

WATERMARK

COAL PROJECT

ENVIRONMENTAL IMPACT STATEMENT

February 2013

T Groundwater Impact Assessment (Appendices)





APPENDIX 1

GHD Field Investigation Report 2012



CLIENTS PEOPLE PERFORMANCE

SHENHUA WATERMARK COAL PTY LTD

Hydrogeological Investigations

Stages 1 - 4

October 2012



INFRASTRUCTURE | MINING & INDUSTRY | DEFENCE | PROPERTY & BUILDINGS | ENVIRONMENT



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Executive Summary

At the completion of the Stage 4 drilling program a total of 103 groundwater monitoring bores have been installed including 96 standpipe type bores and 32 vibrating wire piezometers (VWPs). The bores monitor a total of 128 discrete intervals across the lease, including some 'nested' sites monitoring multiple formations at the one site. Since the establishment of a groundwater monitoring bore network, groundwater levels have been routinely monitored to measure and assess seasonal trends and responses to rainfall events. In addition 22 bores have been installed with dataloggers to record daily water levels.

The groundwater elevation data indicates the potentiometric surface in the Permian decreases from local topographic highs including Mt. Watermark, Black Mountain and the Breeza State Forest towards areas of lower elevation forming localised groundwater flow regimes within the various sub-catchments. The groundwater elevation data for the Quaternary alluvial sediments shows that in the southern portion of the alluvial plains the potentiometric head decreases to the south towards the Mooki River. In the north-eastern lease area the inferred flow direction is to the east and north east towards the Mooki River.

A groundwater sampling program has been completed to characterise the baseline groundwater quality across the EL. Groundwater salinity within the Permian sediments varies considerably across the site, from fresh to saline and is dependent upon the geological formation and location within the localised flow system. Bores located on or close to the elevated ridges show fresh to brackish groundwater quality. Down-gradient bores typically show saline groundwater quality, consistent with long residence time groundwater. Higher groundwater salinity is generally observed in the Black Jack Group formations overlying the Hoskissons Coal. Narrabri Formation bores are typically saline particularly those bores located adjacent to the southern margin of the Permian outcrop. Gunnedah Formation bores are fresher ranging from <500 mg/L TDS in the south east of the EL up to 2,870 mg/L TDS to the south west.

A testing program was completed to characterise the hydraulic properties of the formations and included 8 pumping tests, 82 slug tests, 31 recovery tests and 60 packer tests. The main aquifers identified are:

- Sediments associated with the regional Gunnedah Formation aquifer are found along the southern EL boundary. Higher yielding and lower salinity Gunnedah Formation palaeochannel deposits are found in the south east corner of the EL and to the east and north east of the EL;
- A local scale aquifer associated with the weathered Permian quartz rich sandstones interbedded with and overlying the Benelabri Formation. The upper sandstones are restricted in extent to the south west of the EL. The CLR sandstone is between Hoskissons and Caroona coal seams and is found to the south west and south east under the alluvial plains and in isolated areas in the north west.
- A local scale fractured rock aquifer, associated with Tertiary Basalts where they are saturated, is found to the east of the EL. Areas where the Permian strata is more densely fractured also form a local scale fractured rock aquifer as observed in the central western EL area.

Potential for recharge to the Gunnedah Formation from the Permian sediments in the EL is considered to be limited due to the generally low permeability of the Permian sediments, restricted extent of the Gunnedah Formation adjacent to Permian outcrop and the variations in groundwater quality, types and ages observed. The Black Jack Group sediments from the Hoskissons Coal and below typically have a low permeability and would not typically be considered as an aquifer that can produce a useful yield. The very low permeability values of the Watermark Formation, local palaeochannel and Millie and Bellato Group sediments indicates these formations act as aquitards.



1. Introduction

GHD has been engaged by Shenhua Watermark Coal Pty Ltd (Shenhua) to undertake hydrogeological investigations in conjunction with the geological exploration program completed at the Shenhua Watermark Exploration Licence (EL) 7223 near Gunnedah in NSW. The Watermark EL 7223 is situated approximately 35 km southeast of Gunnedah Township and just west of Breeza Township.

The hydrogeological investigations commenced in July 2009 and included the establishment of a groundwater monitoring bore network, aquifer testing and a groundwater monitoring and sampling program. The investigations were completed to provide baseline hydrogeological data allowing development of a conceptual hydrogeological model for the site and to support the groundwater modelling program being completed by Australian Groundwater and Environmental Consultants as part of Environmental Assessment process being delivered by Hansen Bailey.

1.1 Objectives

Previous reports (GHD 2010a, 2010b and 2011a) have progressively documented the hydrogeological results as completed. This report reviews all the results of the hydrogeological investigations completed as part of the Stage 1 to Stage 4 exploration drilling program. Specifically this report includes:

- Construction details of the installed groundwater monitoring bore network;
- Groundwater level data obtained to date and trend analysis;
- Groundwater quality data obtained to date and trend analysis;
- Details of the aquifer testing investigations and analysis of results; and
- Development of a hydrogeological conceptual model for the site.

1.2 Data Sources

In addition to the data collected during the course of the hydrogeological investigations completed in conjunction with the exploration program, the following data sources have been accessed as part of the on-going hydrogeological assessment for the Shenhua Watermark project:

- NSW Office of Water (NoW) groundwater monitoring bore and surface water monitoring records for water levels and water quality;
- Sampling of local farm bores and collation of available hydrogeological information from landowners;
- Review of previous hydrogeological assessment reports from this region; and
- Bureau of Meteorology (BoM) climate records.

1.3 Previous Hydrogeological Investigations

Numerous hydrogeological investigations mostly concentrated on the Quaternary alluvial aquifers that include parts of the EL area, and regions surrounding the EL area have been completed. These investigative reports have been reviewed and summarised previously (GHD, 2011a) and have been consulted throughout the iterative process of developing a hydrogeological conceptual site model. New reports are reviewed as they are released. The reviewed reports are listed in Section 11.

2. Regional Geology

The Watermark Project is located in the southern part of the Gunnedah Basin, a structural trough within the greater Sydney-Bowen Basin. The surface geology comprises Late Tertiary/Quaternary sediments on the alluvial plains overlying a Permian and Triassic aged Gunnedah Basin Sequence that outcrops in the central and western areas as shown in Figure 1. Minor areas of Tertiary volcanics are also present to the east of the site. The stratigraphy of the area is summarised in Table 1 and consists of the following:

- The **Narrabri Formation** is tentatively assigned Pleistocene in age and is dominated by brown clays with minor thin sands and occasional gravel clasts. Deposition is believed to be from a meandering stream on a wide alluvial plain similar to the current Mooki River (Pratt 1998). The Pliocene aged **Gunnedah Formation** consists of interbedded clays with sand and gravel layers. The sand and gravel channel deposits range in thickness from 5 to 30 m and were deposited by a northwards flowing braided river system.
- **Undifferentiated Tertiary Basalts**. Pratt (1998) noted the basalts in the Breeza area may be outliers of the Liverpool Range Beds that occur on the Liverpool Ranges to the south.
- **Glenrowan Intrusives** of Jurassic age, intrude into each of the Permian and Triassic sediments, and preferentially into coal seams and weakened structural textures. Alteration of the intrusions is common. The eastern half of Mt Watermark is a remnant dolerite plug.
- The **Early Permian to Triassic Gunnedah Basin Sequence** comprises predominantly alluvial, deltaic and marine shelf sediments, namely:
 - Early Triassic Digby Formation - lithic and quartz conglomerates which are alluvial fan deposits found to the west of the site.
 - Late Permian Black Jack Group sediments comprised of the Nea, Coogal and Brothers Subgroups. The main Black Jack Group coal seams within Watermark EL 7223 are the Hoskissons and Melvilles. Additional thin seams are found between the Hoskissons and the Melvilles seams as well as below the Melvilles seam. The formations between the Melvilles and Hoskissons Coals have not been differentiated as no distinct lithological horizons were evident and are collectively referred as interburden in this report. There are a number of higher ash coal seams above the Hoskissons that are correlated to the Caroon, Howes Hill, Breeza, Cliff, Doona and Springfield seams. These higher seams are only found on the western side of Watermark EL 7223. Several geophysically distinctive sandstone and conglomerate layers have been identified across the site and are included as marker horizons in the geological model. The lowest is the CLR sandstone found between the Hoskissons and Caroon Coals within the Benelabri Formation. The CLR2 and CLR3 layers are typically quartz dominant conglomerates found below and above the Howes Hill Coal Seam respectively in the western lease area as shown in Table 1. The Clare Sandstone is a geological formation described as a quartz rich sandstone with subordinate conglomerate and occurs between the Howes Hill and Breeza Coals. Both Pratt (1998) and Tadros (1993) note that the Clare Sandstone can interfinger with the Benelabri Formation and Hoskissons Coal Member and this has been observed in EL 7223.
 - The Late Permian marine sedimentary Millie Group is comprised of the Porcupine Formation, an upwards fining sequence of conglomerate, paraconglomerate and siltstones and the overlying laminated siltstones and claystones of the marine Watermark Formation.



- The Early Permian Bellata Group is comprised of the Maules Creek Formation comprising interbedded sandstones, siltstones and coals and the Leard Formation kaolinitic claystone and siltstones. The Lower, Middle and Upper Maules Creek Coal seams and 10 additional thin coal seams have been identified within EL7223. Tadros (1993) suggests that the Maules Creek Coals are diachronous with the Leard Formation and evidence from drilling in EL7223 appears to confirm this theory.
- The Late Carboniferous to Early Permian mafic volcanics of the Werrie Basalt are comprised of a thick sequence of basaltic lavas and intervening paleosols and form the basement rock type to the Gunnedah Basin sequence across EL7223. In the numerous drill cores that terminate in this sequence, a number of different lithologies and varying degrees of weathering have been observed. A strong sideritic profile at the base of the Leard Formation is usually present.

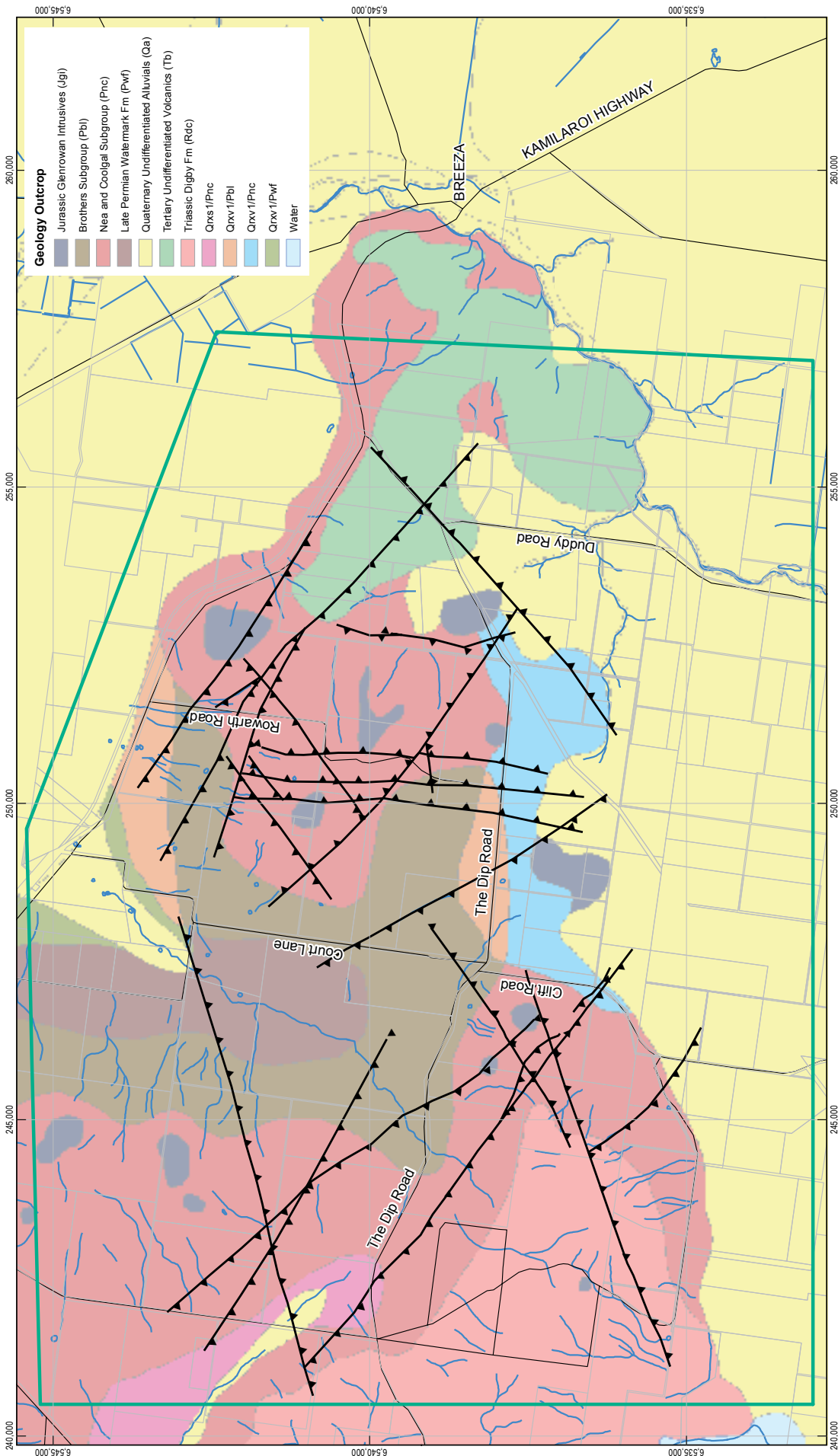
Semi-consolidated soil, appearing as gravelly sand with a silt and clay matrix was intersected in the central western areas of Watermark EL 7223 within the Permian outcrop area. The sequence (up to 60 m deep) prescribes a channelised occurrence and is considered to be of alluvial origin. Rock fragments range from well rounded to sub-angular and comprise most of the rock types found in the Permian sequence. These sediments are referred to as a local palaeochannel deposit in this report and the age of this deposit has not been determined but the occurrence conforms to finger of “Qrxs” and undifferentiated alluvials “Qa” of the regional 1:250,000 scale Geological Survey geology map (Figure 1) which appears to thicken and currently drains towards Lake Goran.

Faulting has been observed in a number of cores and inferred from geological modelling and seismic traverses. Drilling has revealed evidence of faulting such as truncation of seams, fault gouge structures, slickensides, polished surfaces and abundant defects. Mapping of the faults based on the geological data and geophysical surveys also described in the GHD (2011b) Stage 3 Geological Report and faults shown in Figure 1.

Table 1 Regional Stratigraphy

Era		Period	Group	Sub Group	Formation	Member / Coal Seam
Cainozoic		Late Tertiary - Quaternary			Narrabri Formation	
				Gunnedah Formation		
		Tertiary			Undifferentiated Volcanics (Tb)	Goran Conglomerate Member
		Unconformity Surface				
Mesozoic	Surat Basin Units	Jurassic			Glenrowan Intrusives (Jgi)	
		Unconformity Surface				
Palaeozoic	Gunnedah Basin Sequence	Early Triassic			Digby Formation (Rdc)	Ulinda Sandstone Member
						Bomera Conglomerate Member
		Permo- Triassic Unconformity surface				
		Late Permian	Black Jack Group	Nea Subgroup (Pnc)	Trinkey Formation	Doona Coal Seam
						Springfield Coal Seam
				Coogal Subgroup (Pnc)	Wallala Formation	Clift Coal Seam
					Clare Sandstone	Breeza Coal Seam (CLR3 Conglomerate)
					Benelabri Formation	Howes Hill Coal Seam (CLR2 Conglomerate) Caroona Coal Seam (CLR Sandstone)
				Brothers Subgroup (Pbl)	Hoskissons Member	
					Arkarula / Brigalow Formations	
				Pamboola Formation	Melvilles Coal Seam	
				Millie Group		Watermark Formation (Pwf)
			Porcupine Formation (Pps)			
		Early Permian	Bellata Group		Maules Creek Formation (Pmx)	
					Leard Formation (Plf)	
				Boggabri Volcanics (Pbr)		
Werrie Basalt (Pwb)						

Modified after Tadros (1980), Broughton (1994) and after Pratt (1998). Geology outcrop code from 1:250,000 shown in brackets



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Hydrogeological Investigations: Stage 4
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Revision | B
Date | 21 SEP 2012



Shenhua Watermark Coal Project Regional Geology

Figure 1

8/180 Lonsdale St Melbourne VIC 3000 Australia
T 61 3 8687 8000 F 61 3 8687 8111 E me@mail@ghd.com.au W www.ghd.com.au
G:\22\1455\GIS\Map\Deliverables\Hydrology\001_2214551_Shenhua_SiteGeology.mxd
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Data sources: Navteq 2009, GHD 2009, BDIG register

3. Regional Hydrogeological Data

3.1 NoW Bore Registered Data

The NSW Office of Water maintains a database of existing and historic registered bores with information relating to lithology, bore use, yield, groundwater level and groundwater quality. NSW Office of Water bores located in the vicinity of Watermark EL 7223 are shown in Figure 2.

These bores have been used to better understand the hydrogeological conditions within the exploration lease and can be grouped into three general categories:

- Extraction bores for stock, domestic and irrigation (62 registered);
- Investigation bores (33) described as piezometer test holes typically less than 6 m depth drilled for salinity investigation between 1990 -1992; and
- NSW Office of Water groundwater monitoring bores (3) operational (GW093105, GW093106 and GW965577) and one backfilled (GW036100). Information from NoW monitoring bores adjacent to the EL including GW036099 and GW093104 has also been reviewed in this assessment. The NoW bore construction details are shown in Table 2.

A summary of NoW bore groundwater quality and flow rates from the registered and monitoring bore hydrographs is provided in Appendix A and shows groundwater quality in the registered bores is highly variable. Yields from bores screened over the Permian sediments are typically low at less than 1 L/s and groundwater quality descriptions range from good to saline at over 14,000 mg/L TDS. Yields in the Gunnedah Formation on the alluvial plains are significantly higher up to 30 L/s in the south east of the EL and groundwater generally described as good. NoW groundwater chemistry data has been included in the EDSAT groundwater database and is discussed further in Section 6.

