

# Attachment 2 Engineering Services Report



## ATTACHMENT A Layout Plans



DATE: 28/10/2021 9:07:54 AM LOGIN NAME: COLEMAN ENGINEERING SERVICES LOCATION: e:\CES\140233-windellama-subdivision-srle\Civil\140233-Lot-Layout-SK101.d

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Site

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EERING SERVICES 233 Site Aerial-SK104 EN EMAN Ō Ō 28/1( TION: 

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	DATE SEP '20	VERIFIED	DATE	Southern Region Land Engineering	
(A3)	SCALE	APPROVED	DATE	telephone (02) 4823 5577 mobile 0417 235 415 167 Bourke Street, Goulburn NSW 2580	PLANNING PRC FOR WINDELLAMA ROAD PT
	© Copyrighted S.R.L.E - 2021 All Rights Reserved			P.O. Box 111, Thirroul NSW 2515	

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ATTACHMENT B ACT Geotechnical Engineers Pty Ltd Report on Effluent Disposal Site and Soil Evaluation



## ACT Geotechnical Engineers Pty Ltd

ACN 063 673 530

5/9 Beaconsfield St, Fyshwick, ACT, 2600 PO Box 9225, Deakin, ACT, 2609 Ph: (02) 6285 1547

5 July 2021 Our ref: KA/C11822

Southern Region Land Engineering Via email: gregtodd.srle@gmail.com

#### Attention: Greg Todd

#### **BRISBANE GROVE RURAL SUBDIVISION ROSEMONT ROAD & MOUNTAIN ASH ROAD, GOULBURN, NSW EFFLUENT DISPOSAL – SITE AND SOIL EVALUATION**

#### 1 Introduction

At the request of Southern Region Land Engineering, ACT Geotechnical Engineers Pty. Ltd carried out an effluent disposal assessment to A\$1547 "On-Site domestic wastewater management", for the proposed Brisbane Grove Rural Subdivision along Rosemont Road and Mountain Ash Road, in Goulburn, NSW.

The project comprises a new residential subdivision, and the client would like to maximize the yield by having lot sizes of  $\sim$ 4000m<sup>2</sup>. To allow this yield, it must be proved that the land can absorb the wastewater within the desired lot size.

This Site and Soil Evaluation was conducted in general accordance with AS 1547:2012 - "On-site domestic wastewater management", "Designing and Installing On-Site Wastewater Systems: A WaterNSW Current Recommended Practice: 2019", and "The Environment & Protection Guidelines 1998 - On-Site Sewage Management for Single Households" (Silver Book).

The site details and assumptions made to assess the requirements of the effluent disposal system are outlined in Table 1 below.

The details of the site and proposed works are summarized in Table 1 below.

#### TABLE 1 - SITE DETAILS

Area of Lots	Approx. 4000m <sup>2</sup>
Rainfall Station	070330 – Goulburn Airport AWS NSW
Evaporation Station	070263 – Goulburn TAFE

#### 2 **Effluent Disposal Site and Soil Assessment**

The proposed locations were assessed and the site limitations are addressed below.

The 1:100,000 Goulburn Geology Map documents the area to be covered by Quaternary Age residual and colluvial deposits underlain by Siluro-Devonian aged Mount Fairy Group and Bindook Group bedrock comprising Back Station Ignimbrite, Saltpetre Andesite, and Bullamalita Conglomerate.

#### 2.1 Site Limitation Assessment

Table 2 below is a site assessment of the proposed lot locations, and have been assessed using Table 1 from "On-site Sewage Management for Single Households". The table used for this assessment is attached to this report.

Borehole / Location	Slope/ Direction	Exposure to sun/wind	Landform / Slope	Erosion Potential	Presence of Fill	Rock Outcrops (%)	Groundwater
A01	<10% / E	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
A02	<10% / N	High	Waxing Divergent	Low/Not evident	Not found	<10%	Not encountered
A03	10-20% / N	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
A04	10-20% / S	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
A05	<10% / S	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
A06	<10% / S	High	Linear/Waning Planar	Low/Not evident	Not found	<10%	Not encountered
A07	<10% / S	High	Waxing Divergent	Low/Not evident	Not found	<10%	Not encountered
A08	<10% / S	High	Waxing Divergent	Low/Not evident	Not found	<10%	Not encountered
A09	<10% / S	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
A10	<10% / S	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
B01	10-20% / S	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
B02	<10% / W & SW	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
B03	<10% / W	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
B04	<10% / W	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
C01	<10% / S	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
C02	<10% / W	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
C03	<10% / W	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
C04	<10% / E	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
D01	<10% / N & W	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
D02	<10%	High	Linear Planar – some ponding encountered	Low/Not evident	Not found	<10%	Not encountered
D03	<10% / N	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
D04	<10% / N	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered

#### TABLE 2 – SITE ASSESSMENT

Borehole / Location	Slope/ Direction	Exposure to sun/wind	Landform / Slope	Erosion Potential	Presence of Fill	Rock Outcrops (%)	Groundwater
D05	<10% / N	High	Waxing Divergent	Low/Not evident	Not found	<10%	Not encountered
D07	<10% / SW	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
D08	10-20% / S	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
D09	<10% / N	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
D10	10-20% / S	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
D11	10-20% / S	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
E01	<10%	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
E02	<10%	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
E03	<10% / W	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered

#### 2.2 Sub-surface Conditions

To establish the subsurface conditions, thirty-one (31) test holes were drilled at client-provided locations around the proposed subdivision. Figure 1 shows the site locality, while Figures 2 and 3 are aerial photographs showing the location of the investigation boreholes. The subsurface profiles were logged in terms of the Unified Soil Classification System (USCS). The borehole logs can be found in Appendix B.

#### 2.2.1 Site Soil Properties

Based on the soil encountered and in accordance with A\$1547:2012 – "Disposal Systems for Effluent From Domestic Premises" (Reference 2), the properties of the most limiting material are summarised in Table 3 below.

	Borehole / Location	Depth of Borehole (m)	Depth of Topsoil (m)	Depth of Bedrock (m)	Soil Texture	Soil Structure	Approx. Bulk Density (g/cm³)	Indicative Permeability (m/day)
Ī	A01	1.3	0.15	>1.3	Medium to Heavy Clays	Massive/weakly-structured	2.0	<0.06
I	A02	1.3	0.10	>1.3	Light Clays	Moderately-structured	1.8	0.06 - 0.12
I	A03	1.4	0.25	>1.4	Light Clays	Moderately-structured	1.8	0.06 - 0.12
Ī	A04	1.4	0.30	>1.4	Clay Loams	High/moderate structured	1.6	0.5 – 1.5
I	A05	1.3	0.30	>1.3	Clay Loams	High/moderate structured	1.6	0.5 – 1.5
Ī	A06	1.4	0.20	>1.4	Clay Loams	Weakly-structured	1.6	0.12 – 0.5
I	A07	1.4	0.25	>1.4	Light Clays	Moderately-structured	1.8	0.06 - 0.12
I	A08	1.4	0.15	>1.4	Medium to Heavy Clays	Massive/weakly-structured	2.0	<0.06
I	A09	1.3	0.2	>1.3	Sandy Loams	Weakly-structured	1.6	1.4 - 3.0
I	A10	1.2	0.2	>1.2	Clay Loams	Weakly-structured	1.6	0.12 – 0.5
I	B01	1.1	0.2	1.0	Clay Loams	High/moderate structured	1.6	0.5 – 1.5
I	B02	1.4	0.2	>1.4	Light Clays	Moderately-structured	1.8	0.06 - 0.12
I	B03	1.2	0.2	>1.2	Clay Loams	High/moderate structured	1.6	0.5 – 1.5
I	B04	1.4	0.2	>1.4	Clay Loams	High/moderate structured	1.6	0.5 – 1.5
I	C01	0.9	0.2	0.9	Medium to Heavy Clays	Massive/weakly-structured	2.0	<0.06
I	C02	1.3	0.15	>1.3	Medium to Heavy Clays	Moderately-structured	2.0	<0.06
I	C03	1.4	0.2	>1.4	Light Clays	Moderately-structured	1.8	0.06 - 0.12

#### TABLE 3 – SOIL ASSESSMENT

Borehole / Location	Depth of Borehole (m)	Depth of Topsoil (m)	Depth of Bedrock (m)	Soil Texture	Soil Structure	Approx. Bulk Density (g/cm <sup>3</sup> )	Indicative Permeability (m/day)
C04	1.3	0.3	>1.3	Clay Loams	Weakly-structured	1.6	0.12 – 0.5
D01	1.3	0.2	>1.3	Loams	Massive/weakly-structured	1.5	0.5 – 1.5
D02	1.3	0.3	>1.3	Sandy Loams	Weakly-structured	1.6	1.4 - 3.0
D03	1.3	0.15	>1.3	Light Clays	Moderately-structured	1.8	0.06 - 0.12
D04	1.3	0.2	>1.3	Light Clays	Moderately-structured	1.8	0.06 - 0.12
D05	1.3	0.2	>1.3	Loams	Massive/weakly-structured	1.5	0.5 – 1.5
D07	1.3	0.2	>1.3	Clay Loams	Weakly-structured	1.6	0.12 – 0.5
D08	1.3	0.2	1.2	Light Clays	Moderately-structured	1.8	0.06 - 0.12
D09	1.3	0.2	>1.3	Clay Loams	High/moderate structured	1.6	0.5 – 1.5
D10	1.4	0.2	>1.4	Medium to Heavy Clays	Massive/weakly-structured	2.0	<0.06
D11	1.4	0.3	>1.4	Light Clays	Moderately-structured	1.8	0.06 - 0.12
E01	1.3	0.3	>1.3	Loams	Massive/weakly-structured	1.5	0.5 – 1.5
E02	1.3	0.2	>1.3	Clay Loams	High/moderate structured	1.6	0.5 – 1.5
E03	1.3	0.15	>1.3	Light Clays	Moderately-structured	1.8	0.06 - 0.12

#### 2.2.2 Permeability Testing

Soil percolation (falling head) tests were conducted on three areas within the proposed subdivision in order to assess the permeability of the soils in the area. The percolation tests were conducted in general accordance with the falling head test method described in AS1547-1994 "Disposal Systems for Effluent From Domestic Premises".

Three (3) ~0.45m-0.5m deep test holes were excavated using a 100mm diameter hand auger at locations which were considered to be representative of typical soil conditions within the site. 100mm diameter PVC pipes were then placed inside of the test holes to ensure the stability of the walls, and a 50mm thick layer of gravel was placed over the bottom of the test hole to prevent scouring of the bottom when water is added. The holes were filled with water and left for an initial saturation of the ground. Once the falling rate of the water has stabilized, depth and time measurements were taken to calculate the permeability of the soil. The calculated permeability values are summarised in Table 4.

Test Number	Location	Soil Category	Calculated Permeability (m/day)	Indicative Permeability – from A\$1547:2012 (m/day)
P1	Near A2	Light Clays – moderately structured	1.309 m/day	0.06 - 0.12
P2	Near C3	Light Clays – moderately structured	1.019 m/day	0.06 - 0.12
P3	Near D4	Light Clays – moderately structured	1.440 m/day	0.06 - 0.12

### TABLE 4 – PERCOLATION TESTING RESULTS

### 2.2.3 Laboratory Results

Five (5) representative samples were sent to a NATA accredited environmental testing laboratory for pH, electrical conductivity, Emerson testing, and phosphorus sorption capacity. The results of these tests are summarized in Table 5. The Laboratory Certificates of Analysis are included in Appendix C.

#### TABLE 5 – LABORATORY TEST RESULTS ON SOIL PROPERTIES

Soil Test	Borehole / Sample Depth						
	A7 (0.1m – 0.4m)	A10 (0.0m – 0.3m)	B2 (0.3m – 0.6m)	D3 (0.15m – 0.4m)	D11 (0.3m-0.5m)		
рН	6.5	5.3	5.5	5.8	6.8		
Electrical Conductivity (µS/cm)	36	52	34	46	52		
Emerson Class No.	5.0	5.0	5.0	5.0	5.0		
Phosphorus Sorption Capacity (mg/kg)	510	380	590	940	770		

Five (5) samples from client-specified locations were also sent to a NATA accredited environmental testing laboratory to test for the presence of organochlorine pesticides (OCP) and organophosphorus pesticides (OPP). The results of these tests, including assessment against the National Environmental Protection Measure (NEPM) 1999, (as amended 2013) human health guideline values for commercial and industrial land uses, are shown in Table 6.

Contaminant		Bore	Required health-based investigation levels (HIL)				
		P.4	(mg/kg)				
	(0.0m –	(0.0m –	(0.0m –	(0.0m –	(0.0m –	A <sup>1</sup>	B <sup>2</sup>
	0.2m)	0.2m)	0.4m)	0.2m)	0.2m)		
OCPs	<0.1	<0.1	<0.1	<0.1	<0.1	<6 (i)	<10 <sup>(i)</sup>
(mg/kg)							
OPPs (mg/kg)	<0.1	<0.1	<0.1	<0.1	<0.1	< <b>6</b> (i)	<10 <sup>(i)</sup>

#### TABLE 6 - LABORATORY TEST RESULTS ON SOILS FOR PESTICIDES

#### Notes:

<sup>1</sup> HIL A – Residential with garden/accessible soil (home grown produce

<sup>2</sup> HIL B – Residential with minimal opportunities for soil access; includes dwellings with fully and permanently paved yard space such as high-rise buildings and apartments

<sup>(i)</sup> Lowest OCP/OPP specified guideline value

#### 4 Effluent Disposal Recommendations

The local council should be consulted regarding its on-site sewage management policy and required minimum buffer distances (depending on the proposed effluent disposal system).

A fence should be placed around the effluent disposal areas if there is a risk of children, animals or vehicles coming into the area. Signage, complying with AS1319 shall be placed in at least two places at the boundary of the application area, clearly visible to property uses, with wording such as "Recycled Water – Avoid Contact – DO NOT DRINK".

The treated effluent is not suitable for vegetable gardens or areas where people can come in contact with the effluent.

The areas should not be used for any purposes that compromise the effectiveness of the system or access for future maintenance purposes.

Should you require any further information regarding this report, please do not hesitate to contact our office.

Yours faithfully ACT Geotechnical Engineers Pty. Ltd.

