



25 March 2019

Cabonne Council
PO Box 17
Molong NSW 2866

Attn: Jeeva San

Ref: L10776g

Dear Jeeva,

Geotechnical investigation, new reticulation pipeline alignment, Molong NSW

1. Introduction

A new reticulation pipeline is proposed for Molong NSW. The pipeline will be in sections of Molong Street, George Street, Park Street and Edward Place.

A preliminary geotechnical investigation is required to determine subsurface characteristics at the location of the proposed pipeline.

2. Objectives

Envirowest Consulting Pty Ltd was commissioned by Cabonne Council to undertake a preliminary geotechnical investigation at the alignment of the new pipeline.

The aim of the investigation is to describe subsurface ground conditions at the borehole locations including rock or groundwater to the target depth of 2m.

3. Site location

The investigation areas are parts of Molong Street, George Street, Park Street and Edward Place in Molong NSW (Figure 1).

4. Investigation methods

Site inspections and subsurface investigations were undertaken on 21 March 2019. The assessment area was scanned for underground cables and pipes by MrMac cable locating prior to drilling.

The subsurface properties were assessed by constructing 10 boreholes (BH1 to BH10). The borehole locations are outlined in Figure 1. The boreholes were constructed with a truck mounted drill rig and flight auger. The target depth of the borehole was 2m or drill refusal on rock.

Soil conditions were logged for each borehole including soil type, colour, depth, moisture, consistency, density, plasticity and estimated rock strength.

5. Results

5.1 Surface conditions

The surface of the site comprised native grasses, lawn grasses with some bare areas from the presence of gravel and rock.

Limestone rock outcrops were observed in the southern section George Street.

5.2 Subsurface conditions

The borelogs are presented in Appendix 2.

Drill refusal on extremely high strength rock was encountered in the boreholes drilled on the southern section of George Street (BH5 and BH6) at depths from 0.4m to 0.8m. The rock is expected to be limestone. Limestone outcrops were observed approximately 10m east of the proposed alignment.

The target depth of 2m was reached for boreholes BH1 to BH4 and BH7 to BH10. The typical profile for these boreholes was silty sand topsoil over silty clay with gravel and cobbles, weathered limestone rock and clayey gravel. The drilling consistency ranged from stiff to very stiff and hard (weathered rock).

No groundwater was encountered in the profile to the drilling depths.

6. Conclusions

Shallow rock (extremely high strength) was encountered in boreholes BH4 and BH5 at depths from 0.4m. The rock is limestone with an estimated compressive strength of 50MPa. The rock is an excavation limitation.

Weathered rock was encountered in boreholes BH8 to BH10 (Park Street) at depths from 1.7m. The rock was very high strength with an estimated compressive strength of 30MPa. The rock may be an excavation limitation.

Very stiff drilling was observed in boreholes BH1 to BH4 and BH7 to BH10 in clay with medium to coarse gravel and rock fragments. The very stiff drilling strata is not expected to be an excavation limitation.

Large limestone cobbles and boulders may be present within the profile in areas not assessed.

