







BORE NO.

# GW1

100 YEARS ®				SHEET 1 OF 1
Client: Project: Bore Location: Project Number:	CMC Pty Ltd Cobbora Coa Jacksons 2114426E & 2	al Mine Project	Date Commenced: Date Completed: Recorded By: Log Checked By:	24/9/09 24/9/09 Nick Bryant Leah Gleeson
Drilling Method:	Air Rotary - E		Surface RL: 355.43 r	nAHD
Drilling Company:	Impax Drillin	-	Co-ords: E 70752	9.25 N 6442593.57
Bore Informatio	n	Field Material Description		
	GL)			
	RL (mAHD) DEPTH (mBGL) GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
9076017 Normality Somm Som	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	ANDY CLAY - light brown sandy clay loam SANDY CLAY - orange/brown slightly sandy slightly gravelly clay, gravel of gravel CLAY - very clayey gravel, clay soft, gravel fine-med well rou uartz and chert some minor mixed lithologies present SANDY GRAVEL - very clayey gravelly clay fine to coarse well rounded quartz andstone present SANDY GRAVEL - brown clayey sandy gravel, clay soft grey, gravel med ounded quartz SANDY GRAVEL - brown clayey sandy gravel, clay soft grey, gravel med GRAVEL - brown very clayey clay soft, gravel med angular-well rounded quartz SRAVEL - light brown clay gravel, clay mottled brown/grey/dark red, grave red angular-rounded quartz SRAVEL - light brown clayer gravel, clay soft and sandy, gravel med-coal ingular/subrounded quartz and lithic sandstone 2LAY - light brown-orange gravelly clay, clay soft brown/grey, gravel fine- mgular quartz and mixed lithologies	nded to angular  a, some lithic  angular to well  quartz  el coarse of  rse	Airlift = 1 L/s
	13 - - 342			
		END OF BOREHOLE AT 10.50		
	This borehole	log should be read in conjunction with Parsons Brinch	kerhoff's accompanying standard no	otes.



BORE NO.

#### GW2A SHEET 1 OF 1

Proj	ect: e Loca ect N	ation: umber: ethod:	С М 2 <sup>7</sup>	lt Dap	ora C oper 26E	Coal Mine Project         Date           .         .         .	te Commente Complete corded By: g Checked E	ed: By:	12/8/09 12/8/09 Angus McFarlane Leah Gleeson
		ompany:							6.98 N 6430846.57
В	ore In	formatio	n			Field Material Description			
WATER	WELL CC	INSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMA	TION	HYDROGEOLOGY
		152 mm steel				SAND - light brown sand with minor gravel	Alluvium		
		surface casing	- 454 - 453	1 - 2 -		SILTSTONE - dark brown/black, light organic material/oxidised coal with siltstone	Tomcat C Sandstor	Gully ne	_
			- 452	3 -		SANDSTONE - light grey, fine to medium grained sandstone with gravels SANDSTONE - light grey, fine to medium grained sandstone with gravels (dark red rock)			
			- 451	4 -		Wet COARSE SANDSTONE - yellow/orange coarse grained sandstone	_		
		50 mm	- 450 - 449	5 -		COARSE SANDSTONE - dull red/brown coarse grained sandstone	_		
0		PVC casing	- 448	6 - 7 -		COAL - interbedded coal with red claystone	Upper Ul Seam	lan	_
412/08/2009			- 447	8 -					EC = 2.53 mS/cm
			- 446	9 -					pH = 6.98
			- 445 - 444	10 —					
			- 443	11 -		CLAYSTONE - light grey claystone/tuff	C-Marke Clayston		_
			- 442	13 -					
		bentonite	- 441 - 440	14 -		COAL	Lower UI	lan	_
		gravel pack	- 439	15 - 16 -			Seam		
		50 mm slotted PVC casing	- 438	17 -					
			- 437	18 -					
		sump	- 436 - 435	19 -	 	MUDSTONE - dark brown carbonaceous mudstone	-		
			- 434	<b>20</b> – 21 –					_
			- 433			END OF BOREHOLE AT 20.60 m ole log should be read in conjunction with Parsons Brinckerhoff's acc			



BORE NO.

## GW2B

United programme         Expland Uniting         Bioschole Diameter: 50 mm         Co-ords:         E 717360.03         N 6430846.02           Born Information         Image: 1 minimum of the state of	Proje Drillii	nt: ect: Loca ect Nu ng Me	umber: ethod:	Co Mi 21 Ai	t Dap 11442 ir Ha	ora C pper 26E mme	Coal Mine Project         Da           Re         Re           & 2162570B         Lo           er         Su	ate Comme ate Comple ecorded By og Checkee urface RL:	eted: /: d By: <b>454.61</b>	
Number Construction         Subscript         Linklader         FreeMatter         Alluvium           Number Construction         2         5400-tigt been sential with new greent         Alluvium         Alluvium           -403         -         -         5400-tigt been sential with new greent         Alluvium         Tomcat Guily           -403         -         -         -         5400-tigt been sential with new greent         Alluvium         Tomcat Guily           -403         -         -         -         -         5400510/E - ligit gree, fore to metion griend sentiation         Tomcat Guily           -403         -         -         -         -         -         -           -403         -         -         -         -         -         -           -403         -         -         -         -         -         -         -           -403         -         <	Drilli	ng Co	ompany:		ighla	Ind [		o-ords:	E 7173	60.63 N 6430846.62
OUNDER         Output         SAMO-1/glt transmission, light organis         Alluvium           1         -454         -	Bo	re Inf	ormation	n			Field Material Description			
Without Participants       - 454       - 451       - 51.1TONE: - dark toronolistide, Lifet cogamic maderial/outdied out with initiative       Tormcat Guilly Sandstone         -	WATER	'ELL COM	NSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FOR	MATION	HYDROGEOLOGY
Operating         Control Control         Control			steel surface	- 454			SAND - light brown sand with minor gravel	Alluviu	im	
Output         -452				- 453	1 -		SILTSTONE - dark brown/black, light organic material/oxidised coal with siltstone	Tomca Sands	at Gully tone	_
PODUCT         - <td></td> <td></td> <td></td> <td>- 452</td> <td>2 -</td> <td></td> <td>SANDSTONE - light grey, fine to medium grained sandstone with gravels</td> <td></td> <td></td> <td></td>				- 452	2 -		SANDSTONE - light grey, fine to medium grained sandstone with gravels			
OUTOR       - 449       - COARSE SANDETONE - value/orange coarse gained sandatore       - 449       - 449       - 449       - COARSE SANDETONE - 441 red/wown coarse gained sandatore       Upper Ulan       EC = 1/2 mS/cm         - 448       - 448       - COAL - interbesked coal with red clayelane       Upper Ulan       Seam       EC = 1/2 mS/cm         - 448       - 447       - 448       - COAL       - COAL       - COAL					3 -					
OUTONE					4 -		COARSE SANDSTONE - yellow/orange coarse grained sandstone	_		
COAL - interbedded coal with red claystone - 448 - 448 448 447	8/2009		50 mm		5 -		COARSE SANDSTONE - dull red/brown coarse grained sandstone			
- 447 - 447 - 446 - 446 - 446  - 445  - 445  - 444  - 444  - 444  - 444  - 444   	▲ 12/C		PVC		6 -			Upper Seam	Ulan	
8 -         - 446         9 -         - 445         10 -         - 444         11 -         - 444         11 -         - 443         12 -         - 441				- 448	7 -		COAL			
9       -         - 445       -         10       -         - 444       -         11       -         - 443       -         12       -         - 442       -         13       -         - 441       -				- 447	8 -					
10-       - 444       11       - 443       12       - 442       13       - 441				- 446	9 -					
11     CLAYSTONE - light grey claystone/tuff     C-Marker Claystone       443     12       442     13       441     14	<u> </u>			- 445	10 —					
- 443 - 442 - 441 - 441				- 444	11 -		CLAYSTONE - light grey claystone/tuff			_
				- 443	12 -					
				- 442	13 -					
				- 441	14 -					
- 440 COAL Lower Ulan Seam				- 440					Ulan	



BORE NO.

## GW2B

Bor	ject: e Loca	ation: umber:	Co M	t Daj	ora C oper	Coal Mine Project	Date Rece	e Commenced: e Completed: orded By: Checked By:	12/8/09 12/8/09 Angus McFarlane Leah Gleeson
	ing Me	ethod: ompany:		ir Ha iabla		er Drilling Borehole Diameter: 50 mm		ace RL: <b>454.61</b> ords: <b>E 7173</b>	mAHD 60.63 N 6430846.62
		formation		igina		Field Material Description	00-0		00.03 11 0430040.02
				<u></u>	(1)				
WATER	WELL COM	NSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY		FORMATION	HYDROGEOLOGY
		bentonite gravel pack	- 439 - 438 - 437 - 436 - 435 - 435 - 435 - 433 - 433 - 433 - 433 - 433 - 432 - 431 - 430 - 429 - 428	16 - 17 - 18 - 19 - 20 - 21 - 22 - 23 - 24 - 25 - 26 - 27 - 28 -		COAL (continued)         MUDSTONE - dark brown carbonaceous mudstone         SANDSTONE - dark grey becoming grey medium to coarse grained sandstobecoming coarser with depth, wet         SILTSTONE - grey siltstone         SANDSTONE - grey fine to medium grained sandstone	one,	Lower Ulan Seam Dapper formation	
		-	- 426 - 425	29 -					
				This b	oreho	END OF BOREHOLE AT 28.32 I ble log should be read in conjunction with Parsons Brincko		mpanying standard	notes.



BORE NO.

## GW2C

Drillin	: Loca ct Nu g Me	tion: imber: ethod: ompany:	C M 21 Ai	t Dap 11442 ir Hai	ora C oper 26E mme	Coal Mine Project E F & 2162570B er	Date Comm Date Comple Recorded B Log Checke Surface RL: Co-ords:	eted: y: d By: <b>454.52</b>	11/8/09 11/8/09 Angus McFarlane Leah Gleeson mAHD 54.63 N 6430846.5
Bor	e Inf	ormation	ı			Field Material Description			
WATER	ILL CON	ISTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FOR	MATION	HYDROGEOLOGY
		50 mm PVC casing	- 454 - 453 - 452 - 451 - 450 - 449 - 448 - 447 - 446 - 447 - 446 - 445 - 444 - 443 - 442 - 441 - 440 - 439 - 438 - 437 - 436 - 435	1 - 1 - 2 - 3 - 3 - 3 - 3 - 3 - 3 - 3 - 3 - 3		SAND - light brown sand with minor gravel SILTSTONE - dark brown/black, light organic material/oxidised coal with siltstone SANDSTONE - light grey, fine to medium grained sandstone with gravels (dark red roc wet COARSE SANDSTONE - yellow/orange coarse grained sandstone COARSE SANDSTONE - dull red/brown coarse grained sandstone COAL - interbedded coal with red claystone COAL - interbedded coal with red claystone COAL - interbedded coal with red claystone COAL COAL MUDSTONE - light grey claystone/tuff COAL MUDSTONE - dark brown carbonaceous mudstone END OF BOREHOLE AT 33.30 m	Sands	Ulan ker one	EC = 1.407 mS/cm pH = 7.36
				This h	oreh	END OF BOREHOLE AT 33.30 m ble log should be read in conjunction with Parsons Brinckerhoff's a	accompanying	standard	notes.



BORE NO.

## GW2C

Boro Proj Drill	ect: e Loca ect Nu ing Me	imber: ethod:	C M 2^ A	t Dap 11442 ir Ha	ora C oper 26E mme	Coal Mine Pr & 2162570B er			Date Reco Log ( Surfa	Commer Complete orded By: Checked ace RL: 4	ed: By: <b>154.52 n</b>		
		mpany: ormatior		ignia	na I	Drilling	Borehole Diamete		Co-o	ras: 1	= /1/35	4.63 N 6430846.5	
		onnauoi	1			FI	eld Material Desci	ription					
WATER	WELL CON	ISTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG		LITHOLOG	SY		FORMA	ATION	HYDROGEOLOGY	(
	38					MUDSTONE - dar	rk brown carbonaceous mudstor	ne (continued)					
		-	- 434 - 433	21 - 22 -		SANDSTONE - da becoming coarser	ark grey becoming grey medium with depth, wet	to coarse grained sandstone,		Dapper Formatio	on		
		bentonite	- 432 - 431	23 - 24 -									
		gravel pack	- 430 - 429	25 -	····	SILTSTONE - gre	y siltstone						
			- 428	26 - 27 -		SANDSTONE - gr	rey fine to medium grained sand	istone					
		50 mm slotted	- 427 - 426	28 -									
		PVC casing	- 425 - 424	29 - 30-	 		y siltstone with interbedded muc						
		sump	- 423	31 - 32 -			k grey siltstone with interbedded		s of				
		-	- 422	33 -								_	
			- 421 - 420	34 -									
			- 419	35 - 36 -									
			- 418 - 417	37 -									
			- 416	38 - 39 -									
			- 415	This h	oreh	ole log should h	END OF BOR e read in conjunction w	EHOLE AT 33.30 m	offs accor	nnanving st	andard po	otes	



BORE NO.

## GW2D

Proj Drill	nt: ect: e Locat ect Nur ing Me	mber: thod:	Co Mt 21 Air	Dap 1442 r Hai	ora C oper 26E mme	Coal Mine Project     Da       Ref     Ref       & 2162570B     Lo       er     St	ate Comme ate Comple ecorded By og Checked urface RL:	eted: /: d By: <b>454.42</b>	
		mpany: ormatior		ghla	nd L	0	o-ords:	E 7173	48.56 N 6430846.94
Б	Sreimo	ormation	1			Field Material Description			
WATER	WELL CONS	STRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FOR	MATION	HYDROGEOLOGY
	38	152 mm steel	- 454			SAND - light brown sand with minor gravel	Alluviu	m	
		surface casing	- 453	1 -		SILTSTONE - dark brown/black, light organic material/oxidised coal with siltstone	Tomca Sands	at Gully tone	
			- 452	2 -		SANDSTONE - light grey, fine to medium grained sandstone with gravels			
		-	- 451	3 -		SANDSTONE - light grey, fine to medium grained sandstone with gravels (dark red rock) wet	_		
	S S		- 450	4 -		COARSE SANDSTONE - yellow/orange coarse grained sandstone			
		50 mm	- 449	5 -		COARSE SANDSTONE - dull red/brown coarse grained sandstone			
		PVC casing	- 448	6 -		COAL - interbedded coal with red claystone	Upper	Ulan	
	S S		0	7 -		COAL	Seam		
			- 447	8 -					
			- 446	0					
		-	- 445	9 -					
			- 444	10					
		-	- 443	11 -		CLAYSTONE - light grey claystone/tuff	C-Mar Clayst		
		-	- 442	12 -					
			- 441	13 -					
			- 440	14 -					
			440	15 -		COAL	Lower Seam	Ulan	
			- 439	10					
			- 438	16 -					
			- 437	17 -					
				18 -					
		-	- 436	19 -					
		-	- 435			MUDSTONE - dark brown carbonaceous mudstone			
	ı,		- 434	20 -					
				21 -		SANDSTONE - dark grey becoming grey medium to coarse grained sandstone, becoming coarser with depth, wet	Dappe Forma	r tion	
			- 433	22 -					
			- 432	~~ ]					
			- 431	23 -					
				24 -					
			- 430						
			Т	his b	oreho	END OF BOREHOLE AT 49.12 m ble log should be read in conjunction with Parsons Brinckerhoff's ac	companying	standard r	notes.



BORE NO.

## GW2D

District         Market Biological Computer         Statistics Res         64/4/2         64/3/2         6	Bor	iect: e Loca	ition: imber:	Co Mt	Dap	ora C oper	coal Mine Project	Date C Recore	Commenced: Completed: ded By: hecked By:	10/8/09 10/8/09 Angus McFarlane Leah Gleeson
Bore Information         Field Material Description           If         If <th></th> <th>-</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>		-								
Normalion         Number of the second					gina			00 010		040.00 N 0400040.04
Port     Port     Port     Port       1     479     1     1010000000000000000000000000000000000					7	()				
Association         Formation         Formation           428	WATER	WELL CON	STRUCTION	RL (mAHD)	DEPTH (mBGI	GRAPHIC LOO	LITHOLOGY		FORMATION	HYDROGEOLOGY
sump – 406 49 – ···· – 405	Main and a second se		bentonite gravel pack	Here         - 429         - 428         - 427         - 426         - 425         - 422         - 421         - 422         - 421         - 422         - 421         - 421         - 421         - 421         - 419         - 418         - 413         - 414         - 413         - 411         - 410         - 409         - 408	26 - 27 - 28 - 29 - 30 - 33 - 33 - 33 - 33 - 33 - 33 - 3		SANDSTONE - grey fine to medium grained sandstone		Dapper Formation	
			sump				END OF BOREHOLE AT 49.12 m			



BORE NO.

# GW3\_TPB

Client:     CMC Pty Ltd     Date Commences:     278/09       Project:     Cobbors Coal Mine Project     Date Commencest:     318/09       Brez Location:     2114426E 8.2162570B     Log Checked By:     Leah Gleeson       Drilling Method     Air Hammer     Highland Drilling     Borshole Diameter:     203 mm     Co-ords:     276.370.41       Drilling Method     Air Hammer     Highland Drilling     Borshole Diameter:     203 mm     Co-ords:     276.371.44       Sore Information     Field Material Description     Geophysical Log     N 6437874.58       Method     Field Material Description     Field Material Description     N 6437874.58       Method     Field Material Description     Field Material De		<b>100</b> YEARS ®							SHEET 1 OF			
Bore Location: CMV3 South Project Number: 2114426E 8.2152570B Dilling Method Dilling Method	Client:						Date Co	ommenced: 27/8	/09			
Project Number: 2114426E & 2162570B Log Checked By: Leah Gleeson Drilling Method: Air Hammer Drilling Company: High and Drilling Borehole Diameter: 203 mm Surface RL: 375.31 mAHD Co-ords: 375.31 mAH	-					al Mine Project		•				
Drilling Company: Air Hammer Highland Drilling Borehole Diameter: 203 mm Surface RL: 375.31 mAHD Co-ords: E 709120.02 N 6437874.58 Bore Information Field Material Description Ceophysical Log WeLLONGTRUCTOR UP The second se												
Drilling Company:     Highland Drilling     Borehole Diameter:     203 mm     Co-ords:     E 709120.02     N 6437874.58       Bore Information     Field Material Description     Geophysical Log       United Constitution     90     91     91     91     91     91       VELL CONSTITUTION     92     93     93     91     91     91       Operation     93     93     93     93     91     91     91       ODE     93     93     93     93     93     91     91     91       ODE     93     93     93     93     91     91     91     91     91       ODE     93	Project N	Number:	2'	114426	= & .	2162570B	Log Ch	ecked By: Lear	n Gleeson			
Bore Information         Field Material Description         Geophysical Log           U         Image: State of the state of												
Bit of the second se				ighland	Dri	-	Co-ords					
Better Instruction and and the set of model and t	Bore Ir	nformatior	ו			Field Material Description		Geophysical Log				
Better Instruction and and the set of model and t				G G	<u>s</u>							
Model and the set of the	с.		(DH)									
Model and the set of the	VATE			EPTH			E	GAMMA (API-GR) 0 62.5 125.0 187.5 250				
Inter at attrice     3/2     provet of quart and model linklogie     PULVIUII       3/4     1     SANDY CLAY - value bottom andly gravely day, gravel of quart and model linklogies     Pulviuii       3/7     3     CRAVELLY CLAY - value bottom andly gravely day, gravel of quart and model linklogies     Pulviuii       3/7     3     CRAVELLY CLAY - value bottom gravely day, gravel of quart and model linklogies     Digby       3/7     4     CONCLOMENATE - reduction weddered cognitive day, mod - coarse     Digby       3/7     6     CONCLOMENATE - reduction weddered cognitive day, find - coarse     Digby       3/8     7     7     CONCLOMENATE - reduction weddered cognitive day, find - coarse       3/8     7     7     CONCLOMENATE - reduction weddered cognitive day, find - coarse       3/8     7     7     CONCLOMENATE - regrest conglimentation class     Digby       3/8     7     7     CONCLOMENATE - regrest conglimentation class     Pormation       3/8     7     7     CONCLOMENATE - regrest conglimentation class     Pormation       3/8     7     7     CONCLOMENATE - regrest conglimentation class     Pormation       3/8     7     7     CONCLOMENATE - regrest conglimentation class     Pormation       3/8     7     7     CONCLOMENATE - regrest conglimentation class     Pormation	- WELL C	ONSTRUCTION	£		,	LITHOLOGY	Formation		HYDROGEOLOGY			
same       3000° CLAY - yellowbrow tank growing day, growing dir.         372       3       GRAVELLY CLAY - yellowbrow gravely day, med - corree         373       2       3         374       3       GRAVELLY CLAY - yellowbrow gravely day, med - corree         374       3       GRAVELLY CLAY - yellowbrow gravely day, med - corree         377       4       GRAVELLY CLAY - yellowbrow gravely day, med - corree         378       6       CONCLOMERATE - endorsow washered congomerate, datas         378       6       CONCLOMERATE - reference washered congomerate, datas         386       7       CONCLOMERATE - green gravely day, med - corree         386       7       CONCLOMERATE - green gravely day, med - corree         386       7       CONCLOMERATE - green gravely congomerate mode intractore         386       7       CONCLOMERATE - green gravely congomerate mode intractore         386       7       CONCLOMERATE - green gravely congomerate mode intractore         386       11       Formation         387       12       MEDIAN SMOOTOWE - intractore intractore intractore         388       12       MEDIAN SMOOTOWE - intractore individue         388       12       MEDIAN SMOOTOWE - intractore individue         388       12       MEDIAN SMOOTOWE - intr		254 mm	- 375		7	SANDY CLAY - orange/brown sandy gravelly clay, med - coarse	Alluvium					
94     2     Quartz and mixed lithologies       97     2       97     2       97     2       97     2       97     2       97     2       97     2       98     7       98     10       98     10       10     10       11     10       11     11       11     11       11     11       11     11       12     11       13     11       14     11       15     11       <						graver of qualitz and mixed inhologies						
373       3       GRAVELY CLV - velowbrow gravely day, med - coarse         371       3       GRAVELY CLV - velowbrow gravely day, med - coarse         371       4       5         370       5       CONCLOMENTE - instruction weathered congloments, datas mediam well nounde of quartz and mixed timoges         396       6			- 374	-	$\sum$	SANDY CLAY - yellow/brown sandy gravelly clay, gravel of quartz and mixed lithologies						
greet pack as c alway     30     PRVELLY CLXY - yelowherene gravely day, med - coarse       370     5     CONSLOMERATE - reduces weathered congiomerate, datas median well number of quartz and mixed linkogies     Digby Formation       360     6     CONSLOMERATE - reduces weathered congiomerate, datas median well number of quartz and mixed linkogies     Digby Formation       367     8     CONSLOMERATE - reduces and mixed linkogies     Digby Formation       367     8     CONSLOMERATE - reger conglomerate and mixed linkogies     Digby Formation       368     7     CONSLOMERATE - reger conglomerate and mixed linkogies     Digby Formation       366     9     CONSLOMERATE - reger conglomerate and mould linkogies     Digby Formation       366     10     CONSLOMERATE - grey conglomerate and mould linkogies     Digby Formation       361     12     MEDILMI SANDSTONE - Interfaced do moulum grained and anotacine     Ellismayne Formation       361     14     CLAYSTONE - Interfaced do troom claystone 80%, quartz rich anditarine     Ellismayne formation       369     17     OcideS SANDSTONE - Interfaced do troom claystone 80%, quartz rich and discore     Fine SandSTONE - Interfaced do troom claystone 80%, quartz rich and discore       369     16     Fine SANDSTONE - Interfaced do troom claystone 80%, quartz rich and discore     Fine SandSTONE - Interfaced do troom claystone 80%, quartz rich and discore       369     16     F			-	2-/	· ·							
bentonite       367       0       CONCLOMERATE - grey conglomerate medium well rounded quartz dominant some clasts of mixed lithologies         366       10       CONCLOMERATE - cream quartz rich conglomerate large well rounded quartz clasts in a clay matrix - wel         364       11       CONCLOMERATE - cream quartz rich conglomerate large well rounded quartz clasts in a clay matrix - wel         364       11       CONCLOMERATE - cream quartz rich with brown claystone         363       12       MEDIUM SANDSTONE - interbedded brown claystone 80%, quartz rich sandstone quartz rich with brown claystone 80%, quartz rich sandstone         361       14       CLAYSTONE - interbedded brown claystone 80%, quartz rich sandstone 60%, quartz			- 373									
bentonite       367       0       CONCLOMERATE - grey conglomerate medium well rounded quartz dominant some clasts of mixed lithologies         366       10       CONCLOMERATE - cream quartz rich conglomerate large well rounded quartz clasts in a clay matrix - wel         364       11       CONCLOMERATE - cream quartz rich conglomerate large well rounded quartz clasts in a clay matrix - wel         364       11       CONCLOMERATE - cream quartz rich with brown claystone         363       12       MEDIUM SANDSTONE - interbedded brown claystone 80%, quartz rich sandstone quartz rich with brown claystone 80%, quartz rich sandstone         361       14       CLAYSTONE - interbedded brown claystone 80%, quartz rich sandstone 60%, quartz				3		GRAVELLY CLAY - yellow/brown gravelly clay, med - coarse						
bentonite       367       0       CONCLOMERATE - grey conglomerate medium well rounded quartz dominant some clasts of mixed lithologies         366       10       CONCLOMERATE - cream quartz rich conglomerate large well rounded quartz clasts in a clay matrix - wel         364       11       CONCLOMERATE - cream quartz rich conglomerate large well rounded quartz clasts in a clay matrix - wel         364       11       CONCLOMERATE - cream quartz rich with brown claystone         363       12       MEDIUM SANDSTONE - interbedded brown claystone 80%, quartz rich sandstone quartz rich with brown claystone 80%, quartz rich sandstone         361       14       CLAYSTONE - interbedded brown claystone 80%, quartz rich sandstone 60%, quartz												
bentonite       367       0       CONSLICMERATE - grey conglomerate medium well rounded quartz dominant some clasts of mixed lithologies         366       10       CONSLICMERATE - cream quartz rich conglomerate large well rounded quartz clasts in a clay matrix - wel         364       11       CONSLICMERATE - cream quartz rich conglomerate large well rounded quartz clasts in a clay matrix - wel         364       11       CONSLICMERATE - cream quartz rich with brown claystone         364       12       MEDIUM SANDSTONE - interbedded brown claystone 80%, quartz rich sandstone quartz rich with brown claystone 80%, quartz rich sandstone         362       13       CLAYSTONE - interbedded brown claystone 80%, quartz rich sandstone 60%, qua												
bentonite       367       0       CONSLICMERATE - grey conglomerate medium well rounded quartz dominant some clasts of mixed lithologies         366       10       CONSLICMERATE - cream quartz rich conglomerate large well rounded quartz clasts in a clay matrix - wel         364       11       CONSLICMERATE - cream quartz rich conglomerate large well rounded quartz clasts in a clay matrix - wel         364       11       CONSLICMERATE - cream quartz rich with brown claystone         364       12       MEDIUM SANDSTONE - interbedded brown claystone 80%, quartz rich sandstone quartz rich with brown claystone 80%, quartz rich sandstone         362       13       CLAYSTONE - interbedded brown claystone 80%, quartz rich sandstone 60%, qua												
bentonite       367       0       CONSLICMERATE - grey conglomerate medium well rounded quartz dominant some clasts of mixed lithologies         366       10       CONSLICMERATE - cream quartz rich conglomerate large well rounded quartz clasts in a clay matrix - wel         364       11       CONSLICMERATE - cream quartz rich conglomerate large well rounded quartz clasts in a clay matrix - wel         364       11       CONSLICMERATE - cream quartz rich with brown claystone         364       12       MEDIUM SANDSTONE - interbedded brown claystone 80%, quartz rich sandstone quartz rich with brown claystone 80%, quartz rich sandstone         362       13       CLAYSTONE - interbedded brown claystone 80%, quartz rich sandstone 60%, qua		370 5 CONGLOMERATE - red/brown weathered conglomerate, clasts Digby medium well rounded of quartz and mixed lithologies										
bentonite       367       0       CONSLICMERATE - grey conglomerate medium well rounded quartz dominant some clasts of mixed lithologies         366       10       CONSLICMERATE - cream quartz rich conglomerate large well rounded quartz clasts in a clay matrix - wel         364       11       CONSLICMERATE - cream quartz rich conglomerate large well rounded quartz clasts in a clay matrix - wel         364       11       CONSLICMERATE - cream quartz rich with brown claystone         364       12       MEDIUM SANDSTONE - interbedded brown claystone 80%, quartz rich sandstone quartz rich with brown claystone 80%, quartz rich sandstone         362       13       CLAYSTONE - interbedded brown claystone 80%, quartz rich sandstone 60%, qua		CONGLOMERATE - light-brown weathered conglomerate, class										
367       9       CONCLOMERATE - grey conglomerate medium well rounded - quartz dominant some clasts of mixed lithologies         366       10       CONCLOMERATE - cream quartz rich conglomerate large well rounded quartz clasts in a clay matrix - wel         364       11       CONCLOMERATE - cream quartz rich conglomerate large well rounded quartz clasts in a clay matrix - wel         364       11       CONCLOMERATE - cream quartz rich with brown claystone         364       11       CONCLOMERATE - cream quartz rich with brown claystone         364       11       CLAYSTONE - interbedded brown claystone 80%, quartz rich sandstone quartz rich with brown claystone 80%, quartz rich sandstone         361       14       CLAYSTONE - interbedded brown claystone 80%, quartz rich sandstone 50%, coarse quartz rich sandstone 45%, brown/cream claystone         369       16       FINE SANDSTONE - interbedded brown claystone 80%, quartz rich sandstone 50%, coarse quartz rich sandstone 45%, brown/cream claystone         369       17       COARSE SANDSTONE - interbedded Fine grained sandstone 50%, coarse quartz rich sandstone 45%, brown/cream claystone         367       18       COARSE SANDSTONE - interbedded Fine grained sandstone, quartz rich sandstone (quartz rich sandstone, quartz rich sandstone, quartz rich sandstone, quartz rich sandstone (quartz rich sandstone, quartz rich sandstone		Be a set of the set of										
367       9       CONCLOMERATE - grey conglomerate medium well rounded - quartz dominant some clasts of mixed lithologies         366       10       CONCLOMERATE - cream quartz rich conglomerate large well rounded quartz clasts in a clay matrix - wel         364       11       CONCLOMERATE - cream quartz rich conglomerate large well rounded quartz clasts in a clay matrix - wel         364       11       CONCLOMERATE - cream quartz rich with brown claystone         364       11       CONCLOMERATE - cream quartz rich with brown claystone         364       11       CLAYSTONE - interbedded brown claystone 80%, quartz rich sandstone quartz rich with brown claystone 80%, quartz rich sandstone         361       14       CLAYSTONE - interbedded brown claystone 80%, quartz rich sandstone 50%, coarse quartz rich sandstone 45%, brown/cream claystone         369       16       FINE SANDSTONE - interbedded brown claystone 80%, quartz rich sandstone 50%, coarse quartz rich sandstone 45%, brown/cream claystone         369       17       COARSE SANDSTONE - interbedded Fine grained sandstone 50%, coarse quartz rich sandstone 45%, brown/cream claystone         367       18       COARSE SANDSTONE - interbedded Fine grained sandstone, quartz rich sandstone (quartz rich sandstone, quartz rich sandstone, quartz rich sandstone, quartz rich sandstone (quartz rich sandstone, quartz rich sandstone			- 368	770	7							
367       9       CONCLOMERATE - grey conglomerate medium well rounded - quartz dominant some clasts of mixed lithologies         366       10       CONCLOMERATE - cream quartz rich conglomerate large well rounded quartz clasts in a clay matrix - wel         364       11       CONCLOMERATE - cream quartz rich conglomerate large well rounded quartz clasts in a clay matrix - wel         364       11       CONCLOMERATE - cream quartz rich with brown claystone         364       11       CONCLOMERATE - cream quartz rich with brown claystone         364       11       CLAYSTONE - interbedded brown claystone 80%, quartz rich sandstone quartz rich with brown claystone 80%, quartz rich sandstone         361       14       CLAYSTONE - interbedded brown claystone 80%, quartz rich sandstone 50%, coarse quartz rich sandstone 45%, brown/cream claystone         369       16       FINE SANDSTONE - interbedded brown claystone 80%, quartz rich sandstone 50%, coarse quartz rich sandstone 45%, brown/cream claystone         369       17       COARSE SANDSTONE - interbedded Fine grained sandstone 50%, coarse quartz rich sandstone 45%, brown/cream claystone         367       18       COARSE SANDSTONE - interbedded Fine grained sandstone, quartz rich sandstone (quartz rich sandstone, quartz rich sandstone, quartz rich sandstone, quartz rich sandstone (quartz rich sandstone, quartz rich sandstone			-	100	4							
Demonte       366       0			- 367	8-10	$\tilde{\mathbf{D}}$							
Demonte       366       0			-		9							
365     10       364     12       364     12       363     12       MEDIUM SANDSTONE - interbedded medium grained sandstone quartz rich with brown claystone       362     13       362     13       CLAYSTONE - interbedded brown claystone       361     14       361     15       360     16       16     FINE SANDSTONE - interbedded brown claystone       360     16       361     15       360     16       17     543       361     15       361     16       16     FINE SANDSTONE - interbedded Fine grained sandstone 50%, coarse quartz rich sandstone 45%, brown/cream claystone       361     17       363     17       364     17       365     17       366     17       367     18       368     17       357     18       357     18       357     19       361     17       357     18       357     19       357     19       357     19       357     19       357     19       357     19       357     <		bentonite	- 366	<b>P</b> (		CONGLOMERATE - grey conglomerate medium well rounded quartz dominant some clasts of mixed lithologies						
303       11       11         364       12       MEDIUM SANDSTONE - interbedded medium grained sandstone quartz rich with brown claystone         363       12       MEDIUM SANDSTONE - interbedded medium grained sandstone quartz rich with brown claystone         362       13       CLAYSTONE - interbedded brown claystone 80%, quartz rich sandstone         361       14       CLAYSTONE - interbedded brown claystone 80%, quartz rich sandstone         361       14       CLAYSTONE - interbedded brown claystone 80%, quartz rich sandstone         361       15       16         361       15       16         363       16       FINE SANDSTONE - interbedded Fine grained sandstone 50%, coarse quartz rich sandstone 45%, brown/cream claystone         359       16       FINE SANDSTONE - interbedded Fine grained sandstone 50%, coarse quartz rich sandstone 45%, brown/cream claystone         359       17       SHALE - interbedded lithologies 30%.         357       18       COARSE SANDSTONE - coarse quartz rich sandstone, quartz rich sa			_	10 - 0	4	CONGLOMERATE - cream quartz rich condomerate large well						
gravel pack, 200 mm, steel casing       363       12       MEDIUM SANDSTONE - interbedded medium grained sandstone (uartz rich with brown claystone 80%, quartz rich sandstone)         362       13       CLAYSTONE - interbedded brown claystone 80%, quartz rich sandstone       Ellismayne Formation         361       14       CLAYSTONE - interbedded brown claystone 80%, quartz rich sandstone       Formation         361       14       CLAYSTONE - interbedded brown claystone 80%, quartz rich sandstone       Formation         361       15       Interbedded brown claystone 80%, quartz rich sandstone 50%, coarse quartz rich sandstone 45%, brown/cream claystone       Formation         369       16       FINE SANDSTONE - interbedded Fine grained sandstone 50%, coarse quartz rich sandstone 45%, brown/cream claystone       GOARSE SANDSTONE - coarse quartz rich sandstone, q		-	- 365	f(	] '	rounded quartz clasts in a clay matrix - wet						
pravel pack 203 mm steel casing 363 363 364 365 362 362 362 362 362 362 362 362		-	- - 364	11-1-00 D	70							
grade pack, 203 mm       363       method show of with brown claystone         sandstone quartz rich with brown claystone       80%, quartz rich         sandstone       CLAYSTONE - interbedded brown claystone       80%, quartz rich         361       14       CLAYSTONE - interbedded brown claystone       Ellismayne         361       14       CLAYSTONE - interbedded brown claystone       Ellismayne         361       14       CLAYSTONE - interbedded brown claystone       Formation         361       15       -       -         363       16       FINE SANDSTONE - interbedded Fine grained sandstone       50%, coarse quartz rich sandstone         359       16       FINE SANDSTONE - coarse quartz rich sandstone, quartz       -         358       17       -       -         357       18       COARSE SANDSTONE - coarse quartz rich sandstone, quartz       -         357       18       COARSE SANDSTONE - coarse quartz rich sandstone, quartz       -         357       18       COARSE SANDSTONE - coarse quartz rich sandstone, quartz       -         357       19       -       SHALE - interbedded brown shale/luff 65%, dark grey       -		-	_	1) Doc	á							
362       13       CLAYSTONE - interbedded brown claystone 80%, quartz rich sandstone         361       14       CLAYSTONE - interbedded brown claystone 80%, quartz rich sandstone         361       14       CLAYSTONE - interbedded brown claystone 80%, quartz rich sandstone         361       15		203 mm	- 363		1	MEDIUM SANDSTONE - interbedded medium grained sandstone quartz rich with brown claystone						
362       sandstone         14       CLAYSTONE - interbedded brown claystone 80%, quartz rich         361       15         360		. steel casing	-	13								
361       14       CLAYSTONE - interbedded brown claystone 80%, quartz rich sandstone         361       15			- 362	1								
SHALE - interbedded brown shale/tuff 65%, dark grey		· .	- 361	14								
SHALE - interbedded brown shale/tuff 65%, dark grey						sandstone						
SHALE - interbedded brown shale/tuff 65%, dark grey		i.	- 360	15	-							
SHALE - interbedded brown shale/tuff 65%, dark grey		· .	-	16	_							
SHALE - interbedded brown shale/tuff 65%, dark grey			- 359									
SHALE - interbedded brown shale/tuff 65%, dark grey			-	17								
SHALE - interbedded brown shale/tuff 65%, dark grey			- 358 - -									
SHALE - interbedded brown shale/tuff 65%, dark grey			- - - 357	18 <del>  : : :</del>								
SHALE - interbedded brown shale/tuff 65%, dark grey			-	10-								
			- 356	·"		SHALE - interbedded brown shale/tuff 65%, dark grey carbonaceous shale 35%, occasional coaly fragments						
20 - SHALE - dark Grey shale 90% with some brown mudstone tuff			-	20		SHALE - dark Grey shale 90% with some brown mudstone tuff						
and a state of the state		·	- 355 -									
21 SHALE - dark grey shale with light grey sandstone bands			- 354	21	=	SHALE - dark grey shale with light grey sandstone bands						
			-			Jetween 24-2011bgi						
			- 353	22-1								
			-	23								
		·	- 352		_							
			-	24								
			- 351 -		-							
END OF BOREHOLE AT 73.00 m			_	I		END OF BOREHOLE AT 7	3.00 m					
This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.				This bore	hole	log should be read in conjunction with Parsons B	rinckerhoff's accompa	nying standard notes.				



BORE NO.

# GW3\_TPB SHEET 2 OF 3

100 YEARS ®		SHEET 2 OF 3
Client: Project: Bore Location: Project Number:	CMC Pty Ltd Cobbora Coal Mine Project GW3 South 2114426E & 2162570B	Date Commenced:27/8/09Date Completed:31/8/09Recorded By:Nick BryantLog Checked By:Leah Gleeson
Drilling Method: Drilling Company:	Air Hammer Highland Drilling Borehole Diameter: 203 mi	Surface RL: <b>375.31 mAHD</b> m Co-ords: <b>E 709120.02 N 6437874.58</b>
Bore Information	Field Material Description	Geophysical Log
WELL CONSTRUCTION	Image: State of the state o	Formation GAMMA (API-GR) O 62.5 125.0 187.5 250 HYDROGEOLOGY Whaka Formation
203 mm slotted steel casing 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	49       26       MUDSTONE - dark grey mudstone/siltstone         27       COAL - bright coal 95% tuff/claystone layers ~5%         28       28         47       29         46       30         45       31         43       32         COAL - coal 60% interbedded with claystone (soft and potentially weathered) 35%, tuff/claystone layers 5%         43       32         43       32         43       COAL - coal 60% interbedded with claystone (soft and potentially weathered) 35%, tuff/claystone layers 5%         42       33         43       COAL - coal 95% interbedded with tuff/claystone         44       35         45       33         6       COAL - coal 95% interbedded with tuff/claystone	
	<ul> <li>FINE SANDSTONE - cream fine grained sandstone 7% interbedded with white claystone 15% and cream light brown mudstone/shale</li> <li>FINE SANDSTONE - cream fine grained sandstone 50% interbedded with coal 47% and a light brown mudstone/shale 3%</li> </ul>	Avymore Claystone
steel casing	COAL - coal 85% interbedded with light brown tuff/mudstone 15%, coal proportion increasing to 98% with depth. 39 36 40 35 41	Flyblowers Creek Seam
	42 - COAL - coal 75% interbedded with a cream siltstone 25% and cocasional white claystone (soft) 43 - COAL - coal 65% interbedded with dark grey shale 35% with depth	
	44 FINE SANDSTONE - grey/brown fine grained to medium grained sandstone, interbedding of cream sandstone increases between 45- 46-47m 47m 47m 47m 47m 47m 47m 47m	Tomcat Gully Sandstone
	48 27 FINE SANDSTONE - grey/cream fine grained sandstone 49 49 40 40 40 40 40 40 40 40 40 40	
	END OF BOREHOLE AT This borehole log should be read in conjunction with Parsons	



BORE NO.

# GW3\_TPB

SHEET 3 OF 3

100 YEARS ®					SHEET 3 OF 3
Client:	CMC Pty			mmenced: 27/8/	
Project:		Coal Mine Project		mpleted: 31/8/	
Bore Location: Project Number:	GW3 Sou	th & 2162570B	Recorde		Bryant Gleeson
Drilling Method: Drilling Company:	Air Hamn Highland			RL: 375.31 mAHE	) N 6437874.58
Bore Information	-	Field Material Description		Geophysical Log	10 0407 07 4.00
				Ccophysical Log	
	RL (mAHD) DEPTH (mBGL) GRAPHIC LOG				
WELL CONSTRUCTION	TH (n				
	GR CL	LITHOLOGY	Formation	GAMMA (API-GR) 0 62.5 125.0 187.5 250 1 1 1 1	HYDROGEOLOGY
		COARSE SANDSTONE - Coarse quartz rich sandstone, with	Tomcat Gully	<b></b> _	
	- 325	some mixed lithologies. <i>(continued)</i>	Sandstone		
	- 324 51				
	52				
	323				
	- 322 53	COARSE SANDSTONE - coarse sandstone 60% interbedded			
	4:::	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 creats	Upper Ulan		
	55 -	with depth	Seam		
	- 320				
203 mm slotted steel	- 319 56				
casing	57				
	- 318				
	- 317 58 -	FINE SANDSTONE - cream/grey fine grained sandstone with	C-Marker		
	59	occasional coaly fragments	Claystone		
	- 316	MUDSTONE - cream mudstone 50% interbedded with dark grey carbonaceous shale 50%			
	60	COAL - hard shaley coal grading to coal interbedded with light	Lower Ulan		
	- 315	brown tuff 5% with depth	Seam		
	- 314 -				
	62 —			E	
	- 313 _				
	- 312 <sup>63 –</sup>				
	64				
	311	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	CONGLOMERATE - quartz rich conglomerate rounded to angular 70%/30% lithic clasts			
	67 - 308 - 308				
	100				
sump A	- 307	COARSE SANDSTONE - coarse quartz rich sandstone 70%/30% lithic clasts, sandstone becomes significantly finer			
	69	below 70m depth			
	- 306				
	- 305 70	MEDIUM SANDSTONE - medium grained quartz rich sandstone			
	71				
	- 304				
	- 303 72 -				
	73				
	- 302	END OF BOREHOLE AT 73.00 m			
	74 -				
	- 301 _				
	·	END OF BOREHOLE AT 7			
	This bore	nole log should be read in conjunction with Parsons E	srinckerhoff's accompar	nying standard notes.	



BORE NO.

## GW3B

Original Social Mine Project         Date Complete By: Record By: Name All Viet By and Construct By: Name All Viet By and Dilling Method         Zif Rec By All Viet By and Log Checked By: High and Dhiling         Zif Rec By Bore All Social Exercision         Zif Rec By By and Construct By: Exercision         Zif Rec By Bore All Social Exercision           By an original Company Integration         Air Hammer High and Dhiling         Bore All Diamater: 50 mm         Surface R: 37.52 mAHD           By an original Company Integration         Field Material Description         Field Material Description         Field Material Description         Field Material Description           By an original Company Integration         Surface R: 37.52 mAHD         All Vietner         Field Material Description           By an original Company Integration         Surface R: 37.52 mAHD         All Vietner         Field Material Description Company and Field State Stat		ARS ®			<u> </u>		Data Ca		SHEET 1 OF 3
Project Number         241428E & 2162570B         Log Checked By:         Leah Gleeson           Drilling Method:         Air Hammer         Surface R:: 5724 mAHD           Surface R:: 5724 mAHD         E70817778         N 6437880.81           Bere Information         Field Material Description         E70817778         N 6437880.81           Image: Information         Field Material Description         Field Material Description         Image: Information           Image: Information         Field Material Description         Field Material Description         Image: Information           Image: Information         Field Material Description         Field Material Description         Image: Information           Image: Information         Image: Information         Field Material Description         Field Material Description         Image: Information           Image: Information         Image: Information         Image: Information         Field Material Description         Field Material Description           Image: Information         Image: Information         Image: Information         Image: Information         Field Material Description         Image: Information           Image: Information         Image: Information         Image: Information         Image: Information         Image: Information         Image: Information           Image: Information         Ima	Client: Project:								26/8/09 27/8/09
Opening Method:         Air Hammer Highand Drilling         Borehole Diameter: 50 mm         Surface RL: 375.24 mAHD Co-ords:         Strate RL: F 709HT7.18 N 6437880.81           Bore Information         Floid Material Description         Floid Material Description         Floid Material Description         Floid Material Description           Image: RL: constructions         Image: RL: constructions         Image: RL: constructions         Floid Material Description         Floid Material Description           Image: RL: constructions         Image: RL: constructions         Image: RL: constructions         Floid Material Description         Floid Material Description           Image: RL: constructions         Image: RL: constructions         Image: RL: constructions         Floid Material Description         Floid Material Description           Image: RL: constructions         Image: RL: constructions         Image: RL: constructions         Floid Rel Rel: RL: Constructions         Floid Rel: RL: Constructions         Alluvium           Image: RL: constructions         Image: RL: constructions         Image: RL: constructions         Image: RL: constructions         Alluvium           Image: RL: constructions           Image: RL: constructions         Image: RL: constructions         Image: RL: constructions         Image: RL: constru									
United Technomation         End Bightand Drilling         Boordelo Diameter: 50 mm         Co-ords:         E 070117.18 N 6437880.81           Boorde Information         Field Material Description         Field Material Description         Field Material Description           Image: State Construction of the technologie         Image: State Construction of technologie         Image: State Constener State Construction of technologie         Image: St							-	-	
Note         Operating         Operating         Operating         Operating         Display									
Note:         Start CLV: composition and gravity day, nod: carse gravel of outra and minist littingen.         Alluvium           1         1         0 Main	Bore Info	ormatior	١			Field Material Description			
Note:         Start CLV: composition and gravity day, nod: carse gravel of outra and minist littingen.         Alluvium           1         1         0 Main				(ID	OG				
Note         Note <th< td=""><td>WELL CON</td><td>STRUCTION</td><td>RL (mAHD)</td><td>DEPTH (mB</td><td>GRAPHIC L</td><td>LITHOLOGY</td><td></td><td>FORMATION</td><td>HYDROGEOLOGY</td></th<>	WELL CON	STRUCTION	RL (mAHD)	DEPTH (mB	GRAPHIC L	LITHOLOGY		FORMATION	HYDROGEOLOGY
Void         Vietness         Vietness         Vietness         Vietness         Digby           Void         Vietness         Vietness         Vietness         Digby           Void         Vietness         Vietness         Digby         Formation           Void         Vietness         Vietness         Digby         Formation           Vietness         Vietness         Vietness         Digby         Digby           Vietness         Vietness         Vietness         Vietness         Viet		steel	- 375		/	SANDY CLAY - orange/brown sandy gravelly clay, med - coarse gravel of quartz an mixed lithologies	nd Al	lluvium	
None         None         Control of the set of		casing _	- 374			SANDY CLAY - yellow/brown sandy gravelly clay, gravel of quartz and mixed litholo	ogies		
00000         0         000000000000000000000000000000000000		-		3 -			nixed		
Note         State         State <ths< td=""><td></td><td>-</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></ths<>		-							
Under the set of the set		-	- 370	5 -					
OUDDEV       000000000000000000000000000000000000		-	- 369			CONGLOMERATE - weathered light-brown conglomerate, clasts medium well round quartz and mixed lithologies	ded of D	igby ormation	
Object of minor       9		-	- 368	, -	)°C				
Object       000000000000000000000000000000000000		-	- 367	8 -	200	CONGLOMERATE grey conglomerate medium well rounded quartz dominant som clasts of mixed lithologies			
$\begin{array}{ c c c c } \hline \\ \hline $		-	- 366			CONGLOMERATE - cream quartz rich conglomerate large well rounded quartz clas a clay matrix - wet	sts in		
EC = 1.75 mS/cm pice of the standard s	60	-	- 365						
PMC m easing - 363 - 363 - 363 - 362 - 13 - 20 - 362 - 14 - 20 - 20 - 20 - 20 - 20 - 20 - 20 - 2	<b>4</b> 27/08/20	-	- 364		$\mathcal{D}^{o}_{\mathcal{O}}$				
CLAYSTONE - interbedded brown claystone 80%, quartz rich sandstone Ellismayne Formation		PVC			p" ]@C [				pH = 6.62
Formation Formation Formation Fine SANDSTONE - interbedded fine grained sandstone 50%, coarse quartz rich sandstone 45%, cream claystone - 356 - 356 - 356 - 356 - 356 - 356 	14 - CLAYSTONE - interbedded brown claystone 80%, quartz rich sandstone								
FINE SANDSTONE - interbedded fine grained sandstone 50%, coarse quartz rich sandstone 45%, cream claystone - 358 - 357 - 356 - 356		-		15 -			F	ormation	
FINE SANUESTONE - Interbedded fine grained sandstone 50%, coarse quartz rich 18 - 357 19 SHALE - dark grey shale 90% with some brown mudstone tuff bands ~10% END OF BOREHOLE AT 46.10 m		-	- 359	16 -					
END OF BOREHOLE AT 46.10 m		-	- 358	17 -		FINE SANDSTONE - interbedded fine grained sandstone 50%, coarse quartz rich sandstone 45%, cream claystone			
END OF BOREHOLE AT 46.10 m		-	- 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.								



