



RGS32813.1-AC

14 December 2021

Rise Proiects 57/6-8 Herbert Street, St Leonards NSW 2065

Attention: Liam Porritt

Dear Liam,

RE: Proposed Residential Development – Lot 2 Phillip Drive, South West Rocks Acid Sulfate Soil Management Plan

INTRODUCTION

This Acid Sulfate Soil Management Plan (ASSMP) has been prepared for the proposed residential development at Lot 2 Phillip Drive, South West Rocks. Based on the drawings provided, it is proposed to:

- Develop the elevated southern parts of the site with townhouses and dual occupancy flats
- Develop the lower lying northern parts of the site with medium density residential buildings.

As part of the development works it is anticipated that the lower lying northern parts of the site will require filling to raise the area to mitigate flood impacts.

The site is located in an area of gently undulating topography, the Coastal Quaternary Geology map of Kempsey indicates the site is underlain by Holocene age inter-barrier creek deposits (northern low lying are) and pleistocene dune deposits (southern elevated area). Reference to the South West Rocks ASS Risk Map (DLWC, 2000) indicates the southern area of the site is located in an area of "no known occurrence of ASS" and the northern area of the site is located in an area of "high probability" at or within 1m of the ground surface.

The site encompasses an area of approximately 43,400m² and is currently a green field site.





Diagram 1: Site Location and Setting

2 PROPOSED DEVELOPMENT

The proposed buildings are expected to be multi-level with ground floor car parking area. Surface levels vary between 2m and 6.5m AHD.

At this stage the final design of the development is unknown, however the excavations at the site are expected to be up to 2.0m depth for buried services such as stormwater and sewer and localised deeper excavations up to 15m for installation of piled foundations. It is assumed that greater than 1000 tonnes of material are to be disturbed as part of the development.

3 ACID SULFATE SOIL ASSESSMENT

An acid sulfate soil (ASS) assessment was undertaken as part of the geotechnical assessment completed for the project by RGS (Ref: RGS32813.1-AB. 1 dated 16 September 2011). The results of the assessment are summarised below.

Investigations in the more elevated southern and western areas (materials between 3 to 6.5m AHD) generally encountered a subsurface profile comprising pale grey / white loose to medium dense dune sand. Below about 3m AHD the materials changed to dense to very dense dark brown estuarine silty sand to depths of at least 10m.

Investigations in the low lying north and northeastern areas (below RL 3m AHD) the areas generally encountered a subsurface profile comprising dense to very dense dark brown estuarine silty sand to depths of at least 30m.

An extract of the acid sulfate soils risk map for South West Rocks is presented below, the map indicates the site is situated on estuarine deposits with the soils within 1m of the ground surface (shaded pink) having a high probability of being acid sulfate soil. Based on the survey data



provided this correlates to the dark brown sand soil below 2m AHD having a high probability of being acid sulfate soil.

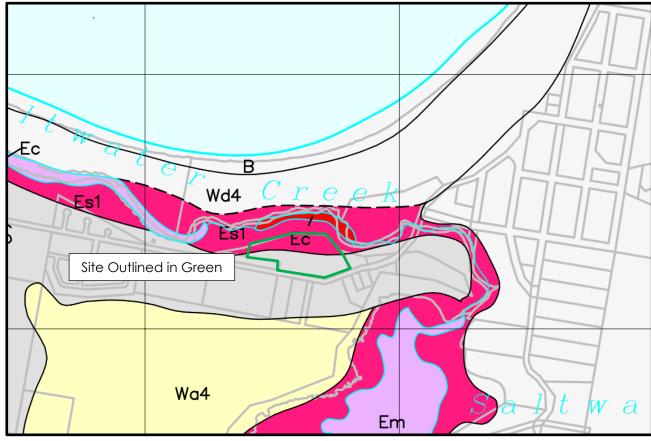


Diagram 2: Acid Sulfate Soil Risk Map for Site

Sourced from the NSW Government Environment and Heritage eSPADE website.

For the assessment, soils were sampled across the site within the upper pale grey / white dune sand and into the underlying dark brown marine sand.

ASS screening tests were undertaken on 60 samples taken during the investigation. The findings from the screening tests are discussed below.

- The samples revealed pH_F values between 3.92 and 6.47 in distilled water. pH_F less than 4 is an indicator of Actual ASS;
- The samples revealed pH_{FOX} values between 1.47 and 6.11 in hydrogen peroxide. Values less than 3 can be an indicator of Potential ASS (PASS) but can also be the result of high organic content in the soil;
- A pH change of more than 1 unit was recorded between pH_F and pH_{FOX} in 39 samples. A pH change of more than 1 unit is an indicator of PASS.

Based on the results of the testing the pale grey / white dune sand had a low reaction and are not considered acid sulfate soils. The dark brown silty sand materials (typically below 2.5m AHD) had a medium to high reactivity and were submitted for Chromium Reducible Sulphur (CRS) analysis. A summary of the test results is presented in Table 1.



Table 1: Summary of CRS Results

Location	Depth	Texture	Net Acidicy (mol H+/t)	Lime Calculation (kg CaCO ₃ /t DW)
TP3	1.0 to 1.2	Coarse	34	3
TP3	1.5 to 1.7	Coarse	28	2
TP4	1.0 to 1.2	Coarse	4	0
TP4	2.0 to 2.2	Coarse	3	0
TP5	0.5 to 0.7	Coarse	52	4
TP5	1.5 to 1.7	Coarse	62	5
TP6	2.0 to 2.2	Coarse	58	4
TP14	1.5 to 1.7	Coarse	10	1
TP18	2.0 to 2.2	Coarse	5	0
BH1	4.0 to 4.45	Coarse	48	4
BH1	5.5 to 5.6	Coarse	130	10
BH1	7.0 to 7.07	Coarse	170	13
внз	5.5 to 5.95	Coarse	107	8
внз	7.0 to 7.45	Coarse	59	4
внз	11.5 to 11.95	Coarse	34	3

3.1 ASS Assessment Summary

The results of the analysis were compared against the action criteria as presented in Table 5.4 of the Water Quality Australia National Acid Sulfate Soils Guidance National acid sulfate soils sampling and identification methods manual June 2018.

The net acidity concentration's exceeded the ASS Assessment Guidelines Action Criteria of 18 moles H+/ tonne for both the test pits and boreholes where samples were taken in the dark brown silty sand materials taken below 2.5m AHD.



On the basis of the laboratory testing results summarised in Table 1:

- The upper pale grey / white dune sand materials are not considered to be ASS.
- All of the dark brown silty sand materials are considered ASS. An ASS Management Plan
 would therefore be required for works such as services installations and pile excavations that
 disturb the dark brown sand soils. The following liming rates are recommended:
 - A liming rate of 10 kg/m³ in the upper 2.5m of the dark brown silty sand soils (between 0m and 2.5m AHD). These materials are typically encountered at the ground surface in the northern and north eastern areas of the site and below the pale grey / white dune sand in the southern and western areas of the site.
 - o A liming rate of 26 kg/m³ in the dark brown and grey sand soils below 0m AHD.

The purpose of an ASS Management Plan is to consider both the potential on-site and off-site impacts of the disturbance of the soils present, with any potential acid leachate being managed appropriately. The preferred option for management of ASS is treatment and reuse on site. Off site disposal of ASS will require neutralisation to pH 7 prior to disposal at an appropriate licensed landfill facility in accordance with NSW EPA requirements.

4 RESPONSIBILITIES

The project superintendent is responsible for implementing the ASS management protocols detailed within this ASSMP. Only a suitably experienced ASS consultant may vary the procedures detailed herein.

The superintendent shall:

- Record a daily log showing the volume of material that has been excavated, and treated;
 and
- Ensure that validation testing is undertaken by an independent monitoring consultant on a regular basis.

The requirements of the ASSMP are in addition to, but do not override any other standard procedures such as safety considerations. Where conflict results, or may result from, the implementation of the ASS management as against other performance criteria, the project superintendent shall obtain directives from the project manager or the ASS consultant as appropriate.

5 NEUTRALISING MATERIALS

Fine Agricultural Lime (ag-lime) must be used for liming of excavated materials. Hydrated lime, Dolomatic ag-lime, or magnesium blend ag-lime, should <u>not</u> be used. The ag-lime grind shall have:

- At least 85% by weight passing 1mm, and 100% passing 2.5mm. In general, a finer grind is better; and
- Ag-lime shall have a Neutralising Value (NV) of 90% or better (i.e. NV>90).
- Given the estimated 13,000m³ of material requiring treatment, a preliminary estimate indicates that a total of 234,000kg of lime will be required to treat the inferred ASS materials.



6 MANAGEMENT AND TREATMENT

6.1 Options

The management and treatment of the Actual ASS will be dependent on where the material is treated. The materials may be treated on site, or if space does not permit then the materials could be moved to an offsite treatment area to allow more efficient treatment of the excavated materials.

NSW EPA requirements (Waste Classification Part 5 – ASS) note Actual ASS is to be treated on site prior to removal off site to a licenced waste disposal facility. Transport of ASS off site for treatment and then potential reuse of the material as a general fill will require a Site Specific Exemption application to NSW EPA for disposal at a nominated site that has a Development Approval for filling works. This process requires the material to be described in detail and an assessment on potential environmental risks the material poses. Based on previous experience with such applications, a minimum turn around time of three months is anticipated.

6.2 Treatment Area

The treatment area shall be fully enclosed by a bund wall to prevent runoff to other areas of the site. The bund must have a height of at least 0.5m that comprises of soils that are not ASS or are treated ASS. The size of the treatment area should be of sufficient size to treat the excavated materials at the proposed excavation rate and to store material for the period required to undertake the verification testing (approximately two (2) weeks). The treatment area should be lined with several layers of heavy duty plastic (HDPE). The lining should be replaced periodically as required, where it is damaged during the treatment process. Treatment may also be undertaken in an area underlain by low permeability material such as concrete or clay. Alternatively, the material may be placed in a large metal skip bin for treatment. It is noted that this may not be efficient for treatment of large volumes of material.

The treatment area should always be covered with heavy duty plastic to prevent runoff, particularly when inclement weather is forecast.

The stockpile pad should grade to a low point where potential leachate can be captured within the bunded area for further treatment if required.

6.3 Treatment

The ASS shall be placed in the treatment area and spread in a layer of not more than 200mm thickness with approved ag-lime being applied across the treatment area at the rates provided in Section 3.3. In calculating the quantity of lime required, the theoretical requirement has been multiplied by a factor of safety of 1.5 to account for the rate of lime reactivity and the possibility of non-homogenous mixing.

The following liming procedures (or equivalent) should be undertaken:

- Spreading of soil in thin (<200mm) layers at the prepared treatment pad;
- Addition of lime by a spreader or pug;
- Cultivate the lime thoroughly into the soil using a disc plough or cultivator before placement of next layer;



- Placement of second layer onto stockpile and addition of lime, repeating the process until
 the maximum height of the stockpile is achieved; and
- Removal of the material and disposal (Refer Section 6.6).

The soil undergoing treatment should be kept moist at all times but not wet.

6.4 Validation Testing

Validation testing shall be undertaken by an independent ASS consultant at the initial rate of one sample per 250m³ or part thereof. The samples shall be submitted to a NATA accredited laboratory for validation testing using the Chromium Reducible Sulfur suite.

All records applicable to acid sulfate testing and treatment shall be collated to substantiate treatment.

It is noted that validation testing takes about 7 to 10 days, therefore this should be allowed in the earthworks management plan to reduce the potential for delays during construction.

Should leachate accumulate in the bunded area, the pH should be monitored daily. Neutralisation may be required should the leachate pH fall below background levels.

6.5 Monitoring

The following monitoring regime is recommended:

- Prior to commencement of works a round of water quality monitoring from adjacent surface waters and drains is recommended to confirm background parameters;
- Treated ASS should be assessed using validation techniques to ensure net acidity is less than Action Criteria (18 moles H+/ tonne):
 - o Action Where net acidity > 18 moles H+/ tonne further lime treatment will be required.
- Water quality monitoring should be undertaken on any leachate captured within the bunded areas. Representative background values are to be confirmed:
 - Action Where leachate water has a pH <background value it will require neutralisation which can be undertaken using a neutralising agent such as calcined magnesia or hydrated lime. Further pH monitoring of the treated water will be required to ensure neutralisation has occurred. Treated water should be discharged overland, away from surface water bodies, to allow infiltration into the soil;</p>
- Record details of all monitoring results.

6.6 Post Treatment

Once the ASS materials have been treated in accordance with this ASSMP, the materials may be reused onsite as general fill or be disposed of in accordance with the relevant regulatory requirements. To comply with the NSW EPA Waste Classification Guidelines (2014) any material to be disposed of off-site requires waste classification. As the material will be treated acid sulfate soil it <u>cannot</u> be classified as virgin excavated natural material (VENM) or excavated natural material (ENM). Therefore, the material will need to be disposed of at a licenced landfill. A site-specific



exemption for the material could be sort from the EPA to enable the material to be used elsewhere, rather than having to be disposed of to landfill.

7 MANAGEMENT OF ONSITE DEWATERING

Should deep excavations with dewatering be proposed which have the potential to lower the natural groundwater level at the site (i.e. the design of basement excavation with dewatering to levels below the natural groundwater level of 2m AHD). Then the lowering of the groundwater could expose actual ASS materials.

In these situations, the contractor must install and / or employ an appropriate groundwater monitoring and control system such that the surrounding groundwater table will be maintained at existing levels. Options such as installing a groundwater cut off wall or groundwater re-injection could be employed to maintain groundwater levels outside the site.

7.1 Treatment of Water

Groundwater and surface water collected from within the site during excavation should be assessed prior to disposal. The following procedures will be required depending on the contamination status of the water.

- The water should be assessed for pH. If pH is below 6.5, the water will require treatment prior to discharge or disposal;
- pH change can take some time to occur, therefore, a suitable holding tank and a water pump should be installed to store collected water. The tank may fulfil a dual purpose and provide suspended solids removal prior to discharge; and
- Hydrated lime in a pre-mixed slurry should be added and the water thoroughly agitated.
 The pH of the water should be measured for one day to confirm stabilisation of water conditions, until pH is within the optimum level of 6.5 to 8.5 pH Units. The application of hydrated lime should continue until the water quality objectives are met.

Alternatively, the acidic waters can be disposed of to a licensed treatment facility in accordance with the NSW EPA Waste Classification Guidelines.

8 LIMITATIONS

This report comprises the results of an investigation carried out for a specific purpose and client as defined in the document. The report should not be used by other parties or for purposes or projects other than those assumed and stated within the report, as it may not contain adequate or appropriate information for applications other than those assumed or advised at the time of its preparation. The contents of the report are for the sole use of the client and no responsibility or liability will be accepted to any third party. The report should not be reproduced either in part or in full, without the express permission of Regional Geotechnical Solutions Pty Ltd.