Table 2 NoW Monitoring Bore Screen Details

Bore	Screen from (m)	Screen to (m)	Lithology Screened	Interpreted Formation
GW093104_1	6	7	Grey Clay	Narrabri Formation
GW093104_2	25	27	Weathered Sandstone	Permian Sandstone
GW093105_1	9	11	Brown and grey clay	Narrabri Formation
GW093105_2	31	33	Weathered sandstone	Permian Sandstone
GW093106	NA	NA	No log - bore depth 35.5m	Unknown
GW036099_1	42.7	45.7	Clay Light brown some gravel	Narrabri Formation
GW036099_2	57.9	60.2	Sand and coarse gravel	Gunnedah Formation
GW965577_1	12.8	14.8	Brown Clay	Narrabri Formation
GW965577_2	44	46	Gravels with clay bands fine to coarse (sand?)	Gunnedah Formation



Construction data or bore logs were not available for GW093016, so it was not possible to determine which formation this bore monitors. The bore hydrograph is relatively steady and does not show the influence of groundwater pumping during drought periods, as shown by the Gunnedah Formation bores. The relatively shallow bore depth of 35.5 m would also suggest that it is likely to screen the Narrabri Formation. Bore hydrographs for the NoW monitoring bores are shown in Appendix B.

3.2 Census of NoW Extraction Bores

A census of the NoW registered extraction bores in the lease and some adjacent properties was undertaken (Figure 3) where the landowner agreed to discuss the status of the bores registered to that property. This information has been collected to verify the location and assess the current status of registered bores and to obtain general observations on groundwater quality, yield and identification of springs from the landowners. In addition several stock and domestic bores not listed on the NoW database were identified and included in the dataset.

Appendix C contains a summary of the registered NoW bores, including current status, registered usage, location details and comments provided by the landowners. Typically, many of the older bores in the western and central Permian outcrop areas are no longer in use due to poor water quality and low yields, with 21 of the registered bores across Watermark EL7223 now abandoned. Better groundwater quality and more consistent flows have been identified on the eastern portion of the EL. Two bores on the eastern side of the lease area pump groundwater from old underground mine workings which are thought to have been abandoned early last century.

3.3 Seeps and Soaks

Figure 3 also shows the location of the seeps and soaks identified by the landowners in the census discussions and during a field inspection completed in April 2012. Descriptions of the seeps and soaks are summarised below and photographs from the 2012 field inspection contained in Appendix D.

Property 37 Spring Fed Dam. Permanent spring from a large area of seepage at the break of slope in the north west corner of paddock which remains green and used to feed into dam. Dam always full and overflowed down gully. Water quality was good and used for stock watering. Around 2001 the spring stopped flowing landowner assumed was due to long period of low rainfall.

Pigs Wallow: Covering an area of approximately 25m². Minor standing fresh water less than 5mm deep. Located within the local palaeochannel and drains to Watermark Gully. Landowner indicated this area generally stays wet. Water source possibly from State forest ridges to the southwest.

Wallaby Soak: No free standing water, but lush grass covering an area of 25 m². Water source and drainage is probably similar to the Pigs Wallow site.

Yarraman Creek: Landowner advised treeless area as saline groundwater affects tree growth. Groundwater encountered as soaks are generally salty in this vicinity however no obvious soaks observed at time of inspection.



Property 36 Soak: Fresh water soak with minor algae, covers an approximate area of 100 m². Some free standing water less than 5 mm deep. Gravels and pebbles in the vicinity possibly representing either colluvium or weathered sandstones and conglomerates. Landowner advised rock encountered at shallow depth less than 5 m.

Property 19 Spring Fed Dam: Dam installed in the early 1980s; always remains full. Water level is less than 2 m below surface. Area of dam is approximately 200 m² with subsurface composed of sands and gravels.

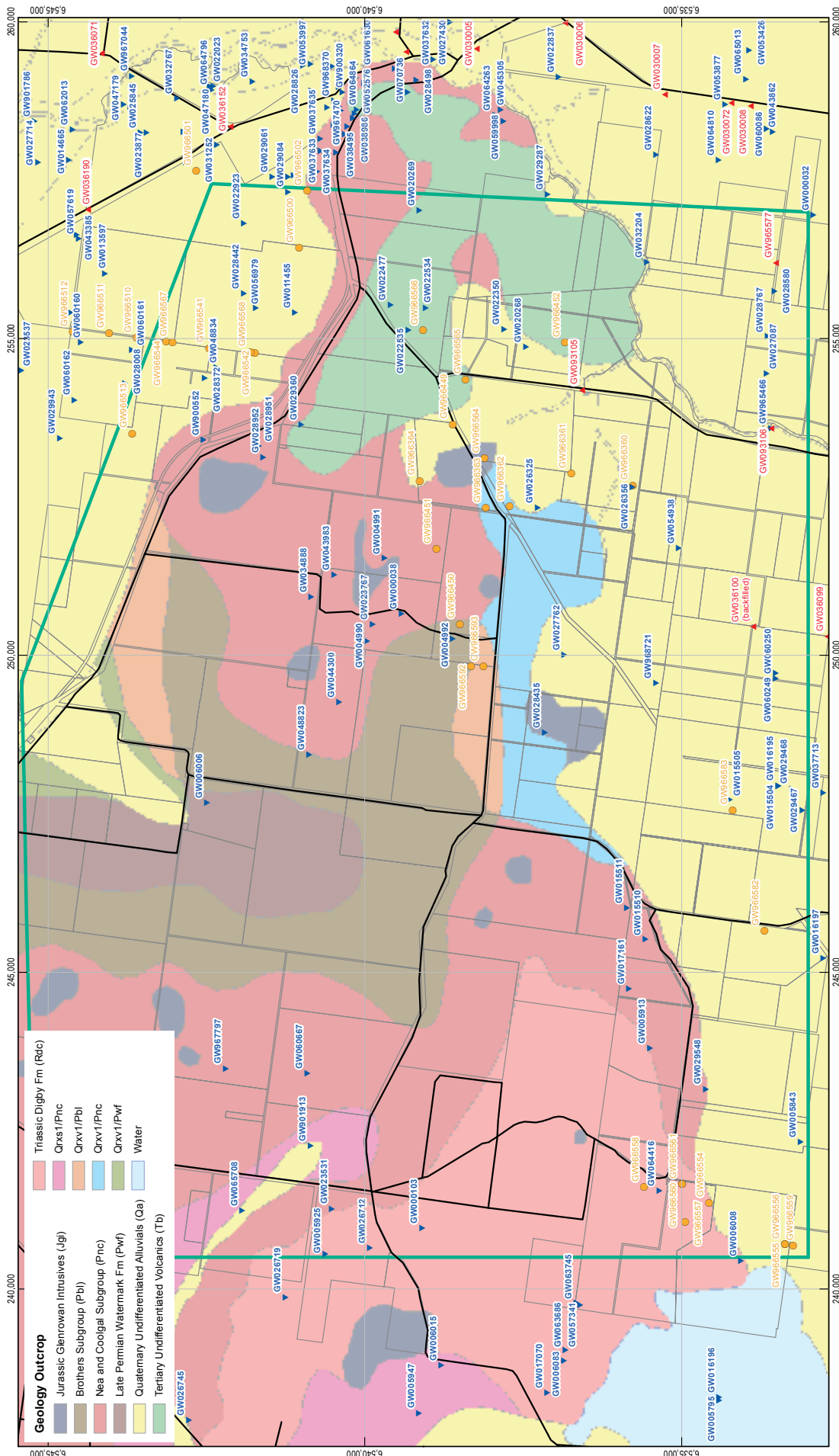
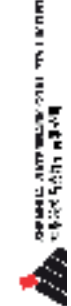


Figure 2

Shenhua Watermark Coal Pty Ltd
Hydrogeological Investigations: Stage 4

Job Number 22 15702-23
Revision A
Date 23 APR 2012

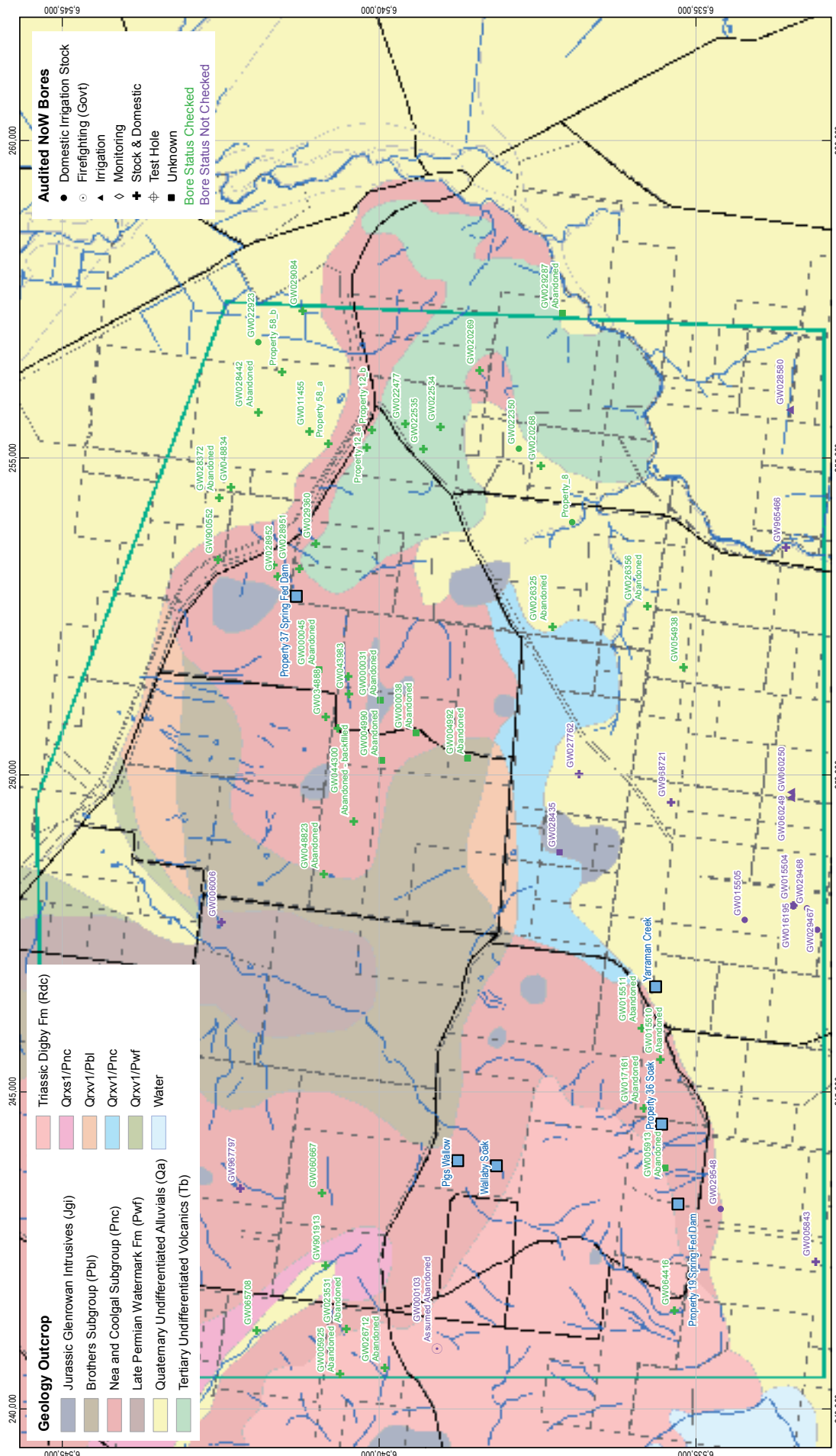


Shenhua Watermark Coal Project
NoW Groundwater Bore Locations

LEGEND
N
1:80,000 (at A4)
0 375 750 1,500 2,250 3,000
Metres
Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia
Grid: Map Grid of Australia 1994, Zone 56

8/180 Lonsdale St, Melbourne VIC 3000 Australia T 61 3 8877 8111 F 61 3 8877 8000 E me@mail@ghd.com.au W www.ghd.com.au
G:\2214551\GIS\MapData\Deliverables\Hydrogeology\002_2214551_Shenhua_NoW\BoreLocationPlan.mxd
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Data source: Navteq 2009, DECCW, New South Wales Office of Water 2010, GHD 2009; Dyke



Job Number 22-15702-23
 Revision A
 Date 18 JUL 2012

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 Watermark Project

Shenhua Watermark Coal Project NoW Groundwater Bore Audit Details and Identified Soaks and Springs

Figure 3

8/180 Lonsdale St Meib VIC 3000 Australia T 61 3 8887 8000 F 61 3 8887 8111 E meimail@ghd.com.au W www.ghd.com.au
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N:\AUMebourne\Projects\2214551\GIS\Maps\Deliverables\HYdrogeology\003_2214551_Shenhua_NoWBoresAudits.mxd
 Data source: Navteq 2009, DECCW, New South Wales Office of Water 2011, Correspondence with Landowners 2010, GHD 2009, BDGregorio



4. Groundwater Monitoring Bore Network

A total of 103 groundwater bores have been installed during the hydrogeological investigations including:

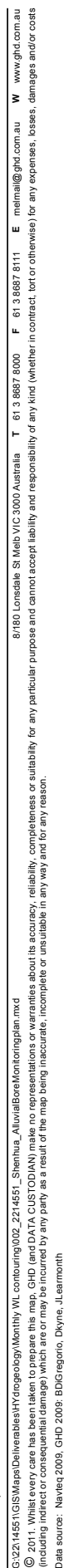
- 87 monitoring bores cased with 50 mm diameter Class 18 uPVC (unplasticised polyvinyl chloride);
- 9 bores cased with 150 mm diameter Class 18 uPVC (primarily for aquifer testing); and
- 32 VWP's installed at 16 monitoring sites across the EL.

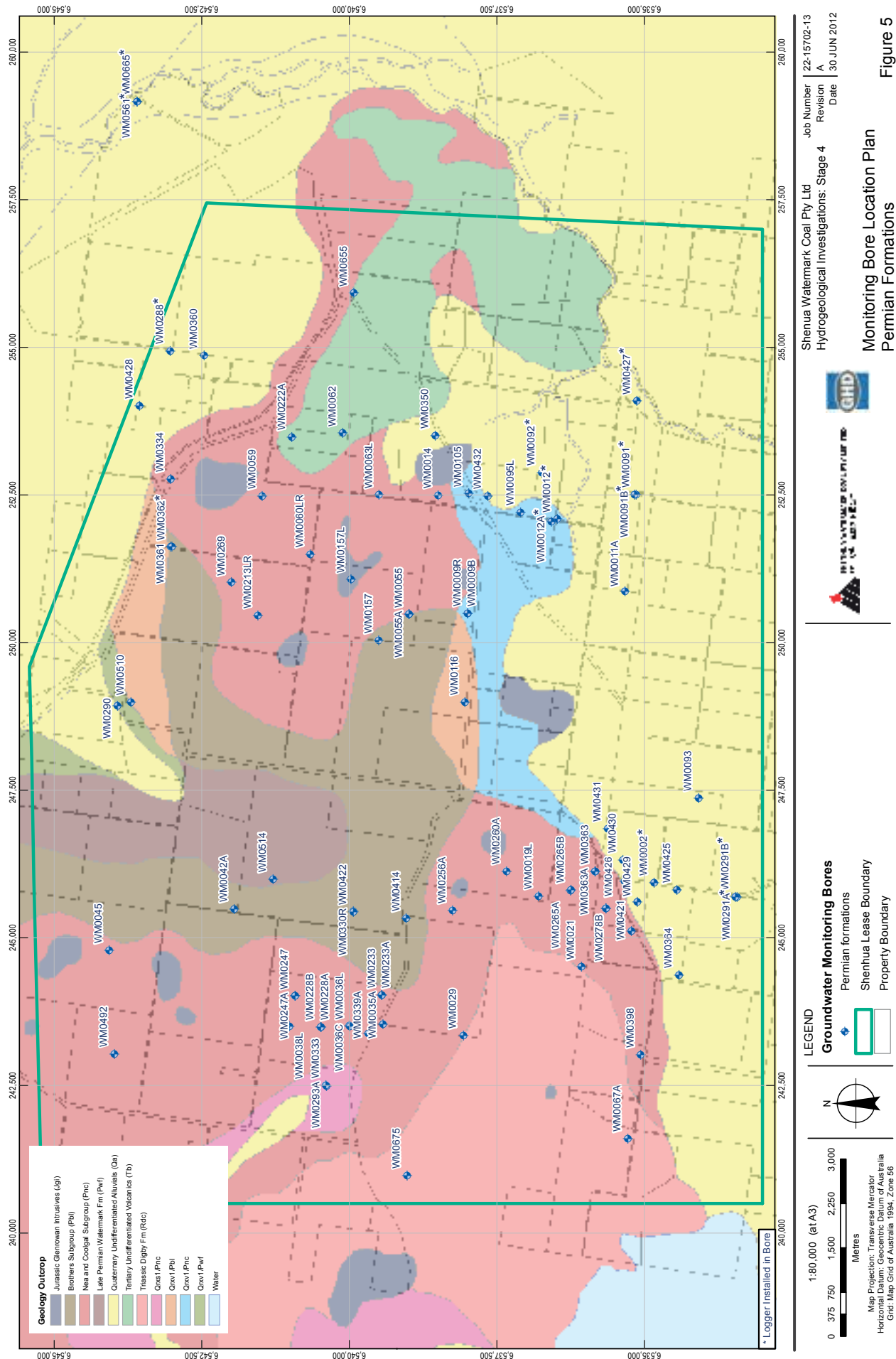
The above installations monitor a total of 128 discrete intervals across the lease, including some 'nested' sites monitoring multiple formations at the one site. The number of monitoring intervals by geological formation is summarised in Table 3 and the bore construction and location details provided in Appendix E. The locations of bores monitoring the alluvial sediments are shown in Figure 4 and all other formations in Figure 5. Lithological logs of all bores and bore construction details are provided in Appendix F.

All standpipe installations are fitted with protective lockable steel bore covers and cement pads and wooden marker posts installed surrounding the bores. Bore licensing 'Form A' documentation has been completed and sent to the NSW Office of Water (NoW) with the licence numbers shown in Appendix E.

