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Our Ref: PSM4252-002L REV5

24 August 2022

Development Graduate Aliro Group Level 38 Gateway 1 Macquarie Place SYDNEY NSW 2000 alloyd@aliro.com.au

Attention: Andy Lloyd

Dear Andy,

RE: MAMRE ROAD, KEMPS CREEK RESULTS OF DETAILED GEOTECHNICAL INVESTIGATION

1. Introduction

This report presents the results of Stage 1 and 2 geotechnical investigations undertaken by PSM at Mamre Road, Kemps Creek. The Stage 1 works have been undertaken in October 2020. The Stage 2 works have been undertaken in accordance with PSM proposal (Ref: PSM4252-008L) dated 27 July 2021.

The report has been updated to include PSM Stage 2 – Detail Geotechnical Investigation completed between 25 May and 08 June 2022.

Figure 1 presents a locality plan of the site and approximate investigation locations.

2. Background

To assist with the geotechnical investigation, we were provided with and reviewed the following documents:

- Contour survey of property by C & A surveyors dated 10 September 2019
- Survey sketch from C & A surveyors dated 16 September 2019
- Concept masterplan dated 20 September 2019
- Preliminary earthworks and retaining wall plan dated 25 September 2019
- AT&L Concept Earthworks Plan (Ref" 21-855-SKC001 dated 4 May 2022).

PSM understand the following about the proposed development:

- The site has an approximate area of 52 hectares
- The proposed development will comprise typical lightweight standard warehouse facilities, with hardstand areas, carparks and retaining wall
- The proposed earthworks comprise:
 - Cut depth: up to 18 m
 - Fill depth: up to 11 m.



Inset 1 below presents the preliminary earthworks (cut and fill) and retaining wall plan.

Inset 1: Preliminary earthworks and retaining wall plan by AT&L (Ref: 21-855-SKC001 dated 4 May 2022)

3. Geotechnical Investigation

The scope of stage 1 and 2 geotechnical investigations comprises:

- Stage 1: Geotechnical investigation undertaken from 22 to 23 October 2020 as a part of due diligence study:
 - Nine (9) boreholes including 3 cored holes and 6 augured holes
 - Six (6) Cone penetration tests.
- Stage 2: Geotechnical investigation undertaken on 22 May 2022, 7 and 8 June 2022 as a part of an additional geotechnical investigation:
 - Three (3) cored boreholes within the deep cut areas.

3.1 Fieldwork – Stage 1 (October 2020)

3.1.1 Boreholes

A total of 9 boreholes, including 3 cored holes (CH01 to CH03) and 6 augered holes (AH01 to AH06), were drilled using truck mounted geotechnical drilling rigs.

The 3 cored holes were drilled to depths of between 10.2 m to 10.9 m with augering through soils and low strength rock using V-Groove carbite bit (V-bit) and tungsten carbide bit (TC-bit), followed with coring through rock with NMLC diamond bit. The 6 augered holes were drilled to depths of between 5.25 to 6.0 m with V-bit and TC-bit.

The geotechnical borehole logs and core photos together with explanation sheets are presented in Appendix A1. Point load strength index testing was performed on the recovered core at approximately one metre intervals with results tabulated in Appendix B1.

3.1.2 Cone penetration testing (CPT)

In addition to the boreholes, a total of 6 CPTs (CPT01 to CPT06) were completed to refusal depths of 4.8 m to 6.6 m. The CPTs were carried out using a 24-tonne truck mounted rig. At the completion of each test, the holes were topped with sand fill. The results of the CPTs including interpreted subsurface profiles are included in Appendix C.

3.2 Fieldwork – Stage 2 (May and June 2022)

A total of three (3) cored boreholeswere drilled using track mounted geotechnical drilling rigs. The 3 cored holes were drilled to depths of between 13.0 m to 20.6 m with augering through soils and low strength rock using V-Groove carbite bit (V-bit) and tungsten carbide bit (TC-bit), followed by coring through rock with NMLC diamond bit.

The geotechnical borehole logs and core photos are presented in Appendix A2. Point load strength index testing was performed on the recovered core at approximately one metre intervals with results tabulated in Appendix B2.

3.3 General

All work was conducted under the full-time supervision of a PSM geotechnical engineer, who undertook the following tasks:

- Preparing engineering logs of the material encountered
- Collection of disturbed samples for geotechnical and analytical laboratory testing
- Point load testing of recovered core samples
- Directing the backfilling of boreholes
- Directing the service locators, drillers, and CPT operators to investigation locations.

Prior to testing, on-site service location "scans" were undertaken by a licensed service locator in the presence of a PSM geotechnical engineer to assess if the test locations were free from buried utilities.

The investigation locations were recorded with a hand-held GPS unit with a horizontal accuracy of approximately +/- 5 m.

Standard Penetration Tests (SPTs) were undertaken at regular intervals in soil units and some weathered rock. Soil samples were taken directly from the auger. At the completion of the fieldwork, the boreholes were backfilled with excavated spoil and sand as required.

Figures 2 to 8 present selected photos of the fieldwork.

3.4 Analytical Laboratory Testing

Six (6) soil samples were retrived by a PSM Geotechnical Engineer for testing in an analytical laboratory. The disturbed soil samples were sent to a NATA accredited analytical laboratory and the following tests were undertaken:

- Resistivity
- Electrical conductivity
- Soil pH
- Moisture content
- Chlorides
- Sulphates
- Cation Exchange Capacity (CEC) of calcium, magnesium, potassium, and sodium
- Exchangeable sodium percentage.

3.5 Geotechnical Laboratory Testing

Soil samples from three (3) of the boreholes were sent to a geotechnical laboratory for California Bearing Ratio (CBR). Tests were undertaken on 4-day-soaked samples compacted to 98% MDD at OMC, with a 4.5 kg surcharge.

4. Site Conditions

4.1 Geological Setting

The 1:100,000 Sydney Geological Map indicates that the site is underlain by Bringelly Shale of the Wianamatta group (Rwb) which consists of shale, carbonaceous claystone, claystone, laminite, fine to medium grained lithic sandstone, rare coal and tuff.

Inset 2 presents the geological map of the site.





4.2 Surface Conditions

The site comprises a farmhouse to the north and water reservoirs around the site. The site primarily comprises of thickly vegetated areas and landscape areas, with wired fences dividing the site. Cattle occupies the approximate 52 hectares site. At the time of the fieldwork, the surfaces were dry and accessible by foot or vehicles.

There are three peaks on the site, one in the east of the farmhouse, and two at the south eastern corner of the site. The slopes are gentle with the lowest area on site located at the south western corner.

4.3 Subsurface Conditions

The subsurface conditions encountered within the boreholes are summarised in Table 1 and Table 2. The Bringelly Shale bedrock unit has been classified using the system developed by Pells et al (1998). With regards to Bedrock unit, we have inferred CPT refusal depths as the top of the unit.

Table 1 - Summary of Inferred Subsurface Conditions Encountered in the Boreholes

Inferred Unit	Inferred Top of unit Depth Below Ground Surface (m)	Description			
TOPSOIL	0.0	CLAY to Clayey SAND; brown to dark brown, low to high plasticity, fine grained sand, grass and rootlets observed, dry to moist condition and firm to stiff consistency.			
NATURAL SOIL	0.1 – 0.05	CLAY to Sandy CLAY; low to high plasticity, orange and mottled grey to dark brown and red, shale fragments observed, fine grained Sand, dry to moist condition, stiff to hard consistency.			
BEDROCK A	0.6 – 6.6	SHALE/SANDSTONE; dark brown and grey, poorly developed to developed rock fabric, extremely to highly weathered, very low to low strength.			
BEDROCK B	3.1 – 6.3	SHALE/SANDSTONE; grey to dark grey, fine grained, developed to well developed rock fabric, thinly laminated, highly to slightly weathered, low to very high strength, moderately spaced defects greater than 60 mm spacing. LAMINITE; SHALE (70%-90%) and SANDSTONE (10%- 30%). SANDSTONE: medium coarse grained, grey, thinly bedded. SHALE: dark grey to grey, poorly developed, thinly laminated, highly to moderately weathered, low to medium strength.			

Stage		The reduced level of Inferred Geotechnical Units (m)						
Investigation Test ID		Topsoil	Natural Soil	Bedrock A	Bedrock B	EOH		
	AH01	74.5	74.4	72.6	-	68.5		
	AH02	72.7	72.6	71.0	-	66.7		
	AH03	73	72.8	71.8	-	67.0		
	AH04	63.3	63.2	60.7	-	57.3		
	AH05	65.6	65.5	63.8	-	59.6		
	AH06	46.6	46.5	45.0	-	41.4		
	CH01	85.7	85.6	85.1	82.6	74.8		
STAGE 1	CH02	73.5	73.3	71.6	66.1	63.3		
	CH03	63.5	63.4	61.5	53.5	53.0		
	CPT01	47.2	47.1	42.3*	-	42.3		
	CPT02	43.7	43.5	37.1*	-	37.1		
	CPT03	51.6	51.5	46.8*	-	46.8		
	CPT04	67.6	67.5	62.6*	-	62.6		
	CPT05	58.7	58.5	54.4*	-	54.4		
	CPT06	57.7	57.5	51.6*	-	51.6		
	BH01	82.0	81.9	80.5	70.2	61.4		
STAGE 2	BH02	81.0	80.9	80.2	71.3	64.3		
	BH03	74.0	73.9	73.2	67.7	61.0		

Table 2 – The reduced level (R.L.) of Inferred Geotechnical Units Encountered in the Boreholes and CPT

Note:

* CPT refusal is inferred as top of BEDROCK A.

4.4 Groundwater

Water seepage was observed at AH05 at depth of 5.7 m.

No groundwater was observed within any of the other boreholes during the geotechnical investigation. Long term groundwater monitoring was not undertaken.

5. Laboratory Testing Results

5.1 Geotechnical Testing

Table 3 present a summary of the CBR test results. The laboratory test sheets for each set of tests are included in Appendix D.

Sample ID	Borehole ID (Depth)	Material Description	Soaked CBR (%)	Moisture Content (%)	ОМС (%)	Standard Maximum Dry Density (t/m³)	Swell (%)
CBR01	AH04 (0.5 m – 1.0m)	CLAY	2.5	21.4	20.5	1.64	2.5
CBR02	CH03 (0.5 m – 1.0m)	CLAY	2.0	21.7	22.1	1.63	3.5
CBR03	AH03 (0.5 m – 1.0m)	Sandy CLAY	1.5	17.6	21.1	1.64	5.5

Table 3 – Summary of CBR test results

5.2 Analytical Testing

5.2.1 Aggressivity

Table 4 presents a summary of the analytical laboratory testing results for aggressivity. Detailed results are provided in Appendix D.

The laboratory test results summarised indicate the following:

- pH of the soil samples analysed ranged from 5.1 to 8.9, with an average of 7.1
- The concentrations of soluble sulphate in samples analysed ranged from 10 mg/kg to 190 mg/kg
- The concentrations of chlorides in samples analysed ranged from <10 mg/kg to 390 mg/kg
- The moisture content ranged from 9.1 to 19.3 %
- The resistivity of the soil samples ranged from 2,500 ohm.cm to 12,800 ohm.cm.

Table 4 – Aggressivity Classification

Sample ID	Material Description	BH ID (Depth)	рН	Moisture Content [%]	Chloride by Discrete Analyser [mg/kg]	Soluble Sulphate by ICPAES [mg/kg]	Resistivity [ohm.cm]
ES01	SHALE	CH01 (1.1 m)	8.4	9.1	<10	10	7,190
ES02	Sandy CLAY	CH02 (0.8 m)	8.9	14.7	280	90	2,500
ES03	CLAY	CH03 (0.7 m)	7.7	15.7	120	10	9,090
ES04	CLAY	AH06 (0.6 m)	5.8	13.7	50	90	10,100
ES05	CLAY	AH04 (0.7 m)	5.1	19.3	390	190	2,900
ES06	CLAY	AH02 (0.5 m)	6.5	16.1	90	90	12,800

Table 4.8.1 of Australian Standard AS 3600 (2009) Concrete Structures provides criteria for exposure classification for concrete in sulphate soils based on sulphate content and acidity in the soil and groundwater. Based on soil sulphate content and pH testing completed, we assess the exposure classification for concrete in the soil to be "A1" to "A2".

Table 6.4.2(C) of Australian Standard AS2159:2009, Piling – Design and Installation provides criteria for exposure classification for concrete piles based on sulphates in the soil and groundwater, soil and groundwater pH, and chlorides in groundwater. On the basis of the soil sulphates and pH testing completed we assess the exposure classification for concrete piles in the soil to be "Non-aggressive" to "Mild".

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

5.2.2 Salinity and Sodicity

Table 5 presents a summary of the analytical laboratory testing results for salinity and sodicity. Detailed results are provided in Appendix D.

"Site Investigations for Urban Salinity" (DLWC, 2002) classify soil salinity based on electrical conductivity (ECe). The method of conversion from EC1:5 to ECe (electrical conductivity of saturated extract) is based on DLWC (2002) and given by ECe = EC1:5 x M, where M is the multiplication factor based on "Soil Texture Group".

Sample	BH ID	E	xchan [n	geable neq/10(Catior 0g]	าร	Electric ESP Conductivity		м	Electric Conductivity	Salinity
U	(Depth)	Са	Mg	к	Na	CEC	[%]	EC1:5 [µS/cm]		ECe [dS/m]	Class
ES01	CH01 (1.1 m)	17	3.1	<0.2	0.6	20.9	3.1	139	8 ¹	1.1	Non- saline
ES02	CH02 (0.8 m)	9.7	17.2	<0.2	3.7	21.3	17.2	400	9 ²	3.6	Slightly saline
ES03	CH03 (0.7 m)	10.6	12.2	<0.2	2.6	21.4	12.2	110	8 ¹	0.9	Non- saline
ES04	AH06 (0.6 m)	3.7	14.2	0.2	1.9	15.6	14.2	99	9 ²	0.9	Non- saline
ES05	AH04 (0.7 m)	0.7	18.8	0.2	2.3	12.4	18.8	345	8 ¹	2.8	Slightly saline
ES06	AH02 (0.5 m)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	78	8 ¹	0.6	Non- saline

Table 5 -	Salinity	and	Sodicity	Classification
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Note:

¹ Multiplication factor based on "Soil Texture Group" - Light medium clay is plastic and smooth to the touch and will form a ribbon of 7.5 cm.

² Multiplication factor based on "Soil Texture Group" - Clay Loam can be easily rolled to a thread 3-4 mm thick but will have a number of fractures along its length. The soil is becoming plastic, capable of being moulded into a stable shape.

The "Soil Texture Group" of the samples tested were assessed during our investigation. The salinity classification for the soil samples that were tested are presented in Table 5. It is assessed that the soils on site are classified as "Non-saline" to "Slightly saline". We have referred to Clause 4.8.2 of Australian Standard AS3600-2009 "Concrete Structures" and note that the assessed soil electrical conductivity (EC_e) is less than the upper limit of the "A2" exposure classification.

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

The Exchangeable Sodium Percentages calculated from the laboratory results was compared to the criteria provided in "Site Investigations for Urban Salinity" (DLWC, 2002). In the inferred NATURAL SOIL unit, the laboratory testing shows ESP ranges from < 0.1 % to 18.8%, indicating that the NATURAL SOIL on the site is classified as "Non-sodic" to "Highly sodic", as per DLWC (2002).

5.2.3 Acid Sulphate Soils Impacts – Desktop assessment

Based on the NSW Government SEED (Sharing and Enabling Environmental Data), the site is not located within the areas covered by the Acid Sulphate Soil Risk Map Data. It is our opinion that the risk of acid sulphate soils is low within this site.

Should further assessment be required, we recommend an environmental consultant be engaged to undertake the assessment.



Inset 3: Acid Sulphate Soils Map – Blue Outline Defines Approximate Site Boundary

6. Bulk Earthworks

A bulk earthworks specification has been prepared for the site (Ref. PSM4252-003S) which sets out clearly the roles and responsibilities of the earthworks contractor and its Geotechnical Inspection and Testing Authority (GITA). The proposed bulk earthworks within the site shall be undertaken in accordance with the PSM Specification prepared for this site. The Specification will only be varied with the consent of PSM to ensure that this interim design advice is able to be confirmed at the completion of the earthworks.

The Specification allows for a broad range of fill to be incorporated into the earthworks. The Specification requires close inspection, and frequent testing to provide a high level of confidence that the completed work complies with the Specification.

We have based our assessment of moduli on numerous plate load tests (PLTs) completed on VENM/ENM fills by PSM. Fill placed in accordance with such a specification is referred to herein as ENGINEERED FILL.

The Specification complies with the intent of AS 3798-2007 "Guidelines on earthworks for commercial and residential developments" and is intended to specify the minimum requirements to achieve a fill with the properties provided in Section 7 of this letter.

The Specification requires close inspection, frequent testing and external auditing of the earthworks to provide a high level of confidence that the completed work complies with the Specification. The Specification will only be varied with the consent of PSM to ensure that this interim design advice is able to be confirmed at the completion of the earthworks.

If the structural or civil engineer requires engineering properties different to those provided in Section 7 then the specification can be modified such that these properties will be obtained in the final earthworks. This allows the additional cost of the earthworks to be balanced against any economies achieved in other parts of the works.

6.1 Excavation Conditions

Excavation in the TOPSOIL, NATURAL SOIL, and most of BEDROCK A units is expected to be achievable using conventional earth moving equipment with minor rock breaking.

It is our experience that excavatability is heavily dependent on both the operator and the plant used. Any earthworks contractor should satisfy itself with regard to excavatability especially in the BEDROCK B or better unit. The presence of medium to very high strength sandstone in BEDROCK B unit will require the use of rock breaking equipment. Prospective contractors should make their own assessment of excavatability based on our logs and their site inspection and experience.

7. Interim Geotechnical Design Advice

7.1 General

The design advice in the following sections is provided on the basis that:

- The bulk earthworks on site to be completed in accordance with a PSM Specification, currently PSM4252-003S REV1 (the Specification) provided in Appendix E
- PSM to audit the earthworks to confirm the advice in this letter at the completion of the bulk earthworks.

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

We understand that the structural engineer should be able to design an efficient slab and shallow footings for these geotechnical conditions. If assessed deformation and settlement is an issue, then our advice can be further refined if required.

We note that desiccation and/or wetting up of the pad surface is possible should it be exposed to the elements for an extended period of time, particularly at completion of the bulk earthworks prior to the builder taking

responsibility for the pad. To reduce the likelihood of this and preserve the pad condition we recommend the following should be considered following completion of the bulk earthworks:

- Placement of a sacrificial layer comprising roadbase or other equivalent material
- Grade the pad surface to reduce the extent and severity of standing water during and after weather events
- Minimise the time between the completion of earthworks and the builder commencing construction of the warehouse roof
- Limit vehicular and plant access until a roof has been installed.

Alternately, the developer or builder may have to undertake some surficial remediation if the pad is to comply with the requirements of this IGDA (i.e. comply with the PSM Specification) at the time of construction.

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

7.2 Site Classification

While the proposed development is out of scope of AS2870-2011 "Residential slabs and footings", we assess that for natural clay soil placed in accordance with the Specification, the characteristic surface movement, y_s , would be in the range 40 mm to 60 mm and thus would classify the site as Class H1. The civil and structural engineers should consider likely heave / settlement due to the effect of climatic factors in their designs.

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

For effectively sealed areas away from the perimeter, the design should allow for the following:

- Differential mound movement, ym = 20 mm. We note that this is not the total heave or settlement but the estimated local heave or settlement due to FILL variability
- Tilts of up to approximately 1 in 300.

Mounds at perimeters or penetrations of slabs open to the environment can be taken to be as per AS2870-2011 for $y_s = 55$ mm.

7.3 Foundations

7.3.1 Pad Footings

Pad footings can be proportioned based on an allowable bearing pressure (ABP) for centric vertical loads provided in Table 6. Higher ABPs in soil units may be available, but these depend on the size, depth, loads, etc., and would be subject to specific advice. The ABP needs to be confirmed by a geotechnical engineer during an inspection.

Settlements in soil units can be estimated using the elastic parameters provided in Table 6. We note that allowable bearing pressures presented in assume a settlement of approximately 1% (or less) of the least footing dimension for footings in the BEDROCK units.

Table 6 – Engineering Parameters of Inferred Geotechnical Units

Inferred Unit	Bulk Unit Weight	Soil Ef Stre Paran	fective ngth neters	Ultimate Bearing Pressure Under	Allowable Bearing Pressure Under	Ultimate Shaft	Elastic P	arameters
	(kN/m³)	c' (kPa)	<i>φ'</i> (deg)	Vertical Centric Loading (kPa)	Centric Loading (kPa)	(kPa)	Young's Modulus (MPa)	Poisson's Ratio
ENGINEERED FILL, NATURAL SOIL	18	0	30	420 ¹	150 ¹	N/A	10	0.3
BEDROCK A	22	N/A	N/A	3,000 ²	700 ²	50	100	0.25
BEDROCK B	24	N/A	N/A	6,000 ²	1,500 ²	350	350	0.25

Note:

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

² Ultimate bearing pressure for bedrock assumes a settlement of approximately 5% of the least footing dimension for footings in rock.

³ Allowable bearing pressure assumes a settlement of approximately 1% of the least footing dimension for footings in rock.

7.3.2 Piled Foundations

Piled foundation should be founded within the BEDROCK units.

Piles should be designed in accordance with the requirements in AS 2159 (2009), *Piling – Design and Installation.* The parameters provided in Table 6 may be adopted in the design of piles founded in the BEDROCK unit.

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

- The ABP needs to be confirmed by a geotechnical engineer during a pile inspection
- Under permanent load, the contribution of side adhesion for soils including soil units should be ignored
- Pile settlement needs to be checked using the recommended elastic parameters in Table 6.

The bearing capacities provided are contingent on piles or footings being vertically and centrally loaded. Further advice should be sought if the footings are not vertically centrically loaded. Should higher bearing capacities be required in Table 6 further advice should be sought from PSM.

With regards to the pile design, we recommend that:

- A geotechnical strength reduction factor, $\Phi g = 0.60$ (AS2159 CL. 4.3.2) be adopted for a high redundancy system for an assessed average risk rating (ARR) between 2.5 and 3.0. This should be reviewed to suit the specific design and appropriate pile testing proposed by the structural designers in accord with the requirements of AS2159
- It may be possible to increase the pile reduction factors, if the details of the proposed pile installation procedures indicate a high level of quality control with regards to concrete placement, base cleanliness, etc
- If a geotechnical strength reduction factor, $\Phi g = 0.40$ is adopted then no pile testing will be required (AS2159 Clause 8.2.4 (b)).

Foundation conditions at the proposed pile locations should be inspected by a suitably qualified geotechnical engineer prior to pouring concrete to confirm this advice.

7.3.3 Slab on Ground

In general, we advise the slab on ground design can be based on a subgrade with a long-term Young's modulus of 10 MPa. The short-term Young's modulus can be taken to be 15 MPa. We note that the environmental effects (e.g. drying or wetting up of the finished surface) affecting the land prior to the development should be considered by the various designers of any development.

We note that the final bulk earthworks subgrade will require proof rolling and plate load testing to confirm the properties provided and may require some boxing out and refilling, etc. Plate load testing during the filling will be required where blended topsoil has been used.

We understand that the structural engineer should be able to design efficient slabs. If assessed deformation and settlement is an issue, our advice can be further refined if required.

The structural designer or builder may wish to employ a surface layer of road base / crushed sandstone / concrete for trafficability or structural purposes. This is not required to achieve the properties in this design advice.

7.4 Pavements

A total of three (3) CBR tests were undertaken. The test results indicate a soaked CBR value of between 1.5% and 2.5%.

Based on our experience with typical clay VENM in western Sydney, the soaked CBR value could be as low as 1%. We advise that a CBR of 2% can be adopted for subgrade and FILL formed in bulk earthworks constructed in accordance with the Specification.

Higher values may be provided on completion of testing on the finished bulk earthworks or if, on request, the Specification is varied to obtain such higher values on ENGINEERED FILL.

We recommend that specific CBR testing be undertaken at subgrade level when pavement layouts are finalised.

7.5 Permanent and Temporary Batters

The batter slope angles in Table 7 are recommended for the design of batters up to a nominal 3 m height; subject to the following recommendations:

- 1. All batters shall be protected from erosion.
- 2. Permanent batters shall be drained.
- 3. Temporary batters shall not be left unsupported for more than 1 month without further advice, and inspection by a geotechnical engineer should be undertaken following significant rain events.
- 4. Where loads are imposed or structures/services are located within one batter height of the crest of the batter, further advice should be sought.

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

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

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

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

Table 7 – Batter Slope Angles

Unit	Temporary	Permanent
ENGINEERED FILL	1.5H : 1V	2.0H : 1V
NATURAL SOIL	1.5H : 1V	2.0H : 1V
BEDROCK A	1H : 1V*	1.5H : 1V*
BEDROCK B	0.5H : 1V (subject to local support)	1H : 1V (subject to design)

Note:

* See above requirements regarding inspections and local support.