Regards,

Andrew Ruming
Environmental Geologist

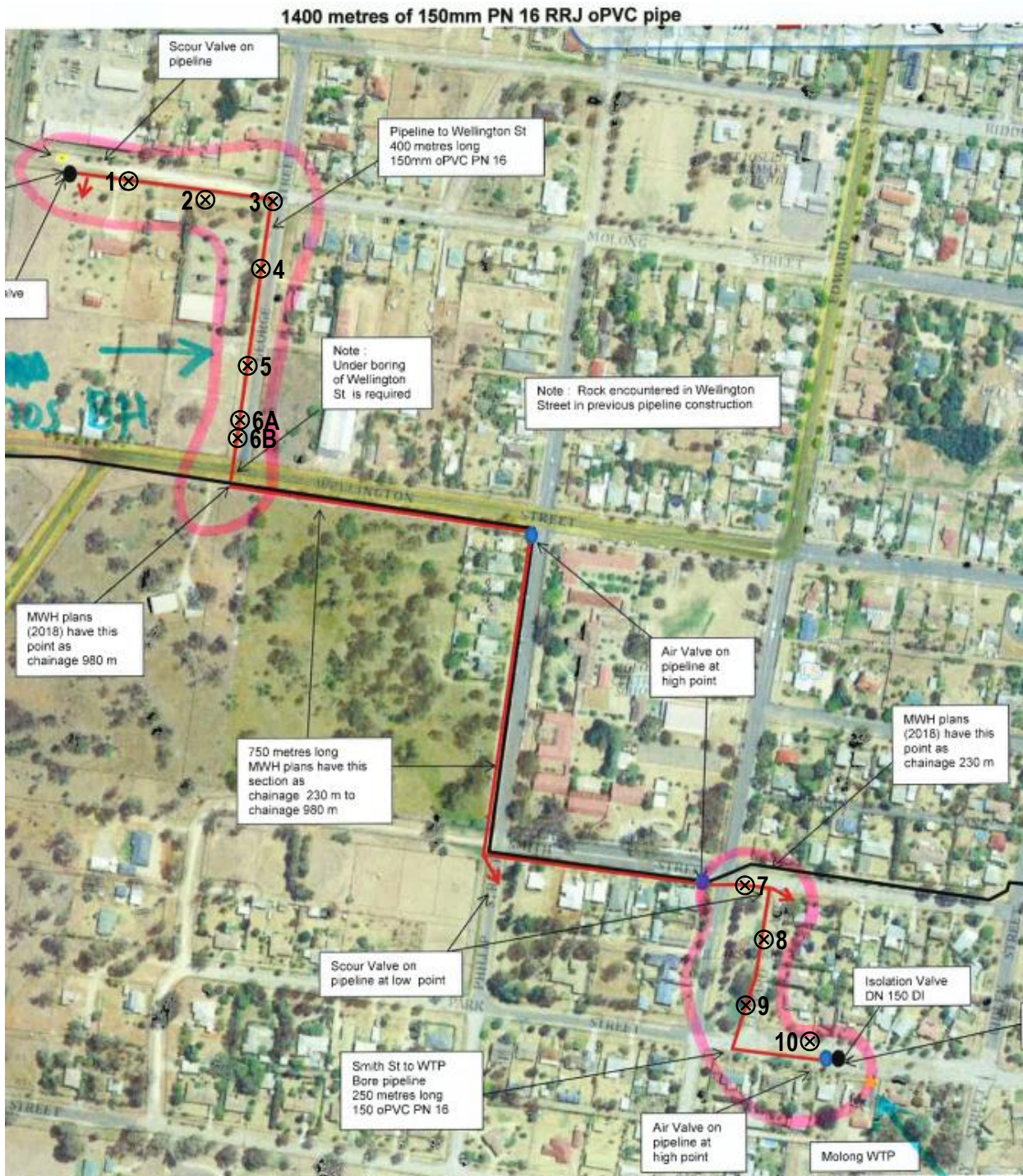
Checked by:
Greg Madafiglio
Engineering Geologist

Attachments

Figure 1. Borehole location

Appendix 1. Limitations

Appendix 2. Bore logs



e (shown in red) is a separable portion. It is 1400 metres long. Valve installation on pipeline is as per MWH standard drawings. Road

Legend

⊗ Borehole location

Figure 1. Site plan and borehole location		
Proposed reticulation pipeline, Molong NSW		
	Envirowest Consulting Pty Ltd	
Job – L10776g	Drawn by: AR from Cabonne Council plan	Date: 25/3/2019

Appendix 1. Limitations of the investigation

The engineering logs describe subsurface conditions only at a specific borehole location and inferred boundaries between geotechnical units may vary.

Ground conditions can vary over relatively short distances and it may be necessary to carry out additional investigations for specific excavation and building sites. Once specific proposals are known a geotechnical review should be undertaken and if necessary additional investigations commissioned to provide the level of information required for assessing design parameters. A geotechnical engineer should be engaged to review subsurface condition during construction stages to confirm that subsurface conditions are consistent with design assumptions.