BORE NO.

## GW3B

Client: Project: Bore Location: Project Number:			CMC Pty Ltd Cobbora Coal Mine Project GW3 Central South 2114426E & 2162570B				Date Commenced:26/8/09Date Completed:27/8/09Recorded By:Nick BryantLog Checked By:Leah Gleeson		
		lethod: ompany:		ir Ha ighla			urface RL: <b>375.24 r</b> o-ords: <b>E 70911</b>	nAHD 7.18 N 6437880.81	
	-	formation		0		Field Material Description			
WATER	WELL CO	ONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY	
			- 355			SHALE - dark grey shale 90% with some brown mudstone tuff bands ~10% (continued)	Ellismayne Formation		
			- 354	21 -					
			- 353	22 -					
			- 352	23 -					
			- 351	24 -					
			- 350	25 -					
			- 349	26 -		MUDSTONE - dark grey mudstone/siltstone	Whaka Formation	_	
			- 348	27 -					
		bentonite	- 347	28 -		COAL - coal with occasional brown mudstone/tuff bands	_		
		50 mm slotted PVC casing	- 346	29 -		COAL - bright coal 95% tuff/claystone layers -5%			
			- 345	30 –					
			- 344	31 -		COAL - coal 60% interbedded with claystone (soft and potentially weathered) 35%, tuff/claystone layers 5%			
			- 343	32 -					
			- 342	33 -		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	34 -					
		50 mm PVC casing	- 340	35 -					
			- 339	36 -					
		bentonite	- 338	37 -					
		50 mm slotted PVC casing	- 337	38 -					
			- 336	39 -		COAL - coal 85% interbedded with light brown tuff/mudstone 15%, coal proportion increasing to 98% with depth	Flyblowers Creek Seam	_	
				This b	oreh	END OF BOREHOLE AT 46.10 m ole log should be read in conjunction with Parsons Brinckerhoff's ar	ccompanying standard n	otes.	



BORE NO.

## GW3B

SHEET 3 OF 3

Bor Pro	ject: e Location: ject Number:	Co GV	V3 C	ra C ent	Coal Mine Project ral South & 2162570B	Date Commenced:26/8/09Date Completed:27/8/09Recorded By:Nick BryantLog Checked By:Leah Gleeson			
	ling Method: ling Company:		r Hai ghla			Surfa Co-o	ace RL: rds:		mAHD 17.18 N 6437880.81
	ore Information		5		Field Material Description				1
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY		FORM	IATION	HYDROGEOLOGY
		- 335 - 334	41 –		COAL - coal 85% interbedded with light brown tuff/mudstone 15%, coal proportion increasing to 98% with depth (continued) COAL - coal 75% interbedded with a cream siltstone 25% and occasional white clayst (soft)	 stone	Flyblow Creek S	ers Seam	
		- 333	42 -						
		- 332 - 331	43 - 44 -		FINE SANDSTONE - grey/brown fine grained to medium grained sandstone, interbed of cream sandstone	dding	Tomcat Sandste	Gully	
	Support	- 330	45 -		FINE SANDSTONE - grey/cream fine grained sandstone				
		- 329	46 -	<u></u>					_
		- 328	47 -						
	-	- 327	48 -						
	-	- 326	49 -						
	-	- 325	50 -						
	-	- 324	51 - 52 -						
	-	- 323	53 -						
		- 322	54 -						
		- 321 - 320	55 -						
		- 319	56 -						
		- 318	57 -						
		- 317	58 -						
		- 316	59 -						
-	<u> </u>				END OF BOREHOLE AT 46.10 m				



BORE NO.

## GW3C

Client: Project: Bore Location: Project Number: Drilling Method:			C G	W3 (	ora C Cent	Coal Mine Project	Date Commenced:25/8/09Date Completed:25/8/09Recorded By:Nick BryantLog Checked By:Leah Gleeson			
	-	ethod: ompany:		ir Ha ighla		er Drilling Borehole Diameter: 50 mm		face RL: <b>375.15</b> ords: <b>E 7091</b>	mAHD 14.87 N 6437885.98	
		formation		.9		Field Material Description				
				T	U	-				
WATER	WELL CO	NSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY		FORMATION	HYDROGEOLOGY	
		152 mm steel casing	- 375	1 -		SANDY CLAY - orange/brown sandy gravelly clay, med - coarse gravel of mixed lithologies GRAVELLY CLAY - yellow/brown gravelly clay, med - coarse gravel of qua		Alluvium		
			- 374	2 -		lithologies				
			- 373							
			- 372	3 -						
			- 371	4 -						
			- 370	5 -	2/0					
			- 369	6 -		GRAVELLY CLAY - yellow/brown very gravelly clay, med - coarse gravel o mixed lithologies some dark grey shale	of quartz and	_		
			- 368	7 -		CONGLOMERATE - light-brown weathered conglomerate, clasts medium quartz and mixed lithologies	well rounded of	Digby Formation		
			- 367	8 -	$D^{oC}$					
			- 366	9 -						
			- 365	10 —	DeC DeC					
		·	- 364	11 -	$D^{\circ}C$					
		50 mm PVC casing	- 363	12 -		CLAYSTONE - interbedded brown claystone 80%, quartz rich sandstone		-		
			- 362	13 -						
			- 361	14 -						
				This h		END OF BOREHOLE AT 53.84			notes	



BORE NO.

## GW3C

Proj Bor	Client: Project: Bore Location: Project Number:			W3 C	ora C Cent	Coal Mine Project D ral R	Date Commenced:25/8/09Date Completed:25/8/09Recorded By:Nick BryantLog Checked By:Leah Gleeson				
		Method: Company:		ir Ha ighla			orface F Co-ords:	RL: 375.15 E 7091	mAHD 14.87 N 6437885.98		
	-	Information				Field Material Description					
WATER	WELL	CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY		FORMATION	HYDROGEOLOGY		
			- 359 - 359 - 358 - 357 - 356 - 355 - 355 - 354 - 353 - 352 - 351 - 350	16 - 17 - 18 - 19 - 20 - 22 - 23 - 24 - 25 - 26 - 26 - 26 - 26 - 26 - 26 - 26		CLAYSTONE - interbedded brown claystone 80%, interbedded with tuff MUDSTONE - light brown interbedded brown claystone 80%, quartz rich sandstone COARSE SANDSTONE - coarse quartz rich sandstone 75%, dominantly angular quartz interbedded with light brown cream mudstone mixed lithologies 25% SHALE - dark grey shale 90% with some brown mudstone tuff bands -10% SILTSTONE - dark grey mudstone/siltstone SILTSTONE - very dark grey mudstone/siltstone 70% coal/carbonaceous shale 25% light brown fine grained sandstone 5%	· ·	rmation			
			- 349 - 348	27 -		SILTSTONE - very dark grey mudstone/siltstone 99% - light brown fine grained sandstone 1% SILTSTONE - very dark grey mudstone/siltstone 95% - light brown fine grained sandstone 5%		naka rmation			
			- 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.										



BORE NO.

## GW3C

SHEET 3 OF 4

Bor Proj Drill Drill	ent: ject: e Location: ject Number: ling Method: ling Company: ore Informatior	GW3 C 211442 Air Ha Highla	ra Coal Mine Project Sentral 26E & 2162570B mmer nd Drilling Borehole Diameter: 50 mm	Date Commenced:       25/8/09         Date Completed:       25/8/09         Recorded By:       Nick Bryant         Log Checked By:       Leah Gleeson         Surface RL:       375.15 mAHD         Co-ords:       E 709114.87 N 6437885.98
D	ore mormation	1	Field Material Description	
WATER	WELL CONSTRUCTION	RL (MAHD) DEPTH (MBGL)	D LITHOLOGY	FORMATION HYDROGEOLOGY
		- 345 - 344 <sup>31 -</sup>	COAL - coal with occasional brown mudstone/tuff bands (continued)	Whaka Formation
		- 343 <sup>- 32</sup> -	COAL - coal 85% interbedded, tuff/claystone layers 10%, with claystone (soft and potentially weathered) 5%	
		- 342 33 -		
		- 341 - 340 - 340	COAL - coal 95% interbedded with tuff/claystone	
		36 - 339	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
		- 338 - 338		
		- 337 - 337	COAL - coal 70% interbedded with very dark carbonaceous shale/stony coal 29% brow fine grained sandstone 1%	<sup>wn</sup> Flyblowers Creek Seam
		- 336		
		40 - 335 41	COAL - coal 90% with distinct pyritization 2% interbedded with very dark carbonaceor shale 8% large rock fragments and increase in water indicating fracture zone	
		- 334 42 -		ev
		- 333 - 332 43 -	CURL - Coal 55% Interbedded with crean influsionerun dark grey state 32%, dark gre     carbonaceous shale 1%, white/cream very fine grained sandstone     SHALE - very dark grey carbonaceous shale 70% white/cream very fine grained     sandstone 10% cream tuff/mudstone 20%	Tomcat Gully
		- 332 - 331 - 331	<ul> <li></li></ul>	Sandstone
			END OF BOREHOLE AT 53.84 m	



BORE NO.

## GW3C

SHEET 4 OF 4

Pro Bor Pro	Client: Project: Bore Location: Project Number: Drilling Method:			W3 C	ora C Cent	Coal Mine ProjectDateralRef& 2162570BLog	Date Commenced:25/8/09Date Completed:25/8/09Recorded By:Nick BryantLog Checked By:Leah Gleeson			
	-	ethod: ompany:		ir Ha ighla			face RL: <b>375.15 r</b> ords: <b>E 70911</b>	nAHD 4.87 N 6437885.98		
В	ore Inf	formatio	า			Field Material Description				
WATER	WELL COM	NSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY		
MM		50 mm slotted PVC casing	.	46 - 47 - 48 - 49 - 50 - 52 - 53 - 53 - 55 - 55 - 55 - 55 - 55 - 55		SHALE - grey/brown shale mudstone         SHALE - grey shale/mudstone 60%, 40 % light brown mudstone/shale         FINE SANDSTONE - cream/light brown 65% grey mudstone 29% carbonaceous shale         COARSE SANDSTONE - coarse quartz rich sandstone, with some mixed lithologies         including pyritization         COARSE SANDSTONE - coarse quartz rich sandstone 98%, lithic clasts of mudstone/shale         COARSE SANDSTONE - coarse quartz rich sandstone 98%, lithic clasts of mudstone/shale         COARSE SANDSTONE - coarse quartz rich sandstone 98%, lithic clasts of mudstone/shale         COAL - coal 95% interbedded with cream shale 5% and occasional grey fine grained sandstone, coal increasing to 95% with depth	Upper Ulan Seam			
			- 316	59 -	orek	END OF BOREHOLE AT 53.84 m ble log should be read in conjunction with Parsons Brinckerhoff's acc		htes		



BORE NO.

## GW3D

Client: Project: Bore Location: Project Number: Drilling Method:			Co G\ 21	W3 C	ora C Cent 26E	Coal Mine Project ral North & 2162570B	Date Commenced:25/8/09Date Completed:27/8/09Recorded By:Nick BryantLog Checked By:Leah GleesonSurface RL:375.09 mAHD				
	-	ompany:				Drilling Borehole Diameter: 50 mm		9 MAD 111.91 N 6437893.34			
Bor	e Inf	formation	1			Field Material Description					
WATER	ELL COM	NSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY			
		152 mm steel casing	- 374 - 373 - 372 - 371 - 370 - 369 - 368 - 367 - 366	1 2 3 4 5 6 7 8 9		SANDY CLAY - orange/brown sandy gravelly clay, med - coarse gravel of quartz an mixed lithologies SANDY CLAY - yellow/brown sandy gravelly clay, gravel of quartz and mixed lithologies GRAVELLY CLAY - yellow/brown gravelly clay, med - coarse gravel of quartz and m lithologies CONGLOMERATE - weathered light-brown conglomerate, clasts medium well round quartz and mixed lithologies CONGLOMERATE - grey conglomerate medium well rounded quartz dominant som clasts of mixed lithologies CONGLOMERATE - cream quartz rich conglomerate large well rounded quartz clas a clay matrix - wet CONSLOMERATE - cream quartz rich conglomerate large well rounded quartz clas a clay matrix MEDIUM SANDSTONE - interbedded medium grained sandstone quartz rich with br claystone	d of Digby Formation				
52/08/3000		50 mm PVC casing	- 365 - 364 - 363 - 362 - 361	10 11 - 12 13 14		MEDIUM SANDSTONE - interbedded medium grained sandstone quartz rich and ch MEDIUM SANDSTONE - interbedded medium grained sandstone quartz rich with br claystone SILTSTONE - interbedded brown claystone 80%, quartz rich sandstone 20% SILTSTONE - interbedded brown claystone 75%, quartz rich sandstone 25%		Airlift = 0.5 L/s EC = 1.38 mS/cm pH = 7.22			
			- 360 - 359	15 - 16 -		SILTSTONE - interbedded brown claystone 70%, quartz rich sandstone 30%					
			- 358 - 357 - 356	17 - 18 - 19 -		SILTSTONE - interbedded brown claystone 80%, quartz rich sandstone SANDSTONE - grey/brown fine grained sandstone 50% very dark shale 49% <1% b mudstone					
		-	- 355 - 354	<b>20</b> – 21 –		SHALE - dark grey shale 90% with some brown mudstone bands ~10%					
			- 353 - 352	22 - 23 -							
		-	- 351	24 -		SHALE - dark grey calcareous mudstone ~1% grey/light grey mudstone	Whaka Formation				

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



BORE NO.

## GW3D

Proj Boro Proj Drill	Client: Project: Bore Location: Project Number: Drilling Method: Drilling Company: Bore Informatior			W3 ( 1144) ir Ha	ora ( Cent 26E mm	Coal Mine ProjectD.ral NorthR.& 2162570BLoerSolution	Date Commenced: 25/8/09 Date Completed: 27/8/09 Recorded By: Nick Bryant Log Checked By: Leah Gleeson Surface RL: 375.09 mAHD Co-ords: E 709111.91 N 6437893.34			
В	ore lı	formatio	ı	-		Field Material Description				
WATER	WELL C	ONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FO	RMATION	HYDROGEOLOGY	
			- 349	26 -		SHALE - dark grey calcareous mudstone ~1% grey/light grey mudstone (continued)	Whak Form			
			- 348 - 347	27 - 28 -		SHALE - very dark grey mudstone shale 98% interbedded with light grey/cream mudstone 2% COAL - very dark grey stony coal/shale 95% interbedded with light grey/cream mudstone				
		*. * *	- 346	29 -		COAL - Very dark grey story coars rate 50% interbedded with right grey/dearn industone     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 - 34 -		COAL - 90% interbedded with pale brown/brown shale 10%				
		· ·	- 341 - 340	35 -						
		* * *.	- 339	36 -		SHALE - very dark grey carbonaceous shale/stony coal 60% interbedded with fine				
		• • •	- 338	37 -	 	grained sandstone 40% FINE SANDSTONE - dark grey fine grained sandstone/siltstone with minor tuff making u <1%	P Avym Clays			
		· · ·	- 337	38 -		FINE SANDSTONE - grey fine grained sandstone 90% with dark grey fine grained sandstone 10% some coaly fragments		lone		
		· · ·	- 336	39 -		SHALE - dark grey shale 85% brown mudstone 15%	Flyblo	owers < Seam		
		• • •	- 335 - 334	<b>40</b> – 41 –		COAL - with some claystone tuff 1%				
		· · ·	- 334 - 333	42 -		MUDSTONE - dark grey mudstone/siltstone 70% interbedded with fine grained sandston	e			
			- 332	43 -	E-	25%, 5% white claystone COAL - coal with some shale				
			- 331	44 -		FINE SANDSTONE - grey/cream fine grained sandstone	Tomc	at Gully	_	
			- 330	45 -			Cand			
			- 329	46 -						
		•	- 328 - 327	47 - 48 -						
		·	- 327	49 -		COARSE SANDSTONE - coarse sandstone to conglomeratic quartz rich with mixed lithologies making up <5%, some grey shale laminations noted between 50-51m includin				
						some coally fragments between 52-53m END OF BOREHOLE AT 64.82 m	5			



BORE NO.

## GW3D

SHEET 3 OF 3

Proj Bor Proj Drill Drill	Client: Project: Project Number: Drilling Method: Drilling Company: Bore Information			N3 C 1442 r Ha	ora C Cent 26E mmo	Coal Mine ProjectDateral NorthRef& 2162570BLocerSuDrillingBorehole Diameter:50 mm	ate Completed: ecorded By: og Checked By: urface RL: <b>375.09 n</b>	25/8/09 27/8/09 Nick Bryant Leah Gleeson nAHD 1.91 N 6437893.34			
В	ore Int	ormation	ו			Field Material Description					
WATER	WELL CON	ISTRUCTION	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	- 323	52 -		COAL - 50% dark grey carbonaceous shale 50% with some minor light brown claystone/tuff	Upper Ulan Seam	_			
		casing -	- 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 Bringkyrhoff's accompanying standard actor										



BORE NO.

## GW3E

		ŶĔ	ARS ®							SHEET 1 (	OF 3
Pro Boi	Client: Project: Bore Location: Project Number:			C G	W3 N	ora ( Nort	Coal Mine Project	Dat Rec	te Commenced: te Completed: corded By: g Checked By:	24/8/09 25/8/09 Nick Bryant Leah Gleeson	
	-		ethod: mpany:		ir Ha iahla		er Drilling Borehole Diameter: 50 mm		face RL: <b>375.0</b> 4 -ords: <b>E 709</b>	4 mAHD 109.17 N 6437900.51	
_	-		ormatio		igina		-				
	ore	Int	ormatio	n			Field Material Description				
					3L)	g					
WATER	WELI	_ CON	ISTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY		FORMATION	HYDROGEOLOGY	
	X	$\mathbb{X}$	152 mm steel	_			SANDY CLAY - orange/brown sandy gravelly clay, med - coarse gravel o mixed lithologies	of quartz and	Alluvium		
	X		casing	- 374	1 -	. /.					
	×.			574	•		SANDY CLAY - yellow/brown sandy gravelly clay, gravel of quartz and m	ixed lithologies			
	X			- 373	2 -	. /.	GRAVELLY CLAY - yellow/brown gravelly clay, med - coarse gravel of g	upta and mixed	_		
						Þ /	lithologies	ualtz and mixed			
	$\mathbb{X}$			- 372	3 -	6	CONGLOMERATE - light-brown weathered conglomerate, clasts medium	n well rounded of	Digby		
						РC	quartz and mixed lithologies	i non roundoù or	Formation		
		$\mathbb{N}$		- 371	4 -	h°C					
	X					hor					
	×.			- 370	5 -	Þŕ					
	X				0	Doc					
				- 369	6 -	67	CONGLOMERATE - grey conglomerate medium well rounded quartz don clasts of mixed lithologies	minant some			
	$\mathbb{N}$			- 368	7 -	Doc					
				- 300	,	p.	CONGLOMERATE - cream quartz rich conglomerate large well rounded a clay matrix - wet	quartz clasts in			
	$\mathbb{N}$	$\mathbb{N}$		- 367	8 -	Doc	CONGLOMERATE - cream quartz rich conglomerate large well rounded		_		
	$\mathbb{X}$			a clay matrix							
				- 366 9 10 MEDIUM SANDSTONE - interbedded medium grained sandstone quartz rich with brown davstone							
	X						claystone				
				- 365	10 -		MEDIUM SANDSTONE - interbedded medium grained sandstone quartz	rich and chert	-		
		$\mathbb{N}$									
	$ \Sigma $			- 364	11 -		MEDIUM SANDSTONE - interbedded medium grained sandstone quartz claystone	rich with brown	-		
			50	- 363	12 -	::::					
			50 mm PVC casing				MUDSTONE - grey/brown mudstone		Ellismayne Formation		
			, in the second s	- 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 -	-					
				000			CLAYSTONE - interbedded brown claystone 80%, cream fine grained sar	ndstone 20%			
				- 358	17 -		CLAYSTONE - interbedded brown claystone 80%, guartz 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% - mudstone	<1% brown	-		
							Industrie				
				- 355	20 -		SHALE - dark grey shale 90% with some brown mudstone bands ~10%		Whaka		
				- 354	21 -				Formation		
1				554	- '		SHALE - dark grey shale with light grey sandstone bands between				
1				- 353	22 -	<u>t-</u>					
1						E					
1				- 352	23 -	<u>t                                    </u>					
1						F					
				- 351	24 -	E	SHALE - dark grey calcareous mudstone ~1% grey/light grey mudstone		-		
							4				

END OF BOREHOLE AT 73.23 m This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



BORE NO.

## GW3E

Proj Drilli	ect: e Location: ject Number: ing Method:	Cobi GW3 2114 Air H	bora 3 No 4426 Ham	a Coal Mine Project E orth F 6E & 2162570B L Immer S	Date Commenced Date Completed: Recorded By: Log Checked By: Surface RL: <b>375</b> .	25/8/09 Nick Bryant Leah Gleeson 04 mAHD
	ing Company: ore Information	-	ilan		Co-ords: E 70	9109.17 N 6437900.51
			Ŧ	Field Material Description		
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	UTHOLOGY	FORMATION	HYDROGEOLOGY
•		- 349 26	 26	SHALE - dark grey calcareous mudstone ~1% grey/light grey mudstone (continued)	Whaka Formation	
		- 348 2	.7 <del> </del> -  -			
		- 347 28	28 -	SHALE - very dark grey mudstone shale 95% interbedded with light grey/cream     mudstone 5%		
			29 - [-			
			30   31			
			32	SHALE - very dark grey mudstone shale 50% interbedded with light grey/cream     mudstone 45%, light grey weathered mudstone 5%     SHALE - dark grey carbonaceous shale 95% cream/pale brown mudstone 5%		
•		- 342 33	33			
		- 341 34	34			
		- 340 3	35	월 국		
		- 339 36	36 -	COAL - 65% interbedded with a cream/light grey mudstone 35%		
			37 -	FINE SANDSTONE - 98% interbedded with Coal 2%	Avymore Claystone	
			38 – 39 –	COAL - 98% interbedded with pale brown/brown shale 2%	Flyblowers Creek Seam	1
			40 —	COAL - 99% interbedded with pale brown/brown shale 1%		
•		– 334 4 <sup>.</sup>	41 -			
		- 333 42	42	<ul> <li>— SHALE - very dark grey carbonaceous shale/stony coal 60% interbedded with fine</li> <li>grained sandstone 40%</li> </ul>	_	
		- 332 43	43 - [- 			
			44	FINE SANDSTONE - dark grey fine grained sandstone/siltstone with minor tuff making        <1%	Tomcat Gull Sandstone	<del>y</del>
			45	FINE SANDSTONE - grey fine grained sandstone 90% with dark grey fine grained sandstone 10% some coaly fragments		
			47 -			
		- 327 48	48 -			
		- 326 49	49 -			



BORE NO.

## GW3E

Client: Project: Bore Location: Project Number:		C C	GW3 N	ora ( Nort	Coal Mine Project h	Date Co Recorde	ommenced: ompleted: ed By: ecked By:	24/8/09 25/8/09 Nick Bryant Leah Gleeson	
	ling Me			Air Ha				RL: 375.04	
		ompany: formatio		lignia	ina	Drilling Borehole Diameter: 50 mm Field Material Description	Co-ords	E /USI	09.17 N 6437900.51
				~	(1)				
WATER	WELL CON	ISTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY		FORMATION	HYDROGEOLOGY
			- 324 - 323	51 - 52 -		COARSE SANDSTONE - coarse sandstone to conglomeratic quartz rich with mixed lithologies making up <5%, some grey shale laminations noted between 50-51m inclu some coaly fragments between 52-53m	<sup>uding</sup> S	omcat Gully andstone	
			- 322	53 -		COAL - 70% dark grey/brown shale 15% cream fine grained sandstone 15%		Ipper Ulan	
			- 321	54 -		COAL - 80% dark grey shale 15% fine grained shale sandstone 5%		eam	
			- 320	55 - 56 -		COAL - 90% dark grey shale 8% fine grained shale sandstone 2%			
			- 319 - 318	57 -		COAL - 95% dark grey shale 4%, <1% cream fine grained sandstone FINE SANDSTONE - grey fine grained sandstone 50% grey shale containing coaly	0	-Marker	
			- 317	58 -		fragments FINE SANDSTONE - cream fine grained sandstone 50% grey shale/mudstone 40% c fragments 10%	C	laystone	
			- 316	59 -		COAL - coal 90%, carbonaceous shale 10%		ower Ulan eam	_
			- 315 - 314	<b>60</b> -					
			- 313	62 -		COAL - coal 90%, carbonaceous shale 7%, some minor fine grained mudstone and or tuff 3%	or		
			- 312	63 -		FINE SANDSTONE - light brown fine grained sandstone 75%, coal carbonaceous sha 25%, coarse quartz rich sandstone (large drill chips and increase in water indicating fracturing)		apper ormation	_
		bentonite	- 311	64 - 65 -		COARSE SANDSTONE - coarse grained quartz rich sandstone with 80% large rounde quartz clasts and 20% lithic clasts	led		
		50 mm slotted PVC casing	- 310 - 309	66 -					
			- 308	67 -					
			- 307	68 -					
			- 306	69 -					
		sump	- 305 - 304	<b>70</b> - 71 -					
	發發	Sump		70					
			- 303 - 302	72 - 73 -					
			- 301	74 -					



BORE NO.

# GW4

Client: Project: Bore Location: Project Number:	CMC Pty Ltd Cobbora Coal Mi Mates Nth Hwy 2114426E & 2162		Date Commenced:22/9/09Date Completed:22/9/09Recorded By:Nick BryantLog Checked By:Leah Gleeson
Drilling Method: Drilling Company:	Air Rotary - Blad Impax Drilling	e Borehole Diameter: <b>50 mm</b>	Surface RL: <b>345.83 mAHD</b> Co-ords: <b>E 706611.66 N 6445727.53</b>
Bore Information		Field Material Description	
	RL (mAHD) DEPTH (mBGL) GRAPHIC LOG	LITHOLOGY	FORMATION HYDROGEOLOGY
6000 600 6000 6	- 345 - 344 - 344 - 344 - 344 - 344 - 344 - 344 - 342 - 342 - 342 - 341 - 342 - 341 - 341 - 341 - 340 - 340 - 340 - 338 - 338 - 337 - 336 - 336 - 345 -	clayey slightly sandy gravel, gravel fine-medium mixed litholog	ith grey clay in



BORE NO.

# GW5\_TPB SHEET 1 OF 3

Client: Project: Bore Location: Project Number: Drilling Method: Drilling Company: Bore Informatio	Mates 1 2114426E Tubex & A Highland I	coal Mine Project & 2162570B ir Hammer	Date Commenced: Date Completed: Recorded By: Log Checked By: Surface RL: <b>349.61</b> Co-ords: <b>E 7070</b>	31/8/09 31/8/09 Angus McFarlane Leah Gleeson mAHD 017.51 N 6446600.66
WELL CONSTRUCTION	HD) (mBGL) HC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
203 mm         steel           1         203 mm           1         300 mg           1         300 mg	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	CLAY - red brown clay         GRAVELLY CLAY - red brown gravelly clay with iron stone         SANDY CLAY - red brown sandy clay         SANDY CLAY - red brown sandy clay         SANDY CLAY - red brown becoming yellow grey sandy clay         SANDY CLAY - red brown becoming yellow grey sandy clay         GRAVEL - alluvial sands with gravels         GRAVEL - alluvial gravels with coarse sands         CLAY - grey brown clay with minor sand         END OF BOREHOLE AT 54.0         Del log should be read in conjunction with Parsons Brinn		



BORE NO.