7.6 Retention Systems

Permanent cuts in the NATURAL SOIL and BEDROCK unit's steeper than the recommended permanent batter slopes in Table 7 will need to be supported by some form of retaining structure.

The design of retaining structures should be based on the following:

- Effective soil strength parameters in Table 6
- Water pressure (depending on the type of the structure)
- With regards to the BEDROCK units, the designer shall allow a minimum lateral pressure of 10 kPa for the BEDROCK units when cut vertical. This is to allow for blocks and rock wedges formed due to adverse defects that may exist within the unit. These loads may be able to be reduced by specifying inspections during the works and provision of additional support (rock bolts, shotcrete etc.) should the inspection indicate that support is required. In any case excavation in BEDROCK units will need to be inspected during the works to confirm/dismiss the presence of defects/structure in the unit that may result in higher loads than anticipated in this design. The designer of the wall should consider including inspection requirements in their design at no more than 2 m intervals in the excavation.

Note that design of retention systems may be based on either K_a or K_p earth pressures. Design using active earth pressures provides the minimum lateral earth pressure that must be supported to avoid failure and requires wall that can rotate or translate to allow the pressures to reduce to these values (vertical and lateral movements up to 2% of height may occur, typical movements will be much less).

Where the design is based on K_o pressures, construction should be carefully controlled to avoid unwanted effects. It should be noted that designing for K_o pressures does not, of itself, ensure that movement does not occur. Movements are controlled by the construction method, especially sequence.

Both surface and sub-surface drainage needs to be designed and constructed properly to prevent pore water pressures from building up behind the retaining walls or appropriate water pressures must be included in the design.

8. General

If at any time, the conditions are found to vary from those described in this report, further advice should be sought.

Should there be any queries, do not hesitate to contact the undersigned.

Yours Sincerely

TONY OU GEOTECHNICAL ENGINEER

AGUSTRIA SALIM PRINCIPAL

Encl.

Figure 1: Location of Boreholes (Cored and Augered) and CPT Figures 2 – 5: Selected Site Photos (2020 Site Investigation) Figures 6 – 8: Selected Site Photos (2022 Site Investigation) Appendix A: Geotechnical Engineering Borehole Logs A1 – 2020 Site Investigation A2 - 2022 Site Investigation Point Load Test Results Appendix B: B1 - 2020 Site Investigation B2 - 2022 Site Investigation Appendix C: **CPT Results** Appendix D: Laboratory Testing Results PSM4252-003S Rev 1 - Bulk Earthworks Specification Appendix E:



Approximate Site Boundary



Photo 1 - General site conditions at CH01 facing north-west (22/10/2020)



Photo 2 - General site conditions at CH02 facing north (22/10/2020)

SELECTED SITE PHOTOGRAPHS (1 of 4) 2020 Site Investigation

PSM4252-002L Rev 5

FIGURE 2



Photo 3 - General site conditions at AH01 facing west (23/10/2020)



Photo 4 - General site condition at CH03 facing south-west and backfilled borehole (23/10/2020)



SELECTED SITE PHOTOGRAPHS (2 of 4) 2020 Site Investigation

PSM4252-002L Rev 5 | FIGURE 3



Photo 5 - Drill rig setup at CH02 facing north-east (22/10/2020)



Photo 6 - Drill rig setup at AH02 facing south-west (23/10/2020)

SELECTED SITE PHOTOGRAPHS (3 of 4) 2020 Site Investigation

PSM4252-002L Rev 5

FIGURE 4



Photo 7 - CPT truck at CPT03 facing south-west (22/10/2020)



Photo 8 - Service Locator at CH03 facing west (22/10/2020)



SELECTED SITE PHOTOGRAPHS (4 of 4) 2020 Site Investigation

PSM4252-002L Rev 5

FIGURE 5



Photo 1 - General Site Photo Centre of Site Facing East (07/6/2022)



Aliro Group Mamre Road, Kemps Creek Selected Site Photographs (1 of 3) 2022 Site Investigation PSM4252-002L Rev 5 Figure 6

N:\PSM4252\Docs Out\PSM4252-002L\Rev4\tools\[Macro- Figure 2-6- Selected Site Photos.xlsm]Fig 2 (4)



Photo 3 - General Site Conditions at the North Side of Site Facing South East (25/5/2022)



Photo 4 - 5.4-tonne Track-mounted Drill Rig Setup (08/6/2022)

		Aliro Group					
		Mamre Road, Kemps Creek					
S	M	Selected Site Pho	otographs (2 of 3)				
	5	2022 Site Ir	nvestigation				
	\sim	PSM4252-002L Rev 5	Figure 7				

N:\PSM4252\Docs Out\PSM4252-002L\Rev4\tools\[Macro- Figure 2-6- Selected Site Photos.xlsm]Fig 2 (4)



Photo 5 - Typical Soil Profile at BH01 (25/5/2022)



Photo 6 - Typical Bedrock (SHALE) Material at BH03 (08/6/2022)



N:\PSM4252\Docs Out\PSM4252-002L\Rev4\tools\[Macro- Figure 2-6- Selected Site Photos.xlsm]Fig 2 (4)

Appendix A Geotechnical Engineering Borehole Logs

- A1: 2020 Site Investigation
- A2: 2022 Site Investigation

A1 – 2020 Site Investigation

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Borehole ID

CH01

Page 1 of 4

Engineering Log - Non Corec	Borehole	Project No.: PSM4252	2
Client:Aliro GroupProject Name:Mamre Road, KempsHole Location:Mamre Road KempsHole Position:295669.4 m E 625367	Creek Creek '7.6 m N MGA94 Zone 56	Commenced:22/10/202Completed:22/10/202Logged By:DTChecked By:AS	20 20
Drill Model and Mounting: 24 tonnes true Hole Diameter: 100 mm	ck mounted Inclination: -90° Bearing:	RL Surface: 85.70 m Datum: AHD C	operator: JK Drilling
Drilling Information	Soil Descrip	tion	Observations
Method Lests Memarks M	Material Description SOIL NAME: Colour, struc plasticity, additional	matheficity (Monisture Consistency / Relative Density (Son (ed.))	r Structure, Zoning, Origin, Additional Observations
	SP SAND with traces of Clay: low plast CL brown, fine grained. Sandy CLAY: low plasticity, orange fine grained.	ticity, e and red, D St	0.00: Topsoil. 0.10: Inferred Natural Soil.
	SHALE: pale orange and grey, exi weathered, very low strength, iron fragments observed.	remely	0.60: Inferred Bedrock. V-bit refusal.
SPT: SPT: 1.00 - 1.16 m 9.3/10 mm N=Refusal O ES 1.10 m			1.00: SPT recovered: 150 / 160 mm.
	SANDS IONE: fine grained, prowr weathered, very low strength.	, nigniy	
	Becomes grey, fragments of shale	observed.	
00.00.00.01 	Continued on cored borehole shee	t	
4			
Method Method AD/T - Auger drilling TC bit AD/V - Auger drilling V bit WB -Washbore SPT - Standard penetration test AS - Auger Screwing See Explanatory Notes for details of abbreviations and basis of description	Water Samples an De Inflow U - Undisturbed 3 Partial Loss D - Disturbed 3 SPT - Standard Per Complete Loss Complete Loss SPT - Standard Per Complete Loss LB - Large Disturb ons. Soil and rock descriptions in accordance w	d Tests Moisture Condition Sample D - Dry mple M - Moist etration Test W - Wet al Sample ed Sample with AS 1726:2017	Consistency/Relative Density VS Very soft S Soft F - Firm St Stiff VSt Very stiff H - Hard VL Very loose L - Loose MD - Medium dense D - Dense VD Very dense Ce - Cemented C - Compact

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Borehole ID

CH01

Page 2 of 4

Engi	nee	ering	Log	j - C	orec	d Borehole		Project No.:	PSM4252	
Clier Proje Hole Hole	nt: ect N e Loca e Posi	ame: ation: ition:	Ali Ma Ma 29	iro Gr amre amre 95669	oup Road, Road I .4 m E	Kemps Creek Kemps Creek 6253677.6 m N MGA94 Zor	ne 56	Commenced: Completed: Logged By: Checked By:	22/10/2020 22/10/2020 DT AS	
Drill Barr	Mode el Ty	el and M be and L	lounti .engt	ng: h:	24 ton NMLC	nnes truck mounted In C 3 m Be	clination: -90° earing:	RL Surface: 85.7 Datum: AHI	70 m D Operato	or: JK Drilling
	Dril	ling Info	ormat	ion			Rock Substance		Roc	k Mass Defects
Method Water	RQD (%)	SAMPLES & FIELD TESTS	TCR (%)	RL (m)	Depth (m)	Material D ROCK TYPE: Colour (texture, fabric, mineral alteration, cementatio b 0	escription , grain size, structure composition, hardness, n, etc as applicable), inor components	Weathering Weathering S A Xial O - Diametral	Defect Spacing D (mm) c	efect Descriptions / Comments escription, alpha/beta, infilling or coating, shape, roughness, thickness, other
		2.90m		83.7 84.7	- - - - - - - - - - - - - - - - - - -	Continued from non-cored	borehole sheet			
		C-1		82.7	3-	No Core: 200 mm.				
	71	3.94m - ls(50) d=1.28 a=1.28 A=1.28 A=1.28 MPa 4.34m - ls(50) d=0.71 a=0.01 MPa	93	81.7	4	Becomes well developed.	ained, light brown,			3P, 5°, FE SN, CU, RF SM, 0°, Clay infill, 10mm Highly fractured 3P, 5°, FE SN, CU, RF SM, 10°, RF, 20mm T, 70°, FE SN, PR, S
AD AD AD PC SP PT See Expla	M M M M M M M M M M M M M M	L ethod ger drilling T ger drilling V shbore eline core (eline core (ndard pene sh tube	I C bit 63.5 m 85.0 m tration	n) m) test	Grap	Water Inflow Partial Loss Complete Loss Core recovered (hatching indicates material) No core recovery s of descriptions.	Weathering XW Extremely Weathered HW Highly Weathered MW Moderately Weathered SW Slightly Weathered FR Fresh VL Very Low L Low M Medium H High VH Very High EH Extremely High	Defect Type FT - Fault SS - Shear Surface SZ - Shear Zone BP - Bedding parting SM - Seam IS - Infilled Seam JT - Joint CO - Contact CZ - Crushed Zone VN - Vein FZ - Fracture Zone BSH - Bedding Shear DB - Drilling Break	Infiling/Coating CN - Clean SN - Stain VN - Veneer CO - Coating RF - Rock fragmer G - Gravel S - Sand Z - Silt CA - Calcite CL - Clay FE - Iron QZ - Quartz X - Carbonaceou	Roughness SL - Slickensided POL - Polished S - Smooth RF - Rough VR - Very Rough Shape PR - Planar CU - Curved UN - Undulating ST - Stepped IR - Irregular

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Borehole ID

CH01

Page 3 of 4

E	İngi	nee	ring	Log	J - C	ored	B	orehole		Pro	oject N	lo.:		PSM	4252		
	Clier Proje Hole Hole	nt: ect Na e Loca e Posi	ame: ation: tion:	Ali Ma Ma 29	ro Gr amre amre 5669	oup Road, I Road K .4 m E	Kemp (emp 6253	os Creek s Creek 677.6 m N MGA94 Zo	ne 56	Co Co Lo Ch	mmer mplet gged eckeo	nced ed: By: I By:	:	22/10 22/10 DT AS	0/202 0/202	20 20	
	Drill Barr	Mode el Typ	el and M be and L	ounti .engt	ng: h:	24 toni NMLC	nes t 3 m	ruck mounted Ir B	nclination: -90° earing:	RL Da	Surfa tum:	ace:	85. AHI	85.70 m AHD Operator: JK Drilling			ator: JK Drilling
		Dril	ling Info	rmat	ion				Rock Substance							R	ock Mass Defects
14 - 44 - 14	Water	RQD (%)	SAMPLES & FIELD TESTS	TCR (%)	RL (m)	Depth (m)	Graphic Log	Material E ROCK TYPE: Colouu (texture, fabric, mineral alteration, cementation inclusions and m	Description r, grain size, structure composition, hardness, on, etc as applicable), inor components	Wea 조 위	thering ≩ ≳ ∰	St : 0-1 1-0 : 1-0	rength s(50) -Axial Diametral 3 ← ∞ ♀ ≥ ェ ≯ i	Defect Spacing (mm) or			Defect Descriptions / Comments Description, alpha/beta, infilling or coating, shape, roughness, thickness, other
		71	5.37m - Is(50) d=0.75 a=0.75 5.60m MPa	93		-		SANDSTONE: medium gr developed rock fabric. (co	ained, light brown, well ntinued)								[∼] BP, 0°, FE SN, UN, RF [∼] JT, 45°, FE SN, PR, S Highly fractured −BP, 0°, FE SN, PR, RF
		23	C-2	35	1 79.7	6		No Core: 850 mm.									
.0 2019-05-06	ed	100	6.51m - ls(50) d=1.02 a=1.13 MPa 6.90m C-3 7.23m - ls(50)	100	78.7	7		SANDSTONE: medium gr developed rock fabric, ind SHALE: pale brown and g fabric, iron staining observ	ained, light brown, well istinct bedding. rey, poorly developed roch red.								Highly fractured
5 Tool Lib: PSM 3.03.1 2019-05-07 Prj: PSM 3.03	Not Observ	7.35m C-4	d=0.12 ==0.35 MPa		77.7	8		Becomes grey.									−BP, 5°, FE SN, UN, S - Highly fractured with clay infill - BP, 0°, FE SN, ST, S ~ BP, 0°, FE SN, PR, S
10/11/2020 10:44 10.01.00.11 Datgel Fence and Mai		86	8.33m - Is(50) d=0.08 a=0.04 MPa	100	1 76.7	99 99		Becomes grey and orange	3.								- BP, 20°, FE SN, UN, RF - BP, 0°, FE SN, PR, S - JT, 70°, FE SN, PR, S
3H PSM4252.GPJ < <drawingfile>></drawingfile>		C-5 62	9.40m 9.50m - Is(50) d=0.01 a=0.08 MPa	100													→J, 45°, FE SN, PR, S →JT, 45°, FE SN, PR, S →BP, 0°, FE SN, PR, RF —BP, 5°, FE SN, UN, RF —BP, 0°, FE SN, ST, S
PSM 3.03.1 LIB_AK.GLB Log PSM AU CORE E	AD AD WE HC PC SP PT	/T - Aug /V - Aug 3 - Wa (3- Wir (3- Wir))))))))))))))))))))))))))))))))))))	ethod jer drilling T jer drilling V shbore eline core (i eline core (i ndard pene sh tube otes for detai	C bit / bit 63.5 mi 85.0 mi tration ls of abb	m) m) test	Graph	Wa Inflow Partia Comp hic Lo Core r indica No co of descr	nter v al Loss blete Loss bg/Core Loss ecovered (hatching tes material) re recovery iptions.	Weathering XW - Extremely Weathered HW - Highly Weathered MW Moderately Weathered SW - Slightly Weathered FR - Fresh Strength VL VL - Very Low L - Low M - Medium H - High VH - Very High EH - Extremely High		Defe FT - Fa SS - Sh SZ - Sh BP - Be SM - Se SM - Se SS - Infi JT - Joi CO - Co CC - C	ect Ty ult ear Sur ear Zon dding p am illed Sea nt ntact ushed Z in acture Z dding S dding S	γ pe face arting am cone one hear eak	Infi C S V C R G S Z C C F C C X	Iling/C N - Cle N - Sta N - Ver O - Coa F - Roo - Gra - Sar - Sar - Sitt A - Cal L - Cla E - Iror Z - Qua - Car	Coatina an in heer ating ck frag avel hd cite loite y h artz rbonad	Ing Roughness SL - Slickensided POL - Polished S - Smooth RF - Rough VR - Very Rough Shape PR - Planar CU - Curved UN - Undulating ST - Stepped IR - Irregular

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Borehole ID

CH01

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E	ngi	nee	ring	Log) - C	ore	d Bo	orehole		F	Project N	lo.:	F	PSM4252			
	Clier Proje Hole Hole	nt: ect Na Loca Posi	ame: ition: tion:	Ali Ma Ma 29	ro Gr amre amre 5669	oup Road, Road .4 m E	Kem Kemp 6253	os Creek s Creek 677.6 m N MGA94 Zo	ne 56		Commer Complet ogged Checked	nced: ed: By: I By:	22	22/10/2020 22/10/2020 DT AS			
	Drill Barre	Mode el Typ	el and M be and L	ounti .engtl	ng: h:	24 tor NMLC	nnest 3 m	ruck mounted Ir B	nclination: -90° searing:	F	RL Surfa)atum:	ice:	85.7 AHD	70 m D Operator: JK Drilling			
		Drill	ing Info	ormat	ion				Rock Substance					, I	Rock N	lass Defects	
Method	Water	RQD (%)	SAMPLES & FIELD TESTS	TCR (%)	RL (m)	Depth (m)	Graphic Log	Material I ROCK TYPE: Colou (texture, fabric, mineral alteration, cementati inclusions and n	Description r, grain size, structure l composition, hardness, on, etc as applicable), ninor components	W MX	eathering ≩≧ ਨੇ ⊮	Stren Is(5 ○ - Ai ○ - Diar	gth 0) xial netral ∞ ♀ ≖ 못 ⊞	Defect Spacing (mm)	Defect Desc or co	t Descriptions / Comments ription, alpha/beta, infilling pating, shape, roughness, thickness, other	
NMLC	Not Observed	62 10.9m	10.75m - Is(50) d=0.07 a=0.18	100				SHALE: grey orange, poo iron staining observed. (co Becomes dark grey.	rly developed rock fabric, ontinued)						- High - BP, 1 BP, BP, I BP, I High	ly fractured 10°, FE SN, PR, S 0°, FE SN, PR, S ly fractured	
H PSMA252.GPJ < <dnawngrlie>> 10/1/2020 10:44 10.01.00.11 Dagel Ferres and Map Tool Lib; PSM 303.12019-05-07 Pf; PSM 3.03.0 2019-05-06</dnawngrlie>			ΜΡα		71.7 72.7 73.7 74.7 74.7			Hole Terminated at 10.90 Target depth	m								
PSM 3.03.1 LIB_AK.GLB Log PSM AU CORE	AD AD WE HQ PQ SP PT	Ma /T - Aug /V - Aug 3 - War 3 - Wir 3 - Wir 3 - Wir 7 - Star - Pus natory N	ethod er drilling T er drilling V shbore eline core (i eline core (i ndard pene h tube	C bit / bit 63.5 mr 85.0 mr tration t	n) n) test	Grap	Wa > Inflov ☐ Partia ■ Comp ohic Lo - Core n indica - No co s of descr	Iter / I Loss blete Loss bg/Core Loss ecovered (hatching es material) re recovery ptions.	Weathering XW - Extremely Weathered HW - Highly Weathered MW - Moderately Weathered SW - Slightly Weathered FR - Fresh Strength - VL - Very Low L - Low M - Medium H - High VH - Very High EH - Extremely High	d	Defe FT - Fai SS - Sh SZ - Sh BP - Be SM - Se IS - Infi JT - Joi CO - Co CZ - Cn VN - Ve FZ - Fra BSH - Be DB - Dri	ect Type ult ear Surface ear Zone dding partin am Illed Seam nt ntact ushed Zone in acture Zone dding Sheaa lling Break	9	Infilling/Coa CN - Clean SN - Stain VN - Veneet CO - Coatin, RF - Rock fi G - Gravel S - Sand Z - Silt CA - Calcite CL - Clay FE - Iron QZ - Quartz X - Carbor	ating g agments naceous	Roughness SL - Slickensided POL - Polished S - Smooth RF - Rough VR - Very Rough VR - Very Rough CU - Curved UN - Undulating ST - Stepped IR - Irregular	

P S M	JOB NO:	PSM4252		BH ID:	CH01	
	PROJECT: LOCATION: DATE:	Mamre Road Kemps Creek 22/10/2020		FROM: TO:	2.9 m 7.0 m	
0.1 0 2 START	2 0.3 CORING	0.4 0.5 AT 2.9 m	0.6	-0.7	0.8	0.9 1m
3 NO CORE 200 mm	12 T	A.G. D.				
5 NO LORE : 5.	5m to 6.45m		1	NO COR	E FROM	5.6 m
		[PSM		Aliro Marr Kem CORE PH (Core P	o Group hre Road ps Creek IOTOS CH01 hoto 1 of 2)
			┶┤┈╞╝╴			,

P S M	JOB NO: PROJECT: LOCATION: DATE:	PSM4252 Mamre Road Kemps Creek 22/10/2020	E 	BH ID: Cł FROM: 7.0 FO: 10	H01 0 m).9 m
			0.6		.8 0.9 1m
			P S M	COF (C PSM4252-002L	Aliro Group Mamre Road Kemps Creek RE PHOTOS CH01 ore Photo 2 of 2) Appendix A

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Borehole ID

CH02

Page 1 of 4

Engine	eel	'n	g Log - N	lon	n Co	ored	Bo	reho	le Project	No.:		PSM	1252	
Client: Project Hole Lo Hole P	Na cat	me: ion: on:	Aliro G Mamre Mamre 295350	roup Roa Roa).6 m	ad, Ke ad Ke n E 62	emps (mps C 25392)	Creek Creek 6.7 m	N MG	Comme Comple Logged A94 Zone 56 Checker	nced: ted: By: d By:		22/10 22/10 DT AS)/202)/202	0 0
Drill Mo Hole D	odel iam	anc eter:	l Mounting:	24 t 100	tonne) mm	es truc	k mou	inted	Inclination: -90° RL Surfa Bearing: Datum:	ace:	73 A⊢	.50 m ID	0	perator: JK Drilling
	L	Drill	ing Informat	ion					Soil Description					Observations
Method Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description SOIL NAME: Colour, structure, plasticity, additional	Moisture Condition	Consistency / Relative Density	Har Penetro UC (kPa	id metei S a)	- Structure, Zoning, Origin, Additional Observations
								SP	SAND: dark brown, fine grained, rootlets observed.		F		4 10	0.00: Topsoil.
						-		CL-CI	Sandy CLAY: low to medium plasticity, dark brown, fine grained.		 St			0.20: Inferred Natural Soil.
ADN	z		- ES 0.80 m - SPT: 1.00 - 1.45 m 3, 10, 14 N = 24		 72.5	1		CI	CLAY: medium plasticity, grey and pale orange.	D				1.00: SPT recovered: 450/450 mm.
ad Luc Paña 3.0.1.2019-09-07 Pig Paña 3.000 2019-09-06		Not Observed			71.5	- 2 - - -			SHALE: grey and pale orange, extremely weathered, very low strength. Becomes grey.					1.90: Inferred Bedrock. V-bit refusal.
HHZAO PSM222591 -Clawinghes> 10172200 1049 (1990)	Z				69.5 70.5	3			Becomes low strength. Becomes dark grey.					4.00: Based on increased drilling resistance.
ADV - A ADV - A ADV - A ADV - A WB - W SPT - Sta PT - Pu AS - Au	etho Auge Auge ashb anda ish tu iger s	d r drill ore rd pe ibe Screv	ling TC bit ling V bit enetration test wing details of abbreviation	Pe.	netrat No re throu ref	tion sistanco ugh to usal	e .s. So	W ▷ Infle □ Par ■ Cor	ater Samples and Tests ow U - Undisturbed Sample tial Loss D - Disturbed Sample SPT - Standard Penetration Tess nplete Loss ES - Environmental Sample TW - Thin Walled LB LB - Large Disturbed Sample bck descriptions in accordance with AS 1720	.t 5:2017	loistui D M W	re Cond - Dry - Mois - Wet	l ition t	Consistency/Relative Density VS - Very soft S - Soft F - Firm St - Stiff VS - Very stiff H - Hard VL - Very loose L - Loose MD - Medium dense D Dense VD - Very dense Ce - Comented C - Compact