Table 3 Summary of Groundwater Monitoring bores by Formation

Formation Bore	No of standpipes	No of VWP
Narrabri Formation	16	0
Gunnedah Formation	5	0
Local Palaeochannel Deposit	2	0
Tertiary Volcanics / Dolerite	2	0
Digby Formation	1	0
Wallala Formation	1	0
Coogal Subgroup above Howes Hill Coal	2	0
Benelabri Formation above CLR	2	0
CLR Sandstone	10	0
Benelabri Fm below CLR	7	1
Hoskissons Coal	7	3
Interburden	17	7
Melvilles Coal	7	7
Pamboola Fm below Melvilles Coal	6	2
Watermark Formation	10	0
Porcupine Formation	1	4
Maules Creek / Leard Formations	0	8





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Figure 5
Monitoring Bore Location Plan
Permian Formations

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Data source: Navteq 2009, GHD 2009, BDIGregoria, Dikyne and JLearnmonth

5. Groundwater Monitoring Program

5.1 Groundwater Level Monitoring

Since the establishment of a groundwater monitoring bore network, groundwater levels have been routinely monitored from the PVC standpipes as well as VWPs. Monitoring generally occurred on a fortnightly basis from August 2009 to end of June 2012 to measure and assess seasonal trends and responses to rainfall events. Occasional access difficulties restricted routine monitoring. The standpipes are monitored using a water level meter, whilst the VWPs are monitored using an electronic readout box.

Daily groundwater level data is also collected via downhole data loggers installed in bores WM0002, WM0002A, WM0012, WM0012A, WM0091, WM0091A, WM0091B, WM0092, WM0092A, WM0288, WM0288A, WM0291, WM0291A, WM0291B, WM0362, WM0427, WM0427A and WM0433. The loggers at WM0561, WM0562, WM0563 and WM0655 record water levels more frequently to assess variations in response to pumping of the adjacent pump bore GW967044. The bores with installed loggers are primarily located at nested sites within the alluvial plains to assist in developing an understanding of the rainfall recharge processes to the alluvial sediments and interconnectivity between alluvial and underlying Permian sediments. The location of the bores containing data loggers is shown in Figure 4 and Figure 5.

Reduced groundwater level (RWL) data collected to end of June 2012 for all groundwater installations is presented as bore hydrographs in Appendix G. The time series data is also provided in table format in Appendix H.

5.2 Bore Hydrograph Analysis

5.2.1 Permian Sediments Water Level Trends

Groundwater levels in the Permian bores are typically stable over the monitoring period across the EL. The exceptions to this include

- Bores showing increasing trends are located in either the central western area where increasing trends have been observed in bores screened over interburden (WM0036L, WM0036C, WM0339A and WM233A), Hoskissons Coal (WM0247) and Melvilles Coal (WM0038L) or in the central eastern area where upwards trends have been observed in the Pamboola Fm (WM0014 and WM0092) and Hoskissons Coal (WM0157).
- Decreasing trends WM0002 (v01,v02), WM0021 (v01), WM291A, WM00291B and WM0421 all located to the south east of the EL.

Bores that show distinct response to rainfall are typically screened over the weathered Permian sediments located on and adjacent to the alluvial plains and include (WM0002s01, WM0009B, WM0012A, WM0291B, WM0430, WM00431 and WM0432). Bores screened below the base of weathering that also show rainfall responses include WM0105s01, WM00350 and WM291B.

Groundwater levels at a number of bores were influenced by purging of bore water as part of the groundwater sampling program. At these bores, notably slow recoveries were identified during sampling which is consistent with the low hydraulic conductivities obtained from aquifer testing. It is



noted that most of these bores are screened in the Watermark Formation (WM0042A, WM0288, WM0330R, WM0422, WM0362, WM0428 and WM0655), 3 in interburden (WM0059, WM0247A, WM0260) and one over the Hoskissons Coal (WM0093) and their locations are shown in Figure 5.

5.2.2 Quaternary Alluvial Sediments Water Level Trends

Groundwater bores monitoring the Quaternary sediments (Narrabri Formation and Gunnedah Formation) generally show stable trends with several bores showing overall declining groundwater levels (WM0092A, WM0291 and WM0424) since commencement of monitoring in May 2011.

Rainfall responses are observed at numerous Narrabri Formation bores (WM002A, WM0011, WM0092A, WM0426A, WM0429A, WM0430A, WM0431A, WM0432A and WM0433). The Gunnedah Formation bore WM0291 also shows responses to rainfall events and an overall declining trend similar to the underlying Permian monitoring bores at this location.

The relatively short record from the Gunnedah Formation bores to the north east of the EL at WM0562 and WM0563 show an overall rising trend superimposed on short term declines from localised groundwater pumping. It is noted that the basal Gunnedah Formation bore WM0562 shows two spikes of 0.3 to 0.5 m in water levels corresponding to high rainfall days. A lesser response was observed at WM0563.

5.2.3 Trends at Nested Sites

The diverging trends are observed at nested site across the EL suggesting limited connection between the deep and shallow formation screened including:

- Bores WM0233/A, WM293A/WM333 and WM0247/A in the central western lease area. The interburden trend at WM0233A shows an asymmetrical response to rainfall events compared to most other bores with water levels significantly increasing after the rain events followed by a uniform slow decline until the next rain event. Whereas the Melvilles bore WM0233 has a stable trend indicating poor connection between the formations which are influenced by different recharge processes.
- Bores WM0002 and WM0021 located in the south west of the EL show diverging trends between the deep VWP and shallow bores and rainfall responses are found in the shallow bores.
- WM0092, WM0062, WM0105, WM0350 and to a lesser degree WM0009 in the central eastern area show diverging trends and responses to rainfall.
- Trends and significant differences in RWLs at WM0288/A and WM00361/WM0362 to the north east of the lease area suggest poor connection between the screened formations primarily due to the low permeability of the Watermark Formation screened in the deep bores at these sites.

Nested sites that show similar water levels and trends include WM0425, WM0426, WM0430, WM0431 and WM0432 and are all located on the margins of the alluvial plains where the Narrabri Formation directly overlies the weathered Permian sediments and the Gunnedah is absent.

In the central EL water levels and trends are similar at WM0055 screened in the weathered interburden and underlying Melvilles Coal. The similar trend at WM0014 is due to the VWPs being placed fairly close together in the hole.

5.2.4 Vertical Pressure Gradients

The vertical groundwater pressure gradients can be determined at nested, i.e. paired, bore sites. Around 70% of the nested bore sites within both the Permian formations and Quaternary sediments show a downwards vertical gradient. This is consistent with an inferred recharge mechanism where the relative potentiometric heads indicate potential for downwards groundwater movement from shallower formations to deeper formations controlled by the vertical permeability of the strata. Several bores located on the edge of the alluvial plains show neutral and marginally fluctuating potentiometric head difference (WM0430, WM0431, WM0432 and WM0425).

Bores which show an upwards pressure gradient include:

- Bores located to the south east of the EL in the vicinity of the Mooki River (WM0091/ WM0091A/ WM0091B and WM0427/WM0427A);
- WM0293A / WM0333; located in the local palaeochannel and shows an upwards pressure gradient from the Melvilles Coal to the overlying palaeochannel deposit;
- WM0157; situated at a local high point in elevation, exhibits an upwards pressure gradient from the interburden to the overlying Hoskissons Coal and may be associated with faulting which has been identified in the area. This hypothesis is supported by the pumping test results at this site which indicates good vertical connectivity between coal and underlying interburden and the presence of a recharge source to coal.

The upwards pressure gradient at WM0157 in an inferred recharge area is anomalous compared to WM0091, WM0427 and WM0293 which are located in lower areas of the localised flow systems where an upwards pressure gradient would be expected (see Figure 6).

5.3 Groundwater Flow Direction

Reduced groundwater level (RWL) data from June 2012 has been used to develop groundwater elevation contours for the EL region. Figure 6 and Figure 7 show groundwater elevation contours for bores screening the Permian and Quaternary alluvial sediments, respectively.

Groundwater elevation data indicates that groundwater levels in the Permian sediments are controlled by elevation with the potentiometric surface being a subdued representation of the topography. The groundwater elevation plan shows that the potentiometric head decreases from local topographic highs including Mt. Watermark, Black Mountain and the Breeza State Forest towards areas of lower elevation forming localised groundwater flow regimes within the various sub-catchments.

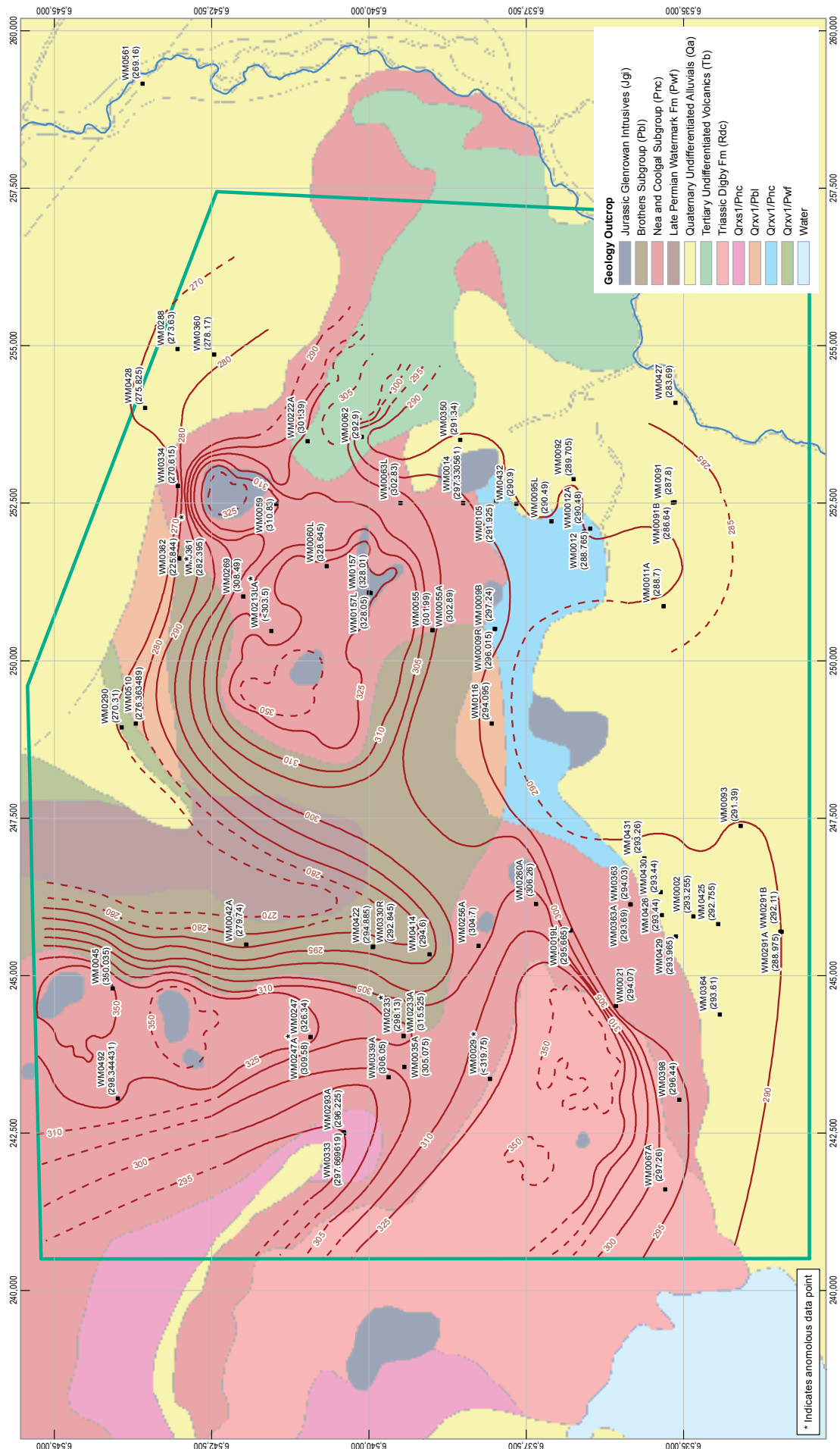
The groundwater elevation plan for the Quaternary alluvial sediments shows that in the southern portion of the alluvial plains, the potentiometric head decreases to the south east indicating a south east groundwater flow direction towards the Mooki River. In the north-eastern lease area, the potentiometric head decreases to the east and north east with inferred flow direction again towards the Mooki River.



5.4 Groundwater Intersections in Exploration Drilling.

The majority of exploration holes were drilled by mud rotary and coring methods where it is not feasible to accurately assess groundwater inflows. Where bores were drilled using the rotary air drilling technique it was possible to identify the depth at which groundwater was encountered during drilling and an estimate of flow rate. Occasionally a groundwater sample was obtained for analysis from these open boreholes. These approximate measurements of the depth of the groundwater inflow and flow rates were provided by the driller and site hydrogeologist and are summarised in Appendix I. A bore location plan and graph of flow rate with depth is also shown in Appendix I and indicates the groundwater inflows were typically in the 0.1 to 3.5 L/s range and there is an overall trend of decreasing flows with increasing depth. Four (4) of the 52 bores which encountered groundwater had short term flows above 3.5 L/s with the maximum flow rate of 8 L/s struck at WM0687 at 41 m depth. It is noted that only bores which intersected groundwater were recorded and the vast majority of bores didn't intersect measurable groundwater inflows.

In addition to the groundwater inflows recorded as part of the routine exploration drilling, five bores were drilled to basement using air hammer to assess the short term groundwater yields within the basement and thick dolerite sill identified in the central lease area. The sites were located based on geophysical interpretations of identified major structures and faults. The open hole was periodically airlifted during drilling and groundwater flow rates were measured using a V-notch weir and flows confirmed using a bucket-test and stopwatch. Very low flows were observed at WM0418 (<0.1L/s) and WM00419 (<0.02L/s). At WM0417 groundwater inflows were typically less than 0.6 L/s and increased to between 1 and 2 L/s towards the base of the Gunnedah Basin Sequence. At WM0423 the maximum flow rate of 2.5 L/s was intersected at 87m below which only minor inflows of <0.3 L/s were struck. Bore WM0416 intersected the highest short term flows with airlift rates of 5.7 L/s obtained from within the dolerite sill.



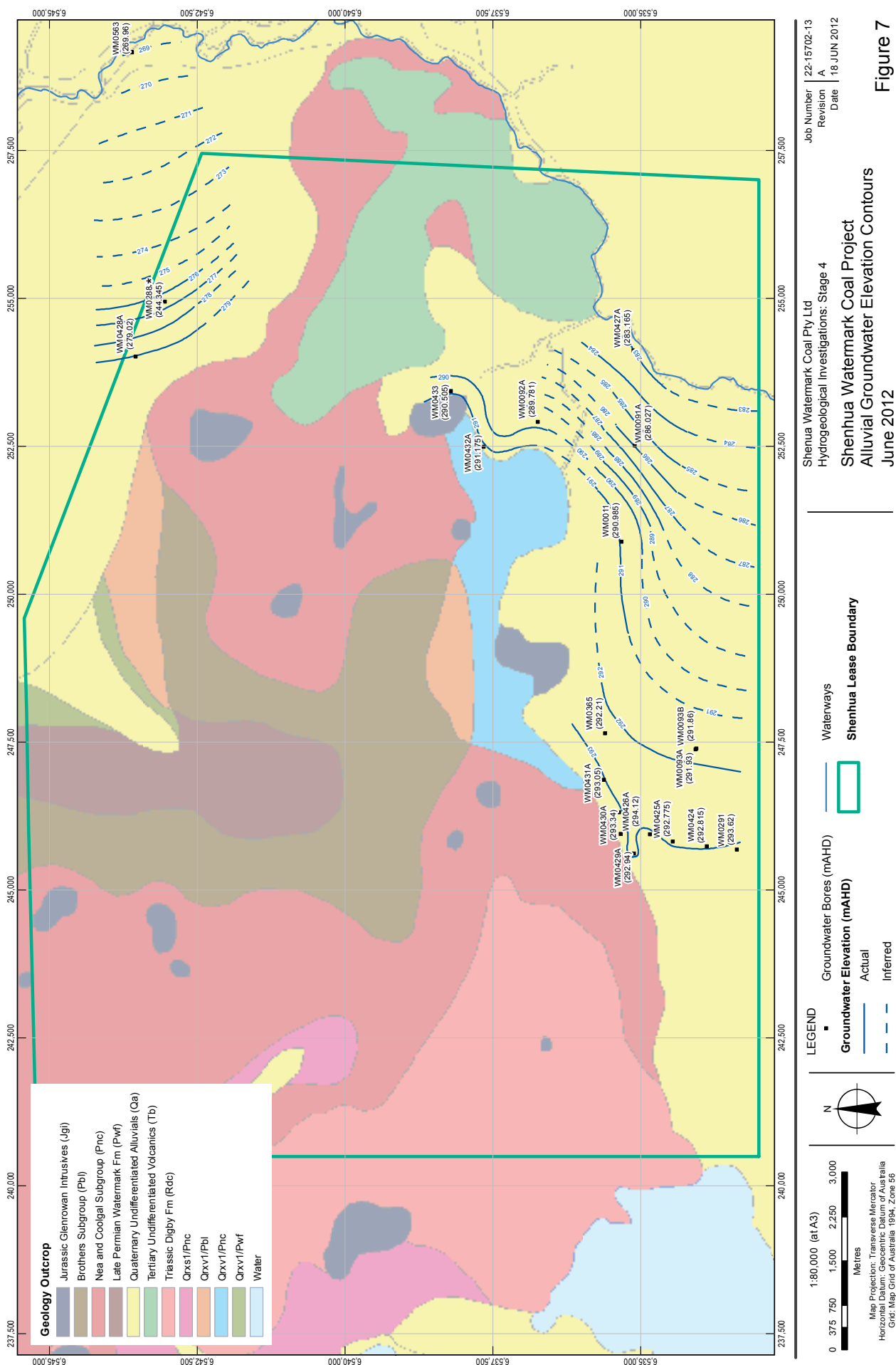
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Figure 6

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Data source: NGA04-2003, GHD 2003, Dhyne

6. Aquifer Testing Program

6.1 Aquifer Testing Program

The aquifer testing program included the completion of 8 pumping tests, slug testing of 82 bores, 31 recovery tests in constructed bores and exploration holes and 60 packer tests in 12 exploration holes.

Estimation of the hydraulic-properties is limited by the variability inherent in the strata. Lithological factors, such as facies changes in sedimentary deposits and the degree of fracturing in consolidated and igneous rocks can cause hydraulic properties to vary greatly over relatively short distances. Because of the inherent nature of variability, longer-term aquifer tests typically will produce more representative hydraulic-property estimates (hydraulic conductivity and storativity) than shorter-term aquifer tests. Reliable site specific storativity data can only be obtained from a pumping test with an observation bore.

