Appendix A **Monitoring bore logs**

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 251 AHD
EASTING: 230111
NORTHING: 6410330
DIP/AZIMUTH: 90°/--

BORE No: A01-D
PROJECT No: 49761
DATE: 26/8/2011
SHEET 1 OF 3

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
251	0	SILTY CLAY - Dark Brown silty clay, M>Wp							
250	1								
249	2								
248	3	3.0 CLAY - Brown clay, trace fine grained sand, M>Wp							
247	4								
246	5								
245	6	6.2 GRAVEL/SAND - Undifferentiated, sandy clay in parts from 6.2m to 7.0m						▼	
244	7								From 0.0m to 13.8m, grout
243	8								
242	9								

RIG: Hydrapower MDR105 **DRILLER:** Myers (Macquarie) **LOGGED:** Benson **CASING:** Deep HWT to 20.6m
TYPE OF BORING: 4¾ blade bit washbore
WATER OBSERVATIONS: Some water loss from 6.2m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	⇘	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 251 AHD
EASTING: 230111
NORTHING: 6410330
DIP/AZIMUTH: 90°/--

BORE No: A01-D
PROJECT No: 49761
DATE: 26/8/2011
SHEET 2 OF 3

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
241		GRAVEL/SAND - Undifferentiated, sandy clay in parts from 6.2m to 7.0m *(continued)*							
240	11								11
239	12								12
238	13								13
237	14								14 From 14.35m to 13.8m, bentonite
236	15								15
235	16			D	16.0				16
234	17								17 From 15.6m to 18.6m, screen From 13.8m to 20.6m, gravel
	17.4	RESIDUAL CLAY - Grey, some completely weathered coal in returns from 17.4m to 18.0m							
233	18								18
232	19								19 From 18.6m to 20.6m, sump

RIG: Hydrapower MDR105 **DRILLER:** Myers (Macquarie) **LOGGED:** Benson **CASING:** Deep HWT to 20.6m
TYPE OF BORING: 4¾ blade bit washbore
WATER OBSERVATIONS: Some water loss from 6.2m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	⌀	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 251 AHD
EASTING: 230111
NORTHING: 6410330
DIP/AZIMUTH: 90°/--

BORE No: A01-D
PROJECT No: 49761
DATE: 26/8/2011
SHEET 3 OF 3

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
231		RESIDUAL CLAY - Grey, some completely weathered coal in returns from 17.4m to 18.0m *(continued)*							End cap
	20.6	Bore discontinued at 20.6m, limit of investigation							
230	21								21
229	22								22
228	23								23
227	24								24
226	25								25
225	26								26
224	27								27
223	28								28
222	29								29

RIG: Hydrapower MDR105 **DRILLER:** Myers (Macquarie) **LOGGED:** Benson **CASING:** Deep HWT to 20.6m
TYPE OF BORING: 4¾ blade bit washbore
WATER OBSERVATIONS: Some water loss from 6.2m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	⊳	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 251 AHD
EASTING: 230111
NORTHING: 6410330
DIP/AZIMUTH: 90°/--

BORE No: A01-S
PROJECT No: 49761
DATE: 26/8/2011
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
251	0	SILTY CLAY - Dark Brown silty clay, M>Wp							From 0.0m to 1.0m, grout
250	1			D	1.0				From 1.0m to 1.8m, bentonite
249	2								
248	3								
247	4			D	4.0				
246	5								From 1.9m to 7.9m, screen From 1.8m to 8.5m, gravel
245	6								
	6.2	GRAVEL/SAND - Undifferentiated, sandy clay in parts from 6.2m to 7.0m						▼	
244	7								
243	8								From 7.9m to 8.5m, sump End cap From 8.5m to 8.6m, backfill
	8.6	Bore discontinued at 8.6m, limit of investigation							
242	9								

RIG: Hydrapower MDR105 **DRILLER:** Myers (Macquarie) **LOGGED:** Benson **CASING:**

TYPE OF BORING: 4¾ blade bit washbore

WATER OBSERVATIONS: Free groundwater observed at 6.2m

REMARKS: Location BY70015CH

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	⊳	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: TBC
EASTING: 230645
NORTHING: 6404074
DIP/AZIMUTH: 90°/--

BORE No: A02-D
PROJECT No: 49761
DATE: 28/2/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SANDY SILT - (Stiff), dark brown, fine to coarse grained sandy silt with some clay, trace rootlets, M<Wp							Stickup=0.6m
	0.4	SILTY CLAY/CLAYEY SILT - Very stiff to hard, brown silty clay/clayey silt, with slightly to some fine to coarse grained sand, M<Wp							
	1	From 1.0m, sandy silt in parts		pp S	1.0 1.2 1.45		>450kPa 5,11,18 N = 29		
	2								From 0m to 3.7m, backfill cuttings
		From 2.5m, trace fine to coarse grained sand, M~Wp		pp S	2.5 2.7 2.95		>450kPa 5,8,15 N = 23		
	4								
	4.0	SANDY CLAY - Hard, grey mottled red brown fine to coarse grained sandy clay, M>Wp		pp S	4.0 4.2 4.45		>450kPa 6,12,15 N = 27		From 3.7m to 5.1m, bentonite
	5	From 5.3m, very stiff		pp S	5.3 5.5 5.95		200kPa 5,8,9 N = 17	▼	
	6								
	7	From 7.2m, hard		S pp pp	6.8 7.1 7.2 7.25		5,5,10 N = 15 200kPa >450kPa		From 5.1 to 8.53m, gravel From 5.53m to 8.53m, screen
	8	From 7.8m, trace coarse sized subrounded gravel							
	8.3	SANDSTONE - Extremely low strength, extremely weathered, grey mottled yellow brown, fine to coarse grained sandstone with trace fine to coarse sized subrounded gravel (soil-like properties)		S	8.3		11, 22, 25/100mm bouncing		End cap
	8.75	Bore discontinued at 8.75m, limit of investigation			8.75				
	9								

RIG: Envirodrill **DRILLER:** Total Drilling (Foody) **LOGGED:** Semmler **CASING:** HW to 5.5m

TYPE OF BORING: Solid flight auger to 5.5m, wash boring to 8.3m

WATER OBSERVATIONS: Free groundwater observed at 5.3m (28/2/12), 4.4m (29/2/12)

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	⊳	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: TBC
EASTING: 230645
NORTHING: 6404074
DIP/AZIMUTH: 90°/--

BORE No: A02-S
PROJECT No: 49761
DATE: 28/2/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SANDY SILT - (Stiff), dark brown, fine to coarse grained sandy silt with some clay, trace rootlets, M<Wp							Stickup=0.6m
	0.4	SILTY CLAY/CLAYEY SILT - Very stiff to hard, brown silty clay/clayey silt, with slightly to some fine to coarse grained sand, M<Wp							From 0m to 0.6m, bentonite
	1	From 1.0m, sandy silt in parts							
	2								From 0.6m to 3.8m, gravel From 0.8m to 3.8m, screen
	3	From 2.5m, trace fine to coarse grained sand, M~Wp							
	3.8	Bore discontinued at 3.8m, limit of investigation							End cap
	4								
	5								
	6								
	7								
	8								
	9								

RIG: Envirodrill **DRILLER:** Total Drilling (Foody) **LOGGED:** Semmler **CASING:** HW to 5.5m

TYPE OF BORING: Solid flight auger to 3.8m

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Bore located immediately adjacent A02-D. Strata inferred from A02-D Borehole Log

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	⌵	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 288.00 AHD
EASTING: 232614
NORTHING: 6405417
DIP/AZIMUTH: 90°/--

BORE No: A03D
PROJECT No: 49761.02
DATE: 30/5/2012
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
288		CLAY - (Stiff to very stiff) dark brown clay, trace to some silt, trace fine to medium grained sand, M>Wp							From 0m to 0.3m, bentonite
287	1	From 1.0m, increasing sand content						▼	1
	1.5	CLAYEY SAND - Loose dark brown clayey fine to medium grained sand, trace to some silt, saturated		S	1.5		2,3,5 N = 8		
286	1.8	CLAY - Very stiff dark brown mottled red clay, trace fine to medium grained sand, M>Wp		pp	1.85 1.95		200-300 kPa		2
	2.1	SANDY CLAY - (Soft) dark brown fine to medium grained sandy clay, some silt, M<Wp (inferred from cuttings on auger)							
	2.5				2.6				
	2.75	SANDY CLAY - Very stiff brown fine to coarse grained sandy clay, trace silt, M>Wp		pp	2.75		290-350 kPa		
285	3	CLAY - Very stiff brown clay, M>Wp		S, pp	3.05		4,6,10 N = 16 200-290 kPa		3 From 0.3m to 5.7m, backfill cuttings
284	4								4
	4.3	SILTY SAND - Loose light brown silty fine to medium grained sand with grey mottling, saturated			4.25				
	4.6	CLAY - Stiff light brown clay with grey mottling, M>Wp		S pp	4.6 4.7		6,4,5 N = 9 160-200 kPa		
283	5								5
					5.75				
282	6.0	SILTY CLAY - Stiff to very stiff light brown silty clay with grey mottling, trace fine grained sand, M>Wp		S, pp	6.2		4,6,6 N = 12 170-240 kPa		6 From 5.7m to 6.2m, bentonite
	6.5	CLAY - Stiff light brown clay, M>Wp							
281	7								7
	7.25	CLAY - Very stiff to hard brown and grey clay, slightly gravelly (gravel subrounded up to 7mm diameter), trace to some fine to medium grained sand, M>Wp			7.25 7.3				
				pp S	7.7		340-450 kPa 6,8,10 N = 18		
280	8								8 From 6.2m to 9.4m, gravel From 6.4m to 9.4m, 50mm diameter Class 18 machine slotted PVC screen
	8.4	SILTY CLAY/CLAYEY SILT - Hard grey (and brown in parts) silty clay/clayey silt, trace fine grained sand, M>Wp			8.75				
279	9			S, pp pp	9.0 9.2		6,6,8 N = 14 250-310 kPa 300-600 kPa		9 End cap
	9.6	SANDSTONE - Extremely low strength, extremely weathered, brown, fine to coarse grained sandstone							
				S	9.75		24,17,9 N = 26		

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Holden **CASING:** HW to 2.5m

TYPE OF BORING: Solid flight auger to 2.5m, wash boring to 9.75m

WATER OBSERVATIONS: Free groundwater observed at 1.0m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U,	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	⊳	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 288.00 AHD
EASTING: 232614
NORTHING: 6405417
DIP/AZIMUTH: 90°/--

BORE No: A03D
PROJECT No: 49761.02
DATE: 30/5/2012
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
278	10.05	At 9.75m, refusal by drilling		S	10.2				
	10.2	CLAYSTONE - Extremely low strength, extremely weathered, grey claystone							
		Bore discontinued at 10.2m, limit of investigation							
277	11								11
276	12								12
275	13								13
274	14								14
273	15								15
272	16								16
271	17								17
270	18								18
269	19								19

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Holden **CASING:** HW to 2.5m

TYPE OF BORING: Solid flight auger to 2.5m, wash boring to 9.75m

WATER OBSERVATIONS: Free groundwater observed at 1.0m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	⌵	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 288.00 AHD
EASTING: 232614
NORTHING: 6405417
DIP/AZIMUTH: 90°/--

BORE No: A03S
PROJECT No: 49761.02
DATE: 30/5/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
288	0	CLAY - (Stiff to very stiff) dark brown clay, trace to some silt, trace fine to medium grained sand, M>Wp							From 0m to 0.3m, bentonite
287	1	From 1.0m, increasing sand content						▼	
	1.5	CLAYEY SAND - Loose dark brown clayey fine to medium grained sand, trace to some silt, saturated		S	1.5		2,3,5 N = 8 200-300 kPa		
286	1.8	CLAY - Very stiff dark brown mottled red clay, trace fine to medium grained sand, M>Wp		pp	1.85 1.95				From 0.3m to 3.5m, gravel From 0.5m to 3.5m, 50mm diameter Class 18 machine slotted PVC screen
	2.1	SANDY CLAY - (Soft) dark brown fine to medium grained sandy clay, some silt, M<Wp (inferred from cuttings on auger)							
	2.5				2.6				
	2.75	SANDY CLAY - Very stiff brown fine to coarse grained sandy clay, trace silt, M>Wp		pp S, pp	2.75 3.05		290-350 kPa 4,6,10 N = 16 200-290 kPa		
285	3	CLAY - Very stiff brown clay, M>Wp							End cap From 6.2m to 9.4m, gravel
284	4	Bore discontinued at 4.0m, limit of investigation							
283	5								
282	6								
281	7								
280	8								
279	9								

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Holden **CASING:** HW to 2.5m

TYPE OF BORING: Solid flight auger to 4.0m

WATER OBSERVATIONS: Free groundwater observed at 1.0m

REMARKS: Well in close proximity to A03D, soil profile inferred from log

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	⊳	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 294.75 AHD
EASTING: 233789
NORTHING: 6405925
DIP/AZIMUTH: 90°/--

BORE No: A04
PROJECT No: 49761.02
DATE: 16/5/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
294	0.6	SANDY SILTY CLAY - (Very soft), dark brown fine to medium grained sandy silty clay, M<Wp (humid)							From 0m to 0.2m, bentonite
	1	SAND - Grey-brown fine to coarse grained sand, slightly silty, trace subrounded gravel up to 5mm diameter, wet From 0.8m, saturated						▼	
293	2	From 1.5m, very loose		S	1.5 1.95		2,2,1 N = 3		
292	3								From 0.2m to 5.2m, 5mm gravel From 0.2m to 5.2m, screen
	3.2	SAND - Loose, light brown fine to medium sand, trace silt, saturated		S	3.0 3.45		3,2,4 N = 6		
291	4	From 4m, some to slightly silty							
290	4.7	SAND - Medium dense, brown, fine to coarse grained sand, trace silt, trace subrounded gravel up to 5mm diameter, saturated		S	4.5 4.95		5,7,9 N = 16		End cap
289	6	From 6m, loose		S	6.0		3,3,2 N = 5		
	6.45	Bore discontinued at 6.45m, limit of investigation			6.45				
288	7								
287	8								
286	9								
285									

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Holden **CASING:** Uncased
TYPE OF BORING: Solid flight auger to 6.0m
WATER OBSERVATIONS: Free groundwater observed at 0.8m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	⊳	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 231260
NORTHING: 6407410
DIP/AZIMUTH: 90°/--

BORE No: A06
PROJECT No: 49761
DATE: 10 - 12/9/2013
SHEET 1 OF 6

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.3	SILTY CLAY/CLAYEY SILT - (Stiff), dark brown silty clay/clayey silt, with some sand, M>Wp							
	1	SILTY SAND - Medium dense, brown silty fine to coarse grained sand, with some fine sized subrounded gravel, humid							
	1.4	SILTY CLAY - Very stiff, brown silty clay with some fine to coarse grained sand, M<Wp							
	2								
	2.5	SILTY SAND - Loose, yellow brown silty, fine to coarse grained sand, with trace clay, saturated							
	3								
	4.0	SAND - Loose, brown, fine to coarse grained sand with some silt, saturated							
	5.0	CLAYEY SAND - Loose, fine to coarse grained clayey sand with interbedded sandy clay, saturated							
	6								
	7.0	SANDY CLAY - Soft to firm, grey mottled yellow brown, fine to coarse grained sandy clay with trace fine sized subrounded gravel, M>Wp From 7.3m, hard							
	8								
	9								
	9.3	GRAVELLY CLAY - Hard, yellow brown, slightly sandy, fine to medium sized subangular gravelly clay with some coarse sized, subrounded gravel and subrounded cobbles, M>Wp							
	10.0								

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 10.6m

TYPE OF BORING: Solid flight auger to 10.5m, rock roller to 10.85m, HQ3 to 53.86m

WATER OBSERVATIONS: Free groundwater observed at 3.0m

REMARKS: 50% water loss at 13.5m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
HP	Hand penetrometer (kPa)		
R	Rock roller penetrometer (kPa)		
SPT	Standard penetration test		
V	Shear vane (kPa)		

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 231260
NORTHING: 6407410
DIP/AZIMUTH: 90°/--

BORE No: A06
PROJECT No: 49761
DATE: 10 - 12/9/2013
SHEET 2 OF 6

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SANDSTONE - Extremely low strength, extremely weathered, grey mottled yellow brown/red brown, fine to coarse grained sandstone							
	10.85				10.85				
11		SANDSTONE - High strength, slightly weathered, light orange fine to medium grained sandstone		C	11.17		PL(A) = 1.82 PL(D) = 1.41		11
		From 11.8m, interbedded with siltstone			11.9				
12	12.08	COAL - Hight strength, fresh, fractured black coal		C					12
		From 12.65m, mudstone							
	12.89								
13	13.05	CORE LOSS: 0.16m (12.89m - 13.05m)			13.05				13
		SILTSTONE - Medium strength, fresh, grey siltstone			13.4		PL(A) = 0.84 PL(D) = 0.59		
		From 13.7m, high strength with some sandstone laminations		C					
14	14.4								14
		CARBONACEOUS SILTSTONE - High strength, fresh, dark brown carbonaceous siltstone			14.85				
15									15
	15.91				15.86		PL(A) = 1.99		
16		COAL - High strength, fresh, black coal		C					16
		From 16.15m to 16.30m, tuffaceous laminations							
		From 16.80m to 17.08m, carbonaceous siltstone band							
17					17.21		PL(A) = 1.91		17
	17.57								
		TUFFACEOUS CLAYSTONE - High strength, fresh, light grey tuffaceous claystone			17.75				
18		From 17.77m to 18.07m, carbonaceous siltstone band			18.13		PL(A) = 1.24		18
					GT001 18.15				
	18.47				18.36				
		COAL - High strength, fresh, black coal		C					
19									19
	19.51								
		SANDSTONE - High strength, fresh, grey fine to medium grained sandstone			19.82		PL(A) = 2.17		
				C	19.85				

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 10.6m

TYPE OF BORING: Solid flight auger to 10.5m, rock roller to 10.85m, HQ3 to 53.86m

WATER OBSERVATIONS: Free groundwater observed at 3.0m

REMARKS: 50% water loss at 13.5m

SAMPLING & IN SITU TESTING LEGEND

A Auger sample — U Tube sample — PID Photo ionisation detector (ppm)
B Bulk sample — W Water sample — PL(A) Point load axial test Is(50) (MPa)
BLK Block sample — U Tube sample (x mm dia.) — PL(D) Point load diametral test Is(50) (MPa)
C Core drilling — W Water sample — DP Perth penetrometer (kPa)
D Disturbed sample — ▽ Water seep — S Standard penetration test
E Environmental sample — ▼ Water level — V Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 231260
NORTHING: 6407410
DIP/AZIMUTH: 90°/--

BORE No: A06
PROJECT No: 49761
DATE: 10 - 12/9/2013
SHEET 3 OF 6

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SANDSTONE - High strength, fresh, grey fine to medium grained sandstone *(continued)*					PL(D) = 1.25		
				C					
	21				21.1				21
					21.41		PL(A) = 2.84		
					21.45		PL(D) = 1.64		
				GT002					
					21.75				
	22								22
				C					
	23								23
		From 23.05m, medium strength, course grained			23.21				
				GT003					
					23.51		PL(A) = 1.08		
					23.56				
	24								24
		From 24.05m, some fine to medium sized gravel			24.05				
	25								25
	25.08	COAL - High strength, fresh, black coal							
				C					
	26								26
					26.66		PL(A) = 2.12		
	27				27.09				27
					27.51		PL(A) = 1.77		
	28								28
				C	28.51		PL(A) = 1.35		
	28.67	SANDSTONE - High strength, fresh, dark grey, medium to coarse grained sandstone					PL(A) = 1.97		
	29				28.94		PL(D) = 1.71		29
				GT004	28.98				
		From 29.33m, grey, fine to medium grained			29.28				
					29.87		PL(A) = 2.29		

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 10.6m
TYPE OF BORING: Solid flight auger to 10.5m, rock roller to 10.85m, HQ3 to 53.86m
WATER OBSERVATIONS: Free groundwater observed at 3.0m
REMARKS: 50% water loss at 13.5m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
HP	Hand penetrometer (kPa)	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 231260
NORTHING: 6407410
DIP/AZIMUTH: 90°/--

BORE No: A06
PROJECT No: 49761
DATE: 10 - 12/9/2013
SHEET 4 OF 6

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SANDSTONE - High strength, fresh, dark grey, medium to coarse grained sandstone *(continued)*		C	30.14		PL(D) = 1.83		
	31								31
				C	31.4		PL(D) = 2.64		
	32								32
	32.7	SILTSTONE - High strength, fresh, grey siltstone with some sand							
	33				33.14		PL(A) = 1.93		33
					33.18		PL(D) = 1.2		
	34								34
				C					
	35				35.2		PL(A) = 2.28		35
							PL(D) = 1.11		
	36				36.14				36
				GT005					
					36.44		PL(A) = 2.41		
					36.49		PL(D) = 1.63		
	36.83	SANDSTONE - High to very high strength, fresh, grey fine to medium grained sandstone							
	37			C					37
	38				38.48		PL(A) = 3.78		38
							PL(D) = 2.6		
	39				39.15				39
				C					

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 10.6m

TYPE OF BORING: Solid flight auger to 10.5m, rock roller to 10.85m, HQ3 to 53.86m

WATER OBSERVATIONS: Free groundwater observed at 3.0m

REMARKS: 50% water loss at 13.5m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Tube sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
I	Water level	DP	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 231260
NORTHING: 6407410
DIP/AZIMUTH: 90°/--

BORE No: A06
PROJECT No: 49761
DATE: 10 - 12/9/2013
SHEET 5 OF 6

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SANDSTONE - High to very high strength, fresh, grey fine to medium grained sandstone *(continued)*			40.34		PL(A) = 3.94 PL(D) = 1.67		
		From 40.19m to 40.3m, sideritic							
		From 40.3m, interbedded with siltstone							
41				C					41
	41.29	SILTSTONE - High strength, fresh, grey siltstone			41.68		PL(A) = 1.74 PL(D) = 1.12		
42	41.92	MUDSTONE - High strength, fresh, grey mudstone			42.15				42
		From 42.70m, tuffaceous band 110mm thick			42.78		PL(A) = 1.61 PL(D) = 1		
43									43
		From 43.5m to 43.97m, interbedded with sandstone		C					
44					44.38		PL(A) = 1.85		44
	44.8	SANDSTONE - High strength, fresh, grey fine grained sandstone							
45					45.13				45
46					46.1		PL(A) = 2.26 PL(D) = 1.71		46
				C					
47					46.97				47
				GT006	47.26		PL(A) = 1.21		
					47.3				
48					48.12				48
		From 48.21m, interbedded with mudstone laminations up to 15mm thick							
49				C					49
	49.19	MUDSTONE - High strength, fresh, brown and grey mudstone with fine grained sandstone laminations up to 10mm thick							

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 10.6m

TYPE OF BORING: Solid flight auger to 10.5m, rock roller to 10.85m, HQ3 to 53.86m

WATER OBSERVATIONS: Free groundwater observed at 3.0m

REMARKS: 50% water loss at 13.5m

SAMPLING & IN SITU TESTING LEGEND

A Auger sample — U Tube sample — PID Photo ionisation detector (ppm)
B Bulk sample — W Water sample — PL(A) Point load axial test Is(50) (MPa)
BLK Block sample — U$_{xx}$ Tube sample (x mm dia.) — PL(D) Point load diametral test Is(50) (MPa)
C Core drilling — W Water sample — DP Perth penetrometer (kPa)
D Disturbed sample — ▽ Water seep — S Standard penetration test
E Environmental sample — ▼ Water level — V Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 231260
NORTHING: 6407410
DIP/AZIMUTH: 90°/--

BORE No: A06
PROJECT No: 49761
DATE: 10 - 12/9/2013
SHEET 6 OF 6

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	50.32				50.23		PL(A) = 1.21		
		SANDSTONE - High strength, fresh, grey fine grained sandstone		C					
	50.67	MUDSTONE - High strength, fresh, grey and brown mudstone with some interbedded siltstone			51.12				
	51								51
	52				51.93		PL(A) = 1.35		52
				C					
	53								53
	53.86				53.86				
	54	Bore discontinued at 53.86m , limit of investigation							54
	55								55
	56								56
	57								57
	58								58
	59								59

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 10.6m
TYPE OF BORING: Solid flight auger to 10.5m, rock roller to 10.85m, HQ3 to 53.86m
WATER OBSERVATIONS: Free groundwater observed at 3.0m
REMARKS: 50% water loss at 13.5m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Tube sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
I	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: TBC
EASTING: 231260
NORTHING: 6407410
DIP/AZIMUTH: 90°/--

BORE No: A06-D
PROJECT No: 49761
DATE: 28/2/2012
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.3	SILTY CLAY/CLAYEY SILT - (Stiff), dark brown silty clay/clayey silt, with some sand, M>Wp							Stickup=0.7m
		SILTY SAND - Medium dense, brown silty fine to coarse grained sand, with some fine sized subrounded gravel, humid		S	1.0		5,6,8 N = 14		
	1.4	SILTY CLAY - Very stiff, brown silty clay with some fine to coarse grained sand, M<Wp			1.45				
	2.5	SILTY SAND - Loose, yellow brown silty, fine to coarse grained sand, with trace clay, saturated		S	2.5 2.95		3,2,3 N = 5		From 0m to 5.7m, backfill cuttings
	4.0	SAND - Loose, brown, fine to coarse grained sand with some silt, saturated		S	4.0 4.45		3,3,3 N = 6		
	5.0	CLAYEY SAND - Loose, fine to coarse grained clayey sand with interbedded sandy clay, saturated		pp S	5.5 5.6 5.95		50kPa (sandy clay ~50mm) 3,1,1 N = 2		From 5.7m to 6.9m, bentonite
	7.0	SANDY CLAY - Soft to firm, grey mottled yellow brown, fine to coarse grained sandy clay with trace fine sized subrounded gravel, M>Wp From 7.3m, hard		pp S pp	7.0 7.1 7.3 7.45		50kPa 3,7,12 N = 19 >450kPa		
				S	8.5 8.95		2,17,17 N = 34		From 6.9m to 10m, gravel From 7m to 10m, screen
	9.3	GRAVELLY CLAY - Hard, yellow brown, slightly sandy, fine to medium sized subangular gravelly clay with some coarse sized, subrounded gravel and subrounded cobbles, M>Wp							
	10.0				10.0				

RIG: Envirodrill **DRILLER:** Total Drilling (Foody) **LOGGED:** Semmler **CASING:** HW to 2.5m

TYPE OF BORING: Solid flight auger to 2.5m, wash boring to 10.0m

WATER OBSERVATIONS: Free groundwater observed at 2.4m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	⊳	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: TBC
EASTING: 231260
NORTHING: 6407410
DIP/AZIMUTH: 90°/--

BORE No: A06-D
PROJECT No: 49761
DATE: 28/2/2012
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
									End cap
	10.27	SANDSTONE - Extremely low strength, extremely weathered, grey mottled yellow brown/red brown, fine to coarse grained sandstone		S	10.27		21, 45/120mm		
		Bore discontinued at 10.27m, limit of investigation							
	11								
	12								
	13								
	14								
	15								
	16								
	17								
	18								
	19								

RIG: Envirodrill **DRILLER:** Total Drilling (Foody) **LOGGED:** Semmler **CASING:** HW to 2.5m

TYPE OF BORING: Solid flight auger to 2.5m, wash boring to 10.0m

WATER OBSERVATIONS: Free groundwater observed at 2.4m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: TBC
EASTING: 231260
NORTHING: 6407410
DIP/AZIMUTH: 90°/--

BORE No: A06-S
PROJECT No: 49761
DATE: 28/2/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.3	SILTY CLAY/CLAYEY SILT - (Stiff), dark brown silty clay/clayey silt, with some sand, M>Wp							Stickup=0.7m
		SILTY SAND - Medium dense, brown silty fine to coarse grained sand, with some fine sized subrounded gravel, humid							From 0m to 1.2m, bentonite
	1.4	SILTY CLAY - Very stiff, brown silty clay with some fine to coarse grained sand, M<Wp						▼	
	2.5	SILTY SAND - Loose, yellow brown silty, fine to coarse grained sand, with trace clay, saturated							From 1.2m to 4.54m, gravel From 1.54m to 4.54m, screen
	4.0	SAND - Loose, brown, fine to coarse grained sand with some silt, saturated							
	4.54	Bore discontinued at 4.54m, limit of investigation							End cap

RIG: Envirodrill **DRILLER:** Total Drilling (Foody) **LOGGED:** Semmler **CASING:** Uncased

TYPE OF BORING: Solid flight auger to 4.54m

WATER OBSERVATIONS: Free groundwater observed at 2.4m

REMARKS: Bore located immediately adjacent A06-D. Strata inferred from A06-D Borehole Log

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	⊳	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 267.35 AHD
EASTING: 230231
NORTHING: 6408492
DIP/AZIMUTH: 90°/--

BORE No: A08D
PROJECT No: 49761.02
DATE: 23/5/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
267	0.0	SAND - (Very loose) brown fine to medium grained sand, some silt, humid							Stickup = 0.6m From 0m to 0.2m, bentonite
	0.4	From 0.1m, increase clay content							
		CLAY - Very stiff, dark grey-brown clay, trace to some silt, trace fine to medium grained sand, M>Wp			1.5 1.6				
266	1			pp S	1.85 1.95		200-250 kPa 3,5,7 N = 12		
	2								
265					2.6		4,4,6 N = 10 160-250 kPa		From 0.2m to 5m, backfill cuttings and gravel
	3			S, pp					
	3.0	CLAYEY SAND - Loose brown clayey fine to coarse grained sand, trace to some subrounded gravel up to 5mm diameter, trace silt, saturated			3.05				
264	3.6	CLAY - (Soft) dark brown-grey clay, trace silt, M>Wp							
	4								
	4.15	SAND - Loose to medium dense fine to medium grained sand, slightly clayey, trace silt, saturated			4.1				
263				S			3,4,6 N = 10		
	4.85	CLAY - Very soft dark brown-grey clay, trace silt, M>Wp			4.85				
	5								From 5m to 5.4m, bentonite
262	5.65				5.6				
	5.8	CLAYEY SAND - Very loose light brown fine to medium grained sand, trace to some silt, trace subrounded gravel up to 5mm diameter, saturated		S			3,2,1 N = 3		
	6				6.05				
261		SILTY SAND - Very loose light brown fine to medium grained silty sand, saturated							
	6.6	CLAY - Very stiff light brown clay, M>Wp							
	7								From 5.4m to 8.6m, gravel From 5.6m to 8.6m, 50mm diameter Class 18 machine slotted PVC screen
	7.15				7.1				
260	7.3	SAND - Medium dense light grey fine to medium grained sand, saturated			7.3				
		CLAY - Stiff light brown and grey clay, M>Wp		pp S, pp	7.55		150-200 kPa 4,3,6 N = 9 230-280 kPa		
	7.8	SAND - Medium dense brown-yellow fine to coarse grained sand, trace subrounded gravel up to 10mm diameter, saturated							
259	8								End cap
					8.6				
				S			10,12,16 N = 28		
	9.0								
258	9.05	SANDSTONE - Extremely weathered, extremely low strength, brown, fine to coarse grained sandstone Bore discontinued at 9.05m, limit of investigation			9.05				

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Holden **CASING:** HW to 2.5m

TYPE OF BORING: Solid flight auger to 2.5m, wash boring to 8.6m

WATER OBSERVATIONS: Free groundwater observed at 3.0m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	⊳	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 267.35 AHD
EASTING: 230229
NORTHING: 6408492
DIP/AZIMUTH: 90°/--

BORE No: A08S
PROJECT No: 49761.02
DATE: 23/5/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
267	0.0	SAND - (Very loose) brown fine to medium grained sand, some silt, humid							Stickup = 0.6m
	0.4	From 0.1m, increase clay content							From 0m to 0.3m, bentonite
		CLAY - Very stiff, dark grey-brown clay, trace to some silt, trace fine to medium grained sand, M>Wp			1.5				
266	1				1.6				From 0.3m to 1.5m, backfill cuttings and gravel
				pp			200-250 kPa		
				S	1.85		3,5,7		
265	2				1.95		N = 12		From 1.5m to 1.8m, bentonite
					2.6		4,4,6		
				S, pp			N = 10		
264	3						160-250 kPa	▼	
	3.0	CLAYEY SAND - Loose brown clayey fine to coarse grained sand, trace to some subrounded gravel up to 5mm diameter, trace silt, saturated			3.05				
	3.6	CLAY - (Soft) dark brown-grey clay, trace silt, M>Wp							From 1.8m to 5.0m, gravel
	4								From 2.0m to 5.0m, 50mm diameter Class 18 machine slotted PVC screen
263	4.15	SAND - Loose to medium dense fine to medium grained sand, slightly clayey, trace silt, saturated			4.1				
				S			3,4,6		
							N = 10		
	4.85				4.85				
	5.0	CLAY - Very soft dark brown-grey clay, trace silt, M>Wp							End cap
		Bore discontinued at 5.0m, limit of investigation							
262	6								
261	7								
260	8								
259	9								
258									

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Holden **CASING:** HW to 2.5m

TYPE OF BORING: Solid flight auger to 5.0m

WATER OBSERVATIONS: Free groundwater observed at 3.0m

REMARKS: Well in close proximity to A08D, soil profile inferred from A08D Log

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	⊳	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 255.35 AHD
EASTING: 228646
NORTHING: 6409921
DIP/AZIMUTH: 90°/--

BORE No: A09
PROJECT No: 49761.02
DATE: 26/7/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
255	0.0	SAND - (Loose) dark brown fine to medium grained sand, trace silt, humid		A	0.5				Stickup = 0.6m From 0m to 0.4m, bentonite
	1.0	SAND - (Loose) brown fine to medium grained sand, trace subrounded gravel up to 20mm, trace silt, wet		A	1.0				
254	1.5	From 1.3m, increasing gravel content From 1.5m, saturated		S	1.5		3,3,3 N = 6	▼	
	2.0	GRAVELLY SAND/SANDY GRAVEL - (Loose) dark brown fine to coarse grained sandy gravel/gravelly sandy gravel, subrounded up to 40mm, some silt, trace clay, saturated From 2.0m, some boulders up to 300mm			1.95				
253		From 2.5m, increasing clay content		A	2.5				
252	3.0	GRAVELLY CLAYEY SAND - Medium dense, brown gravelly clayey fine to coarse grained sand, gravel subrounded up to 20mm, trace silt, saturated		S	3.1		11,11,12 N = 23		From 0.4m to 6.6m, gravel From 0.6m to 6.6m, 50mm diameter Class 18 machine slotted PVC screen
					3.55				
251		From 4.6m, gravelly sand, trace to some clay		S	4.6		12,13,10 N = 23		
					5.05				
250									
				S	6.1		9,17,18 N = 35		
249	6.6				6.55				End cap
	6.85	SANDSTONE - Extremely low strength, extremely weathered, brown mottled grey fine to medium grained sandstone		S	6.75 6.85		20, 20 for 60mm/150mm,-		
248		Bore discontinued at 6.85m, limit of investigation							
247									
246									

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Holden **CASING:** HW to 2.5m

TYPE OF BORING: Solid flight auger to 2.5m, wash boring to 6.75m

WATER OBSERVATIONS: Free groundwater observed at 1.5m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	⊳	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 278.25 AHD
EASTING: 230457
NORTHING: 6406650
DIP/AZIMUTH: 90°/--

BORE No: A10
PROJECT No: 49761.02
DATE: 23/5/2012
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
278	0.0	SILTY CLAY - (Stiff), dark brown silty clay, some sand, M>Wp							From 0m to 0.2m, bentonite
	0.4	SAND - (Loose), brown fine to medium grained sand, slightly silty, trace clay, humid							
277	1.0	CLAY - Very stiff, dark brown clay, some silt, M>Wp			1.5				From 0.2m to 2.3m, backfill cuttings
	1.75	SAND - Medium dense, grey fine to medium grained sand, trace silt, moist		S pp	1.8		4,7,8 N = 15 340-440 kPa		
276	2.1	CLAY - Very stiff, dark brown clay, trace silt, M>Wp			1.95				
	2.75	SAND - Medium dense, grey fine to medium grained sand, trace silt, some clay, saturated		S pp	2.6 2.75 3.05		4,7,9 N = 16 230-240 kPa		From 2.3m to 2.8m, bentonite
275	3.3	SANDY CLAY - Firm, dark brown sandy clay, trace silt, M<Wp							
274	4.15	SAND - Medium dense, brown, fine to medium grained sand, some clay, trace silt, saturated		S	4.1 4.55		5,6,7 N = 13		
273	5.0	SANDY CLAY - (Soft), brown, fine to medium sandy clay, M<Wp (inferred from drill cuttings)							
	5.55	CLAYEY SAND - (Medium dense), clayey fine to medium sand, saturated (inferred from cuttings)		S	5.5 6.05		3,3,5 N = 8		From 2.8m to 9m, gravel From 3m to 9m, 50mm diameter Class 18 machine slotted PVC screen
272	6.4	CLAYEY SAND - (Medium dense), clayey fine to medium grained sand, saturated (inferred from cuttings)							
	6.8	SAND - Medium dense, brown fine to coarse grained sand, some to slight subrounded gravel up to 30mm diameter, trace to some clay, trace silt, saturated From 6.8m to 8m, bands of clay and sandy clay observed in cuttings		S	7.1 7.55		4,8,12 N = 20		
271	8.0	SANDY CLAY - Medium dense, grey fine to coarse grained sandy clay, trace subrounded gravel, trace silt, M>Wp			8.6				
270	8.65	CLAY - Very stiff, grey clay, trace silt, M>Wp		pp S	8.65 8.85		200-250 kPa 5,5,18 N = 23		
	8.85	GRAVELLY SAND - Medium dense, brown gravelly fine to coarse grained sand, subrounded gravel up to 40mm diameter, trace silt, saturated From 9.1m to 9.6m, bands of clay observed in cuttings			9.05				End cap
269	9.8	GRAVELLY CLAY / CLAYEY GRAVEL - Hard,							
	10.0								

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Holden **CASING:** HW to 2.5m

TYPE OF BORING: Solid flight auger to 2.5m, wash boring to 10.1m

WATER OBSERVATIONS: Free groundwater observed at 4.5m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	⊳	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 278.25 AHD
EASTING: 230457
NORTHING: 6406650
DIP/AZIMUTH: 90°/--

BORE No: A10
PROJECT No: 49761.02
DATE: 23/5/2012
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
268		yellow-brown slightly fine to coarse sandy gravel, subrounded to 20mm diameter, M>Wp		S	10.1		29,27,24 N = 51		
	10.55	SANDSTONE - Extremely low strength, extremely weathered, yellow / light brown mottled red-brown, fine to coarse grained sandstone			10.55				
		Bore discontinued at 10.55m, limit of investigation							
267	11								11
	12								12
266	13								13
265	14								14
264	15								15
263	16								16
262	17								17
261	18								18
260	19								19
259									

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Holden **CASING:** HW to 2.5m

TYPE OF BORING: Solid flight auger to 2.5m, wash boring to 10.1m

WATER OBSERVATIONS: Free groundwater observed at 4.5m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	⊳	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: TBC
EASTING: 230167
NORTHING: 6402188
DIP/AZIMUTH: 90°/--

BORE No: A11-D
PROJECT No: 49761
DATE: 1/3/2012
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SANDY SILT - (Stiff), dark brown, fine to coarse grained sandy silt, M<Wp (humid)							Stickup=0.6m
1	1.0	SAND - Medium dense, brown/grey brown, slightly silty, fine to coarse grained sand, humid		S	1.0		6,7,4 N = 11		
		At 1.4m, medium to coarse grained sand			1.45			▼	
2					2.5				From 0m to 4.8m, backfill cuttings
		From 2.5m, fine to coarse grained sand with trace silt and fine sized subrounded gravel		S			3,4,2 N = 6		
3					2.95				
	3.8	SANDY CLAY / CLAYEY SAND - Stiff, brown/grey brown, fine to coarse grained sandy clay/clayey sand, M>Wp		pp	4.15		100kPa		
4				S	4.2		3,3,3 N = 6		
	4.4	SILTY CLAY - Stiff, grey brown silty clay with thin clayey sand and sand lenses, M>Wp		S pp	4.4 4.6		150kPa		
5									From 4.8m to 6.1m, bentonite
		From 5.65m to 5.9m, predominantly silt with slightly to some fine grained sand		pp	5.65		80kPa		
6				S	5.7		3,4,4 N = 8		
				pp	5.95 6.1		180kPa		
7									
	7.3	From 7.15m, very stiff		pp	7.15		300kPa		
		SAND - Medium dense, grey, fine to medium grained sand with some coarse grained sand, trace silt, saturated		S	7.2 7.6		5,8,11 N = 19		
8		From 8.0m, some fine to medium sized subrounded gravel							
		From 8.65m, fine to coarse grained sand, sandy clay in parts, trace coarse sized subrounded gravel		S	8.65		13,10,8 N = 18		
9					9.1				From 6.1m to 12.2m, gravel From 6.2m to 12.2m, screen

RIG: Envirodrill **DRILLER:** Total Drilling (Foody) **LOGGED:** Semmler **CASING:** HW to 2.5m

TYPE OF BORING: Solid flight auger to 2.5m, wash boring to 13.15m

WATER OBSERVATIONS: Free groundwater observed at 1.7m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	⊳	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: TBC
EASTING: 230167
NORTHING: 6402188
DIP/AZIMUTH: 90°/--

BORE No: A11-D
PROJECT No: 49761
DATE: 1/3/2012
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	10.2	SANDY GRAVEL - Dense, yellow brown, fine to coarse grained sandy, fine sized subrounded gravel with some medium sized subrounded gravel, trace coarse sized subrounded gravel, trace silt, saturated		S	10.1		25/100mm (no recovery)		
				S	10.2		11,11,16 N = 27		
11					10.65				
					11.65		7, 15/20mm bouncing (no recovery)		
12				S					End cap
					12.1				
13	13.15								
	13.25	SILTSTONE - Extremely low strength, extremely weathered, grey siltstone		S	13.15		25/100mm		
		Bore discontinued at 13.25m, limit of investigation			13.25				

RIG: Envirodrill **DRILLER:** Total Drilling (Foody) **LOGGED:** Semmler **CASING:** HW to 2.5m

TYPE OF BORING: Solid flight auger to 2.5m, wash boring to 13.15m

WATER OBSERVATIONS: Free groundwater observed at 1.7m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	⊳	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: TBC
EASTING: 230167
NORTHING: 6401288
DIP/AZIMUTH: 90°/--

BORE No: A11-S
PROJECT No: 49761
DATE: 1/3/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SANDY SILT - (Stiff), dark brown, fine to coarse grained sandy silt, M<Wp (humid)							Stickup=0.6m
	1.0	SAND - Medium dense, brown/grey brown, slightly silty, fine to coarse grained sand, humid							From 0m to 0.8m, bentonite
		At 1.4m, medium to coarse grained sand						▼	
		From 2.5m, fine to coarse grained sand with trace silt and fine sized subrounded gravel							From 0.8m to 3.9m, gravel From 0.9m to 3.9m, screen
	3.8								
	3.9	SANDY CLAY / CLAYEY SAND - Stiff, brown/grey brown, fine to coarse grained sandy clay/clayey sand, M>Wp							End cap
		Bore discontinued at 3.9m, limit of investigation							

RIG: Envirodrill **DRILLER:** Total Drilling (Foody) **LOGGED:** Semmler **CASING:** Uncased

TYPE OF BORING: Solid flight auger to 3.9m

WATER OBSERVATIONS: Free groundwater observed at 1.7m

REMARKS: Bore located immediately adjacent A11-D, strata inferred from A11-D Borehole Log

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	⊳	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 341.50 AHD
EASTING: 229867
NORTHING: 6398595
DIP/AZIMUTH: 90°/--

BORE No: A12
PROJECT No: 49761.02
DATE: 17/5/2012
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
341	0.1	SAND - (Very loose), grey fine sand, trace silt, humid							Stickup = 0.5m
		SAND - Loose, grey-brown fine to coarse sand, trace silt, humid							From 0m to 0.2m, bentonite
		From 0.5m, wet						▼	
	1	From 0.8m, saturated							1
340		From 1.5m, trace subrounded gravel up to 10mm diameter		S	1.5		1,2,2 N = 4		
	2				1.95				2
339									
	3	From 3.0m to 3.1m, brown-orange clay lense		S	3.0		1,2,5 N = 7		3
338	3.35	SAND - Loose, light grey fine to medium grained sand, trace to some clay, trace silt, saturated			3.45				From 0.2m to 6.2m, gravel From 0.2m to 6.2m, 50mm diameter Class 18 machine slotted PVC screen
	3.7	CLAY - (Soft), dark grey clay, (inferred from drill cuttings), M>Wp							
	4.0	SANDY CLAY - Soft, brown, fine to coarse sandy clay, trace silt, M>Wp		S,pp	4.0		3,2,2 N = 4 30-50 kPa		4
337		From 4.1m to 4.45m, clay and clayey fine to coarse sand bands			4.45				
		From 4.5m, increasing clay content							
	5								5
336					5.5				
	5.7	From 5.5m to 5.7m, clay with some fine to coarse sand, M>Wp		S,pp			4,4,5 N = 9 30 kPa		
	6	SANDY CLAY / CLAYEY SAND - Loose to stiff, light grey fine to medium grained sandy clay / clayey sand, trace silt, M>Wp (saturated)			5.95				6 End cap
335	6.5	CLAY - Stiff to very stiff, light brown clay, trace subrounded gravel up to 10mm diameter, trace fine to medium grained sand, M>Wp							
	7				7.0				7
		From 7.35m to 7.45m, light grey fine to medium grained sand band		S,pp	7.45		3,4,8 N = 12 160-250 kPa		
334	8								8
					8.5				
333	8.6	SAND - Medium dense, light grey fine to coarse grained sand, trace subrounded gravel up to 7mm diameter, trace silt, saturated		S			7,8,9 N = 17		
	9	From 9.2m, orange and light brown clay and sandy clay in parts			8.95				9
332	9.8	GRAVELLY SAND - Medium dense, orange gravelly fine			10.0				
	10.0								

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Holden **CASING:** HW to 2.5m

TYPE OF BORING: Solid flight auger to 2.5m, wash boring to 10m

WATER OBSERVATIONS: Free groundwater observed at 0.8m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	⊳	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 341.50 AHD
EASTING: 229867
NORTHING: 6398595
DIP/AZIMUTH: 90°/--

BORE No: A12
PROJECT No: 49761.02
DATE: 17/5/2012
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		to coarse grained sand, trace silt, gravel subrounded up to 30mm diameter, saturated		S			13,10,8 N = 18		
331	10.45	SANDSTONE - Very low strength, extremely weathered, orange and light brown, fine to coarse grained sandstone			10.45				
		Bore discontinued at 10.45m, limit of investigation							
330	11								11
	12								12
329	13								13
328	14								14
327	15								15
326	16								16
325	17								17
324	18								18
323	19								19
322									

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Holden **CASING:** HW to 2.5m
TYPE OF BORING: Solid flight auger to 2.5m, wash boring to 10m
WATER OBSERVATIONS: Free groundwater observed at 0.8m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	⊳	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 251.75 AHD
EASTING: 229527
NORTHING: 6411267
DIP/AZIMUTH: 90°/--

BORE No: A13
PROJECT No: 49761
DATE: 26/8/2011
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
251	0	SILTY CLAY - Dark brown-brown silty clay, trace fine to coarse grained sand, trace subangular, fine sized gravel							From 0.0m to 1.2m, grout
	1								From 0.9m to 1.4m, bentonite
250	1.5	CLAY - Brown-pale brown clay, trace fine grained sand, M>Wp		D	1.5				
	2								
249	3								
	3.0	SAND - Pale brown, fine to coarse grained sand, trace silt, trace gravel		D	3.5				
248	4								From 1.2m to 7.2m, screen
	4.3	SAND/GRAVEL - Undifferentiated		D	4.5				From 1.4m to 7.6m, gravel
247	5								
246	6							▼	
245	7								From 7.2m to 7.6m, sump
	7.6	Bore discontinued at 7.6m, limit of investigation							End cap
244	8								
243	9								
242									

RIG: Hydrapower MDR105 **DRILLER:** Myers (Macquarie) **LOGGED:** Benson **CASING:** HWT to 7.6m
TYPE OF BORING: 4¾ blade bit washbore
WATER OBSERVATIONS: Some water loss from 6.2m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	⊳	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 280.20 AHD
EASTING: 225363
NORTHING: 6406840
DIP/AZIMUTH: 90°/--

BORE No: A14
PROJECT No: 49761.02
DATE: 27/7/2012
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
280		SILTY CLAY - (Stiff) dark brown silty clay, trace fine to medium grained sand, M>Wp		A	0.5				Stickup = 0.5m From 0m to 0.2m, bentonite
279	1			A	1.0				1
	1.4	CLAY - Hard, brown clay, trace silt, trace fine to medium grained sand, M>Wp			1.5 1.6				From 0.2m to 1.8m, backfill
278	2			pp S	1.95		390-550 kPa 4,8,11 N = 19		2 From 1.8m to 2.1m, bentonite
		From 2.1m, trace silt and subangular gravel up to 10mm		A	2.5				
		From 2.6m, very stiff			2.6				
	2.8	CLAYEY SAND - Medium dense, brown clayey fine to medium grained sand, trace silt, trace subangular and subrounded gravel up to 10mm		S pp	2.8 3.05		5,10,5 N = 15 300-370 kPa		
277	3								3
	3.75	GRAVELLY CLAY - Very stiff, brown gravelly clay, gravel subangular and subrounded up to 20mm, M>Wp							
	4			S	4.1		5,9,15 N = 24		4
276	4.45	CLAYEY GRAVELLY SAND - Dense, brown clayey gravelly fine to coarse grained sand, gravel subangular to subrounded up to 20mm, trace silt, saturated			4.55				
	4.75	GRAVELLY SAND - Dense, brown mottled red gravelly fine to coarse grained sand, gravel subangular to subrounded up to 40mm, some clay, trace silt, saturated							5 From 2.1m to 8.3m, gravel From 2.3m to 8.3m, 50mm diameter Class 18 machine slotted PVC screen
275	5								
		From 5.75m, seepage (water loss)		S	5.6		9,18,20 N = 38		
274	6				6.05				6
	7			S	7.1		12,23,17 N = 40		7
273					7.55				
272	8								8 End cap
	8.6	SILTY CLAY - Firm to stiff, yellowish brown silty clay, some fine to medium grained sand, M>Wp		S pp	8.6 8.78		10,5,7 N = 12 90-150 kPa		
271	9								9
	9.75								

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Holden **CASING:** HW to 2.5m

TYPE OF BORING: Solid flight auger to 2.5m, wash boring to 11.45m

WATER OBSERVATIONS: Free groundwater observed at ~4.0m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	⊳	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 280.20 AHD
EASTING: 225363
NORTHING: 6406840
DIP/AZIMUTH: 90°/--

BORE No: A14
PROJECT No: 49761.02
DATE: 27/7/2012
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
270	10.2	GRAVELLY SAND - Medium dense, gravelly fine to coarse grained sand, gravel subangular to subrounded up to 40mm, some clay, trace to some silt, saturated (continued)		S	10.1		8,10,8 N = 18		
	10.3				10.4				
	11	SILTY SAND - Medium dense, light grey silty fine to medium grained sand, some subangular to subrounded gravel up to 20mm, saturated							11
269	11.25	SAND - Medium dense, brown fine to coarse grained sand, trace silt, saturated							
				S	11.45		27,18,24 N = 42		
	11.75	SANDSTONE - Extremely low strength, extremely weathered, grey fine to coarse grained sandstone From 11.45m, drilling refusal			11.75				
268	12	Bore discontinued at 11.75m, limit of investigation							12
267	13								13
266	14								14
265	15								15
264	16								16
263	17								17
262	18								18
261	19								19

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Holden **CASING:** HW to 2.5m

TYPE OF BORING: Solid flight auger to 2.5m, wash boring to 11.45m

WATER OBSERVATIONS: Free groundwater observed at ~4.0m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	⊳	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 229.30 AHD
EASTING: 234816
NORTHING: 6405886
DIP/AZIMUTH: 90°/--

BORE No: A15
PROJECT No: 49761.02
DATE: 15 - 16/5/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
229	0.7	SANDY SILTY CLAY - (Very soft to soft), dark brown fine to medium sandy silty clay, M<Wp (humid)							From 0m to 0.1m, bentonite
228	1	SAND - Brown, fine to coarse grained sand, trace to some silt, trace subrounded gravel up to 10mm, wet From 0.8m, saturated						▼	From 0.1m to 6.2m, gravel From 0.3m to 6.3m, 50mm diameter Class 18 machine slotted PVC screen
227	2								
226	3								
225	4								
224	5								
223	6								End cap
	6.3	Bore discontinued at 6.3m, limit of investigation							
222	7								
221	8								
220	9								

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Holden **CASING:** Uncased
TYPE OF BORING: Solid flight auger to 6.3m
WATER OBSERVATIONS: Free groundwater observed at 0.8m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	⊳	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 219.50 AHD
EASTING: 226404
NORTHING: 6416905
DIP/AZIMUTH: 90°/--

BORE No: A16
PROJECT No: 49761.02
DATE: 26/7/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
219	0	SANDY CLAY - (Soft) brown fine to medium grained sandy clay, some silt, M>Wp							Stickup = 0.5m From 0m to 0.1m, bentonite From 0.2m to 0.6m, casing From 0.1m to 1.3m, gravel From 0.2m to 1.3m, 50mm diameter Class 18 machine slotted PVC screen End cap
	0.5	From 0.5m, some cobbles up to 200mm thick							
218	1.3	Bore discontinued at 1.3m, limit of investigation							
217	2								
216	3								
215	4								
214	5								
213	6								
212	7								
211	8								
210	9								

RIG:
DRILLER: Foody
LOGGED: Holden
CASING: Uncased

TYPE OF BORING: Shovel - by hand

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	⊳	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: TBC
EASTING: 230062
NORTHING: 6401194
DIP/AZIMUTH: 90°/--

BORE No: A17-D
PROJECT No: 49761
DATE: 28/2/2012
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SANDY SILT - Stiff, dark brown, fine to coarse grained sandy silt, M<Wp							Stickup=0.65m
	0.7	CLAYEY SILT - Stiff to very stiff, dark brown clayey silt with some fine to coarse grained sand, M>Wp			1.0				
				BE	1.2		250kPa		
				S			2,3,1		
	1.4	SAND and CLAY - Soft to firm, grey, fine to coarse grained sand and clay, M>>Wp (wet to saturated)		PP	1.4		N = 4	▼	
					1.45		<50kPa		
	2.6	SILTY SAND - Loose, grey, fine to medium grained silty sand with trace coarse grained sand, saturated			2.6				From 0m to 4.7m, backfill cuttings
				S			6,2,1		
					3.05		N = 3		
	4.1	SANDY CLAY - Stiff to very stiff, grey, fine to coarse grained sandy clay with trace fine sized subrounded gravel, M>Wp		PP	4.1		130kPa		
				S			3,4,5		
				PP	4.5		N = 9		
					4.55		200 kPa		
		From 5.6m to 6.05m, firm, sandy clay with fine to coarse grained silty sand and sandy silt bands			5.6				
				S			3,1,2		
					6.05		N = 3		From 4.7m to 7.1m, bentonite
	7.1	SILTY CLAY - Stiff, grey silty clay with some fine grained sand with thin sandy lenses (fine to medium grained), M>Wp		PP	7.1		140kPa		
				BE	7.3		200kPa		
				S			3,4,5		
				PP	7.5		N = 9		
					7.55		100kPa		
	8.6	CLAYEY SAND and SANDY CLAY - Medium dense/stiff, grey mottled yellow brown/brown, fine to coarse grained clayey sand and sandy clay with some fine to medium sized subrounded gravel, (saturated), M>Wp			8.6				
				S			6,6,8		
					9.05		N = 14		From 7.1m to 11.3m, gravel
		From 9.3m to 9.5m, some fine to coarse sized, subrounded gravel							From 7.3m to 11.3m, screen

RIG: Envirodrill **DRILLER:** Total Drilling (Foody) **LOGGED:** Semmler **CASING:** HW to 2.5m

TYPE OF BORING: Solid flight auger to 2.5m, wash boring to 11.6m

WATER OBSERVATIONS: Free groundwater observed at 1.5m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	⊳	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: TBC
EASTING: 230062
NORTHING: 6401194
DIP/AZIMUTH: 90°/--

BORE No: A17-D
PROJECT No: 49761
DATE: 28/2/2012
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
					10.1				
		From 10.2m to 10.3m, fine to medium grained sand band		S	10.4		4,3,9 N = 12 150kPa		
	10.5	GRAVELLY SAND - Medium dense, brown, fine to coarse sized subrounded gravelly fine to coarse grained sand, with some silt and clay, saturated		SP	10.55				End cap
	11								11
					11.6				
	11.7	SILTSTONE - Extremely low strength to very low strength, extremely weathered, grey siltstone		S			10, 20, 30/80mm bouncing		
	12 11.98	Bore discontinued at 11.98m, limit of investigation			11.98				12
	13								13
	14								14
	15								15
	16								16
	17								17
	18								18
	19								19

RIG: Envirodrill **DRILLER:** Total Drilling (Foody) **LOGGED:** Semmler **CASING:** HW to 2.5m

TYPE OF BORING: Solid flight auger to 2.5m, wash boring to 11.6m

WATER OBSERVATIONS: Free groundwater observed at 1.5m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	⌵	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: TBC
EASTING: 230062
NORTHING: 6401194
DIP/AZIMUTH: 90°/--

BORE No: A17-S
PROJECT No: 49761
DATE: 28/2/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.0	SANDY SILT - Stiff, dark brown, fine to coarse grained sandy silt, M<Wp							Stickup=0.65m From 0m to 0.6m, bentonite
	0.7	CLAYEY SILT - Stiff to very stiff, dark brown clayey silt with some fine to coarse grained sand, M>Wp							
	1.4	SAND and CLAY - Soft to firm, grey, fine to coarse grained sand and clay, M>>Wp (wet to saturated)						▼	From 0.6m to 4.15m, gravel From 1.15m to 4.15m, screen
	2.6	SILTY SAND - Loose, grey, fine to medium grained silty sand with trace coarse grained sand, saturated							
	4.1 4.2	SANDY CLAY - Stiff to very stiff, grey, fine to coarse grained sandy clay with trace fine sized subrounded gravel, M>Wp Bore discontinued at 4.2m, limit of investigation							End cap

RIG: Envirodrill **DRILLER:** Total Drilling (Foody) **LOGGED:** Semmler **CASING:** Uncased

TYPE OF BORING: Solid flight auger to 4.2m

WATER OBSERVATIONS: Free groundwater observed at 1.5m

REMARKS: Bore located immediately adjacent A17-D. Strata inferred from A17-D Borehole Log

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	⊳	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 327.50 AHD
EASTING: 229979
NORTHING: 6400329
DIP/AZIMUTH: 90°/--

BORE No: A18
PROJECT No: 49761.02
DATE: 21/5/2012
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
327	0.0	SANDY SILT - Dark brown, fine to medium grained sandy silt, abundant organics, M<Wp (humid)							From 0m to 0.2m, bentonite
		From 0.5m, increasing clay content							
	1.0	SILTY CLAY - Dark brown silty clay, some to slightly (fine to medium) sandy, M>Wp							
326	1.5	SAND - Very loose, fine to coarse grained sand, trace silt, trace subrounded gravel up to 5mm diameter, saturated		S	1.5		1,1,1 N = 2	▼	
	1.9	SANDY CLAY - Very soft, dark brown fine to coarse grained sandy clay, some silt, M>>Wp			1.95				
325		From 2.5m, increasing sand content, trace subrounded gravel up to 5mm diameter		S	2.7		0,1,0 N = 1		
	3.1	SAND - Very loose, dark brown fine to coarse grained sand, some clay, trace silt, trace subrounded gravel up to 5mm diameter, saturated			3.15				From 0.2m to 6.2m, gravel From 0.2m to 6.2m, 50mm diameter Class 18 machine slotted PVC screen
324				S	4.2		2,4,4 N = 8		
	4.45	SAND - Loose, grey fine to coarse grained sand, trace silt, trace subrounded gravel up to 5mm diameter, saturated			4.65				
	4.8	GRAVELLY SAND - Medium dense, brown gravelly fine to coarse grained sand, gravel subrounded up to 30mm diameter, trace silt, saturated							
323				S	5.7		6,6,6 N = 12		
322					6.15				End cap
	7.1	SILTY SAND - Loose, brown silty fine to medium grained sand, saturated		S	7.2		2,2,3 N = 5		
321					7.65				
	8.5	SANDY SILT - Stiff, grey sand brown fine to medium grained sandy silt, trace clay, M>Wp		S	8.7		4,4,5 N = 9		
320	9.0	GRAVELLY SAND - Medium dense, brown gravelly fine to coarse grained sand, gravel, subrounded up to 20mm diameter, trace silt, saturated			9.15				
319									
318									

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Holden **CASING:** HW to 2.5m

TYPE OF BORING: Solid flight auger to 2.5m, wash boring to 11.7m

WATER OBSERVATIONS: Free groundwater observed at 1.6m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	⊳	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 327.50 AHD
EASTING: 229979
NORTHING: 6400329
DIP/AZIMUTH: 90°/--

BORE No: A18
PROJECT No: 49761.02
DATE: 21/5/2012
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
317	11	GRAVELLY SAND - Medium dense, brown gravelly fine to coarse grained sand, gravel, subrounded up to 20mm diameter, trace silt, saturated *(continued)*			10.2				
		From 10.3m to 10.33m, yellow-brown, fine to medium sand band		S			6,6,8 N = 14		
		From 10.5m to 10.53m, grey clay band, M>Wp			10.65				
316	12				11.7				
				S			100mm, bounsing		
	12.1 12.15	SANDSTONE - Extremely low strength, extremely weathered, yellow- light brown mottled red-brown, fine to coarse grained sandstone			12.15				
315	13	Bore discontinued at 12.15m, limit of investigation							
314	14								
313	15								
312	16								
311	17								
310	18								
309	19								
308									

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Holden **CASING:** HW to 2.5m

TYPE OF BORING: Solid flight auger to 2.5m, wash boring to 11.7m

WATER OBSERVATIONS: Free groundwater observed at 1.6m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	⊳	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 246.25 AHD
EASTING: 229995
NORTHING: 6412730
DIP/AZIMUTH: 90°/--

BORE No: A19
PROJECT No: 49761.02
DATE: 24/7/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
246	0.3	CLAY - (Soft to firm) dark brown clay, some silt, M>Wp							Stickup = 0.6m
		SILTY SAND - (Very loose to loose) dark brown silty fine to medium sand, some clay, humid							From 0m to 1.7m, backfill and bentonite
245	1.3	CLAY - Hard, dark brown clay, some silt, trace fine to medium grained sand, M>Wp			1.5				
				S			8,11,18 N = 29 >400 kPa		
				pp	1.9				From 1.7m to 2.0m, bentonite
244					1.95				
					2.54				
				S			8,7,7 N = 14 350-450 kPa		
	2.87			pp	2.87				
243	3.0	CLAYEY SAND - Medium dense, light grey and brown clayey fine to medium grained sand, trace silt, wet			2.99				
		GRAVELLY SAND - Medium dense, brown gravelly fine to coarse grained sand, gravel subrounded up to 20mm, some to slightly clayey in parts, wet							From 2.0m to 5.2m, gravel From 2.2m to 5.2m, 50mm diameter Class 18 machine slotted PVC screen
		From 3.5m to 3.85m, light grey clay band (inferred from cuttings)							
242					4.04				
				S			8,11,11 N = 22		
	4.4	GRAVELLY SANDSTONE - Extremely low strength, extremely weathered, red fine grained gravelly fine to coarse grained sandstone			4.49				
	5.0	CLAYSTONE - Extremely low strength, extremely weathered, grey claystone							End cap
241					5.54				
				S			6,10,14 N = 24		
					5.99				
240	6.6	From 6.6m, drilling refusal Bore discontinued at 6.6m, limit of investigation							
239									
238									
237									

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Holden **CASING:** HW to 2.5m

TYPE OF BORING: Solid flight auger to 2.5m, wash boring to 6.6m

WATER OBSERVATIONS: Free groundwater observed at ~3.5m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	⊳	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 273.50 AHD
EASTING: 231188
NORTHING: 6407766
DIP/AZIMUTH: 90°/--

BORE No: A20
PROJECT No: 49761.02
DATE: 9/7/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
273	0.6	SAND - (Loose), dark brown fine to medium grained sand, some silt, trace clay, humid							Stickup = 0.5m
		CLAYEY SAND - (Loose) dark brown clayey fine to medium grained sand, some silt, humid to wet							From 0m to 0.9m, bentonite
272	1.0	SANDY CLAY - (Soft) dark brown fine to medium grained sandy clay, some silt, M>Wp							
		From 1.5m, sandy clay / clayey sand (M>Wp)		S pp	1.5 1.85 1.95		2,2,2 N = 4 50-100 kPa		
		From 2.0m, saturated						▼	
271	2.5	CLAY - Stiff, dark brown clay, trace to some silt, trace fine to medium grained sand, M>Wp		S, pp	2.67 3.12		3,4,5 N = 9 180-200 kPa		
		From 3.0m, trace fine grained subrounded gravel up to 5mm							
270	4.3				4.17				From 0.9m to 7.2m, gravel From 1.2m to 7.2m, 50mm diameter Class 18 machine slotted PVC screen
269	4.43	SILTY CLAY - Very soft, light brown silty clay, trace fine to medium grained sand, M>>Wp		pp S pp	4.3 4.43 4.62		0-40 kPa 2,1,6 N = 7 250-330 kPa		
		CLAY - Very stiff, brown mottled red and light grey clay, slightly silty, trace to some fine to medium grained sand, M>Wp							
268	5.5	SANDY CLAY - Hard, light brown mottled red and light grey fine to medium grained sandy clay, trace to some silt, M>Wp		S, pp	5.67 6.12		6,11,14 N = 25 350->400 kPa		
267	6.7	SANDSTONE - Extremely low strength, extremely weathered, brown fine to coarse grained sandstone							
				S	7.17		11, 33, bouncing		End cap
266	7.4 7.47	CLAYSTONE - Extremely low strength, extremely weathered, brown mottled light grey claystone			7.47				
		Bore discontinued at 7.47m, limit of investigation							
265	9								
264									

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Holden **CASING:** HW to 2.5m

TYPE OF BORING: Solid flight auger to 2.5m, wash boring to 7.17m

WATER OBSERVATIONS: Free groundwater observed at 2.0m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	⊳	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 2.58 AHD
EASTING: 230924
NORTHING: 6412502
DIP/AZIMUTH: 90°/--

BORE No: A22
PROJECT No: 49761.02
DATE: 22/10/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
									Stickup = 0.63m
		SAND - (Very loose), brown, fine grained sand with trace to some clay, humid		A	0.1				From 0m to 0.3m, asphalt and concrete
		From 0.5m, slightly clayey with trace fine sized subangular gravel, damp		A	0.5				
1		From 1.0m, trace coal and gravel		S	1.0		3,4,4 N = 8		From 0.3m to 1.7m, backfill and cuttings From 0m to 2.2m, Class 18 PVC
	1.6				1.45				
2	2.0	GRAVELLY SAND - (Medium dense), brown, fine to medium sized subangular gravelly fine to medium grained sand, trace to some clay, damp							From 1.7m to 2.0m, bentonite
		CLAYEY SAND - Dense, brown, fine to medium grained clayey sand, humid		S	2.5		4,17,25 N = 42		
3					2.95				
		From 3.3m, white fine to medium sized subangular gravel, dry to humid (slow drilling progress)		A	3.3				
		From 3.8m, moist to wet			4.0				
4				S pp			8,15,19 N = 34 >600 kPa		
					4.45				From 2.0m to 7.2m, 5mm gravel From 2.2m to 7.2m, 50mm diameter Class 18 machine slotted PVC screen
5	5.0	CLAY - Hard, brown clay, slightly sandy with some sandstone in parts, M<Wp							
				S	5.5		9,13,21 N = 34		
6					5.95				
	6.5								
7		SANDSTONE - Low to medium strength, highly to moderately weathered, brown and grey, fine to medium grained sandstone with some clay in parts							End cap
				S	7.2		10,16,29 N = 45		
	7.65	Bore discontinued at 7.65m, limit of investigation			7.65				
8									
9									

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Fulham **CASING:** HW to 2.6m

TYPE OF BORING: Solid flight auger to 7.0m, wash bore to 7.2m

WATER OBSERVATIONS: Free groundwater observed at 3.4m during drilling

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	▼	Water level
D	Disturbed sample		

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: A23
PROJECT No: 49761.02
DATE: 15-16/10/12
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SAND - (Very loose), brown, fine grained sand with some silt and trace fine to medium sized subrounded gravel, humid		A	0.1				Stickup = 0.63m From 0m to 0.3m, asphalt and concrete
		At 0.5m, humid to damp		A	0.5				
	1	From 1.0m, loose		S	1.0 1.45		3,3,3 N = 6		From 0.3m to 2.9m, backfill and cuttings
	2	From 2.1m, fine to coarse grained sand							From 0m to 3.4m, Class 18 PVC
	2.6	SANDY CLAY - Firm to stiff, dark brown, fine to coarse grained sandy clay with some fine sized gravel, M>Wp		S,pp	2.68 3.13		2,3,2 N = 5 90-130 kPa		From 2.9m to 3.2m, bentonite
	3								
	4	From 3.8m, trace gravel							
		From 4.18m, stiff		S,pp	4.18 4.5		3,6,4 N = 10 120-170 kPa		
	5								
				S	5.65 5.95		4,2,3 N = 5		
	5.9	SAND - Loose to medium dense, brown, fine to medium grained sand, slightly clayey with trace silt, saturated							
	6.25	GRAVELLY SAND - Very dense, brown, fine to coarse sized, subangular gravelly fine to coarse grained sand with some clay in parts, saturated							From 3.2m to 9.4m, 5mm gravel From 3.4m to 9.4m, 50mm diameter Class 18 machine slotted PVC screen
	7			S	7.15 7.45		15,15,18 N = 33		
	8								
	8.0	SANDY GRAVEL - (Very dense), brown, fine to medium grained sandy fine sized subangular gravel, saturated							
	9								End cap
	9.6								From 9.4m to 10.1m, backfilled

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Fulham **CASING:** HW to 2.7m

TYPE OF BORING: Solid flight auger to 3.13m, wash boring to 10.15m

WATER OBSERVATIONS: Free groundwater observed at 5.0m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	V	Vane shear (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: A23
PROJECT No: 49761.02
DATE: 15-16/10/12
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	10.12 10.15	SANDSTONE - Medium to high strength, highly to moderately weathered, brown, fine to coarse grained sandstone *(continued)* BASALT - Medium to high strength, fresh, black/dark brown, fractured basalt Bore discontinued at 10.15m, limit of investigation		S	10.1, 10.15		40/150mm		with bentonite

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Fulham **CASING:** HW to 2.7m

TYPE OF BORING: Solid flight auger to 3.13m, wash boring to 10.15m

WATER OBSERVATIONS: Free groundwater observed at 5.0m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	▼	Water level
D	Disturbed sample	PID	Photo ionisation detector (ppm)
E	Environmental sample	PL(A)	Point load axial test Is(50) (MPa)
PL(D)	Point load diametral test Is(50) (MPa)		
SPT	Standard penetration test		
V	Shear vane (kPa)		

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: A24D
PROJECT No: 49761.02
DATE: 16/10/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
									Stickup = 0.45m
		SAND - (Very loose), brown, fine grained sand with some silt and trace rootlets, humid		A	0.1				From 0m to 0.5m, concrete
				A	0.5				
	1.2	SANDY SILT / SILTY SAND - Very loose, dark brown, fine to medium grained silty sand / sandy silt		S,pp	1.2 1.4		2,1,1 N = 2 30-60 kPa		
		From 2.0m, some fine to medium sized subangular gravel			2.55		4,5,4 N = 9 220-240 kPa		From 0m to 5.6m, Class 18 PVC From 0.5m to 4.8m, backfill and cuttings
	2.8	GRAVELLY SAND - Loose, light brown, fine to medium sized subangular gravelly fine to coarse grained sand, trace silt, humid		S,pp	3.0				
		From 4.1m, wet, slightly clayey			4.1		5,3,6 N = 9 80-120 kPa		
	4.4	From 4.25m, saturated		S,pp	4.4				
		CLAY - Stiff, dark brown clay with trace to some fine grained sand and trace silt, M>Wp			4.45				From 4.8m to 5.3m, bentonite
		From 5.3m, trace to some fine sized subangular gravel			5.6		8,2,2 N = 4		
	5.65	CLAYEY SAND - Very loose, brown, fine grained clayey sand with trace fine to medium sized gravel in parts, saturated		S	5.95				
		From 7.2m, medium dense with firm to stiff sandy clay in parts		S,pp	7.2 7.65		3,5,4 N = 9 50-140 kPa		From 5.3m to 8.6m, 5mm gravel From 5.6m to 8.6m, 50mm diameter Class 18 machine slotted PVC screen
	7.8	SANDSTONE - Medium strength, highly to moderately weathered, red and brown fine to coarse grained sandstone							
	8.55 8.6	BASALT - High strength, moderately weathered to fresh, dark grey basalt Bore discontinued at 8.6m, limit of investigation		S	8.55 8.6		31,27,23 N = 50		End cap

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Fulham **CASING:** HW to 2.4m

TYPE OF BORING: Solid flight auger to 2.55m, wash boring to 8.6m

WATER OBSERVATIONS: Free groundwater observed at 4.4m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
HP	Hand penetrometer (kPa)		
R	Rock core		
V	Shear vane (kPa)		

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: A24S
PROJECT No: 49761.02
DATE: 16/10/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
									Stickup = 0.58m
		SAND - (Very loose), brown, fine grained sand with some silt and trace rootlets, humid		A	0.1				From 0m to 0.4m, concrete
				A	0.5				
	1.2	SANDY SILT / SILTY SAND - Very loose, dark brown, fine to medium grained silty sand / sandy silt		S,pp	1.2 1.4		2,1,1 N = 2 30-60 kPa		From 0.4m to 1.9m, backfill and cuttings From 0m to 2.4m, Class 18 PVC
		From 2.0m, some fine to medium sized subangular gravel							From 1.9m to 2.2m, bentonite
	2.8	GRAVELLY SAND - Loose, light brown, fine to medium sized subangular gravelly fine to coarse grained sand, trace silt, humid		S,pp	2.55 3.0		4,5,4 N = 9 220-240 kPa		
		From 4.1m, wet, slightly clayey			4.1				From 2.2m to 5.4m, 5mm gravel From 2.4m to 5.4m, 50mm diameter Class 18 machine slotted PVC screen
	4.4	From 4.25m, saturated		S,pp	4.4		5,3,6 N = 9 80-120 kPa		
		CLAY - Stiff, dark brown clay with trace to some fine grained sand and trace silt, M>Wp			4.45				
	5.4	From 5.3m, trace to some fine sized subangular gravel							End cap
		Bore discontinued at 5.4m, limit of investigation							

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Fulham **CASING:** Uncased
TYPE OF BORING: Solid flight auger to 5.4m
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	S	Standard penetration test
E	Environmental sample	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: A25
PROJECT No: 49761.02
DATE: 17/10/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.0	SAND - (Very loose), dark brown, fine grained sand with some silt and organics, humid		A	0.1				Stickup = 0.60m From 0m to 0.4m, concrete
		From 0.5m, trace organics, damp		A	0.5				
	1	From 1.0m, trace fine to medium sized subrounded gravel, some silt, damp to moist		S	1.0 1.45		3,1,2 N = 3		From 0.4m to 2.0m, backfill and cuttings From 0m to 2.5m, Class 18 PVC
	2								From 2.0m to 2.3m, bentonite
		From 2.5m, medium dense, slightly silty, some gravel		S	2.5 2.8		4,7,6 N = 13		
	3								
	3.2	GRAVELLY SAND - Light brown, fine to medium sized subangular gravelly fine to medium grained sand with trace clay							
	4.0	SANDY CLAY - Hard, brown, fine to medium grained sandy clay, M> Wp		S,pp	4.0		9,14,22 N = 36 550->600 kPa		From 2.3m to 5.5m, 5mm gravel From 2.5m to 5.5m, 50mm diameter Class 18 machine slotted PVC screen
	4.4	SANDY CLAY / CLAYEY SAND - Dense, light grey, fine to medium grained sandy clay / clayey sand			4.45				
	5	From 4.6m, some fine to medium sized subangular to subrounded gravel, damp							
	5.3	SANDSTONE - Medium strength, highly to moderately weathered, brown, fine to medium grained sandstone with some fragmented basalt in parts and some fine to medium sized subangular gravel		S	5.5		27,25/30mm		End cap
	5.68	Bore discontinued at 5.68m, limit of investigation			5.68				
	6								
	7								
	8								
	9								