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Borehole ID

CH02

Page 2 of 4

Enginee	ring Log - I	Non Cored	Boreho	le	Project No.:	PSM4252	
Client: Project Na Hole Locat Hole Positi	Aliro G me: Mamre ion: Mamre on: 295350	Group e Road, Kemps e Road Kemps (0.6 m E 625392	Creek Creek 6.7 m N MG	A94 Zone 56	Commenced: Completed: Logged By: Checked By:	22/10/2020 22/10/2020 DT AS	
Drill Model Hole Diam	and Mounting: eter:	24 tonnes truc 100 mm	k mounted	Inclination: -90° Bearing:	RL Surface: Datum:	73.50 m AHD Op	erator: JK Drilling
1	Drilling Informat	tion		Soil Descrip	tion		Observations
Method Penetration Support	Samples Tests Remarks	Zia OSO RL Depth (m) (m)	Graphic Log Classification Symbol	Material Description SOIL NAME: Colour, struct plasticity, additional	Moisture, ann Condition	Consistency / Relative Density S200 (back) 500 (back) 5	Structure, Zoning, Origin, Additional Observations
AD/T AD/T AD/T AD/T AD/T AD/T AD/T AD/T	Not Observed	29 29 7-		SHALE: grey and pale orange, ext weathered, very low strength. (con	remely tinued)		
H NZ AU PSIM252.GFJ <cdawingfile> 10/11/2020 1046 10.01.10.11 Dage/Fence and Map Tool [Lb: PSN 3.03.1 2019-05.07 Pg.</cdawingfile>		- 6 65- - 8 65- - 8 65- - 8 -		Continued on cored borehole shee	t		
Metho AD/T - Auge AD/X - Auge AD/X - Auge WB - Washb SPT - Standa PT - Push tu AS - Auger : See Explanatory Not	d r drilling TC bit r drilling V bit ore rd penetration test ibe Screwing	Penetration No resistanc through to refusal	we ⊃ Infla ⊲ Par ⊲ Cor	ater Samples and Samples and	d Tests Mo ample nple etration Test I Sample ed Sample	Disture Condition D - Dry M - Moist W - Wet	Consistency/Relative Density VS - Very soft S - Soft F - Firm St - Soft VS1 - Very stiff H - Hard VL - Very loose L - Loose MD - Medium dense D - Dense VD - Very dense Ce - Compact

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Borehole ID

CH02

Page 3 of 4

E	ingi	nee	ering	Log	g - C	ore	d Bo	orehole		Project	No.:	I	PSM4252		
	Client: Aliro Group Project Name: Mamre Road, Kemps Creek Hole Location: Mamre Road Kemps Creek Hole Position: 295350.6 m E 6253926.7 m N MGA94 Zone 56									Commenced: Completed: Logged By: Checked By:			22/10/2020 22/10/2020 DT AS		
	Drill Model and Mounting:24 tonnes truck mountedInclination:-90°Barrel Type and Length:NMLC 3 mBearing:								RL Sur Datum	face:	73.5 AHD	50 m D Operator: JK Drilling			
Drilling Information							Rock Substance						Rock Mass Defects		
Mathad	Water	RQD (%)	SAMPLES & FIELD TESTS	TCR (%)	RL (m)	Depth (m)	Graphic Log	Material De ROCK TYPE: Colour, (texture, fabric, mineral c alteration, cementation inclusions and mi	escription grain size, structure composition, hardness, n, etc as applicable), nor components	Weathering ● Axial O - Diametra Strength Is(50) Weathering ● Axial O - Diametra Strength Is(50) ● Axial O - Diametra Strength Is(50)		th) al etral ∞ ^Q ⊞	Defect Spacing (mm) [∞] _∞ ∞ ∞ ∞	Defect Descriptions / Comments Description, alpha/beta, infilling or coating, shape, roughness, thickness, other	
					.5 67.5	- - - 6 - - - -	· · · · · · · · · · · · · · · · · · ·								
0 2019-05-06			7.20m C-1		90			Continued from non-cored	borehole sheet			 			
10/11/2020 12:20 10.01.01.00.11 Datgel Fence and Map Tool Lib: PSM 3.03.1 2019-05-07 Prj: PSM 3.03.0 いいれい	Not Observed	79	7.68m - Is(50) d=1.6 a=1.43 MPa 8.55m - Is(50) d=0.15 a=0.45 MPa	92	 64.5 65.5	- - 8- - - - - - - - - - - - -		No core: 250 mm. SANDSTONE: medium gra developed rock fabric. SHALE: dark grey, poorly d thinly laminated bedding.	ined, dark brown,					Highly fractured JT, 60°, FE SN, PR, S — BP, 20°, FE SN, CU, S — BP, 5°, FE SN, PR, S — SM, 0°, RF, 10 mm — BP, 0°, FE SN, PR, RF — BP, 5°, FE SN, PR, S	
A A U CORE BH PSM4252.GPJ < <drawingfile>> 1</drawingfile>	AD	<u>М</u> /Т - Аці /V - Аці	9.58m - Is(50) d=0.01 a=0.36 MPa <u>10.00m</u> ethod ger drilling T ger drilling T	°C bit			<pre>with the second se</pre>	ater v	Weathering XW - Extremely Weathered HW - Highly Weathered	Dee FT - SS -	fect Type Fault		Infilling/Coa SN - Stain	- BP, 5°, FE SN, CU, RF - BP, 0°, FE SN, CU, S - BP, 10°, FE SN, UN, RF - BP, 0°, FE SN, UN, S ting Roughness SL - Slickensided POL - Polished	
WB - Washbore PQ3- Wireline core (85.0 mm) SPT- Standard penetration test PT - Push tube					m) m) test	Gra	☐ Parti Com Core Indica No cc s of desc	al Loss plete Loss og/Core Loss recovered (hatching tes material) re recovery riptions.	www - wooerately Weathere SW - Slightly Weathered FR - Fresh Strength VL - Very Low L - Low M - Medium H - High VH - Very High EH - Extremely High	9 SZ - BP - SM - IS - JT - CO - CZ - VN - FZ - BSH - DB -	Diear Zone Bedding parting Seam Infilled Seam Joint Contact Crushed Zone Vein Fracture Zone Bedding Shear Drilling Break		vN - Veneer CO Coating RF Rock fr G Gravel S Sand Z Sitt CA Calcite CL Clay FE Iron QZ Quartz X Catorbox	s - smooth RF - Rough yVR - Very Rough Shape PR - Planar CU - Curved UN - Undulating ST - Stepped IR - Irregular	

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Borehole ID

CH02

Page 4 of 4

Engineering Log - Cored Borehole								Pr	Project No.:			PSM4252					
Client:Aliro GroupProject Name:Mamre Road, Kemps CreekHole Location:Mamre Road Kemps CreekHole Position:295350.6 m E 6253926.7 m N MGA94								os Creek os Creek 3926.7 m N MGA94 Zo	Commenced: Completed: Logged By: Zone 56 Checked By:					22/10/2020 22/10/2020 DT AS			
	Drill Model and Mounting:24 tonnes truck mountedInclination:-90Barrel Type and Length:NMLC 3 mBearing:							Inclination: -90° Bearing:	RI Da	_ Surfa atum:	ace:	73.5 AHD	50 m D Operator: JK Drilling				
	Drilling Information					1	Rock Substance							Rock Mass Defects			
	Method Water RQD (%) SAMPLES & FIELD TESTS FIELD TESTS () () () () () () () () () () () () ()			Material Description ROCK TYPE: Colour, grain size, structure (texture, fabric, mineral composition, hardness, alteration, cementation, etc as applicable), inclusions and minor components			We X A	Weathering Strength Is(50) ● - Axial O - Diametral ○ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆			Defect Spacing (mm) ରୁ _{ଡି} ରୁ ରୁ ତି	Defec Desc or co	Defect Descriptions / Comments Description, alpha/beta, infilling or coating, shape, roughness, thickness, other				
Γ		79	-	92				SANDSTONE: medium g developed rock fabric./cc	grained, dark brown, ontinued)						-BP (0° FE SN PR S	
58M4252.GPJ < <drawingfie>> 10111/2020 12.20 10.01.00.11 Datgel Fence and Map Tool Lb: PSM 303.1 2019.05.07 Ptj PSM 303.0 2019-05-06</drawingfie>			10.20m IS(50) d=0.05 a=0.72 MPa		59.5 60.5 61.5 62.5			Hole Terminated at 10.20 Target depth	D m								
AK.GLB Log PSMAU CORE BH	AD AD WE HQ PQ SP PT	/T - Aug /V - Aug 3 - Wa 3 - Win 3 - Win 3 - Win 3 - Win - Stat - Pus	ethod er drilling T er drilling V shbore eline core (i eline core (i ndard pene h tube	C bit / bit 63.5 mi 85.0 mi tration	n) m) test	Graj	Wa > Inflov ☐ Partia ■ Com Dhic Lo	ater v al Loss plete Loss bg/Core Loss	Weathering XW - Extremely Weathere HW - Highly Weathered MW - Moderately Weathered SW - Slightly Weathered FR - Fresh Strength VL - Very Low L - I ow	d ed	FT - Fa SS - Sh SZ - Sh BP - Be SM - Se IS - Infi JT - Joi CO - Co	ect Type ult ear Surface ear Zone dding partin am illed Seam int intact	9	Infilling/Coa CN - Clean SN - Stain VN - Veneer CO - Coating RF - Rock fr G - Gravel S - Sand Z - Silt	n ting agments	Roughness SL - Silckensided POL - Polished S - Smooth RF - Rough VR - Very Rough Shape PR - Planar CU - Curved	
PSM 3.03.1 LIB_	See Explanatory Notes for details of abbreviations and basis				s and basi	_ Core i indica - No co s of descr	ecovered (natching tes material) re recovery iptions.	M - Medium H - High VH - Very High EH - Extremely High		CD - Contact CZ - Crushed Zone VN - Vein FZ - Fracture Zone BSH - Bedding Shear DB - Drilling Break			CA - Calcite CL - Clay FE - Iron QZ - Quartz X - Carbor	aceous	UN - Undulating ST - Stepped IR - Irregular		

P S M ↓ ≫	JOB NO: PROJECT: LOCATION: DATE:	PSM4252 Mamre Road Kemps Creek 22/10/2020	BH ID: FROM: TO:	CH02 7.2 m 10.2 m	
0.1 77 START CORING : 7.2 77 77 77 77 77 77 77		0.4 0.5 0.6 DRE 250 mm	-0.7	0.8 0.9	9 1m
10 A	EOH:	10.2 m.		Aliro Group Mamre Road	
		P S M	PSM4252-	CORE PHOTOS (Core Photo 1 c	x CH02 if 1) ndix A
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Borehole ID

CH03

	ee	rin	g Log - r	Non		bred	BOI	reno	le Project	No.:		PS	M42	252	
Client: Project Hole Lo Hole Po	ient: Aliro Group C roject Name: Mamre Road, Kemps Creek C ole Location: Mamre Road Kemps Creek L ole Position: 294940.6 m E 6254150.8 m N MGA94 Zone 56 C rill Model and Mounting: 24 tonnes truck mounted Inclination: -90°									enced eted: By: d By:	:	23/ 23/ DT AS	10/2	2020	0
Drill Mo Hole Di	odel iam	ano eter	d Mounting:	24 t 100	tonne) mm	es truc	k mou	nted	Inclination: -90° RL Sur Bearing: Datum:	ace:	63 AF	.50 r ID	n	Op	perator: JK Drilling
	Drilling Information				Soil Description								Observations		
Method Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description SOIL NAME: Colour, structure, plasticity, additional	Moisture Condition	Consistency / Relative Density	۲ Pene را 000	land trom JCS kPa)	eter	Structure, Zoning, Origin, Additional Observations
			1 LB 0.50-1.00 m - ES 0.70 m		2	-		CI	Sandy CLAY: medium plasticity, dark brown, fine grained sand, rootlets observed. CLAY: medium plasticity, brown and orange. Becomes brown and light orange.	_/	_F				0.00: Topsoil. 0.10: Infered Natural Soil.
ADA	Z		- SPT: 1.00 - 1.45 m 2, 4, 12 N = 16		62.	1		CI	Fragments of shale observed.	M					1.00: SPT recovered: 300 / 450 mm.
		Not Observed			61.5	2			SHALE: grey with pale orange, extremely weathered, very low strength.						2.00: Infered Bedrock. V-bit refusal.
ADIT	z				 60.5	3			Becomes grey.						
					59.5	4			Continued on cored borehole sheet						
						-									
AD/T - A AD/V - A WB - Wa SPT - Sta PT - Pu AS - Au	e tho Auge Auge ashb anda ish tu iger :	d r dril r dril ore rd po ibe Scre	ling TC bit ling V bit enetration test wing	Pe	netrat No re throu ref	t ion sistanc ugh to usal	e [W > Infl ⊲ Par ⊲ Col	Samples and Tests Sow U Undisturbed Sample bital Loss D Disturbed Sample SPT Standard Penetration Templete mplete Loss ES Environmental Sample TW Thin Walled LB LB Large Disturbed Sample	l st	 D Moistu D W	re Co - D - M - W	nditi ry loist /et	ion	Consistency/Relative Density VS - Very soft S - Soft F - Firm St - Stiff VSt - Very stiff H - Hard VL - Very loose L - Loose MD - Medium dense D Dense VD - Very dense Ce - Cremented

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CH03

E	ngi	nee	ring	Log	J - C	ore	d Bo	orehole	I	Project No.: PSM4252			
	Clier Proje Hole Hole	nt: ect Na Loca Posi	ame: ation: tion:	Ali Ma Ma 29	ro Gr amre amre 4940	oup Road, Road .6 m E	Kem Kemp 6254	os Creek s Creek 150.8 m N MGA94 Zo	ne 56		Commenced: Completed: Logged By: Checked By:	23/10/2020 23/10/2020 DT AS	
	Drill Barre	Mode el Typ	el and M be and L	ounti .engtl	ng: h:	24 tor NMLC	nnest C3m	ruck mounted Ir B	nclination: -90° searing:		RL Surface: 63.5 Datum: AHD	i0 m) Opera	ator: JK Drilling
	Drilling Information								Rock Substance			Ro	ock Mass Defects
Method	Water	RQD (%)	SAMPLES & FIELD TESTS	TCR (%)	RL (m)	Depth (m)	Graphic Log	Material I ROCK TYPE: Colou (texture, fabric, minera alteration, cementati inclusions and n	Description r, grain size, structure l composition, hardness, on, etc as applicable), ninor components	, ×	Strength Is(50) ●-Axial O-Diametral	Defect Spacing (mm)	Defect Descriptions / Comments Description, alpha/beta, infilling or coating, shape, roughness, thickness, other
gFle>> 1011/2200 10:44 10:01:00.11 Daggel Fence and Map Tool Lb: PSM 303.12019-05-07 Pt; PSM 303.0 2019-05-06					59.5 60.5 61.5 62.5								
C C	bserve		4.50m C-1			-	\ge	No core: 200 mm.					
NML	Not C	76		93		-		SHALE: grey, poorly deve laminated bedding.	eloped rock fabric, thinly				
PSM 3.03.1 LIB_AK.GLB Log PSMAU CORE BI S	AD, AD, WB HQ PQ SP ⁻ PT	M /T - Aug /V - Aug /V - Aug /V - Aug /V - Aug // - Wa 3 - Wir 3 - Wir 3 - Wir 7 - Sta - Pus - Pus	ethod er drilling T er drilling V shbore eline core (i eline core (i ndard pene h tube	C bit ' bit 63.5 mr 35.0 mr tration t s of abb	n) n) test reviation	Graj	King Constant C	nter v al Loss olete Loss bg/Core Loss ecovered (hatching tes material) re recovery iptions.	Weathering XW Extremely Weather HW Highly Weathered MW Moderately Weathered SW Slightly Weathered FR Fresh VL Very Low L Low M Medium H High H VH VH Very High EH Extremely High	ered	Defect Type FT - Fault SS - Shear Surface SZ - Shear Zone BP - Bedding parting SM - Seam IS - Infilled Seam JT - Joint CO - Contact CZ - Crushed Zone VN - Vein FZ - Fracture Zone BSH - Bedding Shear DB - Drilling Break	Infilling/Coati CN - Clean SN - Stain VN - Veneer CO - Coating RF - Rock frag G - Gravel S - Sand Z - Silt CA - Calcite CL - Clay FE - Iron QZ - Quartz X - Carbonac	ing Roughness SL - Slickensided POL - Polished S - Smooth RF - Rough VR - Very Rough Shape PR - Planar CU - Curved UN - Undulating ST - Stepped IR - Irregular

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Borehole ID

CH03

Page 3 of 4

E	Ingi	nee	ering	Log	J - C	orec	d Bo	orehole			Project No.: PSM4252			
	Clier Proje Hole Hole	nt: ect Na e Loca e Posi	ame: ation: tion:	Ali Ma Ma 29	iro Gr amre amre 4940	oup Road, Road ł .6 m E	Kemp Kemp 6254	os Creek s Creek 150.8 m N MGA94 Zo	one 56		Commen Complete Logged E Checked	iced: ed: By: By:	23/10/2020 23/10/2020 DT AS	
	Drill Barr	Mode el Typ	el and M be and L	ounti engt	ng: h:	24 ton NMLC	nes tr 3 m	uck mounted	nclination: -90° Bearing:		RL Surfa Datum:	ce: 63.5 AHD	0 m Oper	rator: JK Drilling
	Drilling Information								Rock Substance				R	Rock Mass Defects
N - 44 - 1	Water	RQD (%)	SAMPLES & FIELD TESTS	TCR (%)	RL (m)	Depth (m)	Graphic Log	Material ROCK TYPE: Colou (texture, fabric, minera alteration, cemental inclusions and i	Description Ir, grain size, structure al composition, hardne ion, etc as applicable) minor components	e ess,),	Weathering ≷ ≩ ≩ § ଝ	Strength Is(50) ● - Axial O - Diametral	Defect Spacing (mm) ^X	Defect Descriptions / Comments Description, alpha/beta, infilling or coating, shape, roughness, thickness, other
Prj: PSM 3.03.0 2019-05-06	wLC st Observed	9 <u>×</u>	5.86m - Is(50) d=0.04 a=0.22 MPa 6.17m - Is(50) d=0.27 a=0.06 MPa MPa	6	56.5 57.5	6 		SHALE: grey, poorly dev laminated bedding. <i>(conti</i>	eloped rock fabric, thir nued)	nly				 BP, 0°, FE SN, PL, S BP, 5°, FE SN, PL, S SM, 0°, FE SN, PL, RF, 10 mm carbonaceous infill BP, 0°, FE SN, PL, S BP, 5°, FE SN, PL, S BP, 5°, FE SN, UN, S
ngFile>> 10/11/2020 10:44 10.01.00.11 Datget Fence and Map Tool Ltb: PSM 3.03.1 2019-05-07	2 Z	ŝ	MPa 8.74m 1s(50) d=0.06 a=0.06 MPa	100	54.5 55.5	8 9 9								- SM, 0°, FE SN, PL, RF, 20 - mm SM, 0°, FE SN, PL, RF, 30 - mm - JT, 70°, FE SN, PL, S - BP, 0°, FE SN, PR, S - BP, 0°, FE SN, UN, S - BP, 0°, FE SN, PL, S - SM, 0°, RF, 20 mm - SM, 0°, RF, 20 mm
B Log PSMAU CORE BH PSM4252.GPJ < <dra< th=""><th>AD AD WE HC PC</th><th>//T - Aug //T - Aug //V - Aug 3 - Wa 23 - Wir 23 - Wir</th><th>9.71m - Is(50) d=0.46 a=0.48 MPa ethod ger drilling V shbore eline core (eline core (</th><th>⁻C bit / bit 63.5 mi 85.0 mi</th><th>n) n)</th><th></th><th> <i>Wa</i> Inflow Partia Comp </th><th>ter I Loss lete Loss</th><th>Weathering XW - Extremely Wea HW - Highly Weather MW - Slightly Weather SW - Slightly Weathe FR - Fresh Ctronoth</th><th>thered red athered ered</th><th>Defe FT - Fau SS - She BP - Bec SM - See IS - Infil</th><th>the seam</th><th>I LU I I I I I I I I I I I I I I I I I I I</th><th> BP, 5°, FE SN, PL, RF JT, 50°, FE SN, PR, S ting SL - Slickensided POL - Polished S - Smooth RF - Rough agments VR - Very Rough Shape</th></dra<>	AD AD WE HC PC	//T - Aug //T - Aug //V - Aug 3 - Wa 23 - Wir 23 - Wir	9.71m - Is(50) d=0.46 a=0.48 MPa ethod ger drilling V shbore eline core (eline core (⁻ C bit / bit 63.5 mi 85.0 mi	n) n)		 <i>Wa</i> Inflow Partia Comp 	ter I Loss lete Loss	Weathering XW - Extremely Wea HW - Highly Weather MW - Slightly Weather SW - Slightly Weathe FR - Fresh Ctronoth	thered red athered ered	Defe FT - Fau SS - She BP - Bec SM - See IS - Infil	the seam	I LU I I I I I I I I I I I I I I I I I I I	BP, 5°, FE SN, PL, RF JT, 50°, FE SN, PR, S ting SL - Slickensided POL - Polished S - Smooth RF - Rough agments VR - Very Rough Shape
PSM 3.03.1 LIB_AK.GL	PQ3- Wireline core (85.0 mm) SPT- Standard penetration test PT - Push tube						hic Lo Core re indicat No cor of descri	g/Core Loss ecovered (hatching es material) e recovery ptions.	VL - Very Low L - Low M - Medium H - High VH - Very High EH - Extremely High		JT - Joir CO - Cor CZ - Cru VN - Vei FZ - Fra BSH - Beo DB - Dril	nt shed Zone n cture Zone Iding Shear ling Break	S - Sand Z - Silt CA - Calcite CL - Clay FE - Iron QZ - Quartz X - Carbona	PR - Planar CU - Curved UN - Undulating ST - Stepped IR - Irregular

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Borehole ID

CH03

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E	ingi	nee	ering l	Log) - C	ore	d Bo	orehole		Project No	.: F	PSM4252		
	Clier Proje Hole Hole	nt: ect Na e Loca e Posi	ame: ation: tion:	Ali Ma Ma 29	ro Gr amre amre 4940	oup Road, Road .6 m E	Kem Kemp 6254	os Creek s Creek 150.8 m N MGA94 Zo	one 56		Commence Completed Logged By Checked B	ed: 2 : 2 : 1 sy: 7	23/10/2020 23/10/2020 DT AS	
	Drill Barr	Mode el Tyj	el and M be and L	ounti .engtl	ng: h:	24 to NML	nnest C3m	ruck mounted lı E	nclination: -90° 3earing:		RL Surface Datum:	e: 63.5 AHD	0 m Opei	rator: JK Drilling
	Drilling Information Roc								Rock Substance				R	Rock Mass Defects
Mathad	Water	RQD (%)	SAMPLES & FIELD TESTS	TCR (%)	RL (m)	Depth (m)	Graphic Log	Material I ROCK TYPE: Colou (texture, fabric, minera alteration, cementati inclusions and n	Description Ir, grain size, structure I composition, hardnes ion, etc as applicable), ninor components	s,	Weathering C ≳ ≩ ≩ ⊗ ಱ ⊣	Strength Is(50) ● - Axial - Diametral	Defect Spacing (mm)	Defect Descriptions / Comments Description, alpha/beta, infilling or coating, shape, roughness, thickness, other
	Not Observed	85	10.13m - Is(50) d=1.86 a=2.76 MPa 10.50m	100		-		SHALE: grey, poorly deve laminated bedding. (conti	eloped rock fabric, thinl nued)	у				— BP, 5°, FE SN, PL, S — BP, 5°, FE SN, PL, RF
					 52.5	- - 11- - -		Hole Terminated at 10.50 Target depth) m					
19-05-07 Prj: PSM 3.03.0 2019-05-06					51.5	- 12— - -								
.11 Datgel Fence and Map Tool Lib: PSM 3.03.120					50.5	- 13- - -								
H PSM4252.GPJ < <drawingfile>> 10/11/2020 10:44 10.01.01</drawingfile>					49.5									
PSM 3.03.1 LIB_AK.GLB Log PSM AU CORE BI	AD AD WE HQ PQ PT PT	M /T - Aug /V - Aug /V - Aug /2 - Wa /3 - Wir /3 - Wa /3 - Wir /3 - Wir /3 - Wir /3 - Wa /3 - Wir /3 - Wir /3 - Wa /3 - Wir /3 - Wir	ethod ger drilling T ger drilling V shbore eline core (f eline core (f ndard penel sh tube otes for detail	C bit ' bit 63.5 mr 35.0 mr tration t s of abb	n) n) test reviations	Gra	Wa > Inflov ☐ Parti ■ Com phic Lo indica No co is of descri	ter v al Loss olete Loss bg/Core Loss ecovered (hatching tes material) re recovery iptions.	Weathering XW Extremely Weath HW Highly Weathere MW Moderately Wea SW Slightly Weathere FR Fresh Strength VL VL Very Low L Low M Medium H High VH Very High EH Extremely Ingh	ered d thered ed	Defect FT - Fault SS - Shear BP - Beddin SM - Seam IS - Infilled JT - Joint CO - Contac CZ - Crushk VN - Vein FZ - Fractu BSH - Beddin DB - Drilling	Type Surface Zone g parting Seam at at Zone re Zone g Shear Break	Infilling/Coat CN - Clean SN - Stain VN - Veneer CO - Coating RF - Rock fra G - Gravel S - Sand Z - Silt CA - Calcite CL - Clay FE - Iron QZ - Quartz X - Carbona	ting Roughness SL - Slickensided POL - Polished S - Smooth RF - Rough VR - Very Rough Shape PR - Planar CU - Curved UN - Undulating ST - Stepped IR - Irregular aceous

P S M	JOB NO: PROJECT: LOCATION: DATE:	PSM4252 Mamre Road Kemps Creek 23/10/2020		BH ID: FROM: TO:	CH03 4.5 m 9.0 m	
0.1 0.2 4 5 5 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7	0.3 CORING AT	0.4 0. • 4 .5 m.	5 0.6	0.7 200 mm	0.8	0.9 1m
			P S M		Aliro Marr Kem CORE PH (Core P	o Group nre Road os Creek IOTOS CH03 hoto 1 of 2)
N\PSM4252\Fng\Care photos\IPSM4252 Care photos x/sxIC	CH03 1 1			PSM4252-	002L	Appendix A

