



## Tamar Valley Power Station



### GEOLOGICAL AND GEOTECHNICAL INVESTIGATIONS

#### – PRELIMINARY BRIEFING REPORT

- 1.0
- 1 February 2007

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Sinclair Knight Merz  
137 Harrington Street, Hobart 7000  
GPO Box 1725  
Hobart TAS 7001 Australia  
Tel: +61 3 6221 3711  
Fax: +61 3 6224 2325  
Web: [www.skmconsulting.com](http://www.skmconsulting.com)

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## 1. Executive Summary

This is a preliminary geotechnical briefing which will be followed by a final report containing all data that has been referenced in this document.

Work undertaken for a contaminated land assessment has been value added and used to gain a better understanding of the geological setting of the Option 5 site. Results of magnetic and shallow penetrating radar surveys, test pits, groundwater monitoring boreholes and preliminary geotechnical boreholes indicate an area favourable for high load infrastructure. A grid of additional geotechnical boreholes is required to locate the depth to and thickness of fresh igneous rock in a highly prospective area for high load infrastructure, located on a major magnetic high in the central northern region of the site. Drilling to the south of this region will provide information on excavation and foundation constraints for supporting infrastructure.



## 2. Methodology

Following from the preliminary Phase 1 geological assessment (Sinclair Knight Merz, 2007) a surface magnetic survey was undertaken to gain a better understanding of the local geology and its potential constraints on foundation conditions. Test pit and groundwater borehole information was collected and used to supplement the geotechnical knowledge of the Option 5 site. Three preliminary geotechnical boreholes were drilled to supplement the test pit and groundwater borehole information. Proposed future geotechnical drill sites were selected after analysis of all collected data and expected foundation requirements for the proposed power station.



### 3. Magnetic Survey

A surface magnetometer survey of the site was undertaken by GeoAg Pty Ltd between the 9<sup>th</sup> and 10<sup>th</sup> of January, 2007. The magnetic survey showed that the magnetic field varied greatly with areas of both high and low magnetic field intensity present across the site. Based on the magnetic survey information, the southern two thirds of the site was interpreted as being underlain by Tertiary basalt flows and related thin dolerite sills that have intruded the Tertiary sediments. The northern third of the site is non-magnetic and was interpreted as Tertiary sediments. There were also several areas identified that may be underlain by Jurassic dolerite. The magnetic survey report incorporating an interpretive plan showing the magnetic profile and inferred geology (reproduced as **Figure 2**) is attached as **Appendix A**.



## 4. Investigation, Site Selection and Shallow Penetrating Radar Survey

### 4.1 Site Selection

The location of each test pit and borehole site was determined by the coverage required for the contaminated land assessment, site layout, presence of the overhead transmission cables, underground services and the results of the geological assessment and magnetic survey. A subcontracted cable locator identified the positions of the Telstra fibre optic cables which run beneath the northern end of the site and checked each of the test pit and borehole locations for the presence of any underground services.

### 4.2 Shallow Penetrating Radar Survey

As a secondary check for underground services (following survey by a cable locator), Rio Tinto undertook Shallow Penetrating Radar (SPR) surveys of each test pit, ground monitoring borehole and geotechnical borehole location. The images of the SPR survey at each investigation location are attached in **Appendix B**. Results from test pits and boreholes indicated the predicted depths to bedrock or the first water table from the SPR survey were only accurate to a fifty percent level. By providing the Rio Tinto operator of the SPR device with the test pit and borehole logs, future SPR surveys could be more accurately calibrated to local conditions. Once calibrated, it is expected that any future SPR survey may provide more accurate depths to bedrock and groundwater.



## 5. Test Pits and Groundwater Monitoring Boreholes

### 5.1 Test Pits

Seventeen test pits were excavated across the site, with thirteen excavated to 1m deep for contamination assessment sampling and four to between 2 and 4m depth (depending on ground conditions) for preliminary geotechnical assessment. Test pits were logged in accordance to Australian Standard AS 1726-1993 (Geotechnical site investigations). Samples were collected for future geotechnical laboratory analysis. Shear vane tests were conducted on important soil layers for each test pit with a range of values indicating the undrained shear strength of these materials ranged from soft to very stiff. The location of the test pits is shown on **Figure 1** (Note: test pit 5 was surveyed by SPR technique but was not excavated). Engineering logs of test pits are currently not available for this preliminary briefing report.

### 5.2 Groundwater Monitoring Boreholes

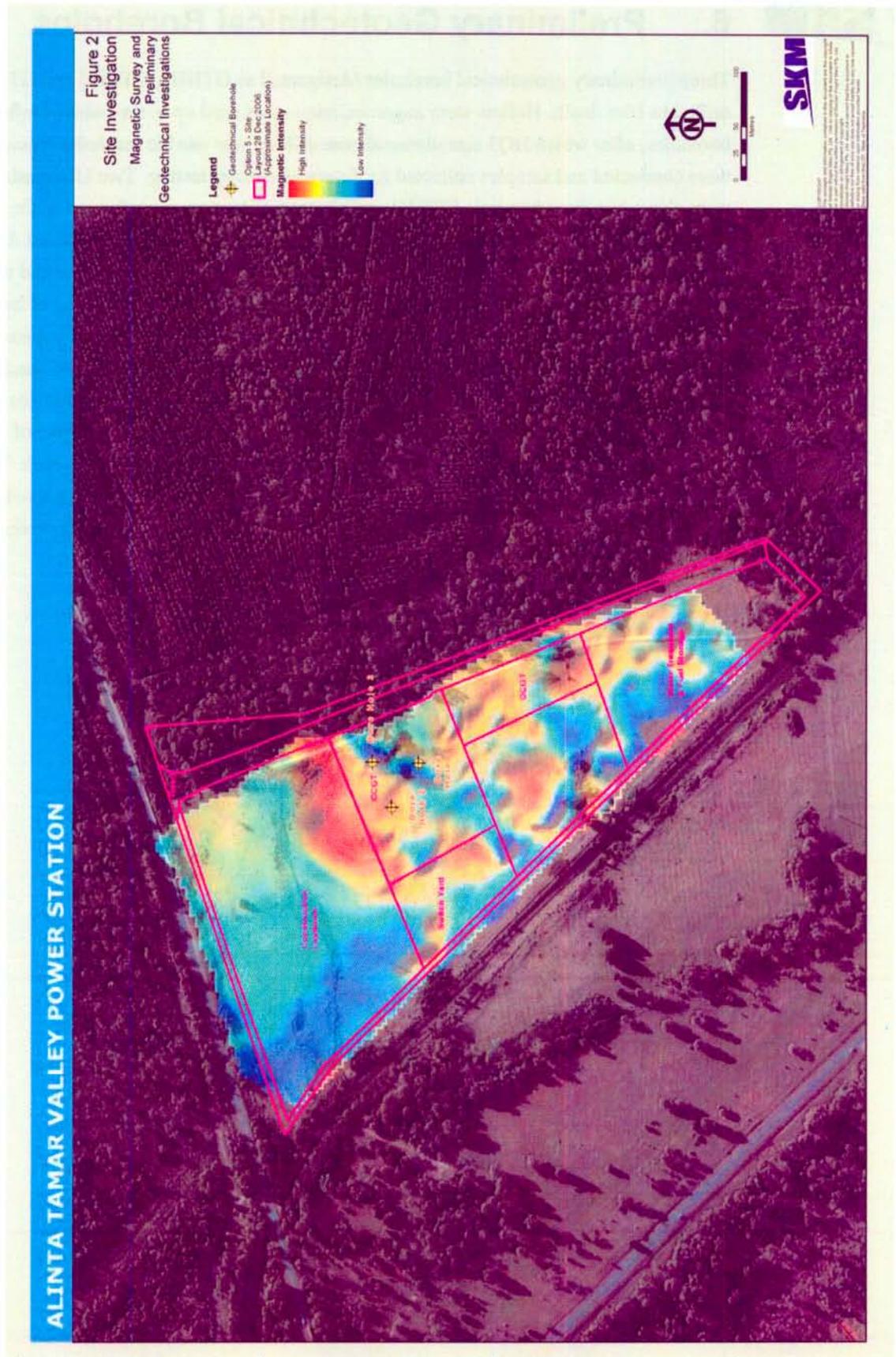
Groundwater monitoring boreholes 2, 4 and 5 were drilled using hollow stem auger techniques. When ground conditions became too hard for auger drilling, down hole hammer drilling was required to advance monitoring Boreholes 1, 3 and 6. Groundwater monitoring boreholes were logged in accordance to Australian Standard AS 1726-1993 (Geotechnical site investigations). Standard Penetration Tests (SPT) were also carried out at regular intervals and samples collected for future geotechnical laboratory analysis. Location of the groundwater monitoring boreholes is shown on **Figure 1**. Engineering logs of groundwater monitoring boreholes are currently unavailable for this preliminary briefing report.





## 6. Preliminary Geotechnical Boreholes

Three preliminary geotechnical boreholes (designated as GTBH1, GTBH2 and GTBH3) were drilled to 10m depth. Hollow stem auger technique was used up to the point of refusal on all three boreholes, after which HQ3 size diamond core drilling was used to reach the required depth. SPT's were conducted and samples collected for future laboratory testing. Two U63 push tube samples were also taken from borehole GTBH1 and shear vane tests were performed in the base of these tubes. Geotechnical boreholes were logged in accordance to Australian Standard AS 1726-1993 (Geotechnical site investigations). The rock core samples were photographed and the holes were backfilled using drilling spoil. The soil profile of borehole GTBH1 consisted of high plasticity moist, firm clay to a depth of 5.5 meters and moist, medium dense sandy clay from 5.5 – 7.0. The soil profile of boreholes GTBH2 and GTBH3 consisted of dry, medium dense sand overlaying hard ironstone (lateritic surface). Tertiary dolerite was intercepted in all three boreholes at 8.0, 1.0 and 0.4 metres in boreholes GTBH1, GTBH2 and GTBH3 respectively. The degree of weathering in the Tertiary dolerite varied from residual soil / extremely weathered to fresh rock. **Figure 2** shows the location of the 3 preliminary geotechnical boreholes with respect to the magnetic survey results. Engineering logs of geotechnical boreholes are currently unavailable for this preliminary briefing report.



SINCLAIR KNIGHT MERZ



## 7. Interpretation of Localised Geology

### 7.1 Lithological Units

Based on the investigations undertaken, seven main lithologies have been identified on the site.

These include:

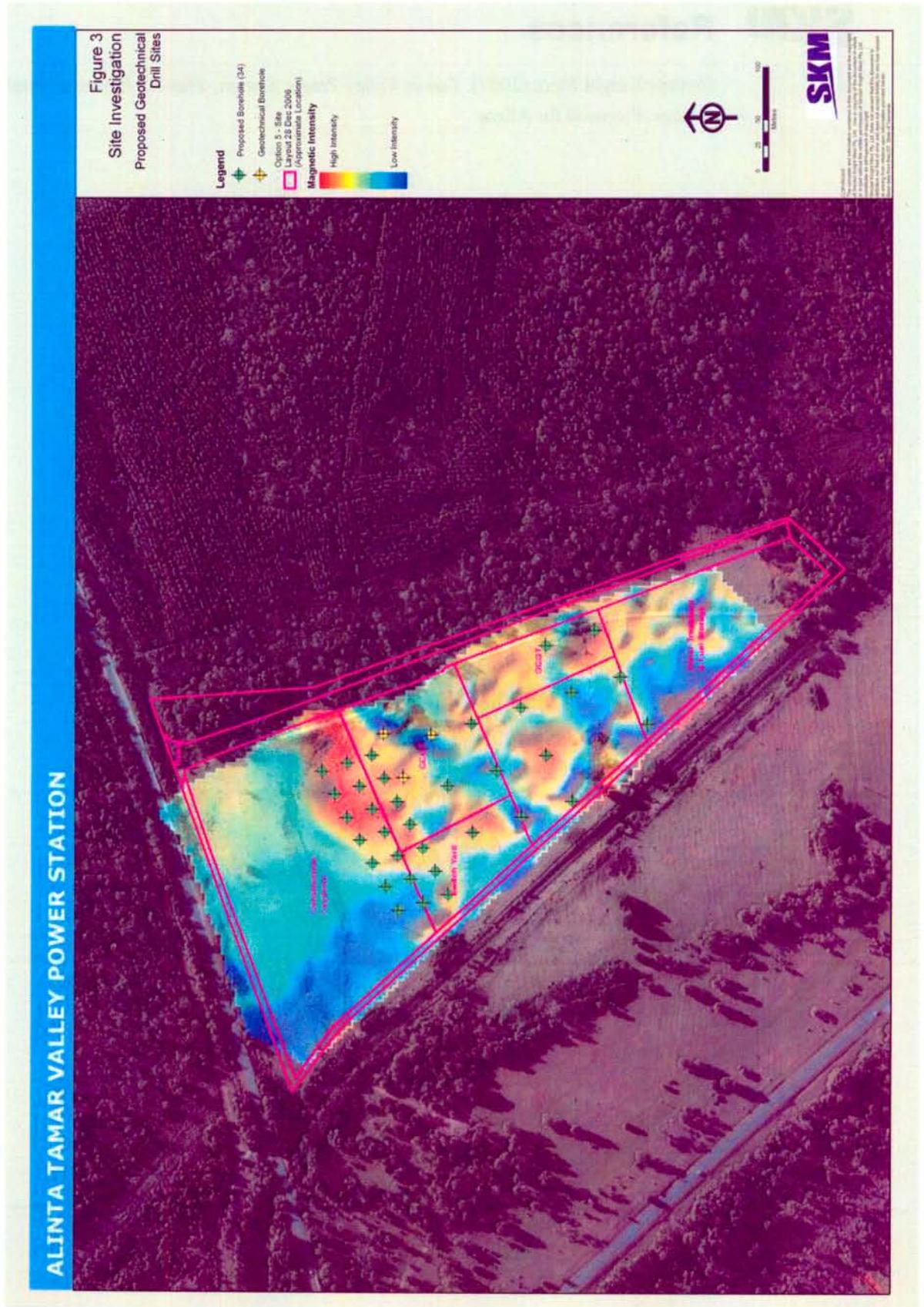
- LF1 Quaternary sediments (windblown and alluvial);
- LF2 Tertiary sediments predominantly clay and sand (that may contain large blocks of igneous rock);
- LF3 Iron hardpans indicating a reworked weathered surface;
- LF4 Residual soil to extremely weathered igneous rock;
- LF5 Highly weathered to slightly weathered igneous rock;
- LF6 Fresh igneous rock; and
- LF7 Tertiary sediments consisting of consolidated clay stone.

The distribution of the lithologies is controlled by the structural setting, depositional environments, emplacement of the Tertiary igneous intrusions and at least 5 unconformity surfaces. The geology and related weathering patterns are heterogeneous and complex, as identified in the Phase 1 report (Sinclair Knight Merz, 2007).



## 8. Recommendations for Further Geotechnical Investigations

Based on and work completed to date, **Figure 3** indicates proposed further geotechnical borehole locations that would provide information to site high load infrastructure required for the power station. The proposed boreholes on the highly magnetic northern feature would provide information on the three dimensional distribution of the depth to and thickness of fresh rock which would be critical for design of foundations and excavations in this area. The majority of these boreholes would be drilled to confirm the depth to fresh rock and selected boreholes would be drilled to the base of fresh rock (to verify bearing capacity). Boreholes to the south of this area would be drilled to identify other potential locations for additional infrastructure. This work would also aid in verifying the current Site Factor of 1.25 as defined in Table 2.4(a) AS1170.4 of Minimum design loads on structures. Additional test pits would also be performed to determine near surface excavatability and recover samples for assessment of pavement design parameters.





