

APPENDIX E

Groundwater assessment (Part B)





Appendix A

Bore logs



GROUNDWATER BOREHOLE LOG

BORE NO.

GW1

SHEET 1 OF 1

Client:	CMC Pty Ltd	Date Commenced:	24/9/09
Project:	Cobbora Coal Mine Project	Date Completed:	24/9/09
Bore Location:	Jacksons	Recorded By:	Nick Bryant
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Rotary - Blade	Surface RL:	355.43 mAHD
Drilling Company:	Impax Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 707529.25 N 6442593.57

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	50 mm PVC casing to 7 mbgl	355	1		SANDY CLAY - light brown sandy clay loam	Alluvium	
		354	2		SANDY CLAY - orange/brown slightly sandy slightly gravelly clay, gravel of med angular quartz		
		353	3		GRAVELLY CLAY - very clayey gravel, clay soft, gravel fine-med well rounded to angular quartz and chert some minor mixed lithologies present		
		352	4		CLAY - grey brown slightly gravelly clay fine to coarse well rounded quartz, some lithic sandstone present		
		351	5				
	bentonite	349	6		SANDY GRAVEL - brown clayey sandy gravel, clay soft grey, gravel med angular to well rounded quartz		
	50 mm slotted PVC casing	348	7		GRAVEL - brown very clayey clay soft, gravel med angular-well rounded quartz		
		347	8		GRAVEL - light brown clay gravel, clay mottled brown/grey/dark red, gravel coarse of med angular-rounded quartz		
		346	9		GRAVEL - light brown clayey gravel, clay soft and sandy, gravel med-coarse angular/subrounded quartz and lithic sandstone		
	sump	345	10		CLAY - light brown-orange gravelly clay, clay soft brown/grey, gravel fine-medium angular quartz and mixed lithologies		
		344	11				
		343	12				
		342	13				

Airlift = 1 L/s

END OF BOREHOLE AT 10.50 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW2A

SHEET 1 OF 1

Client:	CMC Pty Ltd	Date Commenced:	12/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	12/8/09
Bore Location:	Mt Dapper	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	454.66 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 717366.98 N 6430846.57

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	152 mm steel surface casing	454	1		SAND - light brown sand with minor gravel	Alluvium	
		453	2		SILTSTONE - dark brown/black, light organic material/oxidised coal with siltstone	Tomcat Gully Sandstone	
		452	3		SANDSTONE - light grey, fine to medium grained sandstone with gravels		
		451	4		SANDSTONE - light grey, fine to medium grained sandstone with gravels (dark red rock) wet		
		450	5		COARSE SANDSTONE - yellow/orange coarse grained sandstone		
		449	6		COARSE SANDSTONE - dull red/brown coarse grained sandstone		
	50 mm PVC casing	448	7		COAL - interbedded coal with red claystone	Upper Ulan Seam	
		447	8		COAL		
		446	9				EC = 2.53 mS/cm pH = 6.98
		445	10				
		444	11		CLAYSTONE - light grey claystone/tuff	C-Marker Claystone	
		443	12				
		442	13				
		441	14				
	bentonite	440	15		COAL	Lower Ulan Seam	
	gravel pack	439	16				
		438	17				
	50 mm slotted PVC casing	437	18				
		436	19				
	sump	435	20		MUDSTONE - dark brown carbonaceous mudstone		
		434	21				
		433					

END OF BOREHOLE AT 20.60 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW2B

SHEET 1 OF 2

Client:	CMC Pty Ltd	Date Commenced:	12/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	12/8/09
Bore Location:	Mt Dapper	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	454.61 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 717360.63 N 6430846.62

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	152 mm steel surface casing	454	1		SAND - light brown sand with minor gravel	Alluvium	
		453	2		SILTSTONE - dark brown/black, light organic material/oxidised coal with siltstone	Tomcat Gully Sandstone	
		452	3		SANDSTONE - light grey, fine to medium grained sandstone with gravels		
		451	4		SANDSTONE - light grey, fine to medium grained sandstone with gravels (dark red rock) wet		
		450	5		COARSE SANDSTONE - yellow/orange coarse grained sandstone		
		449	6		COARSE SANDSTONE - dull red/brown coarse grained sandstone		
	50 mm PVC casing	448	7		COAL - interbedded coal with red claystone	Upper Ulan Seam	EC = 1.72 mS/cm pH = 7.24
		447	8		COAL		
		446	9				
		445	10				
		444	11		CLAYSTONE - light grey claystone/tuff	C-Marker Claystone	
		443	12				
		442	13				
		441	14				
		440			COAL	Lower Ulan Seam	

END OF BOREHOLE AT 28.32 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW2B

SHEET 2 OF 2

Client:	CMC Pty Ltd	Date Commenced:	12/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	12/8/09
Bore Location:	Mt Dapper	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	454.61 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 717360.63 N 6430846.62

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		439	16		COAL (<i>continued</i>)	Lower Ulan Seam	
		438	17				
		437	18				
	bentonite	436	19		MUDSTONE - dark brown carbonaceous mudstone		
		435	20				
	gravel pack	434	21		SANDSTONE - dark grey becoming grey medium to coarse grained sandstone, becoming coarser with depth, wet	Dapper formation	
		433	22				
		432	23				
	50 mm slotted PVC casing	431	24				
		430	25				
		429	26		SILTSTONE - grey siltstone		
		428	27		SANDSTONE - grey fine to medium grained sandstone		
	sump	427	28				
		426	29				
		425					

END OF BOREHOLE AT 28.32 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW2C

SHEET 1 OF 2

Client:	CMC Pty Ltd	Date Commenced:	11/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	11/8/09
Bore Location:	Mt Dapper	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	454.52 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 717354.63 N 6430846.5

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	152 mm steel surface casing	454	1		SAND - light brown sand with minor gravel	Alluvium	
		453	2		SILTSTONE - dark brown/black, light organic material/oxidised coal with siltstone	Tomcat Gully Sandstone	
		452	3		SANDSTONE - light grey, fine to medium grained sandstone with gravels		
		451	4		SANDSTONE - light grey, fine to medium grained sandstone with gravels (dark red rock) wet		
		450	5		COARSE SANDSTONE - yellow/orange coarse grained sandstone		
		449	6		COARSE SANDSTONE - dull red/brown coarse grained sandstone		
	50 mm PVC casing	448	7		COAL - interbedded coal with red claystone	Upper Ulan Seam	
		447	8		COAL		
		446	9				
		445	10				
		444	11		CLAYSTONE - light grey claystone/tuff	C-Marker Claystone	
		443	12				
		442	13				
		441	14				
		440	15		COAL	Lower Ulan Seam	
		439	16				
		438	17				
		437	18				
		436	19		MUDSTONE - dark brown carbonaceous mudstone		
		435					

EC = 1.407 mS/cm
pH = 7.36

END OF BOREHOLE AT 33.30 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW2C

SHEET 2 OF 2

Client:	CMC Pty Ltd	Date Commenced:	11/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	11/8/09
Bore Location:	Mt Dapper	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	454.52 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 717354.63 N 6430846.5

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
					MUDSTONE - dark brown carbonaceous mudstone (<i>continued</i>)		
		434	21		SANDSTONE - dark grey becoming grey medium to coarse grained sandstone, becoming coarser with depth, wet	Dapper Formation	
		433	22				
		432	23				
	bentonite	431	24				
		430	25				
	gravel pack	429	26		SILTSTONE - grey siltstone		
		428	27		SANDSTONE - grey fine to medium grained sandstone		
		427	28				
	50 mm slotted PVC casing	426	29				
		425	30		SILTSTONE - grey siltstone with interbedded mudstone		
		424	31		SILTSTONE - dark grey siltstone with interbedded mudstone		
	sump	423	32		SANDSTONE - sandstone with interbedded siltstone and large gravels to cobbles of quartz		
		422	33				
		421	34				
		420	35				
		419	36				
		418	37				
		417	38				
		416	39				
		415					

END OF BOREHOLE AT 33.30 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW2D

SHEET 1 OF 2

Client:	CMC Pty Ltd	Date Commenced:	10/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	10/8/09
Bore Location:	Mt Dapper	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	454.42 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 717348.56 N 6430846.94

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	152 mm steel surface casing	454	1		SAND - light brown sand with minor gravel	Alluvium	
		453	2		SILTSTONE - dark brown/black, light organic material/oxidised coal with siltstone	Tomcat Gully Sandstone	
		452	3		SANDSTONE - light grey, fine to medium grained sandstone with gravels		
		451	4		SANDSTONE - light grey, fine to medium grained sandstone with gravels (dark red rock) wet		
		450	5		COARSE SANDSTONE - yellow/orange coarse grained sandstone		
		449	6		COARSE SANDSTONE - dull red/brown coarse grained sandstone		
	50 mm PVC casing	448	7		COAL - interbedded coal with red claystone	Upper Ulan Seam	
		447	8		COAL		
		446	9				
		445	10				
		444	11		CLAYSTONE - light grey claystone/tuff	C-Marker Claystone	
		443	12				
		442	13				
		441	14				
		440	15		COAL	Lower Ulan Seam	
		439	16				
		438	17				
		437	18				
		436	19		MUDSTONE - dark brown carbonaceous mudstone		
		435	20				
		434	21		SANDSTONE - dark grey becoming grey medium to coarse grained sandstone, becoming coarser with depth, wet	Dapper Formation	
		433	22				
		432	23				
		431	24				
		430					

END OF BOREHOLE AT 49.12 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW2D

SHEET 2 OF 2

Client:	CMC Pty Ltd	Date Commenced:	10/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	10/8/09
Bore Location:	Mt Dapper	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	454.42 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 717348.56 N 6430846.94

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		429	26	[Symbol]	SILTSTONE - grey siltstone	Dapper Formation	
		428	27	[Symbol]	SANDSTONE - grey fine to medium grained sandstone		
		427	28	[Symbol]			
		426	29	[Symbol]			
		425	30	[Symbol]	SILTSTONE - grey siltstone with interbedded mudstone		
		424	31	[Symbol]	SILTSTONE - dark grey siltstone with interbedded mudstone		
		423	32	[Symbol]	SANDSTONE - sandstone with interbedded siltstone and large gravels to cobbles of quartz		
		422	33	[Symbol]			
		421	34	[Symbol]			
		420	35	[Symbol]			
	bentonite	419	36	[Symbol]			
	gravel pack	418	37	[Symbol]	SILTSTONE - grey siltstone		
		417	38	[Symbol]	MUDSTONE - dark grey brown carbonaceous mudstone		
		416	39	[Symbol]	SANDSTONE - coarse grained quartz sandstone with minor siltstone		
		415	40	[Symbol]			
		414	41	[Symbol]			
		413	42	[Symbol]			
	50 mm slotted PVC casing	412	43	[Symbol]			
		411	44	[Symbol]			
		410	45	[Symbol]			
		409	46	[Symbol]			
		408	47	[Symbol]	SILTSTONE - grey siltstone with quartz		
		407	48	[Symbol]	SANDSTONE - quartz sandstone with siltstone		
	sump	406	49	[Symbol]			
		405					

END OF BOREHOLE AT 49.12 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW3_TP8

SHEET 1 OF 3

Client: **CMC Pty Ltd**
 Project: **Cobbora Coal Mine Project**
 Bore Location: **GW3 South**
 Project Number: **2114426E & 2162570B**

Date Commenced: **27/8/09**
 Date Completed: **31/8/09**
 Recorded By: **Nick Bryant**
 Log Checked By: **Leah Gleeson**

Drilling Method: **Air Hammer**
 Drilling Company: **Highland Drilling** Borehole Diameter: **203 mm**

Surface RL: **375.31 mAHD**
 Co-ords: **E 709120.02 N 6437874.58**

Bore Information		Field Material Description			Geophysical Log		
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	LITHOLOGY	Formation	GAMMA (API-GR)	HYDROGEOLOGY
	254 mm steel surface casing	375	1	SANDY CLAY - orange/brown sandy gravelly clay, med - coarse gravel of quartz and mixed lithologies	Alluvium		
		374	2	SANDY CLAY - yellow/brown sandy gravelly clay, gravel of quartz and mixed lithologies			
		373	3	GRAVELLY CLAY - yellow/brown gravelly clay, med - coarse gravel of quartz and mixed lithologies			
		372	4	GRAVELLY CLAY - yellow/brown gravelly clay, med - coarse gravel of quartz and mixed lithologies			
		371	5	CONGLOMERATE - red/brown weathered conglomerate, clasts medium well rounded of quartz and mixed lithologies	Digby Formation		
		370	6	CONGLOMERATE - light-brown weathered conglomerate, clasts medium well rounded of quartz and mixed lithologies			
		369	7	CONGLOMERATE - light-brown weathered conglomerate, clasts medium well rounded of quartz and mixed lithologies			
		368	8	CONGLOMERATE - light-brown weathered conglomerate, clasts medium well rounded of quartz and mixed lithologies			
	bentonite	366	9	CONGLOMERATE - grey conglomerate medium well rounded quartz dominant some clasts of mixed lithologies			
		365	10	CONGLOMERATE - cream quartz rich conglomerate large well rounded quartz clasts in a clay matrix - wet			
		364	11	CONGLOMERATE - cream quartz rich conglomerate large well rounded quartz clasts in a clay matrix - wet			
		363	12	MEDIUM SANDSTONE - interbedded medium grained sandstone quartz rich with brown claystone	Ellismayne Formation		
		362	13	CLAYSTONE - interbedded brown claystone 80%, quartz rich sandstone			
		361	14	CLAYSTONE - interbedded brown claystone 80%, quartz rich sandstone			
		360	15	CLAYSTONE - interbedded brown claystone 80%, quartz rich sandstone			
		359	16	FINE SANDSTONE - interbedded Fine grained sandstone 50%, coarse quartz rich sandstone 45%, brown/cream claystone			
		358	17	FINE SANDSTONE - interbedded Fine grained sandstone 50%, coarse quartz rich sandstone 45%, brown/cream claystone			
		357	18	COARSE SANDSTONE - coarse quartz rich sandstone, quartz angular 70% mixed lithologies 30%			
		356	19	SHALE - interbedded brown shale/tuff 65%, dark grey carbonaceous shale 35%, occasional coaly fragments			
		355	20	SHALE - dark Grey shale 90% with some brown mudstone tuff bands ~10%			
		354	21	SHALE - dark grey shale with light grey sandstone bands between 24-25mbgl			
		353	22	SHALE - dark grey shale with light grey sandstone bands between 24-25mbgl			
		352	23	SHALE - dark grey shale with light grey sandstone bands between 24-25mbgl			
		351	24	SHALE - dark grey shale with light grey sandstone bands between 24-25mbgl			

END OF BOREHOLE AT 73.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW3_TP3

SHEET 2 OF 3

Client: **CMC Pty Ltd**
 Project: **Cobbora Coal Mine Project**
 Bore Location: **GW3 South**
 Project Number: **2114426E & 2162570B**

Date Commenced: **27/8/09**
 Date Completed: **31/8/09**
 Recorded By: **Nick Bryant**
 Log Checked By: **Leah Gleeson**

Drilling Method: **Air Hammer**
 Drilling Company: **Highland Drilling** Borehole Diameter: **203 mm**

Surface RL: **375.31 mAHD**
 Co-ords: **E 709120.02 N 6437874.58**

Bore Information		Field Material Description			Geophysical Log		
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	LITHOLOGY	Formation	GAMMA (API-GR) 0 62.5 125.0 187.5 250	HYDROGEOLOGY
		350		COAL - coal with occasional brown mudstone/tuff bands	Whaka Formation		
		349	26	MUDSTONE - dark grey mudstone/siltstone			
		348	27	COAL - bright coal 95% tuff/claystone layers ~5%			
		347	28				
		346	29				
		345	30				
		344	31				
	203 mm slotted steel casing	343	32	COAL - coal 60% interbedded with claystone (soft and potentially weathered) 35%, tuff/claystone layers 5%			
		342	33	COAL - coal 95% interbedded with tuff/claystone			
		341	34				
		340	35				
		339	36	FINE SANDSTONE - cream fine grained sandstone 75% interbedded with white claystone 15% and cream light brown mudstone/shale	Avymore Claystone		
		338	37	FINE SANDSTONE - cream fine grained sandstone 50% interbedded with coal 47% and a light brown mudstone/shale 3%			
	gravel pack, 203 mm steel casing	337	38	COAL - coal 85% interbedded with light brown tuff/mudstone 15%, coal proportion increasing to 98% with depth.	Flyblowers Creek Seam		
		336	39				
		335	40				
		334	41				
		333	42	COAL - coal 75% interbedded with a cream siltstone 25% and occasional white claystone (soft)			
		332	43	COAL - coal 65% interbedded with dark grey shale 35% with depth			
		331	44	FINE SANDSTONE - grey/brown fine grained to medium grained sandstone, interbedding of cream sandstone increases between 46-47m	Tomcat Gully Sandstone		
		330	45				
		329	46				
		328	47				
		327	48	FINE SANDSTONE - grey/cream fine grained sandstone			
		326	49	COARSE SANDSTONE - Coarse quartz rich sandstone, with some mixed lithologies.			

END OF BOREHOLE AT 73.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW3_TP8

SHEET 3 OF 3

Client:	CMC Pty Ltd	Date Commenced:	27/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	31/8/09
Bore Location:	GW3 South	Recorded By:	Nick Bryant
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	375.31 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	203 mm
		Co-ords:	E 709120.02 N 6437874.58

Bore Information		Field Material Description			Geophysical Log		
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	LITHOLOGY	Formation	GAMMA (API-GR)	HYDROGEOLOGY
		325		COARSE SANDSTONE - Coarse quartz rich sandstone, with some mixed lithologies. (continued)	Tomcat Gully Sandstone		
		324	51				
		323	52				
		322	53	COARSE SANDSTONE - coarse sandstone 60% interbedded with carbonaceous mudstone 30% some coal bands 10%			
		321	54	COAL - coal 90% interbedded with cream shale 5% and occasional grey fine grained sandstone, coal increasing to 95% with depth	Upper Ulan Seam		
		320	55				
	203 mm slotted steel casing	319	56				
		318	57				
		317	58	FINE SANDSTONE - cream/grey fine grained sandstone with occasional coaly fragments	C-Marker Claystone		
		316	59	MUDSTONE - cream mudstone 50% interbedded with dark grey carbonaceous shale 50%			
		315	60	COAL - hard shaley coal grading to coal interbedded with light brown tuff 5% with depth	Lower Ulan Seam		
		314	61				
		313	62				
		312	63				
		311	64	COARSE SANDSTONE - coal grading quickly to coarse quartz rich sandstone containing angular quartz 70%.	Dapper Formation		
		310	65	COARSE SANDSTONE - coarse quartz rich sandstone, occasional mixed lithologies			
		309	66	CONGLOMERATE - quartz rich conglomerate rounded to angular 70%/30% lithic clasts			
		308	67				
	sump	307	68	COARSE SANDSTONE - coarse quartz rich sandstone 70%/30% lithic clasts, sandstone becomes significantly finer below 70m depth			
		306	69				
		305	70	MEDIUM SANDSTONE - medium grained quartz rich sandstone			
		304	71				
		303	72				
		302	73	END OF BOREHOLE AT 73.00 m			
		301	74				

END OF BOREHOLE AT 73.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW3B

SHEET 1 OF 3

Client:	CMC Pty Ltd	Date Commenced:	26/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	27/8/09
Bore Location:	GW3 Central South	Recorded By:	Nick Bryant
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	375.24 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 709117.18 N 6437880.81

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	152 mm steel casing	375			SANDY CLAY - orange/brown sandy gravelly clay, med - coarse gravel of quartz and mixed lithologies	Alluvium	EC = 1.75 mS/cm pH = 6.62
		374	1		SANDY CLAY - yellow/brown sandy gravelly clay, gravel of quartz and mixed lithologies		
		373	2				
		372	3		GRAVELLY CLAY - yellow/brown gravelly clay, med - coarse gravel of quartz and mixed lithologies		
		371	4				
		370	5				
		369	6		CONGLOMERATE - weathered light-brown conglomerate, clasts medium well rounded of quartz and mixed lithologies	Digby Formation	
		368	7				
		367	8		CONGLOMERATE - grey conglomerate medium well rounded quartz dominant some clasts of mixed lithologies		
		366	9		CONGLOMERATE - cream quartz rich conglomerate large well rounded quartz clasts in a clay matrix - wet		
		365	10				
		364	11				
		363	12				
		362	13				
		361	14		CLAYSTONE - interbedded brown claystone 80%, quartz rich sandstone	Ellismayne Formation	
		360	15				
		359	16				
		358	17		FINE SANDSTONE - interbedded fine grained sandstone 50%, coarse quartz rich sandstone 45%, cream claystone		
		357	18				
		356	19		SHALE - dark grey shale 90% with some brown mudstone tuff bands ~10%		

END OF BOREHOLE AT 46.10 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW3B

SHEET 2 OF 3

Client:	CMC Pty Ltd	Date Commenced:	26/8/09
Project:	Cobbara Coal Mine Project	Date Completed:	27/8/09
Bore Location:	GW3 Central South	Recorded By:	Nick Bryant
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	375.24 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 709117.18 N 6437880.81

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		355	21		SHALE - dark grey shale 90% with some brown mudstone tuff bands ~10% <i>(continued)</i>	Ellismayne Formation	
		354	22				
		353	23				
		352	24				
		351	25				
		350	26				
		349	27		MUDSTONE - dark grey mudstone/siltstone	Whaka Formation	
		348	28				
		347	29				
	bentonite	347	30		COAL - coal with occasional brown mudstone/tuff bands		
	50 mm slotted PVC casing	346	31		COAL - bright coal 95% tuff/claystone layers ~5%		
		345	32				
		344	33		COAL - coal 60% interbedded with claystone (soft and potentially weathered) 35%, tuff/claystone layers 5%		
		343	34				
		342	35		FINE SANDSTONE - cream fine grained sandstone 60% interbedded with dark grey shale/coal 28% white claystone 1% and cream light brown mudstone/shale 1%	Avymore Claystone	
		341	36				
		340	37				
	50 mm PVC casing	340	38				
		339	39				
	bentonite	338					
	50 mm slotted PVC casing	337					
		336			COAL - coal 85% interbedded with light brown tuff/mudstone 15%, coal proportion increasing to 98% with depth	Flyblowers Creek Seam	

END OF BOREHOLE AT 46.10 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW3B

SHEET 3 OF 3

Client:	CMC Pty Ltd	Date Commenced:	26/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	27/8/09
Bore Location:	GW3 Central South	Recorded By:	Nick Bryant
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	375.24 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 709117.18 N 6437880.81

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		335			COAL - coal 85% interbedded with light brown tuff/mudstone 15%, coal proportion increasing to 98% with depth (<i>continued</i>)	Flyblowers Creek Seam	
		334	41		COAL - coal 75% interbedded with a cream siltstone 25% and occasional white claystone (soft)		
		333	42		FINE SANDSTONE - grey/brown fine grained to medium grained sandstone, interbedding of cream sandstone	Tomcat Gully Sandstone	
		332	43				
		331	44				
		330	45	45	FINE SANDSTONE - grey/cream fine grained sandstone		
		329	46	46			
		328	47	47			
		327	48	48			
		326	49	49			
	325	50	50				
	324	51	51				
	323	52	52				
	322	53	53				
	321	54	54				
	320	55	55				
	319	56	56				
	318	57	57				
	317	58	58				
	316	59	59				

END OF BOREHOLE AT 46.10 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW3C

SHEET 1 OF 4

Client:	CMC Pty Ltd	Date Commenced:	25/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	25/8/09
Bore Location:	GW3 Central	Recorded By:	Nick Bryant
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	375.15 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 709114.87 N 6437885.98

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	152 mm steel casing	375			SANDY CLAY - orange/brown sandy gravelly clay, med - coarse gravel of quartz and mixed lithologies	Alluvium	
		374	1		GRAVELLY CLAY - yellow/brown gravelly clay, med - coarse gravel of quartz and mixed lithologies		
		373	2				
		372	3				
		371	4				
		370	5				
		369	6		GRAVELLY CLAY - yellow/brown very gravelly clay, med - coarse gravel of quartz and mixed lithologies some dark grey shale	Digby Formation	
		368	7		CONGLOMERATE - light-brown weathered conglomerate, clasts medium well rounded of quartz and mixed lithologies		
		367	8				
		366	9				
		365	10				
		364	11				
		363	12		CLAYSTONE - interbedded brown claystone 80%, quartz rich sandstone		
		362	13				
	50 mm PVC casing	361	14				

END OF BOREHOLE AT 53.84 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW3C

SHEET 2 OF 4

Client:	CMC Pty Ltd	Date Commenced:	25/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	25/8/09
Bore Location:	GW3 Central	Recorded By:	Nick Bryant
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	375.15 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 709114.87 N 6437885.98

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		360			CLAYSTONE - interbedded brown claystone 80%, interbedded with tuff	Digby Formation	
		359	16				
		358	17		MUDSTONE - light brown interbedded brown claystone 80%, quartz rich sandstone		
		357	18		COARSE SANDSTONE - coarse quartz rich sandstone 75%, dominantly angular quartz, interbedded with light brown cream mudstone mixed lithologies 25%		
		356	19		SHALE - dark grey shale 90% with some brown mudstone tuff bands ~10%		
		355	20		SILTSTONE - dark grey mudstone/siltstone		
		354	21				
		353	22				
		352	23		SILTSTONE - very dark grey mudstone/siltstone		
		351	24				
		350	25		SILTSTONE - very dark grey mudstone/siltstone 70% coal/carbonaceous shale 25% light brown fine grained sandstone 5%		
		349	26		SILTSTONE - very dark grey mudstone/siltstone 99% - light brown fine grained sandstone 1%	Whaka Formation	
		348	27		SILTSTONE - very dark grey mudstone/siltstone 95% - light brown fine grained sandstone 5%		
		347	28		COAL - coal with occasional brown mudstone/tuff bands		
		346	29				

END OF BOREHOLE AT 53.84 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW3C

SHEET 3 OF 4

Client:	CMC Pty Ltd	Date Commenced:	25/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	25/8/09
Bore Location:	GW3 Central	Recorded By:	Nick Bryant
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	375.15 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 709114.87 N 6437885.98

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		345			COAL - coal with occasional brown mudstone/tuff bands (<i>continued</i>)	Whaka Formation	
		344	31		COAL - bright coal 95% tuff/claystone layers ~5%		
		343	32		COAL - coal 85% interbedded, tuff/claystone layers 10%, with claystone (soft and potentially weathered) 5%		
		342	33				
		341	34				
		340	35		COAL - coal 95% interbedded with tuff/claystone		
		339	36		FINE SANDSTONE - cream fine grained sandstone 60% interbedded with dark grey shale/coal 28% white claystone 1% and cream light brown mudstone/shale 1%	Aymore Claystone	
		338	37				
		337	38		COAL - coal 70% interbedded with very dark carbonaceous shale/stony coal 29% brown fine grained sandstone 1%	Flyblowers Creek Seam	
		336	39				
		335	40		COAL - coal 90% with distinct pyritization 2% interbedded with very dark carbonaceous shale 8% large rock fragments and increase in water indicating fracture zone		
		334	41				
		333	42		COAL - coal 55% interbedded with cream mudstone/tuff dark grey shale 32%, dark grey carbonaceous shale 1%, white/cream very fine grained sandstone		
		332	43		SHALE - very dark grey carbonaceous shale 70% white/cream very fine grained sandstone 10% cream tuff/mudstone 20%	Tomcat Gully Sandstone	
		331	44		SHALE - dark grey carbonaceous shale 95% cream/pale brown mudstone 5%		

END OF BOREHOLE AT 53.84 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW3C

SHEET 4 OF 4

Client:	CMC Pty Ltd	Date Commenced:	25/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	25/8/09
Bore Location:	GW3 Central	Recorded By:	Nick Bryant
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	375.15 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 709114.87 N 6437885.98

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	bentonite	330			SHALE - grey/brown shale mudstone	Tomcat Gully Sandstone	
	50 mm slotted PVC casing	329	46		SHALE - grey shale/mudstone 60%, 40 % light brown mudstone/shale		
		328	47				
		327	48		FINE SANDSTONE - cream/light brown 65% grey mudstone 29% carbonaceous shale		
		326	49		COARSE SANDSTONE - coarse quartz rich sandstone, with some mixed lithologies including pyritization		
		325	50		COARSE SANDSTONE - coarse quartz rich sandstone 98%, lithic clasts of mudstone/shale		
	sump	323	52		COAL - coal 95% interbedded with cream shale 5% and occasional grey fine grained sandstone, coal increasing to 95% with depth	Upper Ulan Seam	
		322	53				
		321	54				
		320	55				
		319	56				
		318	57				
		317	58				
		316	59				

END OF BOREHOLE AT 53.84 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW3D

SHEET 1 OF 3

Client:	CMC Pty Ltd	Date Commenced:	25/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	27/8/09
Bore Location:	GW3 Central North	Recorded By:	Nick Bryant
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	375.09 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 709111.91 N 6437893.34

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	152 mm steel casing		374	1	SANDY CLAY - orange/brown sandy gravelly clay, med - coarse gravel of quartz and mixed lithologies	Alluvium	Airlift = 0.5 L/s EC = 1.38 mS/cm pH = 7.22
			373	2	SANDY CLAY - yellow/brown sandy gravelly clay, gravel of quartz and mixed lithologies		
			372	3	GRAVELLY CLAY - yellow/brown gravelly clay, med - coarse gravel of quartz and mixed lithologies		
			371	4	CONGLOMERATE - weathered light-brown conglomerate, clasts medium well rounded of quartz and mixed lithologies	Digby Formation	
			370	5			
			369	6	CONGLOMERATE - grey conglomerate medium well rounded quartz dominant some clasts of mixed lithologies		
			368	7	CONGLOMERATE - cream quartz rich conglomerate large well rounded quartz clasts in a clay matrix - wet		
			367	8	CONGLOMERATE - cream quartz rich conglomerate large well rounded quartz clasts in a clay matrix		
			366	9	MEDIUM SANDSTONE - interbedded medium grained sandstone quartz rich with brown claystone		
			365	10	MEDIUM SANDSTONE - interbedded medium grained sandstone quartz rich and chert		
			364	11	MEDIUM SANDSTONE - interbedded medium grained sandstone quartz rich with brown claystone		
			363	12			
	50 mm PVC casing		362	13	SILTSTONE - interbedded brown claystone 80%, quartz rich sandstone 20%	Ellismayne Formation	
			361	14	SILTSTONE - interbedded brown claystone 75%, quartz rich sandstone 25%		
			360	15	SILTSTONE - interbedded brown claystone 70%, quartz rich sandstone 30%		
			359	16	SILTSTONE - interbedded brown claystone 80%, cream fine grained sandstone 20%		
			358	17	SILTSTONE - interbedded brown claystone 80%, quartz rich sandstone		
			357	18	SANDSTONE - grey/brown fine grained sandstone 50% very dark shale 49% <1% brown mudstone		
			356	19			
			355	20	SHALE - dark grey shale 90% with some brown mudstone bands ~10%		
			354	21	SHALE - dark grey shale with light grey sandstone bands between		
			353	22			
			352	23			
			351	24	SHALE - dark grey calcareous mudstone ~1% grey/light grey mudstone	Whaka Formation	

END OF BOREHOLE AT 64.82 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW3D

SHEET 2 OF 3

Client:	CMC Pty Ltd	Date Commenced:	25/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	27/8/09
Bore Location:	GW3 Central North	Recorded By:	Nick Bryant
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	375.09 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 709111.91 N 6437893.34

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
			349	26	SHALE - dark grey calcareous mudstone ~1% grey/light grey mudstone (continued)	Whaka Formation	
			348	27	SHALE - very dark grey mudstone shale 98% interbedded with light grey/cream mudstone 2%		
			347	28	COAL - very dark grey stony coal/shale 95% interbedded with light grey/cream mudstone 5%		
			346	29	COAL - 75% interbedded with dark grey shale 23% tuff and mudstone bands 2%		
			345	30			
			344	31	FINE SANDSTONE - 98% interbedded with coal 2%		
			343	32	COAL - 60% interbedded with claystone 35% tuff mudstone 5%		
			342	33	COAL - 90% interbedded with pale brown/brown shale 10%		
			341	34			
			340	35			
			339	36	SHALE - very dark grey carbonaceous shale/stony coal 60% interbedded with fine grained sandstone 40%	Aymore Claystone	
			338	37	FINE SANDSTONE - dark grey fine grained sandstone/siltstone with minor tuff making up <1%		
			337	38	FINE SANDSTONE - grey fine grained sandstone 90% with dark grey fine grained sandstone 10% some coaly fragments		
			336	39	SHALE - dark grey shale 85% brown mudstone 15%	Flyblowers Creek Seam	
			335	40	COAL - with some claystone tuff 1%		
			334	41			
			333	42	MUDSTONE - dark grey mudstone/siltstone 70% interbedded with fine grained sandstone 25%, 5% white claystone		
			332	43	COAL - coal with some shale	Tomcat Gully Sandstone	
			331	44	FINE SANDSTONE - grey/cream fine grained sandstone		
			330	45			
			329	46			
			328	47			
			327	48			
			326	49	COARSE SANDSTONE - coarse sandstone to conglomeratic quartz rich with mixed lithologies making up <5%, some grey shale laminations noted between 50-51m including some coaly fragments between 52-53m		

END OF BOREHOLE AT 64.82 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW3D

SHEET 3 OF 3

Client:	CMC Pty Ltd	Date Commenced:	25/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	27/8/09
Bore Location:	GW3 Central North	Recorded By:	Nick Bryant
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	375.09 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 709111.91 N 6437893.34