# GW5\_TPB

Client: Project: Bore Location: Project Number:			C M 2´	ates 11442	ora ( 1 26E	Coal Mine Project & 2162570B	Date Co Record Log Ch	ecked By:	31/8/09 31/8/09 Angus McFarlane Leah Gleeson
Drilling Method: Tubex & Air Ham Drilling Company: Highland Drilling						Surface Co-ords	e RL: <b>349.61</b> s: <b>E 7070</b>	mAHD 017.51 N 6446600.66	
	-	formatio		Ignia		Field Material Description	00 010	5. Ervit	
				Ê	c)	•••••			
WATER	VELL COI	NSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY		FORMATION	HYDROGEOLOGY
-						SAND - yellow grey becoming grey fine, poorly consolidated sands with 0.5 to 2 cm gravel	A	Alluvium	
			- 329	01					
		bentonite		21 –					
			- 328	22 -					
			207						
			- 327	23 -					
			- 326		· · · ·	SANDY CLAY - grey sandy clay		Fomcat Gully	
		gravel	ULC	24 -	: ./	SANUT CLAT - grey series day	5	Sandstone	
.  . I		pack	- 325		/ ::::	SANDSTONE - grey sandstone with conglomerate			
				25 -					
			- 324						
				26 -		SANDSTONE - grey sandstone with gravel			
			- 323						
ı  .				27 -		SANDSTONE - grey fine becoming coarse quartz sandstone			
			- 322	-0					
				28 -					
			- 321	29 -					
			~~~	20					
			- 320	30 —					
	目	150 mm slotted PVC	240	~~					
		casing	- 319	31 -		SANDSTONE - grey coarse sandstone			
			- 318			SANUS I ONE - grey coarse sanoscine			
			010	32 -					
			- 317						
				33 -					
			- 316						
				34 -					
			- 315						
				35 -		COAL	L	Jpper Ulan	—
			- 314					Seam	
				36 -					
			- 313	37 -					
				01		COAL - coal with light grey mudstone/claystone		C-Marker Claystone	
			- 312	38 -					
			- 311						
			511	39 -		COAL	+-	ower Ulan	
	E		- 310					Seam	
	· H·					END OF BOREHOLE AT 54.00 m			
				This b	oreh	ole log should be read in conjunction with Parsons Brinckerhoffs	s accompa	anving standard	notes.



BORE NO.

# GW5\_TPB

SHEET 3 OF 3

Client: Project: Bore Location: Project Number:			C M	ates	ora ( 1	td Coal Mine P & 21625701		C F	Date Commenced:31/8/09Date Completed:31/8/09Recorded By:Angus McFarlaneLog Checked By:Leah Gleeson				
	ing Me ing Co	ethod: ompany:				ir Hammer Drilling	Borehole Diameter:		Surface RL: <b>349.61 mAHD</b> Co-ords: <b>E 707017.51 N 6446600.66</b>				
В	ore Inf	formatio	1			F	ield Material Descrip						
WATER	WELL CONSTRUCTION		RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG		LITHOLOGY			FORMATION	HYDROGEOLOGY		
			- 309 - 308	41 -		COAL (continued	1)			ower Ulan Seam			
				- 307	42 - 43 -								
			- 306	44 -			very coarse grey sandstone		F	Dapper Formation			
		- 30	- 305 - 304	45 -		SANDSTONE -	grey sandstone medium grained becc	ming coarse with siltstone					
		sump											
			-					- 301 49 - 300					
			- 299	<b>50</b> 51 -									
			- 298 52 -										
			- 296	53 - 54 -									
			- 295	55 -	-								
			- 294 - 293	56 -	-								
			- 292	57 - 58 -	-								
			- 291 - 290	59 -	-								
				This b	oreh	ole log should	END OF BOREF	IOLE AT 54.00 m Parsons Brinckerhoff's a	accompa	anying standard i	notes.		



BORE NO.

# GW5A

YEARS ®								SHEET 1 OF 1	
Client: Project: Bore Location: Project Numbe	C N	lates	ora C 1	td Coal Mine Project & 2162570B	Date Reco	Date Commenced:19/8/09Date Completed:19/8/09Recorded By:Angus McFarlaneLog Checked By:Leah Gleeson			
Drilling Method: Tubex					Surfa	ace RL:	349.58 mAH	łD	
Drilling Compa	ny: H	lighla	Ind I	Drilling Borehole Diameter:	50 mm Co-c	ords:	E 707019.42	2 N 6446611.78	
Bore Informa	ation			Field Material Descript	ion				
	RL (mahd)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY		FOR	MATION	HYDROGEOLOGY	
152 m	ım			CLAY - red brown clay		Alluviu	ım		
8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000	<ul> <li><sup>peg</sup></li> <li><sup>peg</sup></li> <li><sup>1</sup> 349</li> <li><sup>1</sup> 348</li> <li><sup>1</sup> 347</li> <li><sup>1</sup> 346</li> <li><sup>1</sup> 343</li> <li><sup>1</sup> 343</li> <li><sup>1</sup> 344</li> <li><sup>1</sup> 343</li> <li><sup>1</sup> 344</li> <li><sup>1</sup> 344</li> <li><sup>1</sup> 344</li> <li><sup>1</sup> 344</li> <li><sup>1</sup> 345</li> <li><sup>1</sup> 346</li> <li><sup>1</sup> 345</li> <li><sup>1</sup> 346</li> <li><sup>1</sup> 346</li> <li><sup>1</sup> 347</li> <li><sup>1</sup> 347</li> <li><sup>1</sup> 348</li> <li><sup>1</sup> 348</li> <li><sup>1</sup> 349</li> <li><sup></sup></li></ul>	1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 - 11 - 12 - 13 - 13 - 14 - 15 - 16 - 17 -		CLAY - red brown clay CLAY - yellow brown clay GRAVELLY CLAY - red brown gravelly clay with iron s SANDY CLAY - red brown sandy clay SANDY CLAY - red brown becoming yellow grey sand SANDY CLAY - red brown becoming yellow grey sand GRAVEL - alluvial gravels with coarse sands GRAVEL - alluvial gravels with coarse sands		Alluviu	E	<sup>2</sup> C = 5.68 mS/cm pH = 9.71	
	- 332 - 331 - 330	18 - 19 -		CLAY - grey brown clay with minor sand					
50 <b>-</b> 50									
		This b	oreh	END OF BOREH ble log should be read in conjunction with		mpanying	standard notes.		



BORE NO.

## GW5B

Client: Project: Bore Location: Project Number:		Co Ma	ates	ra C 1	td oal Mine Project & 2162570B	Date Recor	Comme Comple rded By Checked	eted: r:	19/8/09 19/8/09 Angus McFarlane Leah Gleeson
	ling Method: ling Company:		ıbex ghlaı	nd E	Drilling Borehole Diameter: 50 mm	Surface RL: <b>349.63 mAHD</b> Co-ords: <b>E 707020.52 N 6446617.82</b>			
В	ore Informatio	n			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY		FORM	MATION	HYDROGEOLOGY
419/09/2009	152         mm           1.1         surface           2.1         surface           2.1	<ul> <li>a</li> <li>a&lt;</li></ul>			CLAY - red brown clay         CLAY - yellow brown clay         GRAVELLY CLAY - red brown gravelly clay with iron stone         SANDY CLAY - red brown sandy clay         SANDY CLAY - red brown becoming yellow grey sandy clay         SANDY CLAY - red brown becoming yellow grey sandy clay         SANDY CLAY - red brown becoming yellow grey sandy clay         GRAVEL - alluvial sands with gravels         GRAVEL - alluvial gravels with coarse sands		Alluviu	m	EC = 0.899 mS/cm pH = 8.55
		- 334	This by		END OF BOREHOLE AT 30.64 m le log should be read in conjunction with Parsons Brincke		papying	standard	notes



BORE NO.

## GW5B

Client: Project: Bore Location: Project Number:			M	ates	1	Rec	e Commenced: e Completed: corded By: Checked By:	19/8/09 19/8/09 Angus McFarlane Leah Gleeson
	ling Me ling Co	ethod: ompany:		ıbex qhla			face RL: <b>349.6</b> ords: <b>E 707</b>	3 mAHD ⁄020.52 N 6446617.82
		formation		<u> </u>		Field Material Description		
WATER	WELL CO	NSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		bentonite	- 333 - 332 - 331 - 330 - 329 - 328 - 328	17 - 18 - 19 - 20 - 21 - 22 - 23 -		GRAVEL - alluvial gravels with coarse sands (continued) CLAY - grey brown clay with minor sand SAND - yellow grey becoming grey fine, poorly consolidated sands with 0.5 to 2cm gravel	Alluvium	
		-	- 326 - 325	24 - 25 -		SANDY CLAY - grey sandy clay SANDSTONE - grey sandstone with conglomerate	Tomcat Gully Sandstone	
		gravel pack 50 mm slotted PVC	- 324 - 323	26 - 27 -		SANDSTONE - grey sandstone with gravel		
		casing	- 322 - 321	28 -		SANDSTONE - grey fine becoming coarse quartz sandstone		
		sump	- 320 - 319 - 318	<b>30</b> – 31 –		END OF BOREHOLE AT 30.64 m		



BORE NO.

## GW5C

SHEET 1 OF 2

Client: Project: Bore Location: Project Number: Drilling Method:			Mate 2114 Tub	bor es 1 4426 ex 8	a C 6E a & A	oal Mine Project     Date       Rec     Rec       & 2162570B     Log       ir Hammer     Surf	Date Commenced:19/8/09Date Completed:19/8/09Recorded By:Angus McFarlaneLog Checked By:Leah GleesonSurface RL:349.51 mAHD		
								1.8 N 6446624.4	
В	ore	Informatio	1			Field Material Description			
WATER	WELL	CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY	
41908/2009		152 mm         steel         surface         casing         and 50         mm PVC         casing         casing	- 348 - 347 - 346 - 345 - 344 - 343 - 342 - 341 - 342 - 341 - 342 - 341 - 342 - 341 - 342 - 341 - 340 - 1 - 338 - 1 - 336 - 1 - 336 - 1 - 336 - 1 - 337 - 336 - 337 - 338 - 337 - 336 - 337 - 337 - 336 - 337 - 337 - 336 - 337 - 337 - 336 - 337 - 337 - 337 - 337 - 337 - 337 - 336 - 337 - 328 - 327 - 326	5 6 7 7 7 10 11 10 12 0 0 0 0 0 0 0 0		CLAY - red brown clay         CLAY - yellow brown clay         GRAVELLY CLAY - red brown gravelly clay with iron stone         SANDY CLAY - red brown sandy clay         SANDY CLAY - red brown becoming yellow grey sandy clay         SANDY CLAY - red brown becoming yellow grey sandy clay         SAND - allovial sands with gravels         GRAVEL - allovial sands with coarse sands         CLAY - grey brown clay with minor sand         SAND - yellow grey becoming grey fine, poorly consolidated sands with 0.5 to 2cm gravel         SAND - yellow grey sandy clay         SANDY CLAY - grey sandy clay         SANDY CLAY - grey sandy clay	Alluvium	EC = 0.897 mS/cm pH = 9.77	
	1	i 1		<u>.</u>	•••	END OF BOREHOLE AT 43.00 m	1	1	
			Th	is bo	rehc	le log should be read in conjunction with Parsons Brinckerhoff's acco	ompanying standard no	otes.	



BORE NO.

## GW5C

Bor Proj Drill Drill	int: ect: e Location: ject Number: ing Method: ing Company: ore Information	Mates 21144 Tubex Highla	ora ( 1 26E & A	Coal Mine ProjectDaRe& 2162570B.ir HammerSu	te Commenced: te Completed: corded By: g Checked By: rface RL: <b>349.51 r</b> -ords: <b>E 70702</b>	19/8/09 19/8/09 Angus McFarlane Leah Gleeson hAHD 1.8 N 6446624.4	
		(GL)	ő				
WATER	WELL CONSTRUCTION	RL (mAHD) DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY	
		- 324		SANDSTONE - grey sandstone with conglomerate (continued)	Tomcat Gully Sandstone		
		26 -		SANDSTONE - grey sandstone with gravel			
		- 323 27 -		SANDSTONE - grey fine becoming coarse quartz sandstone	_		
		- 322 28 -					
		- 321					
		29 - 320					
		30 -					
	50 mm	- 319 31 -		SANDSTONE - grey coarse sandstone	_		
	PVC casing	- 318 32 -					
		- 317					
	bentonite	33 - - 316					
		34 -					
	gravel	- 315 35 -		COAL	Upper Ulan	_	
	pack	- 314 36 -			Seam		
	50 mm slotted PVC casing	- 313					
		37 - - 312		COAL - coal with light grey mudstone/claystone	C-Marker Claystone	_	
		38 -			olayotono		
		- 311 39 -			Lower Ulan	_	
		- 310 <b>40</b> -			Seam		
		- 309					
		41 - - 308					
	2 2 7 5 7 5 7 5 7 5 7 5 7 5 7 5 7 5 7 5	42 -					
		- 307 43 -				_	
		- 306 44 -					
		- 305					
		45 - - 304					
		46 - - 303	1				
		- 303 47 -	-				
		- 302 48 -					
		- 301					
		49 - 300	1				
				END OF BOREHOLE AT 43.00 m			



BORE NO.

## GW5D

Clie		YEARS ®	С	MC F	Pty L	td Date	e Commenced:	17/8/09
Pro	ject:		С	obbc	ora (	Coal Mine Project Date	e Completed:	17/8/09
		ation: lumber:		ates 1144:			orded By: Checked By:	Angus McFarlane Leah Gleeson
		lethod:					face RL: 349.29 r	
Drilling Company:								3.18 N 6446631.55
В	ore Ir	nformatio	n			Field Material Description	1	
				3GL)	0 0			
WATER	WELL C	ONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		152 mm steel surface	- 349		/	CLAY - red brown clay	Alluvium	
		and 50		1 -				
		casing	- 348	-		CLAY - yellow brown clay		
				2 -		GRAVELLY CLAY - red brown gravelly clay with iron stone	-	
		- -	- 347		/			
		· •	- 346	3 -	₽ /			
		·		4 -	6			
			- 345		þ /			
			~	5 -	H.,	SANDY CLAY - red brown sandy clay	-	
			- 344					
			- 343	6 -				
				7 -				
17/08/2009			- 342		- /			
17/08			- 341	8 -	/.	SANDY CLAY - red brown becoming yellow grey sandy clay	-	
			0.1.					
			- 340	9 -	ľ /			
		•		10 –	·/ ·	SAND - alluvial sands with gravels		
			- 339					
			- 338 11 GRAVEL - 2	GRAVEL - alluvial gravels with coarse sands				
				12 -	Po			
			- 337		$\mathcal{C}$			
			- 336	13 -	00			
					Po			
			- 335	14 -	00 00			
		· . ·		15 -	$\frac{1}{2}$			
			- 334		٥Č			
			- 333	16 -	00			
				17 -	Po			
		• •	- 332	., -	0 - 0	CLAY - grey brown clay with minor sand	+	
			001	18 -	/			
		· •	- 331		ľ,			
			- 330	19 -				
					Ĺ			
				This h	oreh	END OF BOREHOLE AT 54.60 m	mpanying standard n	otes


BORE NO.

## GW5D

SHEET 2 OF 3

Client: Project: Bore Location: Project Number: Drilling Method:			C M	ates	ora ( 1	.td Coal Mine Project & 2162570B	Date Rec	e Commenced: e Completed: orded By: Checked By:	17/8/09 17/8/09 Angus McFarlane Leah Gleeson
		ethod: ompany:				hir Hammer Drilling Borehole Diameter: 50 mm		face RL: <b>349.29</b> i ords: <b>E 70702</b>	mAHD 23.18 N 6446631.55
		formatio		.9		Field Material Description			
WATER	WELL COM	NSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY			HYDROGEOLOGY
			- 329			SAND - yellow grey becoming grey fine, poorly consolidated sands with 0.5	5 to 2cm gravel	Alluvium	
			- 328	21 -					
			- 327	22 -					
			- 326	23 -		SANDY CLAY - grey sandy clay		Tomost Oully	_
			- 325	24 -				Tomcat Gully Sandstone	
			- 324	25 -		SANDSTONE - grey sandstone with conglomerate			
			- 323	26 -		SANDSTONE - grey sandstone with gravel		-	
			- 322	27 -		SANDSTONE - grey fine becoming coarse quartz sandstone		-	
			- 321	28 -					
			- 320	29 -					
		50 mm PVC casing	- 319	30 –					
			- 318	31 -		SANDSTONE - grey coarse sandstone		-	
			- 317	32 -					
			- 316	33 -					
			- 315	34 -					
			- 314	35 -		COAL		Upper Ulan Seam	-
			- 313	36 -					
			- 312	37 -		COAL - coal with light grey mudstone/claystone		C-Marker Claystone	-
			- 311	38 -					
			- 310	39 -		COAL		Lower Ulan Seam	_
				This b	oreh	END OF BOREHOLE AT 54.60 ole log should be read in conjunction with Parsons Brinck		ompanying standard n	otes.



BORE NO.

## GW5D

SHEET 3 OF 3

Proj Bore	Client: Project: Bore Location: Project Number: Drilling Method:			ates	ora C 1	_td Coal Mine Project & 2162570B	Date Commenced:17/8/09Date Completed:17/8/09Recorded By:Angus McFarlaneLog Checked By:Leah Gleeson			
		ethod: mpany:				Air Hammer Drilling Borehole Diameter: 50 mm		ace RL: <b>349.29</b> ords: <b>E 70702</b>	mAHD 23.18 N 6446631.55	
	-	ormation		.9		Field Material Description				
				), ),	DG					
WATER	WELL CON	ISTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY		FORMATION	HYDROGEOLOGY	
		bentonite	- 309 - 308	41 -		COAL (continued)		Lower Ulan Seam		
			- 307	43 -						
		-	- 306			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 siltston	ne	-		
17/08/2009		-	- 303	46 -						
7		50 mm slotted PVC casing	- 302	47 -					Airlift = 3 L/s EC = 1.152 mS/cm pH = 7.92	
			- 301	48 -						
		-	- 300	49 -						
		-	- 299	50 —						
		-	- 298	51 -						
		-	- 297	52 -						
		sump	- 296	53 -						
		-	- 295	54 -						
		-	- 294	55 -	••••				_	
		ŀ	- 293	56 -						
		F	- 292	57 -						
		ļ	- 291	58 -						
			- 290	59 -						
				This h	oreho	END OF BOREHOLE AT 54.60 m ole log should be read in conjunction with Parsons Brincker		mpanying standard n	otes	



BORE NO.

# GW6\_TPB

100 YEARS ®				SHEET 1 OF 3
Client: Project: Bore Location: Project Number:	CMC Pty Ltd Cobbora Coal Mine Project Glencross 2 2114426E & 2162570B	Date Cor Date Cor Recorder Log Cher	d By: Angu	
Drilling Method: Drilling Company:	Air Hammer Highland Drilling Borehole Diameter: 203 mm		RL: 411.32 mAHD E 713476.75	
Bore Information	Field Material Description	1	Geophysical Log	
Well construction	(100 901) HFT HT HT HT HT HT HT HT HT HT HT HT HT HT	Formation	GAMMA (API-GR) 0 62.5 125.0 187.5 250 1 62.5 125.0 187.5 250	HYDROGEOLOGY
Bootonite	411       CLAY - Red brown clay         410       1         410       2         411       1         412       GRAVELLY CLAY - red brown gravelly clay (minor laterite)         413       3         414       1         415       GRAVELLY CLAY - yellow brown gravelly sandy clay         416       6         417       CLAY - light grey/cream light clay         418       CLAY - brown grey clay/weathered sandstone         419       CLAY - light brown grey clay/weathered sandstone         410       FINE SANDSTONE - moderately weathered, grey/brown fine         411       CLAY - light brown grey clay/weathered sandstone         412       SILTSTONE - cream siltstone         411       CLAYSTONE - cream claysione         411       CLAYSTONE - dark grey siltstone         412       SILTSTONE - light grey siltstone         413       SILTSTONE - light grey siltstone         414       CLAYSTONE - light grey siltstone         415       SILTSTONE - light grey siltstone         416       SILTSTONE - light grey siltstone         417       SILTSTONE - light grey siltstone         418       SILTSTONE - light grey siltstone         419       SILTSTONE - light grey siltstone </td <td></td> <td></td> <td>EC = 2.3 mS/cm pH = 5.96</td>			EC = 2.3 mS/cm pH = 5.96
	I his borehole log should be read in conjunction with Parsons Bi	rinckerhoff's accompan	ying standard notes.	



BORE NO.

# GW6\_TPB SHEET 2 OF 3

TOO YEARS ®						SHEET 2 OF 3
Client:	CMC Pt				mmenced: 16/8/	/09
Project:			oal Mine Project		ompleted: 16/8/	
Bore Location:	Glencro		2 2162570B	Recorde		us McFarlane
Project Number:					-	n Gleeson
Drilling Method:	Air Ham				RL: 411.32 mAHE	
Drilling Company: Bore Information	Highlan	la Dr	-	Co-ords		
Bore information			Field Material Description		Geophysical Log	
	BGL)	OG				
ATER (mAHD)	DEPTH (mBGL)	GRAPHIC LOG				
WELL CONSTRUCTION	DEP	GRAI	LITHOLOGY	Formation	GAMMA (API-GR) 0 62.5 125.0 187.5 250	HYDROGEOLOGY
	386		SILTSTONE - grey siltstone	Avymore Claystone		
	26 – . 385 – .			Charjotonio		
	1.					
	27 – - 384 – -					
	28 -					
	383					
	29 382					
	30 -					
	381		COAL	Flyblowers Creek Seam		
	31 -		COAL - coal with interbedded claystone and clay	Oreck Geam		
	380					
	32 – 379 –					
	 33 —	_	COAL - coal with interbedded light brown claystone			
	378					
E FILLER	34 <del>-</del> 377 -		COAL - coal with interbedded light brown claystone and grey sitistone			
	35					
	376		SANDSTONE - grey medium grained sandstone	Tomcat Gully Sandstone		
	36				M	
	37					
	374		SANDSTONE - grey coarse grained and pebbly sandstone (subrounded gravel)			
	38		SANDSTONE - grey medium quartz sandstone with grey			
	373		siltstone			
	39 <u>-</u>		COAL - dark brown with interbedded carbonaceous siltstone and claystone	Upper Ulan		
	40 -			Seam		
	371 =					
	41 – 370 –				hula	
	42 -					
	369					
	43 <del>-</del> 368 -		COAL - coal with interbedded grey siltstone			
	-					
	367		SANDSTONE - grey fine grained sandstone with interbedded siltstone	C-Marker Claystone		
	45			Jaysione		
	366					
	365					
	47				ŧ	
	364				1	
	48 <del>- • •</del> 363	••••	COAL	Lower Ulan		
	49 -			Seam		
	362					
	-		END OF BOREHOLE AT 6	1.00 m		
	This bo	rehole	e log should be read in conjunction with Parsons B		nying standard notes.	



BORE NO.

# GW6\_TPB SHEET 3 OF 3

Client: Project: Bore Location: Project Number: Drilling Method:		Co Gle 21 <sup>2</sup> Air	bbo encr 1442 Ha	ross 26E á mme	oal Mine Project 2 & 2162570B er	Date Commenced:16/8/09Date Completed:16/8/09Recorded By:Angus McFarlaneLog Checked By:Leah GleesonSurface RL:411.32 mAHD			
	ling Company:		ghla	nd D	Drilling Borehole Diameter: 203 mm	n Co		6.75 N 64353	865.2
В	ore Informatio	n			Field Material Description		Geophysica		
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	Formation	GAMMA (API-C 0 62.5 125.0 18	IR) 1.5 250 1 HYDR	ROGEOLOGY
		- 361	-		COAL - coal with grey siltstone	Lower Ular Seam		—	
	Samp	- 360	51		SILTSTONE - grey/brown carbonaceous siltstone	Dapper Formation		-	
		- 	52 -	 : : : : : :	SANDSTONE - grey fine to medium grained quartz sandstone	1 officiation	han han		
		-	53 -		SANDSTONE - grey coarse to medium grained sandstone				
		- 358 -	54 —				hhh		
		- 357 	-				AN Mul		
		- 356	55	Ō	CONGLOMERATE - grey fine to coarse grained subrounded conglomerate with clay matrix		high		
		- 355	56 -				hyphylan		
			57 -	$1^{\circ}C$			Anti-Anti-Anti-Anti-Anti-Anti-Anti-Anti-		
		- - - 353	58 -	$P^{O}$					
		-	59 -	$\stackrel{)}{\sim}$					
		- 352	60 -						
		- 351 							
		350	- 10		END OF BOREHOLE AT 61.00 m				
		349	62						
		- 348	63 -						
		 347	64 -						
			65 -						
		-	66						
		345 	67 —						
		- 344 -	68 -						
		- 343 -	-						
		342	69						
		341	70						
		- 340	71 -						
			72 -						
		- 338	73 -						
		-	74 -						
		- 337 	-			1.00			
		т	his b	oreho	END OF BOREHOLE AT 6 le log should be read in conjunction with Parsons B		companying standard n	otes.	



BORE NO.

## GW6A

SHEET 1 OF 2

DDIlling Method: Air Hammer Highland Drilling Borehole Diameter: 50 mm Surface RL: 411.42 mAHD Co-ords: E713475.57 N 6435359.34 Borehole Diameter: 50 mm Surface RL: 411.42 mAHD Co-ords: E713475.57 N 6435359.34 Person Hormation Construction Of the second	
Bore Information       Field Material Description         If year of the second sec	
Bit ONSTRUCTION       Image: Construction of the construction of t	
102 mm       411       CLAY - red brown day       Ellismayne         11       1       CLAY - red brown day       Ellismayne         410       2       GRAVELLY CLAY - red brown gravely day (minor laterite)       (weathered)         409       3       GRAVELLY CLAY - red brown gravely day (minor laterite)       (weathered)         409       400       GRAVELLY CLAY - red brown gravely sandy day       (weathered)         400       0       GRAVELLY CLAY - red brown gravely sandy day       (weathered)         400       0       GRAVELLY CLAY - red brown gravely sandy day       (weathered)         400       0       GRAVELLY CLAY - red brown gravely sandy day       (weathered)         400       0       GRAVELLY CLAY - red brown gravely sandy day       (weathered)         400       0       CLAY - light grey/cream light clay       (CLAY - light grey/cream light clay       (CLAY - brown grey clay/weathered sandstore)       (CLAY - light brown grey clay/weathered sandstore)       (CLAY - light brown grey clay/weathered sandstore)       (LAY - light brown grey clay/weathered, grey/br	
stell and do and do comp       411       Image: Comp       Formation (weathered)         410       Image: Comp       410       Image: Comp         409       Image: Comp       GRAVELLY CLAY - red brown gravelly day (minor laterile)       Image: Comp         408       Image: Comp       GRAVELLY CLAY - red brown gravelly day (minor laterile)       Image: Comp         408       Image: Comp       GRAVELLY CLAY - red brown gravelly day (minor laterile)       Image: Comp         408       Image: Comp       GRAVELLY CLAY - red brown gravelly day (minor laterile)       Image: Comp         408       Image: Comp       GRAVELLY CLAY - red brown gravelly day (minor laterile)       Image: Comp         407       Image: Clay - light gray/ream       GRAVELLY CLAY - red brown gravelly day       Image: Clay - light gray/ream         50 mm       Image: Clay - light gray/ream       Image: Clay - light gray/ream       Image: Clay - light gray/ream         6       Image: Clay - light brown gray day/weathered sandstone       Image: Clay - light brown gray day/weathered sandstone       Image: Clay - light brown gray day/weathered sandstone       Image: Clay - light brown gray day/weathered gray/brown fine grained sandstone         403       Image: Clay - light brown gray clay/weathered gray/brown fine grained sandstone       Image: Clay - light gray - light	
2       GRAVELLY CLAY - red brown gravelly day (minor laterite)         409       3         408	
\$0 mm       PVC       -405       -405         -405       7       -CLAY - brown grey clay/weathered sandstone         -404       8	
S0 mm PVC casing       -405       -405         -404       -404         -404       -403         -403       -50         -403       -50         -403       -50         -403       -50         -403       -50         -403       -50         -403       -50         -402       -50         -402       -50         -50       -50         -50       -50         -50       -50         -50       -50         -50       -50         -50       -50         -50       -50         -50       -50         -50       -50         -50       -50         -50       -50         -50       -50         -50       -50         -50       -50         -50       -50         -50       -50         -50       -50         -50       -50         -50       -50         -50       -50         -50       -50         -50       -50         -50       -50	
\$0 mm       PVC       -405       -405         -405       7       -CLAY - brown grey clay/weathered sandstone         -404       8	
- 404       - 404         - 403       FINE SANDSTONE - moderately weathered, grey/brown fine grained sandstone         - 403       - 5ILTSTONE - cream siltstone         - 402	
bentonite - 402 - SILTSTONE - cream siltstone	
entonite - 402 - 402	
11 - CLAYSTONE - cream claystone	
gravel pack - 399 - SILTSTONE - dark grey siltstone	
50 mm     50 mm       slotted     PVC       casing	
Subject of the process of the proces	
- 393	
COAL     Whaka       END OF BOREHOLE AT 34.50 m	

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



BORE NO.

## **GW6A**

SHEET 2 OF 2

Client: Project: Bore Location: Project Number:		C G	ilenci	ora ( ross	Coal Mine ProjectDa2Re	Date Commenced:16/8/09Date Completed:16/8/09Recorded By:Angus McFarlaneLog Checked By:Leah Gleeson		
	ling Method: ling Company:		ir Ha ighla			urface RL: <b>411.42 u</b> o-ords: <b>E 7134</b> 7	mAHD /5.57 N 6435359.34	
	ore Information		5	-	Field Material Description			
			Ê	U				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY	
		- 391			SILTSTONE - light grey siltstone with interbedded coal	Formation		
		- 391	21 -			Avymore Claystone		
		- 389	22 -					
		- 388	23 -					
			24 -		CLAYSTONE - cream claystone with interbedded coal (water at 24m)			
		- 387						
			25 -		SILTSTONE - grey siltstone	_		
		- 386		-				
		- 385	26 -					
		505	27 -					
		- 384	21					
		- 383	28 -					
		- 303	29 -					
		- 382	29 -					
			30		COAL	<b>E</b> h blavera		
		- 381				Flyblowers Creek Seam		
			31 -		COAL - coal with interbedded claystone and clay	_		
		- 380						
		- 379	32 -					
		575	33 -					
		- 378	55 -		COAL - coal with interbedded light brown claystone			
			34 -		COAL - coal with interbedded light brown claystone and grey siltstone	_		
		- 377					_	
			35 -					
	-	- 376						
	-	- 375	36 -					
			37 -					
		- 374						
			38 -					
		- 373						
		270	39 -					
		- 372						
			This b	oreh	END OF BOREHOLE AT 34.50 m ole log should be read in conjunction with Parsons Brinckerhoff's ac	companying standard n	otes.	



BORE NO.

## GW6B

Client: Project: Bore Location: Project Number: Drilling Method:			C G 2 <sup>-</sup>	lenci 11442	ora ( ross 26E	Coal Mine Project 2 & 2162570B	Date Commenced: 16/8/09 Date Completed: 16/8/09 Recorded By: Angus McFarlane Log Checked By: Leah Gleeson Surface RL: 411.44 mAHD		
	-	ethod: ompany:		ir Ha ighla		er Drilling Borehole Diameter: 50 mm	Surfac Co-orc		mAHD 74.49 N 6435353.41
		formatio							
						Field Material Description			
WATER	WELL CO	NSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY		FORMATION	HYDROGEOLOGY
		152 mm steel surface casing and 50 mm PVC casing	- 411 - 410 - 409	1 - 2 -		CLAY - red brown clay GRAVELLY CLAY - red brown gravelly clay (minor laterite)		Ellismayne Formation (weathered)	
			- 408 - 407	3 - 4 -		GRAVELLY CLAY - yellow brown gravelly sandy clay			
		50 mm	- 406	5 -		CLAY - light grey-cream light clay			
		PVC casing	- 405 - 404	7 -		CLAY - light brown grey clay/weathered sandstone			
			- 403	8 - 9 -		FINE SANDSTONE - moderately weathered, grey/brown fine grained sandstone			
			- 402	10 –		SILTSTONE - cream siltstone		Ellismayne Formation	
			- 401 - 400	11 -	·	CLAYSTONE - cream claystone			
			- 399	12 -		SILTSTONE - dark grey siltstone			
2009			- 398	13 -	 				
16/08/2009			- 397	14 - 15 -		CLAYSTONE - white claystone SILTSTONE - light grey siltstone, with interbedded coal (moist)			EC = 2.43 mS/cm pH = 7.17
			- 396	16 -					
			- 395	17 -	·				
			- 394 - 393	18 -					
			- 392	19 -		SILTSTONE - light grey siltstone		Whaka	
				This b	oreh	END OF BOREHOLE AT 38.00 m ble log should be read in conjunction with Parsons Brinckerhoffs	's accomp	banying standard	notes.



BORE NO.

### GW6B

SHEET 2 OF 2

Client: Project: Bore Location: Project Number:			Co Gl	lencr	ora ( ross	Coal Mine Project	Date Reco	e Completed: orded By:	16/8/09 16/8/09 Angus McFarlane Leah Gleeson
		ethod: ompany:		r Ha ighla				ace RL: <b>411.44 n</b> ords: <b>E 71347</b> 4	nAHD 4.49 N 6435353.41
_	-	formation		<u>.</u>		Field Material Description			
				Ω	0	•			
WATER	VELL COM	NSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY		FORMATION	HYDROGEOLOGY
	$\mathbb{X}$		- 391			SILTSTONE - light grey siltstone with interbedded coal			
	38			21 -				Avymore Claystone	
	$\mathbb{R}$	-	- 390	2.					
				22 -					
	38	-	- 389						
	88			23 -					
	98	-	- 388			CLAYSTONE - cream claystone with interbedded coal (water at 24m)			
	98			24 -					
	38	-	- 387						
	$\mathbb{R}$			25 -		SILTSTONE - grey siltstone			
	i	-	- 386						
	38			26 -	_				
	3 8		- 385						
	Š Š		- 384	27 -					
	38		504	28 -					
	38	-	- 383	20					
	38			29 -					
	38	-	- 382		 				
	38			30 —		COAL		Flyblowers	_
	$\mathbb{R}$	-	- 381					Creek Seam	
	I I			31 -		COAL - coal with interbedded claystone and clay			
		-	- 380						
		bentonite		32 -					
			- 379						
			- 378	33 -		COAL - coal with interbedded light brown claystone			
			- 376	24					
		-	- 377	34 -		COAL - coal with interbedded light brown claystone and grey siltstone			
				35 -					_
		gravel pack	- 376			SANDSTONE - grey medium grained sandstone		Tomcat Gully Sandstone	
				36 -					
			- 375						
		slotted PVC casing		37 -		SANDSTONE - grey coarse grained and pebbly sandstone (subrounded gravel)			
	目		- 374						
				38 -		SANDSTONE - grey medium quartz sandstone with grey siltstone			
			- 373						
	<u>·</u> .⊢⊡`.			39 -					-
		-	- 372						
		I		Thie b	oreh	END OF BOREHOLE AT 38.00 m	2000	mpanying standard po	tes



BORE NO.

## GW6C

Client: Project: Bore Location: Project Number: Drilling Method:			C G 2 <sup>7</sup>	lenci	ora C ross 26E	Coal Mine ProjectDat2Rec& 2162570BLog	e Commenced: e Completed: orded By: Checked By: face RL: <b>411.45</b>	15/8/09 15/8/09 Angus McFarlane Leah Gleeson mAHD	
Drill	Drilling Company: Bore Information			ighla	nd I		Co-ords: E 713473.31 N 6435347.53		
В	ore Inf	formatio	ı			Field Material Description	1		
WATER	WELL CO	NSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY	
▲15/08/2009		152 mm steel casing and 50 mm PVC casing PVC casing	- 411 - 410 - 409 - 408 - 407 - 406 - 405 - 405 - 405 - 405 - 405 - 402 - 401 - 402 - 401 - 402 - 399 - 399 - 398 - 397 - 395 - 395 - 394	$1 - \frac{1}{2} - \frac{1}{3} - \frac{1}{3} - \frac{1}{3} - \frac{1}{3} - \frac{1}{3} - \frac{1}{12} - \frac{1}{13} - \frac{1}{14} - \frac{1}{16} - \frac{1}{16} - \frac{1}{17} - $		CLAY - red brown day         GRAVELLY CLAY - red brown gravelly clay (minor laterite)         GRAVELLY CLAY - yellow brown gravelly sandy clay         CLAY - light grey/cream light clay         CLAY - light grey/cream light clay         CLAY - brown grey clay/weathered sandstone         CLAY - light brown grey clay/weathered sandstone         FINE SANDSTONE - moderately weathered, grey/brown fine grained sandstone         SILTSTONE - cream siltstone         SILTSTONE - brown cream clay/siltstone         CLAYSTONE - dark grey siltstone         SILTSTONE - dark grey siltstone         SILTSTONE - light grey siltstone         SILTSTONE - light grey siltstone	Ellismayne Formation (weathered)	EC = 1.69 mS/cm pH = 7.76	
			- 393 - 392	18 - 19 -		SILTSTONE - light grey siltstone	Whaka	_	
				This b	oreh	END OF BOREHOLE AT 50.00 m ble log should be read in conjunction with Parsons Brinckerhoff's acco	ompanying standard n	otes.	



BORE NO.

## GW6C

SHEET 2 OF 3

Client: Project: Bore Location: Project Number:	Glencro 211442	ra Coal Mine oss 2 26E & 216257		Date Reco Log (	Commenced: Completed: orded By: Checked By:	15/8/09 15/8/09 Angus McFarlane Leah Gleeson
Drilling Method: Drilling Company:	Air Han Highlar	nmer nd Drilling	Borehole Diameter: 50 mm	Surfa Co-o	ace RL: <b>411.45 r</b> rds: <b>E 71347</b>	nAHD 3.31 N 6435347.53
Bore Informatio	n		Field Material Description			
	RL (mAHD) DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY		FORMATION	HYDROGEOLOGY
	- 391 21 - - 390 22 - - 389 23 - - 388 24 - - - 387 25 - - 386 26 - - 385 27 - - 384	CLAYSTON	E - light grey siltstone with interbedded coal E - cream claystone with interbedded coal (water at 24m)		Formation Avymore Claystone	
	28 - - 383 29 - - 382 30 - - 381 31 - - 380 32 - - 379 33 - - 378 34 - - 377		with interbedded claystone and clay		Flyblowers Creek Seam	
bentonite	- 377 - 376 - 376 - 375 - 374 - 374 - 373 - 372	SANDSTON	E - grey medium grained sandstone	ne	Tomcat Gully Sandstone Upper Ulan Seam	



BORE NO.

## GW6C

SHEET 3 OF 3

Proj Bor Proj	Client: Project: Bore Location: Project Number: Drilling Method:			lenci 11442	ora C ross 26E	Coal Min 2 & 21625	e Project 70B	Da Re Lo	ate Commenced: ate Completed: ecorded By: og Checked By:	15/8/09 Angus McFarlane Leah Gleeson
		ethod: ompany:		ir Ha ighla		er Drilling	Borehole Diameter: 50 m		urface RL: <b>411.4</b> o-ords: <b>E 713</b>	I5 mAHD 3473.31 N 6435347.53
В	ore Inf	formatior	ı				Field Material Description			
WATER	WELL COM	NSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG		LITHOLOGY		FORMATION	HYDROGEOLOGY
MA		50 mm slotted PVC casing	a         - 371         - 370         - 369         - 369         - 367         - 366         - 365         - 364         - 363         - 364         - 363         - 364         - 363         - 364         - 363         - 364         - 365         - 361         - 362         - 363         - 364         - 365         - 365         - 361         - 362         - 355	$\begin{array}{c} \mathbf{a} \\ $		COAL	k brown with interbedded carbonaceous siltstone ar		Upper Ulan Seam C-Marker Claystone	
			- 354 - 353 - 352	57 - 58 - 59 -			END OF BOREHOLE A			



BORE NO.

## GW6D

Proj Drilli	ect: e Loca ect Nu	umber: ethod:	Co Gl 21 Ai	encr 1442 r Hai	ra C oss 26E mme	Coal Mine Project         Date           2         Red           & 2162570B         Log           er         Sur	Date Commenced:15/8/09Date Completed:15/8/09Recorded By:Angus McFarlaneLog Checked By:Leah GleesonSurface RL:411.44 mAHD		
		ompany:		ghla	nd [		ords: E 71347	2.12 N 6435341.06	
Bo	ore In	formatio	1			Field Material Description			
WATER	VELL CO	NSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY	
415.08/2009		152 mm steel casing and 50 mm PVC casing 50 mm PVC casing	- 411 - 410 - 409 - 408 - 407 - 406 - 405 - 404 - 403 - 402 - 401 - 400 - 399 - 398 - 397 - 398 - 393 - 389 - 388 - 387 -	3 - 4 - 5 - 6 - 7 - 6 - 7 - 8 - 7 - 8 - 7 - 10 - 11 - 12 - 113 - 114 - 115 - 116 - 117 - 118 - 119 - 20 - 21 - 22 - 23 - 24 - 24 - 24 - 24 - 24 - 24		CLAY - red brown clay         GRAVELLY CLAY - red brown gravelly clay (minor laterite)         GRAVELLY CLAY - yellow brown gravelly sandy clay         CLAY - light grey/cream light clay         CLAY - brown grey clay/weathered claystone         CLAY - brown grey clay/weathered claystone         CLAY - light brown grey clay/weathered claystone         FINE SANDSTONE - light brown fine sandstone         SILTSTONE - cream siltstone         SILTSTONE - brown cream clay/siltstone         CLAYSTONE - dark grey siltstone         SILTSTONE - dark grey siltstone         SILTSTONE - light grey siltstone, with interbedded coal (moist)         SILTSTONE - light grey siltstone with interbedded coal         CLAYSTONE - light grey siltstone with interbedded coal         CLAYSTONE - light grey siltstone with interbedded coal         SILTSTONE - light grey siltstone with interbedded coal         COAL         SILTSTONE - light grey siltstone with interbedded coal	Ellismayne Formation (weathered)	EC = 1.83 mS/cm pH = 7.82	
				This b	oreho	ole log should be read in conjunction with Parsons Brinckerhoff's acc	ompanying standard no	otes.	



BORE NO.

## GW6D

SHEET 2 OF 3

	ect: e Lo	ocation: Number:	C G	ilencı	ora ( ross	Coal Mine ProjectDate2Rec	e Commenced: e Completed: orded By: Checked By:	15/8/09 15/8/09 Angus McFarlane Leah Gleeson
		Method: Company:		ir Ha ighla			face RL: <b>411.44</b> ords: <b>E 7134</b> 7	mAHD 72.12 N 6435341.06
В	ore	Information	า		1	Field Material Description	T	
				Ê	c			
WATER	WELL	CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	X	× ·	- 386			SILTSTONE - grey siltstone	Avymore	
	X.			26 -			Claystone	
	$\Im$		- 385					
	$\langle \langle \cdot \rangle$		- 384	27 -				
	X.		504	28 -				
	$\Im$		- 383					
	$\mathbb{X}$		000	29 -				
	X.		- 382	30 —				
	$\mathbb{Y}$		- 381			COAL	Flyblowers Creek Seam	
	$\mathbb{X}$			31 -		COAL - coal with interbedded claystone and clay	-	
	X.		- 380	32 -				
	$\mathbb{R}$		- 379	32 -				
	Ň.			33 -		COAL - coal with interbedded light brown claystone	-	
	X.		- 378					
	$\mathbb{X}$		- 377	34 -		COAL - coal with interbedded light brown claystone and grey siltstone		
	Ŋ.			35 -	_	SILTSTONE - grey siltstone	Tomcat Gully	
	X.		- 376		·		Sandstone	
	$\mathbb{R}$		- 375	36 -		SILTSTONE - grey siltstone with coarse quartz sandstone	-	
	Š.		0.0	37 -		SANDSTONE - grey coarse quartz sandstone	-	
	X.		- 374			SANUS FONE - grey coarse qualiz sanusione		
	$\mathbb{R}$		070	38 -		SANDSTONE - grey medium quartz sandstone with grey siltstone	-	
	Š.	Š [	- 373	39 -	::::			
	$\mathbb{X}$		- 372			SILTSTONE - dark grey carbonaceous siltstone	Upper Ulan Seam	
	X.			40 —				
	ÿ		- 371	41 -			ļ	
	$\langle \langle \rangle$		- 370	- 1		COAL		
	X.			42 -				
	$\Im$		- 369	12				
	$\leq$		- 368	43 -		COAL - coal with interbedded grey siltstone		
	X			44 -	—	SILTSTONE - grey siltstone	C-Marker	_
	)		- 367				Claystone	
	$\leq$		- 366	45 -				
	X			46 -	·			
	$\mathbb{N}$		- 365					
	$\leq$		- 364	47 -	<u>-</u>			
	$\langle \langle \rangle$			48 -	·	COAL		_
	$\mathbb{X}$		- 363				Lower Ulan Seam	
	$\mathfrak{I}$		- 362	49 -				
	X	×	502					
				This b	oreh	END OF BOREHOLE AT 61.00 m ole log should be read in conjunction with Parsons Brinckerhoff's acco	mpanying standard n	otes.



BORE NO.

## **GW6D**

SHEET 3 OF 3

Bor Pro	ent: ject: e Location: ject Number: ling Method:	Glend	ora ( cross 126E	Coal Mine Project 5 2 & 2162570B	Date ( Recor Log C	Commenced: Completed: rded By: Checked By: ce RL: <b>411.44 r</b>	15/8/09 15/8/09 Angus McFarlane Leah Gleeson nAHD
	ling Company:			Drilling Borehole Diameter			2.12 N 6435341.06
В	ore Information	1		Field Material Descri	ption		
WATER	WELL CONSTRUCTION	RL (mAHD) DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY		FORMATION	HYDROGEOLOGY
	bentonite	- 361		COAL - coal with grey siltstone		Lower Ulan	
	-	51 - 360		SILTSTONE - grey siltstone		Seam Dapper Formation	_
	-	52 - 359		SANDSTONE - grey medium quartz sandstone			
	gravel	53 - 358 54		SANDSTONE - grey medium becoming coarse qua	tz sandstone		
	50 mm slotted	- 357 55 - 356		SANDSTONE - grey coarse becoming medium grai	ned quartz sandstone		
	PVC casing	- 355 - 355	-				
		57 - 354 - 58	-				
		- 353 59 - 352	-				
		<b>60</b> - 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					
		- 338 74 - 337	-				
		Thie	borob	END OF BORE	HOLE AT 61.00 m	nanving standard no	tos



BORE NO.

#### GW7\_TPB SHEET 1 OF 4

Client: Project: Bore Location: Project Number:	Darlington 2114426E	coal Mine Project & 2162570B	Date Co Recorde Log Che	cked By: Leah		
Drilling Method: Drilling Company:	Air Hamme Highland D			Surface RL: <b>358.47 mAHD</b> Co-ords: <b>E 707836.34 N 6442769.92</b>		
Bore Information		Field Material Description		Geophysical Log		
WELL CONSTRUCTION	DEPTH (mBGL) GRAPHIC LOG	LITHOLOGY	Formation	GAMMA (API-GR) 0 62.5 125.0 187.5 250	HYDROGEOLOGY	
203 mm and 203 mm ateel surface casing	358       1         357       2         356       3         357       2         356       3         357       4         358       1         356       3         357       4         358       5         354       5         353       6         354       5         353       6         354       5         353       6         354       5         355       4         350       9         349       10         348       11         347       12         348       13         344       15         343       16         344       15         343       16         343       19         339       20         338       21         337       22         336       23         337       22         334       24	CLAY - pale yellow brown clay with quartz gravel CLAY - yellow brown clay with quartz gravel CLAY - yellow brown clay clay laterite and unknown metamorphic rock CLAY - yellow brown clay CLAY - yellow brown clay with minor gravel CLAY - yellow brown clay with minor gravel SANDY GRAVEL - red brown sandy gravel with clay matrix GRAVELLY SAND - yellow brown gravelly sand with clay matrix GRAVELLY SAND - yellow brown claystone (samples contaminated from falling alluvium) SILTSTONE - grey siltstone SILTSTONE - grey siltstone SILTSTONE - grey siltstone and coarse grey siltstone SILTSTONE - light grey sandstone (quartz medium grained) and siltstone SANDSTONE - light grey sandstone (quartz medium grained) and siltstone SANDSTONE - fine grained sandstone and light brown SANDSTONE - brown mudstone and quartz sandstone END OF BOREHOLE AT 85 ble log should be read in conjunction with Parsons Br	.00 m			



BORE NO.

# GW7\_TPB SHEET 2 OF 4

		Darlingte	a Coal Mine Project	Date Co Record	Date Commenced:14/8/09Date Completed:14/8/09Recorded By:Angus McFarlaneLog Checked By:Leah Gleeson			
	ng Method: ng Company:	Air Hamı Highlano	mer d Drilling Borehole Diameter: 20		RL: 358.47 mAHD E 707836.34	N 6442769.92		
	re Information	-	Field Material Description		Geophysical Log			
WATER	/ELL CONSTRUCTION	RL (mAHD) DEPTH (mBGL)	UTHOLOGY	Formation	GAMMA (API-GR) 0 62.5 125.0 187.5 250	HYDROGEOLOGY		
	203 mm slotted steel casing	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	SILTSTONE - light grey siltstone      SILTSTONE - light grey to grey siltstone      SILTSTONE - grey siltstone      SILTSTONE - grey siltstone      SILTSTONE - dark grey carbonaceous mudstone and silts	Ellismayne Formation				
		324 35 323 36 322 37	COAL - stony coal	Whaka Formation	Marth Marthala Andread Marthala Angle			
		37       -         321       38         320       39         319       -         319       -         311       -         315       -         316       -         317       -         316       -         317       -         316       -         317       -         318       -         317       -         42       -         316       -         43       -         314       -         45       -         311       -         46       -         311       -         48       -         309       -	CLAYSTONE - light brown claystone and dark grey siltstor  SILTSTONE - dark grey siltstone  SILTSTONE - dark grey to light grey siltstone and cream  SILTSTONE - dark grey to light grey siltstone and cream  CLAYSTONE - cream claystone and dark grey siltstone  CLAYSTONE - cream claystone and dark grey siltstone	E AT 85.00 m				



BORE NO.

### GW7\_TPB SHEET 3 OF 4

100 YEARS ®						SHEET 3 OF				
Client: Project:	CMC Pt	a Coal Mine	Project		mmenced: <b>14/8/</b> mpleted: <b>14/8</b> /					
Bore Location:	Darling		Fioject	Recorde	•	us McFarlane				
Project Number:		6E & 216257	0B			Gleeson				
Drilling Method:	Air Ham				RL: 358.47 mAHD					
Drilling Company		nd Drilling	Borehole Diameter: 203 n	nm Co-ords		N 6442769.92				
Bore Informati	on	Field	d Material Description		Geophysical Log					
	3GL)	90								
	Z RL (mAHD) DEPTH (mBGL)	GRAPHIC LOG								
WELL CONSTRUCTION		GRA	LITHOLOGY	Formation	GAMMA (API-GR) 0 62.5 125.0 187.5 250 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	HYDROGEOLOGY				
	-	COAL - story	coal and dark grey siltstone		2					
	308	CONESSION		Flyblowers Creek Seam						
	51 – 307 –									
	507 =									
	306				han a handa ha					
	53-									
	- 305									
	304									
	55 -	SANDSTONE	- quartz sandstone and siltstone	Tomcat Gully						
				Sandstone						
	- 302									
	57				Why h					
	E 301									
	58- 300									
	59									
	299									
	60				ANA ANA ANA ANA ANA ANA					
	298									