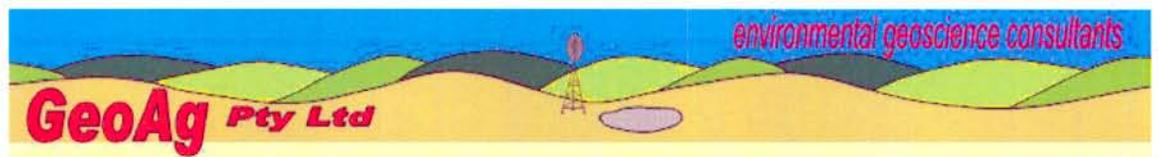
## References

Sinclair Knight Merz (2007). *Tamar Valley Power Station: Phase 1 Environmental Baseline Studies*. Prepared for Alinta.

**SKM** Appendix A GeoAg Magnetic Survey Report

**Magnetic Survey  
of  
Proposed Power Station Site,  
Georgetown, Tasmania**

January, 2007



## Georgetown, Tasmania

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Magnetic survey of site of proposed Alinta  
Power Station near Georgetown, Tasmania

January, 2007



GeoAg Pty Ltd  
ACN 424 195 890  
ABN 48 424 195 890

PO Box 102  
Cottesloe  
WA 6011  
Australia

Telephone + 61 8 93849513

Email [Gstreet@iinet.net.au](mailto:Gstreet@iinet.net.au)

[www.geoag.com.au](http://www.geoag.com.au)

Cover Photo; Looking west from eastern boundary, across an area underlain by basalt, towards transmission line.



## Executive Summary

Magnetic surveys were conducted at site of a proposed power station near Georgetown, Tasmania. A single magnetometer was used and lines surveyed at 20 m interval and around 3m station spacing. A major powerline runs through the area and distorted the magnetic field over around 30m either side. Once the effects of this powerline were removed a pattern consistent with basalt flows was evident. The results suggest that southern two thirds of the site is probably underlain by basalt flows. The northern third appears to be non-magnetic and probably sediments. Possible areas of dolerite were also interpreted following drilling.



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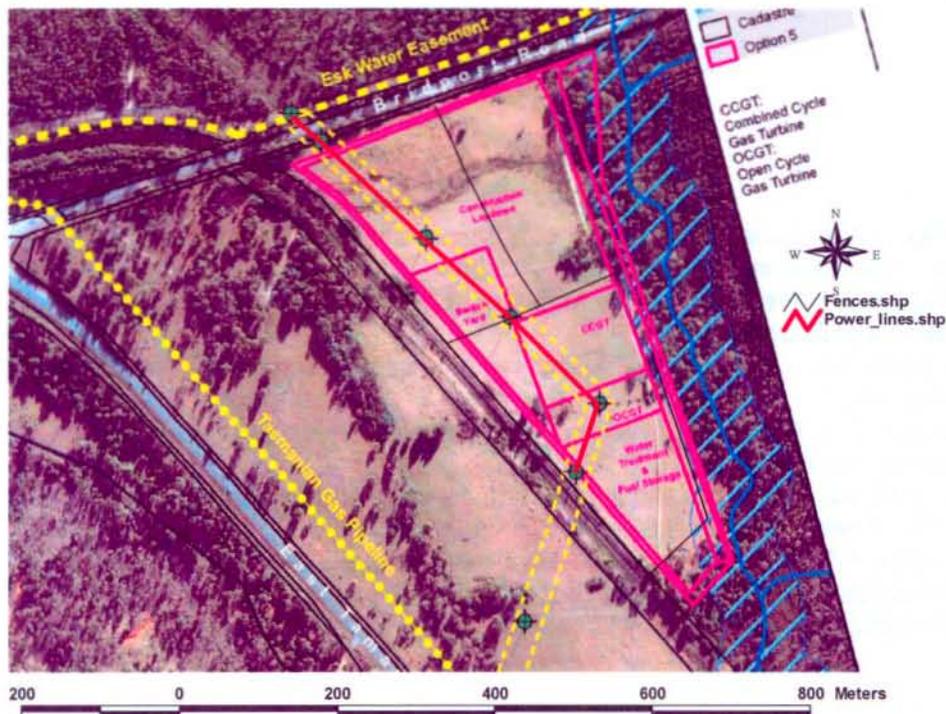
■ Figure 1-1 Aerial photo of site with transmission line marked in red and proposed works in pink.	1
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## 1. Introduction

At the request of Craig Clifton of SKM Consulting, GeoAg Pty Ltd carried out a ground magnetic survey of a site near Georgetown, Tasmania. Construction of a power station on the site will involve areas of excavation. Geology maps and preliminary field investigations suggest that areas of basalt flows and/or dolerite may underlie the site. As both these rock types are usually more magnetic than surrounding sediments a magnetic survey is a normal technique for mapping the extent of these rocks.

Figure 1.1 shows the layout of the site. Note the major powerline which runs through the site. There is another smaller powerline along the northern boundary and a small disused powerline extending south from that powerline for around 200 m along the NW to SE trending fence.



- Figure 1-1 Aerial photo of site with transmission line marked in red and proposed works in pink.

The magnetic survey work was conducted on 9<sup>th</sup> January 2007 and GPS positions of lines picked up on 10<sup>th</sup> January.

The site was mostly cleared with some small stands of scrub along boundaries (Figure 1.1).



## 2. Method

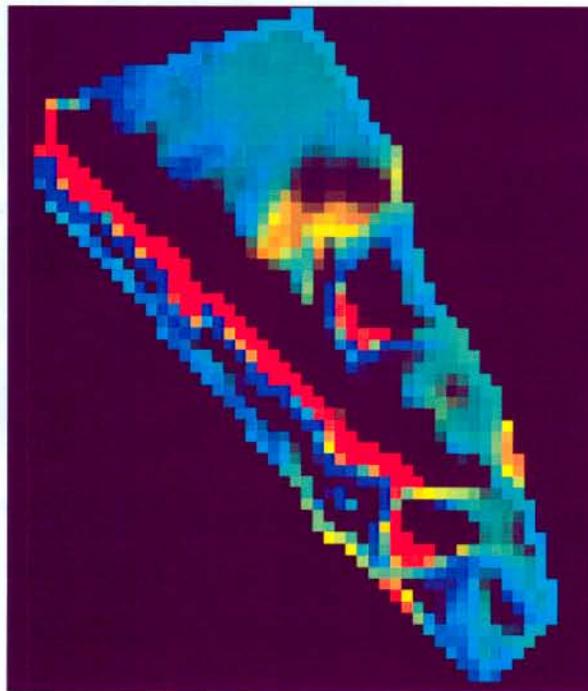
A Geometrics 856 memory magnetometer was used for the magnetic survey and UTM coordinates of ends of lines surveyed using a Magellan Meridian GPS receiver. The magnetometer has an accuracy of around 0.1 nT in quiet magnetic conditions and the GPS receiver is accurate to better than 5 m depending upon satellite configurations and signal.

A base line was surveyed with tape along the fence next to the railway line on the southwest side of the area. Lines were flagged at 20 metre intervals. The east side was flagged by compass sites back towards the southwest. Readings of magnetic field were taken at regular intervals (5 paces) along each of the lines, starting in the southern corner and going west to east, east to west on alternate lines.

The ends of each line were surveyed using a GPS (non-differential). Sites of each magnetic reading were interpolated along the line in processing the data.

Data were imported into Chrisdbf software and processed to grids. Images of total magnetic intensity and a first vertical derivative of the magnetic field were created in ERMMapper software.

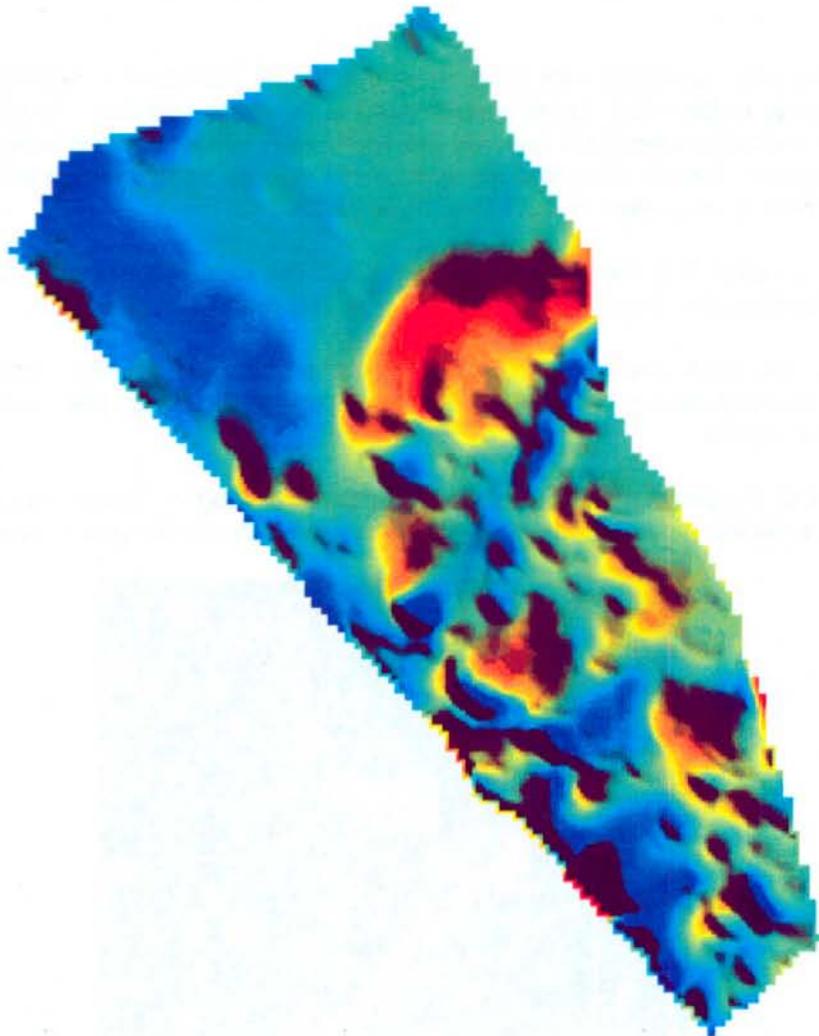
The effects of the power line were obvious in the initial images (Figure 2.1) and readings along the powerline easement removed from the data and new images created.



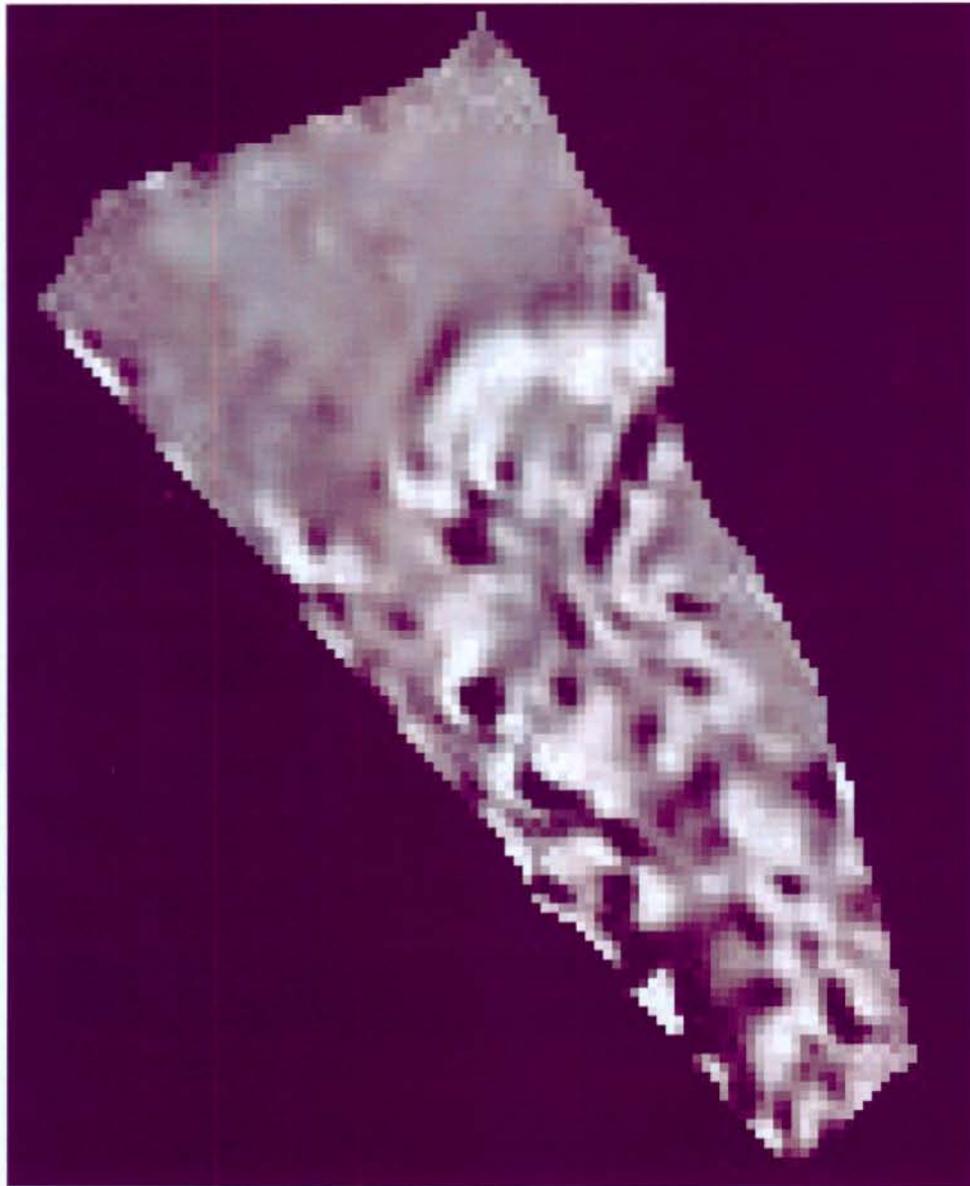
■ Figure 2-1 Preliminary total magnetic intensity (TMI) images with effects of powerline.

### 3. Results

Figure 3.1 shows a TMI image with most of the effects of powerline removed and Figure 3.2 a first vertical derivative (1VD) image. The 1VD is usually used in magnetic interpretation to sharpen edges but in this case has not improved the data resolution.



■ Figure 3-1. TMI image of area with most of powerline effects removed.

