

AGL Upstream Investments Pty Ltd

Phase 2 Groundwater Investigations

Stage 1 Gas Field Development Area
Gloucester Gas Project

January 2012



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Phase 2 Groundwater Investigations – Stage 1 Gas Field Development Area Gloucester Gas Project

January 2012

AGL Upstream Investments Pty Ltd

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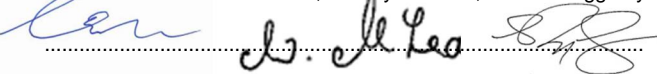
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00	First DRAFT	25/08/2011	
01	Second DRAFT	01/11/2011	JCD/WMC
02	Final DRAFT	19/12/2011	JCD/WMC/SB
03	FINAL	11/01/2012	JCD

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Appendix A

AGL Pilot test wells laboratory
analyses



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: ES1021779	Page	: 1 of 4
Client	: AGL ENERGY	Laboratory	: Environmental Division Sydney
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Project	: GLOUCESTER GAS PROJECT-POND WATER QUALITY ASSESSMENT	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 29-OCT-2010
C-O-C number	: ----	Issue Date	: 04-NOV-2010
Sampler	: TL	No. of samples received	: 5
Site	: ----	No. of samples analysed	: 5
Quote number	: SY/456/10		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits



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Accredited for compliance with ISO/IEC 17025.

Signatories

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

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General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

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

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

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

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

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

LOR = Limit of reporting

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

- **ED041G: LOR raised for SO4 analysis on sample Id:TiedNth/201010/1/TL due to sample matrix**
- **ED-093F:LCS recovery for Potassium falls outside ALS Dynamic Control Limit. However, they are within the acceptance criteria based on ALS DQO. No further action is required.**
- **EP080:Level of Reporting raised for toluene due to ambient background levels in the laboratory.**



Analytical Results

Sub-Matrix: WATER

Client sample ID
 Client sampling date / time

Compound	CAS Number	LOR	Unit	TiedNth/201010/1/TL	TiedSth/201010/1/TL	STRAT1/201010/1/TL	STRAT3/201010/1/TL	CRAV6/201010/1/TL
				26-OCT-2010 15:00	26-OCT-2010 15:00	26-OCT-2010 15:00	26-OCT-2010 15:00	26-OCT-2010 15:00
				ES1021779-001	ES1021779-002	ES1021779-003	ES1021779-004	ES1021779-005
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	4280	2790	2160	2300	6440
EA016: Non Marine - Estimated TDS Salinity								
^ Total Dissolved Solids (est.)	----	1	mg/L	2780	1810	1410	1500	4180
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	454	314	212	220	270
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	901	464	393	463	2850
Total Alkalinity as CaCO3	----	1	mg/L	1360	778	605	683	3120
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<5	22	21	10	<1
ED045G: Chloride Discrete analyser								
Chloride	16887-00-6	1	mg/L	569	425	332	338	515
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	<1	3	2	3	10
Magnesium	7439-95-4	1	mg/L	<1	1	<1	1	3
Sodium	7440-23-5	1	mg/L	769	624	504	524	1620
Potassium	7440-09-7	1	mg/L	323	43	12	27	11
EN055: Ionic Balance								
^ Total Anions	----	0.01	meq/L	43.1	28.0	21.9	23.4	76.9
^ Total Cations	----	0.01	meq/L	41.7	28.5	22.4	23.7	71.4
^ Ionic Balance	----	0.01	%	1.70	0.85	1.01	0.62	3.77
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50
EP080: BTEX								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L	<5	<5	<5	<5	<5
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	108	110	91.9	85.2	90.8
Toluene-D8	2037-26-5	0.1	%	106	112	102	96.4	103
4-Bromofluorobenzene	460-00-4	0.1	%	104	106	98.0	95.2	101



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	76.4	133.1
Toluene-D8	2037-26-5	79.6	126.8
4-Bromofluorobenzene	460-00-4	79.1	125.0

Appendix B

Bore logs



GROUNDWATER BOREHOLE LOG

BORE NO.

AMB01

SHEET 1 OF 1

Client:	AGL Energy Limited	Date Commenced:	1/2/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	31/1/11
Bore Location:	Gloucester - Atkins property	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	107.88 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 401659.1 N 6448639.73 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
	50 mm ID Class 18 uPVC & grout	107	1		TOPSOIL - Grey, dry sandy topsoil - low organic content	Avon River Alluvium	
	Drill cuttings backfill	106	2		CLAY - Light brown, mottled sandy clay - dry		
		105	3		CLAY - Grey brown, sticky medium plasticity		
	Bentonite seal	103	5				
	Gravel 5 mm graded	102	6		MIXED GRAVELS - Brown & white, fine grained mixed, clean gravels with some fine grained sand		
	50 mm ID, 0.5 mm aperture uPVC screen	101	7		Some grey, blue, white and brown pebbles up to 4 cm		
		100	8		MIXED GRAVELS - Brown & white, medium to fine grained mixed, clean gravels with some grey, blue, white and brown pebbles up to 4 cm		
		99	9		resistance during drilling, indicative of siltstone		
		98	10				
		97	11				
	Sump/ bentonite plug	96	12		SILTSTONE - Dark grey, siltstone (60%) with 40% light grey, medium grained sandstone	Gloucester Coal Measures	pH: 7.46 EC: 2953 µS/cm Temp: 24.38 °C redox: -27.9 mV pH: 7.37 EC: 2988 µS/cm Temp: 23.45 °C redox: -99.4 mV
		95	13				
		94	14				
		93					

END OF BOREHOLE AT 12.60 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

AMB02

SHEET 1 OF 1

Client:	AGL Energy Limited	Date Commenced:	31/1/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	1/2/11
Bore Location:	Gloucester - Atkins property	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	111.48 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 400693.99 N 6447946.05 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
	50 mm ID Class 18 uPVC & grout	111	1 -		CLAY TOPSOIL - Brown, sandy clay topsoil, medium plasticity	Avon River Alluvium	
	Drill cuttings backfill	110	2 -		SAND - Light brown, very fine grain sand with some clay		
		109	3 -				
		108	4 -				
		107	5 -		SANDY CLAY - Light brown, very fine grained sand with dark grey clay (medium plasticity)		
		106	6 -		CLAY - Light grey and brown, low/medium plasticity clay with light brown very fine grained sand		
	Bentonite seal	105	7 -				
	Gravel 5 mm graded	104	8 -		MIXED GRAVELS/CLAY - Mixed gravels up to 3mm with grey, sticky, moist clay		
	50 mm ID, 0.5 mm aperture uPVC screen	103	9 -		MIXED GRAVELS - Green/black/brown, medium gravels and pebbles up to 5mm, with some medium to fine grained sandstone		
	Sump/bentonite plug	101	10 -		MIXED GRAVELS/CLAYSTONE - Multi-coloured, fine to medium grain mixed gravels and sand with 20% larger pebbles up to 10mm plus claystone and grey sandstone		
		100	11 -		SANDSTONE - Light grey, fine to medium grained sandstone		Gloucester Coal Measures
		99	12 -				
		98	13 -				
		97	14 -				

pH: 7.34
EC: 387 µS/cm
Temp: 20.92 °C
redox: 12.4 mV

END OF BOREHOLE AT 11.50 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

BMB01

SHEET 1 OF 1

Client:	AGL Energy Limited	Date Commenced:	11/1/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	12/1/11
Bore Location:	Gloucester - Bignall property	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	108.95 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 401366.46 N 6449378.81 MGA56

Bore Information		Field Material Description						
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY	
	50 mm ID Class 18 uPVC & grout	108	1		TOPSOIL/DRILLPAD - Grey, drill pad	LELOMA FORMATION (upper)		
		107	2					
		106	3		WEATHERED CLAY - Light grey, weathered mottled clay			
		105	4		WEATHERED SANDY CLAY - Dark brown/black/cream/creamy green/yellow weathered mottled clay - sandy			
		104	5					
		103	6					
		102	7		WEATHERED CLAY - Black and light brown, weathered clay with weathered siltstone/claystone			
		101	8		WEATHERED SILTSTONE - Light grey, weathered siltstone/claystone			
		100	9					
	Bentonite seal	99	10		WEATHERED SANDSTONE - Grey, fine grained weathered sandstone, siltstone and claystone			
		98	11					
		97	12		SANDSTONE and SILTSTONE - Grey, fine grained light grey sandstone (50%) and dark grey/black siltstone (50%)			
	Gravel 5 mm graded	96	13					
		95	14					
	50 mm ID, 0.5 mm aperture uPVC screen	94	15					
		93	16					
		92	17					
		91	18		some mudstone/white claystone present			
		90	19		SILTSTONE - Dark grey, siltstone (70%) and sandstone (30%) and some clay	pH: n/a (pH probe failed) EC: 3190 µS/cm Temp: 30.77 °C Redox: -17.4 mV DO: 67.3 % Sat DO: 4.92 mg/L		
		89	20		SANDSTONE - Grey to light grey, medium to fine grained sandstone and darker fine grained sandstone (30%)			
		88	21					
		87	22					
		86	23		SILTSTONE - Dark grey, siltstone (80%) and light grey medium grain sandstone (20%)			
		85	24		SANDSTONE - Light grey, medium to fine grained sandstone			
		84	25		becoming grey		pH: n/a EC: 3356 µS/cm Temp: 29.15 °C Redox: 92.4 mV DO: 78.8 % Sat DO: 5.8 mg/L	
		83	26		SANDSTONE AND SILTSTONE - Grey, 50-50 medium to fine grained sandstone and darker siltstone/shale			
		82	27		SILTSTONE - Dark grey, siltstone (80%) and fine grained grey sandstone			
		81	28		SHALE - Dark grey/black, shale (80%) and fine grained sandstone			
		80	29		SANDSTONE - Grey, fine grained sandstone (80%) and siltstone			
		79	30			pH: n/a EC: 4339 µS/cm Temp: 30.16 °C Redox: 8.00 mV DO: 65.0 % Sat DO: 4.84 mg/L		
	Sump/bentonite plug	78	31					

END OF BOREHOLE AT 30.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

BMB02

SHEET 1 OF 6

Client:	AGL Energy Limited	Date Commenced:	12/1/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	12/1/11
Bore Location:	Gloucester - Bignall property	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	108.83 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 401367.89 N 6449384.04 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
	50 mm ID Class 18 uPVC & grout	108	1		DRILL PAD - Grey, drill pad fill	LELOMA FORMATION (upper)	
		107	2				
		106	3		SANDY CLAY - Light grey/brown, sandy clay, brown mottling - alluvial clays		
		105	4				
		104	5		claystone pebbles		
		103	6				
		102	7				
		101	8		WEATHERED SILTSTONE - Grey, weathered siltstone and claystone, grey clay and black organic clay		
		100	9		WEATHERED SANDSTONE - Grey, very fine grained sandstone - some weathered sandstone and clay		
	Backfill	99	10				
		98	11		WEATHERED CLAYSTONE - Dark grey, claystone		
		97	12		WEATHERED SANDSTONE/CLAYSTONE - Light grey, very fine grained sandstone/claystone, some weathered rock		
		96	13				
		95	14		CLAYSTONE - Light grey, hard claystone		
		94	15		some very fine grained sandstone		
		93	16		SANDSTONE - Grey and light grey, wet solid rock zone - fine grained sandstone (85%) and claystone		
		92	17				
		91	18		some dark grey/black shale 20%		
		90	19				
		89	20				
		88	21				
		87	22		some siltstone 5%		
		86	23				
		85	24				
		84					

END OF BOREHOLE AT 138.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

BMB02

SHEET 2 OF 6

Client:	AGL Energy Limited	Date Commenced:	12/1/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	12/1/11
Bore Location:	Gloucester - Bignall property	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	108.83 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 401367.89 N 6449384.04 MGA56

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
			83	26	SANDSTONE - Grey, fine - medium grained sandstone (99%) and some black organic matter	LELOMA FORMATION (upper)	
			82	27	SHALE - Dark grey/black, shale with dark grey and black laminations and fine to medium grey sandstone and siltstone (30%)		
			81	28			
			80	29	SANDSTONE - Grey, fine and medium grained sandstone (90%) and dark black shale		
			79	30	SANDSTONE/SILTSTONE - Grey, very fine grained sandstone and siltstone/shale with blackish organic staining		
			78	31			
			77	32			
			76	33	SANDSTONE/SHALE - Grey, 50-50 fine grained sandstone and dark shale		
			75	34	SANDSTONE/SILTSTONE - Grey, 50-50 fine-medium grained sandstone plus organic siltstone		
			74	35	SHALE - Dark grey, shale with organic staining (85%) and fine grained sandstone (15%)		
			73	36			
			72	37	SANDSTONE - Grey to light grey, fine to medium grained sandstone - some organic staining		
			71	38			
			70	39			
			69	40	some grey claystone fragments and dark shale (20%)		
			68	41			
			67	42			
			66	43			
			65	44	SHALE - Dark grey/black, shale (90%) and fine grain sandstone (10%)		
			64	45	SANDSTONE - Grey, fine grained sandstone (90%) and shale (10%)		
			63	46	some organic staining		
			62	47	SILTSTONE - Dark grey, siltstone (80%) and medium grained light grey sandstone (20%)		
			61	48	SANDSTONE - Grey to dark grey, very fine grained, hard sandstone		
			60	49	trace of dark grey shale		

END OF BOREHOLE AT 138.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

BMB02

SHEET 3 OF 6

Client:	AGL Energy Limited	Date Commenced:	12/1/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	12/1/11
Bore Location:	Gloucester - Bignall property	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	108.83 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 401367.89 N 6449384.04 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
			58		SANDSTONE - Grey to dark grey, very fine grained, hard sandstone (<i>continued</i>)	LELOMA FORMATION (upper)	
			51		SILTSTONE - Dark grey, soft siltstone (90%) plus fine-medium grained grey sandstone		
			57				
			56		SANDSTONE - Light grey, medium grained sandstone (80%) and dark grey/black siltstone/shale		
			55		SILTSTONE - Light and dark grey, siltstone (90%) and medium grained light grey sandstone		
			54				
			54		SANDSTONE - Grey, fine and medium grained sandstone (60%) and dark grey siltstone		
			53		some dark grey shale		
			52				
			51				
			50		some black shale		
			49		darker with organics		
			48		SILTSTONE - Grey/dark grey, siltstone - darker with organics (70%) and fine grained sandstone		
			47		SANDSTONE - Grey and light grey, fine to medium grained (80%) and dark grey siltstone		
			46				
			45		organic staining		
			44				
			43				
			42				
			41				
			40				
			39		silty		
			38				
			37		trace of black shale		
			36		some soft siltstone		
			35				
			34				

pH: 8.91
 EC: 1662 µS/cm
 Temp: 28.39 °C
 Redox: 176.1 mV
 DO: 76.9 % Sat
 DO: 5.84 mg/L

pH: 9.22
 EC: 1584 µS/cm
 Temp: 28.31 °C
 Redox: 202 mV
 DO: 73.3 % Sat
 DO: 5.61 mg/L

END OF BOREHOLE AT 138.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

BMB02

SHEET 4 OF 6

Client:	AGL Energy Limited	Date Commenced:	12/1/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	12/1/11
Bore Location:	Gloucester - Bignall property	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	108.83 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 401367.89 N 6449384.04 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
			33		CONGLOMERATE - Several colours, equal shares - cream/green/grey claystone, medium grained light grey sandstone and dark grey siltstone	LELOMA FORMATION (upper)	pH probe re-calibrated pH: 8.29 EC: 1320 µS/cm Temp: 28.68 °C Redox: 196.2 mV DO: 78 % Sat DO: 5.9 mg/L
			76		SILTSTONE/SANDSTONE - Light grey, 50-50 medium grained sandstone and siltstone		
			32		SANDSTONE - Grey, coarse sandstone and green claystone		
			31		SILTSTONE - Grey, siltstone (50%) plus brown/cream/green claystone (30%) and coarse grained sandstone (20%)		
			30		SANDSTONE - Grey, fine grained sandstone (50%), cream/brown/green claystone		
			29		SANDSTONE - Grey, medium and fine grained sandstone - fine grained lighter in colour		
			28		SILTSTONE - Dark grey and black, soft siltstone		
			27		SANDSTONE - Grey, fine to medium grained sandstone (80%) and siltstone		
			26		SILTSTONE - Grey/black, siltstone (90%) and medium grained grey sandstone		
			25		CLAYSTONE/TUFF - Light brown/cream, claystone/tuff (50%) and medium grained grey sandstone and dark grey siltstone		
			24		SANDSTONE - Grey, fine grained sandstone (70%) and dark grey siltstone		
			23		SILTSTONE - Dark grey, siltstone (80%) and fine grained grey sandstone		
			22		SANDSTONE - Grey, medium to fine grained sandstone (80%) and dark siltstone (20%)		
			21		SILTSTONE - Dark grey, siltstone (80%) and fine grained grey sandstone		
			20		SANDSTONE - Grey, medium to fine grained sandstone (80%) and dark siltstone (20%)		
			19		SILTSTONE - Dark grey, siltstone (80%) and fine grained grey sandstone		
			18		SANDSTONE - Grey, medium to fine grained sandstone (80%) and dark siltstone (20%)		
			17		SILTSTONE - Dark grey, siltstone (80%) and fine grained grey sandstone		
			16		SANDSTONE - Grey, medium to fine grained sandstone (80%) and dark siltstone (20%)		
			15		SILTSTONE - Dark grey, siltstone (80%) and fine grained grey sandstone		
			14		SANDSTONE - Grey, medium to fine grained sandstone (80%) and dark siltstone (20%)		
			13		SILTSTONE - Dark grey, siltstone (80%) and fine grained grey sandstone		
			12		SANDSTONE - Grey, medium to fine grained sandstone (80%) and dark siltstone (20%)		
			11		SILTSTONE - Dark grey, siltstone (80%) and fine grained grey sandstone		
			10		SANDSTONE - Grey, medium to fine grained sandstone (80%) and dark siltstone (20%)		
			9		SILTSTONE - Dark grey, siltstone (80%) and fine grained grey sandstone		
					black shale lens		pH: 8.88 EC: 1203 µS/cm Temp: 28.11 °C Redox: 218.9 mV DO: 69.5 % Sat DO: 5.35 mg/L
							pH: 8.94 EC: 1275 µS/cm Temp: 28.26 °C Redox: 196.5 mV DO: 69.5 % Sat DO: 5.36 mg/L
							pH: 9.01 EC: 1038 µS/cm Temp: 28.22 °C Redox: 192.8 mV DO: 71.2 % Sat DO: 5.5 mg/L

END OF BOREHOLE AT 138.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

BMB02

SHEET 5 OF 6

Client:	AGL Energy Limited	Date Commenced:	12/1/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	12/1/11
Bore Location:	Gloucester - Bignall property	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	108.83 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 401367.89 N 6449384.04 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
			8		SANDSTONE - Grey, medium to fine grained sandstone (80%) and dark siltstone (20%) (continued)	LELOMA FORMATION (upper)	pH: 9.12 EC: 818 µS/cm Temp: 27.58 °C Redox: 203.9 mV DO: 73 % Sat DO: 5.73 mg/L
			7		SHALE AND SANDSTONE - Dark grey and light grey, 50-50 dark grey shale and fine to medium grained light grey sandstone		
			6		SANDSTONE - Grey, fine to medium sandstone (90%) and black/dark grey siltstone (10%)		
			5				
			4		SANDSTONE AND SILTSTONE - Grey, fine grained sandstone (65%) and siltstone		
			3				
			2				
			1				
			0				
			-1				
			-2			pH: 8.94 EC: 940 µS/cm Temp: 27.31 °C Redox: 204 mV DO: 75.4 % Sat DO: 5.82 mg/L	
			-3				
			-4		SANDSTONE - Grey, fine to medium grained sandstone		
			-5		dark shale lens		
			-6				
			-7				
			-8				
			-9		trace of shale		
			-10		SILTSTONE AND SANDSTONE - Grey, 50-50 siltstone and fine grained sandstone		
			-11		SANDSTONE - Grey, medium to fine grained sandstone (85%) and shale/siltstone (15%)		
			-12			pH: 9 EC: 913 µS/cm Temp: 27.1 °C Redox: 193.2 mV DO: 72.3 % Sat DO: 5.7 mg/L	
			-13				
			-14		SILTSTONE - Dark grey, siltstone (80%) and fine grained sandstone (20%)		
			-15		SANDSTONE - Dark grey, fine to very fine grained sandstone (90%) and siltstone (10%)		
			-16				

END OF BOREHOLE AT 138.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

BMB02

SHEET 6 OF 6

Client:	AGL Energy Limited	Date Commenced:	12/1/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	12/1/11
Bore Location:	Gloucester - Bignall property	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	108.83 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 401367.89 N 6449384.04 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
	screen	-17	126	[Pattern]	SANDSTONE - Dark grey, fine to very fine grained sandstone (90%) and siltstone (10%) <i>(continued)</i>	LELOMA FORMATION (upper)	pH: n/a EC: 1362 µS/cm Temp: 25.99 °C Redox: -238.7 mV DO: 58.5 % Sat DO: 4.73 mg/L
		-18	127	[Pattern]	SHALE - Black/dark grey, shale (80%) and fine grained sandstone (20%)		
		-19	128	[Pattern]	SANDSTONE AND SILTSTONE - Grey, 50-50 fine grained sandstone and siltstone		
		-20	129	[Pattern]	SANDSTONE - Light grey, fine grained sandstone (90%) sand siltstone		
		-21	130	[Pattern]	SANDSTONE - Grey, very fine grained sandstone with some organic staining		
		-22	131	[Pattern]			
		-23	132	[Pattern]			
		-24	133	[Pattern]	some dark siltstone/shale		
		-25	134	[Pattern]	trace siltstone		
		-26	135	[Pattern]			
		-27	136	[Pattern]	trace dark siltstone	pH: n/a EC: 1436 µS/cm Temp: 27.56 °C Redox: -241.6 mV DO: 80.4 % Sat DO: 6.28 mg/L	
	Sump/bentonite plug	-28	137	[Pattern]	SILTSTONE AND SANDSTONE - Grey, 50-50 medium to fine grained sandstone (lighter) and siltstone		pH: n/a EC: 1529 µS/cm Temp: 27.7 °C Redox: -267.5 mV DO: 84.4 % Sat DO: 6.56 mg/L
		-29	138	[Pattern]			
		-30	139	[Pattern]			
		-31	140	[Pattern]			
		-32	141	[Pattern]			
		-33	142	[Pattern]			
		-34	143	[Pattern]			
		-35	144	[Pattern]			
		-36	145	[Pattern]			
		-37	146	[Pattern]			
		-38	147	[Pattern]			
		-39	148	[Pattern]			
		-40	149	[Pattern]			
		-41					