	297	COAL - coal a	and siltstone	Upper Ulan Seam						
	62 -			Count						
	- 296									
	63 295									
	64 -									
	- 294 -									
	65 293									
	66-	COAL - coal a	and siltstone	_	HWY CHAN					
	292	CUAL - COAL -								
	67	CLAYSTONE	- coal and cream claystone	C-Marker						
	- 291			Claystone						
	290	COAL - coal		Lower Ulan Seam	h.					
	69				Arrahmen, Islandar M					
	289				white					
	288				Artholic Article					
	71									
	287									
	286									
		CANDOTON								
	285	SANDSTONE	- coarse quartz sandstone and coal	Dapper Formation						
		SANDSTONE	- coarse to fine grey quartz sandstone	-						
	- 284	· · · · ·			h					
	END OF BOREHOLE AT 85.00 m This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.									



BORE NO.

# GW7\_TPB SHEET 4 OF 4

Drilling Method:       Air Hammer       Surface RL:       358.47 mAHD         Drilling Company:       Highland Drilling       Borehole Diameter:       203 mm       Co-ords:       E 707836.34       N 6442769.9         Bore Information       Field Material Description       Geophysical Log         Image: Strate of the strate o	SHEET 4 OF 4         Date Commenced:       14/8/09         Date Completed:       14/8/09         Recorded By:       Angus McFarlane         Log Checked By:       Leah Gleeson			Date Com Recorded	bora Coal Mine Project Date					
Drilling Company:       Highland Drilling       Borehole Diameter:       203 mm       Co-ords:       E 707836.34       N 6442769.9         Bore Information       Field Material Description       Geophysical Log         Well construction       Image: Stress of the stress o			-	_	/0B					
Bit Mell CONSTRUCTION     Image: Same and state in the second state in the secon	92				Borehole Diameter: 203 mm					
SANDSTONE - coarse to fine grey quartz sandstone (continued) 282 76 282 77 281 78 280 78 280 78 280 78 280 78 280 78 280 78 280 78 280 78 280 78 280 78 280 78 280 78 280 78 280 78 280 78 280 78 280 78 280 78 280 78 280 78 280 78 280 78 280 78 280 78 280 78 280 78 280 78 280 78 280 78 280 78 280 78 280 78 280 78 280 78 280 78 280 78 280 78 280 78 280 78 280 78 78 280 78 78 78 280 78 78 78 280 78 78 78 78 78 78 78		Log	Geophysical Log	G	Id Material Description		۱	re Information	Вс	
283 Formation	PLOGY	i) 250 HYDROGEO	GAMMA (API-GR) 0 62,5 125,0 187,5 250 -	Formation			RL (mAHD)	ELL CONSTRUCTION	WATER	
				pper mation		76 77 78 79 80 81 81 82 83 83 84	282 281 280 279 277 277 276 275			
273       86         272       87         87       87         271       88         270       90         288       91         90       288         91       267         92       266         93       265         94       264         95       263         96       262         96       262         96       262         96       262         96       262         96       262         96       262         96       262         96       262         97       261         98       260         99       259					REHOLE AT 85.00 m	86 87 88 89 90 91 92 93 94 95 96 97 98	272 271 270 269 268 267 266 265 264 263 264 263 262 261 261			
END OF BOREHOLE AT 85.00 m This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.							_	-		



BORE NO.

# GW7A

Defining Method:         Mark Hammer         Surface RL:         358.41 mAHD           Defining Company:         High Ind Drilling         Bore-hole Diameter: 50 mm         Co-ords:         E 707835.22         N6442785.11           Image: Company:         Image: Company: </th <th>Client: Project: Bore Locatio Project Numl</th> <th>on:</th> <th>Co Da</th> <th>obbo Irling</th> <th>gton</th> <th>coal Mine Project</th> <th>Date Comm Date Comple Recorded B Log Checke</th> <th>eted: y:</th> <th>10/8/09 10/8/09 Angus McFarlane Leah Gleeson</th>	Client: Project: Bore Locatio Project Numl	on:	Co Da	obbo Irling	gton	coal Mine Project	Date Comm Date Comple Recorded B Log Checke	eted: y:	10/8/09 10/8/09 Angus McFarlane Leah Gleeson
Bore Information         Field Material Description           Image: Second S									
Note:         Note:         Source         Source         CLVV ysite brand gaves         Allyvium           1         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -				9					
Proving builds         - 368	WELL CONSTR	RUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FOR	RMATION	HYDROGEOLOGY
END OF BOREHOLE AT 11.68 m This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.		ravel ack 0 mm lotted VC ack 0 asing	- 357 - 356 - 355 - 354 - 353 - 352 - 351 - 350 - 349 - 348 - 348	2 - 3 - 3 - 3 - 3 - 3 - 3 - 3 - 3 - 3 -		GRAVELLY CLAY - yellow brown gravelly clay GRAVELLY CLAY - yellow brown gravelly clay (increased % of gravel) GRAVELLY CLAY - brown sandy gravelly clay CLAYEY GRAVEL - brown dayey gravel CLAYEY GRAVEL - alluvium with a clay matrix - water at 9.5m			pH = 7



BORE NO.

## GW7B

Proje	ect: Loca ect Nu	imber:	C D 21	arling 11442	ora C gton 26E	Coal Mine ProjectDatRecRec& 2162570BLog	e Comme e Comple corded By Checked	eted: 9/8 /: Ar d By: Le	8/09 8/09 ngus McFarlane eah Gleeson
		ethod: mpany:		ir Ha ighla			face RL: ords:	358.36 mA E 707835.1	HD N 6442792.59
		ormatio		<u> </u>		Field Material Description			
				î	0	•			
WATER	ELL COM	NSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORI	MATION	HYDROGEOLOGY
		203 mm, 152 mm steel	- 358			CLAY - pale yellow brown clay	Alluviu	m	
	38	surface casing and 50		1 -					
		mm PVC casing	- 357	·					
7///				2 -	$\square$	CLAY - vellow brown clay with guartz gravel			
X	38		- 356			CLAT - yellow brown clay with quartz gravel			
	] []			3 -		CLAY - yellow brown gravelly clay laterite and unknown metamorphic rock	-		
	) ()		- 355						
	38			4 -	$\square$	CLAY - yellow brown clay	_		
X			- 354						
			252	5 -	//	CLAY - yellow brown clay with minor gravel	-		
	3 8		- 353						
			- 352	6 -	,	SANDY GRAVEL - red brown sandy gravel with clay matrix	-		
X			002	-					
	) ()		- 351	7 -	2.0	GRAVELLY SAND - yellow brown gravelly sand with clay matrix			
	38			8 -	 				
X	] []		- 350	Ū		CLAYSTONE - yellow brown claystone (samples contaminated from falling alluvium)	Ellisma Forma	ayne tion	
				9 -					
	3 8		- 349						
X	38			10 —					
	}		- 348						
	) ()			11 -					
			- 347						
	38	152 mm steel	- 246	12 -					
	] []	surface casing and 50	- 346			SILTSTONE - grey siltstone	1		
	)	mm PVC casing	- 345	13 -					
				14					
X	18		- 344	14 –					
				15 -					
	3 8		- 343						
				16 -					
	)		- 342						
	3 🕅			17 -					
	3 🕅		- 341						
1/17/	3	50 mm		18 -					
	) []	PVC casing	- 340						
	3 🕅			19 -		SILTSTONE - grey siltstone/claystone	+		
	3 8		- 339						
				<b>.</b>	. <u> </u>	END OF BOREHOLE AT 53.00 m ble log should be read in conjunction with Parsons Brinckerhoff's acc			



BORE NO.

## GW7B

SHEET 2 OF 3

Proje	ect: e Locat ect Nu	imber:	C D 21	arling 11442	ora C gton 26E	Coal Mine Project A & 2162570B	Date Reco Log (	Commenced: Completed: orded By: Checked By:	9/8/09 9/8/09 Angus McFarlane Leah Gleeson
	ng Me ng Co	ethod: mpany:		ir Ha ighla		er Drilling Borehole Diameter: 50 mm	Surfa Co-o	ace RL: <b>358.36 i</b> irds: <b>E 70783</b>	mAHD 85.1 N 6442792.59
		ormation				Field Material Description			-
WATER	VELL CON	NSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY		FORMATION	HYDROGEOLOGY
		bentonite	rž - 338 - 337 - 336 - 335 - 334 - 333 - 332 - 332 - 332 - 329 - 329 - 329 - 329 - 329 - 322 - 325 - 325 - 324 - 322 - 322 - 322 - 322	$\begin{array}{c} \square \\ \square \\ 21 \\ - \\ 22 \\ - \\ 23 \\ - \\ 23 \\ - \\ 23 \\ - \\ 25 \\ - \\ 26 \\ - \\ 26 \\ - \\ 26 \\ - \\ 27 \\ - \\ 28 \\ - \\ 29 \\ - \\ 29 \\ - \\ 30 \\ - \\ 33 \\ - \\ 33 \\ - \\ 33 \\ - \\ 36 \\ - \\ 37 \\ - \\ 38 \\ - \\ 38 \\ - \\ 39 \\ - \\ 39 \\ - \\ 39 \\ - \\ 39 \\ - \\ 39 \\ - \\ 39 \\ - \\ 39 \\ - \\ 39 \\ - \\ 39 \\ - \\ 39 \\ - \\ 39 \\ - \\ 39 \\ - \\ 39 \\ - \\ 39 \\ - \\ 39 \\ - \\ 39 \\ - \\ 39 \\ - \\ 39 \\ - \\ 39 \\ - \\ 39 \\ - \\ 39 \\ - \\ 39 \\ - \\ 39 \\ - \\ 39 \\ - \\ 39 \\ - \\ 39 \\ - \\ 39 \\ - \\ 39 \\ - \\ 39 \\ - \\ 39 \\ - \\ 39 \\ - \\ 39 \\ - \\ 39 \\ - \\ 39 \\ - \\ 39 \\ - \\ 39 \\ - \\ 39 \\ - \\ 39 \\ - \\ 39 \\ - \\ 39 \\ - \\ 39 \\ - \\ 39 \\ - \\ 39 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ - \\ 30 \\ -$		SANDSTONE - grey fine becoming coarse quartz sandstone         CLAYSTONE - red brown claystone         SILTSTONE - grey siltstone         SILTSTONE - dark grey siltstone, water at 29m         SILTSTONE - dark grey siltstone/carbonaceous mudstone         COAL - stony coal         MUDSTONE - dark grey siltstone/mudstone, water at 42m		Ellismayne Formation	
			- 319	This b		END OF BOREHOLE AT 53.0 ole log should be read in conjunction with Parsons Brind		nnanving standard n	



BORE NO.

## GW7B

SHEET 3 OF 3

Bor Pro	ject: e Location: ject Number:	C D	arling	ora C gton	Coal Mine Project D R & 2162570B L	Date Commenced:9/8/09Date Completed:9/8/09Recorded By:Angus McFarlaneLog Checked By:Leah Gleeson		
	ling Method: ling Company:		ir Ha ighla			urface RL: <b>358.36 i</b> o-ords: <b>E 70783</b>	mAHD 85.1 N 6442792.59	
	ore Information	۱			Field Material Description			
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY	
		- 318 - 317 - 316 - 315 - 315 - 314 - 313 - 312 - 311 - 310	41 - 42 - 43 - 44 - 45 - 46 - 47 - 48 - 48 -		SILTSTONE - dark grey siltstone/mudstone, water at 42m (continued)	Avymore Claystone		
		- 309 - 308 - 307 - 306 - 305 - 305 - 304 - 303 - 303 - 302 - 301 - 300 - 299	50 51 - 52 - 53 - 54 - 55 - 56 - 57 - 58 - 58 - 59 -		CLAYSTONE - off white claystone	Flyblowers Creek Seam		



BORE NO.

## GW7C

Bor Proj	ject: e Loc ject N	ation: lumber:	Co Da 21	arlin	gton 26E	Coal Mine ProjectDaRe& 2162570BLog	ate Comme ate Comple ecorded By g Checked Irface RL:	ted: : By:	9/8/09 9/8/09 Angus McFarlane Leah Gleeson
		lethod: company:							35.98 N 6442799.39
В	ore Ir	nformatio	า			Field Material Description			
WATER	WELL CO	DNSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORM	IATION	HYDROGEOLOGY
		203 mm, steel casing and 50 mm PVC casing 300 mm 900 casing 301 mm 50 mm 900 casing 301 mm 900 casing 300 mm 900 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 3000 casing 300 casing 300 casing 3000 cas	- 358 - 357 - 356 - 355 - 354 - 353 - 352 - 352 - 351 - 350 - 348 - 347 - 348 - 347 - 348 - 347 - 348 - 347 - 348 - 343 - 344 - 343 - 343 - 343 - 342 - 341 - 340 - 339 - 338 - 337 - 336 - 335 - 335	1 - 2 - 3 - 3 - 3 - 3 - 3 - 3 - 3 - 3 - 3		CLAY - pale yellow brown clay with quartz gravel CLAY - yellow brown clay with quartz gravel CLAY - yellow brown gravelly clay laterite and unknown metamorphic rock CLAY - yellow brown clay CLAY - yellow brown clay with minor gravel CLAY - yellow brown clay with minor gravel SANDY GRAVEL - red brown sandy gravel with clay matrix GRAVELLY SAND - yellow brown gravelly sand with clay matrix CLAYSTONE - yellow brown claystone (samples contaminated from falling alluvium) SILTSTONE - grey sitistone/claystone SILTSTONE - grey sitistone/claystone SANDSTONE - grey fine becoming coarse quartz sandstone CLAYSTONE - red brown claystone	Alluviur	yne	
				This b	oreh	le log should be read in conjunction with Parsons Brinckerhoff's acc	companying s	standard n	otes.



BORE NO.

## GW7C

SHEET 2 OF 3

Bor Proj	ect: e Location: ject Number:	Darli 2114	oora ( ngtoi 426E	Coal Mine ProjectDateReco& 2162570BLog (	e Commenced: 9/8/09 e Completed: 9/8/09 orded By: Angus McFarlane Checked By: Leah Gleeson
	ing Method: ing Company:	Air H High		er Surfa Drilling Borehole Diameter: 50 mm Co-o	ace RL: <b>358.38 mAHD</b> ords: <b>E 707835.98 N 6442799.39</b>
В	ore Informatior	า		Field Material Description	
WATER	WELL CONSTRUCTION	RL (mAHD)	GRAPHIC LOG	LITHOLOGY	FORMATION HYDROGEOLOGY
		- 333 - 332 - 331 - 330 - 329 - 328 - 328 - 327 - 326 - 326		SILTSTONE - grey siltstone	Ellismayne Formation
		33 - 325 - 324 - 324 - 323 - 323 36 - 322		SILTSTONE - dark grey siltstone/carbonaceous mudstone COAL - stony coal MUDSTONE - dark grey carbonaceous mudstone	Whaka Formation
		- 322 - 321 - 320 - 319 - 319 - 318 - 317 - 316 - 315 - 315 - 314 - 313 - 312 - 311 - 310 - 310 - 310 - 312 - 311 - 310 - 312 - 311 - 310 - 312 - 312 - 310 - 312 - 310 - 312 - 310 - 312 - 310 - 312 - 310 - 312 - 310 - 310 - 312 - 310 - 310 - 312 - 310 - 310 - 310 - 312 - 310 - 310 - 310 - 312 - 310 - 310 - 310 - 310 - 312 - 310 - 300 - 309		MUDSTONE - dark grey carbonaceous mudstone         SILTSTONE - dark grey siltstone/mudstone, water at 42m         SILTSTONE - dark grey siltstone with clay         CLAYSTONE - light grey claystone with clay         CLAYSTONE - off white claystone         END OF BOREHOLE AT 61.00 m         ole log should be read in conjunction with Parsons Brinckerhoff's accon	Avymore Claystone



BORE NO.

## GW7C

SHEET 3 OF 3

Pro Bor Pro	Client: Project: Bore Location: Project Number: Drilling Method:		Darling 11442	ora ( gtor 26E	Coal Mine n & 216257			Date Comme Date Comple Recorded By Log Checked	eted: /: d By:	9/8/09 9/8/09 Angus McFarlane Leah Gleeson
	ling Method: ling Company:		Air Hai Iighla		er Drilling	Borehole Diameter: 50		Surface RL: Co-ords:		mAHD 35.98 N 6442799.39
	ore Informatio				J	Field Material Descriptio				
WATER	WELL CONSTRUCTION	Z RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG		LITHOLOGY		FOR	MATION	HYDROGEOLOGY
	bentonite gravel pack 50 mm slotted casing	<ul> <li>□ - 308</li> <li>□ 307</li> <li>□ 306</li> <li>□ 305</li> <li>□ 304</li> <li>□ 303</li> <li>□ 302</li> <li>□ 301</li> <li>□ 300</li> <li>□ 299</li> <li>□ 298</li> <li>□ 297</li> <li>□ 298</li> <li>□ 288</li> </ul>			SILTSTONE	- dark grey siltstone - dark grey with layers of light grey siltstone - dark grey with layers of light grey siltstone to E - coarse sandstone with grey siltstone		Flyblov Creek	Seam at Gully	
		- 285 - 284	73 - 74 -			END OF BOREHOL	E AT 61.00 m			



BORE NO.

## GW7D

Client: Project: Bore Location: Project Number: Drilling Method:			Co Da	obbo arling	gton	Coal Mine Project D	Date Commenced:       7/8/09         Date Completed:       7/8/09         Recorded By:       Angus McFarlane         Log Checked By:       Leah Gleeson         Surface RL:       358.42 mAHD				
	g Metho g Comp			r Ha				nAHD 6.34 N 6442806.2			
	e Infori			yma	nu -	Field Material Description		0.34 11 0442000.2			
	•		•								
WATER	ELL CONSTR	RUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY			
X	15	13 mm, i2 mm	358			CLAY - pale yellow brown clay	Alluvium				
	su ca	eel rface sing		1 -							
	3 🚫 m	nd 50 m PVC Ising	357								
			356	2 -		CLAY - yellow brown clay with quartz gravel					
			550	3 -							
		+	355	Ū		CLAY - yellow brown gravelly clay laterite and unknown metamorphic rock					
				4 -		CLAY - yellow brown clay					
			354	-							
		-	353	5 -		CLAY - yellow brown clay with minor gravel					
				6 -	<u>.</u>	SANDY GRAVEL - red brown sandy gravel with clay matrix					
		ŀ	352		ie 🔿						
			351	7 -		GRAVELLY SAND - yellow brown gravelly sand with clay matrix					
				8 -		CLAYSTONE - yellow brown claystone (samples contaminated from falling alluvium)	Filiamoura	_			
		ŀ	- 350				Ellismayne Formation				
			349	9 -							
			343	10 —							
		ŀ	348								
				11 -							
			347	12 -							
	ste	i2 mm eel rface	346	12 -							
	X XX ca	ising id 50 m PVC		13 -		SILTSTONE - grey siltstone					
	ca	sing	345								
			344	14 -							
X				15 -							
		F	343								
			342	16 -							
			0.2	17 -							
		F	341		·						
		0 mm /C	- 340	18 -							
		sing	- 340	19 -	·						
		+	339	10		SILTSTONE - grey siltstone/claystone					
				20 -	 :::::	SANDSTONE - grey fine becoming coarse quartz sandstone					
		F	338	21							
		ŀ	337	21 -							
				22 -							
		F	336								
		Ļ	335	23 -		CLAYSTONE - red brown claystone					
K				24 -							
$\otimes$		-	334								



BORE NO.

## GW7D

SHEET 2 OF 3

Bore	nt: ect: e Location: ect Number:	Darl	bora ingte	Coal Mine Project D n R	ate Commenced: ate Completed: ecorded By: og Checked By:	7/8/09 7/8/09 Angus McFarlane Leah Gleeson
	ing Method: ing Company:	Air High			urface RL: <b>358.42 r</b> o-ords: <b>E 70783</b>	nAHD 6.34 N 6442806.2
	ore Information		lian	Field Material Description		0.34 N 0442000.2
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL) GRAPHICLOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		- 333	<u> </u>	- SILTSTONE - grey siltstone	Ellismayne	
		2	.6		Formation	
	38	- 332	-			
		2 - 331	7 -			
			8 8			
		- 330	-			
		2 - 329	9 +-	SILTSTONE - dark grey siltstone, water at 29m		
			io	-		
		- 328	-	-		
	X X	3	1 - [ -	-		
	× ×	- 327 3	2			
		- 326	- -			
	38	3	3 +	SILTSTONE - dark grey siltstone/carbonaceous mudstone		
	<u> </u>	- 325	i4	-		
		- 324	4 ] -	-		
	Š Š		5 -	COAL - stony coal	Whaka	_
	X	- 323			Formation	
		3 - 322	۴E	MUDSTONE - dark grey carbonaceous mudstone		
	<u> </u>	3	7 -	- SILTSTONE - dark grey siltstone/mudstone, water at 42m	Avymore	_
	\$ \$ T	- 321		-	Claystone	
		3 - 320	8	-		
			i9	-		
		- 319	.  -	-		
		<b>4</b> - 318	.0 0.	-		
		4	1	-		
	38 †	- 317	-	-		
	3 1	4: - 316	2	-		
			3 5	-		
	38 †	- 315	-			
		4 - 314	4			
			5			
		- 313	-			
		4 - 312	<sup>6</sup>	· · ·		
		4	7 +	SILTSTONE - dark grey siltstone with clay		
		- 311		-		
		4 - 310	8	CLAYSTONE - light grey claystone with clay		
	38 [	- 310 4	.9 =			
		- 309		CLAYSTONE - off white claystone		
		Thi		END OF BOREHOLE AT 72.72 m hole log should be read in conjunction with Parsons Brinckerhoff's a	companying standard p	otes



BORE NO.

## GW7D

SHEET 3 OF 3

Client: Project: Bore Location: Project Number: Drilling Method:	CMC Pty Ltd Cobbora Coa Darlington 2114426E & 2 Air Hammer	al Mine Project	Date Completed: Recorded By:	7/8/09 7/8/09 Angus McFarlane Leah Gleeson
Drilling Company:	Highland Dril	lling Borehole Diameter: 50 mm		6.34 N 6442806.2
Bore Informatio		Field Material Description	1	1
WELL CONSTRUCTION	RL (mAHD) DEPTH (mBGL) GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	ILTSTONE - dark grey siltstone ILTSTONE - dark grey with layers of light grey siltstone ILTSTONE - dark grey with layers of light grey siltstone with quartz	Flyblowers Creek Seam         Tomcat Gully Sandstone	
bentonite	- 297 61	ANDSTONE - coarse sandstone with grey siltstone (fine grained) water at 61	Upper Ulan Seam	_
gravel pack 50 mm slotted PVC casing	- 291	LAYSTONE - light cream claystone with dark carbonaceous mudstone	C-Marker Claystone Lower Ulan Seam	-



BORE NO.

# **GW7E**

0110

Proj	nt: ect: e Loca ect Nu	imber:	C D	arling	ora ( gtor	Coal Mine Project     Data       Rec     Rec       & 2162570B     Log	e Commenced: e Completed: orded By: Checked By:	7/8/09 7/8/09 Angus McFarlane Leah Gleeson
	ing Me ing Co	ethod: mpany:		ir Ha iahla			face RL: <b>358.31 i</b> ords: <b>E 70783</b>	mAHD 36.65 N 6442812.96
		ormatio		Igina		Field Material Description		
				~				
WATER	WELL CON	ISTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	38	203 mm, 152 mm steel	- 358			CLAY - pale yellow brown clay	Alluvium	
	38	surface casing		1 -				
	$\mathbb{R}$	and 50 mm PVC casing	- 357		ĺ			
	38		- 356	2 -		CLAY - yellow brown clay with quartz gravel	-	
	38			3 -		CLAY - yellow brown gravelly clay laterite and unknown metamorphic rock	-	
	3		- 355		/			
	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		- 354	4 -	/ /	CLAY - yellow brown clay	+	
	3			5 -			1	
	3		- 353	-	/	CLAY - yellow brown clay with minor gravel		
	$\mathbb{S}$		- 352	6 -		SANDY GRAVEL - red brown sandy gravel with clay matrix	+	
	38			7 -	.o (\ ) .			
	88		- 351		2	GRAVELLY SAND - yellow brown gravelly sand with clay matrix		
	38		- 350	8 -		CLAYSTONE - yellow brown claystone (samples contaminated from falling alluvium)	Ellismayne	_
	38		550	0			Formation	
	3 8		- 349	9 -				
	38			10 -				
	38		- 348					
	3 0		- 347	11 -				
	I 🕅	152 mm		12 -	E			
	I D	steel surface	- 346		<u> </u>	SILTSTONE - grey siltstone	-	
	88	casing and 50 mm PVC casing	- 345	13 -	·			
	88	casing		14 -	·			
	38		- 344					
	38		- 343	15 -				
	38			16 -				
			- 342					
	38		- 341	17 -	-			
	38			18 -				
	38	50 mm PVC casing	- 340	10 -	-			
	38	ý	- 339	19 -	=	SILTSTONE - grey siltstone/claystone	+	
			228					
	38		- 338	20		SANDSTONE - grey fine becoming coarse quartz sandstone		
	\$		<u></u>	21 -				
	38		- 337					
	<u>i</u>		- 336	22 -				
	88			23 -		CLAYSTONE - red brown claystone	-	
	3 🛛		- 335					
	<u></u>		- 334	24 -				
	$\langle \langle \langle \rangle \rangle$							
				This b	oreh	END OF BOREHOLE AT 85.00 m ble log should be read in conjunction with Parsons Brinckerhoff's acco	ompanying standard n	otes.



BORE NO.

# GW7E

SHEET 2 OF 4

Boro Proj	ect: e Location: ject Number:	Co Da 21	arling 1442	ora C gton 26E	Coal Mine ProjectDateRecRec& 2162570BLog	e Completed: corded By: Checked By:	7/8/09 7/8/09 Angus McFarlane Leah Gleeson
	ing Method: ing Company:		r Ha ghla			face RL: 358.31 m ords: E 707836	nAHD 6.65 N 6442812.96
	ore Information	ı			Field Material Description		
				(7)			
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		333			SILTSTONE - grey siltstone	Ellismayne Formation	
		- 332	26 -	+   +   +		ronnauon	
		- 331	27 -				
		- 330	28 -	· ·			
		- 329	29 -	=	SILTSTONE - dark grey siltstone, water at 29m	-	
		- 328	30 -	·			
		- 327	31 -	· ·			
		- 326	32 -				
		- 325	33 -		SILTSTONE - dark grey siltstone/carbonaceous mudstone	-	
			34 -	· ·			
		- 324	35 -	·			_
		- 323	36 -		COAL - stony coal	Whaka Formation	
		- 322			MUDSTONE - dark grey carbonaceous mudstone		
		- 321	37 -		SILTSTONE - dark grey siltstone/mudstone, water at 42m	Avymore Claystone	_
		- 320	38 -	 			
		- 319	39 -				
		- 318	40 —	·			
		- 317	41 -	·			
		- 316	42 -				
		- 315	43 -				
		- 314	44 -				
			45 -	· ·			
		- 313	46 -				
		- 312		·			
		- 311	47 -		SILTSTONE - dark grey siltstone with clay	1	
		- 310	48 -		CLAYSTONE - light grey claystone with clay	1	
		- 309	49 -		CLAYSTONE - off white claystone	+	
			This b	oreh	END OF BOREHOLE AT 85.00 m ble log should be read in conjunction with Parsons Brinckerhoff's acco	n pmpanying standard no	tes.



BORE NO.

# **GW7E**

SHEET 3 OF 4

		Col Dai	bbo rling	gton	Coal Mine Project Date Rec	e Commenced: e Completed: corded By: Checked By:	7/8/09 7/8/09 Angus McFarlane Leah Gleeson
Drillir	ng Method: ng Company:	Hig		mme Ind D		face RL: <b>358.31 r</b> ords: <b>E 70783</b>	mAHD 36.65 N 6442812.96
Bo	re Informatior	<u> </u>		<b></b>	Field Material Description	1	
WATER	ELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		- 308 - 307	51 –		COAL - stony coal	Flyblowers Creek Seam	
		- 306	52 -				
X		- 305	53 -				
X		- 304	54 -		SILTSTONE - dark grey siltstone	Tomcat Gully Sandstone	_
		- 303	55 - 56 -		SILTSTONE - dark grey with layers of light grey siltstone	1	
		- 302	57 -		SILTSTONE - dark grey with layers of light grey siltstone with quartz	-	
			58 -				
X		- 299	59 -		SANDSTONE - coarse sandstone with grey siltstone	-	
		- 298	60 -				
		- 297	61 - 62 -		SANDSTONE - coarse sandstone with grey siltstone (fine grained) water at 61		
X		- 296	63 -		COAL - Coal With Gaystone	Upper Ulan Seam	
			64 -				
		- 293	65 -				
		- 292	66 -				
		- 291	68 -		CLAYSTONE - light cream claystone with dark carbonaceous mudstone	C-Marker Claystone Lower Ulan	_
		- 290 - 289	69 -			Seam	
			70 –				
		- 287	71 -				
		- 286	72 -				
	bentonite _	- 285	74 -		SANDSTONE - grey sandstone with layers of siltstone/carbonaceous mudstone, water at	Dapper	_
		- 204			75m	Formation	



BORE NO.

# GW7E

SHEET 4 OF 4

Bore	ent: ject: e Loca ject Nu		Co Da	arling	ora ( gtor	Coal Mine		Da Re	ate Comm ate Comp ecorded E og Checke	leted: 3y:	7/8/09 7/8/09 Angus McFarlane Leah Gleeson
	ling Me ling Co	ethod: mpany:		r Ha qhla		er Drilling	Borehole Diameter:		urface RL p-ords:	: 358.31 n E 70783	nAHD 6.65 N 6442812.96
		ormatior		<u>.</u>		j	Field Material Descripti				
WATER	WELL CON	ISTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG		LITHOLOGY		FO	RMATION	HYDROGEOLOGY
			- 283			SANDSTON 75m (continu	E - grey sandstone with layers of siltstone/o	carbonaceous mudstone, water at	Dapp	er	
		gravel pack	- 282 - 281 - 280 - 279 - 278 - 277 - 276 - 275 - 274 - 273 - 272 - 271 - 270 - 269	76 - 77 - 78 - 79 - 80 81 - 82 - 83 - 83 - 85 - 86 - 86 - 87 - 88 - 88 - 90 -					Form	ation	
		-	- 268 - 267	91 -							
		-	- 266	92 - 93 -							
		-	- 265 - 264	94 -							
			- 263	95 -							
		-	- 262	96 -							
		-	- 261	97 - 98 -							
		-	- 260 - 259	99 -							
			٦	This b	oreh	ole log shou	END OF BOREH		companying	g standard no	otes.



BORE NO.

# GW8A

Bor Pro	ject: e Loca ject Nu	umber:	С М 2 <sup>-</sup>	lates 1144	ora C Sth 26E	coal Mine Project Hwy & 2162570B	Date Reco Log (	Commo Compleorded By Checke	eted: y: d By:	24/9/09 24/9/09 Nick Bryant Leah Gleeson
	ling Me ling Co	ethod: ompany:		ir Ro npax		- Blade ling Borehole Diameter: 50 mm	Surfa Co-o		351.28 E 7074	mAHD 91 N 6444296.65
		formatio				Field Material Description				
WATER	WELL COI	NSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY		FOR	MATION	HYDROGEOLOGY
23/09/2009		50 mm PVC casing bentonite 50 mm slotted PVC casing	- 351 - 350 - 349 - 348 - 348 - 347 - 346	1 - 2 - 3 - 4 - 5 -		LOAM - brown slightly clayey sandy loam, occasional gravel of fine angular quartz         SAND - coarse quartz sand with some minor lithic fragments occasional quartz fine angular         SAND - gravely coarse sand, gravel fine to medium well rounded dominantly of quarts some angular lithic clasts present         SAND - gravely coarse sand, gravel fine to medium well rounded dominantly of quarts some angular lithic clasts present         GRAVEL - clayey sandy gravel, sand dominantly coarse and quartz rich, gravel medium-coarse some large 6-8cm tabular clasts of fine sandstone         GRAVEL - clayey sandy gravel, sand dominantly quartz, gravel of angular medium quartz, clay content increasing with depth		Alluvit	Im	
			- 345	-		SANDY CLAY - purple soft sandy clay with yellow-orange mottling, sand is quartz dominant				
			- 344	7 -						
				This b	oreh	END OF BOREHOLE AT 6.54 m ble log should be read in conjunction with Parsons Brinckerhoff	's accon	npanying	standard	notes.



BORE NO.

### GW8B

Bor	ject: e Loca	ation: umber:	C M	ates	ora ( Sth	Coal Mine Project I Hwy I	Date Reco	Completed: rded By:	24/9/09 24/9/09 Nick Bryant Leah Gleeson
	ling Me ling Co	ethod: ompany:		ir Ro npax	-		Surfa Co-oi	rds: <b>E 70748</b>	nAHD 8.99 N 6444300.39
_	-	formatio		-		Field Material Description			
				GL)	g				
WATER	WELL CO	NSTRUCTION	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 - 350	1 -		LOAM - brown slightly clayey sandy loam, occasional gravel of fine angular quartz SAND - coarse quartz sand with some minor lithic fragments occasional quartz fine an angular	nd	Alluvium	
			- 349	2 - 3 -		SAND - gravelly coarse sand, gravel fine to medium well rounded dominantly of quart some angular lithic clasts present.	tz,		
			- 348	3 -		GRAVEL - clayey sandy gravel, sand dominantly coarse and quartz rich, gravel medium-coarse some large 6-8cm tabular clasts of fine sandstone			
		bentonite	- 347	5 -		GRAVEL - clayey sandy gravel, sand dominantly quartz, gravel of angular medium quartz, clay content increasing with depth			
		50 mm		6 -		SANDY CLAY - purple soft sandy clay with yellow-orange mottling, sand is quartz			
		slotted PVC casing	- 345	7 -	/	dominant MEDIUM SANDSTONE - weathered quartz rich medium sandstone		Digby	_
₹ 23/09/2009			- 344	8 -		COARSE SANDSTONE - coarse sandstone-conglomerate, weathered to start but		Formation	Airlift = 1 L/s
			- 343	9 -		increasing in competency with depth			
	NONDADA NONDADA	sump	- 342			MEDIUM SANDSTONE - quartz dominant fine-medium grained sandstone			
			- 341	10 –		COAL		Trinkey Seam	-
			- 340	11 -					
				This b	oreh	END OF BOREHOLE AT 10.46 m ole log should be read in conjunction with Parsons Brinckerhoffs	accom	npanying standard no	tes



BORE NO.

## GW9

Bor	ject: e Loca	ition: umber:	Co Gl	encr	ra C oss	Coal Mine Project	Date Co Recorde	mmenced: mpleted: ed By: ecked By:	21/9/09 21/9/09 Nick Bryant Leah Gleeson
	ling Me lina Co	ethod: ompany:		r Hai pax			Surface Co-ords	RL: 377.48	mAHD 772.31 N 6438896.68
_	-	formation				Field Material Description			
				Ĵ	G	·			
WATER	WELL COM	NSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY		FORMATION	HYDROGEOLOGY
₩ 🖉 24/09/2009		50 mm PVC casing bentonite gravel pack 50 mm slotted PVC casing sump backfill	<ul> <li>⊒</li> <li>377</li> <li>376</li> <li>375</li> <li>374</li> <li>373</li> <li>372</li> <li>371</li> <li>370</li> <li>370</li> <li>369</li> <li>368</li> <li>367</li> <li>366</li> </ul>	$\begin{array}{c} \square \\ \square \\ 1 \\ - \\ 2 \\ - \\ 3 \\ - \\ 3 \\ - \\ - \\ - \\ - \\ - \\ -$		MEDIUM SANDSTONE - weathered red/brown medium grained Sandstone         FINE SANDSTONE - weathered grey/brown fine grained sandstone with clay         FINE SANDSTONE - weathered light brown fine grained sandstone with clay         FINE SANDSTONE - weathered red/light brown fine grained sandstone with clay         FINE SANDSTONE - weathered red/light brown fine grained sandstone with clay         CLAY - grey brown clay with minor weathered sandstone         MEDIUM SANDSTONE - weathered white/cream sandstone containing dominantly angular quartz         COARSE SANDSTONE - medium to coarse sandstone dominantly quartz rich classic lithology, also layered with fine grained sandstone containing angular to rounded cla of mixed lithologies         MEDIUM SANDSTONE - interbedded medium grained sandstone, dominantly quartz rich variatione         COARSE SANDSTONE - coarse grained sandstone containing angular to rounded cla of mixed lithologies         MEDIUM SANDSTONE - interbedded medium grained sandstone, dominantly quartz rich variatione         MEDIUM SANDSTONE - interbedded medium grained sandstone, dominantly quartz rich with some mixed lithologies         MEDIUM SANDSTONE - interbedded medium grained sandstone, dominantly quartz rich variatione also some mixed lithologies         MEDIUM SANDSTONE - coarse grained quartz rich sandstone also some mixed lithologies, some small laminations of light grey shaley sandstone	Fr	igby prmation	
	5000 2000 2000 2000	-	- 365				F	ormation	
	-00-01 -00-01			13 -	::::				—
		-	- 364						
			1	This b	oreho	END OF BOREHOLE AT 12.89 m ble log should be read in conjunction with Parsons Brinckerhoff's	accompar	nying standard	notes.


BORE NO.

# GW10

Bor	ject: e Loca	ation: umber:	Co M	ates	ora ( Nth	Coal Mine Project [ Hwy F	Date Com Date Com Recorded Log Check	pleted: By:	22/9/09 22/9/09 Nick Bryant Leah Gleeson
		lethod: ompany:		r Ro Ipax			Surface RI Co-ords:	L: 347.75 E 7068	mAHD 31.36 N 6445486.72
	-	formatio				Field Material Description			
WATER	WELL CC	DNSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	F	ORMATION	HYDROGEOLOGY
▲23/09/2009 WATE		50 mm PVC casing	*       -       347         -       346         -       345         -       344         -       343         -       342         -       341         -       340         -       339         -       338	1 2 3 4 5 6 7 8 9 10		LTHOLOGY LOAM - orange brown slightly slity clayey loam CLAY - orange light brown slightly sandy slity clay LOAM - orange slightly slity loam, some dark brown/red clay horizons present CLAY - orange brown slightly sandy gravelly loamy clay, gravel sub rounded to rounde medium of mixed lithologies SAND - brown slightly clayey gravelly sand, clay grey and sandy with some mottling evident, gravel of medium/coarse angular/rounded mixed lithologies CLAY - slightly gravelly sandy clay, clay grey and mottled, gravel of fine grained well rounded clasts mixed lithologies CLAY - gravelly clay, clay grey, gravel angular fine to medium quartz rich GRAVEL - dark red/brown slightly sandy clayey gravel, gravel med angular quartz and chert GRAVEL - orange/brown slightly sandy clayey gravel, gravel med angular quartz and chert GRAVEL - orange/brown slightly sandy clayey gravel, gravel med angular quartz and chert GRAVEL - orange/brown slightly sandy clayey gravel, gravel med angular quartz and chert GRAVEL - orange/brown slightly sandy clayey gravel, gravel fine to medium dominant well rounded quartz-chert, angular-mixed lithologies also present	d Allus		HYDROGEOLOGY
		sump	- 337 - 336 - 335	11 - 12 -		GRAVEL - orange/brown slightly sandy slightly clayey gravel, gravel of angular quartz and chert			
			- 334	13 -		END OF BOREHOLE AT 12.54 m			



BORE NO.

## GW11

	ect: e Loc	ation: lumber:	Co Da	arling	ora C gton	Coal Mine Project	Date Com Date Com Recorded ∟og Checl	pleted: By:	24/9/09 24/9/09 Nick Bryant Leah Gleeson
		lethod: Company:		ir Ro 1pax			Surface R Co-ords:	L: 381.05 E 7082	5 mAHD 296.82 N 6442150.75
		nformation		<b>v</b>		Field Material Description			
WATER	WELL C	ONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	F	FORMATION	HYDROGEOLOGY
		s0 mm PVC casing bentonite	- 381 - 380 - 379 - 377 - 377 - 376 - 375 - 374			CONGLOMERATE - slightly weathered coarse conglomerate of sub rounded clasts of mixed lithology CONGLOMERATE - coarse quartz rich conglomerate, clasts dominantly angular CONGLOMERATE - coarse quartz rich sandstone with dominantly angular/rounde quartz clasts, some min mixed lithologies present COARSE SANDSTONE - coarse quartz rich sandstone grading to a fine grained/shale sandstone FINE SANDSTONE - fine grained cream sandstone FINE SANDSTONE - fine grained cream sandstone	ed	by mation	
		50 mm sotted PVC casing	- 373 - 372 - 371	8 - 9 - 10 -		FINE SANDSTONE - weathered brown sandstone containing 30-40% clay - damp	— — Wha Forr	aka mation	
				<b>T</b> L:- L		END OF BOREHOLE AT 11.71 m			



BORE NO.

# GW12

Proje Drilli	ect: Lo ect l ng l	cation: Number: Vethod: Company:	Co E 21 Ai	Darli	ora ( ingt 26E mm	Coal Mine ProjectDonF& 2162570BLerS	Date Comme Date Comple Recorded By .og Checked Surface RL: Co-ords:	eted: y: d By: <b>393.7 m</b>	25/2/10 26/2/10 Angus McFarlane Kimberley Saflian nAHD 06.1 N 6438882.75
	-	nformatio			0	Field Material Description	0 0140.	<b>L</b> / <b>V</b>	
	-			÷	(1)				
WATER	/ELL (	CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FOR	MATION	HYDROGEOLOGY
	8	50 mm PVC	- 393		· · · /	CLAYEY SAND - yellow brown medium to large grained	Alluviu	ım	
	Ĭ	casing gypset in alluvium		1 -	· /	GRAVELLY CLAYEY SAND - orange brown, increased clay content, fine gravel 2-4mm	1		
			- 392	2 -	. /	CLAYEY SAND - light brown with 10% 3-4mm gravel, sand coarse grained			
			- 391	3 -	./ · · ,	CLAYEY SAND - brown, sand coarse grained with 5% gravel 10-15 mm quartz, coal an sittstone, sub angular	id		
			- 390	4 -	· . /	CLAYEY SAND - dark brown sand coarse grained with 5% gravel 4-5 mm quartz, coal			
	8	×	- 389	5 -	• . / •	and siltstone, angular CLAYEY SAND - brown, sand coarse grained, decreasing clay content, angular quartz,			
$\sim$			- 388	6 -	· . / · / ·	claystone gravel 20% 5-10mm sand angular			
	y		- 387	7 -	/	GRAVELLY SAND - light brown, sand very coarse grained with a clay matrix, gravel 25	1%		
	Ĭ	) 	- 386	8 -	₽	sub angular to angular, quartz, siltstone CLAYEY SAND - light orange brown, sand medium grained with 15% angular and semi			
$\sim$			- 385	9 -	· . /	rounded gravel, quartz, claystone 7-15mm CLAYEY SAND - light brown, sand medium grained with a band of white/ grey clay with			
	8	X	- 384	10 -	· . /	CLAYEY SAND - brown cream, fine grained sand with 30% clay and 5% quartz gravel CLAYEY SAND - brown cream, fine grained sand with 30% clay and 5% quartz gravel			
	Š		- 383	11 -	· . /				
		50 mm PVC	- 382	12 -		SANDSTONE - yellow cream, weathered fine to medium grained with a clay matrix 10% 2-3mm quartz gravel		Permian erentiateo	1
		casing	- 381						
-			- 380	13 -		SANDSTONE - cream fine grained 1-2mm with 5% 2-3mm rounded quartz with a clay matrix			
			- 379	14 -		SANDSTONE - grey cream fine to medium grained 1-2mm with 5% 5-6mm rounded quartz			
			- 378	15 -		SANDSTONE - yellow cream medium grained 5% 5-10mm sub angular quartz			
			- 377	16 -		SANDSTONE - cream red medium grained 2mm uniform grains with 10% 3-4mm quart grains	tz —		
			- 376	17 -	••••	SANDSTONE - light yellow brown medium to coarse grained 2-4mm with 10% 5-7mm angular quartz			
			- 375	18 -	••••	SANDSTONE - yellow orange fine to medium grained 1-2mm with a clay matrix			
•				19 -	—	SILTSTONE - grey, powder with semi rounded 4-5mm chips			
	•		- 374	20 –	_	SILTSTONE - orange grey, powder with 5% semi rounded 3-4mm chips			
-			- 373	21 -		SILTSTONE/MUDSTONE - light grey, fine powder			
•	· ·		- 372	22 -	·				
			- 371	23 -	-	SILTSTONE/MUDSTONE - light grey, fine powder with bands of brown siltstone			
•			- 370	24 -	·	SILTSTONE - grey, fine powder			
			- 369	25 -	·				
		et te Te	- 368	26 -	·	SILTSTONE - grey, coarse powder			
			- 367	27 -	·	SILTSTONE grey, powder and semi rounded chips 3-6mm			
			- 366	28 -					
•			- 365	29 -	·				
			- 364	20 30 –					
			- 363	30 -		SANDSTONE - dark grey fine grained with a clay matrix, with quartz and grey siltstone			
			- 362						
			- 361	32 -		SILTSTONE - dark grey with fine to coarse 1-5mm quartz angular grains			
			- 360	33 -					
			- 359	34 -	<u></u>				
ŀ	.	.	500		L —	END OF BOREHOLE AT 122.00 m			



BORE NO.

# GW12

SHEET 2 OF 4

Proj Drilli Drilli		E Darl 21144 Air Ha Interte	ora ( ingt 26E mm	Coal Mine ProjectD.onR.& 2162570BLoerSo	ate Comme ate Comple ecorded By og Checked urface RL: o-ords:	eted: 2 y: 4 d By: 4 <b>393.7 mA</b>	25/2/10 26/2/10 Angus McFarlane Kimberley Saflian HD .1 N 6438882.75
WATER	VELL CONSTRUCTION	RL (mAHD) DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FOR	MATION	HYDROGEOLOGY
01/02/20		-358 $36  -357$ $37  -356$ $38  -355$ $39  -354$ $40  -353$ $41  -352$ $42  -351$ $43  -352$ $42  -351$ $43  -352$ $42  -343$ $45  -343$ $46  -344$ $50  -344$ $50  -343$ $51  -344$ $50  -343$ $51  -344$ $50  -343$ $51  -343$ $51  -343$ $51  -343$ $51  -333$ $55  -333$ $56  -333$ $56  -333$ $61  -333$ $61  -333$ $61  -333$ $61  -333$ $61  -333$ $61 -$ <t< td=""><td></td><td>SILTSTONE - grey brown powder with &lt;5% fine quartz grains SILTSTONE - grey, powder with 2mm rounded chips with 10% fine quartz grains SILTSTONE - dark grey, powder with 2mm rounded chips with 10% fine quartz grains SILTSTONE - dark grey powder and semi rounded 3-4mm chips with 15% angular to semi rounded 5-7mm quartz chips SANDSTONE - dark grey powder and semi rounded 3-4mm chips with 25% angular to semi rounded 5-7mm quartz chips SANDSTONE - grey fine to coarse grained, fine fraction 40% siltstone 60% quartz, coarse fraction 60% sub angular quartz SANDSTONE - grey fine to medium grained quartz, semi rounded 3-4mm grains with 20% siltstone and a clay matrix SANDSTONE - grey fine to medium grained quartz, semi rounded 3-4mm grains with 20% siltstone and a clay matrix SANDSTONE - grey medium to coarse grained 1-2mm quartz with a fine clay matrix an a dark thrown claystone band SANDSTONE - grey medium to coarse grained 1-2mm grains with 20% SINONE - grey medium to coarse grained 1-2mm semi rounded quartz SANDSTONE - grey medium to coarse grained 1-5mm semi rounded quartz SANDSTONE - grey medium to coarse grained 1-5mm semi rounded quartz SANDSTONE - grey medium to coarse grained 1-5mm semi rounded quartz SANDSTONE - grey medium to coarse grained 1-5mm semi rounded quartz SANDSTONE - grey medium to coarse grained 1-5mm semi rounded quartz SANDSTONE - grey medium to coarse grained 1-5mm semi rounded quartz SANDSTONE - light grey/cream, fine powder and 15% sub angular 2-3mm chips CLAYSTONE - light grey/cream, fine powder and 15% sub angular 2-5mm chips CLAYSTONE - light grey/cream, fine powder and 15% sub angular 2-5mm chips CLAYSTONE - light grey/cream, fine powder and 15% sub angular 2-5mm chips</td><td> Undiffe   </td><td>Permian erentiated</td><td>EC = 1.78 mS/cm pH = 9.16</td></t<>		SILTSTONE - grey brown powder with <5% fine quartz grains SILTSTONE - grey, powder with 2mm rounded chips with 10% fine quartz grains SILTSTONE - dark grey, powder with 2mm rounded chips with 10% fine quartz grains SILTSTONE - dark grey powder and semi rounded 3-4mm chips with 15% angular to semi rounded 5-7mm quartz chips SANDSTONE - dark grey powder and semi rounded 3-4mm chips with 25% angular to semi rounded 5-7mm quartz chips SANDSTONE - grey fine to coarse grained, fine fraction 40% siltstone 60% quartz, coarse fraction 60% sub angular quartz SANDSTONE - grey fine to medium grained quartz, semi rounded 3-4mm grains with 20% siltstone and a clay matrix SANDSTONE - grey fine to medium grained quartz, semi rounded 3-4mm grains with 20% siltstone and a clay matrix SANDSTONE - grey medium to coarse grained 1-2mm quartz with a fine clay matrix an a dark thrown claystone band SANDSTONE - grey medium to coarse grained 1-2mm grains with 20% SINONE - grey medium to coarse grained 1-2mm semi rounded quartz SANDSTONE - grey medium to coarse grained 1-5mm semi rounded quartz SANDSTONE - grey medium to coarse grained 1-5mm semi rounded quartz SANDSTONE - grey medium to coarse grained 1-5mm semi rounded quartz SANDSTONE - grey medium to coarse grained 1-5mm semi rounded quartz SANDSTONE - grey medium to coarse grained 1-5mm semi rounded quartz SANDSTONE - grey medium to coarse grained 1-5mm semi rounded quartz SANDSTONE - light grey/cream, fine powder and 15% sub angular 2-3mm chips CLAYSTONE - light grey/cream, fine powder and 15% sub angular 2-5mm chips CLAYSTONE - light grey/cream, fine powder and 15% sub angular 2-5mm chips CLAYSTONE - light grey/cream, fine powder and 15% sub angular 2-5mm chips	Undiffe   	Permian erentiated	EC = 1.78 mS/cm pH = 9.16

END OF BOREHOLE AT 122.00 m This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.



BORE NO.

# GW12

SHEET 3 OF 4

	ect: e Loo	cation: Number:	C E	Darli	ora Co ingto	oal Mine Project n	Date Cor Date Cor Recorde Log Chee	d By:	25/2/10 26/2/10 Angus McFarlane Kimberley Saflian
		/lethod: Company:		ir Ha Iterte			Surface I Co-ords:	RL: 393.7 m F 70310	nAHD 06.1 N 6438882.75
	-	nformatio				Field Material Description	00-0140.		JU.1 11 0700002.10
				<u> </u>	(1)	· · · · · · · · · · · · · · · · · · ·			
WATER	WELL C	ONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY		FORMATION	HYDROGEOLOGY
			- 323			CLAYSTONE - light grey/cream, fine powder and 15% semi rounded 3-6mm chips (continued)	Ea	arly Permian differentiated	1
			- 322	71 -				amerentiatee	
			- 321	72 -		CLAYSTONE - light grey/cream with 20% semi rounded 2-7mm chips with a fine pow	/der		
				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 chip			
			- 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					
			- 303	91 -		CLAYSTONE - light grey sub angular planar 3-30mm chips			
			- 302	92 -		CLAYSTONE - light grey sub angular planar 3-30mm chips with 5% angular quartz gra	ains		
			- 301	92 -		CLAYSTONE - light grey sub angular planar 3-30mm chips			
			- 300						
			- 299	94 -		CLAYSTONE - light grey semi rounded to sub angular 2-6mm chips <5% 25mm semi rounded chips			
		bentonite	- 298	95 -		CLAYSTONE - light grey and green grey sub angular 2-4mm with <5% angular quartz			
		gravel pack	- 297	96 -		CLAYSTONE - light grey and green grey slightly fractured semi rounded chips 20-25m with <5% angular quartz,	nm		
			- 296	97 -		CLAYSTONE - light grey/green grey semi rounded (evidence of water weathering and fractures) 5% brown claystone			
			- 295	98 -					
			- 294	99 -		SILTSTONE - grey red siltstone sub angular to semi rounded 3-4mm chips with light grey/green claystone			
				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			



BORE NO.

# **GW12**

SHEET 4 OF 4

Client: Project: Bore Location: Project Number: Drilling Method:			C E	Darli	ora C ingte	coal Mine Project E	Date ( Recor	Commenced: Completed: ded By: hecked By:	25/2/10 26/2/10 Angus McFarlane Kimberley Saflian
		ethod: mpany:		ir Ha Iterte			Surfac Co-ore	ce RL: <b>393.7 m</b>	AHD 6.1 N 6438882.75
		ormation				Field Material Description	00 01		0.1 11 0400002.70
				ے ۲	0				
WATER	WELL CON	NSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY		FORMATION	HYDROGEOLOGY
			- 288			SILTSTONE - light grey semi rounded fractured chips 3-15mm (continued)		Early Permian	