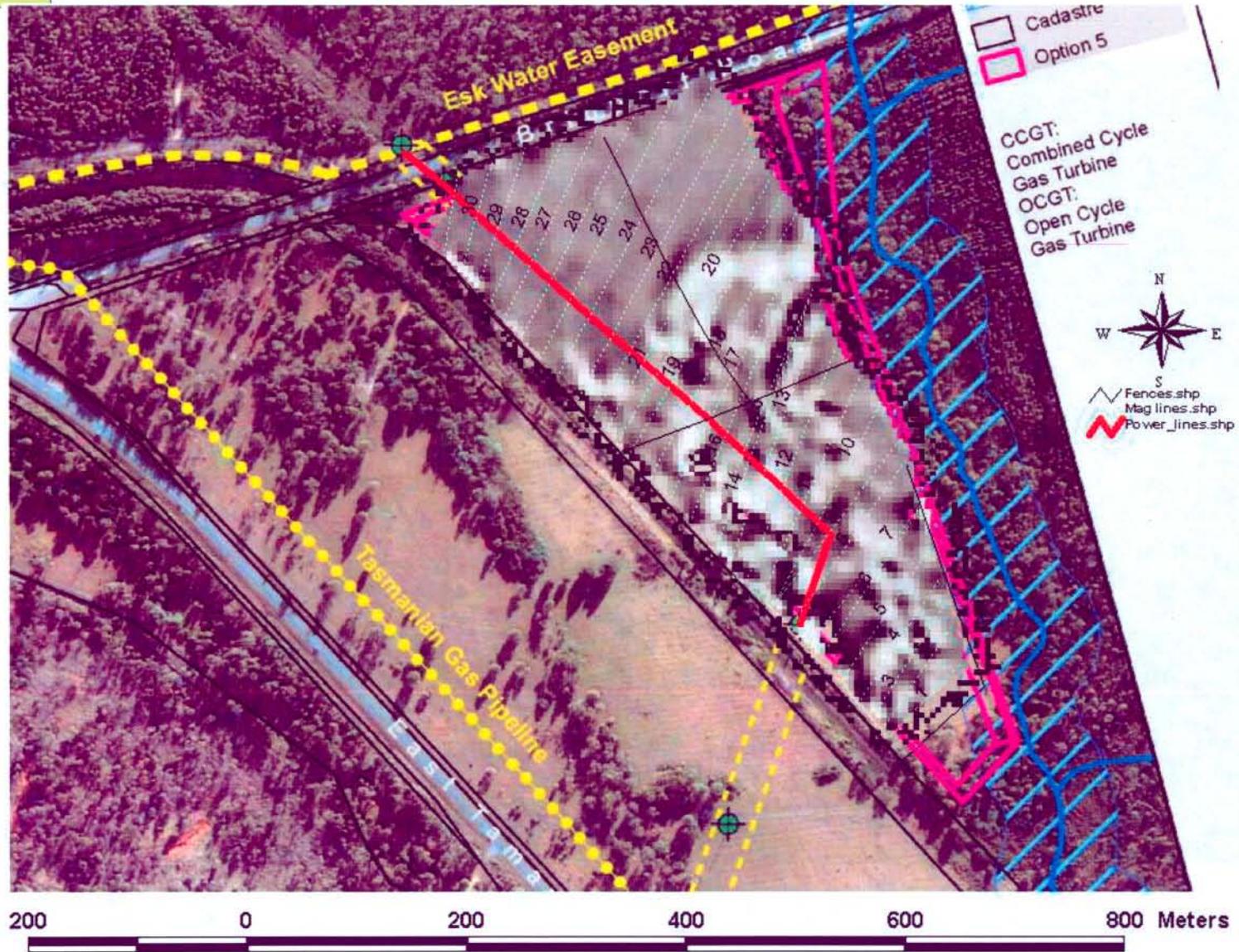


- Figure 3-2. First vertical derivative of magnetic field with powerline effects removed.

Figure 3.3 shows the 1VD image overlaid on an aerial photo of the site.



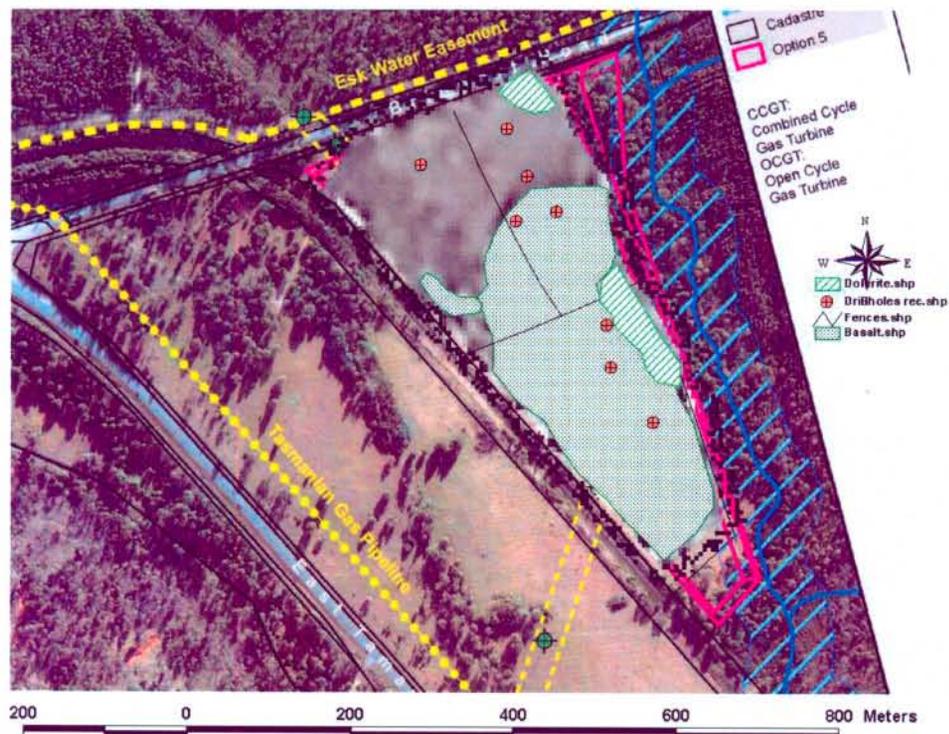
■ Figure 3-3. First vertical derivative image overlaid on aerial photo of site. Power transmission line is marked in red.



## 4. Interpretation

Figure 4.1 shows interpretation of magnetic data. The 'jumbled' magnetic pattern is consistent with basalt flows seen elsewhere in Eastern Australia. Overlapping individual flows create this kind of pattern. As the magnetic field from each flow is detected laterally as well as vertically above the flow, it is not possible from the magnetic data to determine whether the basalt is continuous across the site or discrete flows.

The northern third of the area has much lower magnetic changes and appears consistent with non-magnetic sediments. Drilling in east of area intersected dolerite. Dolerite may have a similar magnetic intensity to basalt but more likely to have a more uniform signature rather than many discrete flows. Areas of possible dolerite have been interpreted in east and north of the area.



■ Figure 4-1 Site with first vertical derivative image overlaid with area interpreted as underlain by basalt flows shown as stippled and possible area of dolerite hatched.

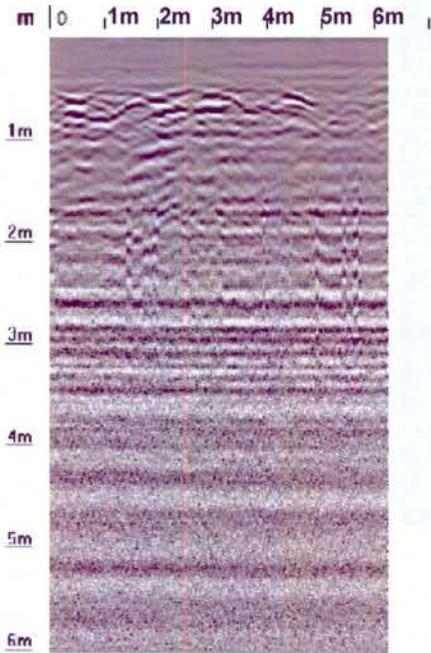


## 5. Conclusion

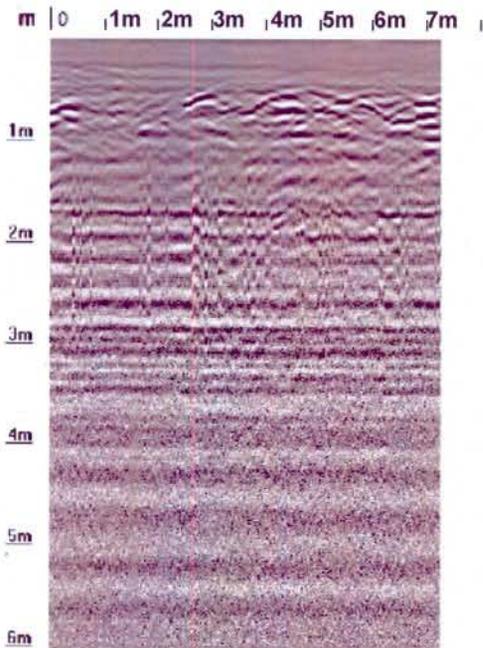
Magnetic surveys at site of a proposed power station near Georgetown, Tasmania showed that the southern two thirds of the site is probably underlain by basalt flows. The northern third appears to be non-magnetic and probably sediments. Possible areas of dolerite were interpreted following drilling.



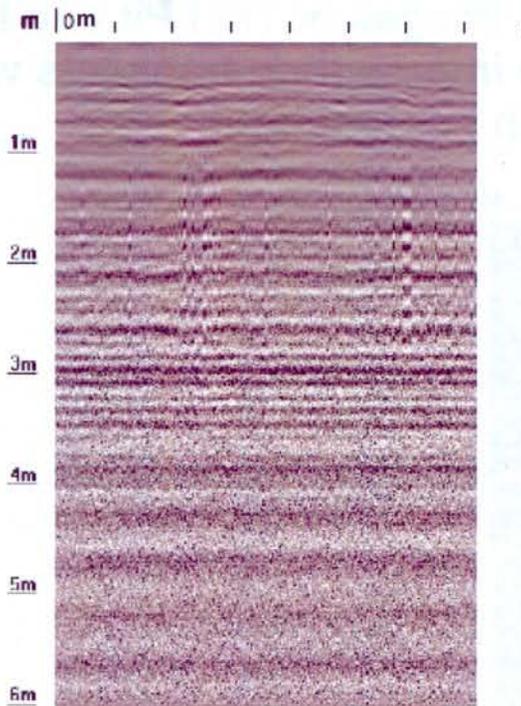
## Appendix B SPR Images of Test Pit and Drill Sites (two intersecting transects were taken per location).



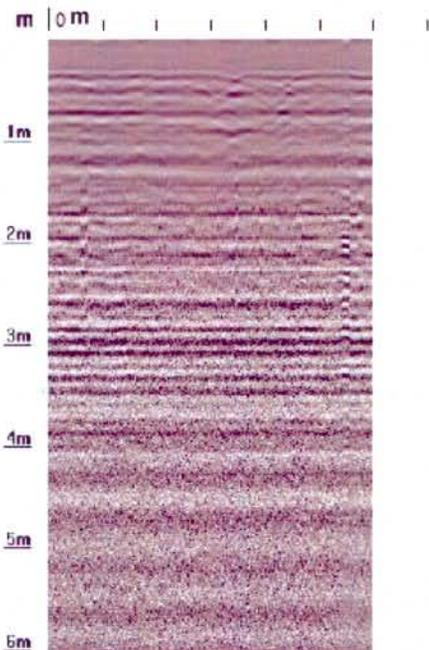
- *Test pit 1: Acquisition number (ACQ) 0013, scan 1.*



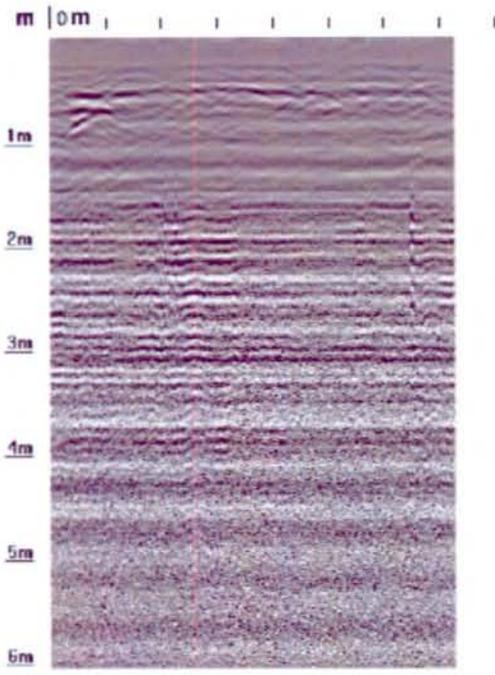
- *Test pit 1: AQN 0013, scan 2.*



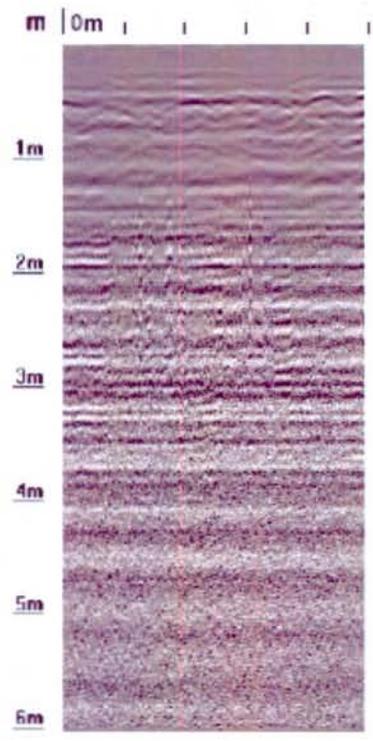
■ Test pit 2: AQN 0013, scan 3.



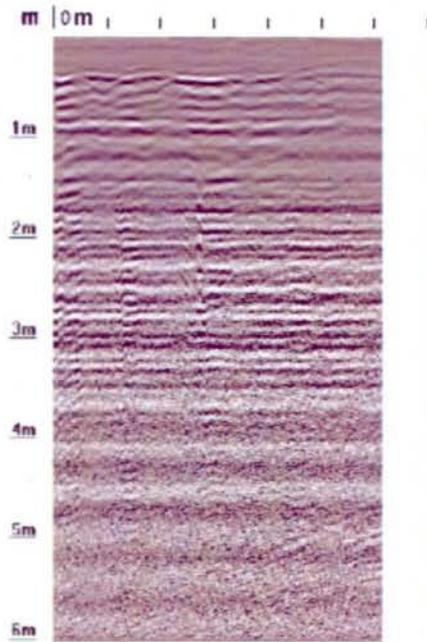
■ Test pit 2: AQN 0013, scan 4.



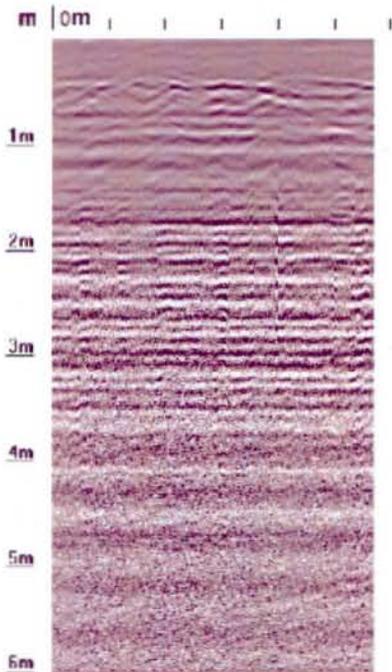
■ Test pit 3: AQN 0013, scan 5.