Jeremy Murray Director Senior Geotechnical Engineer Attachments: Figures 1 to 3, Appendix A to D





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SOUTHERN REGION L BRISBANE GROVE R AERIAL PHOTOGRAPH ANI	AND ENGINEERING URAL SUBDIVISION D BOREHOLE LOCATIONS	
ACT Geotechnical Engineers Pty Ltd	C11822	FIGURE 3

APPENDIX A Location and Soil Core Photos


























































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	BRISBANE Geolg	
B	orehole:E2	
The second		
BRISBANE GR	ROVE RURAL SUBDIVISION	
ACT Geotechnical Engineers Pty Ltd	C11822	FIGURE 30a

	and
Prispare de Bore ho	ever ble:E3
SOUTHERN REGION BRISBANE GROVE I LOCATION AND SOI	LAND ENGINEERING RURAL SUBDIVISION IL CORE PHOTOS (E3)
ACT Geotechnical Engineers Pty Ltd	C11822 FIGURE 310

APPENDIX B Borehole Logs A01 to E03

oroholo					Borehol	e No.	A01
OFENDIE	LUg				Sheet	1 of	1
CLIENT:	South	nern F	Region Land Engineering		Job No.	C11	822
PROJECT	Brisba	ane (	Grove Rural Subdivision	ad Goulburn NSV	Location	n: SEE REPO	RT
Equipment Type Hole Diameter :	: PUSH T 50mm	UBE DI	RILL		Collar L Angle F Bearing	evel:Not Knov rom Vertical:( :N.A.	wn )°
Casing	Uepun Graphic Log	U.S.C.S.	Material Description, Stru Soil Type: Plasticity or Particle Charact Colour, Secondary and Minor Compone Meiotres Structure	ucture eristics, ents,	onsistency or Relative Density	Field Test Results	Geological Profile
Me	$\frac{1}{1} \cdot \frac{1}{2} \cdot \frac{1}$	SM	Silty SAND; fine to medium grained sand, low rootlets, moist.	plasticity silt, brown, with grass	LOOSE		TOPSOIL
0	0.15	ML	Sandy SILT; low plasticity silt, fine to medium grey, moist.	grained sand, light brown, light	FIRM		SLOPEWASH
	0.4	СН	CLAY; medium to high plasticity clay, orange-	grey mottled, dry to moist.	STIFF TO VERY STIFF		RESIDUAL SOI
	0.8	СН	CLAY; high plasticity clay, orange-grey mottled	i, dry.	VERY STIFF		
	1.0-						
	1.3		BOREHOLE TERMINA	red at 1.3m			
	-						
Logged By	1.6   /:KA	4	Date : 15/06/21	Checked By :	JM	Date :	17/06/21

oroholu		h					Boreho	e No.	A02
orenoid		Jy					Sheet	1 of 1	
CLIENT:	S	outhe	ern F	Region Land Engineering			Job No.	C118	322
PROJECT	B	risba	ne C	Grove Rural Subdivision	ad Goulburn NSV	v	Locatio	n: SEE REPOR	Т
Equipment Typ Hole Diameter	e : Pl : 50m	JSH TU	IBE DI	RILL		v	Collar L Angle F Bearing	evel:Not Know rom Vertical: 0 <sup>6</sup> i:N.A.	n
Samples	Depth	Graphic Log	U.S.C.S.	Material Description, Stru Soil Type: Plasticity or Particle Charact Colour, Secondary and Minor Compone Moisture, Structure	ucture eristics, ents,	onsistency	or Relative Density	Field Test Results	Geological Profile
	<u>/letres</u>	<u>x<sup>1</sup> 1<sub>2</sub> x<sup>1</sup> 1<sub>1</sub></u>	SM	Silty SAND; fine to medium grained sand, low rootlets, moist.	plasticity silt, brown, with grass	LOC	OSE		TOPSOIL
	0.1 _	2010 - 10 - 10 - 10 - 10 - 10 - 10 - 10	ML	Silty Gravelly SAND; fine to medium grained s medium grained sedimentary gravel, brown, d	and, low plasticity silt, fine to ry to moist.	LOC TO ME DEI	DSE DIUM NSE		ALLUVIUM
	0.3 <u>-</u>	10000000000000000000000000000000000000	CL	Sandy Gravelly CLAY; low to medium plasticit medium grained sedimentary gravel, orange-b	y clay, fine to coarse sand, fine to rown, dry.	STI	FF		
	0.6 _		SC	Sandy CLAY / Clayey SAND; fine to coarse sa yellow-brown, orange-brown, dry.	nd, low to medium plasticity clay,	STI ME DEI	FF / DIUM NSE		RESIDUAL SO
	1.0 <sup>1</sup>		СН	Sandy CLAY; medium to high plasticity clay, fi mottled orange-brown, dry.	ne to coarse sand, yellow-brown	STI VEF STI	FF TO RY FF		
	1.3			BOREHOLE TERMINA	red AT 1.3m				
									47/00/01
	∃y :	KA		Date : 15/06/21	Checked By :	JIV	1	Date :	17/06/21

Bore	hole I	oa				Boreho	le No.	A03
Dore		og				Sheet	<b>1</b> of 1	
CLIE	ENT: S	outhe	ern F	Region Land Engineering		Job No	C11	822
PRO		risba losen	ne C nont	Grove Rural Subdivision Road & Mountain Ash Ro	oad, Goulburn, NSW	Locatio	n : SEE REPOR	RT (n
Equipm Hole Di	nent Type: P iameter : 50n	USH TU nm	JBE DI	RILL		Angle I Bearing	From Vertical : 0 g : N.A.	0
Samples	Casing	Graphic Log	U.S.C.S.	Material Description, Stru Soil Type: Plasticity or Particle Charact Colour, Secondary and Minor Compone Moisture, Structure	ucture eristics, ents,	onsistency or Relative Density	Field Test Results	Geological Profile
	Metres		SM	Silty SAND; fine to medium grained sand, low rootlets, moist.	plasticity silt, brown, with grass	LOOSE		TOPSOIL
	0.25		CL	Silty Sandy CLAY; low to medium plasticity fir orange-brown, moist.	es, fine to medium grained sand,	FIRM TO STIFF		ALLUVIUM
	0.5		CL-CH	Sandy CLAY; medium plasticity clay, fine to c	barse sand, light brown, moist to	FIRM TO STIFF		
	1.1		СН	Sandy CLAY; medium to high plasticity clay, f ferruginous nodules, light brown, brown, dry.	ne to coarse sand, fine gravel and	VERY STIFF		
				BOREHOLE TERMINA	IED AT 1.4m			
Log	ged By :	KA		Date : 01/06/21	Checked By :	JM	Date :	17/06/21
Geotechn	cal Engineers				1	ACT G	eotechnica	l Engineers

Bo	reh	പം	1	n				Boreho	le No.	A04
DU				J				Sheet	1 of <i>1</i>	
С	IEN	T:	S	outhe	ern F	Region Land Engineering		Job No	C11	822
PF	ROJE	СТ	В	risba	ne (	Grove Rural Subdivision	ad Caulburn NSM	Locatio	on : SEE REPOP	RT
Equ Hol	uipment e Diam	Type : eter : {	PL 50m	JSH TU	IBE DI	RILL	au, Goulburn, NSW	Collar I Angle I Bearing	Level:Not Know From Vertical:0 g: N.A.	/n °
Samples		Casing		Graphic Log	U.S.C.S.	Material Description, Str Soil Type: Plasticity or Particle Charact Colour, Secondary and Minor Compone Meisture Structure	ucture eristics, ents,	onsistency or Relative Density	Field Test Results	Geological Profile
		Met	res -		SM	Silty SAND; fine to medium grained sand, low rootlets, moist.	plasticity silt, brown, with grass	LOOSE		TOPSOIL
					CL	Silty CLAY; low to medium plasticity clay, son yellow-brown, light brown, trace fine gravel an to moist.	ne fine to medium grained sand, d ferruginous nodules to 5mm, dry	STIFF		ALLUVIUM -
		(	0.8 _		SC	Clayey Gravelly SAND: fine to coarse sand, fin gravel, low plasticity clay, red-brown, brown, c	ne to medium grained sedimentary Iry.	MEDIUM DENSE TO DENSE		RESIDUAL SOIL
C11822.6PJ ACI GEO.GDI 04/07/21		1	. <b>0</b>							-
			<u>4</u> _	<u>v</u> //d		BOREHOLE TERMINA	TED AT 1.4m			-
	ogge	ed By	.6 ':	KA		Date : 15/06/21	Checked By :	JM	Date :	17/06/21
Gerte	hn cal I	Engiree	rs					ACT G	eotechnica	l Engineers

Bor	eho	le I d	na				Boreho	le No.	A05
Don	0110		9				Sheet	1 of 1	
CLI	ENT:	S	outhe	ern F	Region Land Engineering		Job No	C118	322
PRO	OJEC	т В R	risba osen	ne C nont	Grove Rural Subdivision Road & Mountain Ash Ro	ad, Goulburn, NSW		on : SEE REPOR	T
Equip Hole [	oment Ty Diamete	ype : Pl er : 50m	JSH TU Im	IBE DI	RILL		Angle F Bearing	From Vertical : 0 g : N.A.	11
Samples	Casing	Depth	Graphic Log	U.S.C.S.	Material Description, Stru Soil Type: Plasticity or Particle Characte Colour, Secondary and Minor Compone Moisture, Structure	icture eristics, nts,	Consistency or Relative Density	Field Test Results	Geological Profile
		Metres		SM	Silty SAND; fine to medium grained sand, low rootlets, moist.	plasticity silt, brown, with grass	LOOSE		TOPSOIL -
		0.3 _		CL	Silty Sandy CLAY; low plasticity fines, fine to n moist.	nedium grained sand, light brown,	FIRM TO STIFF		ALLUVIUM -
		-		SC	Clayey Gravelly SAND; fine to coarse sand, fin low plasticity clay, orange-brown, some grey, c	e gravel and ferruginous nodules, iry.	MEDIUM DENSE TO DENSE		RESIDUAL SOIL
		1.0	2/2/ 2/2/ 2/2/ 2/2/ 2/2/ 2/2/ 2/2/ 2/2						-
		1.3			BOREHOLE TERMINAT	ED AT 1.3m			-
	gged	<u>1.6</u> By :	KA		Date : 15/06/21	Checked By :	JM	Date :	17/06/21
Ge <u>etta</u> chn	cal Eng	giteers				1	ACT G	eotechnical	Engineers

B	orel	nole I	oa				Boreho	le No.	A06	
	0.01		-09				Sheet	1 of 1		
		NT:	South	nern l	Region Land Engineering		Job No	C118	322	
F	PROJ	ECT	Brisba Rose	ane ( mont	Grove Rural Subdivision	ad Goulburn NSW	Locatio	n : SEE REPOR	т	
E	Equipme Iole Dia	nt Type: meter : 5	PUSH T	UBE D	RILL		Collar L Angle F Bearing	Angle From Vertical : 0° Bearing : N.A.		
nnles	sold -	tsing epth	aphic .og	C.S.	Material Description, Str		istency or lative nsity	Field Test	Geological	
Sar		ී ජී Metro	es la construction de la constru	S. ⊃	Colour, Secondary and Minor Compone Moisture, Structure	ents,		Results		
			1/ 3/1/2 1/ 1/2 1/2 1/2	· .	Silty SAND; fine to medium grained sand, low rootlets, moist.	plasticity silt, brown, with grass	LOUSE		-	
		0.	2	ML	Sandy SILT; low plasticity silt, fine to medium	grained sand, light brown, moist.	FIRM		ALLUVIUM	
		0.	4	CL	Silty Gravelly CLAY; low to medium plasticity sedimentary gravel, light brown, some red-bro	fines, fine to medium grained wn, moist.	STIFF		-	
		0.		СН	Sandy CLAY; medium to high plasticity clay, f	ine to medium grained sand, light	STIFF TO		RESIDUAL SOIL	
							STIFF		-	
/21		1.0		SC	Clayey Gravelly SAND; fine to coarse sand, fir ferruginous nodules, low to medium plasticity dry to moist.	ne to medium grained gravel and clay, light brown, orange-brown,	DENSE		-	
11822.GPJ ACT GEO.GDT 04/07									-	
ION LOG C			4 77	4	BOREHOLE TERMINA	TED AT 1.4m				
(EXCAVATI									-	
30REHOLE	Logo	jed By	: KA	۹	Date : 15/06/21	Checked By :	JM	Date :	17/06/21	
Gegt	technica	1 Engineer	3				ACT G	eotechnical	Engineers	

Bore	hole I	oa				Boreho	ole No.	A07
Dore		Ug				Sheet	1 of 1	
CLIE	NT: S	South	ern F	Region Land Engineering		Job No	C118	322
PRO		Brisba	ine (	Grove Rural Subdivision	ad Caulburn NSW	Locatio	on: SEE REPOR	Т
Equipm Hole Di	nent Type: P iameter: 50r	USH TL	JBE DI			Collar   Angle   Bearing	Level: Not Know From Vertical: 0 <sup>0</sup> g: N.A.	n >
amples	Casing Depth	Sraphic Log	S.C.S.	Material Description, Str Soil Type: Plasticity or Particle Charact Colour, Secondary and Minor Compon	ucture eristics, ents.	nsistency or Relative Density	Field Test Results	Geological Profile
<u></u>	Metres		SM	Moisture, Structure Silty SAND; fine to medium grained sand, low rootlets, moist.	plasticity silt, brown, with grass	COOSE		TOPSOIL .
	0.25		ML	Sandy Gravelly SILT; low plasticity silt, fine to brown, orange-brown, dry.	coarse sand, low plasticity silt,	LOOSE TO MEDIUM DENSE		ALLUVIUM
	0.5		SC	Clayey Gravelly SAND; fine to coarse sand, fi gravel, low plasticity clay, orange-brown, red-	ne to medium grained sedimentary prown, dry.	MEDIUM DENSE TO DENSE		RESIDUAL SOIL
GEO.GD1 (MIO//Z1	1.0 -							-
	1.4			BOREHOLE TERMINA	TED AT 1.4m			-
Log	<u>  1.6</u>  ged By :	KA	<u> </u>	Date : 15/06/21	Checked By :	JM	Date :	17/06/21
Ge <u>ette</u> hne	cal Engireers				1	ACT G	eotechnical	Engineers