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Fulham **CASING:** HW to 2.5m
TYPE OF BORING: Solid flight auger to 2.5m, wash bore to 5.68m
WATER OBSERVATIONS:
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
		DP	Dynamic penetrometer (blows per 100mm)
		HP	Hand penetrometer (kPa)
		V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE01A/D
PROJECT No: 49761.02
DATE: 17/10/2012
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.15	SAND - (Loose), brown, fine to medium grained sand, slightly clayey, damp		A	0.1				Stickup = 0.62m From 0m to 0.4m, concrete
		CLAY - Very stiff to hard, dark brown clay, trace to some fine grained sand, M ≤ Wp		A	0.5		300-500 kPa		
	1			S,pp	1.0		450->500 kPa		
	1.6	SANDY GRAVEL - (Medium dense), brown, fine to medium grained sandy fine to medium sized subangular to subrounded gravel with trace to some silt			1.45				
	2.7	GRAVELLY SAND - Medium dense, brown, fine to medium sized gravelly fine to medium grained sand, slightly clayey, wet From 2.95m, saturated with some cobbles up to 40mm (basalt + sandstone)		S	2.9 3.2		9,13,12 N = 25		From 0.4m to 5.9m, backfill and cuttings From 0m to 6.4m, Class 18 PVC
	3.6	SANDY GRAVEL - Medium dense to dense, brown, fine to medium grained sandy fine to medium sized subangular to subrounded gravel, slightly cobbly (with basalt and sandstone up to 40mm), some to slightly clayey, saturated		S	4.0 4.2		13,18,12 N = 30		
	4.9	CLAY - (Stiff), brown clay with trace cobbles		(S)	5.55 5.73		12,15/30mm (bouncing)		
	6.3	SANDY GRAVEL - Medium dense, brown, fine to medium grained sandy fine to medium sized subangular to subrounded gravel, slightly clayey with some cobbles up to 40mm, saturated		S	6.95 7.15		5,11,12 N = 23		From 5.9m to 6.2m, bentonite From 6.2m to 9.4m, 5mm gravel From 6.4m to 9.4m, 50mm diameter Class 18 machine slotted PVC screen
	9.4	CLAYEY GRAVELLY SAND - Dense to medium dense, brown clayey fine to medium sized subangular to subrounded gravelly fine to coarse grained sand, moist, grading to rock		(S) S	8.9 9.05 9.6 9.75		27/150mm (bouncing) 4, 29, 10/20mm		End cap
	10.0								

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Fulham **CASING:** HW to 2.45m

TYPE OF BORING: Solid flight auger to 2.45m, wash bore to 11.25m

WATER OBSERVATIONS: Free groundwater observed at 2.95m during drilling

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	▼	Water level
D	Disturbed sample		

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE01A/D
PROJECT No: 49761.02
DATE: 17/10/2012
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SANDSTONE - High strength, moderately weathered, fine to medium grained sandstone							
	11								11
	11.25	Bore discontinued at 11.25m, limit of investigation		(S)	11.2, 11.25		5, 10, 32/50mm (bouncing)		
	12								12
	13								13
	14								14
	15								15
	16								16
	17								17
	18								18
	19								19

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Fulham **CASING:** HW to 2.45m
TYPE OF BORING: Solid flight auger to 2.45m, wash bore to 11.25m
WATER OBSERVATIONS: Free groundwater observed at 2.95m during drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
V	Shear vane (kPa)		

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE01A/S
PROJECT No: 49761.02
DATE: 17/10/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.15	SAND - (Loose), brown, fine to medium grained sand, slightly clayey, damp		A	0.1				Stickup = 0.75m From 0m to 0.3m, concrete
		CLAY - Very stiff to hard, dark brown clay, trace to some fine grained sand, M ≤ Wp		A,pp	0.5		300-500 kPa		
	1				1.0				From 0.3m to 1.3m, backfill and cuttings From 0m to 1.8m, Class 18 PVC
				S,pp	1.45		450->500 kPa		From 1.3m to 1.6m, bentonite
	1.6	SANDY GRAVEL - (Medium dense), brown, fine to medium grained sandy fine to medium sized subangular to subrounded gravel with trace to some silt							
	2.7	GRAVELLY SAND - Medium dense, brown, fine to medium sized gravelly fine to medium grained sand, slightly clayey, wet From 2.95m, saturated with some cobbles up to 40mm (basalt + sandstone)		S	2.9 3.2		9,13,12 N = 25		From 1.6m to 4.8m, 5mm gravel From 1.8m to 4.8m, 50mm diameter Class 18 machine slotted PVC screen
	3.6	SANDY GRAVEL - Medium dense to dense, brown, fine to medium grained sandy fine to medium sized subangular to subrounded gravel, slightly cobbly (with basalt and sandstone up to 40mm), some to slightly clayey, saturated		S	4.0 4.2		13,18,12 N = 30		
	4.8	Bore discontinued at 4.8m, limit of investigation							End cap

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Fulham **CASING:** HW to 2.45m
TYPE OF BORING: Solid flight auger to 4.8m
WATER OBSERVATIONS:
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	pp	Pocket penetrometer (kPa)
E	Environmental sample	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 230109
NORTHING: 6413815
DIP/AZIMUTH: 90°/--

BORE No: AGE02
PROJECT No: 49761
DATE: 16-26/9/13
SHEET 1 OF 14

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.15	TOPSOIL - Generally comprising dark brown, fine grained silt topsoil, humid		A	0.1				
		SANDY SILT - (Loose), dark brown, fine grained sandy silt, M<<Wp		A	0.5				
	1	From 1.0m, medium dense with some fine size subangular/subrounded gravel		S	1.0 1.45		6,6,6 N = 12		
	2.0	GRAVEL - Loose, brown, coarse sized subrounded gravel with trace silt		A	2.0				
		From 2.6m to 2.8m, fine sized subangular/subrounded gravel, wet		A S	2.5		5,4,2 N = 6 pp = 60		
	2.9	CLAY - Firm, brown clay with some medium sized gravel, M>Wp			2.9 2.95				
	3.4	CLAYEY GRAVEL - Medium dense brown fine to medium sized subangular / subrounded clayey gravel with some fine grained sand, stiff gravelly clay in parts							
	4			A S,pp	4.0 4.45		8,5,9 N = 14 pp = 150-200 kPa		
	5.5	GRAVEL - Medium dense, brown, fine to medium sized subangular / subrounded gravel, slightly clayey with some medium grained sand, wet		A S	5.5 5.95		pp = 50 14,15,18 N = 33		
	6			S	6.1 6.55		12,8,18 N = 26		
	7	From 7.5m, dense with some clay		S	7.6 8.05		11,14,17 N = 31		
	9	From 9.1m, medium dense		S	9.1 9.55		8,11,13 N = 24		

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 13.5m, _____ 39.5m

TYPE OF BORING: Solid flight auger to 6.0m, HW casing advanced rotary to 13m, HQ to 132.18m

WATER OBSERVATIONS: Free groundwater observed at 2.3m, 20L/1.5 minutes at 78.4m to 79m, 60L/minutes at 101.1m to 101.4m, 160L/minutes at EOH

REMARKS: 100% water loss at 9.1m, 100% water loss at 36.7m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Core sample
B	Bulk sample	W	Water sample
C	Core drilling		
D	Disturbed sample	▽	Water level
E	Environmental sample		

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Geotechnics | Environment | Groundwater

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 230109
NORTHING: 6413815
DIP/AZIMUTH: 90°/--

BORE No: AGE02
PROJECT No: 49761
DATE: 16-26/9/13
SHEET 2 OF 14

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		GRAVEL - Medium dense, brown, fine to medium sized subangular / subrounded gravel, slightly clayey with some medium grained sand, wet *(continued)*		S	10.6 10.7		16 (bouncing)		
	11.4	SANDSTONE - Extremely low strength, extremely weathered, friable, grey, fine to medium grained sandstone		S	12.1		11,21,23 N = 44		
	12.5	COAL - Medium to high strength, slightly weathered, black coal			12.55				
	13.0	COAL - High strength, fresh stained, highly fractured black coal			13.0				
	13.47	CORE LOSS - 1.48m (13.47m to 14.95m)		C					
	14.95	SILTSTONE - Extremely low to very low strength, fresh stained, friable grey siltstone From 15.25m to 15.90m, rock roller, no core recovered			15.0		PL(A) = 0.02		
				A	15.25				
	15.9	SILTSTONE - Very low strength, fresh stained, friable grey siltstone		C	15.9 16.44		PL(A) = 0.07 PL(D) = 0.03		
	17.35	SANDSTONE - Very low strength, fresh stained, friable grey fine grained sandstone		C	17.4 17.57		PL(A) = 0.06 PL(D) = 0.06		
	18.1	SILTSTONE - Very low strength, fresh stained, dark grey siltstone From 18.6m, low strength From 18.85m to 19.04m, extremely low strength, tuff band		C	18.16 18.37 18.7 19.58		PL(A) = 0.08 PL(D) = 0.07 PL(A) = 0.11		
				GT001	19.81 19.85		PL(A) = 0.1		

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 13.5m, _____ 39.5m
TYPE OF BORING: Solid flight auger to 6.0m, HW casing advanced rotary to 13m, HQ to 132.18m
WATER OBSERVATIONS: Free groundwater observed at 2.3m, 20L/1.5 minutes at 78.4m to 79m, 60L/minutes at 101.1m to 101.4m, 160L/minutes at EOH
REMARKS: 100% water loss at 9.7m, 100% water loss at 36.7m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Tube sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
I	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics | Environment | Groundwater

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 230109
NORTHING: 6413815
DIP/AZIMUTH: 90°/--

BORE No: AGE02
PROJECT No: 49761
DATE: 16-26/9/13
SHEET 3 OF 14

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		From 19.98m to 20.13m, very low strength, tuff band							
	20.27	SANDSTONE - Low strength, fresh stained, light grey and grey, fine to medium grained sandstone		C	20.45		PL(A) = 0.14		
	21				21.18 21.22		PL(A) = 0.1 PL(D) = 0.08		
	22 22.0	MUDSTONE - Low strength, fresh, dark grey mudstone			22.19		PL(A) = 0.14 PL(D) = 0.16		
		From 22.29m to 22.39m, tuff band							
	22.55	SANDSTONE - Medium strength, fresh, grey fine to medium grained sandstone		C					
	23								
	24 24.07	CORE LOSS - 0.11m (24.07m to 24.22m)			24.18				
	24.22	SILTSTONE - Low strength, fresh, grey and light grey siltstone			24.67		PL(A) = 0.24 PL(D) = 0.16		
	25 24.96	CARBONACEOUS MUDSTONE - Medium strength, fresh, dark brown carbonaceous mudstone							
		From 25.22m to 25.4m, coal		C	25.48		PL(A) = 0.56 PL(D) = 0.36		
	25.79	SILTSTONE - Medium strength, fresh, grey siltstone							
	26				26.18		PL(D) = 0.36		
	26.3	SANDSTONE - Low to medium strength, fresh, grey fine to medium grained sandstone							
	27				27.18				
				C					
	28				28.08				
	28.25	From 28.08m, very low strength							
	28.41	CORE LOSS - 0.16m (28.25m to 28.41m)							
		SANDSTONE - Very low strength, fresh, grey fine to medium grained sandstone							
	29	From 28.66m, medium strength with some fine sized gravel in parts		C					
					29.55		PL(A) = 0.52		
				GT002	29.6 29.81				

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 13.5m, _____ 39.5m

TYPE OF BORING: Solid flight auger to 6.0m, HW casing advanced rotary to 13m, HQ to 132.18m

WATER OBSERVATIONS: Free groundwater observed at 2.3m, 20L/1.5 minutes at 78.4m to 79m, 60L/minutes at 101.1m to 101.4m, 160L/minutes at EOH

REMARKS: 100% water loss at 9.7m, 100% water loss at 36.7m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Core sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
W	Water level	V	Shear vane (kPa)

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Geotechnics | Environment | Groundwater

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 230109
NORTHING: 6413815
DIP/AZIMUTH: 90°/--

BORE No: AGE02
PROJECT No: 49761
DATE: 16-26/9/13
SHEET 4 OF 14

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SANDSTONE - Very low strength, fresh, grey fine to medium grained sandstone *(continued)*		C	30.18 30.22		PL(A) = 0.76 PL(D) = 0.62		
				C					
31	30.96 31.08	CORE LOSS - 0.12m (30.96m to 31.08m)			31.08				31
		SANDSTONE - Medium strength, fresh, grey fine to coarse grained sandstone with some fine sized gravel in parts							
32				C	32.13		PL(A) = 0.96 PL(D) = 0.93		32
33					33.18				33
				C					
34	34.09 34.24	CORE LOSS - 0.15m (34.09m to 34.24m)			34.18 34.29		PL(A) = 0.5		34
		SANDSTONE - Medium strength, fresh, grey fine to coarse grained sandstone with some fine sized gravel in parts		C					
35					35.2				35
	35.58 35.65	From 35.52m, low strength CORE LOSS - 0.07m (35.58m to 35.65m)		C					
36		SANDSTONE - Very low to low strength, fresh, grey fine to medium grained sandstone			36.15 36.3		PL(D) = 5.75		36
	36.33 36.44	From 35.77m, very high strength CORE LOSS - 0.11m (36.33m to 36.44m)							
37		SANDSTONE - Medium strength, fresh, grey fine to medium grained sandstone		C					37
38					38.36		PL(A) = 0.62 PL(D) = 0.44		38
				GT003	38.41 38.65				
		From 38.66m, siderite band, 70mm thick							
39		From 38.9m, mudstone band, 80mm thick			39.15				39
				C					

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 13.5m, _____ 39.5m

TYPE OF BORING: Solid flight auger to 6.0m, HW casing advanced rotary to 13m, HQ to 132.18m

WATER OBSERVATIONS: Free groundwater observed at 2.3m, 20L/1.5 minutes at 78.4m to 79m, 60L/minutes at 101.1m to 101.4m, 160L/minutes at EOH

REMARKS: 100% water loss at 9.1m, 100% water loss at 36.7m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Tube sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
I	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 230109
NORTHING: 6413815
DIP/AZIMUTH: 90°/--

BORE No: AGE02
PROJECT No: 49761
DATE: 16-26/9/13
SHEET 5 OF 14

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SANDSTONE - Medium strength, fresh, grey fine to medium grained sandstone *(continued)*			40.33		PL(A) = 0.68 PL(D) = 0.57		
	41	From 41.0m, some fine to medium sized gravel		C					41
	42				42.15 42.18		PL(A) = 1.36		42
	43			C					43
	44				44.0		PL(A) = 1.15 PL(D) = 1.01		44
	45				45.15 45.27		PL(A) = 1.38		45
	46			C					46
	47				47.32		PL(A) = 1.11		47
47.65	48	CARBONACEOUS MUDSTONE - High strength, fresh, dark brown carbonaceous mudstone with some coal			48.18				48
	49			C					49
49.42		SILTSTONE - Low strength, fresh, grey siltstone			49.46				
				GT004	49.73		PL(A) = 0.16		
				C	49.78		PL(D) = 0.14		

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 13.5m, _____ 39.5m
TYPE OF BORING: Solid flight auger to 6.0m, HW casing advanced rotary to 13m, HQ to 132.18m
WATER OBSERVATIONS: Free groundwater observed at 2.3m, 20L/1.5 minutes at 78.4m to 79m, 60L/minutes at 101.1m to 101.4m, 160L/minutes
REMARKS: 100% water loss at 9.7m, 100% water loss at 36.7m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Tube sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
I	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 230109
NORTHING: 6413815
DIP/AZIMUTH: 90°/--

BORE No: AGE02
PROJECT No: 49761
DATE: 16-26/9/13
SHEET 6 OF 14

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SILTSTONE - Low strength, fresh, grey siltstone *(continued)*							
		From 50.15m, interbedded with fine grained sandstone laminations		C	50.43		PL(A) = 0.34 PL(D) = 0.36		
		From 50.55m, medium strength							
	51	From 50.85m to 54.87m, highly fractured, interbedded with extremely low to very low strength bands (crush zone)			51.18				51
	52			C					52
	52.88								
	53 / 53.03	CORE LOSS - 0.15m (52.88m to 53.03m)			53.03				53
		SILTSTONE - Medium strength, fresh, highly fractured grey to light grey siltstone interbedded with very low strength bands (crush zone)		C	53.65		PL(D) = 0.09		
	54				54.18				54
	54.27	SILTSTONE - Medium strength, fresh, grey and light grey siltstone			54.59		PL(D) = 1.38		
		From 54.67m, interbedded with laminations of extremely low to very low strength siltstone generally at 50mm to 100mm spacings							
	55			C					55
	56				56.19		PL(A) = 1.02		56
	57				57.08				57
		From 57.14m, very low strength, tuff		GT005	57.14				
	57.34	CARBONACEOUS MUDSTONE - High strength, fresh, dark brown carbonaceous mudstone with some coal lenses			57.34 57.39		PL(A) = 1.62		
				C					
	58				58.46				58
		From 58.55m to 58.81m, low strength, tuff			58.77		PL(A) = 0.14		
	58.91								
	59	SANDSTONE - Medium strength, fresh, grey and dark grey, fine to medium grained sandstone with some very low strength bands		C					59
	59.5 / 59.54	CORE LOSS - 0.04m (59.5m to 59.54m)							

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 13.5m, _____ 39.5m

TYPE OF BORING: Solid flight auger to 6.0m, HW casing advanced rotary to 13m, HQ to 132.18m

WATER OBSERVATIONS: Free groundwater observed at 2.3m, 20L/1.5 minutes at 78.4m to 79m, 60L/minutes at 101.1m to 101.4m, 160L/minutes at EOH

REMARKS: 100% water loss at 9.7m, 100% water loss at 36.7m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Core sample
B	Bulk sample	W	Water sample
C	Core drilling		
D	Disturbed sample	▽	Water level

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 230109
NORTHING: 6413815
DIP/AZIMUTH: 90°/--

BORE No: AGE02
PROJECT No: 49761
DATE: 16-26/9/13
SHEET 7 OF 14

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SANDSTONE - Medium strength, fresh, grey fine to medium grained sandstone with some bands of siltstone *(continued)*		C	60.13				
					60.7		PL(A) = 0.57		
	61								61
	61.1	SILTSTONE - Medium strength, fresh, grey siltstone		C					
		From 61.75m to 62.68m, low strength							
	62								62
					62.53		PL(A) = 0.29 PL(D) = 0.21		
	63								63
	63.11	LAMINITE - Medium strength, fresh, grey fine to medium grained laminite			63.11				
	64								64
					64.23		PL(A) = 0.46		
	65			C					65
	66				66.1		PL(A) = 0.9 PL(D) = 0.6		66
	66.33	MUDSTONE - Medium strength, fresh, grey mudstone			66.15				
	67								67
				C					
	68	From 67.8m to 69.23m, carbonaceous			67.89		PL(A) = 0.69		68
		From 68.37m to 68.52m, low strength, tuff band From 68.52m to 68.79m, high strength, coal band							
	69								69
		From 69.04m to 69.23m, some coal From 69.23m, high strength			69.13				
				C	69.62				
				GT006					
					69.88		PL(A) = 1.33		

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 13.5m, _____ 39.5m
TYPE OF BORING: Solid flight auger to 6.0m, HW casing advanced rotary to 13m, HQ to 132.18m
WATER OBSERVATIONS: Free groundwater observed at 2.3m, 20L/1.5 minutes at 78.4m to 79m, 60L/minutes at 101.1m to 101.4m, 160L/minutes at EOH
REMARKS: 100% water loss at 9.7m, 100% water loss at 36.7m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Tube sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
I	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 230109
NORTHING: 6413815
DIP/AZIMUTH: 90°/--

BORE No: AGE02
PROJECT No: 49761
DATE: 16-26/9/13
SHEET 8 OF 14

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		MUDSTONE - Medium strength, fresh, grey mudstone *(continued)*			69.91				
	71			C					71
	72	From 71.8m, medium strength			71.96		PL(A) = 1 PL(D) = 0.84		72
					72.11				
		From 72.61m to 72.7m, very low strength, tuff band			72.8		PL(A) = 0.48		
	72.84	From 72.81m, coal							
	73 72.91	CORE LOSS - 0.07m (72.84m to 72.91m)							73
	73.41	CARBONACEOUS MUDSTONE - Medium strength, fresh, dark brown carbonaceous mudstone with some coal		C	73.55		PL(A) = 0.7 PL(D) = 0.71		
	74	LAMINITE - Medium strength, fresh, grey to light grey, fine to medium grained laminite							74
					74.4		PL(A) = 1.66		
	74.52	MUDSTONE - High strength, fresh, grey mudstone							
	75				75.13				75
					75.32		PL(A) = 1.76		
		From 75.76m, some coal							
	76 76.0	SANDSTONE - High strength, fresh, grey fine grained sandstone		C					76
	76.91								
	77	SILTSTONE - High strength, fresh, grey siltstone			77.19		PL(A) = 1.35		77
	77.94	From 77.86m, tuff							
	78	CARBONACEOUS MUDSTONE - High strength, fresh, dark brown carbonaceous mudstone with some coal			78.15				78
	78.45 78.51	CORE LOSS - 0.06m (78.45m to 78.51m)			78.54		PL(A) = 1.12		
	79	CARBONACEOUS MUDSTONE - High strength, fresh, dark brown carbonaceous mudstone with some coal		C					79
	79.52	SILTSTONE - High strength, fresh, grey siltstone							

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 13.5m, _____ 39.5m

TYPE OF BORING: Solid flight auger to 6.0m, HW casing advanced rotary to 13m, HQ to 132.18m

WATER OBSERVATIONS: Free groundwater observed at 2.3m, 20L/1.5 minutes at 78.4m to 79m, 60L/minutes at 101.1m to 101.4m, 160L/minutes at EOH

REMARKS: 100% water loss at 9.7m, 100% water loss at 36.7m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	⁻	Water seep
E	Environmental sample	▼	Water level

PID	Photo ionisation detector (ppm)
PL(A)	Point load axial test Is(50) (MPa)
PL(D)	Point load diametral test Is(50) (MPa)
SP	Pocket penetrometer (kPa)
S	Standard penetration test
V	Shear vane (kPa)

Douglas Partners
Geotechnics | Environment | Groundwater

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 230109
NORTHING: 6413815
DIP/AZIMUTH: 90°/--

BORE No: AGE02
PROJECT No: 49761
DATE: 16-26/9/13
SHEET 9 OF 14

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SILTSTONE - High strength, fresh, grey siltstone *(continued)*		C	80.34		PL(A) = 1.33		
	81				81.15				
					81.47		PL(A) = 1.41		
				GT007	81.51				
					81.77				
	82	From 81.88m, laminite							
	82.58	SANDSTONE - High to very high strength, friable, fine to medium grained sandstone		C					
	83				83.3		PL(A) = 2.84 PL(D) = 3.05		
		From 83.83m, high strength siltstone							
	83.86	COAL - High strength, fresh, black coal							
	84				84.18				
					84.3		PL(A) = 1.19		
	84.7	SANDSTONE - High strength, fresh, grey fine to medium grained sandstone with some siltstone laminations		C					
	85								
	86								
					86.65		PL(A) = 1.56		
	87				87.18				
	88								
					88.33				
				GT008 C	88.61		PL(A) = 2.31		
	89								
	89.35	MUDSTONE - High strength, fresh, dark grey mudstone							
					89.81		PL(A) = 1.66		

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 13.5m, _____ 39.5m

TYPE OF BORING: Solid flight auger to 6.0m, HW casing advanced rotary to 13m, HQ to 132.18m

WATER OBSERVATIONS: Free groundwater observed at 2.3m, 20L/1.5 minutes at 78.4m to 79m, 60L/minutes at 101.1m to 101.4m, 160L/minutes

REMARKS: 100% water loss at 9.1m, 100% water loss at 36.7m

at EOH

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Tube sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
I	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 230109
NORTHING: 6413815
DIP/AZIMUTH: 90°/--

BORE No: AGE02
PROJECT No: 49761
DATE: 16-26/9/13
SHEET 10 OF 14

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		MUDSTONE - High strength, fresh, dark grey mudstone *(continued)*		C	90.2				
		From 90.59m to 91.1m, sandstone and siltstone bands up to 100mm thick							
	91				91.4		PL(A) = 2.31		91
				GT009	91.46				
	91.88			C	91.73				
	92	COAL - Medium to high strength, fresh, black coal							92
	93				93.2				93
		From 93.4m, some carbonaceous mudstone							
	94								94
		From 94.3m to 94.54m, tuff band							
				C					
	95				94.9		PL(A) = 0.46		95
		From 95.2m, carbonaceous mudstone							
	95.41	TUFF CLAYSTONE - High strength, fresh, grey tuff claystone			95.43				
				GT010					
					95.74		PL(D) = 1.17		
	96				95.78				96
	96.04	COAL - High strength, fresh, black coal			96.22				
	97								97
	97.11	SILTSTONE - High strength, fresh, grey siltstone							
					97.58		PL(A) = 2.85		
				C	97.62		PL(D) = 1.84		
				GT011					
	98				97.95				98
	98.88								
	99	LAMINITE - High strength, fresh, grey, fine to medium grained laminite							99
					99.25		PL(A) = 1.59		
					99.29		PL(D) = 1.23		
	99.54	SANDSTONE - Medium strength, fresh, grey medium to coarse grained sandstone		C					

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 13.5m, _____ 39.5m

TYPE OF BORING: Solid flight auger to 6.0m, HW casing advanced rotary to 13m, HQ to 132.18m

WATER OBSERVATIONS: Free groundwater observed at 2.3m, 20L/1.5 minutes at 78.4m to 79m, 60L/minutes at 101.1m to 101.4m, 160L/minutes at EOH

REMARKS: 100% water loss at 9.7m, 100% water loss at 36.7m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Core sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
		DP	Pocket penetrometer (kPa)
		W	Water seep
		S	Standard penetration test
		V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 230109
NORTHING: 6413815
DIP/AZIMUTH: 90°/--

BORE No: AGE02
PROJECT No: 49761
DATE: 16-26/9/13
SHEET 11 OF 14

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SANDSTONE - Medium strength, fresh, grey medium to coarse grained sandstone *(continued)*			100.5		PL(A) = 0.72 PL(D) = 0.71		
				GT012	100.56				
					100.84				
	101.07	COAL - High strength, fresh, black coal		C					
					102.18		PL(A) = 1.28		
					102.22				
				C					
	104.91				104.88				
		SANDSTONE - Medium strength, fresh, grey fine to medium grained sandstone		C					
					105.19				
					106.0				
				GT013					
					106.27		PL(A) = 0.85 PL(D) = 0.58		
					106.3				
		From 106.6m, high strength		C					
		From 107.4m, fine grained sandstone							
					108.22		PL(A) = 2.59 PL(D) = 2.71		
					108.26				
		From 109.04m to 109.28m, very high strength mudstone band		C					
					109.57		PL(A) = 2.12 PL(D) = 1.02		

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 13.5m, _____ 39.5m

TYPE OF BORING: Solid flight auger to 6.0m, HW casing advanced rotary to 13m, HQ to 132.18m

WATER OBSERVATIONS: Free groundwater observed at 2.3m, 20L/1.5 minutes at 78.4m to 79m, 60L/minutes at 101.1m to 101.4m, 160L/minutes at EOH

REMARKS: 100% water loss at 9.7m, 100% water loss at 36.7m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Tube sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
I	Water level	DP	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 230109
NORTHING: 6413815
DIP/AZIMUTH: 90°/--

BORE No: AGE02
PROJECT No: 49761
DATE: 16-26/9/13
SHEET 12 OF 14

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SANDSTONE - Medium strength, fresh, grey fine to medium grained sandstone *(continued)*		C					
	110.85								
	111	SILTSTONE - High strength, fresh, grey siltstone			111.23				111
					111.44		PL(A) = 1.85		
	112								112
	112.1	SANDSTONE - Very high strength, fresh, grey fine to medium grained sandstone		C					
	113								113
					113.71		PL(A) = 3.27		
	114								114
					114.22				
		From 114.48m to 115.03m, mudstone							
	115								115
					115.43		PL(A) = 3.08 PL(D) = 3.61		
				C					
	116								116
					116.47				
				GT014					
					116.83		PL(A) = 3.25		
	117				116.87				117
					117.2				
					117.81		PL(A) = 3.27		
	118								118
				C					
	119								119
	119.34	SILTSTONE - High strength, fresh, grey siltstone							
					119.53		PL(A) = 1.01		

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 13.5m, _____ 39.5m

TYPE OF BORING: Solid flight auger to 6.0m, HW casing advanced rotary to 13m, HQ to 132.18m

WATER OBSERVATIONS: Free groundwater observed at 2.3m, 20L/1.5 minutes at 78.4m to 79m, 60L/minutes at 101.1m to 101.4m, 160L/minutes at EOH

REMARKS: 100% water loss at 9.7m, 100% water loss at 36.7m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Core sample
B	Bulk sample	W	Water sample
C	Core drilling		
D	Disturbed sample	▽	Water level

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 230109
NORTHING: 6413815
DIP/AZIMUTH: 90°/--

BORE No: AGE02
PROJECT No: 49761
DATE: 16-26/9/13
SHEET 13 OF 14

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SILTSTONE - High strength, fresh, grey siltstone *(continued)*		C	120.21				
		From 120.65m to 120.66m, very low strength tuff							
	121				121.21		PL(A) = 1.37 PL(D) = 1.39		
				C					
	122								
	122.2	SANDSTONE - High strength, fresh, grey fine grained sandstone							
	123	From 122.92m, some siderite bands up to 30mm thick			123.2				
					123.39		PL(A) = 1.85 PL(D) = 1.88		
	124			C					
	125				125.02		PL(A) = 1.56		
				GT015	125.05				
					125.38				
	126				126.02				
					126.52		PL(A) = 1.04		
	127	From 127.0m, medium strength		C					
	127.9								
	128	SILTSTONE - Low strength, fresh, grey siltstone with some fine grained sandstone bands up to 50mm thick and some siderite bands up to 30mm thick			128.73		PL(A) = 0.27 PL(D) = 0.16		
	129				129.13				
				C					

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 13.5m, _____ 39.5m

TYPE OF BORING: Solid flight auger to 6.0m, HW casing advanced rotary to 13m, HQ to 132.18m

WATER OBSERVATIONS: Free groundwater observed at 2.3m, 20L/1.5 minutes at 78.4m to 79m, 60L/minutes at 101.1m to 101.4m, 160L/minutes at EOH

REMARKS: 100% water loss at 9.1m, 100% water loss at 36.7m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Tube sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
I	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 230109
NORTHING: 6413815
DIP/AZIMUTH: 90°/--

BORE No: AGE02
PROJECT No: 49761
DATE: 16-26/9/13
SHEET 14 OF 14

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SILTSTONE - Low strength, fresh, grey siltstone with some fine grained sandstone bands up to 50mm thick and some siderite bands up to 30mm thick *(continued)*							
		From 130.27m, medium strength			130.65		PL(A) = 0.45		
	131			C					131
					131.57		PL(A) = 0.52		
	132								132
	132.18	Bore discontinued at 132.18m , limit of investigation			132.18				
	133								133
	134								134
	135								135
	136								136
	137								137
	138								138
	139								139

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 13.5m, _____ 39.5m

TYPE OF BORING: Solid flight auger to 6.0m, HW casing advanced rotary to 13m, HQ to 132.18m

WATER OBSERVATIONS: Free groundwater observed at 2.3m, 20L/1.5 minutes at 78.4m to 79m, 60L/minutes at 101.1m to 101.4m, 160L/minutes at EOH

REMARKS: 100% water loss at 9.7m, 100% water loss at 36.7m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Tube sample
B	Bulk sample	W	Water sample
BLK	Block sample		
C	Core drilling		
D	Disturbed sample	▽	Water level

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 230102
NORTHING: 6413814
DIP/AZIMUTH: 90°/--

BORE No: AGE02-D
PROJECT No: 49761
DATE: 30/10/2013
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.15	TOPSOIL - Generally comprising dark brown, fine grained silt topsoil, humid							Stickup = 0.509
		SANDY SILT - (Loose), dark brown, fine grained sandy silt, M<<Wp							
	1	From 1.0m, medium dense with some fine size subangular/subrounded gravel							
	2.0	GRAVEL - Loose, brown, coarse sized subrounded gravel with trace silt							From 0.0m to 4.8m, grout From -0.529m to 5.5m, Class 18 blank
		From 2.6m to 2.8m, fine sized subangular/subrounded gravel, wet							
	2.9	CLAY - Firm, brown clay with some medium sized gravel, M>Wp							
	3.4	CLAYEY GRAVEL - Medium dense brown fine to medium sized subangular / subrounded clayey gravel with some fine grained sand, stiff gravelly clay in parts							
	5								From 4.8m to 5.2m, bentonite
	5.5	GRAVEL - Medium dense, brown, fine to medium sized subangular / subrounded gravel, slightly clayey with some medium grained sand, wet							
	7	From 7.5m, dense with some clay							
	8								From 5.2m to 11.5m, gravel From 5.5m to 11.5m, screen
	9	From 9.1m, medium dense							

RIG: Hydropower Scout **DRILLER:** Total Drilling (Sawyer) **LOGGED:** Fulham **CASING:** HW to 11.4m
TYPE OF BORING: HW casing advanced, rotary to 11.4m
WATER OBSERVATIONS: Free groundwater observed at 2.3m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	▽	Water level

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 230102
NORTHING: 6413814
DIP/AZIMUTH: 90°/--

BORE No: AGE02-D
PROJECT No: 49761
DATE: 30/10/2013
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		GRAVEL - Medium dense, brown, fine to medium sized subangular / subrounded gravel, slightly clayey with some medium grained sand, wet *(continued)*							
	11								11
	11.4	SANDSTONE - Extremely low strength, extremely weathered, friable, grey, fine to medium grained sandstone							End cap
	12								12
	12.5	Bore discontinued at 12.5m , limit of investigation							
	13								13
	14								14
	15								15
	16								16
	17								17
	18								18
	19								19

RIG: Hydropower Scout **DRILLER:** Total Drilling (Sawyer) **LOGGED:** Fulham **CASING:** HW to 11.4m
TYPE OF BORING: HW casing advanced, rotary to 11.4m
WATER OBSERVATIONS: Free groundwater observed at 2.3m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
BLK	Block sample	PID	Photo ionisation detector (ppm)
C	Core drilling	PL(A)	Point load axial test Is(50) (MPa)
D	Disturbed sample	PL(D)	Point load diametral test Is(50) (MPa)
E	Environmental sample	DP	Perth penetrometer (blows per 100mm)
G	Gas sample	S	Standard penetration test
P	Piston sample	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 230102
NORTHING: 6413816
DIP/AZIMUTH: 90°/--

BORE No: AGE02-S
PROJECT No: 49761
DATE: 31/10/2013
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.15	TOPSOIL - Generally comprising dark brown, fine grained silt topsoil, humid							Stickup = 0.567
		SANDY SILT - (Loose), dark brown, fine grained sandy silt, M<<Wp							From 0.0m to 1.2m, grout From -0.567m to 1.8m, Class 18 blank
1		From 1.0m, medium dense with some fine size subangular/subrounded gravel							From 1.2m to 1.6m, bentonite
2	2.0	GRAVEL - Loose, brown, coarse sized subrounded gravel with trace silt							
		From 2.6m to 2.8m, fine sized subangular/subrounded gravel, wet							
3	2.9	CLAY - Firm, brown clay with some medium sized gravel, M>Wp							From 1.6m to 4.8m, 5mm gravel From 1.8m to 4.8m, Class 18 screen
	3.4	CLAYEY GRAVEL - Medium dense brown fine to medium sized subangular / subrounded clayey gravel with some fine grained sand, stiff gravelly clay in parts							
4									End cap
	4.8	Bore discontinued at 4.8m , limit of investigation							
5									
6									
7									
8									
9									

RIG: Hydropower Scout **DRILLER:** Total Drilling (Sawyer) **LOGGED:** Fulham **CASING:** HW to 4.8m

TYPE OF BORING: HW casing advanced, rotary to 4.8m

WATER OBSERVATIONS: Free groundwater observed at 2.3m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	▽	Water level

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE04-D
PROJECT No: 49761
DATE: 23/11/2012
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.5	TOPSOIL - Brown, gravelly silt topsoil, generally comprising fine to medium sized subangular gravel with some fine grained sand, humid							Stickup 0.7m
	1	GRAVELLY SILT - Brown, fine to medium sized, subangular gravelly silt with trace to some fine to medium grained sand, humid From 0.75m, some clay							
	2.0	CLAYEY SAND - Brown, fine to medium grained clayey sand with trace to some silt From 2.5m, with some coarse grained sand							
	4.0	SILTY SAND - Brown, fine to coarse grained silty sand with trace clay (humid?) From 5.5m, with some clay							From 0m to 9.0m, backfilled with drill cuttings
	7.0	SAND - Medium dense to dense, brown, fine to coarse grained sand with some fine to medium sized, subangular, subrounded gravel, saturated From 8.5m, with some clay							

RIG: TD Rig 103 **DRILLER:** (Total) Wakeman **LOGGED:** Cowan **CASING:** HW to 2.5m

TYPE OF BORING: Wash boring from 0.0m to 17.3m

WATER OBSERVATIONS: No free groundwater observations obscured due to drilling fluids

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	▼	Water level
D	Disturbed sample		

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE04-D
PROJECT No: 49761
DATE: 23/11/2012
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SAND - Medium dense to dense, brown, fine to coarse grained sand with some fine to medium sized, subangular, subrounded gravel, saturated *(continued)*							
	11								From 9.0m to 14.0m, bentonite
	11.5	SANDY CLAY - Firm to stiff, brown, fine grained sandy clay							
	12								
	13	13.0 SAND - Medium dense to dense, brown, fine to coarse grained sand with some fine to medium sized subangular gravel with some clay							
	14								
	15								
	16								From 14.0m to 17.3m, 5mm gravel From 14.3m to 17.3m, Class 18 PVC Screen
	17	From 16.5m, with some fine to coarse sized subangular gravel							
	17.3	Bore discontinued at 17.3m, limit of investigation							End cap
	18								
	19								

RIG: TD Rig 103 **DRILLER:** (Total) Wakeman **LOGGED:** Cowan **CASING:** HW to 2.5m
TYPE OF BORING: Wash boring from 0.0m to 17.3m
WATER OBSERVATIONS: No free groundwater observations obscured due to drilling fluids
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Tube sample
B	Bulk sample	W	Water sample
C	Core drilling	V	Vane shear
D	Disturbed sample	PID	Photo ionisation detector
E	Environmental sample	PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		DP	Dynamic penetrometer (AS1289.6.3.2)
		S	Standard penetration test

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE04-S
PROJECT No: 49761
DATE: 23/11/2012
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.5	TOPSOIL - Brown, gravelly silt topsoil, generally comprising fine to medium sized subangular gravel with some fine grained sand, humid							Stickup=0.70m
	1	GRAVELLY SILT - Brown, fine to medium sized, subangular gravelly silt with trace to some fine to medium grained sand, humid From 0.75m, some clay							From 0m to 2.5m, backfill with drill cuttings
	2.0	CLAYEY SAND - Brown, fine to medium grained clayey sand with trace to some silt From 2.5m, with some coarse grained sand							From 2.5m to 5.05m, bentonite
	4.0	SILTY SAND - Brown, fine to coarse grained silty sand with trace clay (humid?) From 5.5m, with some clay							
	7.0	SAND - Medium dense to dense, brown, fine to coarse grained sand with some fine to medium sized, subangular, subrounded gravel, saturated From 8.5m, with some clay							From 5.05m to 11.3m, 5mm gravel From 5.3m to 11.3m, Class 18 PVC Screen

RIG: TD Rig 103 **DRILLER:** (Total) Wakeman **LOGGED:** Cowan **CASING:** HW to 2.5m

TYPE OF BORING: Wash boring from 0.0m to 11.3m

WATER OBSERVATIONS: No free groundwater observations obscured due to drilling fluids

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	▼	Water level
D	Disturbed sample		

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE04-S
PROJECT No: 49761
DATE: 23/11/2012
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SAND - Medium dense to dense, brown, fine to coarse grained sand with some fine to medium sized, subangular, subrounded gravel, saturated *(continued)*							
	11								11 End cap
	11.3	Bore discontinued at 11.3m, limit of investigation							
	12								12
	13								13
	14								14
	15								15
	16								16
	17								17
	18								18
	19								19

RIG: TD Rig 103 **DRILLER:** (Total) Wakeman **LOGGED:** Cowan **CASING:** HW to 2.5m
TYPE OF BORING: Wash boring from 0.0m to 11.3m
WATER OBSERVATIONS: No free groundwater observations obscured due to drilling fluids
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
R	Rock sample	DP	Dynamic penetrometer (AS1289.6.3.2)
V	Shear vane (kPa)		

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE05A
PROJECT No: 49761
DATE: 29/11/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SILTY CLAY - (Stiff) brown silty clay, some fine to coarse grained sand, trace fine subangular gravel, M>Wp							Stickup=0.55m From 0m to 0.3m, cement
	1	From 1.0m, very stiff		S	1.0		9,13,16 N = 29		
	1.35	SILTY SAND/SILTY CLAY - Medium dense, brown silty, fine to medium grained sand interbedded with very stiff to hard clay and silty clay, M>Wp			1.45				
	2				2.5				From 0.3m to 4.5m, backfill and cuttings
		From 2.5m to 2.95m, hard clay band		pp S	2.6 2.7		>500kPa 7,14,15 N = 29		
	3				2.95				
	4	From 4.0m to 4.25m, sandy clay band, M>Wp, transitioning into sand			4.0				
	4.25			pp S	4.0 4.25		>230-250kPa 10,12,14 N = 26		
		SAND - Medium dense, brown, fine to medium grained sand, some fine subangular/subrounded gravel, some silt, humid			4.45				
	5	From 5.0m, damp							From 4.5m to 5.4m, bentonite
					5.5				
	5.7	GRAVELLY SAND - Medium dense, brown, fine to coarse grained, subangular/subrounded gravelly, fine to coarse grained sand, trace silt, damp to wet		S			5,5,7 N = 12		
	6	From 6.25m, interbedded with sandy clay in parts			5.95				
									From 5.2m to 8.4m, gravel From 5.4m to 8.4m, Class 18 PVC Screen
	7				7.0				
				S			18,12,14 N = 26		
					7.45				
	8								
	8.4	Bore discontinued at 8.4m, limit of investigation							End cap
	9								

RIG: Hydropower Scout **DRILLER:** Sawyer **LOGGED:** Holden **CASING:** HW to 8.6m

TYPE OF BORING: Solid flight auger to 7.0m, wash boring to 9.2m, HQ3 to 56.90m

WATER OBSERVATIONS: Free groundwater observed at 6.25m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PP	Pocket penetrometer (kPa)
D	Disturbed sample	S	Standard penetration test
E	Environmental sample	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 235105
NORTHING: 6406726
DIP/AZIMUTH: 90°/--

BORE No: B3
PROJECT No: 49761
DATE: 1 - 14/11/2013
SHEET 1 OF 15

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SILTY SAND - (Loose), brown, medium grained silty sand with some fine sized subangular gravel, dry to humid		A	0.1				
				A	0.25				
		From 0.6m, trace medium sized gravel		A	0.5				
	1	From 1m, medium dense		A	1.0				1
				S	1.45		4,7,13 N = 20		
	2								2
	2.3	CLAYEY GRAVEL - Loose to medium dense, brown, fine sized subangular clayey gravel with some coarse grained sand, humid to damp		S	2.5		5,4,6 N = 10		
	3	From 3m, damp			2.95				3
	3.5	CLAYEY SAND - Loose, brown, fine to medium grained clayey sand with trace to some fine sized subangular gravel, damp							
	4			S	4.0		2,3,3 N = 6		4
					4.45				
	5								5
				S	5.5		2,2,3 N = 5		
	6	From 5.9m to 6.2m, clayey gravel, humid			5.95				6
	7	From 7m, slightly gravelly		S	7.0		4,4,5 N = 9		7
					7.45				
	8								8
		From 8.5m, medium dense		S	8.5		6,7,8 N = 15		
	9				8.95				9
	9.5	SAND - Medium dense, brown, fine to coarse grained sand, slightly fine sized gravel with some clay, humid to damp							

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham/Semmler **CASING:** HW to 14.75m, 18.3m and 45.3m
TYPE OF BORING: Solid flight auger to 14.5m, rotary to 15m, HQ to 17.65m, rotary to 18.55m, HQ to 145.26m
WATER OBSERVATIONS: Free groundwater observed at 11.45m
REMARKS: 100% water loss at 42.65m, 10% water loss at 123.56m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 235105
NORTHING: 6406726
DIP/AZIMUTH: 90°/--

BORE No: B3
PROJECT No: 49761
DATE: 1 - 14/11/2013
SHEET 2 OF 15

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SAND - Medium dense, brown, fine to coarse grained sand, slightly fine sized gravel with some clay, humid to damp *(continued)*		S	10.0		6,16,30/130mm refusal		
					10.45				
11	11.1	GRAVELLY CLAY - (Stiff), grey, fine sized gravelly clay, M>Wp							11
		From 11.5m, some cobbles of brown, fine to medium grained sandstone		S	11.5		25/115mm refusal		
					11.62				
12	12.1	SANDY CLAY - Very stiff to hard, brown, fine to medium grained sandy clay, M>Wp							12
13					13.0		10,12,14 N = 26		13
		From 13.3m, grey		S,pp			>300 kPa		
					13.45				
14									14
	14.5	GRAVEL - (Medium dense), brown, medium to coarse sized subangular gravel, slightly clayey in parts, interbedded with weathered sandstone cobbles		S	14.5		30/150mm refusal		
					14.65				
15	15.1	CORE LOSS - 15.1m to 15.75m (0.65m), (very little drilling resistance, gravel)		C	15.0				15
					15.1				
	15.75	GRAVEL - (Medium dense), brown, medium to coarse sized subrounded gravel with some clay, some fine to medium grained sand and some sandstone cobbles up to 60mm		C					
16	16.05	CORE LOSS - 16.05m to 16.65m (0.6m), (very little drilling resistance, gravel)			16.05				16
	16.65	GRAVEL - (Medium dense), brown, medium to coarse sized subrounded gravel with some clay, some fine to medium grained sand and some sandstone cobbles up to 60mm		C					
17	16.95	CORE LOSS - 16.95m to 17.6m (0.65m), (very little drilling resistance, gravel)			16.95				17
	17.6	SANDSTONE - Extremely low strength, extremely weathered, brown sandstone		C	17.65				
18	18.2	SANDSTONE - Very low strength, highly weathered, light brown, fine to medium grained sandstone		S	18.25		20,26/100mm refusal		18
	18.55	SANDSTONE - Very low to low strength, moderately weathered, light brown, fine to medium grained sandstone			18.5				
					18.55		PL(A) = 0.04		
					18.8		PL(D) = 0.06		
19					19.06		PL(A) = 0.15		19
				C	19.2		PL(D) = 0.12		
							PL(A) = 0.05		
							PL(D) = 0.04		
					19.49		PL(A) = 0.1		
					19.66		PL(D) = 0.06		
							PL(A) = 0.01		
					19.91		PL(D) = 0.01		

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham/Semmler **CASING:** HW to 14.75m, 18.3m and 45.3m
TYPE OF BORING: Solid flight auger to 14.5m, rotary to 15m, HQ to 17.65m, rotary to 18.55m, HQ to 145.26m
WATER OBSERVATIONS: Free groundwater observed at 11.45m
REMARKS: 100% water loss at 42.65m, 10% water loss at 123.56m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	pp	Pocket penetrometer (kPa)
D	Disturbed sample	S	Standard penetration test
E	Environmental sample	V	Shear vane (kPa)

Douglas Partners
Geotechnics | Environment | Groundwater

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 235105
NORTHING: 6406726
DIP/AZIMUTH: 90°/--

BORE No: B3
PROJECT No: 49761
DATE: 1 - 14/11/2013
SHEET 3 OF 15

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
				C			PL(A) = 0.12		
	20.26				20.3				
	20.3	CORE LOSS: 20.26m to 20.30m (0.04m)			20.42		PL(A) = 0.05 PL(D) = 0.04		
		SANDSTONE - Very low to low strength, moderately weathered, light brown, fine to medium grained sandstone		C					
	21	From 20.6m, slightly weathered			21.15		PL(A) = 0.11 PL(D) = 0.08		21
		From 21.2m, fresh, grey			21.2				
				C					
	22				21.96		PL(D) = 0.05		22
	22.14	CORE LOSS - 22.14m to 22.34m (0.2m)							
	22.34	SANDSTONE - Very low strength, fresh, grey, medium to coarse grained sandstone			22.45		PL(A) = 0.1		
					22.53		PL(D) = 0.06		
					22.85		PL(A) = 0.05		
				C	22.92		PL(D) = 0.07 PL(A) = 0.06		
	23				23.16		PL(D) = 0.06		23
					23.33		PL(A) = 0.03		
	23.37						PL(D) = 0.06		
	23.45	CORE LOSS - 23.37m to 23.45m (0.08m)			23.45		PL(A) = 0.04		
		MUDSTONE - Medium strength, fresh, dark grey mudstone		C	23.72		PL(D) = 0.05		
					23.77		PL(A) = 0.4		
	24	From 24.03m to 24.07m, tuff band		C	23.94		PL(A) = 0.5		24
					24.2		PL(A) = 0.07		
	24.38				24.3		PL(D) = 0.12		
	24.48	CORE LOSS - 24.38m to 24.48m (0.1m)		C					
		MUDSTONE - Medium strength, fresh, dark grey mudstone			24.85		PL(A) = 0.34		
	25				24.9				25
	25.05	COAL - Medium strength, fresh, black coal with some tuff							
	25.38	TUFF - Extremely low strength, fresh, light grey tuff			25.45		PL(A) = 0.04		
	25.67	From 25.61m, medium strength, coal		C	25.64		PL(A) = 0.67		
		SILTSTONE - Medium strength, fresh, light grey siltstone			25.92		PL(A) = 0.59 PL(D) = 0.36		
	26								26
		From 26.34m, coal			26.39		PL(A) = 1.11		
	26.55				26.55				
	26.61	CORE LOSS - 26.55m to 26.61m (0.06m)			26.67		PL(A) = 1.33		
	26.8	CARBONACEOUS SILTSTONE - High strength, fresh, dark brown carbonaceous siltstone		C	26.74		PL(A) = 0.09		
	27	From 26.72m, very low strength, light grey tuff			26.87		PL(A) = 2.23		27
		COAL - High strength, fresh, black coal			27.2				
		At 26.93m, tuff band, 10mm thick							
		At 27.47m, very low strength tuff band, 30mm thick			27.8		PL(A) = 0.05		
		At 27.77m, very low strength tuff band, 60mm thick							
	28	At 27.89m, very low strength tuff band, 10mm thick			28.15		PL(A) = 0.59		28
	28.07	At 28m, very low strength tuff band, 10mm thick							
		SILTSTONE - Medium strength, fresh, light grey siltstone			28.46				
		From 28.64m, grey		GT001 C	28.67 28.71		PL(A) = 0.71		
	29								29
		From 29.52m, high strength			29.56		PL(A) = 1.63 PL(D) = 1.05		

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham/Semmler **CASING:** HW to 14.75m, 18.3m and 45.3m
TYPE OF BORING: Solid flight auger to 14.5m, rotary to 15m, HQ to 17.65m, rotary to 18.55m, HQ to 145.26m
WATER OBSERVATIONS: Free groundwater observed at 11.45m
REMARKS: 100% water loss at 42.65m, 10% water loss at 123.56m

Douglas Partners
Geotechnics | Environment | Groundwater

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 235105
NORTHING: 6406726
DIP/AZIMUTH: 90°/--

BORE No: B3
PROJECT No: 49761
DATE: 1 - 14/11/2013
SHEET 4 OF 15

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SILTSTONE - Medium strength, fresh, light grey siltstone *(continued)*		C	30.15				
		From 30.2m, dark grey			30.5		PL(A) = 1.99		
	31								31
					31.29		PL(A) = 1.75		
				C	31.7		PL(A) = 1.97 PL(D) = 1.01		
	32 32.05	CARBONACEOUS SILTSTONE - High strength, fresh, dark brown carbonaceous siltstone			32.2		PL(A) = 0.98		32
		From 32.29m to 32.39m, coal			32.4		PL(A) = 1.67 PL(D) = 0.83		
	32.76	SILTSTONE - High strength, fresh, dark grey siltstone			32.89		PL(A) = 1.52		
	33 33.1								33
	33.13	CORE LOSS - 33.1m to 33.13m (0.03m)			33.13				
		SANDSTONE - High strength, fresh, grey, medium grained sandstone			33.24		PL(A) = 1.98 PL(D) = 1.17		
	34								34
					34.39		PL(A) = 0.84 PL(D) = 0.76		
				C					
	35	From 35m, medium strength with some fine sized subrounded gravel			35.31		PL(A) = 1.04 PL(D) = 0.87		35
	36				36.15		PL(A) = 1.9		36
					36.25		PL(D) = 1.11		
		From 36.7m, high strength			36.91		PL(A) = 0.56 PL(D) = 0.49		
	37			C					37
		From 37.2m, medium strength			37.46		PL(A) = 1.34		
	38				38.0				38
		From 38.11m, mudstone band, 70mm thick			38.32		PL(A) = 1.51 PL(D) = 1.27		
				GT002	38.36				
				C	38.62				
	39				39.1				39
		From 39.15m, medium strength, medium to coarse grained			39.4		PL(A) = 2.1 PL(D) = 1.04		
				C					

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham/Semmler **CASING:** HW to 14.75m, 18.3m and 45.3m
TYPE OF BORING: Solid flight auger to 14.5m, rotary to 15m, HQ to 17.65m, rotary to 18.55m, HQ to 145.26m
WATER OBSERVATIONS: Free groundwater observed at 11.45m
REMARKS: 100% water loss at 42.65m, 10% water loss at 123.56m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
I	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics | Environment | Groundwater

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 235105
NORTHING: 6406726
DIP/AZIMUTH: 90°/--

BORE No: B3
PROJECT No: 49761
DATE: 1 - 14/11/2013
SHEET 5 OF 15

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SANDSTONE - High strength, fresh, grey, medium grained sandstone *(continued)*							
		From 40.5m to 41.81m, fine to medium grained with no gravel			40.64		PL(A) = 1.73 PL(D) = 1.24		
41				C	41.01				41
				GT003	41.31		PL(A) = 2.13		
					41.37		PL(D) = 1.76		
42					42.15				42
					42.25		PL(A) = 2.13		
					42.65		PL(A) = 0.74		
43	43.01	COAL - Medium strength, highly fresh black coal		C	42.99		PL(A) = 1.62		43
44									44
	44.25				44.25				
	44.3	CORE LOSS - 44.25m to 44.3m (0.05m)			44.35		PL(A) = 0.1		
		TUFF - Very low strength, fresh, light grey tuff		C	44.64		PL(A) = 0.91		
	44.74	From 44.5m to 44.55m, medium strength coal			44.82		PL(A) = 0.74		
		From 44.58m, medium strength coal			44.9				
45				C					45
	45.1	SILTSTONE - Medium strength, fresh, grey and dark grey siltstone			45.18		PL(A) = 0.82		
				C	45.22				
		LAMINITE - Medium strength, fresh, grey and light grey, fine to medium grained laminite			45.27				
		From 45.45m, high strength		GT004	45.5		PL(A) = 1.2		
					45.54				
46									46
					46.6		PL(A) = 1.68		
				C					
47									47
		From 47.5m, medium strength			47.76		PL(A) = 0.63 PL(D) = 0.34		
48									48
	48.34				48.19				
		SILTSTONE - Medium strength, fresh, dark grey siltstone			48.6		PL(A) = 0.88 PL(D) = 0.57		
	48.85			C					
49		CARBONACEOUS MUDSTONE - High strength, fresh, dark brown carbonaceous mudstone with some very low strength bands up to 20mm thick			49.06		PL(A) = 0.71		49
					49.35		PL(A) = 0.57		
					49.52				
				C					
					49.93		PL(A) = 0.47		

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham/Semmler **CASING:** HW to 14.75m, 18.3m and 45.3m
TYPE OF BORING: Solid flight auger to 14.5m, rotary to 15m, HQ to 17.65m, rotary to 18.55m, HQ to 145.26m
WATER OBSERVATIONS: Free groundwater observed at 11.45m
REMARKS: 100% water loss at 42.65m, 10% water loss at 123.56m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Core sample
B	Bulk sample	W	Water sample
C	Core drilling		
D	Disturbed sample	▽	Water level

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 235105
NORTHING: 6406726
DIP/AZIMUTH: 90°/--

BORE No: B3
PROJECT No: 49761
DATE: 1 - 14/11/2013
SHEET 6 OF 15

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		From 50.05m to 50.23m, extremely low strength, tuff bands up to 110mm thick			50.08		PL(D) = 0.3		
	50.41	TUFF - Very low strength, fresh, grey and light grey tuff		C	50.47		PL(A) = 0.05 PL(D) = 0.06 PL(A) = 0.04 PL(D) = 0.06		
	50.76	LAMINITE - Medium strength, fresh, grey and light grey, fine to medium grained laminite							
51					51.13		PL(A) = 1.17		51
					51.16				
		From 51.39m to 52.04m, siltstone							
					51.82		PL(A) = 1.01 PL(D) = 0.61		
52									52
				C	52.7		PL(A) = 0.95		
53									53
					53.54		PL(A) = 1.01		
	53.7	SILTSTONE - High strength, fresh, dark grey siltstone							
54					54.07		PL(A) = 1.13		54
					54.17				
		From 54.54m to 54.7m, medium strength, tuff			54.66		PL(A) = 0.37		
		From 54.7m to 54.9m, medium strength coal			54.82		PL(A) = 0.4		
55									55
					55.36		PL(A) = 0.84		
				GT005	55.37		PL(D) = 0.36		
				C	55.57				
56					56.1		PL(A) = 1.13 PL(D) = 0.46		56
57									57
					57.08		PL(A) = 0.88		
	57.44	LAMINITE - High strength, fresh, grey and dark grey, fine to medium grained laminite			57.12				
58					57.89		PL(A) = 1.41		58
				C					
59									59
		From 59m, medium strength siltstone			59.17		PL(A) = 0.77		
		From 59.36m, medium strength carbonaceous mudstone			59.51		PL(A) = 0.99 PL(D) = 0.73		
	59.6	From 59.75m, very high strength			59.81		PL(A) = 1.8 PL(D) = 1.33		

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham/Semmler **CASING:** HW to 14.75m, 18.3m and 45.3m
TYPE OF BORING: Solid flight auger to 14.5m, rotary to 15m, HQ to 17.65m, rotary to 18.55m, HQ to 145.26m
WATER OBSERVATIONS: Free groundwater observed at 11.45m
REMARKS: 100% water loss at 42.65m, 10% water loss at 123.56m

SAMPLING & IN SITU TESTING LEGEND

A Auger sample — G Gas sample — PID Photo ionisation detector (ppm)
B Bulk sample — P Piston sample — PL(A) Point load axial test Is(50) (MPa)
BLK Block sample — U Tube sample (x mm dia.) — PL(D) Point load diametral test Is(50) (MPa)
C Core drilling — W Water sample — DP Perth penetrometer (kPa)
D Disturbed sample — ⌵ Water seep — S Standard penetration test
E Environmental sample — ▼ Water level — V Shear vane (kPa)

Douglas Partners
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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 235105
NORTHING: 6406726
DIP/AZIMUTH: 90°/--

BORE No: B3
PROJECT No: 49761
DATE: 1 - 14/11/2013
SHEET 7 OF 15

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SANDSTONE - High strength, fresh, grey, fine grained sandstone with some siltstone laminations up to 20mm thick *(continued)*		C	60.14				
	60.65				60.59		PL(A) = 4.3		
		SILTSTONE - High strength, fresh, grey siltstone							
61					61.12		PL(A) = 1.31		61
				C					
62					62.23		PL(A) = 1.2		62
63					63.14		PL(A) = 1.07		63
					63.19				
		From 63.76m, carbonaceous							
64		From 63.99m to 64.15m, very low strength tuff			64.12		PL(A) = 0.04		64
		From 64.15m to 64.26m, trace coal							
				C	64.68		PL(A) = 1.9		
	64.85								
65		SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone			65.25		PL(A) = 1.37		65
	65.74								
		SILTSTONE - High strength, fresh, grey siltstone							
66					66.1		PL(A) = 2.31		66
				GT006	66.13				
					66.39				
	66.84								
67		CARBONACEOUS MUDSTONE - High strength, fresh, dark grey carbonaceous mudstone with some tuff laminations			67.28		PL(A) = 2.34		67
	67.58								
		SANDSTONE - Medium strength, fresh, light grey, medium grained sandstone		C					
68					67.9		PL(A) = 1.04 PL(D) = 0.47		68
69					69.13		PL(A) = 1.96		69
		From 69.15m, high strength			69.16		PL(D) = 1.96		
				C					

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham/Semmler **CASING:** HW to 14.75m, 18.3m and 45.3m
TYPE OF BORING: Solid flight auger to 14.5m, rotary to 15m, HQ to 17.65m, rotary to 18.55m, HQ to 145.26m
WATER OBSERVATIONS: Free groundwater observed at 11.45m
REMARKS: 100% water loss at 42.65m, 10% water loss at 123.56m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Core sample
B	Bulk sample	W	Water sample
C	Core drilling		
D	Disturbed sample	▽	Water level

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 235105
NORTHING: 6406726
DIP/AZIMUTH: 90°/--

BORE No: B3
PROJECT No: 49761
DATE: 1 - 14/11/2013
SHEET 8 OF 15

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SANDSTONE - Medium strength, fresh, light grey, medium grained sandstone *(continued)*							
					70.75		PL(A) = 2.48 PL(D) = 2.21		
	71			C					71
		From 71.22m, medium strength			71.43		PL(A) = 0.64		
	71.49	SILTSTONE - Medium strength, fresh, dark grey siltstone							
					71.86		PL(A) = 0.98 PL(D) = 0.75		
	72				72.12				72
					72.56		PL(A) = 0.81 PL(D) = 0.56		
	72.82	CARBONACEOUS MUDSTONE - High strength, fresh dark brown carbonaceous mudstone							
	73	At 73.18m, tuff band, 75mm thick							73
					73.34		PL(A) = 1.34		
		At 73.64m, tuff band, 70mm thick		C					
		From 73.87m, coal			73.92		PL(A) = 1.03		
	74 74.03	SILTSTONE - Very high strength, fresh, grey siltstone with some bands of sandstone up to 100mm thick							74
					74.57		PL(A) = 3.12 PL(D) = 3.04		
	75	From 75m, high strength			75.13				75
					75.21		PL(A) = 1.6		
				GT007	75.24				
					75.49				
	76	From 75.98m, very high strength sandstone with siltstone bands							76
				C	76.52		PL(A) = 3.4		
	76.95	SILTSTONE - High strength, fresh, grey siltstone							
	77								77
					77.68		PL(A) = 1.92		
	78				78.14				78
		From 78.42m to 79.2m, medium strength			78.61		PL(A) = 1.02		
	79			C					79
					79.55		PL(A) = 1.29		
					79.94		PL(A) = 2.21		

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham/Semmler **CASING:** HW to 14.75m, 18.3m and 45.3m
TYPE OF BORING: Solid flight auger to 14.5m, rotary to 15m, HQ to 17.65m, rotary to 18.55m, HQ to 145.26m
WATER OBSERVATIONS: Free groundwater observed at 11.45m
REMARKS: 100% water loss at 42.65m, 10% water loss at 123.56m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
I	Tube sample (x mm dia.)	R	Rock strength
V	Shear vane (kPa)		

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 235105
NORTHING: 6406726
DIP/AZIMUTH: 90°/--

BORE No: B3
PROJECT No: 49761
DATE: 1 - 14/11/2013
SHEET 9 OF 15

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		From 79.9m to 80.11m, high strength carbonaceous with some coal SILTSTONE - High strength, fresh, grey siltstone *(continued)*		C					
	80.72	SANDSTONE - Very high strength, fresh, light grey, fine to medium grained sandstone with some siltstone bands up to 40mm thick			81.03 81.15		PL(A) = 5.49 PL(D) = 4.08		
	81.51	TUFF - Medium strength, fresh, light grey tuff			81.57		PL(A) = 0.67		
	81.72	COAL - High strength, fresh, black coal and carbonaceous siltstone			81.75		PL(A) = 2.41		
	82.07	SILTSTONE - High strength, fresh, grey siltstone			82.53		PL(A) = 2		
	82.67	SANDSTONE - High strength, fresh, grey and light grey, fine to medium grained sandstone From 83.4m, coarse grained		C					
	84.0	CONGLOMERATE - High strength, fresh, grey, fine to medium sized subrounded with fine to coarse grained sand and clay matrix, conglomerate with interbedded medium to coarse grained sandstone			84.17 84.2		PL(A) = 2.58 PL(D) = 1.79		
					85.1 85.14		PL(A) = 1.79 PL(D) = 1.39		
				GT008					
					85.46				
				C					
					87.1 87.15		PL(A) = 1.94 PL(D) = 1.76		
					88.1		PL(A) = 0.87 PL(D) = 1.59 refusal		
		From 88.22m, thin coal laminations		C					
	88.93	SANDSTONE - High strength, fresh, grey, medium grained sandstone			89.05		PL(A) = 2.1 PL(D) = 2.06		

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham/Semmler **CASING:** HW to 14.75m, 18.3m and 45.3m
TYPE OF BORING: Solid flight auger to 14.5m, rotary to 15m, HQ to 17.65m, rotary to 18.55m, HQ to 145.26m
WATER OBSERVATIONS: Free groundwater observed at 11.45m
REMARKS: 100% water loss at 42.65m, 10% water loss at 123.56m

SAMPLING & IN SITU TESTING LEGEND

A Auger sample — G Gas sample — PID Photo ionisation detector (ppm)
B Bulk sample — P Piston sample — PL(A) Point load axial test Is(50) (MPa)
BLK Block sample — U Tube sample (x mm dia.) — PL(D) Point load diametral test Is(50) (MPa)
C Core drilling — W Water sample — SP Standard penetration test (kPa)
D Disturbed sample — ⌵ Water seep — V Shear vane (kPa)
E Environmental sample — ⌵ Water level

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 235105
NORTHING: 6406726
DIP/AZIMUTH: 90°/--

BORE No: B3
PROJECT No: 49761
DATE: 1 - 14/11/2013
SHEET 10 OF 15

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SANDSTONE - High strength, fresh, grey, medium grained sandstone *(continued)*		C	90.1 90.16		PL(A) = 1.94 PL(D) = 1.09		
	91				91.0		PL(A) = 2.48 PL(D) = 2.8		91
		From 91.33m to 91.8m, interbedded conglomerate bands (40mm thickness, 20mm to 150mm spacings)		C					
	92	From 91.85m, interbedded siltstone, fine grained sandstone			92.0		PL(A) = 2.29		92
	93				93.0 93.2		PL(A) = 3.14 PL(D) = 2.66		93
	94				93.8		PL(A) = 2.51 PL(D) = 2.2		94
	94.08	COAL - High strength, fresh, dark brown coal with interbedded carbonaceous siltstone			94.25		PL(A) = 1.03		
	94.65	From 94.6m, grading to dark grey		C	94.75		PL(A) = 1.01		
	95 95.05	SILTSTONE - Medium to high strength, fresh, dark grey siltstone From 94.95m, grading to very fine to fine grained sandstone							95
	95.42	SANDSTONE - Hight strength, Fresh, dark grey to grey, very fine to fine grained sandstone with interbedded siltstone			95.45 95.47		PL(A) = 1.86		
				GT009	95.86				
	96	SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone with interbedded very fine grained sandstone and siltstone At 95.88m to 95.91m, conglomerate band From 96.66m to 97.45m, medium to coarse grained, pebbly in parts			96.2 96.4		PL(A) = 1.34 PL(D) = 0.8		96
	97				97.23		PL(A) = 1.26 PL(D) = 1.13		97
				C					
	98				98.2		PL(A) = 1.66 PL(D) = 1.59		98
	99				99.18				99
		From 99.18m, coarse grained		C					

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham/Semmler **CASING:** HW to 14.75m, 18.3m and 45.3m
TYPE OF BORING: Solid flight auger to 14.5m, rotary to 15m, HQ to 17.65m, rotary to 18.55m, HQ to 145.26m
WATER OBSERVATIONS: Free groundwater observed at 11.45m
REMARKS: 100% water loss at 42.65m, 10% water loss at 123.56m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Tube sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
		SPT	Standard penetration test
		V	Shear vane (kPa)

Douglas Partners
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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 235105
NORTHING: 6406726
DIP/AZIMUTH: 90°/--

BORE No: B3
PROJECT No: 49761
DATE: 1 - 14/11/2013
SHEET 11 OF 15

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	100.17				100.1		PL(A) = 0.78		
	100.3	COAL - High strength, fresh, dark brown coal with interbedded carbonaceous siltstone			100.25		PL(A) = 1.18		
		SILTSTONE - High strength, fresh grey siltstone with interbedded, fine to medium grained sandstone							
101		From 100.65m to 101.15m, fine to medium grained sandstone with interbedded siltstone		C	101.05		PL(A) = 2.84 PL(D) = 1.46		101
		From 100.3m to 102.3m, sparse tuffaceous bands (less than 30mm thick)			101.6				
				GT010					
102					101.97				102
	102.24				102.15		PL(A) = 1.39		
		SILTSTONE and SANDSTONE - High strength, fresh, grey to dark grey siltstone and fine to medium grained sandstone			102.2				
					102.55		PL(A) = 1.31		
103					103.05		PL(A) = 2.55 PL(D) = 1.45		103
				C	103.7		PL(A) = 2.58		
				GT011	103.75				
104					104.07				104
		At 104.07m to 104.17m, coal band			104.45		PL(A) = 2.08 PL(D) = 1.55		
	104.6	COAL - High strength, fresh, dark brown coal with interbedded carbonaceous siltstone							
105					105.15		PL(A) = 1.48		105
	105.43				105.18				
		SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone with interbedded siltstone			105.78		PL(A) = 2.77 PL(D) = 2.41		
106				GT012	105.82				106
					106.3		PL(A) = 2.29 PL(D) = 1.23		
	106.63				106.35				
		COAL - High strength, fresh, dark brown coal with interbedded carbonaceous siltstone		C	106.75		PL(A) = 1.01		
107				GT013	106.83				107
					107.15				
		From 107.63m, band interbedded tuffaceous claystone / siltstone			107.8		PL(A) = 1.98		
108					108.22				108
					108.45		PL(A) = 0.92 PL(D) = 0.62		
		At 108.58m to 108.8m, tuffaceous siltstone							
109				C					109
	109.27				109.3		PL(A) = 1.24		
	109.52	TUFFACEOUS CLAYSTONE / SILTSTONE - Medium strength, fresh, pale grey tuffaceous claystone / siltstone							
		From 109.42m, tuffaceous siltstone, high strength							

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham/Semmler **CASING:** HW to 14.75m, 18.3m and 45.3m
TYPE OF BORING: Solid flight auger to 14.5m, rotary to 15m, HQ to 17.65m, rotary to 18.55m, HQ to 145.26m
WATER OBSERVATIONS: Free groundwater observed at 11.45m
REMARKS: 100% water loss at 42.65m, 10% water loss at 123.56m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
		DP	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 235105
NORTHING: 6406726
DIP/AZIMUTH: 90°/--

BORE No: B3
PROJECT No: 49761
DATE: 1 - 14/11/2013
SHEET 12 OF 15

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		At 109.57m to 109.58m, tuffaceous siltstone			110.1		PL(A) = 2.34 PL(D) = 1.32		
	110.33	At 109.65m to 109.7m, tuffaceous siltstone / claystone COAL - High strength, fresh, dark brown coal with interbedded carbonaceous siltstone *(continued)*			110.45		PL(A) = 1.91		
				C GT014	110.55				
	110.89	TUFFACEOUS CLAYSTONE / SILTSTONE - Medium strength, fresh, pale grey tuffaceous claystone / siltstone			110.88				
	111	From 110.75m, high strength			111.24				111
		COAL - High strength, fresh, dark brown coal with interbedded siltstone bands			111.7		PL(A) = 1.01		
	112								112
	112.13	SILTSTONE - High strength, fresh, grey siltstone with some sandstone bands up to 40mm thick			112.4		PL(A) = 1.96		
				C GT015	112.72				
	113				113.02		PL(A) = 3.86		113
					113.05				
	114				113.96		PL(A) = 2.85		114
					114.24				
	114.57	SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone							
	115				115.05		PL(A) = 2.16		115
				C					
	116	From 115.92m, medium strength, coarse grained			116.06		PL(A) = 0.8		116
					116.5		PL(A) = 1.58		
				GT016	116.53				
	117				116.84				117
					117.26				
					117.8		PL(A) = 0.79		
	117.93 118	COAL - Medium to high strength, fresh, fractured black coal							118
				C					
					118.82		PL(A) = 1.36		
	119								119
					119.87		PL(A) = 0.89		

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham/Semmler **CASING:** HW to 14.75m, 18.3m and 45.3m
TYPE OF BORING: Solid flight auger to 14.5m, rotary to 15m, HQ to 17.65m, rotary to 18.55m, HQ to 145.26m
WATER OBSERVATIONS: Free groundwater observed at 11.45m
REMARKS: 100% water loss at 42.65m, 10% water loss at 123.56m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Core sample
B	Bulk sample	W	Water sample
C	Core drilling		
D	Disturbed sample	▽	Water level

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 235105
NORTHING: 6406726
DIP/AZIMUTH: 90°/--

BORE No: B3
PROJECT No: 49761
DATE: 1 - 14/11/2013
SHEET 13 OF 15

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		COAL - Medium to high strength, fresh, fractured black coal *(continued)*		C	120.21				
	121				120.85		PL(A) = 1.18		121
				C					
	122				122.29		PL(A) = 1.68		122
	123				122.95		PL(A) = 0.92 PL(D) = 0.7		123
	123.6				123.21				
		SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone with some siltstone bands up to 50mm thick							
	124				124.29				124
				GT017					
					124.59		PL(A) = 1.59 PL(D) = 1.73		
				C	124.62				
	125								125
					125.8		PL(A) = 1.84 PL(D) = 1.53		
	126				126.25				126
					126.86		PL(A) = 1.8 PL(D) = 1.73		
	127			C					127
	128				127.95		PL(A) = 2.65 PL(D) = 1.43		128
					128.81		PL(A) = 2.83 PL(D) = 1.41		
	129				129.25				129
		From 129.7m, very high strength		C	129.8		PL(A) = 5.49		

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham/Semmler **CASING:** HW to 14.75m, 18.3m and 45.3m
TYPE OF BORING: Solid flight auger to 14.5m, rotary to 15m, HQ to 17.65m, rotary to 18.55m, HQ to 145.26m
WATER OBSERVATIONS: Free groundwater observed at 11.45m
REMARKS: 100% water loss at 42.65m, 10% water loss at 123.56m

SAMPLING & IN SITU TESTING LEGEND

A Auger sample — U Tube sample — PID Photo ionisation detector (ppm)
B Bulk sample — W Water sample — PL(A) Point load axial test Is(50) (MPa)
BLK Block sample — W Water sample — PL(D) Point load diametral test Is(50) (MPa)
C Core drilling — W Water sample — DP Perth penetrometer (kPa)
D Disturbed sample — ▽ Water seep — S Standard penetration test
E Environmental sample — ▼ Water level — V Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 235105
NORTHING: 6406726
DIP/AZIMUTH: 90°/--

BORE No: B3
PROJECT No: 49761
DATE: 1 - 14/11/2013
SHEET 14 OF 15

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone with some siltstone bands up to 50mm thick *(continued)*			130.65		PL(A) = 3.74 PL(D) = 3.16		
	131			C					131
		From 131.3m, high strength			131.48		PL(A) = 2.72 PL(D) = 1.64		
	132				132.24				132
	132.62	SILTSTONE - Very high strength, fresh, grey siltstone			132.81		PL(A) = 3.7		
	133								133
	133.49	SANDSTONE - High strength, fresh, grey, fine grained sandstone with siltstone laminations		C					
	134				134.12		PL(A) = 3.76		134
				GT018	134.16				
					134.43				
		From 134.57m to 134.92m, high strength mudstone band			134.66		PL(A) = 2.32 PL(D) = 1.4		
	135				135.25				135
					135.5		PL(A) = 1.22 PL(D) = 1.43		
	136								136
				C	136.66		PL(A) = 2.61 PL(D) = 1.76		
	137								137
	137.32	MUDSTONE - High strength, fresh, brown / grey mudstone with some fine grained sandstone laminations			137.65		PL(A) = 2.52 PL(D) = 1.82		
	138								138
					138.27				
		From 138.36m, light grey			138.6		PL(A) = 1.84 PL(D) = 1.84		
	139			C					139
					139.59		PL(A) = 4.66 PL(D) = 3.45		
					139.93		PL(A) = 0.68		

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham/Semmler **CASING:** HW to 14.75m, 18.3m and 45.3m
TYPE OF BORING: Solid flight auger to 14.5m, rotary to 15m, HQ to 17.65m, rotary to 18.55m, HQ to 145.26m
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REMARKS: 100% water loss at 42.65m, 10% water loss at 123.56m

SAMPLING & IN SITU TESTING LEGEND

A Auger sample — U Tube sample — PID Photo ionisation detector (ppm)
B Bulk sample — W Water sample — PL(A) Point load axial test Is(50) (MPa)
BLK Block sample — (L) Tube sample (x mm dia.) — PL(D) Point load diametral test Is(50) (MPa)
C Core drilling — W Water sample — DP Perth penetrometer (kPa)
D Disturbed sample — ▽ Water seep — S Standard penetration test
E Environmental sample — ▼ Water level — V Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 235105
NORTHING: 6406726
DIP/AZIMUTH: 90°/--