				106 -		SILTSTONE - light grey semi rounded fractured chips 3-10mm		Undifferentiated	
		Γ	- 287	107 -		SILTSTONE - light grey angular 2-20mm chips			
			- 286	108 -		SILTSTONE - grey and red angular 3-10mm chips with <5% angular quartz chips			
		F	- 285	109 -	· ·				
			- 284	110 —		SILTSTONE - grey angular 3-10mm chips			
		ŀ	- 283	111 -	· ·				
		ŀ	- 282	112 -	· ·				
		ŀ	- 281	113 -	· ·				
		50 mm	- 280	114 -		SILTSTONE - light grey semi rounded and angular 2-10mm with red grey and green gr			
		slotted PVC	- 279	115 -		siltstone	ley		
		casing	- 278	116 -	·				
			- 277	117 -	·				
			- 276						
		-	- 275			SILTSTONE - light grey semi rounded and angular 3-12mm with green grey siltstone			
			- 274	119 -					
	ž	sump	- 273	120 —					
	Ř		- 272	121 -					
	50 50		- 271	122 -					_
		Γ		123 -					
		ſ	- 270	124 -					
			- 269	125 -					
		F	- 268	126 -					
		ŀ	- 267	127 -					
		F	- 266	128 -					
		-	265	129 -					
		ŀ	- 264	130 —					
		ŀ	- 263	131 -					
		ŀ	- 262	132 -					
		+	- 261	133 -					
		F	- 260	134 -					
		-	- 259	134 -					
		-	- 258						
		ļ	- 257	136 -					
			- 256	137 -					
			- 255	138 -					
			- 254	139 -					
	1					END OF BOREHOLE AT 122.00 m le log should be read in conjunction with Parsons Brinckerhoff's a	I		



BORE NO.

## **GW13A**

Unified Company         Market Hammer         Surface R1: 408.3 mAHD           Co-ords         E 704679.17 N 6437233.3           Bore Information         Field Material Description         E 704679.17 N 6437233.3           Image Company         Image Company         Image Company         Image Company           Image Company         Image Company         Image Company         Image Company         Image Company           Image Company         Image Company         Image Company         Image Company         Image Company         Image Company           Image Company         Image Company         Image Company         Image Company         Image Company         Image Company         Image Company         Image Company         Image Company         Image Company         Image Company         Image Company         Image Company         Image Company         Image Company         Image Company         Image Company         Image Company         Image Company         Image Company         Image Company         Image Company         Image Company         Image Company	Client: Project: Bore Location: Project Number:			Co E	Darli	ora C ingte	Coal Mine ProjectDataonRed	ate Comn ate Comp ecorded E og Checke	oleted: 3y:	
Bore Information         Field Material Description           Big         #11.0000000000         Employed         E										N 6437233.3
Nome         Add         CAX* red bases day with 3 dam munded incomere grawf         Napperby           0000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         000         0000         0000         0000		-								
Pormation           Pormation           Control         Contro         Control         Control	WATER	VELL C	CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FC	DRMATION	HYDROGEOLOGY
			50 mm PVC	n         -       408         -       407         -       406         -       405         -       403         -       402         -       401         -       402         -       401         -       399         -       398         -       397         -       398         -       397         -       398         -       397         -       398         -       397         -       398         -       397         -       398         -       397         -       393         -       393         -       393         -       392         -       391	$1 - \frac{1}{2} - \frac{1}{3} - \frac{1}{3} - \frac{1}{3} - \frac{1}{3} - \frac{1}{3} - \frac{1}{13} - \frac{1}{15} - \frac{1}{3} - \frac{1}{16} - \frac{1}{16} - \frac{1}{17} - \frac{1}{18} - \frac$		CLAY - red brown clay with 20% angular ironstone 3-25mm chips         CLAY - red brown clay with bands of fractured ironstone, angular 4-12mm         CLAY - yellow brown clay with minor sit         CLAY - yellow brown clay with minor sit with 5% angular 5-7mm ironstone gravel         SILTY CLAY - light red brown silty clay         CLAY - red brown clay         SILTY CLAY - light red brown silty clay         SILTY CLAY - dark red brown silty clay         SANDY CLAY - red brown sandy clay         SANDY CLAY - red brown sandy clay         SANDY CLAY - light brown sandy clay	Napp Form	berby hation	
				· 389	19 -		END OF BOREHOLE AT 119.00 m			



BORE NO.

## **GW13A**

SHEET 2 OF 6

Proj Bor	Bore Location: E Darling					Coal Mine ProjectDatonRec	e Completed:	9/3/10 10/3/10 Angus McFarlane Kimberley Saflian
		Method: Company:		ir Ha terte			face RL: <b>408.3 m</b> ords: <b>E 70467</b>	AHD 9.17 N 6437233.3
В	ore	Information	ı			Field Material Description		
				Ê	U)			
WATER	WELL	CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		-	- 388			SILTSTONE - grey siltstone, fine powder angular chips layered with dark grey siltstone	Napperby Formation	
			- 387	21 -			Formation	
			- 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 4-6mm chips with 10% inter-layered grey siltstone	-	
			- 370	38 -				
			- 369	39 -				
				Thie b		END OF BOREHOLE AT 119.00 m		ites



BORE NO.

## **GW13A**

SHEET 3 OF 6

Bore Location: E Darlin						Coal Mine Project D	Date	Commenced: Completed: orded By:	9/3/10 10/3/10 Angus McFarlane		
		Number:						Checked By:	Kimberley Saflian		
		Method: Company:		ir Ha terte			Surfa Co-oi	nce RL: <b>408.3 m</b>	AHD 9.17 N 6437233.3		
	-	Informatio				Field Material Description					
				î	(D						
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 (continued)		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%					
			- 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 chip: with 30% interlayered grey siltstone	s —				
			- 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	s –				
			- 349	59 -							
	END OF BOREHOLE AT 119.00 m This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.										



BORE NO.

## **GW13A**

SHEET 4 OF 6

	ject: e Lo	: ocation: Number:	Co E	Darli	ora C ingt	Coal Mine Project	Date Commenced:9/3/10Date Completed:10/3/10Recorded By:Angus McFarlaneLog Checked By:Kimberley Saflian					
		Method: Company:		r Ha terte			Surfa Co-o	ace RL:			N 6437233.3	
		Information			CII	Field Material Description	000	103.		13.11	N 0707200.0	
			-									
WATER	WELL	CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY		FORM	MATION		HYDROGEOLOGY	
			- 348			MUDSTONE - dark grey brown mudstone, powder and semi rounded 3-12mm chips		Napper Format	rby tion			
			- 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 119.00 m This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.											



BORE NO.

## **GW13A**

SHEET 5 OF 6

Client: Project: Bore Location: Project Number:			Co E	Darli	ora C ingto	coal Mine Project on	Date Commenced:9/3/10Date Completed:10/3/10Recorded By:Angus McFarlaneLog Checked By:Kimberley Saflian				
Drill	ing	Method:	Ai	r Hai	mme	er	Surfa	ace RL: 408.3 m	AHD		
	-	Company:		terte	ch		Co-o	rds: E 70467	9.17 N 6437233.3		
B	ore	Information	ו			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 -		SILTSTONE - light brown to brown grey siltstone, powder and sub angular 3-15mm ch	hips				
			- 325	83 -	· ·		nipo				
			- 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	os				
			- 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 2-4mr chips	im				
			- 312	96 -		FINE SANDSTONE - grey fine grained quartz sandstone 1-2mm uniform with 40% gre siltstone	rey	Digby Formation			
			- 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	y	Trinkey Seam	_		
	1			This b	oreho	END OF BOREHOLE AT 119.00 m le log should be read in conjunction with Parsons Brinckerhoff's	accon	npanying standard no	btes.		



BORE NO.

## **GW13A**

SHEET 6 OF 6

Proj Bor	Bore Location:E DateProject Number:2114					Coal Mine ProjectDiagononRe	)ate C Record	Complete ded By:	Date Commenced:9/3/10Date Completed:10/3/10Recorded By:Angus McFarlaneLog Checked By:Kimberley Saflian				
	ling Me ling Co	ethod: mpany:		ir Haı Iterte			Surfac So-orc	e RL: <b>40</b> ds: E		AHD 9.17 N 6437233.3			
В	ore Inf	ormation	า			Field Material Description							
WATER	WELL CON	ISTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY		FORMAT	ION	HYDROGEOLOGY			
			- 308 - 307	101 -		SILTSTONE - dark grey and light grey sub angular planar 5-10mm 50/50 mix		Ellismayn Formatior					
		-	- 306 - 305	102 - 103 -		SILTSTONE - grey semi rounded 2-6mm chips							
		bentonite	- 304	104 -		SILTSTONE - light grey with 30% dark grey chips							
		gravel pack	- 303 - 302	105 -		SILTSTONE - dark grey/black angular 5-6mm chips							
			- 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							
		50 mm slotted PVC casing	- 299	109 -		SILTSTONE - dark grey sub angular 5-7mm chips with 15% light grey siltstone							
			- 298	110		SILTSTONE - light grey with a layer of carbonaceous mudstone/stoney coal							
			- 297 - 296	112 -	· ·	COAL/CARBONACEOUS MUDSTONE - dull stoney angular 2-3mm with <10% light grey sittstone	әу						
		-	- 295	113 -		COAL/CARBONACEOUS MUDSTONE - dull stoney sub angular 4-5mm with <10% light grey claystone		Whaka Formatior		_			
		-	- 294	114 -		COAL/CARBONACEOUS MUDSTONE - dull stoney sub angular 4-5mm with 20% light grey claystone		Formation	1				
		-	- 293	115 -		CARBONACEOUS MUDSTONE - angular 3-4mm with 20% cream claystone/clay matrix	x						
		-	- 292	116 -									
		sume	- 291	117 -		SILTSTONE/CARBONACEOUS MUDSTONE - dark grey and grey interlayered mudstone and siltstone with 30% cream claystone							
		sump	- 290	119 -		CARBONACEOUS MUDSTONE - angular 3-7mm with 10% light grey brown claystone				_			
		-	- 289	This b	oreh	END OF BOREHOLE AT 119.00 m ble log should be read in conjunction with Parsons Brinckerhoff's ac		panving star	ndard no	ptes.			



BORE NO.

## **GW13B**

Proj	ect ect	oca Nu	ition: umber:	C E	Darl	ora ( ingt	Coal Mine Project on & 2162570B	Date ( Recor Log C	Commenced: Completed: ded By: hecked By:	5/3/10 8/3/10 Angus McFarlane Kimberley Saflian
	-		ethod: pmpany:		ir Ha terte			Surfac	ce RL: <b>408.2 n</b> ds: <b>E 7046</b>	nAHD 84.63 N 6437237.27
			formatio				Field Material Description			
_					г)	g				
WATER	VELL	. CO1	NSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY		FORMATION	HYDROGEOLOGY
	X	X	50 mm PVC	- 408			CLAY - red brown clay with 3-4mm rounded ironstone gravel		Napperby	
			casing 50 mm PVC	- 407	1 -		CLAY - red brown clay with 20% angular ironstone 3-25mm chips		Formation	
			casing	- 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			
					6 -	/				
				- 402	7 -		CLAY - red brown clay			
				- 401		Γ,				
				- 400	8 -	$\Pi$	SILTY CLAY - dark red brown silty clay			
				- 399	9 -	/	SANDY CLAY - yellow brown/red brown mottled sandy clay			
				- 398	10 –	<u>  /</u>	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			
					17 -		SILTSTONE - light grey siltstone, fine powder with 10% fine quartz grains			
				- 391	18 -	·				
				- 390	19 -					
				- 389						
				- 388	20 -	-	SILTSTONE - grey siltstone, fine powder angular chips layered with dark grey siltston	ie		
				- 387	21 -					
				- 386	22 -					
				- 385	23 -					
				- 384	24 -					
				- 383	25 -					
				- 382	26 -					
				- 381	27 -	·	SILTSTONE - grey siltstone, angular chips with fine powder			
08/03/2010				- 380	28 -		SILTSTONE - grey siltstone, powder and semi rounded chips			
08/03				- 379	29 -	·	MUDSTONE - grey brown mudstone, fine powder with angular planar 3-10mm chips			EC = 2.01 mS/cm
_				219			END OF BOREHOLE AT 136.00 m			pH = 8.78



BORE NO.

## **GW13B**

SHEET 2 OF 5

Clie Pro	ject	t:	Co		ora C	Coal Mine Project	Date	e Commenced: e Completed:	5/3/10 8/3/10
		ocation: t Number:		Darl 144		on & 2162570B		orded By: Checked By:	Angus McFarlane Kimberley Saflian
		Method: Company:		r Ha terte		er Borehole Diameter: <b>50 mm</b>		face RL: <b>408.2 m</b> ords: <b>E 70468</b>	AHD 34.63 N 6437237.27
В	ore	Information	า			Field Material Description			
				Ê	U				
WATER	WELI	L CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY		FORMATION	HYDROGEOLOGY
			- 378			MUDSTONE - grey brown mudstone, fine powder with angular planar 3-10mm chip (continued)	os	Napperby Formation	
			- 377	31 -	<u> </u>				
		-	- 376	32 -	=-				
			- 375	33 -					
			- 374	34 -	<u>–</u> -				
			- 373	35 -					
				36 -	<u> </u>				
			- 372		=-				
			- 371	37 -		MUDSTONE - grey brown mudstone sub angular 4-6mm chips with 10% interlayer grey siltstone	ed		
			- 370	38 -	<u>–</u> -				
		- 1.4 1.4 1.4	- 369	39 -	E				
		-	- 368	40 -					
			- 367	41 -					
			- 366	42 -					
			- 365	43 -					
			- 364	44 -	E				
			- 363	45 -					
			- 362	46 -		MURSTONE dark gay brown muddong fing neuron gam anadod 2 40mm obin		-	
				47 -	<u>–</u> -	MUDSTONE - dark grey brown mudstone fine powder semi rounded 3-10mm chip 10% interlayered grey siltstone	with		
			- 361		E -				
			- 360	48 -	<u> </u>				
			- 359	49 -					
			- 358	50 —	E				
			- 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 c	hips	+	
			- 355	53 -	<u> </u>				
			- 354	54 -		MUDSTONE - dark grey brown mudstone, fine powder with semi rounded 4-12mm	n chips	+	
			- 353	55 -	E	with 30% interlayered grey siltstone			
			- 352	56 -	<u> </u>				
				57 -	E				
			- 351		E-				
			- 350	58 -	<u>–</u> -	MUDSTONE - dark grey brown mudstone, fine powder with semi rounded 4-12mm with 10% interlayered grey siltstone	ı chips	1	
			- 349	59 -	<u> </u>				
	<u> </u>			This h		END OF BOREHOLE AT 136.00 m	feaco		otes



BORE NO.

## **GW13B**

SHEET 3 OF 5

Bore Location: E Darling				ora C ingt	Coal Mine Project on	Date Reco	Commenced: Completed: rded By: Checked By:	5/3/10 8/3/10 Angus McFarlane Kimberley Saflian
	ing Method: ing Company		ir Ha terte			Surfa Co-or	rds: <b>408.2 m</b>	AHD 34.63 N 6437237.27
В	ore Information	on			Field Material Description			
WATER	WELL CONSTRUCTIO	Z RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY		FORMATION	HYDROGEOLOGY
		- 348 - 347 - 346	61 - 62 -		MUDSTONE - dark grey brown mudstone, powder and semi rounded 3-12mm chips		Napperby Formation	
		- 345 - 344 - 343	63 - 64 - 65 -		MUDSTONE - dark grey brown mudstone, powder and semi rounded 3-8mm chips			
		- 342 - 341 - 340	66 - 67 - 68 -		MUDSTONE - dark grey brown mudstone, powder and semi rounded 3-10mm chips			
		- 339 - 338 - 337	69 - <b>70</b> - 71 - 72 -					
		- 336 - 335 - 334 - 333	73 - 74 - 75 -					
		- 332 - 331 - 330	76 - 77 - 78 -		MUDSTONE - dark grey brown mudstone, powder and sub angular to semi rounded 3-5mm chips			
		- 329 - 328 - 327	79 - <b>80</b> - 81 - 82 -					
		- 326 - 325	83 - 84 -		SILTSTONE - light brown to brown grey siltstone, powder and sub angular 3-15mm ch	hips		
		- 324 - 323	85 -		SILTSTONE - dark grey and light grey layered siltstone 60% light grey semi rounded 2-10mm chips with powder			
		- 322 - 321	86 - 87 -		MUDSTONE - dark grey mudstone carbonaceous fine powder and semi rounded chips COARSE SILTSTONE - dark brown/grey coarse siltstone powder, few chips	s		
		- 320 - 319	88 - 89 -		COARSE SILTSTONE - light brown grey coarse siltstone/fine sandstone, powder			
			This b	ooreh	END OF BOREHOLE AT 136.00 m ole log should be read in conjunction with Parsons Brinckerhoff's	accom	npanying standard n	otes.



BORE NO.

## **GW13B**

SHEET 4 OF 5

Proj Bore Proj Drill	Bore Location: E Darling			obbo Darl 11442 ir Ha	ora C ingt 26E mm	Coal Mine Project     E       on     F       & 2162570B     E       er     S	Date Commenced:5/3/10Date Completed:8/3/10Recorded By:Angus McFarlaneLog Checked By:Kimberley SaflianSurface RL:408.2 mAHDCo-ords:E 704684.63 N 6437237.27				
	-			nterte	ecn		Co-ords: E / U4684	.63 N 6437237.27			
D	Die	Information	1			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 -			Tornation				
			- 316	92 -							
			- 315	93 -							
			- 314	94 -	·						
				95 -							
			- 313		<u> </u>	SILTSTONE - grey siltstone angular planar 3-7mm with 10% light grey siltstone 2-4mm chips					
			- 312	96 -		FINE SANDSTONE - grey fine grained quartz sandstone 1-2mm uniform with 40% grey siltstone	Digby Formation				
			- 311	97 -		SILTSTONE - light grey siltstone angular 5mm chips with 20% quartz 2mm grains					
			- 310	98 -	<u> </u>	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	Trinkey Seam				
			- 308	100 -		black	Ellismayne				
			- 307	101 -	· ·		Formation				
				102 -	· ·						
			- 306			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					
				109 -		siltstone, coal angular 3-4mm SILTSTONE - dark grey sub angular 5-7mm chips with 15% light grey siltstone	-				
			- 299	110		SILTSTORE - dark grey sub angular 5-71111 drips with 1576 light grey sitistone					
			- 298								
			- 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 gr siltstone	ey				
			- 295	113 -		COAL/CARBONACEOUS MUDSTONE - dull stoney sub angular 4-5mm with <10% lig grey claystone					
			- 294	114 -		COAL/CARBONACEOUS MUDSTONE - dull stoney sub angular 4-5mm with 20% light	Formation				
			- 293	115 -		grey claystone CARBONACEOUS MUDSTONE - angular 3-4mm with 20% cream claystone/clay matri	ix				
			- 292	116 -	E						
				117 -							
			- 291			SILTSTONE/CARBONACEOUS MUDSTONE - dark grey and grey interlayered mudstone and siltstone with 30% cream claystone					
			- 290	118 -	E	CARBONACEOUS MUDSTONE - angular 3-7mm with 10% light grey brown claystone					
			- 289	119 -	<u> </u>						
					<u> </u>	END OF BOREHOLE AT 136.00 m					



BORE NO.

## **GW13B**

SHEET 5 OF 5

Client: Project: Bore Location: Project Number: Drilling Method:			C E	Darl	ora ( ingt	Coal Mine Project E	Date Commenced:       5/3/10         Date Completed:       8/3/10         Recorded By:       Angus McFarlane         Log Checked By:       Kimberley Saflian         Surface RL:       408.2 mAHD					
	-	ethod: mpany:		lir Ha nterte			Surface Co-ords				N 6437237.27	
	-	ormatio				Field Material Description						
WATER	WELL CON	ISTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY		FORM	IATION		HYDROGEOLOGY	
			- 288			SILTSTONE - grey semi rounded to sub angular 3-4mm chips with 30% cream claystor		Avymo				-
			- 287	121 -		CLAYSTONE - cream sub angular planar chips with 20% carbonaceous mudstone	- `	Claysto	ne			
			- 286	122 -		COAL/CARBONACEOUS MUDSTONE- dull black stoney 3-4mm angular chips with 10 cream claystone		Tyblow Creek \$	/ers 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 -								
		bentonite	- 282	126 -		COAL/CARBONACEOUS MUDSTONE/SILTSTONE - interlayered shiny black coal wit dull black mudstone and grey siltstone	h					
			- 281	127 -		CARBONACEOUS MUDSTONE/SILTSTONE - sub angular 3-10mm chips with 15% lig grey cream claystone	ght					
		gravel	- 280	128 -		SILTSTONE - dark grey sub angular 3-7mm chips						
		pack 50 mm slotted PVC	- 279	129 -		COARSE SILTSTONE - grey semi rounded 3-4mm chips	1	Fomca Sandst	t Gully one			
		casing .	- 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 - 134 -								
			- 274	134								
		sump	- 273	136 -		COAL - black shiny angular 3-4mm						
			- 272	137 -								
			- 271	138 -	-							
			- 270 - 269	139 -	-							
			- 268	140								
			- 267	141 -								
			- 266	142 -								
			- 265	143 -								
			- 264	144 -								
			- 263	145 -	-							
			- 262	146 -								
			- 261	147 -								
			- 260	148 -								
		ŀ	- 259	149 -	-							
						END OF BOREHOLE AT 136.00 m						_



BORE NO.

## **GW13C**

Drilling Company:       Intertech       Borehole Diameter:       50 mm       Co-ords:       E 704690.17       N 64372         Bore Information       Field Material Description         Image: second s	Date Commenced:       3/3/10         Date Completed:       4/3/10         Recorded By:       Angus McFarlane         Log Checked By:       Kimberley Saflian         Surface RL:       408.2 mAHD	oal Mine Project n & 2162570B	Darlingto	Cobb E Dar 21144	ation: lumber: lethod:	ject: e Loca ject N	Bor Pro
Bit Mell         CONSTRUCTION         Bit Mell         CLAY - red from city with 3-mm rounded investore gravel         Napperby           Pormation         400         1         CLAY - red from city with 20% angular investore gravel         Napperby           400         2         CLAY - red from city with 20% angular investore gravel         Napperby           400         2         CLAY - red from city with 20% angular investore gravel         Formation           405         3         CLAY - red from city with 20% angular investore gravel         Formation           405         3         CLAY - red from city with 20% angular investore gravel         Formation           405         3         CLAY - red from city with 20% angular investore gravel         Formation           405         3         CLAY - red from city with minor all         CLAY - red from city with minor all         Formation           402         6         CLAY - red from ally day         CLAY - red from ally day         CLAY - red from ally day           401         7         -         CLAY - red from ally day         CLAY - red from ally day         CLAY - red from ally day           402         6         -         CLAY - red from ally day         -         -           401         7         -         SANDY CLAY - red from ally day         - <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>							
Spin     408       go man go man central go man central     407     1       407     1       408     2       408     2       408     2       408     2       408     2       408     2       408     2       408     2       408     2       409     3       404     4       404     4       404     4       404     4       404     4       404     4       404     4       404     4       404     4       404     4       404     4       404     4       404     4       404     4       404     4       404     4       402     6       401     7       400     8       99     9       SANDY CLAY - red brown ally day       394     14       393     16       394     14       393     16       394     14       393     16       394     14       395     18 <th>rial Description</th> <th>Field Material Descripti</th> <th></th> <th>n</th> <th>formatior</th> <th>ore In</th> <th>В</th>	rial Description	Field Material Descripti		n	formatior	ore In	В
PVC get pVC esting         407         1         CLAY - red brown day with bands of fractured romstone, angular 4-12mm         Formation           405         3         CLAY - red brown day with bands of fractured romstone, angular 4-12mm         -           403         5         CLAY - willow brown day with bands of fractured romstone, angular 4-12mm         -           403         5         SILTY CLAY - willow brown day with bands of fractured romstone, angular 5-7mm tronstone gravel         -           403         5         SILTY CLAY - willow brown day with minor silt         -         -           400         8         SILTY CLAY - willow brown day.         -         -           401         7         -         -         -         -           400         8         SILTY CLAY - willow brown robitid sandy day         -         -           401         7         -         -         -         -           402         6         SILTY CLAY - willow brown robitid sandy day         -         -           399         9         SANDY CLAY - willow brown sandy day         -         -           391         14         -         -         -         -           392         16         SILTSTONE - light grey silibione, fine powder with 10% fine quarkz grains	LITHOLOGY FORMATION HYDROGEOLOGY	LITHOLOGY	DEPTH (mBGL) GRAPHIC LOG	RL (mAHD) DEPTH (mBGL)	DNSTRUCTION	WELL CO	WATER
casing crasm reasong       407       1       CLAY - red brown day with 20% angular lonatone 3-25mm onlys       Pormation         406       2       CLAY - red brown day with minor sit       CLAY - red brown day with minor sit		CLAY - red brown clay with 3-4mm rounded ironstone gr		- 408	50 mm		
pH = 6.91 pH = 6.91 pH = 6.91 pH = 6.91 pH = 6.91 pH = 6.91	angular instance 3-25mm https       Formation         a of fractured instance, angular 4-12mm       Image: second se	CLAY - red brown clay with 20% angular ironstone 3-25 CLAY - red brown clay with bands of fractured ironstone CLAY - yellow brown clay with minor silt CLAY - yellow brown clay with minor silt with 5% angula SiLTY CLAY - light red brown silty clay CLAY - red brown clay SILTY CLAY - dark red brown silty clay SANDY CLAY - yellow brown/red brown mottled sandy of SANDY CLAY - red brown sandy clay SILTSTONE - light grey siltstone, fine powder SILTSTONE - light grey siltstone, fine powder with 10% SILTSTONE - light grey siltstone, fine powder angular chips T SILTSTONE - grey siltstone, fine powder angular chips T SILTSTONE - grey siltstone, fine powder angular chips T MUDSTONE - grey siltstone, fine powder with a MUDSTONE - grey brown mudstone, fine powder with a	2       3         4       5         6       7         7       8         9       10         11       12         12       13         14       15         15       16         17       18         19       -         21       -         22       -         23       -         24       -         25       -         24       -         25       -         26       -         27       -         28       -         30       -         31       -         32       -         33       -         34       -         37       -	- 407       1         - 406       2         - 405       3         - 404       4         - 403       5         - 402       6         - 401       7         - 400       8         - 399       9         - 393       10         - 394       14         - 393       15         - 394       14         - 393       15         - 394       14         - 393       15         - 394       14         - 393       15         - 394       14         - 393       15         - 394       14         - 393       15         - 394       14         - 393       15         - 384       20         - 385       23         - 386       20         - 383       25         - 384       24         - 383       25         - 384       27         - 383       26         - 379       29         - 378       30         - 377       31	50 mm		
END OF BOREHOLE AT 150.20 m				370 20	·		



BORE NO.

## **GW13C**

SHEET 2 OF 4

	ect: e Lo	ocation: Number:	C E	Darli	ora C ingto	Coal Mine Project [ on F	Date Reco	Commenced: Completed: rded By: Checked By:	3/3/10 4/3/10 Angus McFarlane Kimberley Saflian
		Method: Company:		ir Ha Iterte			Surfa Co-or	ce RL: <b>408.2 m</b> ds: <b>E 7046</b>	nAHD 90.17 N 6437241.12
В	ore	Informatior	ı			Field Material Description			
						•			
WATER	WELL	CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY		FORMATION	HYDROGEOLOGY
			- 368 - 367	41 -		MUDSTONE - grey brown mudstone sub angular 4-6mm chips with 10% interlayered grey siltstone (continued)		Napperby Formation	
			- 366	42 -					
			- 365	43 -					
			- 364	44 -					
			- 363	45 -					
			- 362	46 -		MUDSTONE - dark grey brown mudstone fine powder semi rounded 3-10mm chip with			
			- 361	47 -		10% interlayered grey sitstone			
			- 360	48 -					
				49 -					
			- 359	50 —					
			- 358	51 -					
			- 357	52 -		MUDSTONE - dark grey brown mudstone sub angular 4-6mm chips with 10% interlayered grey siltstone			
			- 356	53 -		MUDSTONE - dark grey brown mudstone, fine powder with sub angular 4-12mm chips	s		
			- 355	54 -					
			- 354	55 -		MUDSTONE - dark grey brown mudstone, fine powder with semi rounded 4-12mm chip with 30% interlayered grey siltstone	ips		
			- 353						
			- 352	56 -					
			- 351	57 -					
			- 350	58 -		MUDSTONE - dark grey brown mudstone, fine powder with semi rounded 4-12mm chip with 10% interlayered grey siltstone	ips		
			- 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 - <b>70</b> -					
			- 338	70 —					
			- 337	71 -					
			- 336	72 -					
			- 335	73 -					
			- 334	74 -					
			- 333	75 -	<u> </u>				
			- 332	76 -		MUDSTONE - dark grey brown mudstone, powder and sub angular to semi rounded 3-5mm chips			
			- 331	77 -	<u> </u>				
			- 330	78 -					
			- 329	79 -					
				This b	oreho	END OF BOREHOLE AT 150.20 m ble log should be read in conjunction with Parsons Brinckerhoff's a	accom	panying standard n	lotes.



BORE NO.

## **GW13C**

SHEET 3 OF 4

	ect: e Lc	ocation: Number:	C E	Darli	ora ( ingt	Coal Mine Project D on R	Date Commo Date Comple Recorded By og Checkee	eted: /:	3/3/10 4/3/10 Angus McFarlane Kimberley Saflian
		Method: Company:		ir Ha Iterte			Surface RL: Co-ords:		nAHD 90.17 N 6437241.12
	-	Informatio		lleite	Cn	Field Material Description	0-0105.	E / 040	90.17 N 0437241.12
			•• 						
WATER	VELL	CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FOR	MATION	HYDROGEOLOGY
			- 328 - 327 - 326 - 325 - 324 - 322 - 322 - 321 - 320 - 319 - 318 - 317 - 316	81 - 82 - 83 - 84 - 85 - 86 - 88 - 88 - 89 - 90 - 91 - 92 -		MUDSTONE - dark grey brown mudstone, powder and sub angular to semi rounded         3-5mm chips (continued)         SILTSTONE - light brown to brown grey siltstone, powder and sub angular 3-15mm chip         SILTSTONE - light brown to brown grey siltstone, powder and sub angular 3-15mm chip         SILTSTONE - dark grey and light grey layered siltstone 60% light grey semi rounded         2-10mm chips with powder         MUDSTONE - dark grey mudstone carbonaceous fine powder and semi rounded chips         COARSE SILTSTONE - dark brown/grey coarse siltstone powder, few chips         COARSE SILTSTONE - light brown grey coarse siltstone/fine sandstone, powder         SILTSTONE - dark grey brown siltstone, powder sub angular 5mm chips         SILTSTONE - dark grey brown siltstone, powder sub angular 5mm chips	Nappe Forma		
			- 315 - 314 - 313 - 312 - 311 - 310	93 - 94 - 95 - 96 - 97 - 98 -		SILTSTONE - grey siltstone angular planar 3-7mm with 10% light grey siltstone 2-4mm chips         FINE SANDSTONE - grey fine grained quartz sandstone 1-2mm uniform with 40% grey siltstone         SILTSTONE - light grey siltstone angular 5mm chips with 20% quartz 2mm grains         SANDSTONE - light grey, fine to medium (1-2mm) grains, quartz and siltstone 3mm		tion	
			- 309	99 -	—	SILTSTONE/COAL - light grey angular 3-5mm chips with a band of coal, shiny stoney	Trinke	y Seam	
			- 308 - 307 - 306	<b>100</b> 101 102		black SILTSTONE - dark grey and light grey sub angular planar 5-10mm 50/50 mix SILTSTONE - grey semi rounded 2-6mm chips	Ellisma Forma		
			- 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 - 300	107 - 108 - 109 -		SILTSTONE - light and dark grey 3-6mm semi rounded chips COAL/CARBONACEOUS MUDSTONE - dark black/grey brown with coarse grey brown siltstone, coal angular 3-4mm			
			- 299 - 298	110 -		SILTSTONE - dark grey sub angular 5-7mm chips with 15% light grey siltstone			
			- 297	111 -	<u>.                                    </u>	SILTSTONE - light grey with a layer of carbonaceous mudstone/stoney coal			
			- 296	112 -	·	COAL/CARBONACEOUS MUDSTONE - dull stoney angular 2-3mm with <10% light gre siltetone	ву		
			- 295 - 294	113 - 114 - 115 -		siltstone COAL/CARBONACEOUS MUDSTONE - dull stoney sub angular 4-5mm with <10% ligh grey claystone COAL/CARBONACEOUS MUDSTONE - dull stoney sub angular 4-5mm with 20% light grey claystone	– – Forma		
			- 293	115 -		CARBONACEOUS MUDSTONE - angular 3-4mm with 20% cream claystone/clay matrix	x		
			- 292 - 291	110 - 117 - 118 -		SILTSTONE/CARBONACEOUS MUDSTONE - dark grey and grey interlayered mudstone and siltstone with 30% cream claystone			
			- 290	119 -		CARBONACEOUS MUDSTONE - angular 3-7mm with 10% light grey brown claystone			
			- 289			END OF BOREHOLE AT 150.20 m			



BORE NO.

## **GW13C**

SHEET 4 OF 4

Client: Project: Bore Location: Project Number: Drilling Method: Drilling Company:		umber:	C E 2	Darl	ora ( lingt 26E	Coal Mine Project D on R & 2162570B	Date Commenced: Date Completed: Recorded By: .og Checked By: Surface RL: <b>408.2 r</b>	3/3/10 4/3/10 Angus McFarlane Kimberley Saflian mAHD
			Ir	nterte	ch			90.17 N 6437241.12
Во	re In	formatio	n		1	Field Material Description		
WATER	ELL CO	NSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
· · ·			- 288		$\left -\right $	SILTSTONE - grey semi rounded to sub angular 3-4mm chips with 30% cream clayston		
			- 287	121 -	<u> </u>	CLAYSTONE - cream sub angular planar chips with 20% carbonaceous mudstone	Claystone	
.  .  .			- 286	122 -		COAL/CARBONACEOUS MUDSTONE- dull black stoney 3-4mm angular chips with 10	% Flyblowers	
			- 285	123 -		cream claystone COAL/CARBONACEOUS MUDSTONE- dull black stoney 3-4mm angular chips with <5	Creek Seam	
			- 284	124 -		cream claystone CARBONACEOUS MUDSTONE - dull black grey sub angular planar 3-6mm		
			- 283	125 -	F-			
			- 282	126 -		COAL/CARBONACEOUS MUDSTONE/SILTSTONE - interlayered shiny black coal with	h	
			- 281	127 -		dull black mudstone and grey siltstone CARBONACEOUS MUDSTONE/SILTSTONE - sub angular 3-10mm chips with 15% lig		
			- 280	128 -		grey cream claystone SILTSTONE - dark grey sub angular 3-7mm chips		
			- 279	129 -	·	COARSE SILTSTONE - grey semi rounded 3-4mm chips	Tomost Cully	
			- 278	130 -			Tomcat Gully Sandstone	
			- 277	131 -		MEDIUM TO COARSE SANDSTONE - grey quartz with 30% grey sittstone		
				132 -		MEDIUM TO COARSE SANDSTONE - grey quartz with 5% grey siltstone		
			- 276	133 -				
			- 275	134 -				
		bentonite	- 274	135 -				
			- 273	136 -		COAL - black shiny angular 3-4mm	Upper Ulan – – Seam	
		gravel pack	- 272	137 -		COAL - grey black angular 3-4mm		
	E.	50 mm slotted PVC	- 271	138 -		COAL/CARBONACEOUS MUDSTONE - dull black stoney with 10% grey claystone		
	目	casing	- 270			COAL/CARBONACEOUS MUDSTONE - dull black stoney with 20% grey claystone		
	目		- 269	139 -		COAL - shiny black 2-4mm angular chips		
	目		- 268	140 -		CLAYSTONE - light grey with 30% grey siltstone semi rounded planar chips 3-6mm	C-Marker	
	E		- 267	141 -			Claystone	
	目		- 266	142 -				
	E.		- 265	143 -	-	CLAYSTONE - light grey with 30% coal dull stoney		
	目		- 264	144 -		COAL - shiny black 3-5mm angular chips	Lower Ulan	
			- 263	145 -		CARBONACEOUS MUDSTONE - dull grey black 3-7mm sub angular planar chips with <5% grey brown claystone	Seam	
	目		- 262	146 -		SILTSTONE - dark grey siltstone, 3-12mm chips with a band of shiny black coal		
	·目·		- 261	147 -	<b> </b>	CARBONACEOUS MUDSTONE - dark grey brown semi rounded planar 3-5mm chips		
	:目:		- 260	148 -	Þ:			
). Te		sump	- 259	149 -	<b>†</b> -			
$\overline{\chi}$	A V		- 258	150 -				
			- 257	151 -				
			- 256	152 -	1			
			- 255	153 -	1			
			- 254	154 -	1			
			- 253	155 -	1			
			- 252	156 -	1			
			- 251	157 -	1			
			- 250	158 -	-			
			- 249	159 -	-			
					1	END OF BOREHOLE AT 150.20 m		



BORE NO.

## **GW13D**

Proj	iect: e Lo iect	: oca Nu	ition:	C E 2	Darli 11442	ora C ingt 26E	Coal Mine Project Con F on F & 2162570B	Date Commo Date Comple Recorded By Log Checkee	eted: y: d By:	26/2/10 3/3/10 Angus McFarlane Kimberley Saflian
			ethod: mpany:		ir Haı Iterte			Surface RL: Co-ords:		nAHD 95.92 N 6437244.88
	-		ormatio		lenc	CII	Field Material Description	20-0143.	E / 040	93.52 11 043/244.00
			Unnaue.							
WATER	WELL	CON	ISTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FOR	MATION	HYDROGEOLOGY
	X	K	50 mm PVC	-		/	CLAY - red brown clay with 3-4mm rounded ironstone gravel	Nappe		
			casing 50 mm PVC	- 407	1 -	$\vdash$	CLAY - red brown clay with 20% angular ironstone 3-25mm chips	Forma	ition	
			casing	- 406	2 -	$\vdash$	CLAY - red brown clay with bands of fractured ironstone, angular 4-12mm			
				- 405	3 -	$\vdash$	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 -	$\Pi$	SILTY CLAY - light red brown silty clay			
				- 402	6 -	1	CLAY - red brown clay			
				- 401	7 - 8 -	$\Box$	CLAY - yellow brown/grey/red mottled clay with angular 12-15mm ironstone pieces			
				- 400	o - 9 -					
				- 399	9 - 10 -		CLAY - yellow brown/brown mottled clay			
	19 60			- 398 - 397	11 -	00	CLAY - red brown clay IRONSTONE - red brown ironstone band, powder and 3-4mm angular chips OLAV.			
				- 397	12 -		CLAY - light grey clay with yellow brown mottles			
				- 395	13 -	/	CLAY - light grey clay with very fine sand highly plastic			
				- 394	14 -	$\square$	CLAY - light grey clay with very fine sand highly plastic with a band of brown siltstone			
				- 393	15 -	<u> </u>	SANDY CLAY - light grey clay with very fine sand nightly plastic with a band of brown slitstone SANDY CLAY - light grey sandy clay with fine to medium sand			
				- 392	16 -		SANDY CLAT - light grey safluy day with line to metuum aana			
				- 391	17 -	/				
				- 390	18 -	· ./·				
				- 389	19 -	/.				
				- 388	20 –					
				- 387	21 -	<u>/-</u> -	SILTSTONE - grey siltstone, powder and 30% 4-10mm sub angular planar chips			
				- 386	22 -					
				- 385	23 -					
				- 384	24 -	<u> -</u>	MUDSTONE - grey mudstone/siltstone (fine material) powder and angular planar			
				- 383	25 -	E:	3-12mm chips			
				- 382	26 -	-	SILTSTONE - light grey siltstone, powder and larger angular 2-15mm chips some semi rounded			
				- 381	27 -		lounded			
				- 380	28 -					
010				- 379	29 -	<u> </u>	MUDSTONE - dark grey brown mudstone, powder and semi rounded 2-7mm chips			
2/03/2010	r - 1 r - 1			- 378	30 -	<u> </u> -				
▼				- 377	31 -	<u> </u>				EC = 1.61 mS/cm pH = 6.7
				- 376	32 -	<b>—</b> -	MUDSTONE - dark grey brown mudstone, powder and semi rounded 3-15mm chips			pri - 0.7
				- 375	33 -	<u> </u>	MUDSTONE - dark grey brown mudstone, very fine powder, semi rounded 3-7mm chip chips becoming sub angular 4-10mm at 36m	ps,		
				- 374	34 -	F-				
				- 373	35 -	<u> </u>				
				- 372	36 - 27					
				- 371	37 - 38 -					
				- 370	39 -		MUDSTONE - dark grey brown mudstone powder and angular 15-25mm chips			
				- 369	55	<u> </u>	MUDSTONE - dark grey brown mudstone powder and semi rounded and angular 3-6mr chips	m		
					<b>T</b> I · I		END OF BOREHOLE AT 162.00 m			



BORE NO.

## **GW13D**

SHEET 2 OF 5

		Co E I	obbo Darli	ingt	Coal Mine Project on	Date Reco	Comme Comple rded By Checked	eted: /:		
Drillin	g Method: g Company:	Int	r Ha erte	mm ch		Surfa Co-or		408.1 m E 70469	N 6437244.88	
Bor	e Informatio	n			Field Material Description					
WATER	LL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY		FOR	MATION	HYDROGEOLOGY	
		_			MUDSTONE - dark grey brown mudstone powder and semi rounded and angular 3-6n chips (continued)	nm	Nappe Forma	rby		
		- 367	41 -				Forma	uon		
		- 366	42 -		MUDSTONE - dark grey brown mudstone fine powder semi rounded planar chips 5-7n					
		- 365	43 - 44 -		MUDSTONE - dark grey brown mudstone fine powder semi rounded planar chips 5-7n with interlayered light grey siltstone	nm				
		- 364	44 -							
		- 363 - 362	45 -	$\vdash$	MUDSTONE - dark grey brown mudstone, fine powder and semi rounded planar 3-10r chips	mm				
		- 361	47 -							
		- 360	48 -							
		- 359	49 -		MUDSTONE - dark grey brown mudstone, fine powder and semi rounded planar 5-15r					
		- 358	50 —	=-	chips with <5% angular	mm				
		- 357	51 -							
1.1		- 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					
		- 350	58 -		4-12mm chips					
		- 349	59 -							
		- 348	60 —		MUDSTONE - interlayered dark grey brown mudstone with grey siltstone 70% mudsto subangular 5-7mm chips	ne,				
		- 347	61 -							
		- 346	62 -							
		- 345	63 -	=-						
		- 344	64 -	=						
		- 343	65 -		MUDSTONE - dark grey brown mudstone, fine powder 30% 5-12mm sub angular plan chips	ar				
		- 342	66 -	<u> </u>						
		- 341	67 - 68 -							
		- 340	69 -		MUDSTONE - dark grey brown mudstone, fine powder 40% 5-12mm semi rounded planar chips					
		- 339 - 338	09 - 70 -							
		- 338 - 337	71 -	<u> </u>	MUDSTONE - interlayered dark grey brown mudstone with light grey siltstone 50% ch 3-5mm semi rounded 70% mudstone	ips				
		- 336	72 -							
		- 335	73 -		MUDSTONE - dark grey brown mudstone, fine powder, 3-15 semi rounded planar chip MUDSTONE - dark grey brown mudstone, fine powder, 3-5 semi rounded planar chips					
		- 334	74 -		Initiation one - dark grey brown mudstone, inte powder, 3-5 semi founded planar chips	°				
		- 333	75 -							
		- 332	76 -							
		- 331	77 -		MUDSTONE - dark grey brown mudstone, fine powder, 10-55 angular planar chips					
		- 330	78 -		MUDSTONE - dark grey blown mudstone, me powder, 10-35 angular planar chips					
		- 329	79 -		MUDSTONE - dark grey mudstone angular planar 5-15mm					
					END OF BOREHOLE AT 162.00 m					



BORE NO.

## **GW13D**

SHEET 3 OF 5

		Col E D	bbo Darli	ingto	Coal Mine Project D on R	ecorded By:	26/2/10 3/3/10 Angus McFarlane Kimberley Saflian
	g Method:			mme		urface RL: 408.1 mA	
	g Company: e Information		erte	ch		o-ords: <b>E 704695</b>	.92 N 6437244.88
BUI		n 			Field Material Description		
WATER	ELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
					MUDSTONE - dark grey mudstone angular planar 5-15mm (continued)	Napperby	
		021	81 -	<b>F</b> 1		Formation	
		020	82 -		CLAYSTONE - cream/light grey claystone		
		020	83 -		SILTSTONE - grey siltstone, powder and angular 4-8mm chips		
		02.	84 -				
		020	85 -		SILTSTONE - grey siltstone, powder and angular 4-8mm chips with a band of light grey cream claystone		
		022	86 -	<u> </u>	MUDSTONE - dark grey mudstone/siltstone angular planar 5-7mm chips and powder		
			87 -	$\square$			
		020	88 -		SILTSTONE - light grey coarse siltstone, powder no chips		
 			89 -		MUDSTONE - grey 10mm mudstone, powder and semi rounded planar 5-7mm chips <5% black mudstone specks		
			90 -	$\models$ ]			
			91 - 92 -	$\square$			
			92 - 93 -	$\square$			
			93 - 94 -	E			
			94 - 95 -				
			95 - 96 -		SILTSTONE - grey siltstone, powder semi rounded chips 3-10mm		
		0.2	97 -		SANDSTONE - grey fine grained sandstone, powder 2-3mm rounded chips 30% fine quartz grains	Digby – Formation	
			98 -		SANDSTONE - light grey fine grained sandstone, powder with 45% fine quartz grains		
			99 -		SANDSTONE - light grey fine grained sandstone, powder with 30% fine quartz grains		
			100		SILTSTONE - grey siltstone, powder with 2-5mm angular chips with a 15cm dull coal band	Trinkey Seam	
			101 -		CLAYSTONE - cream claystone interlayered with grey siltstone, powder 2-4mm semi rounded chips SILTSTONE - light grey siltstone semi rounded to sub angular 3-6mm chips and powder	Ellismayne Formation	
		007	102 -				
			103 -		SILTSTONE - grey siltstone, coarse powder and semi rounded 7-12mm chips		
			104 -		SILTSTONE - grey siltstone, coarse powder and angular 2-4mm chips		
			105 -				
			106 -		SILTSTONE - light grey and grey siltstone, angular 3-10mm chips, coarse grains		
			107 -		SILTSTONE - light grey siltstone rounded to sub angular 2-4mm chips		
			108 -	·	MUDSTONE - dark grey carbonaceous mudstone/coal, stony black/grey angular 2-7mm	_	
			109 -		SILTSTONE - dark grey siltstone with 25% light grey siltstone, planar 5-15mm chips		
		- 298 1	110 -				
		- 297 1	111 -	·	SILTSTONE - light grey and dark grey siltstone, semi rounded 3-7mm chips		
		- 296 1	112 -		COAL - coal, dull black/grey stony with a band of light grey brown claystone	Whaka	
		- 295 1	113 -		COAL - coal/dull grey black carbonaceous mudstone, 4-5mm chips with <5% fines of	– – Formation	
		- 294 1	114 -		light grey brown claystone MUDSTONE - dark grey black carbonaceous mudstone/coal, angular 3-5mm chips with		
		- 293 1	115 -	$\square$	20% grey brown claystone, <5% orange brown claystone		
		- 292 1	116 -		CLAYSTONE - light cream grey claystone, angular 4-6mm chips with 40% 5-7mm dark		
		- 291 1	117 -		grey siltstone MUDSTONE - black/dark grey mudstone/siltstone angular 3-7mm chips with 20% cream	1	
		- 290 1	118 -		grey claystone MUDSTONE - black/dark grey mudstone/siltstone angular 3-7mm chips with 10% cream		
		- 289 1	119 -		grey claystone SILTSTONE - dark grey black siltstone/carbonaceous mudstone, angular 3-8mm chips	_	
• •				<u>  · —</u>	with 5% light grey siltstone END OF BOREHOLE AT 162.00 m		



BORE NO.

## **GW13D**

	E 2 <sup>′</sup>	Darli 11442	ingto 26E á	on R & 2162570B	Date Comple Recorded By og Checked	/: d By:	26/2/10 3/3/10 Angus McFarlane Kimberley Saflian	
