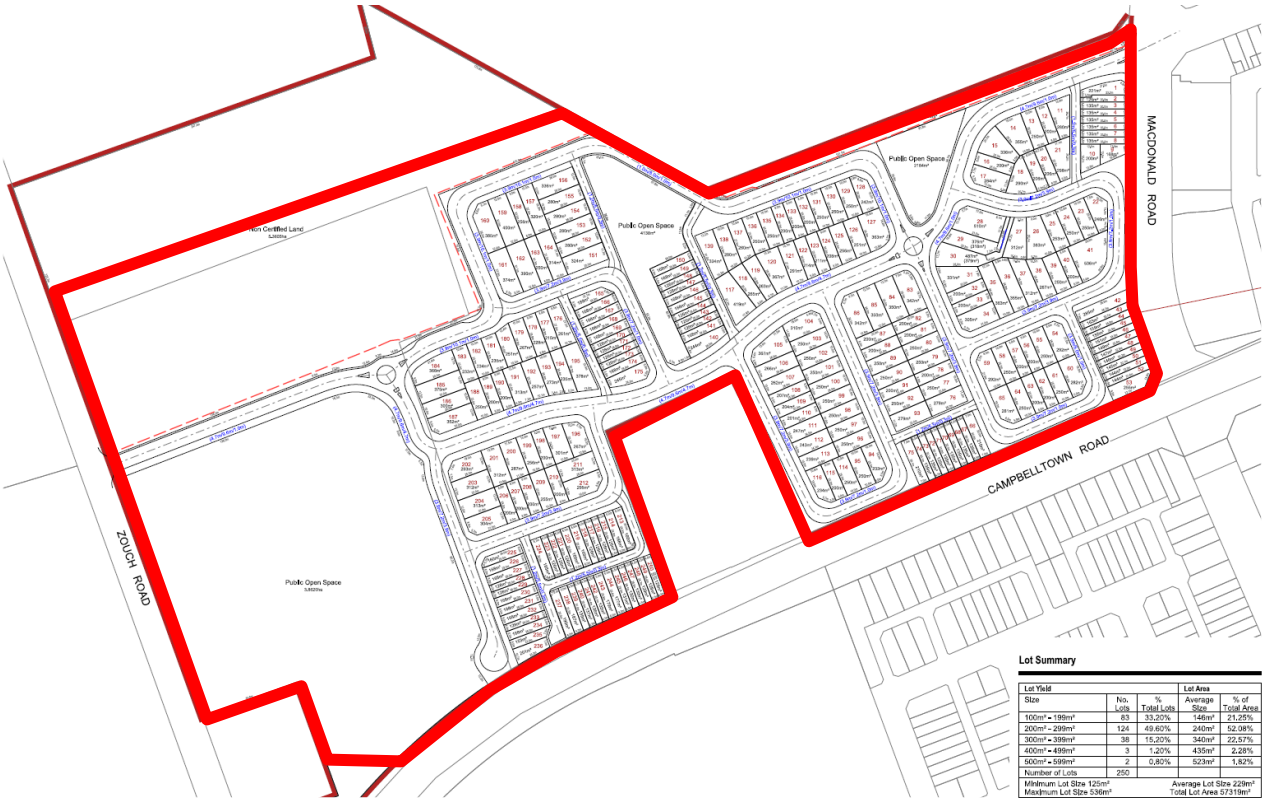
To assist in preparing this letter, we were provided with the following documents:

- Invitation to tender (ref. Tender No. BPA 14774)
- A drawing showing the precinct 3 Concept Layout Plan for Lot 2,3 & 5 by Urbanco (ref: 021.EP.015.05), dated 14 September 2022
- Site surveys for precinct 3, ref.22-000141-DET1, dated 09 December 2022.

Based on the documents above and email correspondence, we understand the following:

- The site (Lot 5 DP 1272931) has an area of 11.9 ha
- The proposed development comprises subdivision of the site into a minimum of 250 residential lots comprising standard one/two storey dwellings and terrace houses, recreational space (including a sports oval), local roads and designated drainage areas
- The Ingleburn Military Heritage Precinct (Bardia Barracks) is listed as an item of State Heritage significance on the State Heritage Register and lies wholly within Lot 4 DP 1272931.

Inset 1 presents the concept plan of the site.



Inset 1: Concept plan of site (Thick red boundary indicates site boundary as per Lot 3 & Lot 5)

3. Geotechnical Investigation – October 2022

3.1 Fieldwork

The fieldwork was undertaken on 17 to 21 October 2022, under the full-time supervision of a PSM geotechnical engineer who undertook the following tasks:

- Directing the test locations
- Preparing engineering logs of the material encountered
- Collecting of soil samples for a geotechnical and analytical laboratory testing
- Supervising the installation of 3 standpipe piezometers.

A total of thirty (30) augered boreholes were drilled across the Site using a 5.5-tonne track mounted drill rig. The boreholes were drilled to a maximum depth of typically 5.0 m with three boreholes (BH15, BH29, BH30) extended to 12 m for piezometer installation. The majority of the boreholes (22 in total) were commenced by using V - bit in soil units and subsequently TC - bit following V - bit refusal. The remaining 8 boreholes were drilled using TC - bit from the beginning. Standard penetration testing (SPT) was undertaken at approximately 1.5m intervals in the boreholes.

The borehole locations were recorded with a hand-held GPS with a horizontal accuracy +/- 5m. The elevations were inferred based on the recorded location from the survey drawing provided to us by JBS&G (ref. 22-000141-DET1).

Prior to drilling, DBYD plans were reviewed and on-site service location “scans” were undertaken by a service locator to check the borehole locations for the presence of buried utilities.

At the completion of drilling, the boreholes were backfilled with excavated spoil and sand as required.

Figure 1 presents a site locality plan showing the borehole locations. Figures 2 to 4 present a selection of site photographs taken during the fieldwork.

Figure 1 presents a site locality plan showing the borehole locations. Figures 2 to 4 present a selection of site photographs taken during the fieldwork.

Appendix A presents the engineering borehole logs.

Appendix B presents the piezometer construction records.

4. Geotechnical Laboratory Results

4.1 California Bearing Ratio (CBR) testing

Four (4) disturbed soil samples were recovered for CBR testing.

The following sample preparation was undertaken prior to CBR testing:

- Compact to 98% standard MDD, at optimum moisture content
- Four (4) day-soaked sample; and
- 4.5 kg surcharge.

Table 1 presents a summary of the CBR test results. The CBR test certificates are presented in Appendix C.

Table 1 - Summary of CBR Laboratory Test Results

Sample ID	Depth (m)	Material Description	Soaked CBR (%)	Optimum Moisture Content (%)	Standard Maximum Dry Density (t/m^3)	Swell (%)
BH 01	0.2 – 0.8	CLAY	2.5*	19.6	1.73	0.5
BH 08	0.2 – 1.0	CLAY	1.0*	17.5	1.79	4.0
BH 11	0.2 – 1.0	CLAY	1.0**	17.8	1.77	3.5
BH 26	0.5 – 0.8	CLAY	3.5*	18.9	1.74	0.5

(*) Denotes soaked CBR value at 2.5mm penetration

(**) Denotes soaked CBR value at 5.0mm penetration

4.2 Atterberg Limits

Eight (8) disturbed soil samples were recovered for Atterberg Limit testing.

Table 2 presents a summary of the Atterberg Limits test results. The Atterberg Limits test certificates are presented in Appendix D.

Table 2 - Atterberg Limits Laboratory Test Results

Sample ID	Depth (m)	Material Description	Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Linear Shrinkage (%)
BH 01	0.2 – 0.8	CLAY	18.5	55	16	39	10.5*
BH 08	0.2 – 1.0	CLAY	20.2	50	17	33	10.5
BH 11	0.2 – 1.0	CLAY	18.6	56	16	40	13.0*
BH 13	0.2 – 0.8	CLAY	20.9	48	15	33	13.0
BH 20	0.5 – 1.0	CLAY	20.1	60	18	42	11.5**

Sample ID	Depth (m)	Material Description	Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Linear Shrinkage (%)
BH 21	0.5 – 1.0	CLAY	18.5	40	13	27	11.5*
BH 22	0.5 – 1.0	CLAY	24.4	61	17	44	15.0
BH 26	0.5 – 0.8	CLAY	19.0	53	15	38	15.0

(*) Denotes linear shrinkage curled

(**) Denotes linear shrinkage cracked

The linear shrinkage mould was 125mm

The test sample for liquid and plastic limit was air-dried & dry-sieved

4.3 Shrink-Swell Testing

Eight (8) undisturbed soil samples were collected using U50 tubes for shrink-swell tests.

Table 3 presents a summary of the shrink-swell test results. The shrink-swell test certificates are presented in Appendix E.

Table 3 - Shrink-Swell Laboratory Test Results

Sample ID	Depth (m)	Swell on Saturation (%)	Shrinkage (%)	Shrink-swell Index (%/pF)	Shrinkage Cracking
BH 03	0.5 – 0.9	0.0	2.8	1.5	Moderate
BH 05	0.5 – 0.9	3.8	3.5	3.02	Moderate
BH 07	0.5 – 0.9	2.8	3.0	2.45	Moderate
BH 10	0.5 – 0.9	0.0	1.4	0.78	Moderate
BH 14	0.5 – 0.9	0.7	1.9	1.25	Major
BH 17	0.5 – 1.0	1.3	4.4	2.82	Major crack centre of sample
BH 20	0.5 – 0.9	1.2	3.9	2.48	Moderate
BH 30	0.5 – 1.0	1.4	6.5	3.97	Moderate

4.4 Aggresivity and Salinity Testing

Four (4) disturbed soil samples were recovered for testing by a NATA accredited laboratory.

The following tests were undertaken on the disturbed samples:

- Field moisture content
- Soil pH
- Cation Exchange Capacity (CEC) of calcium, magnesium, potassium, and sodium
- Electrical conductivity at 25°C (one part of soil to five parts of water)
- Saturated resistivity at 25°C
- Chlorides
- Soluble sulfates.

Table 4 presents the summary of the laboratory testing. Appendix F presents the laboratory test certificates.

Table 4 - Salinity and Aggressivity Laboratory Testing Results

Sample ID (Depth)	pH	Electrical Conductivity [µS/cm]	Resistivity [Ohm cm]	Moisture Content [%]	Chloride by Discrete Analyser [mg/kg]	Soluble Sufate by ICPAES [mg/kg]	Exchangeable Cations [meq/100g]					Exchangeable Sodium Percent [%]
							Ca	Mg	K	Na	CEC	
BH02 (0.4 - 0.5m)	5.9	90	11100	15.9	370	110	0.7	6.7	0.2	1.3	8.9	15.0
BH12 (2.0 - 2.1m)	5.7	324	3090	9.3	440	80	<0.1	4.5	0.3	1.7	6.6	26.0
BH21 (2.8 - 3.0m)	9.6	457	2190	7.4	350	60	2.7	3.0	0.2	3.2	9.1	34.6
BH27 (0.3 - 0.5m)	5.3	326	3070	22.8	420	80	2.7	6.1	0.2	1.6	12.1	13.1

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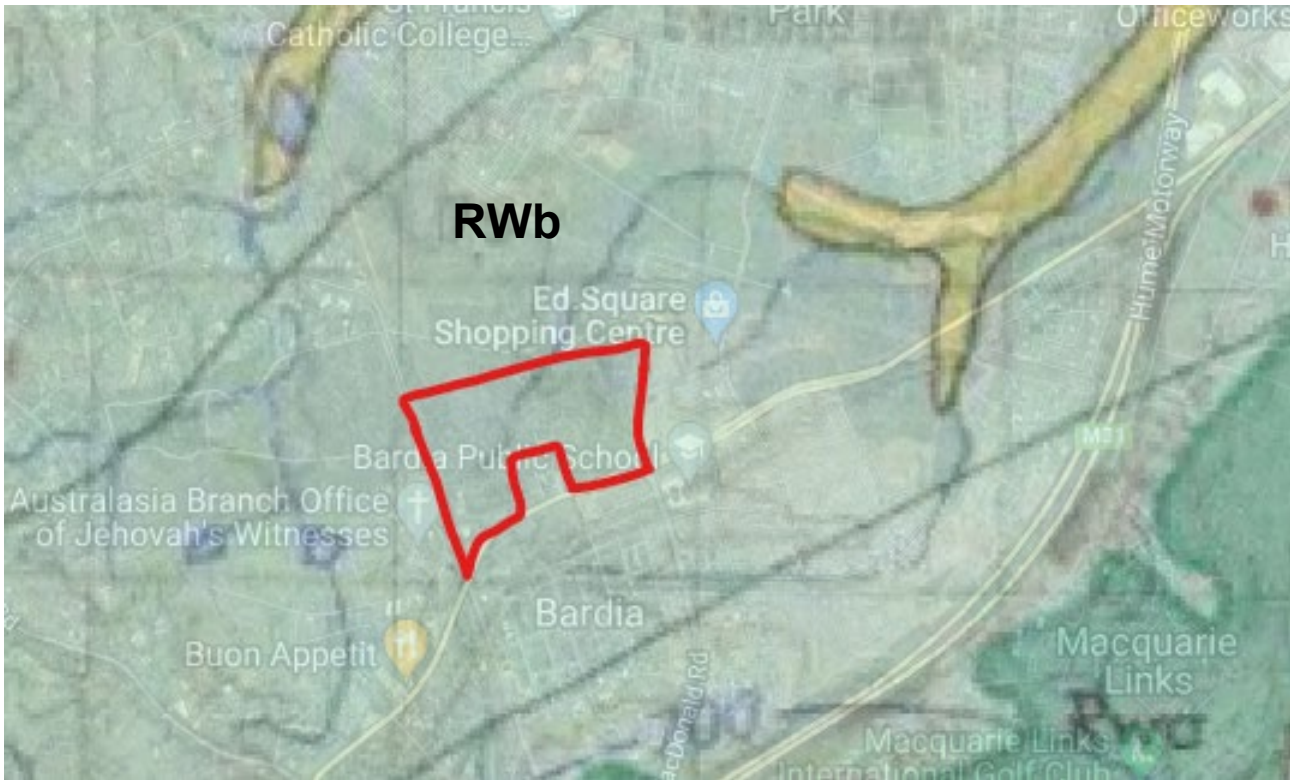
5. Site Conditions

5.1 Geological Setting

The 1:100,000 Sydney Geological Map indicates that the site is underlain by:

- (Rwb) Bringelly Shale of the Wianamatta Group comprising of Shale, carbonaceous claystone, claystone, laminate, fine to medium grained sandstone, rare coal and tuff.

Inset 2 presents the geological map of the site.



Inset 2 - 1:100,000 Penrith Geological Map (approximate site boundaries in red)

5.2 Surface Conditions

Based on the site walkover and available aerial photos, we understand the following regarding the Site:

- The Site was historically used as an army barracks until early 2010. The buildings were then demolished except for the Bardia Barracks which remain as part of a separate Lot
- No significant changes to the land use were observed from 2010 to present
- The existing site comprises:
  - Vegetated area (grass, shrubs and trees)
  - Building slabs and wall remnants from the old barracks
  - Paved road.

Inset 3 presents a recent nearmap image of the Site.

Inset 3 - Nearmap aerial image in Oct 2022

5.3 Subsurface Conditions

The subsurface conditions encountered within the augered boreholes are summarised in Table 5. The approximate elevation of the top of the inferred geotechnical units at each test location are summarised in Table 6. Surface elevations at each borehole location have been estimated using the site survey plan provided to us.

Table 5 - Summary of Inferred Subsurface Conditions Encountered in Boreholes

Inferred Unit	Approximate Depth to Top of UnitSurface(m)	Description
TOPSOIL	0	Silty CLAY to Clayey SILT; non plastic to low plasticity, dark brown, dry to wet, soft to firm consistency, organic soil, contains rootlets
FILL	0	Localised on southeastern portion of the site Sandy GRAVEL to Gravelly SAND, medium dense, fine to medium grained sand, sub-angular gravel up to 30mm
NATURAL SOIL	0.05 to 0.4m	CLAY to Sandy Gravelly CLAY; medium to high plasticity, stiff to very stiff, moist (M>PL) to dry, red brown to yellow brown, fine to coarse grained sand, sub-angular gravel pieces up to 10mm,
BEDROCK	1.7 to 4.0	SHALE; brownish grey to dark grey, extremely to highly weathered, very low to low strength

Table 6 - Approximate Reduced Level (RL) of the Top of Inferred Subsurface Conditions Encountered in Borehole Locations

Testing Location ID	Approximate Reduced Level of Inferred Top of Geological Unit (m AHD)				
	FILL	TOPSOIL	NATURAL SOIL	BEDROCK	EOH
BH01	N.E	66.8	66.7	65	62.1
BH02	N.E	65.9	65.7	64	63.4
BH03	N.E	68.4	68.2	65.8	63.7
BH04	N.E	73.8	73.8	71.4	68.8
BH05	N.E	73.3	73.2	71.8	68.3
BH06	N.E	69.8	69.7	67.3	64.8
BH07	N.E	66.8	66.7	64.6	61.8
BH08	69.6	N.E	69.6	66.5	64.6
BH09	N.E	74.4	74.4	72.1	69.4
BH10	68.8	N.E	68.7	66.0	63.8
BH11	N.E	70.1	70	68.3	65.1
BH12	N.E	71.8	71.6	69.8	66.8
BH13	N.E	75.5	75.5	73.8	70.5
BH14	N.E	73.3	73.2	69.8	68.3
BH15	N.E	68.3	68.0	66.5	58.3
BH16	N.E	70	69.7	66.3	65
BH17	N.E	69.5	69.4	67.1	64.5
BH18	N.E	74.3	74.1	71.9	69.3
BH19	N.E	74.6	74.5	72.6	69.6
BH20	N.E	78.6	78.4	75.8	73.6
BH21	N.E	79	78.8	76	74
BH22	N.E	76	75.8	73.5	71
BH23	N.E	72	71.9	68	67
BH24	N.E	76.2	76	74.7	73.6
BH25	N.E	79.5	79.4	77.8	74.5
BH26	N.E	78.8	78.5	77	73.8
BH27	N.E	81.1	80.9	78.6	76.1
BH28	N.E	76	75.6	74.2	73.7
BH29	N.E	78.8	78.7	76	66.8
BH30	N.E	80.6	80.4	78.2	68.6

EOH = End of Hole

N.E = Not Encountered

5.4 Groundwater

Table 7 presents a summary of the encountered groundwater level measured by manually dipping the installed piezometers.

Table 7 - Summary of Groundwater Level Observations

BHID	BH installation date	Date of observation	Depth of groundwater (mbgl)	Approximate Groundwater table RL (m AHD)
BH15	20/10/2022	21/10/2022	4.6	63.7
BH29	18/10/2022	21/10/2022	8.8	67.2
BH30	17/10/2022	21/10/2022	6.9	73.7

6. Salinity and Aggressivity Assessment

6.1 Soil Chemistry

The laboratory test results summarized in Table 3 indicate the following:

- pH of the soil samples analysed was in the range of 5.3 to 9.6
- The 1:5 soil to water extraction and subsequent electrical conductivity ($EC_{1:5}$) of the soil samples analysed o be in the range of 90 to 457 µS/cm
- Resistivity of soil samples to be in the range of 2190 to 11100 ohm cm
- Concentrations of chlorides in samples analysed to be 350 to 440 mg/kg
- Concentrations of sulphate in samples to be in the range of 60 to 110 mg/kg
- Cation Exchange Capacity (CEC) in samples analysed was in the range of 6.6 to 12.1 meq/100g
- Exchangeable Sodium Percentage (ESP) in samples analysed was in the range of 13.1 to 34.6%.