Slug tests and packer tests are shorter term tests and therefore only examine a relatively small amount of aquifer material adjacent to the borehole. Because of this, hydraulic-property estimates from slug tests and packer tests might not be representative of the entire formation. They do however allow testing of a greater number of locations and depths compared to pump testing. The results from the slug and packer tests provide a range of values reflecting the varying material properties which can then be assessed and the spread and mean values for a particular formation determined to supplement the pumping test data.

Descriptive statistics, including the geometric and arithmetic means and range are reported for each of the geological formations. As hydraulic conductivity tends to be log normally distributed (Neuman 1982), the geometric mean of the estimates is reported. The arithmetic mean is also reported as a comparison. Storage parameters tend to be normally distributed (Neuman 1982) and because of this, the arithmetic mean of the estimates is reported.

6.1.1 Analysis Assumptions

In fractured rocks such as the Permian-Triassic sequence and Tertiary Volcanics, water can be contributed to the system either from fractures or the matrix. This "dual-porosity" concept involves the exchange of water between the fractures and the matrix. In order to apply these aquifer-test methods to fractured rocks it is necessary to assume that the rocks are sufficiently homogeneously fractured and interconnected such that the rock being tested can be considered "an equivalent porous medium". Selected tests were also analysed using the specialised fractured rock methods as a comparison. Aquifer tests in the unconsolidated Quaternary alluvial sediments were analysed by conventional methods developed for porous media.

The conventional porous media analytical methods used to determine the hydraulic-property estimates presented in this report rely on assumptions about the type and configuration of the aquifer. Most analytical methods assume that flow to a pumping well is derived from an aquifer of infinite extent. This assumption may not be accurate for many aquifer tests presented in this report because of faults in the study area that may act as either recharge or barrier boundaries. These assumptions however are necessary to simplify the flow system so that mathematical equations representing ground-water flow can be solved analytically but result in some uncertainty in the computed hydraulic properties.



6.2 Pumping Test Program

Seven larger diameter bores were constructed in the 255mm diameter 8C core holes with 150 mm PVC and slotted PVC screens to enable pumping tests to be undertaken to assess the aquifer parameters of the various formations. The pump bore construction diagrams and lithological logs are contained in Appendix F and locations shown in Figure 8. Where possible the pump bores were drilled in close proximity to existing observation or landowners bores.

Pumping Test contractor Agmek were engaged by GHD to undertake the pumping tests of six bores screened over the Permian sediments (WM0019L, WM0036L, WM0060LR, WM0095L, WM0157 and WM00363). Completion of bore WM0038L was however delayed and was not available to be included in the pumping test program. Instead the bore was airlifted and the water level recovery in the pump bore monitored and analysed as a short term pumping test as discussed in Section 6.4.

A short step drawdown test was typically completed first from which a flow rate to complete the longer constant rate test was determined. Water levels were allowed to recovery prior to the commencement of the constant rate test. This test involves the pumping from a bore at a constant flow rate and monitoring the water level drawdown in the pump bore and in nearby observation bores (when available) by installed dataloggers. Vented datalogger cabling was used for the pump bore to enable compensation for barometric pressure effects. Barometric pressure was also logged throughout the tests on a BaroTroll™ so the non-vented logger installed in the observation bores could be compensated for barometric pressure variations via the loggers baromerge function. The recovery in water levels was also monitored following cessation of pumping.

The flow rate was measured and automatically logged by Agmek during the pumping tests using an electronic 50 mm digital readout meter incorporated into the discharge pipe. Flow rates were also confirmed manually using the time taken to fill a 20 L bucket. The field chemistry of the discharge water was periodically measured. A groundwater sample for laboratory analysis was also obtained from most bores prior to the completion of the constant rate test.

In general, monitoring commenced a minimum of several hours prior to the start of testing in order to determine antecedent pumping conditions. In several bores WM0019L, WM0095L and WM0363 it was not possible to maintain a constant rate for the planned 24 hr period due to the very low flow rates and the tests were stopped when the water level was lowered to the top of screen. The decreasing flow rates were monitored and along with well bore storage, were taken in account in the analysis methods. Details of the pumping tests are shown in Table 4.

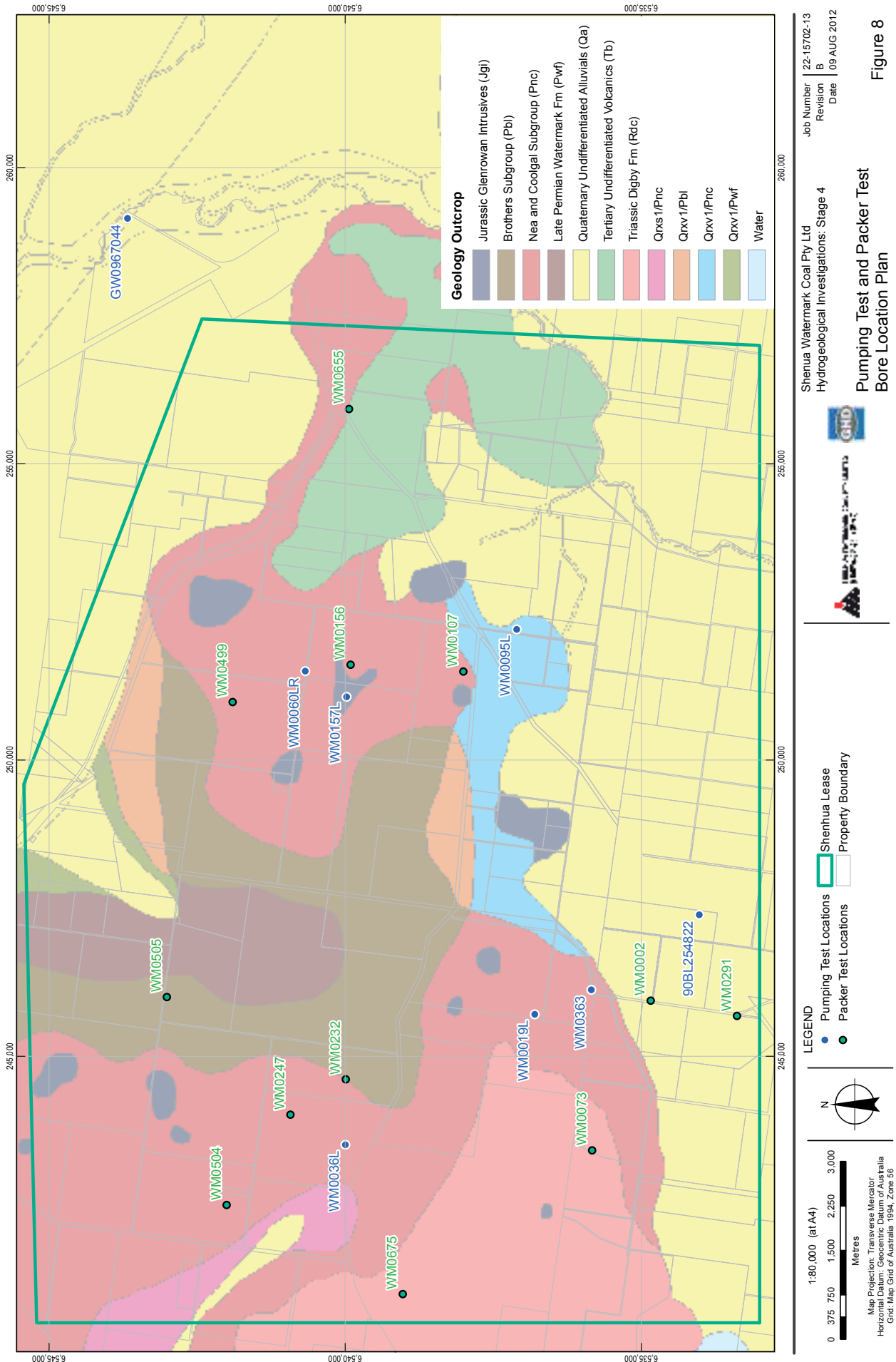
To assess the aquifer parameters of the Gunnedah Formation, in and adjacent to the EL, observation bores were drilled adjacent to the existing landowners bores and data loggers installed to monitor the response to groundwater pumping. Bore GW967044 an irrigation bore was pumped for a period of 12 days in early 2012 as part of the landowners usual irrigation pumping. The bore flow rate data was provided by the landowner. Bore 90BL254822 is a test bore installed by the previous landowner but is not equipped. It was pumped for a period of 48 hours by pumping test contractor Lambert and Torrens. Bore 90BL254822 had been previously tested at the time of installation by Lambert and Torrens for the previous landowner and the flow rate for the 48 hour constant rate test was determined from this data. The locations of the pumping test bores is shown in Figure 8.

The pumped groundwater was discharged to nearby stock dams and tanks for bores WM0036L, WM0060LR and WM0157L via layflat hose. The saline groundwater extracted from WM0019L WM0038L, WM0095L and WM0363L was discharged to large tanks placed at the pump bores and then transported to the site water treatment facility where it was treated and managed as part of the drilling water. The water from GW967044 was discharged to a storage dam as part of the landowner's irrigation system and at 90BL2548822 it was discharged to the adjacent land via layflat hose and temporary channels dug to distribute and contain the water within the property boundaries.

Table 4 Groundwater Pumping Testing Details

Pump Bore	Screen Depths (m)	Formation Monitored	Test Duration	Flow Rate (L/s)	Observation Bores
WM0019L	84 - 90	Melville's Coal / Interburden	4 hrs	0.12 - 0.06	-
WM0036L	50.5 - 53.5 68 - 74	Fractured Interburden	7 days	3	WM0036C, WM0339
WM0038L	80.45-83.45	Melville's Coal	2 hrs*	0.12	-
WM0060LR	40 - 55	Interburden	48 hrs	1	WM0060, GW043983, GW023767
WM0095L	35 - 50	Interburden	6 hrs	0.5 - 0.1	-
WM0157L	40 - 52	Hoskissons Coal	53 hrs	0.2	WM0157
WM0363	17.8 - 32.8	Weathered Benelabri Fm below CLR	4 hrs	0.1 - 0.04	WM0363A
90BL254822	33 - 36 39 - 45 48 - 54	Gunnedah Fm	48 hrs	18	WM0093, WM0093A, WM0093B, WM0002, WM002A, WM0291, WM0291A, WM0291B, WM0424,
GW967044	NA	Gunnedah Fm	12 days	76	WM0561, WM0562, WM0563

* Airlift test



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Data source: Navteq 2009, GHD 2009, BDIGregoria

6.2.1 Pumping Test Analysis

Analysis Assumptions

The pumping test and recovery data was analysed using numerical and curve matching solutions to the transient well equation contained in the pump test analysis software package Aqtesolv™. Data in the form of water level drawdown or recovery are plotted as a function of elapsed time. These data curves are then matched to the dimensionless curves. These match-point values are then substituted into analytical equations to estimate hydraulic-property values. The results were analysed for hydraulic parameters of transmissivity (T) and storativity (S) and are summarised in Table 5.

A range of solution methods were utilised and were selected based on the aquifer conditions encountered in the pump and observation bores. The Cooper Jacob method was used to identify barrier or recharge boundaries. The bores with declining flow rates, where a wellbore storage response was evident, were analysed with an appropriate method including the Dougherty-Babu, Moench and Papadoplous-Cooper methods to account for this. The Moench dual porosity fractured rock method was used for pumping tests WM0036L and WM0060LR as a comparison to the conventional porous media solutions. It is noted this comparison can be problematic when the thickness of the aquifer zone (ie fractured zone) is not known. The pumping test analyses are contained in Appendix J and discussed in the following sections.

Table 5 Groundwater Pumping Testing Details.

Pump Bore	Formation Monitored	Adopted Transmissivity (m ² /d)	Storativity
WM0019L	Melvilles Coal / Interburden	0.05	-
WM0036L	Fractured Interburden	19.3*	5.6 E-04**
WM060LR	Interburden	1.72	0.03
WM0095L	Interburden	0.5	-
WM0157L	Hoskissons Coal	2.52	0.05
WM0363	Weathered Benelabri Fm below CLR	0.05	5.1 E-03
90BL254822	Gunnedah Fm	166	2.4 E-05
GW967044	Gunnedah Fm	850	5.5 E-05

*geometric mean of observation bore results ** arithmetic mean of observation bore results

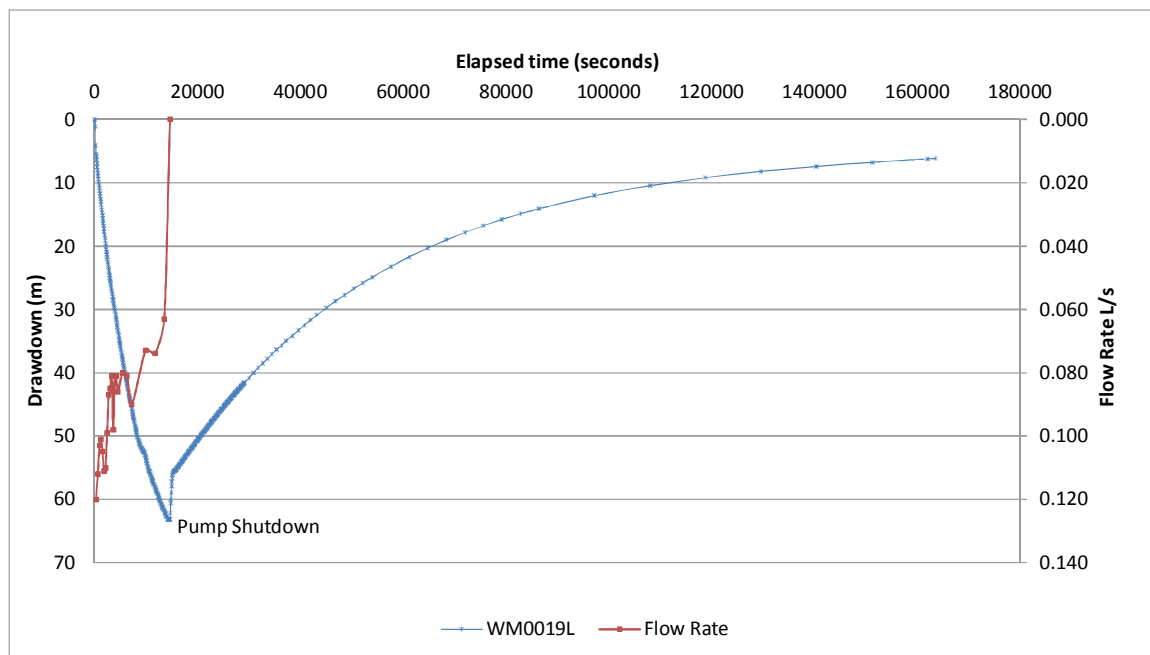
Aquifer Response to Pumping

The pumping bore and observation bore responses (where available) have been shown graphically in the following Figure 9 to Figure 16. The results for each test are discussed below.

**WM0019L**

The bore was initially pumped at a flow rate 0.12 L/s which produced rapid drawdown in the bore. The flow rate was then progressively reduced to 0.06 L/s and the pump shut off after 4 hours when the water level was reduced to the pump depth at the top of the screen. The confined analysis for the pump bore indicated a very low transmissivity of approximately 0.05 m²/d. This is consistent with the rapid drawdown and low flow rate encountered in the Melvilles Coal and interburden in this bore. This corresponds to a hydraulic conductivity of approximately 8.3 E-03 m/d assuming an aquifer thickness equal to the screened thickness.

Figure 9 WM0019L Pump Bore Drawdown and Recovery

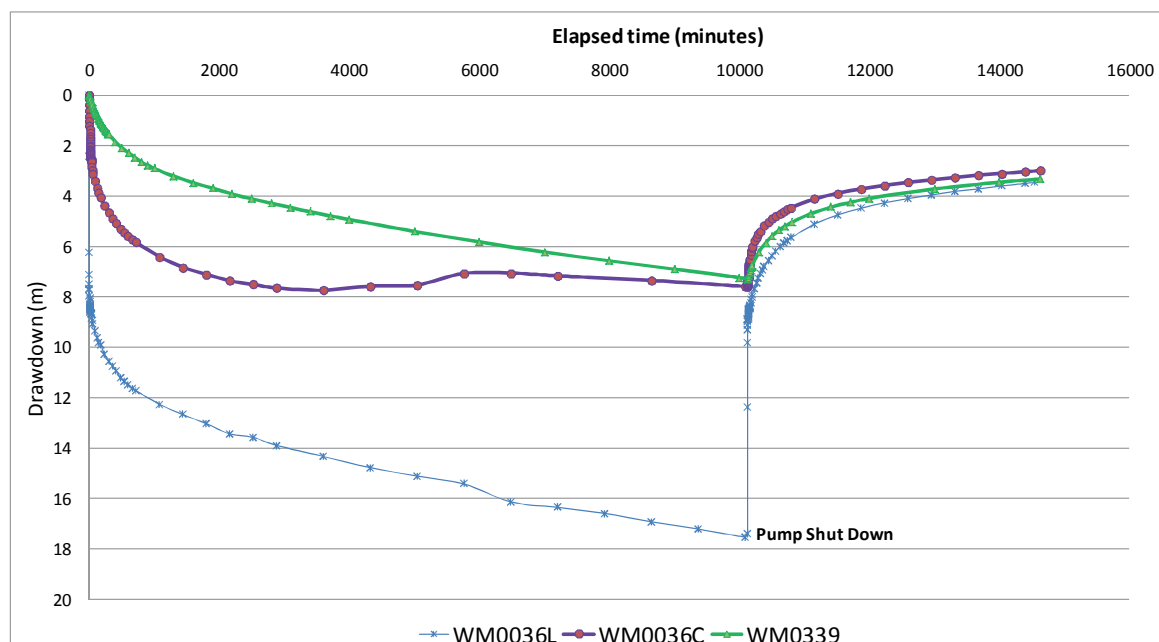


WM0036L

The 7 day pumping test completed at this bore was the longest completed in the Permian sediments. A constant flow rate of 3 L/s was maintained from fractured interburden. The data from the 2 observation bores (WM0036C and WM339) showed final drawdown of over 7 m. The test was analysed using confined and leaky solutions. The Cooper Jacob plot indicates an increasing rate of drawdown in the pump bore at around 300 minutes and again late in the test at 3,000 minutes. The observation bore WM339 also shows an increase in the rate of drawdown at around 2,000 to 3,000 minutes which is consistent with a barrier boundary being intersected. The decrease in drawdown in WM0036C at around this same time is indicative of a recharge boundary being encountered. This is considered anomalous given it was not observed in the pump bore and as such was ignored in the analysis.