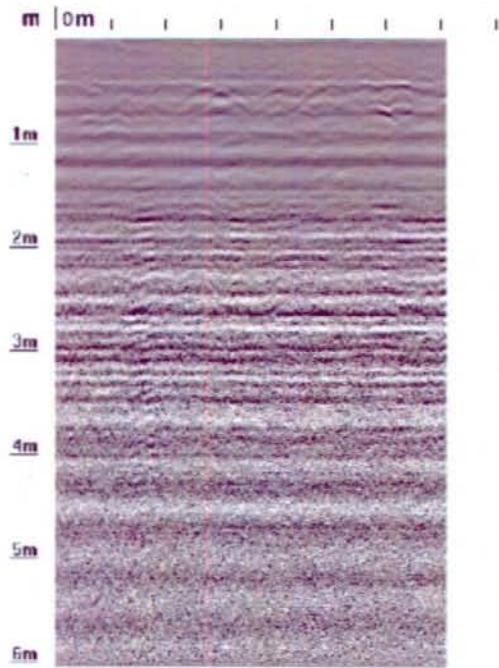
■ Test pit 3: AQN 0013, scan 6.



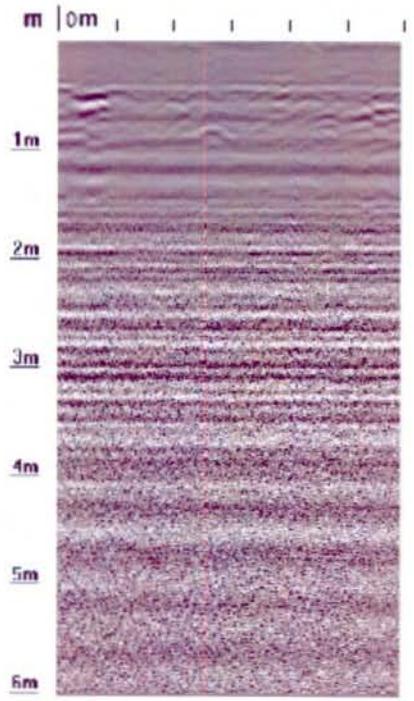
- *Geotechnical borehole 1: AQN 0013, scan 7.*



- *Geotechnical borehole 1: AQN 0013, scan 8.*

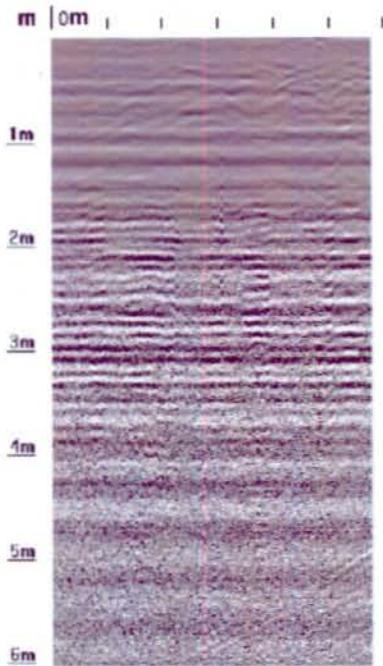


■ *Geotechnical borehole 2: AQN 0013, scan 9.*

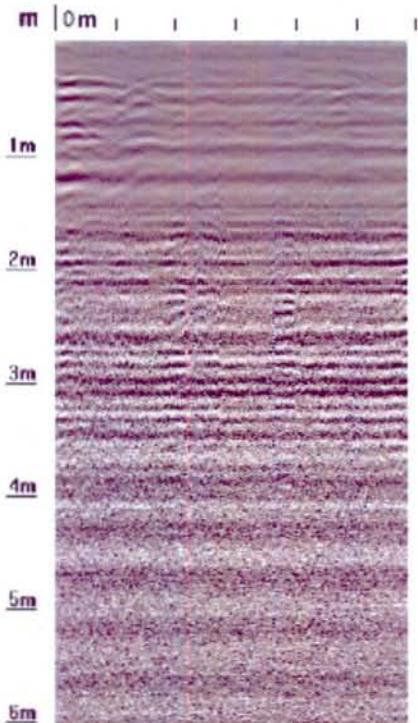


■ *Geotechnical borehole 2: AQN 0013, scan 10.*

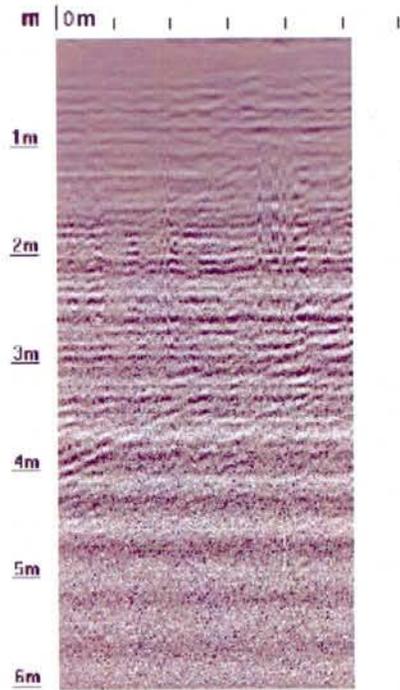




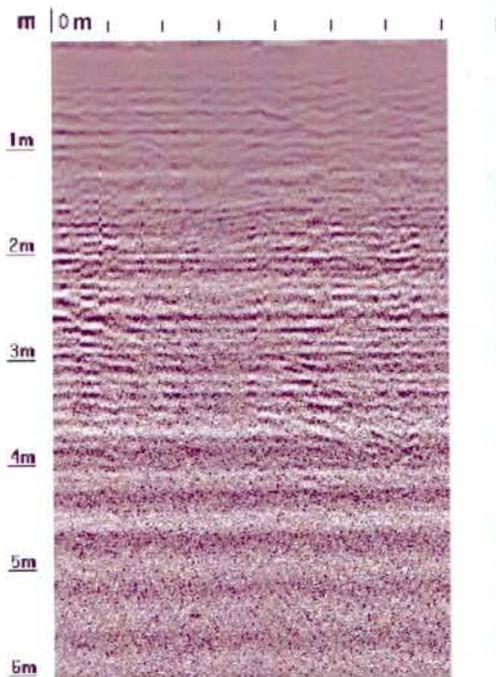
- *Geotechnical borehole 3: AQN 0013, scan 13.*



- *Geotechnical borehole 3: AQN 0014, scan 14.*



■ Borehole 6: AQN 0014, scan 1.



■ Borehole 6: AQN 0014, scan 2.



## Appendix A Bore Logs

**DRAFT**



Project: Proposed Bell Bay Site

Client: Alinta Energy Pty Ltd

Location: Proposed Bell Bay Site Bore dia: -  
 Job No: VW03886.6 Driller: Paul Rich. Exc.  
 Start - Finish Date: 16/01/07 - 16/01/07 Rig: Excavator

Surface Conditions: Grass RL:  
 Northings: mN Logged: Corey B  
 Eastings: mE Checked:

FIELD DATA						SOIL DESCRIPTION			COMMENTS		
sample ID	sample type	visual ranking	odour ranking	PID (ppm)	QA/QC Sample ID	ground water depth (m)	graphic log	soil type, unified classification, colour, structure, particle characteristics, minor components	consistency/density	moisture condition	drilling method, well construction, water and additional observations
TP1-0.1		0	A		1601-QA1			SAND (SM) dark grey, fine grained with organic matter light grey	MD	D	
TP1-0.5		0	A		1601-QA2			Ironstone Layer	H	P	
								CLAYEY SAND (SC) orange-brown, fine grained			
TP1-1.0		0	A					Test pit terminated at 1.0m			



Project: Proposed Bell Bay Site

Client: Alinta Energy Pty Ltd

Location: Proposed Bell Bay Site Bore dia:  
 Job No: VW03886.6 Driller: Paul Rich. Exc.  
 Start - Finish Date: 16/01/07 - 16/01/07 Rig: Excavator

Surface Conditions: Grass RL:  
 Northings: mN Logged: Corey B  
 Eastings: mE Checked:

FIELD DATA						SOIL DESCRIPTION			COMMENTS		
sample ID	sample type	visual ranking	odour ranking	PID (ppm)	QA/QC Sample ID	ground water depth (m)	graphic log	soil type, unified classification, colour, structure, particle characteristics, minor components	consistency/density	moisture condition	drilling method, well construction, water and additional observations
TP2-0.1		0	A					SAND (SM) dark grey, fine grained light grey	MD	D	
TP2-0.5		0	A					CLAYEY SAND (SC) light brown-brown mottled, fine grained	MD	D	
								SAND (SM) light grey, fine grained	MD	M	
TP2-1.0		0	A					CLAY (CH) brown-grey mottled Test pit terminated at 1.0m			

ENV MODIFIED ZPP ALINTA.07.GPJ SKM\_ENVL1.GDT 1/23/07

<b>VISUAL RANKING</b> 0 No visible evidence of contamination 1 Slight visible contamination 2 Visible contamination 3 Significant visible contamination  <b>ODOUR RANKING</b> A No Non-Natural odours B Slight Non-Natural odours C Moderate Non-Natural odours D Strong Non-Natural odours	<b>FIELD DATA ABBREVIATIONS</b> PID = Photo Ionisation Detector reading (ppm, v/v) QA/QC Sample ID = Quality Assurance /Quality Control Sample ID  <b>GROUNDWATER SYMBOLS</b> = Water level (static) = Water level (during drilling)	<b>FIELD DATA SYMBOLS</b> ● = Environmental Sample X = Non Environmental Sample  <b>MOISTURE CONDITION</b> D = Dry M = Moist W = Wet Sl. M = Slightly Moist	<b>DENSITY (N-value)</b> VL (very loose) <10 L (loose) 10 - 20 MD (medium dense) 20 - 30 D (dense) 30 - 50 VD (very dense) >50 CO (compact) >50/150mm	<b>CONSISTENCY (Su)</b> VS (very soft) < 12 kPa S (soft) 12 - 25 F (firm) 25 - 50 St (stiff) 50 - 100 VSt (very stiff) 100 - 200 H (hard) > 200 kPa
---	--	---	---	---



# Test Pit No. TP03

Sheet 2 of 9

**Project: Proposed Bell Bay Site**

**Client: Alinta Energy Pty Ltd**

Location: Proposed Bell Bay Site

Bore dia: -

Surface Conditions: Grass

RL:

Job No: VW03886.6

Driller: Paul Rich. Exc.

Northings: mN

Logged: Corey B

Start - Finish Date: 16/01/07 - 16/01/07

Rig: Excavator

Eastings: mE

Checked:

FIELD DATA						SOIL DESCRIPTION				COMMENTS	
sample ID	sample type	visual ranking	odour ranking	PID (ppm)	QA/QC Sample ID	ground water depth (m)	graphic log	soil type, unified classification, colour, structure, particle characteristics, minor components	consistency/density	moisture condition	drilling method, well construction, water and additional observations
TP3-0.1		0	A		1601-QA3 1601-QA4			SAND (SM) dark grey, fine grained light grey, with ironstone nodules (<20mm)	MD D	D	
TP3-0.5		0	A					Ironstone layer	H	W	
TP3-1.0		0	A			1		CLAY (CH) red-orange-brown mottled, with minor sub-rounded, medium grained quartz gravel	M	W	
Test pit terminated at 1.0m											



# Test Pit No. TP04

**Project: Proposed Bell Bay Site**

**Client: Alinta Energy Pty Ltd**

Location: Proposed Bell Bay Site

Bore dia:

Surface Conditions: Grass

RL:

Job No: VW03886.6

Driller: Paul Rich. Exc.

Northings: mN

Logged: Corey B

Start - Finish Date: 16/01/07 - 16/01/07

Rig: Excavator

Eastings: mE

Checked:

FIELD DATA						SOIL DESCRIPTION				COMMENTS	
sample ID	sample type	visual ranking	odour ranking	PID (ppm)	QA/QC Sample ID	ground water depth (m)	graphic log	soil type, unified classification, colour, structure, particle characteristics, minor components	consistency/density	moisture condition	drilling method, well construction, water and additional observations
TP4-0.1		0	A					SAND (SM) dark grey, fine grained light grey	MD MD	D	
TP4-0.5		0	A					Ironstone layer	H	W	
TP41-1.0		0	A			1		CLAY (CH) orange-brown-grey mottled, with minor ironstone nodules (<25mm)	M	W	
Test pit terminated at 1.0m											

ENV MODIFIED 2PP\_ALINTA 07.GPJ SKM\_ENVL1.GDT 1/23/07

<b>VISUAL RANKING</b> 0 No visible evidence of contamination 1 Slight visible contamination 2 Visible contamination 3 Significant visible contamination <b>ODOUR RANKING</b> A No Non-Natural odours B Slight Non-Natural odours C Moderate Non-Natural odours D Strong Non-Natural odours	<b>FIELD DATA ABBREVIATIONS</b> PID = Photo Ionisation Detector reading (ppm, v/v) QA/QC Sample ID = Quality Assurance /Quality Control Sample ID  <b>GROUNDWATER SYMBOLS</b> = Water level (static) = Water level (during drilling)	<b>FIELD DATA SYMBOLS</b> ● = Environmental Sample ○ = Non Environmental Sample  <b>MOISTURE CONDITION</b> D = Dry M = Moist W = Wet Sl. M = Slightly Moist	<b>DENSITY (N-value)</b> VL (very loose) <10 L (loose) 10 - 20 MD (medium dense) 20 - 30 D (dense) 30 - 50 VD (very dense) >50 CO (compact) >50/150mm	<b>CONSISTENCY (Su)</b> VS (very soft) < 12 kPa S (soft) 12 - 25 F (firm) 25 - 50 St (stiff) 50 - 100 VSt (very stiff) 100 - 200 H (hard) > 200 kPa
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Project: Proposed Bell Bay Site

Client: Alinta Energy Pty Ltd

Location: Proposed Bell Bay Site Bore dia: -  
Job No: VW03886.6 Driller: Paul Rich. Exc.  
Start - Finish Date: 16/01/07 - 16/01/07 Rig: Excavator

Surface Conditions: Grass  
Northings: mN  
Eastings: mE

RL:  
Logged: Corey B  
Checked:

FIELD DATA						SOIL DESCRIPTION				COMMENTS	
sample ID	sample type	visual ranking	odour ranking	PID (ppm)	QA/QC Sample ID	ground water depth (m)	graphic log	soil type, unified classification, colour, structure, particle characteristics, minor components	consistency/density	moisture condition	drilling method, well construction, water and additional observations
TP6-0.1		0	A					SAND (SM) dark grey, fine grained	MD	D	
TP6-0.5		0	A		1601-QA5 1601-QA6			light grey	MD	D	
TP6-1.0		0	A			1		Ironstone layer BASALT (XW) brown-grey. Rock displays properties of a (CH) clay BASALT (HW) grey	H H H	D D D	
								Test pit terminated at 1.0m	VH	M	
								BASALT (FR) grey and fractured Test pit terminated at 1.4m			



Project: Proposed Bell Bay Site

Client: Alinta Energy Pty Ltd

Location: Proposed Bell Bay Site Bore dia:  
Job No: VW03886.6 Driller: Paul Rich. Exc.  
Start - Finish Date: 17/01/07 - 17/01/07 Rig: Excavator

Surface Conditions: Grass  
Northings: mN  
Eastings: mE

RL:  
Logged: Corey B  
Checked:

FIELD DATA						SOIL DESCRIPTION				COMMENTS	
sample ID	sample type	visual ranking	odour ranking	PID (ppm)	QA/QC Sample ID	ground water depth (m)	graphic log	soil type, unified classification, colour, structure, particle characteristics, minor components	consistency/density	moisture condition	drilling method, well construction, water and additional observations
TP7-0.1		0	A					SAND (SM) dark grey, fine grained with grass roots	MD	D	
TP7-0.5		0	A					light grey	D	D	
TP7-1.0		0	A			1		CLAY (CH) grey-brown-orange mottled	F	M	
								Test pit terminated at 1.0m			

ENV MODIFIED 2PP ALINTA 07.GPJ SKM\_ENVL1.GDT 1/23/07

<b>VISUAL RANKING</b> 0 No visible evidence of contamination 1 Slight visible contamination 2 Visible contamination 3 Significant visible contamination  <b>ODOUR RANKING</b> A No Non-Natural odours B Slight Non-Natural odours C Moderate Non-Natural odours D Strong Non-Natural odours	<b>FIELD DATA ABBREVIATIONS</b> PID = Photo Ionisation Detector reading (ppm, v/v) QA/QC Sample ID = Quality Assurance /Quality Control Sample ID  <b>GROUNDWATER SYMBOLS</b> = Water level (static) = Water level (during drilling)	<b>FIELD DATA SYMBOLS</b> ● = Environmental Sample X = Non Environmental Sample  <b>MOISTURE CONDITION</b> D = Dry M = Moist W = Wet Sl. M = Slightly Moist	<b>DENSITY (N-value)</b> VL (very loose) <10 L (loose) 10 - 20 MD (medium dense) 20 - 30 D (dense) 30 - 50 VD (very dense) >50 CO (compact) >50/150mm	<b>CONSISTENCY (Su)</b> VS (very soft) < 12 kPa S (soft) 12 - 25 F (firm) 25 - 50 St (stiff) 50 - 100 VSt (very stiff) 100 - 200 H (hard) > 200 kPa
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Project: Proposed Bell Bay Site

Client: Alinta Energy Pty Ltd

Location: Proposed Bell Bay Site Bore dia: -
Job No: VW03886.6 Driller: Paul Rich. Exc.
Start - Finish Date: 16/01/07 - 16/01/07 Rig: Excavator

Surface Conditions: Grass
Northings: mN
Eastings: mE

RL:
Logged: Corey B
Checked:

Table with 3 main columns: FIELD DATA, SOIL DESCRIPTION, and COMMENTS. Includes sample IDs (TP8-0.1 to TP8-3.0), soil types (SAND, CLAY, BASALT), and a graphic log showing depth from 0 to 4 meters.



Project: Proposed Bell Bay Site

Client: Alinta Energy Pty Ltd

Location: Proposed Bell Bay Site Bore dia:
Job No: VW03886.6 Driller: Paul Rich. Exc.
Start - Finish Date: 17/01/07 - 17/01/07 Rig: Excavator

Surface Conditions: Grass
Northings: mN
Eastings: mE

RL:
Logged: Corey B
Checked:

Table with 3 main columns: FIELD DATA, SOIL DESCRIPTION, and COMMENTS. Includes sample IDs (TP9-0.1 to TP9-1.0), soil types (SAND, BASALT), and a graphic log showing depth from 0 to 4 meters.

ENV MODIFIED RPP ALINTA.07.GPJ SKM\_ENVL1.GDT 1/23/07

Legend table with 5 columns: VISUAL RANKING, ODOUR RANKING, FIELD DATA ABBREVIATIONS, FIELD DATA SYMBOLS, DENSITY (N-value), MOISTURE CONDITION, and CONSISTENCY (Su).



Project: Proposed Bell Bay Site

Client: Alinta Energy Pty Ltd

Location: Proposed Bell Bay Site Bore dia: -  
 Job No: VW03886.6 Driller: Paul Rich. Exc.  
 Start - Finish Date: 17/01/07 - 17/01/07 Rig: Excavator

Surface Conditions: Grass RL:  
 Northings: mN Logged: Corey B  
 Eastings: mE Checked:

FIELD DATA							SOIL DESCRIPTION			COMMENTS	
sample ID	sample type	visual ranking	odour ranking	PID (ppm)	QA/QC Sample ID	ground water depth (m)	graphic log	soil type, unified classification, colour, structure, particle characteristics, minor components	consistency/density	moisture condition	drilling method, well construction, water and additional observations
TP10-0.1		0	A					SAND (SM) grey, fine grained with ironstone nodules (<15mm)	VD	D	
TP10-0.5		0	A					CLAY (CH) orange-brown-grey mottled, with organic matter and ironstone nodules (<30mm)	St	M	
TP10-1.0		0	A								
								Test pit terminated at 1.2m			



Project: Proposed Bell Bay Site

Client: Alinta Energy Pty Ltd

Location: Proposed Bell Bay Site Bore dia:  
 Job No: VW03886.6 Driller: Paul Rich. Exc.  
 Start - Finish Date: 17/01/07 - 17/01/07 Rig: Excavator

Surface Conditions: Grass RL:  
 Northings: mN Logged: Corey B  
 Eastings: mE Checked:

FIELD DATA							SOIL DESCRIPTION			COMMENTS	
sample ID	sample type	visual ranking	odour ranking	PID (ppm)	QA/QC Sample ID	ground water depth (m)	graphic log	soil type, unified classification, colour, structure, particle characteristics, minor components	consistency/density	moisture condition	drilling method, well construction, water and additional observations
TP11-0.1		0	A		1701-QA9 1701-QA10			SAND (SM) grey, fine grained with ironstone nodules (<40mm)	D	D	
TP11-0.5		0	A					Ironstone layer	H	D	
TP11-1.0		0	A					BASALT (MW) grey-brown	H	M	
TP11-2.0		0	A					CLAYSTONE (MW) orange-brown, with organic matter	L-M	M	
TP11-3.0		0	A					Test pit terminated at 2.9m			

ENV MODIFIED 2PP ALINTA 07.GPJ SKM\_ENVL1.GDT 1/23/07

<b>VISUAL RANKING</b> 0 No visible evidence of contamination 1 Slight visible contamination 2 Visible contamination 3 Significant visible contamination <b>ODOUR RANKING</b> A No Non-Natural odours B Slight Non-Natural odours C Moderate Non-Natural odours D Strong Non-Natural odours	<b>FIELD DATA ABBREVIATIONS</b> PID = Photo Ionisation Detector reading (ppm, v/v) QA/QC Sample ID = Quality Assurance /Quality Control Sample ID <b>GROUNDWATER SYMBOLS</b> = Water level (static) = Water level (during drilling)	<b>FIELD DATA SYMBOLS</b> ● = Environmental Sample X = Non Environmental Sample <b>MOISTURE CONDITION</b> D = Dry M = Moist W = Wet Sl. M = Slightly Moist	<b>DENSITY (N-value)</b> VL (very loose) <10 L (loose) 10 - 20 MD (medium dense) 20 - 30 D (dense) 30 - 50 VD (very dense) >50 CO (compact) >50/150mm	<b>CONSISTENCY (Su)</b> VS (very soft) < 12 kPa S (soft) 12 - 25 F (firm) 25 - 50 St (stiff) 50 - 100 VSt (very stiff) 100 - 200 H (hard) > 200 kPa
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Project: Proposed Bell Bay Site

Client: Alinta Energy Pty Ltd

Location: Proposed Bell Bay Site Bore dia: -  
Job No: VW03886.6 Driller: Paul Rich. Exc.  
Start - Finish Date: 16/01/07 - 16/01/07 Rig: Excavator

Surface Conditions: Grass  
Northings: mN  
Eastings: mE

RL:  
Logged: Corey B  
Checked:

FIELD DATA						SOIL DESCRIPTION			COMMENTS		
sample ID	sample type	visual ranking	odour ranking	PID (ppm)	QA/QC Sample ID	ground water depth (m)	graphic log	soil type, unified classification, colour, structure, particle characteristics, minor components	consistency/density	moisture condition	drilling method, well construction, water and additional observations
TP12-0.1		0	A					SAND (SM) grey, fine grained ironstone nodules (<50mm)	D	D	
TP12-0.5		0	A								
TP12-1.0		0	A			1	CLAY (CH) brown-grey mottled, with weathered basalt fragments	F	M		
						2		Test pit terminated at 1.4m			
						3					
						4					



Project: Proposed Bell Bay Site

Client: Alinta Energy Pty Ltd

Location: Proposed Bell Bay Site Bore dia:  
Job No: VW03886.6 Driller: Paul Rich. Exc.  
Start - Finish Date: 16/01/07 - 16/01/07 Rig: Excavator

Surface Conditions: Grass  
Northings: mN  
Eastings: mE

RL:  
Logged: Corey B  
Checked:

FIELD DATA						SOIL DESCRIPTION			COMMENTS		
sample ID	sample type	visual ranking	odour ranking	PID (ppm)	QA/QC Sample ID	ground water depth (m)	graphic log	soil type, unified classification, colour, structure, particle characteristics, minor components	consistency/density	moisture condition	drilling method, well construction, water and additional observations
TP13-0.1		0	A					SAND (SM) dark grey, fine grained with grass roots light grey	MD	D	
TP13-0.5		0	A								
TP13-1.0		0	A			1	BASALT (XV) brown-grey-red mottled. Rock displays properties of a (CH) clay	EL	M		
						2		Test pit terminated at 1.0m			
						3					
						4					

ENV MODIFIED 2PP ALINTA 07.GPJ SKM\_ENVL1.GDT 1/29/07

<b>VISUAL RANKING</b> 0 No visible evidence of contamination 1 Slight visible contamination 2 Visible contamination 3 Significant visible contamination <b>ODOUR RANKING</b> A No Non-Natural odours B Slight Non-Natural odours C Moderate Non-Natural odours D Strong Non-Natural odours	<b>FIELD DATA ABBREVIATIONS</b> PID = Photo Ionisation Detector reading (ppm, v/v) QA/QC Sample ID = Quality Assurance /Quality Control Sample ID <b>GROUNDWATER SYMBOLS</b> = Water level (static) = Water level (during drilling)	<b>FIELD DATA SYMBOLS</b> ● = Environmental Sample X = Non Environmental Sample <b>MOISTURE CONDITION</b> D = Dry M = Moist W = Wet Sl. M = Slightly Moist	<b>DENSITY (N-value)</b> VL (very loose) <10 L (loose) 10 - 20 MD (medium dense) 20 - 30 D (dense) 30 - 50 VD (very dense) >50 CO (compact) >50/150mm	<b>CONSISTENCY (Su)</b> VS (very soft) < 12 kPa S (soft) 12 - 25 F (firm) 25 - 50 St (stiff) 50 - 100 VSt (very stiff) 100 - 200 H (hard) > 200 kPa
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Project: Proposed Bell Bay Site

Client: Alinta Energy Pty Ltd

Location: Proposed Bell Bay Site

Bore dia: -

Surface Conditions: Grass

RL:

Job No: VW03886.6

Driller: Paul Rich. Exc.

Northings: mN

Logged: Corey B

Start - Finish Date: 17/01/07 - 17/01/07

Rig: Excavator

Eastings: mE

Checked:

FIELD DATA						SOIL DESCRIPTION			COMMENTS		
sample ID	sample type	visual ranking	odour ranking	PID (ppm)	QA/QC Sample ID	ground water depth (m)	graphic log	soil type, unified classification, colour, structure, particle characteristics, minor components	consistency/density	moisture condition	drilling method, well construction, water and additional observations
TP14-0.1		0	A		1701-QA5 1701-QA6			SAND (SM) dark grey, fine grained	MD	D	
TP14-0.5		0	A					light grey	MD	D	
TP14-1.0		0	A					Ironstone layer CLAY (CH) grey-brown-orange mottled	H F	D M	
						1		Test pit terminated at 1.4m			
						2					
						3					
						4					



Project: Proposed Bell Bay Site

Client: Alinta Energy Pty Ltd

Location: Proposed Bell Bay Site

Bore dia:

Surface Conditions: Grass

RL:

Job No: VW03886.6

Driller: Paul Rich. Exc.

Northings: mN

Logged: Corey B

Start - Finish Date: 17/01/07 - 17/01/07

Rig: Excavator

Eastings: mE

Checked:

FIELD DATA						SOIL DESCRIPTION			COMMENTS		
sample ID	sample type	visual ranking	odour ranking	PID (ppm)	QA/QC Sample ID	ground water depth (m)	graphic log	soil type, unified classification, colour, structure, particle characteristics, minor components	consistency/density	moisture condition	drilling method, well construction, water and additional observations
TP15-0.1		0	A		1701-QA3 1701-QA4			SAND (SM) dark grey, fine grained	MD	D	
TP15-0.5		0	A					light grey	MD	D	
TP15-1.0		0	A					CLAY (CH) grey-brown-orange-red mottled	F	M	
						1		Test pit terminated at 1.0m			
						2					
						3					
						4					

ENV MODIFIED 2PP ALINTA 07.GPJ SKM\_ENVL.1.GDT 1/23/07

**VISUAL RANKING**  
0 No visible evidence of contamination  
1 Slight visible contamination  
2 Visible contamination  
3 Significant visible contamination

**ODOUR RANKING**  
A No Non-Natural odours  
B Slight Non-Natural odours  
C Moderate Non-Natural odours  
D Strong Non-Natural odours

**FIELD DATA ABBREVIATIONS**  
PID = Photo Ionisation Detector reading (ppm, v/v)  
QA/QC Sample ID = Quality Assurance /Quality Control Sample ID

**GROUNDWATER SYMBOLS**  
 = Water level (static)  
 = Water level (during drilling)

**FIELD DATA SYMBOLS**  
● = Environmental Sample  
X = Non Environmental Sample

**MOISTURE CONDITION**  
D = Dry M = Moist W = Wet  
Sl. M = Slightly Moist

**DENSITY (N-value)**  
VL (very loose) <10  
L (loose) 10 - 20  
MD (medium dense) 20 - 30  
D (dense) 30 - 50  
VD (very dense) >50  
CO (compact) >50/150mm

**CONSISTENCY (Su)**  
VS (very soft) < 12 kPa  
S (soft) 12 - 25  
F (firm) 25 - 50  
St (stiff) 50 - 100  
VSt (very stiff) 100 - 200  
H (hard) > 200 kPa



Project: Proposed Bell Bay Site

Client: Alinta Energy Pty Ltd

Location: Proposed Bell Bay Site

Bore dia: -

Surface Conditions: Grass

RL:

Job No: VV03886.6

Driller: Paul Rich. Exc.