6.2 Salinity

Site Investigations for Urban Salinity (DLWC 2002) classify soil salinity based on electrical conductivity (ECe) as per Richards (1954). The method of conversion from $EC_{1:5}$ to EC_e (electrical conductivity of saturated extract) is based on DLWC (2002) and given by $EC_e = EC_{1:5} \times M$, where M is the multiplication factor based on "Soil Texture Group".

The "Soil Texture Group" of the samples tested has been assessed during our investigation. The salinity classification for the soil samples that were tested are presented in Table 8.

Table 8 - Salinity Classification

Sample ID	$EC_{1:5}$ (dS/m)	SOIL TYPE	M	Ece (dS/m)	Salinity Class
BH02	90	Medium CLAY	7	0.63	Non-saline
BH12	324	Light CLAY	8.5	2.754	Slightly saline
BH21	457	Light CLAY	8.5	3.885	Slightly saline
BH27	326	Medium CLAY	7	2.282	Slightly saline

It is assessed that the soils on this site are classified as "non-saline" to "slightly saline".

We have referred to Clause 4.8.2 of Australian Standard AS3600-2018 “Concrete Structures” and note that the assessed soil electrical conductivity (Ece) is within the exposure classification of “A2”.

6.3 Corrosivity

Table 4.8.1 of AS3600-2009 “Concrete Structures” provides criteria for exposure classification for concrete in sulphate soils based on sulphates in soil and groundwater, and pH of soil. On the basis of the sulphate and pH testing completed, we assess the exposure classification for concrete in sulphate soils to be A1.

Similarly, Table 6.4.2(C) of Australian Standard AS2159:2009, Piling – Design and Installation provides criteria for exposure classification for concrete piles in soil, and here the exposure classification for concrete piles in soil is non-aggressive.

Table 6.5.2(C) of Australian Standard AS2159:2009, Piling – Design and Installation provides criteria for exposure classification for steel piles based on resistivity, soil and groundwater pH, and chlorides in soil and groundwater. On the basis of the resistivity, pH and chloride testing completed we assess the exposure classification for steel piles in the soil to be non-aggressive.

6.4 Sodicity

Sodicity provides a measure of the likely dispersion on wetting and to shrink/swell properties of a soil. Soil sodicity is classified based on the Exchangeable Sodium Percentage (ESP) which is the amount of exchangeable sodium as a percentage of the Cation Exchange Capacity (DLWC, 2002).

The Exchangeable Sodium Percentages calculated from these laboratory results, ranging from 13.1% to 34.6%, indicates that the soils on site range from sodic to highly sodic when compared to criteria listed in “Site Investigations for Urban Salinity”, DLWC (2002).

7. Earthworks

A separate bulk earthworks specification has been prepared (ref. PSM4815-005S) which clearly sets out the roles and responsibilities of the earthworks contractor and its Geotechnical Inspection and Testing Authority (GITA). The Specification complies with the intent of AS 3798-2007 “Guidelines on earthworks for commercial and residential developments”.

Our specification generally comprises more stringent requirements (e.g., lot testing, more survey, etc.). It reduces risk of poor earthworks performance. We note however depending on the actual consent conditions of the proposed subdivision and the Council requirements, the proposed earthworks could have other requirements. Upon confirmation of the Consent Conditions, we can update PSM specification to meet both consent conditions and our design advice if requested.

8. Interim Geotechnical Design Advice

8.1 General

The interim Geotechnical Design advice (IGDA) provided in the following sections has been prepared on the following basis:

- The subsurface conditions are as described in Section 5
- The earthworks will be undertaken in accordance with the PSM bulk earthworks specification PSM4815-005S.

It is PSM’s opinion that it should be the builder’s responsibility to maintain the condition of the pad after the handover date and accept the risk that comes with modifying excavation levels and weather. There should be a strict transfer of the risk. We recommend that building tenderers be required to indicate how they intend to manage this risk.

8.2 Site Classification

It is understood that the proposed development is a residential subdivision and would therefore be within the scope of Australian Standard AS2870-2011[1] "Residential slabs and footings".

We advise the following:

1. In cut areas within the NATURAL SOIL unit, structures that are within the scope of AS2870-2011 be designed for a site classification of Class "H1" in accordance with Table 2.1 of AS2870-2011.
2. In fill areas, further assessment of the site classification would be required and will depend on the fill materials, depth of fill and the manner in which it was placed.
    a. Where existing fill is present and there is no earthworks documentation (records), the fill cannot be considered as "controlled fill" and thus the site is classified as Class P in accordance with AS2870-2011. Further detailed investigation and assessment should be undertaken to allow for reclassification. Alternatively, it may be simpler and more cost effective to remove the existing fill to natural soil.
    b. Where new fill will be placed in accordance with PSM bulk earthworks specification (Ref. PSM4815-005S), the site can be reclassified from Class P to Class H2, provided the following are satisfied:
        i. The fill is placed strictly in accordance with PSM bulk earthworks specification.
        ii. PSM undertake review of the GITA weekly reports, interim / final certificates as described in the earthworks specification.
        iii. PSM undertake inspection during and at the completion of the bulk earthworks.

The civil and structural engineers should consider likely heave / settlement due to the effect of climatic factors in their designs.

We recommend that all structures and services be detailed such that they preclude any local wetting up or drying out of the subgrade after initial equilibrium is reached following construction of the slab and that the subgrade be within Specification at the time of construction of the slab. We note that normal mounding or sagging away from the perimeter of covered areas will still occur and perimeters, or open joints, will still respond to environmental changes.

8.3 Foundations

8.3.1 Shallow Foundation

It is expected that the foundations used as part of any proposed development at the site would typically include strip, pad or other shallow footings.

Pad footings can be proportioned on the basis of an allowable bearing pressure (ABP) for centric vertical loads provided in Table 9.

We note that an allowable bearing pressure (ABP) is not a soil property. It depends on many factors such as the size of the footings, the embedment depth, the load direction and eccentricity, the stiffness of the footing, the adopted factor of safety (FOS), as well as the soil properties. As footings get bigger or deeper the capacity increases rapidly, and as the load gains eccentricity or becomes inclined, the capacity reduces rapidly.

When assessing the settlement of the shallow footings, the designer needs to consider the additional ground settlement due to the total building load on both shallow and deeper units. The differential settlement due to the building load shall also be assessed. Foundation conditions at the proposed shallow pad footing should be inspected by a suitably qualified geotechnical engineer prior to the pouring of concrete.

[1] Standards Australia (2011) Residential slabs and footings, AS 2870-2011, Standards Australia, NSW.

Table 9 - Foundation Parameters of the inferred Geotechnical Units

	Bulk unit weight (kN/m^3)	Soil effective strength parameters		Ultimate bearing pressure under vertical centric loading [2] (kPa)	Allowable bearing pressure under vertical centric loading [3] (kPa)	Ultimate Shaft Adhesion (kPa)	Elastic parameters	
		c' (kPa)	*ϕ'* (deg)				Young's Modulus (MPa)	Poisson's Ratio
ENGINEERED FILL, NATURAL SOIL	18	0	30	420[1]	150	N/A	10	0.3
BEDROCK	22	10	30	3000	700	100	100	0.25

[1] Pad footings in soil unit should have a minimum horizontal dimension of 1.0 m and a minimum embedment depth of 0.5 m.

[2] Ultimate bearing pressure values occur at large settlement (>5% of minimum footing)

[3] Allowable bearing pressure to cause settlement of <1% of minimum footing

8.3.2 Piles

Piled foundations should be within the BEDROCK units.

Piles should be designed in accordance with the requirements in AS 2159 (2009), *Piling – Design and Installation*. The parameters provided in Table 9 may be adopted in the design of piles founded in the BEDROCK units.

The foundation designer should note the following with regards to the pile design:

- The ABP needs to be confirmed by a geotechnical engineer through pile inspections prior to pouring concrete
- Under permanent load, the contribution of side adhesion for soil units should be ignored
- Pile settlement can be checked using the recommended elastic parameters in Table 9
- Where adjacent foundation details differ (e.g., pile and pad, differing loads or ground conditions), differential settlement should also be assessed.

The rock is expected to increase in strength with depth such that higher bearing capacities than those provided in Table 9 should be achievable at depth. If this is required, further advice should be sought from PSM.

With regards to the pile design, we recommend that:

- A basic geotechnical strength reduction factor, Φgb = 0.56 (AS2159 CL. 4.3.2) be adopted for a high redundancy system for an assessed average risk rating (ARR) between 3.0 and 3.5. This should be reviewed to suit the specific design and appropriate pile testing proposed by the structural / pile designers in accordance with the requirements of AS2159
- It may be possible to increase the pile reduction factors, if the details of the proposed pile installation procedures indicate a high level of quality control with regards to concrete placement, base cleanliness, etc
- If a geotechnical strength reduction factor, Φg = 0.40 is adopted then no pile testing will be required (AS2159 Clause 8.2.4 (b)).

Where the pile is sized using the allowable bearing capacity in Table 9. (i.e., assuming all the serviceability load is carried by the base), the settlement would be expected to be less than 1% of the pile diameter plus elastic shortening of the pile itself.

8.4 Permanent and Temporary Batters

The batter slope angles shown in Table 10 are recommended for the design of batters up to 3m height and above the groundwater, subject to the following recommendations:

- All batters shall be protected from erosion
- Permanent batters shall be drained
- Temporary batters shall not be left unsupported for more than 2 months without further advice, and inspection by a geotechnical engineer should be undertaken following significant rain events
- No buildings, loads or services should be located within 1 batter height of the crest.

If the conditions above cannot be met, further advice should be sought.

Table 10 - Batter Slope Angles

Unit	Temporary	Permanent
ENGINEERED FILL / NATURAL SOIL	2.0H : 1V	2.5H : 1V
BEDROCK	1.0H :1V	1.5H : 1V

Steeper batters or vertical cuts (in bedrock) may be possible subject to further advice. This could include the requirement for soil nails or rock bolts. The length and spacing of soil nail and rock bolts is a matter of design.

The batters should be inspected by an experienced geotechnical engineer or engineering geologist during excavation to confirm the batter advice provided and assess the need for localised support.

Proper and suitable safe work method statements and OHS documents need to be developed for works to be undertaken in the vicinity of the crest and toe of batters.

8.5 Slabs

The design of slabs on ground can be based on a subgrade with a long - term Young's Modulus in Table 1.

We note that the environmental effects (e.g. drying or wetting up of the finished surface) affecting the land prior to development should be taken into account by the various designers of the proposed development.

We note that the final bulk earthworks subgrade will require proof rolling and plate load testing to confirm the properties provided and may require some boxing out and refilling, etc.

8.6 Pavement Design

CBR tests undertaken by PSM in the geotechnical investigation indicate a CBR value ranging from 1.0% to 3.5%. The low CBR value is due to swelling of the samples after fully soaked.

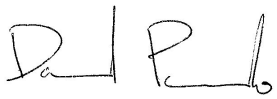
We advise that a design subgrade CBR of 1.5% be adopted for earthworks completed in accordance with PSM specification. Higher values may be provided on completion of testing on the finished bulk earthworks or if, on request, the Specification is varied to obtain such higher values on fill.

We recommend that specific CBR testing be undertaken at pavement subgrade level when pavement layouts are finalised. CBR testing shall be undertaken for any new imported material within the pavement subgrade (e.g., within 1 m below pavement).

Yours Sincerely

ROHAN STOCKER
SENIOR GEOTECHNICAL ENGINEER

DENNIS LIM
GEOTECHNICAL ENGINEER



DAVID PICCOLO
PRINCIPAL

Encl.

Figure 1	Site Locality Plan
Figure 2 to 6	Selected Site Photographs
Appendix A	Engineering Borehole Logs
Appendix B	Piezometer Construction Records
Appendix C	CBR Test Results
Appendix D	Atterberg Limits Test Results
Appendix E	Shrink Swell Test Results
Appendix F	Salinity and Aggressivity Test Results

16960000 16965000 16970000 16975000 16980000 16985000 16990000 16995000

-3755000 -3760000 -3765000 -3770000 -3775000

BH01 BH02 BH03 BH04 BH05 BH06 BH07 BH08 BH09 BH10 BH11 BH12 BH13 BH14 BH15 BH16 BH17 BH18 BH19 BH20 BH21 BH22 BH23 BH24 BH25 BH26 BH27 BH28 BH29 BH30

Precinct 3 Concept Layout Plan

Lots 2, 3 & 5 (DP 1272931), Cnr Cherry Tree Road and MacDonald Road, Edmondson Park

Client Logo

Legend

Estimated Dwelling Yield

urbanco

16960000 16965000 16970000 16975000 16980000 16985000 16990000 16995000

C:\Users\Dennis.Lim\Pells Sullivan Meynink\GIS - ArcGIS\PSM4815 Edmondson Park\02_WorkSpace\01_MXDs\PSM4815.qgs Layout: A3_PSMLandscapeTemplate_V1_QGIS

Legend

- BH Locations
- Site Boundary

Nearmap Image dated 04/06/2022

Note : Layout Plan refers to URBANCO drawing 021.EP.012, dated 14/09/2022

N

Scale 1:100,000

0 0.1 0.2 0.3 0.4 km

Map Projection:
Horizontal Datum:
Grid: EPSG:7856

P S M	Created By: PSM	Revision: B	
	Date: 11 Jan 2023	Paper Size: A3	

JBS&G
Edmondson Park South
Residential Development

SITE LOCATLITY PLAN

PSM4815-004L REV3 | FIGURE 1

Photo 1 : General site photo near BH22, facing West (17 October 2022)

Photo 2 : General site photo near BH22, facing south (17 October 2022)

JBS&G

Edmondson Park South

Residential Development

SELECTED SITE PHOTOGRAPHS (1 of 5)

PSM4815-004L REV3	FIGURE 2

Photo 3 : General site photo near BH06, facing north (21 October 2022)

Photo 4 : General site photo near BH 06 facing west (21 October 2022)

JBS&G

Edmondson Park South

Residential Development

SELECTED SITE PHOTOGRAPHS (2 of 5)

PSM4815-004L REV3	FIGURE 3

Photo 5 : Typical soil cutting profile (BH14)

Photo 6 : Typical soil cutting profile (BH17)

JBS&G

Edmondson Park South

Residential Development

SELECTED SITE PHOTOGRAPHS (3 of 5)

PSM4815-004L REV3	FIGURE 4

Photo 7 : Typical Natural Clay Sample

Photo 8 : Typical piezometer installation process

JBS&G

Edmondson Park South

Residential Development

SELECTED SITE PHOTOGRAPHS (4 of 5)

PSM4815-004L REV3	FIGURE 5

Photo 9 : 5.5t track mounted drill rig typical setup

Photo 10 : Typical piezometer installation process

JBS&G

Edmondson Park South

Residential Development

SELECTED SITE PHOTOGRAPHS (5 of 5)

PSM4815-004L REV3	FIGURE 6

Appendix A
Engineering Borehole Logs

Borehole No.

BH01

Page 1 of 1

Engineering Log - Borehole

Project No.: PSM4815

Client:	JBS&G	Commenced:	19/10/2022
Project Name:	Residential Development, Edmondson Park South	Completed:	19/10/2022
Hole Location:	Edmondson Park South, NSW	Logged By:	DL
Hole Position:	See Figure 1 301893.3 m E 6238783.3 m N MGA2020 Zone 56	Checked By:	RS

Drill Model and Mounting:	Commachio GEO 305	Inclination:	-90°	RL Surface:	66.80 m		
Hole Diameter:	150 mm	Bearing:		Datum:	AHD	Operator:	Matrix Drilling

Drilling Information									Soil Description					Observations
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density	Pocket Penetrometer UCS (kPa) 100 200 300 400 500	Structure and Additional Observations
AD/V		N	Not Encountered	B 0.20-1.00 m SPT 0.50 m 2, 4, 5 N = 9		65.8	1		OL	TOPSOIL; Silty CLAY, low plasticity, dark brown	M	S		0.00: Inferred TOPSOIL, grassed surface 0.10: Inferred NATURAL SOIL
									CH	CLAY, high plasticity, red brown		F		
										becomes pale grey	M (>PL)	St		
AD/T		N		SPT 1.50 m 10, 13/120mm N = R		64.8	2				M (<PL)	VSt		1.55: V-bit refusal
										SHALE; pale grey, extremely weathered, very low strength				1.80: Inferred BEDROCK, observed from SPT sample, strength and weathering inferred from drilling resistance and cuttings
						63.8	3				D			
						62.8	4							
						61.8	5			TC-bit refusal Hole Terminated at 4.70 m				
						60.8	6							
						59.8	7							

Method
AS - Auger Screwing
RR - Rock Roller
WB- Washbore

Penetration
No resistance ranging to refusal

Water
Level (Date)
Inflow
Partial Loss
Complete Loss

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test

Moisture Condition
D - Dry
M - Moist
W - Wet

Consistency/Relative Density
VS - Very Soft
S - Soft
F - Firm
VSt - Very Stiff
H - Hard
Fr - Friable
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Support
C - Casing

Graphic Log/Core Loss
Core recovered (hatching indicates material)
Core loss

Classification Symbols and Soil Descriptions
Based on Unified Soil Classification System

Plastic Limit
< PL
= PL
< PL

Borehole No.

BH02

Page 1 of 1

Engineering Log - Borehole

Project No.: PSM4815

Client:	JBS&G	Commenced:	19/10/2022
Project Name:	Residential Development, Edmondson Park South	Completed:	19/10/2022
Hole Location:	Edmondson Park South, NSW	Logged By:	DL
Hole Position:	See Figure 1 301851.3 m E 6238732.0 m N MGA2020 Zone 56	Checked By:	RS

Drill Model and Mounting: Commachio GEO 305 Inclination: -90° RL Surface: 65.90 m

Hole Diameter: Bearing: Datum: AHD Operator: Matrix Drilling

Drilling Information								Soil Description				Observations
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density / Pocket Penetrometer UCS (kPa) 100 200 300 400 500	Structure and Additional Observations
AD/V			Not Encountered	ES 0.40-0.50 m SPT 0.50 m 4, 7, 8 N = 15		64.9	1		OL	TOPSOIL; Silty CLAY, non plastic, dark brown, organic soil		F	0.00: Inferred TOPSOIL; grassed surface
									CI-CH	CLAY; medium plasticity, red brown			0.20: Inferred NATURAL SOIL
				SPT 1.50 m 7, 8, 12 N = 20		63.9	2			becomes high plasticity, pale grey	M (>PL)	St	
AD/T										SHALE; dark grey and brown, extremely weathered, low strength	D		1.90: Inferred BEDROCK from SPT sample, strength and weathering inferred from drilling resistance and cutting 2.00: V-bit refusal
						62.9	3			TC-bit refusal Hole Terminated at 2.50 m			
						61.9	4						
						60.9	5						
						59.9	6						
						58.9	7						

Method
AS - Auger Screwing
RR - Rock Roller
WB- Washbore

Penetration
No resistance ranging to refusal

Water
Level (Date)
Inflow
Partial Loss
Complete Loss

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test

Moisture Condition
D - Dry
M - Moist
W - Wet

Consistency/Relative Density
VS - Very Soft
S - Soft
F - Firm
VSt - Very Stiff
H - Hard
Fr - Friable
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Support
C - Casing

Graphic Log/Core Loss
Core recovered (hatching indicates material)
Core loss

Classification Symbols and Soil Descriptions
Based on Unified Soil Classification System

Plastic Limit
< PL
= PL
< PL

Borehole No.