This report has been prepared for the use of the client to achieve the objectives given the client requirements and cost constraints. The level of confidence of the conclusion reached is governed by the scope of the investigation and the availability and quality of existing data. Where limitations or uncertainties are known, they are identified in the report. No liability can be accepted for failure to identify conditions or issues which arise in the future and which could not reasonably have been predicted using the scope of the investigation and the information obtained.

The investigation identifies the actual subsurface conditions only at those points where samples are taken, when they are taken. Data derived through sampling and subsequent laboratory testing are interpreted by geologists, engineers or scientists who then render an opinion about overall subsurface conditions, the nature and extent of the investigation and its likely impact on the proposed development. Actual conditions may differ from those inferred to exist, because no professional, no matter how well qualified, and no sub surface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock or time. The actual interface between materials may be far more gradual or abrupt than a report indicates. Actual conditions in areas not sampled may differ from predictions. It is thus important to understand the limitations of the investigation and recognise that Envirowest Consulting Pty Ltd are not responsible for these limitations.

This report including data contained and its findings and conclusions remain the intellectual property of Envirowest Consulting Pty Ltd. This report should not be used by persons or for purposes other than stated and not reproduced without permission.

Appendix 2. Bore logs

Engineering Log - Borehole

Project No.: 10776

Client: Cabonne Council	Commenced: 21-03-2019
Project Name: Molong pipeline	Completed: 21-03-2019
Hole Location: Molong	Logged By: AR
Hole Position: Molong Street 55H 673519 6336737	Checked By: GM

Drill Model and Mounting: EVH auger drill rig	Inclination: -90°	RL Surface: No survey
Hole Diameter: 75 mm	Bearing:	Datum: AHD Operator: TB

Drilling Information				Soil Description						Observations				
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density	Pocket Penetrometer UCS (kPa)	Structure and Additional Observations
AD/T	[Hatched]						0	[Symbol]	SM	SILTY SAND, brown with fine gravel	D	St		
							0.5	[Symbol]	CI	SANDY CLAY, strong brown with fine gravel	D	St		
							1.0	[Symbol]	CI	SILTY CLAY, brown with medium gravel	D	St		
							1.5	[Symbol]	CI	SILTY CLAY, red brown with medium gravel	D	St		
							2			Hole Terminated at 2.00 m Target depth				
							3							
							4							
							5							
							6							
							7							

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<p>Method</p> <p>AS - Auger Screwing RR - Rock Roller WB - Washbore</p>	<p>Penetration</p> <p>No resistance ranging to refusal</p>	<p>Water</p> <p>Level (Date) Inflow Partial Loss Complete Loss</p>	<p>Samples and Tests</p> <p>U - Undisturbed Sample D - Disturbed Sample SPT - Standard Penetration Test</p>	<p>Moisture Condition</p> <p>D - Dry M - Moist W - Wet</p>	<p>Consistency/Relative Density</p> <p>VS - Very Soft S - Soft F - Firm VSt - Very Stiff H - Hard Fr - Friable VL - Very Loose L - Loose MD - Medium Dense D - Dense VD - Very Dense</p>
<p>Support</p> <p>C - Casing</p>	<p>Graphic Log/Core Loss</p> <p>Core recovered (hatching indicates material) Core loss</p>	<p>Classification Symbols and Soil Descriptions</p> <p>Based on Unified Soil Classification System</p>	<p>Plastic Limit</p> <p>< PL = PL < PL</p>		

Engineering Log - Borehole

Project No.: 10776

Client: Cabonne Council	Commenced: 21-03-2019
Project Name: Molong pipeline	Completed: 21-03-2019
Hole Location: Molong	Logged By: AR
Hole Position: Molong Street 55H 673582 6336715	Checked By: GM

Drill Model and Mounting: EVH auger drill rig	Inclination: -90°	RL Surface: No survey
Hole Diameter: 75 mm	Bearing:	Datum: AHD Operator: TB