Bore	ho	ا ما	na					Borehol	le No.	A08
Dure			J					Sheet	1 of 1	
CLIE	ENT:	S	outh	ern F	Region Land Engineering			Job No.	C118	322
PRO	JEC	т В	risba	ne (	Grove Rural Subdivision	ad Oaulhum NOM	,	Location	n : SEE REPOR	г
Equipm Hole Di	nent Ty iamete	/pe : Pl r : 50m	USH TU	nont IBE Di	Road & Mountain Ash Ro	ad, Goulburn, NSV	/	Collar L Angle F Bearing	evel:Not Knowi From Vertical: 0° g: N.A.	1
Samples	Casing	Depth	Graphic Log	U.S.C.S.	Material Description, Stru Soil Type: Plasticity or Particle Characte Colour, Secondary and Minor Compone Moisture, Structure	Icture pristics, nts,	Consistency	or Relative Density	Field Test Results	Geological Profile
		Metres	<u>x 1/2</u> 1/2 · <u>x</u> 1/2 	SM	Silty SAND; fine to medium grained sand, low rootlets, moist.	plasticity silt, brown, with grass	LO	OSE		TOPSOIL
		0.15		CL	Sandy Silty CLAY; low to medium plasticity fine red-brown, dry.	es, fine to medium grained sand,	FIF	RM		ALLUVIUM .
		0.7		CL	Sandy CLAY; low to medium plasticity clay, fin mottled orange-brown, dry.	e to coarse sand, yellow-brown	ST	IFF		RESIDUAL SOIL
		<b>1.0</b> –								
		1.4			BOREHOLE TERMINAT	ED AT 1.4m				
Log	ged	<u>1.6</u> By :	KA		Date : 15/06/21	Checked By :	JN	1	Date :	17/06/21
Ge <u>ett</u> chn	cal Eng	giteers					Α	CT Ge	eotechnical	Engineers

Borehole					Boreho	le No.	A09
Derenere	Log				Sheet	1 of 1	
CLIENT:	South	ern F	Region Land Engineering		Job No	. C118	22
PROJECT	Brisba Roser	ine C nont	Grove Rural Subdivision Road & Mountain Ash Roa	ad, Goulburn, NSW	Locatio	n:SEE REPORT Level:Not Knowr	-
Equipment Type Hole Diameter:	: PUSH TL 50mm	JBE DI	RILL		Angle I Bearing	From Vertical : 0° g : N.A.	
Samples Casing	Graphic Log	U.S.C.S.	Material Description, Stru Soil Type: Plasticity or Particle Characte Colour, Secondary and Minor Componer Moisture, Structure	icture ristics, nts,	Consistency or Relative Density	Field Test Results	Geological Profile
		SM	Silty SAND; fine to medium grained sand, low prooflets, moist.	plasticity silt, brown, with grass	LOOSE		TOPSOIL .
	ው የሚያስት የ የሚያስት የሚያስት የሚያ የሚያስት የሚያስት የሚያ	SM	Silty Gravelly SAND; fine to coarse sand, low pl	lasticity silt, fine gravel and	LOOSE TO MEDIUM DENSE		ALLUVIUM -
		CL	Silty Gravelly CLAY; low plasticity fines, fine gra grey/black, dry.	avel and ferruginous nodules,	STIFF		RESIDUAL SOIL
	13	CL-CH	Sandy CLAY; fine to medium grained sand, me mottled, dry.	dium plasticity clay, orange-grey	VERY STIFF		-
	_		BOREHOLE TERMINATI	ED AT 1.3m			_
Logged By	<sup>1.6</sup> ∣ / : KA	\	Date : 15/06/21	Checked By :	JM	Date :	17/06/21
Gertachn cal Engine	ers				ACT G	eotechnical	Engineers

Bined     1 of 1       CLIENT:     Southern Region Land Engineering     Mb No.     C11822       PROJECT     Brisbane Grove Rural Subdivision Resembler Road & Mountain Ash Road, Coulburn, NSW Designer Type : PUBLT TUBE DRULL     Location : Stee PUBPAT Different Weithern TUBE DRULL     Location : Stee PUBPAT Different Weithern : Other Public Dimeter : Storm     Tige and the company of the company of the company. Stee Public Dimeter : Storm     Tige and the company of the company. Stee Public Dimeter : Storm     Tige and the company of the company. Stee Public Dimeter : Storm     Tige and the company. Stee Public Dimeter : Stee Public Dimeter : Stee Public Dimeter : Stee Publ	Boreho	ا ماد	na					Boreho	le No.	A10
CLIENT:   Southern Region Land Engineering   Job Ne.   C11822     PROJECT   Brisbane Grove Rural Subdivision Rosemont Road & Mountain Ash Road, Goulburn, NSW   Loation :: SEE REPORT     Eduijment Type:   : UUH TUBE DRILL hole Dammer   Material Description, Structure being :: NA.   Coordigation :: SEE REPORT     gg	Dorent		Ug					Sheet	1 of 1	
PROJECT   Brisbane Grove Rural Subdivision Road & Mountain Ash Road, Goulburn, NSW   Localin : SEE REPORT Caller Livel : NA Road Address : Softwart     Builder Filt With State Data   Bild State I and State Road Address : Softwart   Softwart   Softwart   Coller Livel : NA Road Address : Softwart     Build State I and State Road State Data   Bild State Peaksong of Period Comparison   Softwart   So	CLIENT	: S	outh	ern F	Region Land Engineering			Job No.	C118	22
Equipment Type : PUSH TUBE DRILL Note Diameter : Somm	PROJE	CT B	risba loser	ne C nont	Grove Rural Subdivision Road & Mountain Ash Ro	ad, Goulburn, NSW	,	Locatio	n : SEE REPORT	Г
State Big Big<	Equipment <sup>¬</sup> Hole Diame	Type : P eter : 50n	USH TL 1m	JBE DI	RILL			Angle F Bearing	rom Vertical : 0° ; N.A.	I
B     C     C     C     C     C     C     C     Profile	nples	epth	aphic .og	.C.S.	Material Description, Stru	icture	istency	or ative nsity	Field Test	Geological
C2 CL CL Sandy Silv CLAY: low plastoly lines, fine to medium grained sand, light brown, FRM ALLUVUM ALLUVUM CLAPH Sandy CLAY: low plastoly lines, fine to medium grained sand, light brown, FRM CLAPH Sandy CLAY: novel plastoly lines, fine to medium grained sand, light brown, FRM CLAPH Sandy CLAY: novel plastoly lines, fine to medium grained sand, light brown, FRM CLAPH Sandy CLAY: novel plastoly lines, fine to medium grained sand, light brown, FRM CLAPH Sandy CLAY: novel plastoly lines, fine to medium grained sand, light brown, FRM CLAPH Sandy CLAY: medium plastoly dire, fine to medium grained sand, trace TL CLAPH Sandy CLAY: medium plastoly dire, fine to medium grained sand, trace TL CLAPH Sandy CLAY: medium plastoly dire, fine to medium grained sand, trace TL CLAPH Sandy CLAY: medium plastoly dire, fine to medium grained sand, trace TL CLAPH Sandy CLAY: medium plastoly dire, fine to medium grained sand, trace TL CLAPH Sandy CLAY: medium plastoly dire, fine to medium grained sand, trace TL CLAPH Sandy CLAY: medium plastoly dire, fine to ceanse DENSE SC CLAPH Sandy CLAY: medium plastoly dire, fine to ceanse DENSE SC CLAPH Sandy CLAY: medium plastoly dire, fine to ceanse DENSE SC CLAPH Sandy CLAY: medium plastoly dire, fine to ceanse DENSE SC CLAPH Sandy CLAY: medium plastoly dire, fine to ceanse DENSE SC S	Sar Ca	Metres	C.	S. ∩ SM	Colour, Secondary and Minor Componen Moisture, Structure	alacticity silt, brown, with grace	Cons		Results	TOPSOIL
0.2 CL Sandy CLY, low plasticity fines, fine to medium grained sand, light brown. FIRM   0.7 CL-OH Sandy CLAY, medium plasticity day, fine to medium grained sand, trace STIFF   0.7 CL-OH Sandy CLAY, medium plasticity day, fine to medium grained sand, trace STIFF   1.0 CL-OH Sandy CLAY, medium plasticity day, fine to medium grained sand, trace STIFF   1.0 CL-OH Sandy CLAY, medium plasticity day, fine to coarse and, trace STIFF   1.0 SC Clayey Gravely SAND, fine to coarse sand, low plasticity day, fine to coarse DENSE   1.0 SC Clayey Gravely SAND, fine to coarse sand, low plasticity clay, fine to coarse DENSE   1.2 BOREHOLE TERMINATED AT 1 2m Image: Stip Stip Stip Stip Stip Stip Stip Stip				C.M.	rootlets, moist.	nasucity siit, brown, with grass				
0.7 CL-CH Sandy CLAY: medium plasticity clay, fine to medium grained sand, trace STIFF   1.0 CL-CH Sandy CLAY: medium plasticity clay, fine to medium grained sand, trace STIFF   1.0 SC Clayey Gravelly SAND: fine to coarse sand, low plasticity clay, fine to coarse DENSE   1.2 SC Clayey Gravelly SAND: fine to coarse sand, low plasticity clay, fine to coarse DENSE		0.2		CL	Sandy Silty CLAY; low plasticity fines, fine to m moist to wet.	iedium grained sand, light brown,	FIR	RM		ALLUVIUM
1.0 SC Clayey Gravelly SAND: fine to coarse sand, low plasticity clay, fine to coarse gravel and quartz, orange-grey, dry. DENSE   1.2 SC Clayey Gravelly SAND: fine to coarse sand, low plasticity clay, fine to coarse DENSE		0.7		CL-CH	Sandy CLAY; medium plasticity clay, fine to me ferruginous nodules to 5mm, orange-grey mottl	edium grained sand, trace ed, dry.	ST	IFF		RESIDUAL SOIL
BOREHOLE TERMINATED AT 1.2m refusal		1.0 <sup>1</sup> -		SC	Clayey Gravelly SAND; fine to coarse sand, low gravel and quartz, orange-grey, dry.	/ plasticity clay, fine to coarse	DE	NSE		-
			-		BOREHOLE TERMINAT refusal	ED AT 1.2m				
Logged By : KA Date : 15/06/21 Checked By : JM Date : 17/06/21	Logge	<u> </u>	KA	<u> </u>	Date : 15/06/21	Checked By :	JN	1	Date :	17/06/21

Borehole	l oa					Borehol	e No.	B01
20101010	9					Sheet	1 of 1	
CLIENT:	Sout	hern	Region Land Engineering			Job No.	C118	322
PROJECT	Brisb Rose	ane ( mont	Grove Rural Subdivision t Road & Mountain Ash Ro	oad, Goulburn, NSW	V	Locatio	n : SEE REPOR	Г
Equipment Type: Hole Diameter: \$	PUSH <sup>-</sup> 50mm	TUBE D	RILL			Angle F Bearing	rom Vertical : 0° : N.A.	I
Samples Casing	Graphic	U.S.C.S.	Material Description, Stru Soil Type: Plasticity or Particle Charact Colour, Secondary and Minor Component	ucture eristics, ents,	onsistency	or Relative Density	Field Test Results	Geological Profile
Met	res <u>117 - 54 / 1</u> <u>117 - 54 / 1 <u>117 - 54 / 1</u> <u>117 - 54 / 1 <u>117 - 54 / 1 <u>117 - 54 / 1</u> <u>117 - 54 / 1 <u>117 - 54 / 1 <u>117 - 54 / 1</u> <u>117 - 54 / 1 <u>117 - 54 / 1 <u>117 - 54 / 1</u> <u>117 - 54 / 1 <u>117 - 54 / 1 <u>117 - 54 / 1 <u>117 - 55</u></u></u></u></u></u></u></u></u></u></u></u></u></u></u>	M SM	Silty SAND; fine to medium grained sand, low grass rootlets, moist.	plasticity silt, dark brown, with	LC	DOSE		TOPSOIL
		SC SC	Clayey Gravelly SAND; fine to coarse sand, lo grained sedimentary gravel, brown, red-brown	w plasticity clay, fine to medium , moist.	ME DE	EDIUM ENSE		COLLUVIUM
		CL	Sandy CLAY; low to medium plasticity clay, fir	ne to coarse sand, brown, dry.	ST VE ST	nff to Ry Iff		RESIDUAL SOIL
1	. <b>0</b> <sup>1</sup>		Extremely Weathered (EW) SANDSTONE; findry.	e to medium grained, light brown,	EX W	(TREMELY EAK	,	-
	-		BOREHOLE TERMINA refusal	FED AT 1.1m				
Logged By	. <u>6</u> : K	A	Date : 15/06/21	Checked By :	JN	Л	Date :	17/06/21
Geotechnical Enginee	rs			chickled Dy i	A	CT Ge	eotechnical	Engineers

Bor	eholo	e Lo	oa				Boreho	le No.	B02
			- 9				Sheet	1 of 1	
CLI	ENT:	S	outhe	ern F	Region Land Engineering		Job No	C118	322
PRO	OJECT	г В R	risba	ne (	Grove Rural Subdivision	ad Goulburn NSW	Locatio	n : SEE REPOR	Т
Equip Hole [	ment Typ Diameter	e : Pl : 50m	JSH TL	JBE DI	RILL		Line Collar I Angle F Bearing	_evel:Not Know From Vertical: 0 g: N.A.	n
mples	asing	epth	aphic -og	s.C.S.	Material Description, Stru Soil Type: Plasticity or Particle Charact	ucture eristics,	sistency or elative ensity	Field Test	Geological
Sai	Ŭ	∩ ∕letres	5 	0. ⊃	Colour, Secondary and Minor Compone Moisture, Structure	nts,		Results	
		-		SM	Silty SAND; fine to medium grained sand, low rootlets, moist.	plasticity silt, brown, with grass	LOUSE		TOPSOIL
		0.2 <u>-</u> -		CL	Silty Sandy CLAY; low plasticity fines, fine sar	d, light brown, moist.	FIRM		ALLUVIUM
		0.5 _ - -		CL	Sandy CLAY; low to medium plasticity clay, fir and ferruginous nodules, red-brown, light brow	e to coarse sand, trace fine gravel n, some orange, dry to moist.	STIFF		
		<b>1.0</b> — - -							-
		<u>    1.4                                </u>			BOREHOLE TERMINA	TED AT 1.4m			
	gged E	<u>зу</u> :	KA		Date : 01/06/21	Checked By :	JM	Date :	17/06/21
Geotechn	cal Engin	eers				1	ACT G	eotechnical	Engineers