END OF BOREHOLE AT 138.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

RMB01

SHEET 1 OF 2

Client:	AGL Energy Limited	Date Commenced:	3/2/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	4/2/11
Bore Location:	Gloucester - Rombo property	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	128.68 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 400215.21 N 6443387.43 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
	50 mm ID Class 18 uPVC & grout	128	1		TOPSOIL - Brown/grey, mottled clay/ topsoil	LELOMA FORMATION (upper)	
		127	2		CLAY - Red/ grey, mottled, stiff clay		
		126	3				
		125	4				
		124	5				
		123	6				
		122	7			WEATHERED MIXED GRAVEL - Yellow/brown, clayey alluvial gravels with rounded pebbles (volcanic and sedimentary in origin)	
		121	8				
		120	9			WEATHERED SHALE - Black, weathered carbonaceous shale (70%) with 30% grey/brown mudstone	
		119	10			SILTSTONE - Dark grey, weathered siltstone with lighter grey claystone (20%) and 10% coal fines	
		118	11				
		117	12			SILTSTONE - Dark grey, siltstone	
		116	13				
		115	14				
		114	15			SHALE - Dark grey/black, carbonaceous shale	
		113	16			SILTSTONE - Grey, siltstone (80%) with 20% coal	
		112	17				
		111	18				
		110	19			traces of coal (< 5%)	
		109	20				
		108	21			SILTSTONE/SANDSTONE - Grey, fine grained sandstone (50%) with 50% grey siltstone	
		107	22				
		106	23				
		105	24				
		104	25			SHALE - Black, carbonaceous shale (70%) with 30% grey siltstone	
		103	26			SILTSTONE - Dark grey, siltstone	
		102	27			trace of black shale	
		101	28			SANDSTONE - Grey, fine grained sandstone (80%) and black carbonaceous shale	
		100	29			SILTSTONE - Grey, siltstone (60%) with 40% black shale	
		99	30			SILTSTONE - Dark grey, siltstone	
		98	31			SHALE - Black, carbonaceous shale (70%) with 30% grey, fine grained sandstone	
	97						

pH: 7.94
EC: 9182 µS/cm
Temp: 31.99 °C
redox: -26.3 mV

pH: 8.16
EC: 10113 µS/cm
Temp: 30.61 °C
redox: -54.6 mV

pH: 8
EC: 7563 µS/cm
Temp: 29.51 °C
redox: -40.3 mV

END OF BOREHOLE AT 50.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

RMB01

SHEET 2 OF 2

Client:	AGL Energy Limited	Date Commenced:	3/2/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	4/2/11
Bore Location:	Gloucester - Rombo property	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	128.68 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 400215.21 N 6443387.43 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
	<p style="font-size: small;">Bentonite seal</p> <p style="font-size: small;">Gravel 5 mm graded</p> <p style="font-size: small;">50 mm ID, 0.5 mm aperture uPVC screen</p> <p style="font-size: small;">Sump/bentonite plug</p>	96	33		SHALE - Black, carbonaceous shale (70%) with 30% grey, fine grained sandstone (continued)	LELOMA FORMATION (upper)	<p>pH: 8.09 EC: 9710 µS/cm Temp: 28.48 °C redox: -25.2 mV</p>
		95	34		SILTSTONE - Dark grey, siltstone		
		94	35		some fine grained grey sandstone		
		93	36		black carbonaceous shale lens		
		92	37		black carbonaceous shale lens		
		91	38		SANDSTONE - Grey, fine grained sandstone (70%) with 30% dark grey siltstone		
		90	39		SILTSTONE - Dark grey, siltstone (70%) with fine grained sandstone (30%)		
		89	40		SHALE - Black, carbonaceous shale (60%) with 40% grey siltstone		
		88	41		SHALE - Black, carbonaceous shale (60%) with 40% grey siltstone		
		87	42		SILTSTONE - Grey, siltstone (60%) with 40% black shale		
		86	43		SANDSTONE - Grey, fine to medium grained sandstone (70%) with 30% grey siltstone		
		85	44		SANDSTONE - Grey, fine to medium grained sandstone (70%) with 30% grey siltstone		
		84	45		SANDSTONE - Grey, fine to medium grained sandstone (70%) with 30% grey siltstone		
		83	46		SILTSTONE - Grey, siltstone (60%) with 20% grey, fine grained sandstone and 20% black carbonaceous shale		
		82	47		SILTSTONE - Grey, siltstone (80%) with with claystone/tuff (20%) and a few chips of feldspar		
	81	48		SANDSTONE/SILTSTONE - Grey, fine to medium grained sandstone (50%) with 50% dark grey siltstone			
	80	49		SANDSTONE/SILTSTONE - Grey, fine to medium grained sandstone (50%) with 50% dark grey siltstone			
	79	50		SANDSTONE/SILTSTONE - Grey, fine to medium grained sandstone (50%) with 50% dark grey siltstone			
	78	51				<p>pH: 8.13 EC: 8289 µS/cm Temp: 27.19 °C redox: -13.6 mV</p>	
	77	52					
	76	53					
	75	54					
	74	55					
	73	56					
	72	57					
	71	58					
	70	59					
	69	60					
	68	61				<p>pH: 8.2 EC: 6144 µS/cm Temp: 26.53 °C redox: -4.5 mV</p>	
	67	62					
	66	63					
	65	63					

END OF BOREHOLE AT 50.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

RMB02

SHEET 1 OF 4

Client:	AGL Energy Limited	Date Commenced:	3/2/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	3/2/11
Bore Location:	Gloucester - Rombo property	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	128.49 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 400220.11 N 6443386.91 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm)	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
	50 mm ID Class 18 uPVC & grout	128	1		SANDY TOPSOIL - Brown, sandy topsoil, moderately organic	LELOMA FORMATION (upper)	
		127	2		CLAY - Red/grey, mottled, sticky clay		
		126	3		some fine grained sand		
		125	4		grey, medium plasticity clay		
		124	5		some gravels		
		123	6		some claystone pebbles		
		122	7		CLAYSTONE - Grey, soft claystone with a few chips of white medium grained sandstone		
		121	8		COAL - Black, coal (90%) with 10% grey siltstone		
		120	9		SILTSTONE - Dark grey, siltstone (50%) with 30% light grey claystone and 20% black coal		
		119	10		CLAYSTONE - Grey, claystone (60%) with clay and coal fines		
		118	11		CLAY - Grey, clay with dark grey claystone chips		
		117	12		SILTSTONE - Dark grey, siltstone with chips of black shale and coal fines		
		116	13		SILTSTONE - Dark grey, siltstone with chips of black shale and coal fines		
		115	14		SANDSTONE - Grey, medium to fine grained sandstone (80%) with white soft claystone (20%)		
		114	15		SILTSTONE - Grey, siltstone (70%) with 30% black shale		
		113	16		SILTSTONE - Grey, siltstone (70%) with 30% black shale		
		112	17		SILTSTONE - Grey, siltstone (70%) with 30% black shale		
		111	18		SILTSTONE - Grey, siltstone (70%) with 30% black shale		
		110	19		SILTSTONE - Grey, siltstone (70%) with 30% black shale		
		109	20		SILTSTONE - Grey, siltstone (70%) with 30% black shale		
		108	21		SILTSTONE - Grey, siltstone (70%) with 30% black shale		
		107	22		SILTSTONE - Grey, siltstone (70%) with 30% black shale		
		106	23		SILTSTONE - Grey, siltstone (70%) with 30% black shale		
		105	24		some grey claystone		

pH: 7.77
EC: 8859 µS/cm
Temp: 27.19 °C
redox: 82.3 mV

pH: 8.14
EC: 9618 µS/cm
Temp: 29.36 °C
redox: 50.6 mV

END OF BOREHOLE AT 93.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

RMB02

SHEET 2 OF 4

Client:	AGL Energy Limited	Date Commenced:	3/2/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	3/2/11
Bore Location:	Gloucester - Rombo property	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	128.49 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 400220.11 N 6443386.91 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
		103	26		SILTSTONE - Grey, siltstone (70%) with 30% black shale <i>(continued)</i>	LELOMA FORMATION (upper)	pH: 7.98 EC: 8120 µS/cm Temp: 28.87 °C redox: 40.8 mV
		102	27		SANDSTONE - Grey, fine and medium grained sandstone		
		101	28		SHALE - Black, laminated shale (90%) with 10% medium grained light grey sandstone		
		100	29		SANDSTONE - Grey, medium to fine grained sandstone with a few dark grey siltstone chips		
		99	30		SILTSTONE - Black, siltstone with a few chips of light grey claystone		
		98	31		SANDSTONE / SILTSTONE - Grey, siltstone (50%) with 50% light grey, medium grained sandstone		
		97	32		SILTSTONE - Dark grey, siltstone and 20% grey, medium grained sandstone		
		96	33		SANDSTONE/SILTSTONE - Grey, fine grained sandstone with dark grey siltstone		
		95	34		some brown mudstone		
		94	35		SANDSTONE - Grey, medium and fine grained sandstone with 10% white soft claystone		
		93	36		SILTSTONE - Grey, siltstone (80%) with 20% light grey, medium grained sandstone	pH: 7.93 EC: 9146 µS/cm Temp: 24.45 °C redox: 42.1 mV	
		92	37				
		91	38				
		90	39				
		89	40				
		88	41			pH: 8.15 EC: 9582 µS/cm Temp: 27.76 °C redox: 34.9 mV	
		87	42				
		86	43				
		85	44				
		84	45				
		83	46			pH: 8.16 EC: 8875 µS/cm Temp: 28.75 °C redox: 31.4 mV	
		82	47				
		81	48				
		80	49				
		79			trace of black laminated shale		

END OF BOREHOLE AT 93.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

RMB02

SHEET 3 OF 4

Client:	AGL Energy Limited	Date Commenced:	3/2/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	3/2/11
Bore Location:	Gloucester - Rombo property	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	128.49 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 400220.11 N 6443386.91 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
			78		SANDSTONE - Light grey, medium grained sandstone (60%) with 40% dark grey siltstone	LELOMA FORMATION (upper)	pH: 8.21 EC: 9427 µS/cm Temp: 27.26 °C redox: 35.6 mV
			51				
			77				
			52				
			76				
			53				
			75				
			54		trace of black shale		
			74				
			55				
			73				
			56		SILTSTONE - Dark grey, siltstone (75%) with 15% grey, fine grained sandstone		
			72				
			57				
			71				
			58				
			70				
			59				
			60				
			61		SANDSTONE - Light grey, medium grained sandstone		
			67				
			62		SILTSTONE - Dark grey, siltstone		
			66				
			63		SANDSTONE - Grey, fine grained sandstone with grey siltstone		
			65				
			64		SILTSTONE - Dark grey, siltstone with carbonaceous shale		
			64				
			65		SHALE - Black, carbonaceous shale		
			63				
			66		COAL / SHALE - Black, coal / shale (60%) with 40% medium grained grey sandstone		
			62				
			67		SHALE - Black, shale (60%) with 40% grey, medium grained sandstone		
			61				
			68				
			60				
			69		SANDSTONE - Grey, fine grained sandstone		
			59				
			70		SILTSTONE - Grey, siltstone with some black carbonaceous staining		
			58				
			71				
			57				
			72		SANDSTONE / COAL - Black, coal with some grey fine grained sandstone		
			56				
			73		SANDSTONE - Grey, medium grained sandstone		
			55				
			74		SILTSTONE/SANDSTONE - Grey, siltstone with some grey medium grained sandstone		
			54				

END OF BOREHOLE AT 93.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

RMB02

SHEET 4 OF 4

Client:	AGL Energy Limited	Date Commenced:	3/2/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	3/2/11
Bore Location:	Gloucester - Rombo property	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	128.49 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 400220.11 N 6443386.91 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
		53	76		SILTSTONE/SANDSTONE - Grey, siltstone with some grey medium grained sandstone (continued)	LELOMA FORMATION (upper)	pH: 8.21 EC: 7314 µS/cm Temp: 27.08 °C redox: 20.7 mV
		52	77				
		51	78				
		50	79				
		49	80				
		48	81		SANDSTONE - Grey, fine grained sandstone (80%) with 20% grey siltstone		
	Bentonite seal	47	82		SHALE/SILTSTONE - Dark grey, carbonaceous shale (60%) with 40% with grey medium grained sandstone		
		46	83				
		45	84				
	Gravel 5 mm graded	44	85		SANDSTONE - Light grey, medium to fine grained sandstone		
	50 mm ID, 0.5 mm aperture uPVC screen	43	86				
		42	87		some black carbonaceous staining		
		41	88				
		40	89		some dark grey siltstone		
		39	90				
		38	91		SILTSTONE - Grey, siltstone (60%) with 40% medium grained light grey sandstone		
	Sump/bentonite plug	37	92		COAL/SHALE - Black, coal with some dark grey siltstone		
		36	93		SANDSTONE - Light grey, fine and medium grained sandstone		
		35	94			pH: 8.26 EC: 8134 µS/cm Temp: 26.75 °C redox: 8.3 mV	
		34	95				
		33	96				
		32	97				
		31	98				
		30	99				

END OF BOREHOLE AT 93.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

S4MB01

SHEET 1 OF 3

Client:	AGL Energy Limited	Date Commenced:	5/1/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	6/1/11
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	118.38 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 402581.82 N 6449409.83 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm)	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
	PVC 50mm ID Class 18 uPVC & grout	118		[Cross-hatch pattern]	DRILL PAD	LELOMA FORMATION	
		117	1	[Wavy pattern]	TOPSOIL - Light brown/yellow, sandy clayey soil medium plasticity with chips of hard yellow clay		
		116	2	[Wavy pattern]			
		115	3	[Wavy pattern]			
		114	4	[Wavy pattern]	WEATHERED ROCK - Light grey, weathered rock with chips of hard brown dry clay (up to 3 mm)		
		113	5	[Wavy pattern]			
		112	6	[Wavy pattern]			
		111	7	[Wavy pattern]			
		110	8	[Wavy pattern]			
		109	9	[Wavy pattern]			
		108	10	[Wavy pattern]			
		107	11	[Wavy pattern]			
		106	12	[Wavy pattern]			
		105	13	[Wavy pattern]	SILTSTONE/SANDSTONE - Light grey, medium grained sandstone, 50% grey siltstone		
		104	14	[Wavy pattern]			
		103	15	[Wavy pattern]	SILTSTONE - Dark grey, soft siltstone with a few chips of cream/white tuff		
		102	16	[Wavy pattern]	TUFF - Cream/green, medium to fine grained tuff, 40% dark grey/black siltstone/shale	LELOMA FORMATION Jo Doth Tuff	
		101	17	[Wavy pattern]			
		100	18	[Wavy pattern]			
		99	19	[Wavy pattern]			
		98	20	[Wavy pattern]			
		97	21	[Wavy pattern]			
		96	22	[Wavy pattern]			
		95	23	[Wavy pattern]	TUFF - Cream/green/grey, fine grained smooth tuff, 50% green/grey medium grained tuff		
		94	24	[Wavy pattern]	TUFF - Green and brown, very fine grained tuff		

END OF BOREHOLE AT 66.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

S4MB01

SHEET 2 OF 3

Client:	AGL Energy Limited	Date Commenced:	5/1/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	6/1/11
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	118.38 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 402581.82 N 6449409.83 MGA56

Bore Information		Field Material Description						
WATER	WELL CONSTRUCTION	RL (AHDm)	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY	
		93	26		TUFF - Green and brown, very fine grained tuff <i>(continued)</i>	LELOMA FORMATION Jo Doth Tuff		
		92	27					
		91	28		TUFF - Grey, medium grained tuff, 30% cream/green medium grained tuff			
		90	29		TUFF/SILTSTONE - Green/grey, medium grained tuff, 50% black siltstone			
		89	30		SILTSTONE - Dark grey, siltstone, 30% light grey medium grained sandstone, 10% cream/green tuff	LELOMA FORMATION	pH: 7.73 EC: 2457 µS/cm Temp: 25.76 °C Redox: 98.4 mV DO: 39 % Sat DO: 3.14 mg/L	
		88	31		SANDSTONE - Grey, medium to fine grained sandstone, 10% dark grey siltstone, a few chips of green/cream tuff			
		87	32		SILTSTONE - Dark grey, siltstone, 20% grey fine grained sandstone			
		86	33					
		85	34					
		84	35					
		83	36		SILTSTONE/SANDSTONE - Light grey, medium to fine grained sandstone, 50% dark grey siltstone			pH: 7.67 EC: 2351 µS/cm Temp: 25.25 °C Redox: 130 mV DO: 54.4 % Sat DO: 4.4 mg/L
		82	37		SILTSTONE - Dark grey and black, soft siltstone			
		81	38		SILTSTONE/SANDSTONE - Grey, siltstone, 20% light grey medium grained sandstone			
		80	39					
		79	40		SILTSTONE - Dark grey and black, (organic matter) soft siltstone			
		78	41		SILTSTONE/SANDSTONE - Grey, fine to medium grained sandstone, 50% siltstone		pH: 7.86 EC: 2396 µS/cm Temp: 23.56 °C Redox: 123.6 mV DO: 59.6 % Sat DO: 4.96 mg/L	
		77	42					
		76	43					
		75	44					
		74	45		some clay			
		73	46		SANDSTONE - Light grey, medium grained unconsolidated sandstone, 40% brown and grey siltstone, 10% light grey medium grained sand			
		72	47		SANDSTONE/SILTSTONE - Light grey, fine to medium grained sandstone and grey siltstone		pH: 8.02 EC: 2454 µS/cm Temp: 21.97 °C Redox: 131.2 mV DO: 81 % Sat DO: 7.01 mg/L	
		71	48					
		70	49					
		69						

END OF BOREHOLE AT 66.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

S4MB01

SHEET 3 OF 3

Client:	AGL Energy Limited	Date Commenced:	5/1/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	6/1/11
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	118.38 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 402581.82 N 6449409.83 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
		68	51		SANDSTONE/SILTSTONE - Light grey, fine to medium grained sandstone and grey siltstone (<i>continued</i>)	LELOMA FORMATION	<p>pH: 8.03 EC: 2433 µS/cm Temp: 21.78 °C Redox: 135.7 mV DO: 102.2 % Sat DO: 8.81 mg/L</p>
		67	52				
		66	53				
		65	54				
		64	55				
		63	56				
		62	57				
		61	58				
		60	59				
		59	60				
		58	61				
		57	62				
		56	63				
		55	64				
		54	65				
		53	66				
		52			SANDSTONE - Grey, fine grained sandstone		<p>pH: 8.01 EC: 2451 µS/cm Temp: 22.53 °C Redox: 122 mV DO: 71 % Sat DO: 6.1 mg/L</p>
		51					
		50					
		49					
		48					
		47					
		46					
		45					
		44					

END OF BOREHOLE AT 66.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

S4MB02

SHEET 1 OF 4

Client:	AGL Energy Limited	Date Commenced:	4/1/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	5/1/11
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	118.44 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 402586.74 N 6449408.84 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
	50 mm ID Class 18 uPVC & grout	118	1		DRILL PAD	LELOMA FORMATION	
		117	2		CLAY SOIL - Grey/brown, dry medium plasticity, dry, not sticky		
		115	3		WEATHERED ROCK/SOIL - Grey/light grey, well weathered rock very fine, brown/grey clay chips (medium plasticity - dry)	LELOMA FORMATION Jo Doth Tuff	
		112	6		WEATHERED ROCK - Light grey, well weathered rock		
		106	12		SILTSTONE - Grey, 90% medium-fine grained grey siltstone plus light grey medium grained sandstone and shale		
		104	14		TUFF/SILTSTONE - Off white/green, 50-50 off-white/green amorphous tuff plus grey/black hard siltstone/shale		
		103	15		TUFF - White/green, medium-fine grained tuff plus chips dark grey siltstone		
		100	18		SANDSTONE - Light grey, medium grained sandstone plus 40% green tuff		
		97	21		TUFF - Green/cream, tuff (70%) plus light green/cream medium grained sandstone (30%)		
		94	24		TUFF - Green, medium and fine grained tuff (some grey tuff) plus 50% chips of dark grey/black siltstone/shale		
	Gravel backfill	108	10				

END OF BOREHOLE AT 97.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

S4MB02

SHEET 2 OF 4

Client:	AGL Energy Limited	Date Commenced:	4/1/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	5/1/11
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	118.44 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 402586.74 N 6449408.84 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
		93	26		TUFF - Green, medium and fine grained tuff (some grey tuff) plus 50% chips of dark grey/black siltstone/shale (continued) a small amount of orange/red clay	LELOMA FORMATION Jo Doth Tuff	
		92	27		CONGLOMERATE - Cream/green/brown, tuff (60%) plus grey and brown fine grained siltstone and black siltstone/shale	LELOMA FORMATION	
		91	28		SILTSTONE - Dark grey, siltstone 90% plus medium light grey sandstone tuff (green)		
		90	29		SANDSTONE/SILTSTONE - Light grey, 50-50 medium grained sandstone and dark siltstone		
		89	30		SANDSTONE - Light and dark grey, medium-fine grained sandstone plus few chips of tuff (green/brown)		
		88	31		SANDSTONE/SILTSTONE - Light grey, 50/50 medium-grained sandstone plus darker siltstone		
		87	32		SILTSTONE/SHALE - Black, 90% siltstone/shale plus tuff (green and brown) and grey siltstone [poor return]		
		86	33		SILTSTONE - Black/dark grey, siltstone (organic) and clay plus green tuff		
		85	34		SILTSTONE - Grey, siltstone plus some darker organic pieces, clay and light grey medium grained sandstone		
		84	35				
		83	36				
		82	37				
		81	38				
		80	39		SANDSTONE/SILTSTONE - Light and dark grey, 50-50 medium and fine sandstone and siltstone		
		79	40		SILTSTONE - Dark grey, siltstone 90% (black organic staining) + 10% lighter grey siltstone/sandstone		
		78	41		SILTSTONE - Grey, siltstone 60%, fine and medium grained sandstone light and darker grey plus chips of mudstone? light/medium brown very grained		
		77	42		SANDSTONE/SILTSTONE - Light grey, 50-50 medium grained sandstone and dark grey and black siltstone		
		76	43		SILTSTONE - Dark grey, siltstone 90% and black siltstone/shale and a few chips of light grey medium grained sandstone		
		75	44		SANDSTONE - Light grey, medium grained sandstone (60%), 30% fine grained grey sandstone, 10% grey siltstone + black siltstone/shale chips + medium grained sand		
		74	45		SILTSTONE - Dark grey, siltstone (70%) and medium grained light grey sandstone (30%)		
		73	46		SANDSTONE - Grey, fine grained sandstone (90%) and dark grey/black siltstone/shale (10%)		
		72	47		SILTSTONE - Dark grey/black, siltstone (60%) and fine to medium grained grey sandstone (40%)		
		71	48				
		70	49				
		69					