P S M	JOB NO: PROJECT: LOCATION: DATE:	PSM4252 Mamre Road Kemps Creek 23/10/2020	BH I FRO TO:	D: CH03 M: 9.0 m 10.5 m	
0.1	0.2 0.3	0.4 0.5	0.6 0	.7 0.8	0.9 1n
			EO	H : 105m.	
Files	and the second s			11 10.51	
				Alir Man Kem CORE PH (Core P	o Group nre Road aps Creek HOTOS CH03 Photo 2 of 2)

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Borehole ID

AH01

Engineering Log - Non Cored	Borehole	Project No.: PSM4252								
Client:Aliro GroupProject Name:Mamre Road, KempsHole Location:Mamre Road Kemps (295049.2 m E 625416)	Creek Freek 7.3 m N MGA94 Zone 56	Commenced:23/10/202Completed:23/10/202Logged By:DTChecked By:AS	0 0							
Drill Model and Mounting: 24 tonnes true Hole Diameter: 100 mm	k mounted Inclination: -90° Bearing:	RL Surface: 74.50 m Datum: AHD Of	perator: JK Drilling							
Drilling Information	Soil Descripti	on	Observations							
Method Tests Remarks Million Contraction Remarks Million Contraction RL Depth (m) (m)	Bong in the second seco	b Moisture Condition Consistency / Relative Density 200 800 800 800 800	Structure, Zoning, Origin, Additional Observations							
	SC Clayey SAND: low plasticity, brown, ' CI grained. CLAY: medium plasticity, brown and CLAY: medium plasticity, brown and CI Becomes pale orange, shale fragme	orange.	0.00: Topsoil. 0.10: Inferred Natural Soil.							
VOP IIII Z	observed, up to 6 mm.	D H	1.00: SPT recovered: 370 / 370 mm.							
PSM 3.03.1 2019-05-07 Ppt PSM 3.03.1 2019-05-06	CI Becomes grey. SHALE: grey, extremely weathered, strength.	very low	1.90: Inferred Bedrock. V-bit refusal.							
International factor and Main Tod 1100 100 100 100 100 100 100 100 100 1										
ORE BH NZ AU PSNA22GGP <<0 million	Becomes dark grey, highly weathere strength.	d, low								
Method Penetration AD/T - Auger drilling TC bit AD/Y - Auger drilling V bit WB - Washbore SPT - Standard penetration test SPT - Standard penetration test Ferse AS - Auger Screwing See Explanatory Notes for details of abbreviations and basis of description	Method Penetration Water Samples and Tests Moisture Condition Consistency/Relative Density AD/T - Auger drilling V bit No resistance Inflow U - Undisturbed Sample D D Dry VS Very soft AD/T - Auger drilling V bit No resistance Partial Loss D - Disturbed Sample D - Dry VS Very soft SPT - Standard penetration test Partial Loss ST - Environmental Sample W Wet S - Soft TY - Push tube AS - Auger Screwing - Omplete Loss ES - Environmental Sample W Wet St - Suff We - Vue y loss - Undisturbed Sample - Undisturbed Sample W - Undisturbed Sample VL - Very suff Moter - Undisturbed Sample VL - Very losse MD - Medium dense - Losse - Losse - Undisturbed Sample - Undisturbed Sample - Vue youse - Undisturbed Sample - Vue youse - Undisturbed Sample - Vue youse - Vue youse - Vue youse -									

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AH01

Clent: Alto Group Commenced: 23/10/2020 Poject Name Road Kemps Creek Completed By DT Hole Location: Mame Road Kemps Creek Logged By DT Joint Model and Mounting: 24 hones truck mounted Inclination: 40° TAS 0 Drill Model and Mounting: 24 hones truck mounted Inclination: 40° R. Surface: 74.50 m Drill Model and Mounting: 24 hones truck mounted Baaring: Dot Description: Operator: McDiffied Backgroup Image Structure: Sander Structure: Sander Structure: Description: Operator: McDiffied Backgroup Image Structure: Sander Structure: Sander Structure: Sander Structure: Description: Image Structure: Sander Structure: Sander Structure: Description: Madel Description: Image Structure: Sander Structure: Sander Structure: Sander Structure: Madel Description: Image Structure: Sander Structure: Sander Structure: Sander Structure: Sander Structure: Sander Structure: Image Structure: Sander Structure: Sander Structure: Sander Structure: Sander Structure: Sander Structure: Image Structure: Sander Structure: Sander Structure: <	Engineering Log - Non Corec	d Borehole	Project No.: PSM4252	
Drift Model and Mouring: 24 tornes truck mounted Inclination: 90° RL Surface: 74 50 m Hele Diameter: 100 mm Bearing: Datum: AHD Operator: JK Drilling Image: Second and the secon	Client:Aliro GroupProject Name:Mamre Road, KempsHole Location:Mamre Road KempsHole Position:295049.2 m E 625416	Creek Creek 67.3 m N MGA94 Zone 56	Commenced:23/10/2020Completed:23/10/2020Logged By:DTChecked By:AS))
Drilling Information Soil Description Observations 1 <td>Drill Model and Mounting: 24 tonnes true Hole Diameter: 100 mm</td> <td>ck mounted Inclination: -90° Bearing:</td> <td>RL Surface: 74.50 m Datum: AHD Op</td> <td>perator: JK Drilling</td>	Drill Model and Mounting: 24 tonnes true Hole Diameter: 100 mm	ck mounted Inclination: -90° Bearing:	RL Surface: 74.50 m Datum: AHD Op	perator: JK Drilling
Image: Subject of the state	Drilling Information	Soil Descri	otion	Observations
Image: Shall be also	Wettpod Tests Remarks (m) (m) (m)	h U U U U U U U U U U U U U U U U U U U	Moisture Action Moisture Action Condition	Structure, Zoning, Origin, Additional Observations
Method Penetration Penetenetration Penetration	AD/T N Nat Observed	SHALE: dark grey, highly weather strength. (continued)	ed, low	
Image: Standard penetration test Penetration Water Samples and Tests Moisture Condition Consistency/Relative Density Image: Standard penetration test No resistance through to refusal Image: Standard penetration test Image: Standard penetration test D - Dry Moistured Sample Vs - Very soft SPT - Standard penetration test Penetration Image: Standard penetration test Image: Standard penetration test D - Dry Moistured Sample Vs - Very soft SPT - Standard penetration test Image: Standard penetration test Image: Standard penetration test Moisture Condition Standard Penetration AS - Auger Screwing Image: Standard penetration test AS - Auger Screwing Image: Standard penetration test	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Hole Terminated at 6.00 m Target depth		
g ŪD - Very dense	Method Penetration AD/T - Auger drilling TC bit No resistan AD/T - Auger drilling V bit WB -Washbore SPT - Standard penetration test PT - Push tube AS - Auger Screwing Auger Screwing	ce → Inflow U - Undisturbed → Partial Loss SPT - Standard Pe ← Complete Loss ES - Environment TW - Thin Walled LB - Large Disturb	Moisture Condition Sample D - Dry mple M - Moist retration Test W - Wet al Sample D - Dry bed Sample D - Dry	Consistency/Relative Density VS - Very soft S - Soft F - Firm St - Stiff VSt - Very stiff H - Hard VL - Very loose L - Loose MD - Medium dense D - Dense VD - Very dense

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Borehole ID

AH02

Engineering Log - Non Cored	Borehole	Project No.: PSM4252							
Client:Aliro GroupProject Name:Mamre Road, Kemps CHole Location:Mamre Road Kemps CHole Position:295212.2 m E 625415	Creek (creek L l.2 m N MGA94 Zone 56 (Commenced:23/10/2020Completed:23/10/2020.ogged By:DTChecked By:AS							
Drill Model and Mounting: 24 tonnes truck Hole Diameter: 100 mm	mounted Inclination: -90° ۴ Bearing: ۲	RL Surface: 72.70 m Datum: AHD Ope	rator: JK Drilling						
Drilling Information	Soil Description	n	Observations						
Method Penetration Penetration Remarks Benetration Method Remarks Benetration Method Remarks Method	Bon in the second secon	Moisture Condition Consistency / Relative Density 100 (SOL 200 (SOL) 200 (SO	Structure, Zoning, Origin, Additional Observations						
- ES 0.50 m	SC Clayey SAND: medium plasticity, dark fine grained sand, rootlets observed. CLAY: medium plasticity, dark brown.	brown, <u>M</u> <u>F</u> 0 0	.00: Topsoil. .10: Inferred Natural Soil.						
NOP	CI Becomes brown.	D 1	.00: SPT recovered: 450 / 450 mm.						
201905001 Pili FelM 3100 020190500	SHALE: grey and pale orange, extrem weathered, very low strength.	iely 1	.70: Inferred Bedrock. -bit refusal.						
	Becomes grey.								
Method Penetration Water Samples and Tests Moisture Condition Consistency/Relative D AD/T - Auger drilling TC bit No resistance Inflow U - Undisturbed Sample D D Dry VS - Very soft AD/V - Auger drilling V bit Water Partial Loss O - Disturbed Sample M Moist S S - Soft SPT - Standard penetration test PT - Push tube Complete Loss Complete Loss S - Environmental Sample M W - Wet S - Firm SK Auger Screwing Soft and rock descriptions in accordance with AS 1726:2017 VL - Very lonse C - Compact									

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AH02

E	igineering Log - Non Cored Borehole									reho	Project N	0.:		PS	SM4	252	2	
	Client:Aliro GroupCommenced:23/10/2020Project Name:Mamre Road, Kemps CreekCompleted:23/10/2020Hole Location:Mamre Road Kemps CreekLogged By:DTHole Position:295212.2 m E 6254151.2 m N MGA94 Zone 56Checked By:AS											20 20						
	Drill I Hole	Moo Dia	del ame	and eter:	Mounting:	24 100	tonne) mm	s truc	k mou	inted	Inclination: -90° Bearing:	RL Surfac Datum:	ce:	72 Ał	.70 ID	m	С	perator: JK Drilling
			Ľ	Drilli	ing Informati	ion					Soil Descri	ption						Observations
Method	Penetration		Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description SOIL NAME: Colour, stru plasticity, additional	cture,	Moisture Condition	Consistency / Relative Density	Pene	Hand etror UCS (kPa	d nete) 005	r Structure, Zoning, Origin, Additional Observations
AD/T			z	Not Observed				-			SHALE: grey, extremely weathered strength. (continued) Becomes dark grey.	ed, very low						
							7.	-										
3.03.0 2019-05-06							 65.7 66				Hole Terminated at 6.00 m Target depth							
jel Fence and Map Tool Lib: PSM 3.03.1 2019-05-07 Pg; PSM							 64.7	- - - 8 -										
PSM4252.647 < <drwngf#855 080<="" 10="" 10:01:00.11="" 11="" 11:02="" 2020="" td=""><td></td><td></td><td></td><td></td><td></td><td></td><td> 63.7</td><td>- - 9- - -</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></drwngf#855>							 63.7	- - 9- - -										
PSM 3.03.1 LIB_AK.GLB_LOG_PSM.AU NUNUURE DETINZ.AU S	AD/T AD/V WB - SPT - PT - AS -	Met - Au - Au Was Star Pus Aug	thoo uge shbo ndai sh tu jer S	drill drill ore d pe be Screv	ing TC bit ing V bit enetration test ving Jetails of abbreviation	Pe	netrat No rea throu ref	<i>ion</i> sistanco ugh to usal	e I 	W ⊃ Infi ⊲ Par ◄ Cor <i>il and r</i>	ater Samples a bw U - Undisturbed tial Loss D - Disturbed Sa SPT - Standard Pe ES - Environment TW - Thin Walled LB - Large Disturb bock descriptions in accordance	nd Tests Sample ample netration Test ial Sample bed Sample with AS 1726:	N 2017	loistu D M W	re Ca - [- N - V	ondi Dry Moist Vet	tion:	Consistency/Relative Density VS - Very soft S - Soft F - Firm St - Stiff VSt - Very stiff H - Hard VL - Very loose L - Loose MD - Medium dense D - Dense VD - Very dense C - Compact

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AH03

E	igineering Log - Non Cored Borehole										Project I	No.:		PS	SM4:	252	
	Client: Projec Hole L Hole F	: ct Na _ocat Posit	me: ion: on:	Aliro G Mamre Mamre 295277	roup Roa Roa 7.6 m	nd, Ke nd Ke n E 62	emps (mps C 25397(Creek Creek 0.0 m	N MG	A94 Zone 56	Commer Complet Logged Checked	nced: ted: By: d By:		23 23 D1 AS	5/10/2 5/10/2 Г S	202	0 0
	Drill M Hole [lodel Diam	ano eter	d Mounting:	24 1 100	tonne) mm	s truc	k mou	inted	Inclination: -90° Bearing:	RL Surfa Datum:	ace:	73 A⊦	.00 ID	m	0	perator: JK Drilling
			Drill	ing Informat	ion					Soil Descrip	tion						Observations
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description SOIL NAME: Colour, struct plasticity, additional	ure,	Moisture Condition	Consistency / Relative Density	Pene	Hand etrom UCS (kPa)	d neter ;)	- Structure, Zoning, Origin, Additional Observations
							_		SP	SAND: dark brown, fine grained.			F				0.00: Topsoil.
AD/V		z		- LB 0.50-1.00 m			-		CL-CI	Sandy Clay: low to medium plastici and red, fine grained.	ty, orange	D	St				0.20: Interred Natural Soil.
				- SPT:		72.0	1—						— — - Н				1.00: SPT recovered: 250 / 250 mm.
ОКЕ ВН NZ AU PSMA252.GPJ < <drawingfile>> 10/11/2/20 11/02 10:01:00.11 Dagel Fence and Map Tool LLb: PSM 3.03.1 2019-05-07 Pfr PSM 3.03.0 2019-05-06 AD/T</drawingfile>		Z	Not Observed	1.00 - 1.25 m 4, 8/100 mm N=Refusal		69.0 70.0 71.0	- - - - - - - - - - - - - - - - - - -			SANDSTONE: light brown, fine gra weathered, very low strength. SHALE: grey, extremely weathered strength.	ined, highly						1.20: Inferred Bedrock. V-bit refusal.
3.03.1 LIB_AK.GLB Log PSMAU NONC	Method Penetration Water Samples and Tests Moisture Condition Consistency// AD/T - Auger drilling TC bit AD/Y - Auger drilling V bit WB - Washbore No resistance Inflow U - Undisturbed Sample D - Dry VS - Ve WB - Washbore SPT - Standard penetration test Partial Loss SPT - Standard Penetration Test W - Wet F F - Standard Penetration Test YT - Push tube AS - Auger Screwing Complete Loss Environmental Sample W - Wet H - Ha LB Large Disturbed Sample LB - Large Disturbed Sample U - Lo - Lo VU - Ve U - Dry VZ VZ VE VE VE											Consistency/Relative Density VS - Very soft F - Firm St - Stiff VSt - Very stiff H - Hard VL - Very loose L - Loose MD - Medium dense D - Dense VD - Very dense Co - Consected					
Se Se	e Explanatory Notes for details of abbreviations and basis of descriptions. Soil and rock descriptions in accordance with AS 1726:2017 C - Compact																

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AH03

Engine	gineering Log - Non Cored Borehole								Project N	lo.:		P	SM4	252	2
Client: Project Hole Lo Hole Po	Client:Aliro GroupProject Name:Mamre Road, Kemps CreekHole Location:Mamre Road Kemps CreekHole Position:295277.6 m E 6253970.0 m N MGA94 Zone 56									nced: ed: By: By:		23 23 D ⁻ AS	3/10 3/10 T S	/202 /202	20 20
Drill Mo Hole Di	odel and iameter	l Mounting:	24 t 100	onne mm	s truc	k mounted Inclination: -90° RL Surface: 73 Bearing: Datum: Al-				6.00 HD	m	С	operator: JK Drilling		
	Drill	ing Informat	ion					Soil Desci	ription	-					Observations
Method Penetration	Support Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Descriptio SOIL NAME: Colour, stri plasticity, additiona	n ucture, I	Moisture Condition	Consistency / Relative Density	Pen	Han etror UCS (kPa	d nete 3 1) 0000000000000000000000000000000000	r Structure, Zoning, Origin, Additional Observations
	N Not Observed			66.0 67.0				SHALE: grey, extremely weathe strength. <i>(continued)</i> Hole Terminated at 6.00 m Target depth	red, very low				е 	4 0	
SMR226.5442 - <-Dismingrees- 10/11/2020 11/02 10/10/01 Jaggel Ferice and Map 1041 Lio: FSM 3.			-	64.0 65.0											
Met AD/T - A AD/V - A AD/V - A AD/V - A WB - Wa See Explanato	ethod Auger drill Auger drill ashbore andard pe sh tube ger Screv	ling TC bit ling V bit enetration test wing details of abbreviation	Per	netrat No rea throu ref	ion sistanco ugh to usal	e [W > Infl∉ ⊲ Par ⊲ Cor	ater Samples a Sow U - Undisturbed tial Loss D - Disturbed S mplete Loss SPT - Standard P mplete Loss ES - Environmen TW - Thin Waller LB - Large Distu pock descriptions in accordance	and Tests d Sample sample enetration Test ntal Sample d ribed Sample with AS 1726.	N :2017	loistu D M W	// - \\	ondi Dry Moisi Wet	t	Consistency/Relative Density VS Very soft S Soft F - Firm St Stiff VSt Very stiff H - Hard VL Very loose L - Loose MD Medium dense D - Dense VD - Very dense Ce - Cemented C - Compact

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Borehole ID

AH04

Engineering Log - Non	Cored Bo	orehole	e Projec	t No.:	PSM4252						
Client:Aliro GroupProject Name:Mamre RoadHole Location:Mamre RoadHole Position:295689.3 m	l, Kemps Cree I Kemps Creel E 6253897.5 r	enced: eted: d By: ed By:	23/10/202 23/10/202 DT AS	0 0							
Drill Model and Mounting: 24 to Hole Diameter: 100	onnes truck mo mm	ounted	Inclination: -90° RL Su Bearing: Datum	rface: ::	63.30 m AHD O	perator: JK Drilling					
Drilling Information			Soil Description			Observations					
Method A covery Recovery Recovery Recovery Recovery	RL Depth (m) (m)	Classification Symbol	Material Description SOIL NAME: Colour, structure, plasticity, additional	Moisture Condition	Consistency / Relative Density 200 800 (eAy) 500 (eVe) 500 (eVe) 5	Structure, Zoning, Origin, Additional Observations					
ACCE Provide a constraint of the second sec	61:3 61:3		CLAY with Sand: medium plasticity, dark prown, fine grained sand. CLAY: medium plasticity, red and orange, nottled grey.	 M	VSt	0.00: Topsoil. 0.10: Inferred Natural Soil. 1.00: SPT recovered: 450 / 450 mm.					
	60.3 60.3 60.3 60.3 60.3 60.3 60.3 60.3		SHALE: pale orange, extremely weathered, very low strength.			2.60: Inferred Bedrock. V-bit refusal.					
Method Pen AD/T - Auger drilling TC bit AD/V - Auger drilling V bit WB - Washbore SPT - Standard penetration test PT - Push tube AS - Auger Screwing See Explanatory Notes for details of abbreviations and base	Method Penetration Water Samples and Tests Moisture Condition Consistency/Relative Density AD/T - Auger drilling TC bit AD/V - Auger drilling V bit WB -Washbore SPT - Standard penetration test PT - Push tube AS - Auger Screwing No resistance through to refusal Inflow U - Undisturbed Sample D - Dry VS - Very soft SPT - Standard penetration test PT - Push tube AS - Auger Screwing Partial Loss ST - Standard Penetration Test W - Wet F - Firm St St - Suff We - U - Undisturbed Sample F - Dry W - Wet F - Firm St - Suff Motor - Complete Loss Complete Loss ES - Environmental Sample W - Wet F - Firm MD - Medium dense D - Dense ES - Large Disturbed Sample W - Wet H - Hard - Loose MD - Medium dense D - Dense D - Dense WD - Very Idense U - Very Idense VL - Very Idense Exe Explanatory Notes for details of abbreviations and basis of descriptions. Soil and rock descriptions in accordance with AS 1726:2017 C - Compact										

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AH04

Er	ngin	lor	n Co	bred	Bo	Project I	Project No.: PSM4252					2					
C F H H	Client: Project Hole Lo Hole P	t Na ocat	me: tion: ion:	Aliro G Mamre Mamre 295689	roup Roa Roa .3 n	ad, Ke ad Ke n E 62	emps (mps (25389	Creek Creek 7.5 m	N MG	A94 Zone 56	Comme Complet Logged Checked	nced: ted: By: d By:		23 23 D A	3/10 3/10 T S	/202 /202	20 20
[H	Drill Mo Hole D	odel liam	and eter:	Mounting:	24 100	tonne) mm	es truc	k mou	inted	Inclination: -90° Bearing:	RL Surfa Datum:	ace:	63 Al	8.30 HD	m	0	perator: JK Drilling
	-	l	Drilli	ing Informati	on	-				Soil Descri	otion						Observations
Method	Method Samples Lests Remarks (m) (m) (m)							bo cite cite cite cite control cite control cite control cite control cite control cite control cite control cite control cite control cite control cite control contr			CMO Hamorian Consistence Consistence Consistence Consistence (kba) Consistence (kba)			Han etroi UC (kPa	d nete 3 a) 004	r Structure, Zoning, Origin, Additional Observations	
AD/T		Z	Not Observed				-			SHALE: grey, extremely weathere strength. (continued)	d, very low						
33.0 2019-05-06						56.3 57.5	6			Hole Terminated at 6.00 m Target depth							
el Fence and Map. Tool LID: PSM 3.03.1.2019-05-07 Pg: PSM 3.						 55.3											
PSM4252.GPJ < <drawingfile>> 10/11/2020 11:02 10.01.00.11 Datg</drawingfile>						 54.3											
Mothod Penetration Water Samples and Tests Moisture Condition Consistency/R AD/T - Auger drilling V bit No resistance Inflow U - Undisturbed Sample D D - Dry VS - Ver AD/V - Auger drilling V bit No resistance Partial Loss Partial Loss SPT - Standard Penetration Test M - Moist S - String S - String SPT - Standard penetration test Provente Complete Loss E - Environmental Sample M - Wet S - String VS - Ver AS - Auger Screwing See Explanatory Notes for details of abbreviations and basis of descriptions. Soil and rock descriptions in accordance with AS 1726:2017 VL - Loco													Consistency/Relative Density VS Very soft S - Soft F - Firm St - Soft VSt - Very stiff H - Hard VL - Very loose L - Loose MD - Medium dense D - Dense VD - Very dense C - Compact				

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AH05

Client:Aliro GroupCommencedProject Name:Mamre Road, Kemps CreekCompleted:Hole Location:Mamre Road Kemps CreekLogged By:Library Location:Completed Completed Complet	4: 23/10/2020 23/10/2020 DT : AS 65.60 m										
Hole Position: 295237.0 m E 6253839.0 m N MGA94 Zone 56 Checked By	65.60 m										
Drill Model and Mounting:24 tonnes truck mountedInclination:-90°RL Surface:Hole Diameter:100 mmBearing:Datum:	AHD Operator: JK Drilling										
Drilling Information Soil Description	Observations										
Material Description Source tration Source tration Source to the second of the second	Hand Hand Penetrometer UCS (kPa) (kPa) 000000000000000000000000000000000000										
Image: CL of the second sec	F 0.00: Topsoil. St 0.10: Inferred Natural Soil. St 1.00: SPT recovered: 450 / 450 mm. VSt 1.00: SPT recovered: 450 / 450 mm.										
Notational and the second seco	1.80: Inferred Bedrock. V-bit refusal.										
Method Penetration Water Samples and Tests Moisture Condition Consistency/Relative Density AD/T - Auger drilling TC bit AD/V - Auger drilling V bit WB - Washbore No resistance through to refusal Inflow U - Undisturbed Sample D - Dry VS - Very soft SPT - Standard penetration test PT - Push tube AS - Auger Screwing Partial Loss ST Standard Penetration Test ES W - Wet F - Firm VS VS - Very soft Mo - Tributed SPT - Standard penetration test W - Wet F - Firm VS VS - Very soft W - Thin Walled LB - Large Disturbed Sample W - Wet VL - Very soft MO - Medium dense D D - Dry VL - Very dense VL - Very dense AS - Auger Screwing Soil and rock descriptions is secondense with AS 4726:2047 VL - Very dense VD - Very dense											