Northings: mN

Logged: Corey B

Start - Finish Date: 17/01/07 - 17/01/07

Rig: Excavator

Eastings: mE

Checked:

FIELD DATA						SOIL DESCRIPTION				COMMENTS	
sample ID	sample type	visual ranking	odour ranking	PID (ppm)	QA/QC Sample ID	ground water depth (m)	graphic log	soil type, unified classification, colour, structure, particle characteristics, minor components	consistency/density	moisture condition	drilling method, well construction, water and additional observations
TP16-0.1		0	A		1701-QA1 1701-QA2			CLAYEY SAND (SC) brown-orange mottled, fine grained with minor fine gravel	MD	D	
TP16-0.5		0	A				grey-black-orange mottled, fine to medium grained	MD	M		
TP16-1.0		0	A			1	CLAY (CH) grey-black-orange mottled	F	M		
TP16-2.0		0	A			2	SANDY CLAY (SC) grey-brown mottled. Sand is medium grained	F	M		
TP16-3.0		0	A			3					
						4	CLAYEY SAND (SC) grey-green-orange-brown mottled, fine to medium grained	MD	M		
								Groundwater intercepted at 4.0m			
								Test pit terminated at 4.0m			



Project: Proposed Bell Bay Site

Client: Alinta Energy Pty Ltd

Location: Proposed Bell Bay Site

Bore dia:

Surface Conditions: Grass

RL:

Job No: VV03886.6

Driller: Paul Rich. Exc.

Northings: mN

Logged: Corey B

Start - Finish Date: 17/01/07 - 17/01/07

Rig: Excavator

Eastings: mE

Checked:

FIELD DATA						SOIL DESCRIPTION				COMMENTS	
sample ID	sample type	visual ranking	odour ranking	PID (ppm)	QA/QC Sample ID	ground water depth (m)	graphic log	soil type, unified classification, colour, structure, particle characteristics, minor components	consistency/density	moisture condition	drilling method, well construction, water and additional observations
TP17-0.1		0	A					SAND (SM) dark grey, fine grained	L	D	
TP17-0.5		0	A					SAND (SM) light grey, fine to medium grained	VD	D	
TP17-1.0		0	A			1		CLAYEY SAND (SC) grey-orange-brown mottled, fine grained	MD	M	
								Test pit terminated at 1.0m			

ENV MODIFIED 2PP ALINTA 07.GPJ SKM\_ENVL1.GDT 1/23/07

<b>VISUAL RANKING</b> 0 No visible evidence of contamination 1 Slight visible contamination 2 Visible contamination 3 Significant visible contamination  <b>ODOUR RANKING</b> A No Non-Natural odours B Slight Non-Natural odours C Moderate Non-Natural odours D Strong Non-Natural odours	<b>FIELD DATA ABBREVIATIONS</b> PID = Photo Ionisation Detector reading (ppm, v/v) QA/QC Sample ID = Quality Assurance /Quality Control Sample ID  <b>GROUNDWATER SYMBOLS</b> = Water level (static) = Water level (during drilling)	<b>FIELD DATA SYMBOLS</b> ● = Environmental Sample ○ = Non Environmental Sample  <b>MOISTURE CONDITION</b> D = Dry M = Moist W = Wet St. M = Slightly Moist	<b>DENSITY (N-value)</b> VL (very loose) <10 L (loose) 10 - 20 MD (medium dense) 20 - 30 D (dense) 30 - 50 VD (very dense) >50 CO (compact) >50/150mm	<b>CONSISTENCY (Su)</b> VS (very soft) < 12 kPa S (soft) 12 - 25 F (firm) 25 - 50 St (stiff) 50 - 100 VSt (very stiff) 100 - 200 H (hard) > 200 kPa
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**Project: Proposed Bell Bay Site**

**Client: Alinta Energy Pty Ltd**

Location: Proposed Bell Bay Site

Bore dia: -

Surface Conditions: Grass

RL:

Job No: VVW03886.6

Driller: Paul Rich. Exc.

Northings: mN

Logged: Corey B

Start - Finish Date: 17/01/07 - 17/01/07

Rig: Excavator

Eastings: mE

Checked:

FIELD DATA						SOIL DESCRIPTION				COMMENTS	
sample ID	sample type	visual ranking	odour ranking	PID (ppm)	QA/QC Sample ID	ground water depth (m)	graphic log	soil type, unified classification, colour, structure, particle characteristics, minor components	consistency/density	moisture condition	drilling method, well construction, water and additional observations
TP18-0.1		0	A					SAND (SM) dark grey, fine grained with grass roots light grey with ironstone nodules (<50mm)	MD	D	
TP18-0.5		0	A						MD	D	
TP18-1.0		0	A			1		CLAY (CH) grey-red-orange-brown mottled	VSt.	M	
								Test pit terminated at 1.0m			

ENV MODIFIED 2PP ALINTA 07.GPJ SKM\_ENVL1.GDT 1/23/07

<p><b>VISUAL RANKING</b></p> <p>0 No visible evidence of contamination</p> <p>1 Slight visible contamination</p> <p>2 Visible contamination</p> <p>3 Significant visible contamination</p> <p><b>ODOUR RANKING</b></p> <p>A No Non-Natural odours</p> <p>B Slight Non-Natural odours</p> <p>C Moderate Non-Natural odours</p> <p>D Strong Non-Natural odours</p>	<p><b>FIELD DATA ABBREVIATIONS</b></p> <p>PID = Photo Ionisation Detector reading (ppm, v/v)</p> <p>QA/QC Sample ID = Quality Assurance /Quality Control Sample ID</p> <p><b>GROUNDWATER SYMBOLS</b></p> <p>▼ = Water level (static)</p> <p>⚡ = Water level (during drilling)</p>	<p><b>FIELD DATA SYMBOLS</b></p> <p>● = Environmental Sample</p> <p>× = Non Environmental Sample</p> <p><b>MOISTURE CONDITION</b></p> <p>D = Dry M = Moist W = Wet</p> <p>Sl, M = Slightly Moist</p>	<p><b>DENSITY (N-value)</b></p> <p>VL (very loose) &lt;10</p> <p>L (loose) 10 - 20</p> <p>MD (medium dense) 20 - 30</p> <p>D (dense) 30 - 50</p> <p>VD (very dense) &gt;50</p> <p>CO (compact) &gt;50/150mm</p>	<p><b>CONSISTENCY (Su)</b></p> <p>VS (very soft) &lt; 12 kPa</p> <p>S (soft) 12 - 25</p> <p>F (firm) 25 - 50</p> <p>St (stiff) 50 - 100</p> <p>VSt (very stiff) 100 - 200</p> <p>H (hard) &gt; 200 kPa</p>
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**Project: Proposed Bell Bay Site**

**Client: Alinta Energy Pty Ltd**

Location: Proposed Bell Bay Site

Bore dia: 150mm

Surface Conditions: Grass

RL:

Job No: VVW03886.6

Driller: KMR Drilling

Northings: mN

Logged: Corey B

Start - Finish Date: 18/01/07 - 18/01/07

Rig: Hydrapower Scout

Eastings: mE

Checked:

FIELD DATA						SOIL DESCRIPTION			COMMENTS		
sample ID	sample type	visual ranking	odour ranking	PID (ppm)	QA/QC Sample ID	ground water depth (m)	graphic log	soil type, unified classification, colour, structure, particle characteristics, minor components	consistency/density	moisture condition	drilling method, well construction, water and additional observations
BH1-0.1		0	A					SAND (SM) light grey, fine grained	L	D	Hollow Augering
BH1-0.5		0	A					GRAVELLEY SAND (SP) red-brown, fine grained with medium grained, angular ironstone gravel	L	D	
BH1-1.0		0	A			1		CLAY (CH) dark grey-orange mottled with iron oxide staining	St	M	Grout (0m - 0.2m)
BH1-2.0		0	A			2					PVC Casing (0m - 3.5m)
BH1-3.0		0	A			3		BASALT (MW) grey-brown	M	M	Bentonite seal (2m - 3m)
						3		Auger Refusal at 3.1m. Downhole hammering is now the drilling method	H	M	Hammer Drilling
						5		BASALT (FR) grey	VH	M	Sand (3.0m - 12.5m)
						10		BASALT (XV) grey-brown, with iron staining	L	M	PVC Slotted Screen (3.5m - 12.5m)
						11		BASALT (SW) dark grey	H	M	
						12		Borehole terminated at 12.5m			

ENV 1 MODIFIED ALINTA.07.GPJ SKM\_ENVL1.GDT 11/23/07

<b>VISUAL RANKING</b> 0 No visible evidence of contamination 1 Slight visible contamination 2 Visible contamination 3 Significant visible contamination  <b>ODOUR RANKING</b> A No Non-Natural odours B Slight Non-Natural odours C Moderate Non-Natural odours D Strong Non-Natural odours	<b>FIELD DATA ABBREVIATIONS</b> PID = Photo Ionisation Detector reading (ppm, v/v) QA/QC Sample ID = Quality Assurance /Quality Control Sample ID  <b>GROUNDWATER SYMBOLS</b>  = Water level (static)  = Water level (during drilling)	<b>FIELD DATA SYMBOLS</b> ● = Environmental Sample X = Non Environmental Sample  <b>MOISTURE CONDITION</b> D = Dry M = Moist W = Wet Sl. M = Slightly Moist	<b>DENSITY (N-value)</b> VL (very loose) <10 L (loose) 10 - 20 MD (medium dense) 20 - 30 D (dense) 30 - 50 VD (very dense) >50 CO (compact) >50/150mm	<b>CONSISTENCY (Su)</b> VS (very soft) < 12 kPa S (soft) 12 - 25 F (firm) 25 - 50 St (stiff) 50 - 100 VSt (very stiff) 100 - 200 H (hard) > 200 kPa
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**Project: Proposed Bell Bay Site**

**Client: Alinta Energy Pty Ltd**

Location: Proposed Bell Bay Site Bore dia: 150mm  
 Job No: VW03886.6 Driller: KMR Drilling  
 Start - Finish Date: 18/01/07 - 18/01/07 Rig: Hydrapower Scout

Surface Conditions: Grass RL:  
 Northings: mN Logged: Corey B  
 Eastings: mE Checked:

FIELD DATA						SOIL DESCRIPTION			COMMENTS		
sample ID	sample type	visual ranking	odour ranking	PID (ppm)	QA/QC Sample ID	ground water depth (m)	graphic log	soil type, unified classification, colour, structure, particle characteristics, minor components	consistency/density	moisture condition	drilling method, well construction, water and additional observations
BH2-0.1		0	A					SAND (SM) grey, fine grained	L	D	Hollow Augering
BH2-0.5		0	A					SANDY CLAY (SC) orange-brown-grey mottled, with organic matter. Sand is fine grained	S	M	Bentonite seal (0m - 1.0m)
BH2-1.0		0	A								
BH2-2.5		0	A						S	W	Sand (1.0m - 5.0m)
BH2-4.0		0	A								PVC Slotted Screen (1.0m - 5.0m)
								Borehole terminated at 5.0m			

ENV 1 MODIFIED ALINTA 07.GPJ SKM\_ENVL1.GDT 1/23/07

<p><b>VISUAL RANKING</b></p> <p>0 No visible evidence of contamination</p> <p>1 Slight visible contamination</p> <p>2 Visible contamination</p> <p>3 Significant visible contamination</p> <p><b>ODOUR RANKING</b></p> <p>A No Non-Natural odours</p> <p>B Slight Non-Natural odours</p> <p>C Moderate Non-Natural odours</p> <p>D Strong Non-Natural odours</p>	<p><b>FIELD DATA ABBREVIATIONS</b></p> <p>PID = Photo Ionisation Detector reading (ppm, v/v)</p> <p>QA/QC Sample ID = Quality Assurance /Quality Control Sample ID</p> <p><b>GROUNDWATER SYMBOLS</b></p> <p>▽ = Water level (static)</p> <p>▽ = Water level (during drilling)</p>	<p><b>FIELD DATA SYMBOLS</b></p> <p>● = Environmental Sample</p> <p>✕ = Non Environmental Sample</p> <p><b>MOISTURE CONDITION</b></p> <p>D = Dry M = Moist W = Wet</p> <p>Sl. M = Slightly Moist</p>	<p><b>DENSITY (N-value)</b></p> <p>VL (very loose) &lt;10</p> <p>L (loose) 10 - 20</p> <p>MD (medium dense) 20 - 30</p> <p>D (dense) 30 - 50</p> <p>VD (very dense) &gt;50</p> <p>CO (compact) &gt;50/150mm</p>	<p><b>CONSISTENCY (Su)</b></p> <p>VS (very soft) &lt; 12 kPa</p> <p>S (soft) 12 - 25</p> <p>F (firm) 25 - 50</p> <p>St (stiff) 50 - 100</p> <p>VSt (very stiff) 100 - 200</p> <p>H (hard) &gt; 200 kPa</p>
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**Project: Proposed Bell Bay Site**

**Client: Alinta Energy Pty Ltd**

Location: Proposed Bell Bay Site    Bore dia: 150mm  
 Job No: VV03886.6    Driller: KMR Drilling  
 Start - Finish Date: 19/01/07 - 19/01/07    Rig: Hydrapower Scout

Surface Conditions: Grass  
 Northings: mN  
 Eastings: mE

RL:  
 Logged: Corey B  
 Checked:

FIELD DATA					SOIL DESCRIPTION				COMMENTS		
sample ID	sample type	visual ranking	odour ranking	PID (ppm)	QA/QC Sample ID	ground water depth (m)	graphic log	soil type, unified classification, colour, structure, particle characteristics, minor components	consistency/density	moisture condition	drilling method, well construction, water and additional observations
BH3-0.1		0	A		1901-QA1 1901-QA2			SAND (SM) grey, fine grained	L	D	Hollow Augering
BH3-0.5		0	A				light brown Ironstone layer				
BH3-1.0		0	A			1	CLAY (CH) light grey-brown-orange mottled	F	M	Grout (0m - 1.5m) PVC Casing (0m - 3.0m)	
						2		Auger Refusal at 2.3m. Downhole hammering is now the drilling method	VH	M	Bentonite seal (1.5m - 2.5m)
						3		DOLERITE (FR) blue, fine to medium grained			Hammer Drilling
						4					
						5					
						6					
						7					
						8					
						9					
						10		Borehole terminated at 9.0m			
						11					
						12					

<b>VISUAL RANKING</b> 0 No visible evidence of contamination 1 Slight visible contamination 2 Visible contamination 3 Significant visible contamination  <b>ODOUR RANKING</b> A No Non-Natural odours B Slight Non-Natural odours C Moderate Non-Natural odours D Strong Non-Natural odours	<b>FIELD DATA ABBREVIATIONS</b> PID = Photo Ionisation Detector reading (ppm, v/v) QA/QC Sample ID = Quality Assurance /Quality Control Sample ID  <b>GROUNDWATER SYMBOLS</b>  = Water level (static)  = Water level (during drilling)	<b>FIELD DATA SYMBOLS</b> ● = Environmental Sample X = Non Environmental Sample  <b>MOISTURE CONDITION</b> D = Dry M = Moist W = Wet St, M = Slightly Moist	<b>DENSITY (N-value)</b> VL (very loose) <10 L (loose) 10 - 20 MD (medium dense) 20 - 30 D (dense) 30 - 50 VD (very dense) >50 CO (compact) >50/150mm	<b>CONSISTENCY (Su)</b> VS (very soft) < 12 kPa S (soft) 12 - 25 F (firm) 25 - 50 St (stiff) 50 - 100 VSt (very stiff) 100 - 200 H (hard) > 200 kPa
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**Project: Proposed Bell Bay Site**

**Client: Alinta Energy Pty Ltd**

Location: Proposed Bell Bay Site    Bore dia: 150mm  
 Job No: VV03886.6    Driller: KMR Drilling  
 Start - Finish Date: 17/01/07 - 17/01/07    Rig: Hydrapower Scout

Surface Conditions: Grass    RL:  
 Northings: mN    Logged: Corey B  
 Eastings: mE    Checked:

FIELD DATA						SOIL DESCRIPTION				COMMENTS	
sample ID	sample type	visual ranking	odour ranking	PID (ppm)	QA/QC Sample ID	ground water depth (m)	graphic log	soil type, unified classification, colour, structure, particle characteristics, minor components	consistency/density	moisture condition	drilling method, well construction, water and additional observations
BH4-0.1		0	A					SAND (SM) grey, fine grained	L-MD	D	Hollow Augering
BH4-0.5		0	A								
BH4-1.0		0	A			1		SANDY CLAY (SC) red-grey-orange mottled. Sand is fine grained	F	M	Grout (0m - 2.0m) PVC Casing (0m - 3.6m)
BH4-2.5		0	A			2		CLAYEY SAND (SC) light brown-yellow, fine grained white-yellow mottled	D	M	Bentonite seal (2.0m - 3.0m)
BH4-4.0		0	A			3		white-yellow-orange mottled			
BH4-5.5		0	A			4					
BH4-7.0		0	A			5					
BH4-8.5		0	A			6		black organic matter ironstone nodules			
						7					
						8					
						9					
						10		Downhole hammering is now the drilling method	VD	M	PVC Slotted Screen (3.6m - 12.6m) Hammer Drilling
						11					
						12		CLAYSTONE (SW) grey	M	W	
Borehole terminated at 12.6m											

ENV 1 MODIFIED ALINTA 07.GPJ SKM\_ENVL1.GDT 1/23/07

<b>VISUAL RANKING</b> 0 No visible evidence of contamination 1 Slight visible contamination 2 Visible contamination 3 Significant visible contamination  <b>ODOUR RANKING</b> A No Non-Natural odours B Slight Non-Natural odours C Moderate Non-Natural odours D Strong Non-Natural odours	<b>FIELD DATA ABBREVIATIONS</b> PID = Photo Ionisation Detector reading (ppm, v/v) QA/QC Sample ID = Quality Assurance /Quality Control Sample ID  <b>GROUNDWATER SYMBOLS</b> ▽ = Water level (static) ▽▽ = Water level (during drilling)	<b>FIELD DATA SYMBOLS</b> ● = Environmental Sample X = Non Environmental Sample  <b>MOISTURE CONDITION</b> D = Dry M = Moist W = Wet Sl, M = Slightly Moist	<b>DENSITY (N-value)</b> VL (very loose) <10 L (loose) 10 - 20 MD (medium dense) 20 - 30 D (dense) 30 - 50 VD (very dense) >50 CO (compact) >50/150mm	<b>CONSISTENCY (Su)</b> VS (very soft) < 12 kPa S (soft) 12 - 25 F (firm) 25 - 50 St (stiff) 50 - 100 VSt (very stiff) 100 - 200 H (hard) > 200 kPa
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**Project: Proposed Bell Bay Site**

**Client: Alinta Energy Pty Ltd**

Location: Proposed Bell Bay Site      Bore dia: 150mm  
 Job No: VW03886.6      Driller: KMR Drilling  
 Start - Finish Date: 17/01/07 - 17/01/07      Rig: Hydrapower Scout

Surface Conditions: Grass  
 Northings: mN  
 Eastings: mE

RL:  
 Logged: Corey B  
 Checked:

FIELD DATA					SOIL DESCRIPTION				COMMENTS		
sample ID	sample type	visual ranking	odour ranking	PID (ppm)	QA/QC Sample ID	ground water depth (m)	graphic log	soil type, unified classification, colour, structure, particle characteristics, minor components	consistency/density	moisture condition	drilling method, well construction, water and additional observations
BH5-0.1		0	A					SAND (SM) dark grey, fine grained light grey	MD MD	D D	Hollow Augering
BH5-0.5		0	A								
BH5-1.0		0	A			1		CLAYEY SAND (SC) light grey-brown, fine grained	D	M	Grout (0m - 1.5m)
						2		SANDY CLAY (SC) brown. Sand is fine grained	F	M	PVC Casing (0m - 2.9m)
BH5-2.5		0	A			3		CLAYEY SAND (SC) light grey, medium grained	MD	M	Bentonite seal (1.5m - 2.5m)
						4		SANDY CLAY (SC) light brown. Sand is fine grained	S	M	
BH5-4.0		0	A			5		grey-brown mottled			Sand (2.5m - 5.9m)
BH5-5.5		0	A			6					PVC Slotted Screen (2.9m - 5.9m)
						7		Borehole terminated at 6.0m. Borehole collapsed back to 5.9m at the completion of drilling.			
						8					
						9					
						10					
						11					
						12					

ENV 1 MODIFIED ALINTA 07.GPJ SKM\_ENVL1.GDT 1/23/07

<b>VISUAL RANKING</b> 0 No visible evidence of contamination 1 Slight visible contamination 2 Visible contamination 3 Significant visible contamination  <b>ODOUR RANKING</b> A No Non-Natural odours B Slight Non-Natural odours C Moderate Non-Natural odours D Strong Non-Natural odours	<b>FIELD DATA ABBREVIATIONS</b> PID = Photo Ionisation Detector reading (ppm, v/v) QA/QC Sample ID = Quality Assurance /Quality Control Sample ID  <b>GROUNDWATER SYMBOLS</b> ▽ = Water level (static) ▽ = Water level (during drilling)	<b>FIELD DATA SYMBOLS</b> ● = Environmental Sample X = Non Environmental Sample  <b>MOISTURE CONDITION</b> D = Dry M = Moist W = Wet Sl, M = Slightly Moist	<b>DENSITY (N-value)</b> VL (very loose) <10 L (loose) 10 - 20 MD (medium dense) 20 - 30 D (dense) 30 - 50 VD (very dense) >50 CO (compact) >50/150mm	<b>CONSISTENCY (Su)</b> VS (very soft) < 12 kPa S (soft) 12 - 25 F (firm) 25 - 50 St (stiff) 50 - 100 VSt (very stiff) 100 - 200 H (hard) > 200 kPa
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**Project: Proposed Bell Bay Site**

**Client: Alinta Energy Pty Ltd**

Location: Proposed Bell Bay Site      Bore dia: 150mm  
 Job No: VW03886.6                      Driller: KMR Drilling  
 Start - Finish Date: 19/01/07 - 19/01/07      Rig: Hydrapower Scout

Surface Conditions: Grass  
 Northings: mN  
 Eastings: mE

RL:  
 Logged: Corey B  
 Checked:

FIELD DATA						SOIL DESCRIPTION			COMMENTS		
sample ID	sample type	visual ranking	odour ranking	PID (ppm)	QA/QC Sample ID	ground water depth (m)	graphic log	soil type, unified classification, colour, structure, particle characteristics, minor components	consistency/density	moisture condition	drilling method, well construction, water and additional observations
BH6-0.1		0	A					SAND (SM) light grey, fine grained	MD	D	Hollow Augering
BH6-0.5		0	A					CLAY (CH) light grey			Grout (0m - 0.5m)
BH6-1.0		0	A					Auger Refusal at 1.9m. Downhole hammering is now the drilling method	St	M	PVC Casing (0m - 1.9m)
								BASALT (FR) dark blue, fine grained NOTE: This basalt appears to be different to the basalts found in the southern area of site	VH	M	Bentonite seal (0.5m - 1.5m) Hammer Drilling
											Sand (1.5m - 6.9m)
								BASALT (HW) orange, fine grained and highly fractured	L-M	M	PVC Slotted Screen (1.9m - 6.9m)
								Borehole terminated at 7.5m. Borehole collapsed back to 6.9m at the completion of drilling.			

ENV 1 MODIFIED ALINTA 07.GPJ\_SKM\_ENV1.GDT 1/23/07

<p><b>VISUAL RANKING</b></p> <p>0 No visible evidence of contamination</p> <p>1 Slight visible contamination</p> <p>2 Visible contamination</p> <p>3 Significant visible contamination</p> <p><b>ODOUR RANKING</b></p> <p>A No Non-Natural odours</p> <p>B Slight Non-Natural odours</p> <p>C Moderate Non-Natural odours</p> <p>D Strong Non-Natural odours</p>	<p><b>FIELD DATA ABBREVIATIONS</b></p> <p>PID = Photo Ionisation Detector reading (ppm, v/v)</p> <p>QA/QC Sample ID = Quality Assurance /Quality Control Sample ID</p> <p><b>GROUNDWATER SYMBOLS</b></p> <p>▽ = Water level (static)</p> <p>▽ = Water level (during drilling)</p>	<p><b>FIELD DATA SYMBOLS</b></p> <p>● = Environmental Sample</p> <p>× = Non Environmental Sample</p> <p><b>MOISTURE CONDITION</b></p> <p>D = Dry M = Moist W = Wet</p> <p>Sl. M = Slightly Moist</p>	<p><b>DENSITY (N-value)</b></p> <p>VL (very loose) &lt;10</p> <p>L (loose) 10 - 20</p> <p>MD (medium dense) 20 - 30</p> <p>D (dense) 30 - 50</p> <p>VD (very dense) &gt;50</p> <p>CO (compact) &gt;50/150mm</p>	<p><b>CONSISTENCY (Su)</b></p> <p>VS (very soft) &lt; 12 kPa</p> <p>S (soft) 12 - 25</p> <p>F (firm) 25 - 50</p> <p>St (stiff) 50 - 100</p> <p>VSt (very stiff) 100 - 200</p> <p>H (hard) &gt; 200 kPa</p>
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Sinclair Knight Merz Pty Ltd  
137 Harrington Street  
Hobart, Tasmania, 7001  
+61 3 6221 3735  
Monday, 1 September 2008 12:42:53 PM

PROJECT: 86.4\Technical\Spatial\Terramodel\Alinta\_GPS site detail\_FINAL\_MAG.pro

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Point Coordinates Listing

Point	East	North	Elev	Layer	Name
1219(2)	490542.670	5447882.638	36.158	GEOTECH_BOREHOLE	gtbh1
1220(2)	490501.762	5447909.867	36.360	GEOTECH_BOREHOLE	gtbh2
1222(2)	490543.463	5447929.289	34.186	GEOTECH_BOREHOLE	gtbh3



**BOREHOLE No. GTBH1**

Sheet 1 of 3

Project: Tamar Valley Power Station  
 Location: Tamar Valley  
 Job No: VW03886

Client: Alinta  
 Start - Finish Date: 22/01/07 - 22/01/07  
 Bore dia: 150mm / 90mm

Driller: KMR Drilling  
 Rig: Hydra Power Scout  
 Surface Conditions: Grass

Northings: mN5447882  
 Eastings: mE4905426  
 Logged: A.E.  
 Checked:  
 RL: m (AHD) Oriented: -90

LAB DATA		MINOR DEFECT DATA		FIELD DATA			ROCK DESCRIPTION		ROCK CONDITION		COMMENTS
dry density (t/m <sup>3</sup> )	moisture content (%)	minor defect description: type, dip/dip direction, colour, coating, thickness (mm), roughness	minor defect spacing (mm)	field & other tests	sample type field tests	ground water depth (m)	graphic log	rock type, degree of weathering, colour, grain size, texture and fabric, structure, angle of bedding dip, geological formation	rock or soil strength	moisture condition	drilling method, well construction, water and additional observations
								Silty CLAY (CH) orange, brown, red, grey, high plasticity, ironstone nodules, erratic, black organic material	F	M	Hollow stem auger 150mm dia
				Suv=234kPA Sur=217kPA	X						
				47/9 (N=16)	●						
				Suv=157kPA Sur=107kPA	X						
				57/10 (N=17)	●						

SKM 001 ROCK TAMAR VALLEY POWER STATION BOREHOLE LOGS 30.01.07.GPJ SKM\_001\_20060209.GDT 1/31/07

<p><b>LABORATORY DATA</b></p> <p>UCN Unconfined Comp. Strength (MPa)                  UCS Unconfined Comp. Strength (MPa)                  TQN Unconsolidated Undrained Triaxial                  TQS Unconsolidated Undrained Triaxial                  N = Natural S = Saturated</p> <p><b>GROUNDWATER SYMBOLS</b></p> <p>▼ = Water level (static)                  ▽ = Water level (during drilling)                  ◀▶ = Outflow / Inflow</p>	<p><b>MINOR DEFECT DATA (&lt;10mm thickness)</b></p> <p>B Bedding plane joint                  Sv Sub-vertical joint                  Sh Sub-horizontal joint                  T Transverse to bedding plane                  RQD % core run &gt;100mm long</p> <p><b>FIELD DATA ABBREVIATIONS</b></p> <p>Is(50) Point Load Index (MPa)                  N SPT blows per 300mm                  FPM Field permeability (packer)</p>	<p><b>FIELD DATA SYMBOLS</b></p> <p>⊃ Packer Interval                  ● Point Load Test                  ▽ Standard Penetration Test (SPT top = start of N blowcount)                  ◻ Core recovered                  ◼ % Core Loss per Run                  ■ Large core &gt;100mm long                  ● Small core &lt;100mm long</p>	<p><b>MAJOR DEFECT DATA (&gt;10mm thickness)</b></p> <p>SH Sheared seam                  CR Crushed seam                  NF Infilled seam                  EW Extremely Weathered seam</p> <p><b>MOISTURE CONDITION</b></p> <p>D = Dry M = Moist W = Wet</p>	<p><b>ROCK STRENGTH (Is(50) Point Load Index)</b></p> <p>EL Ext. low &lt;0.03                  VL Very low 0.03-0.1                  L Low 0.1-0.3                  M Medium 0.3-1.0                  H High 1.0-3.0                  VH Very high 3-10                  EH Ext. high &gt;10</p>
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# BOREHOLE No. GTBH1

Sheet 2 of 3

Project: Tamar Valley Power Station  
 Location: Tamar Valley  
 Job No: VW03886

Client: Alinta  
 Start - Finish Date: 22/01/07 - 22/01/07  
 Bore dia: 150mm / 90mm

Driller: KMR Drilling  
 Rig: Hydra Power Scout  
 Surface Conditions: Grass

Northings: mN  
 Eastings: mE  
 RL: m (AHD)

Logged: A.E.  
 Checked:  
 Oriented: -90

LAB DATA		MINOR DEFECT DATA		FIELD DATA		ROCK DESCRIPTION		ROCK CONDITION		COMMENTS
dry density (t/m <sup>3</sup> )	moisture content (%)	minor defect description: type, dip/dip direction, colour, coating, thickness (mm), roughness	minor defect spacing (mm) 5 20 100 500 2000	field & other tests	sample type field tests ground water depth (m)	graphic log	rock type, degree of weathering, colour, grain size texture and fabric, structure, angle of bedding dip geological formation  major defect description - type, dip, colour, filling, thickness (mm), roughness	rock or soil strength	moisture condition	drilling method, well construction, water and additional observations
							Silty CLAY (CH) orange, brown, red, grey, high plasticity, ironstone nodules, erratic, black organic material (continued)			
				6/10/7 (N=17)			Clayey SAND (SC) light grey mottled with orange, with black organic pigments, <2mm in size	MD	M	
				10/10/9 (N=19)			Silty CLAY (CH) brown, high plasticity, with fine Basalt fragments, <4mm in size			
		J60 Fe2mm J60 Fe1mm					DOLERITE slightly weathered, dark blue, medium grained, iron staining, fractured <1mm	F	M	Auger Refusal at 8.0m HQ3 diamond drilling 90mm dia
		J45 1mm					moderately weathered (MW), with disseminated olivine green in colour			
							extremely weathered (XW), with mottled light grey, brown, orange, high plasticity clay and light green clayey sand			
							fresh, dark blue, medium grained			
							extremely weathered (XW), with brown clay			
							moderately weathered (MW), dark blue, brown, medium grained, with cross cutting fractures			