END OF BOREHOLE AT 97.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

S4MB02

SHEET 3 OF 4

Client:	AGL Energy Limited	Date Commenced:	4/1/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	5/1/11
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	118.44 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 402586.74 N 6449408.84 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
		68			SILTSTONE - Dark grey/black, siltstone (60%) and fine to medium grained grey sandstone (40%) <i>(continued)</i>	LELOMA FORMATION	
			51				
		67					
			52				
		66					
			53				
		65					
			54				
		64					
			55				
		63					
			56				
		62					
			57				
		61					
			58				
		60					
			59		SANDSTONE - Light grey, very fine grained sandstone		
		59				pH: 7.77 EC: 2452 µS/cm Temp: 19.7 °C Redox: 173.7 mV DO: 63.1 % Sat DO: 5.72 mg/L pH: 7.6 EC: 2494 µS/cm Temp: 21.66 °C Redox: 168.7 mV DO: 72.2 % Sat DO: 6.27 mg/L	
		60			SANDSTONE - Light grey, fine grained sandstone		
		58			a few chips of tuff		
		61					
		57					
		62					
		56					
		63					
		55					
		64			SANDSTONE/SILTSTONE - Grey/dark grey, 50-50 fine grained sandstone and siltstone		
		65			SANDSTONE - Grey, fine grained sandstone (90%) and dark grey siltstone (10%)		
		53				pH: 7.75 EC: 2573 µS/cm Temp: 21.55 °C Redox: 151.5 mV DO: 96 % Sat DO: 8.1 mg/L	
		66			SILTSTONE - Dark grey, siltstone (70%) and fine & medium grained light grey sandstone		
		52					
		67			SANDSTONE - Light grey, medium grained sandstone (90%) plus dark grey/black siltstone (10%)		
		51					
		68					
		50					
		69					
		49					
		70			SILTSTONE - Grey, siltstone (60%) plus light grey fine grained sandstone (40%)		
		48					
		71					
		47					
		72					
		46					
		73			SANDSTONE - Light grey, fine grained sandstone (80%) and dark grey siltstone (20%)		
		45				pH: 7.85 EC: 2569 µS/cm Temp: 21.84 °C Redox: 138.6 mV DO: 91.1 % Sat DO: 7.76 mg/L	
		74			SILTSTONE - Dark grey, siltstone (80%) and fine grained light grey sandstone (20%) plus small amount of clay		
		44					

END OF BOREHOLE AT 97.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

S4MB02

SHEET 4 OF 4

Client:	AGL Energy Limited	Date Commenced:	4/1/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	5/1/11
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	118.44 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 402586.74 N 6449408.84 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm)	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
		43	76		SILTSTONE - Dark grey, siltstone (80%) and fine grained light grey sandstone (20%) plus small amount of clay (<i>continued</i>)	LELOMA FORMATION	pH: 7.84 EC: 2638 µS/cm Temp: 23.08 °C Redox: 162.4 mV DO: 69.1 % Sat DO: 5.84 mg/L
		42	77				
		41	78		CONGLOMERATE - Several colours, coal, siltstone (dark grey & brown)/shale (black), light grey medium grained sandstone	LELOMA FORMATION Bindaboo Coal	
		40	79		COAL/SILTSTONE - Dark grey/black, 50-50 coal and siltstone/shale		
		39	80		COAL - Black/dark grey, coal (50%), grey siltstone (25%) and medium grained light grey sandstone (25%)	LELOMA FORMATION	
		38	81		SILTSTONE - Grey, siltstone (80%) plus fine grained grey sandstone and coal fines		
		37	82		SANDSTONE - Light grey, fine grain sandstone (80%) and dark grey siltstone	LELOMA FORMATION	pH: 7.78 EC: 2573 µS/cm Temp: 22.5 °C Redox: 166.7 mV DO: 71.3 % Sat DO: 6.11 mg/L
		36	83				
		35	84		SILTSTONE - Dark grey, siltstone (80%) plus 20% fine and medium grained light grey sandstone	LELOMA FORMATION	pH: 7.8 EC: 2592 µS/cm Temp: 22.49 °C Redox: 265.1 mV DO: 84.4 % Sat DO: 7.17 mg/L
		34	85				
	Bentonite seal		86		SILTSTONE - Dark grey, siltstone (80%) plus 20% fine and medium grained light grey sandstone	LELOMA FORMATION	
		33	87				
	Gravel 5 mm graded		32		SANDSTONE/SILTSTONE - Light grey, 50-50 medium grained sandstone and dark grey and black siltstone	LELOMA FORMATION	
		31	88		SANDSTONE - Light grey, coarse-medium grained sandstone plus soft and medium grained grey sand		
	50 mm ID, 0.5 mm aperture uPVC screen		30		SANDSTONE - Grey, coarse-medium grained sandstone (90%) plus dark grey siltstone (10%)	LELOMA FORMATION	pH: 7.82 EC: 2688 µS/cm Temp: 24.08 °C Redox: 94.1 mV DO: 83 % Sat DO: 6.93 mg/L
		29	89		SILTSTONE - Dark grey, siltstone (80%) and medium grained light grey sandstone (20%)		
		28	90		SANDSTONE - Light grey, medium-fine grained sandstone (90%) plus dark siltstone (10%)	LELOMA FORMATION	pH: 7.68 EC: 2564 µS/cm Temp: 23.3 °C Redox: 109 mV DO: 86 % Sat DO: 7.14 mg/L
		27	91		SANDSTONE/SILTSTONE - Light grey, 50-50 fine grained sandstone and dark siltstone with small amount of coal fines		
	Sump/bentonite plug		26		SANDSTONE - Light grey, medium-fine grained sandstone (90%) plus dark siltstone (10%)	LELOMA FORMATION	
		23	92		SANDSTONE/SILTSTONE - Light grey, 50-50 fine grained sandstone and dark siltstone with small amount of coal fines		
		22	93		SANDSTONE - Light grey, medium-fine grained sandstone (90%) plus dark siltstone (10%)	LELOMA FORMATION	
		21	94		SANDSTONE - Light grey, medium-fine grained sandstone (90%) plus dark siltstone (10%)		
		20	95		SANDSTONE - Light grey, medium-fine grained sandstone (90%) plus dark siltstone (10%)	LELOMA FORMATION	
		19	96		SANDSTONE - Light grey, medium-fine grained sandstone (90%) plus dark siltstone (10%)		

END OF BOREHOLE AT 97.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

S4MB03

SHEET 1 OF 8

Client:	AGL Energy Limited	Date Commenced:	15/12/10
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	16/12/10
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	118.37 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 402591.91 N 6449407.84 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
	50 mm ID Class 18 uPVC & grout	118	1		TOPSOIL/DRILLPAD - Dark brown, clay - hard and fill chips	LELOMA FORMATION	<p>pH: 7.08 EC: 2694 µS/cm Temp: 27.42 °C Redox: 92 mV DO: 80.3 % Sat DO: 6.15 mg/L</p>
		117	2		CLAY - Beige, clay, medium plasticity with dry and fine grained sand		
		116	3				
		115	4				
		114	5		SAND - Beige, medium grained sand and small hard clay chips		
		113	6		WEATHERED ROCK - Light grey/brown, weathered rock. fine - medium grained and low plasticity chips	LELOMA FORMATION Jo Doth Tuff	
		112	7		WEATHERED ROCK - Dark brown, fine grained and hard clay dark chips		
		111	8		WEATHERED ROCK - Light grey, medium grained weathered siltstone/sandstone and siltstone/sandstone chips		
		110	9		WEATHERED ROCK - Light grey, medium grained weathered siltstone/sandstone and siltstone/sandstone chips, plus clay		
		109	10		WEATHERED ROCK - Light grey, rock, very fine well weathered		
	Gravel backfill	108	11		SANDSTONE - Light grey, medium-coarse grained sandstone 80% and 20% fine grained		
		107	12		SILTSTONE - Dark grey/ brown, medium grained siltstone and fine grained black siltstone/shale and small amount of clay		
		106	13		TUFF/SHALE - Light grey/off white, medium grained tuff and black shale 50% and 50% fine grained sand		
		105	14		SANDSTONE - Light grey, medium-fine grained sandstone 90% and siltstone (light grey), shale, off-white tuff		
		104	15				
		103	16				
		102	17				
		101	18				
		100	19				
		99	20		TUFF - Greeny cream, smooth tuff 90% and 10% light grey sandstone		
		98	21				
		97					

END OF BOREHOLE AT 170.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

S4MB03

SHEET 2 OF 8

Client:	AGL Energy Limited	Date Commenced:	15/12/10
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	16/12/10
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	118.37 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 402591.91 N 6449407.84 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
		96	23		TUFF - Greeny cream, smooth tuff 90% and 10% light grey sandstone (<i>continued</i>)	LELOMA FORMATION Jo Doth Tuff	pH: 7.46 EC: 2174 µS/cm Temp: 26.52 °C Redox: 80 mV DO: 82.1 % Sat DO: 6.48 mg/L
		95	24		SANDSTONE - Cream green, fine grained sandstone and medium sand (up to 6mm)	LELOMA FORMATION	
		94	25				
		93	26		SHALE/SILTSTONE - Dark grey black, 50% shale and 50% very fine grained siltstone		
		92	27		SANDSTONE - medium light grey 80% fine sandstone and dark grey siltstone		
		91	28				
		90	29		SANDSTONE - Dark grey, coarse grained sandstone		
		89	30		SANDSTONE - Grey, coarse grained sandstone 90% and sand and a small amount (5%) dark shale/ siltstone chips		
		88	31		SILTSTONE - Dark grey, siltstone (up to 3 mm) and clay		
		87	32		SANDSTONE - Light grey, fine grained sandstone and small amount of clay		
		86	33		SILTSTONE - Dark grey, very fine grained siltstone 95% and black shale		
		85	34				
		84	35				
		83	36		CONGLOMERATE - Light grey, fine grained sandstone, shale and mudstone		
		82	37		SANDSTONE/SILTSTONE - Dark grey, fine grained siltstone 50% and 50% fine grained sandstone		
		81	38		small tuff chips		
		80	39				
		79	40		SANDSTONE - Light grey, fine-medium grained sandstone 80% and 20% siltstone		
		78	41		SANDSTONE/SILTSTONE - Dark grey, brittle siltstone and light grey, fine-medium sandstone with a few tuff chips		pH: 7.26 EC: 2182 µS/cm Temp: 25.42 °C Redox: 78.1 mV DO: 66 % Sat DO: 5.1 mg/L
		77	42				
		76	43				
		75					

END OF BOREHOLE AT 170.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

S4MB03

SHEET 3 OF 8

Client:	AGL Energy Limited	Date Commenced:	15/12/10
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	16/12/10
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	118.37 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 402591.91 N 6449407.84 MGA56

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
		74			SANDSTONE - Dark grey, fine grained 90% and dark grey shale and tuff	LELOMA FORMATION	pH: 7.26 EC: 2182 µS/cm Temp: 25.78 °C Redox: 64.2 mV DO: 84.4 % Sat DO: 6.51 mg/L
		45	73		SANDSTONE/SILTSTONE - hard and dark siltstone/shale 50% and 50% fine-medium grained sandstone		
		46	72		SANDSTONE - Light grey, fine grained sandstone and small amount of shale		
		47	71		SILTSTONE/SANDSTONE - Dark grey, very fine grained sand/siltstone		
		48	70		brown shale lens		
		49	69		SANDSTONE - Light grey, fine-medium coarse sandstone and darker siltstone and brown shale		
		50	68				
		51	67		trace of tuff		
		52	66				
		53	65				
		54	64				
		55	63		SILTSTONE - Dark, siltstone 80% and fine grained sandstone and shale	pH: 7.76 EC: 2442 µS/cm Temp: 26.51 °C Redox: 49.5 mV DO: 75.3 % Sat DO: 5.96 mg/L	
		56	62		trace of tuff		
		57	61		SANDSTONE - Light grey, fine grained sandstone and quartz, minor tuff and siltstone		
		58	60				
		59	59				
		60	58				
		61	57				
		62	56				
		63	55				
		64	54				
		65	53		CONGLOMERATE - Dark grey, siltstone and fine grained sandstone and brown tuff	pH: 7.69 EC: 159 µS/cm Temp: 26.28 °C Redox: 159 mV DO: 94 % Sat DO: 7.34 mg/L	

END OF BOREHOLE AT 170.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

S4MB03

SHEET 4 OF 8

Client:	AGL Energy Limited	Date Commenced:	15/12/10
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	16/12/10
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	118.37 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 402591.91 N 6449407.84 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
			52		SANDSTONE - Grey, fine grained sandstone and 10% dark grey siltstone	LELOMA FORMATION	
			67				
			51				
			68				
			50				
			69				
			49				
			70				
	Grout		48		SILTSTONE - Dark grey, siltstone 80% and 20% fine grained lighter sandstone		
			71				
			47				
			72		SANDSTONE/SILTSTONE - Light grey, very fine grained sandstone 60% and 40% dark grey siltstone		
			46				
			73				
			45				
			74				
			44				
			75		SILTSTONE - Dark grey, hard siltstone 80 % and light grey sandstone		
			43				
			76		CONGLOMERATE - Dark and laminated black, siltstone 80% and sandstone with tuff and light brown shale		
			42				
			77		SHALE/SILTSTONE - Black, siltstone/shale and dark grey shale with coal fines and light fine sandstone		
			41				
			78		COAL and siltstone - Bimaboo coal and dark grey siltstone	LELOMA FORMATION Bindaboo Coal Seam	
			40				
			79		CONGLOMERATE - Dark grey, siltstone, light grey tuff and coal and shale		
			39				
			80		SILTSTONE - Very dark, siltstone 50% and dark fine grained siltstone 50%	LELOMA FORMATION	
			38				
			81		CONGLOMERATE - Light grey, fine grained sandstone 60% and highly organic dark siltstone and shale		
			37				
			82		SANDSTONE/SILTSTONE - Light grey, fine grained sandstone and dark siltstone		
			36				
			83				
			35				
			84		SILTSTONE - Dark grey, 95% siltstone and 5% fine grained sandstone and dark shale		
			34				
			85		SANDSTONE/SILTSTONE - Light grey, fine grained sandstone 70% and 30% dark siltstone		
			33				
			86		trace of light shale and coal		
			32				
			87				
			31				

pH: 7.69
EC: 2499 µS/cm
Temp: 25.99 °C
Redox: 341.9 mV
DO: 96.6 % Sat
DO: 7.63 mg/L

pH: 7.89
EC: 2851 µS/cm
Temp: 32.5 °C
Redox: 292.3 mV
DO: 70.6 % Sat
DO: 5.05 mg/L

pH: 7.88
EC: 2491 µS/cm
Temp: 24.68 °C
Redox: 303.8 mV
DO: 70 % Sat
DO: 5.71 mg/L

END OF BOREHOLE AT 170.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

S4MB03

SHEET 5 OF 8

Client:	AGL Energy Limited	Date Commenced:	15/12/10
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	16/12/10
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	118.37 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 402591.91 N 6449407.84 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
		30			SANDSTONE/SILTSTONE - Light grey, fine grained sandstone 70% and 30% dark siltstone (continued)	LELOMA FORMATION	pH: 8.2 EC: 2695 µS/cm Temp: 25.5 °C Redox: 210.7 mV DO: 99.1 % Sat DO: 7.93 mg/L
		89	29		SILTSTONE - Dark, 80% siltstone, fine-med grained light sandstone		
		90	28		SANDSTONE - Dark, 80% sandstone, 20% siltstone/shale		
		91	27				
		92	26				
		93	25		SILTSTONE - Dark and light, - some dark laminations, 80% siltstone, 20% fine grained light sandstone and shale		
		94	24				
		95	23		Shale with leaf prints		
		96	22		SHALE - Dark, highly organic shales, small amount of tuff		
		97	21		SANDSTONE - Light grey, 50% fine to medium sandstone, 50% dark shale/siltstone (coal)		
		98	20				
		99	19		SILTSTONE/SHALE - Dark, 60% siltstone/shale/coal, 40% med-light grey sandstone		
		100	18		SANDSTONE - Light grey, 80% medium sandstone, 20% dark grey siltstone		
		101	17		SILTSTONE - Light grey, 90% siltstone, 10% medium sandstone		
		102	16				
		103	15		SANDSTONE - Light grey, 80% medium sandstone, 20% dark grey siltstone		
		104	14				
		105	13		SILTSTONE - Dark and light grey, 90% siltstone, 10% light grey, fine sandstone		
		106	12		CONGLOMERATE - Dark, coal fines, shale, siltstone and lighter siltstone and brown siltstone and grey medium sandstone and quartz		
		107	11		SANDSTONE - Light grey, fine grained sandstone and 40% darker siltstone		
		108	10				
		109	9		SANDSTONE/SILTSTONE - Grey, fine grained sandstone, dark grey siltstone and trace of red/brown mudstone		

END OF BOREHOLE AT 170.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

S4MB03

SHEET 6 OF 8

Client:	AGL Energy Limited	Date Commenced:	15/12/10
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	16/12/10
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	118.37 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 402591.91 N 6449407.84 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
		8			SANDSTONE/SILTSTONE - Grey, fine grained sandstone, dark grey siltstone and trace of red/brown mudstone (<i>continued</i>)	LELOMA FORMATION	pH: 8.22 EC: 2929 µS/cm Temp: 25.55 °C Redox: 92.9 mV DO: 96.9 % Sat DO: 7.84 mg/L
		111	7				
		112	6		SHALE - Dark, hard shale/siltstone-leaf prints 5% darker fine sandstone		
		113	5				
		114	4				
		115	3		SILTSTONE/SHALE - Dark black, siltstone/shale		
		116	2		SANDSTONE - Light grey, 80% fine to medium sandstone, 20% dark grey shale-leaf prints		
		117	1				
		118	0		SHALE - Dark grey, silty shale (90%) and medium light grey sandstone		
		119	-1		CONGLOMERATE - Light grey, fine to medium sandstone, shale, siltstone		
		120	-2				
		121	-3		SILTSTONE - Dark and lighter grey, siltstone (shale) 95%, 5% coarse light sandstone and quartz chips		
		122	-4		SANDSTONE/SILTSTONE - Light, fine grained sandstone 50%, 50% dark siltstone		
		123	-5		trace of quartz		
		124	-6				
		125	-7				
		126	-8				
		127	-9				
		128	-10				
		129	-11				
		130	-12		COAL/SHALE - Dark black, coal/shale 50%, 50% dark grey siltstone and fine light sandstone	LELOMA FORMATION Deards Coal Seam	pH: 7.98 EC: 2955 µS/cm Temp: 26.27 °C Redox: 142 mV DO: 99 % Sat DO: 7.86 mg/L
		131	-13		SILTSTONE - 95% dark grey, 5% brown - up to 1mm, grey up to 5mm		

END OF BOREHOLE AT 170.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

S4MB03

SHEET 7 OF 8

Client:	AGL Energy Limited	Date Commenced:	15/12/10
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	16/12/10
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	118.37 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 402591.91 N 6449407.84 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
		-14			SANDSTONE - Light grey, medium-fine grained sandstone 95% and 5% dark siltstone	LELOMA FORMATION Deards Coal Seam	Temp: 25.43 °C Redox: 83.4 mV DO: 92.8 % Sat DO: 7.52 mg/L
		133			CONGLOMERATE - Grey, fine - medium sandstone, siltstone, shale		
		-15			SHALE - Dark grey, shale/siltstone (organic matter)		
		134					
		-16					
		135			SILTSTONE/SHALE - Lighter grey, siltstone, dark grey /black shale		
		-17					
		136			CONGLOMERATE - Light, fine sandstone, shale, siltstone, brown siltstone/mudstone		
		-18					
		137			SANDSTONE/SILTSTONE - Light, fine grained sandstone 50%, 50% dark siltstone		
		-19				pH: 7.98 EC: 2962 µS/cm Temp: 24.54 °C Redox: 101.2 mV DO: 115.9 % Sat DO: 9.15 mg/L	
		138					
		-20					
		139					
		-21					
		140			COAL - Black, coal plus black shale		
		-22					
		141					
		-23					
		142			SILTSTONE/SHALE - Light, medium grained sandstone 50%, 50% medium sand		
		-24				pH: 8.1 EC: 2946 µS/cm Temp: 25.16 °C Redox: 89 mV DO: 79 % Sat DO: 6.43 mg/L	
		143			SANDSTONE - Light grey, fine grained sandstone 80%, 20% darker siltstone + sand		
		-25					
		144					
		-26					
		145			SILTSTONE/SHALE - Dark brown/black, siltstone/shale 95%, 5% light, coarse-medium sandstone		
		-27					
		146					
		-28					
		147			COAL - Black, coal and dark siltstone/shale		
		-29				LELOMA FORMATION	pH: 8.19 EC: 3077 µS/cm Temp: 25.15 °C Redox: 93 mV DO: 89.4 % Sat DO: 7.24 mg/L
		148			SANDSTONE/SILTSTONE - Light grey, medium grained sandstone 50%, 50% dark siltstone + coal fines		
		-30					
		149			SANDSTONE - Dark grey, fine and light medium sandstone		
		-31					
		150			SILTSTONE - Light and dark grey, siltstone 80%, light fine grained sandstone + tuff chips		
		-32					
		151					
		-33					
		152			SANDSTONE/SILTSTONE - Light grey, medium-fine sandstone 50%, 50% dark siltstone		
		-34					
		153			SILTSTONE/SHALE - Dark grey and black, siltstone/shale 90% and 10% light grey medium grained sandstone		
		-35					