The results indicated a transmissivity of $12.3 \text{ m}^2/\text{d}$ and storativity $3.21\text{E-}5$ for WM0339 and $23.95 \text{ m}^2/\text{d}$ and $1.51 \text{ E-}04$ for WM0036C. The leaky solution for WM0036L provided a better fit to the data and was consistent with the Theis and Cooper Jacob results. The adopted hydraulic parameters based on the mean values from the observation bores indicate a transmissivity of $19.3 \text{ m}^2/\text{d}$ and storativity of $5.6 \text{ E-}04$. Assuming an aquifer thickness equivalent to the screen length of 9 m (as the screens were placed over the groundwater intersected) this corresponds to a hydraulic conductivity of around 2.1 m/d . These results are consistent with the higher flow obtained at this site and the observed responses to rainfall in this area suggesting the fracturing mapped in the area has locally increased the permeability of the interburden. The Moench fractured solution was also used for the observation bore data from WM0036L and a relatively good fit to the data and derivative curve was obtained. The results indicate a permeability of 1.74 m/d which is a similar result to that obtained from the porous media solutions.

Figure 10 Pump Bore WM0036L and Observation bores Drawdown and Recovery





WM0060LR

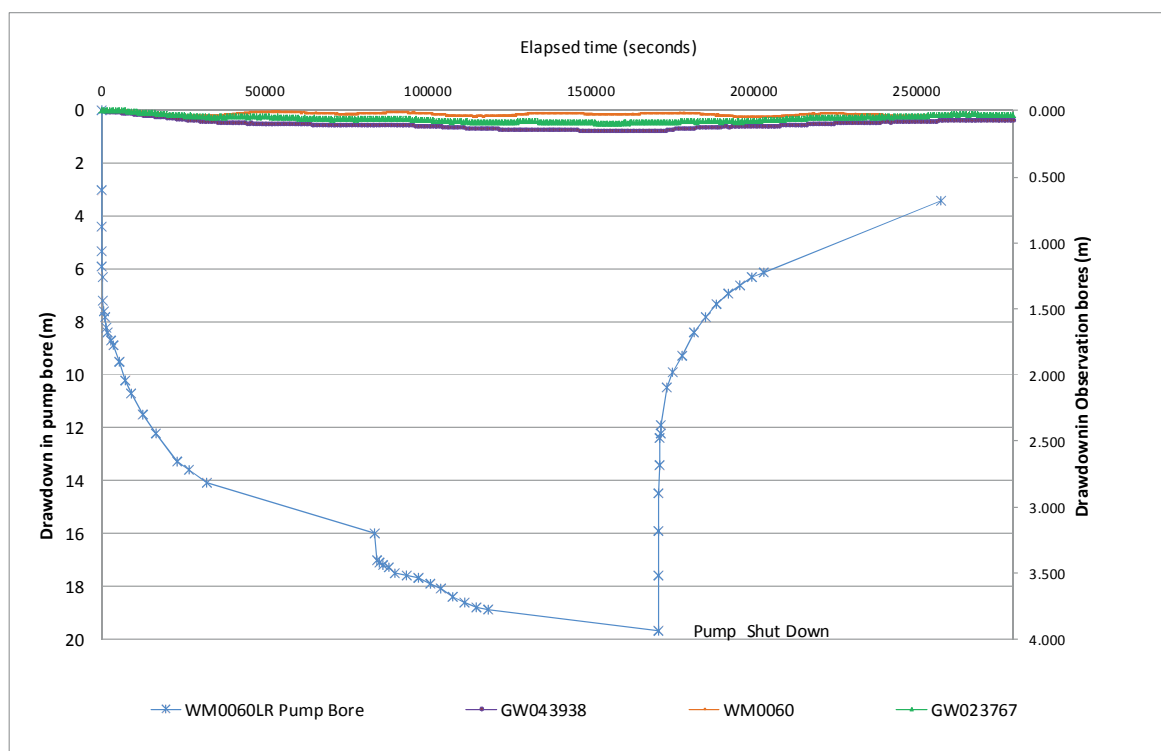
A 48 hour constant rate pumping test was completed at this bore. Three observation bores were monitored including 2 landowner bores assigned as GW043938 and GW023767 based on the bore census discussion, and the abandoned WM0060 hole which was only open to 19 m. Bore GW023767 was not operational and GW043938 which has an installed solar operated pump was switched off during the testing. The pump bore maintained a constant flow rate of 1 L/s.

The observation bores recorded drawdowns of 0.15 m at GW043938, 0.1 m at GW023767 and 0.05 m at WM0060. Only data for the pump bore and GW043938 which is located approximately 140 m from the pump bore, was analysed. WM0060 is not open over the same depth as pumped in WM0060LR and therefore is not suitable for analysis. There is also some uncertainty as to the construction and condition of GW023767 and given the small drawdown response no analysis of the data was undertaken.

The observation bore data was analysed using unconfined and leaky solutions. The results obtained from both solutions were fairly consistent indicating an aquifer transmissivity of $1.44 \text{ m}^2/\text{d}$ and storativity of 0.03. Including the Moench pump bore analysis, the geometric mean transmissivity value increases to $1.72 \text{ m}^2/\text{d}$.

The Moench fractured rock solution showed a good fit to the drawdown and recovery data and indicated a permeability of around 0.05 m/d.

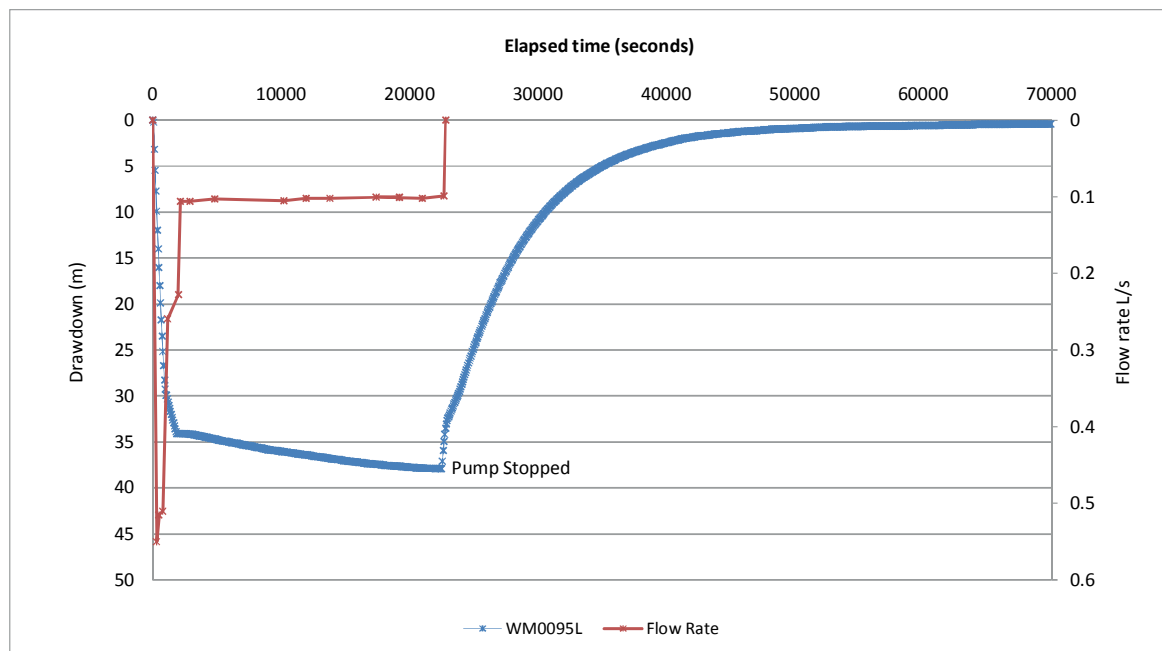
Figure 11 Pump Bore WM0060LR and Observation bores Drawdown and Recovery



WM0095L

The bore is screened in the interburden from 35 to 50 m depth. The initial flow rate was set at 0.5 L/s. At this rate the water levels declined rapidly in the bore and the flow rate was then reduced to 0.1 L/s for the duration of the test. This reduction in flow rate resulted in a flattening of the drawdown. The confined analysis using the Dougherty-Babu method which allows for the variable flow rate and well bore storage achieved a good fit to the drawdown and majority of the recovery data with the exception being the late recovery data. The results indicated a transmissivity of $0.5 \text{ m}^2/\text{d}$. Based on an aquifer thickness equal to the screen thickness of 15 m, this equates to a hydraulic conductivity of 0.03 m/d. There is some uncertainty in the thickness of the fracture zones which comprises the aquifer. If a greater thickness of interburden at 50 m is assumed to represent the fractured rock aquifer then the hydraulic conductivity is reduced to 0.01 m/d.

The Moench fractured rock solution shows a good fit to the drawdown and recovery data and indicated a permeability of around 0.007 m/d. This is lower than the porous media estimate however it is noted that regardless of the analysis method, the results indicate a very low permeability which can be approximated to around 0.01 m/d.

Figure 12 WM0095L Pump Bore Drawdown and Recovery

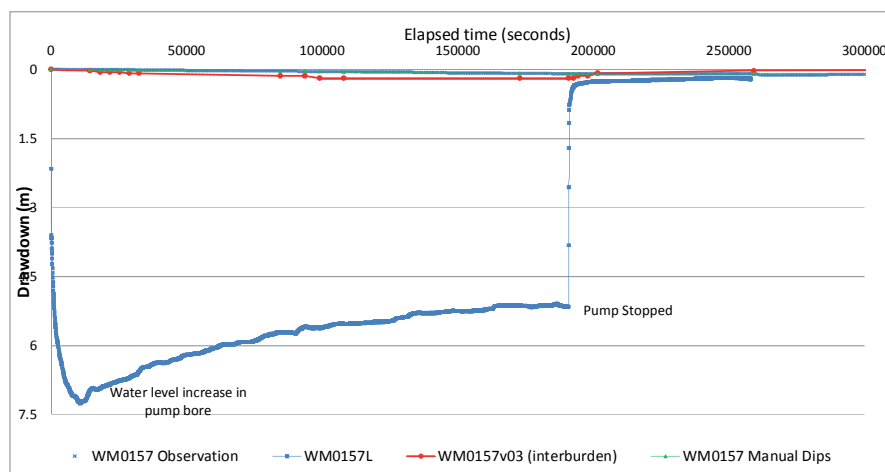


WM0157L

The bore is screened in the Hoskissons Coal from 40 to 52 m depth. It was pumped for 53 hours at a constant flow rate of 0.2 L/s. Measurements were recorded from one observation bore WM0157. The standpipe in this bore is screened over the Hoskissons Coal and was monitored with a data logger and the VWP in the underlying interburden periodically manually read. The drawdown response recorded in the observation standpipe was around 0.1 m and 0.19 m in the VWP. The pump bore Cooper Jacob plot shows an anomalous reversal in gradient occurring around 200 minutes. The flow meter data and manual checks from 200 minutes to the completion of pumping indicate no change in flow rate from 0.2 L/s. The reversal in drawdown is therefore considered to be either a result of a recharge boundary being intersected or further development of the pumping bore. For this reason the pump bore drawdown data was not able to be analysed and the recovery data only analysed.

The WM0157 data was analysed using the Moench and Neuman unconfined methods and the WM0157v03 data using the Neuman and Hanstush leaky solutions. The results indicate a transmissivity of $2.5 \text{ m}^2/\text{d}$. The storativity of the Hoskissons Coal is estimated to be 0.05 at this site which is consistent with coal being unconfined at this location as the water levels are generally recorded towards the base of the screened sections. The greater response to pumping in the underlying interburden VWP suggests good vertical connectivity between the Hoskissons Coal and underlying interburden at this location with similar hydraulic conductivity results. It is also noted that the bore hydrograph for WM0157 consistent shows an upwards pressure gradient and along with the greater drawdown response recorded in the interburden, suggests the recharge boundary intersected in the pump bore may relate to fracturing in the underlying interburden.

Figure 13 Pump Bore WM0157L and Observation bores Drawdown and Recovery

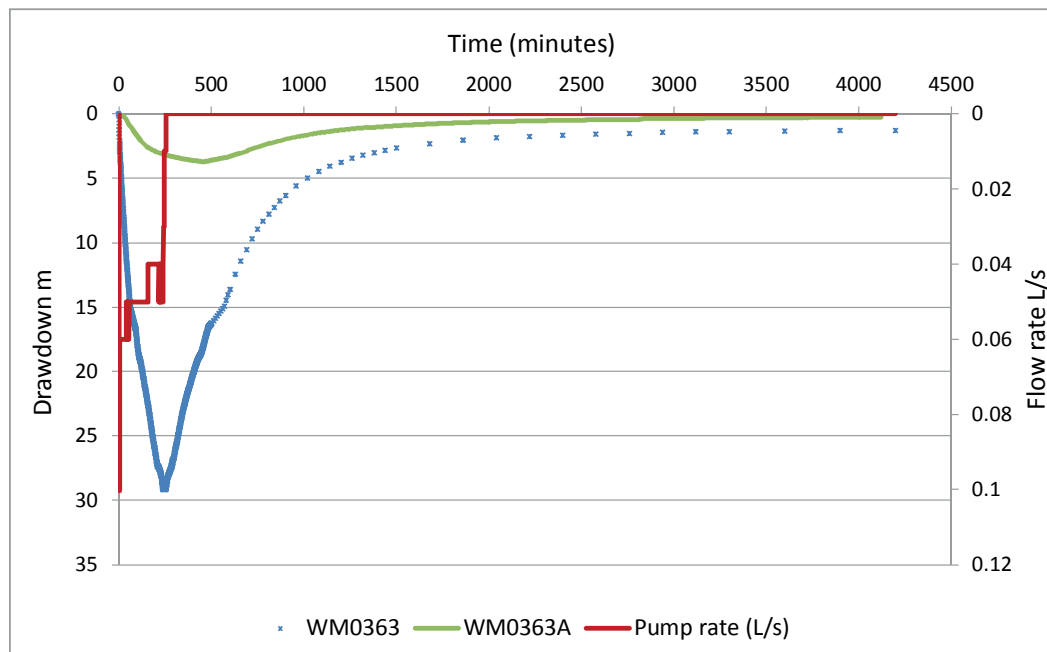


WM0363L

The bore is screened in weathered Benelabri Formation below the CLR sandstone at a depth from 17.8 to 32.8 m. One observation bore WM0363A was screened over the same interval. The pump bore was originally intended to screen the CLR sandstone but as no appreciable groundwater inflow was recorded over this unit, the bore was deepened to assess if deeper groundwater could be intersected. The bore was assessed to have a low flow rate based on the development data and the initial flow rate for the pumping test was set at 0.1 L/s. Groundwater levels however declined rapidly in the bore and the flow rate was then reduced to 0.04 L/s. Even at this reduced flow rate pumping was only able to be sustained for 4 hours before pumping dry. The observation bore recorded a maximum drawdown of 3.7 m at the end of pumping.

The observation bore WM0363A data was were analysed using unconfined Neuman and Moench methods to allow for the variable flow rate and well bore storage. The results showed a similar range of results for the different methods and indicated a low transmissivity of $0.05 \text{ m}^2/\text{d}$ which is consistent with the low flow rates and clayey lithology, and storativity of $5.1 \text{ E-}03$.

Figure 14 Pump Bore WM0363 and Observation bores Drawdown and Recovery



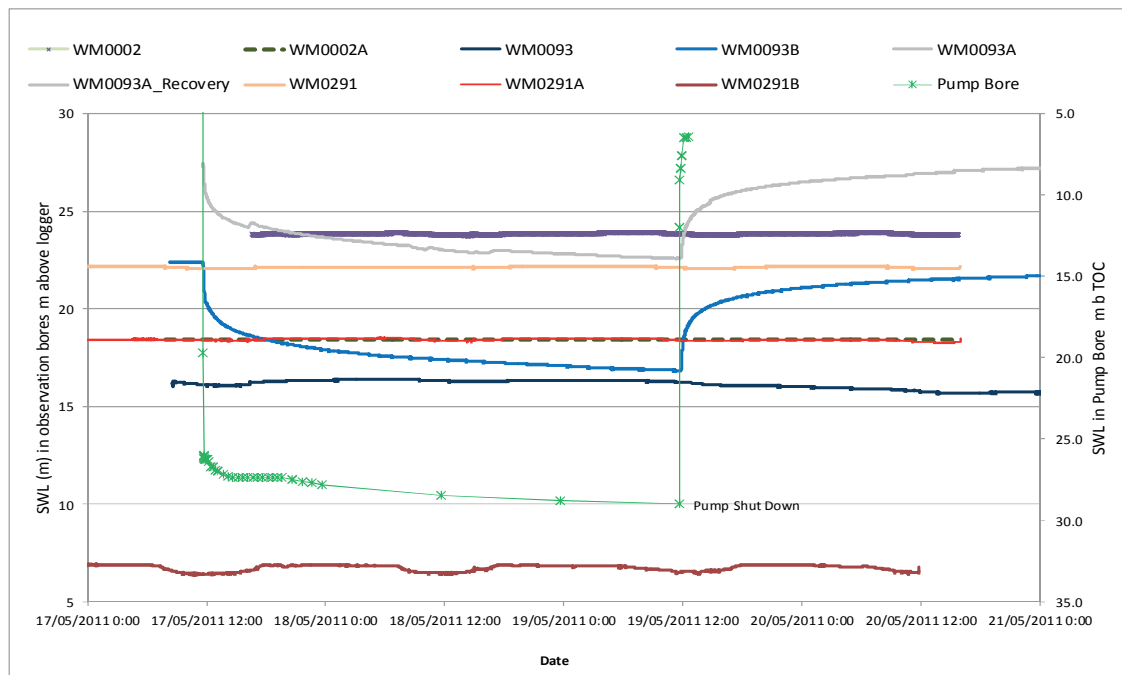
**90BL254822**

This bore was drilled by the landowner as a test bore and has three screened intervals between depths of 33 to 54 m. Based on the assessment of the sonic core and geophysical logs, it is interpreted to be screened over the base of the Narrabri Formation and predominately the sand and gravels of the Gunnedah Formation. Nested observation bores were drilled adjacent to this pump bore with WM0093 monitoring the Hoskissons Coal, WM0093A the Gunnedah Formation as screened in the pump bore and WM0093B screening the lower part of the Narrabri Formation. Loggers in bores WM00291/A/B and WM0002/A located on Clift Road were reset to capture drawdown and recovery data.