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	bentonite	324	51		COARSE SANDSTONE - coarse sandstone to conglomeratic quartz rich with mixed lithologies making up <5%. some grey shale laminations noted between 50-51m including some coaly fragments between 52-53m (continued)	Tomcat Gully Sandstone	
	50 mm slotted PVC casing	323	52		COAL - 50% dark grey carbonaceous shale 50% with some minor light brown claystone/tuff	Upper Ulan Seam	
		322	53				
		321	54				
		320	55		COAL - 80% dark grey shale 15% fine grained shale sandstone 5%		
		319	56				
		318	57		FINE SANDSTONE - grey fine grained sandstone 80% grey shale containing coaly fragments	C-Marker Claystone	
		317	58		FINE SANDSTONE - white/light grey grained sandstone 50% grey shale/mudstone 40% coaly fragments 10%		
		316	59		COAL - 90% carbonaceous shale 10%	Lower Ulan Seam	
		315	60				
		314	61				
		313	62		COAL - 90% carbonaceous shale 7% some minor fine grained mudstone and or tuff 3%		
		312	63		FINE SANDSTONE - light brown fine grained sandstone 75%, coal carbonaceous shale 25%, coarse quartz rich sandstone (large drill chips and increase in water indicating fracturing)	Dapper Formation	
	sump	311	64				
		310	65				
		309	66				
		308	67				
		307	68				
		306	69				
		305	70				
		304	71				
		303	72				
		302	73				
		301	74				

END OF BOREHOLE AT 64.82 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW3E

SHEET 1 OF 3

Client:	CMC Pty Ltd	Date Commenced:	24/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	25/8/09
Bore Location:	GW3 North	Recorded By:	Nick Bryant
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	375.04 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 709109.17 N 6437900.51

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	152 mm steel casing		374	1	SANDY CLAY - orange/brown sandy gravelly clay, med - coarse gravel of quartz and mixed lithologies	Alluvium	
			373	2	SANDY CLAY - yellow/brown sandy gravelly clay, gravel of quartz and mixed lithologies		
			372	3	GRAVELLY CLAY - yellow/brown gravelly clay, med - coarse gravel of quartz and mixed lithologies		
			371	4	CONGLOMERATE - light-brown weathered conglomerate, clasts medium well rounded of quartz and mixed lithologies	Digby Formation	
			370	5			
			369	6	CONGLOMERATE - grey conglomerate medium well rounded quartz dominant some clasts of mixed lithologies		
			368	7	CONGLOMERATE - cream quartz rich conglomerate large well rounded quartz clasts in a clay matrix - wet		
			367	8	CONGLOMERATE - cream quartz rich conglomerate large well rounded quartz clasts in a clay matrix		
			366	9	MEDIUM SANDSTONE - interbedded medium grained sandstone quartz rich with brown claystone	Ellismayne Formation	
			365	10	MEDIUM SANDSTONE - interbedded medium grained sandstone quartz rich and chert		
			364	11	MEDIUM SANDSTONE - interbedded medium grained sandstone quartz rich with brown claystone		
	50 mm PVC casing		363	12	MUDSTONE - grey/brown mudstone		
			362	13	CLAYSTONE - interbedded brown claystone 80%, quartz rich sandstone 20%		
			361	14	CLAYSTONE - interbedded brown claystone 75%, quartz rich sandstone 25%		
			360	15	CLAYSTONE - interbedded brown claystone 70%, quartz rich sandstone 30%		
			359	16	CLAYSTONE - interbedded brown claystone 80%, cream fine grained sandstone 20%		
			358	17	CLAYSTONE - interbedded brown claystone 80%, quartz rich sandstone		
			357	18	SANDSTONE - cream fine grained sandstone 50% very dark shale 49% <1% brown mudstone		
			356	19	SANDSTONE - cream fine grained sandstone 50% very dark shale 49% <1% brown mudstone	Whaka Formation	
			355	20	SHALE - dark grey shale 90% with some brown mudstone bands ~10%		
			354	21	SHALE - dark grey shale with light grey sandstone bands between		
			353	22			
			352	23			
			351	24	SHALE - dark grey calcareous mudstone ~1% grey/light grey mudstone		

END OF BOREHOLE AT 73.23 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW3E

SHEET 2 OF 3

Client:	CMC Pty Ltd	Date Commenced:	24/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	25/8/09
Bore Location:	GW3 North	Recorded By:	Nick Bryant
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	375.04 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 709109.17 N 6437900.51

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
			349	26	SHALE - dark grey calcareous mudstone ~1% grey/light grey mudstone (continued)	Whaka Formation	
			348	27	SHALE - very dark grey mudstone shale 98% interbedded with light grey/cream mudstone 2%		
			347	28	SHALE - very dark grey mudstone shale 95% interbedded with light grey/cream mudstone 5%		
			346	29			
			345	30			
			344	31	SHALE - very dark grey mudstone shale 50% interbedded with light grey/cream mudstone 45%, light grey weathered mudstone 5%		
			343	32	SHALE - dark grey carbonaceous shale 95% cream/pale brown mudstone 5%		
			342	33			
			341	34			
			340	35			
			339	36	COAL - 65% interbedded with a cream/light grey mudstone 35%	Aymore Claystone	
			338	37	FINE SANDSTONE - 98% interbedded with Coal 2%		
			337	38	COAL - 98% interbedded with pale brown/brown shale 2%	Flyblowers Creek Seam	
			336	39			
			335	40	COAL - 99% interbedded with pale brown/brown shale 1%		
			334	41			
			333	42	SHALE - very dark grey carbonaceous shale/stony coal 60% interbedded with fine grained sandstone 40%	Tomcat Gully Sandstone	
			332	43			
			331	44	FINE SANDSTONE - dark grey fine grained sandstone/siltstone with minor tuff making up <1%		
			330	45	FINE SANDSTONE - grey fine grained sandstone 90% with dark grey fine grained sandstone 10% some coaly fragments		
			329	46			
			328	47			
			327	48			
			326	49			

END OF BOREHOLE AT 73.23 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW3E

SHEET 3 OF 3

Client:	CMC Pty Ltd	Date Commenced:	24/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	25/8/09
Bore Location:	GW3 North	Recorded By:	Nick Bryant
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	375.04 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 709109.17 N 6437900.51

Bore Information				Field Material Description			
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
			324	51	COARSE SANDSTONE - coarse sandstone to conglomeratic quartz rich with mixed lithologies making up <5%. some grey shale laminations noted between 50-51m including some coaly fragments between 52-53m	Tomcat Gully Sandstone	
			323	52			
			322	53	COAL - 70% dark grey/brown shale 15% cream fine grained sandstone 15%	Upper Ulan Seam	
			321	54	COAL - 80% dark grey shale 15% fine grained shale sandstone 5%		
			320	55	COAL - 90% dark grey shale 8% fine grained shale sandstone 2%		
			319	56	COAL - 95% dark grey shale 4%, <1% cream fine grained sandstone		
			318	57	FINE SANDSTONE - grey fine grained sandstone 50% grey shale containing coaly fragments	C-Marker Claystone	
			317	58	FINE SANDSTONE - cream fine grained sandstone 50% grey shale/mudstone 40% coaly fragments 10%		
			316	59	COAL - coal 90%, carbonaceous shale 10%	Lower Ulan Seam	
			315	60			
			314	61			
			313	62	COAL - coal 90%, carbonaceous shale 7%, some minor fine grained mudstone and or tuff 3%	Dapper Formation	
			312	63	FINE SANDSTONE - light brown fine grained sandstone 75%, coal carbonaceous shale 25%, coarse quartz rich sandstone (large drill chips and increase in water indicating fracturing)		
	bentonite		311	64	COARSE SANDSTONE - coarse grained quartz rich sandstone with 80% large rounded quartz clasts and 20% lithic clasts		
	50 mm slotted PVC casing		310	65			
			309	66			
			308	67			
			307	68			
			306	69			
			305	70			
	sump		304	71			
			303	72			
			302	73			
			301	74			

END OF BOREHOLE AT 73.23 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW4

SHEET 1 OF 1

Client:	CMC Pty Ltd	Date Commenced:	22/9/09
Project:	Cobbora Coal Mine Project	Date Completed:	22/9/09
Bore Location:	Mates Nth Hwy	Recorded By:	Nick Bryant
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Rotary - Blade	Surface RL:	345.83 mAHD
Drilling Company:	Impax Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 706611.66 N 6445727.53

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	50 mm PVC casing				SANDY LOAM - orange brown sandy loam occasional fine/med sub rounded gravel of quartz	Alluvium	Airlift = 2 L/s
		345	1		CLAY - orange yellow silty sandy clay		
	bentonite	344	2		SANDY LOAM - orange brown very sandy loam		
	gravel pack	343	3				
		342	4		SANDY LOAM - brown very sandy loam grading to coarse sand/gravel with grey clay in lower 25cm		
22/09/2009	50 mm slotted PVC casing	341	5		GRAVEL - clayey slightly sandy gravel, gravel fine-medium mixed lithologies angular to well rounded		
		340	6		GRAVEL - coarse sandy gravel, gravel of mixed lithologies angular to rounded		
		339	7				
	backfill - sump	338	8		SAND - coarse gravelly sand occasional med-well rounded gravel with some larger clasts noted		
		337	9				
		336					

END OF BOREHOLE AT 8.92 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW5_TP5

SHEET 1 OF 3

Client:	CMC Pty Ltd	Date Commenced:	31/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	31/8/09
Bore Location:	Mates 1	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Tubex & Air Hammer	Surface RL:	349.61 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	152 mm
		Co-ords:	E 707017.51 N 6446600.66

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	203 mm steel surface casing and 150 mm PVC casing to 30 mbgl	349	1		CLAY - red brown clay	Alluvium	
		348	2		CLAY - yellow brown clay		
		347	3		GRAVELLY CLAY - red brown gravelly clay with iron stone		
		346	4				
		345	5		SANDY CLAY - red brown sandy clay		
		344	6				
		343	7				
		342	8		SANDY CLAY - red brown becoming yellow grey sandy clay		
		341	9				
		340	10		SAND - alluvial sands with gravels		
		339	11		GRAVEL - alluvial gravels with coarse sands		
		338	12				
		337	13				
		336	14				
		335	15				
		334	16				
		333	17				
		332	18		CLAY - grey brown clay with minor sand		
		331	19				
	330						

END OF BOREHOLE AT 54.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW5_TP8

SHEET 2 OF 3

Client:	CMC Pty Ltd	Date Commenced:	31/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	31/8/09
Bore Location:	Mates 1	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Tubex & Air Hammer	Surface RL:	349.61 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	152 mm
		Co-ords:	E 707017.51 N 6446600.66

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
			329		SAND - yellow grey becoming grey fine, poorly consolidated sands with 0.5 to 2 cm gravel	Alluvium	
	bentonite		21				
			328				
			22				
			327				
			23				
			326		SANDY CLAY - grey sandy clay	Tomcat Gully Sandstone	
	gravel pack		24				
			325		SANDSTONE - grey sandstone with conglomerate		
			25				
			324		SANDSTONE - grey sandstone with gravel		
			26				
			323		SANDSTONE - grey fine becoming coarse quartz sandstone		
			27				
			322				
			28				
			321				
			29				
			320				
	150 mm slotted PVC casing		30				
			319		SANDSTONE - grey coarse sandstone		
			31				
			318				
			32				
			317				
			33				
			316				
			34				
			315				
			35		COAL	Upper Ulan Seam	
			314				
			36				
			313		COAL - coal with light grey mudstone/claystone	C-Marker Claystone	
			37				
			312				
			38				
			311				
			39		COAL	Lower Ulan Seam	
			310				

END OF BOREHOLE AT 54.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW5_TP8

SHEET 3 OF 3

Client:	CMC Pty Ltd	Date Commenced:	31/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	31/8/09
Bore Location:	Mates 1	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Tubex & Air Hammer	Surface RL:	349.61 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	152 mm
		Co-ords:	E 707017.51 N 6446600.66

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		309	41		COAL (<i>continued</i>)	Lower Ulan Seam	
		308	42				
		307	43				
		306	44		SANDSTONE - very coarse grey sandstone	Dapper Formation	
		305	45		MUDSTONE - dark grey carbonaceous mudstone		
		304	46		SANDSTONE - grey sandstone medium grained becoming coarse with siltstone		
		303	47				
		302	48				
	sump	301	49				
		300	50				
		299	51				
		298	52				
		297	53				
		296	54				
		295	55				
		294	56				
		293	57				
		292	58				
		291	59				
		290					

END OF BOREHOLE AT 54.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW5A

SHEET 1 OF 1

Client:	CMC Pty Ltd	Date Commenced:	19/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	19/8/09
Bore Location:	Mates 1	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Tubex	Surface RL:	349.58 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 707019.42 N 6446611.78

Bore Information		Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION
	152 mm steel surface casing and 50 mm PVC casing	349	1		CLAY - red brown clay	Alluvium
		348	2		CLAY - yellow brown clay	
		347	3		GRAVELLY CLAY - red brown gravelly clay with iron stone	
		346	4			
		345	5		SANDY CLAY - red brown sandy clay	
		344	6			
		343	7			
		342	8		SANDY CLAY - red brown becoming yellow grey sandy clay	
		341	9			
		340	10		SAND - alluvial sands with gravels	
		339	11		GRAVEL - alluvial gravels with coarse sands	
	gravel pack	337	12			
		336	13			
		335	14			
	50 mm slotted PVC casing	334	15			
		333	16			
		332	17			
	sump	332	18		CLAY - grey brown clay with minor sand	
		331	19			
		330				

EC = 5.68 mS/cm
pH = 9.71

END OF BOREHOLE AT 19.75 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW5B

SHEET 1 OF 2

Client:	CMC Pty Ltd	Date Commenced:	19/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	19/8/09
Bore Location:	Mates 1	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Tubex	Surface RL:	349.63 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 707020.52 N 6446617.82

Bore Information		Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION
	152 mm steel surface casing and 50 mm PVC casing	349	1		CLAY - red brown clay	Alluvium
		348	2		CLAY - yellow brown clay	
		347	3		GRAVELLY CLAY - red brown gravelly clay with iron stone	
		346	4			
		345	5		SANDY CLAY - red brown sandy clay	
		344	6			
		343	7			
		342	8		SANDY CLAY - red brown becoming yellow grey sandy clay	
		341	9			
		340	10		SAND - alluvial sands with gravels	
		339	11		GRAVEL - alluvial gravels with coarse sands	
		338	12			
		337	13			
		336	14			
		335	15			
	334					

EC = 0.899 mS/cm
pH = 8.55

19/08/2009

END OF BOREHOLE AT 30.64 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW5B

SHEET 2 OF 2

Client:	CMC Pty Ltd	Date Commenced:	19/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	19/8/09
Bore Location:	Mates 1	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Tubex	Surface RL:	349.63 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 707020.52 N 6446617.82

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
			333		GRAVEL - alluvial gravels with coarse sands <i>(continued)</i>	Alluvium	
			332		CLAY - grey brown clay with minor sand		
			331				
			330				
			329		SAND - yellow grey becoming grey fine, poorly consolidated sands with 0.5 to 2cm gravel		
			328				
	bentonite		327				
			326		SANDY CLAY - grey sandy clay	Tomcat Gully Sandstone	
			325		SANDSTONE - grey sandstone with conglomerate		
			324		SANDSTONE - grey sandstone with gravel		
	gravel pack		323		SANDSTONE - grey fine becoming coarse quartz sandstone		
	50 mm slotted PVC casing		322				
			321				
	sump		320				
			319				
			318				

END OF BOREHOLE AT 30.64 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW5C

SHEET 1 OF 2

Client:	CMC Pty Ltd	Date Commenced:	19/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	19/8/09
Bore Location:	Mates 1	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Tubex & Air Hammer	Surface RL:	349.51 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 707021.8 N 6446624.4

Bore Information		Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION
	152 mm steel surface casing and 50 mm PVC casing	349	1		CLAY - red brown clay	Alluvium
		348	2		CLAY - yellow brown clay	
		347	3		GRAVELLY CLAY - red brown gravelly clay with iron stone	
		346	4			
		345	5		SANDY CLAY - red brown sandy clay	
		344	6			
		343	7			
		342	8		SANDY CLAY - red brown becoming yellow grey sandy clay	
		341	9			
		340	10		SAND - alluvial sands with gravels	
		339	11		GRAVEL - alluvial gravels with coarse sands	
		338	12			
		337	13			
		336	14			
		335	15			
		334	16			
		333	17			
		332	18		CLAY - grey brown clay with minor sand	
		331	19			
		330	20		SAND - yellow grey becoming grey fine, poorly consolidated sands with 0.5 to 2cm gravel	
		329	21			
		328	22			
		327	23			
		326	24		SANDY CLAY - grey sandy clay	Tomcat Gully Sandstone
	325			SANDSTONE - grey sandstone with conglomerate		

EC = 0.897 mS/cm
pH = 9.77

19/08/2009

END OF BOREHOLE AT 43.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW5C

SHEET 2 OF 2

Client:	CMC Pty Ltd	Date Commenced:	19/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	19/8/09
Bore Location:	Mates 1	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Tubex & Air Hammer	Surface RL:	349.51 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 707021.8 N 6446624.4

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		324	26		SANDSTONE - grey sandstone with conglomerate <i>(continued)</i>	Tomcat Gully Sandstone	
		323	27		SANDSTONE - grey sandstone with gravel		
		322	28		SANDSTONE - grey fine becoming coarse quartz sandstone		
		321	29				
		320	30				
		319	31		SANDSTONE - grey coarse sandstone		
		318	32				
		317	33				
	bentonite	316	34				
		315	35		COAL	Upper Ulan Seam	
	gravel pack	314	36				
		313	37		COAL - coal with light grey mudstone/claystone	C-Marker Claystone	
		312	38				
		311	39		COAL	Lower Ulan Seam	
		310	40				
		309	41				
		308	42				
	sump	307	43				
		306	44				
		305	45				
		304	46				
		303	47				
		302	48				
		301	49				
		300					

END OF BOREHOLE AT 43.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW5D

SHEET 1 OF 3

Client:	CMC Pty Ltd	Date Commenced:	17/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	17/8/09
Bore Location:	Mates 1	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Tubex & Air Hammer	Surface RL:	349.29 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 707023.18 N 6446631.55

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	152 mm steel surface casing and 50 mm PVC casing	349	1		CLAY - red brown clay	Alluvium	
		348	2		CLAY - yellow brown clay		
		347	3		GRAVELLY CLAY - red brown gravelly clay with iron stone		
		346	4				
		345	5		SANDY CLAY - red brown sandy clay		
		344	6				
		343	7				
		342	8		SANDY CLAY - red brown becoming yellow grey sandy clay		
		341	9				
		340	10		SAND - alluvial sands with gravels		
		339	11		GRAVEL - alluvial gravels with coarse sands		
		338	12				
		337	13				
		336	14				
		335	15				
		334	16				
		333	17				
		332	18		CLAY - grey brown clay with minor sand		
		331	19				
	330						

END OF BOREHOLE AT 54.60 m
This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



GROUNDWATER BOREHOLE LOG

BORE NO.

GW5D

SHEET 2 OF 3

Client:	CMC Pty Ltd	Date Commenced:	17/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	17/8/09
Bore Location:	Mates 1	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Tubex & Air Hammer	Surface RL:	349.29 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 707023.18 N 6446631.55

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		329	21		SAND - yellow grey becoming grey fine, poorly consolidated sands with 0.5 to 2cm gravel	Alluvium	
		328	22				
		327	23				
		326	24		SANDY CLAY - grey sandy clay	Tomcat Gully Sandstone	
		325	25		SANDSTONE - grey sandstone with conglomerate		
		324	26		SANDSTONE - grey sandstone with gravel		
		323	27		SANDSTONE - grey fine becoming coarse quartz sandstone		
		322	28				
		321	29				
		320	30				
	50 mm PVC casing	319	31		SANDSTONE - grey coarse sandstone		
		318	32				
		317	33				
		316	34				
		315	35				
		314	36		COAL	Upper Ulan Seam	
		313	37		COAL - coal with light grey mudstone/claystone	C-Marker Claystone	
		312	38				
		311	39				
		310			COAL	Lower Ulan Seam	

END OF BOREHOLE AT 54.60 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW5D

SHEET 3 OF 3

Client:	CMC Pty Ltd	Date Commenced:	17/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	17/8/09
Bore Location:	Mates 1	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Tubex & Air Hammer	Surface RL:	349.29 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 707023.18 N 6446631.55

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		309			COAL (continued)	Lower Ulan Seam	
	bentonite	308	41				
		307	42				
		306	43		SANDSTONE - very coarse grey sandstone	Dapper Formation	
		305	44		MUDSTONE - dark grey carbonaceous mudstone		
	gravel pack	304	45		SANDSTONE - grey sandstone medium grained becoming coarse with siltstone		
	50 mm slotted PVC casing	303	46				
		302	47				
		301	48				
		300	49				
		299	50				
		298	51				
		297	52				
	sump	296	53				
		295	54				
		294	55				
		293	56				
		292	57				
		291	58				
		290	59				

Airlift = 3 L/s
EC = 1.152 mS/cm
pH = 7.92

END OF BOREHOLE AT 54.60 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW6_TP6

SHEET 1 OF 3

Client: **CMC Pty Ltd**
 Project: **Cobbora Coal Mine Project**
 Bore Location: **Glencross 2**
 Project Number: **2114426E & 2162570B**

Date Commenced: **16/8/09**
 Date Completed: **16/8/09**
 Recorded By: **Angus McFarlane**
 Log Checked By: **Leah Gleeson**

Drilling Method: **Air Hammer**
 Drilling Company: **Highland Drilling** Borehole Diameter: **203 mm**

Surface RL: **411.32 mAHD**
 Co-ords: **E 713476.75 N 6435365.2**

Bore Information		Field Material Description			Geophysical Log		
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	LITHOLOGY	Formation	GAMMA (API-GR) 0 62.5 125.0 187.5 250	HYDROGEOLOGY
	254 mm and 203 mm steel surface casing	411	1	CLAY - Red brown clay	Ellismayne Formation (weathered)		
		410	2	GRAVELLY CLAY - red brown gravelly clay (minor laterite)			
		409	3	GRAVELLY CLAY - yellow brown gravelly sandy clay			
		408	4	CLAY - light grey/cream light clay			
		407	5	CLAY - brown grey clay/weathered sandstone			
	203 mm steel casing	405	6	CLAY - light brown grey clay/weathered sandstone			
	bentonite	404	7	CLAY - light brown grey clay/weathered sandstone	Ellismayne Formation		
		403	8	FINE SANDSTONE - moderately weathered, grey/brown fine grained sandstone			
		402	9	SILTSTONE - cream siltstone			
		401	10	SILTSTONE - brown cream clay/siltstone			
	gravel pack	400	11	CLAYSTONE - cream claystone			
		399	12	SILTSTONE - dark grey siltstone			
		398	13	CLAYSTONE - white claystone			
	203 mm slotted steel casing	397	14	SILTSTONE - light grey siltstone, with interbedded coal (moist)			
		396	15	SILTSTONE - light grey siltstone			
		395	16	CLAYSTONE - cream claystone with interbedded coal (water at 24m)			
		394	17				
		393	18				
		392	19				
		391	20	COAL	Whaka Formation		
		390	21	SILTSTONE - light grey siltstone with interbedded coal	Avymore Claystone		
		389	22				
		388	23				
		387	24				

EC = 2.3 mS/cm
 pH = 5.96

END OF BOREHOLE AT 61.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW6_TP6

SHEET 2 OF 3

Client: **CMC Pty Ltd**
 Project: **Cobbora Coal Mine Project**
 Bore Location: **Glencross 2**
 Project Number: **2114426E & 2162570B**

Date Commenced: **16/8/09**
 Date Completed: **16/8/09**
 Recorded By: **Angus McFarlane**
 Log Checked By: **Leah Gleeson**

Drilling Method: **Air Hammer**
 Drilling Company: **Highland Drilling** Borehole Diameter: **203 mm**

Surface RL: **411.32 mAHD**
 Co-ords: **E 713476.75 N 6435365.2**

Bore Information		Field Material Description			Geophysical Log			
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	Formation	GAMMA (API-GR) <small>0 62.5 125.0 187.5 250</small>	HYDROGEOLOGY
		386	26		SILTSTONE - grey siltstone	Avymore Claystone		
		385	27					
		384	28					
		383	29					
		382	30					
		381	31		COAL	Flyblowers Creek Seam		
		380	32		COAL - coal with interbedded claystone and clay			
		379	33		COAL - coal with interbedded light brown claystone			
		378	34		COAL - coal with interbedded light brown claystone and grey siltstone			
		377	35					
		376	36		SANDSTONE - grey medium grained sandstone	Tomcat Gully Sandstone		
		375	37		SANDSTONE - grey coarse grained and pebbly sandstone (subrounded gravel)			
		374	38		SANDSTONE - grey medium quartz sandstone with grey siltstone			
		373	39					
		372	40		COAL - dark brown with interbedded carbonaceous siltstone and claystone	Upper Ulan Seam		
		371	41		COAL			
		370	42					
		369	43		COAL - coal with interbedded grey siltstone			
		368	44					
		367	45		SANDSTONE - grey fine grained sandstone with interbedded siltstone	C-Marker Claystone		
		366	46					
		365	47					
		364	48					
		363	49		COAL	Lower Ulan Seam		
		362						

END OF BOREHOLE AT 61.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW6_TP6

SHEET 3 OF 3

Client:	CMC Pty Ltd	Date Commenced:	16/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	16/8/09
Bore Location:	Glencross 2	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	411.32 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	203 mm
		Co-ords:	E 713476.75 N 6435365.2

Bore Information		Field Material Description			Geophysical Log		
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	LITHOLOGY	Formation	GAMMA (API-GR)	HYDROGEOLOGY
	sump	361	51	COAL - coal with grey siltstone	Lower Ulan Seam		
		360	52	SILTSTONE - grey/brown carbonaceous siltstone	Dapper Formation		
		359	53	SANDSTONE - grey fine to medium grained quartz sandstone			
		358	54	SANDSTONE - grey coarse to medium grained sandstone			
		356	55	CONGLOMERATE - grey fine to coarse grained subrounded conglomerate with clay matrix			
		351	61	END OF BOREHOLE AT 61.00 m			
		350	62				
		349	63				
		348	64				
		347	65				
		346	66				
		345	67				
		344	68				
		343	69				
		342	70				
		341	71				
		340	72				
		339	73				
		338	74				
		337					

END OF BOREHOLE AT 61.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW6A

SHEET 1 OF 2

Client:	CMC Pty Ltd	Date Commenced:	16/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	16/8/09
Bore Location:	Glencross 2	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	411.42 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 713475.57 N 6435359.34

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	152 mm steel surface casing and 50 mm PVC casing	411	1		CLAY - red brown clay	Ellismayne Formation (weathered)	EC = 1.84 mS/cm pH = 7.88
		410	2		GRAVELLY CLAY - red brown gravelly clay (minor laterite)		
		409	3		GRAVELLY CLAY - yellow brown gravelly sandy clay		
		408	4				
		407	5		CLAY - light grey/cream light clay		
		406	6		CLAY - brown grey clay/weathered sandstone		
	50 mm PVC casing	405	7		CLAY - light brown grey clay/weathered sandstone		
		404	8		FINE SANDSTONE - moderately weathered, grey/brown fine grained sandstone		
	bentonite	403	9		SILTSTONE - cream siltstone	Ellismayne Formation	
		402	10		SILTSTONE - brown cream clay/siltstone		
		401	11		CLAYSTONE - cream claystone		
		400	12		SILTSTONE - dark grey siltstone		
	gravel pack	399	13				
		398	14		CLAYSTONE - white claystone		
	50 mm slotted PVC casing	397	15		SILTSTONE - light grey siltstone, with interbedded coal (moist)		
		396	16				
		395	17				
		394	18				
		393	19		SILTSTONE - light grey siltstone		
		392			COAL	Whaka	

END OF BOREHOLE AT 34.50 m

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



GROUNDWATER BOREHOLE LOG

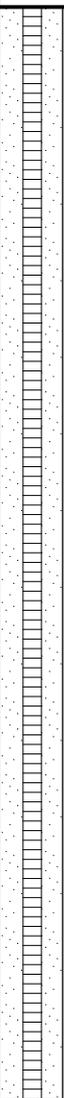
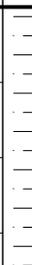
BORE NO.

GW6A

SHEET 2 OF 2

Client:	CMC Pty Ltd	Date Commenced:	16/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	16/8/09
Bore Location:	Glencross 2	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	411.42 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 713475.57 N 6435359.34

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		391	21		SILTSTONE - light grey siltstone with interbedded coal	Formation Aymore Claystone	
		390	22		CLAYSTONE - cream claystone with interbedded coal (water at 24m)		
		389	23		SILTSTONE - grey siltstone		
		388	24				
		387	25				
		386	26				
		385	27				
		384	28				
		383	29				
		382	30		COAL	Flyblowers Creek Seam	
		381	31		COAL - coal with interbedded claystone and clay		
		380	32				
		379	33		COAL - coal with interbedded light brown claystone		
		378	34		COAL - coal with interbedded light brown claystone and grey siltstone		
		377					
		376					
		375					
		374					
		373					
		372					

END OF BOREHOLE AT 34.50 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW6B

SHEET 1 OF 2

Client:	CMC Pty Ltd	Date Commenced:	16/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	16/8/09
Bore Location:	Glencross 2	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	411.44 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 713474.49 N 6435353.41

Bore Information		Field Material Description						
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY	
	152 mm steel surface casing and 50 mm PVC casing	411	1		CLAY - red brown clay	Ellismayne Formation (weathered)	EC = 2.43 mS/cm pH = 7.17	
		410	2		GRAVELLY CLAY - red brown gravelly clay (minor laterite)			
		409	3		GRAVELLY CLAY - yellow brown gravelly sandy clay			
		408	4		CLAY - light grey-cream light clay			
		407	5		CLAY - brown grey clay/weathered sandstone			
		406	6		CLAY - light brown grey clay/weathered sandstone			
	50 mm PVC casing	405	7		FINE SANDSTONE - moderately weathered, grey/brown fine grained sandstone	Ellismayne Formation		
		404	8		SILTSTONE - cream siltstone			
		403	9		SILTSTONE - brown cream clay/siltstone			
		402	10		CLAYSTONE - cream claystone			
		401	11		SILTSTONE - dark grey siltstone			
		400	12		CLAYSTONE - white claystone			
		399	13		SILTSTONE - light grey siltstone, with interbedded coal (moist)			
		398	14		SILTSTONE - light grey siltstone			
		397	15		COAL			Whaka
		396	16					
		395	17					
		394	18					
		393	19					
		392						

END OF BOREHOLE AT 38.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW6B

SHEET 2 OF 2

Client:	CMC Pty Ltd	Date Commenced:	16/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	16/8/09
Bore Location:	Glencross 2	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	411.44 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 713474.49 N 6435353.41

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		391	21		SILTSTONE - light grey siltstone with interbedded coal	Formation Avymore Claystone	
		390	22				
		389	23				
		388	24		CLAYSTONE - cream claystone with interbedded coal (water at 24m)		
		387	25				
		386	26		SILTSTONE - grey siltstone		
		385	27				
		384	28				
		383	29				
		382	30		COAL	Flyblowers Creek Seam	
		381	31		COAL - coal with interbedded claystone and clay		
		380	32				
	bentonite	379	33		COAL - coal with interbedded light brown claystone		
		378	34		COAL - coal with interbedded light brown claystone and grey siltstone		
		377	35				
	gravel pack	376	36		SANDSTONE - grey medium grained sandstone	Tomcat Gully Sandstone	
		375	37		SANDSTONE - grey coarse grained and pebbly sandstone (subrounded gravel)		
	50 mm slotted PVC casing	374	38		SANDSTONE - grey medium quartz sandstone with grey siltstone		
		373	39				
		372					

END OF BOREHOLE AT 38.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW6C

SHEET 1 OF 3

Client:	CMC Pty Ltd	Date Commenced:	15/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	15/8/09
Bore Location:	Glencross 2	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	411.45 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 713473.31 N 6435347.53

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	152 mm steel surface casing and 50 mm PVC casing	411	1		CLAY - red brown clay	Ellismayne Formation (weathered)	EC = 1.69 mS/cm pH = 7.76
		410	2		GRAVELLY CLAY - red brown gravelly clay (minor laterite)		
		409	3		GRAVELLY CLAY - yellow brown gravelly sandy clay		
		408	4		CLAY - light grey/cream light clay		
		407	5		CLAY - brown grey clay/weathered sandstone		
	50 mm PVC casing	406	6		CLAY - light brown grey clay/weathered sandstone		
		405	7		FINE SANDSTONE - moderately weathered, grey/brown fine grained sandstone		
		404	8		SILTSTONE - cream siltstone	Ellismayne Formation	
		403	9		SILTSTONE - brown cream clay/siltstone		
		402	10		CLAYSTONE - cream claystone		
		401	11		SILTSTONE - dark grey siltstone		
		400	12		CLAYSTONE - white claystone		
		399	13		SILTSTONE - light grey siltstone, with interbedded coal (moist)		
		398	14			Whaka	
		397	15				
		396	16				
		395	17				
		394	18				
		393	19		SILTSTONE - light grey siltstone		
		392			COAL		

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.