Geotechnical site investigation is based on data collection, judgment, experience, and opinion. By its nature, it is less exact than other engineering disciplines. The findings presented in this report and used as the basis for the recommendations presented herein were obtained using normal, industry accepted geotechnical design practises and standards. To our knowledge, they represent a reasonable interpretation of the general condition of the site. Under no circumstances, however, can it be considered that these findings represent the actual state of the site at all points.



The recommended depth and properties of any soil, rock, groundwater, or other material referred to in this report is an engineering estimate based on the information available at the time of its writing. The estimate is influenced and limited by the fieldwork method and testing carried out in the site investigation, and other relevant information as has been made available. In cases where information has been provided to Regional Geotechnical Solutions for the purposes of preparing this report it has been assumed that the information is accurate and appropriate for such use. No responsibility is accepted by Regional Geotechnical Solutions for inaccuracies within any data supplied by others.

If site conditions encountered during construction vary significantly from those discussed in this report, Regional Geotechnical Solutions Pty Ltd should be contacted for further advice.

This report alone should not be used by contractors as the basis for preparation of tender documents or project estimates. Contractors using this report as a basis for preparation of tender documents should avail themselves of all relevant background information regarding the site before deciding on selection of construction materials and equipment.

If you have any questions regarding this project, or require any additional consultations, please contact the undersigned.

For and on behalf of

Regional Geotechnical Solutions Pty Ltd

Matt Rowbotham

Associate Engineering Geologist

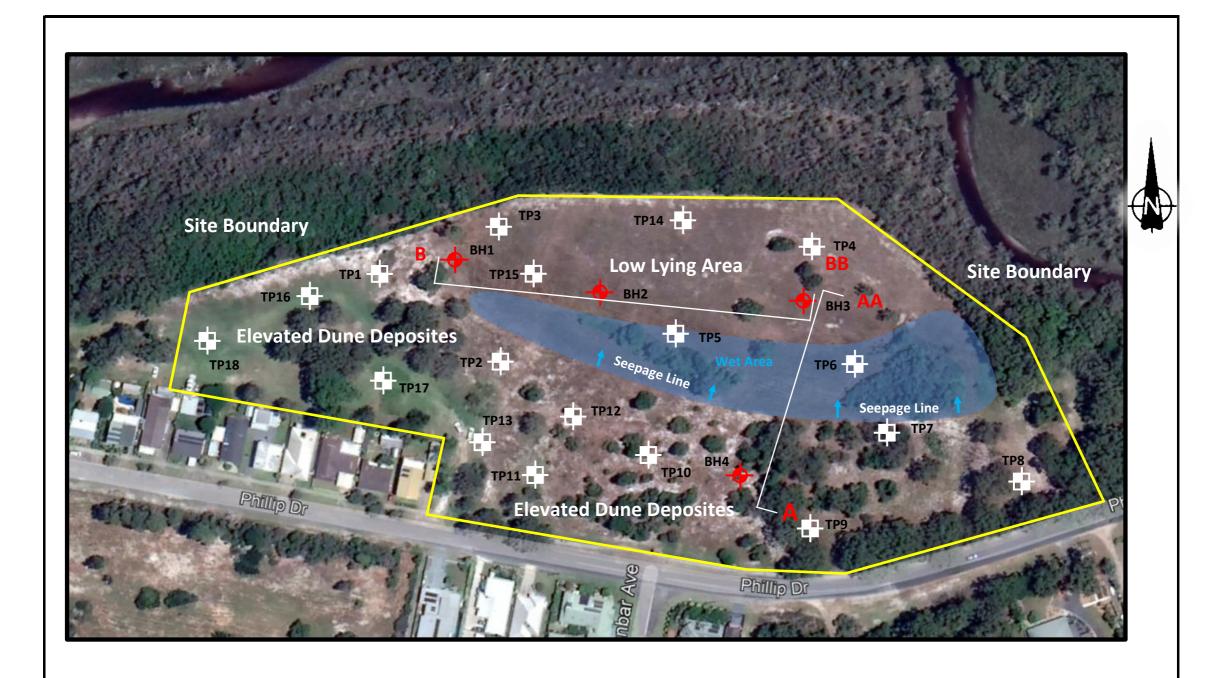
Attachments

Figure 1

Laboratory Results

Borehole and Test Pit Logs

Survey Plan



REGIONAL
GEOTECHNICAL
SOLUTIONS

	Client:	Rise Projects	Job No.	RG\$32813.1
	Project:	Residential Development	Drawn By:	MR
L		Lot 2 Phillip Drive, South West Rocks	Date:	10.12.21
	Title:	Borehole and Test Pit Locations	Drawing No.	Figure 1

RESULTS OF ACID SULFATE SOIL ANALYSIS

1/21 Cook Drive COFFS HARBOUR N																	reon ac	ated soil	Hom u	eated soil
Sample Identification	EAL Lab Code	Texture	Moisture	e Content		pH _F an	d pH _{FOX}		KCI-extrac	table sulfur	Potential Su	fidic Acidity		Actual Acidity	Retaine	d Acidity	Acid Neutrali	sing Capacity	Net Acidity	Lime Calculation
	Code					ı		1			(Chromium Re	ducible Sulfur -		(Titratable Actual					-	
									(8	i _{KCI})	CF	S)		Acidity - TAA)			(AN	C _{BT})		
			(% moisture of total wet	(g moisture / g of oven dry	pH₂	pH _{rax}	pH	Reaction	(% S _{KCI})	(equiv.	(% S _{cr})	(mol H*/t)	pH _{KCI}	(mol H*/t)	(%S _{NAS})	(mol H ⁺ /t)	(% CaCO ₃)	(mol H*/t)	(mol H*/t)	(kg CaCO ₃ /t DW)
Method Info.		**	weight)	soil)		(In-house n	change nethod S21)		(mol H*/t)	(In-house m	ethod \$20)		ise method 16b)	,		(In-house r	nethod S14)	**	**
																	,			
TP1 0.5-0.7	M0509/1 M0509/2	Coarse	13.8	0.16	5.77	4.83	-0.94	Low										-		
TP1 1.5-1.7 TP2 0.5-0.7	M0509/2 M0509/3	Coarse	17.0 18.2	0.20 0.22	4.60 5.10	4.21 3.34	-0.39 -1.76	Low										-		
TP2 1.5-1.7	M0509/4	Coarse	18.4	0.23	5.19	4.25	-0.94	Low										-		
TP3 0.5-0.7	M0509/5	Coarse	21.4	0.27	4.63	3.51	-1.12	Low												
TP3 1.0-1.2	M0509/6	Coarse	19.4	0.24	4.62	2.04	-2.58	Medium	0.003	2	0.007	5	4.31	29	<0.001	0			34	3
TP4 0.5-0.7	M0509/7	Coarse	17.0	0.20	5.64	4.93	-0.71	Low												
TP4 1.5-1.7	M0509/8	Coarse	19.2	0.24	5.36	3.09	-2.27	Low												
TP5 0.5-0.7	M0509/9	Coarse	20.6	0.26	4.38	2.50	-1.88	Medium	0.004	3	0.012	8	4.31	44	< 0.001	0			52	4
TP5 1.0-1.2	M0509/10	Coarse	20.1	0.25	4.66	3.55	-1.11	Low												
TP6 0.5-0.7	M0509/11	Coarse	18.7	0.23	4.55	3.02	-1.53	Low												
TP6 2.0-2.2	M0509/12	Coarse	18.2	0.22	3.92	1.65	-2.27	Medium	0.024	15	0.043	27	4.64	31				-	58	4
TP7 0.5-0.2	M0509/13	Coarse	4.4	0.05	4.94	4.49	-0.45	Low			-	-						-		
TP7 2.0-2.2	M0509/14	Coarse	17.5	0.21	5.44	5.02	-0.42	Low			-	-						-		
TP8 0.5-0.7	M0509/15	Coarse	4.1	0.04	4.74	4.36	-0.38	Low	-		-	-				-		-		
TP8 1.5-1.7 TP9 0.5-0.7	M0509/16 M0509/17	Coarse Coarse	4.1 2.9	0.04 0.03	5.11 5.19	4.74 4.88	-0.37 -0.31	Low				-						-		
	M0509/17 M0509/18	Coarse	3.9	0.03	4.92	4.88	-0.49	Low												
TP9 1.5-1.7	M0509/18 M0509/19	Coarse	5.2	0.04	5.18	4.43	-0.49	Low												
TP10 1.5-1.7	M0509/19 M0509/20	Coarse	15.7	0.05	4.92	4.92	-0.20	Low												
TP10 0.5-0.7 TP10 1.0-1.2	M0509/21	Coarse	5.4	0.19	5.08	5.08	0.00	Low											**	**
TP12 0.5-0.7	M0509/22	Coarse	9.8	0.11	4.90	4.64	-0.26	Low										-		
TP12 1.0-1.2	M0509/23	Coarse	16.7	0.20	5.38	4.87	-0.51	Low												
TP12 1.5-1.7	M0509/24	Coarse	19.3	0.24	5.67	4.44	-1.23	Low										-		
TP13 0.5-0.7	M0509/25	Coarse	4.4	0.05	5.37	4.71	-0.66	Low												
TP14 0.5-0.7	M0509/26	Coarse	15.6	0.18	5.65	5.08	-0.57	Low												
TP14 1.0-1.2	M0509/27	Coarse	18.0	0.22	5.82	5.11	-0.71	Low												
TP14 1.5-1.7	M0509/28	Coarse	17.9	0.22	5.58	4.71	-0.87	Low	0.002	1	< 0.005	0	5.30	10					10	1
TP15 0.5-0.7	M0509/29	Coarse	18.7	0.23	4.55	2.90	-1.65	Low												
TP15 1.0-1.2	M0509/30	Coarse	35.2	0.54	4.38	2.54	-1.84	Low												
TP15 1.5-1.7	M0509/31	Coarse	19.9	0.25	4.60	3.10	-1.50	Low												
TP15 2.0-2.2	M0509/32	Coarse	24.2	0.32	4.69	2.25	-2.44	Low					**						**	
TP16 0.5-0.7	M0509/33	Coarse	8.7	0.09	5.41	4.27	-1.14	Low					**						**	
TP16 1.0-1.2	M0509/34	Coarse	15.9	0.19	5.33	3.90	-1.43	Low												
TP16 1.5-1.7	M0509/35	Coarse	18.5	0.23	5.35	3.48	-1.87	Low											**	
TP16 2.0-2.2	M0509/36 M0509/37	Coarse	18.7 14.9	0.23 0.18	5.15 5.75	4.11 4.60	-1.04 -1.15	Low												
TP17 0.5-0.7	M0509/37 M0509/38	Coarse	17.0	0.18	5.75	4.70	-1.15	Low												
TP17 1.0-1.2 TP17 1.5-1.7	M0509/38 M0509/39	Coarse	12.7	0.20	5.72	4.70	-0.86	Low												
TP18 0.5-0.7	M0509/39	Coarse	13.8	0.15	6.12	5.10	-1.02	Low												
TP18 0.5-0.7	M0509/40	Coarse	16.3	0.10	6.02	4.30	-1.73	Low												
TP18 1.5-1.7	M0509/42	Coarse	10.5	0.12	6.21	5.00	-1.21	Low												
TP18 2.0-2.2	M0509/43	Coarse	16.8	0.20	5.86	2.90	-2.96	Medium	0.002	1	< 0.005	0	5.70	5					5	0
TP1 1.0-1.2	M0509/44	Coarse	20.6	0.26	5.82	2.10	-3.72	Low												
TP5 1.5-1.7	M0509/45	Coarse	19.3	0.24	5.17	1.47	-3.70	High	0.012	8	0.030	19	5.17	43					62	5
TP4 2.0-2.2	M0509/46	Coarse	17.4	0.21	5.99	3.29	-2.70	Medium	0.003	2	< 0.005	0	6.03	3					3	0
TP4 1.0-1.2	M0509/47	Coarse	18.1	0.22	5.82	4.27	-1.55	Medium	0.002	1	< 0.005	0	6.05	4					4	0
TP3 1.5-1.7	M0509/48	Coarse	18.8	0.23	5.40	1.82	-3.58	Medium	0.003	2	0.008	5	5.53	23					28	2
TP6 1.5-1.7	M0509/49	Coarse	19.7	0.25	4.04	1.52	-2.52	Low			-	-						-		
TP6 1.0-1.2	M0509/50	Coarse	19.2	0.24	4.72	1.52	-3.21	Low			-	-				-		-		
TP2 1.0-1.2	M0509/51	Coarse	18.2	0.22	5.09	2.57	-2.52	Low										-		
TP8 2.0-2.2	M0509/52	Coarse	12.7	0.15	6.06	3.37	-2.69	Low		1 7						;		-		
BH1 77.07	M0509/53 M0509/54	Coarse	20.1	0.25	4.85	2.28	-2.57	Medium	0.006	4	0.015	9	4.28	158	0.005	2		-	170	13
BH1 5.5-5.6		Coarse	18.3	0.22	5.07	2.94	-2.13		0.005	3	0.014	9	4.67	121				-	130	10
BH1 4.0-4.45	M0509/55 M0509/56	Coarse	22.1	0.28	5.11	3.72	-1.39	Medium Low	0.003	2	0.013	8	5.07	40				-	48	4
BH1 13.0-13.45 BH3 8.5-8.95	M0509/56 M0509/57	Coarse Coarse	16.3 20.9	0.20 0.26	5.79 5.61	4.16 1.67	-1.63 -3.94	Low			-							-		
	M0509/57 M0509/58	Coarse	21.0	0.26	6.47	2.10	-3.94	Medium	0.005	3	0.041	25	6.01	9					34	3
BH3 11.5-11.95 BH3 5.5-5.95	M0509/58 M0509/59	Coarse	20.9	0.27	5.95	2.75	-3.20	Volcanic	0.003	5	0.160	100	5.70	7				-	107	8
BH3 7.0-7.45	M0509/59 M0509/60	Coarse	20.9	0.26	5.93	2.73	-3.20	Extreme	0.007	5	0.160	51	5.83	7		**		-	59	4
					0.00	2.12	2.01	FVIIGHIG	0.007		0.002									

NOTES:

- All analysis is reported on a dry weight (DW) basis, unless wet weight (WW) is specified.
- 2. Samples are dried and ground immediately upon arrival (unless supplied dried and ground).
 3. Analytical procedures are sourced from Sullivan L, Ward N, Toppler N and Lancaster G. 2018. National acid sulfate soils guidance: national acid sulfate soils identification and laboratory methods manual, Department of Agriculture and Water Resources, Canberra, ACT. CC BY 4.0.
- 4. The Acid Base Accounting Equation, where Acid Neutralising Capacity has not been corroborated by other data, is Net Acidity = Potential Acidity + Actual Acidity + Retained Acidity (Eq. 3.2; Sullivan et al. 2018 full reference above).