The results, as plotted in Figure 15, show no response to pumping was detected other than in the WM0093A and WM0093B bores. The water level in WM0093, screening the underlying Hoskissons Coal, initially increased during the testing in line with barometric responses observed in the other deep bores and then remained steady for the duration of pumping period. Following cessation of pumping a slightly declining trend was observed possibly associated with a delayed response to pumping. The delayed and very muted response to pumping in the underlying Hoskissons Coal suggest poor hydraulic connection with the overlying Gunnedah Formation. The data for WM0093B was not analysed as the Narrabri and Gunnedah Formations are both screened in the pump bore and therefore cannot be used to assessing vertical connection between the two formations.

The data from WM0093A, screened over the Gunnedah Formation, was analysed using confined aquifer and leaky solutions. The results from the leaky solutions were subsequently disregarded as they produced unrealistic results. The confined method results were relatively consistent indicating an aquifer transmissivity of 150 to 200 m²/d, with a mean of 166 m²/d, and a storativity of 1.9 E-05. Using an aquifer thickness of 20 m, this equated to a hydraulic conductivity of 8.7 m/d.

Figure 15 Pump Bore 90BL254822 and Observation bores Drawdown and Recovery

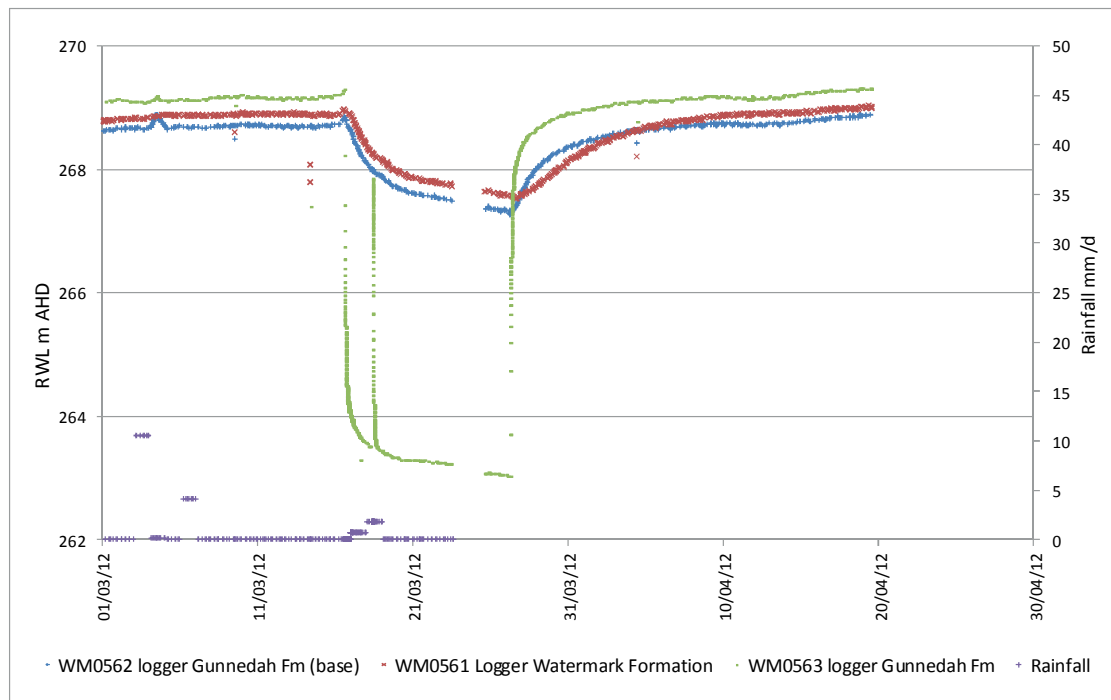


GW967044

A pumping test utilising the irrigation bore GW967044 was completed in early 2012. To support the analysis observation bores were drilled adjacent to the irrigation bore. No construction data was available for this irrigation bore other than its depth of 63 m. The sonic core from the site was reviewed and the screens in the observation bore WM0563 placed over the coarser grained sediments from 54 to 63 m which corresponds to the total depth of the irrigation bore. Observation bore WM0562 was screened over a basal gravel layer encountered overlying the Watermark Formation. The presence of basalt lithics in this gravel deposit together with the geophysical interpretation were used to classify this as Gunnedah Formation. Observation bore WM0561 is screened at the top of the Permian Watermark Formation. As the gravel pack extends to around 1 m below the top of the formation it is interpreted as screening weathered Watermark Formation. Bore WM0665 screened in fresh Watermark Formation between 109 to 115 m and was not installed at the time of pumping but will now be utilised to monitor future responses to irrigation pumping in this formation.

The results, as shown Figure 16 indicate the greatest response to pumping was observed in WM0563 with a drawdown of over 6 m compared to 1.6 m in the basal Gunnedah Formation and 1.3 in the weathered Watermark Formation. The flow rate of 76 L/s used in the analysis was provided by the landowner. The results were analysed using both confined and leaky solutions. The Neuman Witherspoon method which assumes a leaky confined two aquifer system with storage in the aquitard, obtained the best match for the drawdown and recovery data and is consistent with the conceptualisation of the Narrabri and Gunnedah Formations on the alluvial plains. The results of this method indicate an aquifer transmissivity of 850 m²/d and a storativity of 5.5E-05. Assuming an aquifer thickness of 48 m based on the site data, this equates to a hydraulic conductivity of around 18 m/d for the Gunnedah Formation at this location.

Figure 16 Pump Bore GW967044 and Observation bores Drawdown and Recovery





6.3 Hydraulic Conductivity Testing

6.3.1 Slug Testing

Slug tests were undertaken in all installed groundwater monitoring bores where possible with a total of 82 bores tested. Testing has been conducted in accordance with the GHD standard procedures as documented in the Exploration Services Contract Environmental Management System (GHD 2010). In slug tests, water is instantaneously displaced by insertion of a solid slug into the monitoring bore and the time history of water-level displacement to the static water level is monitored. The slug is then removed to monitor the water level recovery and the test generally repeated to confirm the results.

Displacement data from the slug testing was analysed using curve matching techniques contained in the pump test analysis software package Aqtesolv™. Test data was analysed using a various methods including the Hvorslev, Bouwer-Rice and Springer-Gelhar analytical solutions depending on the hydrogeologic setting and water level responses. The Springer-Gelhar method was used in bores showing very fast oscillatory responses. The results are presented in Figure 17 and in Appendix K along with the analyses. A summary of the mean hydraulic conductivity results by formation is shown in Table 6.

Table 6 Summary of Slug Test Hydraulic Conductivity (K) Results by Formation

Formation Tested	No of Test	Arithmetic Mean (m/d)	Geometric Mean (m/d)	Minimum K value (m/d)	Maximum K value (m/d)
Narrabri Formation	16	3.83 E-01	1.10 E-01	3.00 E-03	3.14 E+00
Gunnedah Formation	5	9.62 E+00	6.31 E+00	1.79 E+00	2.85 E+01
Local Palaeochannel Deposit	2	4.01 E-03	2.02 E-03	5.45 E-04	7.47 E-03
Tertiary Volcanics / Dolerite	2	4.66 E-01	1.06 E-01	1.23 E-02	9.20 E-01
Digby Formation	1	3.15 E-02	3.15 E-02		
Wallala Formation	1	5.75 E-01	5.75 E-01		
Weathered Coogal Subgroup above Howes Hill Coal	2	5.77 E+00	5.48 E+00	3.97 E+00	7.57 E+00
Benelabri Formation above CLR	1	6.82 E+00	6.82 E+00		
Weathered CLR Sandstone	8	1.11 E+00	3.75 E-01	1.85 E-02	3.50 E+00
Fresh CLR Sandstone	1	4.70 E-01	4.70 E-01		
Benelabri Fm below CLR	5	1.17 E-01	3.93 E-02	1.20 E-02	4.91 E-01
Hoskissons Coal	6	3.95 E-02	1.31 E-02	1.62 E-04	7.82 E-02
Interburden (All)	12	2.86 E-01	1.80 E-02	1.38 E-04	2.21 E+00
Weathered Interburden	5	5.07 E-01	6.33 E-02	2.00 E-03	2.21 E+00
Fresh Interburden	7	1.29 E-01	7.33 E-03	1.38 E-04	4.85 E-01
Melvilles Coal Seam	3	4.32 E-02	1.51 E-02	4.50 E-03	1.18 E-01

Formation Tested	No of Test	Arithmetic Mean (m/d)	Geometric Mean (m/d)	Minimum K value (m/d)	Maximum K value (m/d)
Melvilles Coal inc Ben and B2	5	1.12 E-01	3.76 E-02	4.50 E-03	3.69 E-01
Pamboola Fm below Melvilles Coal	5	1.55 E-02	1.10 E-02	2.30 E-03	3.15 E-02
Weathered Watermark Formation	3	6.84 E-03	3.72 E-03	1.50 E-03	1.70 E-02
Fresh Watermark Formation	6	1.06 E-02	5.64 E-03	7.19 E-04	2.41 E-02
Porcupine Formation	1	2.14 E-04	2.14 E-04		

The slug test analysis shows:

- Gunnedah Formation bores show a range of hydraulic conductivity results between 1.8 m/day to 28.5 m/day with a geometric mean value around 6 m/d.
- Other formations with mean permeability values greater than 1 m/d includes the CLR2 Conglomerate (WM0021) and upper sections of the Coogal Group (WM365 and WM291B). It is noted that limited tests of the formations above the CLR Sandstone were completed due to the limited extent of these formations in the lease area.
- Eight of the nine CLR sandstone tests were completed in the weathered zone due to the occurrence of this formation at relatively shallow depths to the south of the proposed eastern and southern open cut mines. The results indicate a geometric mean of around 0.4 m/d and arithmetic mean of 1.1 m/d. The one test conducted over fresh CLR sandstone had a permeability of 0.5 m/d which is similar to the geometric mean of the weathered formation and approximately half of the arithmetic mean.
- The Narrabri Formation shows a geometric mean permeability of approximately 0.1 m/d which is consistent with its clay dominated lithology.
- Limited testing of the Tertiary volcanics has been completed as it occurs largely to the west of the proposed open cut mining area and is unsaturated at higher elevations. The result obtained indicates a permeability of around 0.9 m/d.
- The Permian formations from the Benelabri Fm (below the CLR sandstone) to the Pamboola Formation span the bulk of the strata that will be exposed in the proposed pits. The results for these formation show geometric mean permeability values ranging from 0.013 to 0.039 m/d. The effect of weathering of the interburden increases the geometric mean permeability value by around one order of magnitude from 0.007 m/d to 0.06 m/d.
- Formations with a geometric mean permeability value of less than 0.01 m/d include the Fresh Interburden, Watermark Formation and local palaeochannel deposits. The results indicate weathering of the Watermark Formation decreases the permeability for both the arithmetic and geometric means and this is likely to be associated with its fine grained nature reducing the fracture permeability in the weathered zone.

In summary the slug test results indicate an overall declining permeability trend in the Permian sequence from the quartz sandstone formations in the upper sections of the Coogal Subgroup through the main coal bearing sequence to the fine grained mudstones of the Watermark Formation.



6.4 Recovery Testing

Recovery tests were completed in selected open holes (7) and constructed bores (24). For the open bore hole tests the groundwater was airlifted from the hole via the drilling rods and water level recovery monitored. These tests give an indication of the bulk hydraulic conductivity of the strata intersected but are less useful to assign particular values to specific formations. Bores where recovery testing was the primary method of testing are shown Table 7. A summary of the recovery test results including a comparison to the slug test data and all analyses are shown in Appendix L. Typically the recovery test results were of a similar order of magnitude or lower than the slug test results.

In bores constructed over specific formations water was airlifted for an extended period (if possible) and the water levels recovery recorded either by manual dipping or with a datalogger. If the bore maintained a relatively constant flow rate during airlifting, the recovery data was analysed as a short term pumping test using the residual drawdown method. In several instances where the bore didn't produce water during airlifting and the rate of water level recovery was very slow, the data was analysed as a slug test as the removal of water was essentially instantaneous relative to very slow recovery time. An example of this is WM0655 which took on the order of weeks to recovery following purging of the bore indicating a very low permeability.

Table 7 Summary of Recovery Test Results.

Bore	Formation Monitored	Adopted Transmissivity (m ² /d)	Hydraulic Conductivity (m/d)
WM0038L	Fractured Interburden	0.87	9.45 E-02
WM228B	Weathered Benelabri Fm below CLR	-	5.56 E-05
WM228A	Weathered CLR Sandstone	-	1.22 E-04
WM0414	Porcupine Formation	-	1.77 E-05
WM0561	Watermark Formation	7.85 E-03	1.31 E-03
WM0655	Watermark Formation	-	2.88 E-06

6.5 Packer Testing

Hydrogeological packer testing has been undertaken by pneumatic packer testing methods, utilising both single-packer and straddle-packer arrangements. A total of 12 boreholes have been packer tested with seven bores tested in 2010, three in 2011 and two in 2012. The borehole locations are shown in Figure 8. The packer testing program focused on testing the deeper Gunnedah Basin formations and Black Jack Group formations at greater depths than slug and pumping test allows.

Typically six or seven tests were completed on each hole, with the packer positioned to target various coal seams and formations. For each test, the pneumatic packer wireline assembly was run through the drill rods, after the conclusion of drilling and flushing of the hole. For the single-packer tests, the base of the tested interval was always at the bottom of the hole and increasingly larger intervals tested. The results were calculated for the open hole section and then adjusted based on the permeability of the underlying formations (tested in both single and straddle tests) to represent the bulk hydraulic conductivity of the target formation. Straddle tests were also completed with 2 packers isolating a

specific zone or coal seam. A summary of the packer test results by formation are shown Table 8 and analyses for each test are contained in Appendix M.

Table 8 Summary of Packer Hydraulic Conductivity (K) Results by Formation

Formation Tested	No of Test	Arithmetic Mean (m/d)	Geometric Mean (m/d)	Minimum K value (m/d)	Maximum K value (m/d)
Dolerite Intrusive	2	3.46E-03	2.99E-03	1.73E-03	5.78E-03
Benelabri Formation above CLR	2	1.10E-02	5.77E-03	2.59E-03	2.76E-02
Benelabri Fm below CLR	2	1.72E-02	1.43E-02	3.76E-03	2.68E-02
Hoskissons Coal	5	3.36E-02	1.42E-02	3.46E-03	1.21E-01
Interburden	8	7.47E-02	4.22E-03	8.64E-05	5.13E-01
Melvilles Coal	6	4.07E-02	3.02E-03	8.64E-05	2.65E-01
Pamboola Fm below Melvilles Coal	9	1.97E-02	5.45E-03	6.84E-04	1.36E-01
Watermark Formation	1	5.70E-03	5.70E-03		
Porcupine Formation	4	6.28E-03	2.73E-04	7.95E-05	1.99E-03
Maules Ck Formation (all)	17	2.30E-03	1.32E-03	1.12E-04	.27E-03
Maules Ck Formation (excluding Coal Seams)	8	1.39E-03	6.19E-04	1.12E-04	5.27E-03
Maules Ck Formation Coals Seams	9	3.12E-03	2.59E-03	4.75E-04	5.27E-03
Basement / Leard Formation	4	1.09E-03	4.86E-04	8.09E-05	3.37 E-02

The results indicate;

- The packer test results were generally comparable to the slug test results with the geometric means values in the same order of magnitude for most formations tested in both programs. The exceptions were the Melvilles Coal and underlying Pamboola Formation where the geometric means of the packer testing results were around one order of magnitude lower compared to the slug test geometric means.
- The results from packer testing of the intrusive dolerite was also lower as would be expected given the significantly greater depth the sill was encountered in the packer test holes.
- The geometric mean permeability values for the Porcupine Formation and Leard Formation/Basement rocks were very low 2.7E-03 m/d and 4.7E-04 m/d respectively.
- The Maules Creek Formation geometric mean permeability values were higher at 1.3E-03m/d and showed the coal seams to have a higher permeability relative to the non coal sediments.