END OF BOREHOLE AT 170.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

S4MB03

SHEET 8 OF 8

Client:	AGL Energy Limited	Date Commenced:	15/12/10
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	16/12/10
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	118.37 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 402591.91 N 6449407.84 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
		-36	155		SANDSTONE - Dark grey, fine grained sandstone 90% and 10% dark siltstone	LELOMA FORMATION	pH: 6.66 EC: 2686 µS/cm Temp: 21.66 °C Redox: 5360 mV DO: 96.1 % Sat DO: 8.3 mg/L
	Bentonite seal	-37	156				
		-38	157				
		-39	158		SILTSTONE - Dark grey, siltstone 95% and 5% light, medium grained sandstone	JILLEON FORMATION Cloverdale Coal Seam	pH: 8.07 EC: 2682 µS/cm Temp: 21.21 °C Redox: 225.1 mV DO: 58.4 % Sat DO: 5.14 mg/L
	Gravel 5 mm graded	-40	159		CONGLOMERATE - Dark, fine grained sandstone, light grey, medium grained sandstone and siltstone and shale		
		-41	160		COAL - coal (95%) and shale		
	50 mm ID, 0.5 mm aperture uPVC screen	-42	161		COAL - coal (80%) and shale/siltstone		
		-43	162		COAL - coal (90%) and shale/siltstone		
		-44	163		COAL - coal (70%) with shale/siltstone		
		-45	164		COAL - coal (90%) and shale/siltstone		
		-46	165		COAL - coal (70%) with shale/siltstone		
		-47	166		SILTSTONE - Dark and light grey, siltstone and coal fines		
	Sump/bentonite plug	-48	167		SILTSTONE - Dark grey, siltstone 60% and 40% fine dark and medium light sandstone		
		-49	168		SILTSTONE/SANDSTONE - Dark, siltstone 50% and dark fine grained sandstone	JILLEON FORMATION	pH: 8.39 EC: 2828 µS/cm Temp: 21.72 °C Redox: 204 mV DO: 101.2 % Sat DO: 8.62 mg/L
		-50	169				
		-51	170				
		-52	171				
		-53	172				
		-54	173				
		-55	174				
		-56	175				
		-57					

END OF BOREHOLE AT 170.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

S5MB01

SHEET 1 OF 2

Client:	AGL Energy Limited	Date Commenced:	13/12/10
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	14/12/10
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH / JCD
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	129.98 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 403155.96 N 6449250.34 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
	50 mm ID Class 18 uPVC & grout	129	1		TOPSOIL - Dark brown, medium/low plasticity brown clay and fill	JILLEON FOMRATION	
		128	2		WEATHERED ROCK - Red/brown/grey, well weathered rock and sandy clay clumps		
		127	3				
		126	4				
		125	5				
		124	6				
		123	7				
		122	8				
		121	9				
		120	10				
		119	11				
		118	12				
		117	13				
		116	14				
		115	15				
		114	16				
		113	17		few small dark siltstones		
		112	18				
		111	19				
		110	20				
		109	21				
		108	22				
		107	23		WEATHERED SILTSTONE - Dark grey, fine grained siltstone covered in clay		
		106	24				
	105	25					
	104	26					
	103	27					
	102	28					
	101	29					
	100	30		SANDSTONE - Light grey, fine - coarse grained sandstone, dark brown and grey fine grained siltstone, sand and quartz, small amount of clay			
	99	31					
	98	32					
	97	33					
	96	34					

END OF BOREHOLE AT 60.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

S5MB01

SHEET 2 OF 2

Client:	AGL Energy Limited	Date Commenced:	13/12/10
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	14/12/10
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH / JCD
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	129.98 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 403155.96 N 6449250.34 MGA56

Bore Information		Field Material Description						
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY	
		94	36		SANDSTONE - Light grey, fine - coarse grained sandstone, dark brown and grey fine grained siltstone, sand and quartz, small amount of clay (<i>continued</i>)	JILLEON FORMATION	pH: 8.00 EC: 4335 µS/cm Temp: 24.05 °C Redox: 43.7 mV DO: 73.2 % Sat DO: 6.04 mg/L	
		93	37					
		92	38		SILTSTONE - Dark grey, fine grained siltstone			
		91	39		small amount of clay			
		90	40					
		89	41		SANDSTONE - Light grey, coarse grained sandstone plus sand and quartz			pH: 8.09 EC: 4323 µS/cm Temp: 24.72 °C Redox: 54.7 mV DO: 98.1 % Sat DO: 7.82 mg/L
		88	42					
		87	43					
		86	44		some fine grained sandstone			
		85	45		small amount of dark siltstone			
	Bentonite seal	83	47		SILTSTONE - Dark grey, fine grained siltstone plus fine and coarse light grey sandstone		pH: 8.05 EC: 4240 µS/cm Temp: 24.76 °C Redox: 55.4 mV DO: 81.5 % Sat DO: 6.60 mg/L	
		82	48		minor clay			
		81	49		SANDSTONE - Light grey, coarse and fine grained sandstone (both light grey)			
	Gravel 5 mm graded	80	50		minor dark grey siltstone			
		79	51		SILTSTONE/SHALE - Dark grey, siltstone/shale			
	50 mm ID, 0.5 mm aperture uPVC screen	78	52				pH: 7.85 EC: 4439 µS/cm Temp: 27.41 °C Redox: 66.9 mV DO: 81.3 % Sat DO: 6.27 mg/L	
		77	53					
		76	54					
		75	55		SANDSTONE - Light grey, medium grained sandstone			
		74	56					
		73	57					
	Sump/bentonite plug	72	58		SILTSTONE - Dark grey, fine grained siltstone plus light grey coarse sandstone and minor clay		pH: 8.39 EC: 3445 µS/cm Temp: 26.19 °C Redox: 45.9 mV DO: 80.2 % Sat DO: 6.39 mg/L	
		71	59					
		70	60					
		69	61					
		68	62					
		67	63					
		66	64					
		65	65					
		64	66					
		63	67					
		62	68					
		61	69					

END OF BOREHOLE AT 60.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

S5MB02

SHEET 1 OF 5

Client:	AGL Energy Limited	Date Commenced:	9/12/10
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	13/12/10
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH / JCD
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	129.87 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 403153.45 N 6449244.93 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
	50 mm ID Class 18 uPVC & grout	129	1		TOPSOIL - Light brown, low organic content and drill pad	JILLEON FORMATION	
		128	2		WEATHERED ROCK/CLAY - Light yellow, weathered rock with red/cream sticky, high plasticity clay		
		127	3				
		126	4				
		125	5				
		124	6				
		123	7				
		122	8				
		121	9				
		120	10				
	Gravel backfill	119	11		SANDSTONE - Light grey, fine grained sandstone (60%) and dark grey siltstone (40%), plus a small amount of clay		
		118	12				
		117	13				
		116	14				
		115	15				
		114	16				
		113	17				
		112	18				
		111	19		SANDSTONE - Light grey, medium to fine grained sandstone (90%) and dark grey/black siltstone (5%), plus some medium grained sand and brown clay		
		110	20				
		109	21		SILTSTONE - Dark grey, siltstone, with a small amount of clay		
		108	22				
		107	23				
		106	24		black organic staining		
		105					

END OF BOREHOLE AT 114.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

S5MB02

SHEET 2 OF 5

Client:	AGL Energy Limited	Date Commenced:	9/12/10
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	13/12/10
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH / JCD
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	129.87 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 403153.45 N 6449244.93 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm)	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
		104	26	----	SILTSTONE - Dark grey, siltstone, with a small amount of clay <i>(continued)</i>	JILLEON FORMATION	
		103	27	----			
		102	28	----			
		101	29	----			
		100	30	----	SILTSTONE - Dark grey/black, siltstone (60%) and 40% fine grained sandy clay		
		99	31	----			
		98	32	----	SILTSTONE - Dark grey, siltstone (70%) and fine grained grey sandstone (30%)		
		97	33	●●●●	SANDSTONE - Light grey, medium to fine grained sandstone (60%) and dark grey siltstone		
		96	34	----	SILTSTONE - Dark grey, siltstone (80%) with 20% grey, medium to fine grained sandstone		
		95	35	----			
		94	36	----			
		93	37	●●●●	SANDSTONE - Light grey, medium grained sandstone (80%) and dark grey siltstone (20%)		
		92	38	----	SILTSTONE - Dark grey, siltstone, with some black organic staining (90%). 10% light grey medium grained sandstone		
		91	39	----			
		90	40	----			
		89	41	----			
		88	42	----			
		87	43	----			
		86	44	----			
		85	45	----			
		84	46	----			
		83	47	●●●●	SANDSTONE - Light grey, fine grained sandstone (80%) with 20% grey siltstone		
		82	48	●●●●			
		81	49	●●●●			
		80		●●●●			

pH: 8.01
 EC: 4025 µS/cm
 Temp: 26.58 °C
 Redox: 93 mV
 DO: 65.9 % Sat
 DO: 5.19 mg/L

END OF BOREHOLE AT 114.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

S5MB02

SHEET 3 OF 5

Client:	AGL Energy Limited	Date Commenced:	9/12/10
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	13/12/10
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH / JCD
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	129.87 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 403153.45 N 6449244.93 MGA56

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
			79	51	SANDSTONE - Light grey, fine grained sandstone (80%) with 20% grey siltstone (continued)	JILLEON FORMATION	pH: 8.2 EC: 4014 µS/cm Temp: 28.43 °C Redox: 31.9 mV DO: 83 % Sat DO: 6.29 mg/L
			78	52			
			77	53	SILTSTONE - Dark grey, siltstone with a few chips of light grey fine grained sandstone		
			76	54			
			75	55			
			74	56			
			73	57			
			72	58	SANDSTONE - Grey, medium grained sandstone		
			71	59	SILTSTONE - Dark grey, siltstone (90%) with 10% light grey, fine grained sandstone		
			70	60			
			69	61			
			68	62			
			67	63	SANDSTONE - Light grey, fine grained sandstone (60%) with 40% dark grey siltstone		
			66	64			
			65	65	Grout		
			64	66			
			63	67			
			62	68			
			61	69			
			60	70	SHALE - Black, hard shale and coal fines (85%) with 15% grey siltstone and sandstone		
			59	71			
			58	72	COAL/SHALE - Black/dark brown, reflective, soft coal and hard shale	JILLEON FORMATION Cloverdale Coal Seam	pH: 8.09 EC: 3456 µS/cm Temp: 26.88 °C Redox: 29.2 mV DO: 66.2 % Sat DO: 5.23 mg/L
			57	73			
			56	74	COAL/SHALE - Black/dark brown, reflective, soft coal and hard shale (60%) and 40% very fine grained grey sandstone and sand		
			55				

END OF BOREHOLE AT 114.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

S5MB02

SHEET 4 OF 5

Client:	AGL Energy Limited	Date Commenced:	9/12/10
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	13/12/10
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH / JCD
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	129.87 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 403153.45 N 6449244.93 MGA56

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (AHDm)	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
			54	•••••	SANDSTONE - Grey, fine grained sandstone (90%) with 10% grey siltstone	JILLEON FORMATION Cloverdale Coal Seam	pH: 8.21 EC: 3739 µS/cm Temp: 28.83 °C Redox: 36.4 mV DO: 70.6 % Sat DO: 5.37 mg/L
			53	•••••			
			52	•••••			
			51	•••••			
			50	•••••			
			49	•••••			
			48	•••••			
			47	•••••	SILTSTONE - Grey, siltstone (90%) with 10% medium to fine grained sandstone		
			46	•••••	COAL/SHALE - Black, coal and shale (90%) with 10% dark grey siltstone		
			45	•••••	COAL/SHALE - Black, soft coal and hard shale		
			44	•••••	COAL/SHALE - Black, soft coal and hard shale (70%) with 30% grey siltstone		
			43	•••••	SANDSTONE - Grey, fine grained sandstone (100%)	JILLEON FORMATION	pH: 8.3 EC: 3416 µS/cm Temp: 27.82 °C Redox: 32 mV DO: 71.8 % Sat DO: 5.56 mg/L
			42	•••••	SANDSTONE/SILTSTONE - Grey, medium to fine grained sandstone (50%) with 50% grey siltstone		
			41	•••••	SANDSTONE - Grey, fine grained sandstone		
			40	•••••	SILTSTONE - Grey, siltstone (90%) with 10% grey fine grained sandstone		
			39	•••••	SANDSTONE/SILTSTONE - Grey sandstone (50%) and grey siltstone (50%)		
			38	•••••			
			37	•••••			
			36	•••••			
			35	•••••	COAL/SHALE - Black, soft coal and hard shale (60%) with 30% grey sandstone and siltstone		
			34	•••••	SILTSTONE - Black, siltstone (organic staining) with some coal fines		
			33	•••••			
			32	•••••	SILTSTONE - Grey, siltstone		
			31	•••••			
			30	•••••			

END OF BOREHOLE AT 114.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

S5MB02

SHEET 5 OF 5

Client:	AGL Energy Limited	Date Commenced:	9/12/10
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	13/12/10
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH / JCD
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	129.87 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 403153.45 N 6449244.93 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
	50 mm ID, 0.5 mm aperture uPVC screen	29	101	[Dotted pattern]	SANDSTONE - Grey, fine grained sandstone	JILLEON FORMATION	pH: 7.55 EC: 3610 µS/cm Temp: 25.74 °C Redox: 21 mV DO: 82.5 % Sat DO: 6.62 mg/L
		28	102	[Dotted pattern]			
		27	103	[Dotted pattern]			
		26	104	[Dotted pattern]	SANDSTONE - Grey, fine grained sandstone (60%) with 40% dark grey siltstone		
		25	105	[Dotted pattern]			
		24	106	[Horizontal dashes]	SILTSTONE - Dark grey, siltstone with a small amount of grey clay		
		23	107	[Horizontal dashes]			
		22	108	[Horizontal dashes]	SILTSTONE - Dark grey, siltstone with a small amount of grey, medium grained sandstone		
		21	109	[Horizontal dashes]	SILTSTONE/SANDSTONE - Dark grey, siltstone (50%) with 50% grey, medium-fine grained sandstone and sand		
		20	110	[Horizontal dashes]	SILTSTONE - Dark grey, siltstone with a small amount of grey, medium grained sand		
		19	111	[Horizontal dashes]			
		18	112	[Horizontal dashes]			
		17	113	[Horizontal dashes]			
	Sump/bentonite plug	16	114	[Horizontal dashes]			
		15	115			pH: 8.13 EC: 4207 µS/cm Temp: 30.52 °C Redox: 32.6 mV DO: 77.6 % Sat DO: 5.72 mg/L	
		14	116				
		13	117				
		12	118				
		11	119				
		10	120				
		9	121				
		8	122				
		7	123				
		6	124				

END OF BOREHOLE AT 114.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

S5MB03

SHEET 1 OF 6

Client:	AGL Energy Limited	Date Commenced:	8/12/10
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	9/12/10
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH / JCD
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	129.79 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 403151.18 N 6449240.24 MGA56

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
	50 mm ID Class 18 uPVC & grout	129	1		TOP SOIL - Dark brown, top soil with clay chips and fill from the drill pad	JILLEON FORMATION	
		128	2		WEATHERED ROCK/LOAM - Light grey, fine, soft weathered rock. siltstone and mudstone chips present		
		127	3				
		126	4				
		125	5				
		124	6		SILTY CLAY - Cream, very fine grained silty clay with weathered siltstone (homogeneous)		
		123	7				
		122	8				
		121	9				
	Gravel backfill	120	10				
		119	11				
		118	12				
		117	13				
		116	14				
		115	15				
		114	16				
		113	17				
		112	18				
		111	19				
		110	20		SAND - Grey, silty coarse sand with grey siltstone chips (up to 6 mm)		
		109	21				
		108	22				
		107	23		SILTSTONE - Dark grey, and black (highly organic) siltstone chips (up to 8 mm)		
		106	24		SAND - Light grey, fine grained sand with medium grained grey sandstone chips		
		105	25		SILTSTONE - Dark grey, siltstone, organic content present		
		104	26		some coarse grained light sand		
		103	27				
		102	28				
		101	29				
		100	30		SILTSTONE/SHALE - Very dark grey, siltstone, organic content present		
		99	31				
		98					

END OF BOREHOLE AT 160.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

S5MB03

SHEET 2 OF 6

Client:	AGL Energy Limited	Date Commenced:	8/12/10
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	9/12/10
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH / JCD
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	129.79 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 403151.18 N 6449240.24 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
		97	33		SILTSTONE - Dark grey, siltstone, organic content present, 20% fine grained sandstone	JILLEON FORMATION	pH: 8.2 EC: 2105 µS/cm Temp: 27.4 °C redox: 82 mV
		96	34				
		95	35				
		94	36				
		93	37				
		92	38				
		91	39				
		90	40				
		89	41				
		88	42				
		87	43		minor clay		
		86	44				
		85	45				
		84	46				
		83	47				
		82	48				
		81	49		SANDSTONE - Light grey, fine grained sandstone		
		80	50				
		79	51				
		78	52				
		77	53				
		76	54		SILTSTONE - Dark grey, siltstone (60%), plus light grey medium grained sandstone (40%)		
		75	55				
		74	56				
		73	57		SANDSTONE - Light grey, fine grained sandstone plus dark grey siltstone chips (20%) and fine grained sand		
		72	58				
		71	59				
		70	60		SILTSTONE - Grey, siltstone (80%) with light grey sandstone, medium grained and sand		
		69	61				
		68	62				
		67	63				
		66					

END OF BOREHOLE AT 160.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

S5MB03

SHEET 3 OF 6

Client:	AGL Energy Limited	Date Commenced:	8/12/10
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	9/12/10
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH / JCD
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	129.79 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 403151.18 N 6449240.24 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
	Grout	65	65	---	SILTSTONE - Grey, siltstone (80%) with light grey sandstone, medium grained and sand (continued)	JILLEON FORMATION	
		64	66	---	SILTSTONE/SHALE - Dark grey, siltstone/shale (60%) with lighter grey sandstone (20%), quartz and clay		
		63	67	---	SILTSTONE - Grey, siltstone with fine grained light grey sand (20%)		
		62	68	---			
		61	69	---			
		60	70	---		JILLEON FORMATION Cloverdale Coal Seam	
		59	71	■	COAL - Black, coal fragments with shale (60%) plus light grey fine grained sandstone and sand		
		58	72	■	COAL - Black, soft coal and shale (90%) plus fine grained light grey sand		
		57	73	---	COAL - Black, soft coal (70%) and hard black shale		
		56	74	---			
		55	75	---	SILTSTONE - Grey, siltstone (50%) and fine grained grey sandstone, plus coal fines		
		54	76	---			
		53	77	●	SANDSTONE - Light grey, medium grained sandstone (60%) with dark grey siltstone		
		52	78	●			
		51	79	●			
		50	80	●		JILLEON FORMATION	
		49	81	●			
		48	82	●			
		47	83	---	SILTSTONE/SHALE - Dark grey/black, siltstone/shale (high organic matter), plus coal fines		
		46	84	■	COAL - Black, coal, cloverdale seam, soft and highly reflective		
		45	85	---			
		44	86	---	COAL - Black, coal and shale		
		43	87	●	SANDSTONE - Light grey, medium grained sandstone (60%), dark grey siltstone (organic) (up to 3 mm)		
		42	88	---	SILTSTONE - Grey, siltstone (70%) with dark grey siltstone/shale (30%) and fine grained sand		
		41	89	---			
		40	90	---		JILLEON FORMATION	
		39	91	---			
		38	92	---			
		37	93	---			
		36	94	●	SANDSTONE - Light grey, medium grained sandstone (60%) plus dark grey siltstone (up to 2 mm)		
		35	95	---	SILTSTONE/SHALE - Dark grey/black, angular siltstone/shale (highly organic) with coal fines		
		34					

END OF BOREHOLE AT 160.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

S5MB03

SHEET 4 OF 6

Client:	AGL Energy Limited	Date Commenced:	8/12/10
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	9/12/10
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH / JCD
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	129.79 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 403151.18 N 6449240.24 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
		33	97		SILTSTONE/SHALE - Dark grey/black, angular siltstone/shale (highly organic) with coal fines (<i>continued</i>)	JILLEON FORMATION	
		32	98		SILTSTONE - Light grey, siltstone with clay and fine grained sand		
		31	99				
		30	100				
		29	101				
		28	102				EC: 2300 µS/cm
		27	103				
		26	104				
		25	105				
		24	106				
		23	107		SANDSTONE - Dark grey, fine grained sandstone (60%) with darker siltstone and fine grained grey sandstone		
		22	108		SILTSTONE - Grey, siltstone with grey, fine sandstone	EC: 3300 µS/cm	
		21	109				
		20	110				
		19	111				
		18	112				
		17	113				
		16	114		SILTSTONE - Dark grey, (organic) siltstone	EC: 3100 µS/cm	
		15	115				
		14	116				
		13	117				
		12	118				
		11	119				
		10	120			EC: 2800 µS/cm	
		9	121				
		8	122				
		7	123				
		6	124				
		5	125				
		4	126			EC: 2900 µS/cm	
		3	127		SILTSTONE - Light grey, (organic) siltstone with medium plasticity clay		
		2					

END OF BOREHOLE AT 160.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

S5MB03

SHEET 5 OF 6

Client:	AGL Energy Limited	Date Commenced:	8/12/10
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	9/12/10
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH / JCD
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	129.79 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 403151.18 N 6449240.24 MGA56