 5. The Acid Base Accounting Equation for post-limed soil materials is Net Acidity = Potential Acidity + Actual Acidity + Retained Acidity (Ep. 3.2; Sullivan et al. 2018 full reference above).
- While the Acid Neutralising Capacity of a soil material may not be included in the Net Acidity calculation (Note 4), it must be measured to give an Initial Acid Neutralising Capacity if verification testing is planned post-liming. The Initial Acid Neutralising Capacity must be provided by the client to enable EAL to produce Verification Net Acidity and Liming calculations for post-limed soil materials.
- 6. The Acid Base Accounting Equation, where Acid Neutralising Capacity has been corroborated by other data, is Net Acidity = Potential Acidity + Retual Acidity + Retained Acidity Acid Neutralising Capacity (Eq. 3.1; Sullivan et al. 2018 full reference above).
 7. The lime calculation includes a Safety Factor of 1.5 as a safety margin for acid neutralisation (Sullivan et al. 2018). This is only applied to positive values. An increased Safety Factor may be required in some cases.
- 8. Retained Acidity is required when the pHKCl < 4.5 or where jarosite has been visually observed.
- 9. A negative Net Acidity result indicates an excess acid neutralising capacity.
- 10. If insufficient mixing occurs during initial sampling, or during post-liming, or both: the Potential Sulfidic Acidity may be greater in the post-limed sample than in the initial sample; the post-liming Acid Neutralising Capacity may be lower in the post-limed sample than in the initial sample.
- 11. An acid sulfate soil management plan is triggered by Net Acidity results greater than the texture dependent criterion: coarse texture ≥ 0.03% S or 18 mol H+/t; medium texture ≥ 0.06% S or 36 mol H+/t; fine texture ≥ 0.1% S or 62 mol H+/t) (Table 1.1; Sullivan et al. 2018 full reference above) 12. For projects that disturb > 1000 t of soil material, the coarse trigger of ≥ 0.03% S or ≥ 18 mol H+/t must be applied in accordance with Sullivan et al. (2018) (full reference above).
- 13. Acid sulfate soil texture triggers can be related to NCST (2009) textures: coarse and peats = sands to loamy sands; medium = clayey sand to light clays; fine = light medium to heavy clays (Sullivan et al. 2018 full reference above).
- 15. A negative Net Acidity result indicates an excess acid neutralising capacity.
- 16. :: is reported where a test is either not requested or not required. Where pHKCl is < 4.5 or > 6.5, zero is reported for SNAS and ANC in Net Acidity calculations, respectively.
- 17. Results refer to samples as received at the laboratory. This report is not to be reproduced except in full.
- ** NATA accreditation does not cover the performance of this service.

 Analysis conducted between sample arrival date and reporting date.
- 20. All services undertaken by EAL are covered by the EAL Laboratory Services Terms and Conditions (refer SCU.edu.au/eal/t&cs or on request).
- 21. Results relate to the samples tested.
 22. This report was issued on 02/09/2021.







CLIENT:

De Groot and Benson

PROJECT NAME: Proposed Development **JOB NO:** RGS32813.1

SITE LOCATION: Lot 2 Phillip Drive, South West Rocks

TEST LOCATION: Refer to Site Plan **DATE:** 26/7/21

TEST PIT NO:

LOGGED BY:

PAGE:

TP1

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MR

EQUIPMENT TYPE: 5 Tonne Excavator **EASTING**: 505629 m **SURFACE RL**:

		IENT TYP IT LENGTI		5 Tonr		avato I DTH :	0.5 m EASTING :			SURF. DATU		RL:	AHD
	Drill	ing and San	npling				Material description and profile information				Field	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plastic characteristics,colour,minor compone		MOISTURE	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
ш		В		-		SM	Silty SAND: fine to medium grained, grey affected.	ı, root		MD	DCP (0-1.6m)	1 1 2	TOPSOIL
		0.30m 0.50m		- 0. <u>5</u>		SP	SAND: fine to medium grained, pale grey	 /white.	_ w	_		2	AEOLIAN — — — — —
	2021	B&E		- -								2 2	
	l ⊲ 26/07/2021	0.90m 1.00m		1. <u>0</u>			Colour change to brown/dark brown, som	ıe silt.				2 3 5	COLLAPSING PIT WALLS @ 1.0M
o and in Situ 1001		B 1.40m		-								4 2 3	
0.02.00.04 ∪atgel∟ar		1.50m B&E		1. <u>5</u> -								3	SULFUR SMELL
0/09/2021 14:16 11		1.80m		2.0			Due to Collapsing Pit Walls Hole Terminated at 1.80 m						
S.GPJ < <drawingfile>></drawingfile>				-									
KGS32813.1 1E31 F11 LUGG				2.5_ -									
O.	END:			Notes, Sa	mples a	nd Tes	<u>s</u>	<u>Consi</u> VS	istency Very Sof	<u> </u>	<u>U(</u>	CS (kPa	a) Moisture Condition D Dry
Wat Wat Stra	Wat (Dat Wat Wat	er Level te and time sl ter Inflow er Outflow anges	hown)	U_{50} CBR E ASS B	Bulk s Enviro Acid S	ample f onmenta	ter tube sample or CBR testing Il sample soil Sample	S F St VSt H Fb	Soft Firm Stiff Very Stiff Hard Friable		25 50 10 20	5 - 50 0 - 100 00 - 200 00 - 400 400	M Moist W Wet W _p Plastic Limit
RG LIB 1.05.0.6LB	G tra D	radational or ansitional stra efinitive or dis rata change	ata	Field Test PID DCP(x-y) HP	Photo Dynar	nic pen	on detector reading (ppm) etrometer test (test depth interval shown) meter test (UCS kPa)	Densi		L O M D	ery Lo oose lediun ense ery Do	n Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%



CLIENT:

De Groot and Benson

PAGE: 1 of 1 **PROJECT NAME:** Proposed Development JOB NO: RGS32813.1

TEST PIT NO:

TP2

MR

SITE LOCATION: Lot 2 Phillip Drive, South West Rocks LOGGED BY:

TEST LOCATION: Refer to Site Plan DATE: 26/7/21

	ST PI	T LENGTH	ł:	5 Tonr		avato	0.5 m NORTHING	50566 : 658247		DATU	M:		AHD
	Drill	ing and Sam	pling	1			Material description and profile information				Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plastici characteristics,colour,minor componer		MOISTURE	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
В		E 0.45		_		SM	Silty SAND: fine to medium grained, dark brown/dark grey.			MD	(0-1.7m)	1	TOPSOIL
	l	0.15m 0.50m B 0.90m 1.00m B 1.40m 1.50m		- 0.5 <u>-</u> - 1.0 <u>-</u> - 1.5 <u>-</u>		SP	SAND: fine to medium grained, pale grey/	white.	W		DCP (0-1	1 1 2 1 1 2 3 3 3 4 3 4 3 3 3 3	AEOLIAN COLLAPSING PIT WALLS 0.8M
Wat	Wat (Dat Wat Wat	er Level te and time sher Inflow er Outflow anges	lown)	2.0	50mm Bulk s Enviro Acid S	Diame ample f	Due to Collapsing Pit Walls Hole Terminated at 1.90 m ts ter tube sample for CBR testing al sample Soil Sample	S F St VSt H	ency Very Soft Soft Firm Very Stiff Very Stiff Hard Friable		50 50 10 20 >4	CS (kPe 25 5 - 50 0 - 100 00 - 4000	D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit
	G tra De	radational or ansitional stra efinitive or dis rata change		PID DCP(x-y) HP	Photoi Dynan	nic pen	on detector reading (ppm) etrometer test (test depth interval shown) ometer test (UCS kPa)	Density		Lo M D	ery Lo oose lediur ense ery D	n Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%



CLIENT:

De Groot and Benson

PROJECT NAME: Proposed Development JOB NO:

SITE LOCATION: Lot 2 Phillip Drive, South West Rocks LOGGED BY:

TEST LOCATION: Refer to Site Plan DATE: 26/7/21

TEST PIT NO:

PAGE:

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MR

		IENT TYP		5 Tonr		avato IDTH:		ASTING: DRTHING:	505660 6582535		SURF. DATU		RL:	AHD
	Dril	ing and San	npling				Material description and profile in	nformation				Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil ty characteristics,colour,minor	/pe, plasticit r componen	y/particle ts	MOISTURE	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
Ш		E&B		_		SM	Silty SAND: fine to medium gra affected.	ained, grey,	root		MD	(0-1.8m)	0	TOPSOIL
		0.20m		-		SP	0.20m SAND: fine to medium grained	 , grey.		M		DCP (0	1	MARINE/AEOLIAN — — —
Ì				_									2	
	26/07/2021	0.50m		0.5_									2	
	1 26/	0.70m		_		SM	0.70m Silty SAND: fine to medium gra	ained. browr	— — — — - 1.	W			2	COLLAPSING PIT WALLS
				-			3	,					4	0.7M
		1.00m		1.0_									4	SULFUR SMELL
		В		-									6	
		1.40m		-									4	
		1.50m		1. <u>5</u>									3	
		B 1.70m		-									4	
				_			Hole Terminated at 1.80 m							
				2.0_										
				-										
				-										
				2.5										
				-										
LEC Wat				-										
LEG	SEND:			Notes, Sa	mples a	nd Tes	is s		Consister	ncy		U	CS (kPa	a) Moisture Condition
Wat	er Wat (Da Wat Wat	er Level te and time sl er Inflow er Outflow	hown)	U ₅₀ CBR E ASS B	50mm Bulk s Enviro Acid S	Diame ample to	ter tube sample or CBR testing al sample Soil Sample		VS V S S F F St S VSt V H H	ery Soft oft irm tiff ery Stiff		25 50 10 20	25 5 - 50 0 - 100 00 - 200 00 - 400 400	D Dry M Moist W Wet W _p Plastic Limit
Stra	G tra D	anges radational or ansitional stra efinitive or dis rata change		PID DCP(x-y) HP	Photo Dynar	nic pen	on detector reading (ppm) etrometer test (test depth interval shown) meter test (UCS kPa)		Fb F Density	riable V L MD D VD	L() N D	ery Lo oose lediun ense ery D	n Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%



CLIENT:

De Groot and Benson

PROJECT NAME: Proposed Development **JOB NO:** RGS32813.1

TEST PIT NO:

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TP4

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MR

SITE LOCATION: Lot 2 Phillip Drive, South West Rocks

TEST LOCATION: Refer to Site Plan **DATE:** 26/7/21

EQUIPMENT TYPE: 5 Tonne Excavator **EASTING**: 505801 m **SURFACE RL**:

		IENT TYPI T LENGTH		5 Tonr		avator I DTH :		STING: RTHING:	505801 6582532		SURF.		RL:	AHD
	Drill	ing and Sam					Material description and profile in	formation				Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil ty characteristics,colour,minor	pe, plasticil componen	y/particle ts	MOISTURE	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
Ш		E				SM	Silty SAND: fine to medium gra	ined, grey,	root	М	MD	1.6m)	1	TOPSOIL
	1 ⊲ 26/07/2021	0.15m 0.50m B 0.60m 1.00m B&E 1.40m 1.50m B		- 0.5 <u>-</u> - 1.0 <u>-</u> - 1.5 <u>-</u> 1.5 <u>-</u>		SP	SAND: fine to medium grained, some silt.	- — — — pale grey t	o grey,	W		DCP (0-1.6m)	2 3 3 3 3 3 4 4 4 4 5	COLLAPSING PIT WALLS 0.7M
		1.90m 2.00m B		2.0			Due to Collapsing Pit Walls Hole Terminated at 2.00 m							
Wat	Wat (Dat Wat	er Level e and time sh er Inflow	nown)	2.5	50mm Bulk s Enviro Acid S	Diamet ample fo nmenta sulfate S	<u>\$</u> er tube sample or CBR testing sample oil Sample		S So F Fi St Si VSt Vo	ery Soft oft irm tiff ery Stiff		25 50 10 20	CS (kPa 25 5 - 50 0 - 100 00 - 200 00 - 400	D Dry M Moist W Wet W _p Plastic Limit
	ta Cha G tra De	er Outflow anges radational or ansitional stra efinitive or dis rata change		B Field Test PID DCP(x-y) HP	<u>s</u> Photoi Dynan	nic pene	n detector reading (ppm) trometer test (test depth interval shown) neter test (UCS kPa)		1	ard riable V L MD D VD	Lo M D	ery Lo	n Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%



CLIENT:

De Groot and Benson

PROJECT NAME: Proposed Development **JOB NO:** RGS32813.1

TEST PIT NO:

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MR

SITE LOCATION: Lot 2 Phillip Drive, South West Rocks

TEST LOCATION: Refer to Site Plan **DATE:** 26/7/21

EQUIPMENT TYPE: 5 Tonne Excavator **EASTING**: 505734 m **SURFACE RL**:

		MENT TYP		5 Tonr		avato I DTH :	0.5 m	EASTING: NORTHING:	505734 6582509		SURF.		RL:	AHD
	D	rilling and Sa	mpling				Material description and	d profile information				Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTIC characteristics,col	DN: Soil type, plasticit lour,minor componen		MOISTURE	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
Ш		E		_		SM	Silty SAND: fine to m affected.	edium grained, grey,	root	М	MD	(0-1.3m)	1 2	TOPSOIL
		0.20m		-		SP	SAND: fine to medium				_	DCP (2	MARINE/AEOLIAN — — —
	2021	0.50m		0.5									3	
	< 26/07/2021			-		SM	Silty SAND: fine to m	 edium grained, browr	<u> </u>	-			3	
				-						W			4	
		1.00m	_	1. <u>0</u>									7	SULFUR SMELL
l Tool		B&E 1.20m		-									7	
RG LIB 1.05.0.GLB Log RG NON-CORED BOREHOLE - TEST PIT RGS32813.1 TEST PIT LOGS GPJ < <drawingfile>→ 10/09/2021 14:16 10.02.00.04 Datyel Lab and In Situ Tool</drawingfile>				1. <u>5</u>			Becoming brown/grey	,						
> 10/09/2021 14:1				2.0			2.00m Hole Terminated at 2.	00 m						
<drawingfile></drawingfile>				-			noie remiliated at 2.	00 III						
813.1 TEST PIT LOGS.GPJ <				- 2. <u>5</u> -										
EHOLE - TEST PIT RGS32				-										
Log RG NON-CORED BORE	- (□ - W	/ater Level Date and time s /ater Inflow /ater Outflow	shown)	U ₅₀ CBR E ASS B	50mm Bulk s Enviro Acid S	Diame ample f	s ter tube sample or CBR testing I sample soil Sample		S S S S S S S S S S S S S S S S S S S	ency Very Soft Soft Firm Stiff Very Stiff Hard Friable		25 50 10 20	CS (kPa 25 5 - 50 0 - 100 00 - 200 00 - 400 400	D Dry M Moist W Wet W _p Plastic Limit
RG LIB 1.05.0.GLB 1		Changes Gradational or transitional str Definitive or d strata change	ata	Field Test PID DCP(x-y) HP	Photo Dynar	nic pen	on detector reading (ppm) etrometer test (test depth interv meter test (UCS kPa)	al shown)	<u>Density</u>	V L ME D VD	Lo D D	ery Lo oose lediun ense ery D	n Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%