BH03

Page 1 of 1

Engineering Log - Borehole

Project No.: PSM4815

Client:	JBS&G	Commenced:	19/10/2022
Project Name:	Residential Development, Edmondson Park South	Completed:	19/10/2022
Hole Location:	Edmondson Park South, NSW	Logged By:	DL
Hole Position:	See Figure 1 301908.8 m E 6238695.8 m N MGA2020 Zone 56	Checked By:	RS

Drill Model and Mounting:	Commachio GEO 305	Inclination:	-90°	RL Surface:	68.40 m		
Hole Diameter:		Bearing:		Datum:	AHD	Operator:	Matrix Drilling

Drilling Information								***Soil Description***					***Observations***
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density	Pocket Penetrometer UCS (kPa) 100 200 300 400 500	Structure and Additional Observations
AD/V			Not Encountered	U50 0.50-0.90 m SPT 0.90 m 2, 7, 8 N = 15 SPT 2.00 m 8, 12, 18/115mm N = R		67.4 66.4	1 2		OL	TOPSOIL; Silty CLAY, low plasticity, dark brown, organic soil	M (>PL)	S		0.00: Inferred TOPSOIL, grassed surface, rootlets observed to D=0.2m 0.20: Inferred NATURAL SOIL
									CH	CLAY; high plasticity, red brown				
										becomes CLAY trace gravel, sub-angular gravel up to 5mm		St		
										becomes CLAY, yellow brown with pale gray mottling	M (<PL)			
										becomes pale grey		H		2.40: V-bit refusal
AD/T						65.4 64.4	3 4			SHALE; brownish grey, extremely weathered, very low strength becomes pale grey, highly weathered	D			2.60: Inferred BEDROCK, strength and weathering inferred from drilling resistance and cuttings
						63.4 62.4 61.4	5 6 7			TC-bit refusal Hole Terminated at 4.70 m				

Method
AS - Auger Screwing
RR - Rock Roller
WB- Washbore

Penetration
No resistance ranging to refusal

Water
Level (Date)
Inflow
Partial Loss
Complete Loss

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test

Moisture Condition
D - Dry
M - Moist
W - Wet

Consistency/Relative Density
VS - Very Soft
S - Soft
F - Firm
VSt - Very Stiff
H - Hard
Fr - Friable
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Support
C - Casing

Graphic Log/Core Loss
Core recovered (hatching indicates material)
Core loss

Plastic Limit
< PL
= PL
< PL

Classification Symbols and Soil Descriptions
Based on Unified Soil Classification System

Borehole No.

BH04

Page 1 of 1

Engineering Log - Borehole

Project No.: PSM4815

Client:	JBS&G	Commenced:	19/10/2022
Project Name:	Residential Development, Edmondson Park South	Completed:	19/10/2022
Hole Location:	Edmondson Park South, NSW	Logged By:	DL
Hole Position:	See Figure 1 301926.7 m E 6238605.3 m N MGA2020 Zone 56	Checked By:	RS

Drill Model and Mounting:	Commachio GEO 305	Inclination:	-90°	RL Surface:	73.80 m		
Hole Diameter:		Bearing:		Datum:	AHD	Operator:	Matrix Drilling

Drilling Information								Soil Description					Observations
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density / Pocket Penetrometer UCS (kPa)	Structure and Additional Observations
AD/V			Not Encountered	SPT 0.50 m 2, 4, 6 N = 10		72.8	1		OL	TOPSOIL; Silty CLAY, dark brown, organic soil		S	0.00: Inferred TOPSOIL, grassed surface, observered rootlets up to D=0.1m
									CH	CLAY; high plasticity, red brown		F	0.50: Inferred NATURAL SOIL
											M (>PL)		
										becomes CLAY, yellow brown with pale grey mottling		St	
				SPT 1.50 m 8, 12, 10/50mm N = R		71.8	2			becomes Gravelly CLAY, sub-angular gravel up to 10mm	M (<PL)		
										becomes CLAY, pale grey becomes yellow brown		VSt	
AD/T						70.8	3			SHALE; pale grey, extremely weathered, very low to low strength	D		2.40: V-bit refusal. Inferred BEDROCK, strength and weathering inferred from drilling resistance and cuttings
						69.8	4						
						68.8	5			Target depth Hole Terminated at 5.00 m			
						67.8	6						
						66.8	7						

Method
AS - Auger Screwing
RR - Rock Roller
WB- Washbore

Penetration
No resistance ranging to refusal

Water
Level (Date)
Inflow
Partial Loss
Complete Loss

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test

Moisture Condition
D - Dry
M - Moist
W - Wet

Consistency/Relative Density
VS - Very Soft
S - Soft
F - Firm
VSt - Very Stiff
H - Hard
Fr - Friable
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Support
C - Casing

Graphic Log/Core Loss
Core recovered (hatching indicates material)
Core loss

Classification Symbols and Soil Descriptions
Based on Unified Soil Classification System

Plastic Limit
< PL
= PL
< PL

Borehole No.

BH05

Page 1 of 1

Engineering Log - Borehole

Project No.: PSM4815

Client:	JBS&G	Commenced:	19/10/2022
Project Name:	Residential Development, Edmondson Park South	Completed:	19/10/2022
Hole Location:	Edmondson Park South, NSW	Logged By:	DL
Hole Position:	See Figure 1 301870.0 m E 6238588.4 m N MGA2020 Zone 56	Checked By:	RS

Drill Model and Mounting: Commachio GEO 305 Inclination: -90° RL Surface: 73.30 m

Hole Diameter: Bearing: Datum: AHD Operator: Matrix Drilling

Drilling Information								Soil Description					Observations
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density	Pocket Penetrometer UCS (kPa)	Structure and Additional Observations
AD/V			Not Encountered	U50 0.50-0.90 m SPT 0.90 m 6, 16, 13 N = 29		72.3	1		OL	TOPSOIL; Sandy Silty CLAY, low plasticity, dark brown, organic soil		F		0.00: 30mm gap graded loose Gravelly SAND. Inferred TOPSOIL 0.08: Inferred NATURAL SOIL
									CH	CLAY; high plasticity, red brown	M (>PL)	St		
										becomes pale grey	M (<PL)	H		
AD/T						71.3	2			SHALE; brownish grey, exteremely weathered, very low strength				1.55: V-bit refusal Inferred BEDROCK, strength and weathering inferred from drilling resistance and cuttings
						70.3	3			becomes SHALE, pale grey, extremely to highly weathered, low strength	D			
						69.3	4							
						68.3	5			Target depth Hole Terminated at 5.00 m				
						67.3	6							
						66.3	7							

Method
AS - Auger Screwing
RR - Rock Roller
WB- Washbore

Penetration
No resistance ranging to refusal

Water
Level (Date)
Inflow
Partial Loss
Complete Loss

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test

Moisture Condition
D - Dry
M - Moist
W - Wet

Consistency/Relative Density
VS - Very Soft
S - Soft
F - Firm
VSt - Very Stiff
H - Hard
Fr - Friable
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Support
C - Casing

Graphic Log/Core Loss
Core recovered (hatching indicates material)
Core loss

Classification Symbols and Soil Descriptions
Based on Unified Soil Classification System

Plastic Limit
< PL
= PL
< PL

Borehole No.

BH06

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Engineering Log - Borehole

Project No.: PSM4815

Client:	JBS&G	Commenced:	20/10/2022
Project Name:	Residential Development, Edmondson Park South	Completed:	20/10/2022
Hole Location:	Edmondson Park South, NSW	Logged By:	DL
Hole Position:	See Figure 1 301858.2 m E 6238653.5 m N MGA2020 Zone 56	Checked By:	RS

Drill Model and Mounting:	Commachio GEO 305	Inclination:	-90°	RL Surface:	69.80 m		
Hole Diameter:		Bearing:		Datum:	AHD	Operator:	Matrix Drilling

Drilling Information									Soil Description				Observations
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density	Pocket Penetrometer UCS (kPa) 100 200 300 400 500	Structure and Additional Observations
AD/V			Not Encountered	SPT 0.50 m 3, 5, 7 N = 12		68.8	1			TOPSOIL; Silty Sandy CLAY, low plasticity, dark brown, organic soil				0.00: Inferred TOPSOIL, grassed surface
										CLAY; medium plasticity, red brown				0.08: Inferred NATURAL SOIL
										becomes high plasticity, red brown with pale grey mottling	M (>PL)	St		
				SPT 1.50 m 7, 11, 13 N = 24		67.8	2			becomes pale grey	M (<PL)	VSt		2.00: V-bit refusal
										SHALE; brownish grey, extremely weathered, very low strength				2.50: Inferred BEDROCK, strength and weathering inferred from drilling resistance and cuttings
AD/T				SPT 3.00 m 5, 16, 1/140mm N = R		66.8	3			becomes, pale grey, extremely to highly weathered, very low to low strength	D			
						65.8	4							
						64.8	5			Target depth Hole Terminated at 5.00 m				
						63.8	6							
						62.8	7							

Method
AS - Auger Screwing
RR - Rock Roller
WB- Washbore

Penetration
No resistance ranging to refusal

Water
Level (Date)
Inflow
Partial Loss
Complete Loss

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test

Moisture Condition
D - Dry
M - Moist
W - Wet

Consistency/Relative Density
VS - Very Soft
S - Soft
F - Firm
VSt - Very Stiff
H - Hard
Fr - Friable
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Support
C - Casing

Graphic Log/Core Loss
Core recovered (hatching indicates material)
Core loss

Classification Symbols and Soil Descriptions
Based on Unified Soil Classification System

Plastic Limit
< PL
= PL
< PL

Borehole No.

BH07

Page 1 of 1

Engineering Log - Borehole

Project No.: PSM4815

Client:	JBS&G	Commenced:	19/10/2022
Project Name:	Residential Development, Edmondson Park South	Completed:	19/10/2022
Hole Location:	Edmondson Park South, NSW	Logged By:	DL
Hole Position:	See Figure 1 301774.0 m E 6238736.6 m N MGA2020 Zone 56	Checked By:	RS

Drill Model and Mounting:	Commachio GEO 305	Inclination:	-90°	RL Surface:	66.75 m		
Hole Diameter:		Bearing:		Datum:	AHD	Operator:	Matrix Drilling

Drilling Information								Soil Description					Observations
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density	Pocket Penetrometer UCS (kPa) 100 200 300 400 500	Structure and Additional Observations
AD/V			Not Encountered	U 0.50-0.90 m SPT 0.90 m 5, 8, 19 N = 28		65.8	1		OL	TOPSOIL; low plasticity, dark brown, organic soil	W	S		0.00: Inferred TOPSOIL, grassed surface, rootlets observed up to D=0.2m 0.10: Inferred NATURAL SOIL
									CH	CLAY; high plasticity, red brown	M (>PL)	St		
										becomes red brown with pale grey mottling		VSt		
						64.8	2				M (<PL)	H		2.00: V-bit refusal
AD/T										becomes extremely weathered, very low to low strength SHALE; brownish grey, residual, very low strength				2.20: Inferred BEDROCK, strength and weathering inferred from drilling resistance and cuttings
						63.8	3			becomes grey, highly weathered, low strength	D			
						62.8	4							
						61.8	5			Target depth Hole Terminated at 5.00 m				
						60.8	6							
						59.8	7							

Method
AS - Auger Screwing
RR - Rock Roller
WB- Washbore

Penetration
No resistance ranging to refusal

Water
Level (Date)
Inflow
Partial Loss
Complete Loss

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test

Moisture Condition
D - Dry
M - Moist
W - Wet

Consistency/Relative Density
VS - Very Soft
S - Soft
F - Firm
VSt - Very Stiff
H - Hard
Fr - Friable
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Support
C - Casing

Graphic Log/Core Loss
Core recovered (hatching indicates material)
Core loss

Classification Symbols and Soil Descriptions
Based on Unified Soil Classification System

Plastic Limit
< PL
= PL
< PL

Borehole No.

BH08

Page 1 of 1

Engineering Log - Borehole

Project No.: PSM4815

Client:	JBS&G	Commenced:	20/10/2022
Project Name:	Residential Development, Edmondson Park South	Completed:	20/10/2022
Hole Location:	Edmondson Park South, NSW	Logged By:	DL
Hole Position:	See Figure 1 301815.4 m E 6238631.1 m N MGA2020 Zone 56	Checked By:	RS

Drill Model and Mounting: Commachio GEO 305 Inclination: -90° RL Surface: 69.60 m

Hole Diameter: Bearing: Datum: AHD Operator: Matrix Drilling

Drilling Information								Soil Description					Observations
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density	Pocket Penetrometer UCS (kPa)	Structure and Additional Observations
AD/V			Not Encountered	B 0.20-1.00 m SPT 0.50 m 3, 7, 12 N = 19		68.6	1		GP CH	Sandy GRAVEL, medium dense, gap graded, sub-agular up to 30mm CLAY, high plastcity, red brown	M M (>PL)	MD St		0.00: Inferred FILL 0.05: Inferred NATURAL SOIL
				SPT 1.50 m 7, 12, 11 N = 23		67.6	2			becomes yellow brown becomes pale grey	M (<PL)	VSt		
AD/T						66.6	3			SHALE; dark grey, highly weathered, low strength	D			3.10: V-bit refusal Inferred BEDROCK, strength and weathering inferred from drilling resistance and cuttings
						65.6	4							
						64.6	5			Target depth Hole Terminated at 5.00 m				
						63.6	6							
						62.6	7							

Method
AS - Auger Screwing
RR - Rock Roller
WB- Washbore

Penetration
No resistance ranging to refusal

Water
Level (Date)
Inflow
Partial Loss
Complete Loss

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test

Moisture Condition
D - Dry
M - Moist
W - Wet

Consistency/Relative Density
VS - Very Soft
S - Soft
F - Firm
VSt - Very Stiff
H - Hard
Fr - Friable
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Support
C - Casing

Graphic Log/Core Loss
Core recovered (hatching indicates material)
Core loss

Classification Symbols and Soil Descriptions
Based on Unified Soil Classification System

Plastic Limit
< PL
= PL
< PL

Borehole No.

BH09

Page 1 of 1

Engineering Log - Borehole

Project No.: PSM4815

Client:	JBS&G	Commenced:	20/10/2022
Project Name:	Residential Development, Edmondson Park South	Completed:	20/10/2022
Hole Location:	Edmondson Park South, NSW	Logged By:	DL
Hole Position:	See Figure 1 301810.6 m E 6238534.1 m N MGA2020 Zone 56	Checked By:	RS

Drill Model and Mounting:	Commachio GEO 305	Inclination:	-90°	RL Surface:	74.40 m		
Hole Diameter:		Bearing:		Datum:	AHD	Operator:	Matrix Drilling

Drilling Information									Soil Description					Observations
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density	Pocket Penetrometer UCS (kPa) 100 200 300 400 500	Structure and Additional Observations
AD/V			Not Encountered	SPT 0.50 m 3, 3, 6 N = 9		73.4	1		OL	TOPSOIL; Gravelly Silty CLAY, low plasticity, dark brown	M	S		0.00: Inferred TOPSOIL, grassed surface 0.05: Inferred NATURAL SOIL
									CH	CLAY; high plasticity, red brown	M (>PL)	F		
				SPT 1.50 m 5, 10, 6/20mm N = R		72.4	2			becomes yellow brown becomes yellow brown with pale grey mottling	M (<PL)	VSt		
AD/T						71.4	3			SHALE; brownish grey, extremely weathered, very low to low strength	D			2.35: V-bit refusal Inferred BEDROCK, strength and weathering inferred from drilling resistance and cuttings
						70.4	4							
						69.4	5			Target depth Hole Terminated at 5.00 m				
						68.4	6							
						67.4	7							

Method
AS - Auger Screwing
RR - Rock Roller
WB- Washbore

Penetration
No resistance ranging to refusal

Water
Level (Date)
Inflow
Partial Loss
Complete Loss

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test

Moisture Condition
D - Dry
M - Moist
W - Wet

Consistency/Relative Density
VS - Very Soft
S - Soft
F - Firm
VSt - Very Stiff
H - Hard
Fr - Friable
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Support
C - Casing

Graphic Log/Core Loss
Core recovered (hatching indicates material)
Core loss

Classification Symbols and Soil Descriptions
Based on Unified Soil Classification System

Plastic Limit
< PL
= PL
< PL

Borehole No.

BH10

Page 1 of 1

Engineering Log - Borehole

Project No.: PSM4815

Client:	JBS&G	Commenced:	20/10/2022
Project Name:	Residential Development, Edmondson Park South	Completed:	20/10/2022
Hole Location:	Edmondson Park South, NSW	Logged By:	DL
Hole Position:	See Figure 1 301772.5 m E 6238628.1 m N MGA2020 Zone 56	Checked By:	RS

Drill Model and Mounting: Commachio GEO 305 Inclination: -90° RL Surface: 68.75 m

Hole Diameter: Bearing: Datum: AHD Operator: Matrix Drilling

Drilling Information								Soil Description				Observations
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density / Pocket Penetrometer UCS (kPa)	Structure and Additional Observations
AD/V			Not Encountered	U 0.50-0.90 m		67.8	1			FILL; Gravelly SAND, uniform, light brown	M	MD	0.00: Inferred FILL
										Sandy CLAY trace Gravel, medium plasticity, sub-angular gravel up to 5mm, red brown			0.15: Inferred NATURAL SOIL
				SPT 0.90 m 0.9 - 1.35 2, 2, 3 N = 5								F	
						66.8	2			becomes CLAY w Gravel	M (>PL)		
				SPT 2.00 m 2 - 2.45 8, 6, 11 N = 17						becomes CLAY		St	
										becomes pale grey	M (<PL)	VSt	
AD/T						65.8	3			SHALE; brownish pale grey, extremely weathered, very low strength	D		2.80: V-Bit refusal Inferred BEDROCK, strength and weathering profile inferred from drillling resistance and cuttings
						64.8	4						
						63.8	5			Target depth Hole Terminated at 5.00 m			
						62.8	6						
						61.8	7						

Method
AS - Auger Screwing
RR - Rock Roller
WB- Washbore

Penetration
No resistance ranging to refusal

Water
Level (Date)
Inflow
Partial Loss
Complete Loss

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test

Moisture Condition
D - Dry
M - Moist
W - Wet

Consistency/Relative Density
VS - Very Soft
S - Soft
F - Firm
VSt - Very Stiff
H - Hard
Fr - Friable
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Support
C - Casing

Graphic Log/Core Loss
Core recovered (hatching indicates material)
Core loss

Classification Symbols and Soil Descriptions
Based on Unified Soil Classification System

Plastic Limit
< PL
= PL
< PL

Borehole No.