Bore Information		Field Material Description							
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY		
		1	129	---	SILTSTONE - Light grey, (organic) siltstone with medium plasticity clay <i>(continued)</i>	JILLEON FORMATION	EC: 2900 µS/cm		
		0	130	---	SILTSTONE - Dark grey, (organic) siltstone with a small fine grained sand and clay				
		-1	131	---					
		-2	132	---					
		-3	133	---					
		-4	134	---					
		-5	135	---					
		-6	136	---					
		-7	137	---					
		-8	138	---					
		-9	139	•••••	SANDSTONE - Light grey, medium grained sandstone (60%) (up to 5 mm) with dark grey siltstone and sand			JILLEON FORMATION Roseville Coal Seam	EC: 2900 µS/cm
		-10	140	•••••					
		-11	141	•••••					
		-12	142	---	SILTSTONE/SHALE - Black, siltstone/shale (up to 2 mm), angular				
		-13	143	---	SILTSTONE - Dark grey/black, siltstone (70%) with light grey medium grained siltstone and coal fines				
		-14	144	---					
		-15	145	---					
		-16	146	---					
		-17	147	---					
		-18	148	---					
		-19	149	---	COAL - Black, coal with light brown siltstone chips (up to 1 mm)				
		-20	150	---	SILTSTONE - Light and dark grey, siltstone (70%) with fine grained light grey sandstone				
		-21	151	•••••	SANDSTONE - Light grey, coarse grey sandstone (60%) (up to 7 mm) with dark and light grey siltstone				
		-22	152	•••••					
		-23	153	•••••					
		-24	154	•••••					
		-25	155	---	SILTSTONE - Dark grey, siltstone (60%) (up to 1 mm) with light grey medium grained sandstone				
		-26	156	•••••	SANDSTONE - Light grey, medium grained sandstone (60%) with dark grey siltstone				
		-27	157	•••••					
		-28	158	---	COAL - Black, coal with black shale chips				
		-29	159	---	SHALE - Dark brown and black, shale with coal fines				
		-30		---					

END OF BOREHOLE AT 160.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

S5MB03

SHEET 6 OF 6

Client:	AGL Energy Limited	Date Commenced:	8/12/10
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	9/12/10
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH / JCD
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	129.79 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 403151.18 N 6449240.24 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
	<p>Sump/ bentonite plug</p>	-31	161		COAL - Black, coal with black shale chips	JILLEON FORMATION Roseville Coal Seam	pH: 8.3 EC: 3581 µS/cm Temp: 29 °C redox: 27 mV
		-32	162		SANDSTONE - Light grey, fine grained sandstone with coal fines		
		-33	163		COAL - Black, soft coal with black shale (up to 3 mm)		
		-34	164		SILTSTONE - Light and dark, siltstone (60%) with light grey fine grained sandstone	JILLEON FORMATION	pH: 8.3 EC: 3465 µS/cm Temp: 28.3 °C redox: 49 mV
		-35	165				
		-36	166				
		-37	167				
		-38	168				
		-39	169				
		-40	170				
		-41	171				
		-42	172				
		-43	173				
		-44	174				
		-45	175				
		-46	176				
	-47	177					
	-48	178					
	-49	179					
	-50	180					
	-51	181					
	-52	182					
	-53	183					
	-54	184					
	-55	185					
	-56	186					
	-57	187					
	-58	188					
	-59	189					
	-60	190					
	-61	191					
	-62						

END OF BOREHOLE AT 160.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

TCMB02

SHEET 1 OF 6

Client:	AGL Energy Limited	Date Commenced:	18/3/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	21/3/11
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	123.16 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 402502.42 N 6448904.4 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm)	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
	50 mm ID galvanized steel & grout	123			DRILL PAD	LELOMA FORMATION Jo Doth Tuff	
		122	1		WEATHERED TUFF - Light cream/green, weathered tuff with clay		
		121	2				
		120	3				
		119	4				
		118	5				
		117	6				
		116	7				
		115	8				
		114	9				
		113	10		WEATHERED ROCK - Grey and black, well weathered rock (siltstone and coal) with clay	LELOMA FORMATION	
		112	11				
		111	12				
		110	13				
		109	14				
		108	15				
		107	16				
		106	17				
		105	18				
		104	19				
		103	20				
		102	21				
		101	22		WEATHERED SILTSTONE - Dark grey, siltstone with light grey clay		
		100	23				
		99	24		WEATHERED CLAYSTONE - Light grey with dark grey, carbonaceous stained siltstone		
		98	25		WEATHERED SANDSTONE - Light grey, fine to medium grained sandstone with clay and weathered rock		
		97	26		WEATHERED SILTSTONE - Dark grey, siltstone partially weathered, clay and 5% black shale		
		96	27				
		95	28				
		94	29		WEATHERED SANDSTONE - Light grey, fine to medium grained, carbonaceous stained sandstone (50%) with 40% dark grey siltstone and 10% black shale, and clay and weathered rock		
		93	30		WEATHERED SILTSTONE - Dark grey, siltstone (90%) with 10% black shale and weathered rock and clay		
	92	31		WEATHERED TUFF - Light grey, medium grained (50%) with 30% grey siltstone and 10% black shale, and weathered rock and clay			

END OF BOREHOLE AT 183.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

TCMB02

SHEET 2 OF 6

Client:	AGL Energy Limited	Date Commenced:	18/3/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	21/3/11
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	123.16 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 402502.42 N 6448904.4 MGA56

Bore Information		Field Material Description				
WATER	WELL CONSTRUCTION	RL (AHDm)	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)
		91			WEATHERED SILTSTONE - Dark grey, siltstone with weathered rock and clay	LELOMA FORMATION
		90	33		SILTSTONE - Grey, siltstone (90%) with 10% light grey, fine grained sandstone and clay	
		89	34			
		88	35			
		87	36		SILTSTONE - Dark grey, siltstone (50%) with 40% light grey, fine grained sandstone and 10% black shale and clay	
		86	37			
		85	38			
		84	39		SANDSTONE - Grey, very fine grained sandstone	
		83	40			
		82	41		SILTSTONE - Dark grey, carbonaceous stained siltstone	
		81	42		SANDSTONE - Grey & light grey, very fine grained, carbonaceous stained sandstone (90%) with 10% dark grey siltstone and a few chips of hard white quartz	
		80	43			
		79	44			
		78	45		SILTSTONE - Dark grey, siltstone (70%) with 30% light grey, fine grained sandstone	
		77	46		SANDSTONE - Light grey, fine grained sandstone (60%) with 40% dark grey siltstone and white clay	
		76	47		SILTSTONE - Dark grey, siltstone (90%) with 10% light grey, fine grained sandstone and white clay	
		75	48			
		74	49		SANDSTONE - Light grey, fine to medium grained sandstone (90%) with 10% dark grey/black siltstone/shale	
		73	50			
		72	51		SILTSTONE - Dark grey & black, siltstone	
		71	52		SHALE - Black, shale (70%) with dark grey siltstone (30%) and coal fines	
		70	53		SILTSTONE - Dark grey, siltstone (80%) with 20% black shale	
		69	54			
		68	55			
		67	56		SANDSTONE - Light grey, very fine grained sandstone (80%) with 20% black shale	
		66	57		SHALE - Black, shale (40%) with 30% grey siltstone and 30% grey, fine grained sandstone	
		65	58		TUFF - Light brown, fine grained tuff (50%) with 50% black shale and white clay	
		64	59		SANDSTONE - Light grey, fine to medium grained sandstone (70%) with 30% grey siltstone	
		63	60		SANDSTONE - Light grey, medium grained sandstone (60%) with 40% grey siltstone	
		62	61		SILTSTONE - Grey, siltstone (80%) with 20% grey, fine to medium grained sandstone	
		61	62		SANDSTONE - Light grey, fine to medium grained sandstone (60%) with 40% dark grey siltstone	
		60	63			

END OF BOREHOLE AT 183.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

TCMB02

SHEET 3 OF 6

Client:	AGL Energy Limited	Date Commenced:	18/3/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	21/3/11
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	123.16 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 402502.42 N 6448904.4 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm)	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
		59			SILTSTONE - Grey, siltstone (80%) with 20% grey, very fine grained sandstone	LELOMA FORMATION	
		58	65		SANDSTONE - Grey, predominantly fine with some fine to medium grained sandstone		
		57	66		SILTSTONE - Grey, siltstone (90%) with 10% grey, fine to medium grained sandstone		
		56	67		SANDSTONE - Grey, fine to medium grained sandstone		
		55	68				
		54	69		SILTSTONE - Grey, siltstone (90%) with black shale and light grey, fine to medium grained sandstone		
		53	70				
		52	71				
		51	72				
		50	73				
		49	74				
		48	75				
		47	76		SANDSTONE - Light grey, fine grained sandstone	LELOMA FORMATION	
		46	77				
		45	78		black shale lens		
		44	79		SANDSTONE/SILTSTONE - Grey, siltstone (50%) with light grey, fine to medium grained sandstone		
		43	80		SILTSTONE - Dark grey, siltstone (90%) with 10% black shale and coal fines		
		42	81				
		41	82				
		40	83		SANDSTONE - Light grey, fine to medium grained sandstone (85%) with 15% grey siltstone and shale		
		39	84				
		38	85		SILTSTONE - Grey, siltstone (70%) with black shale and light grey medium grained sandstone		
		37	86				
		36	87		SANDSTONE - Light grey, medium grained, carbonaceous stained sandstone	LELOMA FORMATION	
		35	88				
		34	89				
		33	90		SILTSTONE/SANDSTONE - Grey, siltstone (50%) with 50% grey, fine to medium grained sandstone		
		32	91		SANDSTONE - Light grey, fine to medium grained, carbonaceous stained sandstone		
		31	92				
		30	93		some grey siltstone		
		29	94		SILTSTONE/SHALE - Dark grey/black, siltstone/shale (70%) with 30% light grey, fine grained sandstone		
		28	95				

pH: 6.48
EC: 3433 µS/cm
Temp: 25.78 °C
redox: 70 mV
TDS: 2.21 g/L

pH: 6.64
EC: 3660 µS/cm
Temp: 27.11 °C
redox: -13 mV
TDS: 2.29 g/L

pH: 7.1
EC: 2893 µS/cm
Temp: 26.03 °C
redox: -46.9 mV
TDS: 1.842 g/L

pH: 7.1
EC: 3107 µS/cm
Temp: 25.75 °C
redox: -62.8 mV
TDS: 1.993 g/L

END OF BOREHOLE AT 183.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

TCMB02

SHEET 4 OF 6

Client:	AGL Energy Limited	Date Commenced:	18/3/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	21/3/11
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	123.16 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 402502.42 N 6448904.4 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm)	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
		27			SHALE - Black/dark brown, shale/siltstone and coal	LELOMA FORMATION Bindaboo Coal Seam	pH: 6.91 EC: 2501 µS/cm Temp: 25.94 °C redox: 16.7 mV TDS: 1.597 g/L
		26	97				
		25	98		SILTSTONE - Grey, siltstone (60%) with 40% black shale/siltstone		
		24	99				
		23	100		SANDSTONE - Grey, fine grained sandstone		
		22	101				
		21	102		black shale lens		
		20	103		SILTSTONE - Grey, siltstone (80%) with 20% light grey, fine to medium grained sandstone		
		19	104				
		18	105		coal fines		
		17	106		Bindaboo Coal		
		16	107				
		15	108		SHALE - Black, shale (50%) with 25% grey siltstone and 25% light grey, fine to medium grained sandstone	LELOMA FORMATION	pH: 7.49 EC: 3366 µS/cm Temp: 26.74 °C redox: -47.7 mV TDS: 2.116 g/L
		14	109		SILTSTONE - Grey, siltstone (90%) with 10% brown siltstone		
		13	110		SILTSTONE - Dark brown/black, siltstone/shale with some coal fines		
		12	111				
		11	112				
		10	113				
		9	114		SANDSTONE - Light grey, fine grained sandstone (80%) with 20% dark grey siltstone		
		8	115		SILTSTONE - Dark grey/black, siltstone/shale with some coal fines		
		7	116				
		6	117				
		5	118		SHALE - Black, shale and coal (80%) with 20% light grey, medium grained sandstone		
		4	119				
		3	120		SANDSTONE - Light grey, medium grained sandstone (60%) with 40% dark grey siltstone	LELOMA FORMATION	pH: 7.73 EC: 3398 µS/cm Temp: 26.25 °C redox: -87.8 mV TDS: 2.104 g/L
		2	121				
		1	122				
		0	123				
		-1	124				
		-2	125		SILTSTONE - Dark grey & brown, siltstone		
		-3	126		SHALE - Black		
		-4	127		SILTSTONE - Dark grey, siltstone		

END OF BOREHOLE AT 183.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

TCMB02

SHEET 5 OF 6

Client:	AGL Energy Limited	Date Commenced:	18/3/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	21/3/11
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	123.16 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 402502.42 N 6448904.4 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
		-5		---	SILTSTONE - Dark grey, siltstone (<i>continued</i>) becoming lighter grey	LELOMA FORMATION	pH: 7.83 EC: 3154 µS/cm Temp: 26.01 °C redox: -91.9 mV TDS: 2.009 g/L
		-6	129	•••••	SANDSTONE - Grey, fine grained sandstone		
		-7	130	•••••			
		-8	131	---	SILTSTONE - Grey, siltstone (80%) with 20% light grey, fine to medium grained sandstone		
		-9	132	•••••	SANDSTONE - Grey, very fine grained sandstone with traces of black shale		
		-10	133	•••••			
		-11	134	•••••	some grey siltstone		
		-12	135	•••••			
		-13	136	---	SILTSTONE - Grey, siltstone (80%) with 20% grey, very fine grained sandstone		
		-14	137	---			
		-15	138	---			
		-16	139	---			
		-17	140	---			
		-18	141	•••••	SANDSTONE - Light grey, fine grained sandstone		
		-19	142	•••••			
		-20	143	•••••	carbonaceous staining		
		-21	144	•••••			
		-22	145	•••••			
		-23	146	•••••			
		-24	147	---	SILTSTONE - Grey, siltstone (60%) with 40% light grey, medium grained sandstone		
		-25	148	•••••	CONGLOMERATE - Grey, cream, green, medium, fine to medium grained sandstone, grey and dark grey siltstone		
		-26	149	•••••			
		-27	150	•••••			
		-28	151	•••••	SANDSTONE - Grey, medium grained sandstone (60%) with 40% dark grey/black siltstone/shale		
		-29	152	•••••			
		-30	153	---	SILTSTONE/SANDSTONE - Dark grey, siltstone (50%) with 50% grey fine and fine to medium sandstone		
		-31	154	•••••	SANDSTONE - Grey, fine grained sandstone		
		-32	155	•••••			
		-33	156	•••••			
		-34	157	---	SILTSTONE - Dark grey, siltstone	LELOMA FORMATION	
		-35	158	---	SILTSTONE/SHALE - Black, siltstone/shale with some coal fines (Deards Coal)	Deards Coal Seam	
		-36	159	---	SILTSTONE/SANDSTONE - Dark grey, siltstone (50%) with 50% grey, fine to medium grained sandstone	LELOMA FORMATION	

END OF BOREHOLE AT 183.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

TCMB02

SHEET 6 OF 6

Client:	AGL Energy Limited	Date Commenced:	18/3/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	21/3/11
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	123.16 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 402502.42 N 6448904.4 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
		-37		[Dotted pattern]	SANDSTONE - Grey, fine to medium grained sandstone (90%) with 10% grey siltstone	LELOMA FORMATION	pH: 8.01 EC: 2982 µS/cm Temp: 26.31 °C redox: -30.1 mV TDS: 1.891 g/L
		-38	161	[Dotted pattern]			
		-39	162	[Horizontal dashed lines]	SILTSTONE - Dark grey, siltstone (60%) with 40% light grey, fine to medium grained sandstone		
		-40	163	[Horizontal dashed lines]			
		-41	164	[Dotted pattern]	SANDSTONE - Grey, fine to medium grained sandstone (90%) with 10% dark grey siltstone		
		-42	165	[Dotted pattern]			
		-43	166	[Horizontal dashed lines]	SILTSTONE - Grey, siltstone (80%) with 20% light grey, medium grained sandstone		
		-44	167	[Horizontal dashed lines]			
	Bentonite seal	-45	168	[Dotted pattern]	SILTSTONE - Grey, fine to medium grained sandstone (80%) with 20% dark grey siltstone		
		-46	169	[Dotted pattern]			
		-47	170	[Horizontal dashed lines]	SILTSTONE - Grey, siltstone (70%) with 30% grey, very fine grained sandstone	pH: 7.9 EC: 3098 µS/cm Temp: 26.09 °C redox: -76.1 mV TDS: 1.972 g/L	
	Gravel 5 mm graded	-48	171	[Dotted pattern]	SANDSTONE - Grey, fine grained, carbonaceous stained sandstone		
		-49	172	[Dotted pattern]			
		-50	173	[Horizontal dashed lines]	SANDSTONE/SILTSTONE - Grey, siltstone (50%) with 50% light grey, fine to medium grained sandstone		
		-51	174	[Dotted pattern]	SANDSTONE - Grey, very fine grained, carbonaceous stained sandstone with 10% grey siltstone		
		-52	175	[Dotted pattern]			
	50 mm ID, 0.5 mm aperture stainless steel screen	-53	176	[Dotted pattern]			
		-54	177	[Dotted pattern]			
		-56	179	[Horizontal dashed lines]	SANDSTONE - Light grey, fine grained sandstone (80%) with 20% dark grey siltstone, carbonaceous staining		
		-57	180	[Horizontal dashed lines]			
	Sump/bentonite plug	-58	181	[Dotted pattern]		pH: 7.81 EC: 3336 µS/cm Temp: 26.29 °C redox: -88.5 mV TDS: 2.116 g/L	
		-59	182	[Dotted pattern]	SANDSTONE - Light grey, medium grained sandstone		
		-60	183	[Dotted pattern]			
		-61	184	[Dotted pattern]			
		-62	185	[Dotted pattern]			
		-63	186	[Dotted pattern]			
		-64	187	[Dotted pattern]			
		-65	188	[Dotted pattern]			
		-66	189	[Dotted pattern]			
		-67	190	[Dotted pattern]			
		-68	191	[Dotted pattern]		pH: 7.98 EC: 3256 µS/cm Temp: 25.94 °C redox: -59.8 mV TDS: 2.075 g/L	
		-69		[Dotted pattern]			

END OF BOREHOLE AT 183.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

TCMB03

SHEET 1 OF 8

Client:	AGL Energy Limited	Date Commenced:	14/3/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	16/3/11
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH / JCD
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	123.18 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 402503.15 N 6448909.61 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) / AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
	50 mm ID galvanized steel & grout	123			DRILL PAD	LELOMA FORMATION Jo Doth Tuff	
		122	1		TUFF - Cream, weathered tuff and clay		
		121	2				
		120	3				
		119	4				
		118	5				
		117	6				
		116	7				
		115	8				
		114	9				
		113	10		WEATHERED COAL - Grey/brown, weathered coal with 15% coal fines	LELOMA FORMATION	
		112	11		WEATHERED COAL - Grey/brown, weathered coal (60%) with 40% well weathered grey siltstone/claystone		
		111	12		WEATHERED SILTSTONE - Grey, well weathered siltstone (60%) with 40% weathered black coal		
		110	13				
		109	14		WEATHERED COAL - Black, weathered coal (70%) with 30% dark brown claystone		
		108	15		WEATHERED CLAYSTONE - Brown, very fine grained sandy weathered claystone		
		107	16				
		106	17		trace of black coal		
		105	18		WEATHERED COAL - Black, coal (95%) with 5% grey, very fine grained weathered claystone		
		104	19		WEATHERED CLAYSTONE - Light grey, very fine grained, weathered claystone		
		103	20				
		102	21		CLAY - Grey, sticky clay (60%) with 40% black coal fines		
		101	22		WEATHERED CLAYSTONE - Grey, very fine grained, sandy weathered claystone (95%) with 5% black coal		
		100	23		CLAY - Grey, very fine grained clay with 5% weathered siltstone		
		99	24		WEATHERED SILTSTONE - Grey, well weathered siltstone with some clay		
		98	25				
		97	26				
		96	27				
		95	28		some coal fines		
		94	29				
		93	30		fresh siltstone		
		92	31				
		91	32				
		90	33				
	89	34		SILTSTONE - Grey, carbonaceous stained siltstone (60%) with 30% grey, fine grained sandstone and 10% black shale			

END OF BOREHOLE AT 269.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

TCMB03

SHEET 2 OF 8

Client:	AGL Energy Limited	Date Commenced:	14/3/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	16/3/11
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH / JCD
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	123.18 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 402503.15 N 6448909.61 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm)	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
		88			SILTSTONE/SHALE - Grey, carbonaceous stained siltstone (40%) with 40% black shale and 20% grey, fine grained sandstone	LELOMA FORMATION	<p>pH: 6.89 EC: 2408 µS/cm Temp: 30.11 °C redox: -117.7 mV TDS: 1.425 g/L</p>
		87	36		SILTSTONE - Dark grey, siltstone with clay and 5% black shale		
		86	37				
		85	38				
		84	39		SANDSTONE - Grey, fine to medium grained sandstone with 5% dark grey siltstone and black shale		
		83	40				
		82	41				
		81	42		SILTSTONE - Dark grey, siltstone with a few chips of black shale		
		80	43		SANDSTONE - Light grey, medium grained sandstone (60%) with 40% dark grey siltstone and some clay		
		79	44		SILTSTONE - Grey, siltstone with clay and 5% light grey, medium grained sandstone and a black shale		
		78	45		SANDSTONE - Grey, fine grained sandstone with some clay		
		77	46		SILTSTONE/SHALE - Grey, siltstone (50%) with 50% black shale and some clay		
		76	47		SILTSTONE/SANDSTONE - Grey, siltstone (50%) with 50% light grey, fine to medium grained sandstone		
		75	48				
		74	49				
		73	50				
		72	51				
		71	52		SILTSTONE - Dark grey, and dark brown siltstone (80%) with 20% black shale		
		70	53				
		69	54				
		68	55		SILTSTONE/SANDSTONE - Light grey, fine to medium grained sandstone (50%) with 50% grey siltstone		
		67	56		SILTSTONE - Grey, siltstone (80%) with 20% light grey, fine to medium grained sandstone		
		66	57		black shale lens		
		65	58		SANDSTONE - Light grey, fine grained sandstone with some white clay and 10% black shale and light brown tuff		
		64	59		SILTSTONE - Grey, siltstone (90%) with 10% light grey, fine grained sandstone and 10% black shale		
		63	60		SANDSTONE - Grey, medium and fine grained sandstone (90%) with 10% grey siltstone		
		62	61				
		61	62		SILTSTONE - Grey, siltstone (80%) with 20% light grey, medium grained sandstone		
		60	63		SANDSTONE - Grey, light grey, medium grained sandstone (90%) with 10% siltstone		
		59	64				
		58	65		SILTSTONE - Grey, siltstone (60%) with 30% grey, fine grained sandstone and 10% black shale		
		57	66		SANDSTONE - Light grey, fine to medium grained sandstone with some black carbonaceous staining		
		56	67		SILTSTONE - Dark grey, siltstone with some black siltstone		
		55	68				
		54	69		SILTSTONE - Grey, siltstone (80%) with 20% black shale		
						<p>pH: 6.75 EC: 4121 µS/cm Temp: 26.2 °C redox: 29.5 mV TDS: 2.619 g/L</p> <p>pH: 7.29 EC: 3390 µS/cm Temp: 26.18 °C redox: -7.8 mV TDS: 2.157 g/L</p> <p>pH: 7.62 EC: 3024 µS/cm Temp: 25.39 °C redox: 10.3 mV TDS: 1.951 g/L</p>	