GW6C

SHEET 2 OF 3

Client:	CMC Pty Ltd	Date Commenced:	15/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	15/8/09
Bore Location:	Glencross 2	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	411.45 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 713473.31 N 6435347.53

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		391	21		SANDSTONE - light grey siltstone with interbedded coal	Formation Avymore Claystone	
		390	22				
		389	23				
		388	24		CLAYSTONE - cream claystone with interbedded coal (water at 24m)		
		387	25				
		386	26		SILTSTONE - grey siltstone		
		385	27				
		384	28				
		383	29				
		382	30		COAL	Flyblowers Creek Seam	
		381	31		COAL - coal with interbedded claystone and clay		
		380	32				
		379	33		COAL - coal with interbedded light brown claystone		
		378	34		COAL - coal with interbedded light brown claystone and grey siltstone		
		377	35				
		376	36		SANDSTONE - grey medium grained sandstone	Tomcat Gully Sandstone	
	bentonite	375	37				
		374	38		SANDSTONE - grey coarse grained and pebbly sandstone (subrounded gravel)		
		373	39		SANDSTONE - grey medium quartz sandstone with grey siltstone		
	gravel pack	372			COAL - dark brown with interbedded carbonaceous siltstone and claystone	Upper Ulan Seam	

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.

GW6C

SHEET 3 OF 3

Client:	CMC Pty Ltd	Date Commenced:	15/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	15/8/09
Bore Location:	Glencross 2	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	411.45 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 713473.31 N 6435347.53

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	50 mm slotted PVC casing	371	41	[Solid black bar]	COAL - dark brown with interbedded carbonaceous siltstone and claystone <i>(continued)</i>	Upper Ulan Seam	
		370	42		COAL		
		369	43		COAL - coal with interbedded grey siltstone		
		368	44	[Dotted pattern]	SANDSTONE - grey fine grained sandstone with interbedded siltstone	C-Marker Claystone	
		367	45				
		366	46				
		365	47				
		364	48	[Solid black bar]	COAL	Lower Ulan Seam	
		363	49				
		362	50				
		361	51				
		360	52				
		359	53				
		358	54				
		357	55				
		356	56				
		355	57				
		354	58				
		353	59				
		352					

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.

GW6D

SHEET 2 OF 3

Client:	CMC Pty Ltd	Date Commenced:	15/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	15/8/09
Bore Location:	Glencross 2	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	411.44 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 713472.12 N 6435341.06

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		386	26		SILTSTONE - grey siltstone	Avymore Claystone	
		385	27				
		384	28				
		383	29				
		382	30		COAL	Flyblowers Creek Seam	
		381	31		COAL - coal with interbedded claystone and clay		
		380	32				
		379	33		COAL - coal with interbedded light brown claystone		
		378	34		COAL - coal with interbedded light brown claystone and grey siltstone		
		377	35		SILTSTONE - grey siltstone	Tomcat Gully Sandstone	
		376	36		SILTSTONE - grey siltstone with coarse quartz sandstone		
		375	37		SANDSTONE - grey coarse quartz sandstone		
		374	38		SANDSTONE - grey medium quartz sandstone with grey siltstone		
		373	39		SILTSTONE - dark grey carbonaceous siltstone	Upper Ulan Seam	
		372	40				
		371	41		COAL		
		370	42				
		369	43		COAL - coal with interbedded grey siltstone		
		368	44		SILTSTONE - grey siltstone	C-Marker Claystone	
		367	45				
		366	46				
		365	47				
		364	48		COAL	Lower Ulan Seam	
		363	49				
		362					

END OF BOREHOLE AT 61.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW6D

SHEET 3 OF 3

Client:	CMC Pty Ltd	Date Commenced:	15/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	15/8/09
Bore Location:	Glencross 2	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	411.44 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 713472.12 N 6435341.06

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	bentonite	361	51		COAL - coal with grey siltstone	Lower Ulan Seam	
		360	52		SILTSTONE - grey siltstone	Dapper Formation	
		359	53		SANDSTONE - grey medium quartz sandstone		
	gravel pack	358	54		SANDSTONE - grey medium becoming coarse quartz sandstone		
	50 mm slotted PVC casing	357	55		SANDSTONE - grey coarse becoming medium grained quartz sandstone		
		356	56				
		355	57				
		354	58				
		353	59				
		352	60				
		351	61				
		350	62				
		349	63				
		348	64				
		347	65				
		346	66				
		345	67				
		344	68				
		343	69				
		342	70				
		341	71				
		340	72				
		339	73				
		338	74				
		337					

END OF BOREHOLE AT 61.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW7_TP8

SHEET 1 OF 4

Client:	CMC Pty Ltd	Date Commenced:	14/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	14/8/09
Bore Location:	Darlington	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	358.47 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	203 mm
		Co-ords:	E 707836.34 N 6442769.92

Bore Information		Field Material Description			Geophysical Log		
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	LITHOLOGY	Formation	GAMMA (API-GR)	HYDROGEOLOGY
	304 mm, 254 mm and 203 mm steel surface casing	358	1	CLAY - pale yellow brown clay	Alluvium		
		357	2	CLAY - yellow brown clay with quartz gravel			
		356	3	CLAY - yellow brown gravelly clay laterite and unknown metamorphic rock			
		355	4	CLAY - yellow brown clay			
		354	5	CLAY - yellow brown clay with minor gravel			
		353	6	SANDY GRAVEL - red brown sandy gravel with clay matrix			
		352	7	GRAVELLY SAND - yellow brown gravelly sand with clay matrix			
		351	8	CLAYSTONE - yellow brown claystone (samples contaminated from falling alluvium)	Ellismayne Formation		
		350	9				
		349	10				
		348	11				
		347	12				
	254 mm and 203 mm steel surface casing	346	13	SILTSTONE - grey siltstone			
		345	14				
		344	15	SILTSTONE - grey siltstone and coarse grey siltstone			
		343	16				
		342	17				
		341	18	SANDSTONE - light grey sandstone (quartz medium grained) and siltstone			
	203 mm steel casing	340	19				
		339	20				
		338	21	SANDSTONE - fine grained sandstone and light brown mudstone			
		337	22	SANDSTONE - brown mudstone and quartz sandstone			
	bentonite	336	23				
		335	24				
		334					

END OF BOREHOLE AT 85.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW7_TP8

SHEET 2 OF 4

Client: **CMC Pty Ltd**
 Project: **Cobbora Coal Mine Project**
 Bore Location: **Darlington**
 Project Number: **2114426E & 2162570B**

Date Commenced: **14/8/09**
 Date Completed: **14/8/09**
 Recorded By: **Angus McFarlane**
 Log Checked By: **Leah Gleeson**

Drilling Method: **Air Hammer**
 Drilling Company: **Highland Drilling** Borehole Diameter: **203 mm**

Surface RL: **358.47 mAHD**
 Co-ords: **E 707836.34 N 6442769.92**

Bore Information		Field Material Description			Geophysical Log		
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	LITHOLOGY	Formation	GAMMA (API-GR) 0 62.5 125.0 187.5 250	HYDROGEOLOGY
	gravel pack	333	26	SILTSTONE - light grey siltstone	Ellismayne Formation		
		332	27	SILTSTONE - light grey to grey siltstone			
		331	28	SILTSTONE - grey siltstone			
		330	29	SILTSTONE - dark grey carbonaceous mudstone and siltstone			
	203 mm slotted steel casing	329	30		Whaka Formation		
		328	31	COAL - stony coal			
		327	32	CLAYSTONE - light brown claystone and dark grey siltstone	Avymore Claystone		
		326	33	SILTSTONE - dark grey siltstone			
		325	34				
		324	35				
		323	36				
		322	37				
		321	38				
		320	39				
		319	40				
		318	41				
		317	42				
		316	43				
		315	44				
		314	45				
		313	46				
		312	47	SILTSTONE - dark grey to light grey siltstone and cream claystone			
		311	48				
		310	49	CLAYSTONE - cream claystone and dark grey siltstone			
		309					

END OF BOREHOLE AT 85.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW7_TP8

SHEET 3 OF 4

Client:	CMC Pty Ltd	Date Commenced:	14/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	14/8/09
Bore Location:	Darlington	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	358.47 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	203 mm
		Co-ords:	E 707836.34 N 6442769.92

Bore Information		Field Material Description			Geophysical Log		
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	LITHOLOGY	Formation	GAMMA (API-GR)	HYDROGEOLOGY
			308	COAL - stony coal and dark grey siltstone	Flyblowers Creek Seam		
			51				
			307				
			52				
			306				
			53				
			305				
			54				
			304				
			55				
			303	SANDSTONE - quartz sandstone and siltstone	Tomcat Gully Sandstone		
			56				
			302				
			57				
			301				
			58				
			300				
			59				
			299				
			60				
			298				
			61				
			297	COAL - coal and siltstone	Upper Ulan Seam		
			62				
			296				
			63				
			295				
			64				
			294				
			65				
			293				
			66	COAL - coal and siltstone			
			292				
			67	CLAYSTONE - coal and cream claystone	C-Marker Claystone		
			291				
			68	COAL - coal	Lower Ulan Seam		
			290				
			69				
			289				
			70				
			288				
			71				
			287				
			72				
			286				
			73	SANDSTONE - coarse quartz sandstone and coal	Dapper Formation		
			285				
			74	SANDSTONE - coarse to fine grey quartz sandstone			
			284				

END OF BOREHOLE AT 85.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW7_TP8

SHEET 4 OF 4

Client:	CMC Pty Ltd	Date Commenced:	14/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	14/8/09
Bore Location:	Darlington	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	358.47 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	203 mm
		Co-ords:	E 707836.34 N 6442769.92

Bore Information		Field Material Description			Geophysical Log		
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	LITHOLOGY	Formation	GAMMA (API-GR)	HYDROGEOLOGY
		283	76	SANDSTONE - coarse to fine grey quartz sandstone (continued)	Dapper Formation		
		282	77				
		281	78				
		280	79				
		279	80				
		278	81				
		277	82				
		276	83				
		275	84				
		274	85				
		273	86				
		272	87				
		271	88				
		270	89				
		269	90				
		268	91				
		267	92				
		266	93				
		265	94				
		264	95				
		263	96				
		262	97				
		261	98				
		260	99				
		259					

END OF BOREHOLE AT 85.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW7A

SHEET 1 OF 1

Client:	CMC Pty Ltd	Date Commenced:	10/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	10/8/09
Bore Location:	Darlington	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	358.41 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 707835.22 N 6442785.11

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	50 mm PVC casing bentonite	358	1		CLAY - yellow brown clay	Alluvium	EC = 4.73 mS/cm pH = 7
		357	2		GRAVELLY CLAY - yellow brown gravelly clay		
		356	3		GRAVELLY CLAY - yellow brown gravelly clay (increased % of gravel)		
	gravel pack	354	4		GRAVELLY CLAY - brown sandy gravelly clay		
	50 mm slotted PVC casing	353	5				
10/08/2009		352	6		CLAYEY GRAVEL - brown clayey gravel		
		351	7		CLAYEY GRAVEL - alluvium with a clay matrix - water at 9.5m		
		350	8				
		349	9				
		348	10				
	sump	347	11				

END OF BOREHOLE AT 11.68 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW7B

SHEET 2 OF 3

Client:	CMC Pty Ltd	Date Commenced:	9/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	9/8/09
Bore Location:	Darlington	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	358.36 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 707835.1 N 6442792.59

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		338	21		SANDSTONE - grey fine becoming coarse quartz sandstone	Ellismayne Formation	
		337	22				
		336	23		CLAYSTONE - red brown claystone		
	bentonite	335	24				
		334	25		SILTSTONE - grey siltstone		
		333	26				
		332	27				
		331	28				
		330	29		SILTSTONE - dark grey siltstone, water at 29m		
	gravel pack	329	30				
	50 mm slotted PVC casing	328	31				
		327	32				
		326	33		SILTSTONE - dark grey siltstone/carbonaceous mudstone		
		325	34				
		324	35		COAL - stony coal	Whaka Formation	
		323	36		MUDSTONE - dark grey carbonaceous mudstone		
		322	37		SILTSTONE - dark grey siltstone/mudstone, water at 42m	Avymore Claystone	
		321	38				
		320	39				
		319					

END OF BOREHOLE AT 53.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW7B

SHEET 3 OF 3

Client:	CMC Pty Ltd	Date Commenced:	9/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	9/8/09
Bore Location:	Darlington	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	358.36 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 707835.1 N 6442792.59

Bore Information			Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY	
		318	41		SILTSTONE - dark grey siltstone/mudstone, water at 42m <i>(continued)</i>	Avymore Claystone		
		317	42					
		316	43					
		315	44					
		314	45					
		313	46					
		312	47			SILTSTONE - dark grey siltstone with clay		
		311	48			CLAYSTONE - light grey claystone with clay		
		310	49			CLAYSTONE - off white claystone		
		309	50			COAL - stony coal		Flyblowers Creek Seam
		308	51					
		307	52					
		306	53					
		305						
		304						
		303						
		302						
		301						
		300						
		299						

END OF BOREHOLE AT 53.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW7C

SHEET 1 OF 3

Client:	CMC Pty Ltd	Date Commenced:	9/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	9/8/09
Bore Location:	Darlington	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	358.38 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 707835.98 N 6442799.39

Bore Information			Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY	
	203 mm, 152 mm steel surface casing and 50 mm PVC casing	358	1		CLAY - pale yellow brown clay	Alluvium		
		357	2		CLAY - yellow brown clay with quartz gravel			
		356	3		CLAY - yellow brown gravelly clay laterite and unknown metamorphic rock			
		355	4		CLAY - yellow brown clay			
		354	5		CLAY - yellow brown clay with minor gravel			
		353	6		SANDY GRAVEL - red brown sandy gravel with clay matrix			
		152 mm steel surface casing and 50 mm PVC casing	352	7		GRAVELLY SAND - yellow brown gravelly sand with clay matrix	Ellismayne Formation	
			351	8		CLAYSTONE - yellow brown claystone (samples contaminated from falling alluvium)		
			350	9				
			349	10				
			348	11				
			347	12				
	346		13		SILTSTONE - grey siltstone			
	345		14					
	344		15					
	343		16					
	342		17					
	341		18					
	50 mm PVC casing	340	19		SILTSTONE - grey siltstone/claystone			
		339	20		SANDSTONE - grey fine becoming coarse quartz sandstone			
		338	21					
		337	22					
		336	23		CLAYSTONE - red brown claystone			
		335	24					

END OF BOREHOLE AT 61.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW7C

SHEET 2 OF 3

Client:	CMC Pty Ltd	Date Commenced:	9/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	9/8/09
Bore Location:	Darlington	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	358.38 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 707835.98 N 6442799.39

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		333	26		SILTSTONE - grey siltstone	Ellismayne Formation	
		332	27				
		331	28				
		330	29		SILTSTONE - dark grey siltstone, water at 29m		
		329	30				
		328	31				
		327	32				
		326	33		SILTSTONE - dark grey siltstone/carbonaceous mudstone		
		325	34				
		324	35		COAL - stony coal	Whaka Formation	
		323	36		MUDSTONE - dark grey carbonaceous mudstone		
		322	37		SILTSTONE - dark grey siltstone/mudstone, water at 42m	Aymore Claystone	
		321	38				
		320	39				
		319	40				
		318	41				
		317	42				
		316	43				
		315	44				
		314	45				
		313	46				
		312	47		SILTSTONE - dark grey siltstone with clay		
		311	48		CLAYSTONE - light grey claystone with clay		
		310	49		CLAYSTONE - off white claystone		
		309					

END OF BOREHOLE AT 61.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW7C

SHEET 3 OF 3

Client:	CMC Pty Ltd	Date Commenced:	9/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	9/8/09
Bore Location:	Darlington	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	358.38 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 707835.98 N 6442799.39

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	bentonite	308	51		COAL - stony coal	Flyblowers Creek Seam	
	gravel pack	307	52				
	50 mm slotted PVC casing	306	53				
		305	54		SILTSTONE - dark grey siltstone	Tomcat Gully Sandstone	
		304	55		SILTSTONE - dark grey with layers of light grey siltstone		
		303	56		SILTSTONE - dark grey with layers of light grey siltstone with quartz		
		302	57				
		301	58				
		300	59		SANDSTONE - coarse sandstone with grey siltstone		
		299	60				
		298	61				
		297	62				
		296	63				
		295	64				
		294	65				
		293	66				
		292	67				
		291	68				
		290	69				
		289	70				
		288	71				
		287	72				
		286	73				
		285	74				
		284					

END OF BOREHOLE AT 61.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW7D

SHEET 1 OF 3

Client:	CMC Pty Ltd	Date Commenced:	7/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	7/8/09
Bore Location:	Darlington	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	358.42 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 707836.34 N 6442806.2

Bore Information			Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY	
	203 mm, 152 mm steel surface casing and 50 mm PVC casing	358	1		CLAY - pale yellow brown clay	Alluvium		
		357	2		CLAY - yellow brown clay with quartz gravel			
		356	3		CLAY - yellow brown gravelly clay laterite and unknown metamorphic rock			
		355	4		CLAY - yellow brown clay			
		354	5		CLAY - yellow brown clay with minor gravel			
		353	6		SANDY GRAVEL - red brown sandy gravel with clay matrix			
		352	7		GRAVELLY SAND - yellow brown gravelly sand with clay matrix			
		152 mm steel surface casing and 50 mm PVC casing	351	8		CLAYSTONE - yellow brown claystone (samples contaminated from falling alluvium)	Ellismayne Formation	
			350	9				
			349	10				
			348	11				
			347	12				
	346		13		SILTSTONE - grey siltstone			
	345		14					
	344		15					
	343		16					
	342		17					
	50 mm PVC casing	341	18					
		340	19		SILTSTONE - grey siltstone/claystone			
		339	20		SANDSTONE - grey fine becoming coarse quartz sandstone			
		338	21					
		337	22					
		336	23		CLAYSTONE - red brown claystone			
		335	24					
		334						

END OF BOREHOLE AT 72.72 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW7D

SHEET 2 OF 3

Client:	CMC Pty Ltd	Date Commenced:	7/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	7/8/09
Bore Location:	Darlington	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	358.42 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 707836.34 N 6442806.2

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		333	26		SILTSTONE - grey siltstone	Ellismayne Formation	
		332	27				
		331	28				
		330	29		SILTSTONE - dark grey siltstone, water at 29m		
		329	30				
		328	31				
		327	32				
		326	33		SILTSTONE - dark grey siltstone/carbonaceous mudstone		
		325	34				
		324	35		COAL - stony coal	Whaka Formation	
		323	36		MUDSTONE - dark grey carbonaceous mudstone		
		322	37		SILTSTONE - dark grey siltstone/mudstone, water at 42m	Aymore Claystone	
		321	38				
		320	39				
		319	40				
		318	41				
		317	42				
		316	43				
		315	44				
		314	45				
		313	46				
		312	47		SILTSTONE - dark grey siltstone with clay		
		311	48		CLAYSTONE - light grey claystone with clay		
		310	49		CLAYSTONE - off white claystone		
		309					

END OF BOREHOLE AT 72.72 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW7D

SHEET 3 OF 3

Client:	CMC Pty Ltd	Date Commenced:	7/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	7/8/09
Bore Location:	Darlington	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	358.42 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 707836.34 N 6442806.2

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		308	51		COAL - stony coal	Flyblowers Creek Seam	
		307	52				
		306	53				
		305	54				
		304	55		SILTSTONE - dark grey siltstone	Tomcat Gully Sandstone	
		303	56		SILTSTONE - dark grey with layers of light grey siltstone		
		302	57		SILTSTONE - dark grey with layers of light grey siltstone with quartz		
		301	58				
		300	59		SANDSTONE - coarse sandstone with grey siltstone		
		299	60				
		298	61		SANDSTONE - coarse sandstone with grey siltstone (fine grained) water at 61		
		297	62				
		296	63		COAL - coal with claystone	Upper Ulan Seam	
		295	64				
	bentonite	294	65				
		293	66				
		292	67		CLAYSTONE - light cream claystone with dark carbonaceous mudstone	C-Marker Claystone	
	gravel pack	291	68				
	50 mm slotted PVC casing	290	69		COAL	Lower Ulan Seam	
		289	70				
		288	71				
	sump	287	72				
		286	73				
		285	74				
		284					

END OF BOREHOLE AT 72.72 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW7E

SHEET 1 OF 4

Client:	CMC Pty Ltd	Date Commenced:	7/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	7/8/09
Bore Location:	Darlington	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	358.31 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 707836.65 N 6442812.96

Bore Information			Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY	
	203 mm, 152 mm steel surface casing and 50 mm PVC casing	358	1		CLAY - pale yellow brown clay	Alluvium		
		357	2		CLAY - yellow brown clay with quartz gravel			
		356	3		CLAY - yellow brown gravelly clay laterite and unknown metamorphic rock			
		355	4		CLAY - yellow brown clay			
		354	5		CLAY - yellow brown clay with minor gravel			
		353	6		SANDY GRAVEL - red brown sandy gravel with clay matrix			
		152 mm steel surface casing and 50 mm PVC casing	352	7		GRAVELLY SAND - yellow brown gravelly sand with clay matrix	Ellismayne Formation	
			351	8		CLAYSTONE - yellow brown claystone (samples contaminated from falling alluvium)		
			350	9				
			349	10				
			348	11				
			347	12				
	346		13		SILTSTONE - grey siltstone			
	345		14					
	344		15					
	343		16					
	342		17					
	341		18					
	50 mm PVC casing	340	19		SILTSTONE - grey siltstone/claystone			
		339	20		SANDSTONE - grey fine becoming coarse quartz sandstone			
		338	21					
		337	22					
		336	23		CLAYSTONE - red brown claystone			
		335	24					
		334						

END OF BOREHOLE AT 85.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW7E

SHEET 2 OF 4

Client:	CMC Pty Ltd	Date Commenced:	7/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	7/8/09
Bore Location:	Darlington	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	358.31 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 707836.65 N 6442812.96

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		333	26		SILTSTONE - grey siltstone	Ellismayne Formation	
		332	27				
		331	28				
		330	29				
		329	30		SILTSTONE - dark grey siltstone, water at 29m		
		328	31				
		327	32				
		326	33				
		325	34		SILTSTONE - dark grey siltstone/carbonaceous mudstone		
		324	35				
		323	36		COAL - stony coal	Whaka Formation	
		322	37		MUDSTONE - dark grey carbonaceous mudstone		
		321	38		SILTSTONE - dark grey siltstone/mudstone, water at 42m	Aymore Claystone	
		320	39				
		319	40				
		318	41				
		317	42				
		316	43				
		315	44				
		314	45				
		313	46				
		312	47				
		311	48		SILTSTONE - dark grey siltstone with clay		
		310	49		CLAYSTONE - light grey claystone with clay		
		309			CLAYSTONE - off white claystone		

END OF BOREHOLE AT 85.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW7E

SHEET 3 OF 4

Client:	CMC Pty Ltd	Date Commenced:	7/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	7/8/09
Bore Location:	Darlington	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	358.31 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 707836.65 N 6442812.96

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		308			COAL - stony coal	Flyblowers Creek Seam	
			51				
		307					
			52				
		306					
			53				
		305					
			54		SILTSTONE - dark grey siltstone	Tomcat Gully Sandstone	
		304					
			55		SILTSTONE - dark grey with layers of light grey siltstone		
		303					
			56				
		302					
			57		SILTSTONE - dark grey with layers of light grey siltstone with quartz		
		301					
			58				
		300					
			59		SANDSTONE - coarse sandstone with grey siltstone		
		299					
			60				
		298					
			61		SANDSTONE - coarse sandstone with grey siltstone (fine grained) water at 61		
		297					
			62		COAL - coal with claystone	Upper Ulan Seam	
		296					
			63				
		295					
			64				
		294					
			65				
		293					
			66				
		292					
			67		CLAYSTONE - light cream claystone with dark carbonaceous mudstone	C-Marker Claystone	
		291					
			68		COAL	Lower Ulan Seam	
		290					
			69				
		289					
			70				
		288					
			71				
		287					
			72				
		286					
			73				
		285					
			74				
		284			SANDSTONE - grey sandstone with layers of siltstone/carbonaceous mudstone, water at 75m	Dapper Formation	

END OF BOREHOLE AT 85.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW7E

SHEET 4 OF 4

Client:	CMC Pty Ltd	Date Commenced:	7/8/09
Project:	Cobbora Coal Mine Project	Date Completed:	7/8/09
Bore Location:	Darlington	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	358.31 mAHD
Drilling Company:	Highland Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 707836.65 N 6442812.96

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		283			SANDSTONE - grey sandstone with layers of siltstone/carbonaceous mudstone, water at 75m (continued)	Dapper Formation	
	gravel pack	282	76				
		281	77				
	50 mm slotted PVC casing	280	78				
		279	79				
		278	80				
		277	81				
		276	82				
		275	83				
	sump	274	84				
		273	85				
		272	86				
		271	87				
		270	88				
		269	89				
		268	90				
		267	91				
		266	92				
		265	93				
		264	94				
		263	95				
		262	96				
		261	97				
		260	98				
		259	99				

END OF BOREHOLE AT 85.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW8A

SHEET 1 OF 1

Client:	CMC Pty Ltd	Date Commenced:	24/9/09
Project:	Cobbora Coal Mine Project	Date Completed:	24/9/09
Bore Location:	Mates Sth Hwy	Recorded By:	Nick Bryant
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Rotary - Blade	Surface RL:	351.28 mAHD
Drilling Company:	Impax Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 707491 N 6444296.65

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	50 mm PVC casing	351	1		LOAM - brown slightly clayey sandy loam, occasional gravel of fine angular quartz	Alluvium	
	bentonite	350	2		SAND - coarse quartz sand with some minor lithic fragments occasional quartz fine and angular		
		349	3		SAND - gravelly coarse sand, gravel fine to medium well rounded dominantly of quartz, some angular lithic clasts present		
	50 mm slotted PVC casing	348	4		GRAVEL - clayey sandy gravel, sand dominantly coarse and quartz rich, gravel medium-coarse some large 6-8cm tabular clasts of fine sandstone		
		347	5		GRAVEL - clayey sandy gravel, sand dominantly quartz, gravel of angular medium quartz, clay content increasing with depth		
		346	6		SANDY CLAY - purple soft sandy clay with yellow-orange mottling, sand is quartz dominant		
	sump	345	7				
		344					

END OF BOREHOLE AT 6.54 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW8B

SHEET 1 OF 1

Client:	CMC Pty Ltd	Date Commenced:	24/9/09
Project:	Cobbora Coal Mine Project	Date Completed:	24/9/09
Bore Location:	Mates Sth Hwy	Recorded By:	Nick Bryant
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Rotary - Blade	Surface RL:	351.33 mAHD
Drilling Company:	Impax Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 707488.99 N 6444300.39

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	100 mm PVC casing to 5 mbgl, 50 mm PVC casing from 5 - 6 mbgl	351	1		LOAM - brown slightly clayey sandy loam, occasional gravel of fine angular quartz	Alluvium	Airlift = 1 L/s
		350	2		SAND - coarse quartz sand with some minor lithic fragments occasional quartz fine and angular		
		349	3		SAND - gravelly coarse sand, gravel fine to medium well rounded dominantly of quartz, some angular lithic clasts present.		
		348	4		GRAVEL - clayey sandy gravel, sand dominantly coarse and quartz rich, gravel medium-coarse some large 6-8cm tabular clasts of fine sandstone	Digby Formation	
	bentonite	347	5		GRAVEL - clayey sandy gravel, sand dominantly quartz, gravel of angular medium quartz, clay content increasing with depth		
		346	6		SANDY CLAY - purple soft sandy clay with yellow-orange mottling, sand is quartz dominant		
	50 mm slotted PVC casing	345	7		MEDIUM SANDSTONE - weathered quartz rich medium sandstone	Trinkey Seam	
		344	8		COARSE SANDSTONE - coarse sandstone-conglomerate, weathered to start but increasing in competency with depth		
		343	9		MEDIUM SANDSTONE - quartz dominant fine-medium grained sandstone		
	sump	342	10		COAL		
		341	11				
		340					

END OF BOREHOLE AT 10.46 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW9

SHEET 1 OF 1

Client:	CMC Pty Ltd	Date Commenced:	21/9/09
Project:	Cobbora Coal Mine Project	Date Completed:	21/9/09
Bore Location:	Glencross	Recorded By:	Nick Bryant
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Hammer	Surface RL:	377.48 mAHD
Drilling Company:	Impax Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 708772.31 N 6438896.68

Bore Information				Field Material Description		
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION
	50 mm PVC casing	377	1		MEDIUM SANDSTONE - weathered red/brown medium grained Sandstone	Digby Formation
		376	2		FINE SANDSTONE - weathered grey/brown fine grained sandstone with clay	
		375	3		FINE SANDSTONE - weathered light brown fine grained sandstone with clay	
		374	4		FINE SANDSTONE - weathered red/light brown fine grained sandstone with clay	
		373	5		CLAY - grey brown clay with minor weathered sandstone	
	bentonite	371	6		MEDIUM SANDSTONE - weathered white/cream sandstone containing dominantly angular quartz	Digby Formation
		370	7		COARSE SANDSTONE - medium to coarse sandstone dominantly quartz rich clastic lithology, also layered with fine grained sandstone	
	gravel pack	369	8		COARSE SANDSTONE - coarse grained sandstone containing angular to rounded clasts of mixed lithologies	
	50 mm slotted PVC casing	368	9		MEDIUM SANDSTONE - interbedded medium grained sandstone interbedded with fine grained sandstone	
		367	10		MEDIUM SANDSTONE - medium to fine grained cream sandstone, dominantly quartz rich with some mixed lithologies	
	sump	366	11		COARSE SANDSTONE - coarse grained quartz rich sandstone also some mixed lithologies, some small laminations of light grey shaley sandstone	
	backfill	365	12		FINE SANDSTONE - fine grained grey sandstone	
		364	13			

END OF BOREHOLE AT 12.89 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW10

SHEET 1 OF 1

Client:	CMC Pty Ltd	Date Commenced:	22/9/09
Project:	Cobbora Coal Mine Project	Date Completed:	22/9/09
Bore Location:	Mates Nth Hwy	Recorded By:	Nick Bryant
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Rotary - Blade	Surface RL:	347.75 mAHD
Drilling Company:	Impax Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 706831.36 N 6445486.72

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	50 mm PVC casing	347	1		LOAM - orange brown slightly silty clayey loam	Alluvium	
		346	2		CLAY - orange light brown slightly sandy silty clay		
		345	3		LOAM - orange slightly silty loam, some dark brown/red clay horizons present		
		344	4		CLAY - orange brown slightly sandy gravelly loamy clay, gravel sub rounded to rounded medium of mixed lithologies		
		343	5		SAND - brown slightly clayey gravelly sand, clay grey and sandy with some mottling evident, gravel of medium/coarse angular/rounded mixed lithologies		
		342	6		CLAY - slightly gravelly sandy clay, clay grey and mottled, gravel of fine grained well rounded clasts mixed lithologies		
	bentonite	341	7		CLAY - gravelly clay, clay grey, gravel angular fine to medium quartz rich		
	gravel pack	340	8		GRAVEL - dark red/brown slightly clayey gravel, gravel med angular quartz and chert		
	50 mm slotted PVC casing	339	9				
		338	10		GRAVEL - orange/brown slightly sandy clayey gravel, gravel fine to medium dominantly well rounded quartz-chert, angular-mixed lithologies also present		
		337	11		GRAVEL - orange/brown slightly sandy slightly clayey gravel, gravel of angular quartz and chert		
	sump	336	12				
		335	13				
		334					

END OF BOREHOLE AT 12.54 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW11

SHEET 1 OF 1

Client:	CMC Pty Ltd	Date Commenced:	24/9/09
Project:	Cobbora Coal Mine Project	Date Completed:	24/9/09
Bore Location:	Darlington	Recorded By:	Nick Bryant
Project Number:	2114426E & 2162570B	Log Checked By:	Leah Gleeson

Drilling Method:	Air Rotary - Blade	Surface RL:	381.05 mAHD
Drilling Company:	Impax Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 708296.82 N 6442150.75

Bore Information				Field Material Description		
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION
	50 mm PVC casing	381			CONGLOMERATE - slightly weathered coarse conglomerate of sub rounded clasts of mixed lithology	Digby Formation
		380	1		CONGLOMERATE - coarse quartz rich conglomerate, clasts dominantly angular	
		379	2			
		378	3			
	bentonite	377	4		COARSE SANDSTONE - coarse quartz rich sandstone with dominantly angular/rounded quartz clasts, some min mixed lithologies present	
	gravel pack	376	5			
		375	6		COARSE SANDSTONE - coarse quartz rich sandstone grading to a fine grained/shaley sandstone	
		374	7		FINE SANDSTONE - fine grained cream sandstone	
	50 mm slotted PVC casing	373	8			
		372	9			
		371	10		FINE SANDSTONE - weathered brown sandstone containing 30-40% clay - damp	
	sump	370	11		COAL - dull coal	Whaka Formation

END OF BOREHOLE AT 11.71 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW12

SHEET 1 OF 4

Client:	CMC Pty Ltd	Date Commenced:	25/2/10
Project:	Cobbora Coal Mine Project	Date Completed:	26/2/10
Bore Location:	E Darlington	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Saflian

Drilling Method:	Air Hammer	Surface RL:	393.7 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 703106.1 N 6438882.75