Rorehole		n					Borehole	e No.	B03
		-9					Sheet	1 of 1	
CLIENT:	So	outhe	ern F	Region Land Engineering			Job No.	C118	322
PROJECT	Bi Re	risba osen	ne G nont	Brove Rural Subdivision Road & Mountain Ash Ro	oad, Goulburn, NSW	/	Location	: SEE REPOR	T n
Equipment Type Hole Diameter :	: PL 50m	JSH TU m	JBE DF	RILL			Angle Fi Bearing	rom Vertical : 0 : N.A.	5
sing	pth	phic og	.C.S.	Material Description, Str	ucture	stency	or ative nsity	Field Test	Geological
Me Car	ם etres	L a	U.S.	Soli Type: Plasticity or Particle Charact Colour, Secondary and Minor Compon- Moisture, Structure	ensucs, ents,	Consi		Results	Profile
	0.2		SM CL	Silty SAND; fine to medium grained sand, low rootlets, moist.	plasticity silt, brown, with grass	so	DET TO		
	• • • • • • • • • •		61	Silty Sandy CLAY; low plasticity fines, fine to moist to wet.	nedium grained sand, light brown,	FIF	RM		ALLUVIOM
	0.6		СН	Sandy CLAY; medium to high plasticity clay, f dry.	ine to coarse sand, orange-brown,	ST VE ST	IFF TO RY IFF		
	0.8 _ - <b>1.0</b> _		CL-CH	Sandy CLAY: medium plasticity clay, fine to c brown, dry.	oarse sand, orange-brown, light	VE ST HA	RY IFF TO RD		
	1.2			BOREHOLE TERMINA	TED AT 1.2m				
	-			vory slow plog					
Logged B	<u>1.6</u> y :	KA		Date : 01/06/21	Checked By :	JN	/	Date :	17/06/21
ttehn cal Engine	eers				1	A	CT Ge	otechnical	Engineer

Borehole I og	Borehole No	B	<b>304</b>
Dorenoie Log	Sheet	1 of 1	
CLIENT: Southern Region Land Engineering	Job No.	C1182	2
PROJECT Brisbane Grove Rural Subdivision	Location : S	SEE REPORT	
Equipment Type : PUSH TUBE DRILL Hole Diameter : 50mm	Collar Level Angle From Bearing : N	:Not Known Vertical : 0° .A.	
Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure	or Relative Density	Field Test Results	Geological Profile
Metres Silty SAND; fine to medium grained sand, low plasticity silt, brown, with grass CO   Image: Solution of the second of the	DOSE		TOPSOIL
0.2	DOSE	_	SLOPEWASH
0.3 CL Sandy Gravelly CLAY; low to medium plasticity clay, fine sand, fine grained gravel and ferruginous nodules, light grey, moist. FI   0.8 CL-CH Sandy CLAY; medium plasticity clay, fine to medium grained sand, orange-grey mottled, some red-brown, dry. Si	IRM TO TIFF TIFF TO ERY TIFF		ALLUVIUM - - - - - - -
1.0-   1.0-   1.1			-
		Date · 1	7/06/21
Geotochnical Engineers			

Borehole	<u>.</u>	Da				Borehole	e No.	C01
		9				Sheet	1 of 1	
CLIENT:	S	outhe	ern F	Region Land Engineering		Job No.	C11	822
PROJECT	B	risba osen	ne C nont	Grove Rural Subdivision Road & Mountain Ash Ro	oad, Goulburn, NSW	Location	: SEE REPOR	RT
Equipment Type Hole Diameter :	e : PL : 50m	JSH TU m	IBE DI	RILL		Angle Fi Bearing	rom Vertical : 0 : N.A.	0
sing	pth	phic og	C.S.	Material Description, Stru	ucture	stency or ative nsity	Field Test	Geological
M Can	ے letres	Gra	U.S	Colour, Secondary and Minor Compone Moisture, Structure	ensucs, ents,	Der Ref. 0	Results	Profile
	_		SM	Silty SAND; fine to medium grained sand, low rootlets, moist.	plasticity silt, brown, with grass	LOOSE		TOPSOIL
	0.2 _		SM	Silty Gravelly SAND; fine to coarse sand, low grained sedimentary gravel, grey/brown, dry to	plasticity silt, fine to medium moist.	MEDIUM DENSE		ALLUVIUM
	0.3 _		СН	Sandy CLAY; medium to high plasticity clay, fi mottled red-brown, dry.	ne to coarse sand, yellow-brown	VERY STIFF		RESIDUAL SOIL
	0.5 _	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	SC	Clayey Gravelly SAND; fine to coarse sand, lo medium grained sedimentary gravel, yellow-br	w to medium plasticity clay, fine to rown, dry.	DENSE		
	0.9	<u>. /. /.</u>		BOREHOLE TERMINA refusal	TED AT 0.9m			
	<b>1.0</b>							
Logged B	<u>1.6</u> By :	KA		Date : 16/06/21	Checked By :	JM	Date :	17/06/21
eotechnical Engin	eers				1	ACT Ge	otechnica	Engineers

orobolo					Boreho	le No.	C02
	LUY				Sheet	1 of <i>1</i>	1
CLIENT:	South	nern l	Region Land Engineering		Job No	C11	822
PROJECT	Brisb Rose	ane ( mont	Grove Rural Subdivision	oad. Goulburn. NSV	Locatio	n : SEE REPOF	RT
Equipment Type Hole Diameter :	: PUSH 1 50mm	UBE D	RILL	, _ ,	Angle F	From Vertical : 0 : N.A.	vn °
Casing	Graphic	U.S.C.S.	Material Description, Stru Soil Type: Plasticity or Particle Charact Colour, Secondary and Minor Compone Moisture, Structure	ucture eristics, ents,	onsistency or Relative Density	Field Test Results	Geological Profile
	$\frac{ \underline{x}, \underline{y}, \underline{y} }{ \underline{y}, \underline{y} }$	SM	Silty SAND; fine to medium grained sand, low rootlets, moist.	plasticity silt, brown, with grass	LOOSE		TOPSOIL
0	15 	SM	Silty Gravelly SAND; fine to coarse sand, fine low plasticity silt, grey, moist.	gravel and ferruginous nodules,	LOOSE TO MEDIUM DENSE		ALLUVIUM
		CH	Sandy CLAY; medium to high plasticity clay, fi some orange-brown, dry to moist.	ine to coarse sand, light brown,	STIFF TO VERY STIFF		RESIDUAL SO
0	.85 .0-	CH	Sandy CLAY; high plasticity clay, fine to coars 20mm, light brown, dry to moist.	e sand, trace sedimentary gravel to	VERY STIFF TO HARD		
	1.3		BOREHOLE TERMINA	TED AT 1.3m			
	.6		Deta : 16/06/21	Checked By :		Data	47/00/04

Rore	holo		1			Boreho	ole No.	C03
DOIG		LUY				Sheet	1 of 1	
CLIE	ENT:	Sout	thern	Region Land Engineering		Job No	<sup></sup> C118	322
PRO	JECT	Brisk Rose	bane emon	Grove Rural Subdivision t Road & Mountain Ash Rc	ad, Goulburn, NSW		on : SEE REPOR	T
Equipm Hole Di	nent Type: iameter : {	PUSH 50mm	TUBE [	PRILL		Angle Bearin	From Vertical : 0° g : N.A.	
Samples	Casing	Graphic	Log U.S.C.S.	Material Description, Str Soil Type: Plasticity or Particle Charact Colour, Secondary and Minor Compone Michting Structure	ucture eristics, ents,	onsistency or Relative Density	Field Test Results	Geological Profile
	Met		5 SM	Silty SAND; fine to medium grained sand, low rootlets, moist.	plasticity silt, brown, with grass	Ŭ LOOSE		TOPSOIL
		2.2 موجود مرجود مرجو مرجود مرجود مرج مرجود مرجود مرج	SM	Silty Gravelly SAND; fine to medium grained s and ferruginous nodules, dark brown, dry to m	and, low plasticity silt, fine gravel oist.	LOOSE		ALLUVIUM
				Sandy CLAY; medium plasticity clay, fine to c red, dry to moist.	parse sand, orange-brown, some	STIFF		
	1	<b>0</b> -	СН	Sandy CLAY; medium to high plasticity clay, f mottled, dry.	ine to coarse sand, grey-orange	VERY STIFF		RESIDUAL SOIL
		-		BOREHOLE TERMINA	TED AT 1.4m			
Log	 Iged By	.6   : ド	<a< td=""><td>Date : 16/06/21</td><td>Checked By :</td><td>JM</td><td>Date :</td><td>17/06/21</td></a<>	Date : 16/06/21	Checked By :	JM	Date :	17/06/21
Ge <u>cte</u> chn	cal Enginee	rs			1	ACT G	eotechnical	Engineers

Borehole Log	Borehole No. C04
Dorenoie Log	Sheet 1 of 1
CLIENT: Southern Region Land Engineering	Job No. C11822
PROJECT Brisbane Grove Rural Subdivision Bosemont Road & Mountain Ash Road, Goulburn, NS	Location : SEE REPORT
Equipment Type : PUSH TUBE DRILL Hole Diameter : 50mm	Collar Level : Not Known Angle From Vertical : 0° Bearing : N.A.
Solution Solution Structure   Solution Solution Solution	Besults Besults Besults Besults Besults
Moisture, Structure   Metres Moisture, Structure   Moisture, Structure	S LOOSE TOPSOIL
0.3 ML Clayey Sandy SILT; low to medium plasticity fines, fine to medium grained sar fine gravel and ferruginous nodules, light brown, moist to wet.	IND, FIRM ALLUVIUM
0.6 CH Silty CLAY; medium to high plasticity fines, orange-grey mottled, dry to moist.	. VERY STIFF RESIDUAL SOIL
1.3 BOREHOLE TERMINATED AT 1.3m	
Logged By : KA Date : 16/06/21 Checked By	· .IM Date · 17/06/21

Borehole I og			Borehol	e No.	D01
Borenole Log			Sheet	1 of 1	
CLIENT: Souther	n Region Land Engineering		Job No.	C118	322
PROJECT Brisband Rosemo	e Grove Rural Subdivision nt Road & Mountain Ash Ro	oad, Goulburn, NSW	Location	n:SEE REPOR evel:Not Know	T
Equipment Type: PUSH TUBI Hole Diameter : 50mm	E DRILL		Angle F Bearing	rom Vertical : 0 : N.A.	
Samples Casing Depth Log	5 5 5 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	ucture eristics, ents,	onsistency or Relative Density	Field Test Results	Geological Profile
<u>Metres</u>	M Silty SAND; fine to medium grained sand, low rootlets, moist.	plasticity silt, brown, with grass	U LOOSE		TOPSOIL
	IL Clayey Sandy SILT; low plasticity fines, fine to moist to wet.	medium grained sand, brown,	FIRM		ALLUVIUM
	CL Silty Gravelly CLAY; low to medium plasticity in nodules, light brown, moist.	înes, fine gravel and ferruginous	FIRM TO STIFF		
0.7	H Sandy CLAY; medium to high plasticity clay, fi orange-brown, orange-grey, dry to moist.	ine to medium grained sand,	VERY STIFF		RESIDUAL SOIL
	BOREHOLE TERMINA	TED AT 1.3m			
Logged By : KA	Date : 17/06/21	Checked By :	JM	Date :	17/06/21

Borehole Loa		Boreh	ole No.	D02
		Sheet	1 of	1
CLIENT: Southern Region Land Eng	gineering	Job No	<sup>o.</sup> C11	1822
PROJECT Brisbane Grove Rural Sub Rosemont Road & Mounta	division in Ash Road, Goulburn,	NSW College	on: SEE REPO	RT
Equipment Type : PUSH TUBE DRILL Hole Diameter : 50mm		Angle Bearin	From Vertical : g : N.A.	0°
Soil Type: Plasticity Colour, Secondary a Motore	cription, Structure or Particle Characteristics, nd Minor Components,	Consistency or Relative Density	Field Test Results	Geological Profile
Metres Metres   Metres Metres	grained sand, low plasticity silt, brown, with	grass LOOSE		TOPSOIL
0.2 Silty Gravelly SAND; fine to and ferruginous nodules, lig	medium grained sand, low plasticity silt, fine ht brown, moist.	gravel LOOSE		ALLUVIUM
0.7 CH Sandy CLAY; medium to hig gravel and ferruginous nodu	gh plasticity clay, fine to coarse sand, some fi les, orange-grey mottled, dry to moist.	ine VERY STIFF		RESIDUAL SOIL
BOR	EHOLE TERMINATED AT 1.3m			
1.6				

orehole I (	n				Bo	rehole No.		D03
	Jy				Sh	eet	1 of 1	
CLIENT: S	outhe	rn F	Region Land Engineering		Jo	b No.	C11	822
	risbar	ne G	Grove Rural Subdivision	ad Goulburn NSM	Lo Lo	cation : SEE	REPOR	RT
Equipment Type : PL Hole Diameter : 50m	JSH TUE m	BE DF			Co An Be	ollar Level: N gle From Vert aring: N.A.	lot Know tical : 0	° °
Samples Casing Depth	Graphic Log	U.S.C.S.	Material Description, Stru Soil Type: Plasticity or Particle Character Colour, Secondary and Minor Component	acture eristics, nts,	onsistency or	Field Deusity Te Res	eld est sults	Geological Profile
Metres	<u>1</u> <u>1</u> <u>1</u> <u>1</u> <u>1</u> <u>1</u> <u>1</u> <u>1</u> <u>1</u> <u>1</u>	SM	Silty SAND; fine to medium grained sand, low rootlets, moist.	plasticity silt, brown, with grass	LOOSE			TOPSOIL
0.15		СН	Sandy CLAY; medium to high plasticity clay, fi to moist.	ne to coarse sand, red-brown, dry	STIFF VERY STIFF	ТО		RESIDUAL SOIL
0.5_		СН	Silty CLAY; medium to high plasticity fines, so yellow-brown/grey, dry to moist.	me fine to medium grained sand,	VERY STIFF			
1.0		CL-CH	Sandy Gravelly CLAY; medium plasticity clay, medium grained sedimentary gravel, yellow-br	fine to coarse sand, fine to own, dry.	VERY STIFF HARD	то		
	<u>; ;6 / 9</u>		BOREHOLE TERMINAT	ED AT 1.3m				
1.6			Dete : 16/06/21	Chooked By			to i	17/06/21