Drilling Information				Soil Description						Observations				
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density	Pocket Penetrometer UCS (kPa)	Structure and Additional Observations
AD/T	[Hatched]						0	[X]	CI	FILL, silty clay, yellow brown	D	St	100	
							0.5	[X]	SM	SILTY SAND, red brown with fine gravel	D	St	200	
							1.0	[X]	CI	SILTY CLAY, red brown to red with medium gravel increasing with depth	D	VSt	300	
							2.0			Hole Terminated at 2.00 m Target depth				
							3.0							
							4.0							
							5.0							
							6.0							
							7.0							

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<p>Method</p> <p>AS - Auger Screwing RR - Rock Roller WB - Washbore</p>	<p>Penetration</p> <p>No resistance ranging to refusal</p>	<p>Water</p> <p>Level (Date) Inflow Partial Loss Complete Loss</p>	<p>Samples and Tests</p> <p>U - Undisturbed Sample D - Disturbed Sample SPT - Standard Penetration Test</p>	<p>Moisture Condition</p> <p>D - Dry M - Moist W - Wet</p>	<p>Consistency/Relative Density</p> <p>VS - Very Soft S - Soft F - Firm VSt - Very Stiff H - Hard Fr - Friable VL - Very Loose L - Loose MD - Medium Dense D - Dense VD - Very Dense</p>
<p>Support</p> <p>C - Casing</p>	<p>Graphic Log/Core Loss</p> <p>Core recovered (hatching indicates material) Core loss</p>	<p>Classification Symbols and Soil Descriptions</p> <p>Based on Unified Soil Classification System</p>	<p>Plastic Limit</p> <p>< PL = PL > PL</p>		

Engineering Log - Borehole

Project No.: 10776

Client: Cabonne Council	Commenced: 21-03-2019
Project Name: Molong pipeline	Completed: 21-03-2019
Hole Location: Molong	Logged By: AR
Hole Position: Molong Street 55H 673632 6336706	Checked By: GM

Drill Model and Mounting: EVH auger drill rig	Inclination: -90°	RL Surface: No survey
Hole Diameter: 75 mm	Bearing:	Datum: AHD Operator: TB

Drilling Information				Soil Description						Observations				
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density	Pocket Penetrometer UCS (kPa)	Structure and Additional Observations
AD/T							0		CI	FILL, silty clay, yellow brown with coarse gravel and tree roots	D	VSt	100	
							0.5		SM	SILTY SAND, yellow brown with fine gravel	D	St	200	
							1.5		CH	SILTY CLAY, yellowish red to red brown with medium gravel increasing with depth. Some ironstone nodules present from 1.5m.	D to M	VSt	300	
							2			Hole Terminated at 2.00 m Target depth			400	
							3						500	
							4							
							5							
							6							
							7							

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Method AS - Auger Screwing RR - Rock Roller WB - Washbore	Penetration No resistance ranging to refusal	Water Level (Date) Inflow Partial Loss Complete Loss	Samples and Tests U - Undisturbed Sample D - Disturbed Sample SPT - Standard Penetration Test	Moisture Condition D - Dry M - Moist W - Wet	Consistency/Relative Density VS - Very Soft S - Soft F - Firm VSt - Very Stiff H - Hard Fr - Friable VL - Very Loose L - Loose MD - Medium Dense D - Dense VD - Very Dense
Support C - Casing	Graphic Log/Core Loss Core recovered (hatching indicates material) Core loss	Classification Symbols and Soil Descriptions Based on Unified Soil Classification System	Plastic Limit < PL = PL > PL		

Engineering Log - Borehole

Project No.: 10776

Client: Cabonne Council	Commenced: 21-03-2019
Project Name: Molong pipeline	Completed: 21-03-2019
Hole Location: Molong	Logged By: AR
Hole Position: George Street 55H 673647 6336648	Checked By: GM

Drill Model and Mounting: EVH auger drill rig	Inclination: -90°	RL Surface: No survey
Hole Diameter: 75 mm	Bearing:	Datum: AHD Operator: TB