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	50 mm PVC casing gypset in alluvium	393	1		CLAYEY SAND - yellow brown medium to large grained	Alluvium	
		392	2		GRAVELLY CLAYEY SAND - orange brown, increased clay content, fine gravel 2-4mm		
		391	3		CLAYEY SAND - light brown with 10% 3-4mm gravel, sand coarse grained		
		390	4		CLAYEY SAND - brown, sand coarse grained with 5% gravel 10-15 mm quartz, coal and siltstone, sub angular		
		389	5		CLAYEY SAND - dark brown sand coarse grained with 5% gravel 4-5 mm quartz, coal and siltstone, angular		
		388	6		CLAYEY SAND - brown, sand coarse grained, decreasing clay content, angular quartz, claystone gravel 20% 5-10mm sand angular		
		387	7		GRAVELLY SAND - light brown, sand very coarse grained with a clay matrix, gravel 25% sub angular to angular, quartz, siltstone		
		386	8		CLAYEY SAND - light orange brown, sand medium grained with 15% angular and semi rounded gravel, quartz, claystone 7-15mm		
		385	9		CLAYEY SAND - light brown, sand medium grained with a band of white/ grey clay with 10% 5-7mm gravel, quartz and claystone		
		384	10		CLAYEY SAND - brown cream, fine grained sand with 30% clay and 5% quartz gravel		
		50 mm PVC casing	383	11			
	382		12		SANDSTONE - cream fine grained 1-2mm with 5% 2-3mm rounded quartz with a clay matrix		
	381		13		SANDSTONE - grey cream fine to medium grained 1-2mm with 5% 5-6mm rounded quartz		
	380		14		SANDSTONE - yellow cream medium grained 5% 5-10mm sub angular quartz		
	379		15		SANDSTONE - cream red medium grained 2mm uniform grains with 10% 3-4mm quartz grains		
	378		16		SANDSTONE - light yellow brown medium to coarse grained 2-4mm with 10% 5-7mm angular quartz		
	377		17		SANDSTONE - yellow orange fine to medium grained 1-2mm with a clay matrix		
	376		18		SILTSTONE - grey, powder with semi rounded 4-5mm chips		
	375		19		SILTSTONE - orange grey, powder with 5% semi rounded 3-4mm chips		
	374		20		SILTSTONE/MUDSTONE - light grey, fine powder		
	373		21		SILTSTONE/MUDSTONE - light grey, fine powder with bands of brown siltstone		
	372		22		SILTSTONE - grey, fine powder		
	371		23		SILTSTONE - grey, coarse powder		
	370		24		SILTSTONE - grey, powder and semi rounded chips 3-6mm		
	369		25		SILTSTONE - grey, powder		
	368		26		SILTSTONE - grey, coarse powder		
	367		27		SILTSTONE - grey, powder and semi rounded chips 3-6mm		
	366		28		SILTSTONE - grey, powder		
	365		29		SILTSTONE - grey, powder		
	364	30		SANDSTONE - dark grey fine grained with a clay matrix, with quartz and grey siltstone			
	363	31		SANDSTONE - dark grey fine grained with a clay matrix, with quartz and grey siltstone			
	362	32		SILTSTONE - dark grey with fine to coarse 1-5mm quartz angular grains			
	361	33		SILTSTONE - dark grey with fine to coarse 1-5mm quartz angular grains			
	360	34		SILTSTONE - dark grey with fine to coarse 1-5mm quartz angular grains			
	359						

END OF BOREHOLE AT 122.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW12

SHEET 2 OF 4

Client:	CMC Pty Ltd	Date Commenced:	25/2/10
Project:	Cobbora Coal Mine Project	Date Completed:	26/2/10
Bore Location:	E Darlington	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Saflian

Drilling Method:	Air Hammer	Surface RL:	393.7 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 703106.1 N 6438882.75

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
			358		SILTSTONE - grey brown powder with <5% fine quartz grains	Early Permian Undifferentiated	EC = 1.78 mS/cm pH = 9.16
			36		SILTSTONE - grey brown powder		
			357		SILTSTONE - grey, powder with 2mm rounded chips with 10% fine quartz grains		
			356		SILTSTONE - dark grey, powder with 2mm rounded chips with 10% fine quartz grains		
			355		SILTSTONE - dark grey powder and semi rounded 3-4mm chips with 15% angular to semi rounded 5-7mm quartz chips		
			354		SILTSTONE - dark grey powder and semi rounded 3-4mm chips with 25% angular to semi rounded 5-7mm quartz chips		
			353				
			352				
			351		SANDSTONE - grey fine to coarse grained, fine fraction 40% siltstone 60% quartz, coarse fraction 60% sub angular quartz		
			350				
			349				
			348		SANDSTONE - grey fine to medium grained quartz, semi rounded 3-4mm grains with 20% siltstone and a clay matrix		
			347		SANDSTONE - grey fine to medium grained quartz, semi rounded 3-4mm grains with 20% siltstone and a clay matrix with 15% 5-15mm quartz gravel		
			346		SANDSTONE - grey medium to coarse grained 2-6mm quartz with a fine clay matrix and a dark brown claystone band		
			345		SANDSTONE - grey medium grained 1-2mm		
			344		SANDSTONE - grey medium to coarse grained 1-5mm semi rounded quartz		
			343				
			342		SANDSTONE - grey medium to coarse grained 1-5mm semi rounded quartz with 10% 5-7mm semi rounded quartz and 20% semi rounded siltstone and clay matrix		
			341				
			340		CLAYSTONE - light grey/cream, fine powder and semi rounded 4-6mm planar chips		
			339				
			338				
			337				
			336				
			335				
			334		CLAYSTONE - light grey/cream, fine powder and 15% sub angular 2-3mm chips		
			333				
			332				
			331				
			330		CLAYSTONE - light grey/cream, fine powder and 15% sub angular 2-5mm chips		
			329				
			328				
			327				
			326				
			325		CLAYSTONE - light grey/cream, fine powder and 15% semi rounded 3-6mm chips		
			324				

END OF BOREHOLE AT 122.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW12

SHEET 3 OF 4

Client:	CMC Pty Ltd	Date Commenced:	25/2/10
Project:	Cobbora Coal Mine Project	Date Completed:	26/2/10
Bore Location:	E Darlington	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Saflian

Drilling Method:	Air Hammer	Surface RL:	393.7 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 703106.1 N 6438882.75

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		323	71		CLAYSTONE - light grey/cream, fine powder and 15% semi rounded 3-6mm chips <i>(continued)</i>	Early Permian Undifferentiated	
		322	72		CLAYSTONE - light grey/cream with 20% semi rounded 2-7mm chips with a fine powder		
		321	73				
		320	74				
		319	75				
		318	76				
		317	77				
		316	78		CLAYSTONE - light yellow cream grey 15% rounded 2-7mm chips with powder		
		315	79		CLAYSTONE - light yellow cream grey 25% rounded 2-7mm chips with powder		
		314	80				
		313	81		CLAYSTONE - light yellow cream grey fine powder		
		312	82		CLAYSTONE - light yellow cream grey fine powder with 5% 4-6mm semi rounded chips		
		311	83		CLAYSTONE - light grey/cream fine powder with 10% 4-6mm semi rounded chips		
		310	84				
		309	85				
		308	86				
		307	87				
		306	88				
		305	89				
		304	90		CLAYSTONE - light grey sub angular planar 3-30mm chips		
		303	91		CLAYSTONE - light grey sub angular planar 3-30mm chips with 5% angular quartz grains		
		302	92		CLAYSTONE - light grey sub angular planar 3-30mm chips		
		301	93				
		300	94		CLAYSTONE - light grey semi rounded to sub angular 2-6mm chips <5% 25mm semi rounded chips		
	bentonite	299	95		CLAYSTONE - light grey and green grey sub angular 2-4mm with <5% angular quartz		
	gravel pack	298	96		CLAYSTONE - light grey and green grey slightly fractured semi rounded chips 20-25mm with <5% angular quartz,		
		297	97		CLAYSTONE - light grey/green grey semi rounded (evidence of water weathering and fractures) 5% brown claystone		
		296	98				
		295	99		SILTSTONE - grey red siltstone sub angular to semi rounded 3-4mm chips with light grey/green claystone		
		294	100		SILTSTONE - dark green grey, angular planar 2-8mm chips and larger 10mm semi rounded chips		
		293	101				
		292	102		SILTSTONE - dark green grey, angular 3-4mm chips with 40% red grey siltstone		
		291	103		SILTSTONE - light grey angular 4-12mm chips with 10% grey siltstone		
		290	104		SILTSTONE - light grey semi rounded fractured chips 3-15mm		
		289					

END OF BOREHOLE AT 122.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW12

SHEET 4 OF 4

Client:	CMC Pty Ltd	Date Commenced:	25/2/10
Project:	Cobbora Coal Mine Project	Date Completed:	26/2/10
Bore Location:	E Darlington	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Saflian

Drilling Method:	Air Hammer	Surface RL:	393.7 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 703106.1 N 6438882.75

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	50 mm slotted PVC casing	288	106		SILTSTONE - light grey semi rounded fractured chips 3-15mm <i>(continued)</i>	Early Permian Undifferentiated	
		287	107		SILTSTONE - light grey semi rounded fractured chips 3-10mm		
		286	108		SILTSTONE - light grey angular 2-20mm chips		
		285	109		SILTSTONE - grey and red angular 3-10mm chips with <5% angular quartz chips		
		284	110		SILTSTONE - grey angular 3-10mm chips		
		283	111				
		282	112				
		281	113				
		280	114		SILTSTONE - light grey semi rounded and angular 2-10mm with red grey and green grey siltstone		
		279	115				
		278	116				
		277	117				
		276	118		SILTSTONE - light grey semi rounded and angular 3-12mm with green grey siltstone		
		275	119				
		274	120		sump		
		273	121				
		272	122				
		271	123				
		270	124				
		269	125				
		268	126				
		267	127				
	266	128					
	265	129					
	264	130					
	263	131					
	262	132					
	261	133					
	260	134					
	259	135					
	258	136					
	257	137					
	256	138					
	255	139					
	254	139					

END OF BOREHOLE AT 122.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW13A

SHEET 1 OF 6

Client:	CMC Pty Ltd	Date Commenced:	9/3/10
Project:	Cobbora Coal Mine Project	Date Completed:	10/3/10
Bore Location:	E Darlington	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Saflian

Drilling Method:	Air Hammer	Surface RL:	408.3 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 704679.17 N 6437233.3

Bore Information		Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION
	50 mm PVC casing 50 mm PVC casing	408	1		CLAY - red brown clay with 3-4mm rounded ironstone gravel	Napperby Formation
		407	2		CLAY - red brown clay with 20% angular ironstone 3-25mm chips	
		406	3		CLAY - red brown clay with bands of fractured ironstone, angular 4-12mm	
		405	4		CLAY - yellow brown clay with minor silt	
		404	5		CLAY - yellow brown clay with minor silt with 5% angular 5-7mm ironstone gravel	
		403	6		SILTY CLAY - light red brown silty clay	
		402	7		CLAY - red brown clay	
		401	8		SILTY CLAY - dark red brown silty clay	
		400	9		SANDY CLAY - yellow brown/red brown mottled sandy clay	
		399	10		SANDY CLAY - red brown sandy clay	
		398	11		SANDY CLAY - light brown sandy clay	
		397	12		SANDY CLAY - light brown sandy clay	
		396	13		SANDY CLAY - light brown sandy clay	
		395	14		SANDY CLAY - light brown sandy clay	
		394	15		SANDY CLAY - light brown sandy clay	
		393	16		SILTSTONE - light grey siltstone, fine powder	
		392	17		SILTSTONE - light grey siltstone, fine powder with 10% fine quartz grains	
		391	18		SILTSTONE - light grey siltstone, fine powder	
		390	19		SILTSTONE - light grey siltstone, fine powder	
	389					

EC = 5.83 mS/cm
pH = 8.45

END OF BOREHOLE AT 119.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW13A

SHEET 2 OF 6

Client:	CMC Pty Ltd	Date Commenced:	9/3/10
Project:	Cobbora Coal Mine Project	Date Completed:	10/3/10
Bore Location:	E Darlington	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Saflian

Drilling Method:	Air Hammer	Surface RL:	408.3 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 704679.17 N 6437233.3

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		388	21		SILTSTONE - grey siltstone, fine powder angular chips layered with dark grey siltstone	Napperby Formation	
		387	22				
		386	23				
		385	24				
		384	25				
		383	26				
		382	27		SILTSTONE - grey siltstone, angular chips with fine powder		
		381	28		SILTSTONE - grey siltstone, powder and semi rounded chips		
		380	29		MUDSTONE - grey brown mudstone, fine powder with angular planar 3-10mm chips		
		379	30				
		378	31				
		377	32				
		376	33				
		375	34				
		374	35				
		373	36				
		372	37		MUDSTONE - grey brown mudstone sub angular 4-6mm chips with 10% inter-layered grey siltstone		
		371	38				
		370	39				
		369					

END OF BOREHOLE AT 119.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW13A

SHEET 3 OF 6

Client:	CMC Pty Ltd	Date Commenced:	9/3/10
Project:	Cobbora Coal Mine Project	Date Completed:	10/3/10
Bore Location:	E Darlington	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Saflian

Drilling Method:	Air Hammer	Surface RL:	408.3 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 704679.17 N 6437233.3

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		368			MUDSTONE - grey brown mudstone sub angular 4-6mm chips with 10% inter-layered grey siltstone <i>(continued)</i>	Napperby Formation	
			41				
		367					
			42				
		366					
			43				
		365					
			44				
		364					
			45				
		363					
			46		MUDSTONE - dark grey brown mudstone fine powder semi rounded 3-10mm chip with 10% interlayered grey siltstone		
		362					
			47				
		361					
			48				
		360					
			49				
		359					
			50				
		358					
			51		MUDSTONE - dark grey brown mudstone sub angular 4-6mm chips with 10% interlayered grey siltstone		
		357					
			52		MUDSTONE - dark grey brown mudstone, fine powder with sub angular 4-12mm chips		
		356					
			53				
		355					
			54		MUDSTONE - dark grey brown mudstone, fine powder with semi rounded 4-12mm chips with 30% interlayered grey siltstone		
		354					
			55				
		353					
			56				
		352					
			57				
		351					
			58		MUDSTONE - dark grey brown mudstone, fine powder with semi rounded 4-12mm chips with 10% interlayered grey siltstone		
		350					
			59				
		349					

END OF BOREHOLE AT 119.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW13A

SHEET 4 OF 6

Client:	CMC Pty Ltd	Date Commenced:	9/3/10
Project:	Cobbora Coal Mine Project	Date Completed:	10/3/10
Bore Location:	E Darlington	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Saflian

Drilling Method:	Air Hammer	Surface RL:	408.3 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 704679.17 N 6437233.3

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		348	61		MUDSTONE - dark grey brown mudstone, powder and semi rounded 3-12mm chips	Napperby Formation	
		347	62				
		346	63		MUDSTONE - dark grey brown mudstone, powder and semi rounded 3-8mm chips		
		345	64				
		344	65				
		343	66		MUDSTONE - dark grey brown mudstone, powder and semi rounded 3-10mm chips		
		342	67				
		341	68				
		340	69				
		339	70				
		338	71				
		337	72				
		336	73				
		335	74				
		334	75				
		333	76		MUDSTONE - dark grey brown mudstone, powder and sub angular to semi rounded 3-5mm chips		
		332	77				
		331	78				
		330	79				
		329					

END OF BOREHOLE AT 119.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW13A

SHEET 5 OF 6

Client:	CMC Pty Ltd	Date Commenced:	9/3/10
Project:	Cobbora Coal Mine Project	Date Completed:	10/3/10
Bore Location:	E Darlington	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Saflian

Drilling Method:	Air Hammer	Surface RL:	408.3 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 704679.17 N 6437233.3

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		328	81		MUDSTONE - dark grey brown mudstone, powder and sub angular to semi rounded 3-5mm chips <i>(continued)</i>	Napperby Formation	
		327	82				
		326	83		SILTSTONE - light brown to brown grey siltstone, powder and sub angular 3-15mm chips		
		325	84		SILTSTONE - dark grey and light grey layered siltstone 60% light grey semi rounded 2-10mm chips with powder		
		324	85				
		323	86		MUDSTONE - dark grey mudstone carbonaceous fine powder and semi rounded chips		
		322	87		COARSE SILTSTONE - dark brown/grey coarse siltstone powder, few chips		
		321	88		COARSE SILTSTONE - light brown grey coarse siltstone/fine sandstone, powder		
		320	89		SILTSTONE - dark grey brown siltstone, powder sub angular 5mm chips		
		319	90		SILTSTONE - grey siltstone with 20% light grey siltstone semi rounded chips 4-7mm		
		318	91				
		317	92				
		316	93				
		315	94				
		314	95		SILTSTONE - grey siltstone angular planar 3-7mm with 10% light grey siltstone 2-4mm chips	Digby Formation	
		313	96		FINE SANDSTONE - grey fine grained quartz sandstone 1-2mm uniform with 40% grey siltstone		
		312	97		SILTSTONE - light grey siltstone angular 5mm chips with 20% quartz 2mm grains		
		311	98		SANDSTONE - light grey, fine to medium (1-2mm) grains, quartz and siltstone 3mm	Trinkey Seam	
		310	99		SILTSTONE/COAL - light grey angular 3-5mm chips with a band of coal, shiny stoney black		
		309					

END OF BOREHOLE AT 119.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW13A

SHEET 6 OF 6

Client:	CMC Pty Ltd	Date Commenced:	9/3/10
Project:	Cobbora Coal Mine Project	Date Completed:	10/3/10
Bore Location:	E Darlington	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Saflian

Drilling Method:	Air Hammer	Surface RL:	408.3 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 704679.17 N 6437233.3

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		308	101		SILTSTONE - dark grey and light grey sub angular planar 5-10mm 50/50 mix	Ellismayne Formation	
		307	102		SILTSTONE - grey semi rounded 2-6mm chips		
		306	103		SILTSTONE - light grey with 30% dark grey chips		
		305	104		SILTSTONE - dark grey/black angular 5-6mm chips		
	bentonite	304	105		SILTSTONE - light and dark grey 3-6mm semi rounded chips		
		303	106		COAL/CARBONACEOUS MUDSTONE - dark black/grey brown with coarse grey brown siltstone, coal angular 3-4mm		
	gravel pack	302	107		SILTSTONE - dark grey sub angular 5-7mm chips with 15% light grey siltstone		
		301	108		SILTSTONE - light grey with a layer of carbonaceous mudstone/stoney coal		
	50 mm slotted PVC casing	300	109		COAL/CARBONACEOUS MUDSTONE - dull stoney angular 2-3mm with <10% light grey siltstone		
		299	110		COAL/CARBONACEOUS MUDSTONE - dull stoney sub angular 4-5mm with <10% light grey claystone		Whaka Formation
		298	111		COAL/CARBONACEOUS MUDSTONE - dull stoney sub angular 4-5mm with 20% light grey claystone		
		297	112		CARBONACEOUS MUDSTONE - angular 3-4mm with 20% cream claystone/clay matrix		
		296	113		SILTSTONE/CARBONACEOUS MUDSTONE - dark grey and grey interlayered mudstone and siltstone with 30% cream claystone		
		295	114		CARBONACEOUS MUDSTONE - angular 3-7mm with 10% light grey brown claystone		
		294	115				
		293	116				
		292	117				
		291	118				
	sump	290	119				
		289					

END OF BOREHOLE AT 119.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW13B

SHEET 1 OF 5

Client:	CMC Pty Ltd	Date Commenced:	5/3/10
Project:	Cobbora Coal Mine Project	Date Completed:	8/3/10
Bore Location:	E Darlington	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Saflian

Drilling Method:	Air Hammer	Surface RL:	408.2 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 704684.63 N 6437237.27

Bore Information		Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION
	50 mm PVC casing 50 mm PVC casing	408			CLAY - red brown clay with 3-4mm rounded ironstone gravel	Napperby Formation
		407	1		CLAY - red brown clay with 20% angular ironstone 3-25mm chips	
		406	2		CLAY - red brown clay with bands of fractured ironstone, angular 4-12mm	
		405	3		CLAY - yellow brown clay with minor silt	
		404	4		CLAY - yellow brown clay with minor silt with 5% angular 5-7mm ironstone gravel	
		403	5		SILTY CLAY - light red brown silty clay	
		402	6		CLAY - red brown clay	
		401	7			
		400	8		SILTY CLAY - dark red brown silty clay	
		399	9		SANDY CLAY - yellow brown/red brown mottled sandy clay	
		398	10		SANDY CLAY - red brown sandy clay	
		397	11		SANDY CLAY - light brown sandy clay	
		396	12			
		395	13			
		394	14			
		393	15			
		392	16		SILTSTONE - light grey siltstone, fine powder	
		391	17		SILTSTONE - light grey siltstone, fine powder with 10% fine quartz grains	
		390	18			
		389	19			
		388	20		SILTSTONE - grey siltstone, fine powder angular chips layered with dark grey siltstone	
		387	21			
		386	22			
		385	23			
		384	24			
		383	25			
		382	26			
		381	27		SILTSTONE - grey siltstone, angular chips with fine powder	
		380	28		SILTSTONE - grey siltstone, powder and semi rounded chips	
	379	29		MUDSTONE - grey brown mudstone, fine powder with angular planar 3-10mm chips		

EC = 2.01 mS/cm
pH = 8.78

END OF BOREHOLE AT 136.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW13B

SHEET 2 OF 5

Client:	CMC Pty Ltd	Date Commenced:	5/3/10
Project:	Cobbora Coal Mine Project	Date Completed:	8/3/10
Bore Location:	E Darlington	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Saffian

Drilling Method:	Air Hammer	Surface RL:	408.2 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 704684.63 N 6437237.27

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		378			MUDSTONE - grey brown mudstone, fine powder with angular planar 3-10mm chips <i>(continued)</i>	Napperby Formation	
		377	31				
		376	32				
		375	33				
		374	34				
		373	35				
		372	36				
		371	37		MUDSTONE - grey brown mudstone sub angular 4-6mm chips with 10% interlayered grey siltstone		
		370	38				
		369	39				
		368	40				
		367	41				
		366	42				
		365	43				
		364	44				
		363	45				
		362	46		MUDSTONE - dark grey brown mudstone fine powder semi rounded 3-10mm chip with 10% interlayered grey siltstone		
		361	47				
		360	48				
		359	49				
		358	50				
		357	51		MUDSTONE - dark grey brown mudstone sub angular 4-6mm chips with 10% interlayered grey siltstone		
		356	52		MUDSTONE - dark grey brown mudstone, fine powder with sub angular 4-12mm chips		
		355	53				
		354	54		MUDSTONE - dark grey brown mudstone, fine powder with semi rounded 4-12mm chips with 30% interlayered grey siltstone		
		353	55				
		352	56				
		351	57				
		350	58		MUDSTONE - dark grey brown mudstone, fine powder with semi rounded 4-12mm chips with 10% interlayered grey siltstone		
		349	59				

END OF BOREHOLE AT 136.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW13B

SHEET 3 OF 5

Client:	CMC Pty Ltd	Date Commenced:	5/3/10
Project:	Cobbora Coal Mine Project	Date Completed:	8/3/10
Bore Location:	E Darlington	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Saflian

Drilling Method:	Air Hammer	Surface RL:	408.2 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 704684.63 N 6437237.27

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		348			MUDSTONE - dark grey brown mudstone, powder and semi rounded 3-12mm chips	Napperby Formation	
			61				
			62				
			63		MUDSTONE - dark grey brown mudstone, powder and semi rounded 3-8mm chips		
			64				
			65				
			66		MUDSTONE - dark grey brown mudstone, powder and semi rounded 3-10mm chips		
			67				
			68				
			69				
			70				
			71				
			72				
			73				
			74				
			75				
			76		MUDSTONE - dark grey brown mudstone, powder and sub angular to semi rounded 3-5mm chips		
			77				
			78				
			79				
			80				
			81				
			82				
			83		SILTSTONE - light brown to brown grey siltstone, powder and sub angular 3-15mm chips		
			84		SILTSTONE - dark grey and light grey layered siltstone 60% light grey semi rounded 2-10mm chips with powder		
			85				
			86		MUDSTONE - dark grey mudstone carbonaceous fine powder and semi rounded chips		
			87		COARSE SILTSTONE - dark brown/grey coarse siltstone powder, few chips		
			88		COARSE SILTSTONE - light brown grey coarse siltstone/fine sandstone, powder		
			89		SILTSTONE - dark grey brown siltstone, powder sub angular 5mm chips		

END OF BOREHOLE AT 136.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW13B

SHEET 4 OF 5

Client:	CMC Pty Ltd	Date Commenced:	5/3/10
Project:	Cobbora Coal Mine Project	Date Completed:	8/3/10
Bore Location:	E Darlington	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Saffian

Drilling Method:	Air Hammer	Surface RL:	408.2 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 704684.63 N 6437237.27

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		318			SILTSTONE - grey siltstone with 20% light grey siltstone semi rounded chips 4-7mm	Napperby Formation	
		317	91				
		316	92				
		315	93				
		314	94				
		313	95		SILTSTONE - grey siltstone angular planar 3-7mm with 10% light grey siltstone 2-4mm chips	Digby Formation	
		312	96		FINE SANDSTONE - grey fine grained quartz sandstone 1-2mm uniform with 40% grey siltstone		
		311	97		SILTSTONE - light grey siltstone angular 5mm chips with 20% quartz 2mm grains		
		310	98		SANDSTONE - light grey, fine to medium (1-2mm) grains, quartz and siltstone 3mm		
		309	99		SILTSTONE/COAL - light grey angular 3-5mm chips with a band of coal, shiny stoney black	Trinkey Seam	
		308	100		SILTSTONE - dark grey and light grey sub angular planar 5-10mm 50/50 mix	Ellismayne Formation	
		307	101				
		306	102		SILTSTONE - grey semi rounded 2-6mm chips		
		305	103				
		304	104		SILTSTONE - light grey with 30% dark grey chips		
		303	105		SILTSTONE - dark grey/black angular 5-6mm chips		
		302	106				
		301	107		SILTSTONE - light and dark grey 3-6mm semi rounded chips		
		300	108		COAL/CARBONACEOUS MUDSTONE - dark black/grey brown with coarse grey brown siltstone, coal angular 3-4mm		
		299	109		SILTSTONE - dark grey sub angular 5-7mm chips with 15% light grey siltstone		
		298	110				
		297	111		SILTSTONE - light grey with a layer of carbonaceous mudstone/stoney coal	Whaka Formation	
		296	112		COAL/CARBONACEOUS MUDSTONE - dull stoney angular 2-3mm with <10% light grey siltstone		
		295	113		COAL/CARBONACEOUS MUDSTONE - dull stoney sub angular 4-5mm with <10% light grey claystone		
		294	114		COAL/CARBONACEOUS MUDSTONE - dull stoney sub angular 4-5mm with 20% light grey claystone		
		293	115		CARBONACEOUS MUDSTONE - angular 3-4mm with 20% cream claystone/clay matrix		
		292	116				
		291	117		SILTSTONE/CARBONACEOUS MUDSTONE - dark grey and grey interlayered mudstone and siltstone with 30% cream claystone		
		290	118		CARBONACEOUS MUDSTONE - angular 3-7mm with 10% light grey brown claystone		
		289	119				

END OF BOREHOLE AT 136.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW13B

SHEET 5 OF 5

Client:	CMC Pty Ltd	Date Commenced:	5/3/10
Project:	Cobbora Coal Mine Project	Date Completed:	8/3/10
Bore Location:	E Darlington	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Safliani

Drilling Method:	Air Hammer	Surface RL:	408.2 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 704684.63 N 6437237.27

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		288			SILTSTONE - grey semi rounded to sub angular 3-4mm chips with 30% cream claystone	Avymore Claystone	
		287	121		CLAYSTONE - cream sub angular planar chips with 20% carbonaceous mudstone		
		286	122		COAL/CARBONACEOUS MUDSTONE - dull black stoney 3-4mm angular chips with 10% cream claystone	Flyblowers Creek Seam	
		285	123		COAL/CARBONACEOUS MUDSTONE - dull black stoney 3-4mm angular chips with <5% cream claystone		
		284	124		CARBONACEOUS MUDSTONE - dull black grey sub angular planar 3-6mm		
		282	126		COAL/CARBONACEOUS MUDSTONE/SILTSTONE - interlayered shiny black coal with dull black mudstone and grey siltstone		
	bentonite	281	127		CARBONACEOUS MUDSTONE/SILTSTONE - sub angular 3-10mm chips with 15% light grey cream claystone		
		280	128		SILTSTONE - dark grey sub angular 3-7mm chips		
	gravel pack 50 mm slotted PVC casing	279	129		COARSE SILTSTONE - grey semi rounded 3-4mm chips	Tomcat Gully Sandstone	
		278	130		MEDIUM TO COARSE SANDSTONE - grey quartz with 30% grey siltstone		
		277	131		MEDIUM TO COARSE SANDSTONE - grey quartz with 5% grey siltstone		
		276	132				
		275	133				
		274	134				
	sump	273	135		COAL - black shiny angular 3-4mm		
		272	136				
		271	137				
		270	138				
		269	139				
		268	140				
		267	141				
		266	142				
		265	143				
		264	144				
		263	145				
		262	146				
		261	147				
		260	148				
		259	149				

END OF BOREHOLE AT 136.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW13C

SHEET 1 OF 4

Client:	CMC Pty Ltd	Date Commenced:	3/3/10
Project:	Cobbora Coal Mine Project	Date Completed:	4/3/10
Bore Location:	E Darlington	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Saflian

Drilling Method:	Air Hammer	Surface RL:	408.2 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 704690.17 N 6437241.12

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	50 mm PVC casing 50 mm PVC casing	408			CLAY - red brown clay with 3-4mm rounded ironstone gravel	Napperby Formation	
		407	1		CLAY - red brown clay with 20% angular ironstone 3-25mm chips		
		406	2		CLAY - red brown clay with bands of fractured ironstone, angular 4-12mm		
		405	3		CLAY - yellow brown clay with minor silt		
		404	4		CLAY - yellow brown clay with minor silt with 5% angular 5-7mm ironstone gravel		
		403	5		SILTY CLAY - light red brown silty clay		
		402	6		CLAY - red brown clay		
		401	7				
		400	8		SILTY CLAY - dark red brown silty clay		
		399	9		SANDY CLAY - yellow brown/red brown mottled sandy clay		
		398	10		SANDY CLAY - red brown sandy clay		
		397	11		SANDY CLAY - light brown sandy clay		
		396	12				
		395	13				
		394	14				
		393	15				
		392	16		SILTSTONE - light grey siltstone, fine powder		
		391	17		SILTSTONE - light grey siltstone, fine powder with 10% fine quartz grains		
		390	18				
		389	19				
		388	20		SILTSTONE - grey siltstone, fine powder angular chips layered with dark grey siltstone		
		387	21				
		386	22				
		385	23				
		384	24				
		383	25				
		382	26				
		381	27		SILTSTONE - grey siltstone, angular chips with fine powder		
		380	28		SILTSTONE - grey siltstone, powder and semi rounded chips		
		379	29		MUDSTONE - grey brown mudstone, fine powder with angular planar 3-10mm chips		
		378	30				
		377	31				
		376	32				
		375	33				
		374	34				
		373	35				
		372	36				
		371	37		MUDSTONE - grey brown mudstone sub angular 4-8mm chips with 10% interlayered grey siltstone		
		370	38				
	369	39					

EC = 1.67 mS/cm
pH = 6.91

END OF BOREHOLE AT 150.20 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW13C

SHEET 2 OF 4

Client:	CMC Pty Ltd	Date Commenced:	3/3/10
Project:	Cobbora Coal Mine Project	Date Completed:	4/3/10
Bore Location:	E Darlington	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Saffian

Drilling Method:	Air Hammer	Surface RL:	408.2 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 704690.17 N 6437241.12

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		368			MUDSTONE - grey brown mudstone sub angular 4-6mm chips with 10% interlayered grey siltstone <i>(continued)</i>	Napperby Formation	
		367	41				
		366	42				
		365	43				
		364	44				
		363	45				
		362	46		MUDSTONE - dark grey brown mudstone fine powder semi rounded 3-10mm chip with 10% interlayered grey siltstone		
		361	47				
		360	48				
		359	49				
		358	50				
		357	51		MUDSTONE - dark grey brown mudstone sub angular 4-6mm chips with 10% interlayered grey siltstone		
		356	52		MUDSTONE - dark grey brown mudstone, fine powder with sub angular 4-12mm chips		
		355	53				
		354	54		MUDSTONE - dark grey brown mudstone, fine powder with semi rounded 4-12mm chips with 30% interlayered grey siltstone		
		353	55				
		352	56				
		351	57				
		350	58		MUDSTONE - dark grey brown mudstone, fine powder with semi rounded 4-12mm chips with 10% interlayered grey siltstone		
		349	59				
		348	60		MUDSTONE - dark grey brown mudstone, powder and semi rounded 3-12mm chips		
		347	61				
		346	62				
		345	63		MUDSTONE - dark grey brown mudstone, powder and semi rounded 3-8mm chips		
		344	64				
		343	65				
		342	66		MUDSTONE - dark grey brown mudstone, powder and semi rounded 3-10mm chips		
		341	67				
		340	68				
		339	69				
		338	70				
		337	71				
		336	72				
		335	73				
		334	74				
		333	75				
		332	76		MUDSTONE - dark grey brown mudstone, powder and sub angular to semi rounded 3-5mm chips		
		331	77				
		330	78				
		329	79				

END OF BOREHOLE AT 150.20 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW13C

SHEET 3 OF 4

Client:	CMC Pty Ltd	Date Commenced:	3/3/10
Project:	Cobbora Coal Mine Project	Date Completed:	4/3/10
Bore Location:	E Darlington	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Safliian

Drilling Method:	Air Hammer	Surface RL:	408.2 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 704690.17 N 6437241.12