BORE No: B3
PROJECT No: 49761
DATE: 1 - 14/11/2013
SHEET 15 OF 15

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		At 139.87m, medium strength tuff band, 130mm thick					PL(D) = 0.52		
		MUDSTONE - High strength, fresh, brown / grey mudstone with some fine grained sandstone laminations *(continued)*			140.36		PL(A) = 1.2		
	140.66	From 140m to 140.13m, dark grey		C	140.76		PL(A) = 2.63 PL(D) = 1.92		
141		SANDSTONE - High strength, fresh, grey, fine grained sandstone			141.24				141
	141.3	MUDSTONE - High strength, fresh, grey / brown mudstone			141.51		PL(A) = 2.51		
142									142
	142.58	SANDSTONE - High strength, fresh, grey, fine grained sandstone			142.48		PL(A) = 1.88		
143				C	142.93		PL(A) = 2.11 PL(D) = 1.37		143
		From 143.44m, medium strength with some mudstone laminations up to 10mm thick			143.61		PL(A) = 0.89 PL(D) = 0.7		
					143.77				
				GT019					
144					144.0				144
					144.25				
				C	144.78		PL(A) = 0.82 PL(D) = 0.46		
145									145
	145.26	Bore discontinued at 145.26m , limit of investigation			145.26				
146									146
147									147
148									148
149									149

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham/Semmler **CASING:** HW to 14.75m, 18.3m and 45.3m
TYPE OF BORING: Solid flight auger to 14.5m, rotary to 15m, HQ to 17.65m, rotary to 18.55m, HQ to 145.26m
WATER OBSERVATIONS: Free groundwater observed at 11.45m
REMARKS: 100% water loss at 42.65m, 10% water loss at 123.56m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	∇	Water level

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 235107
NORTHING: 6406726
DIP/AZIMUTH: 90°/--

BORE No: B3-D
PROJECT No: 49761
DATE: 28/11/2013
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.0	SILTY SAND - (Loose), brown, medium grained silty sand with some fine sized subangular gravel, dry to humid							TOC = 0.509m
		From 0.6m, trace medium sized gravel							
	1	From 1m, medium dense							
	2								
	2.3	CLAYEY GRAVEL - Loose to medium dense, brown, fine sized subangular gravel with some coarse grained sand, humid to damp							
	3	From 3m, damp							
	3.5	CLAYEY SAND - Loose, brown, fine to medium grained clayey sand with trace to some fine sized subangular gravel, damp							
	4								
	5								
	6	From 5.9m to 6.2m, clayey gravel, humid							
	7	From 7m, slightly gravelly							From 0m to 14.0m, grout
									From -0.509m to 15.7m, Class 18 blank
	8	From 8.5m, medium dense							
	9								
	9.5	SAND - Medium dense, brown, fine to coarse grained sand, slightly fine sized gravel with some clay, humid to damp							

RIG: Hydropower Scout **DRILLER:** Total Drilling (Sinclair) **LOGGED:** Fulham **CASING:** HW to 17.9m
TYPE OF BORING: Solid flight to 14m, HW casing advanced to 17.9m
WATER OBSERVATIONS: Free groundwater observed at 11.45m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
BLK	Block sample	pp	Pocket penetrometer (kPa)
C	Core drilling	V	Shear vane (kPa)
D	Disturbed sample		
E	Environmental sample		

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 235107
NORTHING: 6406726
DIP/AZIMUTH: 90°/--

BORE No: B3-D
PROJECT No: 49761
DATE: 28/11/2013
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SAND - Medium dense, brown, fine to coarse grained sand, slightly fine sized gravel with some clay, humid to damp *(continued)*							
11	11.1	GRAVELLY CLAY - (Stiff), grey, fine sized gravelly clay, M>Wp From 11.5m, some cobbles of brown, fine to medium grained sandstone							
12	12.1	SANDY CLAY - Very stiff to hard, brown, fine to medium grained sandy clay, M>Wp From 13.3m, grey							
14	14.5	GRAVEL - (Medium dense), brown, medium to coarse sized subangular gravel, slightly clayey in parts, interbedded with weathered sandstone cobbles							From 14.0m to 14.4m, bentonite
15	15.1	CORE LOSS - 15.1m to 15.75m (0.65m), (very little drilling resistance, gravel)							
16	15.75 16.05	GRAVEL - (Medium dense), brown, medium to coarse sized subrounded gravel with some clay, some fine to medium grained sand and some sandstone cobbles up to 60mm							From 14.4m to 18.0m, gravel
	16.65	CORE LOSS - 16.05m to 16.65m (0.6m), (very little drilling resistance, gravel)							
17	16.95	GRAVEL - (Medium dense), brown, medium to coarse sized subrounded gravel with some clay, some fine to medium grained sand and some sandstone cobbles up to 60mm							From 15.7m to 18.0m, Class 18 machine slotted
	17.6	CORE LOSS - 16.95m to 17.6m (0.65m), (very little drilling resistance, gravel)							
18	18.0	SANDSTONE - Extremely low strength, extremely weathered, brown sandstone Bore discontinued at 18.0m , limit of investigation							End cap
19									

RIG: Hydropower Scout **DRILLER:** Total Drilling (Sinclair) **LOGGED:** Fulham **CASING:** HW to 17.9m
TYPE OF BORING: Solid flight to 14m, HW casing advanced to 17.9m
WATER OBSERVATIONS: Free groundwater observed at 11.45m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
I	Tube sample (x mm dia.)	DP	Pocket penetrometer (kPa)
N	Standard penetration test	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 235109
NORTHING: 6406728
DIP/AZIMUTH: 90°/--

BORE No: B3-S
PROJECT No: 49761
DATE: 27/11/2013
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0	SILTY SAND - (Loose), brown, medium grained silty sand with some fine sized subangular gravel, dry to humid							TOC = 0.538m
		From 0.6m, trace medium sized gravel							
	1	From 1m, medium dense							
	2								
	2.3	CLAYEY GRAVEL - Loose to medium dense, brown, fine sized subangular gravel with some coarse grained sand, humid to damp							
	3	From 3m, damp							
	3.5	CLAYEY SAND - Loose, brown, fine to medium grained clayey sand with trace to some fine sized subangular gravel, damp							
	4								
	5								From 0m to 9.5m, grout From -0.538m to 10.15m, Class 18 blank
	6	From 5.9m to 6.2m, clayey gravel, humid							
	7	From 7m, slightly gravelly							
	8								
		From 8.5m, medium dense							
	9								
	9.5	SAND - Medium dense, brown, fine to coarse grained sand, slightly fine sized gravel with some clay, humid to damp							From 9.5m to 9.9m, bentonite

RIG: Hydropower Scout **DRILLER:** Total Drilling (Sawyer) **LOGGED:** Fulham **CASING:** Uncased
TYPE OF BORING: Solid flight to 13.6m
WATER OBSERVATIONS: Free groundwater observed at 11.45m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
HP	Hand penetrometer (kPa)	R	Rock strength
SPT	Standard penetration test	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 235109
NORTHING: 6406728
DIP/AZIMUTH: 90°/--

BORE No: B3-S
PROJECT No: 49761
DATE: 27/11/2013
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SAND - Medium dense, brown, fine to coarse grained sand, slightly fine sized gravel with some clay, humid to damp *(continued)*							
11	11.1	GRAVELLY CLAY - (Stiff), grey, fine sized gravelly clay, M>Wp From 11.5m, some cobbles of brown, fine to medium grained sandstone							
12	12.1	SANDY CLAY - Very stiff to hard, brown, fine to medium grained sandy clay, M>Wp							From 9.9m to 13.65m, gravel From 10.15m to 13.65m, Class 18 machine slotted
13	13.65	Bore discontinued at 13.65m , limit of investigation							End cap
14									
15									
16									
17									
18									
19									

RIG: Hydropower Scout **DRILLER:** Total Drilling (Sawyer) **LOGGED:** Fulham **CASING:** Uncased
TYPE OF BORING: Solid flight to 13.6m
WATER OBSERVATIONS: Free groundwater observed at 11.45m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	▽	Water level
D	Disturbed sample		
E	Environmental sample		

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 227521
NORTHING: 6409097
DIP/AZIMUTH: 90°/--

BORE No: M2
PROJECT No: 49761
DATE: 11/12/2013
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
									TOC = 0.495m
		SILTY CLAY - (Stiff), brown silty clay, M<<Wp		A	0.1				
				A	0.25				
				A	0.5				
	0.8								
	1	CLAY - (Hard), light brown clay with trace to some silt, M<<Wp		A	1.0				From 0m to 2.1m, grout
		At 1.0m, cobble		S	1.15		25/150mm		From -0.495m to 2.9m, Class 18 blank
	2								
	2.2	GRAVEL - Dense, brown, fine to medium sized subangular / subrounded gravel, slightly medium grained sandy with some clay, damp			2.5				From 2.1m to 2.6m, bentonite
				S			13,14,19 N = 33		
	3				2.95				
		From 3.5m, trace sand and trace clay, moist		D	3.5				
	4	From 3.9m to 4.05m, clay band		pp	4.0		230 kPa		
		From 4.05m, some gravel up to 35mm in diameter		S			8,24, 14/75mm		From 2.6m to 5.9m, gravel
					4.38				From 2.9m to 5.9m, Class 18 machine slotted
	5	From 5.0m, wet with some fine to medium grained sand							
				S	5.5		18, 12/60 (bouncing)		
	5.68	SANDSTONE - Medium strength, moderately weathered, brown, fine to medium grained sandstone			5.71				End cap
	5.95	Bore discontinued at 5.95m , limit of investigation		S	6.0		3/0 (bouncing)		
	6								
	7								
	8								
	9								

RIG: Hydropower Scout **DRILLER:** Total Drilling (Sawyer) **LOGGED:** Fulham **CASING:** Uncased

TYPE OF BORING: Solid flight auger to 5.95m

WATER OBSERVATIONS: Free groundwater observed at 5.6m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Tube sample
B	Bulk sample	W	Water sample
C	Core drilling		
D	Disturbed sample	▽	Water level

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: A23W
PROJECT No: 49761.02
DATE: 23/10/2012
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0	SAND - (Very loose), brown, fine grained sand with some silt and trace fine to medium sized subrounded gravel, humid							Stickup = 0.52m From 0m to 0.4m, asphalt and concrete
		At 0.5m, humid to damp							
	1	From 1.0m, loose							
	2	From 2.1m, fine to coarse grained sand							
	2.6	SANDY CLAY - Firm to stiff, dark brown, fine to coarse grained sandy clay with some fine sized gravel, M>Wp							
	3								
		From 3.8m, trace gravel							
	4	From 4.18m, stiff							
									From 0.4m to 8.8m, backfill and cuttings
	5								From 0m to 10.4m, Class 18 PVC
	5.9	SAND - Loose to medium dense, brown, fine to medium grained sand, slightly clayey with trace silt, saturated							
	6.25	GRAVELLY SAND - Very dense, brown, fine to coarse sized, subangular gravelly fine to coarse grained sand with some clay in parts, saturated							
	7								
	8								
	8.0	SANDY GRAVEL - (Very dense), brown, fine to medium grained sandy fine sized subangular gravel, saturated							
	9								
	9.06	CORE LOSS - 9.06m to 10.53m		C	9.06				
				C	9.52				From 8.8m to 10.35m, bentonite

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Fulham **CASING:** HW to 11m
TYPE OF BORING: Solid flight auger to 9.06m, HQ3 to 16.5m
WATER OBSERVATIONS:
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
		R	Rock strength
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: A23W
PROJECT No: 49761.02
DATE: 23/10/2012
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		CORE LOSS - 9.06m to 10.53m *(continued)*		C					
	10.53	SANDSTONE - Very low strength, extremely to highly weathered, grey and brown, fine grained sandstone			10.64		PL(A) = 0.09 PL(D) = 0.07		
	10.79	CORE LOSS - 10.79m to 11.81m			10.79				
11				C					11
	11.81	SANDSTONE - Extremely low to very low strength, extremely to highly weathered, grey and brown, fine grained sandstone			11.91		PL(A) = 0 PL(D) = 0		
12					12.17		PL(A) = 0.07 PL(D) = 0.02		12
	12.31	CORE LOSS - 12.31m to 12.52m			12.31				
	12.52	SANDSTONE - Extremely low to very low strength, extremely to highly weathered, grey and brown, fine grained sandstone		C	12.65		PL(A) = 0.13 PL(D) = 0.03		
	12.68				12.8		PL(A) = 0.2		
	12.91	CORE LOSS - 12.86m to 12.91m		C	12.86				
13		SILTSTONE - Low strength, highly to moderately weathered, grey and brown siltstone with interbedded very low to low strength bands up to 80mm long		C	13.29				13
	13.33			C	13.33		PL(A) = 0.78 PL(D) = 0.61		
	13.43	CORE LOSS - 13.33m to 13.43m		C	13.62				
	13.87			C	13.67				
14	13.99	SILTSTONE - Medium strength, moderately weathered, grey and orange-brown siltstone			13.83				14
		From 13.72m, slightly weathered with some highly weathered bands		C	14.46		PL(A) = 1.26 PL(D) = 1.08		From 10.35m to 16.4m, 5mm gravel From 10.4m to 16.4m, 50mm diameter Class 18 machine slotted PVC screen
		CORE LOSS - 13.87m to 13.95m							
15		SANDSTONE - Medium to high strength, fresh, grey, fine to medium grained sandstone with trace highly weathered bands up to 30mm thick			15.08				15
		From 14.2m, some siltstone laminations up to 30mm thick			15.39		PL(A) = 1.07 PL(D) = 0.52		
				C					
16									16
	16.5	Bore discontinued at 16.5m, limit of investigation			16.5				End cap
17									17
18									18
19									19

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Fulham **CASING:** HW to 11m

TYPE OF BORING: Solid flight auger to 9.06m, HQ3 to 16.5m

WATER OBSERVATIONS:

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
		DP	Dynamic penetrometer (AS1289.6.3.2)
		SPT	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE01W
PROJECT No: 49761.02
DATE: 25/10/12-
SHEET 1 OF 3

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.15	TOPSOIL - Brown silty sand topsoil, generally comprising fine grained sand, trace clay, abundant rootlets							Stickup=0.5m
		CLAY - Hard, brown clay, M<<Wp							
	1	From 1.0m, with some fine sized subrounded gravel							
		From 1.5m, orange brown							
	2								
	2.5	SANDY GRAVEL - Brown sandy gravel, fine to coarse grained sand, fine to medium sized, subrounded gravel, moist to wet							
	3	From 2.8m, saturated							
	4								
	5								
	6								From 0m to 11.7m, backfill
	7								
	8								
	9								
		From about 9.5m, with some cobbles							

RIG: Total (Envirodrill) **DRILLER:** Total (Sawyer) **LOGGED:** Cowan **CASING:** HW to 11.25m

TYPE OF BORING: Solid flight auger with TC Bit to 9.2m, rotary to 20.45m

WATER OBSERVATIONS: Free groundwater observed at 2.8m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
V	Shear vane (kPa)		

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE01W
PROJECT No: 49761.02
DATE: 25/10/12-
SHEET 2 OF 3

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SANDY GRAVEL - Brown sandy gravel, fine to coarse grained sand, fine to medium sized, subrounded gravel, moist to wet *(continued)*							
	11								11
	11.53	SANDSTONE - Medium strength, moderately to slightly weathered, yellow brown, fine to medium grained sandstone		C	11.53				
	12				11.9		PL(A) = 2.74 PL(D) = 2.38		12
	12.1	From 12.01m to 12.1m, granite fragments		C	11.94				
	12.23	CORE LOSS - 0.13m							
	12.32			C	12.32				
	12.39	SANDSTONE - Medium strength, moderately to slightly weathered, yellow brown, fine to medium grained sandstone		C	12.52				
	12.79			C	12.79				
	12.85	CORE LOSS - 0.07m			12.85				13 From 11.7m to 14.3m, bentonite
	13	BASALT - High to very high strength, fresh, grey basalt							13
	13.5	CORE LOSS - 0.06m		S	13.5		25/85mm		
	13.59				13.59				
	13.75	Casing advanced rotary drilling, no sample recovered		C					
	14	SILTSTONE - Very low to low strength, slightly weathered to fresh, grey siltstone, trace fine to medium grained sand and clay			13.96		PL(A) = 0 PL(D) = 0.02		14
		CORE LOSS - 0.16m			14.0				
		SANDSTONE - Very low to low strength, fresh, grey, fine grained sandstone with some clay and silt		C					
	15	From 13.92m to 13.98m, extremely low strength, extremely weathered, clay seam			15.04				15
		From 14.14m to 14.16m, extremely low strength, extremely weathered							
		From 14.47m to 14.49m, extremely low strength, extremely weathered, clay seam			15.5		PL(A) = 0.14 PL(D) = 0.08		
	16				15.55				16
		From 16.3m to 16.45m, carbonaceous siltstone, medium to high strength, fresh, dark grey		C GT001					
	17	From 16.93m to 17.12m, high strength							17 From 14.3m to 20.45m, gravel From 14.45m to 20.45m, Class 18 PVC
	18				18.03		PL(A) = 0.1 PL(D) = 0.05		18
	18.12	LAMINITE - Very low to low strength, fresh, grey and dark grey laminite, fine grained sand			18.07				
		From 18.56m to 18.82m, fine grained sandstone layer							
	19			C					19
		From 19.18m to 19.75m, fine grained sandstone layer							
		From 19.47m, coal lense, 5mm thick							
	19.75	SILTSTONE - Low strength, fresh, grey siltstone							

RIG: Total (Envirodrill) **DRILLER:** Total (Sawyer) **LOGGED:** Cowan **CASING:** HW to 11.25m
TYPE OF BORING: Solid flight auger with TC Bit to 9.2m, rotary to 20.45m
WATER OBSERVATIONS: Free groundwater observed at 2.8m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
		V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE01W
PROJECT No: 49761.02
DATE: 25/10/12-
SHEET 3 OF 3

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SILTSTONE - Low strength, fresh, grey siltstone *(continued)*		C					
	20.45	Bore discontinued at 20.45m, limit of investigation			20.45				End cap

RIG: Total (Envirodrill) **DRILLER:** Total (Sawyer) **LOGGED:** Cowan **CASING:** HW to 11.25m

TYPE OF BORING: Solid flight auger with TC Bit to 9.2m, rotary to 20.45m

WATER OBSERVATIONS: Free groundwater observed at 2.8m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
I	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE03W
PROJECT No: 49761
DATE: 7 - 11/12/2012
SHEET 1 OF 4

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.0	TOPSOIL - (Stiff), brown, fine to medium grained sandy silt topsoil, some fine subangular gravel, M<Wp							From 0m to 0.3m, cement
	1.35	CLAYEY SILT - Very stiff, brown clayey silt, some fine to medium grained sand, M<Wp		S	1.0 1.45		7,9,12 N = 21		
	2.3	CLAY - Hard, dark brown clay, M>Wp			2.5		7,10,12 N = 22 >500kPa		
	2.65	SANDY SILT - Hard, brown, fine to medium grained sandy silt, some clay, M<Wp		S,pp	2.95				
	3.2	SILTY CLAY - (Very stiff), dark brown silty clay, M>Wp							
	3.7	SANDY SILT - (Soft), yellowish brown, fine grained sandy silt, M<Wp							
	3.9	CLAY - Very stiff, dark brown clay, M>Wp		pp	4.0 4.1		200-250kPa		
	4.1	SILTY CLAY - Stiff, yellowish and orangish brown mottled grey silty clay, M>Wp		S pp	4.2 4.25 4.35		3,5,4 N = 9 100-200kPa		
	4.25	SILTY SAND - Loose, yellowish brown silty fine to medium grained sand, trace fine to medium subrounded gravel, saturated			4.45				
	5.3	SAND - Medium dense, fine to medium grained sand, some silt, some fine subrounded gravel, saturated		S	5.5		3,7,7 N = 14		
	5.8	GRAVELLY SAND - Medium dense, brown, fine subrounded gravelly fine to medium grained sand, trace silt, saturated			5.95				
	6.3	GRAVELLY SAND - Medium dense, brown mottled red, fine subrounded gravelly fine to coarse sand, trace silt and clay, saturated							
		From 6.9m, trace to some basalt and fine to coarse grained sandstone boulders (inferred from drilling resistance, cuttings and SPT samples)		S	6.8 7.25		23,14,10 N = 24		
		From 8.3m, dense		S	8.3 8.75		15,16,17 N = 33		From 0.3m to 16.7m, bentonite
				S,pp	9.8		100kPa		

RIG: Hydropower Scout **DRILLER:** (Total) Sawyer **LOGGED:** Holden **CASING:** HW to 17.00m

TYPE OF BORING: Solid flight auger to 5.5m, wash boring to 13.20m, HQ3 to 31.50m

WATER OBSERVATIONS: Free groundwater observed at 4.7m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	▼	Water level
D	Disturbed sample		
E	Environmental sample		

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE03W
PROJECT No: 49761
DATE: 7 - 11/12/2012
SHEET 2 OF 4

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
				S,pp	10.25		28 for 100mm, 0.0		
	10.4	SANDY CLAY/CLAYEY SAND - Firm/(medium dense), brown, fine to medium grained sandy clay/clayey sand, slightly gravelly (gravel subangular and subrounded fine grained)		S	10.4		34, 30 for 90mm, 0		
	11	From 10.4m, interbedded with basalt and sandstone boulders (inferred from high drilling resistance and cuttings)			10.85				11
	11.45	CORE LOSS - 0.3m		C	11.0				
	11.75	SANDY CLAY/CLAYEY SAND - Firm/(medium dense), brown, fine to medium grained sandy clay/clayey sand, slightly gravelly (gravel subangular and subrounded fine grained)			11.75				
	12								12
	13								13
	13.2	GRAVELLY SAND - (Dense), brown, fine to medium subangular and subrounded gravelly fine to medium grained sand interbedded with basalt and sandstone cobbles/boulders			13.2				
	13.7	CORE LOSS - 0.75m		C	14.0				
	14								14
	14.45	GRAVELLY SAND - (Dense), brown, fine to medium subangular and subrounded gravelly fine to medium grained sand interbedded with basalt and sandstone cobbles/boulders			14.45				
	14.85	CORE LOSS - 0.63m		C	15.0				
	15								15
	15.5	GRAVELLY SAND - (Dense), brown, fine to medium subangular and subrounded gravelly fine to medium grained sand interbedded with basalt and sandstone cobbles/boulders			15.5				
	15.95	CORE LOSS - 0.63m		C	16.45				
	16								16
	16.58			C					
	16.7	GRAVELLY SAND - (Dense), brown, fine to medium subangular and subrounded gravelly fine to medium grained sand interbedded with basalt and sandstone cobbles/boulders		C	17.0				
	16.95								17
	17.0	TUFF - Fresh, very low strength, light grey tuff			17.3		250kPa		
	17.3	CLAY - Fresh, extremely low strength, dark grey clay			17.32		PL(A) = 0.97		From 16.7m to 18.0m, grout
	17.32	CORE LOSS - 0.3m (wash bored to clean hole after installing casing)		C pp	17.48				
	17.68	CLAY - Fresh, very low strength, dark grey clay			17.75		PL(A) = 4.63		
	17.98	SILTSTONE - Fresh, low strength, grey siltstone laminated with some tuff and fine to medium grained sandstone			18.0				
	18.0	From 17.62m, grading into sandstone			18.57		PL(A) = 1.97		
	18	SANDSTONE - Fresh, high strength, light grey, fine to medium grained sandstone with some tuff laminations							18
	19.2	From 17.88m, grading into tuff			19.26				
	19	TUFF - Fresh, low strength, light grey tuff laminated with some fine to medium strength sandstone			19.73		PL(A) = 1.23		19
	19.98	SANDSTONE - Fresh, medium strength, light grey, fine			19.77		PL(D) = 1.02		

RIG: Hydropower Scout **DRILLER:** (Total) Sawyer **LOGGED:** Holden **CASING:** HW to 17.00m

TYPE OF BORING: Solid flight auger to 5.5m, wash boring to 13.20m, HQ3 to 31.50m

WATER OBSERVATIONS: Free groundwater observed at 4.7m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

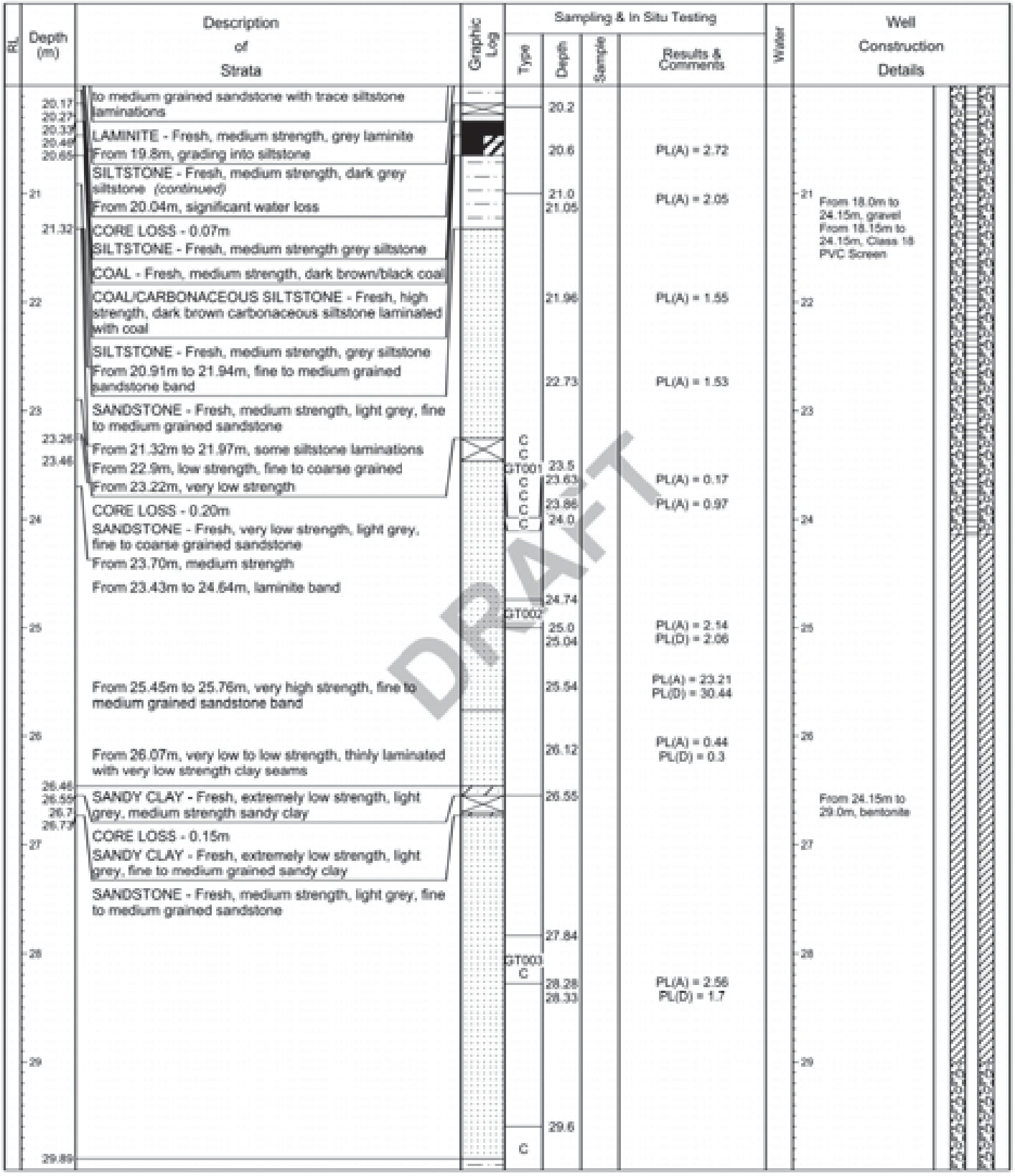
A	Augered sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	pp	Pocket penetrometer (kPa)
D	Disturbed sample	S	Standard penetration test
E	Environmental sample	V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE03W
PROJECT No: 49761
DATE: 7 - 11/12/2012
SHEET 3 OF 4



RIG: Hydropower Scout **DRILLER:** (Total) Sawyer **LOGGED:** Holden **CASING:** HW to 17.00m

TYPE OF BORING: Solid flight auger to 5.5m, wash boring to 13.20m, HQ3 to 31.50m

WATER OBSERVATIONS: Free groundwater observed at 4.7m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A Auger sample — U Tube sample — PID Photo ionisation detector (ppm)
B Bulk sample — W Water sample — PL(A) Point load axial test Is(50) (MPa)
BLK Block sample — U Tube sample (x mm dia.) — PL(D) Point load diametral test Is(50) (MPa)
C Core drilling — W Water sample — DP Perth penetrometer (kPa)
D Disturbed sample — W Water seep — S Standard penetration test
E Environmental sample — Water level — V Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE03W
PROJECT No: 49761
DATE: 7 - 11/12/2012
SHEET 4 OF 4

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	30.05	SILTSTONE - Fresh, medium strength, grey and brown siltstone (bedded on 10° offset) *(continued)*		C					From 29.0m to 31.5m, 5mm gravel
	30.44	SANDSTONE - Fresh, medium strength, light grey, fine to medium grained sandstone			30.55				
	30.55	From 30.29m to 30.39m, low to medium strength siltstone band		C	30.83		PL(A) = 1.16		
31		CORE LOSS - 0.11m							31
		SANDSTONE - Fresh, medium strength, light grey, fine to medium grained sandstone							End cap
	31.5	From 30.76m, fine to coarse grained			31.5				
		Bore discontinued at 31.5m, limit of investigation							
32									32
33									33
34									34
35									35
36									36
37									37
38									38
39									39

RIG: Hydropower Scout **DRILLER:** (Total) Sawyer **LOGGED:** Holden **CASING:** HW to 17.00m

TYPE OF BORING: Solid flight auger to 5.5m, wash boring to 13.20m, HQ3 to 31.50m

WATER OBSERVATIONS: Free groundwater observed at 4.7m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
		DP	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE04
PROJECT No: 49761
DATE: 23/11/2012
SHEET 1 OF 7

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
									Stickup=0.61m
		TOPSOIL - Brown, gravelly silt topsoil, generally comprising fine to medium sized subangular gravel with some fine grained sand, humid		D	0.1				
				D	0.25				
	0.5			D	0.5				
		GRAVELLY SILT - Brown, fine to medium sized, subangular gravelly silt with trace to some fine to medium grained sand, humid		D	0.75				
		From 0.75m, some clay		S	1.0		7,10,11 N = 21		
					1.45				
	2.0	CLAYEY SAND - Brown, fine to medium grained clayey sand with trace to some silt		D	2.0				
		From 2.5m, with some coarse grained sand		S	2.5		3,5,10 N = 15		
					2.95				
	4.0	SILTY SAND - Brown, fine to coarse grained silty sand with trace clay (humid?)		S	4.0		6,9,9 N = 18		
					4.45				
		From 5.5m, with some clay		S	5.5		3,4,5 N = 9		
					5.95				
	7.0	SAND - Medium dense to dense, brown, fine to coarse grained sand with some fine to medium sized, subangular, subrounded gravel, saturated		S	7.0		8,10,17 N = 27		
					7.45				
		From 8.5m, with some clay		S	8.5		15,15,16 N = 31		
					8.95				

RIG: TD Rig 103 **DRILLER:** (Total) Wakeman **LOGGED:** Cowan **CASING:** HW to 18.2m

TYPE OF BORING: Solid flight auger to 7.0m, rotary to 18.35m, HQ3 to 66.17m

WATER OBSERVATIONS: Free groundwater observed at 6.30m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
I	Initial water level	RW	Rising head permeameter (kPa)
S	Standard penetration test	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE04
PROJECT No: 49761
DATE: 23/11/2012
SHEET 2 OF 7

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SAND - Medium dense to dense, brown, fine to coarse grained sand with some fine to medium sized, subangular, subrounded gravel, saturated *(continued)*		S	10.0 10.44		7, 15, 25/135mm		
11									
	11.5	SANDY CLAY - Firm to stiff, brown, fine grained sandy clay		S, pp	11.5 11.95		2,1,3 N = 4 50-200kPa		
12									
13	13.0	SAND - Medium dense to dense, brown, fine to coarse grained sand with some fine to medium sized subangular gravel with some clay		S	13.0 13.45		9,14,26 N = 40		
14									
				S	14.5 14.95		8,8,4 N = 12		
15									
16									
		From 16.5m, with some fine to coarse sized subangular gravel		S	16.5 16.79		24, 25/140mm		
17									
	17.9	SILTSTONE - Extremely low to very low strength, highly weathered, grey, siltstone		S	18.0 18.1		25/100mm		
18	18.4	SANDSTONE - Very low to low strength, slightly weathered, grey white fine to medium grained sandstone			18.35 18.49		PL(A) = 0.15 PL(D) = 0.07		
19		From 19.02m to 19.18m, siltstone band		C					
	19.3	SILTSTONE - Very low to low strength, slightly weathered to fresh, grey, grey to white siltstone			19.77		PL(A) = 0.47 PL(D) = 0.2		

RIG: TD Rig 103 **DRILLER:** (Total) Wakeman **LOGGED:** Cowan **CASING:** HW to 18.2m

TYPE OF BORING: Solid flight auger to 7.0m, rotary to 18.35m, HQ3 to 66.17m

WATER OBSERVATIONS: Free groundwater observed at 6.30m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	S	Standard penetration test
E	Environmental sample	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE04
PROJECT No: 49761
DATE: 23/11/2012
SHEET 3 OF 7

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		From 19.95m, dark grey SILTSTONE - Very low to low strength, slightly weathered to fresh, grey, grey to white siltstone *(continued)*		C					
	20.63	From 20.52m, coal, extremely low strength, extremely weathered, black							
	20.8								
	20.87								
21	21.04	CORE LOSS - 0.17m			21.2				21
	21.2	COAL - Low to medium strength, slightly weathered to fresh, black, fragmented coal							
	21.39								
	21.55	TUFF - Very low strength, moderately weathered, white, tuff							
22		COAL - Low to medium strength, slightly weathered to fresh, black coal			22.24		PL(A) = 0.93		22
		CORE LOSS - 0.19m							
		COAL - Low strength, slightly weathered to fresh, black, fragmented coal		C					
23		SILTSTONE - Low strength, slightly weathered to fresh, grey siltstone From 21.62m to 21.65m, extremely low strength, extremely weathered From 21.94m, clay band, 10mm thick From 22.17m, low to medium strength			23.54		PL(A) = 0.72 PL(D) = 0.35		23
24					24.2				24
25					25.18		PL(A) = 1.18 PL(D) = 0.42		25
	25.27	COAL / CARBONACEOUS SILTSTONE - Very low to low strength, slightly weathered, black, dark brown coal / carbonaceous siltstone From 25.72m to 25.89m, tuff band		C					
26		From 25.89m, low to medium strength							26
	26.27	SILTSTONE - Low strength, fresh, grey siltstone							
27					27.2				27 From 0m to 54.0m, grout
	27.41	CARBONACEOUS SILTSTONE - Low strength, fresh, dark brown to black, carbonaceous silt			27.43		PL(A) = 1.51 PL(D) = 0.1		
28									28
		From 28.7m to 28.86m, with some coal bands up to 20mm thick		C					
29					29.28		PL(A) = 1 PL(D) = 0.34		29

RIG: TD Rig 103 **DRILLER:** (Total) Wakeman **LOGGED:** Cowan **CASING:** HW to 18.2m

TYPE OF BORING: Solid flight auger to 7.0m, rotary to 18.35m, HQ3 to 66.17m

WATER OBSERVATIONS: Free groundwater observed at 6.30m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
V	Shear vane (kPa)		

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE04
PROJECT No: 49761
DATE: 23/11/2012
SHEET 4 OF 7

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	30.25	COAL / STONEY COAL - Low to medium strength, fresh, black, dark brown coal / stoney coal		C	30.18				
31	30.99	SILTSTONE - Low to medium strength, fresh, grey siltstone			31.32		PL(A) = 0.54 PL(D) = 0.51		31
	31.61	COAL / STONEY COAL - Low to medium strength, fresh, black, dark brown coal / stoney coal		C					
32	31.94	SILTSTONE - Medium strength, fresh, grey siltstone							32
33					33.04		PL(A) = 1.08 PL(D) = 0.49		33
	33.27	TUFFACEOUS SANDSTONE - Low strength, moderately weathered, grey to white, fine to coarse grained tuffaceous sandstone			33.07				
	33.46	SILTSTONE - Low to medium strength, fresh, grey siltstone							
34				C					34
35					35.32		PL(A) = 2.61 PL(D) = 0.65		35
36					36.05				36
	36.2	LAMINITE - Medium strength, fresh, grey, fine grained laminite							
37					37.41		PL(A) = 5.79 PL(D) = 3.35		37
38	37.9	SILTSTONE - Medium strength, fresh, grey siltstone							38
	38.57	TUFF - Very low to low strength, fresh, grey to white							
	38.64	COAL - Low to medium strength, fresh, black coal From 38.88m, low to medium strength			39.06				
39		From 39.18m, low strength							39
	39.4	SILTSTONE - Medium strength, fresh, grey siltstone		C					
	39.68	LAMINITE - Medium strength, fresh, grey, fine to medium grained laminite			39.94		PL(A) = 0.75		

RIG: TD Rig 103 **DRILLER:** (Total) Wakeman **LOGGED:** Cowan **CASING:** HW to 18.2m

TYPE OF BORING: Solid flight auger to 7.0m, rotary to 18.35m, HQ3 to 66.17m

WATER OBSERVATIONS: Free groundwater observed at 6.30m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
I	Initial water level	S	Standard penetration test
V	Shear vane (kPa)		

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE04
PROJECT No: 49761
DATE: 23/11/2012
SHEET 5 OF 7

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		LAMINITE - Medium strength, fresh, grey, fine to medium grained laminite *(continued)*					PL(D) = 0.78		
	41				40.82		PL(A) = 2.59 PL(D) = 1.58		41
	42				42.08				42
	42.2	CARBONACEOUS SILTSTONE - Medium strength, fresh, dark grey carbonaceous siltstone			42.63		PL(A) = 1 PL(D) = 0.46		
	43								43
	43.17	LAMINITE - Medium strength, fresh, grey, fine to medium grained laminite		C					
	44			C					44
					44.8		PL(A) = 2.22 PL(D) = 0.93		
	45								45
	45.15	CARBONACEOUS SILTSTONE - Medium to high strength, fresh, dark grey to black carbonaceous siltstone (possible coal / stoney coal?)			45.15				
	46								46
	46.87			C	46.84		PL(A) = 0.91 PL(D) = 0.33		
	47	SANDSTONE - Medium to high strength, fresh, grey, fine grained sandstone							47
	47.14	CARBONACEOUS SILTSTONE - Medium to high strength, fresh, dark grey to black carbonaceous siltstone (possible coal / stoney coal?)							
	48				48.08 48.22 48.25		PL(A) = 1.88 PL(D) = 0.63		48
	48.88								
	49	COAL - Medium strength, fresh, black coal		C					49
	49.21	TUFF - Very low to low strength, moderately weathered, grey to white tuff with some fine to medium grained sand							
	49.6	CARBONACEOUS SILTSTONE - Medium to high							

RIG: TD Rig 103 **DRILLER:** (Total) Wakeman **LOGGED:** Cowan **CASING:** HW to 18.2m

TYPE OF BORING: Solid flight auger to 7.0m, rotary to 18.35m, HQ3 to 66.17m

WATER OBSERVATIONS: Free groundwater observed at 6.30m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Tube sample
B	Bulk sample	W	Water sample
BLK	Block sample		
C	Core drilling		
D	Disturbed sample		
E	Environmental sample		

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE04
PROJECT No: 49761
DATE: 23/11/2012
SHEET 6 OF 7

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		strength, fresh, dark grey to black carbonaceous siltstone (possible coal / stoney coal?)							
		COAL - Medium strength, fresh, black coal *(continued)*							
	50.51	TUFF - Medium to high strength, fresh, grey to white tuff with some fine grained sand		C					
51	51.06	COAL - Medium strength, fresh, black coal			51.18				51
					51.66		PL(A) = 1.95 PL(D) = 0.81		
52		From 51.9m to 51.97m, tuff band							52
	52.19	SANDSTONE - Medium to high strength, fresh, grey, fine to medium grained sandstone		C					
53					53.27		PL(A) = 2.59 PL(D) = 1.4		53
54					54.14				54
55					55.17		PL(A) = 2.1 PL(D) = 0.87		55
				C					From 54.0m to 56.5m, bentonite
56		From 55.77m, fine to coarse grained with trace to some fine sized, subrounded gravel							56
57					57.15 57.18		PL(A) = 0.82 PL(D) = 0.92		57
	57.61	COAL - Low to medium strength, fresh, black coal							
58									58
	58.59	CORE LOSS - 0.25m		C					
59	58.84	COAL - Low to medium strength, fragmented, black coal							59
					59.71		PL(A) = 0.87 PL(D) = 0.15		
	60.0								

RIG: TD Rig 103 **DRILLER:** (Total) Wakeman **LOGGED:** Cowan **CASING:** HW to 18.2m

TYPE OF BORING: Solid flight auger to 7.0m, rotary to 18.35m, HQ3 to 66.17m

WATER OBSERVATIONS: Free groundwater observed at 6.30m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
I	Tube sample (x mm dia.)	DP	Pocket penetrometer (kPa)
R	Water level	S	Standard penetration test
		V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE04
PROJECT No: 49761
DATE: 23/11/2012
SHEET 7 OF 7

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SILTSTONE - Medium to high strength, fresh, grey siltstone		C	60.15				From 57.17m to 63.17m, Class 18 PVC Screen
	60.49	SANDSTONE - Medium to high strength, fresh, grey, fine to medium grained sandstone			60.84		PL(A) = 2.89 PL(D) = 2.19		
	61			C					From 56.5m to 66.17m, gravel
	62								
		From 62.64m, high to very high strength							
	63				63.13				
					63.86		PL(A) = 2.84 PL(D) = 2.23		
	64								
				C					
	65								
					65.68		PL(A) = 4.12 PL(D) = 3.46		
	66								End cap
	66.17	Bore discontinued at 66.17m, limit of investigation			66.17				
	67								
	68								
	69								

RIG: TD Rig 103 **DRILLER:** (Total) Wakeman **LOGGED:** Cowan **CASING:** HW to 18.2m

TYPE OF BORING: Solid flight auger to 7.0m, rotary to 18.35m, HQ3 to 66.17m

WATER OBSERVATIONS: Free groundwater observed at 6.30m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	▼	Water level
D	Disturbed sample		

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE04-W
PROJECT No: 49761
DATE: 23/11/2012
SHEET 1 OF 3

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
									Stickup=0.70m
		TOPSOIL - Brown, gravelly silt topsoil, generally comprising fine to medium sized subangular gravel with some fine grained sand, humid		D	0.1				
				D	0.25				
	0.5			D	0.5				
		GRAVELLY SILT - Brown, fine to medium sized, subangular gravelly silt with trace to some fine to medium grained sand, humid		D	0.75				
		From 0.75m, some clay		S	1.0		7,10,11 N = 21		
					1.45				
	2.0	CLAYEY SAND - Brown, fine to medium grained clayey sand with trace to some silt		D	2.0				
		From 2.5m, with some coarse grained sand		S	2.5		3,5,10 N = 15		
					2.95				
	4.0	SILTY SAND - Brown, fine to coarse grained silty sand with trace clay (humid?)		S	4.0		6,9,9 N = 18		
					4.45				
		From 5.5m, with some clay		S	5.5		3,4,5 N = 9		
					5.95				
	7.0	SAND - Medium dense to dense, brown, fine to coarse grained sand with some fine to medium sized, subangular, subrounded gravel, saturated		S	7.0		8,10,17 N = 27		
					7.45				
		From 8.5m, with some clay		S	8.5		15,15,16 N = 31		From 0m to 17.4m, grout
					8.95				

RIG: HydroPower Scout **DRILLER:** (Total) Wakeman **LOGGED:** Cowan **CASING:** HW to 18.2m
TYPE OF BORING:
WATER OBSERVATIONS: No free groundwater observations obscured due to drilling fluids
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Tube sample
B	Bulk sample	W	Water sample
C	Core drilling	▼	Water level
D	Disturbed sample		

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE04-W
PROJECT No: 49761
DATE: 23/11/2012
SHEET 2 OF 3

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SAND - Medium dense to dense, brown, fine to coarse grained sand with some fine to medium sized, subangular, subrounded gravel, saturated *(continued)*		S	10.0 10.44		7, 15, 25/135mm		
11									11
	11.5	SANDY CLAY - Firm to stiff, brown, fine grained sandy clay		S, pp	11.5 11.95		2,1,3 N = 4 50-200kPa		
12									12
13	13.0	SAND - Medium dense to dense, brown, fine to coarse grained sand with some fine to medium sized subangular gravel with some clay		S	13.0 13.45		9,14,26 N = 40		13
14									14
				S	14.5 14.95		8,8,4 N = 12		
15									15
16									16
		From 16.5m, with some fine to coarse sized subangular gravel		S	16.5 16.79		24, 25/140mm		
17									17
18	17.9	SILTSTONE - Extremely low to very low strength, highly weathered, grey, siltstone		S	18.0 18.1		25/100mm		18
	18.4	SANDSTONE - Very low to low strength, slightly weathered, grey white fine to medium grained sandstone			18.35 18.49		PL(A) = 0.15 PL(D) = 0.07		From 17.4m to 19.7m, bentonite
19		From 19.02m to 19.18m, siltstone band		C					19
	19.3	SILTSTONE - Very low to low strength, slightly weathered to fresh, grey, grey to white siltstone			19.77		PL(A) = 0.47 PL(D) = 0.2		

RIG: HydroPower Scout **DRILLER:** (Total) Wakeman **LOGGED:** Cowan **CASING:** HW to 18.2m
TYPE OF BORING:
WATER OBSERVATIONS: No free groundwater observations obscured due to drilling fluids
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	pp	Pocket penetrometer (kPa)
D	Disturbed sample	V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE04-W
PROJECT No: 49761
DATE: 23/11/2012
SHEET 3 OF 3

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		From 19.95m, dark grey SILTSTONE - Very low to low strength, slightly weathered to fresh, grey, grey to white siltstone *(continued)*		C					
	20.63	From 20.52m, coal, extremely low strength, extremely weathered, black							
	20.8								
	20.87								
21	21.04	CORE LOSS - 0.17m			21.2				21
	21.2	COAL - Low to medium strength, slightly weathered to fresh, black, fragmented coal							
	21.39								
	21.55	TUFF - Very low strength, moderately weathered, white, tuff							
22		COAL - Low to medium strength, slightly weathered to fresh, black coal			22.24		PL(A) = 0.93		22
		CORE LOSS - 0.19m							
		COAL - Low strength, slightly weathered to fresh, black, fragmented coal		C					
23		SILTSTONE - Low strength, slightly weathered to fresh, grey siltstone							23 From 19.7m to 25.95m, gravel From 19.95m to 25.95m, Class 18 PVC Screen
		From 21.62m to 21.65m, extremely low strength, extremely weathered							
		From 21.94m, clay band, 10mm thick			23.54		PL(A) = 0.72 PL(D) = 0.35		
		From 22.17m, low to medium strength							
24					24.2				24
25									25
	25.27	COAL / CARBONACEOUS SILTSTONE - Very low to low strength, slightly weathered, black, dark brown coal / carbonaceous siltstone			25.18		PL(A) = 1.18 PL(D) = 0.42		
		From 25.72m to 25.89m, tuff band							
26	25.95	From 25.89m, low to medium strength							26 End cap
		Bore discontinued at 25.95m, limit of investigation							
27									27
28									28
29									29

RIG: HydroPower Scout **DRILLER:** (Total) Wakeman **LOGGED:** Cowan **CASING:** HW to 18.2m

TYPE OF BORING:

WATER OBSERVATIONS: No free groundwater observations obscured due to drilling fluids

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
I	Water level	S	Standard penetration test
		V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE05
PROJECT No: 49761
DATE: 29/11/2012
SHEET 1 OF 6

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SILTY CLAY - (Stiff) brown silty clay, some fine to coarse grained sand, trace fine subangular gravel, M>Wp							Stickup=0.55m From 0m to 0.3m, cement
	1	From 1.0m, very stiff		S	1.0		9,13,16 N = 29		
	1.35	SILTY SAND/SILTY CLAY - Medium dense, brown silty, fine to medium grained sand interbedded with very stiff to hard clay and silty clay, M>Wp			1.45				
	2	From 2.5m to 2.95m, hard clay band			2.5				
				pp	2.6		>500kPa		
				S	2.7		7,14,15 N = 29		
	3				2.95				
	4	From 4.0m to 4.25m, sandy clay band, M>Wp, transitioning into sand			4.0				
				pp	4.0		>230-250kPa		
	4.25	SAND - Medium dense, brown, fine to medium grained sand, some fine subangular/subrounded gravel, some silt, humid		S	4.25		10,12,14 N = 26		
					4.45				
	5	From 5.0m, damp							
					5.5				
	5.7	GRAVELLY SAND - Medium dense, brown, fine to coarse grained, subangular/subrounded gravelly, fine to coarse grained sand, trace silt, damp to wet		S			5,5,7 N = 12		
	6	From 6.25m, interbedded with sandy clay in parts			5.95				
	7				7.0				
				S			18,12,14 N = 26		
					7.45				
	8								
	8.7	SANDSTONE - Highly weathered, low strength, brown, fine to medium grained sandstone			8.8				
	9	From 8.7m to 9.2m, high drilling resistance using wash boring (changed to HQ at 9.2m)		S			41/130mm (bouncing) N=50		
					9.2				
					9.25				
	9.69			C	9.62		PL(A) = 0.45		

RIG: Hydropower Scout **DRILLER:** Sawyer **LOGGED:** Holden **CASING:** HW to 8.6m
TYPE OF BORING: Solid flight auger to 7.0m, wash boring to 9.2m, HQ3 to 56.90m
WATER OBSERVATIONS: Free groundwater observed at 6.25m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	pp	Pocket penetrometer (kPa)
D	Disturbed sample	S	Standard penetration test
E	Environmental sample	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE05
PROJECT No: 49761
DATE: 29/11/2012
SHEET 2 OF 6

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	10.2	SILTSTONE/SANDSTONE - Moderately weathered, low strength, brown, fine to medium grained sandstone laminated with grey siltstone *(continued)*		C	10.07		PL(A) = 0.27		
					10.2				
		SILTSTONE - Slightly weathered, very low strength, grey siltstone			10.5		PL(A) = 0.17		
	11								11
		From 11.2m, medium strength			11.22		PL(A) = 1.08		
		From 11.5m, fresh		C					
	12								12
					12.1				
	12.36	TUFF - Fresh, very low strength, light grey tuff							
	12.39								
	12.48	MUDSTONE - Fresh, medium strength, dark grey mudstone			12.6				
	12.72								
	13	COAL - Fresh, medium strength, black/dark brown coal							13
		SILTSTONE - Fresh, medium strength, grey siltstone			13.18		PL(A) = 1.19		
				C					
	14								14
					14.13		GT-001		
	14.26	MUDSTONE - Fresh, medium strength, dark grey mudstone			14.23				
					14.57		PL(A) = 1.38		
	15								15
					15.11				
	15.23	COAL - Fresh, medium strength, dark grey coal							
	15.5	SILTSTONE - Fresh, medium strength, grey siltstone							
	16			C					16
					16.68		PL(A) = 1.56 PL(D) = 1.31		
	17								17
					17.2				
	17.33	COAL - Fresh, medium strength, black coal			17.36		PL(A) = 1.8		
	17.7	From 17.66m, coal seam		C					
	18	SILTSTONE - Fresh, high strength, dark grey siltstone							18
		From 17.73m to 17.74m, coal seam			18.14		PL(A) = 3.97		From 0.3m to 36.0m, grout
		From 17.86m to 17.89m, coal seam			18.17				
		From 17.95m, coal seam			18.5		PL(A) = 1.87		
		From 18.17m to 18.56m, medium strength, thinly laminated with coal			18.54		GT-002		
	19				18.93				19
				C					
	19.22	CARBONACEOUS SILTSTONE/COAL - Fresh, medium strength, dark brown carbonaceous siltstone laminated with black coal							
					19.75		PL(A) = 2.45		

RIG: Hydropower Scout **DRILLER:** Sawyer **LOGGED:** Holden **CASING:** HW to 8.6m

TYPE OF BORING: Solid flight auger to 7.0m, wash boring to 9.2m, HQ3 to 56.90m

WATER OBSERVATIONS: Free groundwater observed at 6.25m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
BLK	Block sample	pp	Pocket penetrometer (kPa)
C	Core drilling	V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE05
PROJECT No: 49761
DATE: 29/11/2012
SHEET 3 OF 6

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	20.08	SILTSTONE - Fresh, medium strength, grey siltstone		C	20.32		PL(A) = 1.86 PL(D) = 1.39		
21					21.14				21
		From 21.46m to 21.64m, medium strength sandstone band							
22	21.91	LAMINITE - Fresh, medium strength, grey laminite		C	22.53		PL(A) = 2.11 PL(D) = 2.33		22
23		From 23.0m, grading into sandstone							23
	23.19	SANDSTONE - Fresh, high strength, light grey, fine to medium grained sandstone			23.44		PL(A) = 5.33 PL(D) = 3.58		
24									24
	24.15	CONGLOMERATE - Fresh, high strength, grey, medium grained conglomerate in a fine to medium grained sandstone matrix			24.28				
	24.33	SANDSTONE - Fresh, high strength, grey, fine to medium grained sandstone			24.66		PL(A) = 5.08 PL(D) = 3.69		
25	24.93	CONGLOMERATE - Fresh, high strength, grey, medium grained conglomerate in a fine to medium grained sandstone matrix							25
	25.27	SANDSTONE - Fresh, high strength, grey, fine to medium grained sandstone		C					
26		SILTSTONE - Fresh, medium strength, dark grey siltstone			25.97		PL(A) = 1.83 PL(D) = 2.69		26
		From 26.27m, grading into tuff							
	26.47	TUFF - Fresh, high strength, light grey tuff			26.5 26.58		PL(A) = 4.2 GT-003		
27		From 26.47m to 26.97m, heat affected							27
	27.07	From 26.97m, very low strength			27.03				
	27.15 27.27	COAL/CARBONACEOUS MUDSTONE - Fresh, high strength, dark brown/black coal/carbonaceous mudstone							
	27.63	COAL - Fresh, medium strength, black coal			27.66		PL(A) = 8.44 PL(D) = 3.64		
28		CARBONACEOUS MUDSTONE - Fresh, high strength, dark brown/black mudstone							28
	28.22 28.28 28.43	CARBONACEOUS MUDSTONE/COAL - Fresh, high strength coal/cark brown mudstone		C					
		TUFF - Fresh, medium strength, light grey tuff (possibly heat affected)							
29		COAL - Fresh, medium strength, black coal			29.0		PL(A) = 6.43 PL(D) = 4.84		29
		LAMINITE - Fresh, high strength, grey laminite (fine to medium grained sandstone)							
		From 29.84m, grading into mudstone							

RIG: Hydropower Scout **DRILLER:** Sawyer **LOGGED:** Holden **CASING:** HW to 8.6m
TYPE OF BORING: Solid flight auger to 7.0m, wash boring to 9.2m, HQ3 to 56.90m
WATER OBSERVATIONS: Free groundwater observed at 6.25m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
BLK	Block sample	PID	Photo ionisation detector (ppm)
C	Core drilling	PL(A)	Point load axial test Is(50) (MPa)
D	Disturbed sample	PL(D)	Point load diametral test Is(50) (MPa)
E	Environmental sample	SPT	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE05
PROJECT No: 49761
DATE: 29/11/2012
SHEET 4 OF 6

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	30.05	MUDSTONE - Fresh, high strength, dark grey/black mudstone			30.08				
31	31.03	SANDSTONE/SILTSTONE - Fresh, high strength, light grey, fine grained sandstone interbedded with grey siltstone (bedding up to 200mm thick)		C	30.96 31.0 31.24		PL(A) = 4.94 GT-004		31
32					32.18		PL(A) = 6.94		32
33					33.04 33.08		PL(A) = 4.69		33
	33.36	MUDSTONE - Fresh, high strength, dark grey/black mudstone							
34					34.05		PL(A) = 4.59		34
	34.52	From 34.38m to 34.40m, medium strength coal seam		C					
		COAL - Fresh, medium strength, black coal							
	34.87	SILTSTONE - Fresh, high strength, dark grey siltstone							
35					35.04		PL(A) = 4		35
	35.42	COAL - Fresh, medium strength, black coal							
	35.48	SILTSTONE - Fresh, high strength, dark grey siltstone							
	35.66	CARBONACEOUS MUDSTONE/COAL - Fresh, high strength, grey/black carbonaceous mudstone/coal							
36					36.14 36.24		GT-010		36
	36.8	From 36.62m to 36.68m, high strength tuff band			36.73				
37	36.88	TUFF - Fresh, medium strength, light grey/brown tuff							37
		COAL - Fresh, medium strength, dark grey/black coal							
	37.59	TUFF - Fresh, low strength, light grey/brown tuff		C	37.65		PL(A) = 0.59 PL(D) = 0.41		
		From 37.76m to 37.90m, high strength mudstone band							
38	37.99	From 37.9m, high strength							38
		COAL - Fresh, medium dense, dark grey/black coal							
	38.65	TUFF - Fresh, medium strength, light grey/brown tuff			38.63		GT-005		
		From 38.69m to 38.70m, very low strength							From 36.0m to 41.7m, bentonite
39		From 38.83m to 38.90m, very low strength			39.2				39
	39.7	COAL - Fresh, medium strength, black coal		C					

RIG: Hydropower Scout **DRILLER:** Sawyer **LOGGED:** Holden **CASING:** HW to 8.6m

TYPE OF BORING: Solid flight auger to 7.0m, wash boring to 9.2m, HQ3 to 56.90m

WATER OBSERVATIONS: Free groundwater observed at 6.25m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Augered sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
		PP	Pocket penetrometer (kPa)
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE05
PROJECT No: 49761
DATE: 29/11/2012
SHEET 5 OF 6

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	40.08	SILTSTONE - Gresh, high strength, grey siltstone			40.27		PL(A) = 5.98 PL(D) = 5.1		
41	41.08	From 40.93m, grading into sandstone		C	41.15				
		SANDSTONE - Fresh, high strength, light grey, fine to medium grained sandstone					GT-006		
					41.62 41.66		PL(A) = 4.98 PL(D) = 3.7		
42					42.13				
		From 42.64m, fine to coarse grained							
43									
		From 43.52m, medium strength, slightly fine grained		C	43.66		PL(A) = 1.55 PL(D) = 1.84		
	43.73	COAL - Fresh, medium strength, black coal							
44									
45	45.0	CORE LOSS			45.1				From 41.7m to 48.1m, gravel From 41.9m to 47.9m, Class 18 PVC Screen
	45.45	COAL - Fresh, medium strength, black coal							
46	46.1	SANDSTONE - Fresh, high strength, grey, fine to medium grained sandstone			46.38		PL(A) = 6.94 PL(D) = 6.95		
				C					
47					47.34 47.4		PL(A) = 7.57 PL(D) = 6.83 GT-007		
		From 47.69m to 47.79m, medium strength, fine to coarse grained			47.69				
48					48.1				
					48.8		PL(A) = 6.81 PL(D) = 8.81		
49	49.08	SANDSTONE - Fresh, high strength, grey, fine to medium grained sandstone		C					
					49.55				From 47.9m to 50.9m, Class 18 PVC (sump)
				C			GT-008		
	49.98				49.88		PL(A) = 3.84		

RIG: Hydropower Scout **DRILLER:** Sawyer **LOGGED:** Holden **CASING:** HW to 8.6m
TYPE OF BORING: Solid flight auger to 7.0m, wash boring to 9.2m, HQ3 to 56.90m
WATER OBSERVATIONS: Free groundwater observed at 6.25m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	pp	Pocket penetrometer (kPa)
D	Disturbed sample	V	Shear vane (kPa)

Douglas Partners
Geotechnics | Environment | Groundwater

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE05
PROJECT No: 49761
DATE: 29/11/2012
SHEET 6 OF 6

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		CONGLOMERATE - Fresh, high strength, grey conglomerate (fine to medium sized gravel in fine to coarse grained sand matrix)			49.92		PL(D) = 3.64		
	50.36	SANDSTONE - Fresh, high strength, grey, fine to medium grained sandstone *(continued)*		C					
					50.73				
		SILTSTONE - Fresh, high strength, dark grey siltstone			51.04		PL(A) = 5.38		
	51.53	SANDSTONE - Fresh, high strength, light grey, fine to medium grained sandstone							From 48.1m to 56.9m, bentonite
				C					
					53.16		PL(A) = 9 PL(D) = 6.78		
					53.2		GT-009		
					53.62				
		From 54.5m, very high strength			53.85				
				C					
					55.54		PL(A) = 11.98 PL(D) = 9.05		
	56.9	Bore discontinued at 56.9m, limit of investigation			56.9				

RIG: Hydropower Scout **DRILLER:** Sawyer **LOGGED:** Holden **CASING:** HW to 8.6m
TYPE OF BORING: Solid flight auger to 7.0m, wash boring to 9.2m, HQ3 to 56.90m
WATER OBSERVATIONS: Free groundwater observed at 6.25m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
		S	Standard penetration test
		V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE05W
PROJECT No: 49761
DATE: 29/11/2012
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SILTY CLAY - (Stiff) brown silty clay, some fine to coarse grained sand, trace fine subangular gravel, M>Wp							Stickup=0.52m From 0m to 0.3m, cement
	1	From 1.0m, very stiff		S	1.0		9,13,16 N = 29		
	1.35	SILTY SAND/SILTY CLAY - Medium dense, brown silty, fine to medium grained sand interbedded with very stiff to hard clay and silty clay, M>Wp			1.45				
	2								
		From 2.5m to 2.95m, hard clay band			2.5				
				pp	2.6		>500kPa		
				S	2.7		7,14,15		
	3				2.95		N = 29		
					4.0				
	4	From 4.0m to 4.25m, sandy clay band, M>Wp, transitioning into sand		pp	4.0		>230-250kPa		
	4.25			S	4.25		10,12,14 N = 26		From 0.3m to 8.4m, grout
		SAND - Medium dense, brown, fine to medium grained sand, some fine subangular/subrounded gravel, some silt, humid			4.45				
	5	From 5.0m, damp							
					5.5				
	5.7			S			5,5,7 N = 12		
		GRAVELLY SAND - Medium dense, brown, fine to coarse grained, subangular/subrounded gravelly, fine to coarse grained sand, trace silt, damp to wet			5.95				
	6	From 6.25m, interbedded with sandy clay in parts							
					7.0				
	7			S			18,12,14 N = 26		
					7.45				
	8								
	8.7				8.8				
		SANDSTONE - Highly weathered, low strength, brown, fine to medium grained sandstone		S			41/130mm (bouncing) N=50		From 8.4m to 9.5m, bentonite
	9	From 8.7m to 9.2m, high drilling resistance using wash boring (changed to HQ at 9.2m)			9.2				
					9.25				
	9.69			C	9.62		PL(A) = 0.45		

RIG: Hydropower Scout **DRILLER:** Sawyer **LOGGED:** Holden **CASING:** HW to 8.6m
TYPE OF BORING: Solid flight auger to 7.0m, wash boring to 9.2m, HQ3 to 56.90m
WATER OBSERVATIONS: Free groundwater observed at 6.25m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	pp	Pocket penetrometer (kPa)
D	Disturbed sample	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE05W
PROJECT No: 49761
DATE: 29/11/2012
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	10.2	SILTSTONE/SANDSTONE - Moderately weathered, low strength, brown, fine to medium grained sandstone laminated with grey siltstone *(continued)*		C	10.07 10.2		PL(A) = 0.27		
		SILTSTONE - Slightly weathered, very low strength, grey siltstone			10.5		PL(A) = 0.17		
	11	From 11.2m, medium strength		C	11.22		PL(A) = 1.08		
		From 11.5m, fresh							
	12				12.1				
	12.36	TUFF - Fresh, very low strength, light grey tuff							
	12.39				12.6				From 9.5m to 15.7m, gravel From 9.7m to 15.7m, Class 18 PVC Screen
	12.48	MUDSTONE - Fresh, medium strength, dark grey mudstone							
	12.72								
	13	COAL - Fresh, medium strength, black/dark brown coal							
		SILTSTONE - Fresh, medium strength, grey siltstone			13.18		PL(A) = 1.19		
				C					
	14								
	14.26				14.13 14.23		GT-001		
		MUDSTONE - Fresh, medium strength, dark grey mudstone			14.57		PL(A) = 1.38		
	15				15.11				
	15.23	COAL - Fresh, medium strength, dark grey coal							
	15.5	SILTSTONE - Fresh, medium strength, grey siltstone							End cap
	15.7	Bore discontinued at 15.7m, limit of investigation							
	16								
	17								
	18								
	19								

RIG: Hydropower Scout **DRILLER:** Sawyer **LOGGED:** Holden **CASING:** HW to 8.6m

TYPE OF BORING: Solid flight auger to 7.0m, wash boring to 9.2m, HQ3 to 56.90m

WATER OBSERVATIONS: Free groundwater observed at 6.25m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
		DP	Dynamic penetrometer (blows per 100mm)
		S	Standard penetration test
		V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE08C
PROJECT No: 49761
DATE: 7-13/12/12
SHEET 1 OF 4

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SANDY SILT - Stiff, brown, fine to coarse grained sandy silt with abundant organics, M<Wp							Stickup=0.77m
1	1.0	SANDSTONE AND SILTSTONE - Extremely low strength, extremely weathered, yellow brown / grey brown, fine to medium grained sandstone and carbonaceous siltstone		S	1.0		15,21/130mm, refusal, bouncing		
	1.28	CORE LOSS - 0.32m			1.28				
	1.6	SILTSTONE - Low strength, moderately weathered, grey / grey brown siltstone with interbedded fine to medium grained sandstone			1.9		PL(A) = 0.48		
2	2.22	SANDSTONE - Low to medium strength, moderately weathered, grey / grey brown fine to medium grained sandstone		C					
3					3.3		PL(A) = 0.31		
					3.4				
4		From 3.87m, interbedded siltstone							
	4.7	SANDSTONE - High strength, fresh, grey, medium grained sandstone with interbedded siltstone to 5.25m			4.6		PL(A) = 0.97		
5		From 5.25m, medium to coarse grained		C	5.15		PL(A) = 1.77		
6					6.0		PL(A) = 1.49		
					6.36				
7									
8				C					
9					8.9		PL(A) = 1.35		
	9.46	At 9.42m to 9.46m, tuffaceous claystone			9.4				
		COAL - High strength, fresh, black / dark brown coal with interbedded carbonaceous siltstone		C	9.75		PL(A) = 1.06		

RIG: Hydropower Scout **DRILLER:** (Total) Wakeman **LOGGED:** Semmler **CASING:** HW to 1.65m
TYPE OF BORING: Solid flight auger to 1.0m, HQ3 coring to 36.4m
WATER OBSERVATIONS: Free groundwater observations obscured due to drilling fluids
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Tube sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
I	Water level	V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE08C
PROJECT No: 49761
DATE: 7-13/12/12
SHEET 2 OF 4

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		At 9.95m to 9.98m, tuffaceous claystone							
	10.33	SANDSTONE AND SILTSTONE - High strength, fresh, grey / dark grey, fine to medium grained sandstone and siltstone (laminite?)		C	10.7		PL(A) = 1.01		
	11								
	12				12.05		PL(A) = 1.13		
					12.34				
		At 12.49m to 12.8m, carbonaceous siltstone / coal							From 0m to 25.7m, grout
	13								
	13.14	CARBONACEOUS SILTSTONE / COAL - Medium strength, fresh, dark brown carbonaceous siltstone / coal			13.35		PL(A) = 0.62		
	13.95			C					
	14	SILTSTONE AND SANDSTONE - High strength, fresh, grey / dark grey siltstone and fine to medium grained sandstone							
	15				14.95		PL(A) = 1.54		
					15.29				
	16								
					16.25		PL(A) = 1.55		
				C					
	17				16.95		PL(A) = 2.84		
					17.53		PL(A) = 2.98		
		At 17.65m to 17.85m, carbonaceous siltstone							
	17.95								
	18.0	CORE LOSS - 0.05m							
		COAL - Medium to high strength, fresh, dark brown / black coal with interbedded carbonaceous siltstone			18.34				
	18.76								
	19	SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone		C					
					19.35		PL(A) = 1.99		
					19.75		PL(A) = 1.67		
	19.9								

RIG: Hydropower Scout **DRILLER:** (Total) Wakeman **LOGGED:** Semmler **CASING:** HW to 1.65m
TYPE OF BORING: Solid flight auger to 1.0m, HQ3 coring to 36.4m
WATER OBSERVATIONS: Free groundwater observations obscured due to drilling fluids
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
I	Initial water level	DP	Pocket penetrometer (kPa)
S	Standard penetration test	V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE08C
PROJECT No: 49761
DATE: 7-13/12/12
SHEET 3 OF 4

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		CARBONACEOUS SILTSTONE / COAL - Medium strength, fresh, dark brown carbonaceous siltstone / coal *(continued)*		C					
	21	From 21m, coal with interbedded carbonaceous siltstone			21.3		PL(A) = 0.64		
		At 21.38m to 21.39m, tuffaceous claystone band			21.34		PL(D) = 1.32		
	22				22.65		PL(A) = 0.87		
				C					
	23	At 23.11m to 23.24m, tuffaceous claystone band			23.2		PL(A) = 0.4		
		At 23.32m to 23.37m, tuffaceous claystone band							
	23.52	TUFFACEOUS CLAYSTONE - Medium strength, fresh, pale grey tuffaceous claystone							
	23.76	At 23.52m to 23.55m, extremely low strength, extremely weathered							
	24	COAL - Medium to high strength, fresh, dark brown / black coal with interbedded carbonaceous siltstone			24.36				
	24.6	At 24.22m to 24.25m, tuffaceous band			24.65		PL(A) = 1.56		
		SANDSTONE AND SILTSTONE - High strength, fresh, grey / dark grey fine to medium grained sandstone and siltstone							
	25								
				C					
	26								
	27				27.35		PL(A) = 1.9		From 25.7m to 29.25m, bentonite
					27.38				
	27.88	SANDSTONE - High strength, fresh, grey, coarse grained sandstone with interbedded pebbly sandstone							
	28				28.0		PL(A) = 1.19		
				C					
	29								

RIG: Hydropower Scout **DRILLER:** (Total) Wakeman **LOGGED:** Semmler **CASING:** HW to 1.65m

TYPE OF BORING: Solid flight auger to 1.0m, HQ3 coring to 36.4m

WATER OBSERVATIONS: Free groundwater observations obscured due to drilling fluids

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
		SPT	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE08C
PROJECT No: 49761
DATE: 7-13/12/12
SHEET 4 OF 4

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SANDSTONE - High strength, fresh, grey, coarse grained sandstone with interbedded pebbly sandstone *(continued)*		C	30.45		PL(A) = 0.97		
	30.74				30.47				
		COAL - Medium to high strength, dark brown / black coal			30.9		PL(A) = 0.69		
31		At 30.99m, tuffaceous claystone band 10mm							31
				C					From 29.25m to 34m, 5mm gravel
32									From 29.4m to 33.9m, Class 18 PVC Screen 32
					32.8		PL(A) = 1.16		
33	33.02								33
		CORE LOSS - 0.36m							
	33.38				33.38				
		COAL - Medium to high strength, dark brown / black coal							
	33.82								
34		SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone with interbedded coarse grained sandstone and sparse thin siltstone laminations			34.05		PL(A) = 2.67		34
				C					
35									35 From 33.9m to 36.4m, sump
36									36
	36.4				36.35		PL(A) = 2.84		End cap
		Bore discontinued at 36.4m, limit of investigation			36.4				
37									37
38									38
39									39

RIG: Hydropower Scout **DRILLER:** (Total) Wakeman **LOGGED:** Semmler **CASING:** HW to 1.65m

TYPE OF BORING: Solid flight auger to 1.0m, HQ3 coring to 36.4m

WATER OBSERVATIONS: Free groundwater observations obscured due to drilling fluids

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
I	Tube sample (x mm dia.)	DP	Dynamic penetrometer (AS1289.6.3.2)
N	Standard penetration test	V	Shear vane (kPa)

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Geotechnics | Environment | Groundwater

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE08W
PROJECT No: 49761
DATE: 7-13/12/12
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SANDY SILT - Stiff, brown, fine to coarse grained sandy silt with abundant organics, M<Wp							
	1.0	SANDSTONE AND SILTSTONE - Extremely low strength, extremely weathered, yellow brown / grey brown, fine to medium grained sandstone and carbonaceous siltstone							
	1.28								
	1.6	CORE LOSS - 0.32m							
		SILTSTONE - Low strength, moderately weathered, grey / grey brown siltstone with interbedded fine to medium grained sandstone							
	2.22	SANDSTONE - Low to medium strength, moderately weathered, grey / grey brown fine to medium grained sandstone							From 0m to 5.5m, grout
		From 3.87m, interbedded siltstone							
	4.7	SANDSTONE - High strength, fresh, grey, medium grained sandstone with interbedded siltstone to 5.25m							
		From 5.25m, medium to coarse grained							From 5.5m to 7.5m, bentonite
	9.46	At 9.42m to 9.46m, tuffaceous claystone							
		COAL - High strength, fresh, black / dark brown coal with interbedded carbonaceous siltstone							

RIG: Hydropower Scout **DRILLER:** (Total) Wakeman **LOGGED:** Semmler **CASING:** Uncased

TYPE OF BORING: Rock roller from 0.0m to 13.8m

WATER OBSERVATIONS: Free groundwater observations obscured due to drilling fluids

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
V	Shear vane (kPa)		

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE08W
PROJECT No: 49761
DATE: 7-13/12/12
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		At 9.95m to 9.98m, tuffaceous claystone							
	10.33	SANDSTONE AND SILTSTONE - High strength, fresh, grey / dark grey, fine to medium grained sandstone and siltstone (laminite?)							From 7.5m to 13.8m, 5mm gravel From 7.8m to 13.8m, Class 18 PVC Screen
	11								
	12								
		At 12.49m to 12.8m, carbonaceous siltstone / coal							
	13								
	13.14	CARBONACEOUS SILTSTONE / COAL - Medium strength, fresh, dark brown carbonaceous siltstone / coal							
	13.8	Bore discontinued at 13.8m, limit of investigation							End cap
	14								
	15								
	16								
	17								
	18								
	19								

RIG: Hydropower Scout **DRILLER:** (Total) Wakeman **LOGGED:** Semmler **CASING:** Uncased

TYPE OF BORING: Rock roller from 0.0m to 13.8m

WATER OBSERVATIONS: Free groundwater observations obscured due to drilling fluids

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Augered sample	U	Tube sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
		DP	Dynamic penetrometer (blows per 100mm)
		SPT	Standard penetration test
		V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE11
PROJECT No: 49761
DATE: 4/12/2012
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SANDY SILT - Stiff, brown, fine to coarse grained sandy silt with trace fine sized subrounded gravel, M<Wp							Stickup 0.5m From 0m to 0.3m, concrete
	1			S	1.0		5,3,3 N = 6		
					1.45				
	2	From 2m, some fine sized subrounded gravel, some coarse grained sandy silt with some fine to medium grained sand							From 0.3m to 3.6m, backfill and cuttings
				S	2.5		14,24,24 N = 48		From 0m to 5.25m, Class 18 Blank
	3				2.95				
	4			S	4.0		15,20/60mm		
	4.2	SANDSTONE - Extremely low strength, extremely weathered, yellow brown medium to coarse grained sandstone			4.2 4.21				
		From 4.44m, fine to coarse grained sandstone		PP PP C PP PP	4.58 4.65 4.68 4.95 5.15		550 kPa 300 kPa 250 kPa 300 kPa		From 3.6m to 5.25m, bentonite
	5								
	5.72	At 5.54m to 5.72m, conglomerate band (medium to coarse sized subrounded gravel)		C					
	6	SANDSTONE - High strength, slightly weathered, pale grey mottled yellow brown, medium grained sandstone			6.2				
	7			C					
	8	From 8.19m, fine to medium grained sandstone, interbedded carbonaceous siltstone / sandstone							
					8.8				
	9			C					
		At 9.51m to 9.73m, pebbly sandstone							From 5.2m to 14.2m, 5mm gravel
		From 9.74m to 9.86m, thin coal laminations							

RIG: Hydropower Scout **DRILLER:** (Total) Wakeman **LOGGED:** Semmler **CASING:** HW to 4.0m
TYPE OF BORING: Solid flight auger to 4.2m, rockroller blade bit wash boring to 4.44m, HQ3 coring to 14.79m
WATER OBSERVATIONS: Free groundwater observations obscured due to drilling fluids
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PP	Pocket penetrometer (kPa)
D	Disturbed sample	S	Standard penetration test
E	Environmental sample	V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE11
PROJECT No: 49761
DATE: 4/12/2012
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		At 9.84m to 9.96m, conglomerate From 9.96m, interbedded siltstone SANDSTONE - High strength, slightly weathered, pale grey mottled yellow brown, medium grained sandstone *(continued)*							From 5.2m to 14.2m, Class 18 PVC Screen
	10.87	From 10.26m, fine grained sandstone		C					
11		SILSTONE - High strength, fresh, grey siltstone From 10.92m, fresh							
					11.82				
12		From 12.33m, sandstone/siltstone							
	12.58	SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone							
13				C					
		From 13.76m, interbedded siltstone							
14									Bentonite
	14.79	Bore discontinued at 14.79m, limit of investigation			14.79				
15									
16									
17									
18									
19									