Drilling Information				Soil Description						Observations					
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density	Pocket Penetrometer UCS (kPa)	Structure and Additional Observations	
AD/T	[Hatched]						0	[SM Symbol]	SM	SILTY SAND, pale brown	D	VSt	100		
							0.5	[CL-CI Symbol]	CL-CI	SILTY CLAY, dark yellow brown with fine gravel	D	VSt	200		
							1.5	[CH Symbol]	CH	SILTY CLAY, red brown with fine gravel	M	VSt	300		
							2			Hole Terminated at 2.00 m Target depth					
							3								
							4								
							5								
							6								
							7								

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<p>Method</p> <p>AS - Auger Screwing RR - Rock Roller WB - Washbore</p>	<p>Penetration</p> <p>No resistance ranging to refusal</p>	<p>Water</p> <p>Level (Date) Inflow Partial Loss Complete Loss</p>	<p>Samples and Tests</p> <p>U - Undisturbed Sample D - Disturbed Sample SPT - Standard Penetration Test</p>	<p>Moisture Condition</p> <p>D - Dry M - Moist W - Wet</p>	<p>Consistency/Relative Density</p> <p>VS - Very Soft S - Soft F - Firm VSt - Very Stiff H - Hard Fr - Friable VL - Very Loose L - Loose MD - Medium Dense D - Dense VD - Very Dense</p>
<p>Support</p> <p>C - Casing</p>	<p>Graphic Log/Core Loss</p> <p>Core recovered (hatching indicates material) Core loss</p>	<p>Classification Symbols and Soil Descriptions</p> <p>Based on Unified Soil Classification System</p>	<p>Plastic Limit</p> <p>< PL = PL > PL</p>		

Engineering Log - Borehole

Project No.: 10776

Client: Cabonne Council	Commenced: 21-03-2019
Project Name: Molong pipeline	Completed: 21-03-2019
Hole Location: Molong	Logged By: AR
Hole Position: George Street 55H 673601 6336572	Checked By: GM

Drill Model and Mounting: EVH auger drill rig	Inclination: -90°	RL Surface: No survey
Hole Diameter: 75 mm	Bearing:	Datum: AHD Operator: TB

Drilling Information					Soil Description						Observations			
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density	Pocket Penetrometer UCS (kPa)	Structure and Additional Observations
													100 200 300 400 500	
AD/T							1		ML	FILL, sandy silt, dark grey with coarse gravel	D	VSt		0.00: Limestone outcrops nearby
									SP	SILTY GRAVEL, pale yellow to pale grey with coarse gravel	D	H		
									GC	CLAYEY GRAVEL, red brown with limestone rock and cobbles	D	H		0.70: Hard drilling. Extremely high strength limestone cobbles (estimated compressive strength 50MPa).
							1			Hole Terminated at 0.80 m Refusal				
							2							
							3							
							4							
							5							
							6							
							7							

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Method AS - Auger Screwing RR - Rock Roller WB - Washbore	Penetration No resistance ranging to refusal	Water Level (Date) Inflow Partial Loss Complete Loss	Samples and Tests U - Undisturbed Sample D - Disturbed Sample SPT - Standard Penetration Test	Moisture Condition D - Dry M - Moist W - Wet	Consistency/Relative Density VS - Very Soft S - Soft F - Firm VSt - Very Stiff H - Hard Fr - Friable VL - Very Loose L - Loose MD - Medium Dense D - Dense VD - Very Dense
Support C - Casing	Graphic Log/Core Loss Core recovered (hatching indicates material) Core loss	Classification Symbols and Soil Descriptions Based on Unified Soil Classification System	Plastic Limit < PL = PL < PL		

Engineering Log - Borehole

Project No.: 10776

Client: Cabonne Council	Commenced: 21-03-2019
Project Name: Molong pipeline	Completed: 21-03-2019
Hole Location: Molong	Logged By: AR
Hole Position: George Street 55H 673606 6336532	Checked By: GM

Drill Model and Mounting: EVH auger drill rig	Inclination: -90°	RL Surface: No survey
Hole Diameter:	Bearing:	Datum: AHD Operator: TB