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		328			MUDSTONE - dark grey brown mudstone, powder and sub angular to semi rounded 3-5mm chips (continued)	Napperby Formation	
		327	81				
		326	82				
		325	83		SILTSTONE - light brown to brown grey siltstone, powder and sub angular 3-15mm chips		
		324	84		SILTSTONE - dark grey and light grey layered siltstone 60% light grey semi rounded 2-10mm chips with powder		
		323	85				
		322	86		MUDSTONE - dark grey mudstone carbonaceous fine powder and semi rounded chips		
		321	87		COARSE SILTSTONE - dark brown/grey coarse siltstone powder, few chips		
		320	88		COARSE SILTSTONE - light brown grey coarse siltstone/fine sandstone, powder		
		319	89		SILTSTONE - dark grey brown siltstone, powder sub angular 5mm chips		
		318	90		SILTSTONE - grey siltstone with 20% light grey siltstone semi rounded chips 4-7mm		
		317	91				
		316	92				
		315	93				
		314	94				
		313	95		SILTSTONE - grey siltstone angular planar 3-7mm with 10% light grey siltstone 2-4mm chips	Digby Formation	
		312	96		FINE SANDSTONE - grey fine grained quartz sandstone 1-2mm uniform with 40% grey siltstone		
		311	97		SILTSTONE - light grey siltstone angular 5mm chips with 20% quartz 2mm grains		
		310	98		SANDSTONE - light grey, fine to medium (1-2mm) grains, quartz and siltstone 3mm	Trinkey Seam	
		309	99		SILTSTONE/COAL - light grey angular 3-5mm chips with a band of coal, shiny stoney black		
		308	100		SILTSTONE - dark grey and light grey sub angular planar 5-10mm 50/50 mix	Ellismayne Formation	
		307	101				
		306	102		SILTSTONE - grey semi rounded 2-6mm chips		
		305	103				
		304	104		SILTSTONE - light grey with 30% dark grey chips		
		303	105		SILTSTONE - dark grey/black angular 5-6mm chips		
		302	106				
		301	107		SILTSTONE - light and dark grey 3-6mm semi rounded chips		
		300	108		COAL/CARBONACEOUS MUDSTONE - dark black/grey brown with coarse grey brown siltstone, coal angular 3-4mm		
		299	109		SILTSTONE - dark grey sub angular 5-7mm chips with 15% light grey siltstone		
		298	110				
		297	111		SILTSTONE - light grey with a layer of carbonaceous mudstone/stoney coal		
		296	112		COAL/CARBONACEOUS MUDSTONE - dull stoney angular 2-3mm with <10% light grey siltstone	Whaka Formation	
		295	113		COAL/CARBONACEOUS MUDSTONE - dull stoney sub angular 4-5mm with <10% light grey claystone		
		294	114		COAL/CARBONACEOUS MUDSTONE - dull stoney sub angular 4-5mm with 20% light grey claystone		
		293	115		CARBONACEOUS MUDSTONE - angular 3-4mm with 20% cream claystone/clay matrix		
		292	116				
		291	117		SILTSTONE/CARBONACEOUS MUDSTONE - dark grey and grey interlayered mudstone and siltstone with 30% cream claystone		
		290	118		CARBONACEOUS MUDSTONE - angular 3-7mm with 10% light grey brown claystone		
		289	119				

END OF BOREHOLE AT 150.20 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW13C

SHEET 4 OF 4

Client:	CMC Pty Ltd	Date Commenced:	3/3/10
Project:	Cobbora Coal Mine Project	Date Completed:	4/3/10
Bore Location:	E Darlington	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Saflian

Drilling Method:	Air Hammer	Surface RL:	408.2 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 704690.17 N 6437241.12

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		288			SILTSTONE - grey semi rounded to sub angular 3-4mm chips with 30% cream claystone	Avymore Claystone	
		287	121		CLAYSTONE - cream sub angular planar chips with 20% carbonaceous mudstone		
		286	122		COAL/CARBONACEOUS MUDSTONE - dull black stoney 3-4mm angular chips with 10% cream claystone	Flyblowers Creek Seam	
		285	123		COAL/CARBONACEOUS MUDSTONE - dull black stoney 3-4mm angular chips with <5% cream claystone		
		284	124		CARBONACEOUS MUDSTONE - dull black grey sub angular planar 3-6mm		
		283	125				
		282	126		COAL/CARBONACEOUS MUDSTONE/SILTSTONE - interlayered shiny black coal with dull black mudstone and grey siltstone		
		281	127		CARBONACEOUS MUDSTONE/SILTSTONE - sub angular 3-10mm chips with 15% light grey cream claystone		
		280	128		SILTSTONE - dark grey sub angular 3-7mm chips		
		279	129		COARSE SILTSTONE - grey semi rounded 3-4mm chips	Tomcat Gully Sandstone	
		278	130		MEDIUM TO COARSE SANDSTONE - grey quartz with 30% grey siltstone		
		277	131		MEDIUM TO COARSE SANDSTONE - grey quartz with 5% grey siltstone		
		276	132				
		275	133				
	bentonite	274	134				
		273	135		COAL - black shiny angular 3-4mm	Upper Ulan Seam	
	gravel pack	272	136		COAL - grey black angular 3-4mm		
	50 mm slotted PVC casing	271	137		COAL/CARBONACEOUS MUDSTONE - dull black stoney with 10% grey claystone		
		270	138		COAL/CARBONACEOUS MUDSTONE - dull black stoney with 20% grey claystone		
		269	139		COAL - shiny black 2-4mm angular chips		
		268	140				
		267	141		CLAYSTONE - light grey with 30% grey siltstone semi rounded planar chips 3-6mm	C-Marker Claystone	
		266	142				
		265	143		CLAYSTONE - light grey with 30% coal dull stoney		
		264	144		COAL - shiny black 3-5mm angular chips	Lower Ulan Seam	
		263	145		CARBONACEOUS MUDSTONE - dull grey black 3-7mm sub angular planar chips with <5% grey brown claystone		
		262	146		SILTSTONE - dark grey siltstone, 3-12mm chips with a band of shiny black coal		
		261	147		CARBONACEOUS MUDSTONE - dark grey brown semi rounded planar 3-5mm chips		
		260	148				
	sump	259	149				
		258	150				
		257	151				
		256	152				
		255	153				
		254	154				
		253	155				
		252	156				
		251	157				
		250	158				
		249	159				

END OF BOREHOLE AT 150.20 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW13D

SHEET 1 OF 5

Client:	CMC Pty Ltd	Date Commenced:	26/2/10
Project:	Cobbora Coal Mine Project	Date Completed:	3/3/10
Bore Location:	E Darlington	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Safliani

Drilling Method:	Air Hammer	Surface RL:	408.1 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 704695.92 N 6437244.88

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	50 mm PVC casing 50 mm PVC casing	407	1		CLAY - red brown clay with 3-4mm rounded ironstone gravel	Napperby Formation	
		406	2		CLAY - red brown clay with 20% angular ironstone 3-25mm chips		
		405	3		CLAY - red brown clay with bands of fractured ironstone, angular 4-12mm		
		404	4		CLAY - yellow brown clay with minor silt		
		403	5		CLAY - yellow brown clay with minor silt with 5% angular 5-7mm ironstone gravel		
		402	6		SILTY CLAY - light red brown silty clay		
		401	7		CLAY - red brown clay		
		400	8		CLAY - yellow brown/grey/red mottled clay with angular 12-15mm ironstone pieces		
		399	9		CLAY - yellow brown/brown mottled clay		
		398	10		CLAY - red brown clay		
		397	11		IRONSTONE - red brown ironstone band, powder and 3-4mm angular chips		
		396	12		CLAY - light grey clay with yellow brown mottles		
		395	13		CLAY - light grey clay with very fine sand highly plastic		
		394	14		CLAY - light grey clay with very fine sand highly plastic with a band of brown siltstone		
		393	15		SANDY CLAY - light grey sandy clay with fine to medium sand		
		392	16				
		391	17				
		390	18				
		389	19				
		388	20				
		387	21		SILTSTONE - grey siltstone, powder and 30% 4-10mm sub angular planar chips		
		386	22				
		385	23				
		384	24		MUDSTONE - grey mudstone/siltstone (fine material) powder and angular planar 3-12mm chips		
		383	25				
		382	26		SILTSTONE - light grey siltstone, powder and larger angular 2-15mm chips some semi rounded		
		381	27				
		380	28				
		379	29		MUDSTONE - dark grey brown mudstone, powder and semi rounded 2-7mm chips		
		378	30				
		377	31				
		376	32		MUDSTONE - dark grey brown mudstone, powder and semi rounded 3-15mm chips		
		375	33		MUDSTONE - dark grey brown mudstone, very fine powder, semi rounded 3-7mm chips, chips becoming sub angular 4-10mm at 36m		
		374	34				
		373	35				
		372	36				
		371	37				
		370	38		MUDSTONE - dark grey brown mudstone powder and angular 15-25mm chips		
		369	39		MUDSTONE - dark grey brown mudstone powder and semi rounded and angular 3-6mm chips		

EC = 1.61 mS/cm
pH = 6.7

END OF BOREHOLE AT 162.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW13D

SHEET 2 OF 5

Client:	CMC Pty Ltd	Date Commenced:	26/2/10
Project:	Cobbora Coal Mine Project	Date Completed:	3/3/10
Bore Location:	E Darlington	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Safliian

Drilling Method:	Air Hammer	Surface RL:	408.1 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 704695.92 N 6437244.88

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		367	41		MUDSTONE - dark grey brown mudstone powder and semi rounded and angular 3-8mm chips (continued)	Napperby Formation	
		366	42		MUDSTONE - dark grey brown mudstone fine powder semi rounded planar chips 5-7mm		
		365	43		MUDSTONE - dark grey brown mudstone fine powder semi rounded planar chips 5-7mm with interlayered light grey siltstone		
		364	44				
		363	45		MUDSTONE - dark grey brown mudstone, fine powder and semi rounded planar 3-10mm chips		
		362	46				
		361	47				
		360	48				
		359	49		MUDSTONE - dark grey brown mudstone, fine powder and semi rounded planar 5-15mm chips with <5% angular		
		358	50				
		357	51				
		356	52				
		355	53				
		354	54				
		353	55		MUDSTONE - interlayered dark grey brown mudstone with light grey siltstone		
		352	56				
		351	57		MUDSTONE - dark grey brown mudstone, fine powder and semi rounded planar chips 4-12mm chips		
		350	58				
		349	59				
		348	60		MUDSTONE - interlayered dark grey brown mudstone with grey siltstone 70% mudstone, subangular 5-7mm chips		
		347	61				
		346	62				
		345	63				
		344	64				
		343	65		MUDSTONE - dark grey brown mudstone, fine powder 30% 5-12mm sub angular planar chips		
		342	66				
		341	67				
		340	68		MUDSTONE - dark grey brown mudstone, fine powder 40% 5-12mm semi rounded planar chips		
		339	69				
		338	70		MUDSTONE - interlayered dark grey brown mudstone with light grey siltstone 50% chips 3-5mm semi rounded 70% mudstone		
		337	71				
		336	72		MUDSTONE - dark grey brown mudstone, fine powder, 3-15 semi rounded planar chips		
		335	73		MUDSTONE - dark grey brown mudstone, fine powder, 3-5 semi rounded planar chips		
		334	74				
		333	75				
		332	76				
		331	77		MUDSTONE - dark grey brown mudstone, fine powder, 10-55 angular planar chips		
		330	78		MUDSTONE - dark grey mudstone 5-20mm angular chips and powder		
		329	79		MUDSTONE - dark grey mudstone angular planar 5-15mm		

END OF BOREHOLE AT 162.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW13D

SHEET 3 OF 5

Client:	CMC Pty Ltd	Date Commenced:	26/2/10
Project:	Cobbora Coal Mine Project	Date Completed:	3/3/10
Bore Location:	E Darlington	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Saflian

Drilling Method:	Air Hammer	Surface RL:	408.1 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 704695.92 N 6437244.88

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		327	81		MUDSTONE - dark grey mudstone angular planar 5-15mm <i>(continued)</i>	Napperby Formation	
		326	82				
		325	83		CLAYSTONE - cream/light grey claystone		
		324	84		SILTSTONE - grey siltstone, powder and angular 4-8mm chips		
		323	85		SILTSTONE - grey siltstone, powder and angular 4-8mm chips with a band of light grey cream claystone		
		322	86		MUDSTONE - dark grey mudstone/siltstone angular planar 5-7mm chips and powder		
		321	87				
		320	88		SILTSTONE - light grey coarse siltstone, powder no chips		
		319	89		MUDSTONE - grey 10mm mudstone, powder and semi rounded planar 5-7mm chips <5% black mudstone specks		
		318	90				
		317	91				
		316	92				
		315	93				
		314	94				
		313	95		SILTSTONE - grey siltstone, powder semi rounded chips 3-10mm		
		312	96		SANDSTONE - grey fine grained sandstone, powder 2-3mm rounded chips 30% fine quartz grains	Digby Formation	
		311	97		SANDSTONE - light grey fine grained sandstone, powder with 45% fine quartz grains		
		310	98		SANDSTONE - light grey fine grained sandstone, powder with 30% fine quartz grains		
		309	99		SILTSTONE - grey siltstone, powder with 2-5mm angular chips with a 15cm dull coal band	Trinkey Seam	
		308	100		CLAYSTONE - cream claystone interlayered with grey siltstone, powder 2-4mm semi rounded chips	Ellismayne Formation	
		307	101		SILTSTONE - light grey siltstone semi rounded to sub angular 3-6mm chips and powder		
		306	102		SILTSTONE - grey siltstone, coarse powder and semi rounded 7-12mm chips		
		305	103				
		304	104		SILTSTONE - grey siltstone, coarse powder and angular 2-4mm chips		
		303	105		SILTSTONE - light grey and grey siltstone, angular 3-10mm chips, coarse grains		
		302	106				
		301	107		SILTSTONE - light grey siltstone rounded to sub angular 2-4mm chips		
		300	108		MUDSTONE - dark grey carbonaceous mudstone/coal, stony black/grey angular 2-7mm chips with 20% grey siltstone		
		299	109		SILTSTONE - dark grey siltstone with 25% light grey siltstone, planar 5-15mm chips		
		298	110				
		297	111		SILTSTONE - light grey and dark grey siltstone, semi rounded 3-7mm chips		
		296	112		COAL - coal, dull black/grey stony with a band of light grey brown claystone	Whaka Formation	
		295	113		COAL - coal/dull grey black carbonaceous mudstone, 4-5mm chips with <5% fines of light grey brown claystone		
		294	114		MUDSTONE - dark grey black carbonaceous mudstone/coal, angular 3-5mm chips with 20% grey brown claystone, <5% orange brown claystone		
		293	115				
		292	116		CLAYSTONE - light cream grey claystone, angular 4-6mm chips with 40% 5-7mm dark grey siltstone		
		291	117		MUDSTONE - black/dark grey mudstone/siltstone angular 3-7mm chips with 20% cream grey claystone		
		290	118		MUDSTONE - black/dark grey mudstone/siltstone angular 3-7mm chips with 10% cream grey claystone		
		289	119		SILTSTONE - dark grey black siltstone/carbonaceous mudstone, angular 3-8mm chips with 5% light grey siltstone		

END OF BOREHOLE AT 162.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW13D

SHEET 4 OF 5

Client:	CMC Pty Ltd	Date Commenced:	26/2/10
Project:	Cobbora Coal Mine Project	Date Completed:	3/3/10
Bore Location:	E Darlington	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Saflian

Drilling Method:	Air Hammer	Surface RL:	408.1 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 704695.92 N 6437244.88

Bore Information				Field Material Description			
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
			287	121	SILTSTONE - light grey and cream siltstone, semi rounded 3-5mm chips	Avymore Claystone	
			286	122	CLAYSTONE - cream claystone, semi rounded 3-5mm chips with dark grey carbonaceous mudstone		
			285	123	MUDSTONE - dark grey carbonaceous mudstone, angular 3-7mm chips with 10% grey siltstone	Flyblowers Creek Seam	
			284	124	COAL - coal, stony dull black/carbonaceous mudstone angular 3-5mm chips with 10% dark brown claystone		
			283	125			
			282	126	SILTSTONE - dark grey siltstone, angular 4-15mm chips with 15% red brown claystone		
			281	127	CLAYSTONE - cream/light grey claystone interlayered with grey siltstone, semi rounded 3-7mm, equal mix		
			280	128	SILTSTONE - dark grey siltstone angular 3-10mm chips 10% rounded red brown 3mm claystone		
			279	129	SILTSTONE - light grey siltstone, angular to semi rounded 4-7mm chips with 20% siltstone	Tomcat Gully Sandstone	
			278	130	SANDSTONE - grey medium to coarse grained sandstone, quartz 2-5mm norm uniform with 10% grey siltstone angular 2mm		
			277	131			
			276	132	SANDSTONE - grey medium to coarse grained quartz sandstone 2-4mm with 10% white and brown claystone and 10% 2-3mm angular siltstone/coal		
			275	133	SANDSTONE - grey coarse grained quartz sandstone 3-5mm with 15% siltstone/coal 2mm sub angular and some larger 20mm pieces		
			274	134	SANDSTONE - grey medium grained quartz sandstone with 10% grey siltstone and stony coal and <5% larger 5-7mm quartz grains some claystone chips		
			273	135	COAL - coal, stony angular 3-7mm with <5% clay/claystone 2-3mm chips	Upper Ulan Seam	
			272	136	COAL - coal, stony angular planar 3-10mm chips with a band of light grey siltstone		
			271	137	COAL - coal, stony angular planar 3-6mm with 20% light grey claystone and brown claystone		
			270	138	COAL - coal, stony angular 3-10mm <10% grey brown claystone		
			269	139			
			268	140	SILTSTONE - grey, light grey and dark grey siltstone, sub angular 2-7mm		
			267	141	SILTSTONE - interlayered slightly fractured grey siltstone with light grey cream claystone, semi rounded to sub angular 3-20mm chips equal mix	C-Marker Claystone	
			266	142	SILTSTONE - interlayered slightly fractured grey siltstone with light grey cream claystone, semi rounded to sub angular 3-15mm chips equal mix		
			265	143	SILTSTONE - light grey siltstone angular planar 2-6mm with 30% angular 3-5mm chips		
			264	144	COAL - coal, stony/black/grey angular 3-6mm with a band of light grey/cream claystone	Lower Ulan Seam	
			263	145	SILTSTONE - dark grey siltstone semi rounded planar 3-8mm chips with minor fine quartz grains and <5% 1-2mm brown claystone		
			262	146	SILTSTONE - dark grey siltstone semi rounded planar 3-8mm chips with minor fine quartz grains and <5% light grey siltstone		
			261	147			
			260	148	SILTSTONE - dark grey siltstone, sub angular planar 3-7mm chips with 5% brown clay/claystone		
			259	149			
	bentonite		258	150	SILTSTONE - dark grey siltstone, angular planar 4-6mm with 5% light grey siltstone		
			257	151	SANDSTONE - grey conglomerate sandstone, 50% 3-5mm quartz 3-6mm non uniform, 30% dark grey siltstone and 20% light grey siltstone 1-2mm chips	Dapper Formation	
	gravel pack 50 mm slotted PVC casing		256	152	SANDSTONE - grey coarse grained sandstone with 10% larger conglomerate 5-10mm quartz and 30% 1-2mm light grey siltstone, non uniform		
			255	153	SANDSTONE - grey conglomerate sandstone with medium to coarse grains 2-15mm non uniform with 15% light and dark grey siltstone, large quartz angular, siltstone semi rounded/sub angular		
			254	154			
			253	155			
			252	156	SANDSTONE - grey conglomerate sandstone with medium to coarse grains 2-15mm non uniform with 15% light and dark grey siltstone, large quartz angular, siltstone semi rounded/sub angular with some white cream claystone, larger conglomerate fraction rest 2-10mm		
			251	157			
			250	158			
			249	159	SANDSTONE - grey white conglomerate quartz sandstone 3-12mm angular with 40% grey 2-3mm and dark grey 4-7mm siltstone		

END OF BOREHOLE AT 162.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW13D

SHEET 5 OF 5

Client:	CMC Pty Ltd	Date Commenced:	26/2/10
Project:	Cobbora Coal Mine Project	Date Completed:	3/3/10
Bore Location:	E Darlington	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Saflian

Drilling Method:	Air Hammer	Surface RL:	408.1 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 704695.92 N 6437244.88

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		247	161		SANDSTONE - grey medium to coarse grained 2-4mm quartz sandstone with 30% grey siltstone	Dapper Formation	
		246	162		SILTSTONE - dark grey/grey siltstone, semi rounded planar chips 3-8mm		
		245	163				
		244	164				
		243	165				
		242	166				
		241	167				
		240	168				
		239	169				
		238	170				
		237	171				
		236	172				
		235	173				
		234	174				
		233	175				
		232	176				
		231	177				
		230	178				
		229	179				
		228	180				
		227	181				
		226	182				
		225	183				
		224	184				
		223	185				
		222	186				
		221	187				
		220	188				
		219	189				
		218	190				
		217	191				
		216	192				
		215	193				
		214	194				
		213	195				
		212	196				
		211	197				
		210	198				
		209	199				

END OF BOREHOLE AT 162.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW14

SHEET 1 OF 2

Client:	CMC Pty Ltd	Date Commenced:	24/2/10
Project:	Cobbora Coal Mine Project	Date Completed:	24/2/10
Bore Location:	Hays - Wallandra	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Saflian

Drilling Method:	Air Hammer	Surface RL:	429.0 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 716052.88 N 6441091.14

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	50 mm PVC casing 50 mm PVC casing	428	1		CLAY - light brown with 10% angular quartz and ironstone gravel	Ellismayne Formation	
					CLAY - brown with <5% quartz 5mm angular gravel		
		427	2		CLAY - brown with brown/white claystone chips and 20% quartz 4-10mm angular/sub angular planar gravel		
		426	3		SILTY CLAY - brown with some grey mottles		
		425	4				
		424	5				
		423	6				
		422	7				
		421	8		COARSE SILTSTONE - orange, fine powder		
		420	9		SILTSTONE - light orange, powder with <5% semi rounded 4-5mm chips		
		419	10		FINE SANDSTONE - light brown orange, quartz 5% 2mm rounded grains with a band 10% of dark brown siltstone		
		418	11		CLAYSTONE - white/cream fine powder		
		417	12				
		416	13				
		415	14		MEDIUM SANDSTONE - light grey 1-2mm clayey matrix		
		414	15		COAL - black/grey smutty powder with 10% 5-7mm angular planar chips	Whaka Formation	
		413	16		COAL - black fine powder 5% 3-4mm sub angular chips		
	bentonite	412	17		OXIDISED COAL		
	gravel pack	411	18		MUDSTONE - dark brown/black carbonaceous		
		410	19				

EC = 6.06 mS/cm
pH = 7.79

END OF BOREHOLE AT 32.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW14

SHEET 2 OF 2

Client:	CMC Pty Ltd	Date Commenced:	24/2/10
Project:	Cobbora Coal Mine Project	Date Completed:	24/2/10
Bore Location:	Hays - Wallandra	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Saflian

Drilling Method:	Air Hammer	Surface RL:	429.0 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 716052.88 N 6441091.14

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	50 mm slotted PVC casing	408	21		MUDSTONE - dark brown/black carbonaceous <i>(continued)</i>	Whaka Formation	
		407	22		SILTSTONE - light grey		
		406	23				
		405	24				
		404	25				
		403	26		SILTSTONE - interbedded grey, green and brown semi rounded to angular chips		
		402	27				
		401	28				
		400	29				
		399	30				
		398	31				
		397	32				
		396	33				
		395	34				
		394	35				
		393	36				
		392	37				
		391	38				
		390	39				

sump

END OF BOREHOLE AT 32.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW15

SHEET 1 OF 4

Client:	CMC Pty Ltd	Date Commenced:	16/2/10
Project:	Cobbara Coal Mine Project	Date Completed:	17/2/10
Bore Location:	Inder	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Saflian

Drilling Method:	Air Hammer	Surface RL:	431.6 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 707063.06 N 6431211.79

Bore Information			Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY	
	50 mm PVC casing 50 mm PVC casing	431	1		CLAY - red yellow clay	Alluvium		
		430	2		CLAY - yellow brown clay with 5% angular gravel, 10-12mm			
		429	3		CLAY - yellow brown and grey with 5% angular gravel, 10-12mm with Mn and Fe nodules			
		428	4					
		427	5		CLAY - red brown clay			
		426	6		CLAY - red brown clay with 10% ironstone			
		425	7		SILTSTONE - weathered grey siltstone			Napperby Formation
		424	8		SILTSTONE - grey and cream brown siltstone, fine powder, 5% sub angular chips			
		423	9		SILTSTONE - grey siltstone with a band of brown siltstone, fine powder and rounded 5-10mm chips			
		422	10		SILTSTONE - dark grey siltstone, fine powder with 30% rounded 5-7mm chips			
		421	11		SILTSTONE - dark brown siltstone, fine powder and 50% semi rounded 5-12mm chips			
		420	12		SILTSTONE - dark grey siltstone, fine powder with 30% rounded 5-12mm chips			
		419	13		MUDSTONE - light grey mudstone, fine powder and 20% <5mm angular chips			
		418	14		SILTSTONE - grey siltstone, fine powder and semi rounded 4-5mm chips			
		417	15		SILTSTONE - grey siltstone, fine powder and semi rounded 4-5mm chips			
		416	16		SILTSTONE - grey siltstone, fine powder and semi rounded 4-5mm chips			
		415	17		SILTSTONE - grey siltstone, fine powder and semi rounded 4-5mm chips			
		414	18		SILTSTONE - grey siltstone, fine powder and semi rounded 4-5mm chips			
		413	19		SILTSTONE - grey siltstone, fine powder and semi rounded 4-5mm chips			
	412							

END OF BOREHOLE AT 70.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW15

SHEET 2 OF 4

Client:	CMC Pty Ltd	Date Commenced:	16/2/10
Project:	Cobbara Coal Mine Project	Date Completed:	17/2/10
Bore Location:	Inder	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Saflian

Drilling Method:	Air Hammer	Surface RL:	431.6 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 707063.06 N 6431211.79

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		411	21		SILTSTONE - grey siltstone, fine powder and semi rounded 4-5mm chips (<i>continued</i>)	Napperby Formation	EC = 2.25 mS/cm pH = 8.55
		410	22		CLAYSTONE - light grey/cream claystone, very fine powder, chips <2mm		
		409	23		SILTSTONE - grey siltstone, fine powder with 10% 5mm rounded chips		
		408	24		CLAYSTONE - light grey claystone, very fine powder, 20% 4-7mm rounded chips		
		407	25		CLAYSTONE - light grey claystone, fine powder and 15% sub angular 5mm chips	Digby Formation	
		406	26		SILTSTONE - grey brown siltstone, fine powder and 30% 5mm rounded 5mm chips		
		405	27		SILTSTONE - grey brown coarse siltstone, 20% 3-5mm angular chips.		
		404	28		SILTSTONE - grey siltstone, semi rounded and angular 4-7mm chips		
		403	29		SILTSTONE - light grey cream coarse siltstone, powder and 3-5mm chips	Ellismayne Formation	
		402	30		SILTSTONE - light grey coarse siltstone, powder		
		401	31		SILTSTONE - grey siltstone, fine powder, 10% sub angular 5-10mm chips		
		400	32		SILTSTONE - light grey siltstone, fine powder and sub angular 5mm chips		
		399	33		SILTSTONE - light grey coarse siltstone, powder		
		398	34		SILTSTONE - grey brown siltstone, fine powder and rounded 5-7mm chips		
		397	35		SILTSTONE - dark brown siltstone, fine powder and 2-3mm rounded chips		
		396	36				
		395	37				
		394	38				
		393	39				
		392					

END OF BOREHOLE AT 70.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW15

SHEET 3 OF 4

Client:	CMC Pty Ltd	Date Commenced:	16/2/10
Project:	Cobbara Coal Mine Project	Date Completed:	17/2/10
Bore Location:	Inder	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Saflian

Drilling Method:	Air Hammer	Surface RL:	431.6 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 707063.06 N 6431211.79

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
			391		MUDSTONE - coal, dull/carbonaceous mudstone, fine powder, 5% semi rounded 3-4mm grey siltstone	Ellismayne Formation	
			41		MUDSTONE - dark grey carbonaceous mudstone, fine powder, sub angular 4-5mm chips		
	bentonite		390				
			42		COAL - coal, dull/carbonaceous mudstone, powder and semi rounded 5-7mm chips	Whaka Formation	
	gravel pack		389				
			43		SILTSTONE - dark brown coarse siltstone, powder		
			388				
			44		COAL - coal, shiny powder and 4-5mm sub angular and rounded chips		
			387				
			45		MUDSTONE - dark brown carbonaceous mudstone with a band of cream claystone		
			386				
			46				
			385				
			47		COAL - coal, dull fine powder and 2-3mm sub angular chips with a band of cream claystone		
			384				
			48		COAL - coal, angular chips 5-7mm with a band of brown siltstone		
			383				
			49		SILTSTONE - grey siltstone, powder and angular 4mm chips with a band of cream claystone	Avymore Claystone	
			382				
			50		COAL - coal, fine powder and angular planar 4mm chips	Flyblowers Creek Seam	
			381				
			51		COAL - coal shiny black powder and semi rounded 3-4mm chips		
			380				
			52				
			379				
			53		COAL - coal, shiny angular 3-10mm chips with 5% brown claystone rounded 2mm chips		
			378				
			54		COAL - coal, angular 4-8mm chips, with 30% grey claystone bands		
			377				
			55				
			376				
	50 mm slotted PVC casing		56		SILTSTONE - dark grey siltstone, angular and planar 3-10mm chips with <5% brown claystone		
			375				
			57				
			374				
			58		COAL - coal, stony coal, semi angular/rounded 5mm chips with 10% grey brown claystone		
			373				
			59		SILTSTONE - dark grey siltstone, angular planar 3-8mm chips	Tomcat Gully Sandstone	
			372				

END OF BOREHOLE AT 70.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW15

SHEET 4 OF 4

Client:	CMC Pty Ltd	Date Commenced:	16/2/10
Project:	Cobbora Coal Mine Project	Date Completed:	17/2/10
Bore Location:	Inder	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Saflian

Drilling Method:	Air Hammer	Surface RL:	431.6 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 707063.06 N 6431211.79

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		371	61		SANDSTONE - grey coarse grained quartz sandstone, 3mm grains with 5% grey siltstone	Tomcat Gully Sandstone	
		370	62		COAL - coal, angular 2-4mm chips with 10% red brown 2mm claystone	Upper and Lower Ulan Seams	
		369	63		COAL - coal, stony with fractured grey siltstone pieces 5-45mm at 63.5		
		368	64		COAL - coal, stony with angular 5-12mm pieces with 40% grey siltstone and 55 brown claystone		
		367	65		COAL - coal, stony 2-3mm angular chips with 20% 3-25mm grey siltstone and brown claystone		
		366	66				
		365	67		COAL - coal, angular 4-10mm chips with <5% brown claystone		
		364	68		SILTSTONE - dark grey siltstone, angular planar 5-7mm chips with <5% brown claystone	Dapper Formation	
		363	69		SANDSTONE - grey coarser grained quartz sandstone, 2-3mm grains with larger 5-6mm white quartz gravel		
		362	70				
	361	71					
	360	72					
	359	73					
	358	74					
	357	75					
	356	76					
	355	77					
	354	78					
	353	79					
	352						

END OF BOREHOLE AT 70.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW16

SHEET 1 OF 4

Client:	CMC Pty Ltd	Date Commenced:	11/3/10
Project:	Cobbora Coal Mine Project	Date Completed:	12/3/10
Bore Location:	Hayley	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Saflian

Drilling Method:	Air Hammer	Surface RL:	601.2 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 720907.26 N 6429063.23

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	50 mm PVC casing	601			SANDY CLAY - yellow brown/red brown mottled sandy clay	Napperby Formation	
	50 mm PVC casing	600	1		SANDSTONE - white weathered fine grained clayey sandstone, quartz rich, uniform grain size		
	50 mm PVC casing	599	2		SANDSTONE - white fine grained quartz sandstone, uniform 1-2mm grain size, hard to drill		
		598	3				
		597	4		SANDSTONE - creamy light red fine grained quartz sandstone, uniform 1-2mm grain size		
		596	5				
		595	6		SANDSTONE - light red/white fine grained quartz sandstone with <5% 3mm sub angular quartz grains		
		594	7		SANDSTONE - light red/white fine grained quartz sandstone with <5% 4mm sub angular quartz grains		
		593	8				
		592	9		SANDSTONE - brown fine grained sandstone with claystone and ironstone layers, angular 3-5mm chips		
		591	10		CLAYSTONE - yellow brown claystone band very fine not hard slightly weathered		
		590	11		CLAYSTONE/MUDSTONE - dark grey light purple claystone/mudstone, powder and semi rounded chips 3-6mm slightly weathered		
		589	12		CLAYSTONE/MUDSTONE - dark green grey purple weathered mudstone/claystone		
		588	13		CLAYSTONE/MUDSTONE - dark grey/black claystone/mudstone, fine powder and semi rounded 3-7mm chips		
		587	14				
		586	15				
		585	16				
		584	17				
		583	18				
		582	19				
		581	20		SILTSTONE - dark grey siltstone, sub angular 4-7mm chips		
		580	21		CLAYSTONE/MUDSTONE - grey/black claystone/mudstone sub angular 4-6mm chips		
		579	22				
		578	23				
		577	24				
		576	25		CLAYEY SILTSTONE grey clay/siltstone very hard, angular chips, colloidal fractures		
		575	26		CLAYSTONE/MUDSTONE - grey/black claystone/mudstone		
		574	27		SILTSTONE - grey siltstone sub angular chips <1mm grain size, interlayered with fine darker material		
		573	28				
		572	29		CLAYSTONE - grey black claystone, sub angular 4-9mm chips		
		571	30		SILTSTONE - grey siltstone <1mm grain size 20% quartz		
		570	31				
		569	32		SANDSTONE - light grey brown very fine grained uniform sandstone, quartz with a clay matrix		
		568	33		SILTSTONE - grey siltstone, fine <1mm sub angular 3-5mm chips		
		567	34		CLAYSTONE - red brown claystone with <5% ironstone		
		566	35		SANDSTONE - light red cream fine grained uniform quartz sandstone with a clay matrix		
		565	36				
		564	37		SANDSTONE - red fine grained uniform 1-2mm sandstone		
		563	38		SILTSTONE - grey siltstone coarse grained becoming finer 20% grading to 10% quartz		
		562	39				