Drilling N Drillina C	lethod: Company:		ir Ha terte			Surface RL: Co-ords:		nAHD 95.92 N 6437244.88
-	nformatio				Field Material Description			
			-					
MATER METT C	ONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FOR	MATION	HYDROGEOLOGY
		_			SILTSTONE - light grey and cream siltstone, semi rounded 3-5mm chips	Avymo		
		- 287	121 -		CLAYSTONE - cream claystone, semi rounded 3-5mm chips with dark grey carbonaceous mudstone	Claysto	one	
		- 286	122 -		MUDSTONE - dark grey carbonaceous mudstone, angular 3-7mm chips with 10% grey siltstone		wers	
	·. ·	- 285	123 -		COAL - coal, stony dull black/carbonaceous mudstone angular 3-5mm chips with 10% dark brown claystone	Creek	Seam	
		- 284	124 -					
	i.	- 283	125 -		SILTETONIE dark grav ailtatona angular 4 15mm abina with 45% and brave alaystana			
		- 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	d		
		- 280	128 -		SILTSTONE - dark grey siltstone angular 3-10mm chips 10% rounded red brown 3mm claystone			
	i.	- 279	129 -	·	SILTSTONE - light grey siltstone, angular to semi rounded 4-7mm chips with 20% siltstone	Tomca	at Gully	
		- 278	130 —		SANDSTONE - grey medium to coarse grained sandstone, guartz 2-5mm norm uniform	Sands	tone	
		- 277	131 -		with 10% grey siltstone angular 2mm			
		- 276	132 -		SANDSTONE - grey medium to coarse grained quartz sandstone 2-4mm with 10% white	te		
	· ·	- 275	133 -		and brown claystone and 10% 2-3mm angular siltstone/coal SANDSTONE - grey coarse grained quartz sandstone 3-5mm with 15% siltstone/coal			
		- 274	134 -		2mm sub angular and some larger 20mm pieces SANDSTONE - grey medium grained quartz sandstone with 10% grey siltstone and stor	ny		
	·	- 273	135 -		coal and <5% larger 5-7mm quartz grains some claystone chips COAL - coal,stony angular 3-7mm with <5% clay/claystone 2-3mm chips	Upper	Ulan	
		- 272	136 -		COAL - coal, stony angular planar 3-10mm chips with a band of light grey siltstone	Seam	<b>U</b> ILII	
	·	- 271	137 -		COAL - coal, stony angular planar 3-6mm with 20% light grey claystone and brown			
		- 270	138 -		ClaystoneCOAL - 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	C-Marl	kor	
		- 266	142 -	·	claystone, semi rounded to sub angular 3-20mm chips equal mix SILTSTONE - interlayered slightly fractured grey sittstone with light grey cream	– Clayste		
	· .	- 265	143 -	·	Claystone, semi rounded to sub angular 3-15mm chips equal mix SILTSTONE - light grey sittstone angular planar 2-6mm with 30% angular 3-5mm chips			
		- 264	144 -					
		- 263	145 -		COAL - coal, stony/black/grey angular 3-6mm with a band of light grey/cream claystone SILTSTONE - dark grey siltstone semi rounded planar 3-8mm chips with minor fine	Lower Seam	Ulan	
		- 262	146 -		SIL IS IONE - dark grey sittstone semi rounded planar 3-8mm chips with minor tine quartz grains and <5% 1-2mm brown claystone SILTSTONE - dark grey sittstone semi rounded planar 3-8mm chips with minor fine			
	·.	- 261	147 -		SILISIONE - dark grey sittstone semi rounded planar 3-8mm chips with minor fine quartz grains and <5% light grey siltstone			
		- 260	148 -					
		- 259	149 -		SILTSTONE - dark grey siltstone, sub angular planar 3-7mm chips with 5% brown clay/claystone			
	bentonite	- 259	150 -					
			151 -		SILTSTONE - dark grey siltstone, angular planar 4-6mm with 5% light grey siltstone			
	gravel	- 257	152 -		SANDSTONE - grey conglomerate sandstone, 50% 3-5mm quartz 3-6mm non uniform, 30% dark grey siltstone and 20% light grey siltstone 1-2mm chips	Forma		
	50 mm slotted	- 256			SANDSTONE - grey coarse grained sandstone with 10% larger conglomerate 5-10mm quartz and 30% 1-2mm light grey siltstone, non uniform			
	PVC casing	- 255	153 -		SANDSTONE - grey conglomerate sandstone with medium to coarse grains 2-15mm no uniform with 15% light and dark grey siltstone, large quartz angular, siltstone semi	on		
	· .	- 254	154 -		rounded/sub angular			
		- 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			
		- 251	157 -		rounded/sub angular with some white cream claystone, larger conglomerate fraction res 2-10mm	st		
目目		- 250	158 -					
	·	- 249	159 –		SANDSTONE - grey white conglomerate quartz sandstone 3-12mm angular with 40% grey 2-3mm and dark grey 4-7mm siltstone			



BORE NO.

## **GW13D**

SHEET 5 OF 5

Pro Bor	ent: ject: e Location: ject Number:	C E	Darli	ora ( ingt	Coal Mine ProjectDataonRed	ate Completed:	26/2/10 3/3/10 Angus McFarlane Kimberley Saflian
	ling Method:		ir Ha			urface RL: <b>408.1 m</b>	AHD 5.92 N 6437244.88
	ling Company: ore Information		nterte	CN		o-ords: <b>E 70469</b>	5.92 N 6437244.00
D					Field Material Description		
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		-			SANDSTONE - grey medium to coarse grained 2-4mm quartz sandstone with 30% grey siltstone	Dapper	
	sump	- 247	161 -	<u> </u>	SILTSTONE - dark grey/grey siltstone, semi rounded planar chips 3-8mm		
		- 246	162 -				-
		- 245	163 -				
		- 244	164 -				
		- 243	165 -				
		- 242	166 -				
		- 241	167 - 168 -				
		- 240 - 239	169 -				
		- 239	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 -	1			
		- 224	184 -				
		- 223	185 -				
		- 222	186 - 187 -				
		- 221 - 220	188 -				
		- 219	189 -				
		- 218	190 —	-			
		- 217	191 -				
		- 216	192 -				
		- 215	193 -				
		- 214	194 -				
		- 213	195 -	-			
		- 212	196 -	-			
		- 211	197 -				
		- 210	198 -				
		- 209	199 -	-			
	<u> </u>	<u> </u>			END OF BOREHOLE AT 162.00 m		



BORE NO.

# GW14

Client: Project: Bore Location: Project Number: Drilling Method:			C H	ays -	ora ( • Wa	Coal Mine Project Da	te Comm te Compl corded B g Checke	eted: y:	24/2/10 24/2/10 Angus McFarlane Kimberley Saflian
	-	lethod: ompany:		ir Ha terte			rface RL: -ords:		1AHD 52.88 N 6441091.14
	-	formatio				Field Material Description			
WATER	WELL CO	DNSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FOF	RMATION	HYDROGEOLOGY
0103/2010		bentonite gravel	<ul> <li>428</li> <li>427</li> <li>426</li> <li>425</li> <li>424</li> <li>423</li> <li>422</li> <li>421</li> <li>420</li> <li>421</li> <li>420</li> <li>419</li> <li>417</li> <li>416</li> <li>417</li> <li>416</li> <li>417</li> <li>416</li> <li>417</li> <li>411</li> <li>411</li> <li>410</li> </ul>	1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 - 11 - 12 - 13 - 14 - 13 - 14 - 15 - 16 - 17 - 18 - 18 - 19 -		CLAY - light brown with <5% quartz 5mm angular gravel CLAY - brown with <5% quartz 5mm angular gravel CLAY - brown with brown/while claystone chips and 20% quartz 4-10mm angular/sub angular planar gravel SILTY CLAY - brown with some grey mottles COARSE SILTSTONE - orange, fine powder SILTSTONE - light orange, powder with <5% semi rounded 4-5mm chips FINE SANDSTONE - light orange, quartz 5% 2mm rounded grains with a band 10% of dark brown sittsfore CLAYSTONE - white/cream fine powder CLAYSTONE - white/cream fine powder COAL - black/grey smutty powder with 10% 5-7mm angular planar chips COAL - black/grey smutty powder with 10% 5-7mm angular planar chips COAL - black/grey smutty powder with 10% 5-7mm angular planar chips COAL - black/grey smutty powder with 10% 5-7mm angular planar chips COAL - black/grey smutty powder with 10% 5-7mm angular planar chips COAL - black/grey smutty powder with 10% 5-7mm angular planar chips COAL - black/grey smutty powder with 10% 5-7mm angular planar chips COAL - black fine powder 5% 3-4mm sub angular chips COAL - black fine powder 5% 3-4mm sub angular chips COAL - black fine powder fine powder fine powder fine chips COAL - black fine powder fine powder fine powder fine fine powder fine fine fine powder fine fine fine fine fine fine fine fine	Ellism Forma	ation	EC = 6.06 mS/cm pH = 7.79



BORE NO.

# GW14

SHEET 2 OF 2

Project:CoBore Location:HaProject Number:21			ays -	ora C Wal	Coal Mine Project Dat	te Comme te Comple corded By g Checkee	eted: /:	24/2/10 24/2/10 Angus McFarlane Kimberley Saflian	
	ling Me ling Co	ethod: ompany:		ir Haı terte			rface RL: -ords:		nAHD 52.88 N 6441091.14
		formatio	n			Field Material Description	-1		1
WATER	WELL COI	NSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FOR	MATION	HYDROGEOLOGY
			- 408	21 -		MUDSTONE - dark brown/black carbonaceous (continued)	Whaka Forma		
			- 407	22 -		SILTSTONE - light grey	Lachla Orogei		-
			- 406	23 -					
			- 405 - 404	24 - 25 -					
		50 mm slotted PVC casing	- 403	26 -		SILTSTONE - interbedded grey, green and brown semi rounded to angular chips			
			- 402	27 -					
			- 401	28 -					
			- 400	29 –					
			- 399 - 398	<b>30</b> – 31 –					
		sump	- 398 - 397	31 -					_
			- 396	33 -					
			- 395	34 -					
			- 394	35 -					
			- 393	36 -					
			- 392 - 391	37 - 38 -					
		,	- 390	39 -					
				This !		END OF BOREHOLE AT 32.00 m		otordard	



BORE NO.

## GW15

Client: Project: Bore Location: Project Number: Drilling Method:			C In 2 <sup>r</sup>	der 11442	ora C 26E	Coal Mine ProjectDaRe& 2162570BLog	te Comme te Comple corded By g Checkee	eted: /: d By:	16/2/10 17/2/10 Angus McFarlane Kimberley Saflian	
			ethod: mpany:		ir Ha Iterte			rface RL: -ords:		nAHD 63.06 N 6431211.79
			ormatio		161.0	CII	Field Material Description	-0103.		03.00 100401211.10
					<u> </u>					
WATER	WELL	. CON	STRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FOR	MATION	HYDROGEOLOGY
	$\mathbb{N}$	$\mathbb{N}$	50 mm PVC			/	CLAY - red yellow clay	Alluviu	m	
			casing 50 mm PVC casing	- 431 - 430	1 -		CLAY - yellow brown clay with 5% angular gravel, 10-12mm — — — — — — — — — — — — — — — — — —	_		
				- 429	2 - 3 -					
				- 428	4 -		CLAY - yellow brown and grey with 5% angular gravel, 10-12mm with Mn and Fe nodules	_		
				- 427	5 -					
				- 426	6 -	/				
				- 425 - 424	7 -	/				
				- 423	8 -	/				
				- 422	9 -	/	CLAY - red brown clay			
					10 —	//	CLAY - red brown clay with 10% ironstone	-		
				- 421			SILTSTONE - weathered grey siltstone	Nappe	rby	—
					11 -		SILTSTONE - grey and cream brown siltstone, fine powder, 5% sub angular chips	- Forma	tion	
				- 420	12 -	-	SILTSTONE - grey siltstone with a band of brown siltstone, fine powder and rounded	_		
				- 419			5-10mm chips			
					13 -		SILTSTONE - dark grey siltstone, fine powder with 30% rounded 5-7mm chips			
				- 418	14 -		SILTSTONE - dark brown siltstone, fine powder and 50% semi rounded 5-12mm chips	_		
				- 417			OLE OF OTHE - VAIN DRAWN AND/OTHE, THE POWLER AND DV% SETTI FOURIOUS - 12111M CRIPS			
					15 -	<u> </u>	SILTSTONE - dark grey siltstone, fine powder with 30% rounded 5-12mm chips	-		
				- 416		·				
					16 -		MUDSTONE - light grey mudstone, fine powder and 20% <5mm angular chips			
				- 415	47					
					17 -		SILTSTONE - grey siltstone, fine powder and semi rounded 4-5mm chips			
				- 414	18 -					
				- 413						
					19 -					
				- 412						
					This b	oreh	END OF BOREHOLE AT 70.00 m ble log should be read in conjunction with Parsons Brinckerhoff's acc	companying	standard r	notes.



BORE NO.

# GW15

SHEET 2 OF 4

Bor Proj	ject: e Location: ject Number:	ect:     Cobbora Coal Mine Project       e Location:     Inder       ect Number:     2114426E & 2162570B       ing Method:     Air Hammer					
	ling Method: ling Company:						N 6431211.79
B	ore Informatio			Field Material Description			
WATER	WELL CONSTRUCTION	RL (mAHD) DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMAT	TION	HYDROGEOLOGY
		- 411 21 - - 410 22 - - 409 23 - - 408 24 - - 407 25 - - 406 26 - - 405 27 - - 404		SILTSTONE - grey siltstone, fine powder and semi rounded 4-5mm chips (continued)         CLAYSTONE - light grey/cream claystone, very fine powder, chips <2mm	Digby Formatio	n 	
417/02/2010		28 - - 403 29 - - 402 30 - - 401 31 - - 400 32 - - 399 33 - - 398		SILTSTONE - grey brown coarse siltstone, 20% 3-5mm angular chips.		ρH	= 2.25 mS/cm I = 8.55
		34 - - 397 - 396 - 396 - 395 - 395 - 394 - 393 - 393 - 393		CLAYSTONE - red claystone, fine powder with 2-4mm angular and semi rounded chips SILTSTONE - grey siltstone, fine powder, 10% sub angular 5-10mm chips SILTSTONE - light grey siltstone, fine powder and sub angular 5mm chips SILTSTONE - light grey coarse siltstone, powder SILTSTONE - grey brown siltstone, fine powder and rounded 5-7mm chips SILTSTONE - dark brown siltstone, fine powder and 2-3mm rounded chips	Ellismayr Formatio	ne in	
		- 392		END OF BOREHOLE AT 70.00 m			



BORE NO.

## **GW15**

SHEET 3 OF 4

Proj Bore Proj Drill	ore Location: Inder				ora C 26E mme	coal Mine Project & 2162570B er	Date Comm Date Compl Recorded B Log Checke Surface RL: Co-ords:	eted: y: ed By: <b>431.6 r</b>	16/2/10 17/2/10 Angus McFarlane Kimberley Saflian mAHD 963.06 N 6431211.79
	-	formatio		101.0		Field Material Description	00 0100.	E / V/ -	
-			-						
WATER	WELL CONSTRUCTION		RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FO	RMATION	HYDROGEOLOGY
						MUDSTONE - coal, dull/carbonaceous mudstone, fine powder, 5% semi rounded 3-4 grey siltstone			
			- 391		<u> </u>		Forma	ation	
				41 -	<u> </u>	MUDSTONE - dark grey carbonaceous mudstone, fine powder, sub angular 4-5mm c	hips		
			- 390						
		bentonite		42 -		COAL - coal, dull/carbonaceous mudstone, powder and semi rounded 5-7mm chips	Whak		—
			- 389				Forma	ation	
		gravel pack		43 -		SILTSTONE - dark brown coarse siltstone, powder			
			- 388						
				44 -		COAL - coal, shiny powder and 4-5mm sub angular and rounded chips			
			- 387	45					
				45 -		MUDSTONE - dark brown carbonaceous mudstone with a band of cream claystone			
			- 386	46 -					
				40 -					
			- 385	47 -					
				-1		COAL - coal, dull fine powder and 2-3mm sun angular chips with a band of cream claystone			
			- 384	48 -					
			000			COAL - coal, angular chips 5-7mm with a band of brown siltstone			
			- 383	49 -					
-			202			SILTSTONE - grey siltstone, powder and angular 4mm chips with a band of cream claystone	Avym Clays		
			- 382	50 -		COAL and fine neurona and any tan classes term abies	-		
			- 381			COAL - coal, fine powder and angular planar 4mm chips	Flyblo Creek	wers Seam	
			501	51 -		COAL - coal shiny black powder and semi rounded 3-4mm chips			
			- 380			COAL - Coal shiny black powder and serin rounded 3-4min crips			
			000	52 -	-				
			- 379						
				53 -	-	COAL - coal, shiny angular 3-10mm chips with 5% brown claystone rounded 2mm chi	ips		
			- 378						
				54 -		COAL - coal, angular 4-8mm chips, with 30% grey claystone bands			
			- 377						
				55 -					
			- 376						
		50 mm		56 -	—	SILTSTONE - dark grey siltstone, angular and planar 3-10mm chips with <5% brown			
	Ē	slotted PVC casing	- 375			claystone			
				57 -					
			- 374						
				58 -	·	COAL - coal, stony coal, semi angular/rounded 5mm chips with 10% grey brown claystone			
	目		- 373			or you the			
				59 -	-	SILTSTONE - dark grey siltstone, angular planar 3-8mm chips	Tomc	at Gully	—
	E		- 372				Sands	stone	
				This b	oreho	END OF BOREHOLE AT 70.00 m le log should be read in conjunction with Parsons Brinckerhoff's	accompanying	standard	notes.



BORE NO.

## GW15

SHEET 4 OF 4

Client: CMC Pty Lt Project: Cobbora Co Bore Location: Inder Project Number: 2114426E 8 Drilling Method: Air Hamme			bbbo der 1442	ora C 26E	Coal Mine ProjectDaRe& 2162570BLo	ate Commenced: ate Completed: ecorded By: g Checked By:	16/2/10 17/2/10 Angus McFarlane Kimberley Saflian	
		ethod: ompany:		r Hai erte			rface RL: <b>431.6 m</b> o-ords: <b>E 70706</b>	AHD 3.06 N 6431211.79
		ormation				Field Material Description		
				SL)	DG			
WATER	WELL CON	ISTRUCTION	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					
		-	- 369	62 -		COAL - coal, angular 2-4mm chips with 10% red brown 2mm claystone	Upper and Lower Ulan Seams	_
		-	- 368	63 -		COAL - coal, stony with fractured grey silfstone pieces 5-45mm at 63.5		
		-	- 367	64 -		COAL - coal, stony with angular 5-12mm pieces with 40% grey siltstone and 55 brown claystone	-	
		-	- 366	65 -		COAL - coal, stony 2-3mm angular chips with 20% 3-25mm grey siltstone and brown claystone	-	
		-	- 365	66 -				
		-	- 364	67 -		COAL - coal, angular 4-10mm chips with <5% brown claystone	_	
		sump	- 363	68 -		SILTSTONE - dark grey siltstone, angular planar 5-7mm chips with <5% brown claystone	Dapper Formation	_
	£		- 362	69 -	. <u> </u>	SANDSTONE - grey coarser grained quartz sandstone, 2-3mm grains with larger 5-6mm white quartz gravel	_	
		-	- 361	70 —	<u>::::</u>			_
			- 360	71 -				
			- 359	72 -				
			- 358	73 -				
				74 -				
		-	- 357	75 -				
		-	- 356	76 -				
		-	- 355	77 -				
		-	- 354	78 -				
		-	- 353	79 –				
		-	- 352			END OF BOREHOLE AT 70.00 m		



BORE NO.

# GW16

Bore Location:         Hayley           Project Number:         2114426E a			obbo ayley	ora C	Coal Mine Project E	Date Commo Date Comple Recorded By .og Checked	eted: y:	11/3/10 12/3/10 Angus McFarlane Kimberley Saflian		
			ethod: ompany:		ir Ha nterte			Surface RL: Co-ords:		nAHD 07.26 N 6429063.23
_	-		ompany: iormatio		iter te	CII	Field Material Description	20-01us.	E / 203	U7.20 N 0429003.23
					-					
WATER	WELL	CON	NSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FOR	MATION	HYDROGEOLOGY
	X	K	50 mm PVC	- 601		/	SANDY CLAY - yellow brown/red brown mottled sandy clay	Nappe		
			casing 50 mm PVC casing	- 600 - 599	1 - 2 - 3 -	/_	SANDSTONE - white weathered fine grained clayey sandstone, quartz rich, uniform gra size SANDSTONE - white fine grained quartz sandstone, uniform 1-2mm grain size, hard to drill	1	ition	
				- 598 - 597 - 596	4 - 5 -	••••	SANDSTONE - creamy light red fine grained quartz sandstone, uniform 1-2mm grain si			
				- 595 - 594	6 - 7 -		SANDSTONE - light red/white fine grained quartz sandstone with <5% 3mm sub angula quartz grains SANDSTONE - light red/white fine grained quartz sandstone with <5% 4mm sub angula			
				- 593	8 -		quartz grains			
				- 592	9 - 10 -	<u></u>	SANDSTONE - brown fine grained sandstone with claystone and ironstone layers, angular 3-5mm chips			
				- 591 - 590	11 -		CLAYSTONE - yellow brown claystone band very fine not hard slightly weathered CLAYSTONE/MUDSTONE - dark grey light purple claystone/mudstone, powder and se rounded chips 3-6mm slightly weathered	 mi		
				- 589	12 –		CLAYSTONE/MUDSTONE - dark green grey purple weathered mudstone/claystone			
				- 588	13 –		CLAYSTONE/MUDSTONE - dark grey/black claystone/mudstone, fine powder and sem rounded 3-7mm chips	 ìi		
				- 587	14 -	_				
				- 586 - 585	15 - 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 - 23 -	_				
				- 578 - 577	24 -					
				- 576	25 -	_	CLAYEY SILTSTONE grey clay/siltstone very hard, angular chips, colloidal fractures CLAYSTONE/MUDSTONE - grey/black claystone/mudstone			
				- 575	26 -	_				
				- 574	27 -	_	SILTSTONE - grey siltstone sub angular chips <1mm grain size, interlayered with fine darker material			
				- 573	28 -	_				
				- 572	29 - <b>30</b> -	=	CLAYSTONE - grey black claystone, sub angular 4-9mm chips			
				- 571 - 570	31 -		SILTSTONE - grey siltstone <1mm grain size 20% quartz			
				- 569	32 -		SANDSTONE - light grey brown very fine grained uniform sandstone, quartz with a clay	/		
				- 568	33 -	<u></u>	matrix 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 matric	x		
				- 565	36 -					
				- 564	37 - 38 -		SANDSTONE - red fine grained uniform 1-2mm sandstone			
				- 563 - 562	39 -		SILTSTONE - grey siltstone coarse grained becoming finer 20% grading to 10% quartz			
				50E			END OF BOREHOLE AT 150.00 m			



BORE NO.

# GW16

SHEET 2 OF 4

Project: C Bore Location: H Project Number: 2 Drilling Method: A		ayley	ora ( / 26E mm	Coal Mine Project D R & 2162570B er S	Date Comm Date Compl Recorded B Log Checke Burface RL: Co-ords:	eted: y: ed By: <b>601.2 m</b>	11/3/10 12/3/10 Angus McFarlane Kimberley Saflian AHD 7.26 N 6429063.23		
WATER	WELL C	CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY		RMATION	HYDROGEOLOGY
			- 561 - 560 - 559 - 558 - 557 - 556 - 555	41 - 42 - 43 - 44 - 45 - 46 - 47 -		SILTSTONE - grey siltstone coarse grained becoming finer 20% grading to 10% quartz (continued)         SANDSTONE - light grey fine grained quartz uniform sandstone 1-2mm grains         SILTSTONE - light grey siltstone with 20% interlayered dark siltstone         CLAYSTONE/MUDSTONE - dark grey claystone/mudstone sub angular 4-7mm         SILTSTONE - grey siltstone with 10% fine quartz grains         SILTSTONE - grey siltstone	Forma		
			- 554 - 553 - 552 - 551 - 550 - 549 - 548	48 - 49 - <b>50</b> - 51 - 52 - 53 -		SILTSTONE - red brown coarse siltstone with some quartz grains , powder and 7-10mm chips           SANDSTONE - light red brown fine grained quartz uniform sandstone 2mm           SANDSTONE - light cream fine to medium grained quartz sandstone 1-2mm, hight clay content	Digby		_
			- 547 - 546 - 545 - 544 - 543	54 - 55 - 56 - 57 - 58 -		SILTSTONE - grey coarse siltstone with 30% coarse quartz grains         SANDSTONE - light grey fine grained quartz uniform sandstone 1-2mm grains hight clay content         SILTSTONE - grey siltstone sub angular 3-6mm chips         SANDSTONE - red fine grained sandstone, quartz and red clay 1-2mm uniform         SANDSTONE - white fine grained quartz sandstone 1-2mm uniform	ıy		
			- 542 - 541 - 540 - 539 - 538	59 - 60 - 61 - 62 - 63 - 64 -		SANDSTONE - yellow brown fine to medium grained sandstone with 5% 7-9mm quartz grains, brown clay matrix, non uniform SILTSTONE - grey siltstone with <15% interlayered red siltstone, sub angular 3-6mm chips SANDSTONE - light grey fine grained sandstone, 1-2mm 50% quartz uniform			
			- 537 - 536 - 535 - 534 - 533	65 - 66 - 67 - 68 -		SANDSTONE - light grey red fine medium grained sandstone with 10% 3-4mm quartz grains non uniform         SANDSTONE - dark grey red medium 2mm grained uniform sandstone         COAL - oxidised coal, dark brown black powdery and 2-4mm sub angular chips         SILTSTONE - grey siltstone sub angular planar 3-10mm chips	  Ellism Forma	ey Seam layne	
			- 532 - 531 - 530 - 529	69 - <b>70</b> - 71 - 72 -		SILTSTONE - dark grey siltstone planar 4-7mm chips with 20% quartz 1-2mm grains SILTSTONE - dark grey siltstone planar 4-7mm chips SILTSTONE - dark grey siltstone sun angular 3-7mm with 5% quartz 1-2mm grains	Forma 	1001	
			- 528 - 527 - 526 - 525 - 524	73 - 74 - 75 - 76 - 77 -		SANDSTONE - grey fine grained sandstone 60% quartz, high clay content 1-2mm grain: SANDSTONE - grey fine to medium sandstone 70% quartz 2-3mm grains non uniform SANDSTONE - grey fine to medium sandstone 70% quartz 2-3mm grains non uniform			
			- 524 - 523 - 522	78 - 79 -		SANDSTONE - grey fine to medium sandstone 70% quartz 2-3mm grains non uniform with 3-5mm black coal fragments SILTSTONE - dark grey siltstone 1mm with 5% claystone chips 2-3mm sub angular chip SILTSTONE - grey coarse siltstone, semi rounded to sub angular 3-5mm chips			

END OF BOREHOLE AT 150.00 m



BORE NO.

# GW16

SHEET 3 OF 4

Bore Location:HayleyProject Number:21144261Drilling Method:Air Hamr		ora ( / 26E mm	Coal Mine Project [ F & 2162570B L er S	Date Commenced:11/3/10Date Completed:12/3/10Recorded By:Angus McFarlaneLog Checked By:Kimberley SaflianSurface RL:601.2 mAHDCo. ords:E 720907 26N 6429063 23					
	-	mpany:		iterte	ch		Co-ords:	E 72090	)7.26 N 6429063.23
Bo	re Inf	ormatio	n			Field Material Description			
WATER	/ELL COM	ISTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY		RMATION	HYDROGEOLOGY
			- 521	81 -		SILTSTONE - grey coarse siltstone, semi rounded to sub angular 3-5mm chips (continued)	Ellism Form		
			- 520	82 -		SANDSTONE - grey fine grained quartz sandstone 1-2mm grains, high clay content			
			- 519	83 -		COAL - oxidised coal, dark brown powder smutty with 30% light grey claystone	Whak		
			- 518	84 -		COAL - oxidised coal/coal and carbonaceous mudstone with grey claystone and clay			
			- 517	85 -		CLAYSTONE - light grey/cream claystone with minor fine quartz grains	Avym Clays		
			- 516	86 -		COAL - coal, hard black with dark brown powder, 3-4mm sub angular chips	Flyblo	owers	
			- 515	87 -		SILTSTONE - grey siltstone sub angular planar 3-10mm chips	Creek	< Seam	
			- 514	88 -					
			- 513	89 -		MUDSTONE - dark brown black carbonaceous mudstone with a 20cm coal band			
			- 512	90 -		SILTSTONE - dark grey siltstone interlayered with light grey coarse siltstone and 20% quartz			
			- 511	91 -		SANDSTONE - brown/ yellow brown fine to medium grained sandstone 40% quartz 1-3mm with high clay content	_ Tomc Sands	at Gully stone	
			- 510	92 -		SANDSTONE - yellow fine to medium grained sandstone 2-3mm high clay content			
			- 509	93 -		SANDSTONE - pale yellow medium grained sandstone, 30% quartz high clay content			
			- 508	94 -		SANDSTONE - light grey becoming dark grey red fine to medium grained quartz sandstone 50% quartz			
			- 507						
			- 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 flo	d w		
			- 505	96 -		out of the hole) SANDSTONE - light brown medium grained quartz sandstone very pooly cemented uniform	1		
			- 504	97 -		SANDSTONE - grey large to coarse grained sandstone 80% quartz with siltstone, non uniform 2-4mm	-1		
			- 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 interlayere with yellow coarse grained quartz sandstone 40% quartz 2-4mm non uniform	ed		
•			- 499	102 -	—	SILTSTONE - grey siltstone 10% quartz fine grains 4-5mm chips with layers of dark an light grey siltstone	nd		
			- 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 -	1-				
			- 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	<u> </u>		
			- 490	111 -		COAL - coal, stony black 3-5mm angular chips with 10% light grey claystone		r Ulan	_
			- 489	112 -	—	SILTSTONE - grey siltstone with 30% coal/carbonaceous mudstone 2-3mm chips with 5% sub angular 3mm grains	Seam	ı	
			- 488	113 -		SANDSTONE - grey large to coarse grained quartz sandstone 3-4mm uniform with 5%	5		
		bentonite	- 487	114 -		coal/siltstone mix COAL - coal/carbonaceous mudstone, stony black angular 4-5mm with 30% light grey dawstone			
			- 486	115 -		claystone MUDSTONE - dark grey black carbonaceous mudstone with 10% light grey clay and adverture.			
		gravel pack	- 485	116 -		claystone COAL - coal angular, stony black 3-10mm with 5% light grey claystone			
		раск	- 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	s,		_

END OF BOREHOLE AT 150.00 m



BORE NO.

# **GW16**

SHEET 4 OF 4

Project: Cot Bore Location: Hay Project Number: 211			ayley	ora ( /	Coal Mine Project D	ate Comn ate Comp ecorded E og Checko	oleted: 3y:	11/3/10 12/3/10 Angus McFarlane Kimberley Saflian	
	ing Me ing Co	thod: mpany:		ir Ha Iterte			urface RL o-ords:		mAHD 907.26 N 6429063.23
В	ore Inf	ormatio	n			Field Material Description			
WATER	WELL CON	ISTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FC	DRMATION	HYDROGEOLOGY
			- 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-Ma		
		50 mm slotted PVC casing	- 480 - 479 - 478	121 - 122 - 123 -		COAL - coal, black shiny sub angular 5-7mm with 50% light grey claystone	- Clays	stone er Ulan	
			- 477 - 476	124 - 125 - 126 -		COAL - coal, shiny black angular 3-5mm with <5% light grey claystone	- — Sean		
			- 475 - 474 - 473	127 - 128 -	  	MUDSTONE - carbonaceous mudstone dull grey black 2-7mm sub angular chips with <5% light grey claystone 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			
	X	sump	- 470	131 - 132 -		SILTSTONE - grey coarse grained siltstone interlayered with 10% dark brown mudstone sub angular 4-10mm chips			
		bentonite	- 469 - 468	133 -		SANDSTONE - grey coarse conglomerate sandstone quartz 80% angular to semi rounded with 20% siltstone mainly semi rounded 3-12mm chips non uniform	Dapp	per nation	
			- 467	134 -					
	8000	backfill	- 466	135 -	····	SILTSTONE - dark grey siltstone sub angular 4-6mm with minor light grey siltstone band	ls		
	80009 20009		- 465	136 - 137 -					
			- 464 - 463	138 -		SILTSTONE - dark grey siltstone sub angular 4-6mm with 5% 3mm quartz grains			
	5000		- 462	139 -		SILTSTORE - dark grey sitistone sub angular 3-6mm chips			
	50000		- 461	140 —	·				
	5000		- 460	141 -	·				
	20202		- 459	142 -					
			- 458	143 - 144 -					
	5000		- 457 - 456	145 -		SILTSTONE - grey silfstone sub angular 3-6mm chips			
	5000		- 455	146 -		SILTSTORE - grey situatorie sub angular 3-oritin chips			
	5001 2001 2001 2001 2001 2001 2001 2001		- 454	147 -	·				
	5000 2000 2000		- 453	148 -					
	2000		- 452	149 -					
	201200		- 451	150 -					
			- 450	151 - 152 -					
			- 449 - 448	153 -					
			- 447	154 -					
			- 446	155 -					
			- 445	156 -					
			- 444	157 -					
			- 443	158 -					
			- 442	159 -					
				This b	oreh	END OF BOREHOLE AT 150.00 m ole log should be read in conjunction with Parsons Brinckerhoff's a	ccompanyin	g standard i	I notes.


BORE NO.

# GW17

Client: Project: Bore Location: Project Number:	S O'Leary	oal Mine Project	Date Completed: 1 Recorded By:	10/2/10 10/2/10 Angus McFarlane Kimberley Saflian	
Drilling Method: Drilling Company:	Air Hamme Intertech		Surface RL: <b>363.4 mA</b> Co-ords: <b>E 697401</b> .	HD .6 N 6441667.07	
Bore Information		Field Material Description			
	<u>ں</u> آ	•			
WELL CONSTRUCTION	RL (mAHD) DEPTH (mBGL) GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY	
50 mm PVC	- 363 /	CLAY - yellow brown clay with ironstone cobbles 20mm and chips 5mm	Alluvium		
SO mm SO mm PVC casing	- 362	CLAY - yellow grey clay with manganese nodules, <5% ironstone chips 5-7mm and a white tuffaceous clay band at 1.8m			
	- 361	CLAYSTONE - tuffaceous creamy mud/claystone	Digby		
	- 360	SANDSTONE - yellow orange clayey sandstone, fine to medium grained 1-4mm	Formation		
	- 359 5	SANDSTONE - grey brown clayey sandstone, fine to medium grained 2-6mm			
	- 358	SANDSTONE - brown clayey sandstone medium grained 3-5mm with minor gravel (< with a band of tuffaceous creamy claystone	5%)		
	- 357	CLAYSTONE - creamy claystone with 5% sand			
	7 - - 356	COAL - coal, smutty grey grading to a shiny black, fine pieces with 30% 5mm chips	Trinkey Seam		
	8 - 355	COAL - carbonaceous mudstone/coal ranging from a fine power to 10mm angular chip with a band of light grey claystone	 os,		
	9 – – – 354	COAL - coal, shiny black powder with 5mmplannar chips and angular 10mm pieces, slightly damp			
	- 353	CLAYSTONE - grey claystone, fine power and <5% rounded 7mm pieces	Ellismayne Formation		
	- 352	CLAYSTONE - darker grey claystone, fine power and <5% rounded 7mm pieces			
	- 351	CLAYSTONE - grey claystone, fine powder grading to a grey red clay stone			
	- 350	CLAYSTONE - grey claystone fine powder			
	- 349	SANDSTONE - grey fine grained sandstone with sub angular 8mm pieces mostly 1-2n quartz matrix, fine powder with 5%	nm		
	- 348	SANDSTONE - grey fine to medium grained sandstone with sub angular 8mm pieces mostly 2-3mm quartz matrix, fine powder with 5%			
	- 347				
	- 346				
	- 345	SANDSTONE - grey fine to medium large grained quartz sandstone, fine fraction 1-2n larger fraction 4-5mm			
	- 344				
	- 343 20	SANDSTONE - light grey fine to medium large quartz sandstone, fine fraction 1-2mm, larger fraction 4mm, with a clay matrix	,		
	- 342	SANDSTONE - light grey fine grained 1-2mm sandstone			
	- 341	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		
10/02/2010	23				
bentonite	- 339	SILTSTONE - dark grey siltstone, fine to medium pieces, 3-4mm chips		EC = 2.77 mS/cm pH = 8.84	



BORE NO.

# GW17

SHEET 2 OF 2

Field Material Description           No	Drilling   Drilling (	Number: Method: Company:	Co S 21 Ai In	O'Le	ora C eary 26E mm	Coal Mine Project       I         & 2162570B       I         er       S         Borehole Diameter: 50 mm       I	Date Commenced:10/2/10Date Completed:10/2/10Recorded By:Angus McFarlaneLog Checked By:Kimberley SaflianSurface RL:363.4 mAHDCo-ords:E 697401.6 N 6441667.07				
No.         Provide and another interview         Subjections: and backetions: and ba	Bore	Informatio	n			Field Material Description					
Desc         138	WATER	CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY		FORMATION	HYDROGEOLOGY		
Reput     23     SubSTICME: pry modum grand quantities, grand 2 mm     Tortical Cully Sandstone       337     27     SubSTICME: pry modum grand quantities, grand 3 mm, who 50, T2mm     -       338     29     SubSTICME: pry modum grand quantities, grand 3 mm, who 50, T2mm     -       338     29     SubSTICME: pry modum grand quantities, grand 3 mm, who 50, T2mm     -       338     30     SubSTICME: pry modum grand quantities, grand 3 mm, who 50, T2mm     -       333     30     SubSTICME: pry modum grand quantities, grand 3 mm, who 50, T2mm     -       333     30     SubSTICME: pry modum grand quantities, grand a module, grand 2 mm, who 15%, grand 1 mm, grand 3 mm, who 50, T2mm     -       333     31     -     -     -       333     31     -     -     -       333     -     -     -     -       333     -     -     -     -       333     -     -     -     -       333     -     -     -     -     -       333     -     -     -     -     -       334     -     -     -     -     -       335     -     -     -     -     -       336     -     -     -     -     -		gravel pack	- 338			SILTSTONE - dark grey siltstone and medium grained quartz sandstone interlayers					
1       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20       20						SANDSTONE - grey medium grained quartz sandstone, grains 2-3mm	То	mcat Gully			
31         32         33         33           33         34         34         34         35           33         34         550/0510/061 gray make in to targe grained quart sandation, grains 2 4cm, with 10%, gray make in the targe grained quart sandation, grains 2 4cm, with 10%, gray make in the targe grained quart sandation, grains 2 4cm, with 10%, gray make in the targe grained quart sandation, grains 2 4cm, with 10%, gray make in the targe grained quart sandation, grains 2 4cm, with 10%, gray make in the targe grained quart sandation, grains 2 4cm, with 10%, gray make in the targe grained quart sandation, grains 2 4cm, with 10%, gray make in the targe grained quart sandation, grains 2 4cm, with 10%, gray make in the targe grained quart sandation, grains 2 4cm, with 10%, gray make in the targe grained quart sandation, grains 2 4cm, with 10%, gray make in the targe grained quart sandation, grained qu			- 335	28 -		SANDSTONE - grey medium grained quartz sandstone, grains 3mm, with 5% 1-2mm coal and sandstone chips					
333       33       33       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34       34 <t< td=""><td></td><td></td><td>- 334</td><td>29 -</td><td></td><td>SANDSTONE - grey medium grained quartz sandstone, 3-5mm grains, with 15% coal and siltstone chips</td><td></td><td></td><td></td></t<>			- 334	29 -		SANDSTONE - grey medium grained quartz sandstone, 3-5mm grains, with 15% coal and siltstone chips					
9 mm         -33         -32         -34         -5XNDSTONE - gray instance and operation grained quarts sendatione, 1-20mm, with 15% allatione           9 mm         -33         -33         -33         -33         -33           -33         -34         -5XNDSTONE - gray instance and operation grained quarts sendatione, 2-5mm, with 15% allatione         -33           -30         -34         -5XNDSTONE - gray ingle grained quarts sendatione, 2-5mm, with 15% allatione and cost         -33           -327         -33         -33         -33         -33           -328         -33         -33         -33           -327         -34         -5XNDSTONE - gray ingle grained quarts sendatione, 2-5mm, with 15% allatione and cost           -328         -33         -34         -34           -328         -34         -34           -328         -34         -34           -328         -34         -34           -328         -34         -34           -328         -34         -34           -328         -34         -34           -329         -34         -34           -324         -34         -34           -324         -34         -34           -324         -34 <td></td> <td></td> <td>- 333</td> <td></td> <td></td> <td>SANDSTONE - grey medium to large grained quartz sandstone, grains 2-4mm, with 18 5mm grains and 10% grey siltstone and cream claystone</td> <td>5%</td> <td></td> <td></td>			- 333			SANDSTONE - grey medium to large grained quartz sandstone, grains 2-4mm, with 18 5mm grains and 10% grey siltstone and cream claystone	5%				
30       -330				32 -		SANDSTONE - grey medium to large grained quartz sandstone, grains 2-4mm, with 18 5mm grains and 10% grey siltstone and cream claystone and coal	5%				
90 mm PVC early 236       -329			- 330	33 -		SANDSTONE - grey fine to medium grained sandstone, 1-2mm grains and 5% siltston					
casing       -32       -32       -32         -327       -32       -32       -32         -326       -32       -32       -32         -326       -32       -32       -32         -326       -32       -33       -32         -326       -32       -33       -32         -324       -32       -32       -32         -324       -32       -32       -32         -324       -32       -32       -32         -324       -32       -32       -32         -32       -32       -32       -32         -32       -32       -32       -32         -32       -32       -32       -32         -32       -32       -32       -32         -32       -32       -32       -32         -32       -32       -32       -32         -32       -32       -32       -32         -316       -31       -31       -31         -316       -31       -31       -31         -316       -31       -31       -31         -316       -31       -31       -31         -31<		slotted	- 329	34 -		SANDSTONE - grey large grained quartz sandstone, 2-5mm, with 15% siltstone and cream claystone chips 3mm					
- 327       37         - 326       37         - 326       38         - 326       38         - 326       38         - 326       5ANDSTONE: grey medium grained sandstone, 2-3mm grains with 5% grey allstone         - 326       - 326         - 326       - 38         - 326       - 38         - 328       - 38         - 324       - 324         - 324       - 324         - 324       - 324         - 324       - 324         - 324       - 324         - 324       - 324         - 325       - 324         - 326       - 324         - 327       - 324         - 328       - 324         - 329       - 41         - 320       - 324         - 321       - 324         - 329       - 324         - 320       - 344         - 316       - 316         - 316       - 316         - 316       - 316         - 316       - 316         - 315       - 49		Casing	- 328								
326       38			- 327								
- 325       39			- 326								
aump       -324			- 325	39 -							
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$				40 —		cream claystone, 10% 10mm angular quartz grains					
$ \begin{array}{c}             42 - \frac{1}{1} \\             - 321 \\             43 - \\             - 320 \\             44 - \\             - 319 \\             45 - \\             - 318 \\             46 - \\             - 317 \\             47 - \\             - 316 \\             48 - \\             - 315 \\             49 - \\             49 - \\         \end{array} $		sump		41 -							
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$				42 -							
$ \begin{array}{c} 44 - \\ -319 \\ 45 - \\ -318 \\ 46 - \\ -317 \\ 47 - \\ -316 \\ 48 - \\ -315 \\ 49 - \\ \end{array} $				43 -							
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$				44 -							
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$			- 318	45 -							
- 316 48 - - 315 49 -			- 317	46 -							
- 315 49 -			- 316	47 -							
			- 315	48 -							
			- 314	49 -							



BORE NO.

# GW18

Pro Bor	Client: Project: Bore Location: Project Number:			C(   8	& C C	ora C D'Lea	Coal Mine Project Data Arry Reference Data Arry Reference Arry Ref	ate Comme ate Comple ecorded By og Checked	eted: /:	17/2/10 18/2/10 Angus McFarlane Kimberley Saflian
	-	Metho Compa			ud ro terte			urface RL: o-ords:		AHD 0.54 N 6444415.91
В	ore l	nform	natior	1			Field Material Description			
WATER	WELL	CONSTRU	ICTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORM	MATION	HYDROGEOLOGY
417/02/2010		son Pvcc casii son pvc casii son son pvc casii son son pvc casii son son pvc casii son son pvc casii son son pvc casii son son pvc casii son son son son son son son son son son	control te	- 337 - 336 - 335 - 334 - 333 - 332 - 332 - 331 - 330 - 329 - 328 - 328 - 328 - 328 - 325 - 325 - 324	$1 - \frac{1}{2} - \frac{1}{3} - $		CLAY E brown with 30% large 20-30mm angular gravels, tronstone, quartz, conglomerate sandstone CLAYEY SAND - brown with 40% large gravels 20-35mm, ironstone, quartz, siltstone, claystone CLAYEY SAND - red brown, coarse grained sand with alluvial sub angular gravels CLAYEY SAND - under gravel 15-30mm, quartz, ironstone, claystone with 30% coarse grained sand GRAVEL - alluvial, angular gravel 15-30mm, quartz, ironstone, claystone with 30% coarse grained sand GRAVEL - alluvial, angular gravel 15-30mm, quartz, claystone. Ironstone is angular planar 30-30mm, with 30% coarse grained sand CLAYEY SAND - brown, coarse grained, damp SANDY CLAY - brown, damp SANDSTONE - brown, medium to coarse grained, 2-3mm, contains quartz, ironstone, claystone	Purlaw Format	raugh	EC = 0.969 mS/cm pH = 8.58
					This b	oreho	END OF BOREHOLE AT 13.00 m ble log should be read in conjunction with Parsons Brinckerhoff's ac	ccompanying s	standard no	otes.



BORE NO.

# GW19

Pro <u></u> Bor	Client: Project: Bore Location: Project Number: Drilling Method:			aft	ora C	coal Mine Project E	Date Reco	Completed: rded By:	12/2/10 15/2/10 Angus McFarlane Kimberley Saflian
		Method: Company:		ud ro terte			Surfa Co-oi	rds: <b>E 69898</b>	AHD 4.91 N 6445305.7
	-	nformatior			_	Field Material Description			
WATER	WELL C	CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION		HYDROGEOLOGY
W/		50 mm PVC casing 50 mm PVC casing 4 50 mm PVC casing 4 50 mm PVC casing 4 50 mm PVC casing 4 50 mm	nd         - 330         - 329         - 328         - 327         - 326         - 325         - 324         - 323         - 323         - 321         - 320         - 3119         - 3116         - 3115         - 314	$\begin{array}{c} \underline{\mathbf{u}} \\ \underline{\mathbf{u}} \\ 1 \\ - \\ 2 \\ - \\ 3 \\ - \\ 3 \\ - \\ - \\ 3 \\ - \\ - \\ -$		CLAYEY SILT - brown sandy clayey silt, sand coarse         SANDSTONE - yellow brown medium grained clayey sandstone         SILTSTONE - dark grey siltstone, chips square angular and planar, 7-12mm with 10% brown claystone         SILTSTONE - dark grey siltstone, chips square angular and planar, 7-12mm with 30% layers of brown claystone and ironstone, chips 5-7mm         SILTSTONE - brown siltstone with 20% grey siltstone and minor sand, chips 5-7mm         CLAYSTONE - light grey claystone, fine powder to sub angular chips 5-15mm         MUDSTONE - light grey mudstone sub angular chips 7-12mm         SILTSTONE - grey brown siltstone, fine powder to rounded chips 5mm         SILTSTONE - grey siltstone, fine powder to rounded chips 5mm         SILTSTONE - light grey fine to medium grained quartz sandstone, 1-3mm grains, molestone         SANDSTONE - light grey medium grained quartz sandstone, 2-3mm with 10% grey siltstone         SANDSTONE - light grey medium grained quartz sandstone, 2-4mm with 10% grey siltstone         SANDSTONE - grey medium to coarse grained quartz sandstone, 2-4mm with 10% grey siltstone		Alluvium Napperby Formation	EC = 1.56 mS/cm pH = 8.93
		sump	- 313 - 312 - 311	17 - 18 - 19 -		CLAYSTONE - bright red claystone, sub angular chips 3-7mm			
			1	This b	oreho	END OF BOREHOLE AT 18.30 m le log should be read in conjunction with Parsons Brinckerhoff's a	accom	npanying standard no	tes.



BORE NO.

# **GW20**

SHEET 1 OF 4

Proj Bore	Client: Project: Bore Location: Project Number: Drilling Method:			l O'Le	ora C eary	Coal Mine Project Dat Rec	Date Commenced:18/2/10Date Completed:23/2/10Recorded By:Angus McFarlaneLog Checked By:Kimberley Saflian			
		ethod: ompany:		ir Ha Iterte			face RL: <b>326.9 m</b> ords: <b>E 69721</b>	AHD 11.51 N 6445662.35		
В	ore In	formatior	ı			Field Material Description	1			
				() ()	ڻ ن					
WATER	WELL CO	NSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY		