SKM 001 ROCK TAMAR VALLEY POWER STATION BOREHOLE LOGS 30.01.07.GPJ SKM\_001\_20060209.GDT 1/31/07

<b>LABORATORY DATA</b> UCN Unconfined Comp. Strength (MPa) UCS Unconfined Comp. Strength (MPa) TQN Unconsolidated Undrained Triaxial TQS Unconsolidated Undrained Triaxial N = Natural S = Saturated  <b>GROUNDWATER SYMBOLS</b> = Water level (static) = Water level (during drilling) = Outflow / Inflow	<b>MINOR DEFECT DATA</b> (<10mm thickness) B Bedding plane joint Sv Sub-vertical joint Sh Sub-horizontal joint T Transverse to bedding plane RQD % core run >100mm long  <b>FIELD DATA ABBREVIATIONS</b> Is(50) Point Load Index (MPa) N SPT blows per 300mm FPM Field permeability (packer)	<b>FIELD DATA SYMBOLS</b> Packer Interval Point Load Test Standard Penetration Test (SPT top = start of N blowcount) Core recovered % Core Loss per Run Large core >100mm long Small core <100mm long	<b>MAJOR DEFECT DATA</b> (>10mm thickness) SH Sheared seam CR Crushed seam NF Infilled seam EW Extremely Weathered seam  <b>MOISTURE CONDITION</b> D = Dry M = Moist W = Wet	<b>ROCK STRENGTH</b> (Is(50) Point Load Index) EL Ext. low <0.03 VL Very low 0.03-0.1 L Low 0.1-0.3 M Medium 0.3-1.0 H High 1.0-3.0 VH Very high 3-10 EH Ext. high >10
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# BOREHOLE No. GTBH1

Sheet 3 of 3

Project: Tamar Valley Power Station  
 Location: Tamar Valley  
 Job No: VW03886

Client: Alinta  
 Start - Finish Date: 22/01/07 - 22/01/07  
 Bore dia: 150mm / 90mm

Driller: KMR Drilling  
 Rig: Hydra Power Scout  
 Surface Conditions: Grass

Northings: mN  
 Eastings: mE  
 RL: m (AHD)

Logged: A.E.  
 Checked:  
 Oriented: -90

LAB DATA		MINOR DEFECT DATA			FIELD DATA		ROCK DESCRIPTION		ROCK CONDITION		COMMENTS	
dry density (t/m <sup>3</sup> )	moisture content (%)	minor defect description: type, dip/dip direction, colour, coating, thickness (mm), roughness		minor defect spacing (mm)	field & other tests	sample type field tests	ground water depth (m)	graphic log	rock type, degree of weathering, colour, grain size, texture and fabric, structure, angle of bedding dip, geological formation	rock or soil strength	moisture condition	drilling method, well construction, water and additional observations
				5 20 100 500 2000					major defect description - type, dip, colour, filling, thickness (mm), roughness			
									Bore hole terminated at 10.05m			Bore hole back filled with Clay (CH)
							11					
							12					
							13					
							14					
							15					

SKM 001 ROCK TAMAR VALLEY POWER STATION BOREHOLE LOGS 30.01.07.GPJ SKM\_001\_20060209.GDT 1/31/07

<b>LABORATORY DATA</b> UCN Unconfined Comp. Strength (MPa) UCS Unconfined Comp. Strength (MPa) TQN Unconsolidated Undrained Triaxial TQS Unconsolidated Undrained Triaxial N = Natural S = Saturated <b>GROUNDWATER SYMBOLS</b> = Water level (static) = Water level (during drilling) = Outflow / Inflow	<b>MINOR DEFECT DATA</b> (<10mm thickness) B Bedding plane joint Sv Sub-vertical joint Sh Sub-horizontal joint T Transverse to bedding plane RQD % core run >100mm long <b>FIELD DATA ABBREVIATIONS</b> Is(50) Point Load Index (MPa) N SPT blows per 300mm FPM Field permeability (packer)	<b>FIELD DATA SYMBOLS</b> Packer Interval Point Load Test Standard Penetration Test (SPT top = start of N blowcount) Core recovered % Core Loss per Run Large core >100mm long Small core <100mm long	<b>MAJOR DEFECT DATA</b> (>10mm thickness) SH Sheared seam CR Crushed seam NF Infilled seam EW Extremely Weathered seam <b>MOISTURE CONDITION</b> D = Dry M = Moist W = Wet	<b>ROCK STRENGTH</b> (Is(50) Point Load Index) EL Ext. low <0.03 VL Very low 0.03-0.1 L Low 0.1-0.3 M Medium 0.3-1.0 H High 1.0-3.0 VH Very high 3-10 EH Ext. high >10
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**BOREHOLE No. GTBH3**

Sheet 1 of 3

Project: Tamar Valley Power Station  
 Location: Tamar Valley  
 Job No: VV03886

Client: Alinta  
 Start - Finish Date: 23/01/07 - 23/01/07  
 Bore dia: 150mm / 90mm

Driller: KMR Drilling  
 Rig: Hydra Power Scout  
 Surface Conditions: Grass

Northings: mN  
 Eastings: mE  
 RL: m (AHD)

Logged: A.E.  
 Checked:  
 Oriented: -90

LAB DATA		MINOR DEFECT DATA		FIELD DATA		ROCK DESCRIPTION		ROCK CONDITION		COMMENTS
dry density (t/m <sup>3</sup> )	moisture content (%)	minor defect description: type, dip/dip direction, colour, coating, thickness (mm), roughness	minor defect spacing (mm) 5 20 100 500 2000	field & other tests	sample type field tests ground water depth (m)	graphic log	rock type, degree of weathering, colour, grain size, texture and fabric, structure, angle of bedding dip, geological formation	rock or soil strength	moisture condition	drilling method, well construction, water and additional observations
					2/4/4 (N=8)		SAND (SM) dark grey, fine grained	MD	D	Hollow stem auger 150mm dia
							IRON PAN red lateritic surface made up of a ferritic cemented gravel between 0.3 to 0.4m depth	H	D	
							DOLERITE extremely weathered, mottled brown, orange, grey, with high plasticity clay and ironstone nodules <50mm in size			
							CORELOSS 2.3 to 2.6m			Auger Refusal at 2.3m HQ3 diamond drilling 90mm dia
							fresh, dark blue, medium grained			
							extremely weathered, mottled grey, brown, orange, with high plasticity clay			
							extremely weathered, light grey, some iron staining, with high plasticity clay			
							fresh, dark blue, medium grained weathered seam with iron staining			
							CORELOSS 4.7 to 4.95m			

SKM 001 ROCK TAMAR VALLEY POWER STATION BOREHOLE LOGS 30.01.07.GPJ SKM\_001\_20060209.GDT 1/3/07

<p><b>LABORATORY DATA</b></p> <p>UCN Unconfined Comp. Strength (MPa)                  UCS Unconfined Comp. Strength (MPa)                  TQN Unconsolidated Undrained Triaxial                  TQS Unconsolidated Undrained Triaxial                  N = Natural S = Saturated</p> <p><b>GROUNDWATER SYMBOLS</b></p> <p>Water level (static)                  Water level (during drilling)                  Outflow / Inflow</p>	<p><b>MINOR DEFECT DATA</b>                  (&lt;10mm thickness)</p> <p>B Bedding plane joint                  Sv Sub-vertical joint                  Sh Sub-horizontal joint                  T Transverse to bedding plane                  RQD % core run &gt;100mm long</p> <p><b>FIELD DATA ABBREVIATIONS</b></p> <p>Is(50) Point Load Index (MPa)                  N SPT blows per 300mm                  FPM Field permeability (packer)</p>	<p><b>FIELD DATA SYMBOLS</b></p> <p>Packer Interval                  Point Load Test                  Standard Penetration Test (SPT top = start of N blowcount)                  Core recovered                  % Core Loss per Run                  Large core &gt;100mm long                  Small core &lt;100mm long</p>	<p><b>MAJOR DEFECT DATA</b>                  (&gt;10mm thickness)</p> <p>SH Sheared seam                  CR Crushed seam                  NF Infilled seam                  EW Extremely Weathered seam</p> <p><b>MOISTURE CONDITION</b></p> <p>D = Dry M = Moist W = Wet</p>	<p><b>ROCK STRENGTH</b>                  (Is(50) Point Load Index)</p> <p>EL Ext. low &lt;0.03                  VL Very low 0.03-0.1                  L Low 0.1-0.3                  M Medium 0.3-1.0                  H High 1.0-3.0                  VH Very high 3-10                  EH Ext. high &gt;10</p>
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**BOREHOLE No. GTBH3**

Sheet 2 of 3

Project: Tamar Valley Power Station  
 Location: Tamar Valley  
 Job No: VV03886

Client: Alinta  
 Start - Finish Date: 23/01/07 - 23/01/07  
 Bore dia: 150mm / 90mm

Driller: KMR Drilling  
 Rig: Hydra Power Scout  
 Surface Conditions: Grass

Northings: mN  
 Eastings: mE  
 RL: m (AHD)

Logged: A.E.  
 Checked:  
 Oriented: -90

LAB DATA		MINOR DEFECT DATA		FIELD DATA		ROCK DESCRIPTION		ROCK CONDITION		COMMENTS			
dry density (t/m <sup>3</sup> )	moisture content (%)	minor defect description: type, dip/dip direction, colour, coating, thickness (mm), roughness	minor defect spacing (mm)	field & other tests	sample type	field tests	ground water depth (m)	graphic log	rock type, degree of weathering, colour, grain size, texture and fabric, structure, angle of bedding dip, geological formation	major defect description - type, dip, colour, filling, thickness (mm), roughness	rock or soil strength	moisture condition	drilling method, well construction, water and additional observations
			5 20 100 500 2000						extremely weathered, mottled grey, brown, with high plasticity clay and iron staining (continued)				
									moderately weathered, dark blue, brown, orange				
							6		extremely weathered, mottled grey, brown, orange with high plasticity clay and dark green secondary minerals				
									iron band 100mm thick				
							7		fresh Dolerite 7.05 to 7.35m depth				
									highly weathered, brown, grey, light green				
							8		extremely weathered, mottled brown, orange, light green, with high plasticity clay				
									fresh, dark blue, medium grained				
		J75 Fe							highly weathered, brown, orange, grey, iron staining				
		J75 Fe					9		fresh, dark blue, medium grained				
									moderately weathered, dark blue, brown, with iron staining				
									fresh, dark blue, medium grained				
							10						

SKM 001 ROCK TAMAR VALLEY POWER STATION BOREHOLE LOGS 30.01.07.GPJ SKM\_001\_20060209.GDT 1/31/07

<b>LABORATORY DATA</b> UCN Unconfined Comp. Strength (MPa) UCS Unconfined Comp. Strength (MPa) TQN Unconsolidated Undrained Triaxial TQS Unconsolidated Undrained Triaxial N = Natural S = Saturated  <b>GROUNDWATER SYMBOLS</b> = Water level (static) = Water level (during drilling) = Outflow / Inflow	<b>MINOR DEFECT DATA</b> (<10mm thickness) B Bedding plane joint Sv Sub-vertical joint Sh Sub-horizontal joint T Transverse to bedding plane RQD % core run >100mm long  <b>FIELD DATA ABBREVIATIONS</b> Is(50) Point Load Index (MPa) N SPT blows per 300mm FPM Field permeability (packer)	<b>FIELD DATA SYMBOLS</b> Packer Interval Point Load Test Standard Penetration Test (SPT top = start of N blowcount) Core recovered % Core Loss per Run Large core >100mm long Small core <100mm long	<b>MAJOR DEFECT DATA</b> (>10mm thickness) SH Sheared seam CR Crushed seam NF Infilled seam EW Extremely Weathered seam  <b>MOISTURE CONDITION</b> D = Dry M = Moist W = Wet	<b>ROCK STRENGTH</b> (Is(50) Point Load Index) EL Ext. low <0.03 VL Very low 0.03-0.1 L Low 0.1-0.3 M Medium 0.3-1.0 H High 1.0-3.0 VH Very high 3-10 EH Ext. high >10
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Project: Tamar Valley Power Station  
 Location: Tamar Valley  
 Job No: VV03886

Client: Alinta  
 Start - Finish Date: 23/01/07 - 23/01/07  
 Bore dia: 150mm / 90mm

Driller: KMR Drilling  
 Rig: Hydra Power Scout  
 Surface Conditions: Grass

Northings: mN  
 Eastings: mE  
 RL: m (AHD)

Logged: A.E.  
 Checked:  
 Oriented: -90

LAB DATA		MINOR DEFECT DATA		FIELD DATA		ROCK DESCRIPTION		ROCK CONDITION		COMMENTS			
dry density (t/m <sup>3</sup> )	moisture content (%)	minor defect description: type, dip/dip direction, colour, coating, thickness (mm), roughness	minor defect spacing (mm)	field & other tests	sample type	field tests	ground water depth (m)	graphic log	rock type, degree of weathering, colour, grain size, texture and fabric, structure, angle of bedding dip, geological formation	major defect description - type, dip, colour, filling, thickness (mm), roughness	rock or soil strength	moisture condition	drilling method, well construction, water and additional observations
			5 20 100 500 2000						extremely weathered, mottled grey, brown, with high plasticity clay and iron staining (continued)				Bore hole back filled with Clay (CH)
									Borehole terminated at 10.35m				
							11						
							12						
							13						
							14						
							15						

<b>LABORATORY DATA</b> UCN Unconfined Comp. Strength (MPa) UCS Unconfined Comp. Strength (MPa) TQN Unconsolidated Undrained Triaxial TQS Unconsolidated Undrained Triaxial N = Natural S = Saturated <b>GROUNDWATER SYMBOLS</b> = Water level (static) = Water level (during drilling) = Outflow / Inflow	<b>MINOR DEFECT DATA</b> (<10mm thickness) B Bedding plane joint Sv Sub-vertical joint Sh Sub-horizontal joint T Transverse to bedding plane RQD % core run >100mm long <b>FIELD DATA ABBREVIATIONS</b> Is(50) Point Load Index (MPa) N SPT blows per 300mm FPM Field permeability (packer)	<b>FIELD DATA SYMBOLS</b> Packer Interval Point Load Test Standard Penetration Test (SPT top = start of N blowcount) Core recovered % Core Loss per Run Large core >100mm long Small core <100mm long	<b>MAJOR DEFECT DATA</b> (>10mm thickness) SH Sheared seam CR Crushed seam NF Infilled seam EW Extremely Weathered seam <b>MOISTURE CONDITION</b> D = Dry M = Moist W = Wet	<b>ROCK STRENGTH</b> (Is(50) Point Load Index) EL Ext. low <0.03 VL Very low 0.03-0.1 L Low 0.1-0.3 M Medium 0.3-1.0 H High 1.0-3.0 VH Very high 3-10 EH Ext. high >10
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## Appendix B Laboratory Reports

**DRAFT**