RIG: Hydropower Scout **DRILLER:** (Total) Wakeman **LOGGED:** Semmler **CASING:** HW to 4.0m
TYPE OF BORING: Solid flight auger to 4.2m, rockroller blade bit wash boring to 4.44m, HQ3 coring to 14.79m
WATER OBSERVATIONS: Free groundwater observations obscured due to drilling fluids
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
R	Rock sample	DP	Dynamic penetrometer (AS1289.6.3.2)
V	Vane shear	SPT	Standard penetration test

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE11W
PROJECT No: 49761
DATE: 4/12/2012
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SANDY SILT - Stiff, brown, fine to coarse grained sandy silt with trace fine sized subrounded gravel, M<Wp							Stickup 0.57m From 0m to 0.3m, concrete
	1								
	2	From 2m, some fine sized subrounded gravel, some coarse grained sandy silt with some fine to medium grained sand							From 0.3m to 3.6m, backfill and cuttings
	3								
	4								
	4.2	SANDSTONE - Extremely low strength, extremely weathered, yellow brown medium to coarse grained sandstone From 4.44m, fine to coarse grained sandstone							From 3.6m to 5.1m, bentonite
	5								
	5.72	At 5.54m to 5.72m, conglomerate band (medium to coarse sized subrounded gravel)							
	6	SANDSTONE - High strength, slightly weathered, pale grey mottled yellow brown, medium grained sandstone							
	7								
	8	From 8.19m, fine to medium grained sandstone, interbedded carbonaceous siltstone / sandstone							
	9								
		At 9.51m to 9.73m, pebbly sandstone From 9.74m to 9.86m, thin coal laminations							From 5.1m to 14.2m, 5mm gravel

RIG: Hydropower Scout **DRILLER:** (Total) Wakeman **LOGGED:** Semmler **CASING:** HW to 4.0m
TYPE OF BORING: Solid flight auger to 4.2m, rockroller blade bit wash boring to 4.44m, HQ3 coring to 14.79m
WATER OBSERVATIONS: Free groundwater observations obscured due to drilling fluids
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Tube sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
I	Initial water level	DP	Dynamic penetrometer (AS1289.6.3.2)
S	Standard penetration test	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE11W
PROJECT No: 49761
DATE: 4/12/2012
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		At 9.84m to 9.96m, conglomerate From 9.96m, interbedded siltstone SANDSTONE - High strength, slightly weathered, pale grey mottled yellow brown, medium grained sandstone *(continued)*							From 5.2m to 14.2m, Class 18 PVC Screen
	10.87	From 10.26m, fine grained sandstone							
11		SILSTONE - High strength, fresh, grey siltstone From 10.92m, fresh							
12		From 12.33m, sandstone/siltstone							
	12.58	SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone							
13									
14		From 13.76m, interbedded siltstone							End Cap From 14.2m to 14.79m, bentonite
	14.79	Bore discontinued at 14.79m, limit of investigation							
15									
16									
17									
18									
19									

RIG: Hydropower Scout **DRILLER:** (Total) Wakeman **LOGGED:** Semmler **CASING:** HW to 4.0m
TYPE OF BORING: Solid flight auger to 4.2m, rockroller blade bit wash boring to 4.44m, HQ3 coring to 14.79m
WATER OBSERVATIONS: Free groundwater observations obscured due to drilling fluids
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
R	Rock sample	DP	Dynamic penetrometer (AS1289.6.3.2)
V	Vane shear	SPT	Standard penetration test
W	Water seep		
▼	Water level		

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 2.59 AHD
EASTING: 230020
NORTHING: 6400304
DIP/AZIMUTH: 90°/--

BORE No: AGE12
PROJECT No: 49761.02
DATE: 25 - 29/10/2012
SHEET 1 OF 3

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
									Stickup = 0.35m
		SAND - Very loose, brown, fine grained sand with some clay and trace silt, humid		A	0.1				
				A	0.5				
	1	From 1.0m, slightly clayey, damp		S	1.0		1,1,1 N = 2		
					1.45				
	2.0	CLAYEY SAND/SANDY CLAY - (Loose), brown, fine to medium grained clayey sand/sandy clay, saturated							
	2.4	SANDY GRAVEL - Loose, brown, fine to medium grained sandy fine to medium sized subangular, subrounded gravel with some clay, saturated	CLAY	S	2.5		5,3,3 N = 6 180kPa		
	2.6			pp	2.9				
	2.9	SAND - Loose, brown, fine to medium grained sand, slightly clayey, saturated			2.95				
		SANDY CLAY - Stiff, brown, fine to medium grained sandy clay, M>Wp							
	4.0	SAND - Loose, brown, fine to medium grained sand, some to slightly clayey, saturated			4.2				
				S			3,5,4 N = 9		
					4.65				
		From 5.65m, medium dense, slightly clayey in parts		S	5.65		4,7,5 N = 12		From 0m to 11.40m, grout
					6.1				
	6.8	SILTY CLAY - Very soft, dark brown silty clay with trace fine grained sand, M>>Wp							From 0.0m to 13.3m, Class 18 PVC
				S, pp	7.0		0,0,0 N = 0 0-50kPa		
					7.45				
	8.5	CLAYEY SAND - Loose, grey, fine to medium grained clayey sand, wet to saturated			8.65				
				S, pp			3,3,3 N = 6 20-60kPa		
					9.1				
	9.5	SANDY GRAVEL - Medium dense, brown, fine to medium grained sand, fine to medium sized subangular, subrounded gravel, slightly clayey, wet							

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Fulham **CASING:** HW to 10.6m

TYPE OF BORING: Solid flight auger to 2.5m, wash bore to 12.3m, HQ to 22.72m

WATER OBSERVATIONS: Groundwater measured at 7.0m during drilling

REMARKS: At 17.18m, water loss (500L)

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
pp	Pocket penetrometer (kPa)		
V	Shear vane (kPa)		

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 2.59 AHD
EASTING: 230020
NORTHING: 6400304
DIP/AZIMUTH: 90°/--

BORE No: AGE12
PROJECT No: 49761.02
DATE: 25 - 29/10/2012
SHEET 2 OF 3

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SANDY GRAVEL - Medium dense, brown, fine to medium grained sand, fine to medium sized subangular, subrounded gravel, slightly clayey, wet *(continued)*		S	10.1 10.4		12,10,8 N = 18		
		From 11.65m, slightly clayey sand in parts		S C	11.65 11.9 12.1		8,7,12 N = 19		
	12.3 12.41 12.47	SILTSTONE - Low strength, extremely to highly weathered, grey siltstone			12.47				From 11.4m to 13.3m, bentonite
		BASALT - High to very high strength, moderately weathered, grey basalt (possible floater)							
	13.02	CORE LOSS - 0.55m		C					
		SILTSTONE - Low strength, extremely to highly weathered, grey siltstone From 13.35m, moderately weathered							
	13.92 13.97	CORE LOSS - (0.05m)			13.92				
		SILTSTONE - Medium to high strength, moderately weathered, grey siltstone							
		From 14.5m, high strength pyrite band, 7mm thick		C					
		From 15.32m, medium strength			15.32				
		From 15.74m to 15.85m, very low strength		C					
	16.26	From 16.1m, medium to high strength CORE LOSS - 2.21m							
				C	16.68				
					16.96				
				C					
					18.32				From 13.3m to 22.6m, 5mm gravel 13.4m to 22.6m, Class 18 Screen
	18.47 18.54 18.69	SILTSTONE - Low strength, highly to moderately weathered, grey siltstone							
	18.9 19.05	CORE LOSS - 0.15m SILTSTONE - Medium strength, moderately weathered, grey siltstone		C					
	19.2 19.34	CORE LOSS - 0.15m SILTSTONE - Medium strength, moderately weathered, grey siltstone							
				C	19.79				

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Fulham **CASING:** HW to 10.6m

TYPE OF BORING: Solid flight auger to 2.5m, wash bore to 12.3m, HQ to 22.72m

WATER OBSERVATIONS: Groundwater measured at 7.0m during drilling

REMARKS: At 17.18m, water loss (500L)

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
HP	Hand penetrometer (kPa)		
V	Shear vane (kPa)		

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Bylong Confidential
LOCATION: Bylong

SURFACE LEVEL: 2.59 AHD
EASTING: 230020
NORTHING: 6400304
DIP/AZIMUTH: 90°/--

BORE No: AGE12
PROJECT No: 49761.02
DATE: 25 - 29/10/2012
SHEET 3 OF 3

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		CORE LOSS - 0.14m		C	20.25				
		SILTSTONE - Medium strength, slightly weathered to fresh, grey siltstone *(continued)*		C	20.57				
		From 20.05m, medium to high strength, with some very low to low bands		C	21.23				
		From 20.52m to 20.60m, tuff band		C					End cap
	22.72	Bore discontinued at 22.72m, limit of investigation			22.72				

RIG: Total (Envirodrill) **DRILLER:** Foody **LOGGED:** Fulham **CASING:** HW to 10.6m

TYPE OF BORING: Solid flight auger to 2.5m, wash bore to 12.3m, HQ to 22.72m

WATER OBSERVATIONS: Groundwater measured at 7.0m during drilling

REMARKS: At 17.18m, water loss (500L)

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	▼	Water level
D	Disturbed sample		

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE13
PROJECT No: 49761
DATE: 4-6/12/12
SHEET 1 OF 5

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
									Stickup=0.7m
		SANDY SILT - Stiff, brown, fine to coarse grained sandy silt, M<Wp		A	0.5				
	1.1				1.0				
		SAND AND SILT - Very stiff, yellow brown slightly fine to medium sized subrounded gravelly fine to coarse grained, trace subrounded cobbles, M<Wp (moist)		S			11,10,5 N = 15 220 kPa		
	1.4			pp	1.4				
		SANDY CLAY - Very stiff, dark brown, fine to coarse grained sandy clay with some silt, M>Wp			1.45				
		From 2.0m, M>Wp		A	2.0				
	2.2								
		SANDY CLAY - Hard, fine to coarse grained, fine to medium grained sandy clay with interbedded silty clay, M<Wp (residual)			2.5				
				pp	2.7		>450 kPa		
	2.9			S			5,12,21 N = 33		
		SILTSTONE - Extremely low strength, extremely weathered, grey siltstone (soil like properties)			2.95				
				A	3.5				
				S	4.0		15,140mm, ref, bouncing		
		From 4.14m, carbonaceous siltstone, interbedded fine grained sandstone			4.14				
				C					
	5.1	CORE LOSS - 0.53m			5.1				
				C					
	5.63	SILTSTONE - Medium strength, slightly weathered, grey siltstone with interbedded fine to medium grained sandstone			5.77				
				C					
		At 5.89m, extremely weathered carbonaceous siltstone / coal lense			6.1				
				C					
	8.7	SANDSTONE - High strength, fresh, yellow brown, medium grained sandstone			9.1				
				C					

RIG: Hydropower Scout **DRILLER:** (Total) Wakeman **LOGGED:** Semmler **CASING:** HW to 4.5m
TYPE OF BORING: Solid flight auger to 4.0m, rock roller blade bit wash boring to ????, HQ3 coring to 45.21m
WATER OBSERVATIONS: Free groundwater observations obscured due to drilling fluids
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PP	Pocket penetrometer (kPa)
D	Disturbed sample	S	Standard penetration test
E	Environmental sample	V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE13
PROJECT No: 49761
DATE: 4-6/12/12
SHEET 2 OF 5

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SANDSTONE - High strength, fresh, yellow brown, medium grained sandstone *(continued)*		C					
	11	From 11.0m, medium to coarse grained			11.05				
				C					
	12				12.12				
	13	From 13.17m, coarse grained							
		At 13.59m to 13.61m, conglomerate band		C					
	14								
	15				15.15				
	16								
				C					
	17								From 0m to 34.5m, backfill/cuttings
	18								
	18.14	SILTSTONE - High strength, fresh, dark grey siltstone with interbedded carbonaceous siltstone and thin coal laminations			18.13				
	19			C					
	19.15	COAL / CARBONACEOUS SILTSTONE - Fresh, dark brown coal / carbonaceous siltstone At 19.49m to 19.62m, siltstone band							

RIG: Hydropower Scout **DRILLER:** (Total) Wakeman **LOGGED:** Semmler **CASING:** HW to 4.5m
TYPE OF BORING: Solid flight auger to 4.0m, rock roller blade bit wash boring to ????, HQ3 coring to 45.21m
WATER OBSERVATIONS: Free groundwater observations obscured due to drilling fluids
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Tube sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
I	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE13
PROJECT No: 49761
DATE: 4-6/12/12
SHEET 3 OF 5

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	20.12	TUFFACEOUS CLAYSTONE - Medium strength, fresh, pale grey tuffaceous claystone							
	20.34	CARBONACEOUS SILTSTONE / COAL - High strength, fresh, dark brown coal / carbonaceous siltstone		C					
	21	At 20.86m to 20.89m, tuffaceous claystone / siltstone							
		At 21.16m to 21.19m, tuffaceous siltstone / claystone			21.16				
	22	At 22.38m to 22.54m, carbonaceous siltstone / coal		C					
	22.8	SANDSTONE / SILTSTONE - High strength, fresh, grey to dark grey, fine to medium grained sandstone / siltstone							
	23	Gtom 23.6m to 23.98m, siltstone band							
	24	At 23.98m to 24.62m, carbonaceous siltstone / coal			24.17				
	25			C					
	26								
	27				27.13				
	28	At 28.10m to 28.55m, carbonaceous siltstone / coal		C					
	29								
	29.89								

RIG: Hydropower Scout **DRILLER:** (Total) Wakeman **LOGGED:** Semmler **CASING:** HW to 4.5m
TYPE OF BORING: Solid flight auger to 4.0m, rock roller blade bit wash boring to ????, HQ3 coring to 45.21m
WATER OBSERVATIONS: Free groundwater observations obscured due to drilling fluids
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	▼	Water level

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE13
PROJECT No: 49761
DATE: 4-6/12/12
SHEET 4 OF 5

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		COAL - High strength, fresh, dark brown to black coal with interbedded carbonaceous siltstone *(continued)*		C	30.16				
	31								31
	31.27	TUFFACEOUS CLAYSTONE - Medium strength, fresh,							
	31.45	pale grey tuffaceous claystone							
		COAL - High strength, fresh, dark brown to black coal with interbedded carbonaceous siltstone		C					
	32	At 31.52m to 31.53m, tuffaceous claystone							32
	32.24	At 31.57m to 31.62m, tuffaceous claystone							
		At 32.14m to 32.15m, tuffaceous claystone							
		At 32.17m to 32.19m, siderite?							
	32.92	TUFFACEOUS CLAYSTONE - Medium strength, fresh,							
	33	pale grey, tuffaceous claystone							33
		COAL - Medium to high strength, fresh, dark brown coal with interbedded carbonaceous siltstone			33.2				
		At 33.73m to 33.78m, tuffaceous claystone							
	34								34
	34.47	TUFFACEOUS SANDSTONE / SILTSTONE - High strength, fresh, pale grey to grey, tuffaceous fine to		C					
		medium grained sandstone / siltstone							
	35 35.0	From 34.8m, tuffaceous siltstone / claystone							35
		SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone							
									From 34.5m to 37.1m, bentonite
	36								36
	36.22	SANDSTONE - High strength, fresh, grey, medium grained sandstone with interbedded siltstone			36.22				
	37								37
		From 37.62m, coarse grained sandstone with interbedded pebbly sandstone		C					
	38								38
	38.58	COAL - High strength, fresh, dark brown to black, coal							
	39								39
					39.22				
		At 39.53m, tuffaceous siltstone (tuffaceous siltstone -5mm)		C					

RIG: Hydropower Scout **DRILLER:** (Total) Wakeman **LOGGED:** Semmler **CASING:** HW to 4.5m
TYPE OF BORING: Solid flight auger to 4.0m, rock roller blade bit wash boring to ????, HQ3 coring to 45.21m
WATER OBSERVATIONS: Free groundwater observations obscured due to drilling fluids
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Tube sample
B	Bulk sample	W	Water sample
C	Core drilling		
D	Disturbed sample		

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Geotechnics | Environment | Groundwater

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE13
PROJECT No: 49761
DATE: 4-6/12/12
SHEET 5 OF 5

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		At 39.89m, tuffaceous siltstone - 10mm COAL - High strength, fresh, dark brown to black, coal *(continued)*							From 37.6m to 43.6m, Class 18 PVC Screen From 37.1m to 45.1m, 5mm gravel
41		At 40.9m, tuffaceous siltstone - 5 mm		C					
		At 41.3m, tuffaceous siltstone - 5mm							
42	42.1	SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone			42.21				
43				C					
44		From 43.95m, interbedded coarse grained sandstone							End cap
45	45.21	Bore discontinued at 45.21m, limit of investigation			45.21				
46									
47									
48									
49									

RIG: Hydropower Scout **DRILLER:** (Total) Wakeman **LOGGED:** Semmler **CASING:** HW to 4.5m
TYPE OF BORING: Solid flight auger to 4.0m, rock roller blade bit wash boring to ????, HQ3 coring to 45.21m
WATER OBSERVATIONS: Free groundwater observations obscured due to drilling fluids
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
		DP	Dynamic penetrometer (blows per 100mm)
		HP	Hand penetrometer (kPa)
		SP	Standard penetration test
		V	Shear vane (kPa)

Douglas Partners
Geotechnics | Environment | Groundwater

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE13W
PROJECT No: 49761
DATE: 4-6/12/12
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SANDY SILT - Stiff, brown, fine to coarse grained sandy silt, M<Wp		A	0.5				Stickup=0.55m
	1.1	SAND AND SILT - Very stiff, yellow brown slightly fine to medium sized subrounded gravelly fine to coarse grained, trace subrounded cobbles, M<Wp (moist)		S	1.0		11,10,5 N = 15 220 kPa		From 0m to 2.5m, grout
	1.4	SANDY CLAY - Very stiff, dark brown, fine to coarse grained sandy clay with some silt, M>Wp		pp	1.4 1.45				
		From 2.0m, M>Wp		A	2.0				
	2.2	SANDY CLAY - Hard, fine to coarse grained, fine to medium grained sandy clay with interbedded silty clay, M<Wp (residual)			2.5				
				pp S	2.7 2.95		>450 kPa 5,12,21 N = 33		
	2.9	SILTSTONE - Extremely low strength, extremely weathered, grey siltstone (soil like properties)		A	3.5				From 2.5m to 4.05m, bentonite
		From 4.14m, carbonaceous siltstone, interbedded fine grained sandstone		S	4.0 4.14		15,140mm, ref, bouncing		
	5.1	CORE LOSS - 0.53m							
	5.63	SILTSTONE - Medium strength, slightly weathered, grey siltstone with interbedded fine to medium grained sandstone At 5.89m, extremely weathered carbonaceous siltstone / coal lense							
	8.7	SANDSTONE - High strength, fresh, yellow brown, medium grained sandstone							From 4.05m to 14.1m, 2/5mm gravel From 4.1m to 14.1m, Class 18 PVC Screen

RIG: Hydropower Scout **DRILLER:** (Total) Wakeman **LOGGED:** Semmler **CASING:** HW to 4.5m
TYPE OF BORING: Solid flight auger to 4.0m
WATER OBSERVATIONS: Free groundwater observations obscured due to drilling fluids
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PP	Pocket penetrometer (kPa)
E	Environmental sample	V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: AGE13W
PROJECT No: 49761
DATE: 4-6/12/12
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SANDSTONE - High strength, fresh, yellow brown, medium grained sandstone *(continued)*							
	11	From 11.0m, medium to coarse grained							
	12								
	13	From 13.17m, coarse grained At 13.59m to 13.61m, conglomerate band							
	14								End cap
	14.1	Bore discontinued at 14.1m, limit of investigation							
	15								
	16								
	17								
	18								
	19								

RIG: Hydropower Scout **DRILLER:** (Total) Wakeman **LOGGED:** Semmler **CASING:** HW to 4.5m
TYPE OF BORING: Solid flight auger to 4.0m
WATER OBSERVATIONS: Free groundwater observations obscured due to drilling fluids
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
		SPT	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 229442
NORTHING: 6406005
DIP/AZIMUTH: 90°/--

BORE No: AGE14
PROJECT No: 49761
DATE: 4/12/2013
SHEET 1 OF 6

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SILTY SAND - (Loose), brown, fine grained silty sand, dry		A	0.1				
				A	0.25				
		From 0.5m to 1.5m, some coarse grained sand and trace fine to medium sized subangular/subrounded gravel		A	0.5				
	1	From 1.0m, dense			1.0				1
				S			10,15,20 N = 35		
		At 1.45m, sandstone cobbles			1.45				
					1.5				
				U_{75}					
				PP	1.67		>400 kPa		
	1.8	CLAY - (Hard), red/brown clay with some fine grained sand and trace fine sized gravel, M<<Wp							
	2								2
					2.5				
				S			17,27/150mm refusal		
					2.8				
	3				3.0				3
	4			D					4
	4.8				4.8				
				D					

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 3.25m, HW to 7.5m

TYPE OF BORING: Solid flight auger to 2.5m, HQ to 6.0m, rotary to 8.0m, HQ to 27.01m

WATER OBSERVATIONS: Free groundwater measured at 22.5m during drilling

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Core sample
B	Bulk sample	W	Water sample
C	Core drilling		
D	Disturbed sample	▽	Water level

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 229442
NORTHING: 6406005
DIP/AZIMUTH: 90°/--

BORE No: AGE14
PROJECT No: 49761
DATE: 4/12/2013
SHEET 2 OF 6

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		GRAVEL - (Medium dense), brown, fine to medium sized subangular/subrounded gravel with trace clay, humid *(continued)*		D					
6	6.0	CLAY - Hard, red/brown clay with trace fine to medium sized gravel, M<<Wp			6.0				6
				S			12,20,25/100mm refusal		
					6.4				
		From 6.5m, some weathered siltstone cobbles up to 30mm in diameter			6.5				
				S			12,28/115mm refusal		
					6.77				
7									7
	7.6	SILTSTONE - Very low to low strength, highly weathered, brown and grey siltstone		S	7.6 7.66		20/90mm refusal bouncing		
				S	7.85 7.86		8/10mm refusal bouncing		
8	8.0	SILTSTONE - Extremely low to very low strength, extremely to highly weathered, brown siltstone			8.0				8
	8.12	CORE LOSS - 0.18m (8.12m to 8.30m)							
	8.3	SILTSTONE - Very low strength, highly weathered, brown siltstone		C					
					8.58		PL(A) = 0.05 PL(D) = 0.03		
					8.8				
9					8.97		PL(A) = 0.69		9
		From 9.09m, slightly weathered							
		From 9.3m, medium strength		C	9.34		PL(A) = 0.77		
	9.45	SANDSTONE - Medium strength, slightly weathered, light brown, fine grained sandstone							
					9.63		PL(A) = 4.41 PL(D) = 0.63		
					9.8				
				C					

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 3.25m, HW to 7.5m

TYPE OF BORING: Solid flight auger to 2.5m, HQ to 6.0m, rotary to 8.0m, HQ to 27.01m

WATER OBSERVATIONS: Free groundwater measured at 22.5m during drilling

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
V	Shear vane (kPa)		

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 229442
NORTHING: 6406005
DIP/AZIMUTH: 90°/--

BORE No: AGE14
PROJECT No: 49761
DATE: 4/12/2013
SHEET 3 OF 6

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SANDSTONE - Medium strength, slightly weathered, light brown, fine grained sandstone *(continued)*							
		From 10.0m, high strength, fresh			10.2		PL(D) = 2.91		
					10.4		PL(A) = 2.99		
	10.46	LAMINITE - High strength, fresh stained, grey and light grey, fine grained laminite							
		From 10.77m, fresh							
	11			C					11 From 0.0m to 22.0m, grout From -0.541m to 22.7m, Class 18 blank
					11.31		PL(A) = 2.8		
	12				11.97				12
		From 12.1m, coarse grained mudstone							
	12.3	COAL - Medium strength, fresh, black coal							
					12.63		PL(A) = 1		
	12.68	SILTSTONE - High strength, fresh, dark grey siltstone							
					12.88		PL(A) = 0.85		
	13	From 13.02m to 13.66m, interbedded with fine grained sandstone bands up to 50mm thick							13
					13.3		PL(A) = 2.08 PL(D) = 1.37		
				GT001 C	13.3				
					13.49				
					13.69		PL(A) = 1.63		
	14	From 14.0m, medium strength, carbonaceous							14
					14.11		PL(A) = 0.96		
	14.36	COAL - Medium to high strength, fresh black coal							
					14.53		PL(A) = 0.89		
					14.99				

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 3.25m, HW to 7.5m

TYPE OF BORING: Solid flight auger to 2.5m, HQ to 6.0m, rotary to 8.0m, HQ to 27.01m

WATER OBSERVATIONS: Free groundwater measured at 22.5m during drilling

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
BLK	Block sample	pp	Pocket penetrometer (kPa)
C	Core drilling	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 229442
NORTHING: 6406005
DIP/AZIMUTH: 90°/--

BORE No: AGE14
PROJECT No: 49761
DATE: 4/12/2013
SHEET 4 OF 6

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		COAL - Medium to high strength, fresh black coal *(continued)*			14.99				
					15.4		PL(A) = 1.15		
		From 15.61m to 15.84m, tuff band							
	16								16
				C	16.5		PL(A) = 2.53		
		From 16.84m to 17.04m, medium strength, tuff band							
	17				16.95		PL(A) = 0.54		17
	17.6	From 17.55m, very low strength, tuff							
		TUFF - High strength, fresh, light grey tuff			17.8		PL(A) = 1.47		
	18 18.0				17.99				18
		COAL - Very high strength, fresh, black coal			18.05		PL(A) = 3.36		
	19			C					19
	19.05	SILTSTONE - High strength, fresh, grey siltstone with some fine grained sandstone bands up to 50mm thick							
					19.3		PL(A) = 2.49		

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 3.25m, HW to 7.5m

TYPE OF BORING: Solid flight auger to 2.5m, HQ to 6.0m, rotary to 8.0m, HQ to 27.01m

WATER OBSERVATIONS: Free groundwater measured at 22.5m during drilling

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Tube sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
I	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 229442
NORTHING: 6406005
DIP/AZIMUTH: 90°/--

BORE No: AGE14
PROJECT No: 49761
DATE: 4/12/2013
SHEET 5 OF 6

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SILTSTONE - High strength, fresh, grey siltstone with some fine grained sandstone bands up to 50mm thick *(continued)*		C	20.5 20.55		PL(A) = 2.87 PL(D) = 1.25		
	20.66	SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone with some siltstone laminations		GT002	20.8				
	21				21.0				21
		From 21.6m, medium to coarse grained			21.51		PL(A) = 1.65 PL(D) = 1.69		
	22				22.2				22
				GT003					From 22.0m to 22.4m, bentonite
				C	22.48 22.55		PL(A) = 0.78 PL(D) = 0.77		
	22.72	COAL - Medium strength, fresh, black coal			22.85		PL(A) = 0.66 PL(D) = 0.32		
	23								23
	24				24.01				24
		From 24.2m, high strength							From 22.4m to 25.7m, gravel From 22.7m to 25.7m, Class 18 screen
				C	24.44		PL(A) = 1.39		

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 3.25m, HW to 7.5m

TYPE OF BORING: Solid flight auger to 2.5m, HQ to 6.0m, rotary to 8.0m, HQ to 27.01m

WATER OBSERVATIONS: Free groundwater measured at 22.5m during drilling

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
HP	Hand penetrometer (kPa)		
R	Rock core		
V	Shear vane (kPa)		

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 229442
NORTHING: 6406005
DIP/AZIMUTH: 90°/--

BORE No: AGE14
PROJECT No: 49761
DATE: 4/12/2013
SHEET 6 OF 6

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		COAL - Medium strength, fresh, black coal *(continued)*			25.45		PL(A) = 1.68		
	25.67	SANDSTONE - High strength, fresh, grey, coarse grained sandstone							
	26			C					26
					26.25				
				GT004	26.4		PL(A) = 1.71 PL(D) = 1.78		From 25.7m to 27.0m, Class 18 blank From 25.7m to 27.0m, bentonite
					26.49				
					26.79		PL(A) = 0.08		
	27 27.01	Bore discontinued at 27.01m , limit of investigation			27.01				End cap 27
	28								28
	29								29

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 3.25m, HW to 7.5m

TYPE OF BORING: Solid flight auger to 2.5m, HQ to 6.0m, rotary to 8.0m, HQ to 27.01m

WATER OBSERVATIONS: Free groundwater measured at 22.5m during drilling

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Tube sample
B	Bulk sample	W	Water sample
BLK	Block sample	PID	Photo ionisation detector (ppm)
C	Core drilling	PL(A)	Point load axial test Is(50) (MPa)
D	Disturbed sample	PL(D)	Point load diametral test Is(50) (MPa)
E	Environmental sample	DP	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 229851
NORTHING: 6405267
DIP/AZIMUTH: 90°/--

BORE No: AGE15
PROJECT No: 49761
DATE: 3/12/2013
SHEET 1 OF 7

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SANDY SILT - (Loose), brown, fine grained sandy silt, dry to humid		A	0.1				
				A	0.25				
				A	0.5				
1	1.0	CLAY - Hard (dry), red/brown clay with some fine grained sand and some silt, M<<Wp			1.0				1
				S			13,23/150 refusal		
					1.3				
					1.5				
				U_{75}					
				pp	1.65		>400 kPa		
2									2
		From 2.5m, trace fine sized gravel			2.5				
				S			21,28/150 refusal		
					2.8				
3					3.0				3
				U_{75}					
				pp	3.11		>400 kPa		
4					4.0				4
				S			12,18,19 N = 37		
					4.45				

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 7.2m

TYPE OF BORING: Solid flight auger to 7.0m, rotary to 7.8m, HQ to 30.34m

WATER OBSERVATIONS: No free groundwater observed

REMARKS: 20% water loss at 11.24m, 100% water loss at 11.94m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Core sample
B	Bulk sample	W	Water sample
C	Core drilling		
D	Disturbed sample	▽	Water level

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 229851
NORTHING: 6405267
DIP/AZIMUTH: 90°/--

BORE No: AGE15
PROJECT No: 49761
DATE: 3/12/2013
SHEET 2 OF 7

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		CLAY - Hard (dry), red/brown clay with some fine grained sand and some silt, M<<Wp *(continued)*							
		From 5.5m, grading to rock		S	5.5		15,25/120mm refusal		
					5.77				
6									6
									From 0.0m to 12.6m, grout
									From -0.503m to 13.9m, Class 18 blank
	6.8	SANDSTONE - Low strength, highly weathered, brown fine grained sandstone with some fine sized gravel bands							
7				S	7.0		15,24,25/130 refusal		7
					7.43				
	7.8	CORE LOSS - 0.45m (7.80m to 8.25m)			7.8				
8									8
	8.25	SANDSTONE - Extremely low to very low strength, extremely to highly weathered, brown, fine to medium grained sandstone		C	8.43		PL(A) = 0.02		
					8.85		PL(A) = 0.24		
					8.93		PL(D) = 0.15		
9									9
	9.1	From 9.04m, extremely weathered		C					
		CORE LOSS - 0.29m (9.1m to 9.39m)							
	9.39								
	9.43	WEATHERED COAL - Extremely low strength, extremely weathered, friable, dark brown coal			9.42		PL(A) = 0.01		
	9.48				9.45				
	9.65	SILTSTONE - Medium strength, moderately weathered, brown siltstone		C	9.72		PL(A) = 1.05		
		From 9.47m, weathered coal							
		CORE LOSS - 0.17m (9.48m to 9.65m)							

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 7.2m

TYPE OF BORING: Solid flight auger to 7.0m, rotary to 7.8m, HQ to 30.34m

WATER OBSERVATIONS: No free groundwater observed

REMARKS: 20% water loss at 11.24m, 100% water loss at 11.94m

SAMPLING & IN SITU TESTING LEGEND

A Auger sample — U Tube sample — PID Photo ionisation detector
B Bulk sample — W Water sample — PL(A) Point load axial test Is(50) (MPa)
BLK Block sample — U Tube sample (x mm dia.) — PL(D) Point load diametral test Is(50) (MPa)
C Core drilling — W Water sample — DP Perth penetrometer (kPa)
D Disturbed sample — Water seep — S Standard penetration test
E Environmental sample — Water level — V Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 229851
NORTHING: 6405267
DIP/AZIMUTH: 90°/--

BORE No: AGE15
PROJECT No: 49761
DATE: 3/12/2013
SHEET 3 OF 7

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SILTSTONE - High strength, moderately weathered, brown siltstone *(continued)*			10.15		PL(A) = 0.8		
	10.4	SANDSTONE - Medium strength, moderately weathered, brown, fine to medium grained sandstone							
	11			C	10.9		PL(A) = 0.95		11
		From 11.25m, slightly weathered			11.5		PL(A) = 0.53		
	12				12.0				12
		From 12.2m, moderately weathered							
		From 12.72m, slightly weathered			12.82		PL(A) = 1.02		
	13	From 12.97m, coarse grained		C					13 From 12.6m to 13.3m, bentonite
					13.67		PL(A) = 0.76 PL(D) = 0.59		
	14								14
	14.05	From 13.99m, highly weathered			14.03				
		WEATHERED COAL - Extremely low strength, extremely weathered, friable, dark brown and red weathered coal			14.28		PL(A) = 0.04		
		From 14.2m, very low strength		C					
		From 14.85m, extremely low strength							
	15.0				15.0				

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 7.2m
TYPE OF BORING: Solid flight auger to 7.0m, rotary to 7.8m, HQ to 30.34m
WATER OBSERVATIONS: No free groundwater observed
REMARKS: 20% water loss at 11.24m, 100% water loss at 11.94m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
		DP	Perth sand penetrometer (blows/300mm)
		HP	Hand penetrometer (kPa)
		SPT	Standard penetration test
		V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 229851
NORTHING: 6405267
DIP/AZIMUTH: 90°/--

BORE No: AGE15
PROJECT No: 49761
DATE: 3/12/2013
SHEET 4 OF 7

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		CORE LOSS - 0.13m (15.0m to 15.13m)			15.0				
	15.13	SANDSTONE - Medium strength, moderately to slightly weathered, brown and grey, fine to medium grained sandstone			15.28		PL(A) = 1.24		
		From 15.27m, high strength							
	16	From 16.0m, some very low strength bands up to 20mm thick		C	16.55		PL(A) = 1.83		16
					16.86		PL(A) = 1.9		
	17	From 17.21m, very high strength, fresh, light grey, (possibly heat affected)							17
	18				17.95		PL(A) = 3.18		18
					18.0				
					18.6		PL(A) = 5.36 PL(D) = 3.81		
	19			C	19.08		PL(A) = 1.93 PL(D) = 1.96		19
	19.2	MUDSTONE - Medium strength, fresh stained, brown mudstone			19.48		PL(A) = 0.96		
					19.7				
				C					

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 7.2m
TYPE OF BORING: Solid flight auger to 7.0m, rotary to 7.8m, HQ to 30.34m
WATER OBSERVATIONS: No free groundwater observed
REMARKS: 20% water loss at 11.24m, 100% water loss at 11.94m

SAMPLING & IN SITU TESTING LEGEND

A Auger sample — U Tube sample — PID Photo ionisation detector (ppm)
B Bulk sample — W Water sample — PL(A) Point load axial test Is(50) (MPa)
BLK Block sample — (x) Tube sample (x mm dia.) — PL(D) Point load diametral test Is(50) (MPa)
C Core drilling — W Water sample — DP Pocket penetrometer (kPa)
D Disturbed sample — ▽ Water seep — S Standard penetration test
E Environmental sample — ▼ Water level — V Shear vane (kPa)

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 229851
NORTHING: 6405267
DIP/AZIMUTH: 90°/--

BORE No: AGE15
PROJECT No: 49761
DATE: 3/12/2013
SHEET 5 OF 7

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		MUDSTONE - Medium strength, fresh stained, brown mudstone *(continued)*			20.08		PL(A) = 1.72		
		From 20.0m, high strength							
		From 20.38m to 20.6m, fine to medium grained sandstone band		C	20.38		PL(A) = 1.95 PL(D) = 1.12		
					20.81		PL(A) = 1.32		
	21				20.99				21
	21.14	SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone with some mudstone from 21.57m to 22.72m							
					21.44		PL(A) = 1.9 PL(D) = 1.09		From 13.3m to 30.34m, gravel
	22								22
					22.12		PL(A) = 1.99		From 13.9m to 30.34m, Class 18 machine slotted
				C					
		From 22.8m, very high strength							
	23								23
					23.23		PL(A) = 4.23 PL(D) = 3.23		
	24				24.02				24
					24.18		PL(D) = 14.16		
				C					
	24.74	MUDSTONE - High strength, fresh, dark grey mudstone							

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 7.2m
TYPE OF BORING: Solid flight auger to 7.0m, rotary to 7.8m, HQ to 30.34m
WATER OBSERVATIONS: No free groundwater observed
REMARKS: 20% water loss at 11.24m, 100% water loss at 11.94m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Tube sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
I	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 229851
NORTHING: 6405267
DIP/AZIMUTH: 90°/--

BORE No: AGE15
PROJECT No: 49761
DATE: 3/12/2013
SHEET 6 OF 7

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		MUDSTONE - High strength, fresh, dark grey mudstone *(continued)*			25.13		PL(A) = 1.93		
	25.44	SILTSTONE - Very high strength, fresh, light grey siltstone							
	26			C	26.0		PL(A) = 3.12		26
		From 26.45m to 26.55m, high strength tuff			26.51		PL(A) = 1.25		
		From 26.55m, grey			26.83		PL(A) = 1.57 PL(D) = 1.06		
	27				26.97				27
		From 27.32m, very high strength with some interbedded sandstone laminations up to 30mm thick							
	28				27.95		PL(A) = 3.2		28
				C					
	28.65	SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone							
					28.9		PL(A) = 1.47		
	29								29
	29.66	MUDSTONE - High strength, fresh, grey mudstone							
					29.95		PL(A) = 1.18		

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 7.2m
TYPE OF BORING: Solid flight auger to 7.0m, rotary to 7.8m, HQ to 30.34m
WATER OBSERVATIONS: No free groundwater observed
REMARKS: 20% water loss at 11.24m, 100% water loss at 11.94m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
HP	Hand penetrometer (kPa)		
S	Standard penetration test		
V	Shear vane (kPa)		

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 229851
NORTHING: 6405267
DIP/AZIMUTH: 90°/--

BORE No: AGE15
PROJECT No: 49761
DATE: 3/12/2013
SHEET 7 OF 7

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		MUDSTONE - High strength, fresh, grey mudstone *(continued)*		C	29.99 29.99		PL(D) = 1.14		
	30.34	Bore discontinued at 30.34m , limit of investigation			30.34				End cap
	31								
	32								
	33								
	34								

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 7.2m

TYPE OF BORING: Solid flight auger to 7.0m, rotary to 7.8m, HQ to 30.34m

WATER OBSERVATIONS: No free groundwater observed

REMARKS: 20% water loss at 11.24m, 100% water loss at 11.94m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
V	Shear vane (kPa)		

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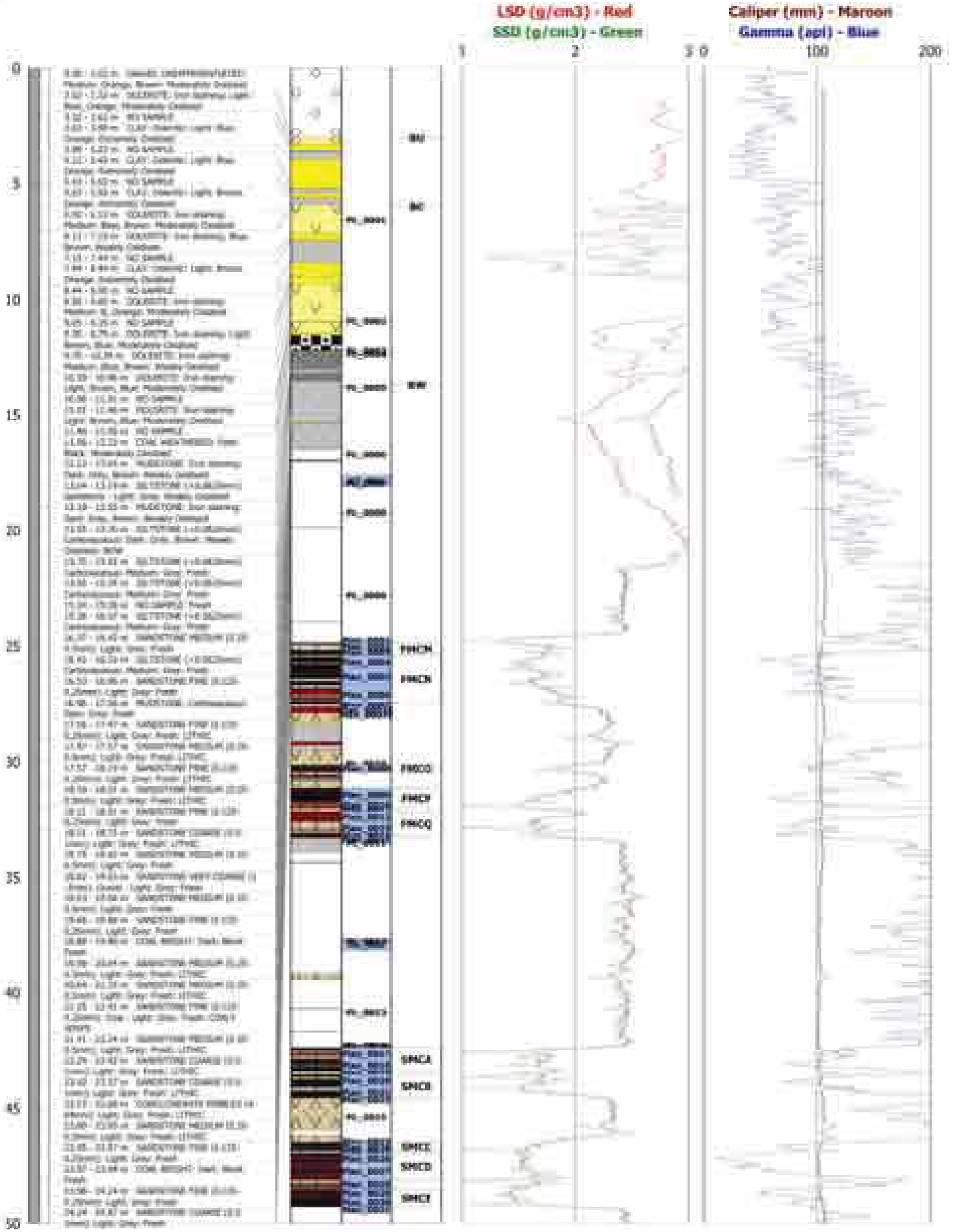
Geotechnics | Environment | Groundwater

Bylong: Drillhole Summary

Hole Number: BY0001CH **Hole Type:** Part Open/Core Drilling
Date: 10/05/2011 **Tenement:** AUTH287
Total Depth: 200.44 m **Area:** Bylong Station

MGA94_56S
Easting: 233576.58
Northing: 6409320.64
Height: 375.40



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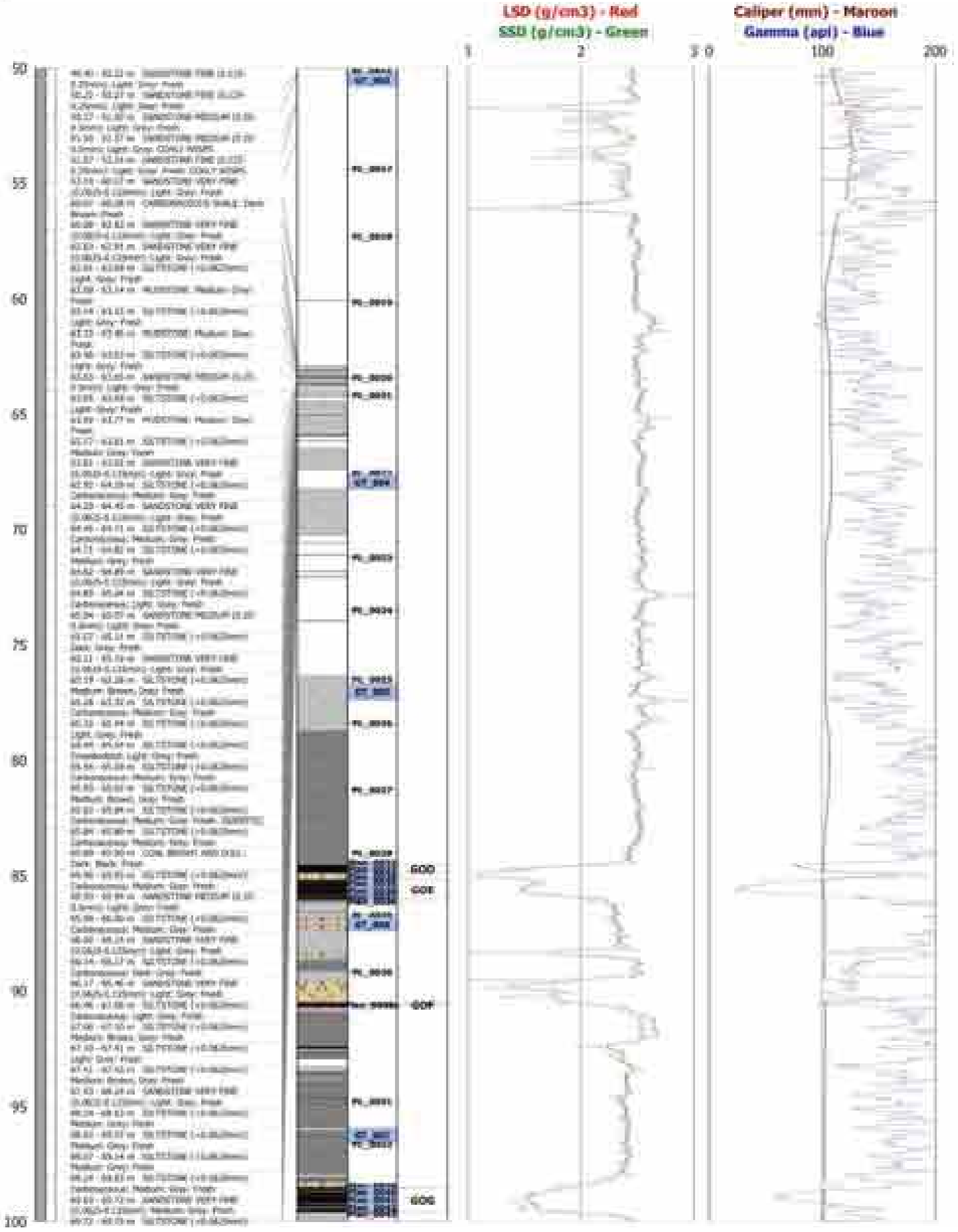

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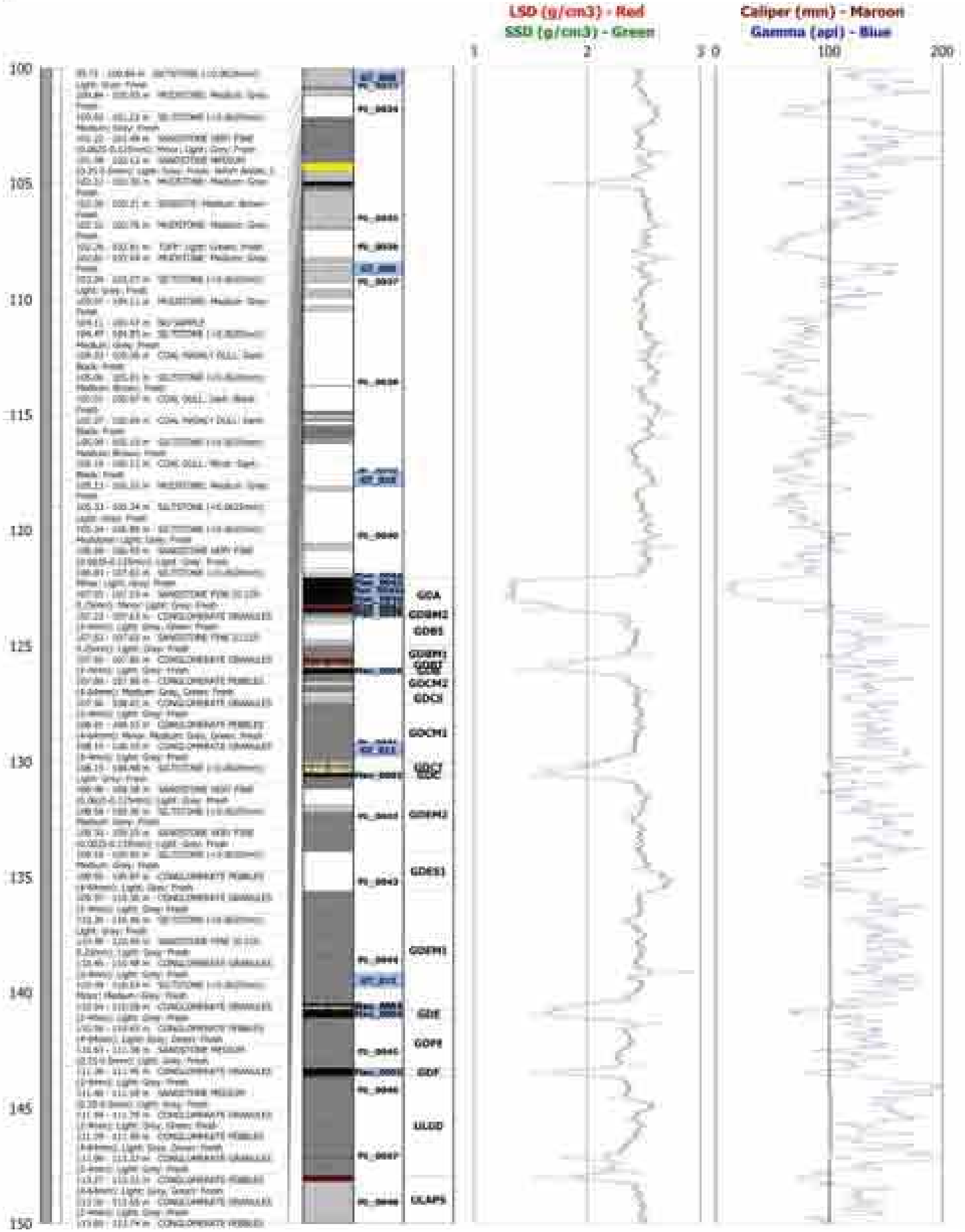

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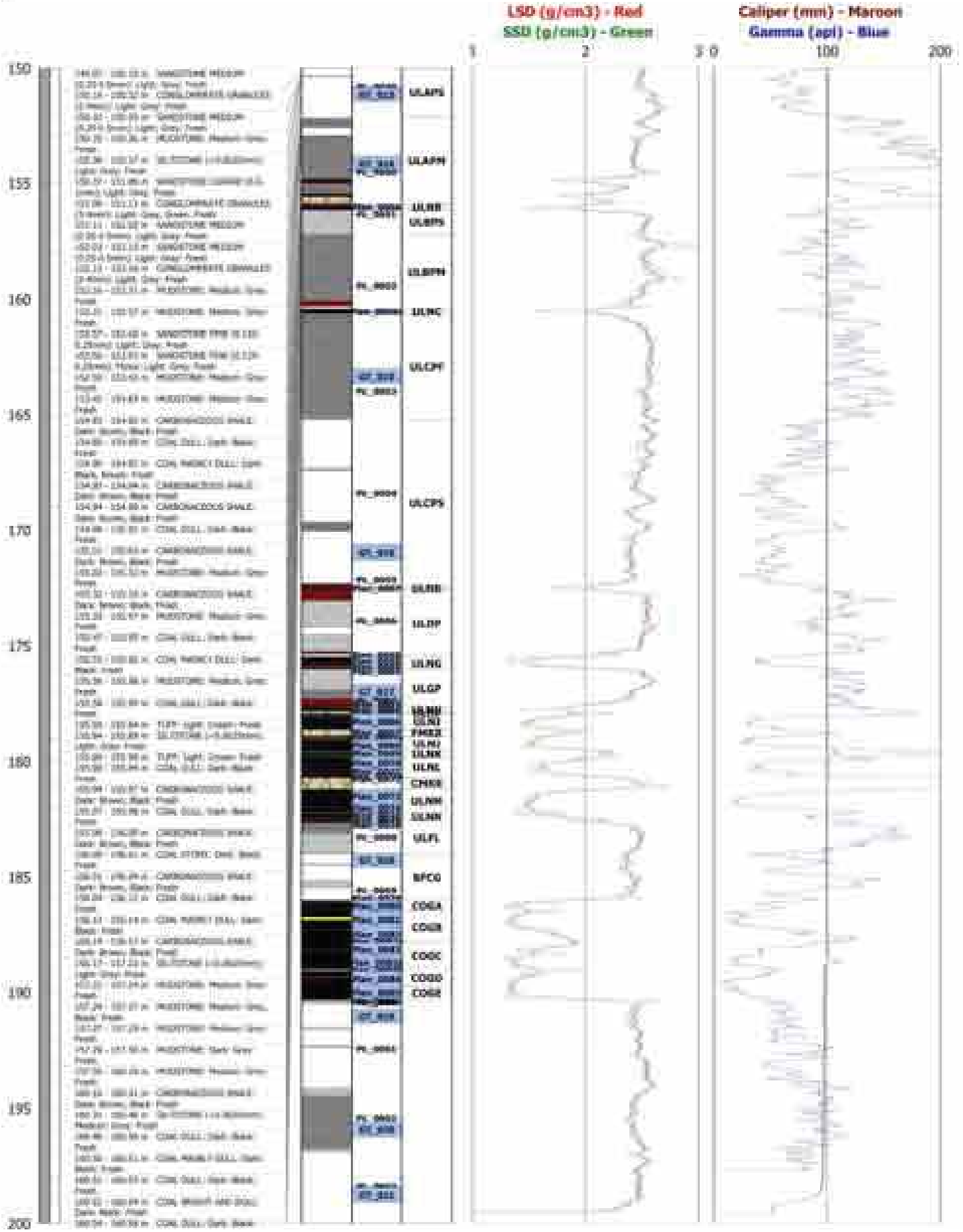

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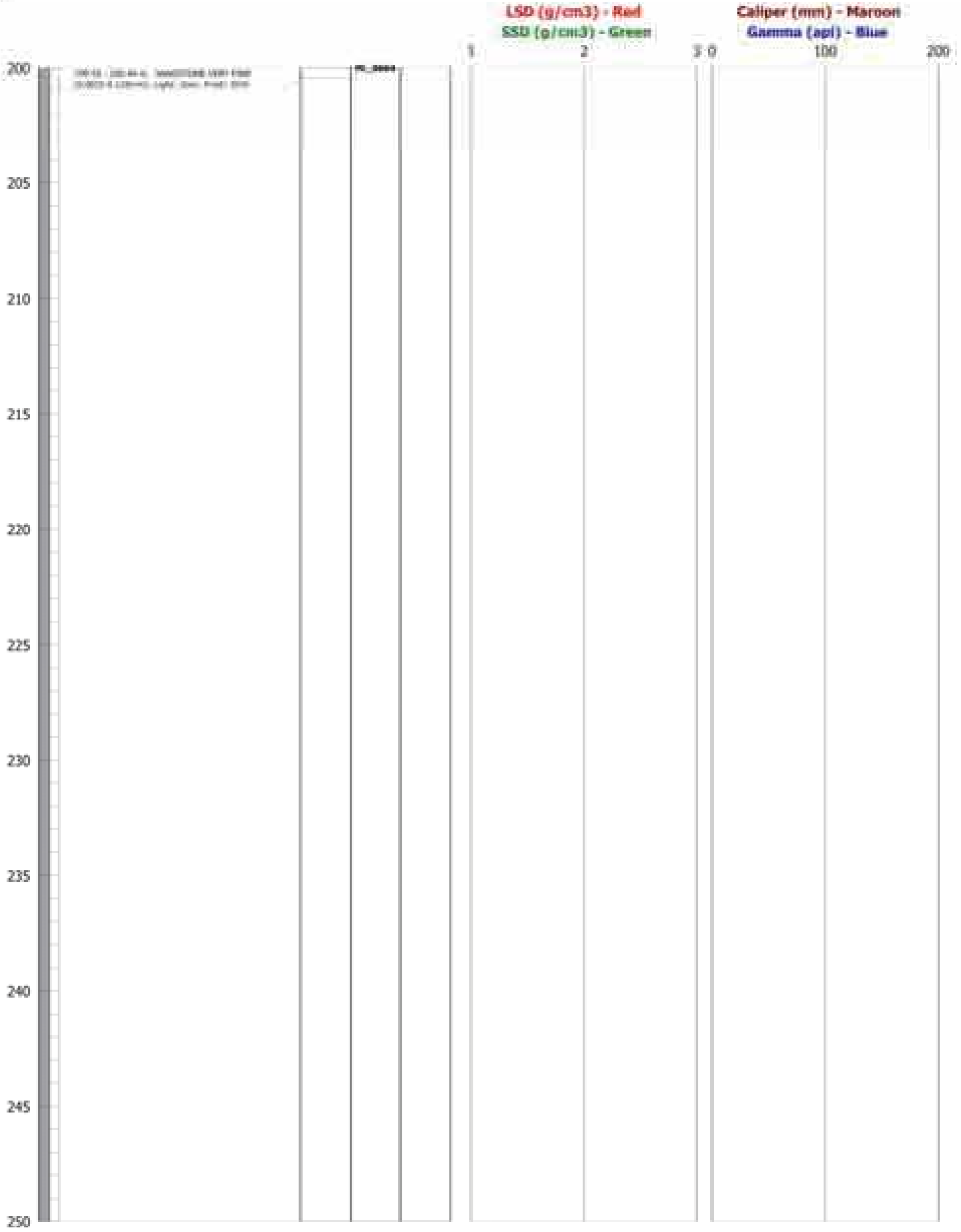
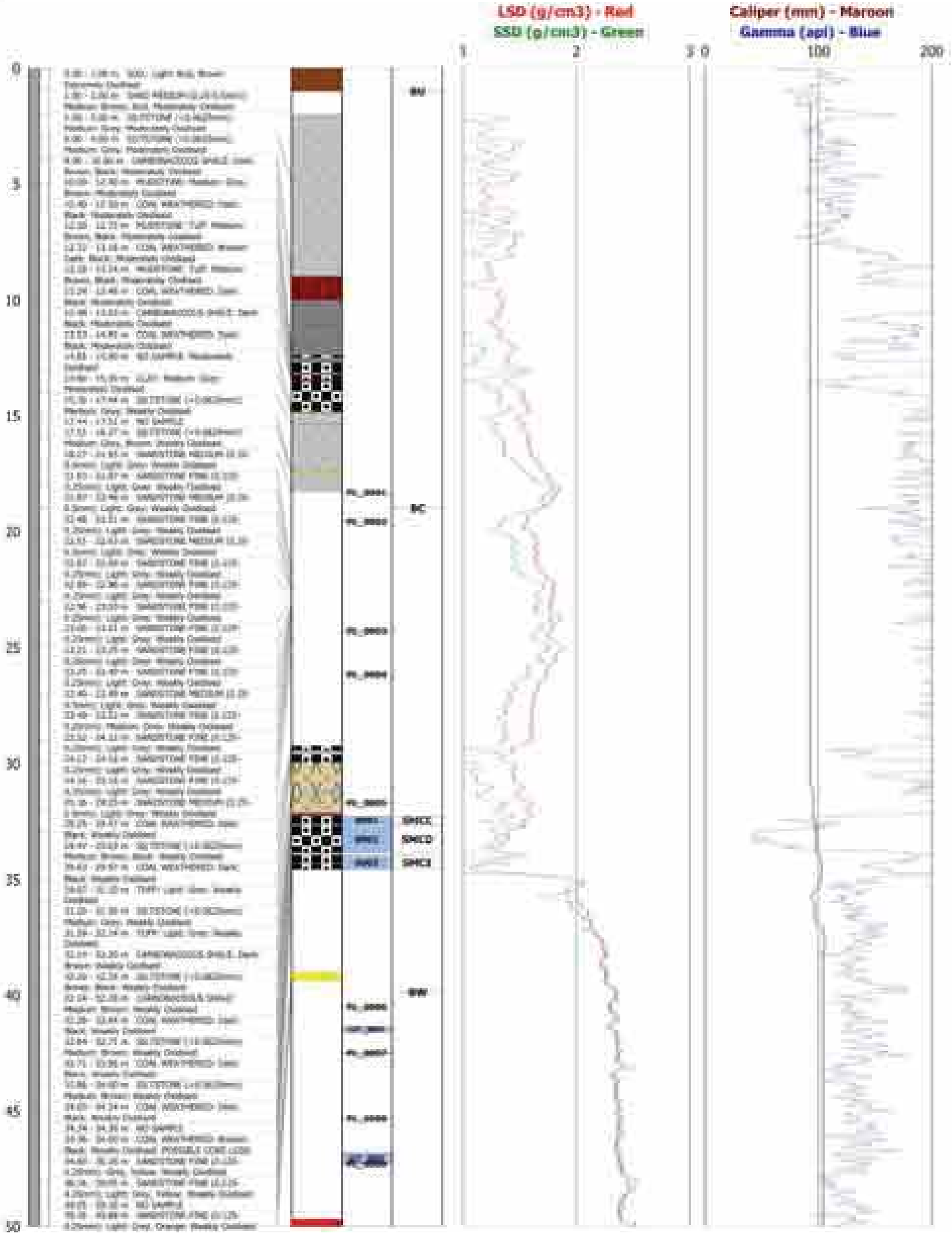


Bylong: Drillhole Summary

Hole Number: BY0007CH **Hole Type:** Part Open/Core Drilling
Date: 6/06/2011 **Tenement:** AUTH287
Total Depth: 186.64 m **Area:** Bylong Station

MGA94_56S
Easting: 230443.17
Northing: 6410217.64
Height: 368.69



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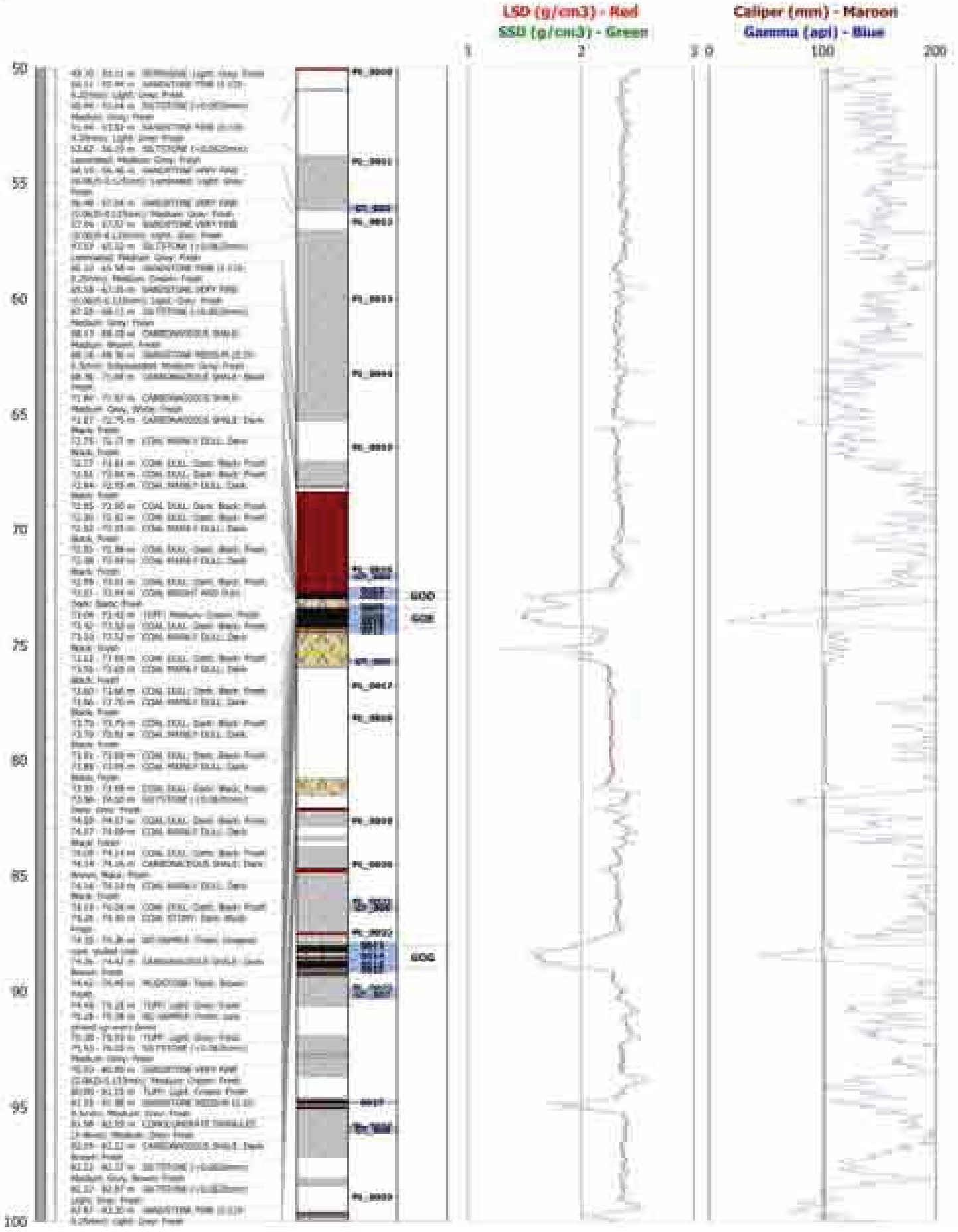

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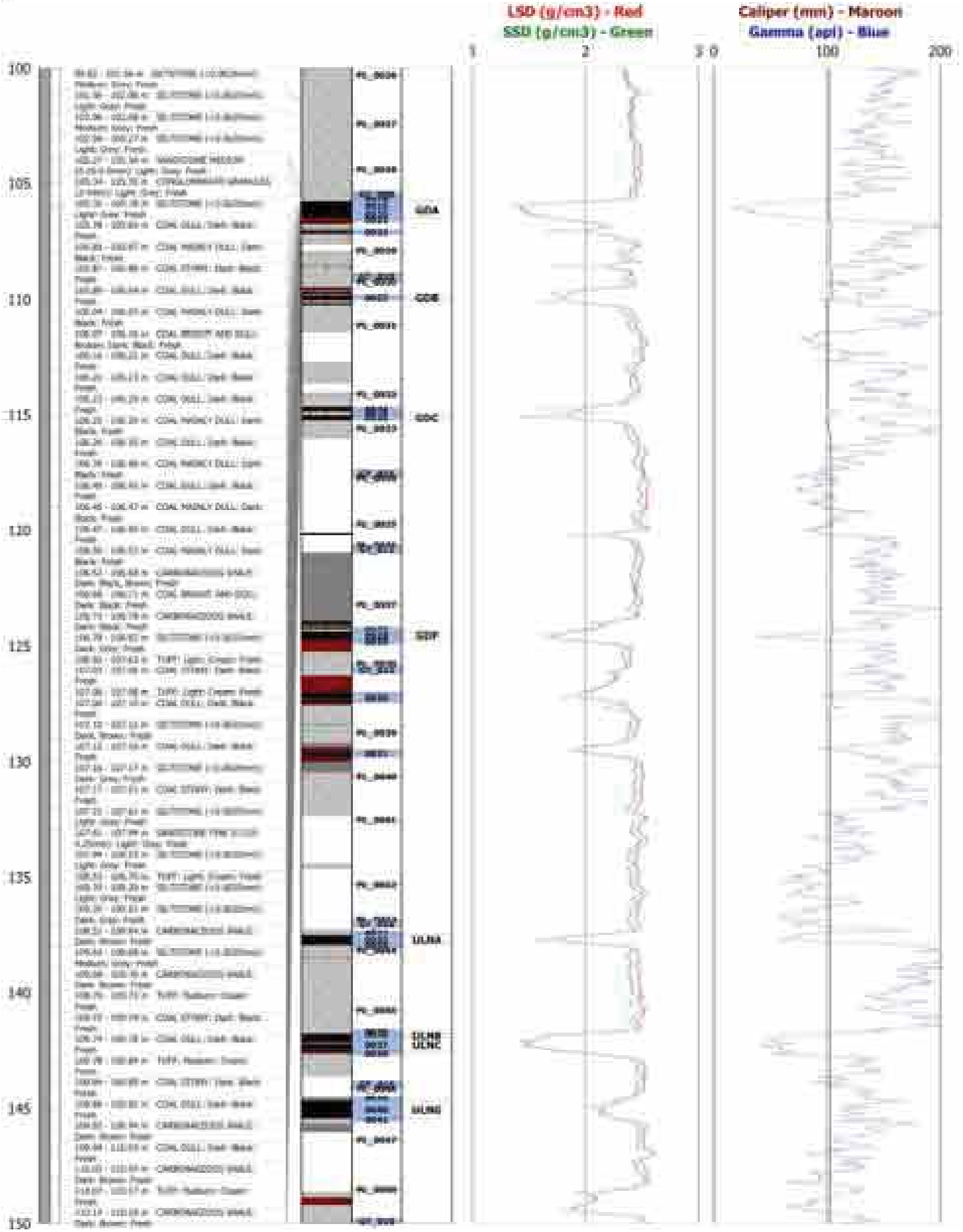

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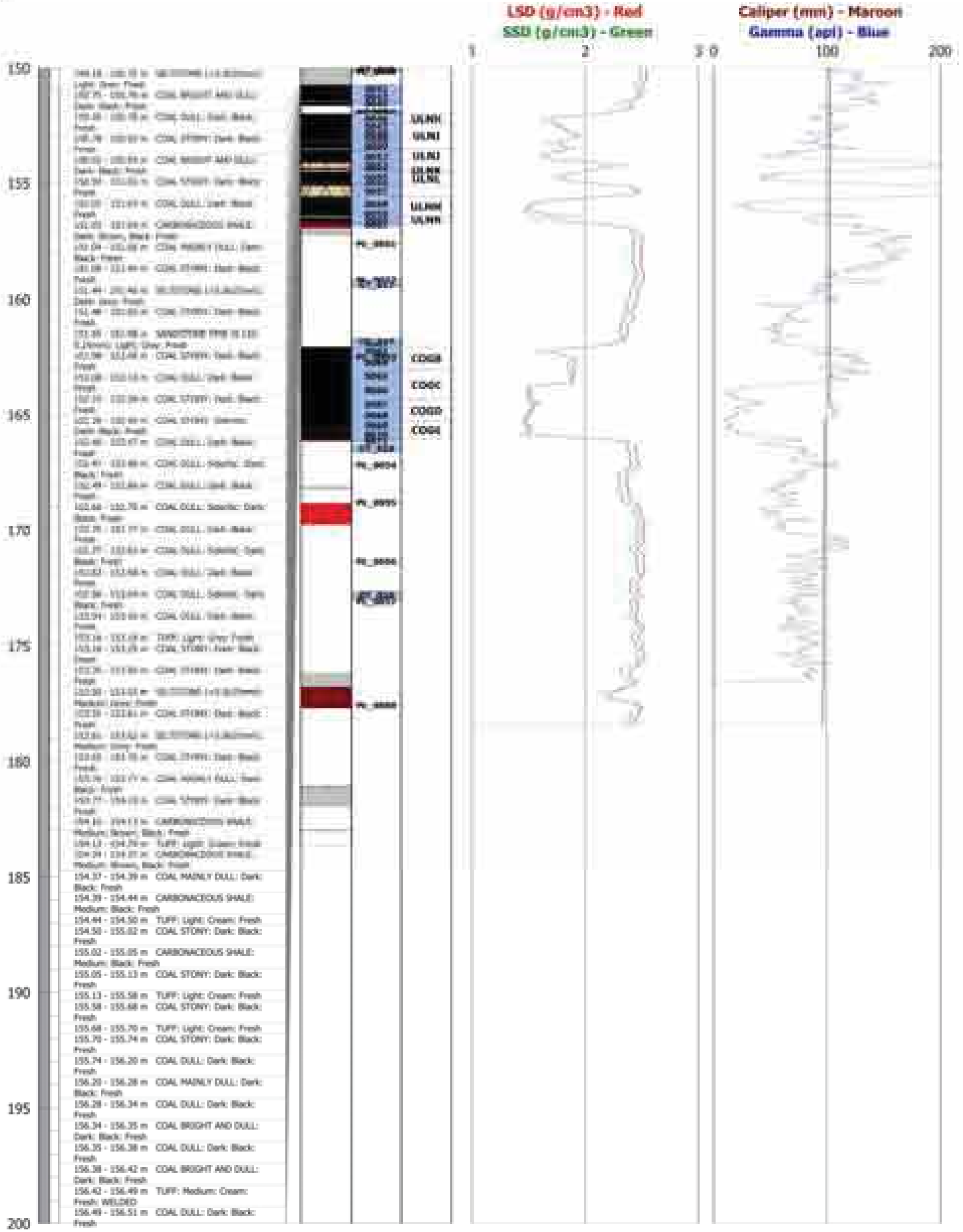

154.37 - 154.39 m COAL MAINLY DULL: Dark: Black: Fresh
154.39 - 154.44 m CARBONACEOUS SHALE: Medium: Black: Fresh
154.44 - 154.50 m TUFF: Light: Cream: Fresh
154.50 - 155.02 m COAL STONY: Dark: Black: Fresh
155.02 - 155.05 m CARBONACEOUS SHALE: Medium: Black: Fresh
155.05 - 155.13 m COAL STONY: Dark: Black: Fresh
155.13 - 155.58 m TUFF: Light: Cream: Fresh
155.58 - 155.68 m COAL STONY: Dark: Black: Fresh
155.68 - 155.70 m TUFF: Light: Cream: Fresh
155.70 - 155.74 m COAL STONY: Dark: Black: Fresh
155.74 - 156.20 m COAL DULL: Dark: Black: Fresh
156.20 - 156.28 m COAL MAINLY DULL: Dark: Black: Fresh
156.28 - 156.34 m COAL DULL: Dark: Black: Fresh
156.34 - 156.35 m COAL BRIGHT AND DULL: Dark: Black: Fresh
156.35 - 156.38 m COAL DULL: Dark: Black: Fresh
156.38 - 156.42 m COAL BRIGHT AND DULL: Dark: Black: Fresh
156.42 - 156.49 m TUFF: Medium: Cream: Fresh: WELDED
156.49 - 156.51 m COAL DULL: Dark: Black: Fresh

Bylong: Drillhole Summary

Hole Number: BY0007CH **Hole Type:** Part Open/Core Drilling
Date: 6/06/2011 **Tenement:** AUTH287
Total Depth: 186.64 m **Area:** Bylong Station