2010		152 mm steel			/	SANDY CLAY - dark brown, with <5 % rounded 7-10mm gravels	Alluvium	EC = 2.38 mS/cm pH = 7.64		
22/02/201		surface casing and 50 mm PVC casing	- 326	1 -		SANDY CLAY - dark brown, with <5 % rounded 7-10mm gravels, very hard	_			
			- 325	2 -		SANDY CLAY - dark brown hard	-			
		-	- 324	3 -		SANDY CLAY - brown	-			
			- 323	4 -		SANDY CLAY - brown with <5 % 5mm gravel	_			
		-	- 322	5 -		CLAY - dark brown, moist	-			
			- 321	6 -		CLAY - brown with minor sand, moist	-			
		-	- 320	7 -		SANDY CLAY - dark brown	-			
			- 319	8 -		OLAV, and know with 40% all wild answer 4.00mm	_			
	38					CLAY - red brown with 40% alluvial gravels 4-30mm				
		_	- 318	9 -	00	GRAVEL - alluvial with clasts of ironstone, claystone, quartz 5-10mm with a grey clay matrix				
	3 8	-	- 317	10	0	CLAY - grey	_			
	)					MUDSTONE - dark grey, weathered, angular planar 7-20mm chips	Napperby	_		
	I I	-	- 316	11 -			Formation			
	8 K									
	3 8	-	- 315	12 -						
	Š Š									
		50 mm PVC casing	- 314	13 -		SILTSTONE - grey, sub angular 3-7mm chips	-			
	38		- 313	14 -						
	3 8									
	) (		- 312	15 -		SILTSTONE - light grey, semi rounded 3-5mm chips	_			
					·					
	38	-	- 311	16 -		SILTSTONE - grey, angular planar 3-6mm chips	_			
	$\sim 1 k^{\prime}$									
			- 310	17 -	·	SILTSTONE - light grey, angular planar 3-6mm chips	+			
			200							
			- 309	18 -		SILTSTONE - dark grey, semi rounded planar 3-7mm chips				
	38		- 308	19 -			_			
						SILTSTONE - grey, semi rounded planar 3-7mm chips				
	28	-	- 307							
				This b	oreho	END OF BOREHOLE AT 78.00 m ole log should be read in conjunction with Parsons Brinckerhoff's acc	ompanying standard n	otes.		



BORE NO.

# **GW20**

SHEET 2 OF 4

Drilling	ient: CMC Pty Ltd oject: Cobbora Coal M ore Location: M O'Leary oject Number: 2114426E & 216 illing Method: Air Hammer illing Company: Intertech			& 2162570B	ecorded By: og Checked By	Angı y: Kiml	10 us McFarlane perley Saflian	
						urface RL: 32 o-ords: E6		N 6445662.35
Bore	Information	า			Field Material Description	1		
		-	uBGL)	: LOG				
WATER METT	CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATIC	ON	HYDROGEOLOGY
- X	$\mathbb{N}$				SILTSTONE - grey, semi rounded planar 3-7mm chips (continued)	Napperby Formation		
		- 306	21 -			Formation		
			21 -		SILTSTONE - dark grey, angular 3-5mm chips			
- X		- 305	22 -		SILTSTONE - dark grey, angular 3-5mm chips with large fractured grey siltstone 50mm			
					SILTSTORE - uark grey, angular somm onps with large nactured grey sinctione somm			
		- 304	23 -		SILTSTONE - grey, 3-5mm angular chips and medium grained quartz sandstone			
		- 303	24 -	. <u> </u>	SANDSTONE - light grey, medium grained, quartz sandstone uniform 2mm grain size	- Dist		
					with 5% siltstone	Digby Formation	ı	
		- 302	25 -					
		- 301						
- X		- 301	26 -		SANDSTONE - grey medium grained quartz sandstone 3mm with 40% grey siltstone			
	bentonite	- 300	27 -		SILTSTONE - grey and dark grey, angular and semi rounded3-7mm chips			
	Dentonite				SILTSTORE - grey and dark grey, angular and seriir roundeds-riniin unps			
	-	- 299	28 -					
		- 298	20					
			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			
			52 -		SANDSTONE - light grey medium grained quartz sandstone uniform 3mm grain size			
	-	- 294	33 -	 	SANDSTONE - cream/white medium to coarse grained sandstone with 15% brown quart	tz		
					with 5% grey siltstone			
	-	- 293	34 -					
	-	- 292	35 -					
			30 -		SILTSTONE - light grey 4-5mm angular chips with 3mm quartz grains	Ellismayne Formation	e I	
	-	- 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	ı	
		- 288	39 -		COAL - stony dull black semi rounded 3-5mm chips with layers of grey siltstone			
		- 287			END OF BOREHOLE AT 78.00 m			



BORE NO.

# **GW20**

SHEET 3 OF 4

Bore	nt: ect: e Location: ect Number:	C M	l O'Le	ora C eary	Coal Mine Project Dat Rec	te Comme te Comple corded By g Checked	eted: /:	18/2/10 23/2/10 Angus McFarlane Kimberley Saflian
	ing Method: ing Company:		ir Ha iterte			rface RL: -ords:		nAHD 11.51 N 6445662.35
В	ore Information	n			Field Material Description			
			<u>,</u>	(1)	· · ·			
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FOR	MATION	HYDROGEOLOGY
		- 286	41 -		COAL - angular 2-3mm chips	Whaka Forma		
		- 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	Avymo Claysto		
		- 280	47 -			Claysu	one	
		- 279	48 -					
		- 278	49 -					
	gravel	- 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	Flyblov Creek	wers	
		- 274	53 -		COAL - angular planar 3-5mm chips with <5% light grey claystone	Creek	Seam	
	50 mm slotted	- 273	54 -		COAL - angular 3-5mm chips with cream claystone	_		
	PVC casing	- 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	Tomca	at Gully	
		- 270	57 -		SILTSTONE - light grey, fractured, 2-4mm semi rounded planar chips with larger 5-45mm	Sandst	tone	
		- 269	58 -		planar chips			
		- 268	59 -		SILTSTONE - light grey, planar 3-5mm chips with 10% coal angular 3-4mm			
		- 267		· ·				
			This b	oreh	END OF BOREHOLE AT 78.00 m ble log should be read in conjunction with Parsons Brinckerhoff's acc	ompanying	standard	notes.



BORE NO.

# GW20

SHEET 4 OF 4

Bor	nt: ject: e Location: ject Number:	C M	O'Le	ora C eary	Coal Mine Project Da	te Completed:	18/2/10 23/2/10 Angus McFarlane Kimberley Saflian
	ling Method: ling Company:		ir Ha Iterte			urface RL: <b>326.9 mA</b> o-ords: <b>E 697211</b>	HD .51 N 6445662.35
	ore Information				Field Material Description		
			Ê	U			
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
					COAL - angular 3-4mm chips	Upper Ulan Seam	
		- 266	61 -			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 -	   — 1	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	_	
		- 255	72 -		MUDSTONE - dark grey, carbonaceous, semi rounded 2-4mm chips	_	
		- 254	73 -				
		- 253			COAL - planar 4-5mm planar chips with 30% medium grained quartz sandstone	Lower Ulan Seam	
		- 252	74 -		SANDSTONE - grey medium grained quartz sandstone 2mm grain size with 5% grey siltstone	Dapper Formation	
			75 -				
		- 251	76 -		SANDSTONE - grey fine grained quartz sandstone 1mm grain size	-	
		- 250	77 -				
		- 249	78 -				-
		- 248	79 -				
	-	- 247					
			This b	oreh	END OF BOREHOLE AT 78.00 m ble log should be read in conjunction with Parsons Brinckerhoff's act	companying standard not	es.



BORE NO.

# GW21

Client: Project: Bore Location: Project Number:			Co Cr	aft	ra C	oal Mine Project D	Date Comme Date Comple Recorded By .og Checked	eted: /:	11/2/10 12/2/10 Angus McFarlane Kimberley Saflian
		Method: Company:		ud ro terte			Surface RL: Co-ords:		nAHD 28.65 N 6445489.93
	-	Information			-	Field Material Description			
				î	(1)	· · · · · · · · · · · · · · · · · · ·			
WATER	WELL	CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORI	MATION	HYDROGEOLOGY
at 52/2010	사람은 승규가 하는 것을 다 같은 것을 다 있는 것을 다 있다. 같은 것을 다 있는 	50 mm PVC casing bentonite	- 328 - 327 - 326 - 325 - 323 - 323 - 323 - 323 - 323 - 323 - 321 - 320 - 319 - 318 - 317 - 316 - 315 - 314	3 -		SAND - dark red brown clay with minor sand         SANDY CLAY - red brown sandy clay with 15% gravel (sandstone and ironstone)         GRAVEL - alluvial gravels with a red brown sandy clay matrix, gravels size from 2-4mm consisting of ironstone, sandstone and claystone, damp         GRAVEL - alluvial gravels with a grey brown medium grained clayey sand, gravels size from 2-4mm consisting of ironstone, sandstone, quarz and claystone         GRAVEL - alluvial gravels, consisting of angular/sub angular planar 5-45mm ironstone, claystone, quarz and sandstone, with a grey coarse clayey sand         GRAVEL - alluvial gravels 5-10mm with a yellow brown clayey sand         GRAVEL - alluvial gravels 5-10mm with a yellow brown clayey sand         GRAVEL - alluvial gravels 5-10mm with a yellow brown clayey sand         GRAVEL - alluvial gravels 5-10mm with a yellow brown clayey sand         GRAVEL - alluvial gravels 5-10mm with a greater sandy clay         GRAVEL - alluvial gravels 5-10mm with a greater sandy clay         GRAVEL - alluvial gravels 5-10mm with a greater sandy clay         GRAVEL - alluvial gravels 5-10mm with a greater sandy clay         GRAVEL - alluvial gravels 5-10mm with a greater sandy clay         GRAVEL - alluvial gravels 5-10mm with a greater sandy clay         GRAVEL - alluvial gravels 5-10mm with a greater sandy clay         GLAY - yellow grey fine sandy clay         GLAY - greater sandy clay with fine sand         GLAY - light brown yellow clay with fine sand         GRAVEL - allu	3	rby	EC = 2.4 mS/cm pH = 8.09
		1 · I		This b	oreho	END OF BOREHOLE AT 20.00 m le log should be read in conjunction with Parsons Brinckerhoff's a	accompanying	standard r	hotes.



BORE NO.

## **GW21**

SHEET 2 OF 2

		Co Cr	aft	ora C	Coal Mine Project Da Re	Date Commenced:11/2/10Date Completed:12/2/10Recorded By:Angus McFarlaneLog Checked By:Kimberley Saflian			
	ing Method: ing Company:		ud ro terte			urface RL: p-ords:		nAHD 28.65 N 6445489.93	
_	ore Information			-	Field Material Description				
~		(QH	DEPTH (mBGL)	GRAPHIC LOG					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH	GRAPH	LITHOLOGY	FOR	RMATION	HYDROGEOLOGY	
					SILTSTONE - grey siltstone, chips 6mm planar	Nappe Forma	erby		
		- 313		· ·					
			16 -		SILTSTONE - layers of grey siltstone and dark grey mudstone, 2-6mm	_			
		240		· ·					
		- 312	17 -	_	SILTSTONE - grey siltstone, fine pieces	_			
				·					
		- 311	18 -	· ·					
			10	·	SILTSTONE - grey siltstone, fine pieces to 10mm angular planar chips				
		- 310							
			19 -		SILTSTONE - grey siltstone, chips 7-15mm planar angular	_			
		- 309							
	sump		20 —					_	
		- 308							
	-	- 306	21 -						
	-	- 307	22 -						
	-	- 306							
			23 -						
	-	- 305							
			24 -						
	-	- 304							
			25 -						
	-	- 303	26 -						
	-	- 302	27						
			27 -						
	F	- 301							
			28 -						
	-	- 300							
			29 -						
		0							
	-	- 299							
		٦	This b	oreh	END OF BOREHOLE AT 20.00 m ble log should be read in conjunction with Parsons Brinckerhoff's ac	companying	standard n	iotes.	



BORE NO.

# GW22\_TPB

SHEET 1 OF 2

Client: Project:	CMC F		td oal Mine Project		ommenced: 1/2/1 ompleted: 10/2/		
Bore Location: Project Number:	Mates		& 2162570B	Record	ed By: Angu	us McFarlane perley Saflian	
Prilling Method: Prilling Company:	Mud ro Interte	-	/Air Hammer Borehole Diameter: 136 mm	Surface RL: <b>349.7 mAHD</b> n Co-ords: <b>E 707014 N 6446584.4</b>			
Bore Information	า		Field Material Description		Geophysical Log		
WELL CONSTRUCTION	BEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY SANDY CLAY - brown sandy clay with 2-3 cm peds CLAY - yellow brown clay with minor sand	Formation	GAMMA (API-GR) 0 62.5 125.0 187.5 250	HYDROGEOLOGY	
	346 4 345 5		GRAVEL - red brown sandy clayey gravel, 20% quartz, 10% orthoclase, 10% other gravel GRAVEL - red brown alluvial gravel with clay. Gravel 2-5mm, consisting of orthoclase, quartz, ironstone, siltstone and claystone GRAVELLY CLAY - red brown gravelly clay, 10% gravel, consisting of orthoclase, quartz, ironstone, siltstone and claystone				
410/02/2010	- 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 CLAYEY GRAVEL - brown clayey gravel, consisting of orthoclase, quartz, ironstone, siltstone and claystone pieces are >5mm, in a 10% clay matrix GRAVEL - brown alluvial gravel, small to medium, rounded and angular gravel (2-10mm), 40% quartz			EC = 0.903 mS/cm pH = 7.96	
	338 12 337 13 336 14 335 15 334 16		GRAVEL - brown alluvial gravel, small to medium, rounded and angular gravel (2-10mm), 40% quartz with 2mm coal pieces GRAVEL - brown alluvial gravel, quartz, ironstone, siltstone, brown claystone 2-10mm pieces, well rounded		-		
	333 17 332 18 331 19 330 20 329 21		consisting of rounded quartz, ironstone and planar chips of brown claystone pieces 5-10mm with 10% clay GRAVEL - brown alluvial gravel, 5-15mm, consisting of grey silistone, ironstone and quartz and smaller 2mm quartz pieces with a 5% clay matrix GRAVELLY CLAY - brown grey gravelly clay, 10mm gravel with grey clay SAND - light brown large grained quartz sand with gravel up to 10mm CLAYEY GRAVEL - grey alluvial gravel 10mm rounded and angular pieces, consisting of quartz, ironstone and grey silistone		- - - -		
	328 22 327 23 326 24 325 25		GRAVEL - brown alluvial gravel 2-5mm mostly quartz with some coal fines	Tomcat Gully			
	324 26 323 27 322 28 321 29 320		SANDSTONE - weathered grey sandstone/quartz gravel, 2-10mm pieces with the smaller fraction being rounded and the larger angular SANDSTONE - grey medium grained sandstone, mostly quartz	Sandstone	-		



BORE NO.

# GW22\_TPB

SHEET 2 OF 2

Proj Bor	Client: Project: Bore Location: Project Number: Drilling Method:			ates	ora C	td coal Mine Project & 2162570B	Date Co Recorde	ed By: Ang	10 2/10 gus McFarlane nberley Saflian
		lethod: ompany:		ud ro terte	-	/ <b>Air Hammer</b> Borehole Diameter: <b>136 mm</b>		RL: 349.7 mAHD : E 707014 N	
В	ore In	formatio	n			Field Material Description		Geophysical Lo	g
WATER	WELL CO	ONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	Formation	GAMMA (API-GR) 0 62.5 125.0 187.5 250 1 62.5 125.0 187.5 250	HYDROGEOLOGY
		136 mm steel casing 136 mm slotted steel casing	2 319 318 317 316 315 314 313 312 314 313 312 311 309 308 307 308 307 308 307 308 307 308 307 308 307 308 307 308 307 308 307 308 307 308 307 308 307 308 307 308 307 308 307 308 307 308 307 308 307 308 307 308 309 308 307 308 307 308 309 308 307 308 307 308 307 308 307 308 307 308 307 308 307 308 307 308 307 308 309 308 307 308 307 308 307 308 307 308 307 308 309 308 307 308 307 308 309 309 309 309 309 309 309 309	$\begin{array}{c} \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$		SANDSTONE - dark grey sandstone with a clay matrix (continued) SANDSTONE - dark grey sandstone with fine grains approximately 2mm and larger grains 4mm with a clay matrix sandstone with pieces 3-5mm, 5% grey siltstone and coal SANDSTONE - grey, medium bacoming medium to fine quartz sandstone, 5% siltstone and coal pieces 2mm COAL/SILTSTONE - coal, story hard, pieces 5-10mm, some 5% larger pieces 15-20mm, 5% grey siltstone COAL/SILTSTONE - coal, chips 2-5mm with 10% grey siltstone some larger queres and coal pieces 2mm COAL/MUDSTONE - coal, chips 2-5mm with 10% grey siltstone coal chips 10mm COAL/MUDSTONE - coal (chips 2-5mm with 5% light grey claystone, coal chips form, claystone chips -2mm COAL - coal with fine (2mm) and larger pieces (10-15mm) with 5% light grey claystone. coal chips 57mm, some 5% larger pieces 10-25mm with 5% light grey for the file (2mm) and larger pieces, 10-25mm, pieces square and angular COAL - coal with fine (2mm) and larger pieces, 10-25mm, pieces square and angular COAL - large slightly fractured larger pieces, 10-25mm, pieces square and angular COAL/MUDSTONE - dark grey carbonaceous mudstone/coal, large angular planar chips 25mm with 5% light grey fine sandstone SANDSTONE - dark grey carbonaceous mudstone/coal, large angular planar and the sandstone chips with 20% dark grey siltstone planar chips 10-12mm SANDSTONE - grey fine to medium grained quartz grains 5mm and smaller quartz grains 2mm and fines sandstone chips with 20% dark grey siltstone fine to medium grained quartz sandstone 2-5mm with 10% larger quartz grains 3mm, larger quartz grains SANDSTONE - grey fine to medium grained quartz and other darker mudstone, 30% grey siltstone SANDSTONE - grey fine to medium grained sandstone, planar chips 5-10mm with 10% 3mm quartz grains SANDSTONE - grey fine grained sandstone consisting of quartz and other darker mudstone, 30% grey siltstone SANDSTONE - grey fine grained sandstone with chips in planar and sub angular form, with 20% conglomerate quartz angular chips 5-7mm	Tomcat Gully         Sandstone         Upper Ulan         Seam         C-Marker         Claystone         Lower Ulan         Seam         Dapper         Formation		
			291	59		END OF BOREHOLE AT 5			



BORE NO.

# **GW23**

ion: mber: thod:	Co Ro 21′	bert 1442	ora C ts 26E	Coal Mine ProjectDateReg& 2162570BLog	Date Commenced: 23/2/10 Date Completed: 23/2/10 Recorded By: Angus McFarlane Log Checked By: Kimberley Saflian Surface RL: 405.9 mAHD eter: 50 mm Co-ords: E 705786.22 N 6436148.65				
mpany:		erte	ch		-ords:	E 70578	86.22 N 6436148.65		
ormation				Field Material Description					
STRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FOR	MATION	HYDROGEOLOGY		
50 mm PVC casing 50 mm PVC casing -	405 404 403	1 2 3 -		CLAY - red brown with 10% ironstone	Nappe Forma	rby tion			
-	401 - 400 399 398	4 5 6 7 8		CLAYSTONE - grey and brown layered angular 4-7mm chips with 15% ironstone					
-	397 396 395 394	9 10 11 12		SILTSTONE - brown and dark grey layered semi rounded 3-4mm chips SILTSTONE - grey becoming darker at 11m then becoming lighter again at 12m, semi rounded chips 2-5mm	_				
-	393 392 391 - 390 389 388	13 - 14 - 15 - 16 - 17 - 18 -		MUDSTONE - dark grey semi rounded and angular 3-6mm chips SILTSTONE - grey to dark grey semi rounded 3-4mm chips					
gravel pack	005	19 - 20 - 21 - 22 - 23 - 24 -		MUDSTONE - dark grey semi rounded and angular becoming harder with depth					
	mber: thod: mpany: mation struction <sup>50</sup> mm PVC casing <sup>50</sup> mm PVC casing <sup>60</sup> mm <sup>60</sup> mm <sup>60</sup> mm <sup>60</sup> mm <sup>60</sup> mm <sup>60</sup> mm <sup>60</sup> mm <sup>60</sup> mm <sup>60</sup> mm <sup>60</sup> mm <sup>60</sup> mm <sup>60</sup> mm <sup>60</sup> mm <sup>60</sup> mm <sup>60</sup> mm <sup>60</sup> mm <sup></sup>	ion: 211 mber: 211 thod: 4in prmation STRUCTION 40 STRUCTION 40 ST	ion: Struction (Some structure struc	ion:       Roberts 2114426E         mber:       2114426E         thod:       Air Hamme Intertech         ormation       Intertech         STRUCTION       Image: Struction of the structure of the struc	ion:         Roberts         Pre- Log           thod:         Air Hammer         Survey         Survey         Survey         Survey           prime merce         G         Field Material Description         Survey         Survey           struction         G         G         Field Material Description         Survey           struction         G         G         CLAY - red brown         Survey         Survey           again monomed merce         G         G         CLAY - red brown         Survey         Survey           404         2         CLAY - red brown with 10% tronsbrue         Survey         Survey         Survey         Survey           403         3         CLAY - red brown with 10% tronsbrue         Survey         Survey         Survey         Survey         Survey           401         5         CLAY STONE - brown grading to light cream, angular 4-745m chips         Survey         Survey <td< td=""><td>Non-         Rescarded By Log Checker           Interfect         Barehole Diameter: 50 nm         Surface RL: Co-ords:           Interfect         Field Material Description         Rescarded By Log Checker           Interfect         Field Material Description         Rescarded By Log Checker           Interfect         Field Material Description         Rescarded By Log Checker           Interfect         CLV*-red traven         Interfect         Nappe           Interfect         CLV*-red traven         Nappe         Nappe           Interfect         CLV*-red traven         Nappe         Nappe           Interfect         CLV*-red traven         Nappe         Nappe           Interfect         Interfect         Nappe         Nappe           Interfect         Interfect         Nappe         Nappe           Interfect         Interfect         Interfect         Interfect         Nappe           Interfect         Interfe</td><td>Roberts         Recorded By: Log Checked By:           Impain         Air Hammer Intertect         Borehole Diameter: 50 mm         Surface RL: Coords:         2432 (405.5 m)           Impain         Air Hammer Intertect         Borehole Diameter: 50 mm         Surface RL: Coords:         243.5 m           Impain         Impain</td></td<>	Non-         Rescarded By Log Checker           Interfect         Barehole Diameter: 50 nm         Surface RL: Co-ords:           Interfect         Field Material Description         Rescarded By Log Checker           Interfect         Field Material Description         Rescarded By Log Checker           Interfect         Field Material Description         Rescarded By Log Checker           Interfect         CLV*-red traven         Interfect         Nappe           Interfect         CLV*-red traven         Nappe         Nappe           Interfect         CLV*-red traven         Nappe         Nappe           Interfect         CLV*-red traven         Nappe         Nappe           Interfect         Interfect         Nappe         Nappe           Interfect         Interfect         Nappe         Nappe           Interfect         Interfect         Interfect         Interfect         Nappe           Interfect         Interfe	Roberts         Recorded By: Log Checked By:           Impain         Air Hammer Intertect         Borehole Diameter: 50 mm         Surface RL: Coords:         2432 (405.5 m)           Impain         Air Hammer Intertect         Borehole Diameter: 50 mm         Surface RL: Coords:         243.5 m           Impain         Impain		



BORE NO.

## **GW23**

SHEET 2 OF 2

Bor	ent: ject: e Loca ject Nu		C R	ober	ora ( ts	td Coal Mine Project & 2162570B	Date Commenced:23/2/10Date Completed:23/2/10Recorded By:Angus McFarlaneLog Checked By:Kimberley Saflian			
	ling Me ling Co	ethod: mpany:		ir Ha terte		er Borehole Diameter: <b>50 mm</b>		ace RL: <b>405.9 mA</b> ords: <b>E 705786</b>	HD .22 N 6436148.65	
		ormation	า			Field Material Description				
WATER	WELL CON	ISTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION		HYDROGEOLOGY	
		50 mm slotted PVC casing	- 380 - 379 - 378 - 377 - 376 - 377 - 376 - 375 - 374 - 373 - 372 - 371 - 370 - 369 - 368 - 367 - 366 - 365 - 364 - 365 - 362 - 361 - 360 - 360 - 362 - 361 - 359	26 - 27 - 28 - 29 - 29 - 30 - 31 - 32 - 33 - 33 - 33 - 33 - 33 - 33		MUDSTONE - dark grey semi rounded and angular becoming harder with depth (continued) MUDSTONE/SILTSTONE - dark grey interbedded mudstone and siltstone SILTSTONE - dark grey and grey bedded siltstone 4-8mm chips		Napperby Formation		
		-	- 358 - 357 <u>- 356</u>	48 - 49 -		END OF BOREHOLE AT 42.00 m ble log should be read in conjunction with Parsons Brinckerhol	ffo c			



BORE NO.

## GW24A

Proje	ect: Location: ect Numbe	: er:	Cnr G 21144	oora Golde 426E	Coal Project en Hwy & Spring Ridge Rd : & 2162570B	Date Comme Date Comple Recorded By Log Checked	eted: 19/ y: Ch ed By: Stu	8/9/11 9/9/11 hiara Callipari tuart Brown
	ng Method ng Compa		Air ha Grick			Surface RL: Co-ords:	388.96 mAH E 710440.83	HD 3 N 6445279.99
	re Informa	,			Field Material Description			
				10				
WATER	ELL CONSTRUC	CTION (DHPm) L	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORI	RMATION	HYDROGEOLOGY
	200m PVC surfac casin 50mn PVC casin	ace ng and m – 388	8 1		CLAY. Yellow-brown & grey clay with minor dark red-brown, slightly oxidised and weathered fine to coarse grained sandstone.	Regolit	.h	
		- 387			SILTY CLAY, Light grey sitly clay, with 20-40% medium grey and yellow orange, weathered fine to coarse grained sandstone and minor yellow clay.			
¥////		- 38	0		/	Disbu		
		- 384	·		<ul> <li>SANDSTONE. Dark red, medium grey and yellow slightly weathered and oxidised fine coarse grained sandstone.</li> </ul>	<sup>ne to</sup> Digby Format	tion	
	50mn PVC casing		36		SILTY CLAY. Light grey, yellow and brown silty clay. 10-50% dark red, grey, yellow a brown fine to coarse grained sandstone.	and		
		- 382	2 7					
		- 38	81 8					
		- 380	-					
		- 379						
		- 378						
		- 376			SANDSTONE and CLAY. Light to dark grey tine to coarse grained sandstone with 40     light grey silty sandy clay.     CLAY. Medium grey and brown clay with minor yellow-brown to brown-red fine to coarse			
		- 37	'5 <sub>14</sub>		grained sandstone or siltstone.			
X		- 374	4 15		SANDSTONE. Dark grey fine sandstone with minor dark grey clay and light grey coal sandstone.	irse		
		- 373	'3 16	_				
¥.		- 372			CLAY. Dark grey clay. 30% light grey coarse sandstone. 20% dark grey sandstone of siltstone.	J.		
		- 37	10		SANDSTONE and SILT. Fine to very fine sandstone and silt with minor lithic quartz sandstone and light grey clay.			
					· salusione.			



BORE NO.

## GW24A

	nt: ect: e Loca	ation: umber:	C C	nr G	ora ( olde	Coal Project n Hwy & Spring Ridge Rd	Date Comn Date Comp Recorded E Log Checke	lleted: By:	SHEET 2 OF 3 18/9/11 19/9/11 Chiara Callipari Stuart Brown
	ng Me ng Co	ethod: ompany:		ir ha ricks			Surface RL Co-ords:		nAHD ).83 N 6445279.99
Bo	ore Inf	formatio	n			Field Material Description			
				Î	0				
WATER	WELL CO	NSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FO	RMATION	HYDROGEOLOGY
			- 368	21 -		SANDSTONE. Light grey fine to coarse gained quartz sandstone in a light grey clay matrix.	Digby Form		
			- 367	22 -					
			- 366 - 365	23 - 24 -		CLAY. Light grey clay with minor light grey, friable coarse grained quartz sandstone.			
			- 364	25 -		SANDSTONE. Medium to dark grey fine sandstone in light grey silty clay. Minor light	<sup>grey</sup> Whak	(a	_
			- 363	26 -		to brown siltstone and quartz.	Form		
			- 362	27 -		SANDSTONE. Yellow-brown to pink fine grained subrounded quartz sandstone.			
			- 361 - 360	28 - 29 -		SANDSTONE. Pink and yellow very coarse grained, quartz sandstone. 40% light grey-brown siltstone. 30% light grey coarse grained sandstone.			
		bentonite	- 359	29 - 30 -		COAL and SANDSTONE. 40% black coal. 30% orange-brown coarse grained quartz sandstone. 20% pink and grey angular sittstone. 10% light grey coarse grained sandstone.			
		gravel	- 358	31 -		COAL. Black coal.			
		pack 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.	d		
			- 355	34 -	·     ·				
			- 354 - 353	35 - 36 -		CLAYSTONE. Light grey claystone. 40% dark grey to black carbonaceous siltstone a minor medium grey, moderate to coarse grained sandstone.	and Avym Clays	iore itone	-
			- 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.	Flyblo	owers < Seam	-
			- 350	39 -		SANDSTONE. Medium to dark grey sandstone in light grey clay.			
	<u>·   ]'</u>	1			1	END OF BOREHOLE AT 47.50 m	I		



BORE NO.

## GW24A

	Bor	v≊añs ⊛ nt: ject: e Location: ject Number:	C C	nr G	ora C olde	td coal Project n Hwy & Spring Ridge Rd & 2162570B	Date Comr Date Comp Recorded I Log Check	oleted: By:	18/9/11 19/9/11 Chiara Callipari Stuart Brown		
Bore Information         Field Material Description           Image: Second contraction of the second contract of the second contexecond contexecond contract of the second contexecond contract o											
Image: biology of the construction of the set of the construction in the or for the construction in the set of the construction in				TICKS		-	Co-oras:	E /1044	0.83 N 6445279.99		
Note         Note         Note         Addition         Is addition in figt gay day, (orderwal)         Flydbourges           000         -34         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3         -3<			-			Tield Material Description					
UN         - 348         41	WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL	GRAPHIC LOG	LITHOLOGY	F	ORMATION	HYDROGEOLOGY		
x mp       - 342       47       - 351, TSTORE Black carbonaceous alistone with minor ligit grey sanstone and ligit grey       Alife 1 - 0.051/s       FE=2.490.05/cm         - 340       49       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       - <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td>Cree</td><td>owers k Seam</td><td></td></t<>							Cree	owers k Seam			
x mp       - 342       47       - 351, TSTORE Black carbonaceous alistone with minor ligit grey sanstone and ligit grey       Alife 1 - 0.051/s       FE=2.490.05/cm         - 340       49       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       - <t< td=""><td></td><td></td><td>- 346</td><td>43 -</td><td></td><td></td><td></td><td></td><td></td></t<>			- 346	43 -							
x mp       - 342       47       - 351, TSTORE Black carbonaceous alistone with minor ligit grey sanstone and ligit grey       Alife 1 - 0.051/s       FE=2.490.05/cm         - 340       49       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       - <t< td=""><td></td><td></td><td>- 345</td><td>44 -</td><td><u> </u></td><td>SANDSTONE. Medium grey fine to coarse grained sandstone in light grey clay.</td><td></td><td></td><td></td></t<>			- 345	44 -	<u> </u>	SANDSTONE. Medium grey fine to coarse grained sandstone in light grey clay.					
x mp       - 342       47       - 351, TSTORE Black carbonaceous alistone with minor ligit grey sanstone and ligit grey       Alife 1 - 0.051/s       FE=2.490.05/cm         - 340       49       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       - <t< td=""><td>/10/11</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	/10/11										
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	20					SILTSTONE. Black carbonaceous siltstone with minor light grev sandstone and light	tarev		EC=2.450mS/cm		
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$			- 341	48 -	<u>·</u>	clay.			_		
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$			— 340	49 -	-						
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$			- 339	50 -	_						
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$			- 338	51 -	-						
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$											
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$					-						
- 332 57 - - 331 58 -			- 334	55 -							
- 331 58 -			- 333	56 -							
			- 332	57 -							
				58 -							
END OF BOREHOLE AT 47.50 m			- 330	59 -							



BORE NO.

## GW24B

	ect: e Loca	ation: umber:	C C	nr Go	ora C olde	Coal Project D n Hwy & Spring Ridge Rd R	Date Commenced:17/9/11Date Completed:18/9/11Recorded By:Chiara CallipariLog Checked By:Stuart Brown			
	ing Me ing Co	ethod: mpany:		ir har ricks			urface RL o-ords:		mAHD 41.97 N 6445268.01	
В	ore In	formatior	า			Field Material Description				
WATER	WELL CO	INSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FO	RMATION	HYDROGEOLOGY	
		200mm PVC surface casing and 50mm PVC casing	- 389 - 388 - 387	1 - 2 -	/	CLAY. Red-brown, light grey and yellow mottled clay with minor red-brown and medium grey, oxidised, fine to coarse grained sandstone.	Rego	lith		
			- 386 - 385 - 384	3 - 4 - 5 -		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 Form	, ation		
		50mm PVC casing	- 383	6 - 7 -		SANDSTONE. Light grey and minor red fine to coarse grained sandstone. 10% light yellow-grey clayey sandy silt.	_			
			- 381	8 -		CLAYSTONE. Light grey and yellow silty, sandy claystone. 5-20% light grey and some yellow fine to coarse grained quartz sandstone.				
			- 380 - 379	9 - 10 -						
			- 378	11 -						
			- 377	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.				
			- 376 - 375	13 - 14 -		SANDSTONE. Light to medium grey and red-orange moderately weathered, fine to	_			
			- 374	15 -		coarse grained sandstone. 30-50% light grey clayey, sandy silt.				
			- 373	16 -		SILTSTONE. Light grey and yellow sandy, clayey sittstone and minor light grey and light yellow-orange fine to coarse grained quartz sandstone. 0-5% light grey sticky clay.				
			- 372 - 371	17 - 18 -						
			- 370	19 -						
	XV		-	This b	oreho	END OF BOREHOLE AT 52.70 m ble log should be read in conjunction with Parsons Brinckerhoff's a	ccompanyin	g standard	notes.	



BORE NO.

## GW24B

SHEET 2 OF 3

Proje		CHC Pty Ltd Cobbora Coal Cnr Golden H 2114426E & 2 Air hammer Gricks Drilling			Coal ProjectDaten Hwy & Spring Ridge RdRec& 2162570BLog	Date Commenced: 17/9/11 Date Completed: 18/9/11 Recorded By: Chiara Callipari Log Checked By: Stuart Brown Surface RL: 389.13 mAHD			
	g Company:						97 N 6445268.01		
Bor	e Information	า			Field Material Description				
WATER	LL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY		
X		- 369			SANDSTONE. Light to medium grey fine to coarse grained sandstone in a light grey silty clay matrix.	Digby			
		- 368	21 -			Formation			
		- 367	22 - 23 -						
		- 366 - 365	24 -						
		- 364	25 -						
		- 363	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.	EllismayneFormati	on		
		- 362	27 - 28 -						
		- 361 - 360	29 -		COAL. Black coal.	Whaka			
		- 359	30 -		SILTSTONE. Interbedded black carbonaceous siltstone and minor light brown and grey	Formation			
			31 -	· ·	claystone.				
		- 358		i					
		- 357	32 -						
		- 356	33 -	·   					
		- 355	34 -						
		- 354	35 -						
		- 353	36 -	;   ;   ;					
		- 352	37 -		CLAYSTONE. Light grey, clay with minor medium grey, medium to coarse grained sandstone.	Avymore Claystone			
		- 351	38 -		SANDSTONE. Medium to dark grey, fine to coarse grained poorly sorted sandstone.	Flyblowers			
		- 350	39 -			Creek Seam			



BORE NO.

## GW24B

SHEET 3 OF 3

Bor	ect: e Loca	ation: umber:	C C	nr Go	ora C olde	coal Project n Hwy & Spring Ridge Rd	Date Commenced:       17/9/11         Date Completed:       18/9/11         Recorded By:       Chiara Callipari         Log Checked By:       Stuart Brown			
	ing Me ina Co	ethod: mpany:		ir har ricks			Surfa Co-o	ace RL: <b>389.13 n</b> rds: <b>E 71044</b>	nAHD 1.97 N 6445268.01	
_	-	formation				Field Material Description				
WATER	WELL CO	NSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY		FORMATION	HYDROGEOLOGY	
	\$\$\\`\$\$\\`\$\$\\`\$\$\\`\$\$\\`\$\$\\`\$\$\\`\$\$\		- 349 - 348	41 -		SANDSTONE. Medium to dark grey, fine to coarse grained poorly sorted sandstone. (continued)		Flyblowers Creek Seam		
			- 347 - 346	43 -		SILTSTONE. Interbedded black carbonaceous siltstone and minor light to dark grey o	clay.			
			- 345	44 -						
			- 344 - 343	45 - 46 -		SILTSTONE. Black carbonaceous siltstone and minor medium grey fine to medium grained sandstone in a medium dark grey clay matrix.				
			- 342	47 -		granieu sanusione in a medicini daik grey day madik.				
		bentonite	- 341	48 - 49 -						
			- 340 - 339	50 —		SILTSTONE. Interbedded black carbonaceous siltstone in a medium to dark grey clay matrix and minor light brown and grey claystone.	ıy			
11		gravel pack	- 338	51 -						
26/10/11		50mm PVC slotted casing bentonite	- 337 - 336	52 - 53 -		SANDSTONE. Light grey fine to coarse grained sandstone in a light grey clay matrix.		Tom Cat Gully Sandstone	- Airlift <0.05L/s EC=0.570mS/cm pH=6.85	
			- 335	54 -					_	
			- 334	55 -						
			- 333	56 -						
			- 332	57 - 58 -						
			- 331 - 330	59 -						
			-	This b	oreho	END OF BOREHOLE AT 52.70 m	s accor	mpanying standard n	otes.	



BORE NO.

## GW24C

Proj Boro Proj	Client: Project: Bore Location: Project Number: Drilling Method:				nr Go	ora C olde	Coal ProjectDn Hwy & Spring Ridge RdR& 2162570BL	Date Commenced: Date Completed: Recorded By: og Checked By:	14/9/11 16/9/11 Chiara Callipari Stuart Brown
	-		thod: mpany:		r har ricks			Surface RL: <b>389.22 r</b> Co-ords: <b>E 71044</b>	nAHD  4.88 N 6445237.89
В	ore	Infe	ormatior	1			Field Material Description		
WATER	WELL	_ CON	STRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
			200mm PVC surface casing and 50mm PVC casing	- 389 - 388	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.		
			-	- 387 - 386 - 385	3 -		SANDSTONE. Light grey, light brown, light red and light yellow weathered fine to coarse grained sandstone ina light grey and light yellow sandy silty clay matrix.	<ul> <li>Digby Formation</li> </ul>	
		$\mathbb{N}$	50mm PVC casing	- 384 - 383	5 - 6 -				
			-	- 382	7 -				
	Y NY NY		-	- 381 - 380	8 - 9 -				
	XIXXXIX		-	- 379	10 – 11 –				
			-	- 378 - 377	12 -				
			-	- 376	13 - 14 -				
	Y XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX		-	- 375 - 374	15 -		SANDSTONE. Medium grey, medium to coarse grained sandstone in a medium grey sandy silt matrix.		
	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX		-	- 373	16 - 17 -				
			-	- 372 - 371	17 -		CLAYSTONE. Light grey and light yellow silty, sandy claystone and minor dark red and yellow medium to coarse grained quartz sandstone.		
			-	- 370	19 -		SANDSTONE. Light to medium grey fine to coarse grained sandstone and light to mediu grey clay, sand and silt.	m	
				г	his b	oreho	END OF BOREHOLE AT 57.10 m ble log should be read in conjunction with Parsons Brinckerhoff's a	accompanying standard r	notes.



BORE NO.

#### GW24C

Proj	ect: • Location: ect Number:	C C 2'	nr Go 11442	ora ( olde 26E	Coal ProjectEen Hwy & Spring Ridge RdF& 2162570BL	Date Commo Date Comple Recorded By Log Checked	eted: 16/ y: Ch d By: Stu	16/9/11 Chiara Callipari Stuart Brown		
	ng Method: ng Company:		ir haı ricks			Surface RL: Co-ords:	389.22 mAH E 710444.88	ID 3 N 6445237.89		
	ore Information				Field Material Description					
			Ŷ	(1)						
WATER	VELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FOR	MATION	HYDROGEOLOGY		
		- 369			SANDSTONE. Light to medium grey fine to coarse grained sandstone and light to mediu grey clay, sand and sit. (continued)	<sup>um</sup> Digby Forma	tion			
4 		- 368	21 -							
		- 367	22 -							
		- 366	23 -							
•		- 365	24 -							
		- 364	25 -							
		- 363	26 - 27 -		SANDSTONE. Light grey fine to medium grained sandstone and minor light grey, yellow and red sandy, silty clay.	Ellisma Forma				
		- 362	28 -							
		- 361	29 -		SANDSTONE. Light grey silty fine to coarse grained sandstone in a light grey clay matr					
		- 360	30 -		COAL. Black coal.	Whaka				
		- 359 - 358	31 -		SILTSTONE. Black carbonaceous siltstone with minor light grey claystone.					
		- 357	32 -	·     ·						
•		- 356	33 -							
		- 355	34 -	·	SILTSTONE. Black carbonaceous siltstone with minor moderate to coarse white clay.					
		- 354	35 -							
		- 353	36 -		COAL and CLAY. 50% black coal. 50% white clay.					
		- 352	37 -		SANDSTONE. Medium to dark grey, fine to medium grained sandstone with minor light grey and white clay.	Avymo Claysto	pre			
		- 351	38 -							
•		— 350	39 -							
				1:::	END OF BOREHOLE AT 57.10 m					



BORE NO.

## GW24C

SHEET 3 OF 3

Client: Project: Bore Location: Project Number: Drilling Method:			Co Co	CHC Pty Ltd Cobbora Coal Project Cnr Golden Hwy & Spring Ridge Rd 2114426E & 2162570B Air hammer			ate Commenced: ate Completed: ecorded By: og Checked By:	14/9/11 16/9/11 Chiara Callipari Stuart Brown
		thod: mpany:		r ha ricks			urface RL: <b>389.22 r</b> o-ords: <b>E 71044</b>	nAHD 4.88 N 6445237.89
		ormatio				Field Material Description		
				ير) بر)	ل و			
WATER	WELL CON	ISTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
			- 349			SANDSTONE. Medium to dark grey, fine to medium grained sandstone with minor light grey and white clay. (continued)	Avymore Claystone	
			- 348	41 -				
			- 347	42 -		SILTSTONE. Dark grey-black carbonaceous siltstone and minor medium to dark grey, fine to medium grained sandstone and white clay.	Flyblowers Creek Seam	_
			- 346	43 -			Creek Seam	
			340	44 -	·   ·			
			- 345					
			- 344	45 -		SANDSTONE. Medium to dark grey, fine to coarse grained sandstone in a medium grey clay matrix.		
			- 343	46 -	:::: 	SILTSTONE. Dark grey-black carbonaceous siltstone with minor medium grey clay.		
			- 342	47 -	—	SANDSTONE. Medium to dark grey and black, fine to coarse grained carbonaceous sandstone with minor medium grey clay.		
			- 341	48 -				
			- 340	49 -		SILTSTONE. Black carbonaceous siltstone with minor light brown and grey claystone.		
				50 -				
			- 339	51 -	· ·			
			- 338	52 -				
			- 337	52 -				
		bentonite	- 336	53 -	· ·			
			- 335	54 -				
			- 334	55 -		SANDSTONE. Light to medium grey, fine to coarse grained sandstone with minor medium	<ul> <li>Tom Cat Gully</li> </ul>	_
<del>~</del>		gravel pack		56 -		grey clay.	Sandstone	
20/10/11		50mm PVC slotted casing	- 333	57 -				Airlift <0.05L/s
		bentonite	- 332					EC=1.872mS/cm pH=8.72
			- 331	58 -		SILTSTONE. Black carbonaceous siltstone with minor light brown and grey claystone.		
			- 330	59 -	·			-
	]					END OF BOREHOLE AT 57.10 m		



BORE NO.

### GW24D

Bor Pro	nt: ect: e Loca ect Nu ing Me	imber:	C C 2	nr Go	ora C olde 26E	oal Project 1 Hwy & Spring Ridge Rd & 2162570B	Date ( Recor Log C	Commer Complete ded By: hecked I ce RL: <b>3</b>	ed: By:	13/10/11 14/9/11 James Dommisse Stuart Brown
	-	tnod: mpany:		r nar ricks			Co-or			15.78 N 6445227.26
В	ore Inf	ormatior	ו			Field Material Description				
WATER	WELL CON	STRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY		FORMA	TION	HYDROGEOLOGY
	1), K.(), K.	200mm PVC surface casing and 50mm PVC casing	- 389 - 388 - 387 - 386 - 385 - 384 - 383 - 382 - 381 - 382 - 381 - 380 - 379 - 379 - 379 - 377 - 377 - 375 - 374 - 373 - 372 - 371	$\begin{bmatrix} \Box \\ \Box $		SANDSTONE. Weathered dark red and yellow-brown fine to medium grained sandstone with minor yellow, orange, red-brown clay.	ne in ne to	Digby Formatio	n	
			- 370							
			-	This b	oreho	END OF BOREHOLE AT 70.00 m le log should be read in conjunction with Parsons Brinckerhoffs	s accom	panying st	andard r	notes.



BORE NO.

## GW24D

	YEARS ®							SHEET 2 OF 4
Clie			HC F			Date Comn		3/10/11
	ject:					Date Comp		4/9/11
	e Location: ject Number:					Recorded E		ames Dommisse Stuart Brown
	ling Method:		ir hai			-	: 389.30 mA	
	ling Company:		ricks			Co-ords:		78 N 6445227.26
	ore Information				Field Material Description			
		â	DEPTH (mBGL)	GRAPHIC LOG				
WATER	WELL CONSTRUCTION	RL (mAHD)	n) HT	APHIC	LITHOLOGY	FC	RMATION	HYDROGEOLOGY
Ŵ		RL (	DEF	GRV				
					CLAYSTONE. Medium grey, silty, sandy claystone and minor light to dark grey and ye		-	
		- 369			fine to coarse grained sandstone. (continued)	llow Digby Form	ation	
			21 -					
		- 368						
			22 -					
		- 367	22					
		- 366	23 -					
		- 365	24 -	-	SILTSTONE. Light grey, clayey, sandy siltstone and minor light grey fine to coarse grained quartz sandstone.	Ellisn		
		505		<u> </u>	granieu quariz sanusione.	Form	ation	
			25 -	·				
		- 364		·				
			26 -	<u> .                                    </u>	SILTSTONE. Light grey, clayey, sandy siltstone with minor light grey medium to fine			
		- 363		·	grained sandstone and dark red, vuggy, fine to coarse grained sandstone.			
			27 -					
		- 362						
				<u>-</u>				
		- 361	28 -	1_				
				_	- -			
		- 360	29 -		SANDSTONE. Light grey fine to coarse grained quartz sandstone. 20% black coal.			
		250	30 -	••••	COAL. Black coal.	What	a	
		- 359				Form	ation	
			31 -	_	SILTSTONE. Black carbonaceous siltstone with minor light grey claystone and white c	clay.		
		- 358		·				
			32 -	·				
		- 357		· _	-			
			33 -					
		- 356						
			34 -		-			
		- 355	J4 -					
				_				
		- 354	35 -	1-				
				_				
		- 353	36 -	-	SILTSTONE. Black carbonaceous siltstone with minor white clay and light grey fine to coarse grained sandstone.	1 1 1 1 1 1	ore	
						Clays	tone	
		050	37 -	1				
		- 352		·				
			38 -	<u> .</u>	SANDSTONE. Light to dark grey sandstone with minor white and medium grey clay an	<sup>id</sup> Flyblo	Wers	
		- 351			black carbonaceous siltstone.	Creel	(	
			39 -	::::		Form	ation	
		- 350						
					END OF BOREHOLE AT 70.00 m			



BORE NO.

## GW24D

SHEET 3 OF 4

Project Number: 211				n Hwy & Spring Ridge Rd & 2162570B	Date Commenced: 13/10/11 Date Completed: 14/9/11 Recorded By: James Dommisse Log Checked By: Stuart Brown Surface RL: 389.30 mAHD				
		ir har ricks							
g Company: e Informatio				Iling Borehole Diameter: Field Material Descript		-ords:	E /10443./0	3 N 6445227.26	
	<b>İ</b>								
LL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY		FOR	MATION	HYDROGEOLOGY	
	- 349			SANDSTONE. Light to dark grey sandstone with minor black carbonaceous siltstone. (continued)	white and medium grey clay and	Creek			
	- 348	41 -							
	- 347	42 -							
	- 346	43 -							
	- 345	44 -							
	- 344	45 -							
	- 343	46 -	· · · · · · · · · · · · · · · · · · ·						
	- 342								
	- 341								
	- 340				······································				