BH11

Page 1 of 1

Engineering Log - Borehole

Project No.: PSM4815

Client:	JBS&G	Commenced:	19/10/2022
Project Name:	Residential Development, Edmondson Park South	Completed:	19/10/2022
Hole Location:	Edmondson Park South, NSW	Logged By:	DL
Hole Position:	See Figure 1 301694.3 m E 6238702.2 m N MGA2020 Zone 56	Checked By:	RS

Drill Model and Mounting: Commachio GEO 305 Inclination: -90° RL Surface: 70.10 m

Hole Diameter: Bearing: Datum: AHD Operator: Matrix Drilling

Drilling Information								Soil Description					Observations
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density	Pocket Penetrometer UCS (kPa) 100 200 300 400 500	Structure and Additional Observations
AD/V			Not Encountered	CBR 0.20-1.00 m SPT 0.50 m 5, 9, 8 N = 17		69.1	1		OL CI-CH	TOPSOIL; Silty CLAY trace Gravel, low plasticity CLAY; medium plasticity, red brown	M (>PL)	F St		0.00: Inferred TOPSOIL, grassed surface, rootlets observed up to 0.1m 0.10: Inferred NATURAL SOIL
										becomes high plasticity, yellow brown	M (<PL)	VSt		
AD/T				SPT 1.50 m 4, 10, 13/75mm N = R		68.1	2			1.50: V-bit refusal SHALE; brownish grey, extremely weathered, very low strength				1.80: Inferred BEDROCK, observed from SPT sample, strength and weathering inferred from drilling resistance and cuttings
						67.1	3			becomes pale grey, highly weathered, low strenngth	D			
						66.1	4							
						65.1	5			Target depth Hole Terminated at 5.00 m				
						64.1	6							
						63.1	7							

Method
AS - Auger Screwing
RR - Rock Roller
WB- Washbore

Penetration
No resistance ranging to refusal

Water
Level (Date)
Inflow
Partial Loss
Complete Loss

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test

Moisture Condition
D - Dry
M - Moist
W - Wet

Consistency/Relative Density
VS - Very Soft
S - Soft
F - Firm
VSt - Very Stiff
H - Hard
Fr - Friable
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Support
C - Casing

Graphic Log/Core Loss
Core recovered (hatching indicates material)
Core loss

Classification Symbols and Soil Descriptions
Based on Unified Soil Classification System

Plastic Limit
< PL
= PL
< PL

Borehole No.

BH12

Page 1 of 1

Engineering Log - Borehole

Project No.: PSM4815

Client:	JBS&G	Commenced:	20/10/2022
Project Name:	Residential Development, Edmondson Park South	Completed:	20/10/2022
Hole Location:	Edmondson Park South, NSW	Logged By:	DL
Hole Position:	See Figure 1 301729.2 m E 6238613.2 m N MGA2020 Zone 56	Checked By:	RS

Drill Model and Mounting:	Commachio GEO 305	Inclination:	-90°	RL Surface:	71.75 m		
Hole Diameter:		Bearing:		Datum:	AHD	Operator:	Matrix Drilling

Drilling Information								Soil Description					Observations
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density / Pocket Penetrometer UCS (kPa)	Structure and Additional Observations
AD/V			Not Encountered	SPT 0.50 m 3, 6, 7 N = 13		70.8	1		OL	TOPSOIL; Silty Sandy CLAY, low plasticity, dark brown		S	0.00: Inferred TOPSOIL; grassed surface
									CH	CLAY, high plasticity, red brown			0.20: Inferred NATURAL SOIL
										becomes red brown with pale grey mottling	M (>PL)	St	
				SPT 1.50 m 7, 9, 13 N = 22						becomes yellow brown with pale grey mottling	M (<PL)	VSt	
				ES 2.00-2.10 m		69.8	2			SHALE; extremely weathered, brownish grey, very low strength			2.00: V-bit refusal Inferred BEDROCK, strength and weathering inferred from drilling resistance and cuttings
AD/T						68.8	3			becomes pale grey, highly weathered	D		
						67.8	4			becoms dark grey			
						66.8	5			Target depth Hole Terminated at 5.00 m			
						65.8	6						
						64.8	7						

Method
AS - Auger Screwing
RR - Rock Roller
WB- Washbore

Penetration
No resistance ranging to refusal

Water
Level (Date)
Inflow
Partial Loss
Complete Loss

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test

Moisture Condition
D - Dry
M - Moist
W - Wet

Consistency/Relative Density
VS - Very Soft
S - Soft
F - Firm
VSt - Very Stiff
H - Hard
Fr - Friable
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Support
C - Casing

Graphic Log/Core Loss
Core recovered (hatching indicates material)
Core loss

Classification Symbols and Soil Descriptions
Based on Unified Soil Classification System

Plastic Limit
< PL
= PL
< PL

Borehole No.

BH13

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Engineering Log - Borehole

Project No.: PSM4815

Client:	JBS&G	Commenced:	20/10/2022
Project Name:	Residential Development, Edmondson Park South	Completed:	20/10/2022
Hole Location:	Edmondson Park South, NSW	Logged By:	DL
Hole Position:	See Figure 1 301746.4 m E 6238528.2 m N MGA2020 Zone 56	Checked By:	RS

Drill Model and Mounting: Commachio GEO 305 Inclination: -90° RL Surface: 75.50 m

Hole Diameter: Bearing: Datum: AHD Operator: Matrix Drilling

Drilling Information								Soil Description					Observations
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density / Pocket Penetrometer UCS (kPa)	Structure and Additional Observations
AD/V				B 0.20-0.80 m			0		OL	TOPSOIL; SIlty CLAY, low plasticity, dark brown		S	0.00: Inferred TOPSOIL, grassed surface
									CH	CLAY; high plasticity; red brown			0.05: Inferred NATURAL SOIL
				SPT 0.50 m 4, 6, 9 N = 15		74.5	1				M (>PL)	St	
												VSt	
AD/T			Not Encountered	SPT 1.50 m 7, 8/50mm N = R		73.5	2			SHALE; brownish grey, extremely weathered, very low to low strength	M (<PL)		1.55: V-bit refusal 1.70: SPT refusal Inferred BEDROCK, observed from SPT sample, strength and weathering are inferred from drilling resistance and cuttings
						72.5	3				D		
						71.5	4			becomes pale grey, highly weathered			
						70.5	5			Target depth Hole Terminated at 5.00 m			
						69.5	6						
						68.5	7						

Method
AS - Auger Screwing
RR - Rock Roller
WB- Washbore

Penetration
No resistance ranging to refusal

Water
Level (Date)
Inflow
Partial Loss
Complete Loss

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test

Moisture Condition
D - Dry
M - Moist
W - Wet

Consistency/Relative Density
VS - Very Soft
S - Soft
F - Firm
VSt - Very Stiff
H - Hard
Fr - Friable
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Support
C - Casing

Graphic Log/Core Loss
Core recovered (hatching indicates material)
Core loss

Classification Symbols and Soil Descriptions
Based on Unified Soil Classification System

Plastic Limit
< PL
= PL
< PL

Borehole No.

BH14

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Engineering Log - Borehole

Project No.: PSM4815

Client:	JBS&G	Commenced:	18/10/2022
Project Name:	Residential Development, Edmondson Park South	Completed:	18/10/2022
Hole Location:	Edmondson Park South, NSW	Logged By:	DL
Hole Position:	See Figure 1 301651.5 m E 6238633.7 m N MGA2020 Zone 56	Checked By:	RS

Drill Model and Mounting: Commachio GEO 305 Inclination: -90° RL Surface: 73.25 m

Hole Diameter: Bearing: Datum: AHD Operator: Matrix Drilling

Drilling Information								Soil Description					Observations
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density / Pocket Penetrometer UCS (kPa)	Structure and Additional Observations
AD/V			Not Encountered	U 0.50-0.90 m		72.3	1		OL	TOPSOIL; Clayey Sandy SILT, non plastic, dark brown, organic soil		S	0.00: Inferred TOPSOIL, Grassed surface
									CH	CLAY; high plasticity, red brown			0.10: Inferred NATURAL SOIL
				SPT 0.90 m 2, 4, 11 N = 15						becomes pale grey	M (>PL)	St	
				SPT 2.00 m 11, 20, 20 N = 40		71.3	2			becomes yellow brown with pale grey mottling	M (<PL)	H	
						70.3	3						3.30: V-bit refusal
AD/T						69.3	4			SHALE; pale grey, extremely weathered, very low to low strength	D		3.50: Inferred BEDROCK, strength and weathering inferred from drilling resistance and cuttings
						68.3	5			becomes highly weahered	M		
										Target Depth Hole Terminated at 5.00 m			
						67.3	6						
						66.3	7						

Method
AS - Auger Screwing
RR - Rock Roller
WB- Washbore

Penetration
No resistance ranging to refusal

Water
Level (Date)
Inflow
Partial Loss
Complete Loss

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test

Moisture Condition
D - Dry
M - Moist
W - Wet

Consistency/Relative Density
VS - Very Soft
S - Soft
F - Firm
VSt - Very Stiff
H - Hard
Fr - Friable
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Support
C - Casing

Graphic Log/Core Loss
Core recovered (hatching indicates material)
Core loss

Classification Symbols and Soil Descriptions
Based on Unified Soil Classification System

Plastic Limit
< PL
= PL
< PL

Borehole No.

BH15

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Engineering Log - Borehole

Project No.: PSM4815

Client:	JBS&G	Commenced:	19/10/2022
Project Name:	Residential Development, Edmondson Park South	Completed:	19/10/2022
Hole Location:	Edmondson Park South, NSW	Logged By:	DL
Hole Position:	See Figure 1 301593.6 m E 6238722.6 m N MGA2020 Zone 56	Checked By:	RS

Drill Model and Mounting:	Commachio GEO 305	Inclination:	-90°	RL Surface:	68.25 m		
Hole Diameter:		Bearing:		Datum:	AHD	Operator:	Matrix Drilling

Drilling Information								Soil Description					Observations
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density / Pocket Penetrometer UCS (kPa)	Structure and Additional Observations
AD/V				SPT 0.50 m 3, 6, 8 N = 14		67.3	1		OL	TOPSOIL; Clayey SILT, non plastic, dark brown, organic soil	W	S	0.00: Inferred TOPSOIL, grassed surface
									CH	CLAY; high plasticity, yellow brown			0.30: Inferred NATURAL SOIL
										becomes red brown with pale grey mottling	M (>PL)	St	
				SPT 1.50 m 11, 8/20mm N = R								H	
AD/T						66.3	2			SHALE, brownish pale grey, extremely weathered, very low strength			1.75: V-bit refusal Inferred BEDROCK, strength and weathering inferred from drilling resistance and cuttings
						65.3	3						
						64.3	4						
						63.3	5				D		
						62.3	6			becomes, dark grey, highly weathered, low strength			
						61.3	7						

Pocket Penetrometer UCS (kPa): 100, 200, 300, 400, 500

Method
AS - Auger Screwing
RR - Rock Roller
WB- Washbore

Penetration
No resistance ranging to refusal

Water
Level (Date)
Inflow
Partial Loss
Complete Loss

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test

Moisture Condition
D - Dry
M - Moist
W - Wet

Consistency/Relative Density
VS - Very Soft
S - Soft
F - Firm
VSt - Very Stiff
H - Hard
Fr - Friable
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Support
C - Casing

Graphic Log/Core Loss
Core recovered (hatching indicates material)
Core loss

Classification Symbols and Soil Descriptions
Based on Unified Soil Classification System

Plastic Limit
< PL
= PL
< PL

Engineering Log - Borehole

Project No.: PSM4815

Client:	JBS&G	Commenced:	19/10/2022
Project Name:	Residential Development, Edmondson Park South	Completed:	19/10/2022
Hole Location:	Edmondson Park South, NSW	Logged By:	DL
Hole Position:	See Figure 1 301593.6 m E 6238722.6 m N MGA2020 Zone 56	Checked By:	RS

Drill Model and Mounting: Commachio GEO 305 Inclination: -90° RL Surface: 68.25 m
Hole Diameter: Bearing: Datum: AHD Operator: Matrix Drilling

Drilling Information								Soil Description					Observations
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density / Pocket Penetrometer UCS (kPa) 100 200 300 400 500	Structure and Additional Observations
AD/T						59.3	9			SHALE, brownish pale grey, extremely weathered, very low strength *(continued)* becomes, medium strength	M		8.00: Water table, inferred from wet cuttings
						58.3	10				W		
										Target depth Hole Terminated at 10.00 m			
						57.3	11						
						56.3	12						
						55.3	13						
						54.3	14						
						53.3	15						

Method
AS - Auger Screwing
RR - Rock Roller
WB- Washbore

Penetration
No resistance ranging to refusal

Water
Level (Date)
Inflow
Partial Loss
Complete Loss

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test

Moisture Condition
D - Dry
M - Moist
W - Wet

Consistency/Relative Density
VS - Very Soft
S - Soft
F - Firm
VSt - Very Stiff
H - Hard
Fr - Friable
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Support
C - Casing

Graphic Log/Core Loss
Core recovered (hatching indicates material)
Core loss

Classification Symbols and Soil Descriptions
Based on Unified Soil Classification System

Plastic Limit
< PL
= PL
< PL

Borehole No.

BH16

Page 1 of 1

Engineering Log - Borehole

Project No.: PSM4815

Client:	JBS&G	Commenced:	17/10/2022
Project Name:	Residential Development, Edmondson Park South	Completed:	17/10/2022
Hole Location:	Edmondson Park South, NSW	Logged By:	DL
Hole Position:	See Figure 1 301464.0 m E 6238703.6 m N MGA2020 Zone 56	Checked By:	RS

Drill Model and Mounting: Commachio GEO 305 Inclination: -90° RL Surface: 70.00 m

Hole Diameter: Bearing: Datum: AHD Operator: Matrix Drilling

Drilling Information								Soil Description					Observations
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density	Pocket Penetrometer UCS (kPa) 100 200 300 400 500	Structure and Additional Observations
AD/T			Not Encountered	SPT 0.50 m 3, 4, 6 N = 10		69.0	1		OL	TOPSOIL; Silty CLAY, low plasticity, dark brown	w > LL	S		0.00: Inferred TOPSOIL, grassed surface, rootlets observed up to 0.6m depth
									CH	SIlty CLAY; high plasticity, yellow brown	w > PL			0.30: Inferred NATURAL SOIL
				SPT 1.50 m 8, 11, 14 N = 25		68.0	2			becomes CLAY; red brown	M (>PL)	St		
				SPT 2.50 m 8/115mm N = R		67.0	3			becomes CLAY, yellow brown	M (<PL)	H		2.62: SPT refusal
						66.0	4			SHALE, brownish grey, extremely weathered, very low strength	D			3.70: Inferred BEDROCK; strength and weathering inferred from drilling resistance and cuttings
						65.0	5			Target depth Hole Terminated at 5.00 m				
						64.0	6							
						63.0	7							

Method
AS - Auger Screwing
RR - Rock Roller
WB- Washbore

Penetration
No resistance ranging to refusal

Water
Level (Date)
Inflow
Partial Loss
Complete Loss

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test

Moisture Condition
D - Dry
M - Moist
W - Wet

Consistency/Relative Density
VS - Very Soft
S - Soft
F - Firm
VSt - Very Stiff
H - Hard
Fr - Friable
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Support
C - Casing

Graphic Log/Core Loss
Core recovered (hatching indicates material)
Core loss

Classification Symbols and Soil Descriptions
Based on Unified Soil Classification System

Plastic Limit
< PL
= PL
< PL

Borehole No.

BH17

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Engineering Log - Borehole

Project No.: PSM4815

Client:	JBS&G	Commenced:	18/10/2022
Project Name:	Residential Development, Edmondson Park South	Completed:	18/10/2022
Hole Location:	Edmondson Park South, NSW	Logged By:	DL
Hole Position:	See Figure 1 301532.2 m E 6238687.5 m N MGA2020 Zone 56	Checked By:	RS

Drill Model and Mounting:	Commachio GEO 305	Inclination:	-90°	RL Surface:	69.50 m	
Hole Diameter:		Bearing:		Datum:	AHD	Operator: Matrix Drilling

Drilling Information								Soil Description					Observations
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density / Pocket Penetrometer UCS (kPa)	Structure and Additional Observations
AD/V			Not Encountered	U50 0.50-0.90 m SPT 0.90 m 5, 10, 12 N = 22		68.5	1		OL	TOPSOIL; Silty CLAY, dark brown, low plasticity		S	0.00: Inferred TOPSOIL; grassed surface, rootlets observed up to D = 0.05m 0.10: Inferred NATURAL SOIL
									CI-CH	CLAY; medium plasticity, red brown becomes CLAY w gravel, red brown with pale grey mottling, sub-angular gravel (1-3mm)		F	
										becomes CLAY	M (>PL)	VSt	
				SPT 2.00 m 11, 10/80mm N = R		67.5	2			becomes CLAY, high plasticity	M (<PL)	H	2.00: V-bit refusal
AD/T						66.5	3			SHALE; pale grey, extremely weathered, very low strength	D		2.40: Inferred BEDROCK, strength and weathering inferred from drilling resistance and cuttings
						65.5	4			becomes dark grey, highly weathered			
						64.5	5			Target depth Hole Terminated at 5.00 m			
						63.5	6						
						62.5	7						

Method
AS - Auger Screwing
RR - Rock Roller
WB- Washbore

Penetration
No resistance ranging to refusal

Water
Level (Date)
Inflow
Partial Loss
Complete Loss

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test

Moisture Condition
D - Dry
M - Moist
W - Wet

Consistency/Relative Density
VS - Very Soft
S - Soft
F - Firm
VSt - Very Stiff
H - Hard
Fr - Friable
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Support
C - Casing

Graphic Log/Core Loss
Core recovered (hatching indicates material)
Core loss

Classification Symbols and Soil Descriptions
Based on Unified Soil Classification System

Plastic Limit
< PL
= PL
< PL

Borehole No.

BH18

Page 1 of 1

Engineering Log - Borehole

Project No.: PSM4815

Client:	JBS&G	Commenced:	18/10/2022
Project Name:	Residential Development, Edmondson Park South	Completed:	18/10/2022
Hole Location:	Edmondson Park South, NSW	Logged By:	DL
Hole Position:	See Figure 1 301602.1 m E 6238614.3 m N MGA2020 Zone 56	Checked By:	RS

Drill Model and Mounting:	Commachio GEO 305	Inclination:	-90°	RL Surface:	74.30 m		
Hole Diameter:		Bearing:		Datum:	AHD	Operator:	Matrix Drilling

Drilling Information								Soil Description					Observations
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density / Pocket Penetrometer UCS (kPa)	Structure and Additional Observations
AD/V			Not Encountered	SPT 0.50 m 3, 6, 9 N = 15 0.50-0.95 m		73.3	1		OL	TOPSOIL, Sandy Silty CLAY, low plasticity, light brown	M (>PL)	F	0.00: Inferred TOPSOIL, gravel surface
									CH	CLAY; high plasticity, red brown			0.20: Inferred NATURAL SOIL
										becomes red brown wih pale grey mottling		St	
				SPT 1.50 m 9, 15, 14 N = 29 1.50-1.95 m		72.3	2				M (<PL)	VSt	
												H	
AD/T				SPT 3.00 m 6/100mm N = R 3.00-3.45 m		71.3	3			SHALE; pale grey, highly weathered, very low strength	D		2.35: V-bit refusal 2.45: Inferred BEDROCK; strength and weathering inferred from drilling resistance and cuttings
						70.3	4						
						69.3	5			Target depth Hole Terminated at 5.00 m			
						68.3	6						
						67.3	7						

Method
AS - Auger Screwing
RR - Rock Roller
WB- Washbore

Penetration
No resistance ranging to refusal

Water
Level (Date)
Inflow
Partial Loss
Complete Loss

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test

Moisture Condition
D - Dry
M - Moist
W - Wet

Consistency/Relative Density
VS - Very Soft
S - Soft
F - Firm
VSt - Very Stiff
H - Hard
Fr - Friable
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Support
C - Casing

Graphic Log/Core Loss
Core recovered (hatching indicates material)
Core loss

Classification Symbols and Soil Descriptions
Based on Unified Soil Classification System

Plastic Limit
< PL
= PL
< PL

Borehole No.