Boro	hol		00				B	orehole No.		D04
DUIC		e L	Uy				S	heet	1 of 1	
CLIE	NT:	S	outhe	ern F	Region Land Engineering		Jo	ob No.	C118	322
PRO	JEC	T B	risba losen	ne G	Grove Rural Subdivision Road & Mountain Ash Ro	ad Goulburn NSV	V L	ocation : S	EE REPOR	Г
Equipm Hole Di	nent Tyj iameter	be : Pl : 50m	USH TU 1m	JBE DF	RILL	,	A B	ollar Level: ngle From V earing : N./	: Not Knowr /ertical : 0° A.	1
nples	tsing	epth	aphic .og	.C.S.	Material Description, Stru Soil Type: Plasticity or Particle Charact		istency	lative nsity	Field Test	Geological
Sar	ő	م Metres	5	C.S	Colour, Secondary and Minor Compone Moisture, Structure	ents,	Cons		Results	
				SM	Silty SAND; fine to medium grained sand, low rootlets, moist.	plasticity silt, brown, with grass		E		IUPSUL
		0.2		SM	Silty Gravelly SAND; fine to medium grained s nodules, low plasticity silt, light brown, brown,	and, fine gravel and ferruginous dry.	LOOS TO MEDI DENS	E UM E		ALLUVIUM
		0.3 - -		СН	Sandy CLAY; medium to high plasticity clay, f moist.	ne sand, orange-brown, dry to	VERY			RESIDUAL SOIL
		0.7 .		СН	CLAY; high plasticity clay, trace fine gravel an dry.	d ferruginous nodules, light brown,	VERY STIFF HARE	то		
		<b>1.0</b> –								
		-			BOREHOLE TERMINA	TED AT 1.3m				
Log	ged	<u>1.6</u> By :	KA		Date : 16/06/21	Checked By :	JM		Date :	17/06/21
ie <u>ett</u> ehna	cal Eng	iteers				1	AC	l Geote	chnical	Engineer
Bore	ehole	Loa				Boreho	ble No.	D05		
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		-~y				Sheet	1 of 1			
CLIE	ENT:	Sout	hern	Region Land Engineering		Job No	<sup>o.</sup> C118	322		
PRO	OJECT	Brisk Rose	ane ( emon	Grove Rural Subdivision t Road & Mountain Ash Ro	oad, Goulburn, NSW	Locatio	on : SEE REPOR	T		
Equip Hole [	ment Type: Diameter : 5	PUSH 0mm	TUBE D	RILL		Angle Bearin	From Vertical : 0 g : N.A.	11		
Samples	Casing	Graphic	U.S.C.S.	Material Description, Structure     Solid Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure     Structure			Field Test Results	Geological Profile		
	Meti		SM SM	Silty SAND; fine to medium grained sand, low rootlets, moist.	plasticity silt, brown, with grass	LOOSE		TOPSOIL		
	c	.2	ML	Gravelly Sandy SILT; low plasticity silt, fine to & ferruginous nodules, light brown, yellow-bro	medium grained sand, fine gravel wn, dry.	LOOSE TO MEDIUM DENSE		ALLUVIUM		
	c		sc X	Gravelly Clayey SAND; fine to coarse sand, fir ferruginous nodules, low plasticity clay, orange	ne to medium grained gravel and e-grey, orange-brown, dry.	MEDIUM DENSE		-		
07/21	1.	<b>0</b> -	СН	Sandy CLAY; medium to high plasticity clay, fi	ine to medium grained sand,	VERY				
J ACT GEO.GDT 04/	1	.3		orange-grey mottled, dry to moist.		SIFF		-		
E/EXCAVATION LOG C11822.6P.		-		BOREHOLE TERMINA	TED AT 1.3m			-		
	gged By	•K	A	Date : 16/06/21	Checked By :	JM	Date :	17/06/21		
Geettehn	cal Engineer	'S				ACT G	eotechnical	Engineers		

Bore	hole I	oa				Boreho	le No.	D07
		~9				Sheet	1 of <i>1</i>	l
CLIE	NT: S	South	ern F	Region Land Engineering		Job No	C11	822
PRO	JECT F	Brisba Roser	ine C nont	Grove Rural Subdivision Road & Mountain Ash Ro	ad, Goulburn, NSW	Locatio	n : SEE REPOR	RT (n
Equipm Hole Di	ient Type: F ameter : 50i	PUSH TL mm	JBE DI	RILL		Angle F Bearing	From Vertical : C I : N.A.	0
Samples	Samples Casing Depth Log U.S.C.S.			Material Description, Stru Soil Type: Plasticity or Particle Characte Colour, Secondary and Minor Compone Moisture. Structure	Material Description, Structure   5     Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure   5			Geological Profile
	Metre		SM	Silty SAND; fine to medium grained sand, low rootlets, moist.	plasticity silt, brown, with grass	LOOSE		TOPSOIL
	0.2		CL	Silty Sandy CLAY; low plasticity fines, fine to n moist.	nedium grained sand, light brown,	FIRM		ALLUVIUM
	0.4	د	SM	Silty Gravelly SAND; fine to medium grained sa ferruginous nodules, light brown, orange-brown	and, low plasticity silt, fine gravel & ,, dry to moist.	MEDIUM DENSE		
	0.6		СН	Sandy CLAY; high plasticity clay, fine to mediu light brown, dry to moist.	m grained sand, orange-brown,	VERY STIFF		RESIDUAL SOIL
	1.0							
	1.3			BOREHOLE TERMINAT	ED AT 1.3m			
		_						
Log	 ged By :	KA	<u> </u>	Date : 16/06/21	Checked By:	JM	Date :	17/06/21
Ge <u>etta</u> chric	al Engineers				<u> </u>	ACT G	eotechnica	l Engineers

Borehole I og			Boreho	le No.	D08			
			Sheet	1 of 1				
CLIENT: Southern F	Region Land Engineering		Job No.	C11	822			
PROJECT Brisbane C Rosemont	Grove Rural Subdivision Road & Mountain Ash Ro	ad, Goulburn, NSW	Locatio	n : SEE REPOR	RT			
Equipment Type : PUSH TUBE DF Hole Diameter : 50mm	RILL		Angle F Bearing	From Vertical : 0	0			
mples asing epth og	Material Description, Stru Soil Type: Plasticity or Particle Characte		sistency or lative ensity	Field Test	Geological			
metres 00 5 50 50 50 50 50 50 50 50 50 50 50 5	Colour, Secondary and Minor Compone Moisture, Structure	nts,		Results	TOPSOIL			
	Silty SANU; fine to medium grained sand, low rootlets, moist.	plasticity silt, brown, with grass	LUUSE		TOFSOIL			
0.2	Silty Clavey SAND: fine to coarse sand low pl	asticity fines, dark brown	LOOSE		ALLUVIUM			
	red-brown, dry to moist.		TO MEDIUM DENSE					
0.8	Clayey Gravelly SAND; fine to coarse sand, me	edium plasticity clay, fine to	DENSE		RESIDUAL SOIL			
	medium grained sedimentary gravel, brown, lig	jht brown, dry.						
1.0-					-			
9 A.								
1.2	Extremely Weathered (EW) SILTSTONE; fine t	o medium grained, light brown,	EXTREMEL	<i>,</i>	BEDROCK			
	dry.		WEAK					
	BOREHOLE TERMINAT	ED AT 1.3m						
Logged By : KA	Date : 17/06/21	Checked By :	JM	Date :	17/06/21			
Gestachnical Engineers			ACT G	eotechnical	Engineers			

Sheet 1 of 1   Southern Region Land Engineering Location: SEE REPORT   PROJECT Brisbane Grove Rural Subdivision   Resembler Road & Mountain Ash Road, Goulburn, NSW   Control of EREPORT   Meters Dural Subdivision   Resembler Exel   Meters Dural Subdivision   Resembler Exel   Meters Dural Subdivision   Meters Dural Description Structure   Meters Dural Subdivision   Meters Dural Description Structure   Meters Dural Description Structure   Meters Dural Description Structure   Meters Dural Description Structure	Borehold	م ا د	n				Boreh	ole No.	D09
CLIENT:   Southern Region Land Engineering   Job No.   C11822     PROJECT   Brisbane Grove Rural Subdivision Rosemont Road & Mountain Ash Road, Goulburn, NSW   Location :: SEE REPORT     Edulpment Type :: PUSH TUBE DRILL   Cold Type Pacifie Characteristics, Medicine State Characteristics, Medicine Characteristics, M	Dorchold		9				Sheet	1 of 1	
PROJECT   Brisbane Grove Rural Subdivision Rosemant Road & Mountain Ash Road, Goulburn, NSW   Location: SEE REPORT     Editorment Type:::PUSH TUBE DRLL   Editorment Type:::PUSH TUBE DRLL   Coller Leet To Monon Addition and the Source of the	CLIENT:	S	outhe	ern F	Region Land Engineering		Job No	<sup>2.</sup> C118	22
Constrained in the constraint of the cons	PROJECT	. В R	risba osen	ne G nont	Grove Rural Subdivision Road & Mountain Ash Roa	ad. Goulburn. NSW	Locati	on : SEE REPORT	-
Build     Part     Heid Metrical     Open- Sub- Contraction     Open- Contraction     Open- Sub- Contraction     Open- Sub- Contraction     Open- Sub- Contraction     Open- Contraction     Op	Equipment Type Hole Diameter	e : Pl : 50m	JSH TU im	BE DF	RILL	, - ,	Angle Bearin	Level: Not Known From Vertical: 0° g: N.A.	
Image: Second	Samples Casing Depth Log U.S.C.S.			U.S.C.S.	Material Description, Stru Soil Type: Plasticity or Particle Characte Colour, Secondary and Minor Componer	cture istics, its,	onsistency or Relative Density	Field Test Results	Geological Profile
0.2   0.2   0.4   SM   Silly Gravely SANC. Ene to medium grained sand, low plasticity silt, fine gravel   LOOSE     0.4   0.4   0.4   Silly Gravely CLAY. low to medium plasticity clay, fine to coarse sand, fine   STEP TO	M	letres		SM	Silty SAND; fine to medium grained sand, low p rootlets, moist.	lasticity silt, brown, with grass	LOOSE		TOPSOIL
1.0 0.4 Stress Sandy Gravely CLAY; low to medium plasticity clay, fine to coarse sand, fine STIFF TO VERY TO STIFF   1.0 1.0 Sandy CLAY; medium to high plasticity clay, fine to coarse sand, orange-grey, dry, VERY STIFF   1.1 0.1 Sandy CLAY; medium to high plasticity clay, fine to coarse sand, orange-grey, dry, VERY STIFF		0.2 _	2.0	SM	Silty Gravelly SAND; fine to medium grained sa and ferruginous nodules, light brown, moist.	nd, low plasticity silt, fine gravel	LOOSE		ALLUVIUM
1.2 CH Sandy CLAY; medium to high plasticity clay, fine to coarse sand, orange-grey, dry. VERY STIFF   1.3 BOREHOLE TERMINATED AT 1.3m		0.4 _		CL	Sandy Gravelly CLAY; low to medium plasticity gravel and ferruginous nodules, orange-brown,	clay, fine to coarse sand, fine ight brown, moist.	STIFF TO VERY STIFF		RESIDUAL SOIL
		1.2 _ 1.3 _	1 5 3	СН	Sandy CLAY; medium to high plasticity clay, fin dry. BOREHOLE TERMINATI	e to coarse sand, orange-grey,	VERY STIFF	_	
Logged By : KA Date : 17/06/21 Checked By : JM Date : 17/06/21	Logged E	зу:	KA		Date : 17/06/21	Checked By :	JM	Date :	17/06/21

orehole I og			Boreho	e No.	D10
			Sheet	1 of <sup>-</sup>	1
CLIENT: Southern F	Region Land Engineering		Job No.	C11	822
PROJECT Brisbane G Rosemont	Grove Rural Subdivision Road & Mountain Ash Ro	ad. Goulburn. NSW	Locatio	n : SEE REPOI	RT
Equipment Type : PUSH TUBE DF Hole Diameter : 50mm	Angle F Bearing	ievel : Not Knov From Vertical : ( I : N.A.	vn )°		
Samples Casing Graphic Log U.S.C.S.	Material Description, Structure   Soil Type: Plasticity or Particle Characteristics,   Soil Type: Plasticity or Particle Characteristics,     Colour, Secondary and Minor Components,   Moisture, Structure			Field Test Results	Geological Profile
<u>SM</u> <u><u>SM</u> <u><u>SM</u> <u>SM</u> <u><u>SM</u> <u>SM</u> <u><u>SM</u> <u>SM</u> </u></u></u></u>	Silty SAND; fine to medium grained sand, low rootlets, moist.	plasticity silt, brown, with grass	LOOSE		TOPSOIL
0.2 CH	Silty CLAY; high plasticity fines, light brown, d	ry.	VERY STIFF		RESIDUAL SOIL
0.8 CH CH	Silty CLAY; high plasticity fines, orange-brown	, dry.	VERY STIFF TO HARD		
	BOREHOLE TERMINAT	IEU AI 1.4m			
	Date : 16/06/21	Checked By	JM	Date ·	17/06/21