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AH05

E	Ingineering Log - Non Cored Borehole F Client: Aliro Group F														PSM	4252	2
	Clier Proj Hole Hole	nt: ect e Lo e Po	Na ocat ositi	me: ion: on:	Aliro Gi Mamre Mamre 295237	roup Roa Roa .0 m	ad, Ke ad Ke n E 62	emps (mps C 25383	Creek Creek 9.0 m	N MG	A94 Zone 56	Comme Complet Logged Checke	nced: ted: By: d By:		23/1(23/1(DT AS)/20:)/20:	20 20
	Drill Hole	Mc 9 Di	odel iam	and eter:	Mounting:	24 100	tonne) mm	es truc	k mou	nted	Inclination: -90° Bearing:	RL Surfa Datum:	ace:	65.6 AHI	60 m D	C	Operator: JK Drilling
			L	Drilli	ing Informati	on			Soil Description							Observations	
Method	Method Samples Lests Kemarks Method Lests Method Lests Method Remarks Method							Depth (m)	Graphic Log	Classification Symbol	Material Descri SOIL NAME: Colour, plasticity, additi	otion structure, ional	Moisture Condition	Consistency / Relative Density -D	Hai enetro UC (kP	nd omete S a)	er Structure, Zoning, Origin, Additional Observations
AD/T			z	rd. 🗸				-			SHALE: grey, extremely wea strength. <i>(continued)</i> Becomes low strength.	thered, very low					
				observe			9.	-			Decomes low eachigan.						
7 Prj: PSM 3.03.0 2019-05-06				Wate			1 58.6 51	- - - - 7-			Hole Terminated at 6.00 m Target depth						
11:02 10.01.00.11 Datgel Fence and Map Tool Lib: PSM 3.08.1 2019-05-0							57.6										
RE BH NZ AU PSM4252.GPJ < <drawingfile>> 10/11/2020 1</drawingfile>							56.6	9									
PSM 3.03.1LIB_AK.GLB Log PSMAU NONCOF	Method Penetration Water Samples and Tests Moisture Condition Consistency/Relative Density AD/T - Auger drilling TC bit AD/V - Auger drilling V bit WB - Washbore No resistance through to refusal No resistance through to refusal No resistance through to refusal Partial Loss D - Disturbed Sample D - Disturbed Sample D - Dry W - Wet VS - Very soft SPT - Standard Penetration Test SPT - Standard penetration Test EV - Thin Walled LB - Large Disturbed Sample W - Wet F - Firm SUM VS - Very stift H - Hard See Explanatory Notes for details of abbreviations and basis of descriptions. Soil and rock descriptions in accordance with AS 1726:2017 Moisture Condition M - Moist VS - Very stift Consistency/Relative Density VS - Very soft																

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Borehole ID

AH06

Engin	ee	rin	g Log - N	lon		ored	Bo	Project N	ct No.: PSM4252				2		
Client: Projec Hole L Hole F	t Na .ocat ?ositi	me: ion: on:	Aliro G Mamre Mamre 294723	roup Roa Roa 3.4 m	id, Ke id Ke i E 62	emps (mps C 253914	Creek Greek 4.8 m	N MG	A94 Zone 56	Commer Complet Logged	nced: æd: By: d By:		23/1 23/1 DT AS	0/202 0/202	20 20
Drill M Hole D	odel Diam	ano eter	d Mounting:	24 t 100	onne mm	s truc	k mou	inted	Inclination: -90° Bearing:	RL Surfa Datum:	ace:	46. AH	60 m D	С	operator: JK Drilling
	I	Drill	ling Informat	ion					Soil Descript	ion					Observations
Method Penetration	Samples Tests Remarks (m) (m) (m)						Graphic Log	Classification Symbol	Material Description SOIL NAME: Colour, structu plasticity, additional	ıre,	Moisture Condition	Consistency / Relative Density	Ha Penetro UC (kF	nd omete S 'a)	r Structure, Zoning, Origin, Additional Observations
	Z 2	Not Observed	- ES 0.60 m - SPT: 1.00 - 1.45 m 8, 7, 10 N = 17		42.6 43.6 44.6 45.6			SP CL-CI	SAND: dark brown, fine grained. CLAY: low to medium plasticity, ora mottled grey. Becomes orange and grey. SHALE: grey, extremely weathered strength.	very low	D	St VSt			0.00: Topsoil. 0.10: Inferred Natural Soil. 1.00: SPT recovered: 250 / 450 mm. 1.60: Inferred Bedrock. V-bit refusal.
AD/T - AD/T - AD/T - WB -W SPT - SP PT - Pi AS - A	Method Penetration Water Samples and Tests Moisture Condition Consistency/Relative Density AD/T - Auger drilling TC bit AD/T - Auger drilling V bit WB - Washbore No resistance through to refusal No resistance through to refusal Partial Loss 0 - Undisturbed Sample D Dry VS - Very soft SPT - Standard penetration test Partial Loss SPT - Standard Penetration Test W W Wet F - Firm AS - Auger Screwing Complete Loss Complete Loss Es Environmental Sample W W Wt H Hard MS - Vacy stiff H - Hard LB - Large Disturbed Sample VL Very stiff MS - Auger Screwing W Wethod - Losse M - Losse M - Losse M MS - Auger Screwing Wethod - Losse - Losse M - Losse M - Dense M MS - Vacy dense - Losse - Losse - Losse - Losse - Losse M - Dense M MS - Vacy dense - Vacy dense - Vacy dense - Vacy dense - Va														
See Explanat	See Explanatory Notes for details of abbreviations and basis of descriptions. Soil and rock descriptions in accordance with AS 1726:2017 C - Cemented C - Cemented C - Compact														

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AH06

E	Engineering Log - Non Cored Borehole													ect No.: PSM4252				2
	Clie Pro Hole Hole	ent: ject e Lo e Po	: Na ocat ositi	me: ion: on:	Aliro G Mamre Mamre 294723	roup Roa Roa 3.4 m	ad, Ke ad Ke n E 62	emps (mps C 25391	Creek Creek 4.8 m	N MG	A94 Zone 56	Comme Comple Logged Checke	enced: eted: By: d By:	: 23/10/202 23/10/202 DT AS				20 20
	Drill Hole	l Mo e Di	odel iam	anc eter	I Mounting:	24 100	tonne) mm	es truc	k mou	nted	Inclination: -90° Bearing:	RL Surf Datum:	ace:	46 A⊢	.60 ID	m	С	operator: JK Drilling
			I	Drill	ing Informat	ion					ption	ion				Observations		
14 - 41 4	A C Dept C C C C C C C C C C C C C C C C C C C								Graphic Log	Classification Symbol	Material Description SOIL NAME: Colour, stru plasticity, additional	cture,	Moisture Condition Consistency / Relative Density		Relative Density Hand ACS (kPa) RPa (kPa)			r Structure, Zoning, Origin, Additional Observations
Ľ			z					_			SHALE: grey, extremely weather strength. <i>(continued)</i>	ed, very low						
		 						-			Becomes low strength. Hole Terminated at 5.25 m		\square					5.25: T-bit refusal.
							 40.6				Target deptn							
19-05-07 Prj: PSM 3.03.0 2019-05-06								- - 7 -										
.01.00.11 Datgel Fence and Map Tool Lib: PSM 3.03.1 20							38.6	- 8 -										
NZ AU PSM4252.GPJ < <drawingfile>> 10/11/2020 11:02 10.0</drawingfile>							37.6	9										
PSM 3.03.1 LIB_AK.GLB Log PSM AU NONCORE BH1	Method Penetration Water Samples and Tests Moisture Condition Consistency/Relative Density AD/T - Auger drilling TC bit AD/Y - Auger drilling V bit WB - Washbore No resistance through to refusal No resistance through to refusal Partial Loss U - Undisturbed Sample D D D D ry M VS - Very soft SPT - Standard penetration test PT - Push tube AS - Auger Screwing Complete Loss See Explanatory Notes for details of abbreviations and basis of descriptions Soil and rock descriptions in accordance with AS 1726:2017 Moisture Condition D Consistency/Relative Density VS VS Soil																	

A2 – 2022 Site Investigation

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BH01

Engir	Engineering Log - Non Cored Borehole Project No												o.: PSM4252			
Client Projec Hole I Hole I	: ct Na _ocat Positi	me: ion: on:	Aliro G Mamre Refer to 295135	roup Roa o Fig 5.4 m	nd, Ke jure 1 n E 62	emps (25415	Creek 1.5 m	N MG	494 Zone 56	Commer Complet Logged I Checked	nced: ed: By: I By:		25/05 25/05 JBL AS	5/202 5/202	22 22	
Drill N Hole I	lodel Diam	ano eter	d Mounting: :	3-to 120	onne) mm	track n	nount	ed	Inclination: -90° Bearing:	RL Surface: 82.00 m Datum: AHD O					perator: Matrix Drilling	
	I	Drill	ing Informat	ion					Soil Descript	tion					Observations	
Method Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description SOIL NAME: Plasticity, behavi particle characteristics of prir component, colour, secondary cor additional observations	our or nary nponents,	Moisture Condition	Consistency / Relative Density	Har Penetro UC (kP	nd meter S a) 005	r Structure, Zoning, Origin, Additional Observations	
0.62 J. <		Not Observed	SPT@0.5m 3,8,28 N=36		78.0 79.0 80.0 81.0			CH	Silty CLAY: high plasticity, dark brown CLAY: high plasticity, dark brown SHALE: dark brown and grey, extre weathered to highly weathered, infe low to low strength	mely rred very	D	<u>Fto</u> \ <u>St</u> /	10	46	0.00: TOPSOIL: grass on surface 0.10: NATURAL 1.35: V-bit refusal Bedrock	
M 3022 LIB GLB Log PSM ALI NONCORE BH NZ ALI PSMA222 (2662) M 2022 LIB GLB Log PSM ALI NONCORE BH NZ ALI PSMA222 (2662) A 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2	Metho Auge Auge Vashb Dash tu uger	d er dril ore rd pe ube Screv	ling TC bit ling V bit enetration test wing	Pe	<i>netra</i> i o resi:	tion stance efusal		Wa > Inflo ⊲ Par ◀ Cor	ater Samples and ow U - Undisturbed Sam bial Loss D - Disturbed Sam SPT - Standard Pene nplete Loss ES - Environmental TW - Thin Walled LB - Large Disturbe	I Tests ample ple stration Test Sample d Sample		loistur D M W	e Conc - Dry - Mois - Wet	<i>lition</i>	Consistency/Relative Density VS - Very soft S - Soft F Firm St - Stiff VS - Very stiff H - Hard VL - Very loose L - Loose MD - Medium dense D - Dense VD - Very dense Ce - Cermented	
ADIV - WB -V SPT -S B PT - F AS - A Logged in a	Auge Vashb tanda Push ti uger	r dril ore ird pe ube Screv	ling V bit enetration test wing AS 1726:2017 Geote	echnical	o resi:	stance efusal		⊲ Par	tial Loss D - Disturbed Sam SPT - Standard Pene ES - Environmental TW - Thin Walled LB - Large Disturbe	ple stration Test Sample d Sample	t	W	- Móis - Wet	st	S - Soft F - Firm St - Stiff H - Hard VL - Very lose L - Loose MD - Medium dense D - Dense VD - Very dense Ce - Cemented C - Compact	

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BH01

E	Engin	ee	rin	g Log - N	lor	n Co	ored	Boi	eho	le		Project N	lo.:		PS	M42	252	
	Client: Projec Hole L Hole F	t Na .oca ?osit	me: tion: ion:	Aliro G Mamre Refer to 295135	roup Roa o Fig 5.4 m	ad, Ke jure 1 n E 62	emps (25415	Creek 1.5 m	N MG	A94 Zone 56		Commer Complete Logged I Checked	nced: ed: By: I By:		25/ 25/ JBL AS	05/2 05/2	2022	2 2
	Drill M Hole [ode Diam	l and eter	d Mounting:	3-to 120	onne †) mm	track r	nount	ed	Inclination: Bearing:	-90°	RL Surfa Datum:	ice:	82. AH	.00 n ID	ı	Or	perator: Matrix Drilling
			Drill	ing Informati	ion					<u></u>	oil Descripti	ion						Observations
	Method Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Materia SOIL NAME: Pl particle chara component, colour, additiona	l Description asticity, behavic cteristics of prim secondary com l observations	our or lary lponents,	Moisture Condition	Consistency / Relative Density	H Penei L (H 00 00	and rom ICS Pa)	eter	Structure, Zoning, Origin, Additional Observations
		Z	Not Observed			73.0 74.0 75.0 76.0 [3]				SHALE: dark brown weathered to highly v low to low strength (o	and grey, extrer veathered, infer iontinued)	nely red very			100	300	200	
	AD/T - AD/V - WB -W SPT -S PT - P AS - A	Auge Auge Auge asht and ush t uger	d er dril er dril oore ard p ube Scre	ling TC bit ling V bit enetration test wing	Pe	netrat o resis	i on stance efusal	[W/ > Inflo ⊲ Par ◀ Cor	ater Jow U - tial Loss SPT - mplete Loss ES - TW - LB -	Samples and Undisturbed Sa Disturbed Sam Standard Penel Environmental 1 Thin Walled Large Disturbed	Tests Imple ole tration Test Sample d Sample		loistui D M W	re Co. - Di - M - W	n diti y pist et	on	Consistency/Relative Density VS - Very soft S - Soft F - Firm St - Stiff VSt - Very stiff H - Hard VL - Very loose L - Loose MD - Medium dense D - Dense VD - Very dense C - Corrected
2	ogged in ac	cordan	ce with	AS 1726:2017 Geote	chnica	l site inve	estigations											C - Compact

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Engineering Log - Non Cored Borehole

Borehole ID

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	Clie Pro Hol Hol	ent: ject le Lo le Po	Na ocat	me: tion: ion:	Aliro G Mamre Refer t 295135	roup Ro o Fig 5.4 r	o ad, Ke gure <i>´</i> n E 62	emps 1 25415	Creek 1.5 m	N MG	A94 Zone 56	Commence Completed: Logged By: Checked By	d: /:		25/ 25/ JB AS	'05/ '05/ L	202	2 2
	Dril Hol	l Mo e Di	odel iam	ano eter	d Mounting: :	3-t 12	onne 0 mm	track i	mount	ed	Inclination: -90° Bearing:	RL Surface Datum:	: 8 A	32.0 \H[00 r D	n	0	perator: Matrix Drilling
			I	Drill	ing Informat	ion					Soil Descrip	tion						Observations
	Method	Penetration	Support	Water	Samples Tests Remarks	Recoverv	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description SOIL NAME: Plasticity, behav particle characteristics of prin component, colour, secondary co additional observations	iour or mary mponents, so	Condition Consistency /	Kelative Density	H Jene ()	land tron JCS kPa)	d nete	r Structure, Zoning, Origin, Additional Observations
13-05-06	ADIT		Z	Not Observed			71.0				SHALE: dark brown and grey, extre weathered to highly weathered, infe low to low strength <i>(continued)</i>	emely prred very						
I Lib: PSM 3.02.1 2019-03-06 Prj: PSM 3.03.0 20							70.0	12-	-		Continued on cored borehole shee	t						
022 17:20 10.02.00.04 Datgel Fence and Map Toc							69.0		-									
H NZ AU PSM4252 (25052022).GPJ < <drawingfile>> 06/07/</drawingfile>							68.0		-									
PSM 3.02.2 LIB.GLB Log PSM AU NONCORE B	AD/ AD/ WB SP1 PT AS	T - A V - A -Wa -Sta - Pu: - Au; in acco	etho Auge Auge ashb anda sh tu ger :	d er dril er dril oore urd pe ube Screv	ling TC bit ling V bit enetration test wing AS 1726:2017 Geot	Pe	No resis R	tion stance efusal	 - - -	₩ ▷ Infi ⊲ Pai ◀ Co	Ater Samples and ow U - Undisturbed S D - Disturbed San SPT - Standard Pen BS - Environmenta TW - Thin Walled LB - Large Disturbe	d Tests ample pple etration Test I Sample ed Sample	Mois	ture D M W	- D - N - W	ndit ry loist /et	tion	Consistency/Relative Density VS - Very soft S - Soft F - Firm St - Stiff VSt - Very stiff H - Hard VL - Very loose L - Loose MD - Medium dense D - Dense VD - Very dense Ce - Cemented C - Compact

Project No.:

PSM4252

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Borehole ID

BH01

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E	ngi	nee	erin	g Log	g - C	ored	d Bo	orehole	Pr	oject No	.: F	PSM4252	
	Clier Proje Hole Hole	nt: ect N Loca Posi	ame: ation: ition:	Al M Re 29	iro Gr amre efer to 95135.	oup Road, Figure 4 m E	Kemj e 1 6254	os Creek 151.5 m N MGA94 Zone 56	Co Co Lo Cł	ommenc ompletec gged By necked E	ed: 2 1: 2 7: 3 3y: 7	25/05/2022 25/05/2022 IBL AS	
	Drill Barr	Mode el Tyj	el ano pe an	d Mount Id Lengt	ing: :h:	3-tonr NMLC	ie tra 3 m	ck mounted Inclination: -90° Bearing:	RL Da	_ Surface atum:	e: 82.0 AHD	0 m Oper	rator: Matrix Drilling
		Dril	ling l	nforma	tion			Rock Substance				R	ock Mass Defects
Mathod	Water	TCR (%)	RQD (%)	Samples and Field Tests	RL (m)	Depth (m)	Graphic Log	Material Description Colour, Fabric, Rock Name, Discontinuities, Additional	Weathe ହ ≳ ≩ ≩	ering	Strength Is(50) ● - Axial - Diametral ਙ ェ 듯 ᇳ	Defect Spacing (mm)	Defect Description Type, Inclination, Shape, Roughness, Coating/Infilling, Thickness (Inclination normal to core axis)
0.04 Datge Fence and Map Tool Lb: PSM 3.02.1 2219.03-06 Pt; PSM 3.03.0 2019-05-06 N.N.M. C	Not Observed		87	Is(50) d=0.02 a=0.27 MPa Is(50) d=0.04 a=0.08 MPa	69.0 70.0 71.0	- - - - - - - - - - - - - - - - - - -		Continued from non-cored borehole sheet LAMINITE: SHALE (90%) and SANDSTONE (10%) SANDSTONE: medium coarse grained, grey SHALE: dark grey, well developed, thinly bedded, spaced 1-3mm					BP, 5°, CL, UN, S BP, 5°, CL, UN, S BP, 5°, CL, UN, S BP, 5°, CL, UN, S ∽ BP, 0°, CL, PR, S − CZ, 45°, CL, IR, RF
NZ PSM4252 (25052022).GPJ < <drawingfile>> 21/07/2022 09:57 10.02.0</drawingfile>			92	ls(50) d=0.18 a=0.25 MPa	68.0			SANDSTONE: medium coarse grained, grey, thinly bedded SHALE: grey, thinly bedded, spaced 2-5mm					— JT, 60°, CL, PR, S Դ CZ, 3mm — BP, 30°, CN, UN, RF
PSM 3.02.2 LIB.GLB Log PSM AU CORE BH N	A C V V N N H F S	AS - a AD - a CB - c VB - w IMLC NQ - w HQ - w CQ - w CPT- s	Metho uger so uger di law of l vashboi - wire vireline vireline vireline tandaro	od crewing iilling blade bit re elline core (5 core (47.6 core (63.5 core (85.0 d penetratic	51.9 mm) mm) mm) mm) on test)		Water Weathering RS evel (Date) RS fifow CW fifow HW Partial Loss MW complete Loss UW aphic Log/Core Loss VW Core recovered (hatching MS Indicates material) S No core recovery VS Lose recovery VS	and Stren al Soil tely Weathe Weathered ately Weathered Weathered Veak ately Strong trong nely Strong	red red	Defect Ty BS - Bedding PT - Parting JT - Joint SZ - Shear Z SS - Shear S CO - Contact CS - Crushec SM - Seam Coating KL - Clean SN - Stain SN - Stain	pe CO - Shear SU - RF - - one G - urface Z - I Seam CA - KT - - QZ - - X - -	Roughness Sulphides SL - Slickensided Sulphides POL- Polished Gravel RO Rough Sand KR Suphides Sit RO Rough Sit KR Rough Sand VR Very Rough Sit VR Very Rough Calcite Planarity Clay PL Planar ron CU Curved Chlorite UN Undulating Quartz ST Stepped Carbonaceous IR Irregular

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Borehole ID

BH01

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E	ingi	inee	erin	g Log	J - C	ored	d Bo	orehole		Project	No.: F	PSM4252	
	Clier Proj Hole Hole	nt: ect N e Loca e Posi	ame: ation: ition:	Al Mi Re 29	iro Gr amre efer to 5135.	oup Road, Figure 4 m E	Kemp e 1 6254	os Creek 151.5 m N MGA94 Zone 56		Comme Comple Logged Checke	enced: 2 eted: 2 I By: J ed By: A	25/05/2022 25/05/2022 IBL AS	
	Drill Barr	Mode el Ty	el and be an	d Mounti d Lengt	ng: h:	3-tonr NMLC	ne trac 3 m	k mounted Inclination Bearing:	ı: -90°	RL Sur Datum:	face: 82.00 AHD) m Oper	rator: Matrix Drilling
		Dril	ling l	nformat	ion			Rock Si	ıbstance			R	Rock Mass Defects
N 4 - 41 1	Water	TCR (%)	RQD (%)	Samples and Field Tests	RL (m)	Depth (m)	Graphic Log	Material Description Colour, Fabric, Rock Nam Discontinuities, Additiona	e, I	Weathering ∞ ≳ ≩ ≩ ≷ ⊗ ⊮	Strength Is(50) ● - Axial ○ - Diametral 쿄 _ হ म 못 표	Defect Spacing (mm)	Defect Description Type, Inclination, Shape, Roughness, Coating/Infilling, Thickness (Inclination normal to core axis)
019-03-06 Prj; PSM 3.03.0 2019-05-06	1. Observed		92	ls(50) d=0 MPa ls(50) a=0.37 MPa	65.0 66.0			LAMINITE:SANDSTONE (70%) and (30%) SANDSTONE: medium-coarse grair SHALE: dark grey, thinly bedded, sp 2-5mm(<i>continued</i>) Becomes grey at 15.40m	SHALE ned, grey paced				– BP, 30°, CN, UN, RF ¬ BP, 5°, CN, PR, RF ¬ BP, 5°, CN, PR, S ¬ BP, 10°, CN, PR, S – JT, 85°, CN, PR, S – BP, 10°, CL, UN, RF
2 09:57 10.02.00.04 Datgel Fence and Map Tool Lib: PSM 3.02.1 20	NIN		100	ls(50) d=0 a=0.36 MPa ls(50) d=0.52 a=0.47 MPa	– 64.0			SHALE: dark grey, well developed, t bedded	hinly				— ВР, 0°, СN, ST, S
Z PSM4252 (25052022).GPJ < <drawingfile>> 21/07/2022</drawingfile>				ls(50) d=0.4 a=0.41 MPa	63.0								— SM, CL, 3mm ⊐- CZ, RF, 5mm — BP, 0°, CL, PR, S, 3mm
PSM 3.02.2 LIB.GLB Log PSM AU CORE BH N		AS - a AD - a CB - c WB - w WMLC NQ - w HQ - w SPT- s	Metho uger so uger dr law of b vashbor - wire vireline vireline tandarc	od crewing illing olade bit re core (47.6 n core (63.5 n core (85.0 n d penetratio	i1.9 mm) nm) nm) nm) n test)		Water U wel (Date) R flow H artial Loss M somplete Loss U aphic Log/Core Loss W _ Core recovered (hatching indicates material) M _ No core recovery E	Veathering a S - Residua W - Complet W - Moderat W - Noderat W - Slightly \ W - Unweatt V - Very We V - Weak IS - Moderat - Strong - Very Stro S - Very Stro S - Kertreme	and Strength I Soil Veathered Veathered ely Weathered Weathered hered back ely Strong ong ly Strong	Defect Ty, BS - Bedding PT - Parting JT - Joint SZ - Shear Z SS - Shear Z CO - Contact CS - Crushed SM - Seam Coating KL - Clean SN - Stain	pe CO Shear SU RF - one G urface Z I Seam CA I Seam CA I Seam CA KT - QZ - X -	Roughness Coating SL Sickensided Subplides PL- Polished Rock fragments SO Smoth Gravel RO Rough Sand RO Rough Sait VR Very Rough Sitt VR Very Rough Calcite Planarity Icon CU Curved Chlorite UN Undulating Quartz ST Stepped Carbonaceous IR Irregular