END OF BOREHOLE AT 269.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

TCMB03

SHEET 3 OF 8

Client:	AGL Energy Limited	Date Commenced:	14/3/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	16/3/11
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH / JCD
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	123.18 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 402503.15 N 6448909.61 MGA56

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
		53			SILTSTONE - Grey, siltstone (80%) with 20% black shale (<i>continued</i>)	LELOMA FORMATION	pH: 7.65 EC: 3275 µS/cm Temp: 25.71 °C redox: 28 mV TDS: 2.1 g/L
		52	71		few chips of white, hard quartz		
		51	72		SANDSTONE - Light grey, medium grained sandstone (60%) with 40% grey, carbonaceous stained siltstone		
		50	73		SILTSTONE - Dark grey, siltstone (80%) with 20% light grey, medium grained sandstone		
		49	74				
		48	75				
		47	76		SANDSTONE - Light grey, fine to medium grained sandstone		
		46	77		carbonaceous staining		
		45	78				
		44	79		SILTSTONE - Dark grey, carbonaceous stained siltstone (70%) with 30% grey, fine grained sandstone and some black shale		
		43	80		SANDSTONE - Grey, fine grained sandstone (90%) with 10% dark grey siltstone	LELOMA FORMATION	pH: 7.65 EC: 3250 µS/cm Temp: 25.16 °C redox: 32.5 mV TDS: 2.11 g/L
		42	81		SILTSTONE - Dark grey, siltstone (80%) with light grey claystone and black shale		
		41	82				
		40	83				
		39	84		SANDSTONE - Grey, fine grained sandstone (70%) with 30% dark grey siltstone		
		38	85		SILTSTONE - Dark grey, siltstone (60%) with 30% light grey, fine to medium grained sandstone with 10% dark shale		
		37	86		SANDSTONE - Light & dark grey, medium grained sandstone (90%) with 10% dark grey siltstone		
		36	87				
		35	88				
		34	89				
		33	90			LELOMA FORMATION	pH: 7.68 EC: 3487 µS/cm Temp: 26.36 °C redox: 3.6 mV TDS: 2.218 g/L
		32	91				
		31	92				
		30	93		carbonaceous staining		
		29	94		SILTSTONE - Dark grey, siltstone (70%) with 30% grey, fine grained sandstone		
		28	95		SANDSTONE - Grey, fine grained sandstone (70%), 20% dark grey siltstone and 10% black shale		
		27	96		SILTSTONE - Dark grey, siltstone (80%) with 10% grey, very fine grained sandstone and 10% black shale		
		26	97				
		25	98				
		24	99		SANDSTONE - Grey, very fine grained sandstone (90%) with 10% grey siltstone		
		23	100			LELOMA FORMATION Bindaboo Coal Seam	pH: 7.67 EC: 5289 µS/cm Temp: 25.91 °C redox: 38.7 mV TDS: 3.377 g/L
		22	101				
		21	102				
		20	103				
		19	104		SILTSTONE - Dark grey, siltstone with 40% black coal/shale, bindaboo coal		

END OF BOREHOLE AT 269.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

TCMB03

SHEET 4 OF 8

Client:	AGL Energy Limited	Date Commenced:	14/3/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	16/3/11
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH / JCD
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	123.18 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 402503.15 N 6448909.61 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
		18		---	SILTSTONE - Dark grey, siltstone with 40% black coal/shale, bindaboo coal (continued)	LELOMA FORMATION Bindaboo Coal Seam	pH: 7.66 EC: 4606 µS/cm Temp: 26.88 °C redox: -86.8 mV TDS: 2.888 g/L
		17	106	---			
		16	107	●●●●	SANDSTONE - Grey, very fine grained sandstone (70%) with 30% dark grey siltstone		
		15	108	---	SILTSTONE - Dark grey, carbonaceous stained siltstone (90%) with 10% brown siltstone and black shale		
		14	109	●●●●	SANDSTONE - Grey, very fine to fine sandstone (90%) with 10% siltstone		
		13	110	---	SILTSTONE - Dark grey, carbonaceous stained siltstone (90%) with 10% black shale		
		12	111	---			
		11	112	---			
		10	113	---			
		9	114	●●●●	SANDSTONE - Light grey, fine grained sandstone (80%) with 20% dark grey/black siltstone		
		8	115	---	SHALE /SILTSTONE - Black, shale (50%) with 50% brown siltstone	LELOMA FORMATION	pH: 7.96 EC: 3939 µS/cm Temp: 25.8 °C redox: 118.6 mV TDS: 2.523 g/L
		7	116	---	SILTSTONE - Dark grey/black, siltstone (90%) with 10% grey, fine grained sandstone and black shale		
		6	117	---			
		5	118	---			
		4	119	---			
		3	120	●●●●	SANDSTONE - Light grey, fine grained sandstone (60%) with 40% dark grey siltstone		
		2	121	●●●●	SANDSTONE - Grey, fine to medium grained sandstone (90%) with 10% grey siltstone		
		1	122	●●●●			
		0	123	●●●●	SANDSTONE - Grey, fine to medium grained sandstone (80%) with 20% grey siltstone		
		-1	124	●●●●			
		-2	125	●●●●			
		-3	126	●●●●			
		-4	127	---	SILTSTONE - Dark grey/black, siltstone (60%) with 40% grey, very fine to fine grained sandstone		
		-5	128	●●●●	SANDSTONE - Grey, very fine to fine grained sandstone (80%) with 20% dark grey siltstone		
		-6	129	●●●●			
		-7	130	●●●●			
		-8	131	●●●●			
		-9	132	---	SILTSTONE - Dark grey/black, siltstone (80%) with 20% grey siltstone		
		-10	133	●●●●	SANDSTONE - Grey, very fine grained sandstone		
		-11	134	●●●●			
		-12	135	---	SILTSTONE - Grey and black, siltstone with 20% grey, fine grained sandstone		
		-13	136	---			
		-14	137	---			
		-15	138	---			
		-16	139	---			

END OF BOREHOLE AT 269.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

TCMB03

SHEET 5 OF 8

Client:	AGL Energy Limited	Date Commenced:	14/3/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	16/3/11
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH / JCD
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	123.18 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 402503.15 N 6448909.61 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm)	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
		-17			SILTSTONE - Grey and black, siltstone with 20% grey, fine grained sandstone (continued)	LELOMA FORMATOIN	pH: 8.25 EC: 3919 µS/cm Temp: 25.34 °C redox: 186.7 mV TDS: 2.53 g/L
		-18	141				
		-19	142		SANDSTONE - Grey, very fine grained sandstone (90%) with 10% grey siltstone	LELOMA FORMATOIN	pH: 8.08 EC: 3866 µS/cm Temp: 25.42 °C redox: 194.4 mV TDS: 2.492 g/L
		-20	143				
		-21	144				
		-22	145		black shale lens		
		-23	146		SILTSTONE - Grey, siltstone (80%) with 20% grey, fine to medium grained sandstone		
		-24	147				
		-25	148		CONGLOMERATE - Green/white/grey, medium and fine grained sandstone, grey and brown siltstone		
		-26	149				
		-27	150		SILTSTONE - Grey, siltstone (60%) with 40% conglomerate		
		-28	151		SANDSTONE - Dark grey/black, siltstone (80%) with 20% light grey, medium grained sandstone		
		-29	152				
		-30	153				
		-31	154				
		-32	155				
		-33	156				
		-34	157		SHALE - Black, shale	LELOMA FORMATOIN	pH: 8.06 EC: 3922 µS/cm Temp: 26.05 °C redox: 134.2 mV TDS: 2.497 g/L
		-35	158				
		-36	159		SHALE - Black, shale (60%) with 40% grey siltstone		
		-37	160		SANDSTONE - Light grey, medium grained sandstone		
		-38	161		minor black siltstone		
		-39	162		SILTSTONE/SANDSTONE - Dark grey, siltstone (50%) with 50% grey, fine to medium grained sandstone		
		-40	163				
		-41	164				
		-42	165		SANDSTONE - Light grey, fine to medium grained sandstone (70%) with 30% grey siltstone		
		-43	166		SILTSTONE - Dark grey, siltstone (90%) with 10% light grey, fine to medium grained sandstone		
		-44	167		SHALE - Black, shale (90%) with 10% light grey, fine to medium grained sandstone and some coal fines	LELOMA FORMATOIN	pH: 8.29 EC: 3824 µS/cm Temp: 25.49 °C redox: 185 mV TDS: 2.47 g/L
		-45	168		SILTSTONE - Grey, siltstone (60%) with 40% grey, fine grained sandstone		
		-46	169				
		-47	170		SANDSTONE - Light grey, medium grained sandstone 20% dark grey and black siltstone		
		-48	171				
		-49	172				
		-50	173				
		-51	174		SHALE - Black, hard shale (60%) with 40% light grey, very fine grained sandstone		

END OF BOREHOLE AT 269.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

TCMB03

SHEET 6 OF 8

Client:	AGL Energy Limited	Date Commenced:	14/3/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	16/3/11
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH / JCD
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	123.18 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 402503.15 N 6448909.61 MGA56

Bore Information		Field Material Description						
WATER	WELL CONSTRUCTION	RL (AHDm)	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY	
		-52			SILTSTONE - Grey, siltstone (60%) with 40% grey, fine grained sandstone	LELOMA FORMATION	redox: 147.6 mV TDS: 2.431 g/L	
		-53	176					
		-54	177					
		-55	178					
		-56	179		SANDSTONE - Light grey, fine to medium grained sandstone (70%) with 30% dark grey, carbonaceous stained siltstone			pH: 8.58 EC: 3725 µS/cm Temp: 24.89 °C redox: 191.3 mV TDS: 2.437 g/L
		-57	180					
		-58	181		SILTSTONE - Dark grey, carbonaceous stained siltstone (60%) with 40% light grey, fine grained sandstone			
		-59	182					
		-60	183					
		-61	184		SHALE - Black, shale/coal with coal fines		LELOMA FORMATION Deards Coal Seam	
		-62	185		SANDSTONE - Grey, medium grained sandstone (90%) with 10% black shale			pH: 8.42 EC: 3736 µS/cm Temp: 24.84 °C redox: 188.6 mV TDS: 2.437 g/L
		-63	186		SANDSTONE - Light grey, medium grained sandstone (80%) with 20% dark grey/black siltstone			
		-64	187		SILTSTONE - Dark grey/black, siltstone and shale and 10% light grey, fine to medium grained sandstone			
		-65	188					
		-66	189					
		-67	190		SANDSTONE - Grey, very fine grained sandstone (70%) with 30% grey siltstone			
		-68	191		SILTSTONE - Grey, siltstone (90%) with 10% grey, fine grained sandstone			pH: 8.25 EC: 3704 µS/cm Temp: 24.97 °C redox: 184.4 mV TDS: 2.411 g/L
		-69	192		SANDSTONE - Grey, medium grained sandstone			
		-70	193		SILTSTONE - Dark grey, siltstone (60%) with 40% grey, medium grained sandstone			
		-71	194					
		-72	195		SANDSTONE - Grey, very fine grained sandstone (80%) with 20% grey siltstone			
		-73	196		SILTSTONE - Dark grey, siltstone (90%) with 10% grey, fine grained sandstone			
		-74	197					
		-75	198				pH: 8.5 EC: 3660 µS/cm Temp: 24.55 °C redox: 180.8 mV TDS: 2.399 g/L	
		-76	199		SANDSTONE - Grey, very fine grained sandstone (60%) with 40% dark grey siltstone			
		-77	200		SILTSTONE - Dark grey/black			
		-78	201					
		-79	202		COAL - Black (Deards Coal)			
		-80	203		COAL - Black, coal with 10% grey siltstone		pH: 8.52 EC: 3693 µS/cm Temp: 24.83 °C redox: 185.2 mV TDS: 2.406 g/L	
		-81	204		COAL/SHALE - Black, coal and shale with 15% grey siltstone			
		-82	205					
		-83	206		SILTSTONE - Grey, siltstone (80%) with 20% grey, fine to medium grained sandstone			
		-84	207		SANDSTONE - Light grey, medium grained sandstone and 20% grey siltstone			
		-85	208					
		-86	209		SHALE - Black, shale/coal (90%) with 10% grey siltstone		pH: 8.18 EC: 3686 µS/cm	

END OF BOREHOLE AT 269.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

TCMB03

SHEET 7 OF 8

Client:	AGL Energy Limited	Date Commenced:	14/3/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	16/3/11
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH / JCD
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	123.18 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 402503.15 N 6448909.61 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
		-87			SHALE - Black, shale/coal (90%) with 10% grey siltstone (<i>continued</i>)	LELOMA FORMATION Deards Coal Seam	Temp: 25.17 °C redox: 157.6 mV TDS: 2.388 g/L
		-88	211		COAL - Black, coal (80%) with 20% dark grey siltstone		
		-89	212				
		-90	213			LELOMA FORMATION	pH: 8.17 EC: 2841 µS/cm Temp: 24.31 °C redox: 182.5 mV TDS: 1.871 g/L
		-91	214		SILTSTONE/SHALE - Black, siltstone/shale		
		-92	215		SILTSTONE - Grey, siltstone		
		-93	216		SANDSTONE - Light grey, medium grained sandstone (60%) with 40% grey siltstone		
		-94	217				
		-95	218		SANDSTONE/SILTSTONE - Light grey, medium grained sandstone (50%) with 50% grey siltstone		
		-96	219		SILTSTONE - Grey, siltstone (90%) with 10% light grey, medium grained sandstone		
		-97	220				
		-98	221		SANDSTONE - Light grey, medium grained sandstone (80%) with 20% grey siltstone		
		-99	222		SILTSTONE - Grey, siltstone (80%) with 20% grey, fine to medium grained sandstone and clay		
		-100	223			pH: 8.08 EC: 2909 µS/cm Temp: 24.58 °C redox: 8.2 mV TDS: 1.906 g/L	
		-101	224				
		-102	225		SANDSTONE - Light grey/white, medium grained sandstone (80%) with 20% grey siltstone		
		-103	226				
		-104	227				
		-105	228		SILTSTONE/SANDSTONE - Light grey, fine to medium grained sandstone (50%) with 50% grey siltstone		
		-106	229				
		-107	230				
		-108	231		SANDSTONE - Light grey, fine to medium, carbonaceous stained sandstone (90%) with 10% siltstone		
		-109	232				
		-110	233			pH: 7.1 EC: 2899 µS/cm Temp: 22.97 °C redox: 100 mV TDS: 1.96 g/L	
		-111	234				
		-112	235				
		-113	236		SILTSTONE - Grey, siltstone (60%) with 40% light grey, fine to medium grained sandstone		
		-114	237		SANDSTONE - Grey, fine to medium grained, carbonaceous stained sandstone (90%) with 10% grey siltstone		
		-115	238				
		-116	239				
		-117	240		SILTSTONE - Grey, siltstone (60%) with 40% grey, fine grained sandstone		
		-118	241				
		-119	242		SANDSTONE - Light grey, fine to medium grained, carbonaceous stained sandstone (70%) with 30% grey siltstone		
		-120	243			pH: 7.75 EC: 3119 µS/cm Temp: 23.74 °C redox: -64.6 mV TDS: 2.077 g/L	
		-121	244				

END OF BOREHOLE AT 269.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

TCMB03

SHEET 8 OF 8

Client:	AGL Energy Limited	Date Commenced:	14/3/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	16/3/11
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH / JCD
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	123.18 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 402503.15 N 6448909.61 MGA56

Bore Information		Field Material Description						
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY	
		-122	246		SANDSTONE - Light grey, fine to medium grained, carbonaceous stained sandstone (70%) with 30% grey siltstone (continued)	LELOMA FORMATION	pH: 7.79 EC: 2985 µS/cm Temp: 23.8 °C redox: -35.1 mV TDS: 1.986 g/L	
		-123	247					
		-124	248		SILTSTONE - Grey and grey/brown, siltstone (70%) with 30% grey, fine grained sandstone			
		-125	249					
		-126	250		SANDSTONE - Grey, fine grained sandstone (70%) with 30% brown siltstone			
		-127	251					
		-128	252		SILTSTONE - Dark grey, siltstone (60%) with 40% light grey, fine to medium grained sandstone			
		-129	253		SANDSTONE - Grey, fine to medium grained sandstone (90%) with 10% dark grey siltstone			
		-130	254					
		-131	255		SILTSTONE - Grey, siltstone (90%) with 10% brown siltstone			
	Bentonite seal	-132	256				pH: 7.7 EC: 3214 µS/cm Temp: 24.09 °C redox: -55.6 mV TDS: 2.111 g/L	
		-133	257					
		-134	258					
		-135	259		COAL - Black, cloverdale coal/shale (90%) with 10% dark grey siltstone	JILLEON FORMATION Cloverdale Coal Seam		
	Gravel 5 mm graded	-136	260					
		-137	261					
		-138	262		COAL/SHALE - Black, cloverdale coal/shale (60%) with 40% grey, fine grained sandstone			
		-139	263		SILTSTONE - Dark grey, siltstone (60%) with 40% black coal/shale			pH: 7.9 EC: 2868 µS/cm Temp: 23.91 °C redox: -24.1 mV TDS: 1.903 g/L
		-140	264		COAL - Black coal/shale (80%) with 20% dark brown siltstone			
		-141	265					
		-142	266		SANDSTONE - Light grey, fine to medium grained sandstone (50%) with 30% dark grey siltstone and 20% black coal/shale	JILLEON FORMATION		
	50 mm ID, 0.5 mm aperture stainless steel screen	-143	267					
	bore collapse/infill	-144	268				pH: 7.68 EC: 2999 µS/cm Temp: 24.17 °C redox: -96.7 mV TDS: 1.981 g/L	
		-145	269					
		-146	270					
		-147	271					
		-148	272					
		-149	273					
		-150	274					
		-151	275					
		-152	276					
		-153	277					
		-154	278					
		-155	279					
		-156	279					

END OF BOREHOLE AT 269.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

TGMB01

SHEET 1 OF 1

Client:	AGL Energy Limited	Date Commenced:	2/2/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	2/2/11
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	133.66 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 403323.58 N 6448544.46 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
	50 mm ID PVC Class 18 & grout	133	1		WEATHERED CLAY - Red, brown and grey, hard dry clay	JILLEON FORMATION	
	Bentonite seal	132	2		WEATHERED CLAY - Light red/cream, weathered clay and claystone		
	Gravel 5 mm graded	131	3				
	50 mm ID, 0.5 mm aperture uPVC screen	130	4		WEATHERED ROCK - Red and grey, weathered siltstone/claystone with some clay		
		129	5				
		128	6				
		127	7				
		126	8				
		125	9				
		124					

END OF BOREHOLE AT 6.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

TGMB02

SHEET 1 OF 1

Client:	AGL Energy Limited	Date Commenced:	1/2/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	1/2/11
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	133.83 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 403330.41 N 6448543.12 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
	<div style="display: flex; flex-direction: column; align-items: center;"> <div style="width: 100%; border: 1px solid black; margin-bottom: 2px;">50 mm ID Class 18 uPVC & grout</div> <div style="width: 100%; border: 1px solid black; margin-bottom: 2px;">Bentonite seal</div> <div style="width: 100%; border: 1px solid black; margin-bottom: 2px;">Gravel 5 mm graded</div> <div style="width: 100%; border: 1px solid black; margin-bottom: 2px;">50 mm ID, 0.5 mm aperture uPVC screen</div> </div>	133	1	/ / / / /	CLAY - Red/brown, mottled dry, low plasticity clay	JILLEON FORMATION	
		132	2	/ / / / /	CLAY - Green/red, mottled dry, hard clay		
		131	3	/ / / / /	CLAY - White, dry, weathered clay with some red/brown/grey mottled clay		
		130	4	/ / / / /	CLAY - Brown, dry, weathered clay with some red/brown/grey mottled clay		
		129	5	/ / / / /			
		128	6	/ / / / /	CLAY - Brown/green, dry weathered clay		
		127	7	- - - - -	WEATHERED SILTSTONE - Grey, well weathered siltstone		
		126	8	- - - - -			
		125	9	- - - - -	WEATHERED SILTSTONE - Grey, weathered siltstone with some coal fines and grey siltstone chips		
		124	10	- - - - -			
		123	11	- - - - -			
		122	12	■	COAL - Black, weathered, dry coal with a small amount of siltstone	JILLEON FORMATION Roseville Coal Seam	
		121	13	- - - - -			
		120	14	- - - - -	SILTSTONE - Grey, weathered siltstone with some grey siltstone chips	JILLEON FORMATION	
		119	15	- - - - -			
	118	16					
	117	17					
	116	18					
	115	19					
	114						