Drilling Information					Soil Description					Observations				
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density	Pocket Penetrometer UCS (kPa)	Structure and Additional Observations
													100 200 300 400 500	
							0.00		SP	SILTY GRAVEL, pale yellow to pale grey with coarse gravel				0.00: Limestone outcrops nearby
							0.40		GC	CLAYEY GRAVEL, red brown with limestone rock and cobbles				0.40: Hard drilling. Extremely high strength limestone cobbles (estimated compressive strength 50MPa).
							1			Hole Terminated at 0.50 m Refusal				
							2							
							3							
							4							
							5							
							6							
							7							

Method AS - Auger Screwing RR - Rock Roller WB - Washbore	Penetration 	Water Level (Date) Inflow Partial Loss Complete Loss	Samples and Tests U - Undisturbed Sample D - Disturbed Sample SPT - Standard Penetration Test	Moisture Condition D - Dry M - Moist W - Wet	Consistency/Relative Density VS - Very Soft S - Soft F - Firm VSt - Very Stiff H - Hard Fr - Friable VL - Very Loose L - Loose MD - Medium Dense D - Dense VD - Very Dense
Support C - Casing	Graphic Log/Core Loss 	Classification Symbols and Soil Descriptions Based on Unified Soil Classification System	Plastic Limit < PL = PL < PL		

Engineering Log - Borehole

Project No.: 10776

Client: Cabonne Council	Commenced: 21-03-2019
Project Name: Molong pipeline	Completed: 21-03-2019
Hole Location: Molong	Logged By: AR
Hole Position: George Street 55H 673605 6336528	Checked By: GM

Drill Model and Mounting: EVH auger drill rig	Inclination: -90°	RL Surface: No survey
Hole Diameter:	Bearing:	Datum: AHD Operator: TB

Drilling Information					Soil Description					Observations				
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density	Pocket Penetrometer UCS (kPa)	Structure and Additional Observations
													100 200 300 400 500	
									SP	SILTY GRAVEL, pale grey with coarse gravel				0.00: Limestone outcrops nearby
									GC	CLAYEY GRAVEL, red brown with limestone rock and cobbles				0.30: Hard drilling. Extremely high strength limestone cobbles (estimated compressive strength 50MPa).
							1			Hole Terminated at 0.40 m Refusal				
							2							
							3							
							4							
							5							
							6							
							7							

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Method AS - Auger Screwing RR - Rock Roller WB - Washbore	Penetration 	Water Level (Date) Inflow Partial Loss Complete Loss	Samples and Tests U - Undisturbed Sample D - Disturbed Sample SPT - Standard Penetration Test	Moisture Condition D - Dry M - Moist W - Wet	Consistency/Relative Density VS - Very Soft S - Soft F - Firm VSt - Very Stiff H - Hard Fr - Friable VL - Very Loose L - Loose MD - Medium Dense D - Dense VD - Very Dense
Support C - Casing	Graphic Log/Core Loss 	Classification Symbols and Soil Descriptions Based on Unified Soil Classification System	Plastic Limit < PL = PL < PL		

Engineering Log - Borehole

Project No.: 10776

Client: Cabonne Council	Commenced: 21-03-2019		
Project Name: Molong pipeline	Completed: 21-03-2019		
Hole Location: Molong	Logged By: AR		
Hole Position: Smith Street 55H 674022 6336153	Checked By: GM		
Drill Model and Mounting: EVH auger drill rig	Inclination: -90°	RL Surface: No survey	
Hole Diameter: 75 mm	Bearing:	Datum: AHD	Operator: TB

Drilling Information				Soil Description						Observations					
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density	Pocket Penetrometer UCS (kPa)	Structure and Additional Observations	
AD/T							0		GM	FILL, silty gravel, yellow brown	D	VSt	100		
							0.5		CI	SILTY CLAY, yellow brown with fine to medium gravel	D	St	200		
							1.0		CH	SILTY CLAY, dark brown to brown with coarse gravel	M	St to VSt	300		
							2.0			Hole Terminated at 2.00 m Target depth					
							3.0								
							4.0								
							5.0								
							6.0								
							7.0								