MGA94_56S
Easting: 230443.17
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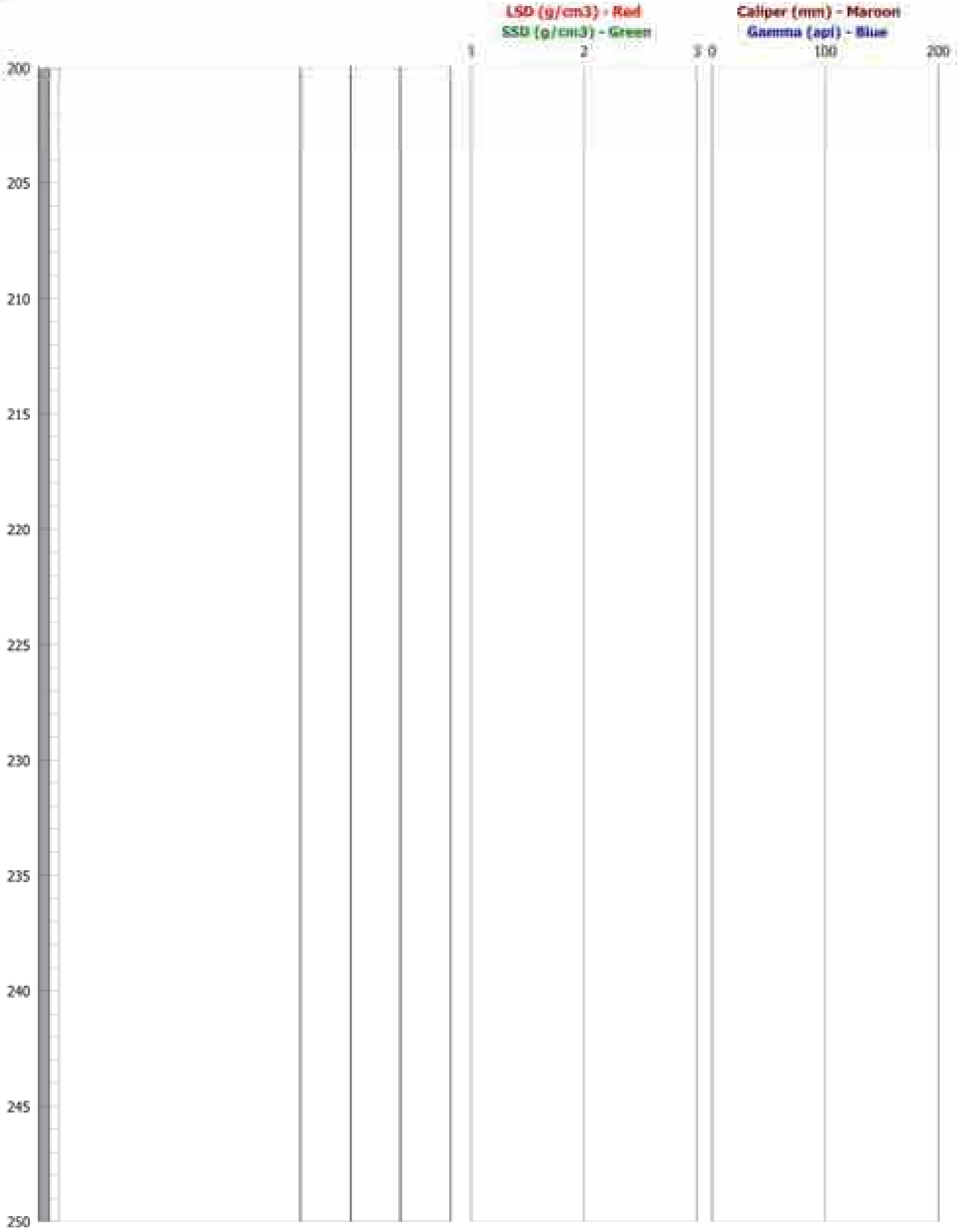
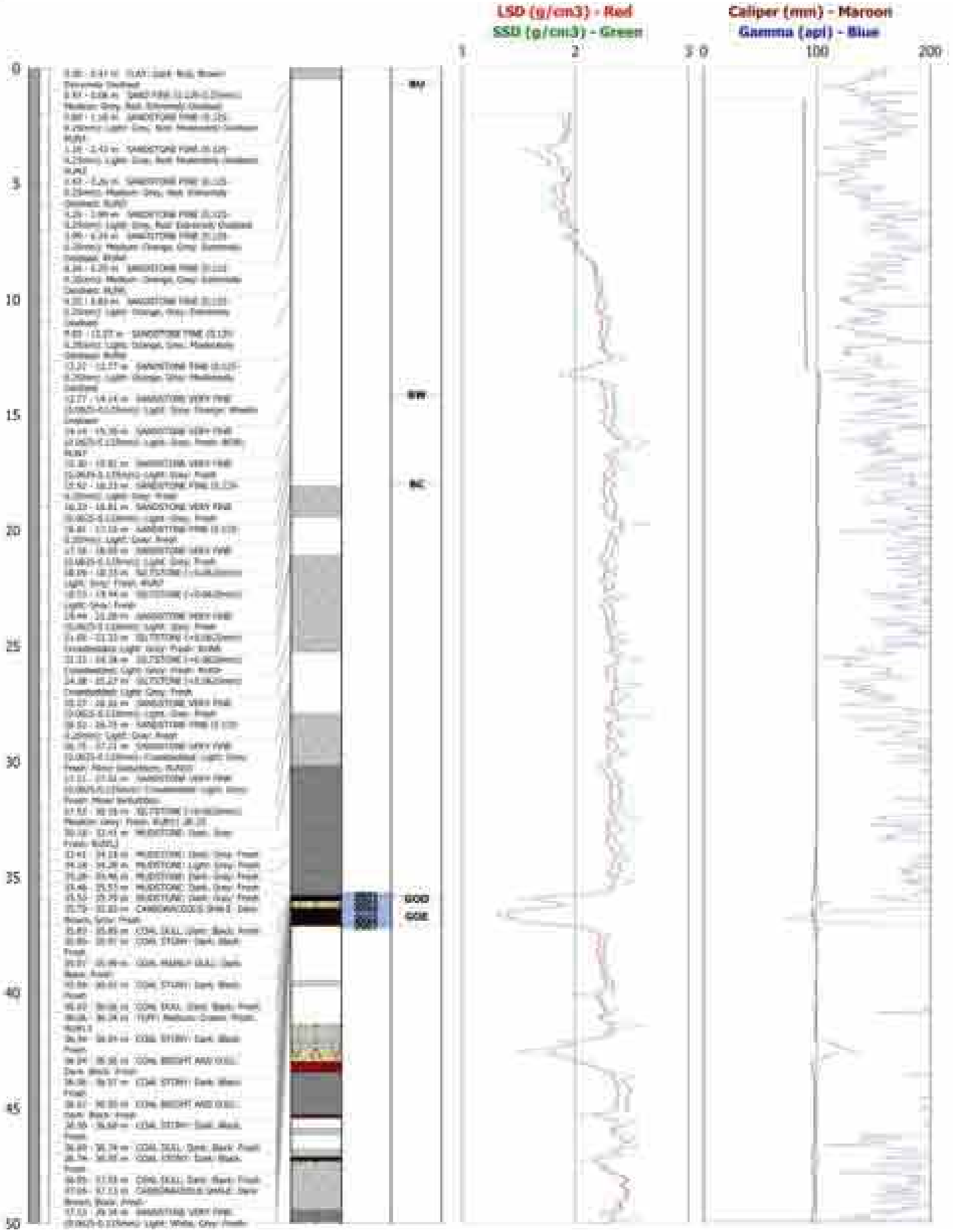


Bylong: Drillhole Summary

Hole Number: BY0010CH **Hole Type:** Core Drilling
Date: 22/06/2011 **Tenement:** AUTH287
Total Depth: 147.52 m **Area:** Bylong Station

MGA94_56S
Easting: 231893.30
Northing: 6412109.84
Height: 301.35



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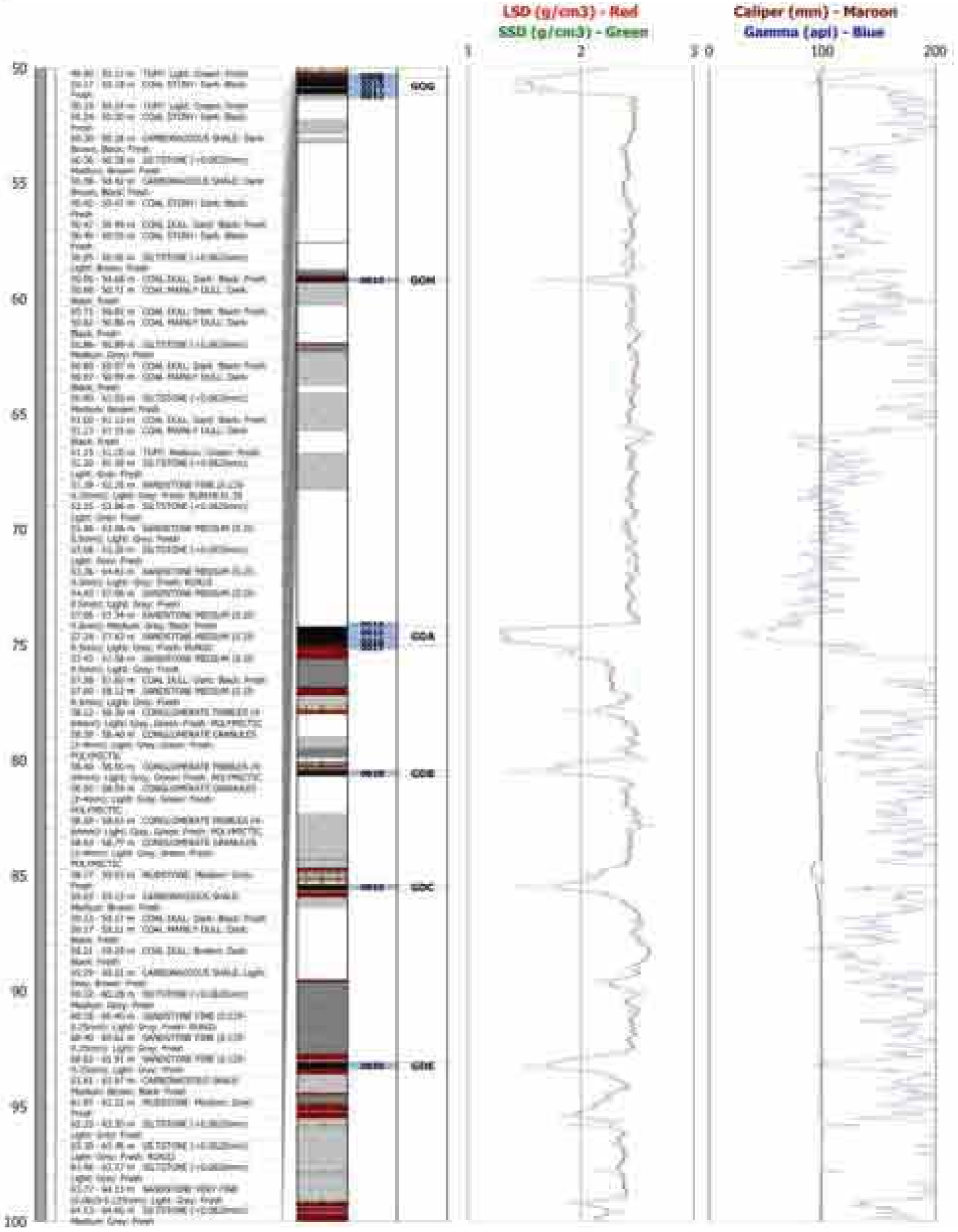

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MGA94_56S
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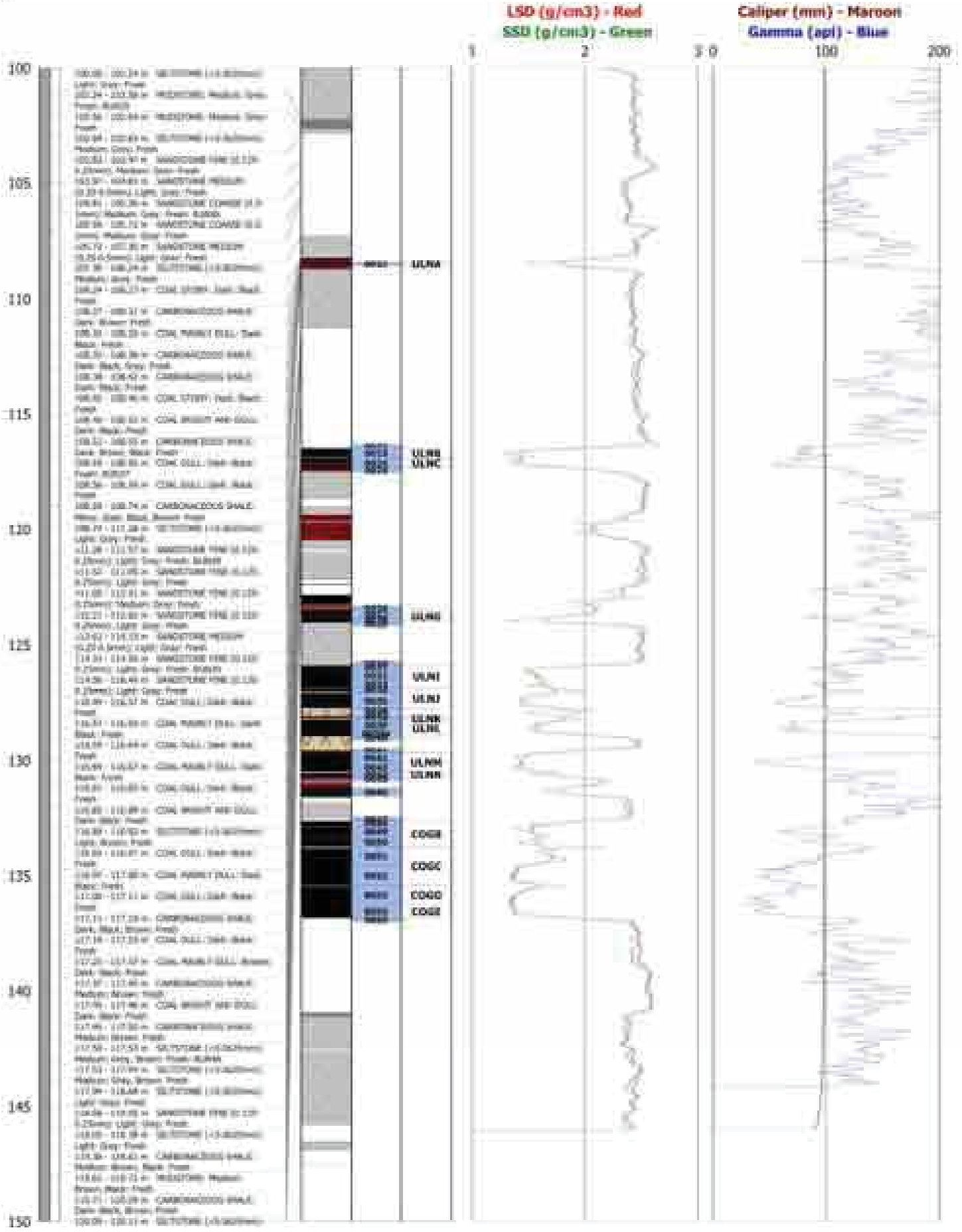
Height: 301.35



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Total Depth: 147.52 m **Area:** Bylong Station

MGA94_56S
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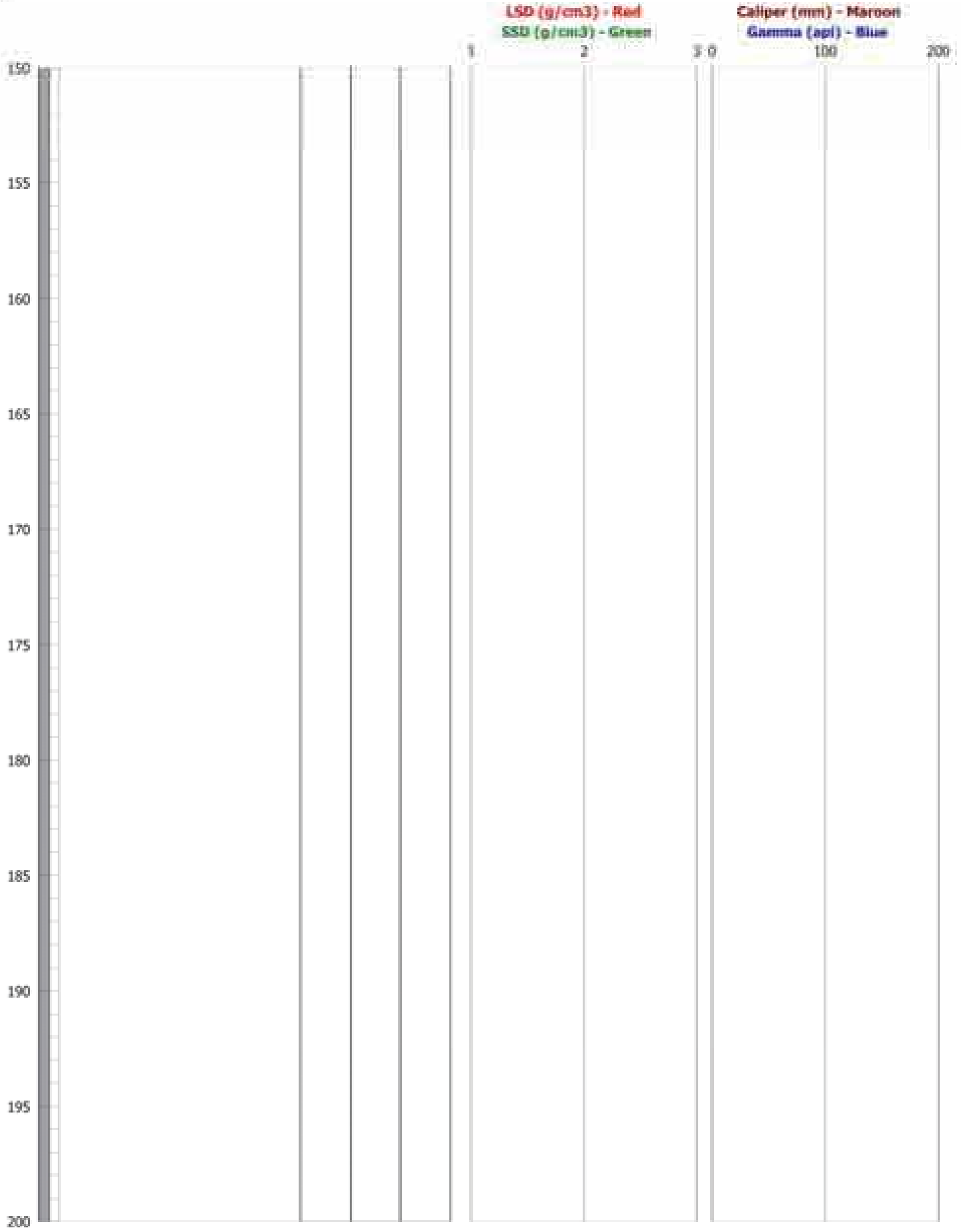
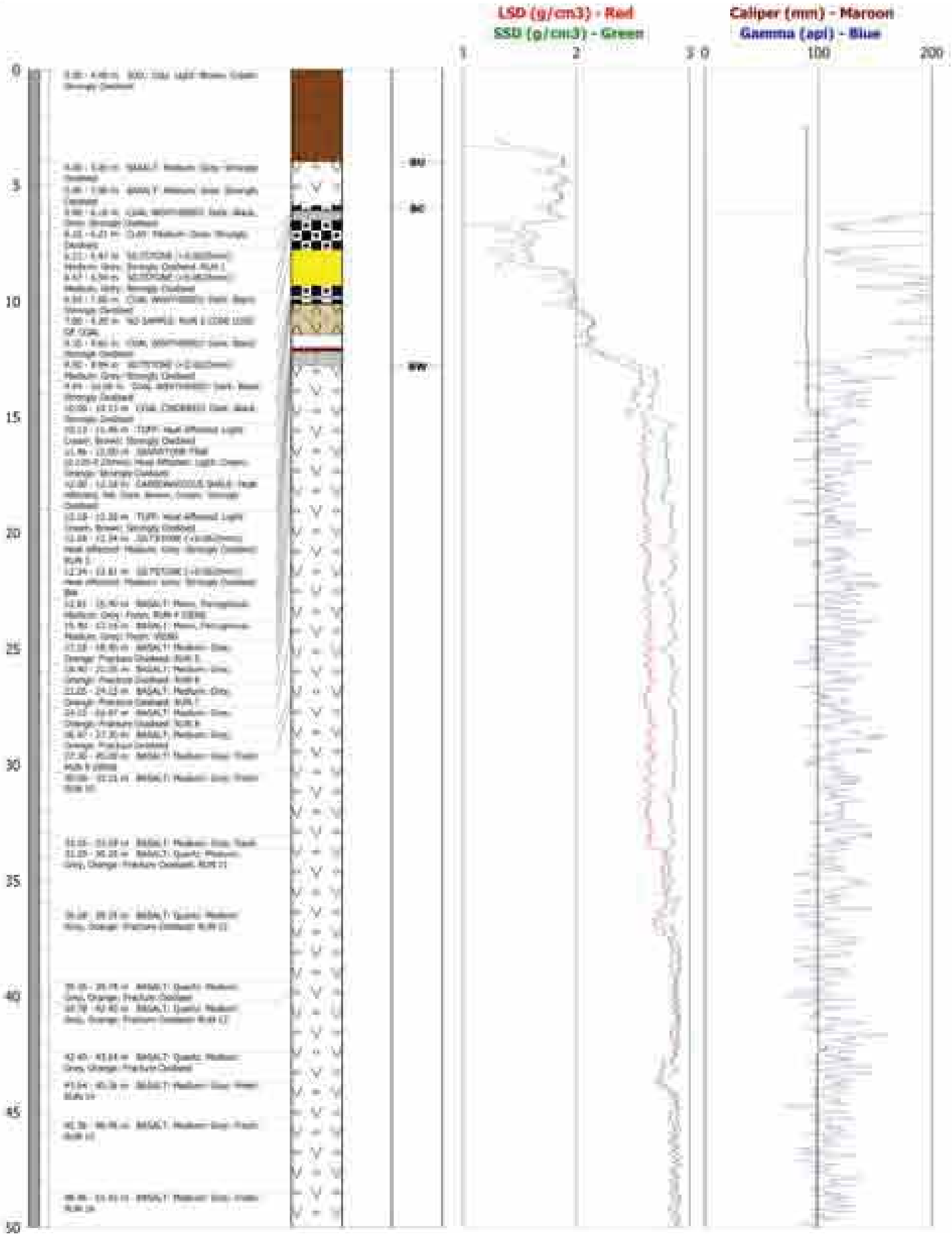
Northing: 6412109.84
Height: 301.35



Bylong: Drillhole Summary

Hole Number: BY0011CH **Hole Type:** Part Open/Core Drilling
Date: 24/06/2011 **Tenement:** AUTH287
Total Depth: 219.68 m **Area:** Bylong Station

MGA94_56S
Easting: 232912.43
Northing: 6411415.62
Height: 358.10



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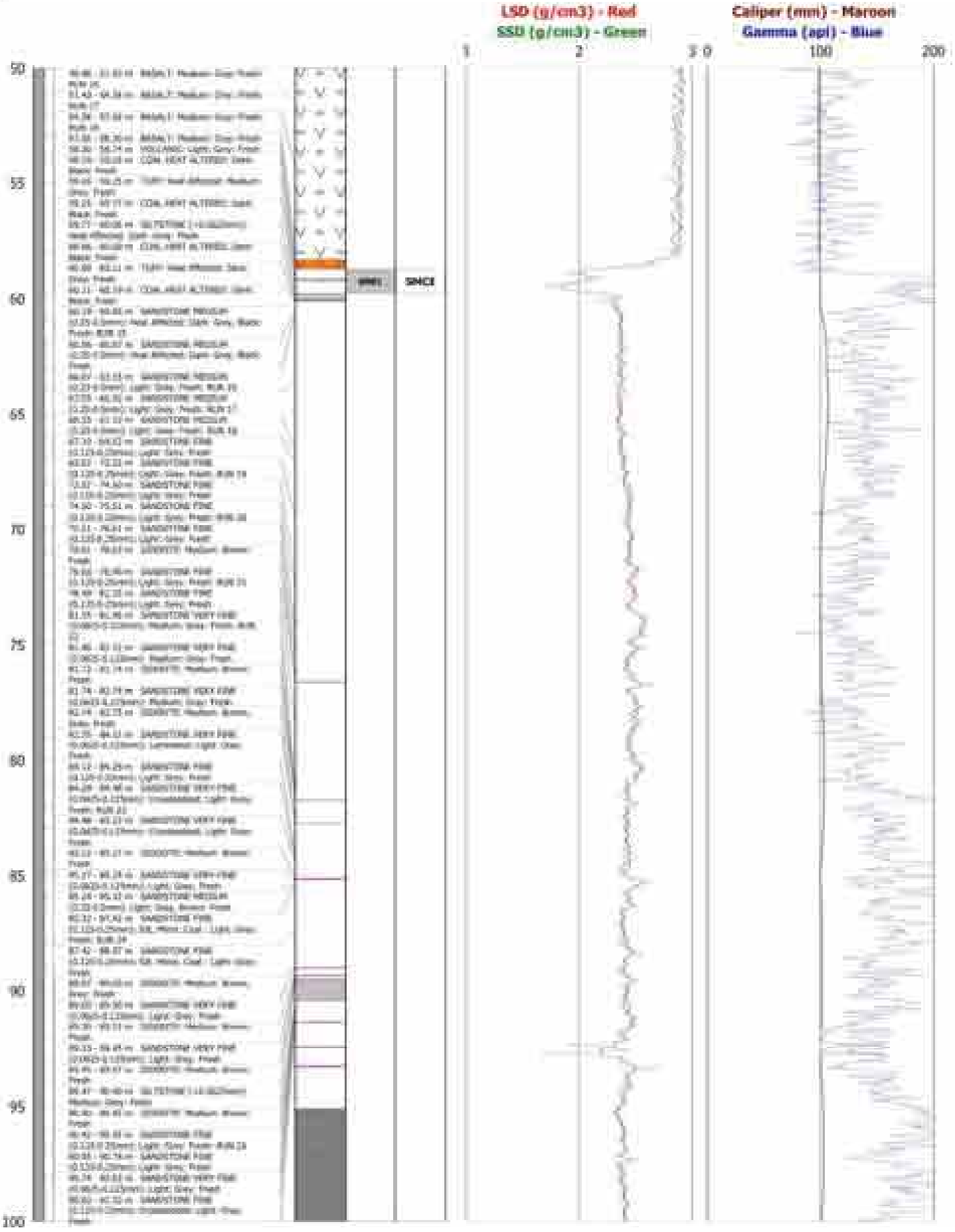

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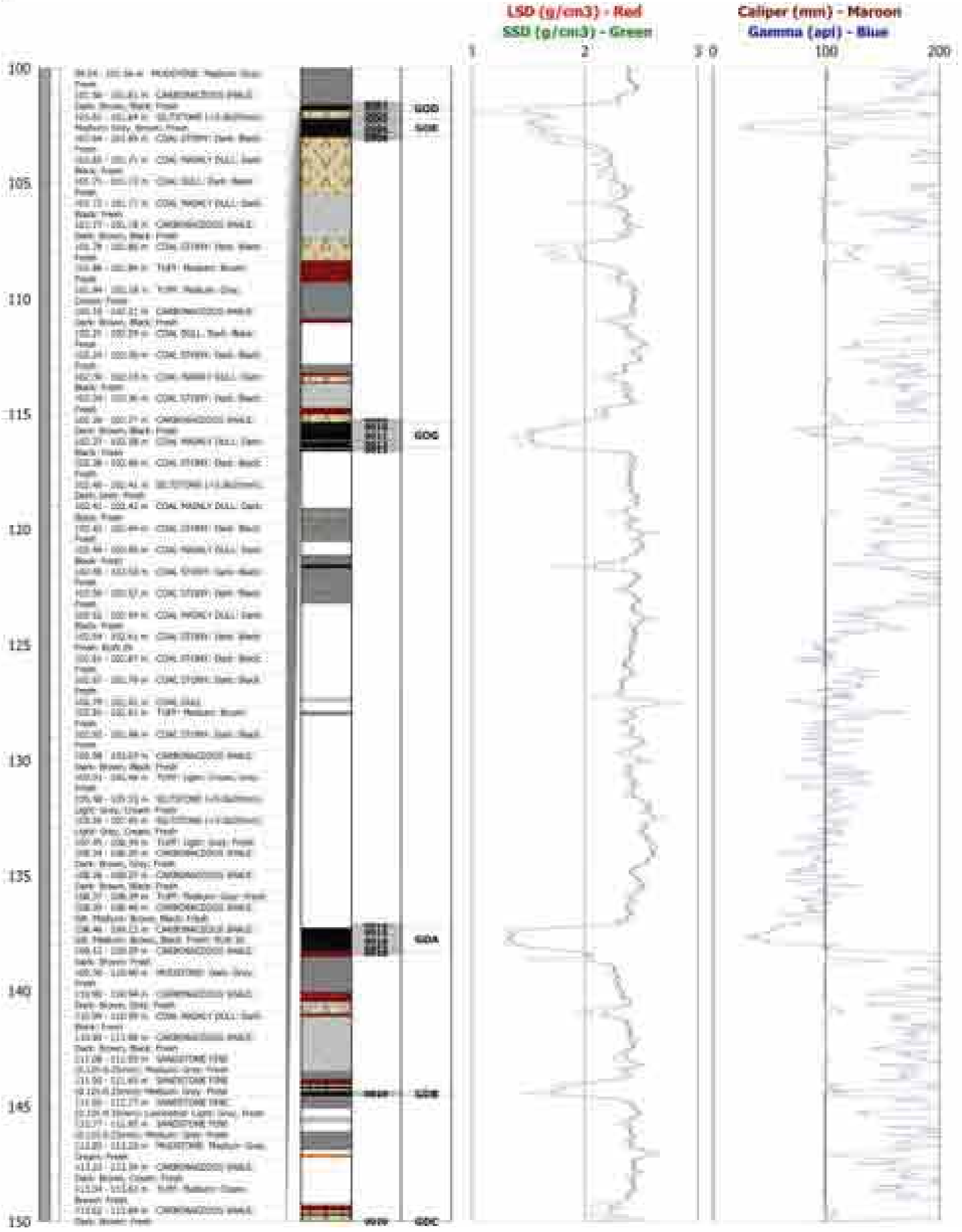
Height: 358.10



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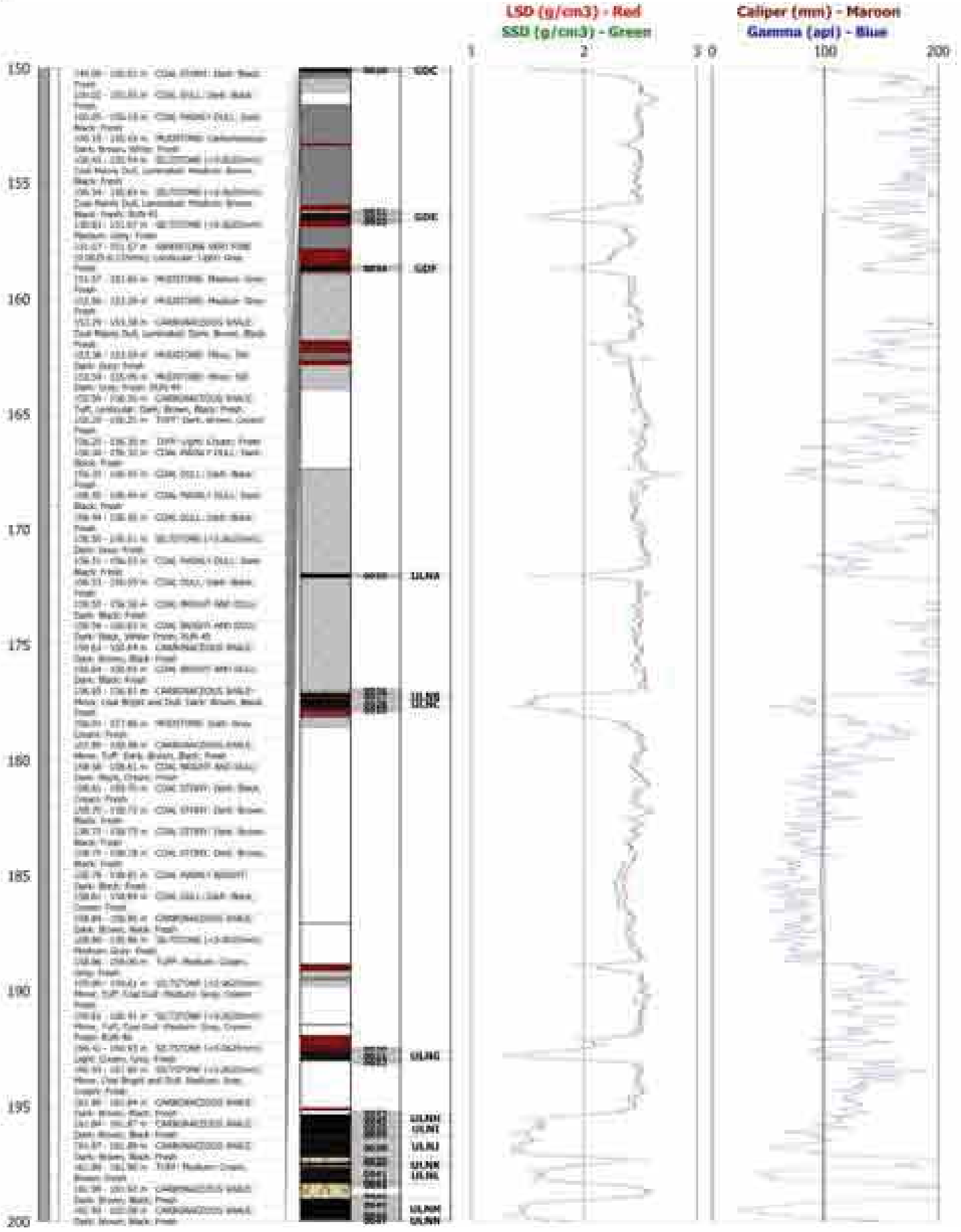

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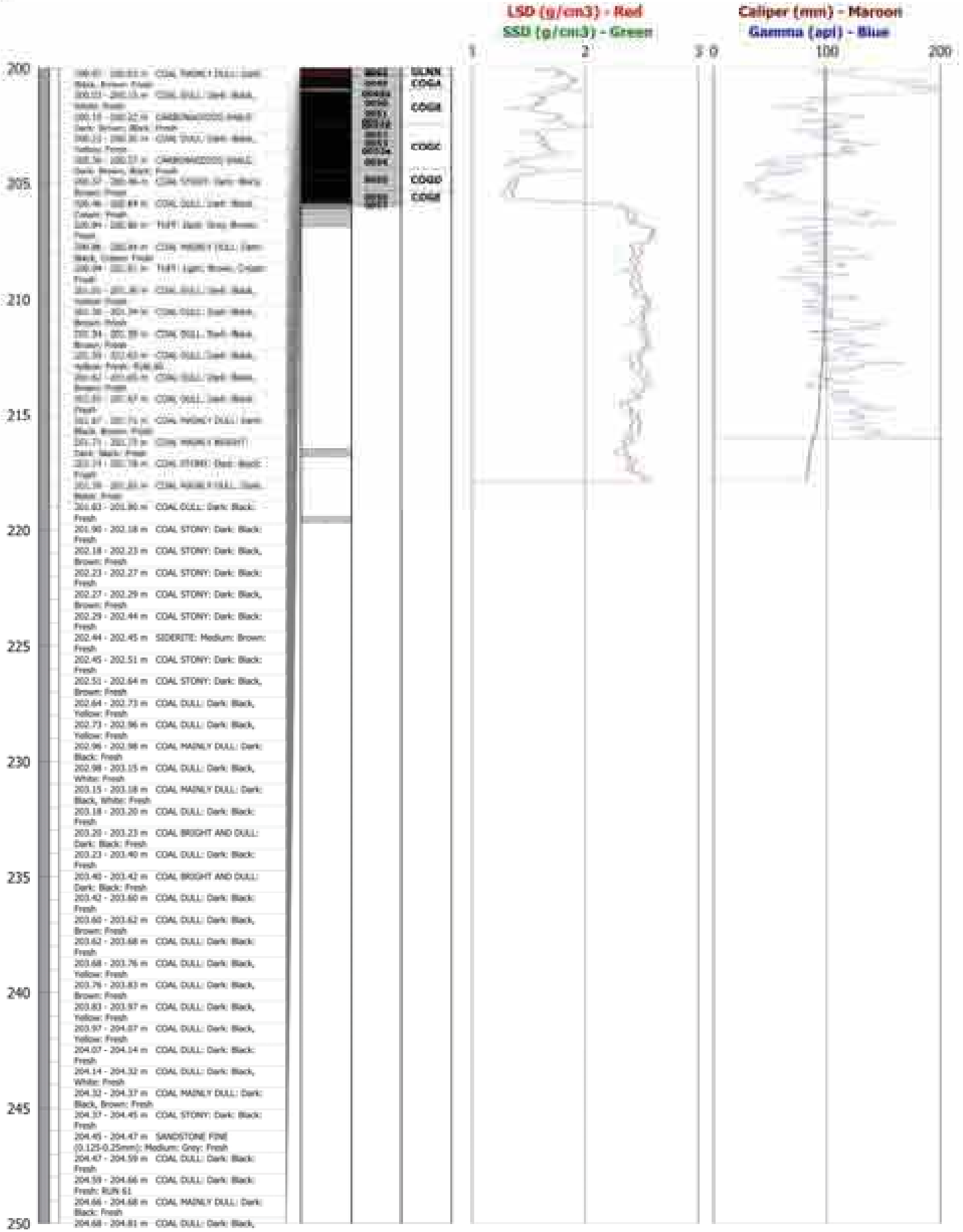
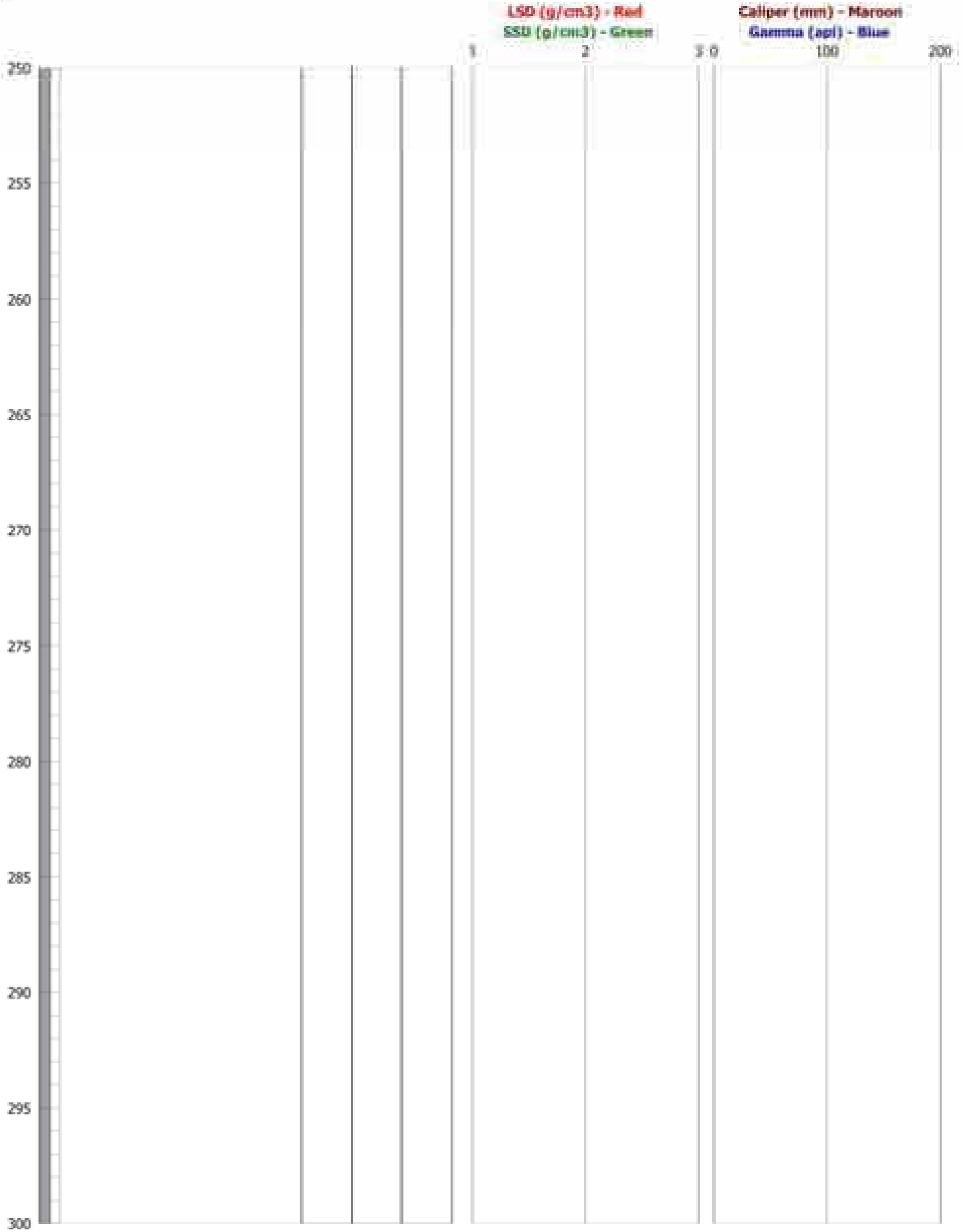


200.63 - 201.90 m COAL DULL: Dark: Black: Fresh
201.90 - 202.18 m COAL STONY: Dark: Black: Fresh
202.18 - 202.23 m COAL STONY: Dark: Black, Brown: Fresh
202.23 - 202.27 m COAL STONY: Dark: Black: Fresh
202.27 - 202.29 m COAL STONY: Dark: Black, Brown: Fresh
202.29 - 202.44 m COAL STONY: Dark: Black: Fresh
202.44 - 202.45 m SIDERITE: Medium: Brown: Fresh
202.45 - 202.51 m COAL STONY: Dark: Black: Fresh
202.51 - 202.64 m COAL STONY: Dark: Black, Brown: Fresh
202.64 - 202.73 m COAL DULL: Dark: Black, Yellow: Fresh
202.73 - 202.96 m COAL DULL: Dark: Black, Yellow: Fresh
202.96 - 202.98 m COAL MAINLY DULL: Dark: Black: Fresh
202.98 - 203.15 m COAL DULL: Dark: Black, White: Fresh
203.15 - 203.18 m COAL MAINLY DULL: Dark: Black, White: Fresh
203.18 - 203.20 m COAL DULL: Dark: Black: Fresh
203.20 - 203.23 m COAL BRIGHT AND DULL: Dark: Black: Fresh
203.23 - 203.40 m COAL DULL: Dark: Black: Fresh
203.40 - 203.42 m COAL BRIGHT AND DULL: Dark: Black: Fresh
203.42 - 203.60 m COAL DULL: Dark: Black: Fresh
203.60 - 203.62 m COAL DULL: Dark: Black, Brown: Fresh
203.62 - 203.68 m COAL DULL: Dark: Black: Fresh
203.68 - 203.76 m COAL DULL: Dark: Black, Yellow: Fresh
203.76 - 203.83 m COAL DULL: Dark: Black, Brown: Fresh
203.83 - 203.97 m COAL DULL: Dark: Black, Yellow: Fresh
203.97 - 204.07 m COAL DULL: Dark: Black, Yellow: Fresh
204.07 - 204.14 m COAL DULL: Dark: Black: Fresh
204.14 - 204.32 m COAL DULL: Dark: Black, White: Fresh
204.32 - 204.37 m COAL MAINLY DULL: Dark: Black, Brown: Fresh
204.37 - 204.45 m COAL STONY: Dark: Black: Fresh
204.45 - 204.47 m SANDSTONE FINE (0.125-0.25mm): Medium: Grey: Fresh
204.47 - 204.59 m COAL DULL: Dark: Black: Fresh
204.59 - 204.66 m COAL DULL: Dark: Black: Fresh: RUN 61
204.66 - 204.68 m COAL MAINLY DULL: Dark: Black: Fresh
204.68 - 204.81 m COAL DULL: Dark: Black,

Bylong: Drillhole Summary

Hole Number: BY0011CH **Hole Type:** Part Open/Core Drilling
Date: 24/06/2011 **Tenement:** AUTH287
Total Depth: 219.68 m **Area:** Bylong Station

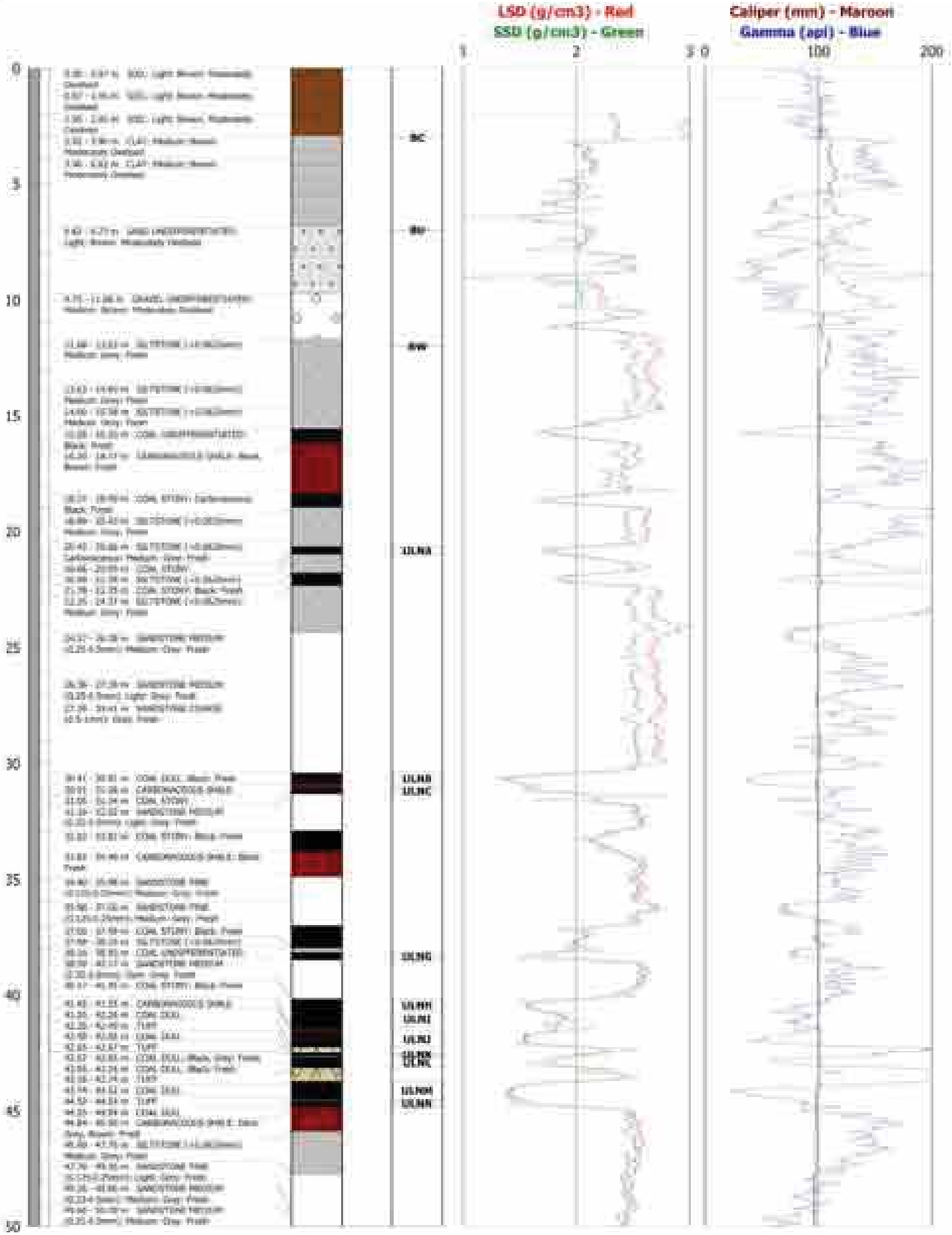
MGA94_56S
Easting: 232912.43
Northing: 6411415.62
Height: 358.10



Bylong: Drillhole Summary

Hole Number: BY0014CHR **Hole Type:** Part Open/Core Drilling
Date: 28/07/2011 **Tenement:** AUTH287
Total Depth: 66.29 m **Area:** Bylong Station

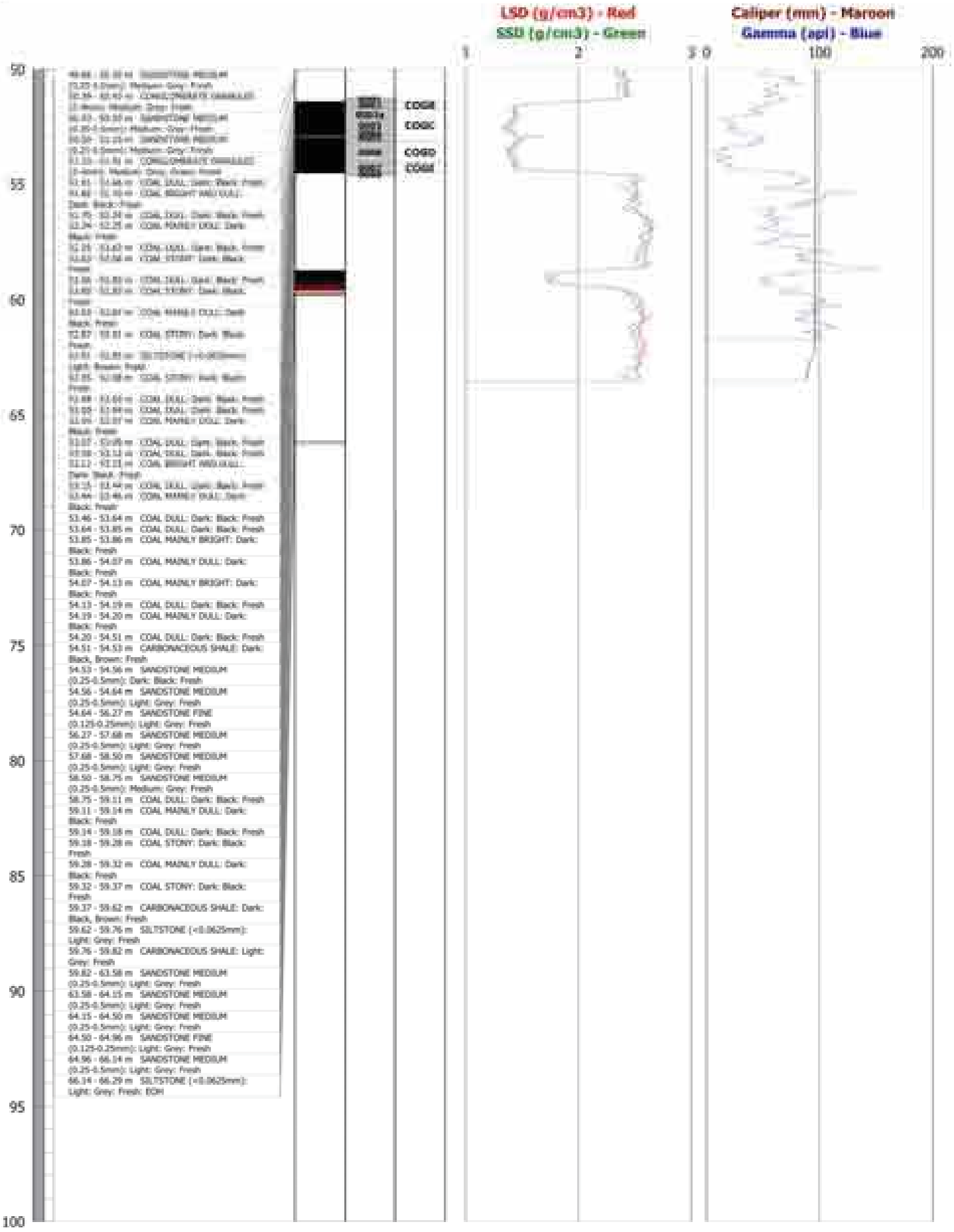
MGA94_56S
Easting: 229612.00
Northing: 6410336.00
Height: 307.00



Bylong: Drillhole Summary

Hole Number: BY0014CHR1 **Hole Type:** Part Open/Core Drilling
Date: 28/07/2011 **Tenement:** AUTH287
Total Depth: 66.29 m **Area:** Bylong Station

MGA94_56S
Easting: 229612.00
Northing: 6410336.00
Height: 307.00

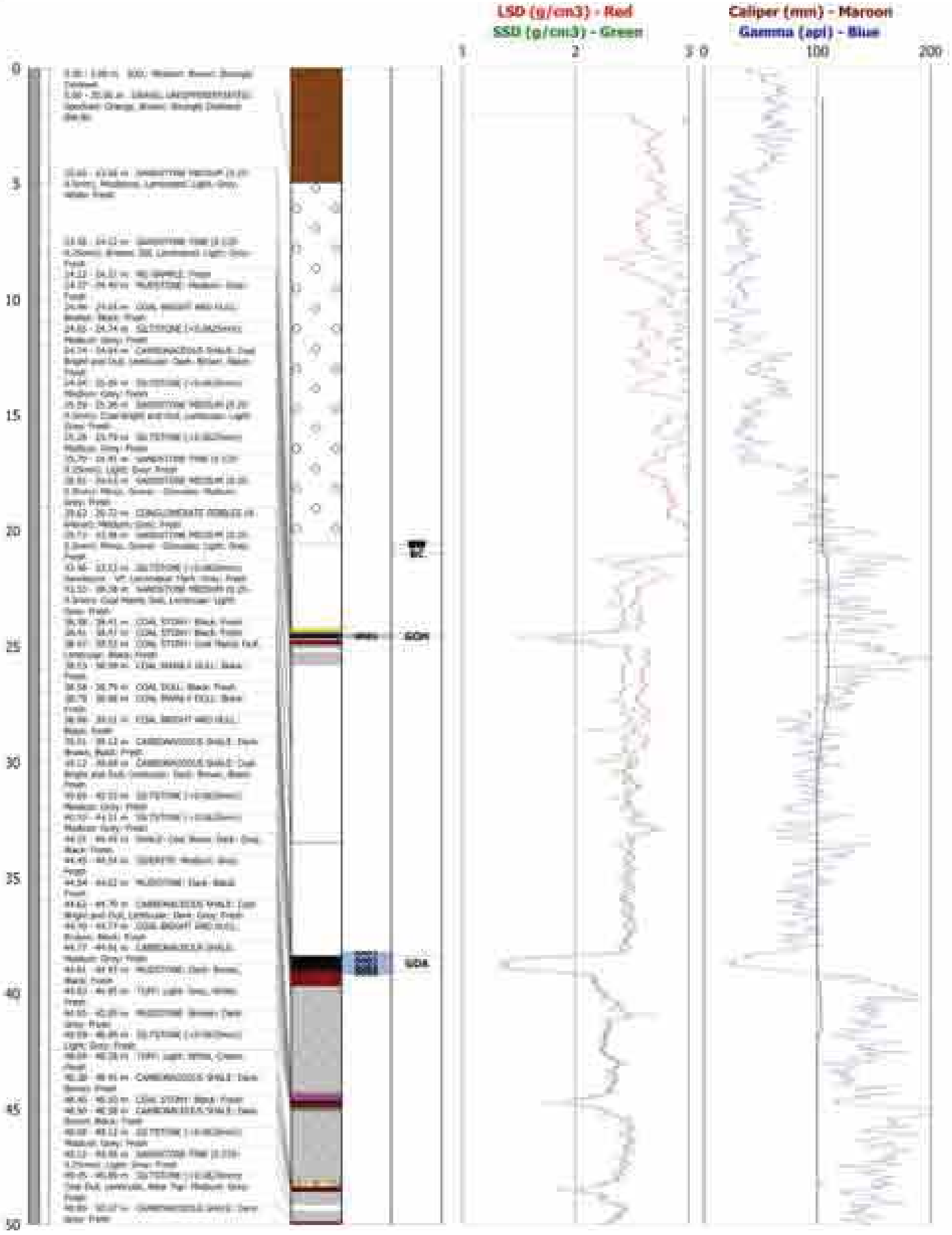


48.66 - 49.39 m SANDSTONE MEDIUM (0.25-0.5mm): Medium: Grey: Fresh
49.39 - 49.43 m CONGLOMERATE GRANULE (2-4mm): Medium: Grey: Fresh
49.43 - 50.55 m SANDSTONE MEDIUM (0.25-0.5mm): Medium: Grey: Fresh
50.55 - 51.23 m SANDSTONE MEDIUM (0.25-0.5mm): Medium: Grey: Fresh
51.23 - 51.51 m CONGLOMERATE GRANULE (2-4mm): Medium: Grey: Green: Fresh
51.51 - 51.66 m COAL DULL: Dark: Black: Fresh
51.66 - 51.70 m COAL BRIGHT AND DULL: Dark: Black: Fresh
51.70 - 51.74 m COAL DULL: Dark: Black: Fresh
51.74 - 52.24 m COAL MAINLY DULL: Dark: Black: Fresh
52.24 - 52.43 m COAL DULL: Dark: Black: Fresh
52.43 - 52.54 m COAL STONY: Dark: Black: Fresh
52.54 - 52.83 m COAL DULL: Dark: Black: Fresh
52.83 - 52.87 m COAL MAINLY DULL: Dark: Black: Fresh
52.87 - 53.01 m COAL STONY: Dark: Black: Fresh
53.01 - 53.85 m SILTSTONE (<0.0625mm): Light: Brown: Fresh
53.85 - 53.88 m COAL STONY: Dark: Black: Fresh
53.88 - 53.89 m COAL DULL: Dark: Black: Fresh
53.89 - 53.93 m COAL DULL: Dark: Black: Fresh
53.93 - 53.94 m COAL DULL: Dark: Black: Fresh
53.94 - 53.97 m COAL MAINLY DULL: Dark: Black: Fresh
53.97 - 54.05 m COAL DULL: Dark: Black: Fresh
54.05 - 54.13 m COAL DULL: Dark: Black: Fresh
54.13 - 54.17 m COAL BRIGHT AND DULL: Dark: Black: Fresh
54.17 - 54.44 m COAL DULL: Dark: Black: Fresh
54.44 - 54.46 m COAL MAINLY DULL: Dark: Black: Fresh
54.46 - 54.64 m COAL DULL: Dark: Black: Fresh
54.64 - 54.85 m COAL DULL: Dark: Black: Fresh
54.85 - 54.86 m COAL MAINLY BRIGHT: Dark: Black: Fresh
54.86 - 54.97 m COAL MAINLY DULL: Dark: Black: Fresh
54.97 - 54.13 m COAL MAINLY BRIGHT: Dark: Black: Fresh
54.13 - 54.19 m COAL DULL: Dark: Black: Fresh
54.19 - 54.20 m COAL MAINLY DULL: Dark: Black: Fresh
54.20 - 54.51 m COAL DULL: Dark: Black: Fresh
54.51 - 54.53 m CARBONACEOUS SHALE: Dark: Black, Brown: Fresh
54.53 - 54.56 m SANDSTONE MEDIUM (0.25-0.5mm): Dark: Black: Fresh
54.56 - 54.64 m SANDSTONE MEDIUM (0.25-0.5mm): Light: Grey: Fresh
54.64 - 56.27 m SANDSTONE FINE (0.125-0.25mm): Light: Grey: Fresh
56.27 - 57.68 m SANDSTONE MEDIUM (0.25-0.5mm): Light: Grey: Fresh
57.68 - 58.50 m SANDSTONE MEDIUM (0.25-0.5mm): Light: Grey: Fresh
58.50 - 58.75 m SANDSTONE MEDIUM (0.25-0.5mm): Medium: Grey: Fresh
58.75 - 59.11 m COAL DULL: Dark: Black: Fresh
59.11 - 59.14 m COAL MAINLY DULL: Dark: Black: Fresh
59.14 - 59.18 m COAL DULL: Dark: Black: Fresh
59.18 - 59.28 m COAL STONY: Dark: Black: Fresh
59.28 - 59.32 m COAL MAINLY DULL: Dark: Black: Fresh
59.32 - 59.37 m COAL STONY: Dark: Black: Fresh
59.37 - 59.62 m CARBONACEOUS SHALE: Dark: Black, Brown: Fresh
59.62 - 59.76 m SILTSTONE (<0.0625mm): Light: Grey: Fresh
59.76 - 59.82 m CARBONACEOUS SHALE: Light: Grey: Fresh
59.82 - 63.58 m SANDSTONE MEDIUM (0.25-0.5mm): Light: Grey: Fresh
63.58 - 64.15 m SANDSTONE MEDIUM (0.25-0.5mm): Light: Grey: Fresh
64.15 - 64.50 m SANDSTONE MEDIUM (0.25-0.5mm): Light: Grey: Fresh
64.50 - 64.96 m SANDSTONE FINE (0.125-0.25mm): Light: Grey: Fresh
64.96 - 66.14 m SANDSTONE MEDIUM (0.25-0.5mm): Light: Grey: Fresh
66.14 - 66.29 m SILTSTONE (<0.0625mm): Light: Grey: Fresh: EOH

Bylong: Drillhole Summary

Hole Number: BY0015CH **Hole Type:** Core Drilling
Date: 7/07/2011 **Tenement:** AUTH287
Total Depth: 102.70 m **Area:** Bylong Station

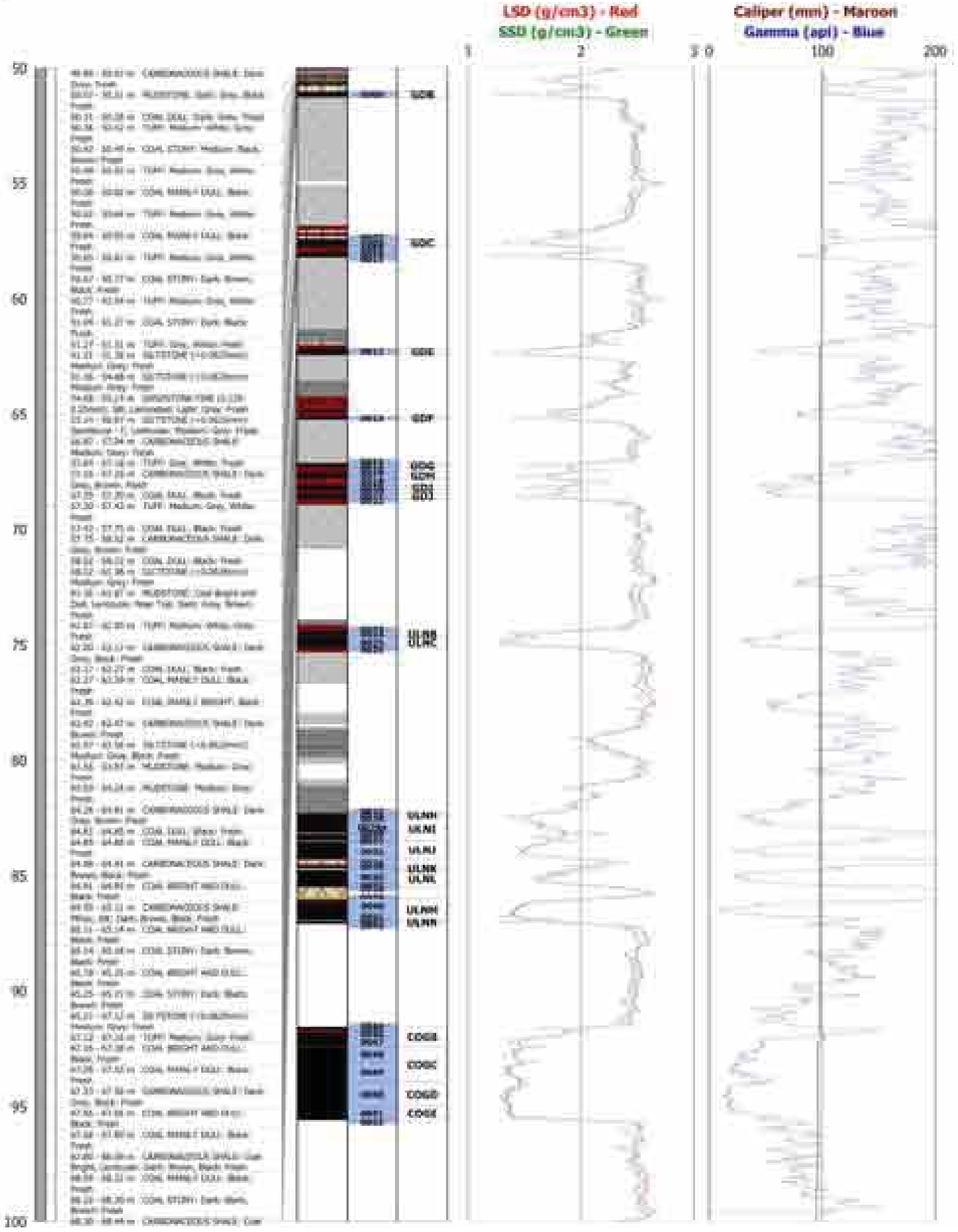
MGA94_56S
Easting: 230110.63
Northing: 6412947.60
Height: 247.24



Bylong: Drillhole Summary

Hole Number: BY0015CH **Hole Type:** Core Drilling
Date: 7/07/2011 **Tenement:** AUTH287
Total Depth: 102.70 m **Area:** Bylong Station

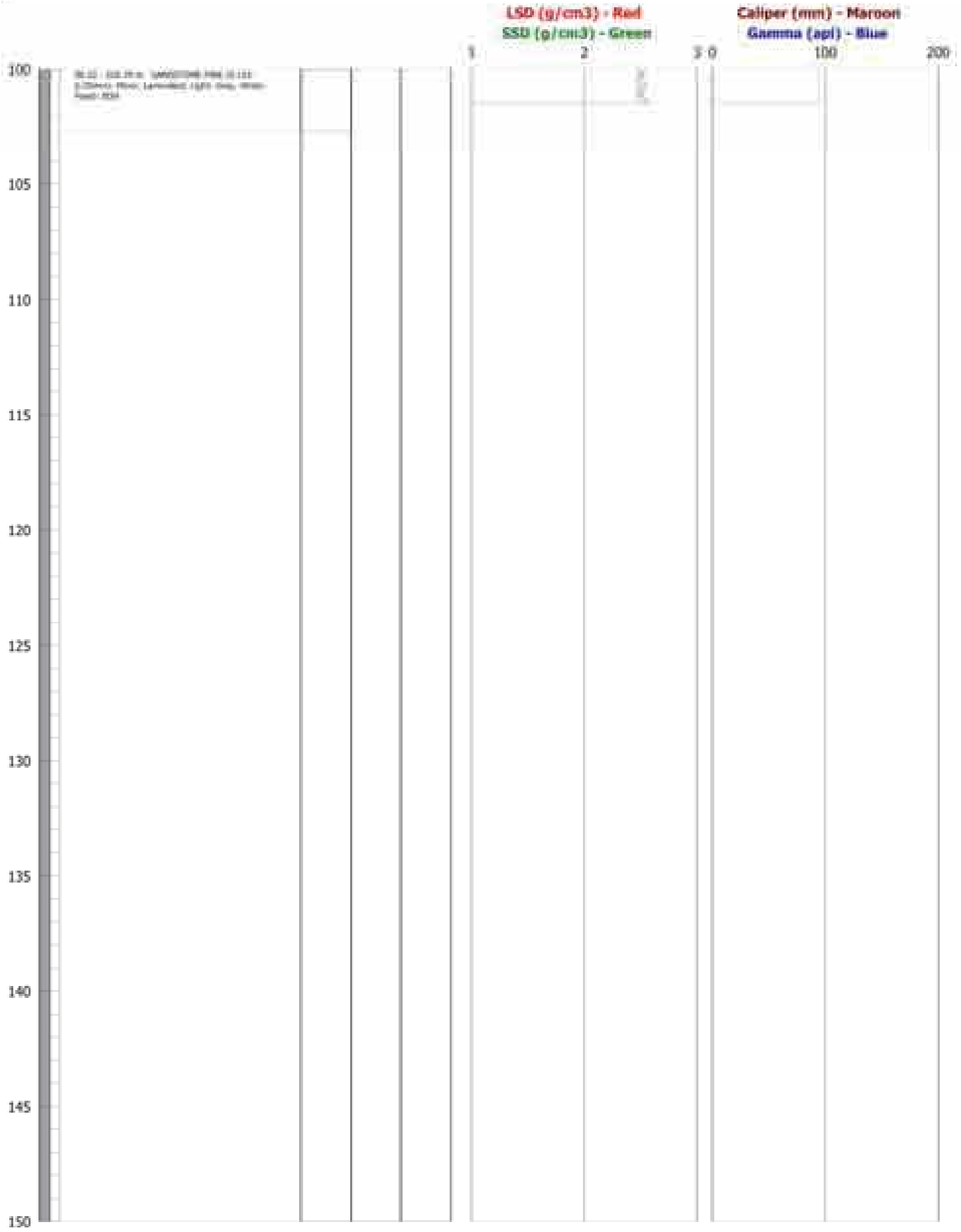
MGA94_56S
Easting: 230110.63
Northing: 6412947.60
Height: 247.24



Bylong: Drillhole Summary

Hole Number: BY0015CH **Hole Type:** Core Drilling
Date: 7/07/2011 **Tenement:** AUTH287
Total Depth: 102.70 m **Area:** Bylong Station

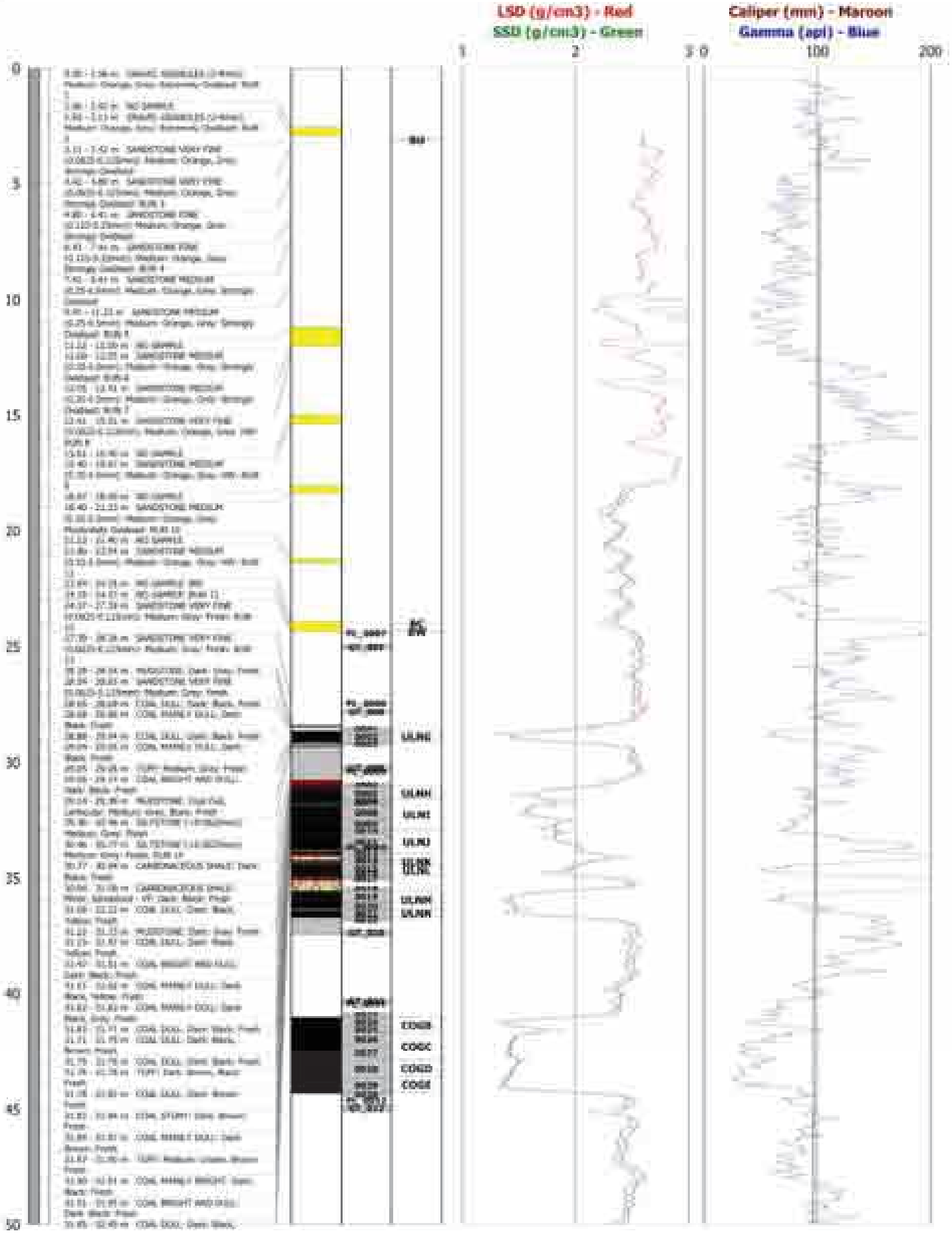
MGA94_56S
Easting: 230110.63
Northing: 6412947.60
Height: 247.24



Bylong: Drillhole Summary

Hole Number: BY0016CH **Hole Type:** Core Drilling
Date: 13/07/2011 **Tenement:** AUTH287
Total Depth: 54.75 m **Area:** Bylong Station

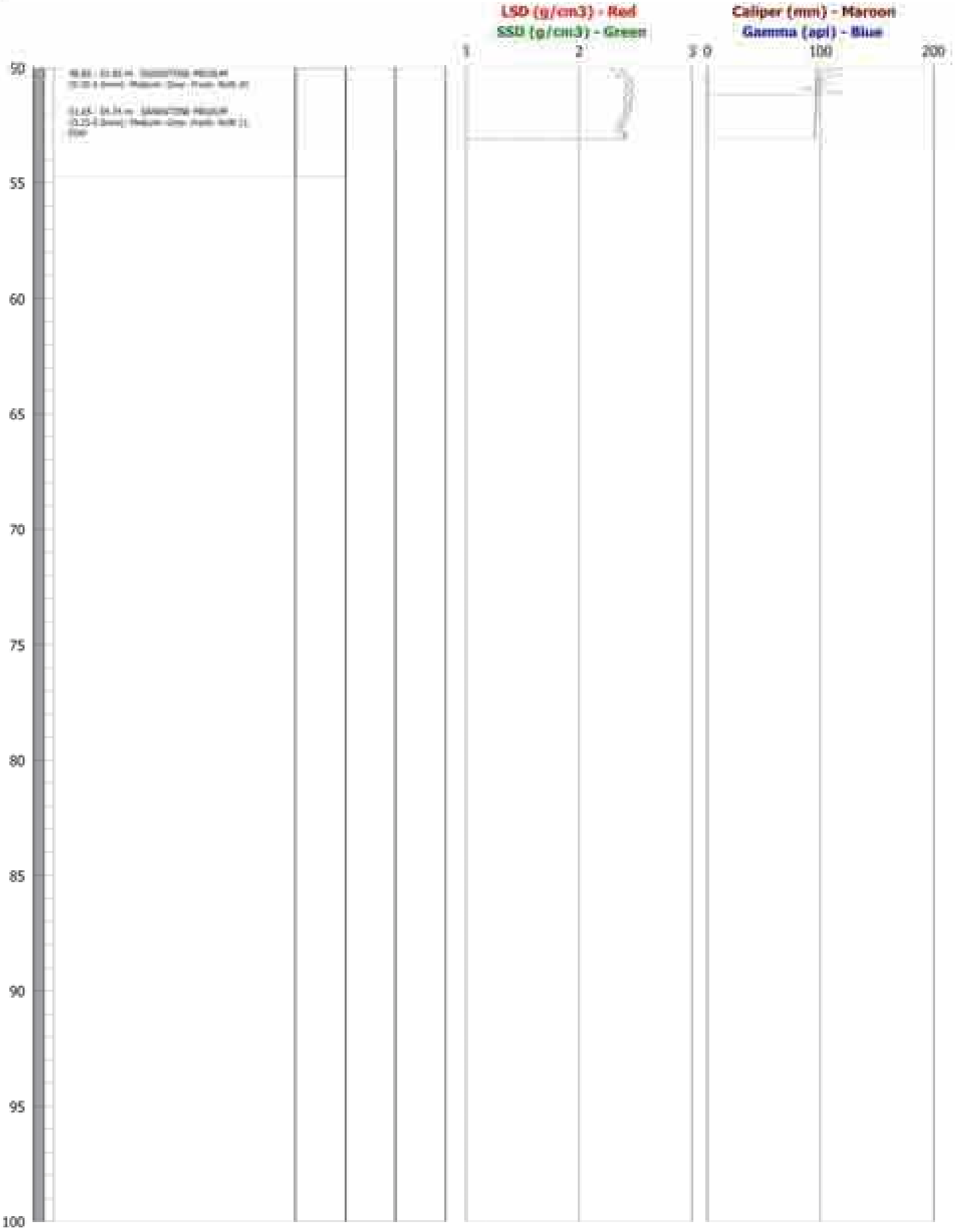
MGA94_56S
Easting: 231315.37
Northing: 6408236.40
Height: 292.89



Bylong: Drillhole Summary

Hole Number: BY0016CH **Hole Type:** Core Drilling
Date: 13/07/2011 **Tenement:** AUTH287
Total Depth: 54.75 m **Area:** Bylong Station

MGA94_56S
Easting: 231315.37
Northing: 6408236.40
Height: 292.89



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 227087
NORTHING: 6408374
DIP/AZIMUTH: 90°/--

BORE No: M1
PROJECT No: 49761
DATE: 11/12/2013
SHEET 1 OF 5

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SILTY CLAY - (Stiff), brown silty clay with some fine grained sand, M<<Wp		A	0.1				Stickup = 0.454m
				A	0.25				
		From 0.5m, red/brown		A	0.5				
	1	From 1.0m, hard		A	1.0				1
				S			13,18,21 N = 39		
				pp	1.45		>400 kPa		
	2								2
		From 2.5m, M<Wp			2.5				
				S			15,25/130mm refusal		
				pp	2.7		>400 kPa		
	3				2.78				3
	4	From 4.0m, trace medium sized subangular gravel			4.0				4
				S			14,26/130mm refusal		
					4.28				

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 6.0m

TYPE OF BORING: Solid flight auger to 5.9m, rotary to 6.5m, HQ to 23.95m

WATER OBSERVATIONS: Free groundwater measured at 16.20m at completion of drilling, groundwater measured at 10.2m 12/12/2013

REMARKS: 50% water loss at 11.59m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Tube sample
B	Bulk sample	W	Water sample
C	Core drilling		
D	Disturbed sample	▽	Water level

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 227087
NORTHING: 6408374
DIP/AZIMUTH: 90°/--