CLIENT:

De Groot and Benson

PROJECT NAME: Proposed Development JOB NO: RGS32813.1

TEST PIT NO:

LOGGED BY:

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MR

SITE LOCATION: Lot 2 Phillip Drive, South West Rocks

TEST LOCATION: Refer to Site Plan **DATE:** 26/7/21

	ST P	MENT TYPE	l:	5 Tonr		avator I DTH :	0.5 m NORTHING :	5058: 65824:		SURF.	M:		AHD
	Drill	ling and Sam	pling				Material description and profile information			1	Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticil characteristics, colour, minor componer		MOISTURE	CONSISTENCY DENSITY	Test Type	Result	Structure and additiona observations
Ш		E				SM	Silty SAND: fine to medium grained, grey, affected.	root		MD	(0-1.6m)	1	TOPSOIL
		0.15m		_		SM	SAND: fine to medium grained, grey.		M		DCP (0-	2	MARINE/AEOLIAN
	2021			-								3	
	1 26/07/2021	0.50m		0.5								3	
	<u>-</u>	B 0.70m					0.70mSilty SAND: fine to medium grained, brow		W			3	
				_			Only Only. The to median grained, brown.	11.				6	
		1.00m		1.0			Becoming brown/orange					7	SULFUR SMELL
		B&E		_								6	
		1.30m										7	
		1.50m		1. <u>5</u>								7	
		B 1.70m		-			Becoming grey/brown					7	COLLAPSING PIT WALLS
		2.00m		2.0									
		B 2.20m		2.0			2.20m						
	-	Z.ZOIII			. 1		Hole Terminated at 2.20 m						
				-									
				2.5_									
				-									
				-									
	SEND:			Notes, Sar	mples a	nd Test	<u>s</u>	Consis VS	stency Very Sof	<u> </u>		CS (kPa 25	Moisture Condition D Dry
_ _	Wat (Dat	ter Level te and time sh ter Inflow ter Outflow anges	own)	U ₅₀ CBR E ASS B	Bulk s Enviro Acid S	ample fonta	er tube sample or CBR testing I sample oil Sample	S F St VSt H Fb	Soft Firm Stiff Very Stiff Hard Friable		25 50 10 20	25 5 - 50 0 - 100 00 - 200 00 - 400 400	M Moist W Wet W _p Plastic Limit
	G tra D	radational or ansitional strat efinitive or disi rata change		PID DCP(x-y) HP	Photoi Dynan	nic pene	n detector reading (ppm) etrometer test (test depth interval shown) meter test (UCS kPa)	Densit		Lo M	ery Lo oose lediun	oose n Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%



CLIENT:

De Groot and Benson

PROJECT NAME: Proposed Development JOB NO:

SITE LOCATION: Lot 2 Phillip Drive, South West Rocks

TEST LOCATION: Refer to Site Plan **DATE:** 26/7/21

TEST PIT NO:

LOGGED BY:

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TP7

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MR

RGS32813.1

EQUIPMENT TYPE: 5 Tonne Excavator EASTING: 505837 m SURFACE RL:

	MENT TYPE: PIT LENGTH:	5 Ton	ne Exca W I	avator I DTH :			505837 : 6582450		SURF.		RL:	AHD
Dri	illing and Samplin	g			Material description and profile informa	ation				Fiel	d Test	
METHOD	SAMPLES R (r		GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, p characteristics,colour,minor com	lasticit ponen	ty/particle its	MOISTURE	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
Tooth	E	-		SM	Silty SAND: fine to medium grained, affected.	grey,	root		VL	(0-1.8m)	0	TOPSOIL
0.45m Tooth Not Encountered	0.15m 0.50m B 0.70m 1.00m B 1.30m 1.50m B 1.70m 2.00m B 2.20m	1. <u>5</u>		SP	SAND: fine to medium grained, pale root affected to 0.6m. 2.20m Due to Collapsing Pit	grey/v	white,	M	MD	DCP (0-1	1 0 1 1 1 1 2 2 3 2 3 3 3 3	AEOLIAN COLLAPSING PIT WALLS
► Was	ater Level ate and time showr ater Inflow ater Outflow	2.5 2.5 U _{so} CBR E ASS B Field Tes PID DCP(x-y) HP	50mm Bulk sa Enviro Acid S Bulk S Photoi Dynan	Diamei ample fonmenta sulfate S ample onisationic pene	Hole Terminated at 2.20 m Set tube sample or CBR testing I sample oil Sample oil Sample oil Sample meter test (test depth interval shown) meter test (UCS kPa)		S S F F St S VSt V H H	ncy /ery Soft soft firm /ery Stiff fard riable V L MD	V L(2: 5: 1: 2: 2: >: 'ery Lo	CS (kPa 25 5 - 50 0 - 100 00 - 200 00 - 400 400 coose n Dense	D Dry M Moist W Wet W _p Plastic Limit U Liquid Limit Density Index <15% Density Index 15 - 35%



CLIENT:

De Groot and Benson

PROJECT NAME: Proposed Development JOB NO: RGS32813.1

TEST PIT NO:

LOGGED BY:

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MR

SITE LOCATION: Lot 2 Phillip Drive, South West Rocks

TEST LOCATION: Refer to Site Plan DATE: 26/7/21

		MENT TYP		5 Toni		avato I DTH :	0.5 m	EASTING: NORTHING:	505897 6582432		SURF.		RL:	AHD
	Dril	ling and San	npling				Material description and	profile information				Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTIO characteristics,cold	N: Soil type, plasticit ur,minor componen		MOISTURE	CONSISTENCY DENSITY	Test Type	Result	Structure and additiona observations
Ш	Not Encountered	E 0.15m		-		SM SP	Silty SAND: fine to me roots. O.20m SAND: fine to medium root affected to 0.9m.			М	MD	DCP (0-1.6m)	1 2 1	TOPSOIL AEOLIAN
		0.50m B 0.70m		0. <u>5</u> - -									1 1 2	
		1.00m B&E 1.30m		- 1.0_ - -									2 2 3	
		1.50m B 1.70m		- 1. <u>5</u> -									3 3	
		2.00m B 2.20m		2. <u>0</u>			2.20m	10 m						
				_			Hole Terminated at 2.2	:0 m						
				- 2. <u>5</u> - -										
				-										
Wat	Wat (Da Wat	ter Level te and time sl ter Inflow ter Outflow	hown)	Notes, Sa U ₅₀ CBR E ASS B	50mm Bulk s Enviro Acid S	Diame ample t	ter tube sample or CBR testing il sample soil Sample		S S F F St S VSt V H H	ery Soft Soft Firm Stiff ery Stiff		25 50 10 20	CS (kPa 25 5 - 50 0 - 100 00 - 200 00 - 400 400	D Dry M Moist W Wet W _p Plastic Limit
Stra	ata Changes Gradational or transitional strata Definitive or distict strata change	Field Test PID DCP(x-y) HP	Photoi Dynan	nic pen	on detector reading (ppm) etrometer test (test depth interva meter test (UCS kPa)	I shown)	Fb F Density	riable V L MI D VD	Lo D D	ery Lo oose lediun ense ery D	n Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%		



TEST LOCATION: Refer to Site Plan

De Groot and Benson

PROJECT NAME: Proposed Development

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RGS32813.1

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SITE LOCATION:

CLIENT:

Lot 2 Phillip Drive, South West Rocks

LOGGED BY: MR DATE: 26/7/21

FOUIPMENT TYPE: SURFACE RI · 5 Tonne Excavator FASTING: 505801 m

		MENT TYPI		5 Tonr		avato	0.5 m	EASTING: NORTHING:	505801 6582409		SURF. DATU		RL:	AHD
	Dril	ling and San	npling				Material description and	profile information				Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTIO characteristics,colo	N: Soil type, plasticit ur,minor componen	y/particle ts	MOISTURE	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
Ш	tered	E		_		SM	Silty SAND: fine to me affected.	dium grained, grey,	root		L	(0-1.6m)	0	TOPSOIL
	Not Encountered	0.20m		-		SP	SAND: fine to medium root affected (tree roots	grained, pale grey/vs) to 0.9m.	 vhite,	M	L to MD	DCP (0-	1 1 2	AEOLIAN — — — — —
		0.50m		0. <u>5</u>									1	
		B 0.70m		-									1	
				-									2	
		1.00m		1.0_							MD		2	
		E 1.30m		_									3	COLLAPSING PIT WALLS
		1.50m		1.5									3	
		B 1.70m		-									4	
				-										
				2.0			2.00m Due to Collapsing Wall	s						
				-			Hole Terminated at 2.0	10 m						
				2.5										
				-										
				-										
LEG	END:			Notes, Sa	mples a	nd Test	<u>s</u>		Consiste				CS (kPa	-
	Wa (Da Wa Wa	ter Level te and time sh ter Inflow ter Outflow	nown)	U ₅₀ CBR E ASS B	Bulk s Enviro Acid S	ample f nmenta	er tube sample or CBR testing I sample oil Sample		S S F F St S VSt V H H	ery Soft off off off off off ery Stiff lard		25 50 10 20	25 5 - 50 0 - 100 00 - 200 00 - 400 400	P
<u>Stra</u>	G tr _ D	anges bradational or ansitional stra befinitive or dis trata change		Field Test PID DCP(x-y) HP	Photo Dynar	nic pen	n detector reading (ppm) strometer test (test depth interva meter test (UCS kPa)	l shown)	Fb F Density	Friable V L ME D VD	Lo N D	ery Lo oose Mediun ense ery D	n Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%



ENGINEERING LOG - TEST PIT

CLIENT:

De Groot and Benson

PROJECT NAME: Proposed Development

SITE LOCATION: Lot 2 Phillip Drive, South West Rocks

TEST LOCATION: Refer to Site Plan DATE: 26/7/21

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MR

RGS32813.1

			IENT TYPI T LENGTI		5 Tonr		avato	0.5 m	EASTING: NORTHING:	505734 6582443		SURF/ DATUI		RL:	AHD
		Drill	ing and San	npling				Material description and pr	ofile information				Fiel	d Test	
	METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: characteristics,colour			MOISTURE	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
	Ш	ntered	E		_		SM	Silty SAND: fine to media roots.	um grained, grey,	some		MD	(0-1.6m)	0	TOPSOIL
		Not Encountered	0.20m		_			SAND: fine to medium gr	ained, pale grey/w	 hite.	M		DCP (0	3	AEOLIAN
			0.50		- 0.5									1	
			0.50m B		0.5_									2	
			0.70m		_									1	
					_									2	
			1.00m		1.0_									2	COLLAPSING PIT WALLS
tu Tool			B 1.30m		_									2	
ab and In S														3	
.04 Datgell			1.50m B&E		1.5_									3	
16 10.02.00			1.70m		-			1.75m Due to Collapsing Pit							
09/2021 14:					_			Hole Terminated at 1.75	m						
gFile>> 10,					2.0_										
PJ < <drawii< th=""><td></td><td></td><td></td><td></td><td>_</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></drawii<>					_										
PIT LOGS.G					_										
313.1 TEST					2.5_										
PIT RGS32,					-										
OLE - TEST					_										
ED BOREH	Wate				Notes, Sai			ser tube sample			ncy ery Soft		<2	CS (kPa 25 5 - 50	Moisture Condition D Dry M Moist
g RG NON-CORED BOREHOLE - TEST PIT RGS32813.1 TEST PIT LOGS.GPJ < <drawingfile>> 10.092021 14:16 10.02.00.04 Datgel Lab and in Situ Tool</drawingfile>	≚	(Dat	er Level e and time sl er Inflow er Outflow	nown)	O ₅₀ CBR E ASS B	Bulk s Enviro	ample f nmenta Julfate S	er tube sample or CBR testing I sample oil Sample		F F St S VSt V H H	irm tiff ery Stiff lard		50 10 20	0 - 100 00 - 200 00 - 400 400	W Wet W _p Plastic Limit
RG LIB 1.05.0.GLB Log	Stra	tra — De	anges radational or ansitional stra efinitive or dis rata change	ıta	Field Test PID DCP(x-y) HP	Photoi Dynan	nic pen	n detector reading (ppm) strometer test (test depth interval s meter test (UCS kPa)	hown)	Fb F <u>Density</u>	riable V L ME D VD	Lo D	ery Lo pose ediun ense ery D	n Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%



CLIENT:

De Groot and Benson

PROJECT NAME: Proposed Development

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MR

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RGS32813.1

EQUIPMENT TYPE: 5 Tonne Excavator EASTING: 505677 m SURFACE RL:

		IENT TYPI T LENGTI		5 Toni		avato I DTH :		TING: RTHING	50567 : 658243		SURF.		RL:	AHD
	Drill	ing and San	npling				Material description and profile info	rmation				Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil typ characteristics,colour,minor o	ક, plastici omponeા	ity/particle nts	MOISTURE	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
Bucket	untered			_		SM	Silty SAND: fine to medium grain affected.	ed, grey,	, root	М	L	(0-1.9m)	0	TOPSOIL
0.45m Tooth Bucket	Not Encountered			1.0 <u>-</u> 1.5 <u>-</u> 2.0		SP	SAND: fine to medium grained, proof affected to 0.6m (tree roots).		white,	M	MD	DCP (C	1 1 2 1 1 1 1 2 2 2 2 2 2 3 3 4 4	AEOLIAN COLLAPSING PIT WALLS
				-			Hole Terminated at 2.00 m							
				- 2. <u>5</u> - -										
Wat	Wat (Dat Wat Wat I Wat ta Cha tra — G	er Level ee and time sl er Inflow er Outflow anges radational or ansitional stra efinitive or dis	nta	Notes, Sa U ₅₀ CBR E ASS B Field Test PID DCP(x-y) HP	50mm Bulk s Enviro Acid S Bulk S ts Photoi Dynan	Diame ample fammenta sulfate stample onisationic pen	ter tube sample or CBR testing all sample soil Sample soil Sample on detector reading (ppm) etrometer test (test depth interval shown) ameter test (UCS kPa)		S F St VSt H	Very Soft Soft Firm Stiff Very Stiff Hard Friable	V L(25 50 10 20 >4 ery Lo	CS (kPa 25 5 - 50 0 - 100 00 - 200 00 - 400 400 cose	D Dry M Moist W Wet W _p Plastic Limit U Liquid Limit Density Index <15% Density Index 15 - 35%



CLIENT:

De Groot and Benson

PROJECT NAME: Proposed Development

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		IENT TYPI T LENGTI		5 Tonr		avatoı IDTH:	0.5 m EASTING:	505696 : 6582454		SURF.	M:		AHD
	Drill	ing and San	npling				Material description and profile information				Fiel	ld Test	
МЕТНОD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plastic characteristics,colour,minor component		MOISTURE	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
Ш		E 0.45		_		SM	Silty SAND: fine to medium grained, grey affected.	root		MD	(0-1.7m)	1	TOPSOIL
	ld 26/07/2021	0.15m 0.50m B 0.80m 1.00m B 1.30m 1.50m B 1.80m		- 0.5 <u>-</u> - 1.0 <u>-</u> - 1.5 <u>-</u> - 2.0		SP	SAND: fine to medium grained, pale grey/	white.	W		DCP (0-1.	2 1 2 1 2 3 4 4 4 4 3 4 4 5	AEOLIAN COLLAPSING PIT WALLS 1.1M
							Hole Terminated at 2.00 m						
				-									
				-									
				-									
				-									
				2.5_									
				-									
				-									
				-									
				-									
LEG	END:			Notes, Sa	mples a	nd Test	<u>s</u>	Consiste			<u>U</u>	CS (kPa	a) Moisture Condition
Wate				U ₅₀	50mm	Diame	ter tube sample		Very Soft Soft	t		25 5 - 50	D Dry M Moist
_		er Level e and time sl	nown)	CBR E	Bulk s	ample f	or CBR testing Il sample	F	Firm Stiff		50	0 - 100 00 - 200	W Wet W _p Plastic Limit
—	Wat	er Inflow		ASS	Acid S	Sulfate S	oil Sample	VSt '	Very Stiff	·	2	00 - 400	
		er Outflow anges		В	Bulk S	ample		1	Hard Friable		>-	400	
	G	radational or	.	Field Test		ionisatio	on detector reading (ppm)	Density	V L		ery Lo	oose	Density Index <15% Density Index 15 - 35%
		ansitional stra efinitive or dis		DCP(x-y)	Dynan	nic pene	etrometer test (test depth interval shown)		ME	O M	l ediur	n Dense	Density Index 35 - 65%
	st	rata change		HP	Hand	Penetro	meter test (UCS kPa)		D VD		ense ery D		Density Index 65 - 85% Density Index 85 - 100%



CLIENT:

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MR

RGS32813.1

TEST LOCATION: Refer to Site Plan

		ENT TYPE		5 Tonr		avator I DTH :	EASTING: 0.5 m NORTHING	505658 : 6582443		SURF.	M:		AHD
	Drill	ing and Sam	pling				Material description and profile information				Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plastic characteristics,colour,minor componer		MOISTURE	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
Е		E		_		SM	Silty SAND: fine to medium grained, dark brown, root affected.	grey/dark	М	MD	(0-1.6m)	1	TOPSOIL
		0.15m		_		SP	SAND: fine to medium grained, pale grey/	 white.	-		DCP (0-	2	AEOLIAN — — — — —
		0.50m		0.5								1	
				-								2	
		B&E 0.70m		_								1	
				_								2	
	21			1. <u>0</u>								2	
	26/07/2021			_								3	
	2 →			_					W			2	COLLAPSING PIT WALLS
		1.50m		1.5								2	1.000
		B 1.70m		-								3	
		1.7011		_									
				2.0			2.00m Hole Terminated at 2.00 m						
				_			Hole reminated at 2.00 m						
				_									
				2.5									
				-									
				_									
				-									
	END:			Notes, Sa	mples a	nd Test	<u>s</u>	Consiste	ency Very Soft	<u> </u>	_	CS (kPa 25	a) Moisture Condition D Dry
Wat	Wat (Dat Wat	er Level e and time sh er Inflow	own)	U ₅₀ CBR E ASS	Bulk s Enviro Acid S	ample fo nmenta ulfate S	er tube sample or CBR testing I sample oil Sample	S S S S S S S S S S S S S S S S S S S	Soft Firm Stiff Very Stiff		25 50 10 20	5 - 50 0 - 100 00 - 200 00 - 400	M Moist W Wet W _p Plastic Limit
Stra	ta Cha	_		B Field Test	Bulk S	ample		1	Hard Friable V	V	ery Lo	400 oose	Density Index <15%
	 tra De	radational or Insitional strat efinitive or dist rata change		PID DCP(x-y) HP	Photoi Dynan	nic pene	n detector reading (ppm) strometer test (test depth interval shown) meter test (UCS kPa)		L ME D VD	Lo D D	oose	n Dense	Density Index 15 - 35%



CLIENT:

De Groot and Benson

PROJECT NAME: Proposed Development

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	ST P	TENT TYP	H:	5 Toni		avatoi IDTH:	0.5 m NORTHING	505744 : 6582543		SURF.	M:		AHD
	Drill	ing and San	npling				Material description and profile information		_		Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plastici characteristics,colour,minor componer		MOISTURE	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
Ш				_		SM	Silty SAND: fine to medium grained, grey, affected.	root	М	MD	(0-1.8m)	1	TOPSOIL
		E&B 0.20m		-		SP	0.20m SAND: fine to medium grained, pale grey		M		DCP (0-	1	MARINE/AEOLIAN — — —
				-		SF .	orange mottle.	anu	IVI			2	
	21	0.50m		0.5								2	
	26/07/2021	0.00111		J 0. <u>9_</u>								2	
		B&E 0.70m		_					W			2	COLLAPSING PIT WALLS
				-					"			3	0.7M
		1.00m		1.0								2	
				1.0_								3	
		B 1.20m		_								3	
				-								3	
		1.50m		1.5								3	
				1.5_								3	
		B 1.70m		_								3	
				-								3	
				2.0			2.00m						
				2.0			Hole Terminated at 2.00 m						
				_									
				-									
				2.5									
				-									
				-									
				-									
LEC Wat	END:			Notes, Sa			_		ery Soft		<	CS (kPa 25	D Dry
_		er Level te and time sl	hown)	U ₅₀ CBR E	Bulk s	ample f	er tube sample or CBR testing I sample	FF	Soft Firm Stiff		50	5 - 50 0 - 100 00 - 200	M Moist W Wet Wp Plastic Limit
		er Inflow er Outflow		ASS B	Acid S		oil Sample	VSt \	/ery Stiff Hard	:	20	00 - 200 00 - 400 400	
Stra	nta Cha	anges radational or		Field Test				Fb F	riable V		ery Lo	oose	Density Index <15%
_	D	ansitional stra efinitive or dis		PID DCP(x-y) HP	Dynan	nic pene	n detector reading (ppm) strometer test (test depth interval shown) meter test (UCS kPa)		L ME D) N	oose lediur ense	n Dense	Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85%
	st	rata change			· idild				VE		ery D		Density Index 85 - 100%



CLIENT:

De Groot and Benson

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MR

RGS32813.1

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EQUIPMENT TYPE: 5 Tonne Excavator EASTING: 505687 m SURFACE RL:

		ENT TYPE T LENGTH		5 Tonr		avatoı IDTH:	0.5 m	EASTING: NORTHING:	505687 6582521		SURF.		RL:	AHD
	Drill	ing and Sam	pling				Material description a	nd profile information				Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPT characteristics,c	ION: Soil type, plasticit olour,minor component	y/particle ts	MOISTURE	CONSISTENCY DENSITY	Test Type	Result	Structure and additiona observations
Ш		E/D		_		SM	Silty SAND: fine to raffected.	medium grained, grey,	root	М	MD	(0-1.6m)	0	TOPSOIL
		E/B 0.20m		_		SP	SAND: fine to mediu	ım grained, grey.		M	-	DCP (0-	1	MARINE/AEOLIAN
	Σ.			_									3	
	26/07/2021	0.50m B		0.5_		SM	0.60m			-			3	
		0.70m		_		SIVI	SIRY SAND line to ri	nedium grained, brown.		W	1		4	SULFUR SMELL
				_									3	
		1.00m		1. <u>0</u>									3	
		B/E 1.20m		_									1	
				_									2 5	
		1.50m B		1.5_			Organics (roots etc t	throughout)					6	
		1.70m		_										
				_										
		2.00m B		2.0_										
		2.20m					2.20m Hole Terminated at 2	2.20 m						
				_										
				2.5_										
				_										
				_										
	END:			Notes, Sai	mples a	nd Test	<u>s</u>		Consister VS V	ncy ery Soft	<u> </u>		CS (kPa	
Wate	Wat (Dat Wat	er Level e and time sh er Inflow er Outflow	own)	U ₅₀ CBR E ASS B	Bulk s Enviro Acid S	ample f	er tube sample or CBR testing I sample oil Sample		S S F F St S VSt V	ery Son oft irm tiff ery Stiff lard		25 50 10 20	25 5 - 50 0 - 100 00 - 200 00 - 400 400	M Moist W Wet Wp Plastic Limit
	ta Cha		ta	Field Test	<u>s</u>		n detector reading (ppm)		1	riable V L		ery Lo		Density Index <15% Density Index 15 - 35%
	_ D	efinitive or dis rata change		DCP(x-y) HP			etrometer test (test depth inter meter test (UCS kPa)	rval shown)		ME D VE	D	lediun ense ery D	n Dense ense	Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%



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De Groot and Benson

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			IENT TYP		5 Tonr		avatoi IDTH:	EASTING: 0.5 m NORTHING:	505582 6582510		SURF		RL:	AHD
ſ		Drill	ing and Sar	npling				Material description and profile information				Field	d Test	
	METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity characteristics, colour, minor component		MOISTURE	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
	Ш		E&B		_		SM	Silty SAND: fine to medium grained, dark of affected.	grey, root	М	L	(0-2.5m)	1	TOPSOIL
-ChrawingFile>> 10/09/2021 14:16 10.02.00.04 Datget Lab and In Situ Tool		l 26/07/2021	0.50m B 0.70m 1.00m B 1.20m 1.50m 2.00m B 2.20m		- 0.5 		SP	SAND: fine to medium grained, pale grey/w Colour change to dark grey/dark brown, so 2.20m		M	MD L	DCP (0-	1	COLLAPSING PIT WALLS @ 1.2M SULFUR SMELL
3PJ < <d< th=""><th></th><th></th><th></th><th></th><th>_</th><th>•</th><th></th><th>Hole Terminated at 2.20 m</th><th></th><th></th><th></th><th></th><th>4</th><th></th></d<>					_	•		Hole Terminated at 2.20 m					4	
HOLE - TEST PIT RGS32813.1 TEST PIT LOGS.C					- 2. <u>5</u> - - -								5	
ON-CORED BO	Water Water Level (Date and time shown) Water Inflow Water Outflow Strata Changes Gradational or transitional strata Definitive or distict strata change			hown)	Notes, Sai U ₅₀ CBR E ASS B Field Test PID DCP(x-y) HP	50mm Bulk s Enviro Acid S Bulk S Photoi Dynan	Diame ample formenta sulfate S sample sonisationic pene	ter tube sample or CBR testing all sample soil Sample on detector reading (ppm) etrometer test (test depth interval shown) imeter test (UCS kPa)	S S F F St S VSt V H H	ery Soft oft irim ery Stiff ery Stiff ard riable V L MC D VD	V L(25 50 10 20 20 20 ery Lo	5 - 50 0 - 100 00 - 200 00 - 400 400 pose n Dense	D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit Density Index <15% Density Index 15 - 35%



CLIENT:

De Groot and Benson

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			MENT TYP		5 Tonr		avatoı IDTH:	EASTING: 0.5 m NORTHING:	505620 6582476		SURF		RL:	AHD
		Dril	ling and Sar	npling				Material description and profile information				Field	d Test	
C I	METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticit characteristics,colour,minor componen		MOISTURE	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
ı	П	Encountered	E&B 0.20m		-		SM	Silty SAND: fine to medium grained, dark brown/dark grey, root affected.			MD	P (0-1.7m)	3	TOPSOIL
		Not End			-		SP	Silty SAND: fine to medium grained, pale o	 grey.	М		DCP	3 3	AEOLIAN
			0.50m B		0. <u>5</u>								2	
			0.70m		-								2	
			1.00m B		1.0								2	
n Situ Tool			1.20m		-								3 4 3	
Datgel Lab and I			1.50m		1. <u>5</u>								4	COLLAPSING PIT WALLS @
16 10.02.00.04			B&E 1.70m		-			1.80m					4	1.5M
RG LIB 1.05.0.GLB Log RG NON-CORED BOREHOLE - TEST PIT RGS32813.1 TEST PIT LOGS.GPJ < <drawingfile>> 10/09/2021 14;16 10.02.00.04 DatgelLab and in Situ Tool</drawingfile>					2. <u>0</u>	-1		Due to Collapsing Pit Walls Hole Terminated at 1.80 m						
GS32813.1 TEST PIT LOGS.GPJ <					- 2. <u>5</u> -									
RED BOREHOLE - TEST PIT R	Nate	_	ter Level		- Notes, Sa U ₅₀			<u>s</u> ter tube sample	s s	ncy 'ery Soft		<2	CS (kPa 25 5 - 50	a) Moisture Condition D Dry M Moist
B Log RG NON-CO	_ _	(Da Wat Wat	ter Level te and time si ter Inflow ter Outflow anges	hown)	CBR E ASS B	Enviro Acid S Bulk S	nmenta	or CBR testing Il sample Soil Sample	St S VSt V H H Fb F	irm stiff 'ery Stiff lard riable		10 20 >4	0 - 100 00 - 200 00 - 400 100	W _L Liquid Limit
RG LIB 1.05.0.GL		tra D	radational or ansitional stra efinitive or dis rata change	ata	Field Test PID DCP(x-y) HP	Photoi Dynan	nic pene	on detector reading (ppm) etrometer test (test depth interval shown) meter test (UCS kPa)	<u>Density</u>	V L ME D VD	Lo M D	ery Lo oose edium ense ery De	n Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%



CLIENT:

De Groot and Benson

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		IENT TYPI T LENGTI		5 Tonr		avato	EASTING: 0.5 m NORTHING:	505537 6582495		DATU	М:		AHD
	Drill	ing and San	npling				Material description and profile information		_		Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticil characteristics,colour,minor componer		MOISTURE	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
Ш		E&B		_		SM	Silty SAND: fine to medium grained, dark root affected.	brown,	М	MD	(0-1.6m)	2	TOPSOIL
	26/07/2021	0.15m 0.50m B 0.70m 1.00m B 1.20m		- 0.5_ - - 1.0_ -		SP	SAND: fine to medium grained, pale grey/n	vhite.	М		DCP (0-	2 4 4 4 3 2 3 3 4 4 4	COLLAPSING PIT WALLS
		1.50m B 1.70m 2.00m B 2.20m		1.5_ - - - 2.0_ -			2.20m					4	SULFUR SMELL
				_			Hole Terminated at 2.20 m						
				- 2.5_ - - -									
	SEND:			Notes, Sa	mples a	nd Test	<u>s</u>	Consiste				CS (kPa	
_ _	Wat (Dat - Wat Wat ata Cha	er Level e and time sl er Inflow er Outflow anges radational or	hown)	U ₅₀ CBR E ASS B	Bulk s Enviro Acid S Bulk S	ample f nmenta sulfate S	ter tube sample or CBR testing Il sample Soil Sample	S S F F St S VSt V	/ery Soft Soft Firm Stiff /ery Stiff Hard Friable V		25 50 10 20	25 5 - 50 0 - 100 00 - 200 00 - 400 400 oose	· ·
	tra De	radational or ansitional stra efinitive or dis rata change		PID DCP(x-y) HP	Photoi Dynan	nic pen	on detector reading (ppm) etrometer test (test depth interval shown) meter test (UCS kPa)		L ME D VD	Lo D D	oose	n Dense	Density Index 15 - 35%