END OF BOREHOLE AT 150.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW16

SHEET 2 OF 4

Client:	CMC Pty Ltd	Date Commenced:	11/3/10
Project:	Cobbora Coal Mine Project	Date Completed:	12/3/10
Bore Location:	Hayley	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Safliani

Drilling Method:	Air Hammer	Surface RL:	601.2 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 720907.26 N 6429063.23

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	
		561			SILTSTONE - grey siltstone coarse grained becoming finer 20% grading to 10% quartz (continued)	Napperby Formation	
		560	41		SANDSTONE - light grey fine grained quartz uniform sandstone 1-2mm grains		
		559	42		SILTSTONE - light grey siltstone with 20% interlayered dark siltstone		
		558	43		CLAYSTONE/MUDSTONE - dark grey claystone/mudstone sub angular 4-7mm		
		557	44		SILTSTONE - grey siltstone with 10% fine quartz grains		
		556	45				
		555	46		SILTSTONE - grey siltstone		
		554	47		SILTSTONE - red brown coarse siltstone with some quartz grains, powder and 7-10mm chips		
		553	48		SANDSTONE - light red brown fine grained quartz uniform sandstone 2mm		Digby Formation
		552	49		SANDSTONE - light cream fine to medium grained quartz sandstone 1-2mm, high clay content		
		551	50				
		550	51				
		549	52				
		548	53				
		547	54		SILTSTONE - grey coarse siltstone with 30% coarse quartz grains		
		546	55		SANDSTONE - light grey fine grained quartz uniform sandstone 1-2mm grains high clay content		
		545	56		SILTSTONE - grey siltstone sub angular 3-6mm chips		
		544	57		SANDSTONE - red fine grained sandstone, quartz and red clay 1-2mm uniform		
		543	58		SANDSTONE - white fine grained quartz sandstone 1-2mm uniform		
		542	59		SANDSTONE - yellow brown fine to medium grained sandstone with 5% 7-9mm quartz grains, brown clay matrix, non uniform		
		541	60		SILTSTONE - grey siltstone with <15% interlayered red siltstone, sub angular 3-6mm chips		
		540	61				
		539	62				
		538	63		SANDSTONE - light grey fine grained sandstone, 1-2mm 50% quartz uniform		
		537	64				
		536	65		SANDSTONE - light grey red fine medium grained sandstone with 10% 3-4mm quartz grains non uniform		
		535	66		SANDSTONE - dark grey red medium 2mm grained uniform sandstone		
		534	67		COAL - oxidised coal, dark brown black powdery and 2-4mm sub angular chips	Trinkey Seam Ellismayne Formation	
		533	68		SILTSTONE - grey siltstone sub angular planar 3-10mm chips		
		532	69		SILTSTONE - dark grey siltstone planar 4-7mm chips with 20% quartz 1-2mm grains		
		531	70		SILTSTONE - dark grey siltstone planar 4-7mm chips		
		530	71				
		529	72		SILTSTONE - dark grey siltstone sub angular 3-7mm with 5% quartz 1-2mm grains		
		528	73				
		527	74				
		526	75		SANDSTONE - grey fine grained sandstone 60% quartz, high clay content 1-2mm grains		
		525	76		SANDSTONE - grey fine to medium sandstone 70% quartz 2-3mm grains non uniform		
		524	77		SANDSTONE - grey fine to medium sandstone 70% quartz 2-3mm grains non uniform with 3-5mm black coal fragments		
		523	78		SILTSTONE - dark grey siltstone 1mm with 5% claystone chips 2-3mm sub angular chips		
		522	79		SILTSTONE - grey coarse siltstone, semi rounded to sub angular 3-5mm chips		

END OF BOREHOLE AT 150.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW16

SHEET 3 OF 4

Client:	CMC Pty Ltd	Date Commenced:	11/3/10
Project:	Cobbora Coal Mine Project	Date Completed:	12/3/10
Bore Location:	Hayley	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Saflian

Drilling Method:	Air Hammer	Surface RL:	601.2 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 720907.26 N 6429063.23

Bore Information				Field Material Description		
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION
		521			SILTSTONE - grey coarse siltstone, semi rounded to sub angular 3-5mm chips <i>(continued)</i>	Ellismayne Formation
		520	81		SANDSTONE - grey fine grained quartz sandstone 1-2mm grains, high clay content	
		519	82		COAL - oxidised coal, dark brown powder smutty with 30% light grey claystone	Whaka Formation
		518	83		COAL - oxidised coal/coal and carbonaceous mudstone with grey claystone and clay	
		517	84		CLAYSTONE - light grey/cream claystone with minor fine quartz grains	Avymore Claystone
		516	85		COAL - coal, hard black with dark brown powder, 3-4mm sub angular chips	
		515	86		SILTSTONE - grey siltstone sub angular planar 3-10mm chips	Flyblowers Creek Seam
		514	87			
		513	88		MUDSTONE - dark brown black carbonaceous mudstone with a 20cm coal band	Tomcat Gully Sandstone
		512	89		SILTSTONE - dark grey siltstone interlayered with light grey coarse siltstone and 20% quartz	
		511	90		SANDSTONE - brown/ yellow brown fine to medium grained sandstone 40% quartz 1-3mm with high clay content	
		510	91		SANDSTONE - yellow fine to medium grained sandstone 2-3mm high clay content	
		509	92		SANDSTONE - pale yellow medium grained sandstone, 30% quartz high clay content	
		508	93		SANDSTONE - light grey becoming dark grey red fine to medium grained quartz sandstone 50% quartz	
		507	94			
		506	95		SANDSTONE - dark grey red fine grained sandstone 30% quartz very poorly cemented uniform (possible blow out/cavity, drill rods weren't advancing yet sand continued to flow out of the hole)	
		505	96		SANDSTONE - light brown medium grained quartz sandstone very poorly cemented uniform	
		504	97		SANDSTONE - grey large to coarse grained sandstone 80% quartz with siltstone, non uniform 2-4mm	
		503	98		SANDSTONE - grey very coarse conglomerate rounded and angular quartz sandstone 2-6mm non uniform	
		502	99		SANDSTONE - grey large grained quartz sandstone 3-4mm, 20% siltstone, uniform	
		501	100		SANDSTONE - grey large to coarse grained sandstone 80% quartz grain size 3-5mm with 10% >7mm semi rounded to angular	
		500	101		SANDSTONE - dark red brown fine grained quartz uniform sandstone 3mm interlayered with yellow coarse grained quartz sandstone 40% quartz 2-4mm non uniform	
		499	102		SILTSTONE - grey siltstone 10% quartz fine grains 4-5mm chips with layers of dark and light grey siltstone	
		498	103			
		497	104		SILTSTONE - dark grey very fine siltstone sub angular 3-5mm chips	
		496	105		SILTSTONE - dark grey and light grey interlayered siltstone 3-7mm planar chips with 15% fine black 2-3mm angular chips	
		495	106			
		494	107			
		493	108		MUDSTONE - dark grey black carbonaceous mudstone 2mm with interlayered grey siltstone 3-5mm	
		492	109		SILTSTONE - dark grey and light grey siltstone 40% light grey 2-4mm semi rounded planar chips	
		491	110		SILTSTONE - dark grey and light grey siltstone 40% light grey with 10% carbonaceous mudstone 2-4mm semi rounded planar chips	
		490	111		COAL - coal, stony black 3-5mm angular chips with 10% light grey claystone	Upper Ulan Seam
		489	112		SILTSTONE - grey siltstone with 30% coal/carbonaceous mudstone 2-3mm chips with 5% sub angular 3mm grains	
		488	113		SANDSTONE - grey large to coarse grained quartz sandstone 3-4mm uniform with 5% coal/siltstone mix	
	bentonite	487	114		COAL - coal/carbonaceous mudstone, stony black angular 4-5mm with 30% light grey claystone	
		486	115		MUDSTONE - dark grey black carbonaceous mudstone with 10% light grey clay and claystone	
	gravel pack	485	116		COAL - coal angular, stony black 3-10mm with 5% light grey claystone	
		484	117		COAL - coal angular 3-10mm interlayered 20% with grey siltstone	
		483	118			
		482	119		SILTSTONE - light grey/grey siltstone fine claystone layers 2-5mm semi rounded chips, light grey has 15% fine quartz grains	

END OF BOREHOLE AT 150.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW16

SHEET 4 OF 4

Client:	CMC Pty Ltd	Date Commenced:	11/3/10
Project:	Cobbara Coal Mine Project	Date Completed:	12/3/10
Bore Location:	Hayley	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Saffian

Drilling Method:	Air Hammer	Surface RL:	601.2 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 720907.26 N 6429063.23

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	50 mm slotted PVC casing	481			SILTSTONE - light grey/grey siltstone 70% light grey fine claystone layers 2-5mm semi rounded chips, light grey has 15% fine quartz grains	C-Marker Claystone	
		480	121		SILTSTONE - light grey siltstone and claystone with fine layers of dark grey siltstone		
		479	122				
		478	123		COAL - coal, black shiny sub angular 5-7mm with 50% light grey claystone	Lower Ulan Seam	
		477	124		COAL - coal, shiny black angular 3-5mm with <5% light grey claystone		
		476	125				
		475	126		MUDSTONE - carbonaceous mudstone dull grey black 2-7mm sub angular chips with <5% light grey claystone		
		474	127				
		473	128		SILTSTONE - grey brown carbonaceous siltstone very fine grain size 4-5mm chips		
		472	129				
		471	130		MUDSTONE - grey brown carbonaceous mudstone very fine grain size 4-5mm chips		
		470	131		SILTSTONE - grey coarse grained siltstone interlayered with 10% dark brown mudstone, sub angular 4-10mm chips		
		469	132				
		468	133		SANDSTONE - grey coarse conglomerate sandstone quartz 80% angular to semi rounded with 20% siltstone mainly semi rounded 3-12mm chips non uniform	Dapper Formation	
		467	134				
	466	135		SILTSTONE - dark grey siltstone sub angular 4-6mm with minor light grey siltstone bands			
	465	136					
	464	137					
	463	138		SILTSTONE - dark grey siltstone sub angular 4-6mm with 5% 3mm quartz grains			
	462	139		SILTSTONE - dark grey siltstone sub angular 3-6mm chips			
	461	140					
	460	141					
	459	142					
	458	143					
	457	144					
	456	145		SILTSTONE - grey siltstone sub angular 3-6mm chips			
	455	146					
	454	147					
	453	148					
	452	149					
	451	150					
	450	151					
	449	152					
	448	153					
	447	154					
	446	155					
	445	156					
	444	157					
	443	158					
	442	159					

END OF BOREHOLE AT 150.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW17

SHEET 1 OF 2

Client:	CMC Pty Ltd	Date Commenced:	10/2/10
Project:	Cobbora Coal Mine Project	Date Completed:	10/2/10
Bore Location:	S O'Leary	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Saflian

Drilling Method:	Air Hammer	Surface RL:	363.4 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 697401.6 N 6441667.07

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	50 mm PVC casing 50 mm PVC casing	363	1		CLAY - yellow brown clay with ironstone cobbles 20mm and chips 5mm	Alluvium	
		362	2		CLAY - yellow grey clay with manganese nodules, <5% ironstone chips 5-7mm and a white tuffaceous clay band at 1.8m		
		361	3		CLAYSTONE - tuffaceous creamy mud/claystone	Digby Formation	
		360	4		SANDSTONE - yellow orange clayey sandstone, fine to medium grained 1-4mm		
		359	5		SANDSTONE - grey brown clayey sandstone, fine to medium grained 2-6mm		
		358	6		SANDSTONE - brown clayey sandstone medium grained 3-5mm with minor gravel (<5%) with a band of tuffaceous creamy claystone		
		357	7		CLAYSTONE - creamy claystone with 5% sand		
		356	8		COAL - coal, smutty grey grading to a shiny black, fine pieces with 30% 5mm chips	Trinkey Seam	
		355	9		COAL - carbonaceous mudstone/coal ranging from a fine power to 10mm angular chips, with a band of light grey claystone		
		354	10		COAL - coal, shiny black powder with 5mm planar chips and angular 10mm pieces, slightly damp		
		353	11		CLAYSTONE - grey claystone, fine power and <5% rounded 7mm pieces	Ellismayne Formation	
		352	12		CLAYSTONE - darker grey claystone, fine power and <5% rounded 7mm pieces		
		351	13		CLAYSTONE - grey claystone, fine powder grading to a grey red clay stone		
		350	14		CLAYSTONE - grey claystone fine powder		
		349	15		SANDSTONE - grey fine grained sandstone with sub angular 8mm pieces mostly 1-2mm quartz matrix, fine powder with 5%		
		348	16		SANDSTONE - grey fine to medium grained sandstone with sub angular 8mm pieces mostly 2-3mm quartz matrix, fine powder with 5%		
		347	17				
		346	18		SANDSTONE - grey fine to medium large grained quartz sandstone, fine fraction 1-2mm, larger fraction 4-5mm		
		345	19				
		344	20		SANDSTONE - light grey fine to medium large quartz sandstone, fine fraction 1-2mm, larger fraction 4mm, with a clay matrix		
		343	21		SANDSTONE - light grey fine grained 1-2mm sandstone		
		342	22		CLAYSTONE - dark grey carbonaceous mud/claystone, fine power with 10% 2-3mm chips with a red grey medium grained sandstone band, pieces 2-3mm	Whaka Formation	
		341	23				
		340	24		SILTSTONE - dark grey siltstone, fine to medium pieces, 3-4mm chips		
	bentonite	339					

EC = 2.77 mS/cm
pH = 8.84

END OF BOREHOLE AT 42.30 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW17

SHEET 2 OF 2

Client:	CMC Pty Ltd	Date Commenced:	10/2/10
Project:	Cobbora Coal Mine Project	Date Completed:	10/2/10
Bore Location:	S O'Leary	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Saflian

Drilling Method:	Air Hammer	Surface RL:	363.4 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 697401.6 N 6441667.07

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	gravel pack	338	26	---	SILTSTONE - dark grey siltstone and medium grained quartz sandstone interlayers	Whaka Formation	
		337	27	...	SANDSTONE - grey medium grained quartz sandstone, grains 2-3mm	Tomcat Gully Sandstone	
		336	28	---	SANDSTONE - grey medium grained quartz sandstone, grains 3mm, with 5% 1-2mm coal and sandstone chips		
		335	29	---	SANDSTONE - grey medium grained quartz sandstone, 3-5mm grains, with 15% coal and siltstone chips		
		334	30	---	SANDSTONE - grey medium to large grained quartz sandstone, grains 2-4mm, with 15% 5mm grains and 10% grey siltstone and cream claystone		
		333	31	---			
		332	32	---	SANDSTONE - grey medium to large grained quartz sandstone, grains 2-4mm, with 15% 5mm grains and 10% grey siltstone and cream claystone and coal		
		331	33	---	SANDSTONE - grey fine to medium grained sandstone, 1-2mm grains and 5% siltstone		
		330	34	---	SANDSTONE - grey large grained quartz sandstone, 2-5mm, with 15% siltstone and cream claystone chips 3mm		
	50 mm slotted PVC casing	329	35	...			
		328	36	...			
		327	37	---	SANDSTONE - grey medium grained sandstone, 2-3mm grains with 5% grey siltstone		
		326	38	---	SANDSTONE - grey large grained quartz sandstone 3-4mm with 10% grey siltstone		
		325	39	---	SANDSTONE - dark grey coarse quartz sandstone, 3-5mm, 20% grey siltstone and cream claystone, 10% 10mm angular quartz grains		
	sump	324	40	---			
		323	41	...			
		322	42	...			
		321	43	---			
		320	44	---			
		319	45	---			
		318	46	---			
		317	47	---			
		316	48	---			
		315	49	---			
		314		---			

END OF BOREHOLE AT 42.30 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW18

SHEET 1 OF 1

Client:	CMC Pty Ltd	Date Commenced:	17/2/10
Project:	Cobbora Coal Mine Project	Date Completed:	18/2/10
Bore Location:	I & C O'Leary	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Saflian

Drilling Method:	Mud rotary	Surface RL:	337.9 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 702230.54 N 6444415.91

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	50 mm PVC casing				CLAY - brown with 30% large 20-30mm angular gravels, ironstone, quartz, conglomerate sandstone	Alluvium	
	50 mm PVC casing	337	1		CLAYEY SAND - brown with 40% large gravels 20-35mm, ironstone, quartz, siltstone, claystone		
		336	2		CLAYEY SAND - red brown, coarse grained sand with alluvial sub angular gravels 20-40mm, ironstone, quartz, siltstone, claystone		
		335	3		GRAVEL - alluvial, angular gravel 15-30mm, quartz, ironstone, claystone with 30% coarse grained sand		
	bentonite	334	4		GRAVEL - alluvial, angular gravel 15-30mm, quartz, claystone. Ironstone is angular planar 30-50mm, with 30% coarse grained sand		
	gravel pack	333	5		CLAYEY SAND - brown, coarse grained, damp	Purlawaugh Formation	EC = 0.969 mS/cm pH = 8.58
		332	6		SANDY CLAY - brown, damp		
		331	7				
		330	8				
		329	9				
	50 mm slotted PVC casing	328	10		SANDSTONE - brown, medium to coarse grained, 2-3mm, contains quartz, ironstone, claystone		
		327	11				
	sump	326	12				
		325	13				
		324	14				
		323					

END OF BOREHOLE AT 13.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW19

SHEET 1 OF 1

Client:	CMC Pty Ltd	Date Commenced:	12/2/10
Project:	Cobbara Coal Mine Project	Date Completed:	15/2/10
Bore Location:	Craft	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Saflian

Drilling Method:	Mud rotary	Surface RL:	330.1 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 698984.91 N 6445305.7

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	50 mm PVC casing	330			CLAYEY SILT - brown sandy clayey silt, sand coarse	Alluvium	
	50 mm PVC casing	329	1		SANDSTONE - yellow brown medium grained clayey sandstone	Napperby Formation	EC = 1.56 mS/cm pH = 8.93
		328	2		SILTSTONE - dark grey siltstone, chips square angular and planar, 7-12mm with 10% brown claystone		
		327	3		SILTSTONE - dark grey siltstone, chips square angular and planar, 7-12mm with 30% layers of brown claystone and ironstone, chips 5-7mm		
		326	4				
		325	5		SILTSTONE - brown siltstone with 20% grey siltstone and minor sand, chips 5-7mm		
		324	6		CLAYSTONE - light grey claystone, fine powder to sub angular chips 5-15mm		
		323	7				
		322	8				
		321	9		MUDSTONE - dark grey mudstone sub angular chips 7-12mm		
		320	10		SILTSTONE - grey brown siltstone, fine powder to rounded chips 5mm		
		319	11				
	bentonite	318	12		SILTSTONE - grey siltstone, fine powder to semi rounded chips 5-15mm		
	gravel pack	317	13		SANDSTONE - light grey fine to medium grained quartz sandstone, 1-3mm grains, moist		
	50 mm slotted PVC casing	316	14		SANDSTONE - light grey medium grained quartz sandstone, 2-3mm with 10% grey siltstone		
		315	15		SANDSTONE - grey medium to coarse grained quartz sandstone, 2-4mm with 10% grey siltstone		
		314	16		SANDSTONE - grey very coarse grained sandstone 3-4mm, 80% quartz and 20% orthoclase and brown claystone		
	sump	313	17		CLAYSTONE - bright red claystone, sub angular chips 3-7mm		
		312	18				
		311	19				

END OF BOREHOLE AT 18.30 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW20

SHEET 1 OF 4

Client:	CMC Pty Ltd	Date Commenced:	18/2/10
Project:	Cobbora Coal Mine Project	Date Completed:	23/2/10
Bore Location:	M O'Leary	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Saflian

Drilling Method:	Air Hammer	Surface RL:	326.9 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 697211.51 N 6445662.35

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
22/02/2010	152 mm steel surface casing and 50 mm PVC casing	326	1		SANDY CLAY - dark brown, with <5 % rounded 7-10mm gravels	Alluvium	EC = 2.38 mS/cm pH = 7.64
		325	2		SANDY CLAY - dark brown, with <5 % rounded 7-10mm gravels, very hard		
		324	3		SANDY CLAY - dark brown hard		
		323	4		SANDY CLAY - brown		
		322	5		SANDY CLAY - brown with <5 % 5mm gravel		
		321	6		CLAY - dark brown, moist		
		320	7		CLAY - brown with minor sand, moist		
		319	8		SANDY CLAY - dark brown		
		318	9		CLAY - red brown with 40% alluvial gravels 4-30mm		
		317	10		GRAVEL - alluvial with clasts of ironstone, claystone, quartz 5-10mm with a grey clay matrix		
		316	11		CLAY - grey	Napperby Formation	
		315	12		MUDSTONE - dark grey, weathered, angular planar 7-20mm chips		
		314	13		SILTSTONE - grey, sub angular 3-7mm chips		
		313	14		SILTSTONE - grey, angular planar 3-6mm chips		
		312	15		SILTSTONE - light grey, semi rounded 3-5mm chips		
		311	16		SILTSTONE - dark grey, semi rounded planar 3-7mm chips		
		310	17		SILTSTONE - grey, angular planar 3-6mm chips		
		309	18		SILTSTONE - light grey, angular planar 3-6mm chips		
		308	19		SILTSTONE - dark grey, semi rounded planar 3-7mm chips		
	50 mm PVC casing	307			SILTSTONE - grey, semi rounded planar 3-7mm chips		

END OF BOREHOLE AT 78.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW20

SHEET 2 OF 4

Client:	CMC Pty Ltd	Date Commenced:	18/2/10
Project:	Cobbora Coal Mine Project	Date Completed:	23/2/10
Bore Location:	M O'Leary	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Saflian

Drilling Method:	Air Hammer	Surface RL:	326.9 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 697211.51 N 6445662.35

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
					SILTSTONE - grey, semi rounded planar 3-7mm chips (<i>continued</i>)	Napperby Formation	
		306	21		SILTSTONE - dark grey, angular 3-5mm chips		
		305	22		SILTSTONE - dark grey, angular 3-5mm chips with large fractured grey siltstone 50mm		
		304	23		SILTSTONE - grey, 3-5mm angular chips and medium grained quartz sandstone		
		303	24		SANDSTONE - light grey, medium grained, quartz sandstone uniform 2mm grain size with 5% siltstone	Digby Formation	
		302	25				
		301	26		SANDSTONE - grey medium grained quartz sandstone 3mm with 40% grey siltstone		
		300	27		SILTSTONE - grey and dark grey, angular and semi rounded 3-7mm chips		
		299	28				
		298	29		SILTSTONE - light grey, sub angular 3-5mm chips		
		297	30		SANDSTONE - light grey medium grained quartz sandstone uniform 3mm grain size		
		296	31				
		295	32		SILTSTONE - dark grey, angular 2-5mm chips		
		294	33		SANDSTONE - light grey medium grained quartz sandstone uniform 3mm grain size		
		293	34		SANDSTONE - cream/white medium to coarse grained sandstone with 15% brown quartz with 5% grey siltstone		
		292	35		SILTSTONE - light grey 4-5mm angular chips with 3mm quartz grains	Ellismayne Formation	
		291	36		SILTSTONE - dark grey 2-7mm semi rounded chips		
		290	37				
		289	38		COAL - stony dull black semi rounded 3-5mm chips	Whaka Formation	
		288	39		COAL - stony dull black semi rounded 3-5mm chips with layers of grey siltstone		
		287					

END OF BOREHOLE AT 78.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW20

SHEET 3 OF 4

Client:	CMC Pty Ltd	Date Commenced:	18/2/10
Project:	Cobbora Coal Mine Project	Date Completed:	23/2/10
Bore Location:	M O'Leary	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Saflian

Drilling Method:	Air Hammer	Surface RL:	326.9 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 697211.51 N 6445662.35

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		286	41		COAL - angular 2-3mm chips	Whaka Formation	
		285	42		COAL - angular 2-7mm chips with bands of light grey claystone		
		284	43		MUDSTONE - dark grey, with bands of light claystone 3-4mm chips		
		283	44		COAL - stony angular planar 3-5mm chips with 5% brown claystone		
		282	45		MUDSTONE - dark grey, carbonaceous, semi rounded 4-6mm chips		
		281	46		SILTSTONE - grey, semi rounded planar 4-5mm chips	Aymore Claystone	
		280	47				
		279	48				
		278	49				
	gravel pack	277	50		SILTSTONE - grey, 2-5mm sub angular chips with 3mm square/rounded quartz grains		
		276	51		SANDSTONE - brown fine grained sandstone with 20% 3mm quartz grains and 10% grey siltstone		
		275	52		COAL - angular 3-4mm chips with light grey claystone	Flyblowers Creek Seam	
		274	53		COAL - angular planar 3-5mm chips with <5% light grey claystone		
	50 mm slotted PVC casing	273	54		COAL - angular 3-5mm chips with cream claystone		
		272	55		COAL - angular 3-7mm chips with <5% light grey siltstone		
		271	56		SILTSTONE - light grey and dark grey, semi rounded planar 4-6mm chips	Tomcat Gully Sandstone	
		270	57		SILTSTONE - light grey, fractured, 2-4mm semi rounded planar chips with larger 5-45mm planar chips		
		269	58				
		268	59		SILTSTONE - light grey, planar 3-5mm chips with 10% coal angular 3-4mm		
		267					

END OF BOREHOLE AT 78.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW20

SHEET 4 OF 4

Client:	CMC Pty Ltd	Date Commenced:	18/2/10
Project:	Cobbora Coal Mine Project	Date Completed:	23/2/10
Bore Location:	M O'Leary	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Saflian

Drilling Method:	Air Hammer	Surface RL:	326.9 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 697211.51 N 6445662.35

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		266	61		COAL - angular 3-4mm chips	Upper Ulan Seam	
		265	62				
		264	63		SILTSTONE - grey, semi rounded planar 3-4mm chips	C-Marker Claystone	
		263	64		SANDSTONE - grey medium grained quartz sandstone 3mm		
		262	65				
		261	66		SILTSTONE - grey, 3-4mm semi rounded chips with 5% grey siltstone		
		260	67		SANDSTONE - grey fine to medium grained quartz sandstone <1-3mm		
		259	68				
		258	69				
		257	70				
		256	71		SANDSTONE - grey medium grained sandstone 2-4mm with <5% coal and dark grey siltstone chips		
		255	72		MUDSTONE - dark grey, carbonaceous, semi rounded 2-4mm chips		
		254	73		COAL - planar 4-5mm planar chips with 30% medium grained quartz sandstone	Lower Ulan Seam	
		253	74		SANDSTONE - grey medium grained quartz sandstone 2mm grain size with 5% grey siltstone	Dapper Formation	
		252	75				
		251	76		SANDSTONE - grey fine grained quartz sandstone 1mm grain size		
		250	77				
		249	78				
		248	79				
		247					

END OF BOREHOLE AT 78.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW21

SHEET 1 OF 2

Client:	CMC Pty Ltd	Date Commenced:	11/2/10
Project:	Cobbara Coal Mine Project	Date Completed:	12/2/10
Bore Location:	Craft	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Saflian

Drilling Method:	Mud rotary	Surface RL:	328.7 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 696528.65 N 6445489.93

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	50 mm PVC casing bentonite	328	1		SAND - dark red brown clay with minor sand	Alluvium	
		327	2		SANDY CLAY - red brown sandy clay with 15% gravel (sandstone and ironstone)		
	50 mm PVC casing	326	3		GRAVEL - alluvial gravels with a red brown sandy clay matrix, gravels size from 2-4mm consisting of ironstone, sandstone and claystone, damp		
		325	4		GRAVEL - alluvial gravels with a grey brown medium grained clayey sand, gravels size from 2-4mm consisting of ironstone, sandstone, quartz and claystone		
		324	5		GRAVEL - alluvial gravels, consisting of angular/sub angular planar 5-45mm ironstone, claystone, quartz and sandstone, with a grey coarse clayey sand		
		323	6		GRAVEL - alluvial gravels 5-10mm with a yellow brown clayey sand		
		322	7		SANDY CLAY - yellow and grey coarse sandy clay		
		321	8		SANDY CLAY - yellow grey fine sandy clay		
		320	9		CLAY - grey brown clay		
		319	10		CLAY - light brown yellow clay with 5% coarse sand		
		318	11		CLAY - light brown yellow clay with fine sand		
		317	12		SANDY CLAY - red brown sandy clay with layers of ironstone		
		316	13		CLAY - yellow grey clay		
	50 mm slotted PVC casing	315	14		MUDSTONE/CLAYSTONE - black grey mud/claystone, chips angular 3-7mm		

EC = 2.4 mS/cm
pH = 8.09

END OF BOREHOLE AT 20.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW21

SHEET 2 OF 2

Client:	CMC Pty Ltd	Date Commenced:	11/2/10
Project:	Cobbora Coal Mine Project	Date Completed:	12/2/10
Bore Location:	Craft	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Saflian

Drilling Method:	Mud rotary	Surface RL:	328.7 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 696528.65 N 6445489.93

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		313	16		SILTSTONE - grey siltstone, chips 6mm planar	Napperby Formation	
		312	17		SILTSTONE - layers of grey siltstone and dark grey mudstone, 2-6mm		
		311	18		SILTSTONE - grey siltstone, fine pieces		
		310	19		SILTSTONE - grey siltstone, fine pieces to 10mm angular planar chips		
		309	20		SILTSTONE - grey siltstone, chips 7-15mm planar angular		
		308	21				
		307	22				
		306	23				
		305	24				
		304	25				
	303	26					
	302	27					
	301	28					
	300	29					
	299						

END OF BOREHOLE AT 20.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW22_TP8

SHEET 1 OF 2

Client:	CMC Pty Ltd	Date Commenced:	1/2/10
Project:	Cobbora Coal Mine Project	Date Completed:	10/2/10
Bore Location:	Mates	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Safliani

Drilling Method:	Mud rotary/Air Hammer	Surface RL:	349.7 mAHD
Drilling Company:	Intertech	Borehole Diameter:	136 mm
		Co-ords:	E 707014 N 6446584.4

Bore Information		Field Material Description			Geophysical Log		
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	LITHOLOGY	Formation	GAMMA (API-GR)	HYDROGEOLOGY
	150 mm steel casing bentonite	349	1	SANDY CLAY - brown sandy clay with 2-3 cm peds	Alluvium		
		348	2	CLAY - yellow brown clay with minor sand			
		347	3	GRAVEL - red brown sandy clayey gravel, 20% quartz, 10% orthoclase, 10% other gravel			
		346	4	GRAVEL - red brown alluvial gravel with clay. Gravel 2-5mm, consisting of orthoclase, quartz, ironstone, siltstone and claystone			
		345	5	GRAVELLY CLAY - red brown gravelly clay, 10% gravel, consisting of orthoclase, quartz, ironstone, siltstone and claystone			
		344	6	CLAYEY GRAVEL - red brown clayey gravel, consisting of orthoclase, quartz, ironstone, siltstone and claystone. gravel are angular 5mm pieces in a 10% clay matrix			
		343	7	CLAYEY GRAVEL - brown clayey gravel, consisting of orthoclase, quartz, ironstone, siltstone and claystone pieces are >5mm, in a 10% clay matrix			
		342	8	GRAVEL - brown alluvial gravel, small to medium, rounded and angular gravel (2-10mm), 40% quartz			
		341	9	GRAVEL - brown alluvial gravel, small to medium, rounded and angular gravel (2-10mm), 40% quartz			
		340	10				
		339	11				
		338	12	GRAVEL - brown alluvial gravel, small to medium, rounded and angular gravel (2-10mm), 40% quartz with 2mm coal pieces			
		337	13	GRAVEL - brown alluvial gravel, quartz, ironstone, siltstone, brown claystone 2-10mm pieces, well rounded			
		336	14				
		335	15				
		334	16	CLAYEY GRAVEL - brown alluvial gravel with a clay matrix, consisting of rounded quartz, ironstone and planar chips of brown claystone pieces 5-10mm with 10% clay			
		333	17	GRAVEL - brown alluvial gravel, 5-15mm, consisting of grey siltstone, ironstone and quartz and smaller 2mm quartz pieces with a 5% clay matrix			
		332	18	GRAVELLY CLAY - brown grey gravelly clay, 10mm gravel with grey clay			
		331	19	SAND - light brown large grained quartz sand with gravel up to 10mm			
		330	20	CLAYEY GRAVEL - grey alluvial gravel 10mm rounded and angular pieces, consisting of quartz, ironstone and grey siltstone with a 10% clay matrix			
		329	21	GRAVEL - brown alluvial gravel 2-5mm mostly quartz with some coal fines			
		328	22	SANDSTONE - weathered grey sandstone, medium grained quartz with larger 10-15mm alluvial gravel (30%)	Tomcat Gully Sandstone		
		327	23	SANDSTONE - weathered grey sandstone/quartz gravel, 2-10mm pieces with the smaller fraction being rounded and the larger angular			
		326	24	SANDSTONE - grey medium grained sandstone, mostly quartz			
		325	25	SANDSTONE - dark grey sandstone with a clay matrix			
		324	26				
		323	27				
		322	28				
		321	29				
		320	30				