BORE No: M1
PROJECT No: 49761
DATE: 11/12/2013
SHEET 2 OF 5

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SILTY CLAY - (Stiff), brown silty clay with some fine grained sand, M<<Wp *(continued)*							
		From 5.5m, mottled brown and dark brown			5.5				
				pp			>400 kPa		
				S			10,26/150mm refusal		
	5.8				5.8				
		SANDSTONE - Low strength, moderately weathered, brown, fine grained sandstone		S	5.9		4/50mm refusal bouncing		
	6				5.94				6
	6.5				6.5				
		SANDSTONE - High strength, moderately weathered, orange, fine to medium grained sandstone with some very low strength tuff bands			6.65		PL(A) = 0.05		
	7			C					7
					7.3		PL(A) = 2.17		
					7.4		PL(A) = 0.6		
					7.45		PL(D) = 0.74		
		From 7.45m, medium strength			7.55		PL(A) = 1.35		
	8				8.1		PL(A) = 0.62		8
				C			PL(D) = 0.81		
					8.66		PL(A) = 2.13		
							PL(D) = 1.68		
	9				8.98				9
				C	9.26		PL(A) = 2.13		
							PL(D) = 1.19		
					9.59				
				C	9.75		PL(A) = 4.06		
							PL(D) = 4		
					10.0		PL(A) = 2.31		

Well Construction Details: From 0.0m to 14.4m, grout; From -0.454m to 15.5m, Class 18 blank

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 6.0m

TYPE OF BORING: Solid flight auger to 5.9m, rotary to 6.5m, HQ to 23.95m

WATER OBSERVATIONS: Free groundwater measured at 16.20m at completion of drilling, groundwater measured at 10.2m 12/12/2013

REMARKS: 50% water loss at 11.59m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Core sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
pp	Pocket penetrometer (kPa)		
S	Standard penetration test		
V	Shear vane (kPa)		

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 227087
NORTHING: 6408374
DIP/AZIMUTH: 90°/--

BORE No: M1
PROJECT No: 49761
DATE: 11/12/2013
SHEET 3 OF 5

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SANDSTONE - High strength, moderately weathered, orange, fine to medium grained sandstone with some very low strength tuff bands *(continued)*					PL(D) = 2.38		
		From 10.47m, brown			10.52		PL(A) = 1.41		
	11			C	11.04		PL(A) = 1.24		11
					11.3		PL(A) = 0.73 PL(D) = 0.31		
					11.89		PL(A) = 0.73 PL(D) = 0.41		
	12				11.93				12
					12.33		PL(A) = 1.39		
					12.52		PL(A) = 1.47		
					12.58				
				GT001					
					12.9				
	13				12.94		PL(A) = 3.43		13
				C					
					13.7		PL(A) = 4.87		
	14				13.98		PL(A) = 2.9 PL(D) = 1.63		14
					14.29		PL(A) = 4.14		
									From 14.4m to 15.2m, bentonite
				C	14.93		PL(A) = 0.65		

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 6.0m

TYPE OF BORING: Solid flight auger to 5.9m, rotary to 6.5m, HQ to 23.95m

WATER OBSERVATIONS: Free groundwater measured at 16.20m at completion of drilling, groundwater measured at 10.2m 12/12/2013

REMARKS: 50% water loss at 11.59m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Tube sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
I	Water level	DP	Perth penetrometer (blows/100mm)
		S	Standard penetration test
		V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 227087
NORTHING: 6408374
DIP/AZIMUTH: 90°/--

BORE No: M1
PROJECT No: 49761
DATE: 11/12/2013
SHEET 4 OF 5

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SANDSTONE - High strength, moderately weathered, orange, fine to medium grained sandstone with some very low strength tuff bands *(continued)* From 15.04m, fresh stained			14.94				
	16				15.96		PL(A) = 2.35 PL(D) = 1.15		16
		From 16.33m, fresh, grey		C					
					16.82		PL(A) = 2.97 PL(D) = 2.33		
	17								17
					17.93				
	18								18
					18.33		PL(A) = 4.13 PL(D) = 3.8		
				C					
					18.86		PL(A) = 3.25		
	19								19
					19.22				From 15.5m to 23.0m, Class 18 machine slotted
	19.63			C					From 15.2m to 23.95m, gravel
		SILTSTONE - High strength, fresh, dark grey siltstone			19.79		PL(A) = 2.29 PL(D) = 1.17		
		From 19.9m to 20.1m, sandstone band							

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 6.0m
TYPE OF BORING: Solid flight auger to 5.9m, rotary to 6.5m, HQ to 23.95m
WATER OBSERVATIONS: Free groundwater measured at 16.20m at completion of drilling, groundwater measured at 10.2m 12/12/2013
REMARKS: 50% water loss at 11.59m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
I	Tube sample (x mm dia.)	DP	Perth penetrometer (kPa)
R	Rock core	S	Standard penetration test
V	Shear vane (kPa)	▽	Water level

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING: 227087
NORTHING: 6408374
DIP/AZIMUTH: 90°/--

BORE No: M1
PROJECT No: 49761
DATE: 11/12/2013
SHEET 5 OF 5

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SILTSTONE - High strength, fresh, dark grey siltstone *(continued)*		C	20.27				
					20.73		PL(A) = 1.42		
	21				21.19				21
				GT002					
					21.43				
				C	21.7		PL(A) = 2.61 PL(D) = 1.59		
	22								22
					22.26		PL(A) = 0.53		
	22.59	SANDSTONE - Medium strength, fresh, grey, fine to medium grained sandstone with some siltstone laminations							
	23				22.99				23
				C	23.51		PL(A) = 0.71		From 23.0m to 23.95m, Class 18 blank
	23.95				23.95				End cap
	24	Bore discontinued at 23.95m , limit of investigation							24

RIG: Hydropower Scout **DRILLER:** (Total Drilling) Sawyer **LOGGED:** Fulham **CASING:** HW to 6.0m

TYPE OF BORING: Solid flight auger to 5.9m, rotary to 6.5m, HQ to 23.95m

WATER OBSERVATIONS: Free groundwater measured at 16.20m at completion of drilling, groundwater measured at 10.2m 12/12/2013

REMARKS: 50% water loss at 11.59m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	PID	Photo ionisation detector (ppm)
D	Disturbed sample	PL(A)	Point load axial test Is(50) (MPa)
E	Environmental sample	PL(D)	Point load diametral test Is(50) (MPa)
		DP	Perth penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Pty Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: OP032
PROJECT No: 49761
DATE: 12/12/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SILTY SAND - (Medium dense), red brown silty, fine to medium grained sand, trace fine grained subangular gravel, humid							From 0m to 0.3m, concrete
		From 0.5m, slightly clayey, some fine sized subangular gravel							
	0.75	SILTY CLAY - Hard, brown silty clay, some fine grained subangular gravel and fine to medium grained sand, M>Wp			1.0				
	1.2			pp	1.0		>500kPa		
		SANDSTONE - Medium strength, highly weathered, grey, fine to medium grained sandstone		S	1.25		8,27,30 N = 57		
	1.5				1.45				
	1.67	CORE LOSS - 0.17m			1.5				
		SILTSTONE/SANDSTONE - Medium strength, slightly to moderately weathered, grey, fine to medium grained sandstone (moderately weathered), thinly bedded with siltstone (slightly weathered)			2.0		PL(A) = 0.91 PL(D) = 0.32		From 0m to 4.85m, Class 18 PVC From 0.3m to 4.85m, bentonite
		From 1.95m to 2.02m, moderately weathered, sandstone band		C					
	2.79	From 2.34m to 2.47m, moderately weathered sandstone band			2.95		PL(A) = 1.14 PL(D) = 0.89		
		SANDSTONE - High strength, moderately weathered, grey, fine to medium grained sandstone			3.0				
		From 3.92m, fine to coarse grained, medium strength			4.22		PL(A) = 0.85 PL(D) = 0.66		
	4.74	COAL - Extremely low strength, extremely weathered, black coal with red mottled sections		C					
	4.92	CORE LOSS - 1.29m							
					6.0				From 4.8m to 6.35m, 5mm gravel From 4.85m to 6.35m, Class 18 PVC Screen End Cap
	6.21	COAL - Extremely low strength, extremely weathered black coal		C					
	6.37				6.4				
	6.4	CARBONACEOUS SILTSTONE - Low strength, moderately weathered, brown carbonaceous siltstone							
	6.55	CORE LOSS - 0.150m							
	6.76	CARBONACEOUS SILTSTONE - Low strength, moderately weathered carbonaceous siltstone							
		SANDSTONE - High strength, slightly weathered, grey/brown, fine to medium grained sandstone		C	7.64		PL(A) = 1.54 PL(D) = 1.1		From 6.35m to 8.65m, bentonite
		From 8.29m, moderately weathered			8.55		PL(A) = 1.73		
	8.65	Bore discontinued at 8.65m, limit of investigation			8.65				

RIG: Hydropower Scout **DRILLER:** (Total) Sawyer **LOGGED:** Holden **CASING:** HW to 1.25m

TYPE OF BORING: Solid flight auger to 1.6m, HQ3 to 8.65m

WATER OBSERVATIONS: Free groundwater obscured due to drilling fluids. No free groundwater observed whilst auger drilling

REMARKS: From 2.6m, water loss

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	U	Undisturbed sample
B	Bulk sample	W	Water sample
C	Core drilling	pp	Pocket penetrometer (kPa)
D	Disturbed sample	S	Standard penetration test
E	Environmental sample	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: 313.68 AHD
EASTING: 233693.28
NORTHING: 6403938.79
DIP/AZIMUTH: 90°/--

BORE No: A21
PROJECT No: 49761
DATE: 29-30/4/13
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
313	0.2	TOPSOIL - Brown silty sand topsoil, generally comprising fine to medium grained sand, abundant rootlets, humid							Stickup = 0.63m
		SILTY SAND - Medium dense, brown, fine to medium grained silty sand with trace to some fine sized gravel, with some clay, humid		D	0.5				
	1			S	1.0		6,10,13 N = 23		
312					1.45				
	2	From 2.0m, with some fine to coarse grained sand, fine to coarse sized subangular to angular gravel							
311				S	2.5		6,12,16 N = 28		
	3				2.95				
	3.0	SAND - Yellow brown, fine to medium grained sand with trace to some silt, trace clay, some fine to medium sized subrounded, subangular gravel, humid		D	3.0				From 0m to 7.0m, grout
310	4			S	4.0		5,7,6 N = 13		
					4.45				
309	5								
					5.5				
308				S			4,5,8 N = 13		
	6				5.95				
		From 6.5m, with some clay lense		D	6.0				
307	7	From 7.1m to 7.4m, very stiff, brown clay, M<Wp		S,pp	7.0		3,7,10 N = 17 230-300 kPa		
					7.45				From 7.0m to 8.05m, bentonite
306	7.8	CLAYEY SAND - Medium dense, brown, fine to coarse grained clayey sand, damp							
	8								
305				S	8.5		4,12,10 N = 22		
	9				8.95				
	9.0	SAND - Brown, fine to coarse grained sand with some clay lenses, trace fine sized gravel, damp		D	9.0				
304	10.0				10.0				

RIG: TD Rig 106 **DRILLER:** (Total) Sawyer **LOGGED:** Cowan **CASING:** Uncased

TYPE OF BORING: Solid flight auger TC to 14.95m

WATER OBSERVATIONS: Free groundwater observed at 11.25m

REMARKS: Top of pipe RL 314.31 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: 313.68 AHD
EASTING: 233693.28
NORTHING: 6403938.79
DIP/AZIMUTH: 90°/--

BORE No: A21
PROJECT No: 49761
DATE: 29-30/4/13
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
303	11	CLAYEY SAND - Medium dense, brown, fine to coarse grained clayey sand, damp		S	10.0		4,5,9 N = 14		From 8m to 14.3m, 5mm gravel From 8.3m to 14.3m, Class 18 PVC Screen
					10.45				
302	12			S	11.5		3,3,8 N = 11		
					11.95				
301	13			S	13.0		4,7,8 N = 15		
					13.45				
300	14								End cap
	14.2	SANDSTONE - Extremely low strength, extremely weathered, brown, fine to medium grained sandstone with trace to some fine sized gravel		S	14.5		12,22,23 N = 45		From 14.3m to 14.95m, bentonite
299	14.95	Bore discontinued at 14.95m			14.95				
298	15								
297	16								
296	17								
295	18								
294	19								

RIG: TD Rig 106 **DRILLER:** (Total) Sawyer **LOGGED:** Cowan **CASING:** Uncased

TYPE OF BORING: Solid flight auger TC to 14.95m

WATER OBSERVATIONS: Free groundwater observed at 11.25m

REMARKS: Top of pipe RL 314.31 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: 270.68 AHD
EASTING: 228647.04
NORTHING: 6409111.72
DIP/AZIMUTH: 90°/--

BORE No: AGE07W
PROJECT No: 49761
DATE: 7-9/5/13
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
270	0.2	TOPSOIL - Grey brown sandy silt topsoil, generally comprising fine to medium grained sand, abundant rootlets, humid							Stickup = 0.65m
	0.6	SANDY SILT / SILTY SAND - Red brown, fine to medium grained sandy silt / silty sand, humid with trace to some clay							
269	1	SILTY CLAY - Hard, red brown silty clay with trace to some fine to medium grained sand, M<<Wp							
	2								
268	2.5	CLAYSTONE - Extremely low strength, extremely weathered grey claystone							
	2.9	CORE LOSS - 0.25m (2.90m-3.15m)							
	3								
	3.15	CLAYSTONE - Extremely low strength, extremely weathered, red brown, orange brown fragmented claystone From 3.35m, extremely low to very low strength, highly to moderately weathered, grey From 3.5m, extremely low strength, extremely weathered, orange brown From 3.73m, very low to low strength, moderately weathered, grey							From 0m to 6.9m, grout
267	4								
266	4.63	From 3.88m, extremely low to very low strength, fragmented From 4.0m, very low to low strength From 4.07m, extremely low to very low strength, fragmented							
	5								
	5.35	From 4.11m, very low to low strength, grey brown, highly fractured							
265	5.64	From 4.35m, brown, orange brown with some grey From 4.56m, extremely low strength, extremely weathered, orange brown							
	6								
	6.02	CORE LOSS - 0.72m (4.63m-5.35m)							
	6.3								
264	6.5	BASALT - High strength, moderately to slightly weathered, grey with some ironstaining basalt							
	7	CLAYSTONE - Extremely low to very low strength, extremely to highly weathered, brown claystone							
		CORE LOSS - 0.28m (6.02m-6.3m)							
263		CLAYSTONE - Low strength, moderately to slightly weathered, grey, brown, claystone							
	8	SANDSTONE - Low strength, moderately to slightly weathered, grey brown, fine to medium grained sandstone From 7.0m, with some dark grey							From 6.9m to 8.9m, bentonite
262									
	9								
	9.1								
	9.14	CORE LOSS - 0.04m (9.10m-9.14m), rock roller cleaning out hole							
261		SANDSTONE - Low strength, moderately to slightly weathered, grey brown, fine to medium grained sandstone							

RIG: TD Rig 106 **DRILLER:** (Total) Sawyer **LOGGED:** Cowan **CASING:** HW to 7.2m

TYPE OF BORING: 100mm DTH to 20m

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Description from AGE07 Log. Top of pipe RL 271.32 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: 270.68 AHD
EASTING: 228647.04
NORTHING: 6409111.72
DIP/AZIMUTH: 90°/--

BORE No: AGE07W
PROJECT No: 49761
DATE: 7-9/5/13
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
260	11	From 9.54m, with some red brown From 9.9m, medium to high strength, slightly weathered SANDSTONE - Low strength, moderately to slightly weathered, grey brown, fine to medium grained sandstone *(continued)* From 10.46m, high to very high strength From 10.6m, fine to coarse grained with trace fine sized subrounded gravel (microgranite?)							11
259	12	From 11.58m, medium to coarse grained with some fine sized subrounded gravel (microgranite?)							12
258	12.41	CLAYSTONE - Very low strength, moderately weathered, brown claystone From 12.51m, brown							
	12.86	From 12.59m to 12.64m, very low to low strength, extremely to highly weathered, black coal From 12.69m, extremely low to very low strength, extremely to highly weathered, light brown and white From 12.79m, low strength, moderately weathered							13
257	13.59	STONEY COAL - Low to medium strength, slightly weathered to fresh, dark brown to black							From 8.9m to 17.55m, 5mm gravel From 9.5m to 17m, Class 18 PVC Screen
	14.11	From 12.99m to 13.01m, coal From 13.03m to 13.06m, coal From 13.21m to 13.29m, bands of coal up to 20mm thick From 13.33m to 13.48m, coal							14
256	15	SILTSTONE - Medium to high strength, fresh, grey siltstone							15
255	15.6	SANDSTONE - Medium to high strength, fresh, grey, fine to medium grained sandstone with some siltstone laminations							
	16	SILTSTONE - Medium to high strength, fresh, grey siltstone From 15.7m to 16.25m, fine grained sandstone, intrusion, 80°, 25-35mm thick From 15.81m to 16.69m, carbonaceous siltstone							16
254	16.84	LAMINITE - Medium to high strength, fresh, grey, fine grained laminite							17
253	18								18
	18.14	SILTSTONE - Medium to high strength, fresh, grey siltstone							
252	19								From 17.55m to 20m, bentonite 19
	19.15	SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone							
251	20.0	Bore discontinued at 20.0m, limit of investigation							End cap

RIG: TD Rig 106 **DRILLER:** (Total) Sawyer **LOGGED:** Cowan **CASING:** HW to 7.2m

TYPE OF BORING: 100mm DTH to 20m

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Description from AGE07 Log. Top of pipe RL 271.32 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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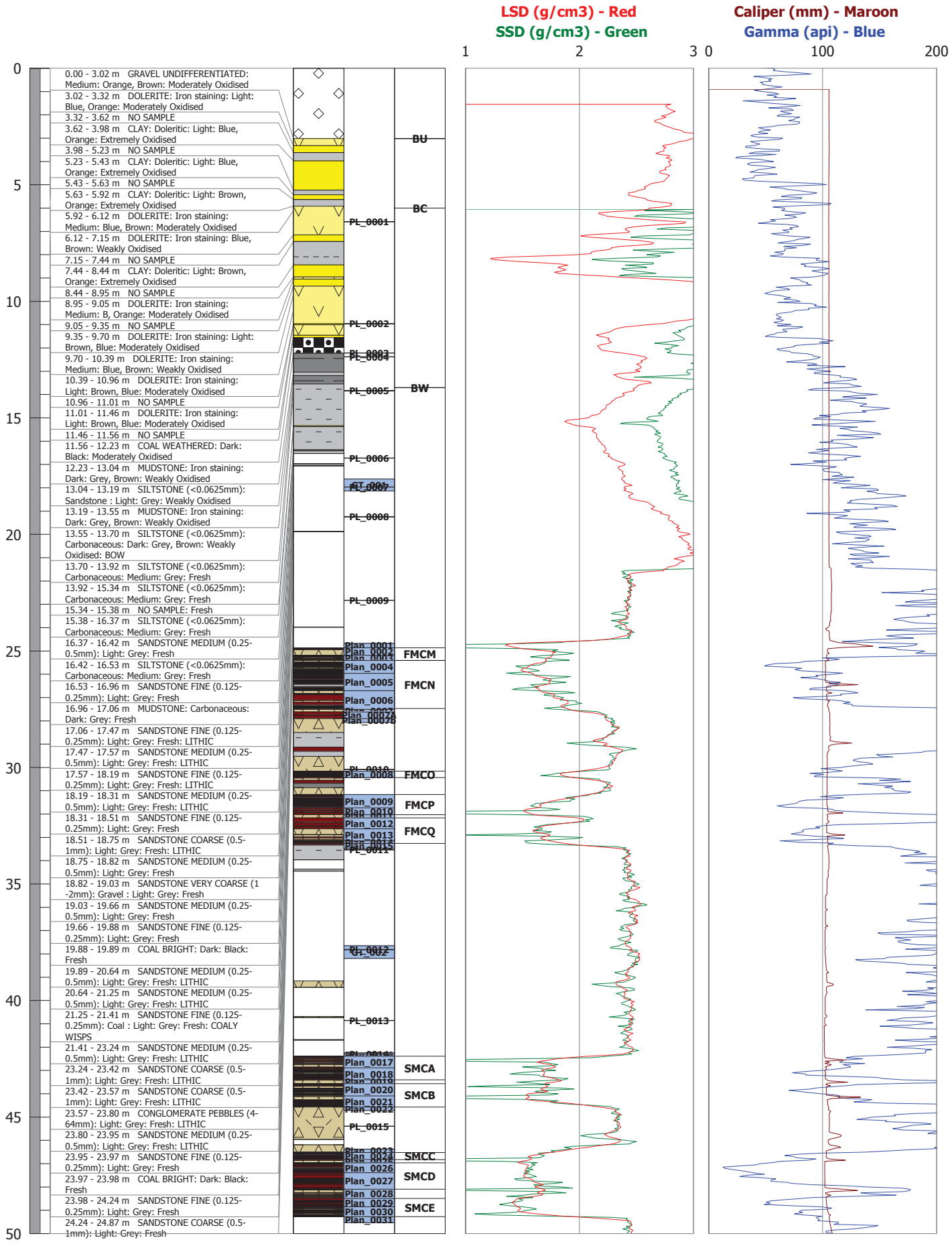
Bylong: Drillhole Summary

Hole Number: BY0001CH **Hole Type**: Part Open/Core Drilling
Date: 10/05/2011 **Tenement**: AUTH287
Total Depth: 200.44 m **Area**: Bylong Station

MGA94_56S
Easting: 233576.58
Northing: 6409320.64
Height: 375.40



Bylong: Drillhole Summary

Hole Number: BY0001CH **Hole Type**: Part Open/Core Drilling
Date: 10/05/2011 **Tenement**: AUTH287
Total Depth: 200.44 m **Area**: Bylong Station

MGA94_56S
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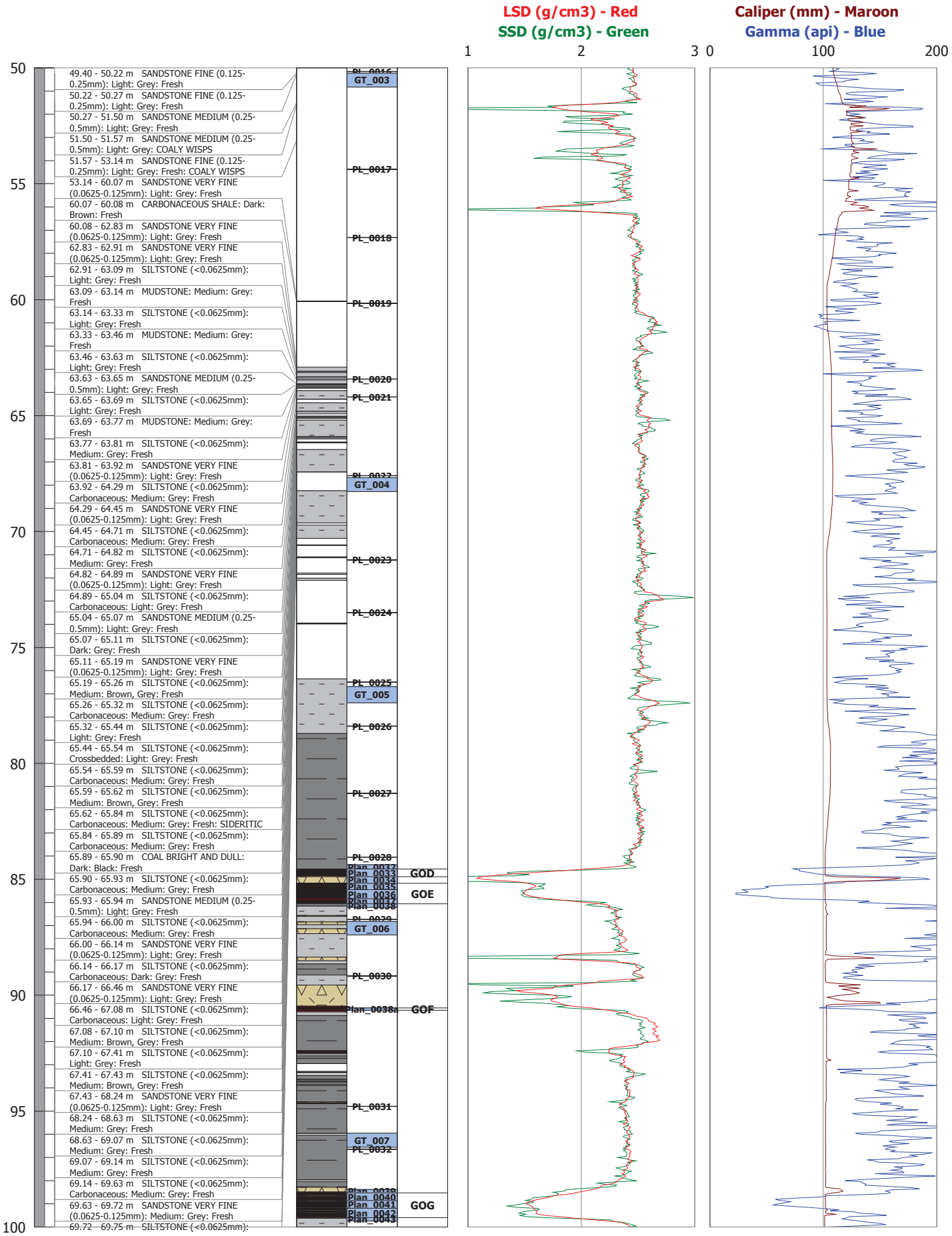

Bylong: Drillhole Summary

Hole Number: BY0001CH **Hole Type**: Part Open/Core Drilling
Date: 10/05/2011 **Tenement**: AUTH287
Total Depth: 200.44 m **Area**: Bylong Station

MGA94_56S
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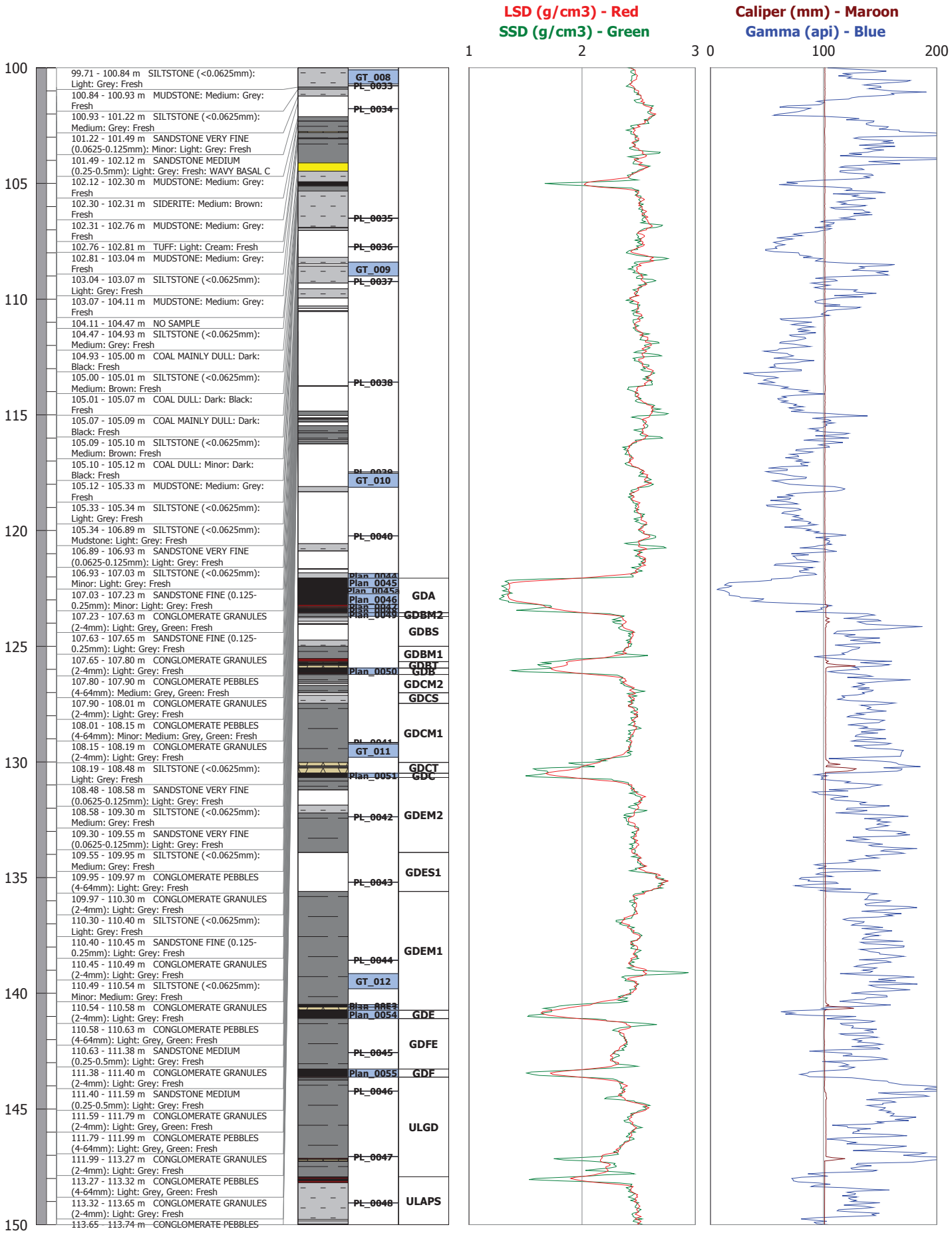

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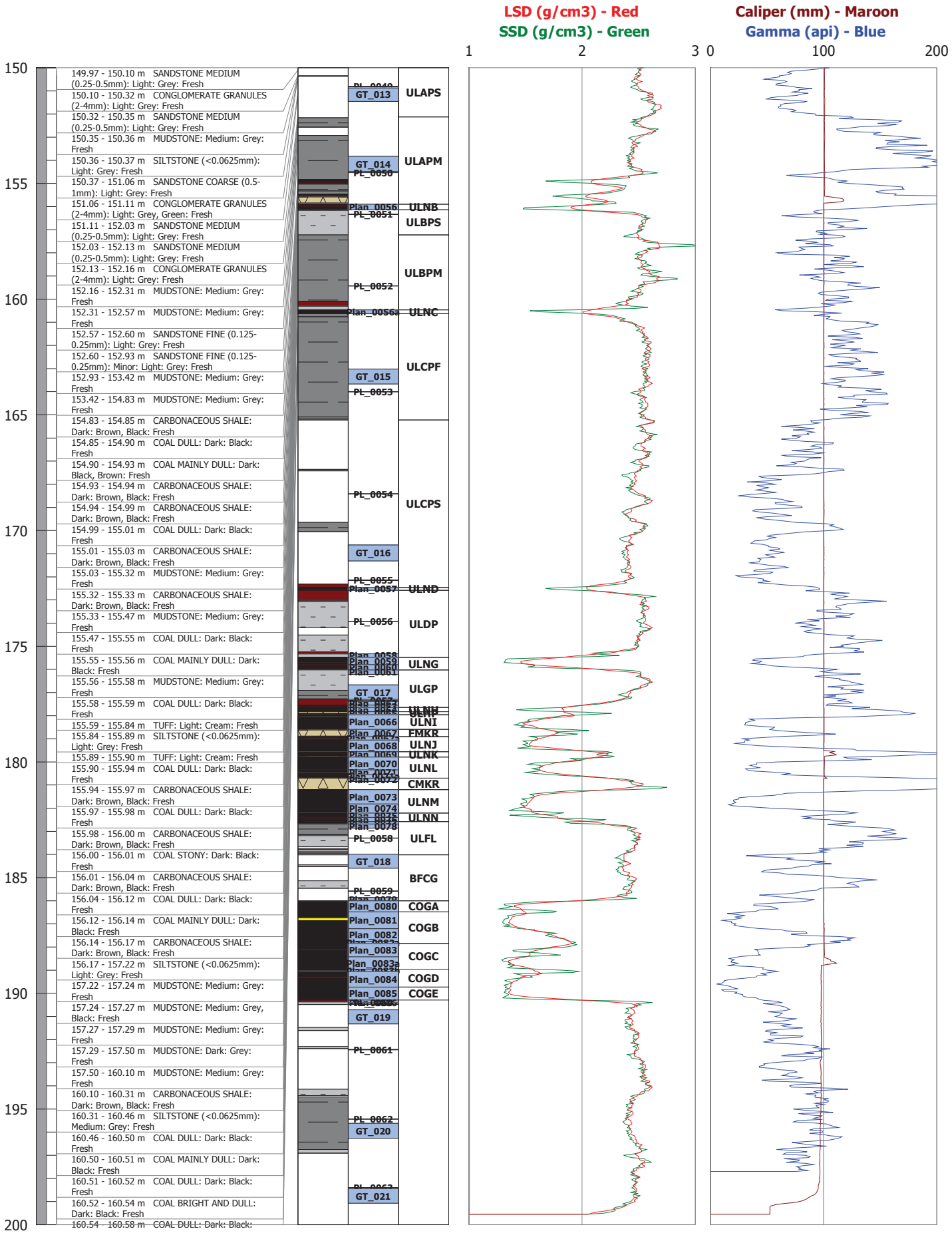
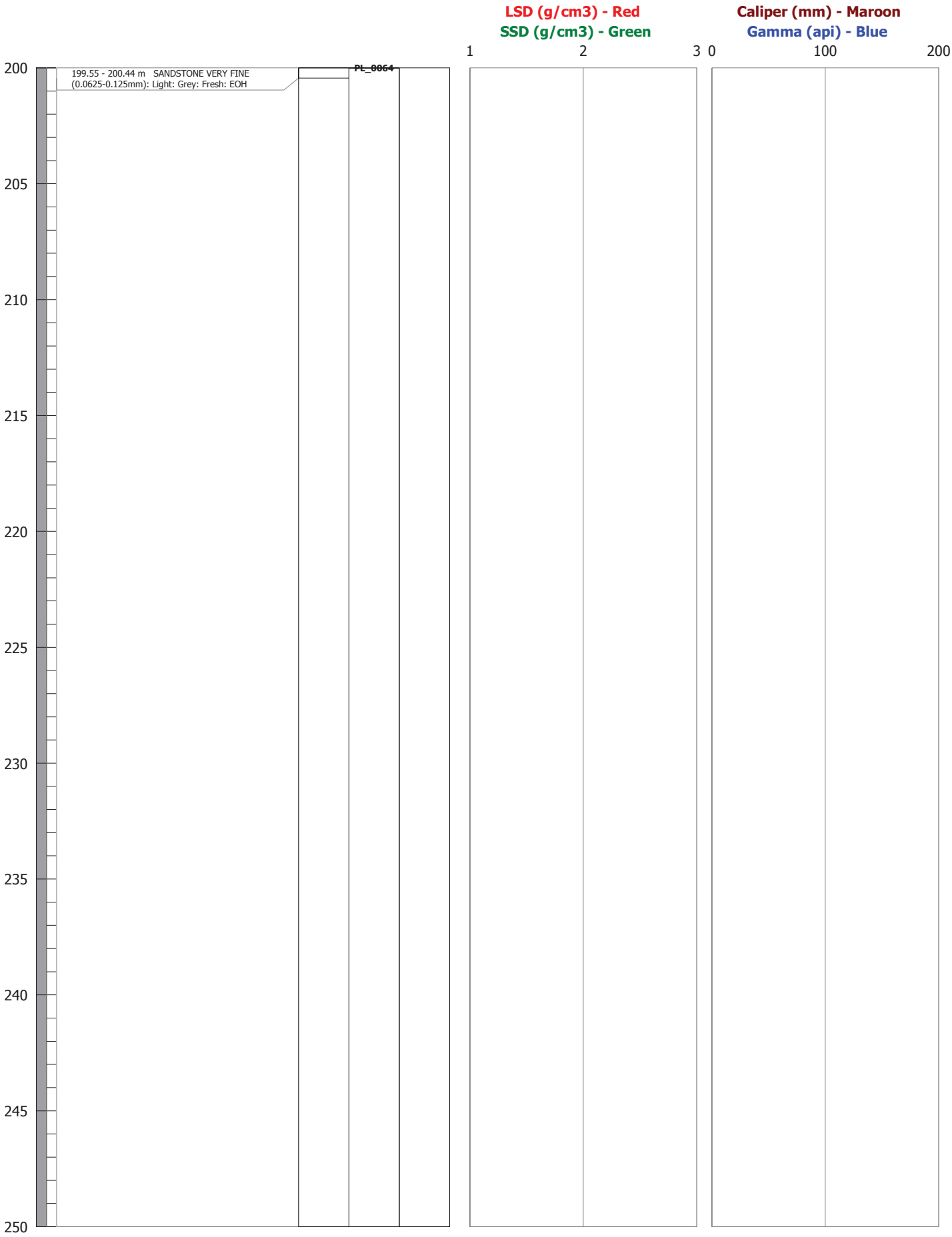


Bylong: Drillhole Summary

Hole Number: BY0001CH **Hole Type**: Part Open/Core Drilling
Date: 10/05/2011 **Tenement**: AUTH287
Total Depth: 200.44 m **Area**: Bylong Station

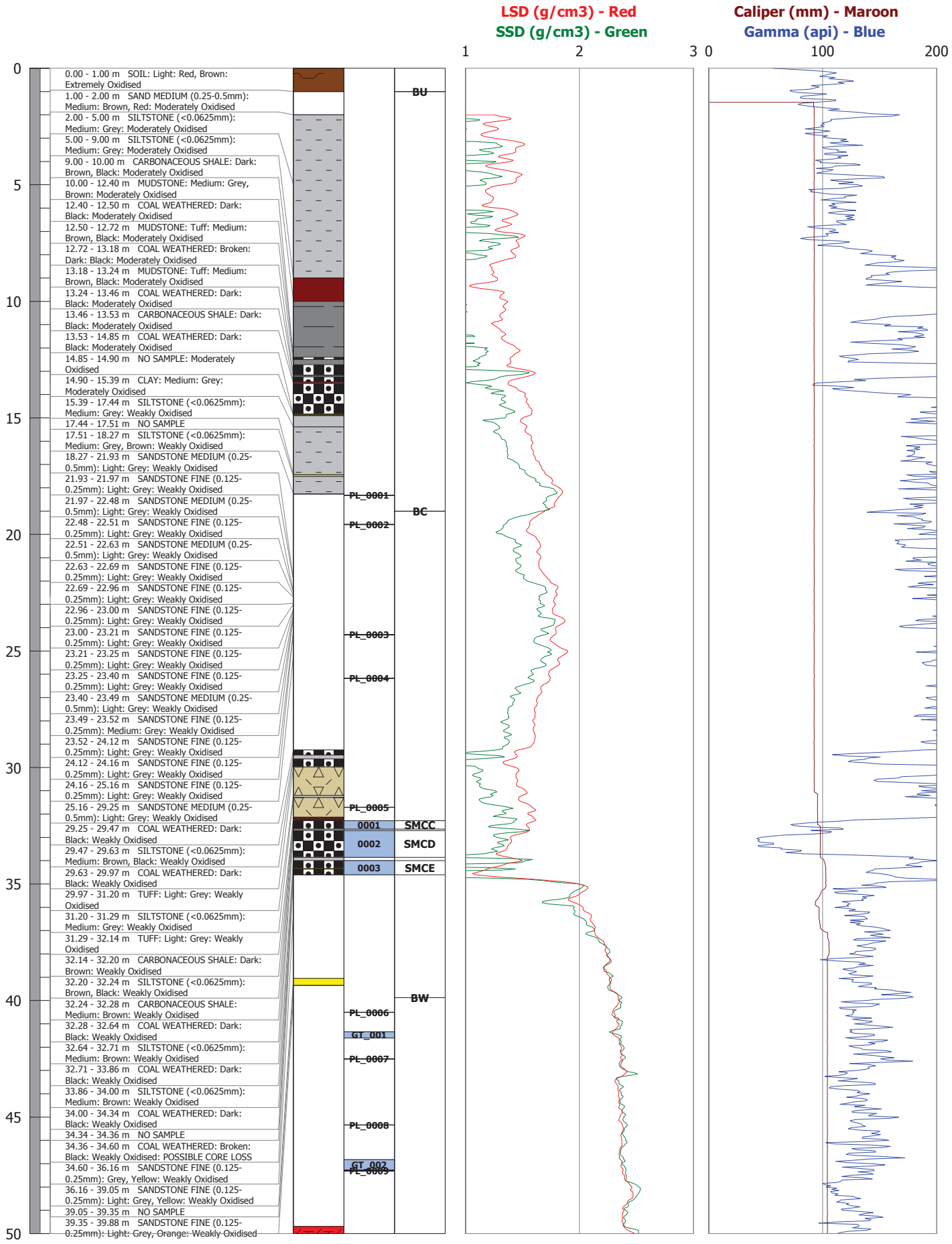
MGA94_56S
Easting: 233576.58
Northing: 6409320.64
Height: 375.40



Bylong: Drillhole Summary

Hole Number: BY0007CH **Hole Type**: Part Open/Core Drilling
Date: 6/06/2011 **Tenement**: AUTH287
Total Depth: 186.64 m **Area**: Bylong Station

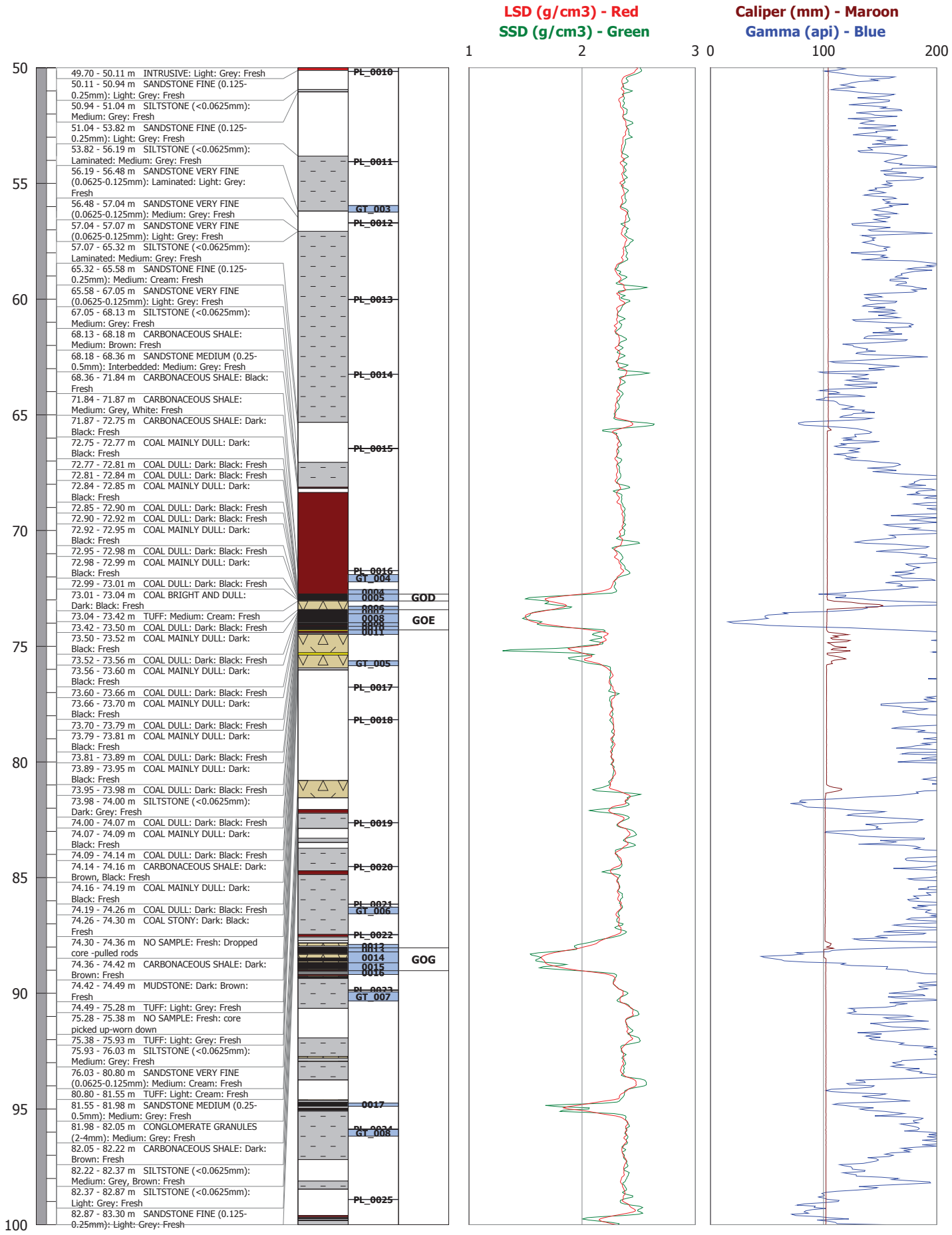
MGA94_56S
Easting: 230443.17
Northing: 6410217.64
Height: 368.69



Bylong: Drillhole Summary

Hole Number: BY0007CH **Hole Type**: Part Open/Core Drilling
Date: 6/06/2011 **Tenement**: AUTH287
Total Depth: 186.64 m **Area**: Bylong Station

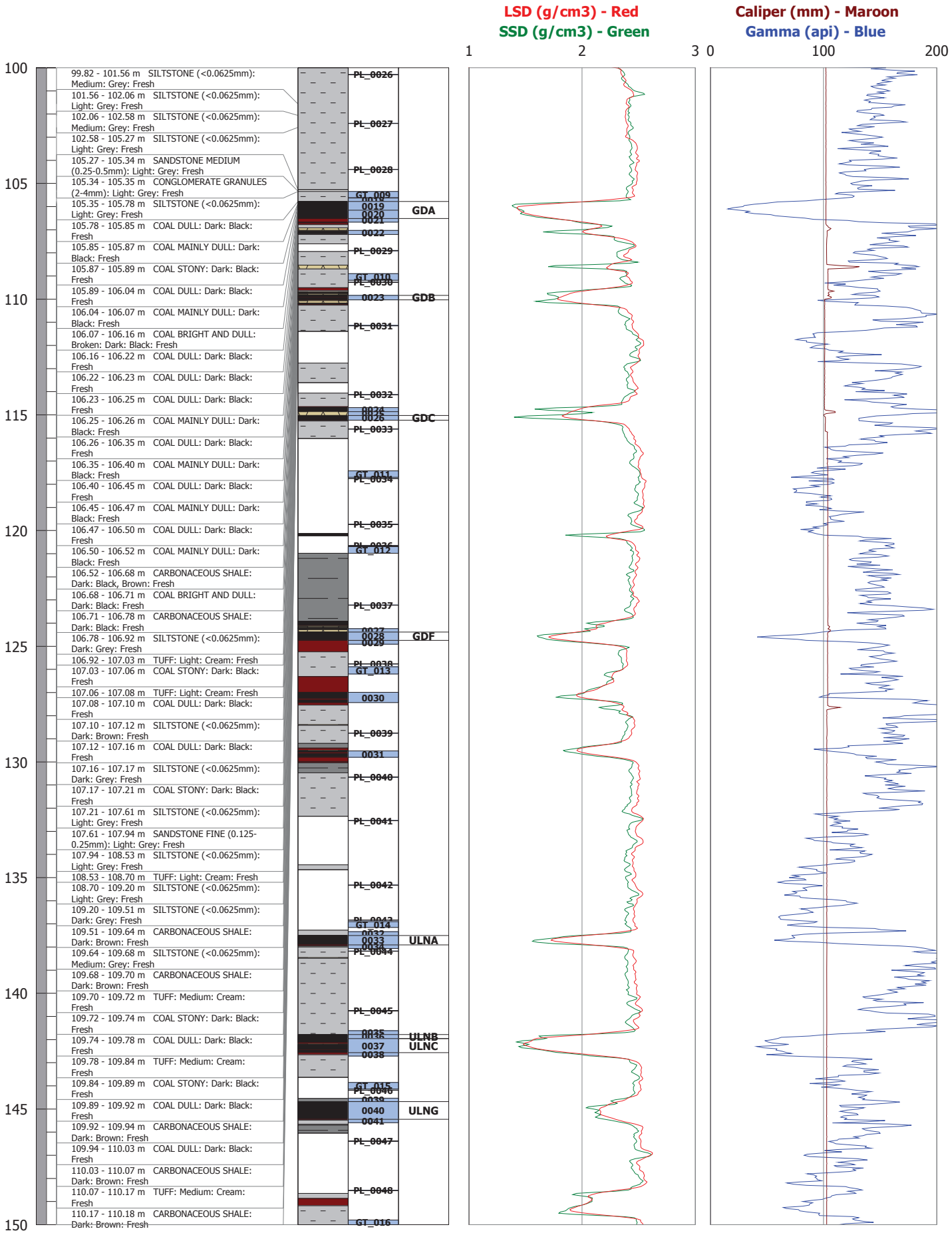
MGA94_56S
Easting: 230443.17
Northing: 6410217.64
Height: 368.69



Bylong: Drillhole Summary

Hole Number: BY0007CH **Hole Type**: Part Open/Core Drilling
Date: 6/06/2011 **Tenement**: AUTH287
Total Depth: 186.64 m **Area**: Bylong Station

MGA94_56S
Easting: 230443.17
Northing: 6410217.64
Height: 368.69



Bylong: Drillhole Summary

Hole Number: BY0007CH **Hole Type**: Part Open/Core Drilling
Date: 6/06/2011 **Tenement**: AUTH287
Total Depth: 186.64 m **Area**: Bylong Station

MGA94_56S
Easting: 230443.17
Northing: 6410217.64
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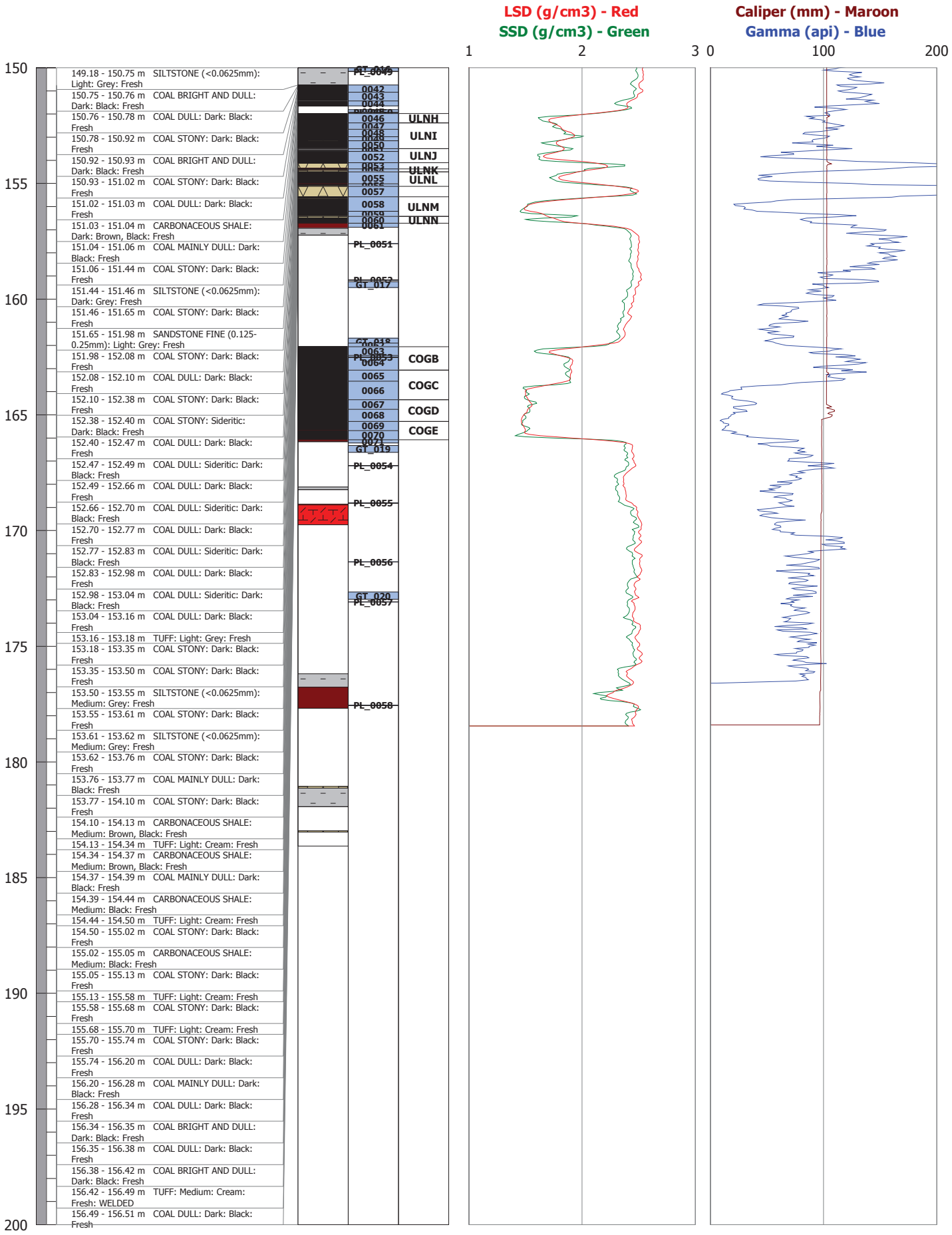
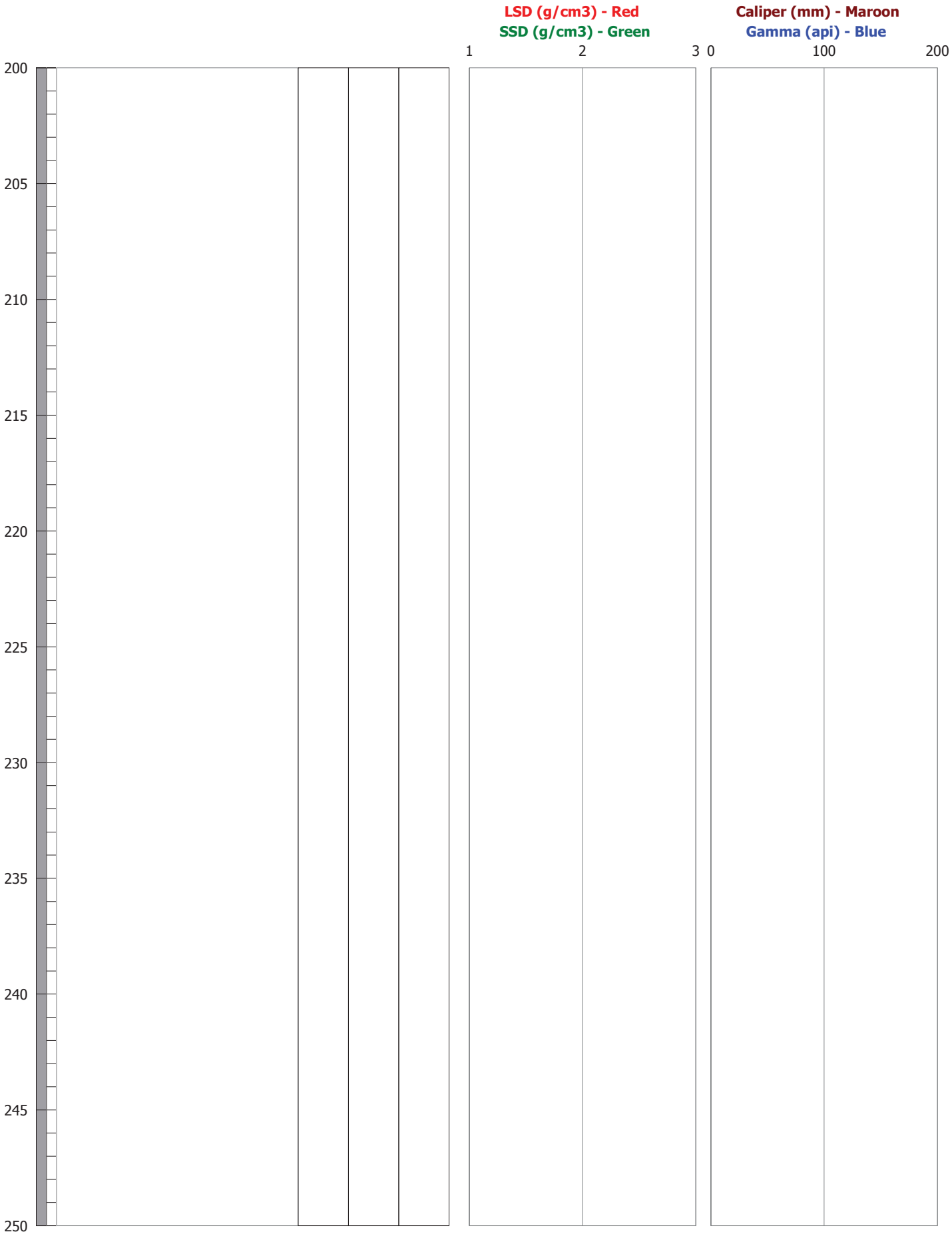


Bylong: Drillhole Summary

Hole Number: BY0007CH **Hole Type**: Part Open/Core Drilling
Date: 6/06/2011 **Tenement**: AUTH287
Total Depth: 186.64 m **Area**: Bylong Station

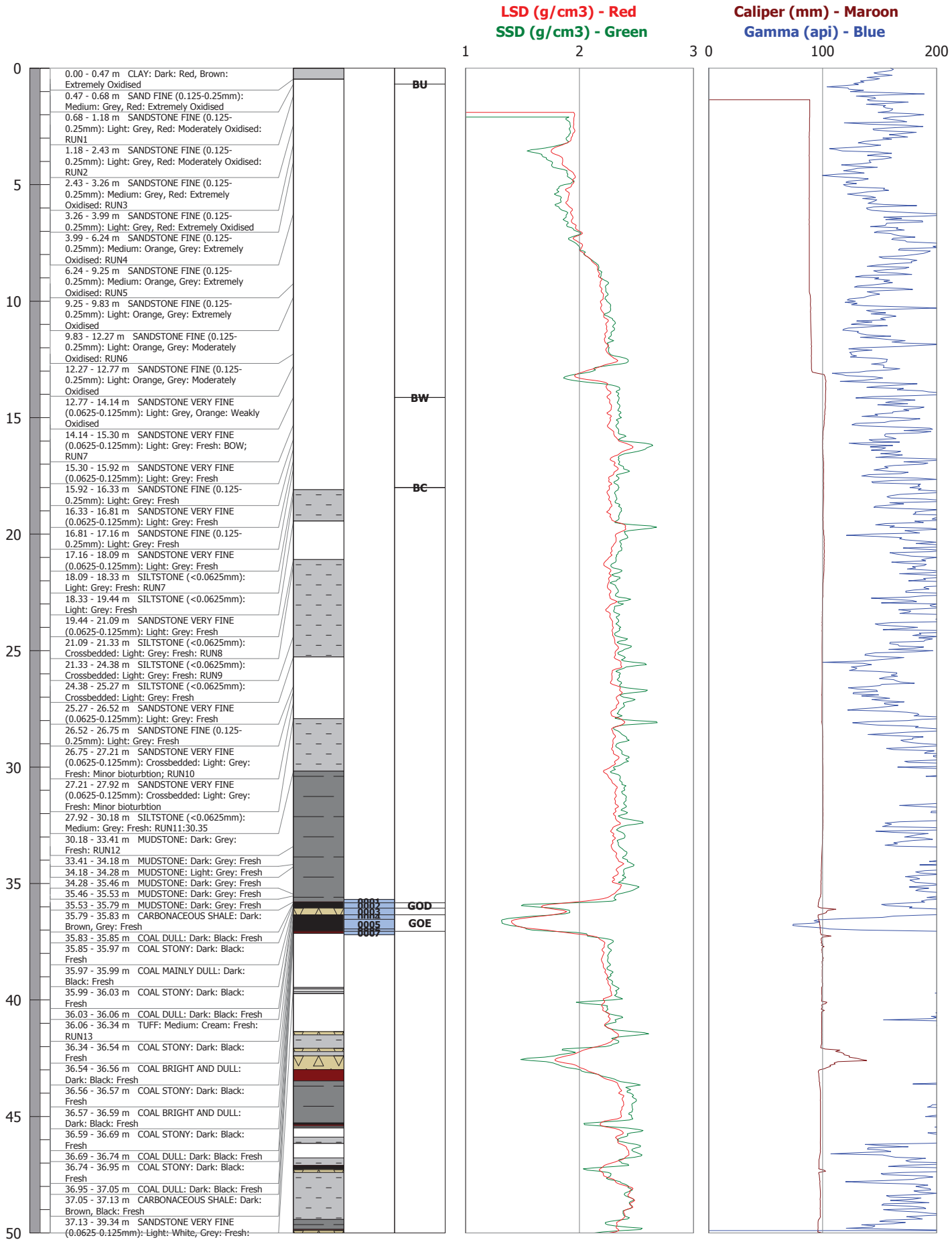
MGA94_56S
Easting: 230443.17
Northing: 6410217.64
Height: 368.69



Bylong: Drillhole Summary

Hole Number: BY0010CH **Hole Type**: Core Drilling
Date: 22/06/2011 **Tenement**: AUTH287
Total Depth: 147.52 m **Area**: Bylong Station

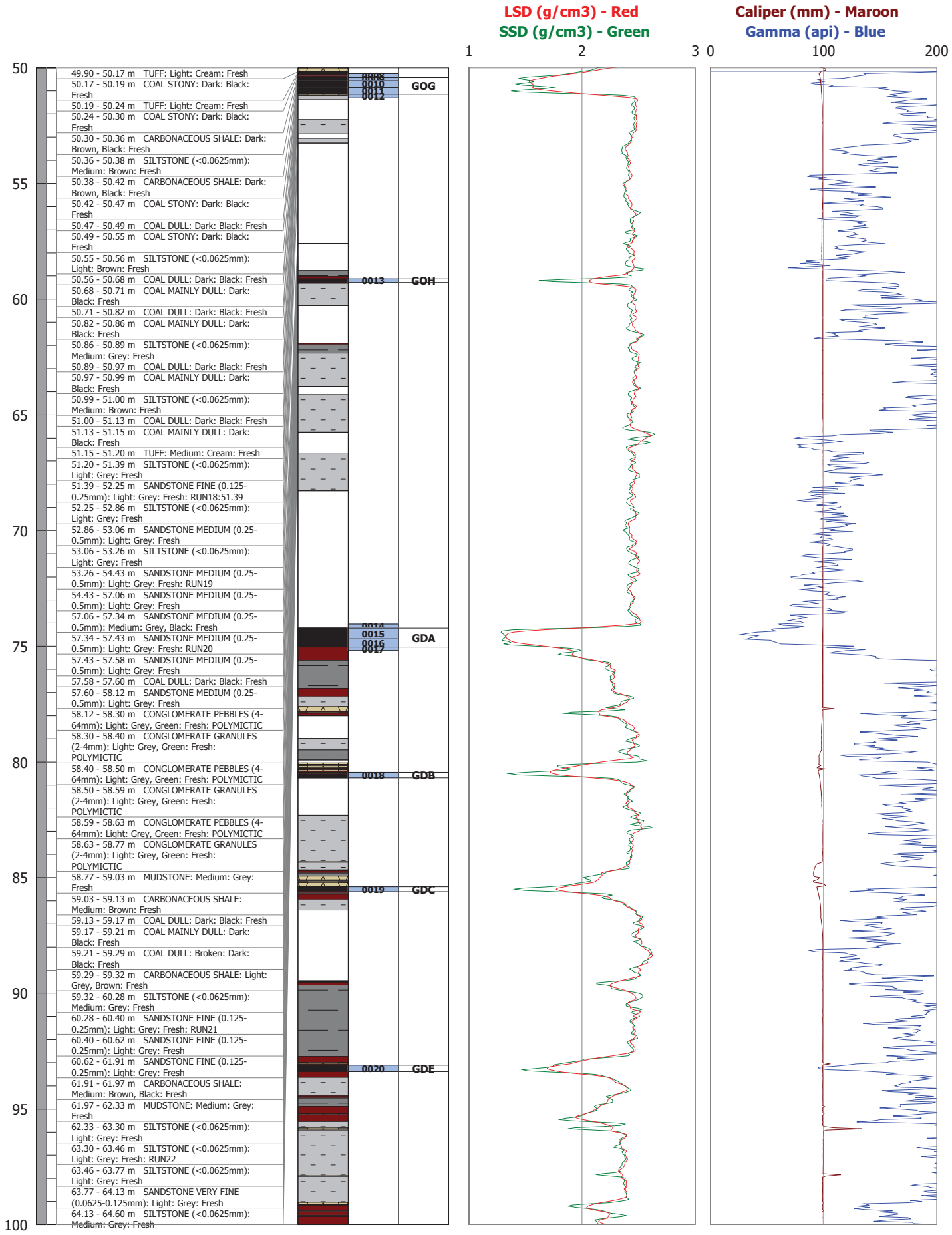
MGA94_56S
Easting: 231893.30
Northing: 6412109.84
Height: 301.35



Bylong: Drillhole Summary

Hole Number: BY0010CH **Hole Type**: Core Drilling
Date: 22/06/2011 **Tenement**: AUTH287
Total Depth: 147.52 m **Area**: Bylong Station

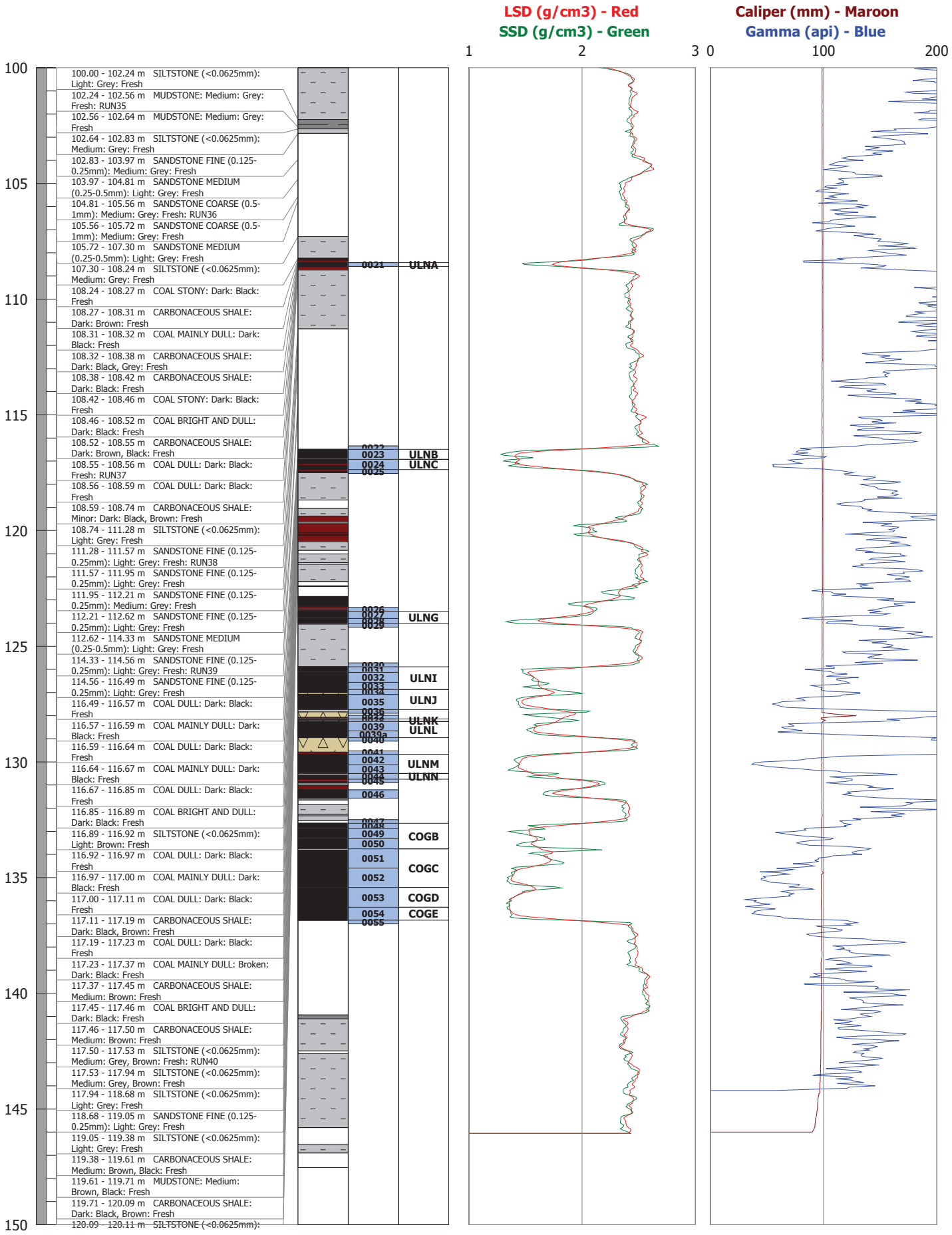
MGA94_56S
Easting: 231893.30
Northing: 6412109.84
Height: 301.35



Bylong: Drillhole Summary

Hole Number: BY0010CH **Hole Type**: Core Drilling
Date: 22/06/2011 **Tenement**: AUTH287
Total Depth: 147.52 m **Area**: Bylong Station

MGA94_56S
Easting: 231893.30
Northing: 6412109.84
Height: 301.35

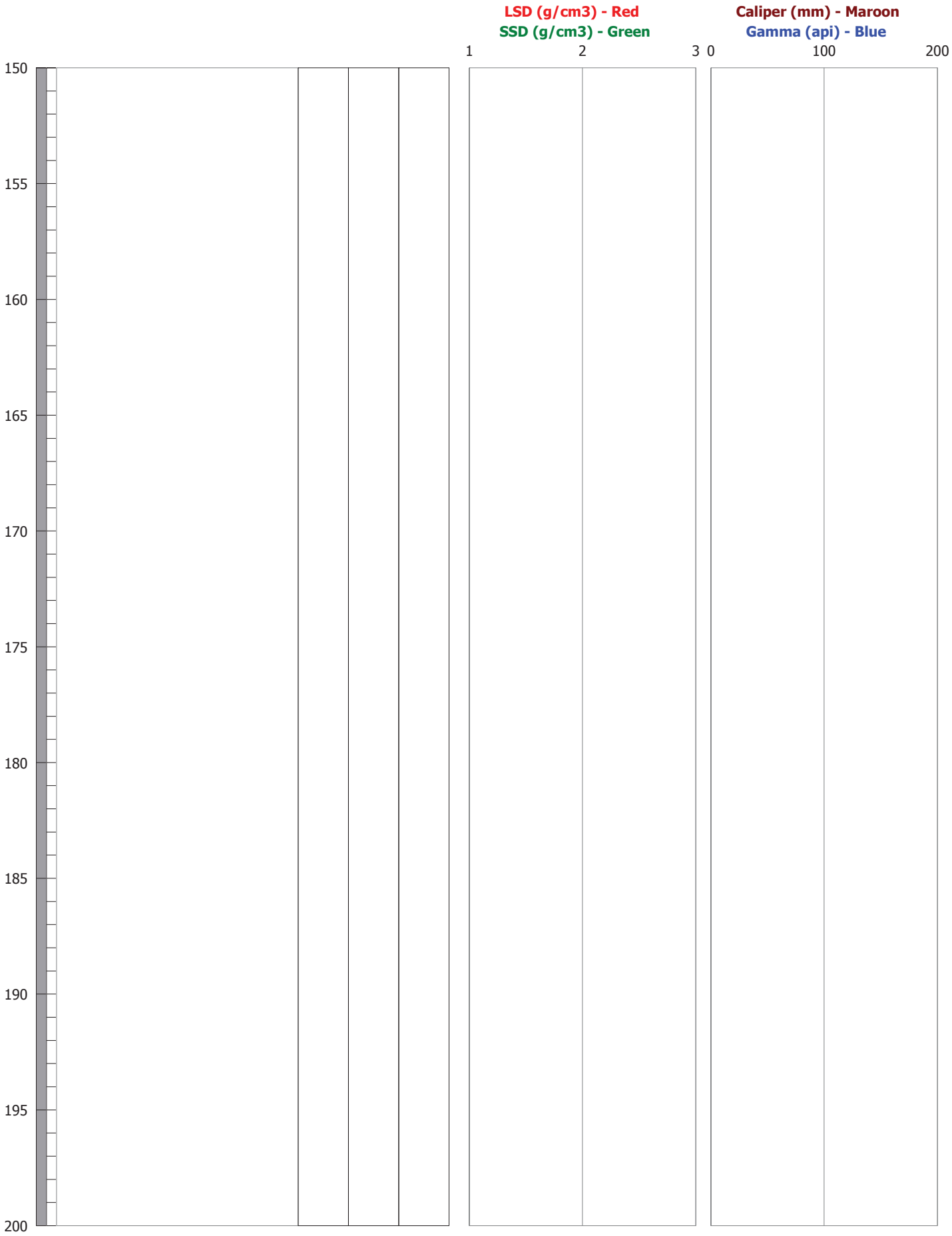


Bylong: Drillhole Summary

Hole Number: BY0010CH
Date : 22/06/2011
Total Depth : 147.52 m

Hole Type : Core Drilling
Tenement : AUTH287
Area : Bylong Station

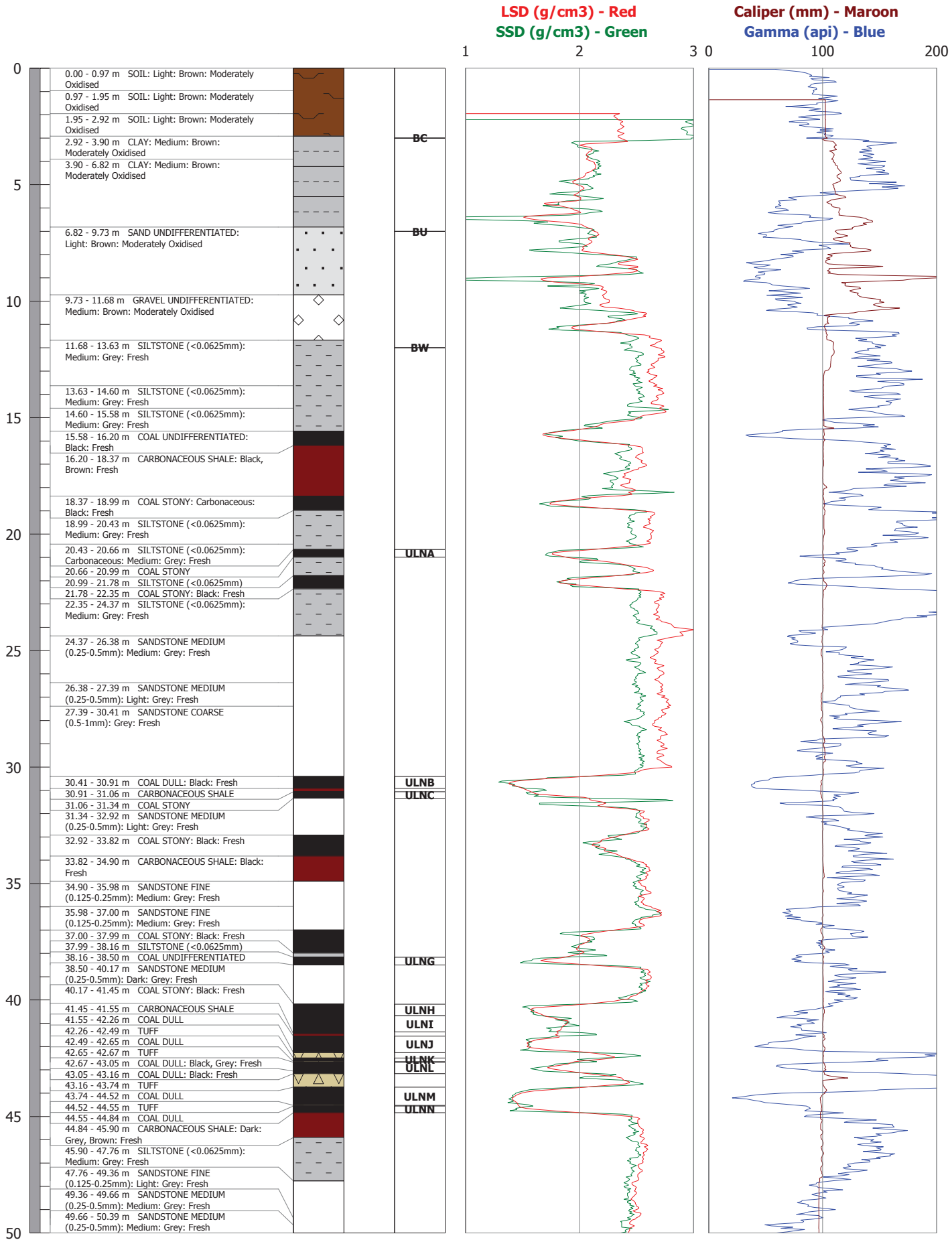
MGA94_56S
Easting : 231893.30
Northing : 6412109.84
Height : 301.35



Bylong: Drillhole Summary

Hole Number: BY0014CHR1 **Hole Type**: Part Open/Core Drilling
Date: 28/07/2011 **Tenement**: AUTH287
Total Depth: 66.29 m **Area**: Bylong Station