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Method AS - Auger Screwing RR - Rock Roller WB - Washbore	Penetration No resistance ranging to refusal	Water Level (Date) Inflow Partial Loss Complete Loss	Samples and Tests U - Undisturbed Sample D - Disturbed Sample SPT - Standard Penetration Test	Moisture Condition D - Dry M - Moist W - Wet	Consistency/Relative Density VS - Very Soft S - Soft F - Firm VSt - Very Stiff H - Hard Fr - Friable VL - Very Loose L - Loose MD - Medium Dense D - Dense VD - Very Dense
Support C - Casing	Graphic Log/Core Loss Core recovered (hatching indicates material) Core loss	Classification Symbols and Soil Descriptions Based on Unified Soil Classification System	Plastic Limit < PL = PL > PL		

Engineering Log - Borehole

Project No.: 10776

Client: Cabonne Council	Commenced: 21-03-2019
Project Name: Molong pipeline	Completed: 21-03-2019
Hole Location: Molong	Logged By: AR
Hole Position: Edward Place 55H 674033 6336103	Checked By: GM

Drill Model and Mounting: EVH auger drill rig	Inclination: -90°	RL Surface: No survey
Hole Diameter: 75 mm	Bearing:	Datum: AHD Operator: TB

Drilling Information				Soil Description						Observations					
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density	Pocket Penetrometer UCS (kPa)	Structure and Additional Observations	
AD/T	[Hatched]						0	[Cross-hatched]	GM	FILL, silty gravel, yellow brown	D	St	100		
							0.5	[Dotted]	SM	SILTY SAND, yellow brown with gravel	D	St	200		
							1.3	[Horizontal lines]	CI	SILTY CLAY, grey brown with coarse gravel from 1.3m	M	St to VSt	300		
							2.0	[Circular patterns]	GC	CLAYEY GRAVEL and WEATHERED ROCK, yellow brown	D	H	400		
							2			Hole Terminated at 2.00 m Target depth				1.80: Hard drilling on weathered rock (estimated compressive strength 40MPa)	
							3								
							4								
							5								
							6								
							7								

ENVIROWEST 1.00 LIB.GLB Log IS AU BOREHOLE 1 10776.GPJ <-DrawingFile--> 21-03-2019 16:47 10.0.000 Ddgel.Lab and In Situ Tool - DGD | Lib: Envirowest1.002017-10-24.Pjt; Envirowest 1.002017-10-24

<p>Method</p> <p>AS - Auger Screwing RR - Rock Roller WB - Washbore</p>	<p>Penetration</p> <p>No resistance ranging to refusal</p>	<p>Water</p> <p>Level (Date) Inflow Partial Loss Complete Loss</p>	<p>Samples and Tests</p> <p>U - Undisturbed Sample D - Disturbed Sample SPT - Standard Penetration Test</p>	<p>Moisture Condition</p> <p>D - Dry M - Moist W - Wet</p>	<p>Consistency/Relative Density</p> <p>VS - Very Soft S - Soft F - Firm VSt - Very Stiff H - Hard Fr - Friable VL - Very Loose L - Loose MD - Medium Dense D - Dense VD - Very Dense</p>
<p>Support</p> <p>C - Casing</p>	<p>Graphic Log/Core Loss</p> <p>Core recovered (hatching indicates material) Core loss</p>	<p>Classification Symbols and Soil Descriptions</p> <p>Based on Unified Soil Classification System</p>	<p>Plastic Limit</p> <p>< PL = PL > PL</p>		

Engineering Log - Borehole

Project No.: 10776

Client: Cabonne Council	Commenced: 21-03-2019
Project Name: Molong pipeline	Completed: 21-03-2019
Hole Location: Molong	Logged By: AR
Hole Position: Edward Place 55H 674016 6336061	Checked By: GM

Drill Model and Mounting: EVH auger drill rig	Inclination: -90°	RL Surface: No survey
Hole Diameter: 75 mm	Bearing:	Datum: AHD Operator: TB