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PAGE: **PROJECT NAME:** Proposed Development JOB NO:

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RGS32813.1

SITE LOCATION: Lot 2 Phillip Drive, South West Rocks

MR **TEST LOCATION:** See Figure DATE: 29/7/21

DRILL TYPE: P160 FASTING: 505651 m SURFACE RI ·

		YPE: OLE DIAM	P160 IETER :	100 n	nm	IN	EASTING: CLINATION: 90° NORTHING:	50565 658253		URF/ DATU		RL:	AHD
	Drill	ing and San	npling				Material description and profile information				Field	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticit characteristics,colour,minor componen		MOISTURE	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
AD/T				-		SM	Silty SAND fine to mwsium grained, grey, raffected.	root	М	L			TOPSOIL
		1.00m SPT 3,4,5		0.5_ - - - - 1.0_		SM	Silty SAND fine to medium grained, grey.		W	MD			AEOLIAN — — — — —
WB		N=9 1.45m		1.5_ - - 2.0_		 SP	SAND fine to medium grained, pale grey.					_	MARINE — — — — — —
		2.50m SPT 2,6,7 N=13		2.5 - - - - 3.0									
RG LIB 1.05.0.GLB Log R6 NON-CORED BOREHOLE - TEST PIT RGS32813.1 LOGS.GPJ < <drawingfile>> 10/09/2021 14:17 10.02.00.04 Datgel Lab and In Situ Tool</drawingfile>		4.0 9; рчт N=R		3.5_ - - 4.0_ - - 4.5_ -		SM	3.40m Silty SAND fine to medium grained, dark b	rown.		VD			
RG LIB 1.05.0 GLB Log RG NON-CORED BOREHOLE TECHNICAL TO STATE TO	Wat (Dai - Wat • Wat • Wat • G • tra	er Level te and time sl ter Inflow ter Outflow anges anadational or ansitional stra efinitive or dis rata change	nown)	Notes, Sai U ₅₀ CBR E ASS B Field Test PID DCP(x-y) HP	50mm Bulk s Enviro Acid S Bulk S S Photoi Dynan	Diame ample f nmenta sulfate S ample onisatio	ter tube sample or CBR testing all sample soil sample	S F St VSt H	ency Very Soft Soft Firm Stiff Very Stiff Hard Friable V L MD D VD	M D	25 50 10 20 >4 ery Lo	6 - 50 0 - 100 00 - 200 00 - 400 100 pose	Moisture Condition D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit Density Index <15% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%



CLIENT:

De Groot and Benson

PROJECT NAME: Proposed Development

SITE LOCATION: Lot 2 Phillip Drive, South West Rocks

LOGGED BY: MR **TEST LOCATION:** See Figure DATE: 29/7/21

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RGS32813.1

DRILL TYPE: P160 **EASTING:** 505651 m SURFACE RL:

			YPE: OLE DIAM	P160 IETER	: 100 n	nm	IN	EASTING: CLINATION: 90° NORTHING:	505651 6582533		OATUI		KL.	AHD
		Drill	ing and San	npling				Material description and profile information				Field	d Test	
i i	METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticit characteristics,colour,minor componen		MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
e>> 10/09/2021 14:17 10.02.00.04 Datgel Lab and In Situ Tool	MR		5.5 9,р ат N=R 7.0 9,р ат N=R		5.5 		SM SM	Silty Sand fine to medium grained, dark br (weakly cemented)	rown	W	VD			MARINE
RG LIB 1.05.0.GLB Log RG NON-CORED BOREHOLE - TEST PIT RGS32813.1 LOGS.GPJ <-DrawingFile>> 10/09/2021 14:17 1			8.5 9,р тт N=R		9.0 9.5			Becoming Silty SAND, fine to medium grain indurated)	ned (not					
Log RG NON-CORED BORE	_ ⊢	r Wat (Dat Wat Wat	er Level e and time sl er Inflow er Outflow anges	hown)	U ₅₀ CBR E ASS B	50mm Bulk s Enviro Acid S	Diamet ample fo	s er tube sample or CBR testing I sample oil Sample	S So F Fi St St VSt Vo H H	ery Soft oft rm iff ery Stiff ard iable		25 50 10 20	CS (kPa) 25 5 - 50 0 - 100 00 - 200 00 - 400 400	Moisture Condition D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit
RG LIB 1.05.0.GLB		Gı tra	radational or ansitional stra efinitive or dis rata change	ata	PID DCP(x-y) HP	Photoi Dynan	nic pene	n detector reading (ppm) strometer test (test depth interval shown) meter test (UCS kPa)	<u>Density</u>	V L MD D VD	Lo M De	ery Lo oose edium ense ery De	n Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%



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PROJECT NAME: Proposed Development JOB NO: RGS32813.1

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MR

SITE LOCATION: Lot 2 Phillip Drive, South West Rocks

TEST LOCATION: See Figure **DATE:** 29/7/21

DRILL TYPE: P160 EASTING: 505651 m SURFACE RL:

			YPE: OLE DIAN	P160 IETER :	100 m	nm	IN	EASTING: CLINATION: 90° NORTHING:	50565′ 6582533		URF/		RL:	AHD
Ī		Drilling and Sampling						Material description and profile information				Field	d Test	
	МЕТНОD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity characteristics,colour,minor component		MOISTURE	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
	WB	20 N	SPT),29,15/50m =44/200mr 10.35m	m n	10.5 - - - - 11.0		SM	Silty Sand fine to medium grained, dark bro (weakly cemented) (continued)		W	VD			MARINE
ı Tool			11.50m SPT 9,12,11 N=23 11.95m		11. <u>5</u>		SC	Sandy Clay/Clayey SAND interbedded, fin medium grained, high plasticity pale grey	e to					
RG LIB 1.05.0.GLB Log RG NON-CORED BOREHOLE - TEST PIT RGS32813.1 LOGS.GPJ < <drawingfile>> 10/09/2021 14:17 10.02.00.04 Datget Lab and In Situ Tool</drawingfile>			13.00m SPT 3,4,7 N=11 13.45m		12.5 - - 13.0 - - 13.5 - - - - - - - - - - - - - - - - - - -					M > w _P	St	HP	100	
RG NON-CORED BOREHOLE - TEST PIT RGS32813.1 LOGS.G	LEG Water	Wat (Dat Wat	SPT 9,14,17 N=31 er Level te and time si er Inflow er Outflow	hown)	14.5 - 1000 - - - - - - - - - - - - - - - - - -	50mm Bulk sa Enviro Acid S	Diamer ample fo nmenta ulfate S	ter tube sample or CBR testing il sample ioil Sample	S S F F St S VSt V	ency Very Soft Soft Firm Very Stiff		25 50 10 20	CS (kPa) 25 5-50 1-100 00-200 00-400	Moisture Condition D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit
RG LIB 1.05.0.GLB Log	Stra	ta Cha G tra De	anges radational or ansitional stra efinitive or dis rata change	ata ,	Field Test PID DCP(x-y) HP	Photoi Dynan	onisatio	on detector reading (ppm) etrometer test (test depth interval shown) meter test (UCS kPa)	1	Friable V L MD D VD	Lo M De	ery Lo	ose n Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%



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PROJECT NAME: Proposed Development

SITE LOCATION: Lot 2 Phillip Drive, South West Rocks

TEST LOCATION: See Figure DATE: 29/7/21

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MR

RGS32813.1

DRILL TYPE: P160 EASTING: 505651 m SURFACE RL:

		YPE: F OLE DIAM	P160 ETER	: 100 n	nm	IN	CLINATION: 90°	EASTING: NORTHING:	505651 6582533		SURF.		RL:	AHD
	Drill	ing and Sam	pling				Material description and p	orofile information				Field	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION characteristics,colou			MOISTURE	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
WB		14.95m 16.00m SPT		15. <u>5</u> 16.0_		SC	Sandy Clay/Clayey SA medium grained, high p Becoming SAND, fine to some silt.	lasticity pale grey (c	continued)	w N	VD			MARINE
iu Tool		12,20,20 N=40 16.45m		16. <u>5</u>			Becoming Silty SAND, o	lark brown.						
(09/2021 14:17 10.02.00.04 Datgel Lab and In Sit		17.50m SPT 3,3,6 N=9 17.95m		17.5_ - - - 18.0_ - - - 18.5_										
O.	GEND:	19. 5;2ип N=R		19.0_ 19.5_ 	mples a	nd Test	<u>s</u>		Consiste VS V	ncy fery Soft		<u>U00</u>	CS (kPa) <u>Moisture Condition</u> D Dry
RG LIB 1.05.0.GLB Log RG NON-CORED B	Wat (Dai - Wat I Wat ata Cha G tra	er Level e and time sh er Inflow er Outflow anges radational or ansitional strat efinitive or dist rata change	own)	U ₅₀ CBR E ASS B Field Test PID DCP(x-y) HP	Bulk s Enviro Acid S Bulk S ts Photo Dynar	ample for onmenta Sulfate S Sample ionisationic pene	er tube sample or CBR testing I sample oil Sample in detector reading (ppm) etrometer test (test depth interval	shown)	S S F F St S VSt V H F	cery sont coft firm stiff /ery Stiff lard friable V L MC D VD	V Lc) M	25 50 10 20 >4 ery Lo	6 - 50 0 - 100 00 - 200 00 - 400 100 pose	M Moist W Wet W _p Plastic Limit W _L Liquid Limit Density Index <15% Density Index 15 - 35%



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PROJECT NAME: Proposed Development JOB NO: RGS32813.1

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MR

SITE LOCATION: Lot 2 Phillip Drive, South West Rocks

TEST LOCATION: See Figure DATE: 29/7/21

DRILL TYPE: P160 **EASTING:** 505651 m SURFACE RL:

Drilling and Sampling				T						AIU		d Test	AHD
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, p	plasticity/particle	MOISTURE	CONSISTENCY DENSITY	Test Type	Result	Structure and additiona observations
WB				20.5		SC	Sandy Clay/Clayey SAND interbed medium grained, high plasticity pale	led, fine to grey (continued)	W	VD			MARINE
				22.0	<i>[[]</i>		Hole Terminated at 22.00 m						
				23.0									
				23.5									
				24.0									
				24. <u>5</u>									
	SEND:		<u>!</u>	Notes, Sar	nples a	nd Test	<u>s</u>	Consiste				CS (kPa)	
Water U ₅₀ CBR CBR (Date and time shown) E Water Inflow ASS Water Outflow B			U _{so} 50mm Diameter tube sample CBR Bulk sample for CBR testing E Environmental sample ASS Acid Sulfate Soil Sample				S F St	Very Soft Soft Firm Stiff Very Stiff Hard Friable		<25 25 - 50 50 - 100 100 - 20 200 - 40 >400		D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit	
	G tra De	radational or ansitional strat efinitive or dist rata change	a ,	Field Tests PID DCP(x-y) HP	Photoi Dynan	nic pene	n detector reading (ppm) strometer test (test depth interval shown) meter test (UCS kPa)	<u>Density</u>	V L ME D VD	Lo M D	ery Lo oose ediun ense ery Do	n Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%



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PAGE: 1 of 6 **PROJECT NAME:** Proposed Development JOB NO: RGS32813.1

BOREHOLE NO:

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MR

SITE LOCATION: Lot 2 Phillip Drive, South West Rocks

TEST LOCATION: See Figure DATE: 29/7/21

DRILL TYPE: P160 SURFACE RI · FASTING: 505715 m

BO		OLE DIAMET		mm T	IN		65825	6582516 m DATUM: AHD				
1	Drill	ing and Samplir	ig T		7	Material description and profile information				Fiel	a rest	
METHOD	WATER		RL DEPTH	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticit characteristics,colour,minor componen	y/particle ts	MOISTURE	CONSISTENCY DENSITY	Test Type	Result	Structure and additiona observations
AD/T			0.5	-	SM	Silty SAND fine to medium grained, grey, on brown root affected. SAND fine to medium grained, grey, some		M	MD			TOPSOIL AEOLIAN
		1.00m SPT 6,6,6 N=12	1.0		SP	Sitty SAND fine to medium grained, grey, obrown.	orange	W				
		1.45m	1. <u>5</u> 2.0		SM	2.00m Silty SAND medium to coarse grained, gre some gravel, fine grained, subrounded.	 y, brown,		VD			MARINE
WB		2.50m SPT 11,15,30 N=45 2.95m	2. <u>5</u> 3. <u>0</u> 3. <u>5</u>									
	4.00m SPT 23,33,2 N=35/225mm 4.38m		4. <u>0</u>			Becoming fine to medium grained, dark bro	own/black	i				
Wate	Wat (Dat Wat	er Level te and time show er Inflow	ASS	50mm Bulk s Enviro Acid S	n Diame sample f onmenta Sulfate S	ts ter tube sample for CBR testing al sample Soil Sample	Consist VS S F St VSt	Very Soft Soft Firm Stiff Very Stiff		25 50 10 20	CS (kPa 25 5 - 50 0 - 100 00 - 200 00 - 400	D Dry M Moist W Wet W _p Plastic Limit
	ta Cha G tra De	er Outflow anges radational or ansitional strata efinitive or distict rata change	Field Test PID DCP(x-y) HP	ets Photo Dynar	nic pen	on detector reading (ppm) etrometer test (test depth interval shown) ometer test (UCS kPa)	H Fb Densit	Hard Friable V V L MI	L D M D	ery Lo	n Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%



CLIENT:

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PROJECT NAME: Proposed Development JOB NO:

SITE LOCATION: Lot 2 Phillip Drive, South West Rocks

TEST LOCATION: See Figure DATE: 29/7/21

BOREHOLE NO:

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MR

RGS32813.1

DRILL TYPE: P160 EASTING: 505715 m SURFACE RL:

	Drill	ling and Samplin	g			Material description and profile information				Field	d Test	
METHOD	WATER	SAMPLES R		GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticit characteristics,colour,minor componen	ty/particle ts	MOISTURE	CONSISTENCY DENSITY	Test Type	Result	Structure and additiona observations
WB					SM	Silty SAND medium to coarse grained, gre some gravel, fine grained, subrounded. (co	ey, brown, ontinued)	W	VD			MARINE
		5.58ppr N=R	5. <u>5</u>			Becoming indurated, weakly cemented.						
		7.0 8,ри т N=R	6. <u>5</u>									
			7. <u>5</u>									
	1	8.50m SPT 18,29,20 1=49/230mm 8.88m	8. <u>5</u>			Becoming medium to coarse grained, (not	indurated)					
LEG	END:	10.00m	9.5 Notes, Sa		nd Test	<u>s</u>	Consister				CS (kPa)	
_ _	Wat (Dat Wat Wat	ter Level te and time showr ter Inflow ter Outflow tanges	U ₅₀ CBR E ASS B	Bulk s Enviro Acid S Bulk S	ample fo	ter tube sample or CBR testing Il sample Soil Sample	S S F Fi St S VSt V	ery Soft oft irm tiff ery Stiff ard riable V		25 50 10 20	25 5 - 50 0 - 100 00 - 200 00 - 400 400	D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit
	tra D	radational or ansitional strata efinitive or distict rata change	PID DCP(x-y)	Photo Dynar	nic pene	on detector reading (ppm) etrometer test (test depth interval shown) meter test (UCS kPa)	Density	V L ME D	Lo N	oose	oose n Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85%



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PAGE: JOB NO:

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RGS32813.1

PROJECT NAME: Proposed Development

SITE LOCATION: Lot 2 Phillip Drive, South West Rocks LOGGED BY: MR **TEST LOCATION:** See Figure DATE: 29/7/21

DRILL TYPE: P160 SURFACE RI FASTING: 505715 m

		TYPE: OLE DIAM	P160 IETER :	100 n	nm	IN	EASTING: CLINATION: 90° NORTHING:	50571 658251		OATU		RL:	AHD
	Dril	ling and San	npling				Material description and profile information				Field	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticil characteristics,colour,minor componer		MOISTURE	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
WB		SPT N=R 10.35m		10. <u>5</u> 11. <u>0</u>		SM	Silty SAND medium to coarse grained, gre some gravel, fine grained, subrounded. (co		W	VD			MARINE
		11.50m SPT 7,2,2 N=4 11.95m		11.5 - - - 12.0		CH	11.60mSandy Clay high plasticity pale grey.		M ∨ W	F	HP	70	
1 Datgel Lab and in Situ 1001				12.5 - - 12.5 -		SP	SAND fine to medium grained, pale grey		_	VD			
wingFile>> 10/09/2021 14:17 10.0z.บบ.บฯ		13.00m SPT 17,25,29 N=54 13.45m		13. <u>0</u>									
- TEST PIT RGS32813.1 LOGS.GPJ <<บาล				14.0 - - - 14.5 -									
A RG NON-CORED BO	(Da — Wai ■ Wai rata Ch — G traican	ter Level te and time sh ter Inflow ter Outflow	nown)	Notes, Sai U ₅₀ CBR E ASS B Field Test PID DCP(x-y) HP	50mm Bulk sa Enviror Acid S Bulk Sa Bulk Sa Photoid Dynam	Diametample for the second properties of the s	ter tube sample or CBR testing Il sample Soil Sample on detector reading (ppm) etrometer test (test depth interval shown) imeter test (UCS kPa)	S F St VSt H	ency Very Soft Soft Firm Stiff Very Stiff Hard V L ME D VD	V Lo M D	25 50 10 20 >4 ery Lo	6 - 50 0 - 100 00 - 200 00 - 400 100 pose	D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit Density Index <15% Density Index 15 - 35%



P160

DRILL TYPE:

ENGINEERING LOG - BOREHOLE

De Groot and Benson

PROJECT NAME: Proposed Development

Lot 2 Phillip Drive, South West Rocks

SITE LOCATION:

TEST LOCATION: See Figure

CLIENT:

EASTING: 505715 m SURFACE RL:

BOREHOLE NO:

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RGS32813.1

	Drill	ing and Sampli					Material description and profile information				Field	d Test	
METHOD	WATER		RL DEI	PTH d	LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plastic characteristics,colour,minor component		MOISTURE	CONSISTENCY DENSITY	Test Type	Result	Structure and additiona observations
WB				15.5		SP	SAND fine to medium grained, pale grey (continued)		M > W	VD			MARINE
		16.00m SPT 7,8,12 N=20 16.45m		16. <u>5</u> 17. <u>5</u> 18. <u>0</u>			Medium to coarse grained, with some to a clay	trace of		MD			
		19.00m SPT N=R 19.45m		19.0			Becoming fine to medium grained			VD			
LEG Wate	END: er		Note	s, Samp	oles and	d Tests	<u> </u>	Consiste VS V	ncy /ery Soft		<u>U(</u> <2		Moisture Condition D Dry
Y	Wat (Dat Wat	er Level e and time show er Inflow er Outflow anges	ASS B	. E	Bulk sar Environi	mple fo mental Ifate So	er tube sample r CBR testing sample bil Sample	F F St S VSt V H H	Soft Firm Stiff Very Stiff Hard Friable		50 10 20 >4	5 - 50 0 - 100 00 - 200 00 - 400 400	M Moist W Wet W _p Plastic Limit W _L Liquid Limit
	tra De	radational or ansitional strata efinitive or distic rata change	PIE	(x-y) [Dynamio	c pene	n detector reading (ppm) rrometer test (test depth interval shown) neter test (UCS kPa)	<u>Density</u>	V L ME D VD	Lo M D	ery Lo cose ledium ense ery De	n Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%



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De Groot and Benson

PROJECT NAME: Proposed Development

SITE LOCATION: Lot 2 Phillip Drive, South West Rocks

TEST LOCATION: See Figure **DATE:** 29/7/21

BOREHOLE NO:

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MR

RGS32813.1

DRILL TYPE: P160 EASTING: 505715 m SURFACE RL:

	OREL	ITPE: IOLE DIAN	P160 IETER	: 100 n	nm	INC	EASTING: CLINATION: 90° NORTHING:	505/15 6582516		OATUI		KL:	AHD
	Dri	lling and San	npling				Material description and profile information				Field	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticit characteristics,colour,minor componen		MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
W				20.5		SP	SAND fine to medium grained, pale grey (continued)		M > W _P	VD			MARINE
				21. <u>0</u> - 21 -			Becoming coarse grained						
				21. <u>5</u> - -									
		22.00m		22.0									
Situ Tool		SPT N=R		-									
Lab and In S		22.45m		22. <u>5</u> -									
14:17 10.02.00.04 Datge				23. <u>0</u> -									
wingFile>> 10/09/2021				23. <u>5</u> - -									
13.1 LOGS.GPJ < <dra< th=""><td></td><td></td><td></td><td>24.<u>0</u> - -</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></dra<>				24. <u>0</u> - -									
RG LIB 1.05.0.GLB Log RG NON-CORED BOREHOLE - TEST PIT RGS32813.1 LOGS GPJ < <drawingfile>> 10/09/2021 14:17 10.02.00.04 Datgel Lab and In Situ Tool</drawingfile>		25.00		24.5 - - -									
J SOREH	EGEND	25.00m :		Notes, Sa	mples a	nd Test	<u>s</u>	Consister				CS (kPa)	
S Log RG NON-COREDE	– (Da – Wa	ater Level ate and time sl ater Inflow ater Outflow nanges	hown)	U ₅₀ CBR E ASS B	Bulk sa Enviro Acid S Bulk S	ample fo nmenta ulfate S	er tube sample or CBR testing I sample oil Sample	S S F Fi St S VSt V H H Fb Fi	ery Soft oft irm tiff ery Stiff ard riable		50 10 20 >4	- 50 - 100 0 - 200 0 - 400 00	D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit
RG LIB 1.05.0.GLB	(t [t	Gradational or ransitional stra Definitive or dis strata change	ata	Field Test PID DCP(x-y) HP	Photoi Dynan	nic pene	n detector reading (ppm) trometer test (test depth interval shown) meter test (UCS kPa)	<u>Density</u>	V L MD D VD	Lo M De	ery Lo oose edium ense ery De	n Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%



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MR

RGS32813.1

SITE LOCATION: Lot 2 Phillip Drive, South West Rocks

TEST LOCATION: See Figure DATE: 29/7/21

DRILL TYPE: P160 **EASTING:** 505715 m SURFACE RL:

SAMT-LES Rt. DEPTH Set Se		AHD	d Test		_	DATU	n [516 r	65825	NORTHING: e information	ICLINATION: 90° Material description and pr	IN	nm	100 m		ng and Sam		ВО
28.00m			Result	Test Type		CONSISTENCY DENSITY	MOISTURE	е				CLASSIFICATION SYMBOL	GRAPHIC LOG	DEPTH (m)	RL			METHOD
28.70m							٨		e gravel		(continued) 28.00m Sandy Clay high plastici	SP		26.0 26.5 27.0 27.5		N=R		WB
Water VS Very Soft <25 D Dry ✓ Water Level (Date and time shown) CBR (Date and time shown) Bulk sample for CBR testing (Date and time shown) F Firm 50 - 100 W Wet ✓ Water Inflow ASS Acid Sulfate Soil Sample VSt Very Stiff 200 - 400 W Liquid L ✓ Water Outflow B Bulk Sample H Hard >400 H											30.00m			29.0				
Strata Changes	st stic Limit id Limit x <15% x 15 - 35%	D Dry M Moist W Wet W _p Plast W _L Liquid Density Index Density Index	5 - 50 - 100 0 - 200 0 - 400 00	25 50 100 200 >40 y Loo	Loos	\ L	ry Soft ft m f ry Stiff rd able V L	Ver Sof Firr Stif Ver Hai Fria	VS S F St VSt H Fb		eter tube sample for CBR testing al sample Soil Sample on detector reading (ppm)	Diamel ample for nmenta ulfate S ample onisatio	50mm Bulk sa Enviro Acid Si Bulk Si Bulk Si	U ₅₀ CBR E ASS B Field Test	hown)	e and time sher Inflow er Outflow anges adational or	Wate (Date Wate Wate ta Cha	Wate



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BOREHOLE NO:

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MR

SITE LOCATION: Lot 2 Phillip Drive, South West Rocks

TEST LOCATION: See Figure DATE: 29/7/21

DRILL TYPE: P160 FASTING: 505795 m SURFACE RI

		YPE: OLE DIAM	P160 IETER	: 100 m	nm	IN	EASTING: CLINATION: 90° NORTHING:	505795 6582513		SURF/ DATU		RL:	AHD
	Drill	ing and San	npling				Material description and profile information				Field	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticit characteristics,colour,minor componen		MOISTURE	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
T/Q				_		SM	Silty SAND fine to medium grained, dark b	rown,	М	MD			TOPSOIL
10.02.00.04 Datget Lab and in Situ Tool WB AD/T	-\-	1.00m SPT 3,3,5 N=8 1.45m 2.50m SPT 2,2,3 N=5 2.95m		1.5 2.0 2.5 3.0			SAND fine to medium grained, dark by coot affected. SAND fine to medium grained, grey, some		W	MD			AEOLIAN — — — — — — — — — — — — — — — — — — —
May NG NON-CORED BO	Wat (Dal - Wat Wat - G - tra	4.00m SPT 3,4,5 N=9 4.43m 4.43m 4.60m And time shader inflow rear Outflow anges aradational or ansitional stratefinitive or disrata change	nown)	3.5 	50mm Bulk s Enviro Acid S Bulk S Photoi Dynan	Diame ample f nmenta sulfate S ample onisationic pend	ter tube sample or CBR testing II sample soil Sample soil Sample soil Sample soil sample for detector reading (ppm) etrometer test (test depth interval shown) meter test (UCS kPa)	S S S S S S S S S S S S S S S S S S S	ency Very Soft Soft Firm Stiff Very Stiff Hard Friable V L MD D V	Vo Lo D	25 50 10 20 >4 ery Lo	5 - 50 0 - 100 00 - 200 00 - 400 400 Dose	D Dry M Moist W Wet W _P Plastic Limit W _L Liquid Limit Density Index <15% Density Index 15 - 35%



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Development

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29/7/21

RGS32813.1

SITE LOCATION: Lot 2 Phillip Drive, South West Rocks

TEST LOCATION: See Figure DATE:

DRILL TYPE: P160 EASTING: 505795 m SURFACE RL:

		YPE: OLE DIAM	P160 IETER	: 100 n	nm	INC		EASTING: NORTHING:	505795 6582513		OATUI		KL:	AHD
	Dril	ling and San	npling				Material description and profi	le information				Field	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: So characteristics, colour, m			MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
WB				_		SP	SAND fine to medium grain	ed, grey, some	silt	W	MD			MARINE
		5.50m SPT 3,5,7 N=12 5.90m		5. <u>5</u> - - - - 6.0			(continued)							
				6. <u>5</u> -			Becoming dark brown							
		7.00m		7.0										
		SPT 6,7,6 N=13 7.37m		7. <u>5</u>							MD to VD			
TEA TO STATE TO THE TOWN TO THE TOWN TH		8.50m		8.0 - - - - 8.5										
		SPT 6,8,9 N=17		9.0										
		10 00m		9.5 - - -										
LEC Wat	Wat (Da Wat	ter Level te and time sh ter Inflow ter Outflow	nown)	Notes, San U ₅₀ CBR E ASS B	50mm Bulk s Enviro Acid S	Diamet ample fo	er tube sample or CBR testing I sample oil Sample		S So F Fi St St VSt Ve H Ha	ery Soft oft rm		25 50 10 20	CS (kPa) 25 5 - 50 0 - 100 00 - 200 00 - 400	Moisture Condition D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit
Stra	G tra D	anges radational or ansitional stra efinitive or dis rata change	ıta	Field Test PID DCP(x-y) HP	Photoi Dynan	nic pene	n detector reading (ppm) strometer test (test depth interval show meter test (UCS kPa)	wn)	<u>Density</u>	V L MD D VD	Lo M De	ery Lo bose edium ense ery De	n Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%



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PROJECT NAME: Proposed Development JOB NO: RGS32813.1

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MR

SITE LOCATION: Lot 2 Phillip Drive, South West Rocks

TEST LOCATION: See Figure DATE: 29/7/21

DRILL TYPE: P160 EASTING: 505795 m SURFACE RL:

			YPE: OLE DIAN	P160 IETER :	: 100 n	nm	IN	EASTING: CLINATION: 90° NORTHING:	505795 6582513		OATUI		KL.	AHD
		Drill	ing and San	npling				Material description and profile information				Field	d Test	
	METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticit characteristics,colour,minor componen		MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
r	WB				_		SP	SAND fine to medium grained, grey, some	silt	W	MD to			MARINE
			SPT 5,5,6 N=11 10.45m		10. <u>5</u>			(continued)			VD			
			11 50m		11.0									
			11.50m SPT 1,0,5 N=5		11. <u>5</u> - - - 12. <u>0</u>						L			Iron Indurated
e>> 10/09/2021 14:17 10.02.00.04 Datgel Lab and In Situ Tool					12. <u>5</u>						VD			
17 10.02.00.04 Da			13.00m SPT		13. <u>0</u>							HP	100	
ingFile>> 10/09/2021 14:			N=R 13.45m		- 13. <u>5</u> - -									
13.1 LOGS.GPJ < <draw< td=""><td></td><td></td><td></td><td></td><td>14.<u>0</u> - -</td><td></td><td></td><td>44.0-</td><td></td><td></td><td></td><td></td><td></td><td></td></draw<>					14. <u>0</u> - -			44.0-						
RG LIB 1.05.0.GLB Log RG NON-CORED BOREHOLE - TEST PIT RGS32813.1 LOGS.GPJ < <drawingfile< td=""><td></td><td></td><td>14.50m SPT 0,0,0 N=0</td><td></td><td>14.5 - - -</td><td></td><td></td><td>Silty CLAY medium plasticity, grey.</td><td></td><td>M > W_P</td><td>S-F</td><td></td><td></td><td></td></drawingfile<>			14.50m SPT 0,0,0 N=0		14.5 - - -			Silty CLAY medium plasticity, grey.		M > W _P	S-F			
BOREH		END:	I		Notes, Sa	mples a	nd Test	<u>s</u>	Consister VS Ve	icy ery Soft		<u>U</u> (LI CS (kPa 25	Moisture Condition D Dry
Log RG NON-CORED	_ 	Wat (Dat Wat Wat	er Level te and time sl er Inflow er Outflow anges	hown)	U ₅₀ CBR E ASS B	Bulk s Enviro Acid S	ample fo	er tube sample or CBR testing I sample oil Sample	S So F Fi St St VSt Ve H Ha	oft rm		25 50 10 20	5 - 50 0 - 100 00 - 200 00 - 400 400	M Moist W Wet W _p Plastic Limit W _L Liquid Limit
RG LIB 1.05.0.GLB		Gi tra De	radational or ansitional stra efinitive or dis rata change	ata	Field Test PID DCP(x-y) HP	Photoi Dynan	nic pene	n detector reading (ppm) etrometer test (test depth interval shown) meter test (UCS kPa)	<u>Density</u>	V L MD D VD	Lo M De	ery Lo oose ediun ense ery Do	n Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%



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SITE LOCATION: Lot 2 Phillip Drive, South West Rocks

TEST LOCATION: See Figure DATE: 29/7/21

DRILL TYPE: P160 FASTING: 505795 m SURFACE RI

		TYPE: OLE DIAM	P160 IETER:	100 m	nm	IN	EASTING: CLINATION: 90° NORTHING	50579 6: 658251		SURF.		RL:	AHD
	Dril	ling and San	npling		_		Material description and profile information				Field	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plastic characteristics,colour,minor compone		MOISTURE	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
WB		14.95m		15.5			Silty CLAY medium plasticity, grey. (cont	inued)	M > Wp	S-F			MARINE
		SPT 5,5,5 N=10		16.5 - - - 17.0		SC	Sandy Clay/Clayey SAND interbedded, medium grained, medium plasticity, grey brown.			St			
.02.00.04 Datgel Lab and In Situ Toc		17.50m SPT 6,7,2 N=9 17.95m		17.5 - - - - 18.0			SAND fine to medium grained, brown. 17.95m Hole Terminated at 17.95 m		W	VD			
RGS32813.1 LOGS.GPJ < <drawingfile>> 10/09/2021 14:17 10.</drawingfile>				18. <u>5</u>									
DG RG NON-CORED BO	(Da - Wa ■ Wa ata Ch tr	ter Level te and time sl ter Inflow ter Outflow	hown)	Notes, Sai U _{so} CBR E ASS B Field Test PID DCP(x-y) HP	50mm Bulk s Enviro Acid S Bulk S S Photoi Dynan	Diame ample f nmenta sulfate S ample onisatio	ter tube sample or CBR testing Il sample soil Sample on detector reading (ppm) etrometer test (test depth interval shown) meter test (UCS kPa)	S F St VSt H	Very Soft Soft Firm Stiff Very Stiff Hard Friable	V Lo D M	<2 25 50 10 20 >4 ery Lo	- 50 - 100 0 - 200 0 - 400 00 ose	Moisture Condition D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%



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BOREHOLE NO:

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MR

SITE LOCATION: Lot 2 Phillip Drive, South West Rocks

TEST LOCATION: See Figure DATE: 2/8/21

DRILL TYPE: P160 FASTING: 505769 m SURFACE RI

		TYPE: P OLE DIAME	160 E TER :	100 m	ım	IN	EASTING: CLINATION: 90° NORTHING:	505769 658243		OATU		RL:	AHD
	Dril	ling and Sam	oling				Material description and profile information				Field	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity characteristics,colour,minor component		MOISTURE	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
AD/T				_		SM	Silty SAND fine to mwsium grained, grey, r	root	М	MD			TOPSOIL
JA		1.00m SPT 2,3,3 N=6 1.45m		0.5_ 1.0_ 1.5_ 2.0_		SP	SAND fine to medium grained, pale grey/wl	hite —	w				AEOLIAN — — — — —
1:17 10.02.00.04 Datgel Lab and In Situ Tool WB	_	2.50m SPT 30/40mm N>50 2.94m		2.5		SM	Silty SAND fine to medium grained, dark be indurated (weakly cemented).	rown,	M	VD			Perched water above indurated sand
RG LIB 1.05.0.GLB Log. RS NON-CORED BORRHOLE - TEST PIT RGS32813.1 LOGS.GPJ < <drawing file="">> 10/09/2021 14:17 10.02.00.04 Datget Lab and In Situ Tool in Situ Too</drawing>	17	4.00m SPT 30,30/100mr N>50 4.38m	m	3.5 - 4.0 - 4.5		SM	3.50m Silty SAND fine to medium grained, dark bi Silty SAND medium to coarse grained, dark some gravel, fine grained, white.		-			_	MARINE — — — — — — — — — — — — — — — — — — —
IG LIB 1.05.0.GLB Log RG NON-CORED BOREH	Mariata Ch — Wariata Ch — G — G	ter Level te and time sho ter Inflow ter Outflow	own)	Notes, Sai U ₅₀ CBR E ASS B Field Test PID DCP(x-y) HP	50mm Bulk sa Enviro Acid S Bulk S Photoi Dynan	Diame ample f nmenta ulfate S ample onisation		S S F F St S VSt \	e/cry Soft Soft Firm Stiff Very Stiff Hard Friable V L MD D VD	Vi Lo M Di	<2 25 50 10 20 >4 ery Lo	6 - 50 0 - 100 00 - 200 00 - 400 000 00se	Moisture Condition D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%



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PROJECT NAME: Proposed Development **JOB NO:** RGS32813.1

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MR

SITE LOCATION: Lot 2 Phillip Drive, South West Rocks

TEST LOCATION: See Figure **DATE:** 2/8/21

DRILL TYPE: P160 EASTING: 505769 m SURFACE RL:

	יייים	ing and Samplin	α			Material description and profile informs -4:				Ein!	d Test	
\neg	וווזט	ing and Samplin	9		7	Material description and profile information		Τ		riek	ıest	
METHOD	WATER	SAMPLES F. (r	L DEPTH	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plastici characteristics,colour,minor componer	ty/particle tts	MOISTURE	CONSISTENCY DENSITY	Test Type	Result	Structure and additiona observations
WB					SM	Silty SAND medium to coarse grained, da some gravel, fine grained, white. (continue		М	VD			MARINE
	1	5.50m SPT 7,30/140mm	5. <u>5</u>									
		7,30/140/min N>50 5.85m	6. <u>0</u>									
			6. <u>5</u>									
		7.00m	7. <u>0</u>									
	1	SPT 4,30/130mm N>50 7.40m	7.5									
		7.10	7. <u>9</u>									
			8. <u>0</u>									
		8.50m	8. <u>5</u>		SM	8.50m Silty SAND fine to medium grained, dark						
		SPT 30/140mm N>50			Jivi	orange/dark brown.						
		8.94m	9.0									
			9. <u>5</u>									
EC.	END:	10.00m	Notes, Sa	umples s	nd Too	te	Consiste	nev		114	CS (kPa) Moisture Condition
Nate	<u>er</u> Wat	er Level e and time showr	U ₅₀ CBR	50mm Bulk s	Diame	eter tube sample for CBR testing	VS V S S F F	ery Soft oft irm		<2 25 50	25 5 - 50 0 - 100	D Dry M Moist W Wet
	Wat Wat	er Inflow er Outflow anges	ASS B	Acid S		al sample Soil Sample	VSt V	oun /ery Stiff lard riable		20	00 - 200 00 - 400 100	W _p Plastic Limit W _L Liquid Limit
	Gi tra	radational or ansitional strata efinitive or distict	Field Tes PID DCP(x-y)	Photo		on detector reading (ppm) etrometer test (test depth interval shown)	Density	V L MD	Lo	ery Lo	ose n Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65%



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PROJECT NAME: Proposed Development JOB NO: RGS32813.1

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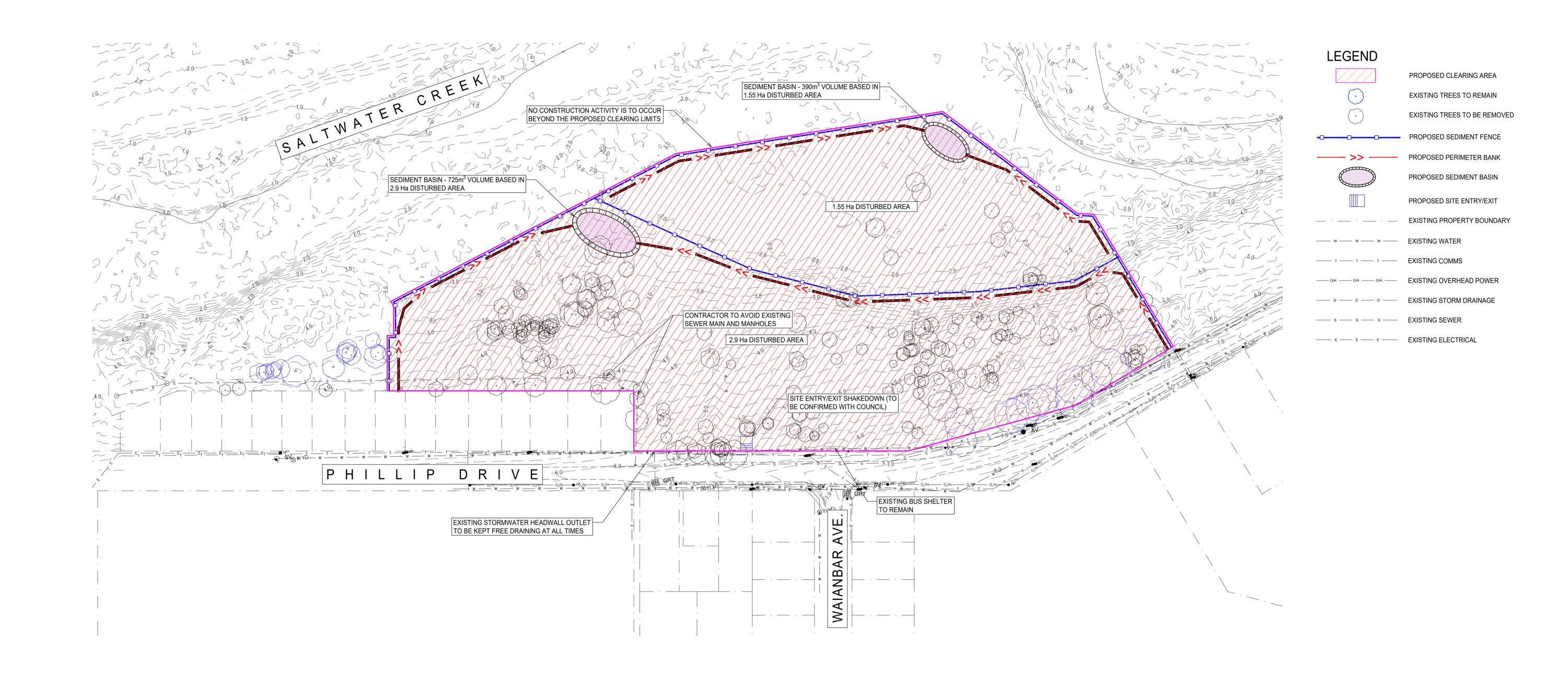
MR

SITE LOCATION: Lot 2 Phillip Drive, South West Rocks

TEST LOCATION: See Figure **DATE:** 2/8/21

DRILL TYPE: P160 EASTING: 505769 m SURFACE RL:

	Drill	ing and Sam					Material description and profile information				Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plastici characteristics,colour,minor componer		MOISTURE	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
WB	3	SPT 0,30/110mm		-		SM	Silty SAND fine to medium grained, dark orange/dark brown. (continued)		М	VD			MARINE
		N>50 10.31m		-			Hole Terminated at 10.26 m						
				10.5									
]									
				140									
				11.0									
				-									
				11.5									
				12.0									
				-									
				12.5									
				-									
				13.0							HP	100	
				-									
				13.5									
				14.0									
				17.5									
				14.5									
LEG	END:			Notes, Sar	nples aı	nd Test	rs	Consiste	ncy		U	CS (kPa	Moisture Condition
Nat	<u>er</u>		-	U ₅₀			ter tube sample	VS V	ery Soft		<2	25 5 - 50	D Dry M Moist
	(Dat	er Level te and time sho	own) (CBR E			or CBR testing Il sample	1	irm Stiff			0 - 100 00 - 200	W Wet W _p Plastic Limit
⊢		er Inflow er Outflow	/	ASS B	Acid S Bulk S		Soil Sample	1	ery Stiff Iard			00 - 400 400	
<u>Stra</u>		anges radational or	<u> </u>	Field Test				Fb F	riable V	V	ery Lo	oose	Density Index <15%
	 tra	ansitional strata efinitive or disti	a ¯	PID DCP(x-y)	Photoi		on detector reading (ppm) etrometer test (test depth interval shown)		L ME	Lo	oose	n Dense	Density Index 15 - 35%
		rata change	101	HP			meter test (UCS kPa)	1	D VD	D	ense		Density Index 65 - 85% Density Index 85 - 100%



FOR APPROVAL

Architect
RISE PROJECTS
57/6-8 HERBERT STREET, ST. LEONARDS, NSW 2065

A ISSUE FOR APPROVAL
Rev Description
Eng Draft Date

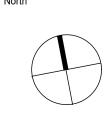
RISE PROJECTS
57/6-8 HERBERT STREET, ST. LEONARDS, NSW 2065



T: 02 8810 5800 E: info@xavierknight.com.au
A: Level 7, 210 Clarence Street, Sydney NSW 2000

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7	SITE CLEARING WORKS LOT 2 PHILLIP DRIVE, SOUTH WEST ROCKS	Scale at A1 1:1000	Drawn AA	Approved SS
)	Sheet Subject	Job No	Drawing No	Revision
	SITE CLEARING AND EROSION AND SEDIMENT CONTROL PLAN	211107	C020	Α