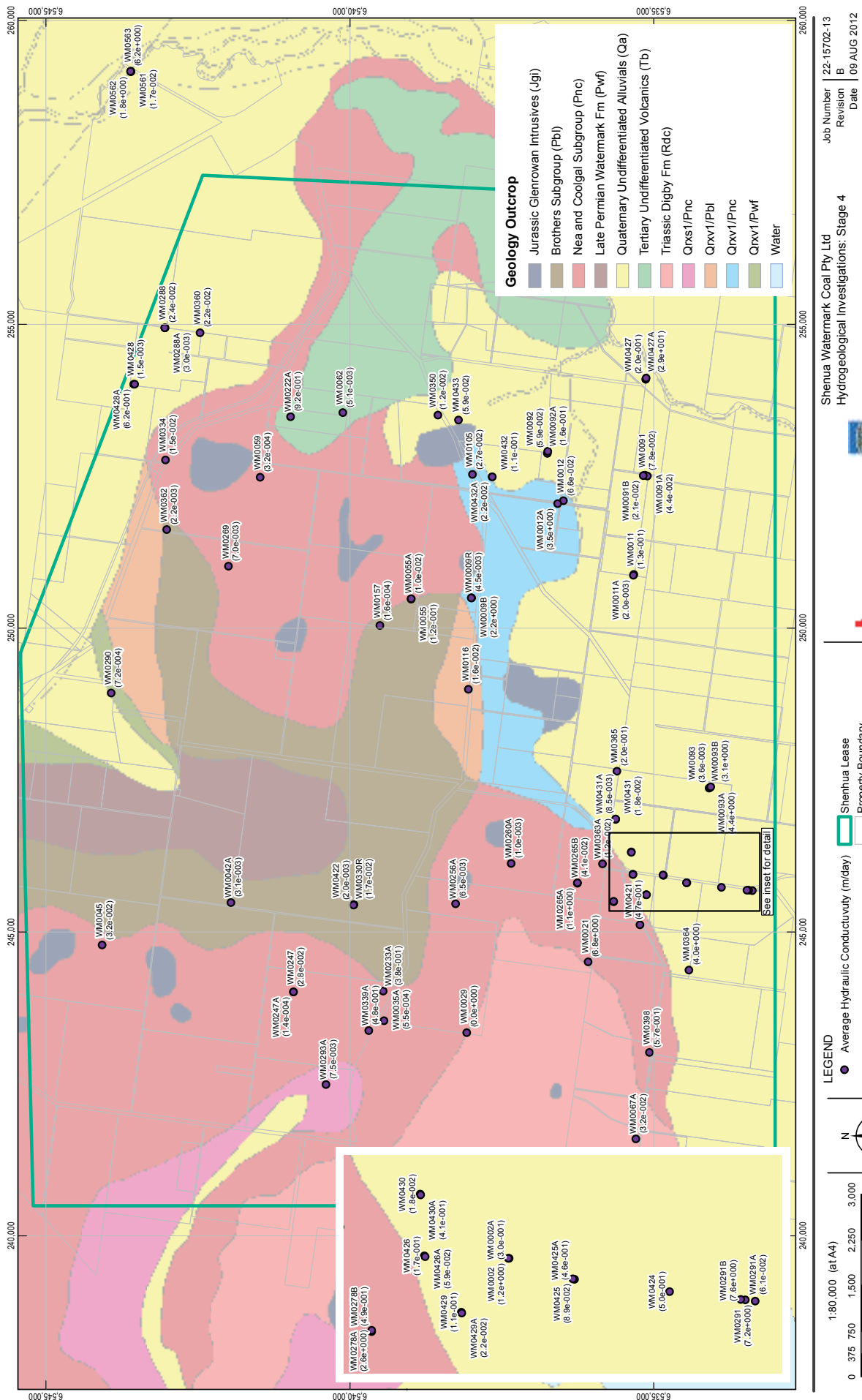


Figure 17

7. Groundwater Quality Monitoring

This section outlines the groundwater quality monitoring program undertaken under the Shenhua Watermark exploration program, including aspects related to sampling, analysis, assessment and reporting. The analytical results obtained from sampling undertaken have been detailed previously in stand-alone hydrogeological monitoring reports and will be summarised in the following sections. The hydrogeological monitoring reports also contain copies of all bore purging records, equipment calibration sheets, chain of custody documentation and laboratory sample receipt notices, analytical and quality control reports and will not be repeated in this report.

7.1 Sampling Techniques

Groundwater monitoring bores installed as part of the Shenhua Watermark project are sampled in accordance with the GHD procedure for groundwater sampling, as documented in the Exploration Services Contract Environmental Management System (GHD, 2010).

Groundwater sampling and laboratory analysis has generally taken place on a quarterly basis for each bore location; however due to the expansion of the monitoring network a rationalised approach to groundwater sampling was introduced in October 2011. Under the rationalised program bores with 12 to 18 months of stable groundwater quality data are sampled on a six monthly or annual basis depending on the density of surrounding bores and range of formations screened.

The first two sampling rounds completed in October 2009 and January 2010 were undertaken using low flow sampling techniques to purge and sample the bores. Further sampling rounds have been undertaken in July and October 2010 using a purge (Bennet) pump, whereby the bores were sampled following either the removal of three bore casing volumes of water or the purging of the bores until they became dry.

Consistent results were shown for bores sampled in January, July and October 2010, supporting the validity of using either sampling technique. Due to technical difficulties experienced throughout the utilisation of the purge pump, groundwater sampling undertaken since January 2011 has primarily been undertaken using deep low-flow techniques. This has resulted in fewer operational problems, attributed to the more robust pumping technique. Some bores cannot be successfully sampled via low flow techniques due to their very low yields, which has typically resulted in these bores becoming dry during the purging process. These bores were subsequently purged and later sampled via bailer once the bore had sufficiently recovered.

Ad hoc groundwater sampling of uncased exploration holes occurs occasionally if groundwater is intersected during drilling of an exploration hole and depending on the bore location, formation and drilling method, a sample may be airlifted from the hole for laboratory analysis

Physical water quality parameters were monitored in the field prior to sampling. The parameters pH, electrical conductivity (EC), dissolved oxygen (DO), oxygen reduction potential (ORP) and temperature were measured using a calibrated electronic multi-parameter water quality meter.



7.2 Sampling Procedure and Analytical Program

During each sampling event, samples to be analysed for dissolved heavy metals were filtered during sample collection using a 0.45 µm filter. Samples were then placed in appropriate sample containers supplied by the primary laboratory. Samples were kept on ice in an ice cooler and transported to a National Association of Testing Authorities, Australia (NATA) accredited laboratory (ALS Environmental), with appropriate chain of custody (CoC) documentation. Samples were couriered on an overnight express service from ALS Gunnedah to ALS Sydney, in order to meet technical holding times for some sample analyses.

The groundwater samples are typically analysed for Suite A parameters as shown in Table 9. Most monitoring bores are also analysed once for the Suite B analytes which include an ICPMS 26 metals scan, TPH, BTEX and pesticides to provide detailed baseline groundwater quality across the EL. Selected bores have also been analysed for triazine herbicides.

In addition to the routine groundwater sampling, 38 groundwater samples were collected for isotope analyses. This included 8 NoW monitoring bores and 30 Watermark groundwater monitoring bores within the EL. The samples were sent to GNS Science in New Zealand for age dating. Samples of the NoW monitoring bores were also to ALS for Suite A analyses.

Table 9 Groundwater Testing Program

Testing Type	Parameters
Field	pH, electrical conductivity (EC), dissolved oxygen (DO), temperature, oxidation-reduction potential (ORP, also known as Eh)
Laboratory	Suite A: pH, total dissolved solids (TDS), major cations, major anions, minor anions, selected metals screen
Laboratory	Suite B: ICPMS metals scan (26 elements including Boron and Strontium), total petroleum hydrocarbons (TPH), benzene, toluene, ethyl-benzene and xylenes (BTEX), organophosphate pesticides (OPP), organochlorine pesticides (OCP) and triazine herbicides (atrazine and simazine).

NOTES:

- Major cations = calcium, magnesium, sodium and potassium
- Major anions = chloride, sulphate, carbonate / bicarbonate
- Minor anions = nitrate, nitrite, fluoride, reactive phosphorous
- Selected metals screen = arsenic, cadmium, chromium, copper, iron, lead, nickel, zinc

7.2.1 Groundwater Assessment Guidelines

The groundwater quality results have been compared to guideline values from:

- NHMRC (2011) Australian Drinking Water Guidelines (health and aesthetic);
- ANZECC (2000) Stock Watering and Agricultural Parks and Gardens Guidelines; and
- ANZECC (2000) Freshwater Ecosystem 95% Species Protection Guidelines.

7.3 Quality Assurance and Quality Control (QA/QC)

Quality control (QC) samples are also collected during each groundwater sampling event for quality assurance (QA) purposes. In accordance with the relevant Australian Standards and industry practice, QC samples are collected at a rate of 10% of primary samples collected and comprise both field duplicate samples and split duplicate samples. Details regarding the QA/QC program undertaken during each quarterly sampling round are outlined in this section, with QA/QC results and analyses provided in Appendix N.

7.3.1 Field Quality Assurance

All fieldwork was conducted in general accordance with the GHD Standard Field Operating Procedures (FOP) provided in the EMS documentation. Details of the groundwater monitoring are summarised for each activity below.

Implemented decontamination procedures – All groundwater sampling equipment was decontaminated in a phosphate-free detergent between sample collections. Where practical, the use of sampling tools were minimised (e.g. through sampling via dedicated sampling containers and dedicated tubing);

Sample identification procedures - All sample containers were clearly labelled with project name, sample number, sample location and sample date;

Information requirements for groundwater samples – field parameters (pH, EC, DO, temperature and ORP) and visual observations for each sample location were recorded on field sheets during purging and sampling;

Chain of custody (CoC) information requirements - CoC documentation was completed and forwarded with the sample to the testing laboratory;

Sample duplicate frequency - Blind duplicate (analysed by primary laboratory, ALS) and split duplicate samples (analysed by secondary laboratory, SGS) were collected and analysed for the same parameters as the respective primary sample. These QA/QC samples were collected at a rate of 10% of the primary samples collected; and

Field equipment calibration requirements – Field equipment that required calibration was limited to the water quality meter, which was pre-calibrated by the supplier and calibrated periodically in the field by GHD.

7.3.2 Field Quality Control

Field quality control procedures used during the project comprised:

Blind duplicates: These are prepared in the field by duplicating the original sample and placing two equivalent portions into two separate containers. The blind duplicate sample is sent anonymously to the project laboratory. Duplicate samples were analysed for the identical set of parameters requested for the corresponding original sample. For the blind duplicate sample pair, relative percentage differences (RPDs) were calculated, with RPDs greater than 30% highlighted for consideration. Blind duplicates provide an indication of the analytical precision of the project laboratory, but may also be affected by factors such as sampling methodology or inherent heterogeneity of the sample medium;



Split duplicates: These are prepared by sending a duplicate of an original sample anonymously to a secondary laboratory. Split duplicates provide an indication of the analytical accuracy of the project laboratory, but may also be affected by factors such as sampling methodology or inherent heterogeneity of the sample medium. RPDs were also calculated for the split duplicate sample pair;

Rinsate Blanks: The sampling equipment was decontaminated using our standard decontamination procedures, then filled with laboratory supplied deionised water. This water was then transferred to appropriate sample containers in the field. Rinsate blanks provide an indication of potential contamination resulting from inadequate decontamination procedures, sample containers, transport or laboratory procedures.

7.3.3 QA/QC Assessment

During the period from October 2009 to June 2012, the following QA/QC statistics have been summarised:

Field Blanks: a total of 15 rinsate blank analyses of the 569 analyses completed (2.6%) and 4 trip blank analyses of the 91 completed (4%) sample showed concentrations of heavy metals or nitrates marginally above laboratory limits of reporting;

Field Samples: a total of 75 field duplicate pairs of the 975 analyses completed showed RPDs exceeding the adopted criteria. This equates to 7.6% of all RPD analyses and the exceedances primarily related to heavy metals and physical chemical parameters and generally occurred when concentrations were close to laboratory limit of reporting (LORs).

Internal Laboratory Quality Control: Analysis of laboratory surrogates showed a total of 405 surrogate analyses with greater than 25% variation to the laboratory upper and lower confidence limits. These primarily related to laboratory induced hydrocarbon spikes and since spike recovery was generally between 70% and 130%, these surrogate exceedances are not considered to present a quality issue.

Laboratory control samples (LCS) were all within acceptable limits (<25%) with the exception of 358 samples with recoveries outside of the control limits. Percentage recovery errors occurred primarily during OC/OP pesticides and PAHs and TPH testing methods.

Matrix spike (MS) recoveries were all within acceptable limits (70% to 130%) with the exception of 57 samples with recoveries outside of the control limits. Each of these samples were spiked with either nitrate, phenolic compounds, TPHs, OPPs, OCPs, mercury, sulphates or chromium and in general, showed only marginal exceedance of the acceptance criteria based on ALS data quality objectives; and

Holding Time Exceedances:

A total of 315 holding time exceedances (excluding pH) occurred from the more than 25,000 analyses completed were identified during this period, with only four of these considered significant (19 days between sampled date and analysis date). Exceedances were primarily related to sulphate, chloride and fluoride analysis, as well as some Volatile Organic Compounds (VOCs) and semivolatile organic compounds (SVOCs).

7.3.4 QA/QC Summary

In total, 24,179 laboratory samples have been collected and analysed as part of the Shenhua Watermark hydrogeological investigations between September 2009 and June 2012, inclusive of ad hoc samples collected and analysed. A total of 2,376 QC samples have been collected during this period, which equates to approximately 9.8% of primary samples submitted.

In general the internal laboratory quality control data shows that the data quality objectives are being met and the data is of a reliable nature.

7.4 Data Presentation

Tabulated analytical results including all historic time series data are also shown within Appendix O. Figure 18 and Figure 19 shows groundwater salinity as TDS from the most recent analytical data collected at the Permian and alluvial plain bores respectively.

Piper tri-linear diagrams have been used to facilitate visual characterisation of the bulk groundwater chemistry and assist in identifying groupings or trends. These are shown in Figure 20 and Figure 21 plotting major ions as cation and anion percentages of milliequivalents (meq/L).

7.5 Groundwater Salinity

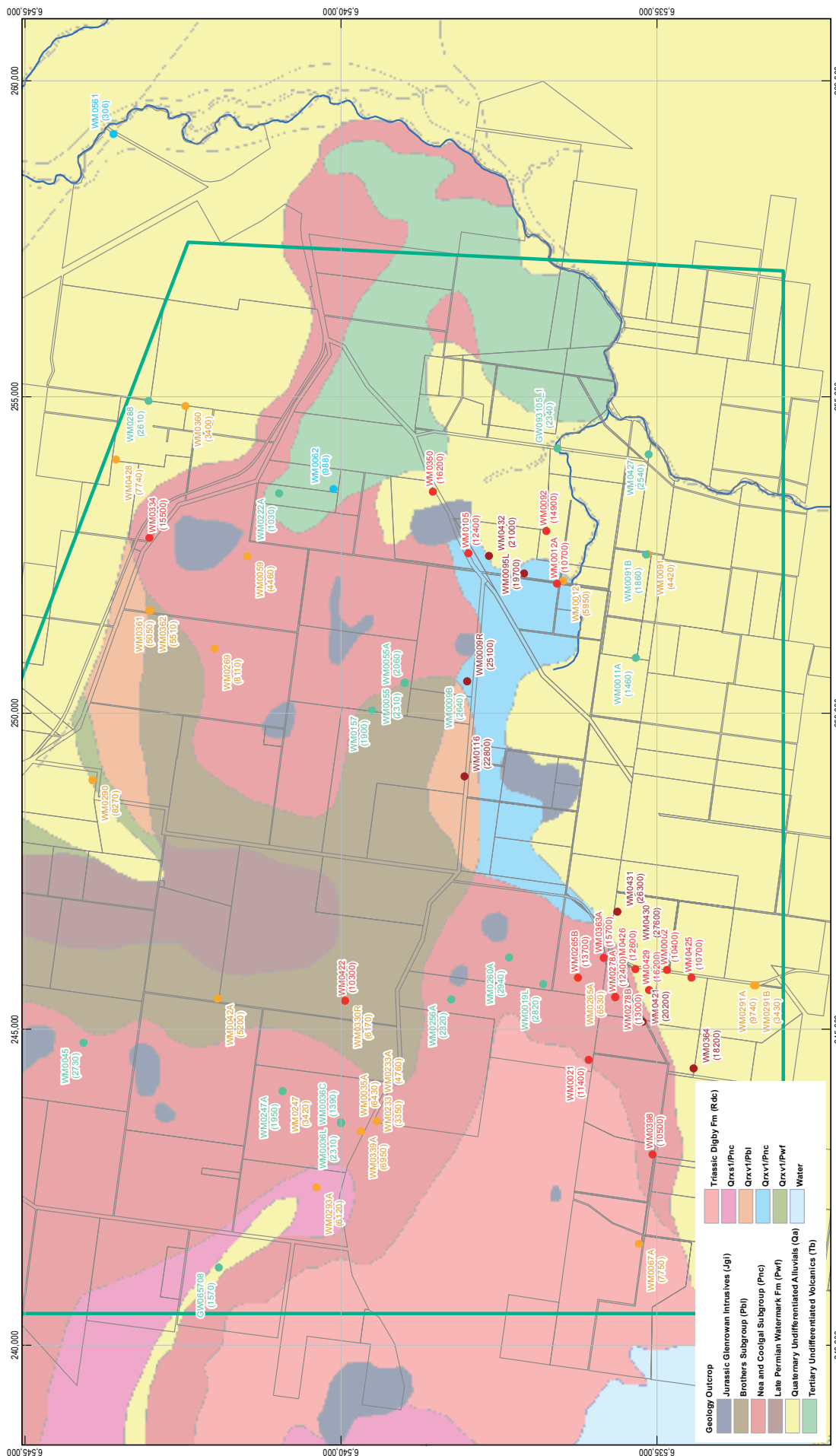
A summary of mean, median and range of groundwater salinity data by formation is shown in Table 10.