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BH01

Page 6 of 6

E	ingi	inee	ering	g Log) - C	ore	d Bo	orehole		Project	No.: F	PSM4252	
	Clie Proj Hole Hole	nt: ect Na e Loca e Posi	ame: ation: tion:	Ali Ma Re 29	ro Greamre amre efer to 5135.	oup Road, Figur 4 m E	Kem e 1 6254	os Creek 151.5 m N MGA94 Zone 56		Comm Comple Logged Checke	enced: 2 eted: 2 d By: J ed By: A	25/05/2022 25/05/2022 IBL AS	
	Drill Barr	Mode el Typ	el anc be an	l Mounti d Lengtl	ng: h:	3-tonr NMLC	ne tra C 3 m	ck mounted Inclination: Bearing:	-90°	RL Sur Datum	face: 82.00 : AHD) m Opei	rator: Matrix Drilling
		Dril	ling l	nformat	ion			Rock Sul	bstance			R	ock Mass Defects
Mathod	Water	TCR (%)	RQD (%)	Samples and Field Tests	RL (m)	Depth (m)	Graphic Log	Material Description Colour, Fabric, Rock Name Discontinuities, Additional	ł,	Weathering ∞ ≳ ₹ ≩ § & £	Strength Is(50) O - Axial O - Diametral ⊟ _ হ म 듯 ᇤ	Defect Spacing (mm)	Defect Description Type, Inclination, Shape, Roughness, Coating/Infiling, Thickness (Inclination normal to core axis)
	Not Observed		100	ls(50) d=0.2 a=0.5 MPa		_		SHALE: dark grey, well developed, th bedded(<i>continued</i>)	inly				
					61.0	- 21		Hole Terminated at 20.60 m					
19-03-06 Prj: PSM 3.03.0 2019-05-06					60.09	- 22 -							
Datgel Fence and Map Tool Lib: PSM 3.02.1 20					59.0	- 23— -							
2022).GPJ < <drawingfile>> 21/07/2022 09:57 10.02.00.04</drawingfile>						- 24 -							
NZ PSM4252 (2505						_							
PSM 3.02.2 LIB.GLB Log PSM AU CORE BH 1		AS - a AD - a CB - c WB - c WB - w NMLC NQ - w HQ - w SPT- s	Metho uger sc uger dr aw of b ashbor - wire ireline o ireline o tandard	od rewing illing blade bit e line core (5 core (47.6 r core (63.5 r core (85.0 r l penetration	1.9 mm) nm) nm) n test)		Water W evel (Date) RS offow HV varial Loss MV complete Loss UV aphic Log/Core Loss VV Core recovered (hatching MS indicates material) S No core recovery VS	eathering a Residual Complet Complet Highly W Slightly V Unweath Vory We Weak Moderat Strong Very Str Extreme	and Strength I Soil ely Weathered /eathered ely Weathered Weathered hered eak ely Strong ly Strong	Defect Ty BS - Bedding PT - Parting JT - Joint SZ - Shear S CO - Contact CS - Crushed SM - Seam Coating KL - Clean SN - Stain VN - Veneer	De CO - Shear SU - RF - Sone G - urface Z - Seam CA - FE - KT - QZ - X -	Roughness Sulphides SL - Slickensided Rock fragments POL- Polished Gravel RO - Rough Sand VR - Rough Slit VR - Very Rough Slit VR - Very Rough Calcite Planarity Clay PL - Planar Iron CU - Curved Chlorite UN - Undulating Quartz ST - Stepped Carbonaceous IR - Irregular

P S N ↓ ≫	JOB NO: PROJECT: LOCATION: DATE:	PSM4252 Mamre Road Kemps Creek 25/05/2022		BH ID: FROM: TO:	BH01 11.8 m 16.0 m	
0.1 12 13 14	0.2 Corin	g Start at 11	0.5 0.6 .8m	0.7	0.8	
VPSM4252\EpolCore.photos\IPSM4252 Core.phot	tos xIsxIBH03 1 1		P S M	PSM4252-00	Aliro Mam Kemp CORE PH (Core Pf 2L Rev 4	o Group re Road os Creek OTOS BH01 noto 1 of 2) Appendix A2

P	SM	JOB NO:	PSM4252	BH ID:	BH01	
		PROJECT:	Mamre Road	FROM:	16.0 m	
		LOCATION:	Kemps Creek	TO:	20.6 m	
		DATE:	25/05/2022			
A DEPARTMENT	0.1	0.2 ,0.	3 0.4 0.5	0.6 0.7	0.8 0.9	1m
16		CARE NO				
				-like		
17	THE ROAD		A. A. S. D. X. X			(Cont
18 1	A BACK					ST.
10			The second second		A CONTRACTOR	
	A DECEMBER OF THE OWNER OF	L IS I SALAR AND A DESCRIPTION OF	A Charles and the second states	and a state of the state of the state	the second s	and the second s
191			President and the local	the the	1.28 50	, W.
201				EDH EDH	20.5m	
201				Ear	Aliro Group	
201				Eor	20.5m Aliro Group Mamre Road Kemps Creek	
201				Eor	23.5m Aliro Group Mamre Road Kemps Creek CORE PHOTOS B⊦	101
201			P S		23.5 Aliro Group Mamre Road Kemps Creek CORE PHOTOS BH (Core Photo 2 of 2	101 2)

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BH02

Eng	Engineering Log - Non Cored Borehole										Project I	No.:		P	SM4	252	
Clie Pro Hol Hol	Client:Aliro GroupProject Name:Mamre Road, Kemps CreekHole Location:Refer to Figure 1Hole Position:295368.8 m E 6253841.6 m N MGA94 Zone 56													07 07 JE AS	7/06/ 7/06/ 3L S	202	2 2
Dril Hol	l Mo e Di	odel iam	ano eter	d Mounting:	5.4 120	-tonn) mm	e track	(mou	nted	Inclination: -90° Bearing:	RL Surfa Datum:	ace:	81 Al-	.00 HD	m	0	perator: JK Drilling
Drilling Information Soil Descrip									tion						Observations		
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description SOIL NAME: Plasticity, behav particle characteristics of pri component, colour, secondary co additional observations	iour or mary mponents,	Moisture Condition	Consistency / Relative Density	Pen	Hand etrom UCS (kPa)	d neter	Structure, Zoning, Origin, Additional Observations
Tool Luk PSM 3.02.1 2019-03-06 Pri P SM 3.030 2019-06-06 AD/V		Z	Not Observed	SPT@0.5m 5,12,13 N=25 SPT@1.5m 6,7,8 N=15		79.0 80.0	- - - - - - - - - - - - - - - - - - -		СН	CLAY: high plasticity, dark brown.		D	VSt St			4 0	0.00: TOPSOIL: grass on surface 0.10: NATURAL 1.00: Clay lumps up to gravel size (easily breakable)
AU NONCORE BH VZ AU PSMA23 (25662023) (541 <<01mm/gFile>> 06077202 17.20 1002 00.04 Darge Fence and May	ининининининининининининининининининин	Z	d r dril r dril	SPT@3.0m, 13.7, HB 25/150mm ling TC bit ling TC bit	Pee	0.82 0.77 	3		W ▷ Infle	SHALE: pale grey, extremely weath highly weathered. ater Samples and bw U - Undisturbed Sa tial Loss D - Disturbed Sar SPT - Standard Pen	<i>Tests</i> ample pple etration Tes	π	H H Moistu D Moistu W		ondii Dry Moist	tion	3.30: V-bit refusal Bedrock 4.50: Thin laminations observed in rock fragments Consistency/Relative Density VS - Very soft F - Firm F - Firm S - Soft
WSd BOT HIS CON BO	Vide - Washbulle Image: Complete Loss Image: Complete Loss St St																

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BH02

E	Engineering Log - Non Cored Borehole								Project N	lo.:		PS	SM4	252			
	Client: Projec Hole L Hole F	t Na .oca Posit	ime: tion: ion:	Aliro G Mamre Refer to 295368	roup Roa o Fig 8.8 n	ad, Ke gure 1 n E 62	emps (25384	Creek 1.6 m	N MG	A94 Zone 56	Commen Complete Logged E Checked	iced: ed: By: By:		07 07 JB AS	7/06/ 7/06/ SL	'202 '202	2 2
	Drill M Hole D	ode Diam	l ano leter	d Mounting:	5.4 120	-tonn) mm	e tracl	< mou	nted	Inclination: -90° Bearing:	RL Surfa Datum:	ce:	81. AH	.00 ID	m	O	perator: JK Drilling
			Drill	ing Informat	ion					Soil Descrip	tion						Observations
N - 411	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description SOIL NAME: Plasticity, behav particle characteristics of pri component, colour, secondary co additional observations	iour or mary mponents,	Moisture Condition	Consistency / Relative Density	Pene	Hand etron UCS (kPa	d neter)	Structure, Zoning, Origin, Additional Observations
		2	Not Observed			72.0 73.0 74.0 75.0				SHALE: pale grey, extremely weath highly weathered. (continued)	nered to					10	
	Method Penetration AD/T - Auger drilling TC bit AD/V - Auger drilling V bit MB - Washbore No resistance SPT - Standard penetration test PT - Push tube AS - Auger Screwing Refusa						t ion stance efusal]	W > Infle ⊲ Par ◀ Cor	Acontinued on cored beampleshame W U - Undisturbed S D - Disturbed S Third Sampleshame D - Disturbed Sam SPT - Standard Pen nplete Loss ES - Environmenta TW - Thin Walled LB - Large Disturbe	Tests ample etration Test Sample Sample ed Sample	M	D D M W	re Co - [- N - V	ondi Dry Aoist Vet	tion	Consistency/Relative Density VS - Very soft S - Soft F - Firm St - Stiff VSt - Very stiff H - Hard VL - Very loose L - Loose MD - Medium dense D - Dense
	.ogged in ac	cordan	ice with	n AS 1726:2017 Geote	echnica	I site inve	estigations	5									VD - Very dense Ce - Cemented C - Compact

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Borehole ID

BH02

Page 3 of 4

E	Engineering Log - Cored Borehole									Project	t No.:	PSM4252			
	Clier Proje Hole Hole	nt: ect Na e Loca e Posi	ame: ation: ition:	Ali Ma Re 29	iro Gre amre l efer to 95368.	oup Road, ł Figure 8 m E (Kemps Creek 1 6253841.6 m N MG/	A94 Zone 56		Comm Comple Logged Checke	enced: eted: d By: ed By:	07/06/2022 07/06/2022 JBL AS			
	Drill Barr	Mode el Tyj	el and pe an	l Mounti d Lengt	ing: h:	5.4-ton NMLC	ne track mounted 3 m	Inclination: Bearing:	-90°	RL Sur Datum	face: 81.0 : AHI	00 m O Operator: JK Drilling			
		Dril	ling l	nformat	tion			Rock Sub	stance			F	Rock Mass Defects		
Mathed	Water	TCR (%)	RQD (%)	Samples and Field Tests	RL (m)	Depth (m)	Do Jo G G Colour, Discor Continued from n	terial Description Fabric, Rock Name, ntinuities, Additional on-cored borehole sl	heet	Weathering [∞] [∞] [∞] [∞] [∞] [∞] [∞] [∞] [∞] [∞]	Strength Is(50) ● - Axial O - Diametral 쿄 _ হ ェ 롯 표	Defect Spacing (mm) ² 00 00 00 00 00 00 00 00 00 00 00 00 00	Defect Description Type, Inclination, Shape, Roughness, Coating/Infilling, Thickness (Inclination normal to core axis)		
3.03.0 2019-05-06			100	Is(60) d=0.05 a=0.24 MPa Is(60) d=0.08 a=0.23 MPa	69.0 70.0	11-10-10-10-10-10-10-10-10-10-10-10-10-1	SHALE: grey, poc SHALE: stal LAMINITE: SHAL SANDSTONE(25 SANDSTONE: fin laminated SHALE: dark grey	E (75%) and %) e grained, pale grey, y, poorly developed	, thinly				- CZ, 10mm - BP, 0°, CL, PR, S, 5mm - BP, 5°, CL, PR, S, 2mm - BP, 0°, CL, UN, S		
57 10.02.00.04 Datgel Fence and Map Tool Lib: PSM 3.02.1 2019-03-06 Prj: PSM NM 10.02.00.04 Datgel Fence	Not Observed		66	Is(50) d=0.11 MPa Is(50) d=0.13 MPa Is(50) d=0.13 MPa Is(50) d=0.13 Is(50) d=0.13 Is(50)					— SM, CL, 30 mm — CZ, PR, RF, 10 mm — BP, 0°, CL, PR, S, 3 mm						
NZ PSM4252(25052022).GPJ < <drawingfile>> 21/07/2022 09:5:</drawingfile>			66	ls(50) d=0.06 a=0.88 MPa	67.0	14]- JT, 85°, CL,UN, PR, S ∩ BP, 0°, CL,UN, PR, S		
PSM 3.02.2 LIB.GLB Log PSM AU CORE BH N	A A V V N N H F S	AS - a AD - a CB - c WB - w VMLC VQ - w HQ - w SPT- s	Metho uger dr law of b vashbor - wire vireline vireline vireline	od rewing illing blade bit e line core (5 core (47.6 core (63.5 core (85.0 r penetratio	51.9 mm mm) mm) mm) n test		Water ✓ Level (Date) > Inflow ✓ Partial Loss ✓ Complete Loss Graphic Log/Core L indicates material) No core recovery	Arr Standard	eathering a - Residua - Complei - Highly V - Moderat - Slightly - Unweatl - Very We - Weak - Woderat - Strong - Very Str - Extreme	and Strength I Soil tely Weathered Veathered ely Weathered Weathered hered back tely Strong ong hy Strong	Defect T BS - Beddin PT - Parting JT - Joint SZ - Shear 3 CO - Contac CS - Crushe SM - Seam Coating KL - Clean SN - Stain VN - Venee	ype CO - g Shear SU - Zone G - Surface S - t CA - d Seam CL - FE - KT QZ - X -	Roughness Sulphides SL Sulphides POL- Rock fragments POL- Gravel RO Sand RO Sitt VR Calcite Planarity Clay PL Iton CU Curved UN Chlorite UN Quartz ST Strepped Carbonaceous IR		

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Borehole ID

BH02

Page 4 of 4

E	ngineering Log - Cored Borehole									Projec	t No.:	PSM4252			
	Clier Proje Hole Hole	nt: ect Na Loca Posi	ame: ation: tion:	Ali Ma Re 29	iro Gr amre efer to 5368	oup Road, Figur .8 m E	Kemp e 1 6253	os Creek 841.6 m N MGA94 Zone 56		Comm Compl Logge Check	enced: eted: d By: ed By:	07/06/2022 07/06/2022 JBL AS			
	Drill Barr	Mode el Tyj	el and be an	d Mounti Id Lengt	ng: h:	5.4-to NMLC	nne tr C 3 m	ack mounted Inclinati Bearing	on: -90° :	RL Su Datum	rface: 81.0 n: AHE	0 m) Ope	rator: JK Drilling		
		Dril	ling l	nformat	ion			Rock	Substance			F	Rock Mass Defects		
Mothod	Water	TCR (%)	RQD (%)	Samples and Field Tests	RL (m)	Depth (m)	Graphic Log	Material Description Colour, Fabric, Rock Na Discontinuities, Additio	n ame, nal	Weathering ଝୁ ≳ୁ ≩ୁ ଛୁ ଛୁ ଝୁ	Strength Is(50) O - Axial O - Diametral 쿄 _ হ т 못 표	Defect Spacing (mm)	Defect Description Type, Inclination, Shape, Roughness, Coating/Infilling, Thickness (Inclination normal to core axis)		
	erved		66	ls(50) d=1.27 a=1.98 MPa		-		LAMINITE: SHALE (75%) and SANDSTONE(25%) SANDSTONE: fine grained, pale g laminated SHALE: dark grey, poorly develop	grey, thinly bed <i>(continued)</i>				— BP, 5°, CN, PR, S — BP, 5°, CN, PR, S		
	Not Obse		96	ls(50) d=1.1 a=2.65 MPa	 65.0	- 16 — - -		LAMINITE: SANDSTONE (60%) a (40%) SANDSTONE: fine grained, pale g laminated	and SHALE				— BP, 0°, CL, PR, S, 2 mm — BP, 0°, CN, PR, S — BP, 15°, CN, ST, S ➡ JT, 60°, CN, ST, S		
PSIM222 (2605202).GPJ <cdrawingfie>> 2/107/2022 09:57 10.02.00.04 Datgel Fenoe and Map Tool Lb: PSM 3.02.1 2019-03-06 Prj: PSM 3.03.0 2019-05-06</cdrawingfie>					62.0 63.0 64.0	- 17 - - - 18 - - - - - - - - - - - - - - - - - -		SHALE: dark grey, poorly develop Hole Terminated at 16.71 m	bed				₽ ₅ UT, 60°, CN, ST, S		
PSM 3.02.2 LIB.GLB Log PSM AU CORE BH NZ	Method Wate AS - auger screwing ∠ Level (D AD - auger drilling ∠ Inflow CB - claw of blade bit ⊃ Partial L WB - washbore ⊃ Partial L NMLC - wireline core (51.9 mm) ⊂ Complet HQ - wireline core (63.5 mm) Graphic PQ - wireline core (85.0 mm) SPT- standard penetration test							Water evel (Date) flow artial Loss omplete Loss aphic Log/Core Loss Core recovered (hatching indicates material) No core recovery	Weathering a RS - Residua CW - Complet HW - Highly W WW - Moderat SW - Slighty 1 UW - Unweatt VW - Very We W - Weak MS - Moderatt S - Strong VS - Very Str S - Strong VS - Very Str S - Extreme	Ind Strength Soil Soil ely Weathered ely Weathered ely Weathered weathered ered eak ely Strong by Strong	Defect 7) BS - Beddin PT - Parting JT - Joint SZ - Shear 2 CO - Contac CS - Crushe SM - Seam Coating KL - Clean SN - Stain VN - Veneel	g Shear CO - g Shear CO - SUF - Zone G - Surface Z - t CA - d Seam CL - FE - KT - QZ - X -	Roughness Coating SL Sickensided Subplides PL- Polished Rock fragments SO Smooth Gravel RO Rough Sand RO Rough Sait VR Very Rough Silt VR Very Rough Calcite Planarity Iron CU Curved Chlorite UN Undulating Quartz ST Stepped Carbonaceous IR Irregular		

D	CM	JOB NO:	PSM4252		BH ID:	BH02	
	3 11	PROJECT:	Mamre Road		FROM:	10.0 m	
		LOCATION:	Kemps Creek		TO:	15.0 m	
	1	DATE:	7/06/2022				
			and the second se	the second			
	0.1	0.2 0.8	0.4 8.5	0.6	0.7 0.8	8	
10	1 A TO		THE REAL PROPERTY OF		and the second sec		
11 500000	The second	- Constant				Ministry and Anna	
12.			and a second			North Party	
B		THE REAL					
	and make land the						
14							
						Aliro	Group Road
						Kompo	
						Kemps	s Creek
				P S M			Creek OTOS BH02

P S M	JOB NO: PROJECT: LOCATION: DATE:	PSM4252 Mamre Road Kemps Creek 7/06/2022		BH ID: BH0 FROM: 15.0 TO: 16.7	12 0 m 71 m
0.1 0.2	.0.3	0.4 0.	5 0.6	0.7 0.8	0.9 0.9 10-7/m
			P S M	N Ka CORE (Core (Core	Aliro Group lamre Road emps Creek PHOTOS BH02 e Photo 2 of 2) 4 Appendix A2

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BH03

Engin	Engineering Log - Non Cored Borehole									roject No.	.:		PSN	14252	2
Client: Projec Hole L Hole F	t Na .ocat Positi	me: ion: on:	Aliro Gr Mamre Refer to 295256	roup Roa o Fig 5.0 m	d, Ke ure 1 i E 62	emps (25406)	Creek 0.0 m	N MG	Co Co Lo A94 Zone 56 Cł	commence completed ogged By: hecked B	ed: : : : : : : :		08/0 08/0 TO AS	6/202 6/202	22 22
Drill M Hole D	odel Diam	ano eter	d Mounting:	5.4- 120	tonn mm	e tracł	(mou	nted	Inclination: -90° RI Bearing: Da	L Surface	e:	74. AH	00 m D	С	perator: JK Drilling
	I	Drill	ing Informati	ion					Soil Description	n					Observations
Method Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description SOIL NAME: Plasticity, behaviour particle characteristics of primary component, colour, secondary compor additional observations	or entropy y pnents, Sol	Condition	Consistency / Relative Density	Ha Penetr U((kF	nd omete CS Pa)	r Structure, Zoning, Origin, Additional Observations
									Silty CLAY: medium to high plasticity, da	lark /N	M	F			0.00: TOPSOIL: grass on surface 0.05: NATURAL
ADN	Z		SPT@0.5m 2,7,14 N=21		1 73.0				CLAY: high plasticity, orange mottled gr brown SHALE: pale grey, extremely weathered highly weathered, inferred very low street	rey and	D '	VSt			0.80: Inferred Bedrock
06 Pri PSM 3 030 2016 06 06		T	SPT@1.5m 11+, refusal		72.0	- - - 2-			SHALE: pale grey, extremely weathered highly weathered, inferred low strength.	ed to					1.70: V-bit refusal
7.20 102.20.04 Dargel Fance and May Tool Libr PSM 3.021 2019-03- AD/T AD/T	Z	Not Observe			71.0				Becomes highly weathered						
H NZ AU PSIM/252 (25052023) GP1 <<0mm/pfile> 06072021 (21					1 70.0	4									
Method Penetration Water Samples and Tests Moisture Condition Consistency/Relative De AD/T - Auger drilling TC bit AD/V - Auger drilling V bit WB - Washbore No resistance Inflow U - Undisturbed Sample D - Dry VS - Very soft SPT - Standard penetration test AS - Auger Screwing No resistance Inflow U - Disturbed Sample M Moisture S - Very soft Method Partial Loss SPT - Standard Penetration Test W W Weter S - Environmental Sample W Weter St - Stiff AS - Auger Screwing Refusal Refusal Refusal Large Disturbed Sample W Weter S - Loose Logged in accordance with AS 1726:2017 Geotechnical site investigations Logged in accordance with AS 1726:2017 Geotechnical site investigations Value S - Compact									Consistency/Relative Density VS Very soft S Soft F Firm St Stiff VS Very stiff H Hard VL Very loose L Loose MD Medium dense D Dense VD Very dense Ce Cemented C Compact						

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BH03

Engineering Log - Non Cored Borehole									Project No.: PSM4252				52							
Client: Aliro Group Project Name: Mamre Road, Kemps Creek										Commenced: Completed:)6/2)6/2	022 022					
	Hole Location:Refer to Figure 1Hole Position:295256.0 m E 6254060.0 m N MGA94 Zone 56												Logged By: TO Checked By: AS							
	Drill Model and Mounting: 5.4-tonne trac Hole Diameter: 120 mm								k mounted Inclination: -90°				RL Surface: 74.00 m			1	Onera	ator: .IK Drill	lina	
	Drilling Information								Soil Descrip				tion				Observations			
	5 Samples								bo-	ation	Material	Description		And Denstrome				er Structure Zoning Origin		
Method	Wethout the second seco					Graphic I	Classifica Symbol	particle charac component, colour, additional	esticity, benavio steristics of prin secondary con l observations	nary mponents, Selection of Condition of Con			UCS (kPa)		Additional C	bning, Origin, bservations				
											Becomes highly weat	thered <i>(continu</i>	ed)			50 20	40 30	20		
				served				-												
AD/T			z	Not Obs				-												
							8.0	6-												
						_	Ö				Continued on cored b	oorehole sheet								
								-												
2019-05-06																				
: PSM 3.03.0	0. 10. 10. 10. 10. 10. 10. 10. 10. 10. 1						67.0	7-												
2019-03-06 Prj	-																			
PSM 3.02.12								-												
Vlap Tool Lib:						-														
I Fence and I							66.0	8-												
2.00.04 Datg								-												
22 17:20 10:0								-												
e>> 06/07/20							0	-												
< <drawingfil< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td>65.</td><td>9</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></drawingfil<>							65.	9												
5052022).GPJ								-												
PSM4252 (2t								-												
RE BH NZ AU			<i>4</i>									Complex '	Toota						Consister (7	alative Damait
AU NONCOF	Image: Note of the state of								rests imple ple tration Test	n.	D M W	- Dr - Mo - W	y Dist et	חמ	VS - Very S - Soft F - Firm	erative Density soft				
SLB Log PSN	SPT - PT - AS -	Sta Pu: Au	anda sh tu ger \$	rd pe ibe Screv	netration test ving		R	efusal		- 00	TW - LB - I	Environmental Thin Walled Large Disturbe	Sample d Sample						VSt - Very H - Haro VL - Very L - Loos	y stiff d v loose se
M 3.02.2 LIB.0																			MD - Med D - Den VD - Very Ce - Cerr	ium dense se v dense nented
τ <u>ι</u> ια	Logged in accordance with AS 1726:2017 Geotechnical site investigations C - Compact																			