	- 339	51 -		and light grey clay.					
	- 338	52 -		SIL IS FORE. DRICK Caliboraceous sinstone was minor	light Drown iaminiateo Gaystone.				
	- 337	53 -							
		54 -							
		55 -		SANDSTONE. Light to dark grey fine to coarse grained carbonaceous silistone.	I sandstone, and minor black				
	- 333	56 -	-			Sandst	one		
	- 332	57 -							
	- 331	58 -	-						
	- 330	59 -	· · · ·	SILTSTONE. Black carbonaceous silstone with minor li light grey sandstone.	ight grey claystone, and medium to	Upper Seam	Ullan		
		- 349 - 348 - 347 - 346 - 345 - 344 - 343 - 343 - 343 - 343 - 342 - 341 - 340 - 340 - 339 - 338 - 337 - 336 - 335 - 334 - 333 - 332 - 331	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	349         SANDSTONE. Light to dark grey sandstore with minor black carbonaceous silistone. (continued)           348         41           348         42           347         42           346         44           345         44           346         44           347         45           348         44           349         45           346         44           347         45           348         46           348         46           349         46           344         46           347         48           348         47           349         34           341         48           343         51           344         51           349         31           351         31           36         -           37         -           38         -           39         -           31         -           32         -           336         -           337         -           -         -	SAMPSITORE Light to dark gray standards with minor while and medium gray day and box. cathornecous stillations. (continued) $ \begin{array}{ccccccccccccccccccccccccccccccccccc$	SMDETORE     Light to dark provide statistics     Contractor       349     1       348     1       348     1       348     1       348     1       348     1       348     1       348     1       348     1       348     1       348     1       348     1       348     1       348     1       348     1       348     1       348     1       348     1       348     1       348     1       348     1       348     1       348     1       348     1       348     1       348     1       349     1       341     1       342     1       341     1       342     1       344     1       349     1       349     1       341     1       341     1       341     1       341     1       341     1       341     1       341     1	Subscription         Subscription         Subscription         Flyblowers Creak Formation         Flyblowers Creak Formation           -349         -41	



BORE NO.

## GW24D

SHEET 4 OF 4

Bor	nt: ject: e Location: ject Number:	C C	nr Go	ora C olde	Coal Project Da Da <b>n Hwy &amp; Spring Ridge Rd</b> Re	Date Commenced:13/10/11Date Completed:14/9/11Recorded By:James DommisseLog Checked By:Stuart BrownSurface RL:389.30 mAHD				
	ing Method: ing Company:		ir har ricks				nAHD 5.78 N 6445227.26			
	ore Informatio				Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY			
	bentonite	- 329 - 328 - 327	61 -		SILSTONE. Black carbonaceous siltstone with minor light brown claystone.	Upper Ullan Seam				
	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 - 65 -		SILSTONE. Black carbonaceous siltstone with minor light brown claystone.	Lower Ulan Seam	_			
19/10/11		- 324 - 323	66 -	· ·	COAL. Black coal.	_				
15	bentonite	- 322	67 -		SILSTONE. Black carbonaceous siltstone with minor medium grey silty clay.	_	Airlift=0.1L/s EC=3.04mS/cm pH=5.98			
		- 321	68 - 69 -							
		- 320 - 319	70 –	· _ ·			_			
		- 318	71 -							
		- 317	72 -							
		- 316	73 - 74 -							
		- 315	75 -							
		- 313	76 -							
		- 312	77 -							
		- 311	78 - 79 -							
		- 310			END OF BOREHOLE AT 70.00 m					



BORE NO.

## GW24E

Bor Proj	ect: e Loca ect N	ation: umber: ethod:	Co Ci 21	nr Go	ora C oldei 26E d	Coal Project [ n Hwy & Spring Ridge Rd F & 2162570B [	Date Comm Date Comple Recorded By _og Checke Surface RL:	eted: y: d By:	25/9/11 26/9/11 Chiara Callipari Stuart Brown mAHD
Drill	ng Co	ompany:		ricks	Dri		Co-ords:		46.25 N 6445216.68
В	ore In	formation	า			Field Material Description			
WATER	WELL CO	ONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FOR	MATION	HYDROGEOLOGY
		200mm PVC surface casing and 50mm PVC casing	- 389 - 388	1 - 2 -		SANDY CLAY. Dark grey and brown-red sandy clay. CLAY. Mottled white, yellow and brown clay, with minor dark grey and brown-red weathered fine sandstone.	Regoli	th	
			- 387 - 386 - 385	3 - 4 -		SANDSTONE. Medium grey, orange-brown and dark red fine to coarse grained sandstone of angular and planar chips, in a brown and red silty clay matrix.	Digby Forma	tion	
		50mm PVC casing	- 384	5 - 6 -		SANDSTONE. Dark brown-red to purple medium to coarse grained sandstone.			
			- 383 - 382	7 -		sandstone in dark brown-red silty clay matrix.			
			- 381 - 380	8 - 9 -		CLAYSTONE. Brown-yellow silty claystone with minor light brown, dark grey and brown-red subrounded medium to coarse grained sandstone. SILTSTONE. Medium to dark grey thinly laminated, friable, siltstone in a brown silty cla matrix.	iy		
			- 379	<b>10 -</b> 11 -		CLAYSTONE. Light brown-yellow silty claystone with minor grey-yellow fine to coarse grained sandstone.			
			- 378 - 377	12 -					
			- 376 - 375	13 - 14 -		CLAY and SANDSTONE. 50% medium grey clay. 50% yellow-orange and brown-red coarse grained, subrounded sandstone. SANDSTONE. Dark grey, friable, fine grained sandstone with minor brown-red and yell fine to coarse grained sandstone in a grey clay matrix.	ow		
			- 374	15 -		SANDSTONE. Light to dark grey fine grained sandstone in a grey clay matrix.			
			- 373 - 372	16 - 17 -					
			- 371	18 - 19 -		SANDSTONE. Grey, orange and brown-red coarse grained quartz sandstone with mino dark grey sandy clay.	or		
			- 370	19 -		END OF BOREHOLE AT 88.00 m			



BORE NO.

## GW24E

	YEARS ®								SHEET 2	0 5
Clie			HC F				nmenced:	25/9/1		
	ject:					Date Con		26/9/1		
	e Location:					Recorded			a Callipari : Brown	
	ject Number:					Log Cheo			DIOWII	
	ing Method:		r hai				RL: 389.29 n			
	ing Company:		ricks	s Dri	-	Co-ords:	E 71044	6.25 r	6445216.68	
В	ore Informatior	า		1	Field Material Description	1				
			3L)	g						
с		Э Г Н	DEPTH (mBGL)	GRAPHIC LOG						
WATER	WELL CONSTRUCTION	RL (mAHD)	EPTH	RAPH	LITHOLOGY		FORMATION		HYDROGEOLOGY	
>		RI	Ö	Ū						
					SANDSTONE. Light grey-brown medium to coarse grained lithic quartz sandstone in a	a Dig	ihv			
		- 369		::::	light grey to white sandy clay matrix.		rmation			
			21 -							
		- 368								
			22 -							
		- 367								
			00							
		- 366	23 -							
		- 365	24 -							
		- 305								
			25 -							
		- 364								
			26 -		CILTETONE Light have to see and mailing have bad with largested difference			_		
		- 363			SILTSTONE. Light brown to grey and medium brown hard, partly laminated siltstone in grey to white sandy clay matrix.	Foi	smayne rmation			
			27 -							
		- 362	21		SANDSTONE. Light to dark grey, brown-grey and red-yellow medium grained lithic qu sandstone in a light grey clay matrix.	lartz				
		- 361	28 -							
		- 360	29 -		SANDSTONE. Light grey and pink coarse grained lithic quartz sandstone, with minor	coal.				
		500								
			30 -		COAL. Coal with minor light grey-brown fine siltstone and a trace of light grey coarse	Wł	naka	_		
		- 359			sandstone.	Fo	rmation			
			31 -							
		- 358								
			32 -							
		- 357								
			33 -							
		- 356	00		SILTSTONE. Dark grey-black carbonaceous siltstone.					
				<u> </u>						
		- 355	34 -		SILTSTONE. Dark grey-black carbonaceous siltstone and light grey clay, with minor l brown-grey siltstone.	light				
				— ·						
		- 354	35 -							
		004		·						
			36 -	<u> </u>	SILTSTONE. Dark grey-black carbonaceous siltstone interbedded with light to mediur	m Av	ymore	_		
		- 353		·	grey, fine to coarse sandstone and grey clay.	Cla	ystone			
			37 -	·						
		- 352		·						
			38 -	·						
		- 351								
			39 -	<u> </u>						
		- 350	J9 -		SANDSTONE. Light to medium grey fine to coarse grained sandstone interbedded wi dark grey-black carbonaceous siltstone and light to dark grey clay.	th Fly	blowers eek Seam			
					END OF BOREHOLE AT 88.00 m			1		



BORE NO.

## GW24E

Clier Proj				ty Li	td oal Project		e Comm e Comple		25/9 26/9	
Bore	ect. Location: ect Number:	C	nr Go	older	h Hwy & Spring Ridge Rd & 2162570B	Rec	orded By Checke	y:	Chia	ara Callipari art Brown
	ng Method: ng Company:			nme 5 Dril			ace RL: ords:	389.29 r		) N 6445216.68
	ore Informatio		TICKS		Field Material Description	0-0	JIUS.	E / 1044	0.25	N 0445210.00
			Ê	U	<b>I</b>					
WATER	VELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY		FOR	MATION		HYDROGEOLOGY
		- 349			SANDSTONE. Light to medium grey fine to coarse grained sandstone interbedded dark grey-black carbonaceous siltstone and light to dark grey clay. (continued)	l with	Flyblov Creek	vers Seam		
		- 348	41 -							
		- 347	42 -							
		- 346	43 -							
		- 345	44 -							
		- 344	45 -							
		- 343	46 - 47 -							
		- 342	47 -							
		- 341	49 -							
		- 340	50							
		- 339	51 -		SILTSTONE. Dark grey-black carbonaceous siltstone with minor light brown-grey		-			
		- 338 - 337	52 -	· · · ·	siltstone. SILTSTONE. Dark grey-black carbonaceous siltstone with minor medium grey fine coarse sandstone.	to	-			
		- 336	53 -	· ·	SILTSTONE. Dark grey-black carbonaceous sittstone with minor medium grey fine coarse grained sandstone.	to	-			
		- 335	54 -							
		- 334	55 -	· ·	SILTSTONE. Dark grey-black carbonaceous siltstone with minor grey claystone.		Tom C Sands	at Gully	_	
		- 333	56 -	· ·	SILTSTONE. Dark grey-black carbonaceous siltstone with minor light brown-grey siltstone.					
		- 332	57 -		SANDSTONE. Light to medium grey fine to coarse grained sandstone.		-			
		- 331	58 -							
		- 330	59 -							
		I			END OF BOREHOLE AT 88.00 m					



BORE NO.

## GW24E

Proje	ct: Locat ct Nur	nber:	C C 2'	CHC Pty Ltd Cobbora Coal Project Cnr Golden Hwy & Spring Ridge Rd 2114426E & 2162570B Air hammer Gricks Drilling Borehole Diameter: 50 mm				Comme Comple rded By Checked	9/11 9/11 ara Callipari art Brown D		
	g Met g Con	hod: npany:					Surfa Co-o		389.29 E 71044		N 6445216.68
		ormatio	n			Field Material Description					
				Ĺ.	g						
WATER	ELL CONS	STRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY		FOR	MATION		HYDROGEOLOGY
Ň			- 329			SILTSTONE. Interbedded dark grey-black carbonaceous siltstone, light brown-grey siltstone, light grey clay and minor quartz.		Upper Seam	Ulan		
			- 328	61 -	·	SILTSTONE. Dark grey-black carbonaceous siltstone with minor light brown medium coarse grained sandstone.	n to				
			- 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-Mark Claysto Lower	one	_	
			- 322	67 -				Seam			
			- 321	68 -							
			- 320	69 -		SILTSTONE. Dark grey-black carbonaceous siltstone.					
		bentonite	- 319	70 —	·						
		gravel pack	- 318	71 -	· _ ·						
		50mm PVC slotted	- 317	72 -	· · · · · ·	SANDSTONE. Medium to dark grey fine to coarse grained quartz sandstone.		Dapper Format	r		
		casing	- 316	73 -							
			- 315	74 -							
			- 314	75 -							
			- 313	76 -							
			- 312	77 -							
			- 311	78 -							
			- 310	79 -							
	日一				::::	END OF BOREHOLE AT 88.00 m					



BORE NO.

## GW24E

SHEET 5 OF 5

Bor	nt: ject: e Location: ject Number:	Cnr	bor Gol	a C Idei	td coal Project n Hwy & Spring Ridge Rd & 2162570B	Date Commenced:       25/9/11         Date Completed:       26/9/11         Recorded By:       Chiara Callipari         Log Checked By:       Stuart Brown				
	ing Method: ing Company:	Air I Gric					ace RL: <b>389.29 m</b> ords: <b>E 710446</b>	nAHD 6.25 N 6445216.68		
_	ore Information	ı	-		Field Material Description					
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY		FORMATION	HYDROGEOLOGY		
1/1/16		- 308 - 307 - 306 - 306 - 304 - 303 - 304 - 303 - 302 - 301 - 300 - 299 - 298 - 298 - 297 - 298 - 297 - 296 - 295 -	31 - 32 - 33 -		SANDSTONE. Light grey coarse grained lithic quartz sandstone. SANDSTONE. Light grey coarse grained lithic quartz sandstone.		Dapper Formation	Airlift=0.125L/s EC=2.74mS/cm pH=6.03		
		Thi	s boi	reho	le log should be read in conjunction with Parsons Brincke	erhoff's acco	ompanying standard no	otes.		



BORE NO.

## **GW25**

Proj	ect e Lo ect	ocat Nu	tion: mber:	Co Da 21	arling	ora ( gtor 26E	Coal Project         Da           Re         Re           & 2162570B         Lo	ate Commenced: ate Completed: ecorded By: g Checked By: urface RL: <b>370.39 r</b>	9/11/11 10/11/11 Chiara Callipari Stuart Brown
			hod: npany:		r nar ricks				1201010 18.98 N 6443789.37
В	ore	Info	ormation	า			Field Material Description		
WATER	WELL	. CON	STRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	200mm PVC casing and 50mm PVC casing		1 - 2 - 3 - 4 - 5 - 6 - 7 - 6 - 7 - 7 - 8 - 7 - 10 - 7 - 11 - 12 - 13 - 11 - 13 - 15 - 14 - 15 - 16 - 17 - 18 - 17 - 18 - 17 - 21 - 22 - 23 - 24 - 23 - 24 - 25 - 26 - 27 - 28 - 27 - 28 - 29 - 30 - 31 - 33 - 34 - 34 - 34 - 34 - 34 - 34		SANDY CLAY. Red-brown and grey sandy clay.         SANDSTONE. Pirk, cream, yellow, red, grey and brown friable fine to medium grained lithic quartz sandstone with minor grey clay clasts.         CLAYSTONE. Black, cream, yellow and brown carbonaceous claystone.         SILTY CLAYSTONE. Light to dark grey and black carbonaceous silly claystone.         SILTY CLAYSTONE. Light to dark grey and black carbonaceous silly claystone.         SILTY CLAYSTONE. Light to dark grey and black carbonaceous silly claystone.         CLAYSTONE and SANDSTONE. 50% brown-grey sillstone. 50% medium grey fine to medium grained sandstone with carbonaceous flecks.         SILTY CLAYSTONE. Dark bown and black carbonaceous silly claystone.         CLAYSTONE. Care, brown and red mottled medium to coarse grained lithic sandstone.         SANDSTONE. Light yellow-cream to yellow-orange oxidised fine to medium grained lithic quartz sandstone.         SANDSTONE. Light yellow-cream to yellow-orange oxidised fine to medium grained lithic quartz sandstone in a cream clay matrix.         SANDSTONE. Light brown and grey fine to coarse grained lithic quartz sandstone in a cream clay matrix.         SANDSTONE. Medium grey moderately friable fine grained sandstone.         SANDSTONE. Medium grey friable fine quartz sandstone.         SANDSTONE. Light to dark grey fine to coarse grained lithic quartz sandstone in a cream clay matrix.         SANDSTONE. Light to dark grey fine to coarse grained carbonaceous sandstone, coarsening with depth, in light grey silly clay matrix.	Tom Cat Gully Sandstone         Ulan Coal Seams         Dapper Formation	
				T	This b	oreho	END OF BOREHOLE AT 61.00 m ble log should be read in conjunction with Parsons Brinckerhoff's ac	ccompanying standard r	notes.



BORE NO.

## **GW25**

SHEET 2 OF 2

Bor	ject: e Loca	ation: umber:	C D	arling	ora C gton	Coal Project	Date C Record	Commenced: Completed: ded By: necked By:	9/11/11 10/11/11 Chiara Callipari Stuart Brown
	ing Me ing Co	ethod: mpany:		ir har ricks			Surfac Co-orc	e RL: <b>370.39</b> ls: <b>E 7091</b>	mAHD 38.98 N 6443789.37
В	ore Inf	ormation	ı		1	Field Material Description			
				<u>د</u>	U				
WATER	WELL COI	NSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY		FORMATION	HYDROGEOLOGY
15/11/11		bentonite gravel pack 50mm slotted PVC casing	- 335 - 334 - 332 - 332 - 331 - 330 - 329 - 328 - 327 - 326 - 327 - 326 - 327 - 326 - 327 - 323 - 322 - 321 - 320 - 319 - 318 - 317 - 316 - 315 - 314 - 313 - 312 - 314 - 313 - 312 - 314 - 313 - 312 - 314 - 313 - 312 - 314 - 315 - 315 - 314 - 315 - 316 - 316 - 315 - 316 - 315 - 316 - 315 - 316 - 315 - 308 - 307 - 308 - 305 - 305 - 302 - 301 - 305 - 305 - 301 - 305 -	36 - 37 - 38 - 37 - 38 - 39 - 40 - 41 - 42 - 43 - 44 - 45 - 44 - 45 - 45 - 45 - 55 - 5		SANDSTONE. Light to dark grey fine to coarse grained carbonaceous sandstone, coarsening with depth, in light grey sily clay matrix. (continued)	n BOUS ised	Dapper Formation	Airlift=0.15L/s EC=3.18mS/cm pH=7.07
			-	This b	oreho	le log should be read in conjunction with Parsons Brinckerhoff's	accomp	panying standard	notes.



BORE NO.

## **GW26**

SHEET 1 OF 3

Bor	nt: ect: e Loca ect Nu		C Ti	mbe	ora C rtop	Coal Project E	Date Commenced: Date Completed: Recorded By: .og Checked By:	27/10/11 27/10/11 Chiara Callipari Stuart Brown
	ing Me ina Co	thod: mpany:		ir haı ricks			Surface RL: <b>434.9</b> Co-ords: <b>E 711</b>	5 mAHD 780.37 N 6443721.05
	-	ormation				Field Material Description		
				Ê	U			
WATER	WELL COM	NSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
	Ĭ	200mm PVC surface casing and 50mm				SANDSTONE. Red-brown weathered fine to coarse grained sandstone with red-brown clay.	Digby Formation	
		PVC casing 50mm PVC	- 434	1 -		CLAYSTONE. Dark red-pink, dark yellow and light grey mottled claystone.		
		casing	- 433	2 -		SANDSTONE. Light grey, dark yellow, red-brown and pink coarse sandstone and fine to coarse grained quartz sandstone.	0	
			- 432	3 -				
			- 431	4 -		SANDSTONE. Light brown-white and dark brown-orange, hard, fine to coarse grained lithic quartz sandstone with minor light grey clay.		
			- 430	5 -				
			- 429	6 -		SANDSTONE and SILTSTONE. 50% light brown-white and dark brown-orange, hard, fir to coarse grained lithic quartz sandstone with minor light grey clay. 50% light grey hard	ne	
			- 428	7 -		siltstone. SANDSTONE. Orange, pink, red and light grey mottled and moderately friable, fine to coarse grained quartz sandstone.		
			- 427	8 -				
			- 426	9 -		SANDSTONE and SILTSTONE. Interbedded light grey and yellow medium to coarse grained lithic sandstone and dark grey, planar, fine to coarse carbonaceous siltstone.	Ellismayne	
			- 425	10 –			Formation	
			- 424	11 -				
			- 423	12 -				
			- 422	13 -				
			- 421					
				14 -		COAL. Coal.	Whaka Formation	
			- 420	15 -		SILTSTONE. Dark grey-black to light grey-brown carbonaceous siltstone.		
			- 419	16 -	·	SILTSTONE and CLAYSTONE. Dark grey-black to light grey-brown carbonaceous siltstone and light grey-while carbonaceous claystone.		
			- 418	17 -	·         ·			
			- 417	18 -	·   ·			
			- 416	19 -				
	X X		_		— ·			
			-	This b	orehc	END OF BOREHOLE AT 57.00 m le log should be read in conjunction with Parsons Brinckerhoff's a	accompanying standar	d notes.



BORE NO.

## **GW26**

SHEET 2 OF 3

Proj	ect e Lo ect	ocation: Number:	Ca Ti 21	mbe  1442	ora C rtop 26E	Coal Project [ F & 2162570B [	Date Commenced: 27/10/11 Date Completed: 27/10/11 Recorded By: Chiara Callipari Log Checked By: Stuart Brown Surface RL: 434.95 mAHD				
		Method: Company:		ir hai ricks			Surface F Co-ords:		5 mAHD 780.37 N 6443721.05		
В	ore	Information	ו			Field Material Description					
WATER	WELL	CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY		FORMATION	HYDROGEOLOGY		
			- 414 - 413	21 - 22 -		SILTSTONE and CLAYSTONE. Dark grey-black to light grey-brown carbonaceous siltstone and light grey-white carbonaceous claystone. (continued)		haka rmation			
			- 412 - 411	23 - 24 -		SANDSTONE. Light grey medium to coarse grained sandstone with minor light grey cla					
			- 410	25 -		CLAYSTONE. Light grey claystone.	Av	ymore	_		
			- 409	26 -		COAL and SILTSTONE. Black stoney coal with minor medium brown carbonaceous sittstone.	Fly	vblowers eek Seam	_		
			- 408	27 -	· ·	SILTSTONE. Dark grey-black carbonaceous siltstone.					
			- 407 - 406	28 - 29 -							
			- 405	30 -	· ·						
			- 404	31 -							
			- 403	32 -		SILTSTONE. Dark grey-black carbonaceous siltstone with minor medium grey medium coarse grained sandstone.	<sup>ito</sup> To Sa	m Cat Gully ndstone			
			- 402 - 401	33 - 34 -		SANDSTONE. Light to medium grey fine to coarse grained quartz sandstone.					
			- 400	35 -							
			- 399	36 -							
			- 398	37 -							
			- 397	38 -	::::	COAL. Coal.		per Ulan am	—		
	Ň		- 396	39 -		SILTSTONE. Dark grey-black carbonaceous sittstone with minor light brown and mediu grey siltstone.	um				
			٦	Γhis b	oreho	END OF BOREHOLE AT 57.00 m le log should be read in conjunction with Parsons Brinckerhoff's a	accompan	iying standard	I notes.		


BORE NO.

# **GW26**

SHEET 3 OF 3

Bor Proj	ject: e Loca ject Nu	mber:	Ca Ti 21	mbe 11442	ora C rtop 26E d	Coal Project         Dia           Ref         Ref           & 2162570B         Lo	ate Commenced: ate Completed: ecorded By: og Checked By:	27/10/11 27/10/11 Chiara Callipari Stuart Brown
	ing Me <sup>:</sup> ing Coi	thod: mpany:		ir haı ricks			urface RL: <b>434.95 I</b> p-ords: <b>E 71178</b>	nAHD 0.37 N 6443721.05
В	ore Inf	ormatior	ו			Field Material Description		
WATER	WELL CON	ISTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
WATE		bentonite gravel pack 50mm PVC casing	<ul> <li>4 1/2</li> <li>- 394</li> <li>- 393</li> <li>- 392</li> <li>- 391</li> <li>- 390</li> <li>- 389</li> <li>- 389</li> <li>- 388</li> <li>- 386</li> <li>- 386</li> <li>- 386</li> <li>- 386</li> <li>- 386</li> <li>- 383</li> <li>- 382</li> <li>- 381</li> <li>- 380</li> <li>- 379</li> </ul>	$\begin{array}{c} 41 \\ 41 \\ 42 \\ 43 \\ 44 \\ 45 \\ 44 \\ 45 \\ 46 \\ 47 \\ 49 \\ 50 \\ 51 \\ 52 \\ 53 \\ 55 \\ 55 \\ 55 \\ 56 \\ 56 \\ 56 \\ 56$		SILTSTONE. Dark grey-black carbonaceous siltstone with minor light brown and medium grey siltstone. (continued) SILTSTONE and CLAYSTONE. Dark grey-black carbonaceous siltstone and light grey-brown claystone. COAL. Coal. SILTSTONE. Dark grey-black carbonaceous siltstone. SANDSTONE. Dark grey-black carbonaceous siltstone with minor light grey-brown medium to coarse grained sandstone and light grey clay.		Dry
			- 378 - 377 - 376	57 - 58 - 59 -				
						END OF BOREHOLE AT 57.00 m		
		-	_		orehc	END OF BOREHOLE AT 57.00 m le log should be read in conjunction with Parsons Brinckerhoff's ad	ccompanying standard r	lotes.



BORE NO.

# GW27

YEARS ®						SHEET 1 OF 2	
Client: Project: Bore Location: Project Number:	Cobbe Woola	Pty Ltd ora Coal Pr andra 26E & 2162	-	Date Comn Date Comp Recorded E Log Checke	leted: <b>29</b> / By: <b>Ch</b>	/10/11 /10/11 iara Callipari uart Brown	
Drilling Method: Drilling Company		ımmer s Drilling	Borehole Diameter: 50 mm	Surface RL Co-ords:	: 436.79 mAH	nAHD 0.22 N 6438900.47	
Bore Information		g	Field Material Description	00 0140.			
	Z RL (mAHD) DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FC	ORMATION	HYDROGEOLOGY	
200mm PVC casing are casing somm PVC casing somm PVC casing somm pro- casing somm soluted s		SANDS - CLAYS - CLA	rONE. Medium to dark grey medium to coarse grained sand vith minor orange and red oxidised fine to medium grained s	carbonaceous shale.       C-Ma         Clays       Ulan         weathered,       Ulan         istone.       Provide the second sec	rker tone		
	- 418 19 - 417	SANDS silty, sa	CONE. Light yellow, slightly oxidised, coarse grained lithic q ndy, clay matrix.	Jaritz Sanostone in			
		borehole log s	END OF BOREHOLE AT 2 nould be read in conjunction with Parsons I		g standard notes		



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#### **GROUNDWATER BOREHOLE LOG**

BORE NO.

# 27

	1000 VEARS ®							GW27 SHEET 2 OF 2	
Client: Project: Bore Location: Project Number:		C V	Voola	ora ( Indra	Coal Project E	Date Cor Recorde	nmenced: npleted: d By: cked By:	28/10/11 29/10/11 Chiara Callipari Stuart Brown	
	lling Method: lling Company:		ir haı iricks			Surface I Co-ords:	RL: 436.79 E 7156	mAHD 60.22 N 6438900.47	
E	Bore Informatio	n			Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY		FORMATION	HYDROGEOLOGY	
		- 416	21 -		SANDSTONE. Light yellow, slightly oxidised, coarse grained lithic quartz sandstone in silty, sandy, clay matrix. (continued) CLAY and SILTSTONE. Minor brown-red clay becoming dark grey-black carbonaceous siltstone.	Fo	pper rmation		
		- 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 cl (possibly collapsed material from near surface).	lay			
		- 412	25 -		(possibly collapsed material from near surface).				
		- 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 siltstor	ne.			
	sump	- 408	29 -		SANDSTONE. Yellow-brown coarse grained lithic quartz sandstone in a light brown clay matrix	y		Dry	

397				
		END OF BOREHOLE AT 29.50 m		
This bo	oreho	le log should be read in conjunction with Parsons Brinckerhoff's acco	ompanying standard not	es.



BORE NO.

# GW28A

Client: Project: Bore Location: Project Number:		C D	arling	ora C gton	Coal Project Da Re	te Commenced: te Completed: corded By: g Checked By:	2/11/11 2/11/11 Chiara Callipari Stuart Brown	
	ling Me ling Co	thod: mpany:		ir har ricks			rface RL: <b>376.00</b> - ords: <b>E 7105</b> 4	mAHD I8.42 N 6439196.01
_		ormatio				Field Material Description		
WATER	WELL COM	ISTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
8/11/11		S0mm PVC casing bentonite gravel pack S0mm slotted PVC casing	- 375 - 374 - 373 - 372 - 372	1 - 2 - 3 - 4 - 5 -		CLAY. Brown and orange silty clay with carbonaceous flecks. CLAY. Mottled brown, grey, orange and black sandy clay. CLAY. Coarse brown, grey and orange sandy clay. CLAY. Coarse brown, grey and orange sandy clay. CLAY. Light grey and light brown coarse sandy clay with subangular clasts of 2-10mm diameter, mixed lithologies. CLAY. Brown and grey sandy clay with subrounded clasts of 2-30mm diameter, mixed lithologies.	Alluvium	
~		sump	- 370 - 369 - 368 - 367	6 - 7 - 8 - 9 -	preho	END OF BOREHOLE AT 6.00 m	companying standard r	Airlift=0.017L/s EC=4.02mS/cm pH=7.49



BORE NO.

#### **GW28B**

Client: Project: Bore Location: Project Number:			C D	arling	ora C gton	Coal Project Da	te Completed: corded By:	2/11/11 2/11/11 Chiara Callipari Stuart Brown
	ing Me ing Co	ethod: ompany:		ir har ricks			rface RL: <b>375.93 m</b> -ords: <b>E 710545</b>	AHD 5.32 N 6439185.93
		formation				Field Material Description		
WATER	WELL CO	INSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY
8/11/11		50mm PVC casing bentonite gravel pack 50mm slotted PVC casing	- 375 - 374 - 373 - 372 - 372 - 371 - 370 - 369 - 368 - 368 - 368	1 2 3 4 5 6 7 8 8 9		SILTY CLAY. Mottled brown, grey and orange silly clay.         SILTY CLAY. Brown silly clay.         SANDY CLAY. Coarse brown sandy clay.         GRAVELLY SANDY CLAY. Light brown and light grey sandy clay with subangular clasts of weathered sandstone and quartz, up to 10mm diameter.         GRAVELLY SANDY CLAY. Light brown and light grey sandy clay with subangular clasts of weathered sandstone and quartz, up to 10mm diameter.         GRAVELLY SANDY CLAY. Brown and grey sandy clay with carbonaceous flecks and subrounded clasts of weathered sandstone and quartz, up to 20mm diameter.         CLAYEY GRAVEL. Brown-orange subrounded gravel of mixed lithologies from 5-50mm diameter in light grey and brown clay.         CONCLOMERATE. Quartz-rich granule conglementate of mixed lithologies of 2-5mm diameter clasts, with a minor light grey clay.         END OF BOREHOLE AT 8.00 m	Alluvium	Airlift=0.125L/s EC=7.88mS/cm pH=7.35
				This b	oreho	ble log should be read in conjunction with Parsons Brinckerhoff's ac	companying standard no	tes.



BORE NO.

### **GW28C**

SHEET 1 OF 2

Client: Project: Bore Location: Project Number:			C D	arling	ora C gton	Coal Project Da	Date Commenced:       1/11/11         Date Completed:       2/11/11         Recorded By:       Chiara Callipari         Log Checked By:       Stuart Brown			
		ethod: ompany:		ir haı ricks			rface RL: <b>375.88 m</b> o-ords: <b>E 710542</b>	AHD 14 N 6439176.71		
В	ore In	formatio	n			Field Material Description				
					U					
WATER	WELL CO	ONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY		
		200mm PVC surface casing and 50mm PVC casing	- 375 - 374	1 - 2 -		SILTY CLAY. Brown silty clay. SANDY CLAY. Brown, grey and orange sandy clay.	Alluvium			
	//////////////////////////////////////		- 373 - 372	3 - 4 -		GRAVEL. Brown-orange coarse subrounded gravel of mixed lithologies in brown-grey				
			- 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 - 368	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 mtrix.	_			
			- 367	8 - 9 -		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 mtrix. Becoming black carbonaceous siltstone.		-		
			- 366	10	· ·	SILTSTONE and CLAYSTONE. 50% black carbonaceous siltstone. 50% light grey-white siltstone and claystone.	Flyblowers Creek Seam			
			- 365	11 -	· ·	(contamination from above). SILTSTONE and SANDSTONE. Medium grey carbonaceous siltstone and fine sandstone, with minor coal. Minor clasts of mixed lithologies (contamination from above).	Tom Cat Gully	-		
		50mm PVC	- 364	12 -	· ·	with finition coal, without classes of finited intrologies (containingtion from above).	Sandstone			
		casing	- 363	13 -	 					
			- 362	14 -	· ·					
			- 361	15 -	· ·					
			- 360 - 359	16 -	· · · · · · · · · · · · · · · · · · ·	SANDSTONE. Coarse quartz sandstone.	-			
		hentorite	- 358	17 - 18 -		SILTETONE Cool and dade grave and account of the trace		_		
		bentonite	- 357	19 -	· ·	SILTSTONE. Coal and dark grey carbonaceous siltstone.	Upper Ulan Seam			
			- 356		· ·	grey-white claystone and siltstone of platey chips.				
				This b	oreho	END OF BOREHOLE AT 29.50 m ole log should be read in conjunction with Parsons Brinckerhoff's ac	companying standard no	tes.		



BORE NO.

#### **GW28C**

SHEET 2 OF 2

Client: Project: Bore Location: Project Number:			Co Da	arlinç	ra C gton	Coal Project E	Date Commenced:1/11/11Date Completed:2/11/11Recorded By:Chiara CallipariLog Checked By:Stuart Brown			
	Drilling Method: Drilling Company: Bore Information			ir har ricks			Surface I Co-ords:	RL: 375.88 E 7105	mAHD 542.14 N 6439176.71	
В	ore Inf	formatior	۱			Field Material Description				
WATER	WELL COP	NSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY		FORMATION	HYDROGEOLOGY	
8/11/11		somm slotted PVC casing	- 355 - 354 - 353 - 352 - 351 - 350 - 349 - 349 - 349 - 349 - 349 - 349 - 349 - 349 - 347 - 346 - 347 - 346 - 345 - 345 - 342 - 342 - 342 - 342 - 342 - 343 - 342 - 343 - 342 - 343 - 342 - 343 - 342 - 343 - 342 - 343 - 345 - 342 - 343 - 345 - 338 - 335 - 336 - 336	21 - 22 - 23 - 24 - 25 - 26 - 27 - 28 - 29 - 30 - 31 - 32 - 33 - 33 - 33 - 33 - 33 - 33 - 33		SILTSTONE: Dark grey-black carbonaceous siltstone with minor coal. SILTSTONE: Dark grey-black carbonaceous siltstone with minor coal, interbedded with light grey claystone and siltstone. SILTSTONE: Dark grey-black carbonaceous siltstone. CLAYSTONE: Light to medium grey, moderately friable, claystone. SILTSTONE: Dark grey carbonaceous siltstone with minor coal. SILTSTONE: Dark grey carbonaceous siltstone with minor coal.	C Cla Lo Se	Marker aystone wer Ulan am	Airlift=0.35L/s EC=2.77mS/cm pH=6.81	



BORE NO.

#### GW28D

Client: Project: Bore Location: Project Number:	Darling	ora C gton	c <b>oal Project</b> Da Re	Date Commenced: 31/10/11 Date Completed: 1/11/11 Recorded By: Chiara Callipari Log Checked By: Stuart Brown			
Drilling Method: Drilling Company:	Air har Gricks			rface RL: <b>375</b> -ords: <b>E 7</b> ′	.80 mAHD 10538.12 N 6439165.79		
Bore Information			Field Material Description				
		U					
	RL (mAHD) DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY		
PVC casing	370 6 -		SILTY CLAY. Brown and grey silty clay. CLAY. Light brown, grey and orange slightly carbonaceous clay. CLAYEY GRAVEL. Coarse orange-brown subrounded gravel of mixed lithologies in light grey clay. CLAYEY GRAVEL. Brown-orange and cream-brown sandy and clayey subrounded gravel of mixed lithologies of 2-30mm diameter.	Alluvium			
	<ul> <li>369</li> <li>7 -</li> <li>368</li> <li>8 -</li> <li>367</li> <li>9 -</li> <li>366</li> <li>10 -</li> <li>365</li> <li>11 -</li> </ul>		COAL or SHALE. Hard black carbonaecous, fine grained coal or shale. COAL. Coal interbedded with coarse quartz orange-red and dark grey pebble conglomerate with 2-12mm diameter clasts.	Flyblowers Creek Seam	1		
50mm PVC casing -	364 12 - 363 13 - 362 14 -		CONGLOMERATE. Coarse sandy subrounded pebble conglomerate of mixed lithologies from 2-30mm diameter, interbedded with dark grey carbonaceous mudstone. Some light grey clay clods. 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. SANDSTONE. Coarse quartz sandstone or pebble conglomerate with minor grey	Tom Cat Gu Sandstone	lly		
	361 15 - 360 16 - 359 17 -		siltstone.				
	358 18 - 357 19 - 356		SANDSTONE and SILTSTONE. 50% coarse quartz sandstone. 50% dark grey-black carbonaceous siltstone. SILTSTONE. Dark grey siltstone with minor white claystone and minor light grey siltstone with carbonaceous flecks. END OF BOREHOLE AT 38.50 m le log should be read in conjunction with Parsons Brinckerhoff's acc	Upper Ulan Seam			



BORE NO.

### GW28D

SHEET 2 OF 2

Client: Project: Bore Location: Project Number:			C D	arling	ora C gton	Coal Project D	Date Commenced:31/10/11Date Completed:1/11/11Recorded By:Chiara CallipariLog Checked By:Stuart Brown			
		lethod: ompany:		ir har ricks			Surface RL: <b>375.80 m</b> Co-ords: <b>E 710538</b>	AHD 3.12 N 6439165.79		
_	-	formation	า			Field Material Description	1			
				Ē.	g					
WATER	WELL C	ONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FORMATION	HYDROGEOLOGY		
			- 355	21 -		SILTSTONE. Dark grey siltstone with minor white claystone and minor light grey siltston with carbonaceous flecks. (continued)	<sup>le</sup> Upper Ulan Seam			
			- 354	22 -	· ·	COAL. Coal.				
			- 353 - 352	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.				
			- 351	24 - 25 -		CLAYSTONE. Light to medium grey-white claystone with carbonaceous flecks.	C-Marker Claystone	_		
			- 350	25 -		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 -						
	× ×	bentonite	- 346	30 —	· ·					
		gravel pack	- 345 - 344	31 -		SANDSTONE. Light to medium grey friable, fine to medium grained thinly bedded sandstone.	Dapper Formation	_		
			- 343	32 -		SILTSTONE. 50% light grey fine gained sandstone with carbonaceous flecks. 50% medium grey siltstone.				
		50mm slotted PVC casing	- 342	33 - 34 -		SANDSTONE. Coarse sandstone in sandy matrix with minor dark grey mudstone.				
-		· · · ·	- 341	35 -		CONGLOMERATE. Coarse quartz sandstone with poorly sorted quartz grains (medium t coarse sand and 10mm pebbles) with minor medium to dark grey siltstone. CONGLOMERATE. 50% coarse quartz sandstone with poorly sorted quartz grains				
3/11/1			- 340	36 -	° () ]°( }	(medium to coarse sand and 10mm pebbles) with minor medium to dark grey sittstone. 50% light grey-brown fine sandstone with carbonaceous flecks. SANDSTONE. Light grey fine grained thinly bedded sandstone with carbonaceous flecks	s.	Airlift=0.05L/s EC=2.11mS/cm		
		·. ·	- 339	37 -		SANDSTONE. Light grey fine to medium grained sandstone with carbonaceous flecks. Minor quartz granules (possible contamination from above).		pH=6.87		
		· . · . · .	- 338	38 -				_		
			- 337	39 -						
			- 336	This b	orebr	END OF BOREHOLE AT 38.50 m	accompanying standard po	I		

D	D
	100 YEARS ®

BORE NO.

# GW29A

Client: Project: Bore Loc Project N		Co Ma	ates	ora C	Coal Project D	Date Comme Date Comple Recorded By .og Checked	eted: /:	12/11/11 13/11/11 Chiara Callipari Stuart Brown
Drilling M Drilling C	/lethod: Company:		ir har ricks			Surface RL: Co-ords:		mAHD 51.24 N 6446145.13
	nformation				Field Material Description		-	1
W ATER	CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FOR	MATION	HYDROGEOLOGY
	200mm PVC casing and 50mm PVC casing 	- 348 - 347 - 346 - 345 - 344 - 343	2 - 3 - 4 - 5 -	OVEROR OR OVEROR OVEROVE	CLAYEY GRAVEL. Pebbly gravel of subangular to subrounded quartz and mixed lithologies (2-15mm diameter) in a brown-red sandy clay matrix.	Alluviu	m	
	gravel pack 50mm slotted PVC casing	- 342 - 341 - 340 - 339	6 - 7 - 9 - 10 -		CLAYEY GRAVEL. Granular gravel of subangular to subrounded quartz and mixed lithologies (2-5mm diameter) in a brown-red sandy clay. Gravel size increasing with depth. GRAVEL and SANDY CLAY. 50% granular gravel of subangular to subrounded quartz and	ind		
		- 338 - 337 - 336 - 335	11 - 12 - 13 -	00000000000000000000000000000000000000	mixed lithologies (2-5mm diameter) in a brown-red sandy clay. 50% light grey sandy clay present as clods. CLAYEY GRAVEL. Granular to pebbly gravel of subangular to subrounded quartz and mixed lithologies (2-25mm diameter) with minor light grey sandy clay. CLAYEY GRAVEL. Pebbly gravel of subangular to subrounded quartz and mixed lithologies (5-50mm diameter) with minor light grey sandy clay. CLAYEY GRAVEL. Pebbly gravel of subangular to subrounded quartz and mixed lithologies (5-50mm diameter) with minor light grey sandy clay.	y 		Airlift<0.01L/s
	Sump	- 334	14 –		END OF BOREHOLE AT 14.00 m			EC=3.53mS/cm pH=7.54

D	R
<u>=</u>	100 YEARS ®

BORE NO.

### **GW29B**

SHEET 1 OF 4

Client: Project: Bore Location: Project Number:		Co M	ates	ora C	Coal Project D	Date Commenced:14/11/11Date Completed:14/11/11Recorded By:Chiara CallipariLog Checked By:Stuart Brown												
Drilling Method: Drilling Company:		Air hammer Gricks Drilling				Surface RL: Co-ords:		mAHD 51.25 N 6446154.55										
Bore Information			۱			Field Material Description												
		WELL CONSTRUCTION		VELL CONSTRUCTION		ELL CONSTRUCTION		WELL CONSTRUCTION		WELL CONSTRUCTION		RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FOF	RMATION	HYDROGEOLOGY
	Ň	KXI -	200mm PVC surface	- 348		· · ·	SANDY CLAY. Red-brown sandy clay.	Alluviu	IM									
		Ř	casing and 50mm PVC casing	- 347 - 346 - 345	1 - 2 - 3 -		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.											
	$\mathbb{Y}$		-	- 344	4 -	$\mathcal{D}(\mathcal{A})$	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.											
			-	- 343	5 - 6 -	2 <u>7.</u> 2	GRAVELLY SAND. Brown-red gravelly clayey sand with subangular to subrounded clast of quartz and mixed lithologies up to 30mm in diameter.	ts										
			-	- 342 7 - - 341	7 -	2												
				- 340	8 -													
			-	- 339 9 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	CLAYEY GRAVEL. Brown-red and yellow-orange pebbly gravel of mixed lithologies in brown and grey sandy clay matrix.													
			-	- 338 - 337	11 -													
		-	- 336	12 –														
			-	- 335	13 -													
		-	- 334	14 -														
			-	- 333	15 - 16 -													
	×××		50mm PVC casing	- 332 - 331	17 -		SILTSTONE. Friable medium grey siltstone in a grey clay matrix.	Napperby Formation	erby Ition									
			-	18 - SILTSTONE. Medium grey siltstone w	SILTSTONE. Medium grey sittstone with grey-black carabonaceous flecks, and minor grey clay.													
			-	- 329	19 -		SILTSTONE. Friable medium grey siltstone in a medium grey clay matrix with minor light brown siltstone.	t										
			-	- 328	20 —		SILTSTONE. Medium grey siltstone in medium grey clay matrix with minor dark grey-bla carbonaceous siltstone.	ck										
			-	- 327	21 -													
			- 326	22 –														
			- 325 - 324	23 - 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.																	



BORE NO.

### **GW29B**

SHEET 2 OF 4

Client: Project: Bore Location: Project Number:		C M	ates	ora C	Coal Project Da Re	Date Commenced:14/11/11Date Completed:14/11/11Recorded By:Chiara CallipariLog Checked By:Stuart Brown			
Drilling Method: Drilling Company:		Air hammer Gricks Drill				urface RL: o-ords:		mAHD 51.25 N 6446154.55	
Bore Information			า			Field Material Description	I		
WATER	WELL	CONSTRUCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY	FO	RMATION	HYDROGEOLOGY
	X		- 323			SILTSTONE. Light grey siltstone in a light grey clay matrix. (continued)	Nappe	erby	
			- 322	26 -		SILTSTONE. Light grey and light brown siltstone in a light grey clay matrix.			
		<u> </u>	- 321	27 -	(	SILTSTONE. Light to medium grey siltstone with some carbonaceous flecks in a light grey clay matrix.			
			- 320	28 -					
				29 -					
			- 319		·				
	Ň	Ň.	- 318	30 —	· ·				
	×.		- 317	31 -		SILTSTONE. Light to medium grey siltstone with some carbonaceous flecks in a light grey clay matrix.	_		
			- 316	32 -					
	×.			33 -					
			- 315	~	· ·				
			- 314	34 -	· _ ·				
			- 313	35 -	·				
	)	)	- 312	36 -					
				37 -	·				
	Ň.		- 311		· ·				
			- 310	38 -	 				
			- 309	39 -					
			- 308	40 —	·				
	Š	)	000	41 -					
			- 307		<u></u> -				
			- 306	42 -					
			- 305	43 -	•				
			- 304	44 -					
			- 303	45 -					
				46 -	· ·				
			- 302	47 -					
			- 301	48 -	•				
			- 300						
				49 –		SILTSTONE. Medium to dark grey siltstone with some carbonaceous flecks in a light grey clay matrix.	у		
┢		M		This b	oreho	END OF BOREHOLE AT 83.50 m ble log should be read in conjunction with Parsons Brinckerhoff's a	ccompanying	g standard r	notes.

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<u> </u>	100 YEARS ®

BORE NO.

### **GW29B**

SHEET 3 OF 4

Client: Project: Bore Location: Project Number:		C N	lates	ora C	td coal Project & 2162570B	Date Commenced: Date Completed: Recorded By: Log Checked By:		14/11/11 14/11/11 Chiara Callipari Stuart Brown		
Drilling Method: Drilling Company:			Air hammer Gricks Drilling				face RL: <b>348.29</b> ords: <b>E 705</b> 7	mAHD /51.25 N 6446154.55		
_		Inform					Field Material Description		T	-
					<u>ر)</u>	g				
WATER	WELL	. CONSTRI	JCTION	RL (mAHD)	DEPTH (mBGL)	GRAPHIC LOG	LITHOLOGY		FORMATION	HYDROGEOLOGY
	X	$\mathbb{X}$	-	- 298			SILTSTONE. Medium to dark grey siltstone with some carbonaceous flecks in a clay matrix. (continued)	a light grey	Napperby Formation	
	X.			- 297	51 -				romation	
	×			201	52 -					
	$\mathbb{Y}$		-	- 296		·				
	×		-	- 295	53 -	·				
	Š.			- 294	54 -	· _ ·				
	X			204	55 -	·				
	$\mathbb{R}$		-	- 293						
	)	Ň	-	- 292	56 -					
	$\mathbf{X}$			- 291	57 -	· ·				
	Š.				58 -	· ·				
	X			- 290						
	$\mathbb{R}$		-	- 289	59 -					
			-	- 288	60 —					
	×	17717771777177717771777177717771777177		007	61 -	·				
				- 287	62 -	· ·				
		ber	Itonite	- 286	02					
			-	- 285	63 -					
				- 284	64 -	· ·				
		gra pac	vel k		65 -	·				
			-	- 283		 				
	E	50r	nm -	- 282	66 –					
		slot PV cas	c	- 281	67 -					
				- 280	68 -	·				
	'• • E			200	69 -	(				
			-	- 279						
			-	- 278	70 —					
			-	- 277	71 -	·	SILTSTONE. Dark grey siltstone in a dark grey clay matrix with minor light grey- claystone.	-brown	-	
	ŀ.E				72 -	·	SILTSTONE. Dark grey siltstone in a dark grey clay matrix.		-	
	:: E			- 276	70		· · · · · · · · · · · · · · · · · · ·			
				- 275	73 -	· ·				
			-	- 274	74 -					
							END OF BOREHOLE AT 83.50 m			



BORE NO.

## **GW29B**

SHEET 4 OF 4

Client: Project: Bore Location: Project Number:		Mate	oora ( s	Ltd Coal Project & 2162570B	Date Commenced:14/11/11Date Completed:14/11/11Recorded By:Chiara CallipariLog Checked By:Stuart Brown			
Drilling Method: Drilling Company:		Air h Gricl			Surface F Co-ords:	RL: 348.29 E 7057	mAHD 751.25 N 6446154.55	
Bore Information			-	Field Material Description				
WATER	WELL CONSTRUCTION	RL (mAHD)	GRAPHIC LOG	LITHOLOGY		FORMATION	HYDROGEOLOGY	
15/11/11 15/11/11	No.     No.       No.     No.			SILTSTONE. Dark grey siltstone in a dark grey clay matrix.         SANDSTONE. Light to dark fine to medium grained sandstone with carbonacec in a dark grey clay matrix.         SANDSTONE. Light to dark fine to medium grained sandstone with carbonacec in a dark grey clay matrix, with minor quartz and light brown-grey siltstone.         SANDSTONE. Light to dark fine to medium grained quartz sandstone with carbonacec in a dark grey clay matrix, with minor quartz and light brown-grey siltstone.         SANDSTONE. Light to dark fine to medium grained sandstone with carbonacec in a dark grey clay matrix, with minor quartz and light brown-grey siltstone.         SANDSTONE. Light to dark fine to medium grained sandstone with carbonacec in a dark grey clay matrix, with minor quartz and light brown-grey siltstone.         SANDSTONE. Light grey fine to medium grained sandstone with carbonacec in a dark grey clay.         SANDSTONE. Light grey fine to medium grained sandstone with carbonacecous minor light grey clay.	minor dark	pperby mation	Airlift=0.1L/s EC=2.40mS/cm pH=7.39	
		- 249		END OF BOREHOLE AT 83.50 m				

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