BH19

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Engineering Log - Borehole

Project No.: PSM4815

Client:	JBS&G	Commenced:	18/10/2022
Project Name:	Residential Development, Edmondson Park South	Completed:	18/10/2022
Hole Location:	Edmondson Park South, NSW	Logged By:	DL
Hole Position:	See Figure 1 301540.5 m E 6238595.4 m N MGA2020 Zone 56	Checked By:	RS

Drill Model and Mounting:	Commachio GEO 305	Inclination:	-90°	RL Surface:	74.60 m		
Hole Diameter:		Bearing:		Datum:	AHD	Operator:	Matrix Drilling

Drilling Information								Soil Description					Observations
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density	Pocket Penetrometer UCS (kPa) 100 200 300 400 500	Structure and Additional Observations
AD/V			Not Encountered	SPT 0.77 m 4, 5, 9 N = 14		73.6	1		OL	TOPSOIL; Clayey SILT, non plastic, dark brown	M	S		0.00: Inferred TOPSOIL, grassed surface, rootlets observed up to D = 0.1m 0.10: Inferred NATURAL SOIL
									CI-CH	CLAY; medium plasticity, red brown		F		
										becomes, high plasticity, pale grey	M (>PL)	St		
				SPT 1.50 m 10, 12, 18 N = 30		72.6	2			becomes red brown		VSt		
AD/T										SHALE; brownish grey, extremely weathered, very low strength				2.00: V-bit refusal Inferred BEDROCK, strength and weathering inferred from drilling resistance and cuttings
				SPT 3.00 m 4/30mm N = R		71.6	3			becomes, dark grey, highly weathered, low strength	D			
						70.6	4							
						69.6	5			Target depth Hole Terminated at 5.00 m				
						68.6	6							
						67.6	7							

Method
AS - Auger Screwing
RR - Rock Roller
WB- Washbore

Penetration
No resistance ranging to refusal

Water
Level (Date)
Inflow
Partial Loss
Complete Loss

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test

Moisture Condition
D - Dry
M - Moist
W - Wet

Consistency/Relative Density
VS - Very Soft
S - Soft
F - Firm
VSt - Very Stiff
H - Hard
Fr - Friable
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Support
C - Casing

Graphic Log/Core Loss
Core recovered (hatching indicates material)
Core loss

Classification Symbols and Soil Descriptions
Based on Unified Soil Classification System

Plastic Limit
< PL
= PL
< PL

Borehole No.

BH20

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Engineering Log - Borehole

Project No.: PSM4815

Client:	JBS&G	Commenced:	17/10/2022
Project Name:	Residential Development, Edmondson Park South	Completed:	17/10/2022
Hole Location:	Edmondson Park South, NSW	Logged By:	DL
Hole Position:	See Figure 1 301557.8 m E 6238495.8 m N MGA2020 Zone 56	Checked By:	RS

Drill Model and Mounting:	Commachio GEO 305	Inclination:	-90°	RL Surface:	78.60 m		
Hole Diameter:		Bearing:		Datum:	AHD	Operator:	Matrix Drilling

Drilling Information								Soil Description					Observations
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density / Pocket Penetrometer UCS (kPa)	Structure and Additional Observations
AD/T			Not Encountered	B 0.50-1.00 m U50 0.50-0.90 m SPT 0.90 m 16, 22, 27 N = 49		77.6	1		OL	TOPSOIL; Silty Sandy CLAY, low plasticity, dark brown	M (>PL)	S	0.00: Infered TOPSOIL, grassed surface
									CH	CLAY; high plasticity, red brown		F	0.20: Inferred NATURAL CLAY
										becomes pale grey		VSt	
				SPT 2.00 m 14, 8/130mm N = R		76.6	2			becoms yellow brown	M (<PL)	H	
						75.6	3			SHALE; brownish pale grey, extremely weathered, very low strength			2.80: Inferred BEDROCK, strength and weathering inferred from drilling resistance and cuttings
						74.6	4			becomes, dark grey, highly weathered, low strength	D		
						73.6	5			Hole terminated at 5.0m Target depth Hole Terminated at 5.00 m			
						72.6	6						
						71.6	7						

Pocket Penetrometer UCS (kPa): 100 200 300 400 500

Method
AS - Auger Screwing
RR - Rock Roller
WB- Washbore

Penetration
No resistance ranging to refusal

Water
Level (Date)
Inflow
Partial Loss
Complete Loss

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test

Moisture Condition
D - Dry
M - Moist
W - Wet

Consistency/Relative Density
VS - Very Soft
S - Soft
F - Firm
VSt - Very Stiff
H - Hard
Fr - Friable
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Support
C - Casing

Graphic Log/Core Loss
Core recovered (hatching indicates material)
Core loss

Classification Symbols and Soil Descriptions
Based on Unified Soil Classification System

Plastic Limit
< PL
= PL
< PL

Borehole No.

BH21

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Engineering Log - Borehole

Project No.: PSM4815

Client:	JBS&G	Commenced:	17/10/2022
Project Name:	Residential Development, Edmondson Park South	Completed:	17/10/2022
Hole Location:	Edmondson Park South, NSW	Logged By:	DL
Hole Position:	See Figure 1 301577.8 m E 6238449.9 m N MGA2020 Zone 56	Checked By:	RS

Drill Model and Mounting:	Commachio GEO 305	Inclination:	-90°	RL Surface:	79.00 m		
Hole Diameter:		Bearing:		Datum:	AHD	Operator:	Matrix Drilling

Drilling Information								Soil Description					Observations
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density / Pocket Penetrometer UCS (kPa)	Structure and Additional Observations
AD/T		Not Encountered		SPT 0.50-0.95 m 3, 5, 6 N=11 B 1.00-1.50 m		78.0	1		OL	TOPSOIL; Silty CLAY, low plasticity, dark brown		F	0.00: Inferred TOPSOIL, grassed surface, rootlets observed up to 0.05m 0.20: Inferred NATURAL SOIL
									CI-CH	CLAY; medium plasticity, red brown	M (>PL)	St	
				SPT 1.50-1.95 m 6, 8, 16 N = 24		77.0	2			becomes high plasticity, yellow brown		VSt	
											M (<PL)		
				ES 2.80-3.00 m								H	
				SPT 3.00-3.45 m 24/150mm N = R		76.0	3			SHALE; brownish pale grey, extremely weathered, vwry low to low strength			3.00: Inferred BEDROCK, strength and wethering inferred from drilling resistance and cuttings
						75.0	4				D		
										becomes pale grey, highly weathered			
						74.0	5			Hole terminated at 5.0m Target depth Hole Terminated at 5.00 m			
						73.0	6						
						72.0	7						

Method
AS - Auger Screwing
RR - Rock Roller
WB- Washbore

Penetration
No resistance ranging to refusal

Water
Level (Date)
Inflow
Partial Loss
Complete Loss

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test

Moisture Condition
D - Dry
M - Moist
W - Wet

Consistency/Relative Density
VS - Very Soft
S - Soft
F - Firm
VSt - Very Stiff
H - Hard
Fr - Friable
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Support
C - Casing

Graphic Log/Core Loss
Core recovered (hatching indicates material)
Core loss

Classification Symbols and Soil Descriptions
Based on Unified Soil Classification System

Plastic Limit
< PL
= PL
< PL

Borehole No.

BH22

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Engineering Log - Borehole

Project No.: PSM4815

Client:	JBS&G	Commenced:	18/10/2022
Project Name:	Residential Development, Edmondson Park South	Completed:	18/10/2022
Hole Location:	Edmondson Park South, NSW	Logged By:	DL
Hole Position:	See Figure 1 301491.0 m E 6238541.0 m N MGA2020 Zone 56	Checked By:	RS

Drill Model and Mounting: Commachio GEO 305 Inclination: -90° RL Surface: 76.00 m

Hole Diameter: Bearing: Datum: AHD Operator: Matrix Drilling

Drilling Information								Soil Description					Observations
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density	Pocket Penetrometer UCS (kPa) 100 200 300 400 500	Structure and Additional Observations
AD/V			Not Encountered	B 0.50-1.50 m		75.0	1		OL	TOPSOIL; Clayey SILT, non plastic, dark brown	M	S		0.00: Inferred TOPSOIL, grassed surface
									CH	CLAY; high plasticity, yellow brown				0.20: Inferred NATURAL SOIL
										becomes red brown	M (>PL)	St		
				SPT 1.50 m 7, 11, 14 N = 25		74.0	2			becomes pale grey	M (<PL)	VSt		
												H		
AD/T				SPT 3.00 m 9/90mm N = R		73.0	3			SHALE: brownish grey, extremely weathered, very low strength	D			2.50: V-bit refusal Inferred BEDROCK, strength and weahering inferred from drilling resistance and cuttings
						72.0	4			becomes pale grey				
						71.0	5			Target depth Hole Terminated at 5.00 m				
						70.0	6							
						69.0	7							

Method
AS - Auger Screwing
RR - Rock Roller
WB- Washbore

Penetration
No resistance ranging to refusal

Water
Level (Date)
Inflow
Partial Loss
Complete Loss

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test

Moisture Condition
D - Dry
M - Moist
W - Wet

Consistency/Relative Density
VS - Very Soft
S - Soft
F - Firm
VSt - Very Stiff
H - Hard
Fr - Friable
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Support
C - Casing

Graphic Log/Core Loss
Core recovered (hatching indicates material)
Core loss

Classification Symbols and Soil Descriptions
Based on Unified Soil Classification System

Plastic Limit
< PL
= PL
< PL

Borehole No.

BH23

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Engineering Log - Borehole

Project No.: PSM4815

Client:	JBS&G	Commenced:	18/10/2022
Project Name:	Residential Development, Edmondson Park South	Completed:	18/10/2022
Hole Location:	Edmondson Park South, NSW	Logged By:	DL
Hole Position:	See Figure 1 301468.2 m E 6238601.2 m N MGA2020 Zone 56	Checked By:	RS

Drill Model and Mounting: Commachio GEO 305 Inclination: -90° RL Surface: 72.00 m

Hole Diameter: Bearing: Datum: AHD Operator: Matrix Drilling

Drilling Information								Soil Description					Observations
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density / Pocket Penetrometer UCS (kPa)	Structure and Additional Observations
AD/V			Not Encountered	SPT 0.50 m 2, 4, 5 N = 9		71.0	1		OL	TOPSOIL; Clayey Sandy SILT, non plastic, dark brown	M	S	0.00: Inferred TOPSOIL, grassed surface, rootlests observed up to D = 0.1
									CH	CLAY; high plasticity, red brown	M (>PL)	St	0.10: Inferred NATURAL SOIL
				SPT 1.50 m 9, 17, 24 N = 41		70.0	2			becomes yellow brown	M (<PL)		2.00: V-bit refusal
AD/T				SPT 3.00 m 4, 10, 15 N = 25		69.0	3			becomes CLAY with gravel, sub-angular gravel 5-7mm	D	H	
						68.0	4			SHALE. pale grey, extremely to highly weathered, very low strength			4.00: Inferred BEDROCK, strength and weathering inferred from drilling resistance and cuttings
						67.0	5			Target depth Hole Terminated at 5.00 m			
						66.0	6						
						65.0	7						

Method
AS - Auger Screwing
RR - Rock Roller
WB- Washbore

Penetration
No resistance ranging to refusal

Water
Level (Date)
Inflow
Partial Loss
Complete Loss

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test

Moisture Condition
D - Dry
M - Moist
W - Wet

Consistency/Relative Density
VS - Very Soft
S - Soft
F - Firm
VSt - Very Stiff
H - Hard
Fr - Friable
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Support
C - Casing

Graphic Log/Core Loss
Core recovered (hatching indicates material)
Core loss

Classification Symbols and Soil Descriptions
Based on Unified Soil Classification System

Plastic Limit
< PL
= PL
< PL

Borehole No.

BH24

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Engineering Log - Borehole

Project No.: PSM4815

Client:	JBS&G	Commenced:	17/10/2022
Project Name:	Residential Development, Edmondson Park South	Completed:	17/10/2022
Hole Location:	Edmondson Park South, NSW	Logged By:	DL
Hole Position:	See Figure 1 301366.2 m E 6238655.7 m N MGA2020 Zone 56	Checked By:	RS

Drill Model and Mounting:	Commachio GEO 305	Inclination:	-90°	RL Surface:	76.20 m		
Hole Diameter:		Bearing:		Datum:	AHD	Operator:	Matrix Drilling

Drilling Information								Soil Description					Observations
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density	Pocket Penetrometer UCS (kPa) 100 200 300 400 500	Structure and Additional Observations
AD/T		Not Encountered		SPT 0.50 m 4, 10/110mm N = R		75.2	1		OL	TOPSOIL; Clayey SILT, non plastic, dark brown	W	S		0.00: Inferred TOPSOIL, rootlets observed up to depth D = 0.15m 0.20: Inferred NATURAL SOIL
									CI-CH	CLAY; medium to high plasticity, red brown	M (>PL)	St		
										becomes high plasticity, yellow brown				
				SPT 1.50 m 18, 26/90mm N = R		74.2	2			SHALE; pale grey, extremely weathered, low strength	D			1.50: Inferred BEDROCK, strength and weathering inferred from drilling resistance and cuttings
						73.2	3			TC-bit refusal Hole Terminated at 2.60 m				2.60: TC-bit refusal
						72.2	4							
						71.2	5							
						70.2	6							
						69.2	7							

Method
AS - Auger Screwing
RR - Rock Roller
WB- Washbore

Penetration
No resistance ranging to refusal

Water
Level (Date)
Inflow
Partial Loss
Complete Loss

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test

Moisture Condition
D - Dry
M - Moist
W - Wet

Consistency/Relative Density
VS - Very Soft
S - Soft
F - Firm
VSt - Very Stiff
H - Hard
Fr - Friable
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Support
C - Casing

Graphic Log/Core Loss
Core recovered (hatching indicates material)
Core loss

Classification Symbols and Soil Descriptions
Based on Unified Soil Classification System

Plastic Limit
< PL
= PL
< PL

Borehole No.

BH25

Page 1 of 1

Engineering Log - Borehole

Project No.: PSM4815

Client:	JBS&G	Commenced:	17/10/2022
Project Name:	Residential Development, Edmondson Park South	Completed:	17/10/2022
Hole Location:	Edmondson Park South, NSW	Logged By:	DL
Hole Position:	See Figure 1 301268.3 m E 6238640.6 m N MGA2020 Zone 56	Checked By:	RS

Drill Model and Mounting:	Commachio GEO 305	Inclination:	-90°	RL Surface:	79.50 m		
Hole Diameter:		Bearing:		Datum:	AHD	Operator:	Matrix Drilling

Drilling Information								Soil Description					Observations
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density / Pocket Penetrometer UCS (kPa)	Structure and Additional Observations
AD/T			Not Encountered	SPT 0.50 m 8, 30, 30/100mm N = R		78.5	1		OL	TOPSOIL; Silty CLAY, low plasticity, dark brown	M (>PL)	F	0.00: Inferred TOPSOIL
									CH	CLAY; high plasticity, red brown		St	0.10: Inferred NATURAL SOIL
				SPT 1.50 m 23, 15/100mm N = R						becomes pale grey	M (<PL)	H	
						77.5	2			SHALE; brownish pale grey, extremely weathered, very low strength			1.70: SPT refusal Inferred BEDROCK, indicated from SPT sample, strength and weathering inferred from drilling resistance and cuttings
						76.5	3				D		
						75.5	4			becomes low strength			
						74.5	5			becomes dark grey			
										Target depth Hole Terminated at 5.00 m			
						73.5	6						
						72.5	7						

Method
AS - Auger Screwing
RR - Rock Roller
WB- Washbore

Penetration
No resistance ranging to refusal

Water
Level (Date)
Inflow
Partial Loss
Complete Loss

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test

Moisture Condition
D - Dry
M - Moist
W - Wet

Consistency/Relative Density
VS - Very Soft
S - Soft
F - Firm
VSt - Very Stiff
H - Hard
Fr - Friable
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Support
C - Casing

Graphic Log/Core Loss
Core recovered (hatching indicates material)
Core loss

Classification Symbols and Soil Descriptions
Based on Unified Soil Classification System

Plastic Limit
< PL
= PL
< PL

Borehole No.

BH26

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Engineering Log - Borehole

Project No.: PSM4815

Client:	JBS&G	Commenced:	17/10/2022
Project Name:	Residential Development, Edmondson Park South	Completed:	17/10/2022
Hole Location:	Edmondson Park South, NSW	Logged By:	DL
Hole Position:	See Figure 1 301351.2 m E 6238559.6 m N MGA2020 Zone 56	Checked By:	RS

Drill Model and Mounting:	Commachio GEO 305	Inclination:	-90°	RL Surface:	78.80 m	
Hole Diameter:		Bearing:		Datum:	AHD	Operator: Matrix Drilling

Drilling Information								Soil Description						Observations
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density	Pocket Penetrometer UCS (kPa) 100 200 300 400 500	Structure and Additional Observations
AD/T			Not Encountered	SPT 0.50 m 3, 4, 5 N = 9 B 0.50 m		77.8	1		OL	TOPSOIL; Clayey SILT, non plastic, dark brown	W	S		0.00: Inferred TOPSOIL; grassed surface, rootlets observed up to D = 0.2m 0.30: Inferred NATURAL SOIL
									CI-CH	CLAY; medium plasticity, dark brown		F		
										becomes high plasticity, red brown	M (>PL)	St		
				SPT 1.50 m 8/70mm N = R		76.8	2			becomes light brown	M (<PL)	H		
						75.8	3			SHALE; pale grey, highly weathered, very low strength	D			1.80: Inferred BEDROCK, strength and weathering inferred from drilling resistance and cuttings
						74.8	4			becomes low strength				
						73.8	5			Target depth Hole Terminated at 5.00 m				
						72.8	6							
						71.8	7							

Method
AS - Auger Screwing
RR - Rock Roller
WB- Washbore

Penetration
No resistance ranging to refusal

Water
Level (Date)
Inflow
Partial Loss
Complete Loss

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test

Moisture Condition
D - Dry
M - Moist
W - Wet

Consistency/Relative Density
VS - Very Soft
S - Soft
F - Firm
VSt - Very Stiff
H - Hard
Fr - Friable
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Support
C - Casing

Graphic Log/Core Loss
Core recovered (hatching indicates material)
Core loss

Classification Symbols and Soil Descriptions
Based on Unified Soil Classification System

Plastic Limit
< PL
= PL
< PL

Borehole No.