Bore	hole I	oa				Boreho	ole No.	D11
2010						Sheet	1 of 1	
CLIE	ENT: S	South	ern F	Region Land Engineering		Job No	<sup>.</sup> C118	322
PRO	JECT F	Brisba Rosen	ne C nont	Grove Rural Subdivision Road & Mountain Ash Ro	ad. Goulburn. NSW	Locatio	on : SEE REPOR	Т
Equipm Hole Di	nent Type: F iameter : 50r	USH TL	JBE DI	RILL		Line Collar I Angle F Bearing	Level:Not Know From Vertical: 0 <sup>°</sup> g: N.A.	n
Samples	Casing Depth	Graphic Log	U.S.C.S.	Material Description, Stru Soil Type: Plasticity or Particle Character Colour, Secondary and Minor Componer Moisture, Structure	acture eristics, nts,	onsistency or Relative Density	Field Test Results	Geological Profile
	Metres		SM	Silty SAND; fine to medium grained sand, low rootlets, moist.	LOOSE		TOPSOIL	
	0.3		CL	Silty CLAY; low to medium plasticity fines, ligh	t brown, moist.	FIRM		ALLUVIUM
	0.5		CL	Silty Gravelly CLAY; low plasticity fines, fine gr orange-brown, dry to moist.	FIRM			
0.7 CH				Sandy CLAY; medium to high plasticity clay, fi mottled, dry.	ne to coarse sand, orange-grey	VERY STIFF		RESIDUAL SOIL
	1.0 -							-
	1.4			BOREHOLE TERMINAT	ED AT 1.4m			
Log	<u>  1.6</u> 1.6 ged By	KA		Date : 16/06/21	Checked By :	JM	Date :	17/06/21
Ge <u>øtt</u> chn	cal Engineers				- -	ACT G	eotechnical	Engineers

oroholo					Boreho	e No.	E01
Orenoie	LUg				Sheet	1 of	1
CLIENT:	Southe	ern F	Region Land Engineering		Job No.	C11	822
PROJECT	Brisba Rosen	ne C nont	Grove Rural Subdivision Road & Mountain Ash Ro	ad. Goulburn. NSV	Location	n : SEE REPO	RT
Equipment Type Hole Diameter :	: PUSH TU 50mm	JBE DI	RILL	, - ,	Angle F Bearing	rom Vertical : 0 N.A.	wn D°
Samples Casing Casing Graphic Log U.S.C.S.			Material Description, Stru Soil Type: Plasticity or Particle Charact Colour, Secondary and Minor Compone Moisture, Structure	onsistency or Relative Density	Field Test Results	Geological Profile	
Me	Ites       Image: A fill of the state of th	SM	Silty SAND; fine to medium grained sand, low with grass rootlets, moist.	plasticity silt, brown, dark brown,	LOOSE		TOPSOIL
		CL	Silty Sandy CLAY; low plasticity fines, fine to of ferruginous nodules, light brown, moist.	coarse sand, trace fine gravel and	FIRM		ALLUVIUM
	0.5	CL-CH	Sandy Gravelly CLAY; medium plasticity clay, sedimentary gravel, yellow-brown, dry to mois	fine to coarse sand, fine to coarse t.	STIFF TO VERY STIFF		RESIDUAL SO
		СН	Sandy CLAY; medium to high plasticity clay, fi mottled, brown, dry.	ne to coarse sand, orange-grey	VERY STIFF		
			BOREHOLE TERMINA	TED AT 1.3m			
Logged By	/: KA		Date : 17/06/21	Checked By :	JM	Date :	17/06/21

Bore	hole L	oa				Boreho	le No.	E02
		- 3				Sheet	1 of 1	
CLIE	ENT: S	outh	ern F	Region Land Engineering		Job No.	C11	822
PRO	JECT B	risba	ne C	Grove Rural Subdivision	ad Goulburn NSW	Locatio	n : SEE REPOR	RT
Equipm Hole Di	nent Type: Pl iameter: 50n	USH TU 1m	JBE DI	RILL	,	Angle F Bearing	evel:Not Know From Vertical:0 J:N.A.	'n
Samples	Casing Depth	Graphic Log	U.S.C.S.	Material Description, Struct Soil Type: Plasticity or Particle Character Colour, Secondary and Minor Componen Moisture. Structure	consistency or Relative Density	Field Test Results	Geological Profile	
	Metres	<u>17 - 24 - 17</u> - <u>17 - 24 - 17</u> - <u>17 - 24 - 17</u> - <u>17 - 27 - 17</u>	SM	Silty SAND; fine to medium grained sand, low p with grass rootlets, moist.	lasticity silt, brown, dark brown,	LOOSE		TOPSOIL
	0.2		CL	Silty Sandy CLAY; low plasticity fines, fine to me brown, moist.	edium grained sand, brown, light	FIRM		ALLUVIUM
	0.5_		CL	Silty Gravelly CLAY; low to medium plasticity fin nodules, light brown, moist to wet.	es, fine gravel and ferruginous	FIRM		
	0.9 <b>1.0</b> –		СН	Sandy CLAY; medium to high plasticity clay, fine sedimentary gravel and ferruginous nodules, ora	e to coarse sand, trace fine ange-grey mottled, dry to moist.	STIFF TO VERY STIFF		RESIDUAL
	1.3			BOREHOLE TERMINATE	:D AT 1.3m			
Log	iged By:	KA		Date : 17/06/21	Checked By :	JM	Date :	17/06/21
Ge <u>ette</u> chnic	cal Engineers					ACT Ge	eotechnica	Engineers

Bore	ho	eld	na				E	Borehole	e No.	E03
Dore			J				ę	Sheet	1 of 1	
CLIE	NT:	S	outhe	ern F	Region Land Engineering		`	Job No.	C118	322
PRO	JEC	T B R	risba osen	ne C nont	Grove Rural Subdivision Road & Mountain Ash Ro	ad, Goulburn, NSW		_ocation	: SEE REPOR	T
Equipm Hole Di	nent Ty iamete	r : 50m	JSH TL Im	JBE DI	RILL		Ē	Angle Fi Bearing	rom Vertical : 0 : N.A.	11 5
Samples	Samples Casing Casing Depth Casing Depth Log U.S.C.S.			U.S.C.S.	Material Description, Structure   Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure   Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure   Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure   Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure   Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure   Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure   Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure   Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure   Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure   Soil Type: Plastic Characteristics, Colour, Secondary and Minor Components, Moisture, Structure     Moisture, Structure   Soil Type: Plastic Characteristics, Colour, Secondary and Minor Components, Moisture, Structure   Soil Type: Plastic Characteristics, Colour, Secondary and Minor Components, Moisture, Structure			Relative Density	Field Test Results	Geological Profile
		<u>Metres</u>	<u>14</u> <u>14</u> <u>14</u> <u>14</u> <u>14</u> <u>14</u>	SM	Silty SAND; fine to medium grained sand, low with grass rootlets, moist.	plasticity silt, brown, dark brown,	LOC	SE		TOPSOIL
		0.15		CL	Sandy CLAY; low plasticity clay, fine to mediu trace gravel to 10mm, moist.	m grained sand, orange-brown,	FIRM	Л		ALLUVIUM
		0.4 _		CL-CH	Sandy Gravelly CLAY; medium plasticity clay, ferruginous nodules, dry to moist.	fine to coarse sand, fine gravel and	STIF	F		RESIDUAL SOIL
		-								
		1.0 —		SC	Clayey SAND / Sandy CLAY; low to medium p fine sedimentary gravel, dry.	lasticity clay, fine to coarse sand,	VER STIF DEN	Y F/ ISE		
		-								
		<u>    1.3    </u>			BOREHOLE TERMINA	rED AT 1.3m				
Log	lged	<u>1.6</u> By :	KA		Date : 16/06/21	Checked By :	JM		Date :	17/06/21
Ge <u>sta</u> chnic	cal Eng	ineers					۵C	T Ge	otechnical	Fngineers

APPENDIX C Laboratory Test Certificates

## Client Reference: ACT Geotechnical Engineers- C11822

Organochlorine Pesticides in soil						
Our Reference		272356-6	272356-7	272356-8	272356-9	272356-10
Your Reference	UNITS	A6	B4	C2	D2	D4
Depth		0.0-0.2m	0.0-0.2m	0.0-0.4m	0.0-0.2m	0.0-0.2m
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/06/2021	25/06/2021	25/06/2021	25/06/2021	25/06/2021
Date analysed	-	25/06/2021	25/06/2021	25/06/2021	25/06/2021	25/06/2021
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
НСВ	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	98	92	94	92	93

## Client Reference: ACT Geotechnical Engineers- C11822

Organophosphorus Pesticides in Soil						
Our Reference		272356-6	272356-7	272356-8	272356-9	272356-10
Your Reference	UNITS	A6	B4	C2	D2	D4
Depth		0.0-0.2m	0.0-0.2m	0.0-0.4m	0.0-0.2m	0.0-0.2m
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/06/2021	25/06/2021	25/06/2021	25/06/2021	25/06/2021
Date analysed	-	25/06/2021	25/06/2021	25/06/2021	25/06/2021	25/06/2021
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	98	92	94	92	93

## Client Reference: ACT Geotechnical Engineers- C11822

Misc Inorg - Soil						
Our Reference		272356-1	272356-2	272356-3	272356-4	272356-5
Your Reference	UNITS	A7	A10	B2	D3	D11
Depth		0.1-0.4m	0.0-0.3m	0.3-0.6m	0.15-0.4m	0.3-0.5m
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	29/06/2021	29/06/2021	29/06/2021	29/06/2021	29/06/2021
Date analysed	-	29/06/2021	29/06/2021	29/06/2021	29/06/2021	29/06/2021
pH 1:5 soil:water	pH Units	6.5	5.3	5.5	5.8	6.8
Electrical Conductivity 1:5 soil:water	µS/cm	36	52	34	46	52
Emerson Class No.	-	5.0	5.0	5.0	5.0	5.0
Phosphorus Sorption Capacity	mg/kg	510	380	590	940	770

APPENDIX D Limitations of Geotechnical Report



ACT Geotechnical Engineers Pty Lt ACN 063 673 530 5/9 Beaconsfield Street, Fyshwick ACT 2609 PO Box 9225, Deakin ACT 2600 Ph: (02) 6285 1547

# Limitations in the Use and Interpretation of this Geotechnical Report

Our Professional services were performed, our findings obtained, and our recommendations prepared in accordance with generally accepted engineering principles and practices. This warranty is in lieu of all other warranties, either expressed or implied.

The geotechnical report was prepared for the use of the Owner in the design of the subject development and should be made available to potential contractors and/or the Contractor for information on factual data only. This report should not be used for contractual purposes as a warranty of interpreted subsurface conditions such as those indicated by the interpretive borehole and test pit logs, cross- sections, or discussion of subsurface conditions contained herein.

The analyses, conclusions and recommendations contained in the report are based on site conditions as they presently exist and assume that the exploratory bore holes, test pits, and/or probes are representative of the subsurface conditions of the site. If, during construction, subsurface conditions are found which are significantly different from those observed in the exploratory bore holes and test pits, or assumed to exist in the excavations, we should be advised at once so that we can review these conditions and reconsider our recommendations where necessary. If there is a substantial lapse of time between conducting this investigation and the start of work at the site, or if conditions have changed due to natural causes or construction operations and reconsult to the site, this report should be reviewed to determine the applicability of the conclusions and the recommendations considering the changed conditions and time lapse.

The summary bore hole and test pit logs are our opinion of the subsurface conditions revealed by periodic sampling of the ground as the test holes progressed. The soil descriptions and interfaces between strata are interpretive and actual changes may be gradual.

The bore hole and test pit logs and related information depict subsurface conditions only at the specific locations and at the particular time designated on the logs. Soil conditions at the other locations may differ from conditions occurring at these bore hole and test pit locations. Also, the passage of time may result in a change in the soil conditions at these test locations.

Groundwater levels often vary seasonally. Groundwater levels reported on the boring logs or in the body of the report are factual data only for the dates shown.

Unanticipated soil conditions are commonly encountered on construction sites and cannot be fully anticipated by merely taking soil samples, bore holes or test pits. Such unexpected conditions frequently require that additional expenditures be made to attain a properly constructed project. It is recommended that the Owner consider providing a contingency fund to accommodate such potential extra costs.

This firm cannot be responsible for any deviation from the intent of this report including, but not restricted to, any changes to the scheduled time of construction, the nature of the project or the specific construction methods or means indicated in this report: nor can our company be responsible for any construction activity on sites other than the specific site referred to in this report.



# ATTACHMENT C NorBE Assessment Wastewater Effluent Model Summaries

# A01-1 NorBE Assessment

# WEM Summary

## **General Information**

WEM model ID	2334112	Associated DA number			
Model description					
Consultancy	Southern Region Land Engineering	Consultant	g	regtodd.sr	e@gmail.com
Consultant reference number	T01405				
Council	Goulburn Mulwaree	Assessing officer			
Nominated lot	2//835278	Associated lots	Lot	Section	Plan
Development class	Subdivision unsewered >=4 lots		2		835278
			1		835278
			1		731427
			22		811954
			23		811954
			24		811954
			3		835278
			1		779194
			103		70346
			104		126140

105

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Date of model run

#### **WEM Model Run Summary**

Model run outcome Pending

#### Any of the sub-surface plumes reaches:

Lot boundary	N/A
Drainage depression	N/A
Top bank of watercourse	N/A
Another disposal field or onsite stormwater management system	N/A
Within 50m, and up gradient of, a licensed drinking water bore	N/A

#### **Proposed Front End Design**

Length (across slope)(m)	40.0	Width (up slope)(m)	20.0
Proposed area(m2)	800.0	Minimum Required area	730.0
Number of trenches	0	(m2)	



126140

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Effluent volume proposed (I/day)	800
Effluent volume calculated (l/day)	800

### **WEM Model Inputs**

#### Location

	Easting	9551687.974039	Northing	4326432.862298
Dei	Slope (m/m)	0.06959	Slope is suitable based on site inspection (Applicable to some disposal systems on streen slopes)	N/A
De	reiopinient		steep slopes)	
	Development type	Dwellings	Development detail	4 bedrooms
	Water supply type	Rainwater	Spa Bath	No
	Continuous system use	Yes		
	Treatment system	AWTS standard	Disposal system	Irrigation sub-surface
Sit	2			
	Lot size(m2)	4000		
	Subject to severe frost	No	Bulk density(g/cm3)	2.00
	Vegetation for nutrient uptake	nutrient uptake Lawn - unmanaged		510
	Soil depth (to impermeable layer) (m)	1.30	(mg/kg) Soil structure	Strong
	Saturated hydraulic conductivity (Ksat)(m/day)	0.06		
	Soil texture	Med-heavy clays		
Effi	uent disposal risk factors			
	Depth to water table	> 1.0		
	Flood potential of disposal system	Above 1 in 50 year ARI		
	Landform score	Hill crests, convex side slopes an	d plains	
	Run-on and upslope seepage	None-low, diversion possible		
	Rock outcrops, scarp and bedrock	< 5%		
	Distance to drainage dpression	> 50		
	Distance to watercourses and water supply reservoirs	> 120		
	Distance to licenced drinking water bores	> 150		