END OF BOREHOLE AT 15.40 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

TMB01

SHEET 1 OF 1

Client:	AGL Energy Limited	Date Commenced:	18/1/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	18/1/11
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH / JCD
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	106.82 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 401996.99 N 6449419.74 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
	50 mm ID Class 18 uPVC & grout	106	1		TOPSOIL - Brown, organic, dry topsoil. small amounts of sand and clay present	Avon River Formation	
		105	2		CLAY - Brown and mottled brown/grey, low to high plasticity clay		
		104	3				
	Bentonite seal	103	4				
		102	5				
	Gravel 5 mm graded	101	6				
		100	7				
	50 mm ID, 0.5 mm aperture uPVC screen	99	8				
		98	9		WEATHERED CLAYSTONE - Black, organic rich, high plasticity clay with some light grey weathered siltstone/claystone		
	Sump/bentonite plug	97	10		WEATHERED TUFF - Light green/cream, medium grained weathered tuff		Gloucester Coal Measures
		96	11				
		95	12				
		94	13				
		93	14				
		92					

pH: 6.91
 EC: 3619 µS/cm
 Temp: 26.82 °C
 Redox: -15 mV

END OF BOREHOLE AT 12.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

TMB02

SHEET 1 OF 1

Client:	AGL Energy Limited	Date Commenced:	18/1/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	18/1/11
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	106.81 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 401905 N 6449100.65 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
	50 mm ID Class 18 uPVC & grout	106	1		TOPSOIL/CLAY - Brown, loamy, dry clay and topsoil	Avon River Alluvium	
	Gravel backfill	105	2		CLAY - Grey, clay with brown, loamy, dry soil		
		104	3		SANDY CLAY - Light brown/grey, sandy clay		
		103	4		CLAY - Grey and brown/yellow, mottled, sticky, moist clay		
		102	5				
	Bentonite seal	101	6		GRAVELS/CLAY - Grey/yellow/brown, mottled clay with medium grained mixed gravels		
		100	7		MIXED GRAVELS - Grey and brown, predominantly coarse to medium grained mixed gravel pebbles (up to 4 cm)		
	Gravel 5 mm graded	99	8				
	50 mm ID, 0.5 mm aperture uPVC screen	98	9		MIXED GRAVELS - Light brown, fine to medium grained mixed gravels, with a few pebbles (up to 2 cm)		
		97	10		some grey siltstone chips		
	Sump/bentonite plug	95	12		SILTSTONE - Dark grey, soft siltstone with a few pebbles (up to 2 cm)	Gloucester Coal Measures	pH: 6.81 EC: 2413 µS/cm Temp: 27.4 °C Redox: 60.5 mV DO: 25.1 % Sat DO: 1.91 mg/L
		94	13		SILTSTONE/CLAYSTONE - Dark grey/light grey, 50% dark grey siltstone and 50% light grey, soft claystone		
		93	14		SILTSTONE/SANDSTONE - Light grey/dark grey, 50% light grey, fine grained sandstone, 50% dark grey siltstone		
		92	15		SANDSTONE - Light grey, medium and fine grained sandstone		pH: 7.61 EC: 3905 µS/cm Temp: 18.63 °C Redox: -68.4 mV DO: 25.1 % Sat DO: 5.04 mg/L
		91	16				
		90	17				
		89	18				
		88	19				
		87					

END OF BOREHOLE AT 15.50 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

TMB03

SHEET 1 OF 1

Client:	AGL Energy Limited	Date Commenced:	19/1/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	19/1/11
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	106.48 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 401969.4 N 6448755.09 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
	50 mm ID Class 18 uPVC & grout	106	1		TOPSOIL - Brown, brown, dry sandy clayey topsoil. clay is hard with low plasticity	Avon River Alluvium	pH: 7.28 EC: 5550 µS/cm Temp: 22.01 °C Redox: 82.8 mV DO: 53.5 % Sat DO: 4.6 mg/L
	Gravel backfill	105	2		SANDY CLAY - Golden brown and grey, golden brown and grey, dry sandy clay		
	Bentonite seal	104	3		CLAY - Red/brown sticky, red/brown sticky, medium plasticity clay		
	Gravel 5 mm graded	103	4		SANDY CLAY - Yellow/grey, mottled sandy clay with a few pebbles		
	50 mm ID, 0.5 mm aperture uPVC screen	102	5		MIXED GRAVEL - Light brown, light brown, coarse grained gravels with large pebbles (up to 5 cm)		
		101	6		SANDY GRAVEL - Gold, fine grained sandy gravel with a few larger pebbles (up to 2 cm)		
		100	7		MIXED GRAVEL - Grey, medium grained mixed gravel with a few pebbles and some clay		
		99	8		MIXED GRAVEL/SHALE - Grey/black, 50% grey, fine to medium grained mixed gravel and 50% black shale		
		98	9		SAND - Grey, 80% grey, fine grained sand with some grey siltstone and sandstone, and mixed gravels		
		97	10		SAND - Grey, 80% grey, fine grained sand with some grey siltstone and sandstone, and mixed gravels		
	Sump/bentonite plug	95	11		SAND/MIXED GRAVELS - Grey/brown, 50% grey, fine grained sand and 50% brown mixed gravels		
		94	12		SILTSTONE/SANDSTONE - Grey, 50% grey siltstone and 50% grey, very fine grained sand with some brown mixed gravels	Gloucester Coal Measures	pH: 7.73 EC: 6.029 µS/cm Temp: 21.59 °C Redox: -30.9 mV DO: 46.9 % Sat DO: 4.06 mg/L
		93	13				
		92	14				

END OF BOREHOLE AT 12.50 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

TMB04

SHEET 1 OF 1

Client:	AGL Energy Limited	Date Commenced:	17/1/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	17/1/11
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	124.47 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 402558.06 N 6448921.76 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
	50 mm ID Class 18 uPVC & grout	124	1		CLAY - Brown/yellow, brown/yellow, dry clay with chips of fill	LELOMA FORMATION	
	Gravel backfill	123	2		SANDY CLAY - Light brown/yellow, light brown/yellow, low plasticity sandy clay		
		122	3				
		121	4				
		120	5		CLAY/LOAM - Dark brown, clay loam with some sticky grey clay		
		119	6		SOIL - Dark brown, organic clayey loamy soil		
	Bentonite seal	118	7		CLAY - Light brown/grey, soft clay		
	Gravel 5 mm graded	117	8		some weathered siltstone		
	50 mm ID, 0.5 mm aperture uPVC screen	116	9				
		115	10				
		114	11		WEATHERED SILTSTONE - Grey to light grey, weathered siltstone and minor clay		
		113	12				
		112	13				
		111	14		SILTSTONE - Dark grey, siltstone		
	Sump/bentonite plug	110	15				
		109	16				
		108	17				
		107	18				
		106	19				
		105					

END OF BOREHOLE AT 15.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

TMB05

SHEET 1 OF 1

Client:	AGL Energy Limited	Date Commenced:	17/1/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	17/1/11
Bore Location:	Gloucester - Tiedeman property	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	118.63 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 402650.17 N 6448725.4 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
	50 mm ID Class 18 uPVC & grout	118	1 -		CLAYEY TOPSOIL - Dark brown, mottled clayey topsoil	LELOMA FORMATION	
	Gravel backfill	117	2 -				
	Bentonite seal	115	3 -		WEATHERED SILTSTONE - Grey, weathered siltstone, sandstone and claystone with some dark brown clay		
	Gravel 5 mm graded	114	4 -		slightly sandy		
	50 mm ID, 0.5 mm aperture uPVC screen	112	6 -		WEATHERED CLAYSTONE - Dark brown, sandy clay with some fine grained weathered sandstone chips		
	Sump/ bentonite plug	109	9 -		SILTSTONE - Grey, soft siltstone with some sandy clay		
		108	11 -				
		107	12 -				
		106	13 -				
		105	14 -				
		104					

END OF BOREHOLE AT 10.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

WMB01

SHEET 1 OF 1

Client:	AGL Energy Limited	Date Commenced:	20/1/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	20/1/11
Bore Location:	Gloucester - Waukivory Road	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	111.06 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 404790.83 N 6454007.15 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) / AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
	50 mm ID Class 18 uPVC & grout	111			LOAM SOIL - Dark brown, organic loamy clay soil	Alluvium	
		110	1		CLAY - Brown/grey, mottled, sticky clay with brown, orange and white pebbles		
	Bentonite seal	109	2				
		108	3				
	Gravel 5 mm graded	107	4				
	50 mm ID, 0.5 mm aperture uPVC screen	106	5		GRAVEL - Red, brown, grey and white, fine to medium mixed gravels with some grey, sandy, sticky clay		
		105	6		SAND - Grey, fine grained sand with some red and brown pebbles (up to 6 cm)		
		104	7		SANDSTONE/SAND - Light grey, fine to medium grained, soft, dry sandstone with light grey, fine grained sand		
	Sump/bentonite plug	103	8				
		102	9				

END OF BOREHOLE AT 8.50 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

WMB02

SHEET 1 OF 1

Client:	AGL Energy Limited	Date Commenced:	24/1/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	24/1/11
Bore Location:	Gloucester - Waukivory Road	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	106.13 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 403908.13 N 6454390.73 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
	50 mm ID Class 18 uPVC & grout	106			CLAY - Brown, medium plasticity clay with some red/grey/yellow mottling	WENHAMS FORMATION	
		105	1				
		104	2				
		103	3				
		102	4		SANDY CLAY - Light brown/gold, fine and medium grained sandy clay. less clay than above		
		101	5		CLAY - Red/brown, low plasticity dry clay with some grey mottling		
		100	6		SANDY CLAY - Light and dark brown, medium and fine grained sandy clay		
		99	7		SANDY CLAY - Light brown, fine grained sandy clay. less clay than above		
		98	8		SANDY CLAY - Dark brown, very fine grained sandy clay		
		97	9		WEATHERED ROCK - Grey, very fine grained well weathered rock with a few grey siltstone chips		
	Bentonite seal	96	10				
		95	11				
		94	12				
	Gravel 5 mm graded	93	13				
		92	14				
	50 mm ID, 0.5 mm aperture uPVC screen	91	15				
		90	16		SANDSTONE - Dark grey, fine grained sandstone. poor return		
		89	17		some soft mudstone		
		88	18				
		87	19				
		86	20				
	Sump/bentonite plug	85	21				
		84	22				
		83	23				
		82	24				

pH: 7.46
 EC: 5351 µS/cm
 Temp: 31.09 °C
 Redox: 55.1 mV
 DO: 45 % Sat
 DO: 3.16 mg/L

pH: 7.78
 EC: 4162 µS/cm
 Temp: 22.15 °C
 Redox: 30.1 mV
 DO: 56.8 % Sat
 DO: 4.88 mg/L

END OF BOREHOLE AT 23.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

WMB03

SHEET 1 OF 2

Client:	AGL Energy Limited	Date Commenced:	25/1/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	25/1/11
Bore Location:	Gloucester - Waukivory Road	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	106.39 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 403917.69 N 6454387.27 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
	50 mm ID Class 18 uPVC & grout	106	1		TOPSOIL & CLAY - Brown, organic soil with some brown/grey, dry clay	WENHAMS FORMATION	
		105	2		CLAY - Mottled red and grey, medium plasticity, sticky clay		
		104	3		SANDY CLAY - Light brown, medium grained sand with some grey/red mottled clay		
		103	4		Red/brown		
		102	5		Light brown/gold/grey		
		101	6		Red/brown		
		100	7		Light brown/gold/grey		
		99	8		Red/brown		
		98	9		Light brown/gold/grey		
		97	10		WEATHERED ROCK - Grey, well weathered rock with a few chips of soft grey claystone		
	Gravel backfill	96	11		WEATHERED ROCK - Grey, well weathered rock with a few chips of soft grey claystone		
		95	12		WEATHERED ROCK - Grey, well weathered rock with a few chips of soft grey claystone		
		94	13		WEATHERED ROCK - Grey, well weathered rock with a few chips of soft grey claystone		
		93	14		CLAYSTONE - Grey, soft claystone		
		92	15		CLAYSTONE - Grey, soft claystone		
		91	16		CLAYSTONE - Grey, soft claystone		
		90	17		CLAYSTONE - Grey, soft claystone		
		89	18		CLAYSTONE - Grey, soft claystone		
		88	19		CLAYSTONE - Grey, soft claystone		
		87					

END OF BOREHOLE AT 36.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

WMB03

SHEET 2 OF 2

Client:	AGL Energy Limited	Date Commenced:	25/1/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	25/1/11
Bore Location:	Gloucester - Waukivory Road	Recorded By:	NPH
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	106.39 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 403917.69 N 6454387.27 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
	Grout	86	21		CLAYSTONE - Grey, soft claystone (<i>continued</i>)	WENHAMS FORMATION	pH: 7.01 EC: 4047 µS/cm Temp: 29.71 °C Redox: 58 mV DO: 43.9 % Sat DO: 3.3 mg/L
		85	22				
		84	23				
		83	24				
		82	25				
		81	26				
		80	27				
		79	28				
	Bentonite seal	78	29				
		77	30		CLAYSTONE - Dark grey, sticky with a few claystone chips		
		76	31		CLAYSTONE - Dark grey, 70 % dark grey soft claystone, 30% dark grey, fine grained sandstone		
	Gravel 5 mm graded	75	32		COAL - Black, highly reflective soft coal	WENHAMS FORMATION Bowens Road Coal Seam	
	50 mm ID, 0.5 mm aperture uPVC screen	74	33				
		73	34		CLAYSTONE - Dark grey, sticky with a few claystone chips	WENHAMS FORMATION	pH: 7.24 EC: 4263 µS/cm Temp: 29.41 °C Redox: 9.9 mV DO: 47.6 % Sat DO: 3.58 mg/L
	Sump/ bentonite plug	72	35		CLAYSTONE - Light grey, soft claystone with some sticky clay		
		71	36				
		70	37				
		69	38				
		68	39				
		67					

END OF BOREHOLE AT 36.00 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

WMB04

SHEET 1 OF 3

Client:	AGL Energy Limited	Date Commenced:	20/1/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	21/1/11
Bore Location:	Gloucester - Waukivory Road	Recorded By:	NPH / JCD
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	106.12 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 403903.44 N 6454392.51 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
	50 mm ID Class 18 uPVC & grout	106			TOPSOIL/CLAY - Brown, organic topsoil with some dry red/grey mottled clay	WENHAMS FORMATION	
		105	1		CLAY - Red/grey/brown, mottled, hard dry clay		
		104	2				
		103	3		SANDY CLAY - Brown, fine to medium grained sandy clay		
		102	4				
		101	5				
		100	6				
		99	7				
		98	8				
		97	9				
	Gravel backfill	96	10				
		95	11		WEATHERED ROCK - Dark grey, very well weathered rock with a few claystone and sandstone chips		
		94	12				
		93	13				
		92	14				
		91	15		SANDSTONE - Dark grey, fine grained sandstone with a few chips of light brown, soft mudstone		
		90	16				
		89	17				
		88	18				
		87	19				
		86	20				
		85	21				
	Grout	84	22				
		83	23				
		82	24				
		81	25				
		80	26				
		79	27				

pH: 7.44
 EC: 4680 µS/cm
 Temp: 24.2 °C
 Redox: -12.5 mV
 DO: 57 % Sat
 DO: 4.68 mg/L

pH: 7.62
 EC: 4253 µS/cm
 Temp: 22.68 °C
 Redox: -62.9 mV
 DO: 55.7 % Sat
 DO: 4.72 mg/L

END OF BOREHOLE AT 80.50 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

WMB04

SHEET 2 OF 3

Client:	AGL Energy Limited	Date Commenced:	20/1/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	21/1/11
Bore Location:	Gloucester - Waukivory Road	Recorded By:	NPH / JCD
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	106.12 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 403903.44 N 6454392.51 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
		78			SILTSTONE - Dark grey, 70% dark grey siltstone and 30% medium to fine grained dark grey sandstone	WENHAMS FORMATION	pH: 7.62 EC: 4070 µS/cm Temp: 22.83 °C Redox: -16.4 mV DO: 50.6 % Sat DO: 4.28 mg/L
		77	29				
		76	30				
		75	31				
		74	32				
		73	33		SANDSTONE - Dark grey, fine grained sandstone		
		72	34		SILTSTONE - Dark grey, siltstone		
		71	35		SANDSTONE - Dark grey, very fine grained sandstone		
		70	36		SILTSTONE - Dark grey, siltstone		
		69	37				
		68	38				
		67	39				
		66	40				
		65	41				
		64	42				
		63	43				
		62	44				
		61	45				
		60	46				
		59	47				
		58	48				
		57	49		SHALE - Black, 70% black, soft shale with 30% light brown, soft mudstone. poor return	WENHAMS FORMATION Bowans Road Coal Seam	pH: 7.72 EC: 4115 µS/cm Temp: 23.87 °C Redox: -48 mV DO: 49 % Sat DO: 4.07 mg/L
		56	50		SHALE/COAL - Black, 80% black, soft shale and coal with 20% light brown, soft mudstone		
		55	51				
		54	52				
		53	53		MUDSTONE - Dark brown, mudstone with some grey clay	WENHAMS FORMATION	pH: 7.7 EC: 4253 µS/cm Temp: 21.03 °C Redox: 46.2 mV DO: 50.6 % Sat DO: 4.4 mg/L
		52	54				
		51	55		MUDSTONE/SILTSTONE - Dark grey, soft mudstone/siltstone		

END OF BOREHOLE AT 80.50 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

WMB04

SHEET 3 OF 3

Client:	AGL Energy Limited	Date Commenced:	20/1/11
Project:	Hydrogeological Assessment - Gloucester Gas Project	Date Completed:	21/1/11
Bore Location:	Gloucester - Waukivory Road	Recorded By:	NPH / JCD
Project Number:	2162406A	Log Checked By:	JCD

Drilling Method:	Air Hammer - Longyear 850	Surface RL:	106.12 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	140 mm
		Co-ords:	E 403903.44 N 6454392.51 MGA56

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (AHDm) AHD	DEPTH (BGLm)	GRAPHIC LOG	LITHOLOGY	FORMATION (Approximate)	HYDROGEOLOGY
		50			SILTSTONE - Dark grey to grey, siltstone	WENHAMS FORMATION	pH: 7.75 EC: 3522 µS/cm Temp: 22.02 °C Redox: 39.5 mV DO: 44.4 % Sat DO: 3.83 mg/L
		49	57				
		48	58				
		47	59				
		46	60				
		45	61				
	Bentonite seal	44	62				
		43	63		SILTSTONE/SANDSTONE - Light/dark grey, 50% light grey, medium grained sandstone and 50% grey siltstone		
		42	64				
	Gravel 5 mm graded	41	65		SANDSTONE - Light/dark grey, 70% light grey fine to medium grained sandstone, 30% grey siltstone		
		40	66		SANDSTONE - Light grey, 90% light grey, fine to medium grained sandstone, 10% dark grey siltstone	pH: 7.84 EC: 3951 µS/cm Temp: 21.64 °C Redox: 1.4 mV DO: 55.5 % Sat DO: 4.82 mg/L	
	50 mm ID, 0.5 mm aperture uPVC screen	39	67				
		38	68				
		37	69		some black organic staining		
		36	70				
		35	71				
		34	72				
		33	73		SANDSTONE - Light grey, fine to medium grained sandstone up to 60% with black organic staining		
		32	74				
		31	75				
		30	76			pH: 7.89 EC: 3864 µS/cm Temp: 21.55 °C Redox: 3864 mV DO: 51.7 % Sat DO: 4.49 mg/L	
		29	77				
		28	78		SANDSTONE - Light grey, predominantly medium to fine grained, with some fine grained sandstone. some black organic staining, plus a few chips of dark grey siltstone		
	Sump/bentonite plug	27	79				
		26	80		SANDSTONE - Light grey, fine to medium grained sandstone with some black organic staining		
		25	81				
		24	82				
		23	83				

END OF BOREHOLE AT 80.50 m

This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.

Appendix C

Test bore licences

NSW Office of Water

Hunter Region
P O Box 2213

BORE LICENSE CERTIFICATE
UNDER SECTION 115 OF THE WATER ACT, 1912

20BL172619



Dangar NSW 2309
Phone: (02)49042500

A G L Upstream Investments Pty Ltd
Locked Bag 1837
St Leonards NSW 2065

LICENSE NUMBER
20BL172619
DATE LICENSE VALID FROM
01-Nov-2010
DATE LICENSE VALID TO
PERPETUITY
FEE
\$0.00

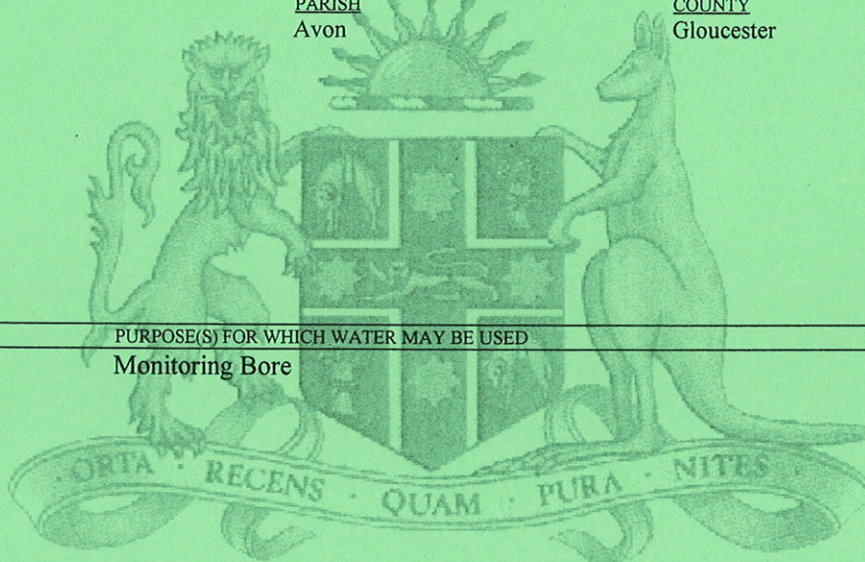
ABN 47661556763 GST NIL

LOCATION OF WORKS

Portion(s) or Lot/Section/DP
84//979859

PARISH
Avon

COUNTY
Gloucester



TYPE OF WORKS

Test Bore

PURPOSE(S) FOR WHICH WATER MAY BE USED

Monitoring Bore

CONDITIONS APPLYING TO THIS LICENSE ARE

As shown on the attached Condition Statement

ORIGINAL

NSW Office of Water**CONDITIONS STATEMENT REFERRED TO ON
20BL172619
ISSUED UNDER PART V OF THE WATER ACT, 1912
ON 01-Nov-2010**

(1) THE LICENCE SHALL LAPSE IF THE WORK IS NOT COMMENCED AND COMPLETED WITHIN THREE YEARS OF THE DATE OF THE ISSUE OF THE LICENCE.