BH27

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Engineering Log - Borehole

Project No.: PSM4815

Client:	JBS&G	Commenced:	17/10/2022
Project Name:	Residential Development, Edmondson Park South	Completed:	17/10/2022
Hole Location:	Edmondson Park South, NSW	Logged By:	DL
Hole Position:	See Figure 1 301312.8 m E 6238482.7 m N MGA2020 Zone 56	Checked By:	RS

Drill Model and Mounting:	Commachio GEO 305	Inclination:	-90°	RL Surface:	81.10 m		
Hole Diameter:		Bearing:		Datum:	AHD	Operator:	Matrix Drilling

Drilling Information								Soil Description					Observations
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density / Pocket Penetrometer UCS (kPa) 100 200 300 400 500	Structure and Additional Observations
AD/T		Not Encountered		ES 0.30-0.50 m SPT 0.50 m 3, 5, 13 N = 18		80.1	1		OL	TOPSOIL; Clayey SILT; non plastic, dark brown		F	0.00: Inferred TOPSOIL; grassed surface
									CI-CH	CLAY; medium plasticity, red brown			0.20: Inferred NATURAL SOIL
										becomes yellow brown with pale gray mottling	M (>PL)	St	
				SPT 1.50 m 12, 27, 21/80mm N = R		79.1	2			becomes high plasticity	M (<PL)	VSt	
												H	
										SHALE; brownish grey, extremely weathered, very low strength			2.50: Inferred BEDROCK; strength and weathering inferred from drilling resistance and cuttings
				SPT 3.00 m 3 - 3.45m 8/60mm N = R		78.1	3				D		
										becomes pale grey, highly weathered, low strength			
						76.1	5			Target depth Hole Terminated at 5.00 m			
						75.1	6						
						74.1	7						

Method
AS - Auger Screwing
RR - Rock Roller
WB- Washbore

Penetration
No resistance ranging to refusal

Water
Level (Date)
Inflow
Partial Loss
Complete Loss

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test

Moisture Condition
D - Dry
M - Moist
W - Wet

Consistency/Relative Density
VS - Very Soft
S - Soft
F - Firm
VSt - Very Stiff
H - Hard
Fr - Friable
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Support
C - Casing

Graphic Log/Core Loss
Core recovered (hatching indicates material)
Core loss

Classification Symbols and Soil Descriptions
Based on Unified Soil Classification System

Plastic Limit
< PL
= PL
< PL

Borehole No.

BH28

Page 1 of 1

Engineering Log - Borehole

Project No.: PSM4815

Client:	JBS&G	Commenced:	18/10/2022
Project Name:	Residential Development, Edmondson Park South	Completed:	18/10/2022
Hole Location:	Edmondson Park South, NSW	Logged By:	DL
Hole Position:	See Figure 1 301420.9 m E 6238540.5 m N MGA2020 Zone 56	Checked By:	RS

Drill Model and Mounting:	Commachio GEO 305	Inclination:	-90°	RL Surface:	76.00 m		
Hole Diameter:		Bearing:		Datum:	AHD	Operator:	Matrix Drilling

Drilling Information								Soil Description					Observations
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density / Pocket Penetrometer UCS (kPa)	Structure and Additional Observations
AD/V			Not Encountered	SPT 0.50 m 4, 7, 5 N = 12		75.0	1		OL	TOPSOIL; Silty CLAY, low plasticity, dark brown	M (>PL)	S	0.00: Inferred TOPSOIL; observed rootlets up to D = 0.2m
									CI-CH	CLAY; medium plasticity, red brown		St	0.40: Inferred NATURAL SOIL
										becomes high plasticity, light brown with pale grey mottling		VSt	
AD/T				SPT 1.50 m 4/50mm N = R		74.0	2						1.60: V-Bit refusal
										SHALE; brownish pale grey, very low strength	D		1.80: Inferred BEDROCK; observed from SPT sample, strength and weathering observed from driling resistance and cutting
						73.0	3			TC-bit refusal Hole Terminated at 2.35 m			
						72.0	4						
						71.0	5						
						70.0	6						
						69.0	7						

Method
AS - Auger Screwing
RR - Rock Roller
WB- Washbore

Penetration
No resistance ranging to refusal

Water
Level (Date)
Inflow
Partial Loss
Complete Loss

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test

Moisture Condition
D - Dry
M - Moist
W - Wet

Consistency/Relative Density
VS - Very Soft
S - Soft
F - Firm
VSt - Very Stiff
H - Hard
Fr - Friable
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Support
C - Casing

Graphic Log/Core Loss
Core recovered (hatching indicates material)
Core loss

Classification Symbols and Soil Descriptions
Based on Unified Soil Classification System

Plastic Limit
< PL
= PL
< PL

Borehole No.

BH29

Engineering Log - Borehole

Project No.: PSM4815

Client:	JBS&G	Commenced:	18/10/2022
Project Name:	Residential Development, Edmondson Park South	Completed:	18/10/2022
Hole Location:	Edmondson Park South, NSW	Logged By:	DL
Hole Position:	See Figure 1 301474.4 m E 6238476.1 m N MGA2020 Zone 56	Checked By:	RS

Drill Model and Mounting: Commachio GEO 305 Inclination: -90° RL Surface: 78.80 m

Hole Diameter: Bearing: Datum: AHD Operator: Matrix Drilling

Drilling Information								Soil Description					Observations
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density	Structure and Additional Observations
AD/V				SPT 0.50 m 6, 9, 12 N = 21		77.8	1		OL	TOPSOIL; Clayey SILT, non plastic, dark brown	M	S	0.00: Inferred TOPSOIL
									CI-CH	CLAY; medium plasticity, yellow brown		F	0.10: Inferred NATURAL SOIL
										becomes high plasticity, red brown	M (>PL)	St	
										becomes yellow brown with pale gray mottling			
				SPT 1.50 m 13, 15, 12 N = 27		76.8	2				M (<PL)	VSt	1.70: V-bit refusal
AD/T												H	
				SPT 3.00 m 11/75mm N = R		75.8	3			SHALE; brownish grey, extremely weathered, very low strength			2.80: Inferred BEDROCK, strength and weathering inferred from drilling resistance and cutting
						74.8	4			becomes pale grey, highly weatehered			
						73.8	5			becomes low strength	D		
						72.8	6						
						71.8	7						

Pocket Penetrometer UCS (kPa): 100, 200, 300, 400, 500

Method
AS - Auger Screwing
RR - Rock Roller
WB- Washbore

Penetration
No resistance ranging to refusal

Water
Level (Date)
Inflow
Partial Loss
Complete Loss

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test

Moisture Condition
D - Dry
M - Moist
W - Wet

Consistency/Relative Density
VS - Very Soft
S - Soft
F - Firm
VSt - Very Stiff
H - Hard
Fr - Friable
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Support
C - Casing

Graphic Log/Core Loss
Core recovered (hatching indicates material)
Core loss

Classification Symbols and Soil Descriptions
Based on Unified Soil Classification System

Plastic Limit
< PL
= PL
< PL

Engineering Log - Borehole

Project No.: PSM4815

Client:	JBS&G	Commenced:	18/10/2022
Project Name:	Residential Development, Edmondson Park South	Completed:	18/10/2022
Hole Location:	Edmondson Park South, NSW	Logged By:	DL
Hole Position:	See Figure 1 301474.4 m E 6238476.1 m N MGA2020 Zone 56	Checked By:	RS

Drill Model and Mounting:	Commachio GEO 305	Inclination:	-90°	RL Surface:	78.80 m	
Hole Diameter:		Bearing:		Datum:	AHD	Operator: Matrix Drilling

Drilling Information								Soil Description						Observations
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density	Pocket Penetrometer UCS (kPa) 100 200 300 400 500	Structure and Additional Observations
AD/T						69.8	9			becomes low strength *(continued)*	D*(continued)*			
						68.8	10				M			10.00: Water Table
						67.8	11				W			
						66.8	12			Target depth Hole Terminated at 12.00 m				
						65.8	13							
						64.8	14							
						63.8	15							

Method
AS - Auger Screwing
RR - Rock Roller
WB- Washbore

Penetration
No resistance ranging to refusal

Water
Level (Date)
Inflow
Partial Loss
Complete Loss

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test

Moisture Condition
D - Dry
M - Moist
W - Wet

Consistency/Relative Density
VS - Very Soft
S - Soft
F - Firm
VSt - Very Stiff
H - Hard
Fr - Friable
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Support
C - Casing

Graphic Log/Core Loss
Core recovered (hatching indicates material)
Core loss

Classification Symbols and Soil Descriptions
Based on Unified Soil Classification System

Plastic Limit
< PL
= PL
< PL

Borehole No.

BH30

Page 1 of 2

Engineering Log - Borehole

Project No.: PSM4815

Client:	JBS&G	Commenced:	17/10/2022
Project Name:	Residential Development, Edmondson Park South	Completed:	17/10/2022
Hole Location:	Edmondson Park South, NSW	Logged By:	DL
Hole Position:	See Figure 1 301470.8 m E 6238374.3 m N MGA2020 Zone 56	Checked By:	RS

Drill Model and Mounting:	Commachio GEO 305	Inclination:	-90°	RL Surface:	80.60 m		
Hole Diameter:		Bearing:		Datum:	AHD	Operator:	Matrix Drilling

Drilling Information								Soil Description					Observations
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density	Pocket Penetrometer UCS (kPa) 100 200 300 400 500	Structure and Additional Observations
AD/T						80.6	0		OL	TOPSOIL; Silty CLAY, low plasticity, dark brown		S		0.00: Inferred TOPSOIL, grassed surface
									CI-CH	CLAY; medium to high plasticity, red brown				0.20: Inferred NATURAL SOIL
				SPT 0.50 m 2, 13, 11/50mm N = R U50 0.50-1.00 m		79.6	1				M (>PL)	St		
										becomes pale grey				1.15: SPT refusal
				SPT 2.00 m 5/90mm N = R		78.6	2				M (<PL)	VSt		
										SHALE, brownish pale grey, extremely weathered, very low strength				2.36: SPT refusal Inferred BEDROCK; strength and weathering inferred from drilling resistance and cutting
						77.6	3							
						76.6	4							
						75.6	5			becomes pale grey, highly weathered, low strength	D			
						74.6	6							
						73.6	7							

Method
AS - Auger Screwing
RR - Rock Roller
WB- Washbore

Penetration
No resistance ranging to refusal

Water
Level (Date)
Inflow
Partial Loss
Complete Loss

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test

Moisture Condition
D - Dry
M - Moist
W - Wet

Consistency/Relative Density
VS - Very Soft
S - Soft
F - Firm
VSt - Very Stiff
H - Hard
Fr - Friable
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Support
C - Casing

Graphic Log/Core Loss
Core recovered (hatching indicates material)
Core loss

Classification Symbols and Soil Descriptions
Based on Unified Soil Classification System

Plastic Limit
< PL
= PL
< PL

Engineering Log - Borehole

Project No.: PSM4815

Client:	JBS&G	Commenced:	17/10/2022
Project Name:	Residential Development, Edmondson Park South	Completed:	17/10/2022
Hole Location:	Edmondson Park South, NSW	Logged By:	DL
Hole Position:	See Figure 1 301470.8 m E 6238374.3 m N MGA2020 Zone 56	Checked By:	RS

Drill Model and Mounting: Commachio GEO 305 Inclination: -90° RL Surface: 80.60 m
Hole Diameter: Bearing: Datum: AHD Operator: Matrix Drilling

Drilling Information								Soil Description						Observations
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density	Pocket Penetrometer UCS (kPa) 100 200 300 400 500	Structure and Additional Observations
AD/T						71.6	9			SHALE, brownish pale grey, extremely weathered, very low strength *(continued)* becomes medium weathered	D*(continued)*			
						70.6	10							10.00: Water table, inferred from wet cuttings
						69.6	11				M			
						68.6	12			Target depth Hole Terminated at 12.10 m				
						67.6	13							
						66.6	14							
						65.6	15							

Method
AS - Auger Screwing
RR - Rock Roller
WB- Washbore

Penetration
No resistance ranging to refusal

Water
Level (Date)
Inflow
Partial Loss
Complete Loss

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test

Moisture Condition
D - Dry
M - Moist
W - Wet

Consistency/Relative Density
VS - Very Soft
S - Soft
F - Firm
VSt - Very Stiff
H - Hard
Fr - Friable
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Support
C - Casing

Graphic Log/Core Loss
Core recovered (hatching indicates material)
Core loss

Classification Symbols and Soil Descriptions
Based on Unified Soil Classification System

Plastic Limit
< PL
= PL
< PL

Appendix B
Piezometer Construction Records

Pells Sullivan Meynink
Engineering Consultants
Rock - Soil - Water

JOB no.: PSM 4815

PROJECT: Edmondson Park South

PIEZOMETER CONSTRUCTION RECORD

HOLE NUMBER:	BH15	DRILLING CONTRACTOR:	Matrix Drilling
PIEZOMETER:		RIG:	Comacchio Geo 305
COLLAR EASTING:	301593.64 mE	DEPTH OF HOLE (m):	10.00
COLLAR NORTHING:	6238722.52 mN	BOREHOLE INCLINATION:	-90°
COLLAR RL(m):	73.30m	PIEZO INSTALLATION DATE:	19/10/2022
DATUM:	AHD	SUPERVISED BY:	DL

Tick boxes

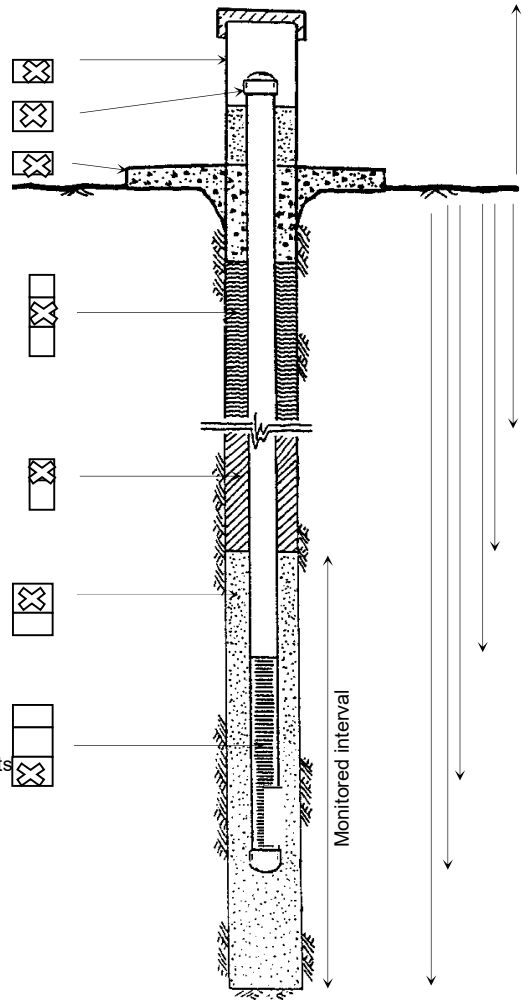
Steel protective well cover ☒
PVC cap ☒
Concrete colar ☒

Back fill type:
Cement bentonite ☒
Soil
None

Seal:
Bentonite pellets ☒
Other

Gravel type:
2-5mm gravel ☒
Other

Perforation type:
Drill holes
Hack saw cuts
40um machine slots ☒



Complete dimensions if appropriate

Height of stickup (m)	1.1
Diameter of PVC (mm)	50
Depth to top of seal	5.5m
Depth to top of gravel pack	6.5m
Depth to top of screen	7.0m
Depth to base of screen	10.0m
Depth to base of piezo	10.0m
Depth to base of gravel	10.0m

COMMENTS: Water table encountered at 8.0m

Pells Sullivan Meynink
Engineering Consultants
Rock - Soil - Water

JOB no.: PSM 4815

PROJECT: Edmondson Park South

PIEZOMETER CONSTRUCTION RECORD

HOLE NUMBER:	BH29	DRILLING CONTRACTOR:	Matrix Drilling
PIEZOMETER:		RIG:	Comacchio Geo 305
COLLAR EASTING:	301474.35 mE	DEPTH OF HOLE (m):	10.00
COLLAR NORTHING:	623847.14 mN	BOREHOLE INCLINATION:	-90°
COLLAR RL(m):	78.8m	PIEZO INSTALLATION DATE:	18/10/2022
DATUM:	AHD	SUPERVISED BY:	DL

Tick boxes

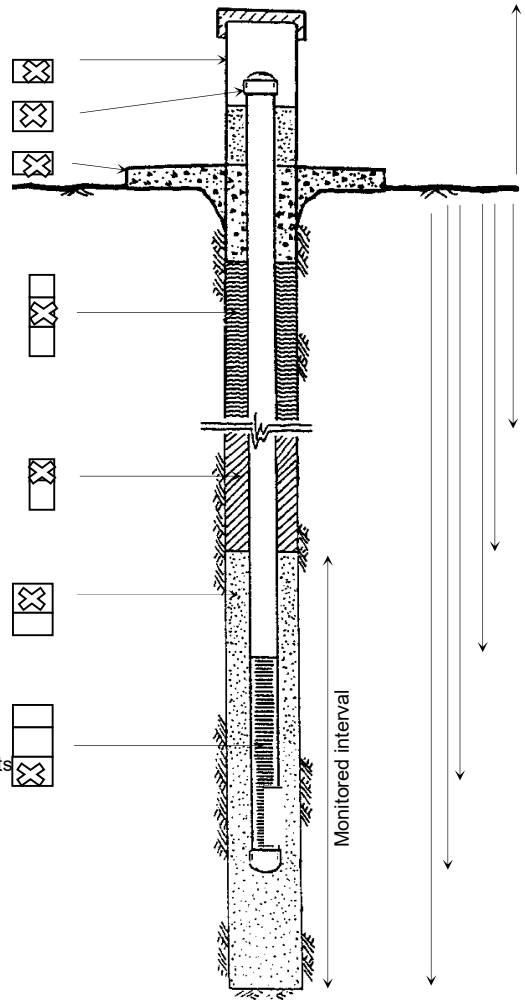
Steel protective well cover ☒
PVC cap ☒
Concrete colar ☒

Back fill type:
Cement bentonite
Soil ☒
None

Seal:
Bentonite pellets ☒
Other

Gravel type:
2-5mm gravel ☒
Other

Perforation type:
Drill holes
Hack saw cuts
40um machine slots ☒



Complete dimensions if appropriate

Height of stickup (m)	1.1
Diameter of PVC (mm)	50
Depth to top of seal	7.4m
Depth to top of gravel pack	8.4m
Depth to top of screen	9.0m
Depth to base of screen	12.0m
Depth to base of piezo	12.0m
Depth to base of gravel	12.0m

COMMENTS: Water table encountered at 10.0m

Pells Sullivan Meynink
Engineering Consultants
Rock - Soil - Water

JOB no.: PSM 4815

PROJECT: Edmondson Park South

PIEZOMETER CONSTRUCTION RECORD

HOLE NUMBER:	BH30	DRILLING CONTRACTOR:	Matrix Drilling
PIEZOMETER:		RIG:	Comacchio Geo 305
COLLAR EASTING:	301470.78 mE	DEPTH OF HOLE (m):	10.00
COLLAR NORTHING:	6238374.25 mN	BOREHOLE INCLINATION:	-90°
COLLAR RL(m):	80.6m	PIEZO INSTALLATION DATE:	17/10/2022
DATUM:	AHD	SUPERVISED BY:	DL