#### **WEM Plume Map**



# A01-2 SPA NorBE Assessment

# WEM Summary

#### **General Information**

WEM model ID	2334111	Associated DA number			
Model description					
Consultancy	Southern Region Land Engineering	Consultant	g	regtodd.sr	e@gmail.com
Consultant reference number	T01405				
Council	Goulburn Mulwaree	Assessing officer			
Nominated lot	2//835278	Associated lots	Lot	Section	Plan
Development class	Subdivision unsewered >=4 lots		2		835278
			1		835278
			1		731427
			22		811954
			23		811954
			24		811954
			3		835278
			1		779194
			103		70346

Date of model run

#### **WEM Model Run Summary**

Model run outcome Pending

#### Any of the sub-surface plumes reaches:

Lot boundary	N/A
Drainage depression	N/A
Top bank of watercourse	N/A
Another disposal field or onsite stormwater management system	N/A
Within 50m, and up gradient of, a licensed drinking water bore	N/A

#### **Proposed Front End Design**

Length (across slope)(m)	50.0	Width (up slope)(m)	26.0
Proposed area(m2)	1300.0	Minimum Required area	1187.0
Number of trenches	0	(m2)	



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Effluent volume proposed (l/day)	1300
Effluent volume calculated (I/day)	1300

### **WEM Model Inputs**

#### Location

	Easting	9551687.974039	Northing	4326432.862298	
Dev	Slope (m/m)	0.06959	Slope is suitable based on site inspection (Applicable to some disposal systems on steen slones)	N/A	
20					
	Development type	Dwellings	Development detail	4 bedrooms	
	Water supply type	Rainwater	Spa Bath	Yes	
	Continuous system use	Yes			
	Treatment system	AWTS standard	Disposal system	Irrigation sub-surface	
Site	e				
	Lot size(m2)	4000			
	Subject to severe frost	No	Bulk density(g/cm3)	2.00	
	Vegetation for nutrient uptake	otake Lawn - unmanaged	Phosphorus sorption	510	
	Soil depth (to impermeable layer) (m)	1.30	Soil structure	Strong	
	Saturated hydraulic conductivity (Ksat)(m/day)	1.31			
	Soil texture	Med-heavy clays			
Effi	uent disposal risk factors				
	Depth to water table	> 1.0			
	Flood potential of disposal system	Above 1 in 50 year ARI			
	Landform score	Hill crests, convex side slopes an	d plains		
	Run-on and upslope seepage	None-low, diversion possible			
	Rock outcrops, scarp and bedrock	< 5%			
	Distance to drainage dpression	> 50			
Distance to watercourses and >120 water supply reservoirs					
	Distance to licenced drinking water bores	> 150			

#### **WEM Plume Map**



# A01-3 NorBE Assessment

# WEM Summary

#### **General Information**

WEM model ID	2334110	Associated DA number			
Model description					
Consultancy	Southern Region Land Engineering	Consultant	gr	egtodd.srl	e@gmail.com
Consultant reference number	T01405				
Council	Goulburn Mulwaree	Assessing officer			
Nominated lot	2//835278	Associated lots	Lot	Section	Plan
Development class	Subdivision unsewered >=4 lots		2		835278
			1		835278
			1		731427
			22		811954
			23		811954
			24		811954
			3		835278
			1		779194
			103		70346

Date of model run

#### **WEM Model Run Summary**

Model run outcome Pending

#### Any of the sub-surface plumes reaches:

Lot boundary	N/A
Drainage depression	N/A
Top bank of watercourse	N/A
Another disposal field or onsite stormwater management system	N/A
Within 50m, and up gradient of, a licensed drinking water bore	N/A

#### **Proposed Front End Design**

Length (across slope)(m)	40.0	Width (up slope)(m)	20.0
Proposed area(m2)	800.0	Minimum Required area	730.0
Number of trenches	0	(m2)	



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Effluent volume proposed (I/day)	800
Effluent volume calculated (l/day)	800

## **WEM Model Inputs**

#### Location

	Easting	9551687.974039	Northing	4326432.862298
Dev	Slope (m/m)	0.06959	Slope is suitable based on site inspection (Applicable to some disposal systems on strong slopes)	N/A
Development			steep slopes)	
	Development type	Dwellings	Development detail	4 bedrooms
	Water supply type	Rainwater	Spa Bath	No
	Continuous system use	Yes		
	Treatment system	AWTS standard	Disposal system	Irrigation sub-surface
Sit	e			
	Lot size(m2)	4000		
	Subject to severe frost	No	Bulk density(g/cm3)	2.00
	Vegetation for nutrient uptake	Lawn - unmanaged	Phosphorus sorption	510
	Soil depth (to impermeable layer) (m)	1.30	(mg/kg) Soil structure	Strong
	Saturated hydraulic conductivity (Ksat)(m/day)	1.31		
	Soil texture	Med-heavy clays		
Effi	uent disposal risk factors			
	Depth to water table	> 1.0		
	Flood potential of disposal system	Above 1 in 50 year ARI		
	Landform score	Hill crests, convex side slopes an	d plains	
	Run-on and upslope seepage	None-low, diversion possible		
	Rock outcrops, scarp and bedrock	< 5%		
	Distance to drainage dpression	> 50		
	Distance to watercourses and water supply reservoirs	> 120		
	Distance to licenced drinking water bores	> 150		

#### WEM Plume Map





#### **General Information**

WEM model ID	2334818	Associated DA number			
Model description					
Consultancy	Southern Region Land Engineering	Consultant	g	jregtodd.sr	le@gmail.com
Consultant reference number	T01405				
Council	Goulburn Mulwaree	Assessing officer			
Nominated lot	2//835278	Associated lots	Lot	Section	Plan
Development class	Subdivision unsewered >=4 lots		2		835278
			1		835278
			1		731427
			22		811954
			23		811954
			24		811954
			3		835278
			1		779194
			103		70346
			104		126140

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Date of model run

#### **WEM Model Run Summary**

Model run outcome Pending

#### Any of the sub-surface plumes reaches:

Lot boundary	N/A
Drainage depression	N/A
Top bank of watercourse	N/A
Another disposal field or onsite stormwater management system	N/A
Within 50m, and up gradient of, a licensed drinking water bore	N/A

#### **Proposed Front End Design**

Length (across slope)(m)	40.0	Width (up slope)(m)	20.0
Proposed area(m2)	800.0	Minimum Required area	730.0
Number of trenches	0	(m2)	



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Effluent volume proposed (l/day)	800
Effluent volume calculated (l/day)	800

### **WEM Model Inputs**

#### Location

	Easting	9551146.503076	Northing	4326517.820624	
Dev	Slope (m/m)	0.04222	Slope is suitable based on site inspection (Applicable to some disposal systems on steen slopes)	N/A	
Development					
	Development type	Dwellings	Development detail	4 bedrooms	
	Water supply type	Rainwater	Spa Bath	No	
	Continuous system use	Yes			
	Treatment system	AWTS standard	Disposal system	Irrigation sub-surface	
Sit	e				
	Lot size(m2)	4000			
	Subject to severe frost	No	Bulk density(g/cm3)	1.80	
	Vegetation for nutrient uptake	Lawn - unmanaged	Phosphorus sorption	380	
	Soil depth (to impermeable layer) (m)	layer) <b>1.30</b>	Soil structure	Moderate	
	Saturated hydraulic conductivity (Ksat)(m/day)	1.30			
	Soil texture	Light clays			
Effi	uent disposal risk factors				
	Depth to water table	> 1.0			
	Flood potential of disposal system	Above 1 in 50 year ARI			
	Landform score	Hill crests, convex side slopes an	d plains		
	Run-on and upslope seepage	None-low, diversion possible			
Rock outcrops, scarp and bedrock <b>&lt; 5%</b>					
	Distance to drainage dpression	> 50			
	Distance to watercourses and water supply reservoirs	> 120			
	Distance to licenced drinking water bores	> 150			

#### **WEM Plume Map**





#### **General Information**

WEM model ID	2334823	Associated DA number			
Model description					
Consultancy	Southern Region Land Engineering	Consultant	gregtodd.srle@gmail.com		
Consultant reference number	T01405				
Council	Goulburn Mulwaree	Assessing officer			
Nominated lot	2//835278	Associated lots	Lot	Section	Plan
Development class	Subdivision unsewered >=4 lots		2		835278
			1		835278
			1		731427
			22		811954
			23		811954
			24		811954
			3		835278
			1		779194
			103		70346

Date of model run

#### **WEM Model Run Summary**

Model run outcome Pending

#### Any of the sub-surface plumes reaches:

Lot boundary	N/A
Drainage depression	N/A
Top bank of watercourse	N/A
Another disposal field or onsite stormwater management system	N/A
Within 50m, and up gradient of, a licensed drinking water bore	N/A

#### **Proposed Front End Design**

Length (across slope)(m)	40.0	Width (up slope)(m)	20.0
Proposed area(m2)	800.0	Minimum Required area	730.0
Number of trenches	0	(m2)	



126140

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Effluent volume proposed (l/day)	800
Effluent volume calculated (l/day)	800

### **WEM Model Inputs**

#### Location

	Easting	9551146.503076	Northing	4326517.820624
	Slope (m/m)	0.04222	Slope is suitable based on site inspection (Applicable to some disposal systems on	N/A
De	velopment		steep slopes)	
	Development type	Dwellings	Development detail	4 bedrooms
	Water supply type	Rainwater	Spa Bath	No
	Continuous system use	Yes		
	Treatment system	AWTS standard	Disposal system	Irrigation sub-surface
Sit	e			
	Lot size(m2)	4000		
	Subject to severe frost	No	Bulk density(g/cm3)	1.80
	Vegetation for nutrient uptake	nutrient uptake Lawn - unmanaged		380
	Soil depth (to impermeable layer) (m)	ble layer) <b>1.30</b>	(mg/kg) Soil structure	Moderate
	Saturated hydraulic conductivity (Ksat)(m/day)	0.06		
	Soil texture	Light clays		
Eff	luent disposal risk factors			
	Depth to water table	> 1.0		
	Flood potential of disposal system	Above 1 in 50 year ARI		
	Landform score	Hill crests, convex side slopes an	d plains	
	Run-on and upslope seepage	None-low, diversion possible		
	Rock outcrops, scarp and bedrock	< 5%		
	Distance to drainage dpression	> 50		
	Distance to watercourses and water supply reservoirs	> 120		
	Distance to licenced drinking water bores	> 150		

#### **WEM Plume Map**





#### **General Information**

WEM model ID	2334824	Associated DA number				
Model description						
Consultancy	Southern Region Land Consultan Engineering		gregtodd.srle@gmail.com			
Consultant reference number	T01405					
Council	Goulburn Mulwaree	Assessing officer				
Nominated lot	2//835278	Associated lots	Lot	Section	Plan	
Development class	Subdivision unsewered >=4 lots		2		835278	
			1		835278	
			1		731427	
			22		811954	
			23		811954	
			24		811954	
			3		835278	
			1		779194	
			103		70346	
			104	_	126140	
			105	_	126140	
			1		853498	

106

Date of model run

#### **WEM Model Run Summary**

Model run outcome Pending

#### Special design criteria, including soil modification and soil permeability testing, will be required

#### Any of the sub-surface plumes reaches:

Lot boundary	N/A
Drainage depression	N/A
Top bank of watercourse	N/A
Another disposal field or onsite stormwater management system	N/A
Within 50m, and up gradient of, a licensed drinking water bore	N/A

#### **Proposed Front End Design**

Length (across slope)(m)	20.0	Width (up slope)(m)	3.8
Proposed area(m2)	150.0	Minimum Required area	
Number of trenches	2	(m2)	







Effluent volume proposed (l/day)	400
Effluent volume calculated (l/day)	600

### **WEM Model Inputs**

#### Location

	Easting	9551146.503076	Northing	4326517.820624
	Slope (m/m)	0.04222	Slope is suitable based on site inspection (Applicable to some disposal systems on	N/A
De	velopment		steep slopes)	
	Development type	Dwellings	Development detail	3 bedrooms
	Water supply type	Rainwater	Spa Bath	No
	Continuous system use	Yes		
	Treatment system	Septic tank	Disposal system	Absorption trench – primary effluent
Sit	e			
	Lot size(m2)	4000		
	Subject to severe frost	No	Bulk density(g/cm3)	1.80
	Vegetation for nutrient uptake	Lawn - unmanaged	Phosphorus sorption	380
	Soil depth (to impermeable layer) (m)	1.30	Soil structure	Moderate
	Saturated hydraulic conductivity (Ksat)(m/day)	0.06		
	Soil texture	Light clays		
Eff	luent disposal risk factors			
	Depth to water table	> 1.0		
	Flood potential of disposal system	Above 1 in 50 year ARI		
	Landform score	Hill crests, convex side slopes ar	nd plains	
	Run-on and upslope seepage	None-low, diversion possible		
	Rock outcrops, scarp and bedrock	< 5%		
	Distance to drainage dpression	> 50		
	Distance to watercourses and water supply reservoirs	> 120		
	Distance to licenced drinking water bores	> 150		

#### WEM Plume Map



# A06-1 NorBE Assessment

# WEM Summary

#### **General Information**

WEM model ID	Associated DA number				
Model description					
Consultancy Southern Region Land Engineering		Consultant	gregtodd.srle@gmail.com		
Consultant reference number	T01405				
Council	Goulburn Mulwaree	Assessing officer			
Nominated lot	2//835278	Associated lots	Lot	Section	Plan
Development class	Subdivision unsewered >=4 lots		2		835278
			1		835278
			1		731427
			22		811954
			23		811954
			24		811954
			3		835278
			1		779194
			103		70346

Date of model run

#### **WEM Model Run Summary**

Model run outcome Pending

#### Any of the sub-surface plumes reaches:

Lot boundary	N/A
Drainage depression	N/A
Top bank of watercourse	N/A
Another disposal field or onsite stormwater management system	N/A
Within 50m, and up gradient of, a licensed drinking water bore	N/A

#### **Proposed Front End Design**

Length (across slope)(m)	40.0	Width (up slope)(m)	20.0	
Proposed area(m2)	800.0	Minimum Required area	730.0	
Number of trenches	0	(m2)		



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Effluent volume proposed (I/day)	800
Effluent volume calculated (l/day)	800