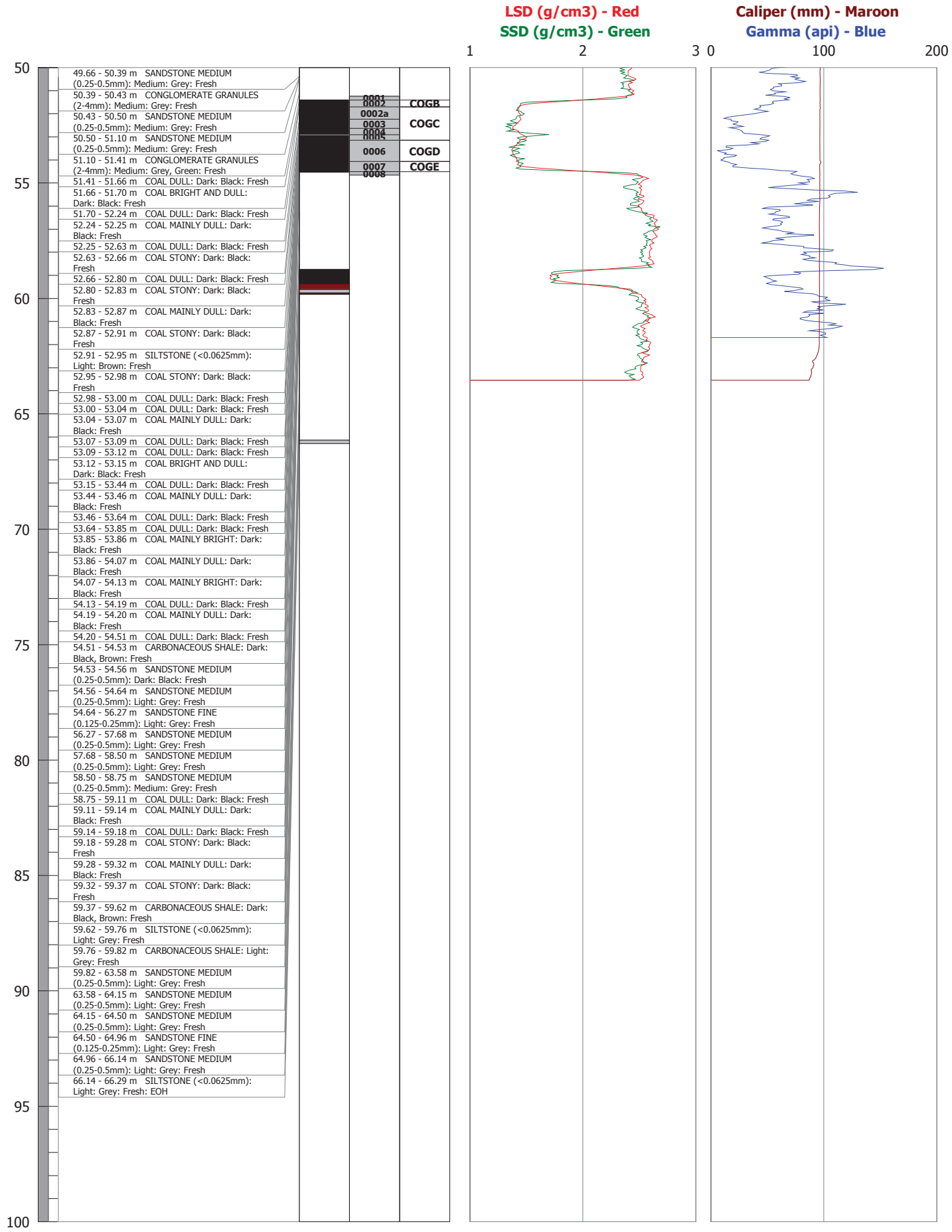
MGA94_56S
Easting: 229612.00
Northing: 6410336.00
Height: 307.00



Bylong: Drillhole Summary

Hole Number: BY0014CHR1 **Hole Type**: Part Open/Core Drilling
Date: 28/07/2011 **Tenement**: AUTH287
Total Depth: 66.29 m **Area**: Bylong Station

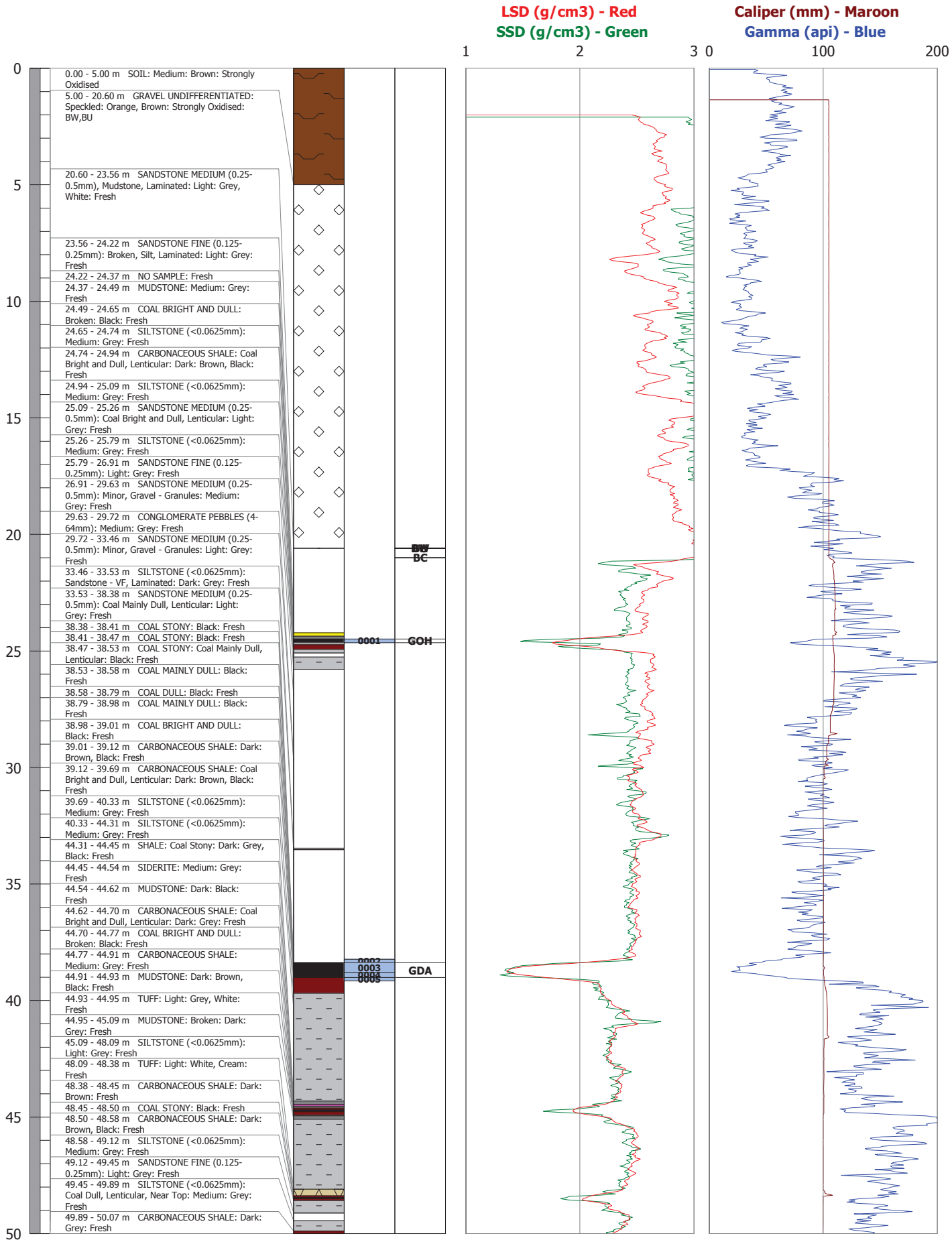
MGA94_56S
Easting: 229612.00
Northing: 6410336.00
Height: 307.00



Bylong: Drillhole Summary

Hole Number: BY0015CH **Hole Type**: Core Drilling
Date: 7/07/2011 **Tenement**: AUTH287
Total Depth: 102.70 m **Area**: Bylong Station

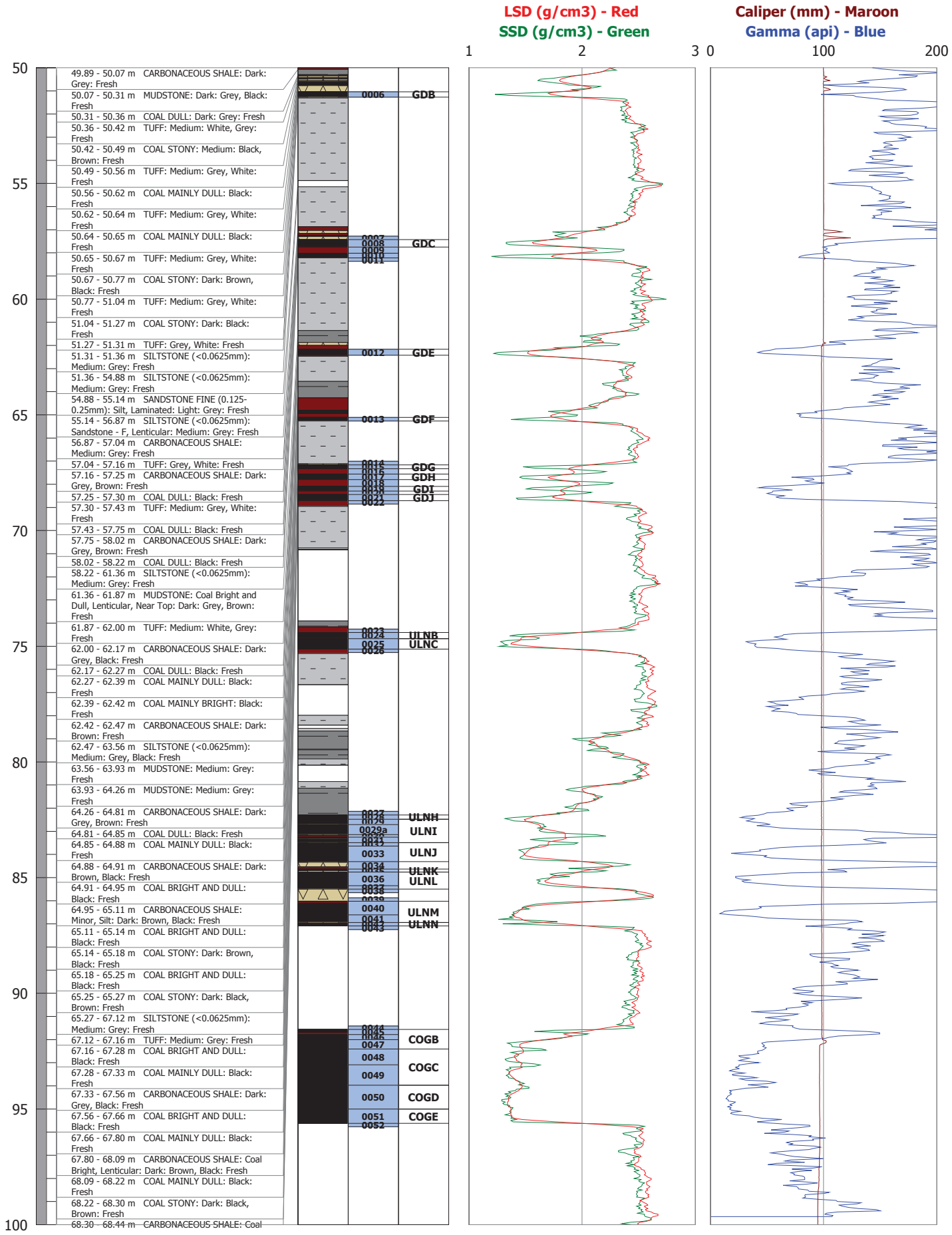
MGA94_56S
Easting: 230110.63
Northing: 6412947.60
Height: 247.24



Bylong: Drillhole Summary

Hole Number: BY0015CH **Hole Type**: Core Drilling
Date: 7/07/2011 **Tenement**: AUTH287
Total Depth: 102.70 m **Area**: Bylong Station

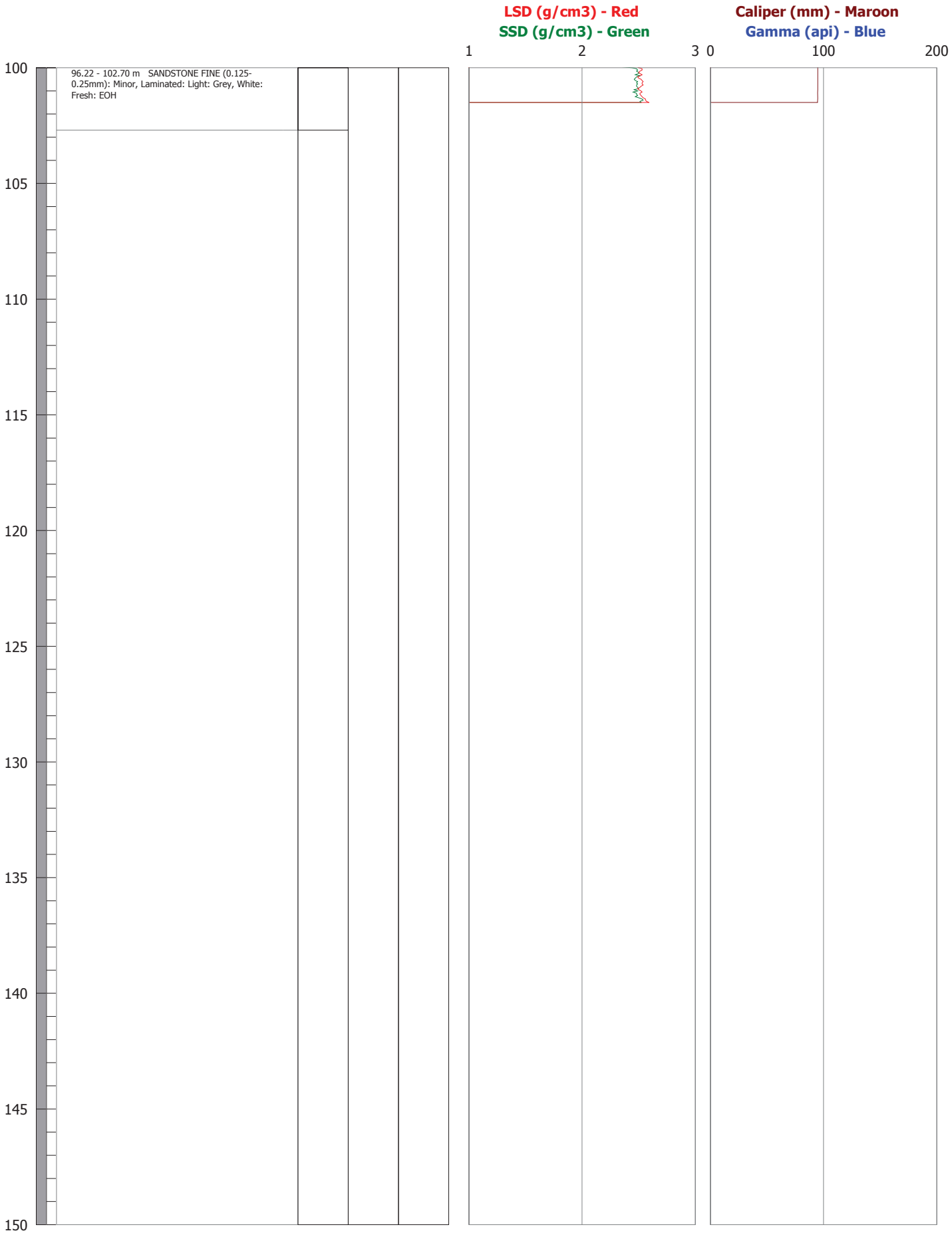
MGA94_56S
Easting: 230110.63
Northing: 6412947.60
Height: 247.24



Bylong: Drillhole Summary

Hole Number: BY0015CH **Hole Type**: Core Drilling
Date: 7/07/2011 **Tenement**: AUTH287
Total Depth: 102.70 m **Area**: Bylong Station

MGA94_56S
Easting: 230110.63
Northing: 6412947.60
Height: 247.24

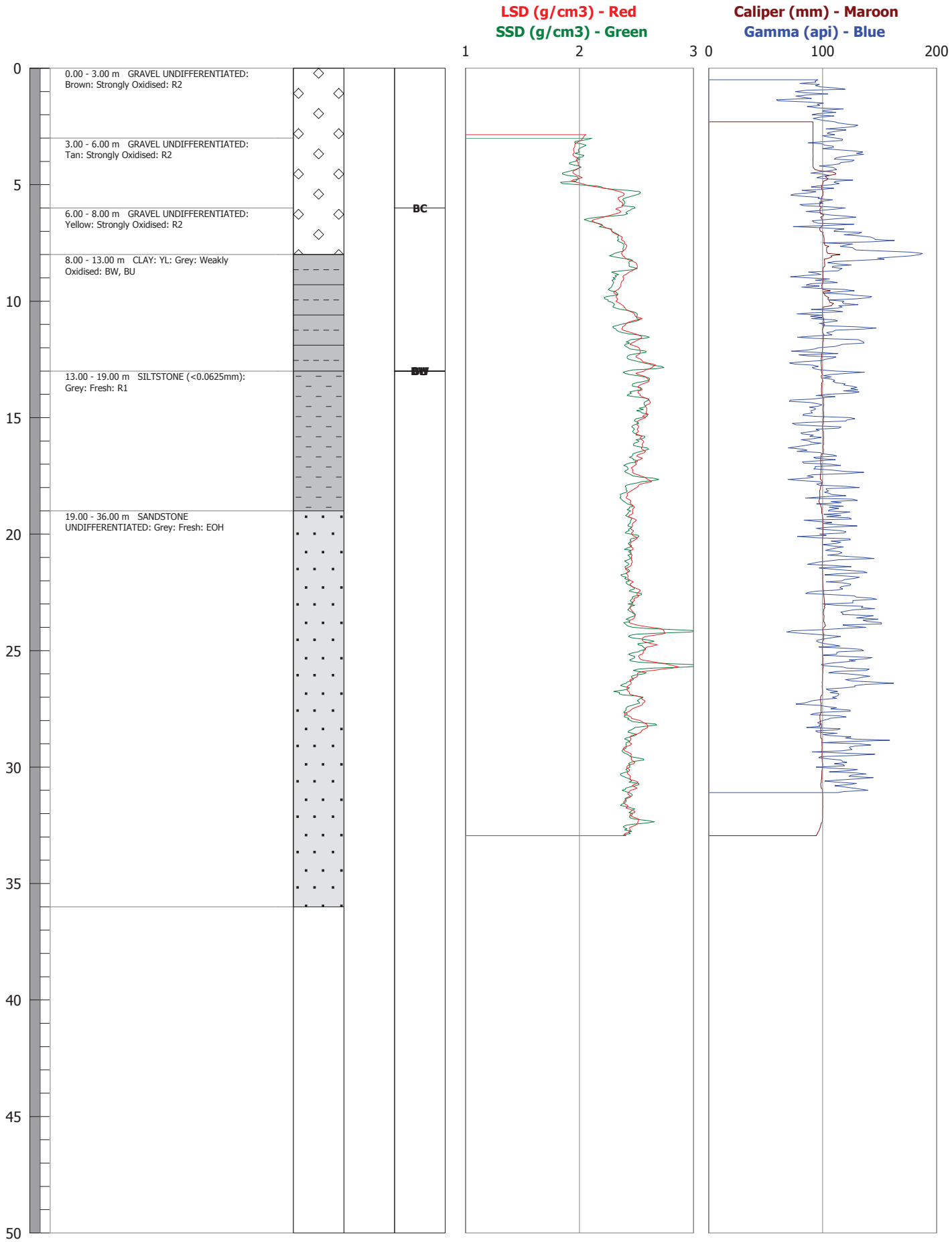


Bylong: Drillhole Summary

Hole Number: BY0020
Date : 14/07/2011
Total Depth : 36.00 m

Hole Type : Open (Chip) Drilling
Tenement : AUTH342
Area : Harley Hill

MGA94_56S
Easting : 230571.56
Northing : 6401183.53
Height : 332.37



BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.78 AHD
EASTING: 231771.61
NORTHING: 6410453.69
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-B
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 1 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
364	0.0				0.0				Stickup=0.7m
	0.2	TOPSOIL - Red-brown silty gravelly sand topsoil, generally comprising fine to medium grained sand, fine to medium sized, rounded to subrounded gravel, humid							From 0m to 0.4m, bentonite
	0.5	BASALT - High strength, moderately weathered, grey with some brown, red-brown and yellow, highly fractured / fragmented basalt		C					
365	1	CORE LOSS - (0.5m to 2.37m)							1
					1.85				
	2			C					2
366	2.37								
		BASALT - High strength, moderately weathered, grey with some brown, red-brown and yellow, highly fractured / fragmented basalt			2.47				
				C	2.72				
	3			C	2.93				3
367	3.16	CORE LOSS - (3.16m to 3.52m)		C					
	3.52				3.52				
		BASALT - High strength, moderately weathered, grey with some brown, red-brown and yellow, highly fractured / fragmented basalt		C	3.77				
	4			C	4.03				4
368	4.27			C	4.3				
	4.36	CORE LOSS - (4.27m to 4.36m)		C					
		BASALT - High strength, moderately weathered, grey with some brown, red-brown and yellow, highly fractured / fragmented basalt			4.76				
	5			C					5
369									
	6								From 0.4m to 11.4m, grout 6
370									
	6.59				6.59				
	6.63	CORE LOSS - (6.59m to 6.63m)							
	7	BASALT - High strength, moderately to slightly weathered, grey with some ironstaining basalt		C					7
371									
	8				8.01				8
372				C					
					8.7				
	9			C					From 0.7m to 17.0m, Class 18 PVC Casing 9
					9.25				
				C					
					9.64				
				C					

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased
TYPE OF BORING: HQ3 from 0m to 203.59m
WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12
REMARKS: Top of pipe RL 364.37 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.78 AHD
EASTING: 231771.61
NORTHING: 6410453.69
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-B
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 2 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
374		BASALT - High strength, moderately to slightly weathered, grey with some ironstaining basalt *(continued)*		C					
					10.62				
	11			C					11
375					11.25				
				C					
	12								12
376					12.33				
				C					
					12.67				
	13			C					13
377					13.38				
									From 11.4m to 16m, bentonite
	14			C					14
378									
	15								15
379					15.28				
				C					
					15.63				
	16								16
380									
				C					
	17								17
381									
	18								18
382					18.18				
				C					
		From 18.6m, slightly weathered			18.56				
	19			C					19
					19.44				
				C					From 16m to 23m, gravel

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased
TYPE OF BORING: HQ3 from 0m to 203.59m
WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12
REMARKS: Top of pipe RL 364.37 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.78 AHD **BORE No:** BY0091CH-B
EASTING: 231771.61 **PROJECT No:** 49761.01
NORTHING: 6410453.69 **DATE:** 8/7 - 1/11/2012
DIP/AZIMUTH: 90°/-- **SHEET** 3 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
384		BASALT - High strength, moderately to slightly weathered, grey with some ironstaining basalt *(continued)*		C					From 17.0m to 23.0m, Class 18 PVC Screen
	20.46				20.46				
	20.57	CORE LOSS - (20.46m to 20.57m)		C					
	20.88	BASALT - High strength, moderately to slightly weathered, grey with some ironstaining basalt			20.88				
	21 20.96	CORE LOSS - (20.88m to 20.96m)		C					21
385		BASALT - High strength, moderately to slightly weathered, grey with some ironstaining basalt			21.46				
				C					
	22				21.98				22
386				C					
		From 22.29m, extremely weathered			22.38				
	23								23 End cap
387		From 23.26m, moderately weathered		C					
		From 23.39m, slightly weathered							
	24				24.08				24
388				C					
		From 24.6m to 26.0m, highly weathered			24.64				
	25								25
389				C					
	26								26
390					26.73				
	27			C					27
391					27.11				
				C					
					27.67				
	28			C					28
392									
	28.65				28.65				
	28.87	CORE LOSS - (28.65m to 28.87m)		C					
	29	BASALT - High strength, moderately to slightly weathered, grey with some ironstaining basalt							29
		From 29.19m, extremely weathered			29.25				
				C					
	29.65				29.65				
	29.75	CORE LOSS - (29.65m to 29.75m)		C					

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased
TYPE OF BORING: HQ3 from 0m to 203.59m
WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12
REMARKS: Top of pipe RL 364.37 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.78 AHD
EASTING: 231771.61
NORTHING: 6410453.69
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-B
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 4 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
394		BASALT - High strength, moderately to slightly weathered, grey with some ironstaining basalt *(continued)*		C	30.35				
				C					
	31 31.0				31.05				31
395	31.05	SANDSTONE - Medium strength, extremely weathered, orange, fine grained sandstone							
		CORE LOSS - (31.05m to 31.86m)							
	31.86								
	32	SANDSTONE - Medium to high strength, extremely weathered, orange fine grained sandstone with some tuff							32
396	32.16	From 32.05m to 32.09m, low strength		C					
		SANDSTONE - High strength, moderately to slightly weathered, grey, fine to medium grained sandstone with trace to some siltstone (heat affected until 33.04m)							
	33				33.23		PL(A) = 1.49 PL(D) = 1.16		33
397					33.65				
		From 33.65m, slightly weathered							
	34								34
398		From 34.3m, slightly weathered to fresh							
		From 34.82m, medium strength, fresh			35.0		PL(A) = 0.48 PL(D) = 0.31		
	35			C					35
399		At 35.4m, coal lense, 2mm thick							
	36				35.98				36
				GT001					
400					36.28 36.32		PL(A) = 0.53 PL(D) = 0.36		
					36.75				
	37								37
401									
	38	From 38.0m, low to medium strength			38.09		PL(A) = 0.37 PL(D) = 0.27		38
402				C					
	39								39
				C	39.73				

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased
TYPE OF BORING: HQ3 from 0m to 203.59m
WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12
REMARKS: Top of pipe RL 364.37 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.78 AHD
EASTING: 231771.61
NORTHING: 6410453.69
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-B
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 5 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
404		SANDSTONE - High strength, moderately to slightly weathered, grey, fine to medium grained sandstone with trace to some siltstone (heat affected until 33.04m) *(continued)*			40.06		PL(A) = 0.52 PL(D) = 0.37		
	41			C					41
405									
	42								42
406					42.38		PL(A) = 0.21 PL(D) = 0.24		
					42.7				
	43								43
407		From 43.7m, medium strength							
	44			C	44.23		PL(A) = 0.73 PL(D) = 0.59		44
408									
	45								45
409					45.69				
	46				46.09		PL(A) = 0.63 PL(D) = 0.58		46
410									
	47			C					47
411									
	48				47.97				48
412				GT002					
					48.31 48.34		PL(A) = 0.74 PL(D) = 0.78		
					48.68				
	49	From 48.8m, slightly interbedded with siltstone bands up to 100mm thick		C					49

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased
TYPE OF BORING: HQ3 from 0m to 203.59m
WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12
REMARKS: Top of pipe RL 364.37 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.78 AHD
EASTING: 231771.61
NORTHING: 6410453.69
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-B
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 6 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
414		SANDSTONE - High strength, moderately to slightly weathered, grey, fine to medium grained sandstone with trace to some siltstone (heat affected until 33.04m) *(continued)*			50.24		PL(A) = 0.51 PL(D) = 0.32		
				C					
	51								51
415									
					51.72		PL(A) = 0.89 PL(D) = 0.62		
					51.76				
	52								52
416									
	53			C					53
417					53.35		PL(A) = 0.47 PL(D) = 0.33		
	54								54
418					54.69				
		From 54.69m, low to medium strength							
	55								55
419					55.25		PL(A) = 0.57 PL(D) = 0.25		
	56			C					56
420									
	57								57
421					57.68				
				GT003					
	58				58.01		PL(A) = 0.26 PL(D) = 0.35		58
422					58.04				
				C					
	59								59
					59.67		PL(A) = 0.34 PL(D) = 0.24		

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased
TYPE OF BORING: HQ3 from 0m to 203.59m
WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12
REMARKS: Top of pipe RL 364.37 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.78 AHD
EASTING: 231771.61
NORTHING: 6410453.69
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-B
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 7 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
424		SANDSTONE - High strength, moderately to slightly weathered, grey, fine to medium grained sandstone with trace to some siltstone (heat affected until 33.04m) *(continued)*		C					
					60.71				
		From 60.78 to 60.83m, siderite band							
	61								61
425					61.7		PL(A) = 0.21 PL(D) = 0.14		
	62								62
426				C					
	63								63
427		From 63.28m to 63.3m, tuff band							
		From 63.59m to 64.08m, very low strength			63.59 63.63		PL(A) = 0.09 PL(D) = 0.04		
	64								64
428									
	65			C					65
429					65.2		PL(A) = 0.27 PL(D) = 0.06		
	65.41	From 65.31m, very low to low strength							
		MUDSTONE - Fresh, dark grey mudstone							
	66								66
430					66.23		PL(A) = 0.46 PL(D) = 0.06		
					66.61				
	67								67
431									
	68			C	68.14		PL(A) = 0.41 PL(D) = 0.27		68
432		From 68.4m, medium strength with some siltstone			68.51		PL(A) = 0.7 PL(D) = 0.2		
				GT004	68.55				
					68.82				
	69								69
					69.61				
				C					

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased
TYPE OF BORING: HQ3 from 0m to 203.59m
WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12
REMARKS: Top of pipe RL 364.37 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	⧗	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.78 AHD
EASTING: 231771.61
NORTHING: 6410453.69
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-B
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 8 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
434		MUDSTONE - Fresh, dark grey mudstone *(continued)*			70.41		PL(A) = 0.54 PL(D) = 0.32		
				GT005	70.46				
					70.77				
71									71
435	71.19	COAL - Medium to high strength, fresh, dark brown (stoney) coal (possibly heat affected)		C	71.33		PL(A) = 1.03 PL(D) = 0.55		
		From 71.42m to 71.73m, extremely to very low strength tuff			71.48		PL(A) = 0.04		
				GT006	71.51				
					71.72				
72									72
436					72.09				
				GT007					
		From 72.32m, carbonaceous mudstone			72.31		PL(A) = 2.34 PL(D) = 0.14		
	72.59				72.34				
		TUFF - Low to medium strength, fresh, light grey to grey tuff, slightly interbedded with siltstone bands up to 30mm thick			72.68				
73									73
437					73.4		PL(A) = 0.88 PL(D) = 0.24		
74									74
438				C					
75									75
439									
					75.62		PL(D) = 1.78		
		From 75.67m, medium strength			75.67				
76					76.01				76
		From 76.4m, low to medium strength		GT008					
440					76.24		PL(D) = 1.91		
					76.27				
77					76.98		PL(A) = 0.36 PL(D) = 0.25		77
441				C					
	77.34	From 77.26m, very low to low strength			77.45		PL(A) = 0.63 PL(D) = 0.19		
	77.6	COAL - Medium to high strength, fresh, black (stoney) coal							
78		CARBONACEOUS MUDSTONE - High strength, fresh, brown to black carbonaceous mudstone							78
442					78.67		PL(A) = 2.56 PL(D) = 1.2		
					78.7				
79									79
				C					
	79.52				79.9		PL(A) = 0.21		

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased
TYPE OF BORING: HQ3 from 0m to 203.59m
WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12
REMARKS: Top of pipe RL 364.37 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.78 AHD
EASTING: 231771.61
NORTHING: 6410453.69
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-B
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 9 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
444		SANDSTONE AND SILTSTONE - Low to medium strength, fresh, grey to dark grey fine to medium grained sandstone interbedded with siltstone bands up to 10mm thick *(continued)*					PL(D) = 0.16		
	80.89			C					
	81	MUDSTONE - Medium to high strength, fresh, dark grey mudstone			81.2		PL(A) = 1.47 PL(D) = 0.16		81
445		From 81.43m, trace very low strength tuff bands			81.7				
	82	From 82.13m, low to medium strength, interbedded fine to medium grained sandstone			82.13 82.17		PL(A) = 0.38 PL(D) = 0.21		82
446				GT009					
					82.5 82.67		PL(A) = 0.79 PL(D) = 0.55		
	83								83
	83.12	SANDSTONE - Medium to high strength, fresh, grey, fine to medium grained sandstone		C					
447									
	84								84
448					84.62 84.66		PL(A) = 1.78 PL(D) = 1		
	85								85
449	85.25	MUDSTONE - Medium to high strength, fresh, black coal with trace high tuff bands up to 60mm thick			85.33				
				GT010					
					85.64 85.67 85.82		PL(A) = 0.63 PL(D) = 0.45 PL(D) = 0.13		
	86 85.99	COAL - Medium to high strength, fresh, black coal with trace high strength tuff bands up to 60mm thick		C					86
450					86.51		PL(A) = 0.05 PL(D) = 0.57		
	87 86.93	SILTSTONE - Medium to high strength, fresh, dark grey siltstone with some fine to medium grained sand			87.18				87
451				GT011					
					87.54 87.57 87.68		PL(A) = 1.11 PL(D) = 0.78		
	87.88								
	88	SANDSTONE - High strength, fresh, grey to dark grey fine to coarse grained sandstone with trace to some siltstone bands up to 30mm thick							88
452				C	88.81		PL(A) = 2.13 PL(D) = 1.55		
	89								89

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased
TYPE OF BORING: HQ3 from 0m to 203.59m
WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12
REMARKS: Top of pipe RL 364.37 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	⧗	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.78 AHD
EASTING: 231771.61
NORTHING: 6410453.69
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-B
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 10 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
454		SANDSTONE - High strength, fresh, grey to dark grey fine to coarse grained sandstone with trace to some siltstone bands up to 30mm thick *(continued)*		C					
		From 90.28m to 91.00m, medium to high strength, fine sized pebbly sandstone			90.61		PL(A) = 1.36 PL(D) = 1.05		
					90.65				
455	91								91
				C					
456	92								92
					92.54		PL(A) = 2.4 PL(D) = 1.76		
457	93								93
					93.66				
458	94								94
					94.38		PL(A) = 0.92 PL(D) = 0.96		
459	95			C					95
					95.41		PL(A) = 4.09 PL(D) = 3.71		
				GT012	95.44				
					95.74				
460	96								96
					96.43				
					96.65		PL(A) = 3.1 PL(D) = 2.26		
	96.9								
461	97	MUDSTONE - Medium to high strength, fresh, dark brown mudstone with some coal lenses up to 10mm thick							97
					97.39		PL(A) = 1.28 PL(D) = 0.27		
	98			C					98
462	98.21								
		SILTSTONE AND SANDSTONE - Medium to high strength, fresh, grey to dark grey siltstone and interbedded fine to medium grained sandstone up to 150mm thick			98.27		PL(A) = 1.39 PL(D) = 0.48		
	99								99
					99.49				
				C					

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased
TYPE OF BORING: HQ3 from 0m to 203.59m
WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12
REMARKS: Top of pipe RL 364.37 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	⧗	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.78 AHD
EASTING: 231771.61
NORTHING: 6410453.69
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-B
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 11 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
464					100.26				
				GT013					
	100.57	SANDSTONE - Medium to high strength, fresh, grey to dark grey fine to coarse grained sandstone			100.56		PL(A) = 1.01		
					100.59		PL(D) = 0.93		
	101								101
465				C					
	102	From 102.00m, high strength with trace fine sized gravel							102
466					102.6				
				GT014					
	103				102.96		PL(A) = 2.32		103
467					102.99		PL(D) = 1.57		
	103.59	COAL - Medium to high strength, fresh black coal							
	104				103.96		PL(A) = 0.24		104
				C	104.0		PL(D) = 0.33		
468				GT015	104.2				
	104.74	SILTSTONE - Medium to high strength, fresh, dark grey siltstone with trace to some fine grained sand							
	105				105.19		PL(A) = 0.61		105
469				GT016	105.22		PL(D) = 0.37		
					105.46				
					105.6				
	106			C					106
470		From 106.38m to 106.86m, carbonaceous			106.39		PL(A) = 1.73		
					106.57		PL(D) = 1.78		
	107								107
471	107.21	TUFF - Very low to low strength, fresh, light grey tuff			107.32		PL(A) = 0.38		
		From 107.43m, medium strength			107.42		PL(D) = 0.18		
				GT017					
					107.7		PL(A) = 0.58		
	107.81				107.74		PL(D) = 0.17		
	107.97	COAL - Medium to high strength, fresh black coal							108
		At 107.86m, extremely low to very low strength, tuff band 20mm thick							
472	108.22			C					
		MUDSTONE - Medium to high strength, fresh, grey mudstone			108.6		PL(A) = 0.52		
							PL(D) = 0.33		
	109	SILTSTONE AND SANDSTONE - Medium strength, fresh, grey to dark grey siltstone and interbedded fine to medium grained sandstone up to 150mm thick							109
	109.94								

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased
TYPE OF BORING: HQ3 from 0m to 203.59m
WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12
REMARKS: Top of pipe RL 364.37 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.78 AHD
EASTING: 231771.61
NORTHING: 6410453.69
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-B
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 12 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
474		MUDSTONE - Medium to high strength, fresh, grey mudstone *(continued)*			110.26		PL(A) = 4.26 PL(D) = 2.67		
	110.46	COAL - Medium to high strength, fresh black coal From 110.51m, interbedded tuff bands up to 90mm thick		C					
	111.0	SILTSTONE AND SANDSTONE - Medium to high strength, fresh, grey to dark grey siltstone and interbedded fine to medium grained sandstone up to 150mm thick			111.57				
475	112				112.16		PL(A) = 1.82 PL(D) = 0.3		
476	113			C					
477	114				114.22		PL(A) = 0.82 PL(D) = 0.6		
478					114.56				
479	115								
480	116			C					
	116.35	MUDSTONE/COAL - Medium strength, fresh, dark brown to black mudstone/coal with some extremely low to very low strength tuff bands up to 110mm thick			116.31		PL(A) = 0.59 PL(D) = 0.12		
481	117								
	117.28	SILTSTONE AND SANDSTONE - Medium to high strength, fresh, grey to dark grey siltstone and interbedded fine to medium grained sandstone up to 150mm thick			117.56		PL(A) = 1.71 PL(D) = 0.89		
	118				117.6				
482					118.33				
				GT018					
				C	118.66 118.7		PL(A) = 2.19 PL(D) = 1.01		
	119								
	119.23	MUDSTONE - Medium to high strength, fresh, dark brown mudstone with some siderite							
					120.0		PL(A) = 2.88		

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased
TYPE OF BORING: HQ3 from 0m to 203.59m
WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12
REMARKS: Top of pipe RL 364.37 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.78 AHD
EASTING: 231771.61
NORTHING: 6410453.69
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-B
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 13 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
484		MUDSTONE - Medium to high strength, fresh, dark brown mudstone with some siderite *(continued)*					PL(D) = 1.18		
				C	120.57				
	121								121
485									
	122			C					122
486		From 122.60m to 122.81m, coal band							
					122.87		PL(A) = 1.03 PL(D) = 0.9		
	123	From 123.08m, thinly laminated with tuff							123
487					123.57				
	124								124
488					124.32		PL(A) = 1.18 PL(D) = 0.63		
		From 124.71m, coal with come calcite							
	124.92								
	125	SILTSTONE AND SANDSTONE - Medium to high strength, fresh, grey to dark grey siltstone and interbedded fine to medium grained sandstone up to 150mm thick		C					125
489									
	126	From 125.97m, trace to some tuff laminations up to 2mm thick			126.13				126
				GT019	126.33		PL(A) = 0.97 PL(D) = 0.35		
490					126.37				
	127								127
491		From 127.40m to 127.86m, carbonaceous mudstone with trace coal lenses up to 2mm thick			127.72		PL(A) = 1.55 PL(D) = 0.44		
		From 127.86m, high strength		C					
	128								128
492					128.57		PL(A) = 2.61 PL(D) = 1.19		
	129								129
					129.4				
	129.71								
		SANDSTONE - High strength, fresh, grey fine to coarse grained sandstone		C					

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased
TYPE OF BORING: HQ3 from 0m to 203.59m
WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12
REMARKS: Top of pipe RL 364.37 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.78 AHD
EASTING: 231771.61
NORTHING: 6410453.69
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-B
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 14 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
494		SANDSTONE - High strength, fresh, grey fine to coarse grained sandstone *(continued)*			130.6		PL(A) = 2.12 PL(D) = 1.81		
	131			C					131
495									
	132								132
496		From 132.35m, trace to some fine to medium sized gravel			132.46		PL(A) = 1.85 PL(D) = 1.66		
					132.5				
	133								133
497									
	134			C	134.01		PL(A) = 2.53 PL(D) = 1.86		134
498									
	135								135
499					135.56				
	136								136
500					136.71		PL(A) = 0.69 PL(D) = 1.27		
				GT020	136.75				
	137			C	137.07				137
501									
	138								138
502									
	138.46	CARBONACEOUS MUDSTONE - High strength, fresh, dark brown mudstone with some coal lenses up to 5mm thick			138.42		PL(A) = 3.34 PL(D) = 0.51		
					138.57				
	138.96								
	139	SANDSTONE - High to very high strength, fresh grey fine to medium grained sandstone		C					139

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased
TYPE OF BORING: HQ3 from 0m to 203.59m
WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12
REMARKS: Top of pipe RL 364.37 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.78 AHD
EASTING: 231771.61
NORTHING: 6410453.69
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-B
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 15 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
504		SANDSTONE - High to very high strength, fresh grey fine to medium grained sandstone *(continued)*			140.33		PL(A) = 2.97 PL(D) = 2.1		
	141			C					141
505					141.53				
	142				142.19		PL(A) = 3.63 PL(D) = 2.85		142
506					142.36		PL(A) = 4.35		
				GT021	142.4		PL(D) = 2.52		
	142.71				142.71				
		CARBONACEOUS MUDSTONE - High strength, fresh, dark brown mudstone with some coal lenses up to 5mm thick		C					
	143								143
507	143.17	From 142.94m, slightly tuffy			143.18				
				GT022	143.38		PL(A) = 0.31 PL(D) = 0.08		
		COAL - High strength, fresh, black coal			143.42				
	144								144
	144.05								
508		SILTSTONE AND SANDSTONE - Medium to high strength, fresh, grey to dark grey siltstone and interbedded fine to medium grained sandstone up to 150mm thick			144.22		PL(A) = 2.01 PL(D) = 0.61		
				GT023	144.26				
					144.52				
					144.57				
	145								145
509					145.3		PL(A) = 1.63 PL(D) = 0.49		
	146			C					146
510					146.24		PL(A) = 3.56 PL(D) = 1.85		
	147								147
511					147.62				
	148								148
512									
	148.5								
		SANDSTONE - Medium strength, fresh, fine to medium grained sandstone		C					
	149								149

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased
TYPE OF BORING: HQ3 from 0m to 203.59m
WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12
REMARKS: Top of pipe RL 364.37 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.78 AHD
EASTING: 231771.61
NORTHING: 6410453.69
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-B
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 16 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
514		SANDSTONE - Medium strength, fresh, fine to medium grained sandstone *(continued)*		C	150.56		PL(D) = 0.05		
					150.59				
	151	From 150.98m, fine to coarse grained with trace fine sized gravel							151
515									
					151.96		PL(A) = 0.9		
	152			C	151.99		PL(D) = 1.86		152
516				GT024					
					152.3		PL(A) = 0.74		
	152.51				152.33		PL(D) = 0.42		
		MUDSTONE - Medium strength, dark brown carbonaceous mudstone							
					152.82		PL(A) = 1.55		
	153	From 153.10m, slightly fine to medium grained sandy					PL(D) = 0.04		153
517									
					153.6				
	154						PL(A) = 2.42		154
518					154.1		PL(D) = 0.44		
					154.5		PL(A) = 3.34		
					154.54		PL(D) = 0.2		
	155			C					155
519				GT025					
	155.49								
		COAL - High strength, fresh, black coal							
	156				155.93				156
	156.15								
520		SANDSTONE - High strength, fresh, dark grey fine grained sandstone with some siltstone bands up to 20mm thick			156.57				
	157								157
521					157.7		PL(A) = 2.75		
				GT026	157.74		PL(D) = 1.18		
	158				157.96				158
522				C					
	158.52	From 158.36m, carbonaceous siltstone			158.51		PL(A) = 2.16		
		COAL - Medium to high strength, fresh, black coal					PL(D) = 0.66		
	159								159
					159.18		PL(A) = 1.39		
		From 159.19m, trace calcite and siderite		GT027	159.21		PL(D) = 0.05		
					159.49				
					159.57				
				C	159.83		PL(A) = 1.13 PL(D) = 0.38		

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased
TYPE OF BORING: HQ3 from 0m to 203.59m
WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12
REMARKS: Top of pipe RL 364.37 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics | Environment | Groundwater

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.78 AHD
EASTING: 231771.61
NORTHING: 6410453.69
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-B
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 17 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
524		COAL - Medium to high strength, fresh, black coal *(continued)*			160.33		PL(A) = 0.84 PL(D) = 0.98		
		From 160.52m to 160.91m, low to medium strength, tuff band			160.6		PL(A) = 0.27		
	161			C					161
525	161.48	TUFF - High to very high strength, fresh, light grey tuff							
	162				161.93		PL(A) = 3.55 PL(D) = 2.01		162
526	162.09	COAL - Medium to high strength, fresh, black coal			162.37		PL(A) = 3.2 PL(D) = 0.58		
					162.55				
	163								163
527	163.22	SILTSTONE - Medium to high strength, fresh, dark grey siltstone with some fine to medium grained sand and trace to some fine to medium sized gravel			163.55		PL(A) = 2.76 PL(D) = 1.33		
				GT028	163.59				
					163.84				
	164			C					164
528					164.25		PL(A) = 2.46		
					164.4		PL(D) = 0.74		
					164.5		PL(D) = 1.18		
					164.6		PL(D) = 0.78		
					164.71		PL(D) = 0.92		
					164.79		PL(D) = 0.95		
	165				164.92		PL(D) = 0.47		165
529	165.15	SANDSTONE - Medium to high strength, fresh, grey to dark grey fine to coarse grained sandstone, quartzone in parts			165.03		PL(D) = 0.86		
					165.19		PL(D) = 0.78		
					165.29		PL(D) = 0.32		
					165.39		PL(D) = 0.51		
					165.52		PL(D) = 0.35		
					165.55		PL(D) = 0.56		
					165.62		PL(D) = 0.73		
	166				165.72		PL(D) = 0.42		166
530					165.82		PL(D) = 0.67		
					165.92		PL(D) = 2.09		
					166.03		PL(D) = 1.17		
					166.13		PL(D) = 1.37		
					166.23		PL(D) = 1.38		
					166.33		PL(D) = 1.12		
					166.44		PL(D) = 0.45		
	167			C			PL(D) = 0.94		167
531					166.54		PL(D) = 0.87		
					166.64		PL(D) = 1.47		
					166.74		PL(D) = 1.12		
					166.83		PL(D) = 1.46		
					166.94		PL(D) = 0.92		
				GT029	167.04		PL(D) = 0.84		
					167.14		PL(D) = 1.27		
	168				167.24		PL(D) = 0.7		168
532		From 168.00m, low to medium strength			167.34		PL(D) = 0.67		
					167.48		PL(A) = 1.45		
					167.55		PL(D) = 1.09		
					167.59		PL(D) = 1.69		
					167.84		PL(D) = 2.06		
					167.9		PL(D) = 0.26		
					168.0		PL(D) = 0.2		
	169				168.1		PL(D) = 0.48		169
					168.2		PL(D) = 0.63		
	169.25	COAL - Medium to high strength, fresh, black coal		C	168.3		PL(D) = 0.55		
					168.4		PL(D) = 0.61		
					168.5		PL(D) = 0.67		
					168.54		PL(D) = 0.93		
					168.6		PL(D) = 0.51		
					168.7		PL(D) = 0.87		

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased

TYPE OF BORING: HQ3 from 0m to 203.59m

WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12

REMARKS: Top of pipe RL 364.37 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	⧗	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.78 AHD
EASTING: 231771.61
NORTHING: 6410453.69
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-B
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 18 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
534		COAL - Medium to high strength, fresh, black coal *(continued)*			168.8		PL(D) = 0.45		
					168.9		PL(D) = 0.57		
					169.0		PL(A) = 0.8		
					169.1		PL(D) = 0.33		
					169.2		PL(D) = 0.45		
				C	170.15				
					170.22				
	171								171
535					171.05		PL(A) = 0.68		
				GT030	171.09		PL(D) = 0.26		
					171.32		PL(A) = 1.12		
					171.35		PL(D) = 0.23		
					171.45				
	172								172
536									
	173			C	173.01		PL(A) = 2.17		173
537							PL(D) = 0.57		
	173.33	SANDSTONE - High to very high strength, fresh, grey fine to coarse grained sandstone			173.4		PL(A) = 2.77		
				GT031	173.44		PL(D) = 2.09		
					173.64				
	174								174
538									
					174.47		PL(A) = 3.15		
					174.5		PL(D) = 1.41		
	175								175
539									
	176			C					176
					176.14		PL(A) = 3.57		
540							PL(D) = 2.65		
	177								177
541					177.51				
	178				177.97		PL(A) = 3.51		178
					178.04		PL(D) = 1.88		
542							PL(A) = 3.88		
							PL(D) = 2.48		
		From 178.70m, trace to some siltstone laminations up to 2mm thick		C					
	179				179.04		PL(A) = 2.98		179
							PL(D) = 0.57		
							PL(A) = 2.8		

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased

TYPE OF BORING: HQ3 from 0m to 203.59m

WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12

REMARKS: Top of pipe RL 364.37 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.78 AHD
EASTING: 231771.61
NORTHING: 6410453.69
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-B
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 19 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
544		SANDSTONE - High to very high strength, fresh, grey fine to coarse grained sandstone *(continued)*		C	180.02		PL(D) = 1.14		
					180.57				
	180.65	SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone, thinly laminated with trace to some siltstone			180.65				
	181								181
545		From 181.63m to 181.87m, siltstone band thinly laminated with some fine to medium strength sandstone							
	182								182
546					182.7		PL(A) = 3.26 PL(D) = 1.8		
				GT032	182.74				
	183			C	183.0				183
547									
	184	From 183.86m to 183.90m, carbonaceous siltstone band							184
548		From 184.26m to 184.36m, fine to coarse grained sand							
		From 184.55m to 184.18m, conglomerate (fine to medium gravel in a fine to coarse sand matrix)							
	185								185
		From 185.05m to 185.11m, carbonaceous siltstone			185.08		PL(A) = 2.58 PL(D) = 1.67		
549				C	185.1				
				C	185.63				
		From 185.69m to 185.77m, low strength tuff			185.82				
	186	From 186m, grading into laminite							186
550	186.2	LAMINITE - High to very high strength, fresh, grey laminite		C					
					186.64		PL(A) = 3.65 PL(D) = 1.38		
	187				186.9				187
551	187.17	SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone							
	187.47	SILTSTONE - High strength, fresh, grey siltstone							
	188								188
552				C					
	188.85				188.78		PL(A) = 1.63		
	188.97	TUFF - Medium strength, fresh, grey tuff		GT033	188.82				
	189	From 188.95m to 188.97m, very low strength			188.91				189
		SILTSTONE - High strength, fresh, grey, siltstone							

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased
TYPE OF BORING: HQ3 from 0m to 203.59m
WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12
REMARKS: Top of pipe RL 364.37 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.78 AHD
EASTING: 231771.61
NORTHING: 6410453.69
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-B
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 20 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
554		SILTSTONE - High strength, fresh, grey, siltstone *(continued)*							
		From 190.4m, grading into sandstone							
	190.62	SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone laminated with trace siltstone							
	191								191
555				C					
	191.91								
	192	SILTSTONE / SANDSTONE - High strength, fresh, grey siltstone interbedded with fine to medium grained sandstone up to 400mm thick, spaced up to 300mm apart			192.05		PL(A) = 1.69 PL(D) = 1.03		192
556		At 192.39m, very low strength clay seam							
		From 192.5m to 192.98m, very high strength, fine to medium grained sandstone band, laminated with trace siltstone			192.9		PL(A) = 7.22		
	193	At 192.76m, very low strength clay seam			192.98		PL(D) = 4.17		193
557					193.5		PL(A) = 1.08		
	194								194
558					194.16		PL(A) = 1.49		
	195								195
559		From 195.31m to 195.36m, medium strength, thinly laminated with very low strength clay seams			195.4		PL(D) = 2.07		
		From 195.42m to 195.44m, very low strength clay seam		C					
	196	From 195.91m to 195.64m, medium strength, thinly laminated with very low strength clay seams							196
560		From 196.23m to 197.12m, medium strength, thinly laminated with very low strength clay seams			196.42				
				GT034	196.58				
	197								197
561					197.42		PL(A) = 0.91		
		From 197.63m to 197.68m, medium strength, thinly laminated with very low strength clay seams							
	198	From 197.88m to 198.25m, medium strength, thinly laminated with very low strength clay seams							198
562		From 198.34m to 198.54m, medium strength, thinly laminated with very low strength clay seams							
					198.75		PL(A) = 1.29		
	199				198.96				199
		From 199.02m to 199.15m, medium strength, thinly laminated with very low strength clay seams		C					
					199.95		PL(A) = 1.09		

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased
TYPE OF BORING: HQ3 from 0m to 203.59m
WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12
REMARKS: Top of pipe RL 364.37 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.78 AHD
EASTING: 231771.61
NORTHING: 6410453.69
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-B
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 21 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
564				GT035	200.0				
					200.2				
	200.42	From 200.33m to 200.42m, very low strength clay seam							
		SILTSTONE - Medium to high strength, fresh, grey siltstone							
	201								201
565		From 201.14m to 201.2m, low strength, very thinly laminated with clay seams		C					
	202								202
566									
	203								203
567		From 203.0m, medium strength			203.06		PL(A) = 0.96		
		From 203.08m to 203.12m, tuffaceous siltstone							
		From 203.2m to 203.3m, tuffaceous siltstone							
	203.59	Bore discontinued at 203.59m, limit of investigation			203.59				
568	204								204
	205								205
569									
	206								206
570									
	207								207
571									
	208								208
572									
	209								209

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased
TYPE OF BORING: HQ3 from 0m to 203.59m
WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12
REMARKS: Top of pipe RL 364.37 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	⧗	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.79 AHD
EASTING: 231770.52
NORTHING: 6410452.08
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-S
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 1 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
364	0.2	TOPSOIL - Red-brown silty gravelly sand topsoil, generally comprising fine to medium grained sand, fine to medium sized, rounded to subrounded gravel, humid			0.0				Stickup=0.6m From 0m to 0.4m, asphalt
	0.5	BASALT - High strength, moderately weathered, grey with some brown, red-brown and yellow, highly fractured / fragmented basalt		C					
365	1	CORE LOSS - (0.5m to 2.37m)							
	2				1.85				
366				C					
	2.37	BASALT - High strength, moderately weathered, grey with some brown, red-brown and yellow, highly fractured / fragmented basalt			2.47				
				C	2.72				
				C	2.93				
	3								
367	3.16	CORE LOSS - (3.16m to 3.52m)		C					
	3.52	BASALT - High strength, moderately weathered, grey with some brown, red-brown and yellow, highly fractured / fragmented basalt		C	3.52				
				C	3.77				
	4				4.03				
368				C					
	4.27				4.3				
	4.36	CORE LOSS - (4.27m to 4.36m)		C					
		BASALT - High strength, moderately weathered, grey with some brown, red-brown and yellow, highly fractured / fragmented basalt			4.76				
	5								
369				C					
	6								
370									
	6.59				6.59				
	6.63	CORE LOSS - (6.59m to 6.63m)							
		BASALT - High strength, moderately to slightly weathered, grey with some ironstaining basalt							
	7			C					
371									
	8				8.01				
372				C					
					8.7				
	9			C					
					9.25				
				C					
					9.64				
				C					

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased
TYPE OF BORING: HQ3 from 0m to 203.59m
WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12
REMARKS: Top of pipe RL 364.43 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.79 AHD
EASTING: 231770.52
NORTHING: 6410452.08
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-S
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 2 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
374		BASALT - High strength, moderately to slightly weathered, grey with some ironstaining basalt *(continued)*		C					
					10.62				
	11			C					11
375					11.25				
				C					
	12								12
376					12.33				
				C					
					12.67				
	13			C					13 From 0.4m to 25.5m, grout
377					13.38				
	14			C					14
378									
	15								15
379					15.28				
				C					From 0.7m to 30.0m, Class 18 PVC Screen
					15.63				
	16								16
380									
				C					
	17								17
381									
	18								18
382					18.18				
				C					
		From 18.6m, slightly weathered			18.56				
	19			C					19
					19.44				
				C					

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased
TYPE OF BORING: HQ3 from 0m to 203.59m
WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12
REMARKS: Top of pipe RL 364.43 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics | Environment | Groundwater

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.79 AHD **BORE No:** BY0091CH-S
EASTING: 231770.52 **PROJECT No:** 49761.01
NORTHING: 6410452.08 **DATE:** 8/7 - 1/11/2012
DIP/AZIMUTH: 90°/-- **SHEET** 3 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
384		BASALT - High strength, moderately to slightly weathered, grey with some ironstaining basalt *(continued)*		C					
	20.46				20.46				
	20.57	CORE LOSS - (20.46m to 20.57m)		C					
	20.88	BASALT - High strength, moderately to slightly weathered, grey with some ironstaining basalt			20.88				
385	20.96	CORE LOSS - (20.88m to 20.96m)		C					
		BASALT - High strength, moderately to slightly weathered, grey with some ironstaining basalt			21.46				
				C					
	22				21.98				22
386				C					
		From 22.29m, extremely weathered			22.38				
	23								23
387				C					
		From 23.26m, moderately weathered							
		From 23.39m, slightly weathered							
	24				24.08				24
388				C					
		From 24.6m to 26.0m, highly weathered			24.64				
	25								25
389				C					
	26								26
390					26.73				
	27			C					27
391				C	27.11				
					27.67				From 25.5m to 29.5, bentonite
	28			C					28
392									
	28.65				28.65				
	28.87	CORE LOSS - (28.65m to 28.87m)		C					
	29	BASALT - High strength, moderately to slightly weathered, grey with some ironstaining basalt			29.25				29
		From 29.19m, extremely weathered		C					
	29.65				29.65				
	29.75	CORE LOSS - (29.65m to 29.75m)		C					

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased
TYPE OF BORING: HQ3 from 0m to 203.59m
WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12
REMARKS: Top of pipe RL 364.43 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.79 AHD
EASTING: 231770.52
NORTHING: 6410452.08
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-S
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 4 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
394		BASALT - High strength, moderately to slightly weathered, grey with some ironstaining basalt *(continued)*		C	30.35				
				C					
	31 31.0				31.05				31
395	31.05	SANDSTONE - Medium strength, extremely weathered, orange, fine grained sandstone							
		CORE LOSS - (31.05m to 31.86m)							
	31.86								
	32	SANDSTONE - Medium to high strength, extremely weathered, orange fine grained sandstone with some tuff							32
396	32.16	From 32.05m to 32.09m, low strength		C					
		SANDSTONE - High strength, moderately to slightly weathered, grey, fine to medium grained sandstone with trace to some siltstone (heat affected until 33.04m)							From 29.5m to 36m, gravel
	33								33 From 30.0m to 36.0m, Class 18 PVC Screen
397					33.23		PL(A) = 1.49 PL(D) = 1.16		
		From 33.65m, slightly weathered			33.65				
	34								34
398		From 34.3m, slightly weathered to fresh							
		From 34.82m, medium strength, fresh			35.0		PL(A) = 0.48 PL(D) = 0.31		
	35								35
399		At 35.4m, coal lense, 2mm thick		C					
	36				35.98				36 End cap
				GT001					
400					36.28		PL(A) = 0.53 PL(D) = 0.36		
					36.32				
					36.75				
	37								37
401									
	38	From 38.0m, low to medium strength			38.09		PL(A) = 0.37 PL(D) = 0.27		38
402				C					
	39								39
				C	39.73				

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased
TYPE OF BORING: HQ3 from 0m to 203.59m
WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12
REMARKS: Top of pipe RL 364.43 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.79 AHD
EASTING: 231770.52
NORTHING: 6410452.08
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-S
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 5 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
404		SANDSTONE - High strength, moderately to slightly weathered, grey, fine to medium grained sandstone with trace to some siltstone (heat affected until 33.04m) *(continued)*			40.06		PL(A) = 0.52 PL(D) = 0.37		
	41			C					41
405									
	42								42
406					42.38		PL(A) = 0.21 PL(D) = 0.24		
					42.7				
	43								43
407		From 43.7m, medium strength							
	44			C	44.23		PL(A) = 0.73 PL(D) = 0.59		44
408									
	45								45
409					45.69				
	46				46.09		PL(A) = 0.63 PL(D) = 0.58		46
410									
	47			C					47
411									
					47.97				
	48			GT002					48
412					48.31 48.34		PL(A) = 0.74 PL(D) = 0.78		
					48.68				
	49	From 48.8m, slightly interbedded with siltstone bands up to 100mm thick		C					49

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased
TYPE OF BORING: HQ3 from 0m to 203.59m
WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12
REMARKS: Top of pipe RL 364.43 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.79 AHD
EASTING: 231770.52
NORTHING: 6410452.08
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-S
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 6 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
414		SANDSTONE - High strength, moderately to slightly weathered, grey, fine to medium grained sandstone with trace to some siltstone (heat affected until 33.04m) *(continued)*			50.24		PL(A) = 0.51 PL(D) = 0.32		
				C					
415	51								51
					51.72		PL(A) = 0.89 PL(D) = 0.62		
					51.76				
416	52								52
417	53			C					53
					53.35		PL(A) = 0.47 PL(D) = 0.33		
418	54								54
					54.69				
		From 54.69m, low to medium strength							
	55								55
419					55.25		PL(A) = 0.57 PL(D) = 0.25		
	56			C					56
420									
	57								57
421					57.68				
				GT003					
	58				58.01		PL(A) = 0.26 PL(D) = 0.35		58
422					58.04				
				C					
	59								59
					59.67		PL(A) = 0.34 PL(D) = 0.24		

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased
TYPE OF BORING: HQ3 from 0m to 203.59m
WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12
REMARKS: Top of pipe RL 364.43 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.79 AHD
EASTING: 231770.52
NORTHING: 6410452.08
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-S
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 7 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
424		SANDSTONE - High strength, moderately to slightly weathered, grey, fine to medium grained sandstone with trace to some siltstone (heat affected until 33.04m) *(continued)*		C					
					60.71				
	61	From 60.78 to 60.83m, siderite band							61
425					61.7		PL(A) = 0.21 PL(D) = 0.14		
	62			C					62
426									
	63								63
427		From 63.28m to 63.3m, tuff band							
		From 63.59m to 64.08m, very low strength			63.59 63.63		PL(A) = 0.09 PL(D) = 0.04		
	64								64
428									
	65			C					65
429					65.2		PL(A) = 0.27 PL(D) = 0.06		
	65.41	From 65.31m, very low to low strength							
		MUDSTONE - Fresh, dark grey mudstone							
	66								66
430					66.23		PL(A) = 0.46 PL(D) = 0.06		
					66.61				
	67								67
431									
	68			C	68.14		PL(A) = 0.41 PL(D) = 0.27		68
432		From 68.4m, medium strength with some siltstone			68.51		PL(A) = 0.7 PL(D) = 0.2		
				GT004	68.55				
					68.82				
	69								69
					69.61				
				C					

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased
TYPE OF BORING: HQ3 from 0m to 203.59m
WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12
REMARKS: Top of pipe RL 364.43 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.79 AHD
EASTING: 231770.52
NORTHING: 6410452.08
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-S
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 8 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
434		MUDSTONE - Fresh, dark grey mudstone *(continued)*			70.41		PL(A) = 0.54		
					70.46		PL(D) = 0.32		
				GT005					
					70.77				
	71								71
435	71.19								
		COAL - Medium to high strength, fresh, dark brown (stoney) coal (possibly heat affected)		C	71.33		PL(A) = 1.03		
		From 71.42m to 71.73m, extremely to very low strength tuff			71.48		PL(D) = 0.55		
				GT006	71.51		PL(A) = 0.04		
					71.72				
	72								72
436					72.09				
				GT007					
					72.31		PL(A) = 2.34		
		From 72.32m, carbonaceous mudstone			72.34		PL(D) = 0.14		
	72.59								
		TUFF - Low to medium strength, fresh, light grey to grey tuff, slightly interbedded with siltstone bands up to 30mm thick			72.68				
	73								73
437									
					73.4		PL(A) = 0.88		
							PL(D) = 0.24		
	74								74
438				C					
	75								75
439									
					75.62		PL(D) = 1.78		
		From 75.67m, medium strength			75.67				
	76				76.01				76
		From 76.4m, low to medium strength		GT008					
440					76.24		PL(D) = 1.91		
					76.27				
							PL(A) = 0.36		
	77				76.98		PL(D) = 0.25		77
441				C					
	77.34	From 77.26m, very low to low strength			77.45		PL(A) = 0.63		
	77.6	COAL - Medium to high strength, fresh, black (stoney) coal					PL(D) = 0.19		
		CARBONACEOUS MUDSTONE - High strength, fresh, brown to black carbonaceous mudstone							
	78								78
442									
					78.67		PL(A) = 2.56		
					78.7		PL(D) = 1.2		
	79								79
				C					
	79.52								
					79.9		PL(A) = 0.21		

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased
TYPE OF BORING: HQ3 from 0m to 203.59m
WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12
REMARKS: Top of pipe RL 364.43 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.79 AHD **BORE No:** BY0091CH-S
EASTING: 231770.52 **PROJECT No:** 49761.01
NORTHING: 6410452.08 **DATE:** 8/7 - 1/11/2012
DIP/AZIMUTH: 90°/-- **SHEET** 9 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
444		SANDSTONE AND SILTSTONE - Low to medium strength, fresh, grey to dark grey fine to medium grained sandstone interbedded with siltstone bands up to 10mm thick *(continued)*					PL(D) = 0.16		
	80.89			C					
445	81	MUDSTONE - Medium to high strength, fresh, dark grey mudstone			81.2		PL(A) = 1.47 PL(D) = 0.16		81
		From 81.43m, trace very low strength tuff bands			81.7				
446	82	From 82.13m, low to medium strength, interbedded fine to medium grained sandstone			82.13 82.17		PL(A) = 0.38 PL(D) = 0.21		82
				GT009					
					82.5 82.67		PL(A) = 0.79 PL(D) = 0.55		
	83								83
447	83.12	SANDSTONE - Medium to high strength, fresh, grey, fine to medium grained sandstone		C					
	84								84
448					84.62 84.66		PL(A) = 1.78 PL(D) = 1		
	85								85
449	85.25	MUDSTONE - Medium to high strength, fresh, black coal with trace high tuff bands up to 60mm thick			85.33				
				GT010					
					85.64 85.67 85.82		PL(A) = 0.63 PL(D) = 0.45 PL(D) = 0.13		
	86 85.99	COAL - Medium to high strength, fresh, black coal with trace high strength tuff bands up to 60mm thick		C					86
450					86.51		PL(A) = 0.05 PL(D) = 0.57		
	87 86.93	SILTSTONE - Medium to high strength, fresh, dark grey siltstone with some fine to medium grained sand			87.18				87
451				GT011					
					87.54 87.57 87.68		PL(A) = 1.11 PL(D) = 0.78		
	87.88								
	88	SANDSTONE - High strength, fresh, grey to dark grey fine to coarse grained sandstone with trace to some siltstone bands up to 30mm thick							88
452				C	88.81		PL(A) = 2.13 PL(D) = 1.55		
	89								89

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased
TYPE OF BORING: HQ3 from 0m to 203.59m
WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12
REMARKS: Top of pipe RL 364.43 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	⧗	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.79 AHD
EASTING: 231770.52
NORTHING: 6410452.08
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-S
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 10 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
454		SANDSTONE - High strength, fresh, grey to dark grey fine to coarse grained sandstone with trace to some siltstone bands up to 30mm thick *(continued)*		C					
		From 90.28m to 91.00m, medium to high strength, fine sized pebbly sandstone			90.61		PL(A) = 1.36 PL(D) = 1.05		
					90.65				
	91								91
455									
	92			C					92
456					92.54		PL(A) = 2.4 PL(D) = 1.76		
	93								93
457					93.66				
	94								94
458					94.38		PL(A) = 0.92 PL(D) = 0.96		
	95			C					95
459					95.41		PL(A) = 4.09 PL(D) = 3.71		
				GT012	95.44				
					95.74				
	96								96
460					96.43				
					96.65		PL(A) = 3.1 PL(D) = 2.26		
	96.9								
	97	MUDSTONE - Medium to high strength, fresh, dark brown mudstone with some coal lenses up to 10mm thick							97
461					97.39		PL(A) = 1.28 PL(D) = 0.27		
	98			C					98
	98.21								
462		SILTSTONE AND SANDSTONE - Medium to high strength, fresh, grey to dark grey siltstone and interbedded fine to medium grained sandstone up to 150mm thick			98.27		PL(A) = 1.39 PL(D) = 0.48		
	99								99
					99.49				
				C					

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased
TYPE OF BORING: HQ3 from 0m to 203.59m
WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12
REMARKS: Top of pipe RL 364.43 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.79 AHD **BORE No:** BY0091CH-S
EASTING: 231770.52 **PROJECT No:** 49761.01
NORTHING: 6410452.08 **DATE:** 8/7 - 1/11/2012
DIP/AZIMUTH: 90°/-- **SHEET** 11 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
464					100.26				
				GT013					
	100.57	SANDSTONE - Medium to high strength, fresh, grey to dark grey fine to coarse grained sandstone			100.56		PL(A) = 1.01 PL(D) = 0.93		
					100.59				
	101								101
465				C					
	102	From 102.00m, high strength with trace fine sized gravel							102
466					102.6				
				GT014					
	103				102.96		PL(A) = 2.32 PL(D) = 1.57		103
467					102.99				
	103.59	COAL - Medium to high strength, fresh black coal							
	104				103.96		PL(A) = 0.24 PL(D) = 0.33		104
468				C	104.0				
				GT015	104.2				
	104.74	SILTSTONE - Medium to high strength, fresh, dark grey siltstone with trace to some fine grained sand							
	105								105
469					105.19		PL(A) = 0.61 PL(D) = 0.37		
				GT016	105.22				
					105.46				
					105.6				
	106			C					106
470		From 106.38m to 106.86m, carbonaceous			106.39		PL(A) = 1.73 PL(D) = 1.78		
					106.57				
	107								107
471	107.21	TUFF - Very low to low strength, fresh, light grey tuff			107.32		PL(A) = 0.38 PL(D) = 0.18		
		From 107.43m, medium strength			107.42				
				GT017					
					107.7		PL(A) = 0.58 PL(D) = 0.17		
	107.81				107.74				
	107.97	COAL - Medium to high strength, fresh black coal							108
472		At 107.86m, extremely low to very low strength, tuff band 20mm thick							
	108.22			C					
		MUDSTONE - Medium to high strength, fresh, grey mudstone			108.6		PL(A) = 0.52 PL(D) = 0.33		
		SILTSTONE AND SANDSTONE - Medium strength, fresh, grey to dark grey siltstone and interbedded fine to medium grained sandstone up to 150mm thick							
	109								109
	109.94								

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased
TYPE OF BORING: HQ3 from 0m to 203.59m
WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12
REMARKS: Top of pipe RL 364.43 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.79 AHD **BORE No:** BY0091CH-S
EASTING: 231770.52 **PROJECT No:** 49761.01
NORTHING: 6410452.08 **DATE:** 8/7 - 1/11/2012
DIP/AZIMUTH: 90°/-- **SHEET** 12 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
474		MUDSTONE - Medium to high strength, fresh, grey mudstone *(continued)*			110.26		PL(A) = 4.26 PL(D) = 2.67		
	110.46	COAL - Medium to high strength, fresh black coal From 110.51m, interbedded tuff bands up to 90mm thick		C					
111	111.0	SILTSTONE AND SANDSTONE - Medium to high strength, fresh, grey to dark grey siltstone and interbedded fine to medium grained sandstone up to 150mm thick			111.57				111
475	112				112.16		PL(A) = 1.82 PL(D) = 0.3		112
476	113			C					113
477	114				114.22		PL(A) = 0.82 PL(D) = 0.6		114
478					114.56				
479	115								115
	116			C					116
480	116.35	MUDSTONE/COAL - Medium strength, fresh, dark brown to black mudstone/coal with some extremely low to very low strength tuff bands up to 110mm thick			116.31		PL(A) = 0.59 PL(D) = 0.12		
	117								117
481	117.28	SILTSTONE AND SANDSTONE - Medium to high strength, fresh, grey to dark grey siltstone and interbedded fine to medium grained sandstone up to 150mm thick			117.56		PL(A) = 1.71 PL(D) = 0.89		
					117.6				
	118								118
482					118.33				
				GT018					
					118.66		PL(A) = 2.19 PL(D) = 1.01		
				C	118.7				
	119								119
	119.23	MUDSTONE - Medium to high strength, fresh, dark brown mudstone with some siderite							
					120.0		PL(A) = 2.88		

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased
TYPE OF BORING: HQ3 from 0m to 203.59m
WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12
REMARKS: Top of pipe RL 364.43 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.79 AHD
EASTING: 231770.52
NORTHING: 6410452.08
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-S
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 13 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
484		MUDSTONE - Medium to high strength, fresh, dark brown mudstone with some siderite *(continued)*					PL(D) = 1.18		
				C	120.57				
	121								121
485									
	122			C					122
486		From 122.60m to 122.81m, coal band							
					122.87		PL(A) = 1.03 PL(D) = 0.9		
	123								123
487		From 123.08m, thinly laminated with tuff							
					123.57				
	124								124
488					124.32		PL(A) = 1.18 PL(D) = 0.63		
		From 124.71m, coal with come calcite							
	124.92			C					
	125	SILTSTONE AND SANDSTONE - Medium to high strength, fresh, grey to dark grey siltstone and interbedded fine to medium grained sandstone up to 150mm thick							125
489									
	126				126.13				126
490		From 125.97m, trace to some tuff laminations up to 2mm thick		GT019	126.33		PL(A) = 0.97 PL(D) = 0.35		
					126.37				
	127								127
491		From 127.40m to 127.86m, carbonaceous mudstone with trace coal lenses up to 2mm thick			127.72		PL(A) = 1.55 PL(D) = 0.44		
		From 127.86m, high strength		C					
	128								128
492					128.57		PL(A) = 2.61 PL(D) = 1.19		
	129								129
					129.4				
	129.71			C					
		SANDSTONE - High strength, fresh, grey fine to coarse grained sandstone							

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased
TYPE OF BORING: HQ3 from 0m to 203.59m
WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12
REMARKS: Top of pipe RL 364.43 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.79 AHD
EASTING: 231770.52
NORTHING: 6410452.08
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-S
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 14 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
494		SANDSTONE - High strength, fresh, grey fine to coarse grained sandstone *(continued)*			130.6		PL(A) = 2.12 PL(D) = 1.81		
	131			C					131
495									
	132								132
496		From 132.35m, trace to some fine to medium sized gravel			132.46		PL(A) = 1.85 PL(D) = 1.66		
					132.5				
	133								133
497									
	134			C	134.01		PL(A) = 2.53 PL(D) = 1.86		134
498									
	135								135
499					135.56				
	136								136
500					136.71		PL(A) = 0.69 PL(D) = 1.27		
				GT020	136.75				
	137			C	137.07				137
501									
	138								138
502									
	138.46	CARBONACEOUS MUDSTONE - High strength, fresh, dark brown mudstone with some coal lenses up to 5mm thick			138.42		PL(A) = 3.34 PL(D) = 0.51		
					138.57				
	138.96								
	139	SANDSTONE - High to very high strength, fresh grey fine to medium grained sandstone		C					139

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased
TYPE OF BORING: HQ3 from 0m to 203.59m
WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12
REMARKS: Top of pipe RL 364.43 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.79 AHD
EASTING: 231770.52
NORTHING: 6410452.08
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-S
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 15 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
504		SANDSTONE - High to very high strength, fresh grey fine to medium grained sandstone *(continued)*			140.33		PL(A) = 2.97 PL(D) = 2.1		
	141			C					141
505					141.53				
	142				142.19		PL(A) = 3.63 PL(D) = 2.85		142
506					142.36		PL(A) = 4.35		
				GT021	142.4		PL(D) = 2.52		
	142.71				142.71				
		CARBONACEOUS MUDSTONE - High strength, fresh, dark brown mudstone with some coal lenses up to 5mm thick		C					
	143								143
507	143.17	From 142.94m, slightly tuffy			143.18				
				GT022	143.38		PL(A) = 0.31 PL(D) = 0.08		
		COAL - High strength, fresh, black coal			143.42				
	144								144
	144.05								
508		SILTSTONE AND SANDSTONE - Medium to high strength, fresh, grey to dark grey siltstone and interbedded fine to medium grained sandstone up to 150mm thick			144.22		PL(A) = 2.01 PL(D) = 0.61		
				GT023	144.26				
					144.52				
					144.57				
	145								145
509					145.3		PL(A) = 1.63 PL(D) = 0.49		
	146			C					146
510					146.24		PL(A) = 3.56 PL(D) = 1.85		
	147								147
511					147.62				
	148								148
512									
	148.5								
		SANDSTONE - Medium strength, fresh, fine to medium grained sandstone		C					
	149								149