Tick boxes

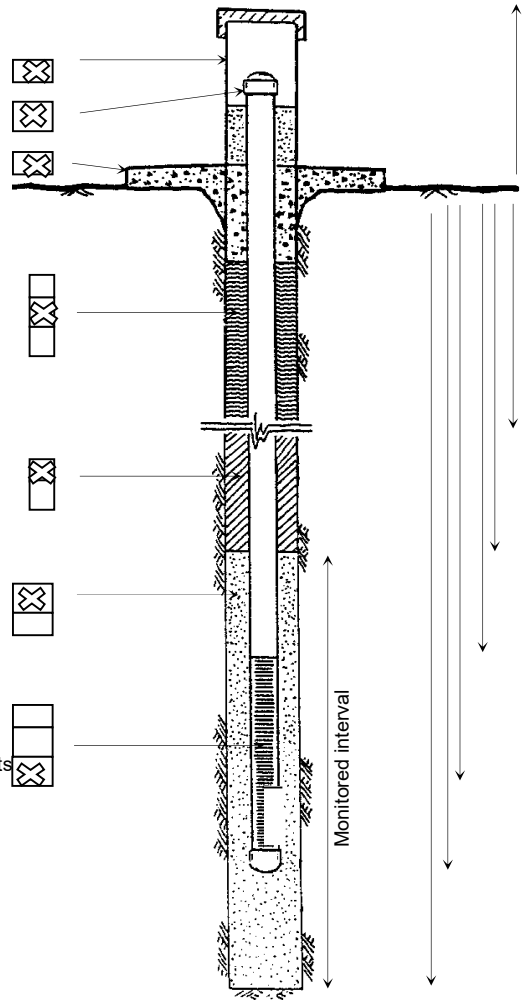
Steel protective well cover ☒
PVC cap ☒
Concrete colar ☒

Back fill type:
Cement bentonite
Soil ☒
None

Seal:
Bentonite pellets ☒
Other

Gravel type:
2-5mm gravel ☒
Other

Perforation type:
Drill holes
Hack saw cuts
40um machine slots ☒



Complete dimensions if appropriate

Height of stickup (m)	1.1
Diameter of PVC (mm)	50
Depth to top of seal	7.5m
Depth to top of gravel pack	8.5m
Depth to top of screen	9.1m
Depth to base of screen	12.1m
Depth to base of piezo	12.1m
Depth to base of gravel	12.1m

COMMENTS: Water table encountered at 10.0m

Appendix C
CBR Test Results

115 Wicks Road
Macquarie Park, NSW 2113
Telephone: 02 9888 5000
Facsimile: 02 9888 5001

SOIL TEST SERVICES
ABN 43 002 145 173

FOUR DAY SOAKED CALIFORNIA BEARING RATIO TEST REPORT

Client: Pells Sullivan Meynink
PSM Job No.: PSM4815 - Edmondson Park

Report No.: L4838 - 1
Report Date: 1/11/2022
Page 1 of 1

BOREHOLE NUMBER	BH 01	BH 08	BH 11	BH 26
DEPTH (m)	0.20 - 0.80	0.20 - 1.00	0.20 - 1.00	0.50 - 0.80
Surcharge (kg)	4.5	4.5	4.5	4.5
Maximum Dry Density (t/m^3)	1.73 STD	1.79 STD	1.77 STD	1.74 STD
Optimum Moisture Content (%)	19.6	17.5	17.8	18.9
Moulded Dry Density (t/m^3)	1.70	1.75	1.73	1.71
Sample Density Ratio (%)	98	98	98	98
Sample Moisture Ratio (%)	97	101	101	97
Moisture Contents				
Insitu (%)	18.5	20.2	18.6	19.0
Moulded (%)	19.1	17.7	18.1	18.3
After soaking and				
After Test, Top 30mm(%)	25.7	31.3	31.0	25.8
Remaining Depth (%)	17.6	20.2	22.9	20.4
Material Retained on 19mm Sieve (%)	0	3*	0	0
Swell (%)	0.5	4.0	3.5	0.5
C.B.R. value: @2.5mm penetration	2.5	1.0		3.5
@5.0mm penetration			1.0	

NOTES: Sampled and supplied by client. Samples tested as received.
- Refer to appropriate Borehole logs for soil descriptions
- Test Methods : AS 1289 6.1.1, 5.1.1 & 2.1.1.
- Date of receipt of sample: 21/10/2022.
- * Denotes not used in test sample.

NATA Accredited Laboratory Number:1327

Accredited for compliance with ISO/IEC 17025 - Testing.
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01/11/2022
Authorised Signature / Date
(D. Treweek)

Appendix D
Atterberg Limits Test Results

115 Wicks Road
Macquarie Park, NSW 2113
PO Box 976
North Ryde, Bc 1670
Telephone: 02 9888 5000
Facsimile: 02 9888 5001

SOIL TEST SERVICES

ABN 43 002 145 173

MOISTURE CONTENT, ATTERBERG LIMITS AND LINEAR SHRINKAGE TEST REPORT

Client: Pells Sullivan Meynink
PSM Job No.: PSM4815 - Edmondson Park

Report No.: L4838 - 3
Report Date: 4/11/2022
Page 1 of 1

AS 1289	TEST METHOD	2.1.1	3.1.2	3.2.1	3.3.1	3.4.1
BOREHOLE NUMBER	DEPTH m	MOISTURE CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	PLASTICITY INDEX %	LINEAR SHRINKAGE %
01	0.2 - 0.8	18.5	55	16	39	10.5*
08	0.2 - 1.0	20.2	50	17	33	10.5
11	0.2 - 1.0	18.6	56	16	40	13.0*
13	0.2 - 0.8	20.9	48	15	33	13.0
20	0.5 - 1.0	20.1	60	18	42	11.5**
21	0.5 - 1.0	18.5	40	13	27	11.5*
22	0.5 - 1.0	24.4	61	17	44	15.0
26	0.5 - 0.8	19.0	53	15	38	15.0

Notes:

- The test sample for liquid and plastic limit was air-dried & dry-sieved
- The linear shrinkage mould was 125mm
- Refer to appropriate notes for soil descriptions
- Date of receipt of sample: 21/10/2022.
- Sampled and supplied by client. Samples tested as received.
- * Denotes Linear Shrinkage curled.
- ** Denotes Linear Shrinkage cracked.

NATA

NATA Accredited Laboratory Number:1327

04/11/2022
Authorised Signature / Date
(D. Treweek)

Appendix E
Shrink Swell Test Results

115 Wicks Road
Macquarie Park, NSW 2113
PO Box 976
North Ryde, Bc 1670
Telephone: 02 9888 5000
Facsimile: 02 9888 5001

SOIL TEST SERVICES

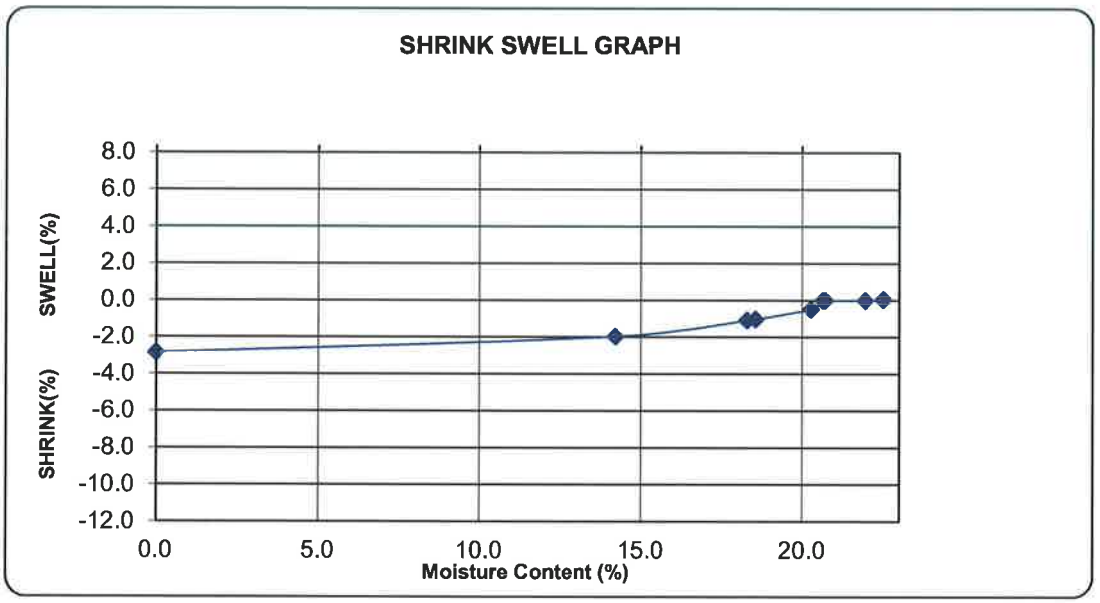
ABN 43 002 145 173

SHRINK - SWELL TEST REPORT
TEST METHOD: AS1289 7.1.1

Client: Pells Sullivan Meynink
PSM Job No.: PSM4815 - Edmondson Park

Report No.: L4838 - 2
Report Date: 3/11/2022
Page 1 of 8

Borehole No.: 03		Depth: 0.5 - 0.9m			
MOISTURE CONTENT (SWELL)		ESTIMATED UNCONFINED COMPRESSIVE STRENGTH			
BEFORE TEST	AFTER TEST	BEFORE TEST		AFTER TEST	
21.9%	22.5%	250,300	kPa	240,290	kPa
LOAD	SETTLEMENT UNDER LOAD BEFORE SATURATION			SWELL ON SATURATION	SHRINKAGE
25	-0.6%			0.0%	2.8%



SHRINK SWELL INDEX
1.55 %/pF

Notes: Sampled and supplied by client. Sample tested as received.

- Suction Value used in calculation = 1.8pF
- Volume Change Coefficient (α) was assumed = 2
- Visually estimated inclusions by volume = 0-5%
- Shrinkage Cracking = Moderate
- Soil Crumbling = none
- Date of receipt of sample: 21/10/2022.

NATA Accredited Laboratory Number:1327

Authorised Signature / Date (D. Treweek) 3/11/22

115 Wicks Road
Macquarie Park, NSW 2113
PO Box 976
North Ryde, Bc 1670
Telephone: 02 9888 5000
Facsimile: 02 9888 5001

SOIL TEST SERVICES

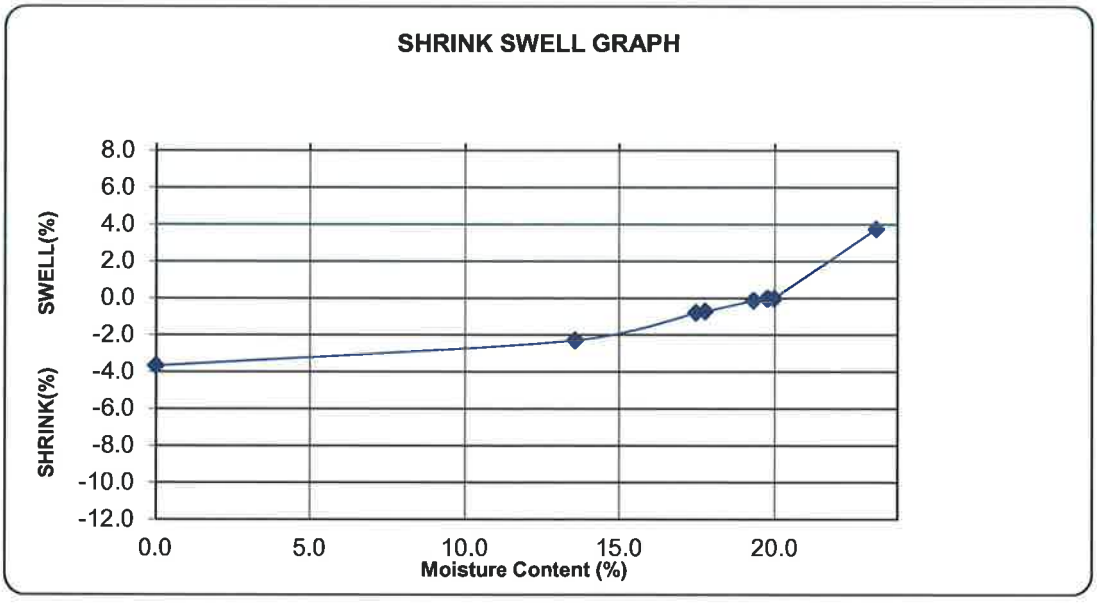
ABN 43 002 145 173

SHRINK - SWELL TEST REPORT
TEST METHOD: AS1289 7.1.1

Client: Pells Sullivan Meynink
PSM Job No.: PSM4815 - Edmondson Park

Report No.: L4838 - 2
Report Date: 3/11/2022
Page 2 of 8

Borehole No.: 05		Depth: 0.5 - 0.9m			
MOISTURE CONTENT (SWELL)		ESTIMATED UNCONFINED COMPRESSIVE STRENGTH			
BEFORE TEST	AFTER TEST	BEFORE TEST		AFTER TEST	
20.0%	23.3%	250,600+	kPa	110,140	kPa
LOAD	SETTLEMENT UNDER LOAD BEFORE SATURATION			SWELL ON SATURATION	SHRINKAGE
25	-0.8%			3.8%	3.5%



SHRINK SWELL INDEX
3.02 %/pF

Notes: Sampled and supplied by client. Sample tested as received.

- Suction Value used in calculation = 1.8pF
- Volume Change Coefficient (α) was assumed = 2
- Visually estimated inclusions by volume = 0-5%
- Shrinkage Cracking = Moderate
- Soil Crumbling = none
- Date of receipt of sample: 21/10/2022.

NATA Accredited Laboratory Number:1327

Authorised Signature / Date (D. Treweek) 3/11/22

115 Wicks Road
Macquarie Park, NSW 2113
PO Box 976
North Ryde, Bc 1670
Telephone: 02 9888 5000
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SOIL TEST SERVICES

ABN 43 002 145 173

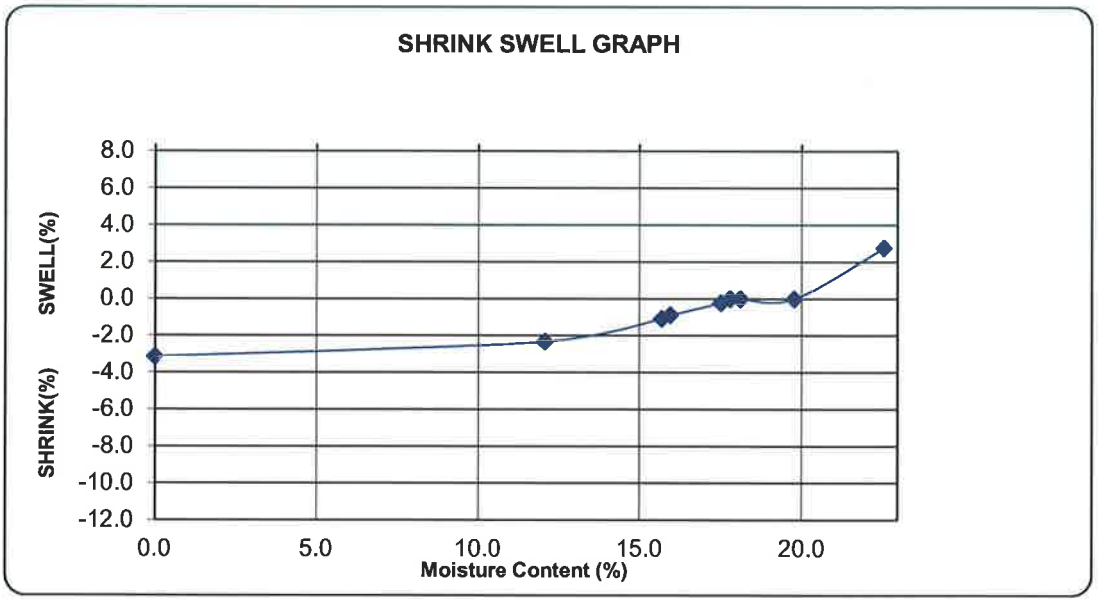
SHRINK - SWELL TEST REPORT
TEST METHOD: AS1289 7.1.1

Client: Pells Sullivan Meynink
PSM Job No.: PSM4815 - Edmondson Park

Report No.: L4838 - 2
Report Date: 3/11/2022
Page 3 of 8

Borehole No.: 07		Depth: 0.5 - 0.9m			
MOISTURE CONTENT (SWELL)		ESTIMATED UNCONFINED COMPRESSIVE STRENGTH			
BEFORE TEST	AFTER TEST	BEFORE TEST		AFTER TEST	
19.8%	22.6%	350,370	kPa	170,180	kPa
LOAD	SETTLEMENT UNDER LOAD BEFORE SATURATION			SWELL ON SATURATION	SHRINKAGE
25	-0.3%			2.8%	3.0%

SHRINK SWELL GRAPH



SHRINK SWELL INDEX
2.45 %/pF

Notes: Sampled and supplied by client. Sample tested as received.

- Suction Value used in calculation = 1.8pF
- Volume Change Coefficient (α) was assumed = 2
- Visually estimated inclusions by volume = 0-5%
- Shrinkage Cracking = Moderate
- Soil Crumbling = none
- Date of receipt of sample: 21/10/2022.