### **WEM Model Inputs**

#### Location

	Easting	9551253.127413	Northing	4326145.975520	
_	Slope (m/m)	0.05111	Slope is suitable based on site inspection (Applicable to some disposal systems on	N/A	
Dev	velopment		steep slopes)		
	Development type	Dwellings	Development detail	4 bedrooms	
	Water supply type	Rainwater	Spa Bath	No	
	Continuous system use	Yes			
	Treatment system	AWTS standard	Disposal system	Irrigation sub-surface	
Sit	e				
	Lot size(m2)	4000			
	Subject to severe frost	No	Bulk density(g/cm3)	1.60	
	Vegetation for nutrient uptake	Lawn - unmanaged	Phosphorus sorption	500	
	Soil depth (to impermeable layer) (m)	1.40	Soil structure	Weak	
	Saturated hydraulic conductivity (Ksat)(m/day)	1.00			
	Soil texture	Clay loams			
Effi	uent disposal risk factors				
	Depth to water table	> 1.0			
	Flood potential of disposal system	Above 1 in 50 year ARI			
	Landform score	Concave side slopes and foot slop	bes		
	Run-on and upslope seepage	None-low, diversion possible			
	Rock outcrops, scarp and bedrock	< 5%			
	Distance to drainage dpression	> 50			
	Distance to watercourses and water supply reservoirs	> 120			
	Distance to licenced drinking water bores	> 150			

#### **WEM Plume Map**



# A10-1 NorBE Assessment

# WEM Summary General Information

WEM model ID	2334828	Associated DA number			
Model description	Concept effluent treatment				
Consultancy	Southern Region Land Engineering	Consultant	gregtodd.srle@gmail.com		
Consultant reference number	T01405				
Council	Goulburn Mulwaree	Assessing officer			
Nominated lot	1//853498	Associated lots	Lot	Section	Plan
Development class	Subdivision unsewered >=4 lots		2		835278
			1		835278
			1		731427
			22		811954
			23		811954
			24		811954

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Date of model run

#### **WEM Model Run Summary**

Model run outcome Pending

#### Any of the sub-surface plumes reaches:

Lot boundary	N/A
Drainage depression	N/A
Top bank of watercourse	N/A
Another disposal field or onsite stormwater management system	N/A
Within 50m, and up gradient of, a licensed drinking water bore	N/A

#### **Proposed Front End Design**

Length (across slope)(m)	40.0	Width (up slope)(m)	20.0
Proposed area(m2)	800.0	Minimum Required area	730.0
Number of trenches	0	(m2)	



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Effluent volume proposed (I/day)	800
Effluent volume calculated (l/day)	800

### **WEM Model Inputs**

#### Location

	Easting	9550898.493270	Northing	4326683.866589
De	Slope (m/m)	0.02291	Slope is suitable based on site inspection (Applicable to some disposal systems on strong stores)	N/A
Dev	velopment		steep slopes)	
	Development type	Dwellings	Development detail	4 bedrooms
	Water supply type	Rainwater	Spa Bath	No
	Continuous system use	Yes		
	Treatment system	AWTS standard	Disposal system	Irrigation sub-surface
Site	2			
	Lot size(m2)	4000		
	Subject to severe frost	No	Bulk density(g/cm3)	1.60
	Vegetation for nutrient uptake	Lawn - unmanaged	Phosphorus sorption	380
	Soil depth (to impermeable layer) (m)	1.20	(mg/kg) Soil structure	Weak
	Saturated hydraulic conductivity (Ksat)(m/day)	0.20		
	Soil texture	Clay loams		
Effi	uent disposal risk factors			
	Depth to water table	> 1.0		
	Flood potential of disposal system	Above 1 in 50 year ARI		
	Landform score	Hill crests, convex side slopes an	d plains	
	Run-on and upslope seepage	None-low, diversion possible		
	Rock outcrops, scarp and bedrock	< 5%		
	Distance to drainage dpression	> 50		
	Distance to watercourses and water supply reservoirs	> 120		
	Distance to licenced drinking water bores	> 150		

#### WEM Plume Map



# B01-1 NorBE Assessment

# WEM Summary General Information

WEM model ID	2335120	Associated DA nu	mber			
Model description	Concept effluent management					
Consultancy	Southern Region Land Engineering	Consultant	gr	egtodd.srl	e@gmail.com	
Consultant reference number	T01405					
Council	Goulburn Mulwaree	Assessing officer				
Nominated lot	1//853498	Associated lots	Lot	Section	Plan	
Development class	Subdivision unsewered >=4 lots		2		8352	278
			1		8352	278
			1		7314	427
			22		8119	954
			23		8119	954
			24		8119	954

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Date of model run

#### **WEM Model Run Summary**

Model run outcome Pending

#### Any of the sub-surface plumes reaches:

Lot boundary	N/A
Drainage depression	N/A
Top bank of watercourse	N/A
Another disposal field or onsite stormwater management system	N/A
Within 50m, and up gradient of, a licensed drinking water bore	N/A

#### **Proposed Front End Design**

Length (across slope)(m)	40.0	Width (up slope)(m)	20.0
Proposed area(m2)	800.0	Minimum Required area	730.0
Number of trenches	0	(1112)	



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Effluent volume proposed (I/day)	800
Effluent volume calculated (l/day)	800

### **WEM Model Inputs**

#### Location

	Easting	9551027.485516	Northing	4326943.138470
	Slope (m/m)	0.02561	Slope is suitable based on site inspection (Applicable to some disposal systems on	N/A
De	velopment		steep slopes)	
	Development type	Dwellings	Development detail	4 bedrooms
	Water supply type	Rainwater	Spa Bath	Νο
	Continuous system use	Yes		
	Treatment system	AWTS standard	Disposal system	Irrigation sub-surface
Sit	e			
	Lot size(m2)	4000		
	Subject to severe frost	No	Bulk density(g/cm3)	1.60
	Vegetation for nutrient uptake	Lawn - unmanaged	Phosphorus sorption	400
	Soil depth (to impermeable layer) (m)	1.00	(mg/kg) Soil structure	High/moderate
	Saturated hydraulic conductivity (Ksat)(m/day)	1.00		
	Soil texture	Clay loams		
Eff	luent disposal risk factors			
	Depth to water table	0.4 - 1.0		
	Flood potential of disposal system	Above 1 in 50 year ARI		
	Landform score	Hill crests, convex side slopes ar	nd plains	
	Run-on and upslope seepage	None-low, diversion possible		
	Rock outcrops, scarp and bedrock	< 5%		
	Distance to drainage dpression	> 50		
	Distance to watercourses and water supply reservoirs	> 120		
	Distance to licenced drinking water bores	> 150		

#### **WEM Plume Map**



# **B02-1 NorBE** Assessment

# **WEM Summary General Information**

WEM model ID	2335121	Associated DA nu	mber		
Model description	Concept effluent management				
Consultancy	Southern Region Land Engineering	Consultant		gregtodd.srl	e@gmail.com
Consultant reference number	T01405				
Council	Goulburn Mulwaree	Assessing officer			
Nominated lot	1//853498	Associated lots	Lot	Section	Plan
Development class	Subdivision unsewered >=4 lots		2		83
			1		83
			1		73
			22		81
			23		81
			24		81

Date of model run

#### **WEM Model Run Summary**

Pending Model run outcome

#### Any of the sub-surface plumes reaches:

Lot boundary	N/A
Drainage depression	N/A
Top bank of watercourse	N/A
Another disposal field or onsite stormwater management system	N/A
Within 50m, and up gradient of, a licensed drinking water bore	N/A

#### **Proposed Front End Design**

Length (across slope)(m)	40.0	Width (up slope)(m)	20.0
Proposed area(m2)	800.0	Minimum Required area	730.0
Number of trenches	0	(mz)	



Effluent volume proposed (I/day)	800
Effluent volume calculated (l/day)	800

### **WEM Model Inputs**

#### Location

	Easting	9550647.406968	Northing	4327243.404693	
_	Slope (m/m)	0.01281	Slope is suitable based on site inspection (Applicable to some disposal systems on	N/A	
Dev	Development steep slopes)				
	Development type	Dwellings	Development detail	4 bedrooms	
	Water supply type	Rainwater	Spa Bath	No	
	Continuous system use	Yes			
	Treatment system	AWTS standard	Disposal system	Irrigation sub-surface	
Site					
	Lot size(m2)	4000			
	Subject to severe frost	No	Bulk density(g/cm3)	1.60	
	Vegetation for nutrient uptake	Lawn - unmanaged	Phosphorus sorption	590	
	Soil depth (to impermeable layer) (m)	1.00	Soil structure	Moderate	
	Saturated hydraulic conductivity (Ksat)(m/day)	1.00			
	Soil texture	Light clays			
Effluent disposal risk factors					
	Depth to water table	0.4 - 1.0			
	Flood potential of disposal system	Above 1 in 50 year ARI			
	Landform score	Hill crests, convex side slopes and plains			
	Run-on and upslope seepage None-low, diversion possible				
	Rock outcrops, scarp and bedrock	< 5%			
	Distance to drainage dpression	> 50			
	Distance to watercourses and water supply reservoirs	> 120			
	Distance to licenced drinking water bores	> 150			

#### WEM Plume Map


# C01-1 NorBE Assessment

# WEM Summary

WEM model ID	2335122	Associated DA number			
Model description	Concept effluent management				
Consultancy	Southern Region Land Engineering	Consultant	g	regtodd.sr	le@gmail.com
Consultant reference number	T01405				
Council	Goulburn Mulwaree	Assessing officer			
Nominated lot	1//731427	Associated lots	Lot	Section	Plan
Development class	Subdivision unsewered >=4 lots		2		835278
			1		835278
			1		731427
			22		811954
			23		811954
			24		811954
			3		835278

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Date of model run

### **WEM Model Run Summary**

Model run outcome Pending

### Any of the sub-surface plumes reaches:

Lot boundary	N/A
Drainage depression	N/A
Top bank of watercourse	N/A
Another disposal field or onsite stormwater management system	N/A
Within 50m, and up gradient of, a licensed drinking water bore	N/A

### **Proposed Front End Design**

Length (across slope)(m)	30.0	Width (up slope)(m)	28.0
Proposed area(m2)	840.0	Minimum Required area	
Number of trenches	0	(m2)	



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### **WEM Summary**

Effluent volume proposed (I/day)	800
Effluent volume calculated (l/day)	800

### **WEM Model Inputs**

### Location

	Easting	9552297.015593	Northing	4325911.594827	
	Slope (m/m)	0.01811	Slope is suitable based on site inspection (Applicable to some disposal systems on	N/A	
De	velopment		steep slopes)		
	Development type	Dwellings	Development detail	4 bedrooms	
	Water supply type	Rainwater	Spa Bath	Νο	
	Continuous system use	Yes			
	Treatment system	AWTS standard	Disposal system	Irrigation sub-surface	
Sit	e				
	Lot size(m2)	4000			
	Subject to severe frost	No	Bulk density(g/cm3)	2.00	
	Vegetation for nutrient uptake	Lawn - unmanaged	Phosphorus sorption	600	
	Soil depth (to impermeable layer) (m)	0.90	(mg/kg) Soil structure	Weak/massive	
	Saturated hydraulic conductivity (Ksat)(m/day)	0.06			
	Soil texture	Med-heavy clays			
Eff	luent disposal risk factors				
	Depth to water table	0.4 - 1.0			
	Flood potential of disposal system	Above 1 in 50 year ARI			
	Landform score	Hill crests, convex side slopes and plains			
	Run-on and upslope seepage	None-low, diversion possible			
	Rock outcrops, scarp and bedrock	< 5%			
	Distance to drainage dpression	> 50			
	Distance to watercourses and water supply reservoirs	> 120			
	Distance to licenced drinking water bores	> 150			

### **WEM Plume Map**

No image of the plumes is available. This may be because the model has not yet been run or because no image was generated when the model ran.



# C03-1 NorBE Assessment

## WEM Summary General Information

WEM model ID	2335124	Associated DA number			
Model description	Concept effluent management				
Consultancy	Southern Region Land Engineering	Consultant	gr	egtodd.srl	e@gmail.com
Consultant reference number	T01405				
Council	Goulburn Mulwaree	Assessing officer			
Nominated lot	1//731427	Associated lots	Lot	Section	Plan
Development class	Subdivision unsewered >=4 lots		2		835278
			1		835278
			1		731427
			22		811954
			23		811954
			24		811954

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Date of model run

### **WEM Model Run Summary**

Model run outcome Pending

#### Any of the sub-surface plumes reaches:

Lot boundary	N/A
Drainage depression	N/A
Top bank of watercourse	N/A
Another disposal field or onsite stormwater management system	N/A
Within 50m, and up gradient of, a licensed drinking water bore	N/A

### **Proposed Front End Design**

Length (across slope)(m)	40.0	Width (up slope)(m)	20.0
Proposed area(m2)	800.0	Minimum Required area	d area 730.0
Number of trenches	0	(1112)	



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### **WEM Summary**

Effluent volume proposed (l/day)	800
Effluent volume calculated (I/day)	800

### **WEM Model Inputs**

### Location

	Easting	9551584.606226	Northing	4325773.369124	
	Slope (m/m)	0.02065	Slope is suitable based on site inspection (Applicable to some disposal systems on	N/A	
De	velopment		steep slopes)		
	Development type	Dwellings	Development detail	4 bedrooms	
	Water supply type	Rainwater	Spa Bath	No	
	Continuous system use	Yes			
	Treatment system	AWTS standard	Disposal system	Irrigation sub-surface	
Sit	e				
	Lot size(m2)	411741			
	Subject to severe frost	No	Bulk density(g/cm3)	1.80	
	Vegetation for nutrient uptake	Lawn - unmanaged	Phosphorus sorption	500	
	Soil depth (to impermeable layer) (m)	1.40	(mg/kg) Soil structure	Moderate	
	Saturated hydraulic conductivity (Ksat)(m/day)	0.06			
	Soil texture	Light clays			
Eff	luent disposal risk factors				
	Depth to water table	> 1.0			
	Flood potential of disposal system	Above 1 in 50 year ARI			
	Landform score	Hill crests, convex side slopes and plains None-low, diversion possible			
	Run-on and upslope seepage				
	Rock outcrops, scarp and bedrock	< 5%			
	Distance to drainage dpression	> 50			
	Distance to watercourses and water supply reservoirs	> 120			
	Distance to licenced drinking water bores	> 150			

### **WEM Plume Map**

No image of the plumes is available. This may be because the model has not yet been run or because no image was generated when the model ran.