Drilling Information				Soil Description						Observations				
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density	Pocket Penetrometer UCS (kPa)	Structure and Additional Observations
AD/T	[Hatched]	[Blank]	[Blank]	[Blank]	[Blank]	[Blank]	0	[GM Symbol]	GM	FILL. silty gravel, pale yellow brown and tree roots	D	St	[Blank]	1.80: Hard drilling on weathered rock (estimated compressive strength 40MPa)
							1	[SM Symbol]	SM	SILTY SAND, yellow brown with fine gravel and tree roots	D	St	[Blank]	
							1.5	[CI Symbol]	CI	SILTY CLAY, grey brown to yellow with coarse gravel	D	VSt	[Blank]	
							2	[GC Symbol]	GC	CLAYEY GRAVEL and WEATHERED ROCK, yellow brown	D	H	[Blank]	
							2			Hole Terminated at 2.00 m Target depth				
							3							
							4							
							5							
							6							
							7							

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<p>Method</p> <p>AS - Auger Screwing RR - Rock Roller WB - Washbore</p>	<p>Penetration</p> <p>No resistance ranging to refusal</p>	<p>Water</p> <p>Level (Date) Inflow Partial Loss Complete Loss</p>	<p>Samples and Tests</p> <p>U - Undisturbed Sample D - Disturbed Sample SPT - Standard Penetration Test</p>	<p>Moisture Condition</p> <p>D - Dry M - Moist W - Wet</p>	<p>Consistency/Relative Density</p> <p>VS - Very Soft S - Soft F - Firm VSt - Very Stiff H - Hard Fr - Friable VL - Very Loose L - Loose MD - Medium Dense D - Dense VD - Very Dense</p>
<p>Support</p> <p>C - Casing</p>	<p>Graphic Log/Core Loss</p> <p>Core recovered (hatching indicates material) Core loss</p>	<p>Classification Symbols and Soil Descriptions</p> <p>Based on Unified Soil Classification System</p>	<p>Plastic Limit</p> <p>< PL = PL > PL</p>		

Engineering Log - Borehole

Project No.: 10776

Client: Cabonne Council	Commenced: 21-03-2019
Project Name: Molong pipeline	Completed: 21-03-2019
Hole Location: Molong	Logged By: AR
Hole Position: Park Street 55H 674067 6336008	Checked By: GM

Drill Model and Mounting: EVH auger drill rig	Inclination: -90°	RL Surface: No survey
Hole Diameter: 75 mm	Bearing:	Datum: AHD Operator: TB

Drilling Information				Soil Description						Observations				
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Group Symbol	Material Description Fraction, Colour, Structure, Bedding, Plasticity, Sensitivity, Additional	Moisture Condition	Consistency Relative Density	Pocket Penetrometer UCS (kPa)	Structure and Additional Observations
AD/T							0		GM	FILL, silty gravel, yellow brown	D	VSt		
							0.5		SM	SILTY SAND, yellow brown with gravel	D	St		
							1		CI	SILTY CLAY, yellow brown with coarse gravel	D	VSt		
							2		GC	WEATHERED ROCK, pale yellow to dark yellow	D	H		
							2	Hole Terminated at 2.00 m Target depth					1.80: Hard drilling on weathered rock (estimated compressive strength 40MPa)	
							3							
							4							
							5							
							6							
							7							

ENVIROWEST 1.00 LIB:GLB Log IS AU BOREHOLE 1 10776.GPJ <-DrawingFile--> 21-03-2019 16:47 10.0.000 DiggetLab and In Situ Tool - DGD | Lib: Envirowest1.002017-10-24Pjt: Envirowest 1.002017-10-24

Method AS - Auger Screwing RR - Rock Roller WB - Washbore	Penetration No resistance ranging to refusal	Water Level (Date) Inflow Partial Loss Complete Loss	Samples and Tests U - Undisturbed Sample D - Disturbed Sample SPT - Standard Penetration Test	Moisture Condition D - Dry M - Moist W - Wet	Consistency/Relative Density VS - Very Soft S - Soft F - Firm VSt - Very Stiff H - Hard Fr - Friable VL - Very Loose L - Loose MD - Medium Dense D - Dense VD - Very Dense
Support C - Casing	Graphic Log/Core Loss Core recovered (hatching indicates material) Core loss	Classification Symbols and Soil Descriptions Based on Unified Soil Classification System	Plastic Limit < PL = PL < PL		