NATA Accredited Laboratory Number:1327

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Authorised Signature / Date (D. Treweek) 3/11/22

115 Wicks Road
Macquarie Park, NSW 2113
PO Box 976
North Ryde, Bc 1670
Telephone: 02 9888 5000
Facsimile: 02 9888 5001

SOIL TEST SERVICES

ABN 43 002 145 173

SHRINK - SWELL TEST REPORT
TEST METHOD: AS1289 7.1.1

Client: Pells Sullivan Meynink
PSM Job No.: PSM4815 - Edmondson Park

Report No.: L4838 - 2
Report Date: 3/11/2022
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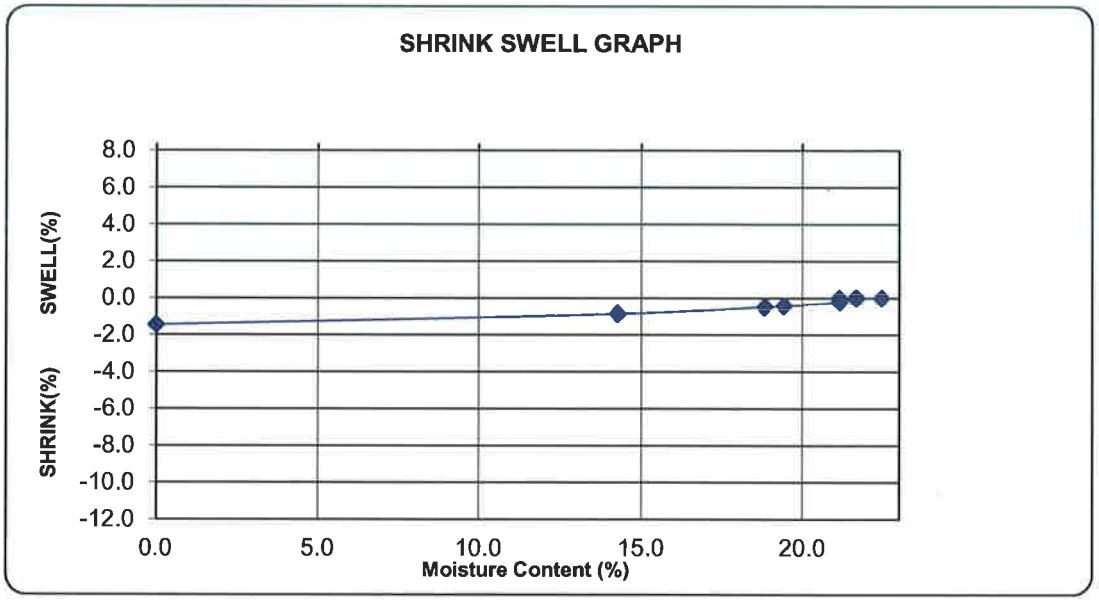
Borehole No.: 10		Depth: 0.5 - 0.9m			
MOISTURE CONTENT (SWELL)		ESTIMATED UNCONFINED COMPRESSIVE STRENGTH			
BEFORE TEST	AFTER TEST	BEFORE TEST		AFTER TEST	
21.2%	22.5%	80,120	kPa	90,100	kPa
LOAD	SETTLEMENT UNDER LOAD BEFORE SATURATION		SWELL ON SATURATION	SHRINKAGE	
25	-1.0%		0.0%	1.4%	



SHRINK SWELL INDEX
0.78 %/pF

Notes: Sampled and supplied by client. Sample tested as received.
- Suction Value used in calculation = 1.8pF
- Volume Change Coefficient (α) was assumed = 2
- Visually estimated inclusions by volume = 0-5%
- Shrinkage Cracking = Moderate
- Soil Crumbling = none
- Date of receipt of sample: 21/10/2022.

NATA Accredited Laboratory Number:1327

Authorised Signature / Date (D. Treweek) 3/11/22

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SHRINK - SWELL TEST REPORT
TEST METHOD: AS1289 7.1.1

Client: Pells Sullivan Meynink
PSM Job No.: PSM4815 - Edmondson Park

Report No.: L4838 - 2
Report Date: 3/11/2022
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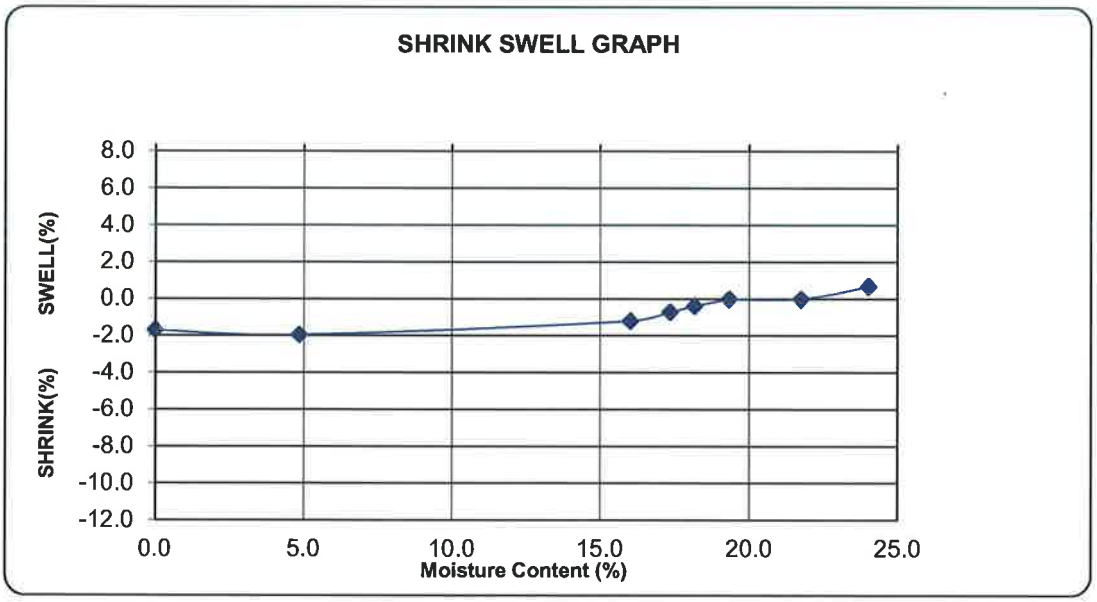
Borehole No.: 14		Depth: 0.5 - 0.9m			
MOISTURE CONTENT (SWELL)		ESTIMATED UNCONFINED COMPRESSIVE STRENGTH			
BEFORE TEST	AFTER TEST	BEFORE TEST		AFTER TEST	
21.8%	24.0%	220	kPa	130,150	kPa
LOAD	SETTLEMENT UNDER LOAD BEFORE SATURATION			SWELL ON SATURATION	SHRINKAGE
25	-0.8%			0.7%	1.9%



SHRINK SWELL INDEX
1.25 %/pF

Notes: Sampled and supplied by client. Sample tested as received.

- Suction Value used in calculation = 1.8pF
- Volume Change Coefficient (α) was assumed = 2
- Visually estimated inclusions by volume = >5%
- Shrinkage Cracking = Major crack.
- Soil Crumbling = none
- Date of receipt of sample: 21/10/2022.

NATA Accredited Laboratory Number:1327

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SHRINK - SWELL TEST REPORT
TEST METHOD: AS1289 7.1.1

Client: Pells Sullivan Meynink
PSM Job No.: PSM4815 - Edmondson Park

Report No.: L4838 - 2
Report Date: 3/11/2022
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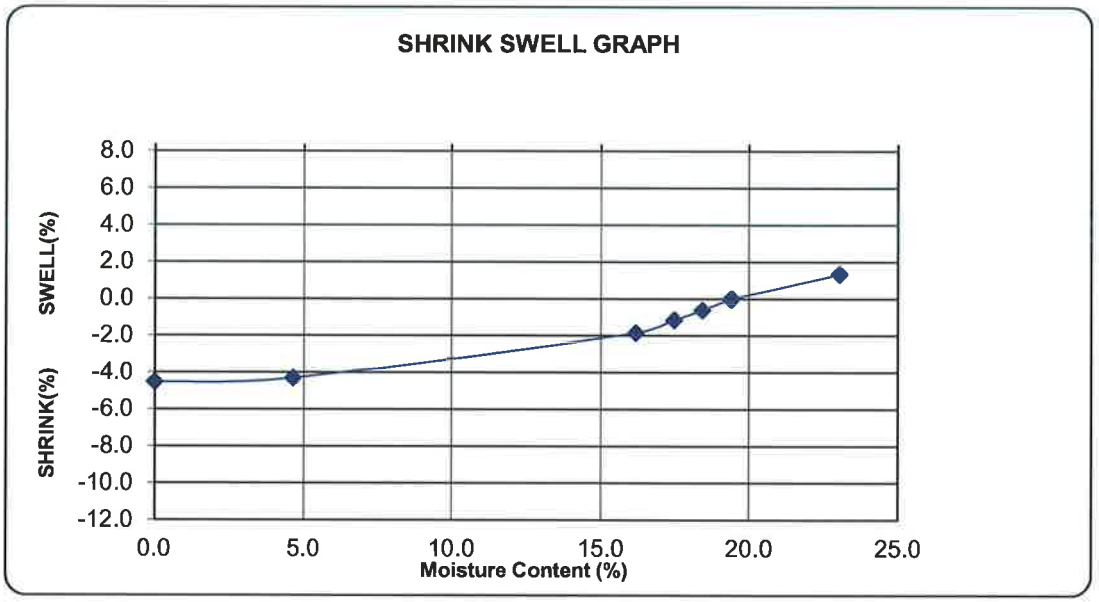
Borehole No.: 17		Depth: 0.5 - 1.0m	
MOISTURE CONTENT (SWELL)		ESTIMATED UNCONFINED COMPRESSIVE STRENGTH	
BEFORE TEST	AFTER TEST	BEFORE TEST	AFTER TEST
19.4%	23.0%	260,350 kPa	100,130 kPa
LOAD	SETTLEMENT UNDER LOAD BEFORE SATURATION	SWELL ON SATURATION	SHRINKAGE
25	-0.3%	1.3%	4.4%

SHRINK SWELL GRAPH



SHRINK SWELL INDEX
2.82 %/pF

Notes: Sampled and supplied by client. Sample tested as received.

- Suction Value used in calculation = 1.8pF
- Volume Change Coefficient (α) was assumed = 2
- Visually estimated inclusions by volume = >5%
- Shrinkage Cracking = Major crack centre of sample.
- Soil Crumbling = none
- Date of receipt of sample: 21/10/2022.

NATA Accredited Laboratory Number:1327

Authorised Signature / Date
(D. Treweek) 3/11/22

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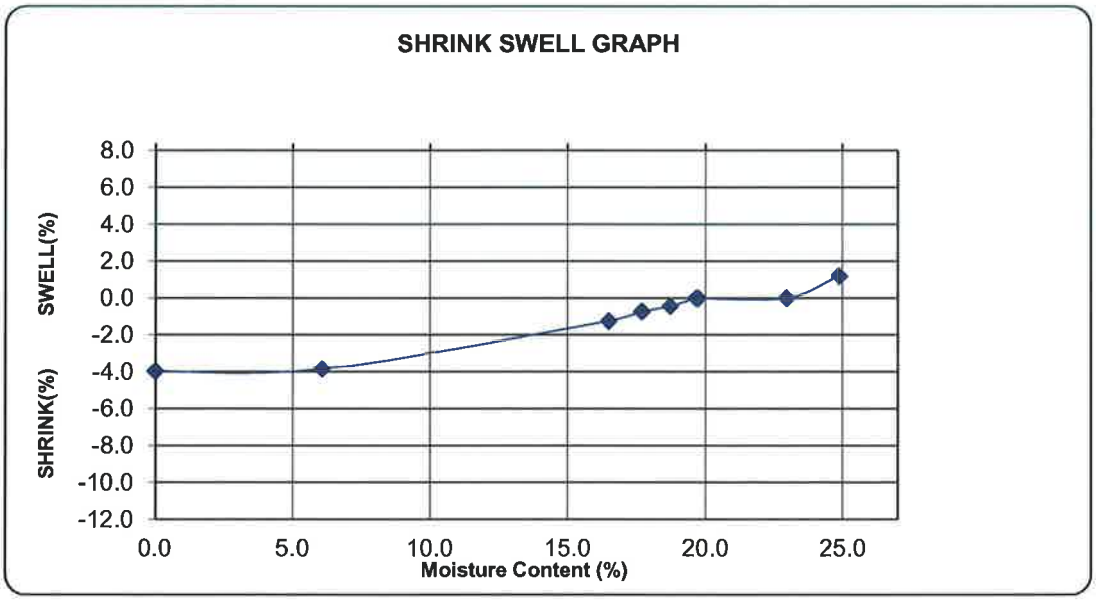
ABN 43 002 145 173

SHRINK - SWELL TEST REPORT
TEST METHOD: AS1289 7.1.1

Client: Pells Sullivan Meynink
PSM Job No.: PSM4815 - Edmondson Park

Report No.: L4838 - 2
Report Date: 3/11/2022
Page 7 of 8

Borehole No.: 20		Depth: 0.5 - 0.9m			
MOISTURE CONTENT (SWELL)		ESTIMATED UNCONFINED COMPRESSIVE STRENGTH			
BEFORE TEST	AFTER TEST	BEFORE TEST		AFTER TEST	
23.0%	24.9%	260	kPa	150,160	kPa
LOAD	SETTLEMENT UNDER LOAD BEFORE SATURATION			SWELL ON SATURATION	SHRINKAGE
25	-0.5%			1.2%	3.9%



SHRINK SWELL INDEX
2.48 %/pF

Notes: Sampled and supplied by client. Sample tested as received.

- Suction Value used in calculation = 1.8pF
- Volume Change Coefficient (α) was assumed = 2
- Visually estimated inclusions by volume = 0-5%
- Shrinkage Cracking = Moderate
- Soil Crumbling = none
- Date of receipt of sample: 21/10/2022.

NATA Accredited Laboratory Number:1327

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SOIL TEST SERVICES

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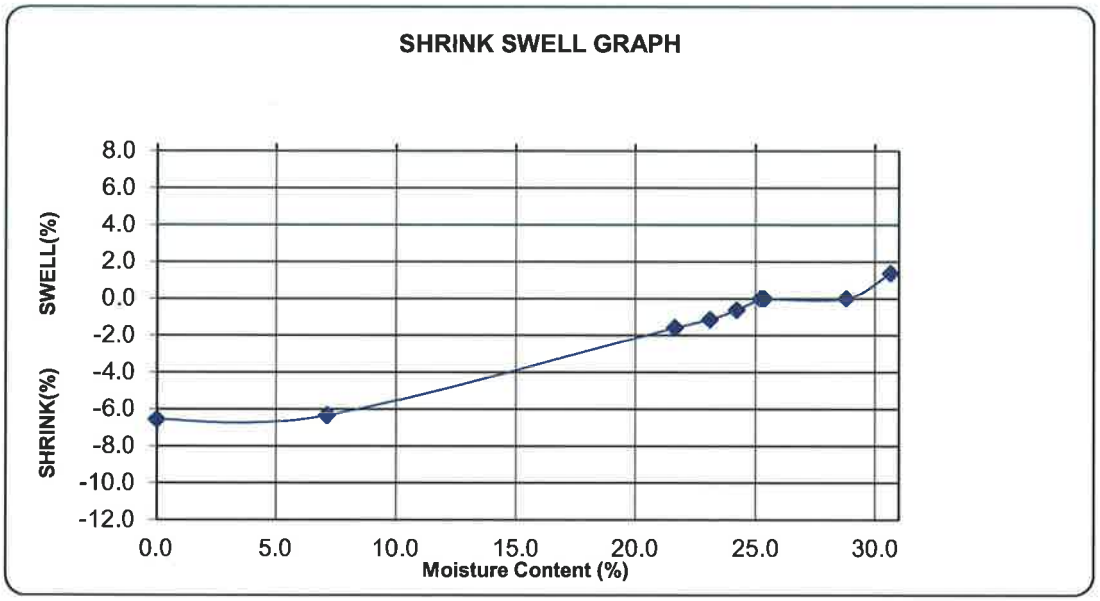
SHRINK - SWELL TEST REPORT
TEST METHOD: AS1289 7.1.1

Client: Pells Sullivan Meynink
PSM Job No.: PSM4815 - Edmondson Park

Report No.: L4838 - 2
Report Date: 3/11/2022
Page 8 of 8

Borehole No.: 30		Depth: 0.5 - 1.0m			
MOISTURE CONTENT (SWELL)		ESTIMATED UNCONFINED COMPRESSIVE STRENGTH			
BEFORE TEST	AFTER TEST	BEFORE TEST		AFTER TEST	
28.8%	30.7%	300	kPa	130,180	kPa
LOAD	SETTLEMENT UNDER LOAD BEFORE SATURATION			SWELL ON SATURATION	SHRINKAGE
25	-0.2%			1.4%	6.5%



SHRINK SWELL INDEX
3.97 %/pF

Notes: Sampled and supplied by client. Sample tested as received.

- Suction Value used in calculation = 1.8pF
- Volume Change Coefficient (α) was assumed = 2
- Visually estimated inclusions by volume = 0-5%
- Shrinkage Cracking = Moderate
- Soil Crumbling = none
- Date of receipt of sample: 21/10/2022.

NATA Accredited Laboratory Number:1327

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Authorised Signature / Date
(D. Treweek) 3/11/22

Appendix F
Salinity and Aggressivity Test Results

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES2237844**	Page	: 1 of 4
Client	: **PELLS SULLIVAN MEYNINK T/A PSM Admin PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR ROHAN STOCKER	Contact	: Customer Services ES
Address	: G3, 56 DELHI ROAD NORTH RYDE NSW, AUSTRALIA 2113	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9812 5000	Telephone	: +61-2-8784 8555
Project	: PSM 4815	Date Samples Received	: 21-Oct-2022 09:00
Order number	: PSM 4815	Date Analysis Commenced	: 25-Oct-2022
C-O-C number	: ----	Issue Date	: 01-Nov-2022 16:17
Sampler	: DENNIS LIM		
Site	: ----		
Quote number	: EN/333		
No. of samples received	: 4		
No. of samples analysed	: 4		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Nanthini Coilparampil	Laboratory Manager - Inorganics	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- ALS is not NATA accredited for the analysis of Exchangeable Cations on Alkaline Soils when performed under ALS Method ED006.
- ED007 and ED008: When Exchangeable Al is reported from these methods, it should be noted that Rayment & Lyons (2011) suggests Exchange Acidity by 1M KCl - Method 15G1 (ED005) is a more suitable method for the determination of exchange acidity (H+ + Al3+).

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH 02	BH 12	BH 21	BH 27	----
			Sampling date / time	19-Oct-2022 11:00	20-Oct-2022 10:00	17-Oct-2022 09:00	17-Oct-2022 13:00	----
Compound	CAS Number	LOR	Unit	ES2237844-001	ES2237844-002	ES2237844-003	ES2237844-004	--------
				Result	Result	Result	Result	----
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	5.9	5.7	9.6	5.3	----
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	90	324	457	326	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	15.9	9.3	7.4	22.8	----
EA080: Resistivity								
Resistivity at 25°C	----	1	ohm cm	11100	3090	2190	3070	----
ED006: Exchangeable Cations on Alkaline Soils								
Exchangeable Calcium	----	0.2	meq/100g	----	----	2.7	----	----
Exchangeable Magnesium	----	0.2	meq/100g	----	----	3.0	----	----
Exchangeable Potassium	----	0.2	meq/100g	----	----	0.2	----	----
Exchangeable Sodium	----	0.2	meq/100g	----	----	3.2	----	----
Cation Exchange Capacity	----	0.2	meq/100g	----	----	9.1	----	----
Exchangeable Sodium Percent	----	0.2	%	----	----	34.6	----	----
ED007: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	0.7	----	----	----	----
Exchangeable Magnesium	----	0.1	meq/100g	6.7	----	----	----	----
Exchangeable Potassium	----	0.1	meq/100g	0.2	----	----	----	----
Exchangeable Sodium	----	0.1	meq/100g	1.3	----	----	----	----
Cation Exchange Capacity	----	0.1	meq/100g	8.9	----	----	----	----
Exchangeable Sodium Percent	----	0.1	%	15.0	----	----	----	----
ED008: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	----	<0.1	----	2.7	----
Exchangeable Magnesium	----	0.1	meq/100g	----	4.5	----	6.1	----
Exchangeable Potassium	----	0.1	meq/100g	----	0.3	----	0.2	----
Exchangeable Sodium	----	0.1	meq/100g	----	1.7	----	1.6	----
Cation Exchange Capacity	----	0.1	meq/100g	----	6.6	----	12.1	----
Exchangeable Sodium Percent	----	0.1	%	----	26.0	----	13.1	----
ED040S : Soluble Sulfate by ICPAES								
Sulfate as SO4 2-	14808-79-8	10	mg/kg	110	80	60	80	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	10	mg/kg	370	440	350	420	----