EC = 0.903 mS/cm
pH = 7.96

END OF BOREHOLE AT 52.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW22_TP8

SHEET 2 OF 2

Client:	CMC Pty Ltd	Date Commenced:	1/2/10
Project:	Cobbora Coal Mine Project	Date Completed:	10/2/10
Bore Location:	Mates	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Saffian

Drilling Method:	Mud rotary/Air Hammer	Surface RL:	349.7 mAHD
Drilling Company:	Intertech	Borehole Diameter:	136 mm
		Co-ords:	E 707014 N 6446584.4

Bore Information		Field Material Description			Geophysical Log		
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	LITHOLOGY	Formation	GAMMA (API-GR)	HYDROGEOLOGY
	150 mm steel casing	319	31	SANDSTONE - dark grey sandstone with a clay matrix <i>(continued)</i>	Tomcat Gully Sandstone		
		318	32	SANDSTONE - dark grey sandstone with fine grains approximately 2mm and larger grains 4mm with a clay matrix			
		317	33	SANDSTONE - dark grey medium to large grained quartz sandstone with pieces 3-5mm, 5% grey siltstone and coal			
		316	34	SANDSTONE - grey, medium becoming medium to fine quartz sandstone, 5% siltstone and coal pieces 2mm			
	136 mm slotted steel casing	314	36	COAL/SILTSTONE - coal, stony hard, pieces 5-10mm, some 5% larger pieces 15-20mm, 5% grey siltstone	Upper Ulan Seam		
		313	37				
		312	38	COAL/SILTSTONE - coal, chips 2-5mm with 10% grey siltstone some larger coal chips 10mm			
		311	39	COAL/MUDSTONE - coal/dark grey carbonaceous mudstone, 20% light grey claystone, coal chips 5mm, claystone chips <2mm	C-Marker Claystone		
		310	40	COAL - coal with fine (2mm) and larger pieces (10mm) with 5% light grey claystone	Lower Ulan Seam		
		309	41	COAL - coal with fine (2mm) and larger pieces (10-15mm) with 5% light grey claystone			
		308	42	COAL - large slightly fractured larger pieces, 10-25mm, pieces square and angular			
		307	43	COAL/MUDSTONE - dark grey carbonaceous mudstone/coal, large angular planar chips 25mm with 5% light grey fine sandstone	Dapper Formation		
		306	44	SANDSTONE - dark grey conglomerate sandstone, smaller quartz grains 3mm, larger quartz grains 5-7mm, sub-angular, 40% dark grey siltstone planar chips 10-12mm			
		305	45	SANDSTONE - grey sandstone, large quartz grains 5mm and smaller quartz grains 2mm and finer sandstone chips with 20% dark grey siltstone			
		304	46	SANDSTONE - grey fine to medium grained quartz sandstone 2-5mm with 10% larger quartz grains and 5% grey siltstone			
		303	47	MUDSTONE/SILTSTONE - dark grey mud/siltstone, planar chips 5-10mm with 10% 3mm quartz grains			
		302	48				
		301	49	SANDSTONE - grey fine grained sandstone consisting of quartz and other darker mudstone, 30% grey siltstone			
		300	50	SANDSTONE - light grey fine grained sandstone with chips in planar and sub angular form, with 20% conglomerate quartz angular chips 5-7mm			
	sump	299	51	SANDSTONE - grey medium to large grained sandstone, smaller grains 3mm, larger grains (35%) 5-10mm			
		298	52	END OF BOREHOLE AT 52.00 m			
		297	53				
		296	54				
		295	55				
		294	56				
		293	57				
		292	58				
		291	59				
		290					

END OF BOREHOLE AT 52.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW23

SHEET 1 OF 2

Client:	CMC Pty Ltd	Date Commenced:	23/2/10
Project:	Cobbora Coal Mine Project	Date Completed:	23/2/10
Bore Location:	Roberts	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Saflian

Drilling Method:	Air Hammer	Surface RL:	405.9 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 705786.22 N 6436148.65

Bore Information		Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION
	50 mm PVC casing	405	1		CLAY - red brown	Napperby Formation
	50 mm PVC casing	404	2		CLAY - red brown with 10% ironstone	
		403	3		CLAY - red brown with 30% ironstone angular 7-45mm chips	
		402	4		CLAYSTONE - brown grading to light cream, angular 5-15mm chips	
		401	5		CLAYSTONE - grey and brown layered angular 4-7mm chips with 15% ironstone	
		400	6			
		399	7			
		398	8			
		397	9		SILTSTONE - brown and dark grey layered semi rounded 3-4mm chips	
		396	10		SILTSTONE - grey becoming darker at 11m then becoming lighter again at 12m, semi rounded chips 2-5mm	
		395	11			
		394	12			
		393	13		MUDSTONE - dark grey semi rounded and angular 3-6mm chips	
		392	14		SILTSTONE - grey to dark grey semi rounded 3-4mm chips	
		391	15			
		390	16			
		389	17			
		388	18			
		387	19		MUDSTONE - dark grey semi rounded and angular becoming harder with depth	
	bentonite	386	20			
	gravel pack	385	21			
		384	22			
		383	23			
		382	24			
		381				

END OF BOREHOLE AT 42.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW23

SHEET 2 OF 2

Client:	CMC Pty Ltd	Date Commenced:	23/2/10
Project:	Cobbora Coal Mine Project	Date Completed:	23/2/10
Bore Location:	Roberts	Recorded By:	Angus McFarlane
Project Number:	2114426E & 2162570B	Log Checked By:	Kimberley Saflian

Drilling Method:	Air Hammer	Surface RL:	405.9 mAHD
Drilling Company:	Intertech	Borehole Diameter:	50 mm
		Co-ords:	E 705786.22 N 6436148.65

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	50 mm slotted PVC casing	380	26		MUDSTONE - dark grey semi rounded and angular becoming harder with depth (continued)	Napperby Formation	
		379	27				
		378	28				
		377	29				
		376	30		MUDSTONE/SILTSTONE - dark grey interbedded mudstone and siltstone		
		375	31				
		374	32		SILTSTONE - dark grey and grey bedded siltstone 4-8mm chips		
		373	33				
		372	34				
		371	35				
		370	36				
		369	37				
		368	38				
		367	39				
		366	40				
		365	41				
		364	42				
		363	43				
		362	44				
		361	45				
		360	46				
	359	47					
	358	48					
	357	49					
	356						

END OF BOREHOLE AT 42.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW24A

SHEET 1 OF 3

Client:	CHC Pty Ltd	Date Commenced:	18/9/11
Project:	Cobbora Coal Project	Date Completed:	19/9/11
Bore Location:	Cnr Golden Hwy & Spring Ridge Rd	Recorded By:	Chiara Callipari
Project Number:	2114426E & 2162570B	Log Checked By:	Stuart Brown

Drilling Method:	Air hammer	Surface RL:	388.96 mAHD
Drilling Company:	Gricks Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 710440.83 N 6445279.99

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	200mm PVC surface casing and 50mm PVC casing	388	1		CLAY. Yellow-brown & grey clay with minor dark red-brown, slightly oxidised and weathered fine to coarse grained sandstone.	Regolith	
		387	2		SILTY CLAY. Light grey silty clay, with 20-40% medium grey and yellow orange, weathered fine to coarse grained sandstone and minor yellow clay.		
		386	3				
		385	4		SANDSTONE. Dark red, medium grey and yellow slightly weathered and oxidised fine to coarse grained sandstone.	Digby Formation	
		384	5				
	50mm PVC casing	383	6		SILTY CLAY. Light grey, yellow and brown silty clay. 10-50% dark red, grey, yellow and brown fine to coarse grained sandstone.		
		382	7				
		381	8				
		380	9				
		379	10				
		378	11		SANDSTONE and CLAY. 50% weathered light to medium grey fine to coarse grained sandstone with 50% light to medium grey silty, sandy clay.		
		377	12		SANDSTONE and CLAY. Light to dark grey fine to coarse grained sandstone with 40% light grey silty sandy clay.		
		376	13		CLAY. Medium grey and brown clay with minor yellow-brown to brown-red fine to coarse grained sandstone or siltstone.		
		375	14				
		374	15		SANDSTONE. Dark grey fine sandstone with minor dark grey clay and light grey coarse sandstone.		
		373	16				
		372	17		CLAY. Dark grey clay. 30% light grey coarse sandstone. 20% dark grey sandstone or siltstone.		
		371	18		SANDSTONE and SILT. Fine to very fine sandstone and silt with minor lithic quartz sandstone and light grey clay.		
		370	19		SANDSTONE. Dark grey fine sandstone. 40% yellow to dark brown quartz, coarse sandstone.		

END OF BOREHOLE AT 47.50 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW24A

SHEET 2 OF 3

Client:	CHC Pty Ltd	Date Commenced:	18/9/11
Project:	Cobbora Coal Project	Date Completed:	19/9/11
Bore Location:	Cnr Golden Hwy & Spring Ridge Rd	Recorded By:	Chiara Callipari
Project Number:	2114426E & 2162570B	Log Checked By:	Stuart Brown

Drilling Method:	Air hammer	Surface RL:	388.96 mAHD
Drilling Company:	Gricks Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 710440.83 N 6445279.99

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		368	21		SANDSTONE. Light grey fine to coarse grained quartz sandstone in a light grey clay matrix.	Digby Formation	
		367	22				
		366	23		CLAY. Light grey clay with minor light grey, friable coarse grained quartz sandstone.		
		365	24		SANDSTONE. Light grey to yellow fine to coarse grained quartz sandstone.		
		364	25		SANDSTONE. Medium to dark grey fine sandstone in light grey silty clay. Minor light grey to brown siltstone and quartz.	Whaka Formation	
		363	26				
		362	27		SANDSTONE. Yellow-brown to pink fine grained subrounded quartz sandstone.		
		361	28		SANDSTONE. Pink and yellow very coarse grained, quartz sandstone. 40% light grey-brown siltstone. 30% light grey coarse grained sandstone.		
	bentonite	360	29		COAL and SANDSTONE. 40% black coal, 30% orange-brown coarse grained quartz sandstone. 20% pink and grey angular siltstone. 10% light grey coarse grained sandstone.		
		359	30		COAL. Black coal.		
	gravel pack	358	31		COAL. 75% black coal, 25% light grey to brown angular siltstone.		
	50mm PVC slotted casing	357	32				
		356	33		SILTSTONE. Dark grey to black carbonaceous siltstone with minor light grey clay and dark grey fine to coarse grained grey sandstone.		
		355	34				
		354	35		CLAYSTONE. Light grey claystone, 40% dark grey to black carbonaceous siltstone and minor medium grey, moderate to coarse grained sandstone.	Avymore Claystone	
		353	36				
		352	37		CLAYSTONE. Light grey claystone with minor dark grey sandstone and light grey to brown siltstone.		
		351	38		SANDSTONE. Medium grey fine to coarse grained sandstone in light grey clay.	Flyblowers Creek Seam	
		350	39		SANDSTONE. Medium to dark grey sandstone in light grey clay.		

END OF BOREHOLE AT 47.50 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW24A

SHEET 3 OF 3

Client:	CHC Pty Ltd	Date Commenced:	18/9/11
Project:	Cobbora Coal Project	Date Completed:	19/9/11
Bore Location:	Cnr Golden Hwy & Spring Ridge Rd	Recorded By:	Chiara Callipari
Project Number:	2114426E & 2162570B	Log Checked By:	Stuart Brown

Drilling Method:	Air hammer	Surface RL:	388.96 mAHD
Drilling Company:	Gricks Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 710440.83 N 6445279.99

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	<p>20/10/11</p> <p>sump</p>				SANDSTONE. Medium to dark grey sandstone in light grey clay. <i>(continued)</i>	Flyblowers Creek Seam	Airlift <0.05L/s EC=2.450mS/cm pH=6.24
		348	41				
		347	42		SILTSTONE. Dark grey to black, partly laminated, carbonaceous siltstone in light grey clay.		
		346	43				
		345	44		SANDSTONE. Medium grey fine to coarse grained sandstone in light grey clay.		
		344	45				
		343	46				
		342	47		SILTSTONE. Black carbonaceous siltstone with minor light grey sandstone and light grey clay.		
		341	48				
		340	49				
		339	50				
		338	51				
		337	52				
		336	53				
		335	54				
		334	55				
		333	56				
		332	57				
		331	58				
	330	59					

END OF BOREHOLE AT 47.50 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW24B

SHEET 1 OF 3

Client:	CHC Pty Ltd	Date Commenced:	17/9/11
Project:	Cobbora Coal Project	Date Completed:	18/9/11
Bore Location:	Cnr Golden Hwy & Spring Ridge Rd	Recorded By:	Chiara Callipari
Project Number:	2114426E & 2162570B	Log Checked By:	Stuart Brown

Drilling Method:	Air hammer	Surface RL:	389.13 mAHD
Drilling Company:	Gricks Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 710441.97 N 6445268.01

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	200mm PVC surface casing and 50mm PVC casing	389	1		CLAY. Red-brown, light grey and yellow mottled clay with minor red-brown and medium grey, oxidised, fine to coarse grained sandstone.	Regolith	
		388	2		CLAY. Light grey and yellow silty, sandy, moderately to well cemented clay.		
		387	3		SANDSTONE. Light grey, red and yellow, moderately weathered and oxidised fine to coarse grained sandstone with minor light grey, red and yellow sandy silt with some clay.	Digby Formation	
		386	4				
		385	5				
		384	6				
	50mm PVC casing	383	7		SANDSTONE. Light grey and minor red fine to coarse grained sandstone. 10% light yellow-grey clayey sandy silt.		
		382	8		CLAYSTONE. Light grey and yellow silty, sandy claystone. 5-20% light grey and some yellow fine to coarse grained quartz sandstone.		
		381	9				
		380	10				
		379	11				
		378	12		SILTSTONE. Light grey and light red-orange clayey, sandy siltstone. 5-20% light to medium grey and orange to dark red oxidised and moderately weathered fine to coarse grained sandstone.		
		377	13				
		376	14		SANDSTONE. Light to medium grey and red-orange moderately weathered, fine to coarse grained sandstone. 30-50% light grey clayey, sandy silt.		
		375	15				
		374	16		SILTSTONE. Light grey and yellow sandy, clayey siltstone and minor light grey and light yellow-orange fine to coarse grained quartz sandstone. 0-5% light grey sticky clay.		
		373	17				
		372	18				
		371	19				
		370					

END OF BOREHOLE AT 52.70 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW24B

SHEET 2 OF 3

Client:	CHC Pty Ltd	Date Commenced:	17/9/11
Project:	Cobbora Coal Project	Date Completed:	18/9/11
Bore Location:	Cnr Golden Hwy & Spring Ridge Rd	Recorded By:	Chiara Callipari
Project Number:	2114426E & 2162570B	Log Checked By:	Stuart Brown

Drilling Method:	Air hammer	Surface RL:	389.13 mAHD
Drilling Company:	Gricks Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 710441.97 N 6445268.01

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		369			SANDSTONE. Light to medium grey fine to coarse grained sandstone in a light grey silty clay matrix.	Digby Formation	
			21				
			22				
			23				
			24				
			25				
			26		SANDSTONE. Light grey fine sandstone. 40% light to dark grey, green and red-brown siltstone. 20% medium red-brown medium to coarse grained quartz sandstone in a light grey clay matrix.	Ellismayne Formation	
			27				
			28				
			29		COAL. Black coal.	Whaka Formation	
			30		SILTSTONE. Interbedded black carbonaceous siltstone and minor light brown and grey claystone.		
			31				
			32				
			33				
			34				
			35				
			36				
			37		CLAYSTONE. Light grey, clay with minor medium grey, medium to coarse grained sandstone.	Avymore Claystone	
			38		SANDSTONE. Medium to dark grey, fine to coarse grained poorly sorted sandstone.	Flyblowers Creek Seam	
			39				

END OF BOREHOLE AT 52.70 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW24B

SHEET 3 OF 3

Client:	CHC Pty Ltd	Date Commenced:	17/9/11
Project:	Cobbora Coal Project	Date Completed:	18/9/11
Bore Location:	Cnr Golden Hwy & Spring Ridge Rd	Recorded By:	Chiara Callipari
Project Number:	2114426E & 2162570B	Log Checked By:	Stuart Brown

Drilling Method:	Air hammer	Surface RL:	389.13 mAHD
Drilling Company:	Gricks Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 710441.97 N 6445268.01

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		349			SANDSTONE. Medium to dark grey, fine to coarse grained poorly sorted sandstone. (continued)	Flyblowers Creek Seam	Airlift <0.05L/s EC=0.570mS/cm pH=6.85
		348	41				
		347	42		SILTSTONE. Interbedded black carbonaceous siltstone and minor light to dark grey clay.		
		346	43				
		345	44				
		344	45				
		343	46		SILTSTONE. Black carbonaceous siltstone and minor medium grey fine to medium grained sandstone in a medium dark grey clay matrix.		
		342	47				
		341	48				
	bentonite	340	49				
		339	50		SILTSTONE. Interbedded black carbonaceous siltstone in a medium to dark grey clay matrix and minor light brown and grey claystone.		
		338	51				
	gravel pack	337	52		SANDSTONE. Light grey fine to coarse grained sandstone in a light grey clay matrix.	Tom Cat Gully Sandstone	
	50mm PVC slotted casing	336	53				
	bentonite	335	54				
		334	55				
		333	56				
		332	57				
		331	58				
		330	59				

END OF BOREHOLE AT 52.70 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW24C

SHEET 1 OF 3

Client:	CHC Pty Ltd	Date Commenced:	14/9/11
Project:	Cobbora Coal Project	Date Completed:	16/9/11
Bore Location:	Cnr Golden Hwy & Spring Ridge Rd	Recorded By:	Chiara Callipari
Project Number:	2114426E & 2162570B	Log Checked By:	Stuart Brown

Drilling Method:	Air hammer	Surface RL:	389.22 mAHD
Drilling Company:	Gricks Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 710444.88 N 6445237.89

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	200mm PVC surface casing and 50mm PVC casing	389	1		CLAY. Red-brown, yellow-brown and light grey mottled clay with minor angular red-brown and yellow-brown oxidised, slightly weathered, siltstone or fine grained sandstone.	Regolith	
		388	2		SANDSTONE. Light grey, light brown, light red and light yellow weathered fine to coarse grained sandstone in a light grey and light yellow sandy silty clay matrix.	Digby Formation	
		387	3				
		386	4				
		385	5				
	50mm PVC casing	384	6				
		383	7				
		382	8				
		381	9				
		380	10				
		379	11				
		378	12				
		377	13				
		376	14		SANDSTONE. Medium grey, medium to coarse grained sandstone in a medium grey sandy silt matrix.		
		375	15				
		374	16				
		373	17		CLAYSTONE. Light grey and light yellow silty, sandy claystone and minor dark red and yellow medium to coarse grained quartz sandstone.		
		372	18				
		371	19		SANDSTONE. Light to medium grey fine to coarse grained sandstone and light to medium grey clay, sand and silt.		
		370					

END OF BOREHOLE AT 57.10 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW24C

SHEET 2 OF 3

Client:	CHC Pty Ltd	Date Commenced:	14/9/11
Project:	Cobbora Coal Project	Date Completed:	16/9/11
Bore Location:	Cnr Golden Hwy & Spring Ridge Rd	Recorded By:	Chiara Callipari
Project Number:	2114426E & 2162570B	Log Checked By:	Stuart Brown

Drilling Method:	Air hammer	Surface RL:	389.22 mAHD
Drilling Company:	Gricks Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 710444.88 N 6445237.89

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		369	21		SANDSTONE. Light to medium grey fine to coarse grained sandstone and light to medium grey clay, sand and silt. <i>(continued)</i>	Digby Formation	
		368	22				
		367	23				
		366	24				
		365	25				
		364	26				
		363	27		SANDSTONE. Light grey fine to medium grained sandstone and minor light grey, yellow and red sandy, silty clay.	Ellismayne Formation	
		362	28				
		361	29				
		360	30		SANDSTONE. Light grey silty fine to coarse grained sandstone in a light grey clay matrix.		
		359	31		COAL. Black coal.	Whaka Formation	
		358	32		SILTSTONE. Black carbonaceous siltstone with minor light grey claystone.		
		357	33				
		356	34				
		355	35		SILTSTONE. Black carbonaceous siltstone with minor moderate to coarse white clay.		
		354	36				
		353	37		COAL and CLAY. 50% black coal. 50% white clay.		
		352	38		SANDSTONE. Medium to dark grey, fine to medium grained sandstone with minor light grey and white clay.	Avymore Claystone	
		351	39				
		350					

END OF BOREHOLE AT 57.10 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW24C

SHEET 3 OF 3

Client:	CHC Pty Ltd	Date Commenced:	14/9/11
Project:	Cobbora Coal Project	Date Completed:	16/9/11
Bore Location:	Cnr Golden Hwy & Spring Ridge Rd	Recorded By:	Chiara Callipari
Project Number:	2114426E & 2162570B	Log Checked By:	Stuart Brown

Drilling Method:	Air hammer	Surface RL:	389.22 mAHD
Drilling Company:	Gricks Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 710444.88 N 6445237.89

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		349	41		SANDSTONE. Medium to dark grey, fine to medium grained sandstone with minor light grey and white clay. <i>(continued)</i>	Avymore Claystone	
		348	42		SILTSTONE. Dark grey-black carbonaceous siltstone and minor medium to dark grey, fine to medium grained sandstone and white clay.	Flyblowers Creek Seam	
		347	43				
		346	44				
		345	45		SANDSTONE. Medium to dark grey, fine to coarse grained sandstone in a medium grey clay matrix.		
		344	46		SILTSTONE. Dark grey-black carbonaceous siltstone with minor medium grey clay.		
		343	47		SANDSTONE. Medium to dark grey and black, fine to coarse grained carbonaceous sandstone with minor medium grey clay.		
		342	48				
		341	49		SILTSTONE. Black carbonaceous siltstone with minor light brown and grey claystone.		
		340	50				
		339	51				
		338	52				
		337	53				
		336	54				
	bentonite	335	55		SANDSTONE. Light to medium grey, fine to coarse grained sandstone with minor medium grey clay.	Tom Cat Gully Sandstone	
		334	56				
	gravel pack 50mm PVC slotted casing	333	57				
		332	58				
	bentonite	331	59		SILTSTONE. Black carbonaceous siltstone with minor light brown and grey claystone.		
		330					

Airlift <0.05L/s
EC=1.872mS/cm
pH=8.72

END OF BOREHOLE AT 57.10 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW24D

SHEET 1 OF 4

Client:	CHC Pty Ltd	Date Commenced:	13/10/11
Project:	Cobbora Coal Project	Date Completed:	14/9/11
Bore Location:	Cnr Golden Hwy & Spring Ridge Rd	Recorded By:	James Domnisse
Project Number:	2114426E & 2162570B	Log Checked By:	Stuart Brown

Drilling Method:	Air hammer	Surface RL:	389.30 mAHD
Drilling Company:	Gricks Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 710445.78 N 6445227.26

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	200mm PVC surface casing and 50mm PVC casing	389	1		SANDSTONE. Weathered orange to red-brown fine to medium grained sandstone with minor yellow, orange, red-brown clay.	Digby Formation	
		388	2				
		387	3				
		386	4				
		385	5				
	50mm PVC casing	384	6		SANDSTONE. Weathered dark red and yellow-brown fine to coarse grained sandstone in a clayey silt matrix.		
		383	7				
		382	8				
		381	9				
		380	10				
		379	11				
		378	12				
		377	13				
		376	14		CLAYSTONE. Light to medium grey silty, sandy claystone with minor medium grey fine to coarse grained sandstone.		
		375	15		SANDSTONE. Medium grey fine grained sandstone in a light grey clayey silt matrix.		
		374	16		CLAYSTONE and SANDSTONE. 50% medium grey silty, sandy claystone. 50% light to medium grey fine to coarse grained sandstone.		
		373	17		CLAYSTONE. Medium grey, silty, sandy claystone and minor light to dark grey and yellow fine to coarse grained sandstone.		
		372	18				
		371	19				
		370					

END OF BOREHOLE AT 70.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW24D

SHEET 2 OF 4

Client:	CHC Pty Ltd	Date Commenced:	13/10/11
Project:	Cobbora Coal Project	Date Completed:	14/9/11
Bore Location:	Cnr Golden Hwy & Spring Ridge Rd	Recorded By:	James Domnisse
Project Number:	2114426E & 2162570B	Log Checked By:	Stuart Brown

Drilling Method:	Air hammer	Surface RL:	389.30 mAHD
Drilling Company:	Gricks Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 710445.78 N 6445227.26

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		369	21		CLAYSTONE. Medium grey, silty, sandy claystone and minor light to dark grey and yellow fine to coarse grained sandstone. <i>(continued)</i>	Digby Formation	
		368	22				
		367	23				
		366	24				
		365	25		SILTSTONE. Light grey, clayey, sandy siltstone and minor light grey fine to coarse grained quartz sandstone.	Ellismayne Formation	
		364	26				
		363	27		SILTSTONE. Light grey, clayey, sandy siltstone with minor light grey medium to fine grained sandstone and dark red, vuggy, fine to coarse grained sandstone.		
		362	28				
		361	29				
		360	30		SANDSTONE. Light grey fine to coarse grained quartz sandstone. 20% black coal.		
		359	31		COAL. Black coal.	Whaka Formation	
		358	32		SILTSTONE. Black carbonaceous siltstone with minor light grey claystone and white clay.		
		357	33				
		356	34				
		355	35				
		354	36				
		353	37		SILTSTONE. Black carbonaceous siltstone with minor white clay and light grey fine to coarse grained sandstone.	Avymore Claystone	
		352	38				
		351	39		SANDSTONE. Light to dark grey sandstone with minor white and medium grey clay and black carbonaceous siltstone.	Flyblowers Creek Formation	
		350					

END OF BOREHOLE AT 70.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW24D

SHEET 3 OF 4

Client:	CHC Pty Ltd	Date Commenced:	13/10/11
Project:	Cobbora Coal Project	Date Completed:	14/9/11
Bore Location:	Cnr Golden Hwy & Spring Ridge Rd	Recorded By:	James Dommissie
Project Number:	2114426E & 2162570B	Log Checked By:	Stuart Brown

Drilling Method:	Air hammer	Surface RL:	389.30 mAHD
Drilling Company:	Gricks Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 710445.78 N 6445227.26

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		349	41		SANDSTONE. Light to dark grey sandstone with minor white and medium grey clay and black carbonaceous siltstone. <i>(continued)</i>	Flyblowers Creek Formation	
		348	42				
		347	43				
		346	44				
		345	45				
		344	46				
		343	47				
		342	48				
		341	49				
		340	50				
		339	51		SILTSTONE. Black carbonaceous siltstone with minor light grey and brown claystone, and light grey clay.		
		338	52		SILTSTONE. Black carbonaceous siltstone with minor light brown laminated claystone.		
		337	53				
		336	54				
		335	55				
		334	56		SANDSTONE. Light to dark grey fine to coarse grained sandstone, and minor black carbonaceous siltstone.	Tom Cat Gully Sandstone	
		333	57				
		332	58				
		331	59				
		330			SILTSTONE. Black carbonaceous siltstone with minor light grey claystone, and medium to light grey sandstone.	Upper Ullan Seam	

END OF BOREHOLE AT 70.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW24D

SHEET 4 OF 4

Client:	CHC Pty Ltd	Date Commenced:	13/10/11
Project:	Cobbora Coal Project	Date Completed:	14/9/11
Bore Location:	Cnr Golden Hwy & Spring Ridge Rd	Recorded By:	James Domnisse
Project Number:	2114426E & 2162570B	Log Checked By:	Stuart Brown

Drilling Method:	Air hammer	Surface RL:	389.30 mAHD
Drilling Company:	Gricks Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 710445.78 N 6445227.26

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	bentonite	329	61		SILTSTONE. Black carbonaceous siltstone with minor light brown claystone.	Upper Ullan Seam	
		328	62				
	gravel pack	326	63		SILTSTONE and CLAYSTONE. Black carbonaceous siltstone and dark brown and white claystone.	C-Marker Claystone	
	50mm PVC slotted casing	325	64		SILTSTONE. Black carbonaceous siltstone with minor light brown claystone.	Lower Ullan Seam	
		323	66		COAL. Black coal.		
	bentonite	322	67		SILTSTONE. Black carbonaceous siltstone with minor medium grey silty clay.		
		321	68				
		320	69				
		319	70				
		318	71				
		317	72				
		316	73				
		315	74				
		314	75				
		313	76				
		312	77				
		311	78				
		310	79				

Airlift=0.1L/s
EC=3.04mS/cm
pH=5.98

END OF BOREHOLE AT 70.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW24E

SHEET 2 OF 5

Client:	CHC Pty Ltd	Date Commenced:	25/9/11
Project:	Cobbora Coal Project	Date Completed:	26/9/11
Bore Location:	Cnr Golden Hwy & Spring Ridge Rd	Recorded By:	Chiara Callipari
Project Number:	2114426E & 2162570B	Log Checked By:	Stuart Brown

Drilling Method:	Air hammer	Surface RL:	389.29 mAHD
Drilling Company:	Gricks Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 710446.25 N 6445216.68

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		369	21		SANDSTONE. Light grey-brown medium to coarse grained lithic quartz sandstone in a light grey to white sandy clay matrix.	Digby Formation	
		368	22				
		367	23				
		366	24				
		365	25				
		364	26			Ellismayne Formation	
		363	27		SILTSTONE. Light brown to grey and medium brown hard, partly laminated siltstone in a grey to white sandy clay matrix.		
		362	28		SANDSTONE. Light to dark grey, brown-grey and red-yellow medium grained lithic quartz sandstone in a light grey clay matrix.		
		361	29		SANDSTONE. Light grey and pink coarse grained lithic quartz sandstone, with minor coal.	Whaka Formation	
		360	30				
		359	31		COAL. Coal with minor light grey-brown fine siltstone and a trace of light grey coarse sandstone.		
		358	32				
		357	33		SILTSTONE. Dark grey-black carbonaceous siltstone.		
		356	34		SILTSTONE. Dark grey-black carbonaceous siltstone and light grey clay, with minor light brown-grey siltstone.	Avymore Claystone	
		355	35				
		354	36		SILTSTONE. Dark grey-black carbonaceous siltstone interbedded with light to medium grey, fine to coarse sandstone and grey clay.		
		353	37			Flyblowers Creek Seam	
		352	38				
		351	39		SANDSTONE. Light to medium grey fine to coarse grained sandstone interbedded with dark grey-black carbonaceous siltstone and light to dark grey clay.		
		350					

END OF BOREHOLE AT 88.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW24E

SHEET 3 OF 5

Client:	CHC Pty Ltd	Date Commenced:	25/9/11
Project:	Cobbora Coal Project	Date Completed:	26/9/11
Bore Location:	Cnr Golden Hwy & Spring Ridge Rd	Recorded By:	Chiara Callipari
Project Number:	2114426E & 2162570B	Log Checked By:	Stuart Brown

Drilling Method:	Air hammer	Surface RL:	389.29 mAHD
Drilling Company:	Gricks Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 710446.25 N 6445216.68

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		349	41		SANDSTONE. Light to medium grey fine to coarse grained sandstone interbedded with dark grey-black carbonaceous siltstone and light to dark grey clay. <i>(continued)</i>	Flyblowers Creek Seam	
		348	42				
		347	43				
		346	44				
		345	45				
		344	46				
		343	47				
		342	48				
		341	49				
		340	50				
		339	51				
		338	52		SILTSTONE. Dark grey-black carbonaceous siltstone with minor light brown-grey siltstone.		
		337	53		SILTSTONE. Dark grey-black carbonaceous siltstone with minor medium grey fine to coarse sandstone.		
		336	54		SILTSTONE. Dark grey-black carbonaceous siltstone with minor medium grey fine to coarse grained sandstone.		
		335	55			Tom Cat Gully Sandstone	
		334	56		SILTSTONE. Dark grey-black carbonaceous siltstone with minor grey claystone.		
		333	57		SILTSTONE. Dark grey-black carbonaceous siltstone with minor light brown-grey siltstone.		
		332	58		SANDSTONE. Light to medium grey fine to coarse grained sandstone.		
		331	59				
		330					

END OF BOREHOLE AT 88.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW24E

SHEET 4 OF 5

Client:	CHC Pty Ltd	Date Commenced:	25/9/11
Project:	Cobbora Coal Project	Date Completed:	26/9/11
Bore Location:	Cnr Golden Hwy & Spring Ridge Rd	Recorded By:	Chiara Callipari
Project Number:	2114426E & 2162570B	Log Checked By:	Stuart Brown

Drilling Method:	Air hammer	Surface RL:	389.29 mAHD
Drilling Company:	Gricks Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 710446.25 N 6445216.68

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		329			SILTSTONE. Interbedded dark grey-black carbonaceous siltstone, light brown-grey siltstone, light grey clay and minor quartz.	Upper Ulan Seam	
		328	61		SILTSTONE. Dark grey-black carbonaceous siltstone with minor light brown medium to coarse grained sandstone.		
		327	62		COAL. Coal with minor light grey-brown fine siltstone.		
		326	63		SILTSTONE. Dark grey-black carbonaceous siltstone interbedded with light brown medium to coarse grained sandstone and light brown-grey siltstone.		
		325	64				
		324	65				
		323	66		CLAYSTONE. Dark brown and light grey claystone.	C-Marker Claystone	
		322	67		COAL. Coal		Lower Ulan Seam
		321	68				
		320	69		SILTSTONE. Dark grey-black carbonaceous siltstone.		
	bentonite	319	70				
	gravel pack	318	71				
	50mm PVC slotted casing	317	72		SANDSTONE. Medium to dark grey fine to coarse grained quartz sandstone.	Dapper Formation	
		316	73				
		315	74				
		314	75				
		313	76				
		312	77				
		311	78				
		310	79				