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BH03

Page 3 of 4

Engineering Log - Cored Borehole										Project	No.:	PSM4252			
	Client:Aliro GroupProject Name:Mamre Road, Kemps CreekHole Location:Refer to Figure 1Hole Position:295256.0 m E 6254060.0 m N MGA94 Zone 56										enced: eted: I By: ed By:	08/06/2022 08/06/2022 TO AS			
	Drill Barr	Mode el Ty	el and be an	d Mount Id Lengt	ing: :h:	5.4-to NMLC	nne track mou 3 m	nted Inclinati Bearing	ion: -90° J:	RL Sur Datum	face: 74.0 AHI	00 m D Operator: JK Drilling			
		Dril	ling l	nforma	tion			Rock	Substance			R	Rock Mass Defects		
Mathead	Water	TCR (%)	RQD (%)	Samples and Field Tests	RL (m)	Depth (m)	Graphic Log	Material Descriptior Colour, Fabric, Rock Na Discontinuities, Additio	n ame, onal	Weathering ≌ ≳ ₹ ≹ § S ⊞	Strength Is(50) O - Axial O - Diametral ⊟ _ ⊇ ऱ ऱ 듯 ᇤ	Defect Spacing (mm) ² ₂ 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Defect Description Type, Inclination, Shape, Roughness, Coating/Infilling, Thickness (Inclination normal to core axis)		
					68.0		Continued	from non-cored boreho	ole sheet						
Datgel Fence and Map Tool Lib: PSM 3.02.1 2019-03-06 Pr]: PSM 3.03.0 2019-05-06 NUMI ←	Not Observed		66	is(50) d=0.35 a=0.36 MPa is(50) d=0.25 a=0.18 MPa	66.0 67.0	7	CLAY ZO SHALE: c staining tr Becomes Becomes SHALE: g developed	NE lark grey and pale grey, nroughout. pale grey and poorly de dark grey and massive rey, indistinctly cross-be d, iron staining througho	massive, iron eveloped edded, poorly but.				- CZ - BP, 0°, CL & Sand, PR, RF - BP, 10°, CL & Sand, PR, RF - BP, 0°, CL & FE, PR, S - CZ - CZ - SM, CL - BP, 30°, FE, UN, S - BP, 0°, FE, ST, S		
PSM4252 (25052022).GPJ < <drawingfile>> 21/07/2022 09:57 10.02.00.</drawingfile>			100	Is(50) d=0.21 a=0.19 MPa Is(50) d=0.03 a=0.16 MPa	65.0	9							_JT, 80°, FE, PR, S _JJT, 70°, FE, PR, S _JT, 45°, FE, PR, S		
PSM 3.02.2 LIB.GLB Log PSM AU CORE BH NZ		AS - a AD - a CB - c WB - w MMLC VQ - w HQ - w HQ - w PQ - w SPT- s	Metho uger so uger dr law of k vashbor - wire vireline tireline tandarc	Dod prewing illing blade bit re eline core (5 core (47.6 core (63.5 core (85.0 d penetration	51.9 mm mm) mm) mm) on test)	Water Water Water Variation National Stress Water Wate	s / Core Loss vered (hatching material) ecovery	Weathering a RS - Residua CW - Complet HW - Highly M MW Moderat SW - Slighty J UW - Unweat WW - Very We W - Very We MS - Moderat S - Strong VS - Very Str ES - Extreme	I LZA I I and Strength I Soil lely Weathered Veathered ely Weathered weathered ered eak ely Strong ong ly Strong	Itel Defect T BS Beddir PT Parting JT Joint SZ Shear CO Contac CS Crushe SM Seam CAting KL KL Clean SN Stain SN Venee	ype g Shear SU - g Shear SU - Surface S - Surface S - Surface Z - t CA - FE - KT - CA - FE - KT - ZONE Z - KT -	Coating SL - Slickensided POL Polished Rock fragments Gravel RO - Rough Sand VR - Very Rough Silt VR - Very Rough Calcite Planarity Clay PL - Planar Iron CU - Curved Chlorite UN - Undulating Quartz ST - Stepped Carbonaceous IR - Irregular		
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Borehole ID

BH03

Page 4 of 4

Ε	Engineering Log - Cored Borehole						orehole	Project	Project No.: PSM4252				
	Client:Aliro GroupProject Name:Mamre Road, Kemps CreekHole Location:Refer to Figure 1Hole Position:295256.0 m E 6254060.0 m N MGA94 Zone 56									Comme Comple Logged Checke	enced: C eted: C I By: T ed By: A	08/06/2022 08/06/2022 TO AS	
	Drill Barr	Mode el Tyj	el and pe an	d Mounti d Lengt	ng: h:	5.4-to NMLC	nne tr C 3 m	rack mounted Inclinatio Bearing:	n: -90°	RL Sur Datum:	face: 74.00 AHD) m Oper	rator: JK Drilling
		Dril	ling l	nformat	tion			Rock S	ubstance			R	ock Mass Defects
Method	Water	TCR (%)	RQD (%)	Samples and Field Tests	RL (m)	Depth (m)	Graphic Log	Material Description Colour, Fabric, Rock Nar Discontinuities, Addition	ne, al	Weathering % ଛୁ ଛୁ ଛୁ ଛୁ ଝୁ	Strength Is(50) ● - Axial ○ - Diametral 쿄 _ হ ∓ 듯 ᇤ	Defect Spacing (mm)	Defect Description Type, Inclination, Shape, Roughness, Coating/Infilling, Thickness (Inclination normal to core axis)
06 NML C	Not Observed		100	Is(50) d=0.19 a=0.22 MPa Is(50) d=0.38 a=0.49 MPa	63.0	- - - - - - - - -		LAMINITE: pale grey and dark grey laminated, developed, Laminite; Sf Sandstone (20%), sandstone is find Becomes Shale (60%), Sandstone sandstone is fine grained, indistinct developed	7, thinly nale (80%), e grained. (40%), t laminations,				BP, 0°, FE, PR, S BP, 0°, CN, PR, S BP, 10°, FE, PR, S BP, 5°, CL & RF, PR, RF
Tool Lib: PSM 3.02.1 2019-03-06 Prj: PSM 3.03.0 2019-05			100	ls(50) d=0.46 a=1.79 MPa	.0 62.0	12		SHALE: dark grey & pale grey, thin developed.	ly laminated,				— BP, 0°, CL, PR, RF — BP, 0°, CN, PR, RF — BP, 0°, CL, PR, RF
B Log PSM AU CORE BH NZ PSM4252 (2565202).GPJ < <drawingfile>> 21/07/2022 08:57 10.02.00.04 Dagel Fence and Map Distribution of the provided /drawingfile>		AS - a AD - a CB - c VB - w VQ - w	Metho uger scalaw of the ashbor riveline of the indices	od rewing illing olade bit e core (47.6 core (47.6	0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0			Hole Terminated at 13.00 m Water evel (Date) nflow 'artial Loss complete Loss aphic Loss	Weathering a RS - Residua CW - Complet HW - Highly W W - Moderat SW - Slightly 1 UW - Very We	I I I I I I	I I I I I I I I I I	I I I I	Coating Sulphides Rock fragments Sand Sit Calcite Black Sand Sand Sand Sand Sand Sand Sand Sand
PSM 3.02.2 LIB.GI	NQ - wireline core (47.6 mm) HQ - wireline core (63.5 mm) PQ - wireline core (63.5 mm) SPT- standard penetration test SPT- standard penetration test					W - Weak MS - Moderat S - Strong VS - Very Str ES - Extreme	ely Strong ong ly Strong	SM - Seam Coating KL - Clean SN - Stain VN - Veneer	CL - (FE - 1 KT - (QZ - (X - (Clay PL - Filanar Iron CU - Curved Chlorite UN - Undulating Quartz ST - Stepped Carbonaceous IR - Irregular			

D	C	M	JOB NO:	PSM4252		BH ID:	BH03	
	3		PROJECT:	Mamre Road		FROM:	6.2 m	
		\approx	LOCATION:	Kemps Creek		TO:	11.0 m	
			DATE:	8/06/2022				
	9.1	0.2	0.3	0.4 0.5	0.6	0.7 - 0	.8 0	.9 1.m
				A Carlot Carlot Carlot				
START	CORING	AT 6.20.		TOUR LE				
-Bri	-	an sh	- Constant	- 4- 11	TING ANT			
e Fra	347	980a	K			1-1-1	1.12	TRACE I
			A Contractor				and the second s	
m					CALL AND	the seal		and the
miller				A MALLAN				The Landson
							Aliro Mam	re Road
							Kemp	os Creek
					P S M			IOTOS BH03
								noto 1 of 2)
12E2)EnglCore = t-t-		o photoo vl-vir				PSIVI4252-0	UZL REV 4	

P S M ↓ ∷ ∭	JOB NO: PROJECT: LOCATION: DATE:	PSM4252 Mamre Road Kemps Creek 8/06/2022		BH ID: FROM: TO:	BH03 11.0 m 13.0 m		
0.1 0.2 1 m 12 m End of Hole	0.3	0.4 0.4	5 0.6	0.7	0.8	0.9	
N/PCM/252/Epg/Cora photos/IPSM/252 (Cora photos view)			P S M	PSM4252-0	Aliro Mam Kemp CORE PH (Core Ph (Core A	o Group re Road os Creek OTOS BH03 noto 2 of 2) Appendix <i>A</i>	^2

Appendix B Point Load Test Results

- B1: 2020 Site Investigation
- B2: 2022 Site Investigation

B1 – 2020 Site Investigation



APPENDIX B - POINT LOAD STRENGTH INDEX TEST RESULTS

Job No. PSM4252 Sheet of 1 Project Mamre Road, Kemps Creek Sampling Date 22 - 23/10/2020 AS 4133.4.1 - 1993 Methods of Testing Rocks for Engineering Sampling Technique Test Method HQ3 Purposes, Determination of Point Load Strength Index Storage History Testing Date 22 - 23/10/2020 In Field DT Test Machine HMA 6510 Tested Bv **Moisture Condition** Natural Calibration Date 16/08/2018. 28/08/2020 Loading Rate < 30 seconds AS 1726 **Diametral Tests** Axial, Block, and Irregular Lump Tests Depth Rock Type Location Ρ W Strength D Ρ D L L I, $I_{s(50)}$ I_{s(50)} Failure Mode Failure Mode (kN) (MPa) (kN) (MPa) (MPa) Class (mm)(mm)(mm) (m) (mm) (mm)3.2 Sandstone CH01 3.94 50 62 1.28 Parallel to bedding 50 24 2.9 1.9 1.7 Through substance Н 20 VL Sandstone **CH01** 50 67 1.8 Parallel to bedding 50 0 Along defect 4.34 0.71 0 0.01 Sandstone **CH01** 5.37 50 67 1.9 Parallel to bedding 50 39 1.9 0.7 0.75 Through substance М 0.75 Sandstone **CH01** 6.51 50 48 2.6 Parallel to bedding 50 21 Through substance Н 1.02 1.7 1.3 1.13 Through substance 0.8 Shale **CH01** 7.23 50 66 0.3 0.12 Parallel to bedding 50 32 0.4 0.35 VL/L Along defect Shale 58 0.2 30 CH01 8.33 50 0.08 Parallel to bedding 50 0.1 0 0.04 L Along defect VL Shale **CH01** 9.50 50 57 0 Alona defect 50 35 0.2 0.1 0.08 0.01 Shale **CH01** 10.75 50 57 0.2 Along defect 50 31 0.4 0.2 Through substance VL/L 0.07 0.18 **CH02** 38 L/M Shale 7.68 50 74 4 Parallel to bedding 50 3.5 1.4 1.43 Through substance 1.6 33 Shale **CH02** 8.55 50 69 0.4 0.15 Parallel to bedding 50 1.1 0.5 0.49 Through substance L/MThrough substance CH02 50 26 Shale 9.58 50 48 0 Along defect 0.7 0.4 М 0.01 0.36 Through substance **CH02** 10.00 50 70 0.1 Alona defect 50 39 1.8 0.7 VL/H Shale 0.05 0.72 Through substance Shale CH03 5.86 50 74 0.1 Along defect 50 39 0.5 0.2 0.22 VL/L 0.04 Alona defect VL/L Shale **CH03** 6.17 50 52 0.7 0.27 Parallel to bedding 50 36 0.1 0.1 0.06 Shale CH03 7.41 50 63 0.6 0.25 Parallel to bedding 50 30 0.7 0.4 0.34 Through substance L/MShale CH03 8.74 50 72 0.2 0.06 Along defect 50 40 0.5 0.2 0.19 Through substance VL/L Shale **CH03** 9.71 50 70 1.2 0.46 Parallel to bedding 50 46 1.4 0.5 0.48 Through substance М Shale **CH03** 10.13 50 71 4.7 1.86 Parallel to bedding 50 44 7.5 2.7 2.76 Through substance Н DT 22 - 23/10/2020 Checked: AS Date: By:

PSM

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B2 – 2022 Site Investigation

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APPENDIX B - POINT LOAD STRENGTH INDEX TEST RESULTS

Job No. PSM4252

Sheet 1 of 1

Project	Mamre Ro	oad, Kemp	s Creek	Kemps	Creek	- Addi	itional G	eotechnical Investig	ation						
Test Method	AS 4133.4.1	1 - 1993 Me	ethods of T	esting F	Rocks for	Engine	ering	Sampling Technique	HQ3					Sampling Date 25/05/202	22 - 08/06/2022
	Purposes, D	Determinatio	on of Point	Load St	rength Ir	ndex	•	Storage History	In Field	1				Testing Date 25/05/202	22 - 08/06/2022
Test Machine	HMA 6510							Moisture Condition	Natura	1				Tested By TO & J	IBL
Calibration Date	e 16/08/2018.	28/08/2020)					Loading Rate	< 30 se	econds				5	
Durit			Diametral Tests		Axial Block and Irregular Lur			np Tests	AS 1726						
Rock 1	Гуре	Location	Depth	D		Р	o(50)		W	D	P				Strength
			(m)	(mm)	(mm)	(kN)	(MPa)	Failure Mode	(mm)	(mm)	(kN)	(MPa)	(MPa)	Failure Mode	Class
Shale		BH01	11.80	50	35	0.2	0.08	Parallel to bedding	50	48	1.5	0.5	0.5	Through substance	VL/M
Shale		BH01	12.58	50	40	0.2	0.09	Parallel to bedding	50	40	0.7	0.3	0.27	Through substance	VL
Shale		BH01	13.15	50	40	0.1	0.04	Parallel to bedding	50	40	0.2	0.1	0.08	Through substance	VL
Laminite		BH01	14.76	50	50	0.5	0.18	Parallel to bedding	50	47	0.7	0.2	0.25	Through substance	VL
Laminite		BH01	15.78	50	40	0	0	Parallel to bedding	50	46				Bad break	
Laminite		BH01	16.00	50	45			Bad break	50	40	0.9	0.4	0.37	Through substance	VL
Shale		BH01	17.60	50	55	0	0	Parallel to bedding	50	45	1	0.3	0.36	Through substance	М
Shale		BH01	18.00	50	60	1.3	0.52	Parallel to bedding	50	48	1.4	0.4	0.47	Through substance	М
Shale		BH01	19.28	50	60	1	0.4	Parallel to bedding	50	40	1	0.4	0.41	Through substance	М
Shale		BH01	20.33	50	45	0.5	0.2	Parallel to bedding	50	45	1.4	0.5	0.5	Through substance	L/M
Shale		BH02	10.46	50	50	0.1	0.05	Parallel to bedding	50	45	0.7	0.2	0.24	Through substance	VL/L
Laminite		BH02	11.82	50	55	0.2	0.08	Parallel to bedding	50	45	0.7	0.2	0.23	Through substance	VL/L
Laminite		BH02	12.28	50	45	0.3	0.11	Parallel to bedding	50	45				Bad break	L
Laminite		BH02	13.28	50	50	0.3	0.1	Parallel to bedding	50	45	0.9	0.3	0.33	Through substance	L/M
Laminite		BH02	14.35	50	65	0.2	0.06	Parallel to bedding	50	40	2.2	0.9	0.88	Through substance	VL/M
Laminite		BH02	15.22	50	55	3.2	1.27	Parallel to bedding	50	45	5.5	1.9	1.98	Through substance	H
Laminite		BH02	16.46	50	45	2.7	1.1	Parallel to bedding	50	40	6.7	2.6	2.65	Through substance	H
Shale		BH03	6.92	50	40	0.9	0.35	Parallel to bedding	50	45	1	0.3	0.36	Through substance	М
Shale		BH03	7.22	50	55	0.6	0.25	Parallel to bedding	50	45	0.5	0.2	0.18	Through substance	L
Shale		BH03	8.75	50	55	0.5	0.21	Parallel to bedding	50	45	0.5	0.2	0.19	Through substance	L
Shale		BH03	9.34	50	40	0.1	0.03	Parallel to bedding	50	35	0.4	0.2	0.16	Through substance	VL/L
Shale		BH03	10.56	50	45	0.5	0.19	Parallel to bedding	50	40	0.6	0.2	0.22	Through substance	L
Shale		BH03	11.32	50	45	1	0.38	Parallel to bedding	50	40	1.2	0.5	0.49	Through substance	М
Shale		BH03	12.00	50	50	1.1	0.46	Parallel to bedding	50	30	3.6	1.9	1.79	Through substance	M/H
By:	TO & JBL			Check	(ed:		AS							Date: 08/06/2	2022

PSM

Appendix C CPT Results



Job No.	PSM4252			Test No.	CPT01
Project	Mamre Road, Kemps Cree	ek		Page	1 of 1
Pushing rig Location Surface R.L.	24-tonne truck 294761 m E, 6254077 m N 47.2 m	Test date Cone I.D. Field work	22/10/2020 S15CFIIP.S09162 JK Drilling		
Co 0 1 1 2 3 4 5 6 6 7 7 8	Dime Resistance, q _c (MPa)	Friction Ratio (%)	Pore Pressure (kPa)	Gravelly Sand 1 Very Stiff, fine 3 Very Stiff, fine 3	rred Soil Type



Job No.	PSM4252	Test No.	CPT02
Project	Mamre Road, Kemps Creek	Page	1 of 1
Pushing rig Location	24-tonne truck 294873 m E, 6253786 m N 43 8 m	Test date Cone I.D. Field work	22/10/2020 S15CFIIP.S09162 JK Drilling
C	one Resistance, q. (MPa) Friction Ratio (%) Pore Pressure (kPa) Infe	rred Soil Type
Surface R.L. C 0 10 1 1 2 3 4 5 6 7	A 3.8 m Dire Resistance, q _c (MPa) Friction Ratio (%) Pore Pressure (kPa 0 20 30 40 50 0 5 10 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Field work Infe Gravelly Sand Very Stiff, fine Silt Mixtures - C Clays - Clay to Silt Mixtures - C Very Stiff, fine Clays - Clay to Very Stiff, fine	JK Drilling rred Soil Type to Sand grained
8 4 4			



Job No.	PSM4252	Test No.	CPT03
Project	Mamre Road, Kemps Creek	Page	1 of 1
Pushing rig Location	24-tonne truck 295093 m E, 6253872 m N 51 7 m	Test date Cone I.D. Field work	22/10/2020 S15CFIIP.S09162 JK Drilling
Surface R.L. C	51.7 m one Resistance, q _c (MPa) Friction Ratio (%) Pore Pressure (KPa 0 20 30 40 50 0 5 10 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Field work a) Infe Gravelly Sand Very Stiff, fine 3 Very Stiff, fine 3 Very Stiff, fine 3 Clays - Clay to Very Stiff, fine 3 Clays - Clay to Very Stiff, fine 3 Clays - Clay to Very Stiff Sand Very Stiff Sand Very Stiff Sand	JK Drilling rred Soil Type to Sand grained Silty Clay To Clayey Sand Silty Clay To Clayey Sand To Clayey Sand To Clayey Sand
8 1 0.0 1.0] [



Job No.	PSM4252			Test No.	CPT04
Project	Mamre Road, Kemps Cre	Page	1 of 1		
Pushing rig Location Surface R.L.	24-tonne truck 295507 m E, 6253781 m N 67.6 m			Test date Cone I.D. Field work	22/10/2020 S15CFIIP.S09162 JK Drilling
С	one Resistance, q _c (MPa)	Friction Ratio (%)	Pore Pressure (kPa)	Infe	rred Soil Type
Euclation Surface R.L. 0 1 1 2 3 4 5 5 6 6	67.6 m one Resistance, q _c (MPa) 0 20 30 40 50	Friction Ratio (%)	Pore Pressure (kPa)	Field work Infer Gravelly Sand I Very Stiff Sand Very Stiff, fine G Clays - Clay to Very Stiff, fine G Very Stiff, fine G	JK Drilling JK Drilling rred Soil Type to Sand To Clayey Sand grained Silty Clay To Clayey Sand Silty Clay To Clayey Sand Silty Clay To Clayey Sand To Clayey Sand To Clayey Sand To Clayey Sand To Clayey Sand
8 0.0 1.	0 2.0 3.0 4.0 5.0			L	



Job No.	PSM4252	Test No.	CPT05
Project	Mamre Road, Kemps Creek	Page	1 of 1
Job No. Project Pushing rig Location Surface R.L. 0 10 0 10 0 10 1 1 1 1 2 1 1	PSM4252 Mamre Road, Kemps Creek 24-tonne truck 295727 m E, 6254083 m N 38.8 m 58.8 m one Resistance, q _c (MPa) 0 20 30 40 50 0 5 10 0 0 0 0 5 10 0	Test No. Page Test date Cone I.D. Field work Page Page Cone I.D. Field work Page Page Page Cone I.D. Field work Page Page P	CPT05 1 of 1 22/10/2020 S15CFIIP.S09162 JK Drilling rred Soil Type Silty Clay to Clayey Sand To Clayey Sand To Clayey Sand grained To Clayey Sand Silty Clay Silty Clay Silty Clay
Dpeth (m)		Sīlt Mixtures - C Very Stiff, fine o Clays - Clay to Very Stiff, fine o	Itayey Silt to Silty Clay
8 4 4	0 2.0 3.0 4.0 5.0		



Job No.	PSM4252			Test No.	CPT06
Project	Mamre Road, Kemps Cre	Page	1 of 1		
Pushing rig Location Surface R.L.	24-tonne truck 295500 m E, 6254092 m N 57.7 m			Test date Cone I.D. Field work	22/10/2020 S15CFIIP.S09162 JK Drilling
	Cone Resistance, q _c (MPa)	Friction Ratio (%)	Pore Pressure (kPa)	Very Stiff, fine Very Stiff, fine	grained
0.0	1.0 2.0 3.0 4.0 5.0				

Appendix D Laboratory Testing Results
 115 Wicks Road

 Macquarie Park, NSW 2113

 PO Box 976

 North Ryde, Bc 1670

 Telephone:
 02 9888 5000

 Facsimile:
 02 9888 5001



FOUR DAY SOAKED CALIFORNIA BEARING RATIO TEST REPORT

Client: Pells Sullivan Meynink PSM Job No.: PSM4252		Ref No: Report: Report Date: Page 1 of 1	L4509E 1 3/11/2020
SAMPLE NUMBER	CBR01 AH04	CBR02 CH03	CBR03 ALIO2
DEPTH (m)	0.50 - 1.00	0.50 - 1.00	0.50 - 1.00
Surcharge (kg)	4.5	4.5	4.5
Maximum Dry Density (t/m³)	1.64 STD	1.63 STD	
Optimum Moisture Content (%)	20.5	22.1	21.1
Moulded Dry Density (t/m ³)	1.61	1 59	21.1
Sample Density Ratio (%)	99	98	08
Sample Moisture Ratio (%)	99	102	90
Moisture Contents		102	33
Insitu (%)	21.4	21.7	17.6
Moulded (%)	20.3	22.6	20.8
After soaking and			20.0
After Test, Top 30mm(%)	32.0	38.4	40.3
Remaining Depth (%)	24.9	26.7	28.0
Swell (%)	0	0	0
Swell (%)	2.5	3.5	5.5
C.B.R. value: @2.5mm penetration	2.5	2.0	1.5

NOTES: Sampled and supplied by client. Samples tested as received.

Refer to appropriate notes for soil descriptions

• Test Methods : AS 1289 6.1.1, 5.1.1 & 2.1.1.



Accredited for compliance with ISO/IEC 17025 - Testing. This document shall not be reproduced except In full without approval of the laboratory. Results relate only to the items tested or sampled.

1 3/11/20

Authorised Signature / Date (T. Pfinnegan)

All services provided by STS are subject to our standard terms and conditions. A copy is available on request.



CERTIFICATE OF ANALYSIS

Work Order	ES2037509	Page	: 1 of 4
Amendment	:1		
Client	: PELLS SULLIVAN MEYNINK T/A PSM Admin PTY LTD	Laboratory	Environmental Division Sydney
Contact	: DANIEL TAN	Contact	: Customer Services ES
Address	: G3, 56 DELHI ROAD	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
	NORTH RYDE NSW, AUSTRALIA 2113		
Telephone	:	Telephone	: +61-2-8784 8555
Project	: PSM4252	Date Samples Received	: 26-Oct-2020 13:30
Order number	:	Date Analysis Commenced	: 29-Oct-2020
C-O-C number	:	Issue Date	: 06-Nov-2020 11:28
Sampler	: Daniel Tan		Hac-MRA NAIA
Site	:		
Quote number	: EN/333		Approximation No. 835
No. of samples received	: 6		Accredited for compliance with
No. of samples analysed	: 6		ISO/IEC 17025 - Testing

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

Signatories

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

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Dian Dao	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, Smithfield, NSW



General Comments

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

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

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

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

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

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

Key: CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

 \emptyset = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- ALS is not NATA accredited for the analysis of Exchangeable Cations on Alkaline Soils when performed under ALS Method ED006.
- Amendment (06/11/2020): This report has been amended and re-released to allow the reporting of additional analytical data.
- ED007 and ED008: When Exchangeable AI is reported from these methods, it should be noted that Rayment & Lyons (2011) suggests Exchange Acidity by 1M KCI Method 15G1 (ED005) is a more suitable method for the determination of exchange acidity (H+ + AI3+).