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased
TYPE OF BORING: HQ3 from 0m to 203.59m
WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12
REMARKS: Top of pipe RL 364.43 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	⧗	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.79 AHD
EASTING: 231770.52
NORTHING: 6410452.08
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-S
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 16 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
514		SANDSTONE - Medium strength, fresh, fine to medium grained sandstone *(continued)*		C	150.56		PL(D) = 0.05		
					150.59				
	151	From 150.98m, fine to coarse grained with trace fine sized gravel							151
515									
					151.96		PL(A) = 0.9		
	152			C	151.99		PL(D) = 1.86		152
516				GT024					
					152.3		PL(A) = 0.74		
	152.51				152.33		PL(D) = 0.42		
		MUDSTONE - Medium strength, dark brown carbonaceous mudstone							
					152.82		PL(A) = 1.55		
	153	From 153.10m, slightly fine to medium grained sandy					PL(D) = 0.04		153
517									
					153.6				
	154						PL(A) = 2.42		154
518					154.1		PL(D) = 0.44		
					154.5		PL(A) = 3.34		
					154.54		PL(D) = 0.2		
	155			C					155
519				GT025					
	155.49	COAL - High strength, fresh, black coal							
					155.93				
	156								156
520	156.15	SANDSTONE - High strength, fresh, dark grey fine grained sandstone with some siltstone bands up to 20mm thick			156.57				
	157								157
521					157.7		PL(A) = 2.75		
				GT026	157.74		PL(D) = 1.18		
	158				157.96				158
522				C					
	158.52	From 158.36m, carbonaceous siltstone			158.51		PL(A) = 2.16		
		COAL - Medium to high strength, fresh, black coal					PL(D) = 0.66		
	159								159
					159.18		PL(A) = 1.39		
		From 159.19m, trace calcite and siderite		GT027	159.21		PL(D) = 0.05		
					159.49				
					159.57				
				C	159.83		PL(A) = 1.13 PL(D) = 0.38		

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased
TYPE OF BORING: HQ3 from 0m to 203.59m
WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12
REMARKS: Top of pipe RL 364.43 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.79 AHD
EASTING: 231770.52
NORTHING: 6410452.08
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-S
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 17 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
524		COAL - Medium to high strength, fresh, black coal *(continued)*			160.33		PL(A) = 0.84 PL(D) = 0.98		
		From 160.52m to 160.91m, low to medium strength, tuff band			160.6		PL(A) = 0.27		
	161			C					161
525	161.48	TUFF - High to very high strength, fresh, light grey tuff							
	162				161.93		PL(A) = 3.55 PL(D) = 2.01		162
526	162.09	COAL - Medium to high strength, fresh, black coal			162.37		PL(A) = 3.2 PL(D) = 0.58		
					162.55				
	163								163
527	163.22	SILTSTONE - Medium to high strength, fresh, dark grey siltstone with some fine to medium grained sand and trace to some fine to medium sized gravel			163.55		PL(A) = 2.76 PL(D) = 1.33		
				GT028	163.59				
					163.84				
	164			C					164
528					164.25		PL(A) = 2.46 PL(D) = 0.74		
					164.4		PL(D) = 1.18		
					164.5		PL(D) = 0.78		
					164.6		PL(D) = 0.92		
					164.71		PL(D) = 0.95		
					164.79		PL(D) = 0.47		
	165				164.92		PL(D) = 0.86		165
529	165.15	SANDSTONE - Medium to high strength, fresh, grey to dark grey fine to coarse grained sandstone, quartzone in parts			165.03		PL(D) = 0.78		
					165.19		PL(D) = 0.32		
					165.29		PL(D) = 0.51		
					165.39		PL(D) = 0.35		
					165.52		PL(D) = 0.56		
					165.55		PL(D) = 0.73		
	166				165.62		PL(D) = 0.42		166
530					165.72		PL(D) = 0.67		
					165.82		PL(D) = 2.09		
					165.92		PL(D) = 1.17		
					166.03		PL(D) = 1.37		
					166.13		PL(D) = 1.38		
					166.23		PL(D) = 1.12		
					166.33		PL(D) = 0.45		
	167				166.44		PL(D) = 0.94		167
531				C	166.54		PL(D) = 0.87		
					166.64		PL(D) = 1.47		
					166.74		PL(D) = 1.12		
					166.83		PL(D) = 1.46		
					166.94		PL(D) = 0.92		
				GT029	167.04		PL(D) = 0.84		
					167.14		PL(D) = 1.27		
	168				167.24		PL(D) = 0.7		168
532		From 168.00m, low to medium strength			167.34		PL(D) = 0.67		
					167.48		PL(A) = 1.45		
					167.55		PL(D) = 1.09		
					167.59		PL(D) = 1.69		
					167.84		PL(D) = 2.06		
					167.9		PL(D) = 0.26		
					168.0		PL(D) = 0.2		
	169				168.1		PL(D) = 0.48		169
					168.2		PL(D) = 0.63		
	169.25	COAL - Medium to high strength, fresh, black coal		C	168.3		PL(D) = 0.55		
					168.4		PL(D) = 0.61		
					168.5		PL(D) = 0.67		
					168.54		PL(D) = 0.93		
					168.6		PL(D) = 0.51		
					168.7		PL(D) = 0.87		

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased

TYPE OF BORING: HQ3 from 0m to 203.59m

WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12

REMARKS: Top of pipe RL 364.43 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	⧗	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.79 AHD
EASTING: 231770.52
NORTHING: 6410452.08
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-S
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 18 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
534		COAL - Medium to high strength, fresh, black coal *(continued)*			168.8		PL(D) = 0.45		
					168.9		PL(D) = 0.57		
					169.0		PL(A) = 0.8		
					169.1		PL(D) = 0.33		
					169.2		PL(D) = 0.45		
				C	170.15				
					170.22				
	171								171
535					171.05		PL(A) = 0.68		
				GT030	171.09		PL(D) = 0.26		
					171.32		PL(A) = 1.12		
					171.35		PL(D) = 0.23		
					171.45				
	172								172
536									
	173			C	173.01		PL(A) = 2.17		173
							PL(D) = 0.57		
537	173.33								
		SANDSTONE - High to very high strength, fresh, grey fine to coarse grained sandstone			173.4		PL(A) = 2.77		
				GT031	173.44		PL(D) = 2.09		
					173.64				
	174								174
538									
					174.47		PL(A) = 3.15		
					174.5		PL(D) = 1.41		
	175								175
539									
	176			C					176
					176.14		PL(A) = 3.57		
540							PL(D) = 2.65		
	177								177
541					177.51				
					177.97		PL(A) = 3.51		
	178				178.04		PL(D) = 1.88		178
542							PL(A) = 3.88		
							PL(D) = 2.48		
		From 178.70m, trace to some siltstone laminations up to 2mm thick		C					
	179				179.04		PL(A) = 2.98		179
							PL(D) = 0.57		
							PL(A) = 2.8		

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased
TYPE OF BORING: HQ3 from 0m to 203.59m
WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12
REMARKS: Top of pipe RL 364.43 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.79 AHD **BORE No:** BY0091CH-S
EASTING: 231770.52 **PROJECT No:** 49761.01
NORTHING: 6410452.08 **DATE:** 8/7 - 1/11/2012
DIP/AZIMUTH: 90°/-- **SHEET** 19 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
544		SANDSTONE - High to very high strength, fresh, grey fine to coarse grained sandstone *(continued)*		C	180.02		PL(D) = 1.14		
					180.57				
	180.65	SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone, thinly laminated with trace to some siltstone			180.65				
	181								181
545		From 181.63m to 181.87m, siltstone band thinly laminated with some fine to medium strength sandstone							
	182								182
546					182.7		PL(A) = 3.26 PL(D) = 1.8		
				GT032	182.74				
	183			C	183.0				183
547									
	184	From 183.86m to 183.90m, carbonaceous siltstone band							184
548		From 184.26m to 184.36m, fine to coarse grained sand							
		From 184.55m to 184.18m, conglomerate (fine to medium gravel in a fine to coarse sand matrix)							
	185						PL(A) = 2.58		185
549		From 185.05m to 185.11m, carbonaceous siltstone			185.08		PL(D) = 1.67		
				C	185.1				
				C	185.63				
		From 185.69m to 185.77m, low strength tuff			185.82				
	186	From 186m, grading into laminite							186
550	186.2	LAMINITE - High to very high strength, fresh, grey laminite		C					
					186.64		PL(A) = 3.65 PL(D) = 1.38		
	187				186.9				187
551	187.17	SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone							
	187.47	SILTSTONE - High strength, fresh, grey siltstone							
	188								188
552				C					
	188.85				188.78		PL(A) = 1.63		
	188.97	TUFF - Medium strength, fresh, grey tuff		GT033	188.82				
	189	From 188.95m to 188.97m, very low strength			188.91				189
		SILTSTONE - High strength, fresh, grey, siltstone							

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased
TYPE OF BORING: HQ3 from 0m to 203.59m
WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12
REMARKS: Top of pipe RL 364.43 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.79 AHD **BORE No:** BY0091CH-S
EASTING: 231770.52 **PROJECT No:** 49761.01
NORTHING: 6410452.08 **DATE:** 8/7 - 1/11/2012
DIP/AZIMUTH: 90°/-- **SHEET** 20 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
554		SILTSTONE - High strength, fresh, grey, siltstone *(continued)*							
		From 190.4m, grading into sandstone							
	190.62	SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone laminated with trace siltstone							
	191								191
555				C					
	191.91								
	192	SILTSTONE / SANDSTONE - High strength, fresh, grey siltstone interbedded with fine to medium grained sandstone up to 400mm thick, spaced up to 300mm apart			192.05		PL(A) = 1.69 PL(D) = 1.03		192
556		At 192.39m, very low strength clay seam							
		From 192.5m to 192.98m, very high strength, fine to medium grained sandstone band, laminated with trace siltstone			192.9		PL(A) = 7.22		
	193	At 192.76m, very low strength clay seam			192.98		PL(D) = 4.17		193
557					193.5		PL(A) = 1.08		
	194								194
558					194.16		PL(A) = 1.49		
	195								195
559		From 195.31m to 195.36m, medium strength, thinly laminated with very low strength clay seams			195.4		PL(D) = 2.07		
		From 195.42m to 195.44m, very low strength clay seam		C					
	196	From 195.91m to 195.64m, medium strength, thinly laminated with very low strength clay seams							196
560		From 196.23m to 197.12m, medium strength, thinly laminated with very low strength clay seams			196.42				
				GT034	196.58				
	197								197
561					197.42		PL(A) = 0.91		
		From 197.63m to 197.68m, medium strength, thinly laminated with very low strength clay seams							
	198	From 197.88m to 198.25m, medium strength, thinly laminated with very low strength clay seams							198
562		From 198.34m to 198.54m, medium strength, thinly laminated with very low strength clay seams							
					198.75		PL(A) = 1.29		
	199				198.96				199
		From 199.02m to 199.15m, medium strength, thinly laminated with very low strength clay seams		C					
					199.95		PL(A) = 1.09		

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased
TYPE OF BORING: HQ3 from 0m to 203.59m
WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12
REMARKS: Top of pipe RL 364.43 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong, NSW

SURFACE LEVEL: 363.79 AHD
EASTING: 231770.52
NORTHING: 6410452.08
DIP/AZIMUTH: 90°/--

BORE No: BY0091CH-S
PROJECT No: 49761.01
DATE: 8/7 - 1/11/2012
SHEET 21 OF 21

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
564				GT035	200.0				
					200.2				
	200.42	From 200.33m to 200.42m, very low strength clay seam							
		SILTSTONE - Medium to high strength, fresh, grey siltstone							
	201								201
565		From 201.14m to 201.2m, low strength, very thinly laminated with clay seams		C					
	202								202
566									
	203								203
567		From 203.0m, medium strength			203.06		PL(A) = 0.96		
		From 203.08m to 203.12m, tuffaceous siltstone							
		From 203.2m to 203.3m, tuffaceous siltstone							
	203.59	Bore discontinued at 203.59m, limit of investigation			203.59				
568	204								204
	205								205
569									
	206								206
570									
	207								207
571									
	208								208
572									
	209								209

RIG: MDR 104 Hydrapower Explorer **DRILLER:** Coix / Myers / Gartside **LOGGED:** Fulham/Holden **CASING:** Uncased
TYPE OF BORING: HQ3 from 0m to 203.59m
WATER OBSERVATIONS: Water depth: 36.88m as measured on the 19.7.12
REMARKS: Top of pipe RL 364.43 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Bylong : Drillhole Summary

Hole Number : BY0188

Date : 26/02/2013

Total Depth : 43.56 m

Hole Type : Open (RAB)

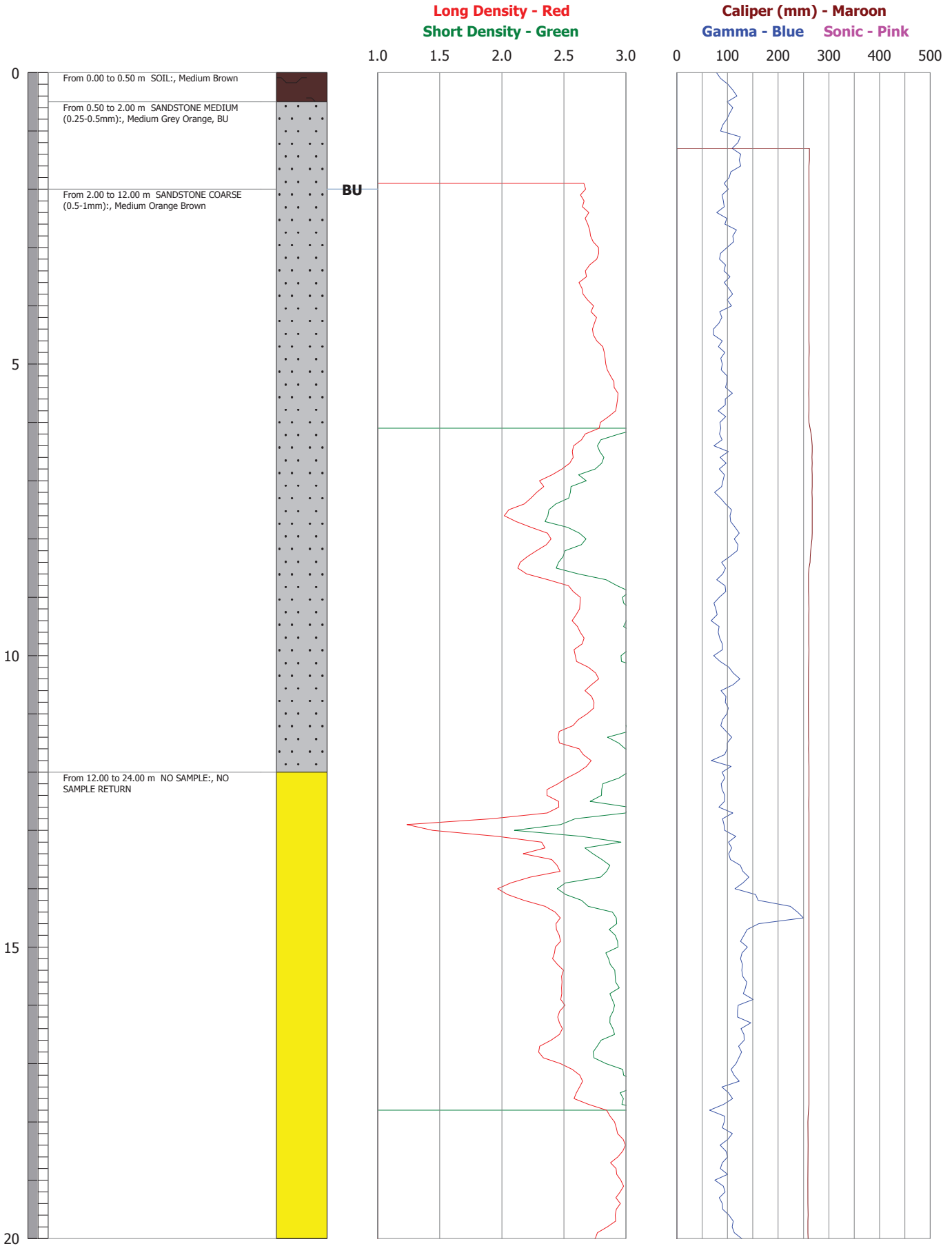
Tenement : AUTH342

Area : Wallings Pastora

Easting : 230858.01

Northing : 6404063.51

Height : 326.60 *MGA94_56S*



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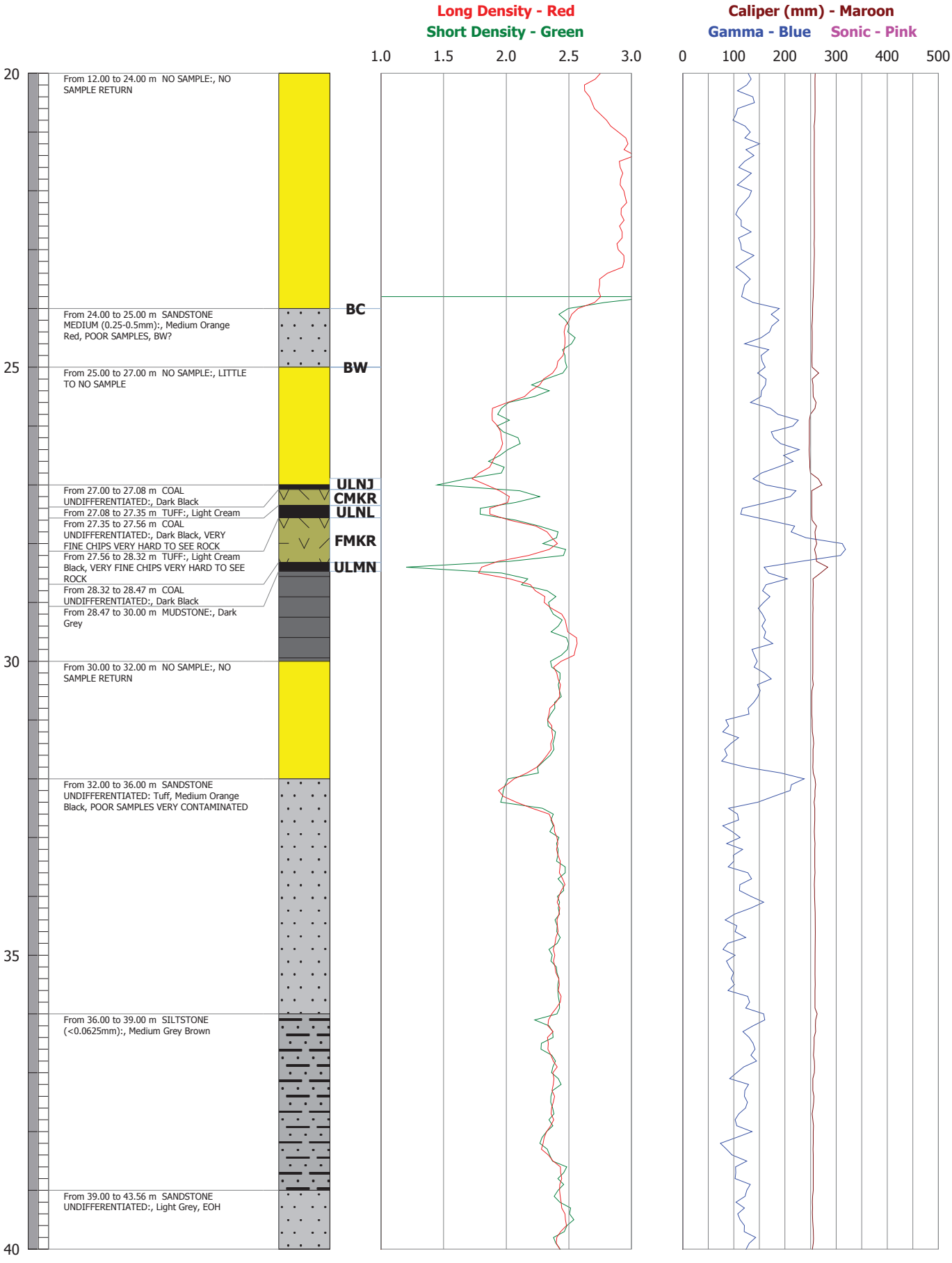

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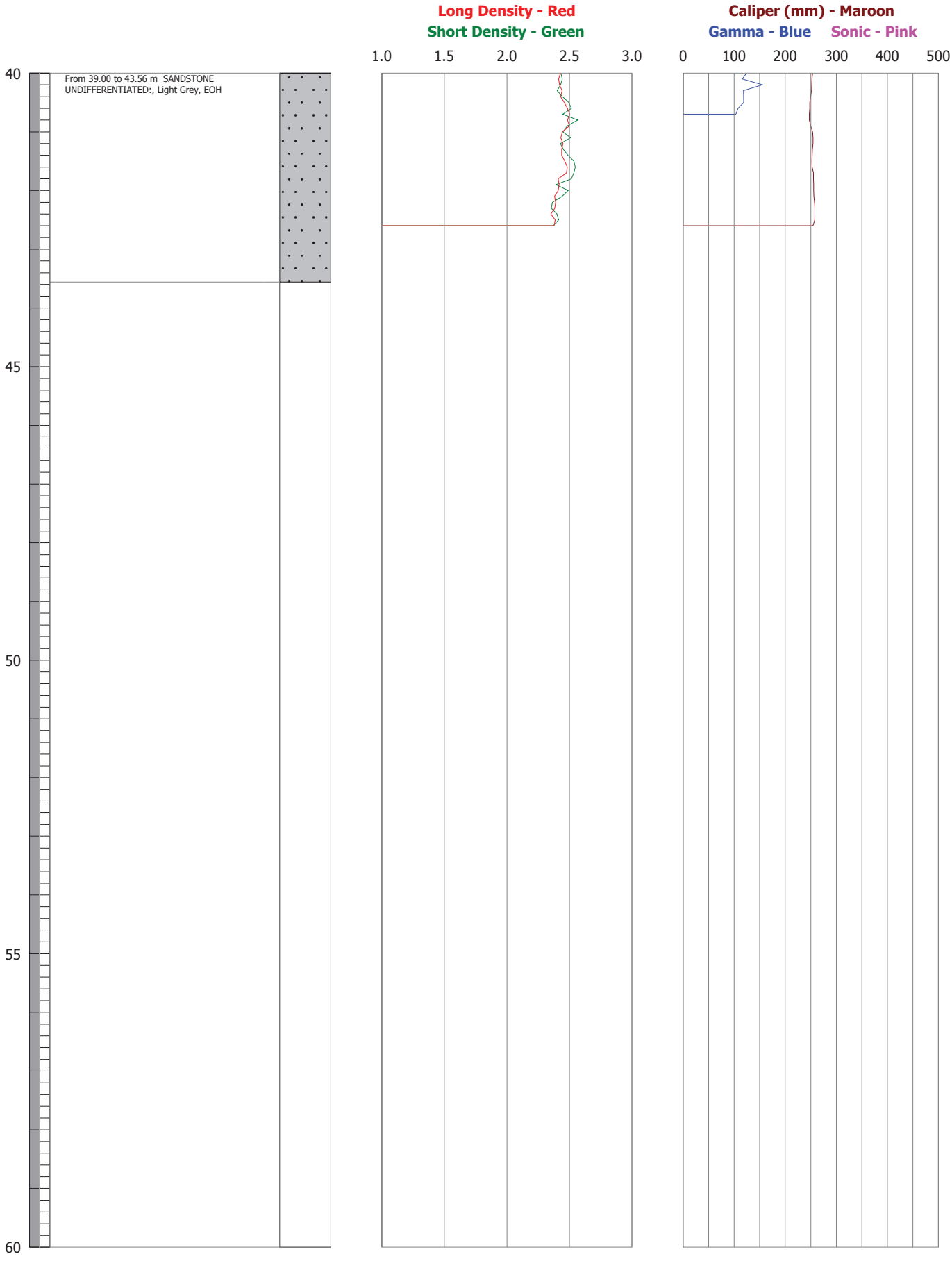
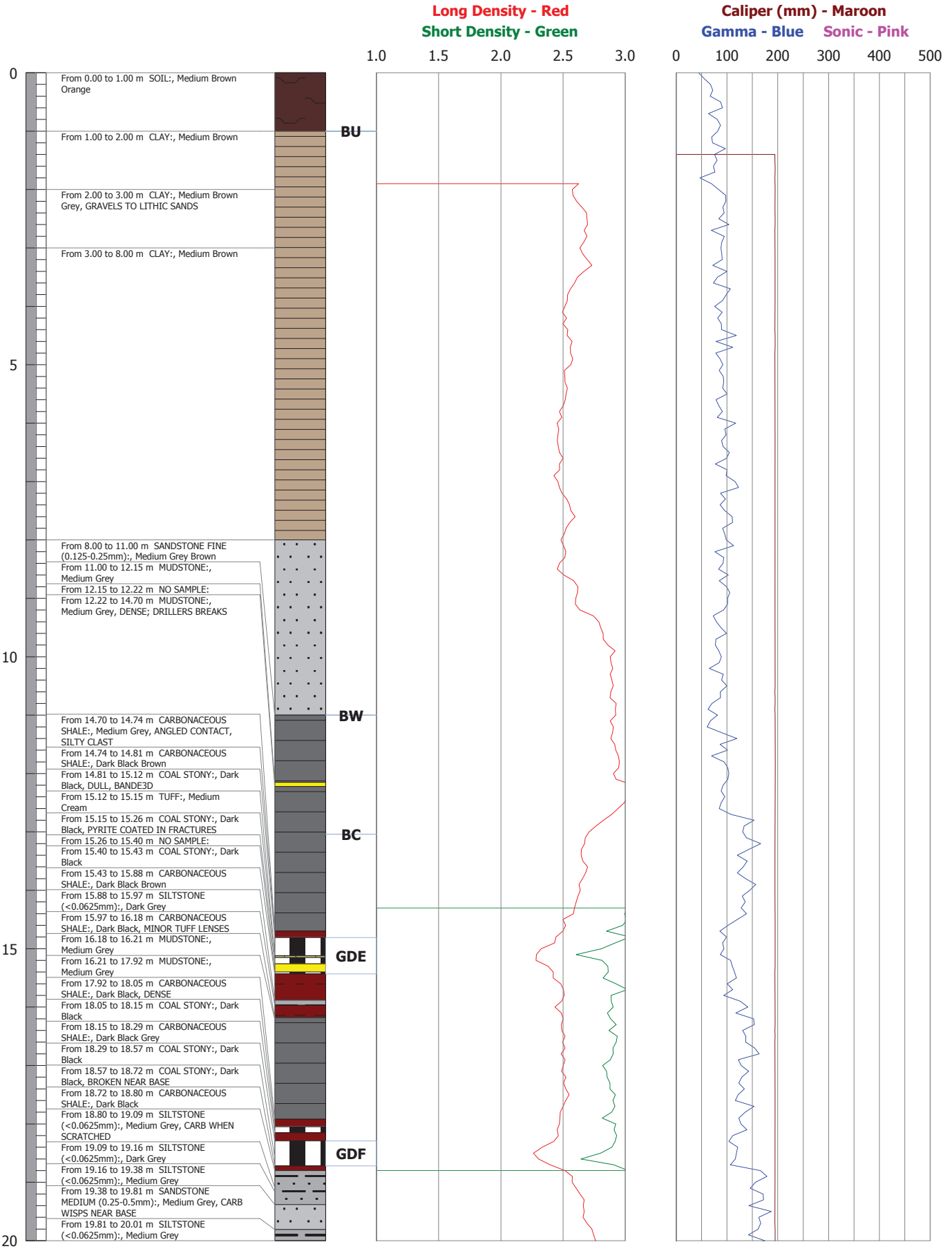


Bylong : Drillhole Summary

Hole Number : BY0204CH **Hole Type** : Fully Cored **Easting** : 232611.11

Date : 27/03/2013 **Tenement** : AUTH342 **Northing** : 6405079.77

Total Depth : 69.45 m **Area** : Walling Pastoral **Height** : 296.74 ***MGA94_56S***



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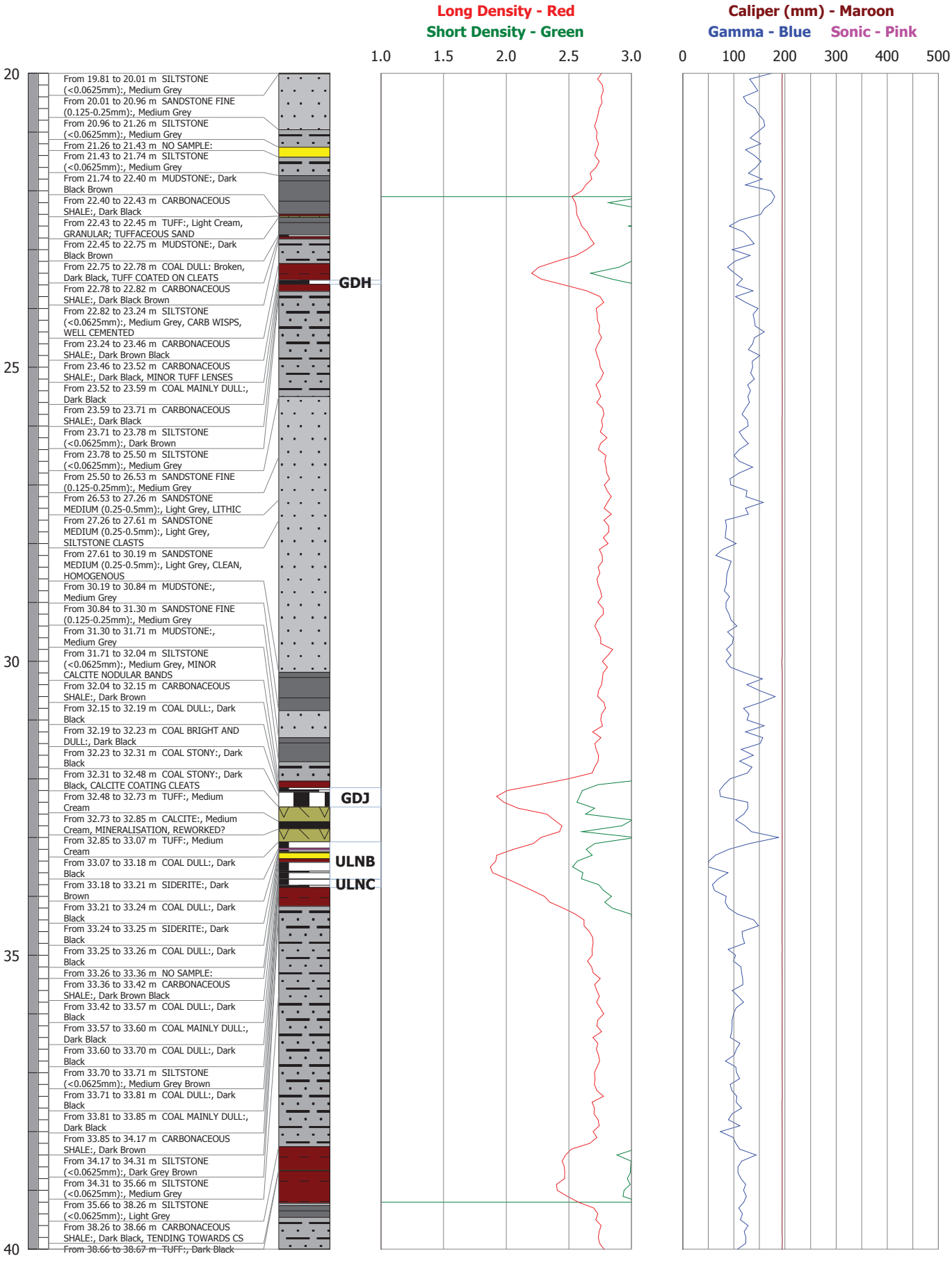
Total Depth : 69.45 m **Area** : Walling Pastoral **Height** : 296.74 ***MGA94_56S***



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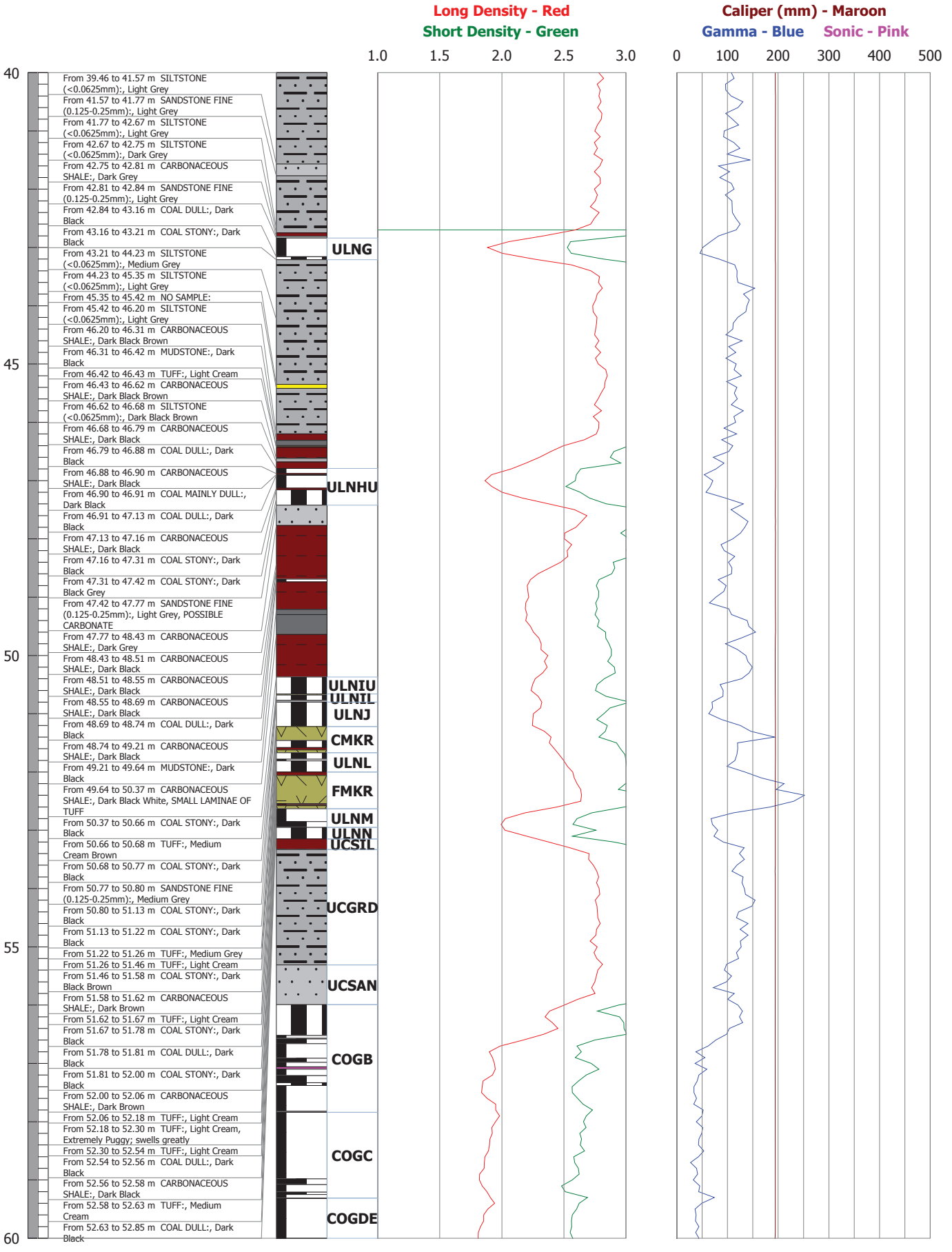

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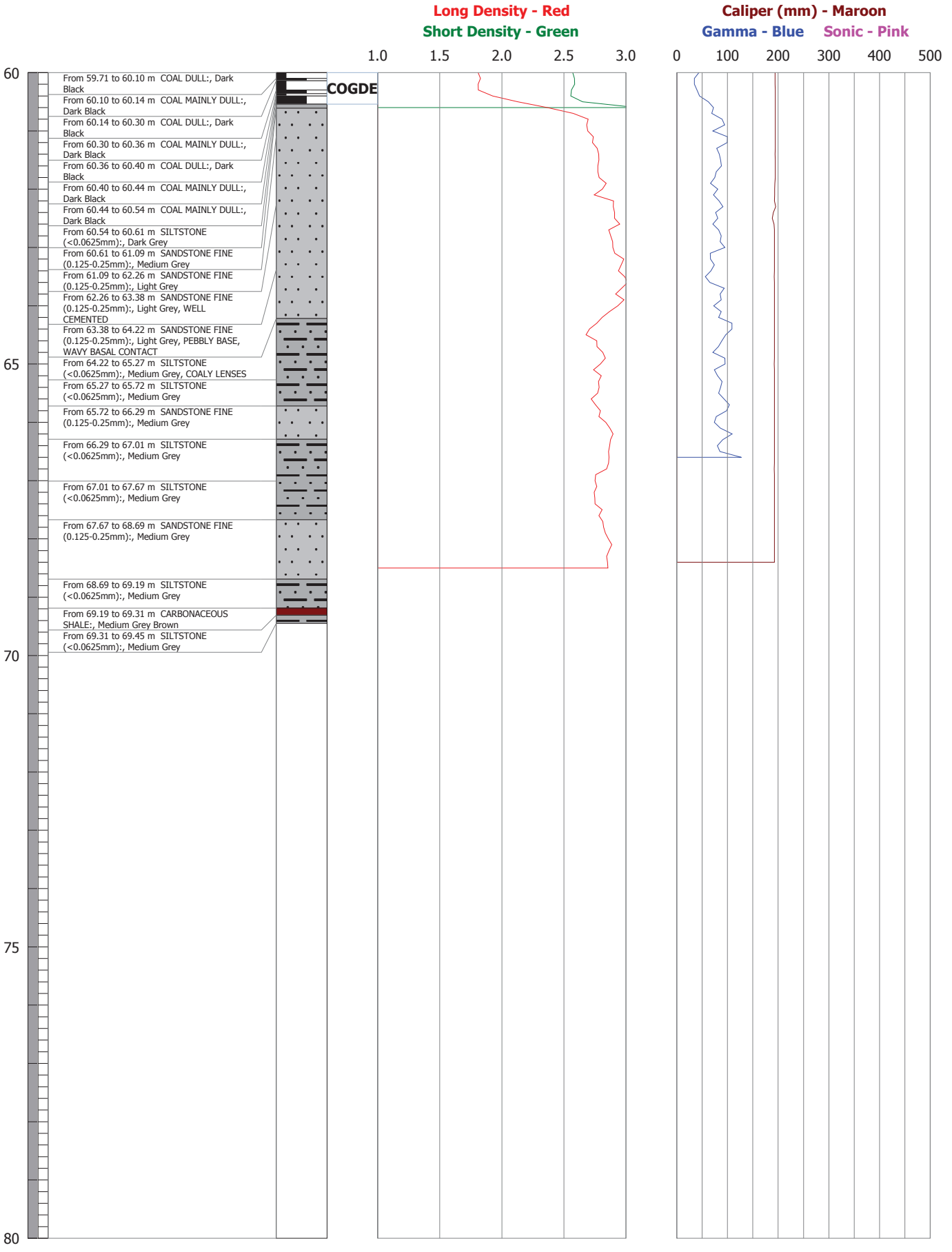
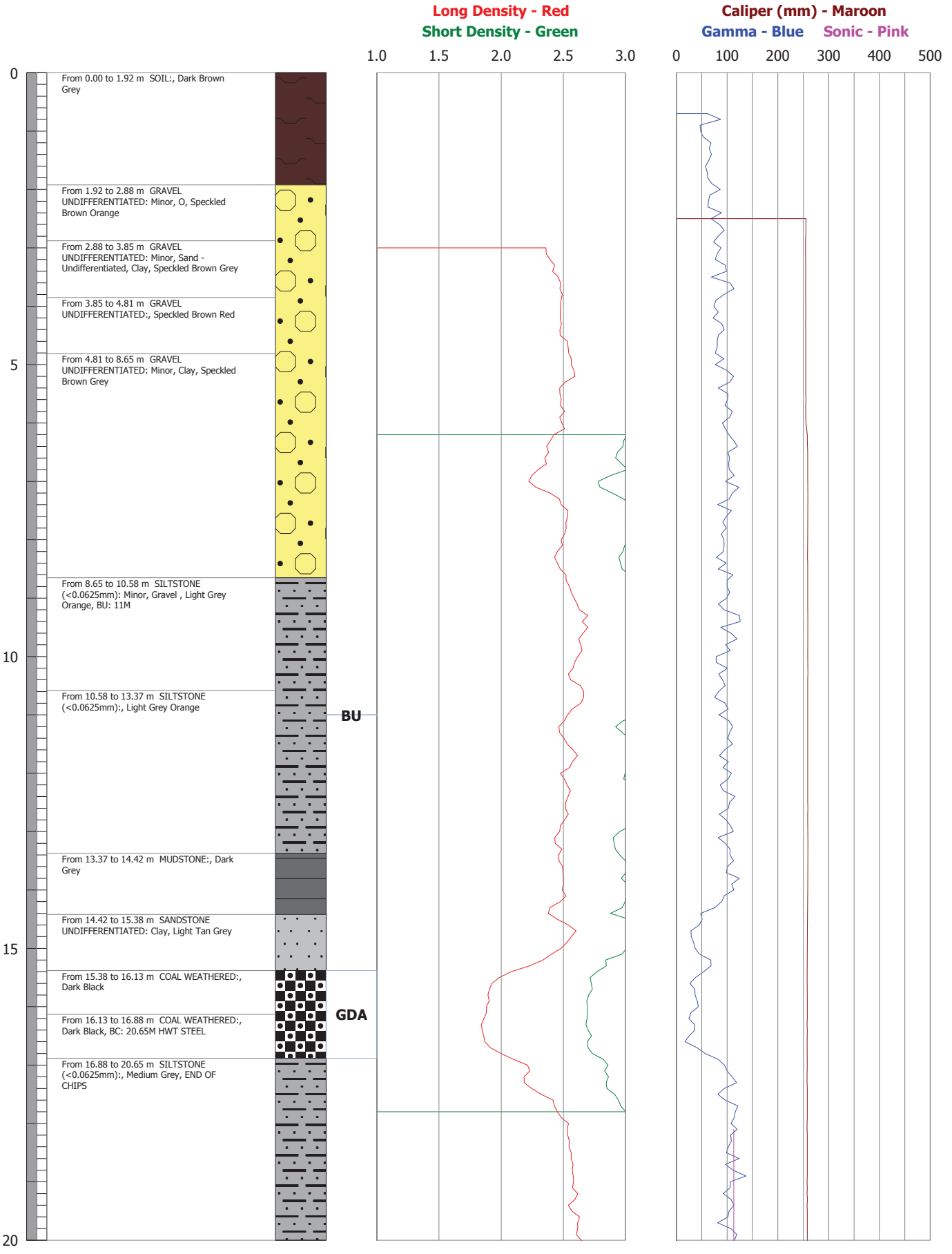


Bylong : Drillhole Summary

Hole Number : BY0208CH **Hole Type** : Fully Cored **Easting** : 234269.38

Date : 4/04/2013 **Tenement** : AUTH342 **Northing** : 6403672.42

Total Depth : 108.60 m **Area** : Wallings Pastora **Height** : 327.08 ***MGA94_56S***



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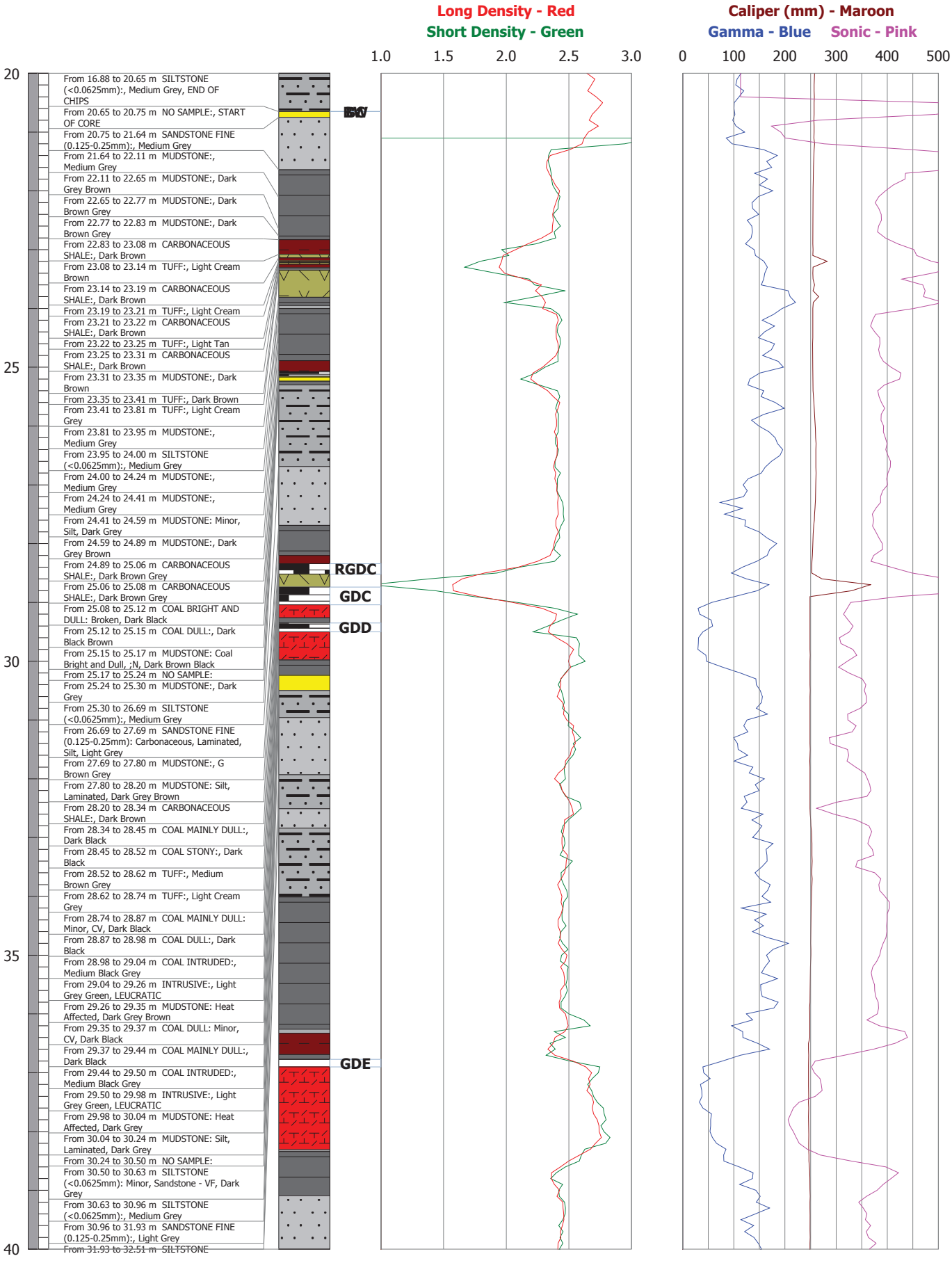
Hole Number : BY0208CH **Hole Type** : Fully Cored **Easting** : 234269.38

Date : 4/04/2013 **Tenement** : AUTH342 **Northing** : 6403672.42

Total Depth : 108.60 m **Area** : Wallings Pastora **Height** : 327.08 ***MGA94_56S***



Bylong : Drillhole Summary

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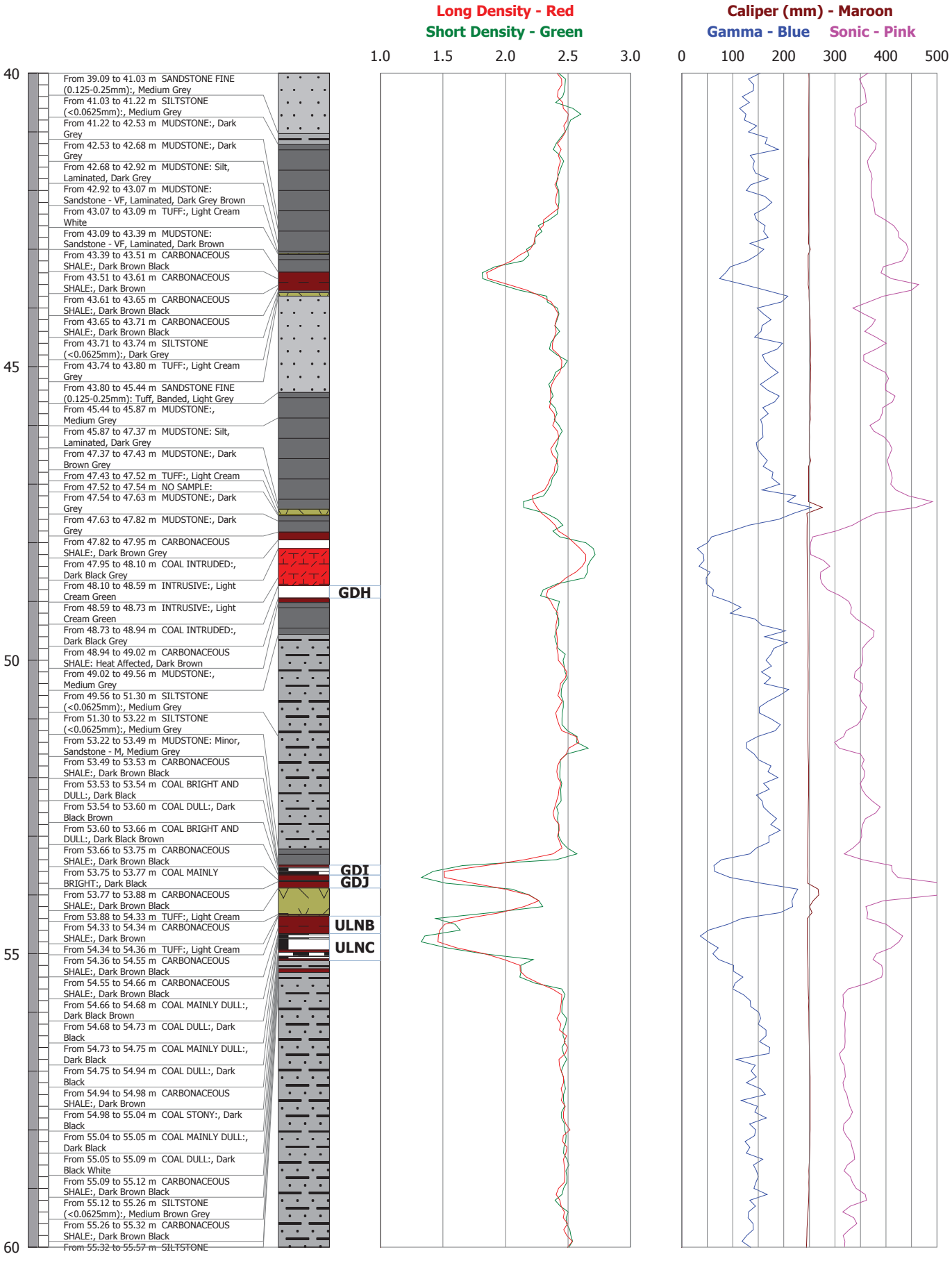
Date : 4/04/2013 **Tenement** : AUTH342 **Northing** : 6403672.42

Total Depth : 108.60 m **Area** : Wallings Pastora **Height** : 327.08 ***MGA94_56S***



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Hole Number : BY0208CH **Hole Type** : Fully Cored **Easting** : 234269.38

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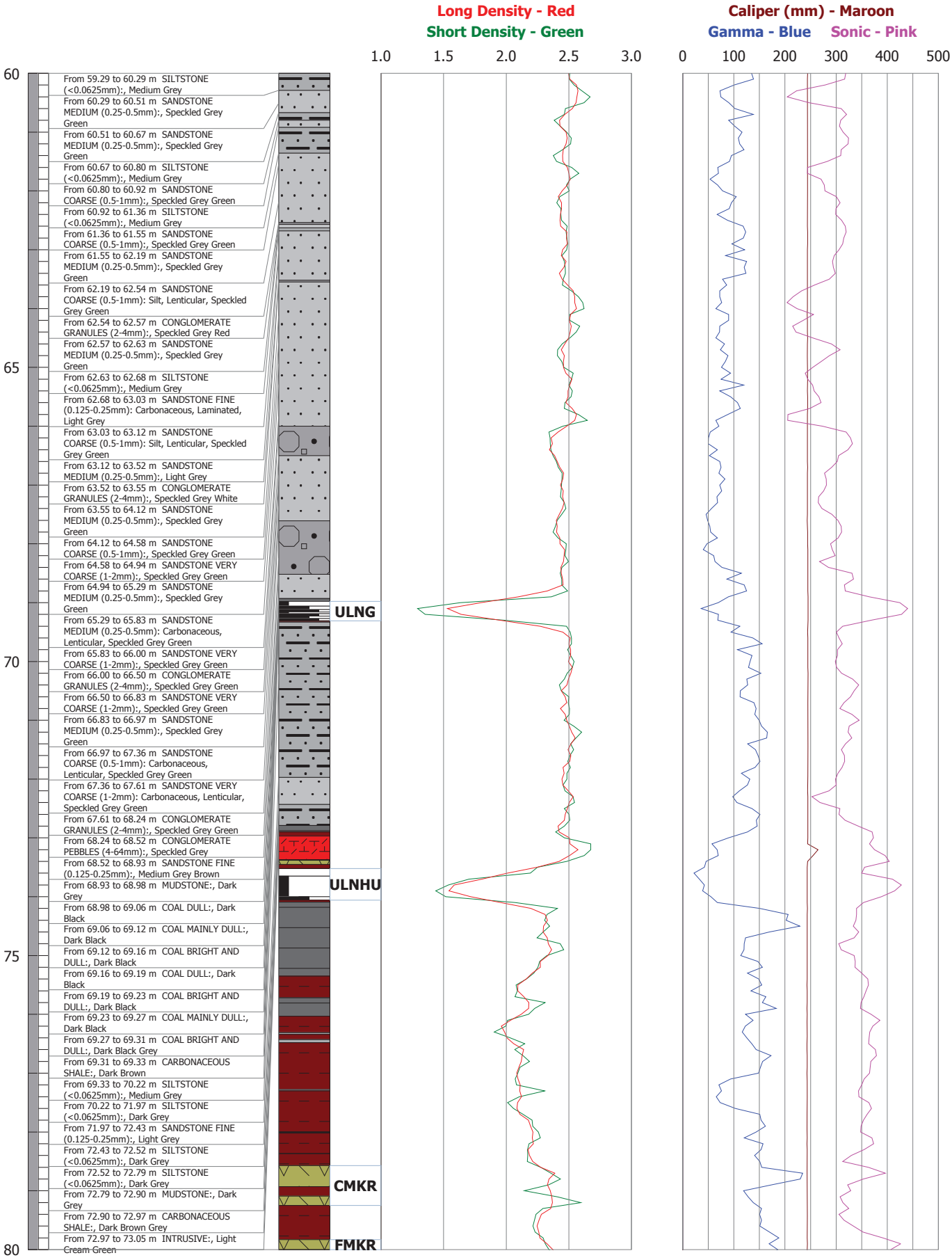
Total Depth : 108.60 m **Area** : Wallings Pastora **Height** : 327.08 ***MGA94_56S***



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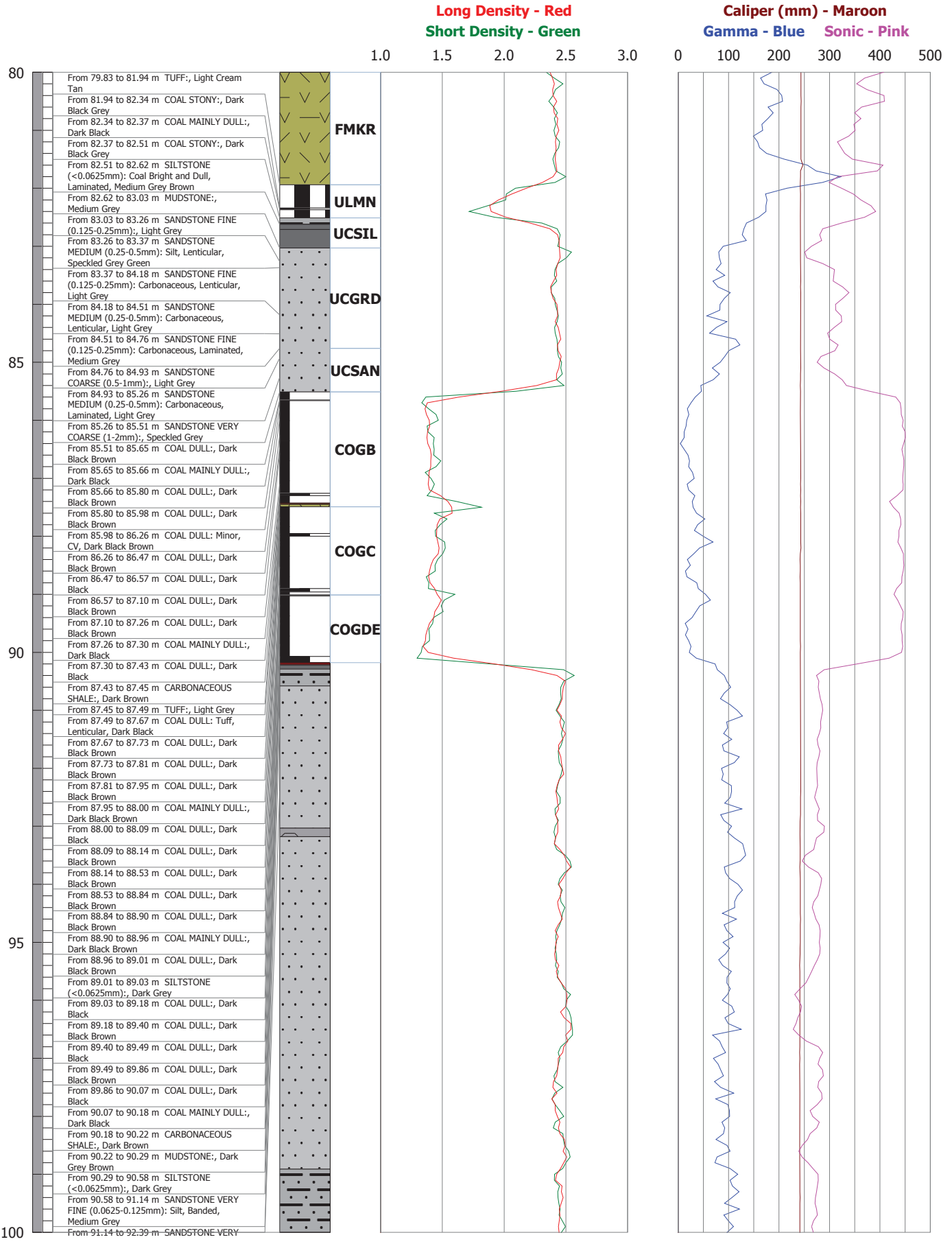

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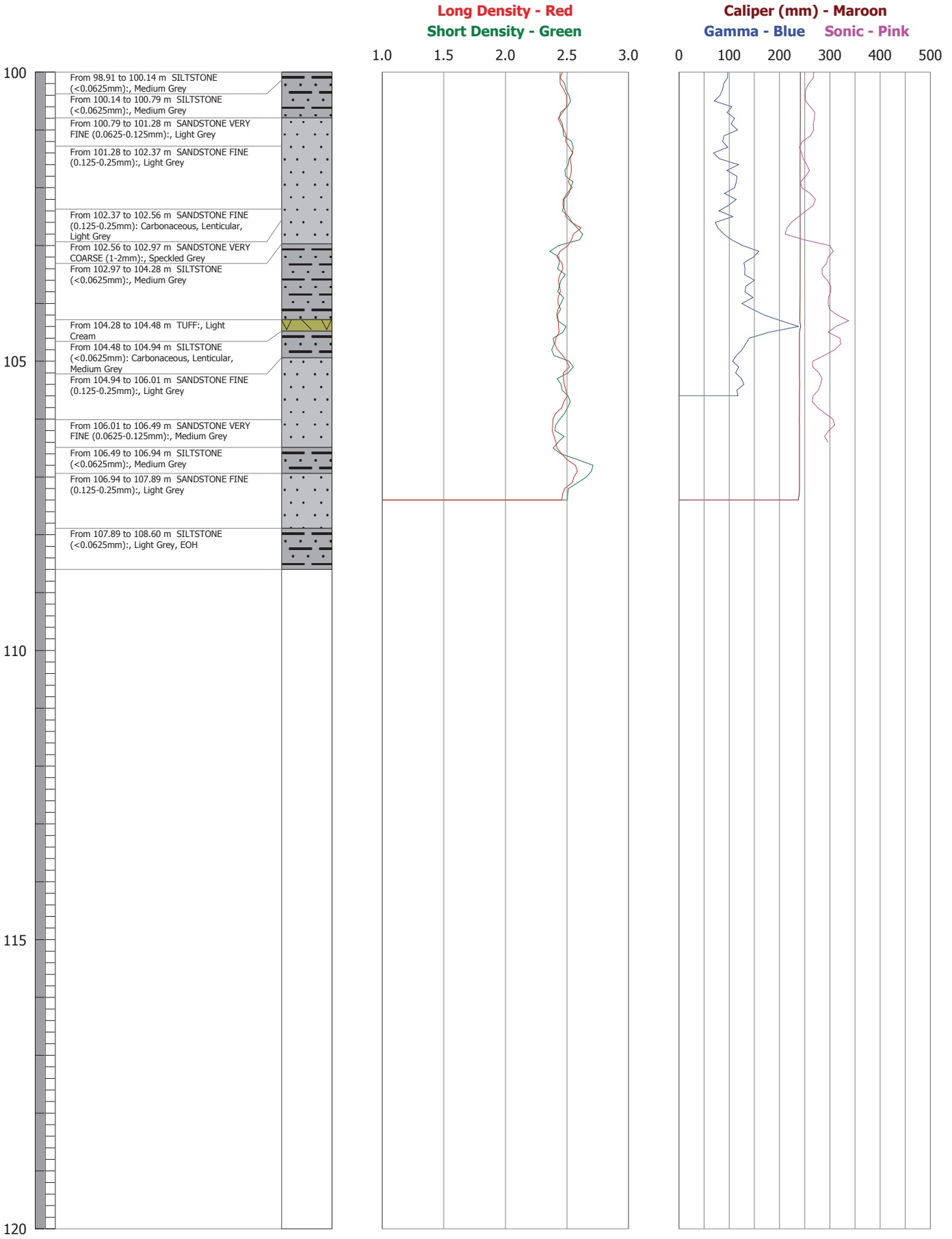

BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: 301.42 AHD
EASTING: 232343.35
NORTHING: 6404982.41
DIP/AZIMUTH: 90°/--

BORE No: CPT36
PROJECT No: 49761
DATE: 30/5-7/6/13
SHEET 1 OF 6

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
					0.0				TOC = 0.62m
301		TOPSOIL - Brown sandy silt topsoil, generally comprising fine to medium grained sand, abundant rootlets, trace clay, humid		D					From 0m to 0.4m, concrete
					0.5				
	0.7	SANDY GRAVEL - Medium dense, red, brown, sandy gravel, generally comprising fine to coarse grained sand, fine to medium sized subrounded, subangular gravel, humid			1.0				
	1			S			8,9,11 N = 20		
	1.35	SILTY SAND - Medium dense, orange, grey brown, fine to medium grained silty sand with some to slightly clayey, humid			1.45				
300					1.8				
	2			U,pp$_{75}$	2.01		>400 kPa		
		From 2.3m, with some fine to medium sized subangular gravel and ironstained cemented parts			2.5				
299				S			7,9,16 N = 25		
	3				2.95				
				D	3.0				
298	3.5	SANDSTONE - Low to medium strength, moderately weathered, grey brown, fine to medium grained sandstone		D	3.5				
					3.7				
	4								From 0.4m to 7.65m, bentonite
297	4.5	SANDSTONE - Low to medium strength, moderately weathered, brown, fine to medium grained sandstone			4.5				
		From 4.56m to 4.69m, extremely low strength, extremely weathered, fragmented							
	5	From 4.74m, clay seam 10mm thick		C					
296		From 5.03m, clay seam 10mm thick							
		From 5.14m to 5.30m, intermixed clay seams through joints, 1-60mm thick							
	6	From 5.39m to 5.41m, extremely low strength, extremely weathered			5.92				
	6.2	From 5.71m to 5.73m, clay seam							
		From 6.11m to 6.2m, extremely low strength, extremely weathered, fragmented		C					
295	6.85	SILTSTONE - Very low to low strength, highly to moderately weathered, grey brown siltstone		pp	6.9		350 kPa		
	7	CLAYSTONE - Extremely low strength, extremely weathered, dark brown claystone		pp	6.93		>400 kPa		
	7.21	From 6.88m, white		pp	7.0		>400 kPa		
294	7.35	From 6.98m, yellow brown		pp	7.15		300 kPa		
	7.47	CORE LOSS - 0.14m		pp	7.18		>400 kPa		
					7.3				
	8	CLAYSTONE - Extremely low strength, extremely weathered, white, yellow brown, dark brown claystone		C					
293	8.0	SANDSTONE - Low to medium strength, slightly weathered, grey, brown, fine to medium grained sandstone			8.45				
		From 7.6m to 7.63m, extremely low strength, extremely weathered, yellow brown		C					
	8.8	From 7.8m, moderately to slightly weathered, brown			8.97				
	9	SANDSTONE - Low to medium strength, slightly to moderately weathered, brown, fine to medium grained sandstone			9.19		PL(A) = 0.68 PL(D) = 0.42		
292				C					
	9.92	SILTSTONE - Low to medium strength, slightly							

RIG: TD Rig 106 **DRILLER:** (Total) Sawyer **LOGGED:** Holden **CASING:** HW to 4.1m

TYPE OF BORING: Solid flight auger (TC) to 3.8m, rock roller to 4.5m, HQ3 to 59.15m

WATER OBSERVATIONS: Free groundwater observed at 12.05m

REMARKS: Top of pipe RL 302.05 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U$_x$	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: 301.42 AHD
EASTING: 232343.35
NORTHING: 6404982.41
DIP/AZIMUTH: 90°/--

BORE No: CPT36
PROJECT No: 49761
DATE: 30/5-7/6/13
SHEET 2 OF 6

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
291		weathered, brown siltstone laminated with some sandstone		C	10.2		PL(A) = 0.62		
		MUDSTONE - Moderately weathered, fresh, dark grey mudstone *(continued)*			10.3				
	11			C					11
290		From 11.41m to 11.45m, slightly weathered			11.33		PL(A) = 0.76 PL(D) = 0.81		From 7.65m to 15.5m, 5mm gravel From 8.0m to 15.5m, Class 18 PVC Screen
	12 12.0	MUDSTONE / SILTSTONE - Medium strength, fresh, dark grey mudstone, thinly laminated with some siltstone			12.0			▼	12
289	12.9								
	13	MUDSTONE - Medium strength, fresh, dark grey mudstone			13.41				13
288	13.61	SILTSTONE - Medium strength, fresh, light and dark grey siltstone		GT001 C	13.78 13.82		PL(A) = 0.63 PL(D) = 0.45		
	14								14
287									
	15				15.0				15
286	15.4	MUDSTONE - Medium strength, fresh, dark grey laminated with some light grey siltstone							
	16				16.0		PL(A) = 0.66 PL(D) = 0.43		16
285	16.47	From 16.29m to 16.47m, low strength, coal / carbonaceous mudstone band		C					
		SILTSTONE - Medium strength, fresh, grey							
	17				17.2		PL(A) = 0.69 PL(D) = 0.6		17
284	17.48	LAMINITE - Medium strength, fresh, grey laminite							
	17.75	From 17.68m to 17.74m, low strength, very thinly laminated with clay seams							
	18	From 17.74m, very low strength clay seam			18.0				18
283		SILTSTONE - Medium strength, fresh, light and dark grey siltstone							
		From 17.75m to 18.17m, thinly laminated with some fine sandstone			18.6				
		From 18.17m to 18.27m, fine sandstone		GT002 C	18.99		PL(A) = 0.89 PL(D) = 0.83		
	19 19.03	MUDSTONE / SILTSTONE - Medium strength, fresh, dark grey			19.0				19
282		From 19.7m to 19.9m, low strength coal seam							
	19.9								

RIG: TD Rig 106 **DRILLER:** (Total) Sawyer **LOGGED:** Holden **CASING:** HW to 4.1m

TYPE OF BORING: Solid flight auger (TC) to 3.8m, rock roller to 4.5m, HQ3 to 59.15m

WATER OBSERVATIONS: Free groundwater observed at 12.05m

REMARKS: Top of pipe RL 302.05 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: 301.42 AHD
EASTING: 232343.35
NORTHING: 6404982.41
DIP/AZIMUTH: 90°/--

BORE No: CPT36
PROJECT No: 49761
DATE: 30/5-7/6/13
SHEET 3 OF 6

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
281		SILTSTONE - Medium strength, fresh, grey *(continued)*		C	20.17		PL(A) = 0.63		
	21				21.0				21
280	21.4	From 21.18m to 21.19m, coal lense From 21.21m to 21.22m, coal lense From 21.3m to 21.31m, coal lense From 21.36m to 21.37m, coal lense From 21.39m to 21.4m, tuff lense (heat affected)							
	21.77	CARBONACEOUS SILTSTONE / COAL - Medium strength, fresh, dark grey carbonaceous siltstone laminated with black coal			21.67		PL(A) = 0.88		
	22			C					22
279		SILTSTONE - High strength, fresh, grey			22.67		PL(A) = 1.36		
	23								23
	23.23	LAMINITE - High strength, fresh, light and dark grey laminite							
278					23.96		PL(A) = 2.04		
	24	From 23.95m, grading into sandstone			24.0				24
	24.26	SANDSTONE - Very high strength, fresh, light grey, fine to medium grained sandstone From 24.56m to 24.64m, siltstone band							
277	25				25.12				25
276				GT003 C	25.56 25.61		PL(A) = 4.63		
	26								26
275		From 26.22m to 26.33m, fine to coarse grained sandstone, trace fine gravel From 26.7m to 27.81m, fine to coarse grained sandstone, trace fine gravel							
	27				27.0				27
274									
	28								28
	28.19	SILTSTONE - Very high strength, fresh, grey			28.4		PL(A) = 3.79		
273	28.44	CARBONACEOUS SILTSTONE / COAL - High strength, fresh, dark brown carbonaceous siltstone laminated with black coal		GT004 C	28.44 28.8		PL(A) = 1.21		
	28.89				28.84				
	29	TUFF - High strength, fresh, light grey tuff (heat affected?)		GT005	28.94				29
272	29.36	CARBONACEOUS SILTSTONE / COAL - High strength, fractured, dark brown carbonaceous siltstone laminated with black coal			29.36				
					30.0		PL(A) = 2.02		

RIG: TD Rig 106 **DRILLER:** (Total) Sawyer **LOGGED:** Holden **CASING:** HW to 4.1m

TYPE OF BORING: Solid flight auger (TC) to 3.8m, rock roller to 4.5m, HQ3 to 59.15m

WATER OBSERVATIONS: Free groundwater observed at 12.05m

REMARKS: Top of pipe RL 302.05 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

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EASTING: 232343.35
NORTHING: 6404982.41
DIP/AZIMUTH: 90°/--

BORE No: CPT36
PROJECT No: 49761
DATE: 30/5-7/6/13
SHEET 4 OF 6

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
									From 15.5m to 44.5m, bentonite
271	30.44	From 30.34m to 30.36m, tuff laminations		C					
		SILTSTONE - High strength, fresh, grey siltstone			30.95		PL(A) = 1.27		
	31				31.0				
270									
	32 32.0	SILTSTONE / SANDSTONE - Very high strength, fresh, dark grey siltstone, thinly bedded with light grey fine grained sandstone		C					
269					32.9		PL(A) = 2.68		
	33				33.0				
		From 33.2m, medium bedded							
268					33.96		PL(A) = 7.22 PL(D) = 5.32		
	34								
267				C					
		From 34.59m, fine to medium grained sandstone band							
	34.83	MUDSTONE - High strength, fresh, dark grey black mudstone							
	35								
266					35.38		PL(A) = 1.63		
	35.56	From 35.43m to 35.45m, coal lense							
		SILTSTONE / SANDSTONE - High strength, fresh, dark grey siltstone laminated with fine grained sandstone							
	36				36.0		PL(A) = 2.18		
					36.05		PL(D) = 1.51		
265									
	37			C					
264		From 37.41m, thinly bedded							
	38				37.97				
					38.0				
263					38.41		PL(A) = 2.53		
				C	38.46		PL(D) = 2.04		
				GT006					
	39				39.0				
262	39.38	COAL - Medium strength, fresh, black		C					
	39.7	SILTSTONE - High strength, fresh, dark grey							

RIG: TD Rig 106 **DRILLER:** (Total) Sawyer **LOGGED:** Holden **CASING:** HW to 4.1m

TYPE OF BORING: Solid flight auger (TC) to 3.8m, rock roller to 4.5m, HQ3 to 59.15m

WATER OBSERVATIONS: Free groundwater observed at 12.05m

REMARKS: Top of pipe RL 302.05 AHD. Coordinates in MGA.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Cockatoo Coal Limited
PROJECT: Proposed Coal Mine
LOCATION: Bylong

SURFACE LEVEL: 301.42 AHD
EASTING: 232343.35
NORTHING: 6404982.41
DIP/AZIMUTH: 90°/--

BORE No: CPT36
PROJECT No: 49761
DATE: 30/5-7/6/13
SHEET 5 OF 6

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
261	40.52	SILTSTONE - High strength, fresh, dark grey *(continued)*							
		LAMINITE - High strength, fresh, light and dark grey laminite		C	40.83		PL(A) = 2.56 PL(D) = 1.76		
260	41.71	MUDSTONE - High strength, fresh, dark grey black			41.53		PL(A) = 0.4		
259	42.67	COAL - Medium strength, fresh, black			42.0				
	43.05	SILTSTONE / SANDSTONE - High strength, fresh, grey			42.64		PL(A) = 0.45 PL(D) = 0.42		
258		From 43.51m to 44.18m, some fine grained sandstone laminations		C	43.76		PL(A) = 2.59		
				GT007	43.81				
257					44.24				
	44.81	STONEY COAL - Medium strength, fresh, black							
	44.93	CORE LOSS - 0.06m			45.0				
	44.99								
	45.27	STONEY COAL - Medium strength, fresh, black							
256	45.37	TUFF - Medium strength, fresh, light grey							
		CARBONACEOUS MUDSTONE / COAL - High strength, fresh, black carbonaceous mudstone / coal			45.86		PL(A) = 1.25		
	46.07	From 45.45m to 45.5m, brown tuff band							
		From 45.9m to 45.93m, light grey tuff band							
255		From 46.02m to 46.07m, light grey tuff band		C					
		MUDSTONE - High strength, fresh, black							
		From 46.6m to 46.91m, thinly laminated weathered tuff							
254		From 47.65m, grading into tuff			47.35		PL(A) = 1.68		From 44.5m to 50.5m, 2mm gravel At 47.75m, vibrating wire piezometer
	47.95	TUFF - Medium strength, fresh, light brown tuff			48.0				
253	48.46	MUDSTONE - High strength, fresh, black			48.46		PL(A) = 2.77		
	48.73	TUFF - Medium strength, fresh, light brown			48.5				
	48.9	SILTSTONE - High strength, fresh, dark grey black			48.8		PL(A) = 0.57		
252				C GT008					

RIG: TD Rig 106 **DRILLER:** (Total) Sawyer **LOGGED:** Holden **CASING:** HW to 4.1m

TYPE OF BORING: Solid flight auger (TC) to 3.8m, rock roller to 4.5m, HQ3 to 59.15m

WATER OBSERVATIONS: Free groundwater observed at 12.05m

REMARKS: Top of pipe RL 302.05 AHD. Coordinates in MGA.

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SHEET 6 OF 6

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SILTSTONE - High strength, fresh, dark grey black *(continued)*							
251	50.45	COAL / CARBONACEOUS MUDSTONE - High strength, fresh, dark brown black		C					
	50.69	SILTSTONE / SANDSTONE - High strength, fresh, light grey, fine to medium, light grey fine sandstone mixed with dark grey siltstone			51.0				
250	51				51.5		PL(A) = 2.38		
	51.92	SILTSTONE - High strength, fresh, dark grey siltstone laminated with some fine sandstone			52.09				
249	52			GT009					
	52.57	SANDSTONE - High strength, fresh, light grey, fine to medium grained sandstone laminated with some siltstone		C	52.43 52.46		PL(A) = 2.62		From 50.5m to 54.25m, bentonite
248	53				53.4		PL(A) = 2.21 PL(D) = 1.58		
	54				54.0				
247	54.63	COAL - High strength, fresh, black coal							
	55			C					
246					55.84		PL(A) = 1.5		
	56								
245					56.44		PL(A) = 1.63		
				GT010	56.48				From 54.25m to 58.9m, 2mm gravel At 56.75m, vibrating wire piezometer
					56.85				
	57				57.0				57
244									
	58			C					58
243					58.18		PL(A) = 1.41		
	58.87	SANDSTONE - High strength, fresh, grey, fine to medium grained sandstone							
	59								59 From 58.9m to 59.11m, betonite
	59.15	Bore discontinued at 59.15m, limit of investigation			59.15				
242									

RIG: TD Rig 106 **DRILLER:** (Total) Sawyer **LOGGED:** Holden **CASING:** HW to 4.1m

TYPE OF BORING: Solid flight auger (TC) to 3.8m, rock roller to 4.5m, HQ3 to 59.15m

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