(2) THE LICENSEE SHALL WITHIN TWO MONTHS OF COMPLETION OR AFTER THE ISSUE OF THE LICENSE IF THE WORK IS EXISTING, FURNISH TO NSW OFFICE OF WATER:-

(A) DETAILS OF THE WORK SET OUT IN THE ATTACHED FORM "A" (MUST BE COMPLETED BY A DRILLER).

(B) A PLAN SHOWING ACCURATELY THE LOCATION OF THE WORK, IN RELATION TO PORTION AND PROPERTY BOUNDARIES.

(C) A ONE LITRE WATER SAMPLE FOR ALL LICENCES OTHER THAN THOSE FOR STOCK, DOMESTIC, TEST BORES AND FARMING PURPOSES.

(D) DETAILS OF ANY WATER ANALYSIS AND/OR PUMPING TESTS.

(3) THE LICENSEE SHALL ALLOW NSW OFFICE OF WATER OR ANY PERSON AUTHORISED BY IT, FULL AND FREE ACCESS TO THE WORKS, EITHER DURING OR AFTER CONSTRUCTION, FOR THE PURPOSE OF CARRYING OUT INSPECTION OR TEST OF THE WORKS AND ITS FITTINGS AND SHALL CARRY OUT ANY WORK OR ALTERATIONS DEEMED NECESSARY BY THE DEPARTMENT FOR THE PROTECTION AND PROPER MAINTENANCE OF THE WORKS, OR THE CONTROL OF THE WATER EXTRACTED AND FOR THE PROTECTION OF THE QUALITY AND THE PREVENTION FROM POLLUTION OR CONTAMINATION OF SUB-SURFACE WATER.

(4) IF DURING THE CONSTRUCTION OF THE WORK, SALINE OR POLLUTED WATER IS ENCOUNTERED ABOVE THE PRODUCING AQUIFER, SUCH WATER SHALL BE SEALED OFF BY:-

(A) INSERTING THE APPROPRIATE LENGTH(S) OF CASING TO A DEPTH SUFFICIENT TO EXCLUDE THE SALINE OR POLLUTED WATER FROM THE WORK.

(B) CEMENTING BETWEEN THE CASING(S) AND THE WALLS OF THE BORE HOLE FROM THE BOTTOM OF THE CASING TO GROUND LEVEL.

ANY DEPARTURE FROM THESE PROCEDURES MUST BE APPROVED BY THE DEPARTMENT BEFORE UNDERTAKING THE WORK.

(5) (A) THE LICENSEE SHALL NOTIFY NSW OFFICE OF WATER IF A FLOWING SUPPLY OF WATER IS OBTAINED. THE BORE SHALL THEN BE LINED WITH CASING AND CEMENTED AND A SUITABLE CLOSING GEAR SHALL BE ATTACHED TO THE BOREHEAD AS SPECIFIED BY NSW OFFICE OF WATER.

(B) IF A FLOWING SUPPLY OF WATER IS OBTAINED FROM THE WORK, THE LICENSEE SHALL ONLY DISTRIBUTE WATER FROM THE BORE HEAD BY A SYSTEM OF PIPE LINES AND SHALL NOT DISTRIBUTE IT IN DRAINS, NATURAL OR ARTIFICIAL CHANNELS OR DEPRESSIONS.

(6) IF A WORK IS ABANDONED AT ANY TIME THE LICENSEE SHALL NOTIFY NSW OFFICE OF WATER THAT THE WORK HAS BEEN ABANDONED AND SEAL OFF THE AQUIFER BY:-

(A) BACKFILLING THE WORK TO GROUND LEVEL WITH CLAY OR CEMENT AFTER WITHDRAWING THE CASING (LINING); OR

(B) SUCH METHODS AS AGREED TO OR DIRECTED BY NSW OFFICE OF WATER.

(7) THE LICENSEE SHALL NOT ALLOW ANY TAILWATER/DRAINAGE TO DISCHARGE INTO OR ONTO:-

- ANY ADJOINING PUBLIC OR CROWN ROAD;
- ANY OTHER PERSONS LAND;
- ANY CROWN LAND;
- ANY RIVER, CREEK OR WATERCOURSE;
- ANY NATIVE VEGETATION AS DESCRIBED UNDER THE NATIVE VEGETATION CONSERVATION ACT 1997;
- ANY WETLANDS OF ENVIRONMENTAL SIGNIFICANCE.

(8) WATER SHALL NOT BE PUMPED FROM THE BORE AUTHORISED BY THIS LICENSE FOR ANY PURPOSE OTHER THAN GROUNDWATER INVESTIGATION.

End Of Conditions

NSW Office of Water

Hunter Region
P O Box 2213

Dangar NSW 2309
Phone: (02) 49042500

BORE LICENSE CERTIFICATE
UNDER SECTION 115 OF THE WATER ACT, 1912

20BL172626

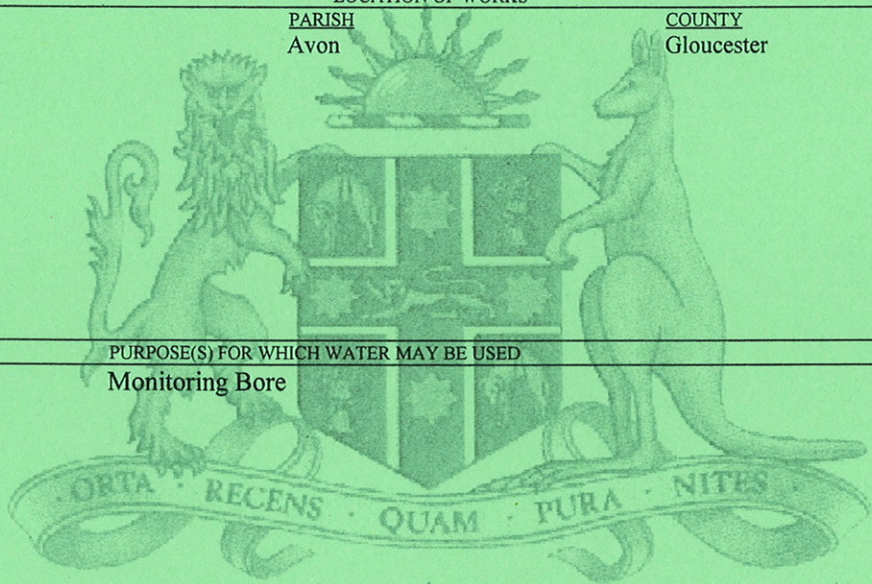


A G L Upstream Investments Pty Ltd
Locked Bag 1837
St Leonards NSW 2065

LICENSE NUMBER
20BL172626
DATE LICENSE VALID FROM
01-Nov-2010
DATE LICENSE VALID TO
PERPETUITY
FEE
\$0.00

ABN 47661556763 GST NIL

LOCATION OF WORKS
Portion(s) or Lot/Section/DP 85//979859
PARISH Avon
COUNTY Gloucester



TYPE OF WORKS Test Bore
PURPOSE(S) FOR WHICH WATER MAY BE USED Monitoring Bore

CONDITIONS APPLYING TO THIS LICENSE ARE

As shown on the attached Condition Statement

ORIGINAL

NSW Office of Water

Hunter Region
P O Box 2213

Dangar NSW 2309
Phone: (02)49042500

BORE LICENSE CERTIFICATE
UNDER SECTION 115 OF THE WATER ACT, 1912

20BL172631



A G L Upstream Investments Pty Ltd
Locked Bag 1837
St Leonards NSW 2065

LICENSE NUMBER
20BL172631
DATE LICENSE VALID FROM
22-Nov-2010
DATE LICENSE VALID TO
PERPETUITY
FEE
\$0.00

ABN 47661556763 GST NIL

LOCATION OF WORKS

Portion(s) or Lot/Section/DP
49/979859

PARISH
Avon

COUNTY
Gloucester

TYPE OF WORKS

Test Bore

PURPOSE(S) FOR WHICH WATER MAY BE USED

Monitoring Bore

CONDITIONS APPLYING TO THIS LICENSE ARE

As shown on the attached Condition Statement

ORIGINAL

NSW Office of Water

Hunter Region
P O Box 2213

BORE LICENSE CERTIFICATE
UNDER SECTION 115 OF THE WATER ACT, 1912

20BL172632

Dangar NSW 2309
Phone: (02) 49042500



A G L Upstream Investments Pty Ltd
Locked Bag 1837
St Leonards NSW 2065

LICENSE NUMBER
20BL172632
DATE LICENSE VALID FROM
22-Nov-2010
DATE LICENSE VALID TO
PERPETUITY
FEE
\$0.00

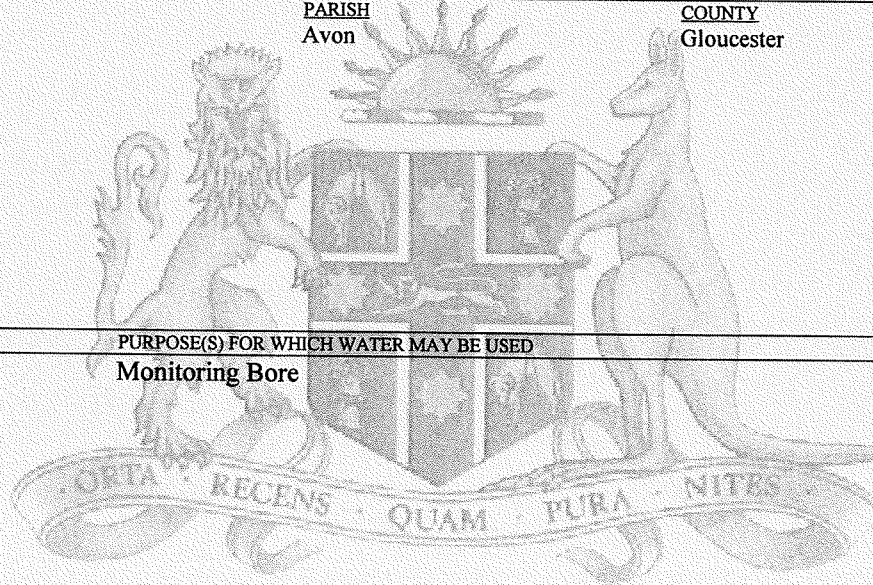
ABN 47661556763 GST NIL

LOCATION OF WORKS

Portion(s) or Lot/Section/DP
50/979859

PARISH
Avon

COUNTY
Gloucester



TYPE OF WORKS

Test Bore

PURPOSE(S) FOR WHICH WATER MAY BE USED

Monitoring Bore

CONDITIONS APPLYING TO THIS LICENSE ARE

As shown on the attached Condition Statement

ORIGINAL

NSW Office of Water

Hunter Region
P O Box 2213

BORE LICENSE CERTIFICATE
UNDER SECTION 115 OF THE WATER ACT, 1912

20BL172667



Dangar NSW 2309
Phone: (02) 49042500

Bignell, Norman
C/- A G L Upstream Invest P/l
L 22, 101 Miller Street
North Sydney NSW 2060

LICENSE NUMBER
20BL172667
DATE LICENSE VALID FROM
23-Dec-2010
DATE LICENSE VALID TO
PERPETUITY
FEE
\$0.00

ABN 47661556763 GST NIL

LOCATION OF WORKS

Portion(s) or Lot/Section/DP
96/979859

PARISH
Avon

COUNTY
Gloucester

TYPE OF WORKS

Test Bore

PURPOSE(S) FOR WHICH WATER MAY BE USED

Monitoring Bore

CONDITIONS APPLYING TO THIS LICENSE ARE

As shown on the attached Condition Statement

ORIGINAL

NSW Office of Water

Hunter Region
P O Box 2213

Dangar NSW 2309
Phone: (02)49042500

BORE LICENSE CERTIFICATE
UNDER SECTION 115 OF THE WATER ACT, 1912

20BL172670

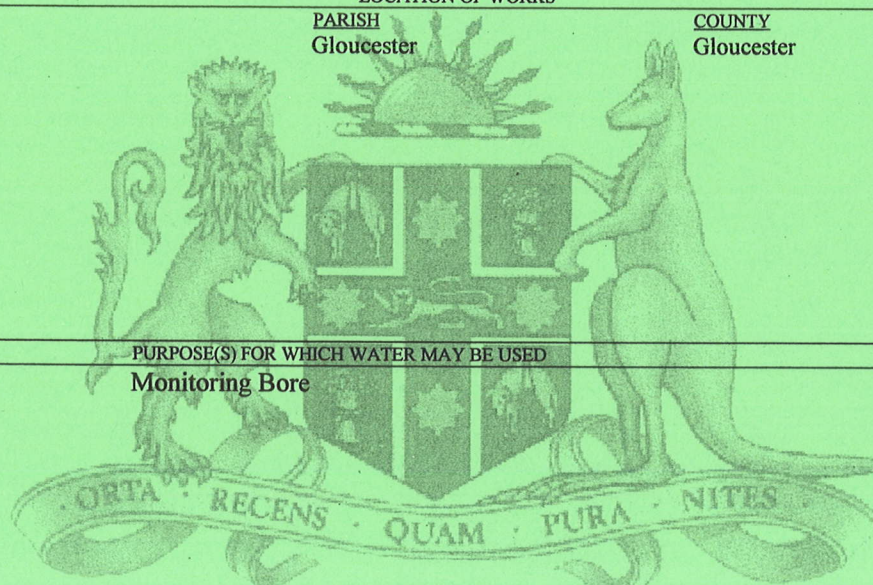


Waukivory Road Pty Limited
C/- A G L Upstream Invest P/l
Level 22,101 Miller Street
North Sydney NSW 2060

LICENSE NUMBER
20BL172670
DATE LICENSE VALID FROM
13-Jan-2011
DATE LICENSE VALID TO
PERPETUITY
FEE
\$0.00

ABN 47661556763 GST NIL

LOCATION OF WORKS
Portion(s) or Lot/Section/DP 890//1134032
PARISH Gloucester COUNTY Gloucester



TYPE OF WORKS PURPOSE(S) FOR WHICH WATER MAY BE USED
Test Bore Monitoring Bore

CONDITIONS APPLYING TO THIS LICENSE ARE

As shown on the attached Condition Statement

ORIGINAL

NSW Office of Water

Hunter Region
P O Box 2213

BORE LICENSE CERTIFICATE
UNDER SECTION 115 OF THE WATER ACT, 1912

20BL172682



Dangar NSW 2309
Phone: (02) 49042500

Gloucester Coal Limited
C/- A G L Upstream Investments
Lv 22, 101 Miller Street
North Sydney NSW 2060

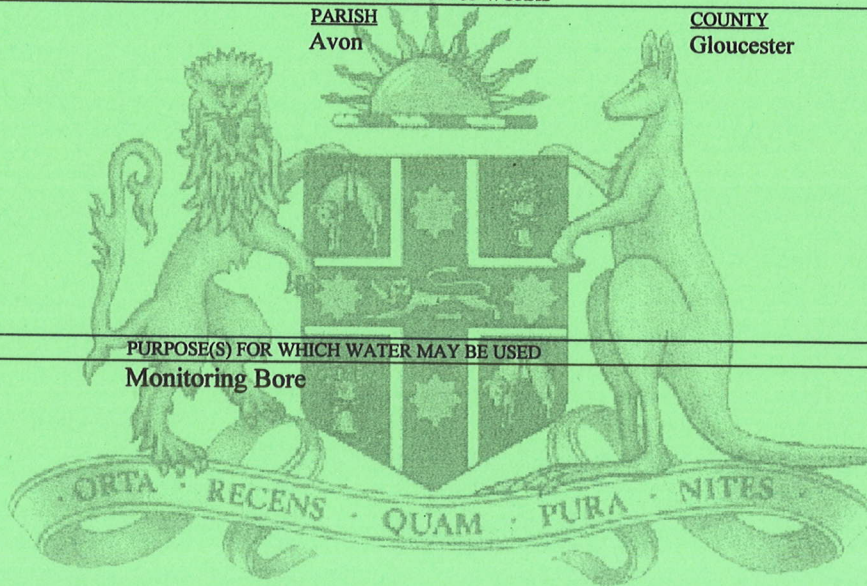
LICENSE NUMBER
20BL172682
DATE LICENSE VALID FROM
24-Jan-2011
DATE LICENSE VALID TO
PERPETUITY
FEE
\$0.00
ABN 47661556763 GST NIL

LOCATION OF WORKS

Portion(s) or Lot/Section/DP
2/1556576

PARISH
Avon

COUNTY
Gloucester



TYPE OF WORKS

Test Bore

PURPOSE(S) FOR WHICH WATER MAY BE USED

Monitoring Bore

CONDITIONS APPLYING TO THIS LICENSE ARE

As shown on the attached Condition Statement

ORIGINAL

Appendix D

TCMB04 Core photographs



Photo 1: 94.4 - 98 m bgl



Photo 2: 98 - 102 m bgl

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Figure AD1: core hole depth 94.4 - 102 m bgl



Photo 3: 102 - 106 m bgl



Photo 4: 106 - 110 m bgl

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Figure AD-2: core hole depth 102 - 110 m bgl



Photo 5: 110 - 114 m bgl



Photo 6: 114 - 118 m bgl

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Figure AD-3: core hole depth 110 - 118 m bgl



Photo 7: 118 - 122 m bgl



Photo 8: 122 - 126 m bgl

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Figure AD-4: core hole depth 118 - 126 m bgl



Photo 9: 126 - 130 m bgl



Photo 10: 130 - 134 m bgl

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Figure AD-5: core hole depth 126 - 134 m bgl



Photo 11: 134 - 138 m bgl



Photo 12: 138 - 142 m bgl

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Figure AD-6: core hole depth 134 - 142 m bgl



Photo 13: 142 - 146 m bgl



Photo 14: 146 - 150 m bgl

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Figure AD-7: core hole depth 142 - 150 m bgl



Photo 15: 150 - 154 m bgl



Photo 16: 154 - 158 m bgl

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Figure AD-8: core hole depth 150 - 158 m bgl



Photo 17: 158 - 162 m bgl



Photo 18: 162 - 166 m bgl

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Figure AD-9: core hole depth 158 - 166 m bgl



Photo 19: 166 - 170 m bgl



Photo 20: 170 - 174 m bgl

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Figure AD-10: core hole depth 166 - 174 m bgl



Photo 21: 174 - 178 m bgl



Photo 22: 178 - 182 m bgl

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Figure AD-11: core hole depth 174 - 182 m bgl



Photo 23: 182 - 186 m bgl



Photo 24: 186 - 190 m bgl

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Figure AD-12: core hole depth 182 - 190 m bgl



Photo 25: 191 - 194 m bgl



Photo 26: 194 - 198 m bgl

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Figure AD-13: core hole depth 191 - 198 m bgl



Photo 27: 198 - 202 m bgl



Photo 28: 202 - 206 m bgl

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Figure AD-14: core hole depth 198 - 206 m bgl



Photo 29: 206 - 210 m bgl



Photo 30: 210 - 214 m bgl

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Figure AD-15: core hole depth 206 - 214 m bgl



Photo 31: 214 - 218 m bgl



Photo 32: 218 - 222 m bgl

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Figure AD-16: core hole depth 214 - 222 m bgl



Photo 33: 222 - 226 m bgl



Photo 34: 226 - 230 m bgl

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Figure AD-17: core hole depth 222 - 230 m bgl



Photo 35: 230 - 234 m bgl



Photo 36: 234 - 238 m bgl

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Figure AD-18: core hole depth 230 - 238 m bgl



Photo 37: 238 - 242 m bgl



Photo 38: 242 - 246 m bgl

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Figure AD-19: core hole depth 238 - 246 m bgl



Photo 39: 246 - 250 m bgl



Photo 40: 250 - 254 m bgl

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Figure AD-20: core hole depth 246 - 254 m bgl



Photo 41: 254 - 258 m bgl



Photo 42: 258 - 262 m bgl

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Figure AD-21: core hole depth 254 - 262 m bgl



Photo 43: 262 - 266 m bgl



Photo 44: 266 - 270 m bgl

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Figure AD-22: core hole depth 262 - 270 m bgl



Photo 45: 270 - 274 m bgl



Photo 46: 274 - 278 m bgl

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Figure AD-23: core hole depth 270 - 278 m bgl



Photo 47: 278 - 282 m bgl



Photo 48: 282 - 286 m bgl

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Figure AD-24: core hole depth 278 - 286 m bgl



Photo 49: 286 - 290 m bgl



Photo 50: 290 - 294 m bgl

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Figure AD-25: core hole depth 286 - 294 m bgl



Photo 51: 294 - 398 m bgl



Photo 52: 298 - 302 m bgl

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Figure AD-26: core hole depth 294 - 302 m bgl



Photo 53: 302 - 306 m bgl



Photo 54: 306 - 310 m bgl

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**PARSONS
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Figure AD-27: core hole depth 302 - 310 m bgl



Photo 55: 310 - 314 m bgl



Photo 56: 314 - 318 m bgl

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Figure AD-28: core hole depth 310 - 318 m bgl



Photo 57: 318 - 322 m bgl



Photo 58: 322 - 326 m bgl

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Job number: 2162406A



Figure AD-29: core hole depth 318 - 326 m bgl



Photo 59: 326 - 330 m bgl



Photo 60: 330 - 334 m bgl

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Figure AD-30: core hole depth 326 - 334 m bgl



Photo 61: 334 - 334.7 m bgl

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Figure AD-31: core hole depth 334 - 334.7 m bgl