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)		Cli	ent sample ID	CH01	CH02	CH03	AH06	AH04
	Ci	lient sampli	ing date / time	22-Oct-2020 00:00	22-Oct-2020 00:00	23-Oct-2020 00:00	23-Oct-2020 00:00	23-Oct-2020 00:00
Compound	CAS Number	LOR	Unit	ES2037509-001	ES2037509-002	ES2037509-003	ES2037509-004	ES2037509-005
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value		0.1	pH Unit	8.4	8.9	7.7	5.8	5.1
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C		1	µS/cm	139	400	110	99	345
EA055: Moisture Content (Dried @ 105-11	0°C)							
Moisture Content		1.0	%	9.1	14.7	15.7	13.7	19.3
EA080: Resistivity								
Resistivity at 25°C		1	ohm cm	7190	2500	9090	10100	2900
ED006: Exchangeable Cations on Alkaline	e Soils							
Exchangeable Calcium		0.2	meq/100g	17.0	9.7	10.6		
Exchangeable Magnesium		0.2	meq/100g	3.2	8.0	8.1		
Exchangeable Potassium		0.2	meq/100g	<0.2	<0.2	<0.2		
Exchangeable Sodium		0.2	meq/100g	0.6	3.7	2.6		
Cation Exchange Capacity		0.2	meq/100g	20.9	21.3	21.4		
Exchangeable Sodium Percent		0.2	%	3.1	17.2	12.2		
ED007: Exchangeable Cations								
Exchangeable Calcium		0.1	meq/100g				3.7	
Exchangeable Magnesium		0.1	meq/100g				7.4	
Exchangeable Potassium		0.1	meq/100g				0.2	
Exchangeable Sodium		0.1	meq/100g				1.9	
Cation Exchange Capacity		0.1	meq/100g				15.6	
Exchangeable Sodium Percent		0.1	%				14.2	
ED008: Exchangeable Cations								
Exchangeable Calcium		0.1	meq/100g					0.7
Exchangeable Magnesium		0.1	meq/100g					9.1
Exchangeable Potassium		0.1	meq/100g					0.2
Exchangeable Sodium		0.1	meq/100g					2.3
Cation Exchange Capacity		0.1	meq/100g					12.4
Exchangeable Sodium Percent		0.1	%					18.8
ED040S : Soluble Sulfate by ICPAES								
Sulfate as SO4 2-	14808-79-8	10	mg/kg	10	90	10	90	190
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	10	mg/kg	<10	280	120	50	390



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	AH02				
Client sampling date / time				23-Oct-2020 00:00				
Compound	CAS Number	LOR	Unit	ES2037509-006				
				Result				
EA002: pH 1:5 (Soils)								
pH Value		0.1	pH Unit	6.5				
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C		1	µS/cm	78				
EA055: Moisture Content (Dried @ 105-1	10°C)							
Moisture Content		1.0	%	16.1				
EA080: Resistivity								
Resistivity at 25°C		1	ohm cm	12800				
ED007: Exchangeable Cations								
Exchangeable Calcium		0.1	meq/100g	<0.1				
Exchangeable Magnesium		0.1	meq/100g	<0.1				
Exchangeable Potassium		0.1	meq/100g	<0.1				
Exchangeable Sodium		0.1	meq/100g	<0.1				
Cation Exchange Capacity		0.1	meq/100g	<0.1				
Exchangeable Sodium Percent		0.1	%	<0.1				
ED040S : Soluble Sulfate by ICPAES								
Sulfate as SO4 2-	14808-79-8	10	mg/kg	10				
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	10	mg/kg	90				

Appendix E PSM4252-003S Rev 1 - Bulk Earthworks Specification

Mamre Road, Kemps Creek

Bulk Earthworks Specification Filling, Cutting and Testing

PSM4252-003S Rev1

22 July 2022

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1. Scope

This specification details the requirements for the bulk earthworks to be undertaken at Mamre Road, Kemps Creek. The area where this specification is applicable is shown in Figure 1. This includes areas where material is filled to bulk earthworks level (BEL) within the site.

Fill placed in accordance with this specification is denoted as Engineered Fill.

This specification does not address any environmental, contamination or erosion issues with respect to the fill material.

There is a HOLD POINT on placing fill in Section 2.4 of this specification.

2. Filling Works

2.1 Subgrade Preparation

The condition of the subgrade should be assessed immediately prior to the commencement of filling.

All Engineered Fill is to be placed on one of the following materials:

- 1. Bedrock.
- 2. Natural insitu material of at least stiff consistency.
- 3. Engineered compacted fill placed in accordance with this or other approved specifications for which the Geotechnical Inspection and Testing Authority (GITA) has a Level 1 certificate certifying compliance with that approved specification AND of at least stiff consistency.
- 4. Existing fill and other materials as approved by PSM.

Proof rolling shall only be undertaken under the direction of PSM. PSM may also direct a bridging layer of Engineered Fill be placed and compacted to a Dry or Hilf Density Ratio (Standard Compaction) of between 95% and 102%. Any such layer shall be a Lot under Clause 5.3.

The GITA should satisfy itself that the subgrade has not been desiccated, affected by rain or disturbed. If the GITA cannot so satisfy itself, then the subgrade should be moisture conditioned and compacted to be in accordance with Clauses 2.5 and 2.6 of this specification.

Engineered Fill shall be placed only on subgrade approved by the GITA as being in accordance with this specification.

2.2 Base Geometry and Permanent Batters

The slope of any buried batter shall be less than 2H:1V unless otherwise directed by PSM.

The contractor shall remove or flatten any geometrical obstructions (e.g. protrusions or holes) such that subsequent Engineered Fill can be placed to achieve the requirements of this specification.

Engineered Fill shall be placed only on areas where the base geometry has been approved by the GITA.

Permanent batters in fill shall be built by overfilling then cut back to the final slopes as shown in the bulk earthworks drawings, e.g. 2H:1V, or other method as approved by PSM.

2.3 Material

2.3.1 Imported Fill

Imported Engineered Fill is to conform to one of the following definitions:

1. "Virgin excavated natural material" (**VENM**) as defined by the Protection of the Environment Operations Act 1997 No 156, Schedule 1, on Page 209:

"Virgin excavated natural material (e.g. clay, gravel, sand, soil and rock) that is not mixed with any other waste and that:



- a. has been excavated from areas that are not contaminated, as a result of industrial, commercial, mining or agricultural activities, with manufactured chemicals and that does not contain sulphide ores or soils, or.
- b. consists of excavated natural materials that meet such criteria as may be approved by the EPA".
- 2. "Excavated natural material" (**ENM**) as defined under Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014:

"Excavated natural material is naturally occurring rock and soil (including but not limited to materials such as sandstone, shale, clay and soil) that has:

- a. been excavated from the ground, and
- b. contains at least 98% (by weight) natural material, and
- c. does not meet the definition of Virgin Excavated Natural Material in the Act.

Excavated Natural Material does not include material that has been located in a hotspot; that has been processed; or that contains asbestos, Acid Sulphate Soils (ASS), Potential Acid Sulphate soils (PASS) or sulfidic ores."

2.3.2 Site Won Material

Site won material shall comprise material won from excavations on site including natural and existing fill. Material needs to satisfy Clause 2.3.3.

2.3.3 All Fill

The Engineered Fill shall be approved by the GITA as suitable for use in a structural fill.

Engineered Fill shall not comprise unsuitable material as defined by Clause 4.3 of AS3798-2007 "Guidelines on earthworks for commercial and residential developments" as:

- a. "organic soils, such as many topsoils, severely root-affected subsoils and peat.
- b. materials contaminated through past site usage which may contain toxic substances or soluble compounds harmful to water supply or agriculture.
- c. materials containing substances which can be dissolved or leached out in the presence of moisture (e.g.: gypsum), or which undergo volume change or loss of strength when disturbed and exposed to moisture (e.g.: some shales and sandstones), unless these matters are specifically addressed in the design.
- d. silts, or materials that have the deleterious engineering properties of silt.
- e. other materials with properties that are unsuitable for the forming of structural fill; and.
- f. fill that contains wood, metal, plastic, boulders or other deleterious material, in sufficient proportions to affect the required performance of the fill."

The GITA shall assess that the proportion of deleterious material in each Lot is not greater than 1% by weight. Deleterious material is defined by Table 3015.3 of the RTA QA Specification 3051 (Edition 5 June 1998) as:

"Type III: Rubber, Plastic, Bitumen, Paper, Cloth, Paint, Wood and Other Vegetable Matter".

If the GITA is not able to visually assess the above criterion, the GITA shall arrange appropriate testing.

All Engineered Fill particles shall be able to be incorporated within a single layer. Further, less than 30% of particles shall be retained on the 37.5 mm sieve.

Engineered Fill shall be able to be tested in accordance with the Standard Compaction method (AS1289.5.4.1) or Hilf test method (AS1289.5.7.1). These methods require less than 20% retained on the 37.5 mm sieve. Where between 20% and 30% of particles are retained on the 37.5 mm sieve the above test methods shall still be adopted and test reports annotated appropriately.

These requirements should be met by the material after placement and compaction.

Only material approved by the GITA shall be placed as Engineered Fill.



2.4 Fill Zonation and Placement

HOLD POINT

Process Held	Placing of Fill
Submission detail	The Contractor / GITA submit to PSM a Weekly Certificate as defined in Clause 6.2.1 of this specification for the earthworks completed to the previous Saturday no later than 5 pm of the subsequent Wednesday.
Release of Hold Point	PSM to confirm receipt of Weekly Certificate and recommend release of Hold Point if initial assessment of the Weekly Certificate indicates it complies with requirements of this specification. The contract superintendent should then release the Hold Point if it considers appropriate.

2.5 Compaction

Engineered Fill shall be placed and compacted to a Dry or Hilf Density Ratios (Standard Compaction) of between 98% and 102%.

The insitu density shall be measured over the full depth of each layer placed.

2.6 Moisture Control

The placement moisture variation or Hilf moisture variation shall be controlled to be between 2% dry of optimum and 2% wet of optimum.

Placement moisture content of the Engineered Fill shall be measured.

3. Cutting

3.1 Subgrade Condition

The subgrade is to comprise one of the following materials:

- 1. Bedrock.
- 2. Natural insitu material of at least stiff consistency.
- 3. Existing fill and other materials as approved by PSM.

Proof rolling shall only be undertaken under the direction of PSM.

The GITA should satisfy itself that the subgrade has not been desiccated, affected by rain or disturbed. If the GITA cannot so satisfy itself, then the subgrade should be excavated and filled to the BEL in accordance with this specification.

4. Survey

4.1 Filling Areas

The survey requirements are as follows:

- Any approved subgrade shall be surveyed prior to first filling such that subgrade levels are established to within ± 0.1 m. The area subject to approval shall be assessed and shown on a plan drawing to an accuracy of at least +/- 5 m in plan.
- 2. The Lot boundaries shall be assessed and shown on a plan drawing to an accuracy of at least +/- 5 m in plan.
- 3. The location of the field density tests shall be assessed and shown on the Lot boundary plan drawing to an accuracy of at least +/-5 m in plan.



4. The elevation of the field density tests shall be surveyed to an accuracy of +/-0.05 m.

The plan drawing shall show at the boundaries of the site and other identifiable site features, so as to allow the location of the lots and the test to be recoverable.

4.2 Cutting Areas

Any approved subgrade for cut areas shall be surveyed such that subgrade levels are established to within ± 0.1 m.

5. Inspection and Testing

5.1 Role of the GITA

The Geotechnical Inspection and Testing Authority (GITA) shall be contracted to document and certify that the works undertaken by the contractor has been completed in accordance with the relevant design and specifications.

5.2 Level 1 Control

The GITA shall adopt Level 1 responsibility as described in Section 8.2 of AS 3798-2007 "Guidelines on earthworks for commercial and residential developments":

"The primary objective of Level 1 Inspection and Testing is for the geotechnical inspection and testing authority (GITA) to be able to express an opinion on the compliance of the work. The GITA is responsible for ensuring that the inspection and testing are sufficient for this purpose.

The geotechnical inspection and testing authority need to have competent personnel on site at all times while earthwork operations are undertaken. Such operations include:

- Completion of removal of topsoil
- Placing of imported or cut material
- Compaction and adding/removal of moisture
- Trenching and backfilling
- Test rolling
- Testing.

The superintendent should agree a suitable inspection and testing plan prior to commencement of the works.

On completion of the earthworks, the GITA will usually be required to provide a report setting out the inspections, sampling and testing it has carried out, and the locations and results thereof. Unless very unusual conditions apply, the GITA should also be able to express an opinion that the works (as far as it has been able to determine) comply with the requirements of the specification and drawings."

For this particular contract, Level 1 responsibility includes:

- 1. Lot testing as per Clause 5.3 of this specification.
- 2. A frequency of compaction testing not less than that specified in Clause 5.4 of this specification.
- 3. The GITA documenting and reporting its activity in the terms required by Clause 6 of this specification.
- 4. The GITA undertaking adequate inspections and testing to comply with the above requirements and to be able to certify the fill in the terms required by Clause 6 of this specification.

5.3 Lot Testing

This specification requires lot testing to be undertaken.

A Lot is defined as a single layer of Engineered Fill consisting of uniform material which has undergone similar treatment.

Lot testing comprises the following:

1. A Lot shall be identified by the Contractor or the GITA with a Lot Number and presented for testing.



- 2. A Lot shall be deemed to be in accordance with the specification if all the tests undertaken within the Lot are in accordance with the specification, i.e. "a none to fail basis".
- 3. If any one test undertaken within a Lot fails, the whole of the Lot shall be reworked and retested.

Any portion of the placed Engineered Fill must be part of a single lot and all Lots will require approval by the GITA.

5.4 **Testing Frequency (Compaction Testing)**

The frequency of compaction testing for each lot shall not be less than the greater of:

- 1. For lot less than 50 m³
 - a. 1 test per lot.
- 2. For lot between 50 m³ and 100 m³
 - a. 2 tests per lot.
- 3. For lot greater than 100 m³
 - a. 1 test per 500 m³ of material placed.
 - b. 3 tests per lot.

A laboratory moisture content test shall be undertaken for each field density test.

5.5 **Proof Rolling and Plate Load Testing**

Proof rolling, together with minor boxing out and refilling, of the upper surface of the bulk earthworks will be undertaken as directed by PSM. The plant to be adopted depends upon the design loads adopted by the structural engineers for each section of the site. Any remediation of soft spots identified during proof rolling shall be undertaken in accordance with this Specification (CI 2.5 and 2.6).

Plate load testing shall be undertaken at the direction of PSM at the following stages:

1. At final bulk earthworks level (BEL). Expected test frequency is approximately a day of testing for each building pad.

The contractor is to make a suitable reaction (e.g. 20 tonne excavator) available for the tests.

5.6 Inspection and Testing

The GITA shall at least undertake the following tasks:

Cut areas

- 1. Identify the subgrade as one of the three (3) subgrade types listed in Clause 3.1 of this specification and assess that the subgrade condition of cut areas is in accordance with the subgrade condition requirements of Clause 3.1 of this specification. If the cut subgrade has been approved by PSM, the GITA will be required to reference the approval in its weekly report.
- 2. Should Engineered Fill be required to fill overcut areas, assess that filling has been placed in accordance with this specification.

Fill areas

- 1. For fill areas, identify the subgrade as one of the four (4) subgrade types listed in Clause 2.1 of this specification and assess that the subgrade condition of any area prior to placement of fill material is in accordance with the subgrade preparation requirements of Clause 2.1 of this specification. For the following subgrade types, GITA needs to include / refer to PSM approval in its weekly report:
 - a. Existing fill and other materials as approved by PSM.
- 2. Assess that the base geometry of any area prior to placement of fill material is in accordance with the base geometry requirements of Clause 2.2of this specification.
- 3. For each Lot, identify the material as either Site Won or Imported fill as defined in Clause 2.3 of this specification and assess that the material placed is in accordance with the fill material requirements of Clause 2.3 of this Specification.



- 4. Assess the proportion of deleterious material is in accordance with the requirements of Clause 2.3.3 of this Specification.
- 5. Assess that the Engineered Fill has been placed in accordance with the requirements for fill zonation and placement of Clause 2.4 of this specification.
- 6. Assess that each Lot as presented for approval by the contractor is in accordance with the requirements for Lot definition of Clause 5.3 of this specification.
- 7. Ensure that the survey requirements in Clause 5 of this specification have been completed.
- 8. Estimate the approximate volume of Engineered Fill placed in each Lot presented for approval.
- 9. Conduct Lot testing in accordance with the construction control testing requirements of Clauses 5.3 and 5.4 of this specification.
- 10. Assess that the compaction of each Lot is in accordance with the requirements of Clause 2.5 of this specification. The GITA shall select a depth of insitu density tests that allows the density of the full layer to be assessed.
- 11. Assess that the moisture variation of each Lot is in accordance with the requirements for moisture control in Clause 2.6 of this specification.
- 12. Conduct material property testing in accordance with the material testing requirements in this specification.

6. Reporting and Certification

6.1 Reporting

The GITA shall produce at least the following reports:

- 1. VENM / ENM Validation Reports. Such a report shall transmit the VENM or ENM validation certificates for the fill imported to site.
- 2. Subgrade Approval Reports (a sample is attached). Such a report shall:
 - Document assessments undertaken for tasks 1 and task 3 of Clause 5.6 including reporting the subgrade type
 - Document the subgrade survey that has been undertaken
 - Approve or reject the subgrade condition and base geometry for filling, based on tasks 3 and 4 of Clause 5.6
 - Approve or reject the subgrade condition for cut areas based on task 1.
- 3. Lot Approval Reports (a sample is attached). Such a report shall:
 - Document assessments, testing and survey undertaken for tasks 3 to 14 of Clause 5.6
 - Report material identification undertaken for task 5 of Clause 5.6
 - Report the assessed proportion of deleterious material for task 6 of Clause 5.6
 - Report the results of testing undertaken for task 11 of Clause 5.6
 - Approve or reject lots based on tasks 12 and 13 of Clause 5.6.
- 4. Material Testing Reports. Such a report shall:
 - Report the results of material property testing undertaken for task 14 of Clause 5.6.
- 5. *Daily Reports* (a sample is attached). Such a report shall be completed daily and shall:
 - Document time spent on site by the GITA personnel
 - List subgrade assessments and approvals undertaken each day with reference to relevant Subgrade Approval Report(s)
 - List Lots presented, accepted and approved or rejected each day, with reference to relevant Lot Approval Report(s)
 - List survey undertaken each day as for task 9 of Clause 5.6 and not already documented in the Subgrade or Lot Approval Reports



Document other relevant activities undertaken on site that day (site instructions, breakdowns, compaction equipment used, etc.).

6.2 Certification

6.2.1 Weekly Certificate

The GITA shall produce a Weekly Certificate for any week in which earthworks are undertaken in accordance with this specification. The Weekly Certificate will cover all works from the previous Weekly Certificate until the end of work on a Saturday.

The Weekly Certificate shall transmit the following:

- Copy or reference to the complete specification document(s)
- Subgrade Approval Reports
- Lot Approval Reports
- Material property testing reports
- Daily Reports
- Survey of subgrade geometry prior to filling or in cut areas
- Plan survey drawing showing lot boundaries and location of density tests
- Survey documenting filling undertaken to date and showing location of testing
- Provide an Excel spreadsheet presenting the results of the week's acceptance testing completed by the GITA.

And certify that:

"All the earthworks undertaken and the subgrade condition in the cut areas [in the stated period] are documented in the above reports and have been undertaken in accordance with the Specification (Ref. PSM4252-003S Rev XX dated XXX)."

6.2.2 Interim or Final Filling Certificate

At the completion of the bulk earthworks, or as requested by the Client, the GITA shall provide an Interim or Final Filling Certificate which shall:

- 1. Transmit a reference list of the Weekly Certificates.
- 2. Provide an Excel spreadsheet presenting the results of all the acceptance testing completed by the GITA.
- 3. Certify that "All the earthworks undertaken and the subgrade condition in the cut areas [in the stated period] are documented in the above reports and have been undertaken in accordance with the Specification (Ref. PSM4252-003S Rev XX dated XXX)."



Appendix A Figure 1





	Client	Course	1 . 2000 @ 11		GB	110
S DRAWING CANNOT BE			1.2000 @ A1	Designed	AMc	
IED OR REPRODUCED IN		Grid	GDA2020	Checked	AMc	
R PURPOSE OTHER THAN		Height Datum	AHD	Approved		
T ORIGINALLY INTENDED ITHOUT THE WRITTEN PERMISSION OF AT&L			GD	A202	20	

100mm on Original

F:\21-855 Aliro Mamre\6.0 Drgs\Civil\Sketches\21-855-SKC001 - EARTHWORKS PLAN.dwg

Appendix B Subgrade Approval Report



GEOTECHNICAL INSPECTION AND TESTING AUTHORITY

SM

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NATA accreditation number



Client:	Contractor:			
Job number:	Report number:	\sim		
Project:	Technician:			
Subgrade areas assessed:		$\langle \rangle	and the second se	
Area ID Date Approximate Subgrade descript	ion Geometry summary	Specification	Compliance Survey (Pass/Fail) reference	Approved (Yes/No)
COMMENTS:		· · · · ·		
Signed:	Date:			

Appendix C Lot Approval Report




GEOTECHNICAL INSPECTION AND TESTING AUTHORITY NATA accreditation number

LOT APPROVAL REPORT

Client:			Report number:			
Job number:			Report date:			
Project:			Technician:	Technician:		
Contractor:			Test methods:			
LOT ID:			Sheet	of		
Retest (Yes/No)			Original test repor	rt number:		
Specification reference						
Location:						
Lot boundary survey reference/location						
Materials description:	(MATERIAL TYPE, colour, minor components, maximum particle size)					
Material identification:	(Identify the material as defined in Clause 2.3.1, Clause 2.3.2 or Clause 2.3.3 of the Specification)					
Deleterious material assessment:	(Report proportion of deleterious material)					
Layer thickness:						
Accepted as Lot: (Yes/No)			Date:			
Approximate volume (m3)	Number of tests required:					
Test ID No.						
Test soil description						
Date tested:	$\langle \land \rangle \setminus \langle \checkmark \rangle$					
Grid reference						
Surveyed test locations (RL,E,N)						
Test depth (mm)						
Max size (mm)						
% Oversize material (wet)						
Field wet density (t/m ³)						
Field moisture content (%)						
PWCD (t/m ³)						
Compactive effort						
Moisture variation (%)						
HILF density ratio (%)						
TEST (Pass/Fail)						
		0		~ /		
	(Pass/Fail)	Signed:	[Date:		

Appendix D Daily Report





GEOTECHNICAL INSPECTION AND TESTING AUTHORITY

NATA accreditation number

DAILY REPORT

Client: Job number: Project: Location: Contractor			Report number: Report date: Level of testing: Level 1 Technician:				
						Time on site: Time off site:	
1. Subgrade Approval							
Areas ID	Subgrade Approval Report No:	Comments	$\bigcirc \searrow$				
2. Lot Approval							
Lot ID	Lot Approval Report No:	Comments					
3. Survey							
Type of survey	Survey undertaken by:	Reference					
4 Instructions rea	ceived on site	1					
4. Instructions for							
5. Instructions giv	ven on site						
COMMENTS:							
Signed:			Date:				

Appendix E Certification Letter (Sample Only)



Our Ref:

Date:

Addressed to: Earthwork Contractor

Attention: Earthwork Contractor Representative

Dear

RE: SAMPLE INTERIM (OR FINAL) FILLING CERTIFICATE INDUSTRIAL DEVELOPMENT, BULK EARTHWORKS CERTIFICATION OF EARTHWORKS BETWEEN [DATE OF COMMENCEMENT] AND [DATE OF COMPLETION]

In the period between [date start] and [date finish] the contractor has undertaken earthworks in areas XXX and XXX.

During the above period:

- The GITA has prepared the following Subgrade Approval Reports:
- 1. Subgrade Approval Report No 1
- 2.
- The GITA has prepared the following Lot Approval Reports:
- 1. Lot Approval Report No 1
- 2.
- The GITA has prepared the following Daily Reports
- 1. Daily Report No 1.....
- 2.

2

- The following subgrade survey was undertaken:
- 1. Subgrade Survey reference.....
- The following weekly survey was undertaken:
- 1. Weekly survey of week endingreference......
- 2.

.

Copies of all the above documents are attached.

The GITA certifies that all the earthworks undertaken period in the above stated are documented in the above reports and have been undertaken in accordance with the Specifications (ref. PSM4252-003S Rev 1, dated XXX) a copy of which is attached, with the exception of:

1. List outstanding issues (not approved subgrade, lots, unsuitable material, failed tests etc.)

2.

Signed

GITA