END OF BOREHOLE AT 88.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW24E

SHEET 5 OF 5

Client:	CHC Pty Ltd	Date Commenced:	25/9/11
Project:	Cobbora Coal Project	Date Completed:	26/9/11
Bore Location:	Cnr Golden Hwy & Spring Ridge Rd	Recorded By:	Chiara Callipari
Project Number:	2114426E & 2162570B	Log Checked By:	Stuart Brown

Drilling Method:	Air hammer	Surface RL:	389.29 mAHD
Drilling Company:	Gricks Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 710446.25 N 6445216.68

Bore Information		Field Material Description						
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY	
		309	81		SANDSTONE. Medium to dark grey fine to coarse grained quartz sandstone. <i>(continued)</i>	Dapper Formation	Airlift=0.125L/s EC=2.74mS/cm pH=6.03	
		308	82					
		307	83					
		306	84					
		305	85					SANDSTONE. Light grey coarse grained lithic quartz sandstone.
		304	86					
		303	87					
		302	88					
		301	89					
		300	90					
		299	91					
		298	92					
		297	93					
		296	94					
		295	95					
		294	96					
		293	97					
		292	98					
		291	99					
		290						

END OF BOREHOLE AT 88.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW25

SHEET 1 OF 2

Client:	CHC Pty Ltd	Date Commenced:	9/11/11
Project:	Cobbora Coal Project	Date Completed:	10/11/11
Bore Location:	Darlington	Recorded By:	Chiara Callipari
Project Number:	2114426E & 2162570B	Log Checked By:	Stuart Brown

Drilling Method:	Air hammer	Surface RL:	370.39 mAHD
Drilling Company:	Gricks Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 709138.98 N 6443789.37

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	200mm PVC surface casing and 50mm PVC casing	370	1		SANDY CLAY. Red-brown and grey sandy clay.	Tom Cat Gully Sandstone	
		369	2		SANDSTONE. Pink, cream, yellow, red, grey and brown friable fine to medium grained lithic quartz sandstone with minor grey clay clasts.		
		368	3		CLAYSTONE. Black, cream, yellow and brown carbonaceous claystone.		
		367	4		SILTY CLAYSTONE. Light to dark grey and black carbonaceous silty claystone.	Ulan Coal Seams	
		366	5		SILTSTONE and SANDSTONE. 50% brown-grey siltstone. 50% medium grey fine to medium grained sandstone with carbonaceous flecks.		
		365	6		SILTY CLAYSTONE. Dark brown and black carbonaceous silty claystone.		
		364	7		CLAYSTONE and SANDSTONE. 50% soft grey claystone. 50% grey and brown fine to medium grained quartz sandstone.	Dapper Formation	
		363	8		SANDSTONE. Grey, brown and red mottled medium to coarse grained lithic sandstone.		
		362	9		SANDSTONE. Light yellow-cream to yellow-orange oxidised fine to medium grained lithic quartz sandstone.		
		361	10		SANDSTONE. Light brown and grey fine to coarse grained lithic quartz sandstone in a cream clay matrix.		
		360	11		SANDSTONE. Medium grey moderately friable fine grained sandstone.		
		359	12		SANDSTONE. Cream fine to medium grained lithic quartz sandstone in a cream clay matrix.		
		358	13		SANDSTONE. Medium grey friable fine quartz sandstone.		
		357	14		SANDSTONE. Light to dark grey fine to coarse grained carbonaceous sandstone, coarsening with depth, in light grey silty clay matrix.		
		356	15				
		355	16				
		354	17				
		353	18				
		352	19				
		351	20				
		350	21				
		349	22				
		348	23				
		347	24				
		346	25				
		345	26				
		344	27				
		343	28				
		342	29				
		341	30				
		340	31				
		339	32				
		338	33				
		337	34				
	336						

END OF BOREHOLE AT 61.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW25

SHEET 2 OF 2

Client:	CHC Pty Ltd	Date Commenced:	9/11/11
Project:	Cobbora Coal Project	Date Completed:	10/11/11
Bore Location:	Darlington	Recorded By:	Chiara Callipari
Project Number:	2114426E & 2162570B	Log Checked By:	Stuart Brown

Drilling Method:	Air hammer	Surface RL:	370.39 mAHD
Drilling Company:	Gricks Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 709138.98 N 6443789.37

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		335	36		SANDSTONE. Light to dark grey fine to coarse grained carbonaceous sandstone, coarsening with depth, in light grey silty clay matrix. <i>(continued)</i>	Dapper Formation	
		334	37				
	bentonite	333	38				
		332	39				
	gravel pack	331	40				
		330	41				
	50mm slotted PVC casing	329	42				
		328	43				
		327	44				
		326	45				
		325	46				
		324	47				
		323	48				
		322	49				
		321	50		SANDSTONE and SILTSTONE. Interbedded light to dark grey and black fine to medium grained sandstone in a light grey clay matrix, and cream siltstone.	Early Permian Sequence	
	bentonite	320	51				
		319	52				
		318	53				
		317	54		SILTSTONE. Cream siltstone with some iron staining, with minor soft black carbonaceous material (likely contamination from above).		
		316	55		SILTSTONE. Cream to light brown-grey thinly laminated siltstone, with a trace of oxidised fine to medium quartz sandstone.		
		315	56				
		314	57				
		313	58				
		312	59				
		311	60				
		310	61				
		309	62				
		308	63				
		307	64				
		306	65				
		305	66				
		304	67				
		303	68				
		302	69				
		301					

Airlift=0.15L/s
EC=3.18mS/cm
pH=7.07

END OF BOREHOLE AT 61.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW26

SHEET 1 OF 3

Client:	CHC Pty Ltd	Date Commenced:	27/10/11
Project:	Cobbora Coal Project	Date Completed:	27/10/11
Bore Location:	Timbertop	Recorded By:	Chiara Callipari
Project Number:	2114426E & 2162570B	Log Checked By:	Stuart Brown

Drilling Method:	Air hammer	Surface RL:	434.95 mAHD
Drilling Company:	Gricks Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 711780.37 N 6443721.05

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	200mm PVC surface casing and 50mm PVC casing 50mm PVC casing	434	1	[Dotted pattern]	SANDSTONE. Red-brown weathered fine to coarse grained sandstone with red-brown clay.	Digby Formation	
		433	2	[Horizontal lines]	CLAYSTONE. Dark red-pink, dark yellow and light grey mottled claystone.		
		432	3	[Dotted pattern]	SANDSTONE. Light grey, dark yellow, red-brown and pink coarse sandstone and fine to coarse grained quartz sandstone.		
		431	4	[Dotted pattern]	SANDSTONE. Light brown-white and dark brown-orange, hard, fine to coarse grained lithic quartz sandstone with minor light grey clay.		
		430	5	[Dotted pattern]			
		429	6	[Dotted pattern]	SANDSTONE and SILTSTONE. 50% light brown-white and dark brown-orange, hard, fine to coarse grained lithic quartz sandstone with minor light grey clay. 50% light grey hard siltstone.	Ellismayne Formation	
		428	7	[Dotted pattern]	SANDSTONE. Orange, pink, red and light grey mottled and moderately friable, fine to coarse grained quartz sandstone.		
		427	8	[Dotted pattern]			
		426	9	[Dotted pattern]	SANDSTONE and SILTSTONE. Interbedded light grey and yellow medium to coarse grained lithic sandstone and dark grey, planar, fine to coarse carbonaceous siltstone.		
		425	10	[Dotted pattern]			
		424	11	[Dotted pattern]		Whaka Formation	
		423	12	[Dotted pattern]			
		422	13	[Dotted pattern]			
		421	14	[Solid black]	COAL. Coal.		
		420	15	[Horizontal lines]	SILTSTONE. Dark grey-black to light grey-brown carbonaceous siltstone.		
		419	16	[Horizontal lines]	SILTSTONE and CLAYSTONE. Dark grey-black to light grey-brown carbonaceous siltstone and light grey-white carbonaceous claystone.		
		418	17	[Horizontal lines]			
		417	18	[Horizontal lines]			
		416	19	[Horizontal lines]			

END OF BOREHOLE AT 57.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW26

SHEET 2 OF 3

Client:	CHC Pty Ltd	Date Commenced:	27/10/11
Project:	Cobbora Coal Project	Date Completed:	27/10/11
Bore Location:	Timbertop	Recorded By:	Chiara Callipari
Project Number:	2114426E & 2162570B	Log Checked By:	Stuart Brown

Drilling Method:	Air hammer	Surface RL:	434.95 mAHD
Drilling Company:	Gricks Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 711780.37 N 6443721.05

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		414	21		SILTSTONE and CLAYSTONE. Dark grey-black to light grey-brown carbonaceous siltstone and light grey-white carbonaceous claystone. <i>(continued)</i>	Whaka Formation	
		413	22				
		412	23				
		411	24		SANDSTONE. Light grey medium to coarse grained sandstone with minor light grey clay.		
		410	25		CLAYSTONE. Light grey claystone.	Aymore Claystone	
		409	26		COAL and SILTSTONE. Black stoney coal with minor medium brown carbonaceous siltstone.	Flyblowers Creek Seam	
		408	27		SILTSTONE. Dark grey-black carbonaceous siltstone.		
		407	28				
		406	29				
		405	30				
		404	31				
		403	32		SILTSTONE. Dark grey-black carbonaceous siltstone with minor medium grey medium to coarse grained sandstone.	Tom Cat Gully Sandstone	
		402	33		SANDSTONE. Light to medium grey fine to coarse grained quartz sandstone.		
		401	34				
		400	35				
		399	36				
		398	37				
		397	38		COAL. Coal.	Upper Ulan Seam	
		396	39		SILTSTONE. Dark grey-black carbonaceous siltstone with minor light brown and medium grey siltstone.		

END OF BOREHOLE AT 57.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW26

SHEET 3 OF 3

Client:	CHC Pty Ltd	Date Commenced:	27/10/11
Project:	Cobbora Coal Project	Date Completed:	27/10/11
Bore Location:	Timbertop	Recorded By:	Chiara Callipari
Project Number:	2114426E & 2162570B	Log Checked By:	Stuart Brown

Drilling Method:	Air hammer	Surface RL:	434.95 mAHD
Drilling Company:	Gricks Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 711780.37 N 6443721.05

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		394	41		SILTSTONE. Dark grey-black carbonaceous siltstone with minor light brown and medium grey siltstone. <i>(continued)</i>	Upper Ulan Seam	
		393	42		SILTSTONE and CLAYSTONE. Dark grey-black carbonaceous siltstone and light grey-brown claystone.		
		392	43		COAL. Coal.		
		391	44				
		390	45		CLAYSTONE. Light to medium brown claystone.	C-Marker Claystone	
		389	46		COAL. Coal.	Lower Ulan Seam	
		388	47		SILTSTONE. Dark grey-black carbonaceous siltstone.		
		387	48				
		386	49		SANDSTONE. Dark grey fine to medium grained sandstone with minor light grey-brown medium to coarse grained sandstone and light grey clay.	Dapper Formation	
	bentonite	385	50				
	gravel pack	384	51				
	50mm slotted PVC casing	383	52				
		382	53				
		381	54				
		380	55				
	sump	379	56				Dry
		378	57				
		377	58				
		376	59				

END OF BOREHOLE AT 57.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW27

SHEET 1 OF 2

Client: **CHC Pty Ltd**
 Project: **Cobbora Coal Project**
 Bore Location: **Woolandra**
 Project Number: **2114426E & 2162570B**

Date Commenced: **28/10/11**
 Date Completed: **29/10/11**
 Recorded By: **Chiara Callipari**
 Log Checked By: **Stuart Brown**

Drilling Method: **Air hammer**
 Drilling Company: **Gricks Drilling** Borehole Diameter: **50 mm**

Surface RL: **436.79 mAHD**
 Co-ords: **E 715660.22 N 6438900.47**

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	200mm PVC surface casing and 50mm PVC casing 50mm PVC casing bentonite gravel pack 50mm slotted PVC casing	436 435 434 433 432 431 430 429 428 427 426 425 424 423 422 421 420 419 418 417	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19		SANDSTONE. Light brown-orange to light red, oxidised, coarse lithic quartz weathered sandstone in a clay matrix. CLAYSTONE. Cream to light brown friable claystone and soft, black carbonaceous shale. COAL. Weathered black soft and fine coal. CLAYSTONE. Dark grey and dark red-brown friable claystone. SANDSTONE. Dark grey moderately friable, fine to medium grained weathered, carbonaceous lithic sandstone. SANDSTONE. Dark grey moderately friable fine carbonaceous sandstone. SANDSTONE. White to light brown fine to medium grained lithic quartz sandstone in silty clay matrix. SANDSTONE. Medium to dark grey medium to coarse grained sandstone in silty clay matrix, with minor orange and red oxidised fine to medium grained sandstone. SANDSTONE. Light yellow, slightly oxidised, coarse grained lithic quartz sandstone in silty, sandy, clay matrix.	Ulan Upper Seam C-Marker Claystone Ulan Lower Seam Dapper Formation	

END OF BOREHOLE AT 29.50 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW27

SHEET 2 OF 2

Client:	CHC Pty Ltd	Date Commenced:	28/10/11
Project:	Cobbora Coal Project	Date Completed:	29/10/11
Bore Location:	Woolandra	Recorded By:	Chiara Callipari
Project Number:	2114426E & 2162570B	Log Checked By:	Stuart Brown

Drilling Method:	Air hammer	Surface RL:	436.79 mAHD
Drilling Company:	Gricks Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 715660.22 N 6438900.47

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
					SANDSTONE. Light yellow, slightly oxidised, coarse grained lithic quartz sandstone in silty, sandy, clay matrix. <i>(continued)</i>	Dapper Formation	Dry
		416	21		CLAY and SILTSTONE. Minor brown-red clay becoming dark grey-black carbonaceous siltstone.		
		415	22		SANDSTONE. Light to medium grey medium to coarse grained sandstone in light grey clay matrix.		
		414	23				
		413	24		SANDSTONE and SILTSTONE. 50% light grey fine to medium grained sandstone in a light grey clay matrix. 50% dark grey carbonaceous siltstone. Trace of orange-brown clay (possibly collapsed material from near surface).		
		412	25				
		411	26		SILTSTONE. Finely bedded light to medium grey carbonaceous siltstone, partly iron-stained.		
		410	27		SANDSTONE. Light pink and light to medium grey fine to medium grained sandstone in light grey and pink clay matrix.		
		409	28		CLAYSTONE. Medium grey moderately friable claystone with minor iron-stained siltstone.		
		408	29		SANDSTONE. Yellow-brown coarse grained lithic quartz sandstone in a light brown clay matrix.		
		407	30				
		406	31				
		405	32				
		404	33				
		403	34				
		402	35				
		401	36				
		400	37				
		399	38				
		398	39				
		397					

END OF BOREHOLE AT 29.50 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW28A

SHEET 1 OF 1

Client:	CHC Pty Ltd	Date Commenced:	2/11/11
Project:	Cobbora Coal Project	Date Completed:	2/11/11
Bore Location:	Darlington	Recorded By:	Chiara Callipari
Project Number:	2114426E & 2162570B	Log Checked By:	Stuart Brown

Drilling Method:	Air hammer	Surface RL:	376.00 mAHD
Drilling Company:	Gricks Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 710548.42 N 6439196.01

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	50mm PVC casing				CLAY. Brown and orange silty clay with carbonaceous flecks.	Alluvium	Airlift=0.017L/s EC=4.02mS/cm pH=7.49
	bentonite	375	1				
	gravel pack				CLAY. Mottled brown, grey, orange and black sandy clay.		
	50mm slotted PVC casing	374	2				
		373	3		CLAY. Coarse brown, grey and orange sandy clay.		
		372	4		CLAY. Light grey and light brown coarse sandy clay with subangular clasts of 2-10mm diameter, mixed lithologies.		
		371	5		CLAY. Brown and grey sandy clay with subrounded clasts of 2-30mm diameter, mixed lithologies.		
	sump	370	6				
		369	7				
		368	8				
		367	9				

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.

GW28B

SHEET 1 OF 1

Client:	CHC Pty Ltd	Date Commenced:	2/11/11
Project:	Cobbora Coal Project	Date Completed:	2/11/11
Bore Location:	Darlington	Recorded By:	Chiara Callipari
Project Number:	2114426E & 2162570B	Log Checked By:	Stuart Brown

Drilling Method:	Air hammer	Surface RL:	375.93 mAHD
Drilling Company:	Gricks Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 710545.32 N 6439185.93

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	50mm PVC casing				SILTY CLAY. Mottled brown, grey and orange silty clay.	Alluvium	
		375	1		SILTY CLAY. Brown silty clay.		
		374	2		SANDY CLAY. Coarse brown sandy clay.		
	bentonite	373	3				
	gravel pack	372	4		GRAVELLY SANDY CLAY. Light brown and light grey sandy clay with subangular clasts of weathered sandstone and quartz, up to 10mm diameter.		
	50mm slotted PVC casing	371	5		GRAVELLY SANDY CLAY. Brown and grey sandy clay with carbonaceous flecks and subrounded clasts of weathered sandstone and quartz, up to 20mm diameter.		
		370	6		CLAYEY GRAVEL. Brown-orange subrounded gravel of mixed lithologies from 5-50mm diameter in light grey and brown clay.		
		369	7				
	sump	368	8		CONGLOMERATE. Quartz-rich granule conglomerate of mixed lithologies of 2-5mm diameter clasts, with a minor light grey clay.	Airlift=0.125L/s EC=7.88mS/cm pH=7.35	
		367	9				
		366					

END OF BOREHOLE AT 8.00 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW28C

SHEET 1 OF 2

Client:	CHC Pty Ltd	Date Commenced:	1/11/11
Project:	Cobbora Coal Project	Date Completed:	2/11/11
Bore Location:	Darlington	Recorded By:	Chiara Callipari
Project Number:	2114426E & 2162570B	Log Checked By:	Stuart Brown

Drilling Method:	Air hammer	Surface RL:	375.88 mAHD
Drilling Company:	Gricks Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 710542.14 N 6439176.71

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	200mm PVC surface casing and 50mm PVC casing	375	1		SILTY CLAY. Brown silty clay.	Alluvium	
		374	2		SANDY CLAY. Brown, grey and orange sandy clay.		
		373	3				
		372	4		GRAVEL. Brown-orange coarse subrounded gravel of mixed lithologies in brown-grey sandy clay.		
		371	5		CLAYEY GRAVEL. Red-brown sandy clayey gravel with subangular to angular clasts of mixed lithologies, up to 30mm diameter, in a mottled grey-brown clay matrix.		
		370	6		CLAYEY GRAVEL. Brown-orange subrounded gravels of mixed lithologies from 5-50mm diameter in a brown-orange silty clay matrix.		
		369	7		CLAYEY SANDY GRAVEL. Light grey-brown clayey sandy gravel of angular to subrounded mixed lithologies (approximately 50% quartz) up to 12mm in diameter, in a sandy clay matrix.		
		368	8		CLAYEY SANDY GRAVEL. Light grey-brown clayey sandy gravel of angular to rounded mixed lithologies (approximately 50% quartz) up to 12mm in diameter, in a sandy clay matrix. Becoming black carbonaceous siltstone.		
		367	9		SILTSTONE and CLAYSTONE. 50% black carbonaceous siltstone. 50% light grey-white siltstone and claystone.	Flyblowers Creek Seam	
		366	10		SILTSTONE. Dark grey-black carbonaceous siltstone. Minor clasts of mixed lithologies (contamination from above).		
		365	11		SILTSTONE and SANDSTONE. Medium grey carbonaceous siltstone and fine sandstone, with minor coal. Minor clasts of mixed lithologies (contamination from above).		
	50mm PVC casing	364	12			Tom Cat Gully Sandstone	
		363	13				
		362	14				
		361	15				
		360	16		SANDSTONE. Coarse quartz sandstone.		
		359	17				
	bentonite	358	18		SILTSTONE. Coal and dark grey carbonaceous siltstone.	Upper Ulan Seam	
		357	19		SILTSTONE and CLAYSTONE. 50% dark grey carbonaceous siltstone. 50% light grey-white claystone and siltstone of platy chips.		
		356					

END OF BOREHOLE AT 29.50 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW28C

SHEET 2 OF 2

Client:	CHC Pty Ltd	Date Commenced:	1/11/11
Project:	Cobbara Coal Project	Date Completed:	2/11/11
Bore Location:	Darlington	Recorded By:	Chiara Callipari
Project Number:	2114426E & 2162570B	Log Checked By:	Stuart Brown

Drilling Method:	Air hammer	Surface RL:	375.88 mAHD
Drilling Company:	Gricks Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 710542.14 N 6439176.71

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	50mm slotted PVC casing 	355	21		SILTSTONE. Dark grey-black carbonaceous siltstone with minor coal.	Upper Ulan Seam	
		354	22		SILTSTONE. Dark grey-black carbonaceous siltstone with minor coal, interbedded with light grey claystone and siltstone.		
		353	23				
		352	24		SILTSTONE and SANDSTONE. Light to medium grey siltstone and fine sandstone with carbonaceous bands.		
		351	25		SILTSTONE. Dark grey-black carbonaceous siltstone.		
		350	26		CLAYSTONE. Light to medium grey, moderately friable, claystone.	C-Marker Claystone	
		349	27		SILTSTONE. Dark grey carbonaceous siltstone with minor coal.	Lower Ulan Seam	
		348	28				
		347	29				
		346	30				
		345	31				
		344	32				
		343	33				
		342	34				
		341	35				
		340	36				
		339	37				
		338	38				
		337	39				
	336						

Airlift=0.35L/s
EC=2.77mS/cm
pH=6.81

END OF BOREHOLE AT 29.50 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW28D

SHEET 1 OF 2

Client:	CHC Pty Ltd	Date Commenced:	31/10/11
Project:	Cobbora Coal Project	Date Completed:	1/11/11
Bore Location:	Darlington	Recorded By:	Chiara Callipari
Project Number:	2114426E & 2162570B	Log Checked By:	Stuart Brown

Drilling Method:	Air hammer	Surface RL:	375.80 mAHD
Drilling Company:	Gricks Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 710538.12 N 6439165.79

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	200mm PVC surface casing and 50mm PVC casing	375	1		SILTY CLAY. Brown and grey silty clay.	Alluvium	
		374	2		CLAY. Light brown, grey and orange slightly carbonaceous clay.		
		373	3		CLAYEY GRAVEL. Coarse orange-brown subrounded gravel of mixed lithologies in light grey clay.		
		372	4		CLAYEY GRAVEL. Brown-orange and cream-brown sandy and clayey subrounded gravel of mixed lithologies of 2-30mm diameter.		
		371	5		COAL or SHALE. Hard black carbonaceous, fine grained coal or shale.		Flyblowers Creek Seam
		370	6		COAL. Coal interbedded with coarse quartz orange-red and dark grey pebble conglomerate with 2-12mm diameter clasts.		
		369	7		CONGLOMERATE. Coarse sandy subrounded pebble conglomerate of mixed lithologies from 2-30mm diameter, interbedded with dark grey carbonaceous mudstone. Some light grey clay clods.	Tom Cat Gully Sandstone	
		368	8		CONGLOMERATE and SANDSTONE. 50% coarse sandy subrounded pebble conglomerate of mixed lithologies from 2-30mm diameter in a light grey clayey sandy matrix. 50% light to medium grey, moderately friable, medium to coarse grained sandstone.		
		367	9		SANDSTONE. Coarse quartz sandstone or pebble conglomerate with minor grey siltstone.		
		366	10		SANDSTONE. Coarse quartz subrounded lithic sandstone (primarily quartz).		
		365	11		SANDSTONE and SILTSTONE. 50% coarse quartz sandstone. 50% dark grey-black carbonaceous siltstone.	Upper Ulan Seam	
		364	12		SILTSTONE. Dark grey siltstone with minor white claystone and minor light grey siltstone with carbonaceous flecks.		
		363	13				
	50mm PVC casing	362	14				
		361	15				
		360	16				
		359	17				
		358	18				
		357	19				
		356					

END OF BOREHOLE AT 38.50 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW28D

SHEET 2 OF 2

Client:	CHC Pty Ltd	Date Commenced:	31/10/11
Project:	Cobbora Coal Project	Date Completed:	1/11/11
Bore Location:	Darlington	Recorded By:	Chiara Callipari
Project Number:	2114426E & 2162570B	Log Checked By:	Stuart Brown

Drilling Method:	Air hammer	Surface RL:	375.80 mAHD
Drilling Company:	Gricks Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 710538.12 N 6439165.79

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		355	21		SILTSTONE. Dark grey siltstone with minor white claystone and minor light grey siltstone with carbonaceous flecks. <i>(continued)</i>	Upper Ulan Seam	
		354	22		COAL. Coal.		
		353	23		SILTSTONE and SANDSTONE. 50% dark grey-black carbonaceous siltstone and light brown siltstone with carbonaceous flecks. 50% light to medium grey friable, fine to medium grained sandstone.		
		352	24		CLAYSTONE. Light to medium grey-white claystone with carbonaceous flecks.	C-Marker Claystone	
		351	25				
		350	26		SILTSTONE. Interbedded dark grey-black siltstone, minor coal, light to medium brown mudstone with carbonaceous flecks and medium grey siltstone.	Lower Ulan Seam	
		349	27				
		348	28				
		347	29				
		346	30				
	bentonite	345	31				
	gravel pack	344	32		SANDSTONE. Light to medium grey friable, fine to medium grained thinly bedded sandstone.	Dapper Formation	
		343	33		SILTSTONE. 50% light grey fine grained sandstone with carbonaceous flecks. 50% medium grey siltstone.		
	50mm slotted PVC casing	342	34		SANDSTONE. Coarse sandstone in sandy matrix with minor dark grey mudstone.		
		341	35		CONGLOMERATE. Coarse quartz sandstone with poorly sorted quartz grains (medium to coarse sand and 10mm pebbles) with minor medium to dark grey siltstone.		
		340	36		CONGLOMERATE. 50% coarse quartz sandstone with poorly sorted quartz grains (medium to coarse sand and 10mm pebbles) with minor medium to dark grey siltstone. 50% light grey-brown fine sandstone with carbonaceous flecks.		
	sump	339	37		SANDSTONE. Light grey fine grained thinly bedded sandstone with carbonaceous flecks.		
		338	38		SANDSTONE. Light grey fine to medium grained sandstone with carbonaceous flecks. Minor quartz granules (possible contamination from above).		
		337	39				
		336					

Airlift=0.05L/s
EC=2.11mS/cm
pH=6.87

END OF BOREHOLE AT 38.50 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW29B

SHEET 1 OF 4

Client: **CHC Pty Ltd**
 Project: **Cobbora Coal Project**
 Bore Location: **Mates**
 Project Number: **2114426E & 2162570B**

Date Commenced: **14/11/11**
 Date Completed: **14/11/11**
 Recorded By: **Chiara Callipari**
 Log Checked By: **Stuart Brown**

Drilling Method: **Air hammer**
 Drilling Company: **Gricks Drilling** Borehole Diameter: **50 mm**

Surface RL: **348.29 mAHD**
 Co-ords: **E 705751.25 N 6446154.55**

Bore Information			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	200mm PVC surface casing and 50mm PVC casing	348	1		SANDY CLAY. Red-brown sandy clay.	Alluvium	
		347	2		CLAYEY GRAVEL. Medium to coarse clayey sandy gravel of quartz (up to 30mm diameter) and mixed lithologies (primarily subrounded siltstones) in a red-brown sandy clay matrix.		
		346	3				
		345	4		CLAYEY GRAVEL. Medium to coarse clayey sandy gravel of mixed lithologies in a red-brown sandy clay matrix. Gravel size increasing to approximately 50mm diameter.		
		344	5		GRAVELLY SAND. Brown-red gravelly clayey sand with subangular to subrounded clasts of quartz and mixed lithologies up to 30mm in diameter.		
		343	6				
		342	7				
		341	8				
		340	9		CLAYEY GRAVEL. Brown-red and yellow-orange pebbly gravel of mixed lithologies in brown and grey sandy clay matrix.		
		339	10				
		338	11				
		337	12				
		336	13				
		335	14				
		334	15				
	50mm PVC casing	332	16		SILTSTONE. Friable medium grey siltstone in a grey clay matrix.	Napperby Formation	
		331	17				
		330	18		SILTSTONE. Medium grey siltstone with grey-black carbonaceous flecks, and minor grey clay.		
		329	19		SILTSTONE. Friable medium grey siltstone in a medium grey clay matrix with minor light brown siltstone.		
		328	20		SILTSTONE. Medium grey siltstone in medium grey clay matrix with minor dark grey-black carbonaceous siltstone.		
		327	21				
		326	22				
		325	23				
		324	24		SILTSTONE. Light grey siltstone in a light grey clay matrix.		

END OF BOREHOLE AT 83.50 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW29B

SHEET 2 OF 4

Client:	CHC Pty Ltd	Date Commenced:	14/11/11
Project:	Cobbara Coal Project	Date Completed:	14/11/11
Bore Location:	Mates	Recorded By:	Chiara Callipari
Project Number:	2114426E & 2162570B	Log Checked By:	Stuart Brown

Drilling Method:	Air hammer	Surface RL:	348.29 mAHD
Drilling Company:	Gricks Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 705751.25 N 6446154.55

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		323			SILTSTONE. Light grey siltstone in a light grey clay matrix. <i>(continued)</i>	Napperby Formation	
		322	26		SILTSTONE. Light grey and light brown siltstone in a light grey clay matrix.		
		321	27		SILTSTONE. Light to medium grey siltstone with some carbonaceous flecks in a light grey clay matrix.		
		320	28				
		319	29				
		318	30				
		317	31		SILTSTONE. Light to medium grey siltstone with some carbonaceous flecks in a light grey clay matrix.		
		316	32				
		315	33				
		314	34				
		313	35				
		312	36				
		311	37				
		310	38				
		309	39				
		308	40				
		307	41				
		306	42				
		305	43				
		304	44				
		303	45				
		302	46				
		301	47				
		300	48				
		299	49		SILTSTONE. Medium to dark grey siltstone with some carbonaceous flecks in a light grey clay matrix.		

END OF BOREHOLE AT 83.50 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW29B

SHEET 3 OF 4

Client:	CHC Pty Ltd	Date Commenced:	14/11/11
Project:	Cobbara Coal Project	Date Completed:	14/11/11
Bore Location:	Mates	Recorded By:	Chiara Callipari
Project Number:	2114426E & 2162570B	Log Checked By:	Stuart Brown

Drilling Method:	Air hammer	Surface RL:	348.29 mAHD
Drilling Company:	Gricks Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 705751.25 N 6446154.55

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		298			SILTSTONE. Medium to dark grey siltstone with some carbonaceous flecks in a light grey clay matrix. <i>(continued)</i>	Napperby Formation	
		297	51				
		296	52				
		295	53				
		294	54				
		293	55				
		292	56				
		291	57				
		290	58				
		289	59				
		288	60				
		287	61				
		286	62				
	bentonite	285	63				
		284	64				
	gravel pack	283	65				
		282	66				
	50mm slotted PVC casing	281	67				
		280	68				
		279	69				
		278	70				
		277	71				
		276	72				
		275	73				
		274	74				

END OF BOREHOLE AT 83.50 m

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



GROUNDWATER BOREHOLE LOG

BORE NO.

GW29B

SHEET 4 OF 4

Client:	CHC Pty Ltd	Date Commenced:	14/11/11
Project:	Cobbora Coal Project	Date Completed:	14/11/11
Bore Location:	Mates	Recorded By:	Chiara Callipari
Project Number:	2114426E & 2162570B	Log Checked By:	Stuart Brown

Drilling Method:	Air hammer	Surface RL:	348.29 mAHD
Drilling Company:	Gricks Drilling	Borehole Diameter:	50 mm
		Co-ords:	E 705751.25 N 6446154.55

Bore Information		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		273			SILTSTONE. Dark grey siltstone in a dark grey clay matrix. <i>(continued)</i>	Napperby Formation	Airlift=0.1L/s EC=2.40mS/cm pH=7.39
		272	76		SILTSTONE. Dark grey and medium brown siltstone in a dark grey clay matrix.		
		271	77		SANDSTONE. Light to dark fine to medium grained sandstone with carbonaceous flecks, in a dark grey clay matrix.	Digby Formation	
		270	78		SANDSTONE. Light to dark fine to medium grained sandstone with carbonaceous flecks, in a dark grey clay matrix, with minor quartz and light brown-grey siltstone.		
		269	79				
		268	80		SANDSTONE. Light grey-brown fine to medium grained quartz sandstone with minor dark grey siltstone in a medium grey clay matrix.		
		267	81		SANDSTONE. Light to dark fine to medium grained sandstone with carbonaceous flecks, in a dark grey clay matrix, with minor quartz and light brown-grey siltstone.		
		266	82				
		265	83		SANDSTONE. Light grey fine to medium grained sandstone with carbonaceous flecks in minor light grey clay.		
		264	84				
	263	85					
	262	86					
	261	87					
	260	88					
	259	89					
	258	90					
	257	91					
	256	92					
	255	93					
	254	94					
	253	95					
	252	96					
	251	97					
	250	98					
	249	99					

END OF BOREHOLE AT 83.50 m

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