Table 10 Summary of Groundwater TDS (mg/L) Results by Formation

Formation	No of Samples	Mean TDS (mg/L)	Median TDS (mg/L)	Minimum TDS value (mg/L)	Maximum TDS value (mg/L)
Narrabri Formation	67	14,100	14,500	620	32,000
Gunnedah Formation	24	1,317	830	316	2,920
Local Palaeochannel Deposit	8	4,034	3,210	1,760	6,430
Tertiary Volcanics / Dolerite	14	5,397	8,516	780	16,200
Digby Formation	6	8,082	7,750	7,210	9,020
Wallala Formation	6	10,792	10,300	9,350	12,700
Coogal Subgroup above Howes Hill Coal	10	12,537	15,400	3,380	18,900
Benelabri Formation above CLR	13	8,971	10,050	2,430	13,100
CLR Sandstone	33	13,379	10,700	6,530	29,100
Benelabri Fm below CLR	14	12,657	13,700	1,790	26,300
Hoskissons Coal	30	4,412	3,590	778	11,200
Interburden	85	6,429	2,925	610	26,300



Formation	No of Samples	Mean TDS (mg/L)	Median TDS (mg/L)	Minimum TDS value (mg/L)	Maximum TDS value (mg/L)
Melvilles Coal	31	8,416	2,960	1,470	25,100
Pamboola Fm below Melvilles Coal	23	5,229	3,400	2,060	15,500
Watermark Formation	50	7,116	5,820	306	22,800



Job Number | 31-28754
Revision | B
Date | 26 JUL 2012

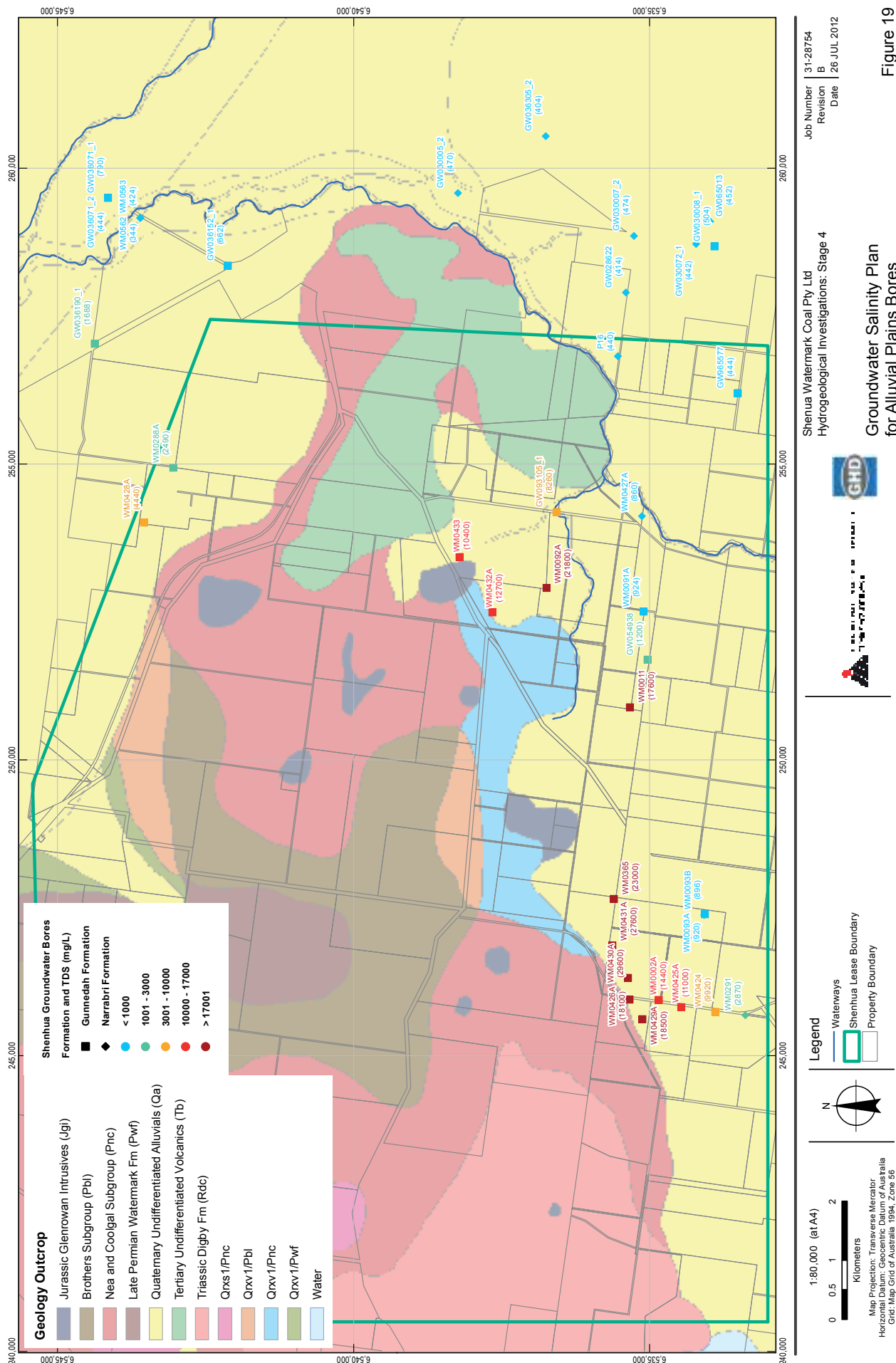
Shenhua Watermark Coal Pty Ltd
Hydrogeological Investigations: Stage 4



Groundwater Salinity Plan for Permian Sediment Bores

Figure 18

8/180 Lonsdale St, Melbourne VIC 3000 Australia T 61 3 8687 8000 F 61 3 8687 8111 E maimail@ghd.com.au W www.ghd.com.au
© 2012 14551GISMaps\Deliverables\Hydrogeology\Monthly TDS\Permian\008_2214551_Shenhua_TDS_March2012_Permian.mxd
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Data source: Navteq 2009, DECCW, GHD 2009, Learmonth



7.5.1 Permian Sediments Bore Groundwater Salinity

Review of the groundwater salinity data for each bore shows the TDS values have remained relatively consistent at each bore over the sampling period with the exception of several bores (WM035A, WM334 and WM0421) which show an increasing salinity trend. When assessed by formation as shown in Table 10, it is evident that most Permian formations show a wide range of salinity values. The most recent groundwater salinity data as plotted in Figure 18 shows that the location of the bore within the localised groundwater flow system and to a lesser degree the formation screened appears to be the major influence of groundwater salinity.

The results indicate:

- Bores located on or close to the elevated ridges such as WM0019L, WM0045, WM0055A, WM0060LR, WM0062, WM0157, WM222A and WM0260A show groundwater salinity less than 3,000 mg/L TDS, which is consistent with these bores located within recharge areas to the Permian formations.
- Bores situated further down-gradient (WM0290, WM0362, WM0042A, WM0365A and the cluster of bores in the central western lease area) are typically more saline ranging from 3,000 mg/L to 10,000 mg/L TDS. This is consistent with long groundwater residence times in formations of low permeability.
- The highest salinity groundwater with TDS values greater than 14,000 mg/L TDS is typically found on the margins of the alluvial plains. These include WM0334 to north east, WM0092, WM0095L, WM0350 and WM0432 to the south east, and WM0363A, WM0364, WM0421, WM0429 and WM0431 to the south west. For bores located in the Permian outcrop areas, this is likely to be associated with long groundwater residence times in formations of low permeability.
- Permian bores located further out on the alluvial plains such as WM0011A, WM0291, WM0091, WM0427 and WM561) show lower salinities in the range of 300 mg/L to 9,740 mg/L TDS.
- Higher groundwater salinities are generally observed in the Black Jack Group formations overlying the Hoskissons Coal including the Benelabri Formation, Coogal subgroup, Wallala Formation which show median salinity values of greater than 10,000 mg/L TDS whereas the Black Jack formations from the Hoskissons Coal and below have median salinity values in the range of 2,000 – 4,000 mg/L TDS.

7.5.2 Quaternary Sediments Salinity

The groundwater salinity of monitoring bores and landowner bores screened over the Quaternary alluvial sediments shows different characteristics for the Narrabri and Gunnedah formations and spatial distributions. The results indicate:

- Narrabri Formation bores are typically saline with a median TDS >14,000 mg/L compared to the Gunnedah Formation with a median TDS of 830 mg/L. This is consistent with the regional groundwater quality as observed in these formations in numerous studies in the area.
- Similar to the Permian sediments as described above, the most saline groundwater in the Narrabri Formation is found on the southern margin of the alluvial plains ranging from 10,000 to 22,000 mg/L TDS in the south east and 11,000 to 30,000 mg/L TDS to the south west. These areas are adjacent to where high salinity groundwater is found in the Permian sediments and therefore some lateral connection between the weathered Permian sediments and Narrabri Formation could potentially



result in the very saline groundwater observed fringing the Permian outcrop as further discussed in Section 7.8. The majority of the saline Narrabri Formation bores show water table elevations at less than 2 m below ground level so processes such as capillary rise and associated salt concentration could also feasibly be contributing to the high salinity observed in the shallow groundwater. Studies by Ackworth and Jankowski (1997) and Ackworth and Timms (2002) have proposed that the salinity observed in the Narrabri Formation in the region is from the redistribution of salt entrained in the near surface clay from aeolian processes.

- Brackish groundwater less than 5,000 mg/L is found in Narrabri Formation bores located in the north east of the EL. In this area saline groundwater is also found in the adjacent Permian sediments (ie WM0334) but there appears to be poor lateral connection between the Permian and Narrabri Formation in this area of the EL. This poor lateral connection is likely to be associated with the very low permeability of the fresh and weathered Watermark Formation forming the top of the Permian sequence in this area and the clayey nature of the alluvial sediments as noted at WM0428 and WM0288A and also mapped by Lavitt (1999).
- Narrabri Formation bores located closer to the Mooki River (WM0091A and GW054938) are fresher at 900 to 1,200 mg/L suggesting potential localised recharge from the river. Bore WM0093A also shows fresh Narrabri Formation groundwater at less than 1,000 mg/L and is similar to the underlying Gunnedah Formation indicating a localised connection between the two formations possible via bore 90BL254822 which screened both formations at this location.
- Bores monitoring the Gunnedah Formation west of the Mooki River in the southern lease area (WM0291, WM0093B and WM0427A) show groundwater salinity values ranging from 860 mg/L to 2,870 mg/L. Bores in the south east of the EL (GW95577 and P16), to the east of the EL (GW028622, GW065013 and GW036305) and to the north east (WM0562 and WM0563) are all located in the regional Gunnedah Formation palaeochannel with fresh groundwater at less than 500 mg/L TDS. This distribution is consistent with previous mapping in the region, Broughton (1994) and Lavitt (1999), and is attributed to past depositional environments during the Pliocene resulting in the thicker and coarser sediments accumulating in the regional palaeochannel from the north flowing braided river system. The aquifer testing completed as part of this investigation indicates high permeability Gunnedah Formation sediments are found in the regional palaeochannel along which the majority of the irrigation bores are located. The low salinity of the groundwater in the regional Gunnedah Formation palaeochannel suggests better connection to the recharge areas as identified by Lavitt (1999) in the foothills of the New England Fold Belt and possibly also with surface waters from the Mooki River.

7.5.3 Groundwater Quality at Nested Sites

Significant differences were identified in groundwater salinity at most nested sites. The trends observed include:

- Where the Narrabri formation directly overlies the weathered Permian sediments on the margins of the alluvial plains most bores show higher groundwater salinity in the Narrabri Formation (WM0011, WM0092, WM0425, WM0426, WM0429, WM0430, WM0431 and GW093105). As discussed above evaporative concentration of the shallow groundwater or redistribution of salt entrained in the near surface clays could be contributing to the high salinities observed in the Narrabri Formation relative to the underlying Permian sediments. The only exception to this observed trend in this topographic setting is WM0432 and WM0428 where the underlying Permian sediments are more saline.

- At the nested sites in the southern lease area further out on the alluvial plains, the groundwater in the alluvial sediments is less saline compared to the underlying groundwater in the Permian sediments and both have typically lower salinity relative to the bores adjacent to the Permian outcrop. This is attributed to the presence of the lower salinity groundwater associated with the Gunnedah Formation at WM0291 and WM427 and proximity to the Mooki River to WM0091 influencing the water quality in the Narrabri Formation at these sites.

7.6 Groundwater Types

7.6.1 Permian Sediments

A piper diagram has been produced from the most recent groundwater quality data to show the relative percentage of major ions for each groundwater monitoring bore (Figure 20). The bores show a range of water types reflecting with the following broad grouping identified:

- The Black Jack Group bores show a Na-Mg-Cl type water;
- Permian Watermark Formation bores show a Na-Cl type chemistry;
- Bore with proportionally elevated sulphate include WM0059, WM00269 and WM0334 all located in the Black Mountain area ad WM0042A: and
- A Na-HCO₃ type water has been observed at WM0062 located in the elevated eastern area of the EL. This groundwater chemistry was also observed in WM0561 which is a weathered Watermark Formation bore which is likely to be locally connected with the overlying Gunnedah Formation WM0562 as shown by the pumping test data at this location. The similar Na-HCO₃ water type in WM0562 suggests the Gunnedah Formation is the probably source of the water in this particular case. The underlying very low permeability fresh Permian sediments at this location (WM0665) are to be sampled.

The different water types between the Watermark Formation and Black Jack Group is consistent with the poor hydraulic connection between these two formation limited by the low permeability of the Watermark Formation.

7.6.2 Alluvial Plains Bores and Surface Water Quality

Recent groundwater chemistry has been plotted against surface water samples as a piper trilinear diagram (Figure 21) to compare chemical composition signatures. Four distinct water types in the alluvial sediments can be identified including:

- Gunnedah Formation bores P16, GW028622, GW65013, GW65577_2 located in and adjacent to the south east of the EL, and WM0563 to the north east, all plot as a Na-Mg-HCO₃ type water in the same area as the surface water samples suggesting a surface water influence.
- Gunnedah Formation bores WM0562 and GW036305_2 show a Na-HCO₃ type water with bicarbonate as the major anion and relatively higher proportions of sodium compared to the surface water.



- Gunnedah Formation bores (WM0291, WM0093A and WM0427A) and Narrabri Formation bores (WM0093B, WM0091A and GW054938) all located across the south section of the EL show a $\text{HCO}_3\text{-Cl-Na}$ chemistry with bicarbonate and chloride as the dominate anions and sodium as the dominant cation. The similar groundwater chemistry indicates some connection between these two formation as has been observed elsewhere in numerous studies.
- Numerous Narrabri Formation bores show Cl-Na-Mg type water. These bores are all located adjacent to the Permian outcrop where the Gunnedah Formation is absent. The bores to the north east of the lease (WM00288A, and WM0428A) show proportionally high concentrations of sulphate relative to the Narrabri Formation bores from the southern areas of the lease.

The different water types found in the Gunnedah Formation in and adjacent to the lease suggest a different recharge sources. The low salinity Na-Mg-HCO_3 type water found in the regional palaeochannel suggests a surface water source whereas the higher salinity $\text{HCO}_3\text{-Cl-Na}$ groundwater found in the southern EL to the west of the Mooki suggests a different sources possibly to the south west of the EL. The $\text{HCO}_3\text{-Na}$ type groundwater has been reported by other authors in the region including Ackworth and Timms (2003) and Lavitt (1999) however the recharge influence for these two bores both located to the east of the EL is unclear at the present with the data available.

7.7 Physical Parameters and Inorganic chemicals

7.7.1 Groundwater pH

The groundwater was measured in the field at the time of sampling and also recorded by the laboratory for comparison purposed only as the laboratory pH analyses are outside the technical holding time of 6 hours for this parameter. Both pH values are shown in Appendix O and based on the field values show the pH of the groundwater to typically be neutral falling within the 6 to 8 range. The Gunnedah Formation has the highest median pH as shown in Table 11. Some variations occur outside this range but there does not appear to be any significant correlation of pH with formation screened. Bore WM0062 is notable as it is consistently alkaline with a pH greater than 9.

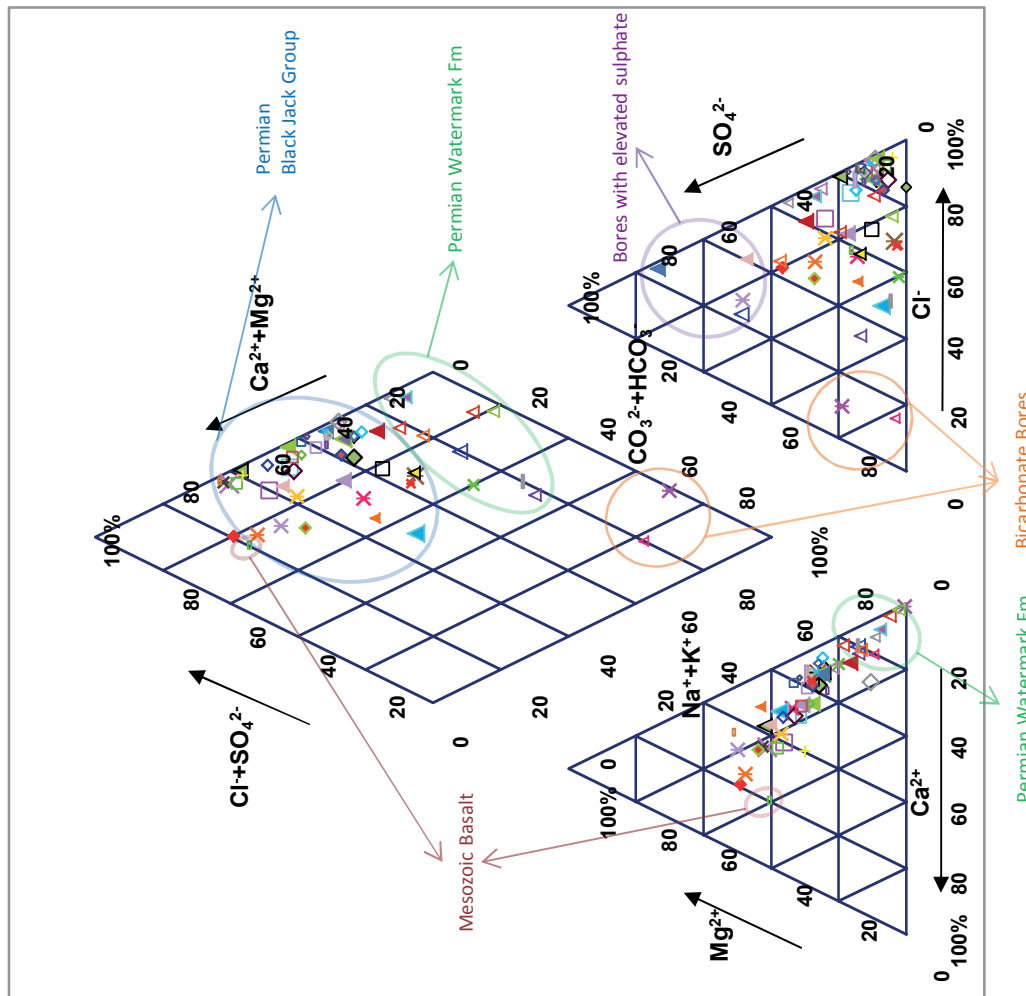
WM0002	WM0009B	WM0009R	WM0011A
WM0012	WM0012A	WM0021	WM0035A
WM0042A	WM0045	WM0055	WM0055A
WM0059	WM0062	WM0067A	WM0091
WM0091B	WM0092	WM0105	WM0116
WM0157	WM0222A	WM0233	WM0233A
WM0247	WM0256A	WM0260A	WM0265A
WM0265B	WM0269	WM0278A	WM0278B
WM0288	WM0290	WM0291A	WM0291B
WM0330R	WM0334	WM0350	WM0360
WM0361	WM0362	WM0363A	WM0364
WM0398	WM0421	WM0422	WM0425
WM0426	WM0427	WM0428	WM0429
WM0430	WM0431	WM0432	WM0561
= GW065708			

Shenhua Watermark Coal

Figure 20 Piper Plot of Mesozoic & Permian Groundwater Types

Mesozoic and Permian Groundwater Bores

- Jurassic**
Dashed Line - Dolerite/Basalt
- Triassic**
Coloured Cross Symbols (X) - Digby Fm
- Permian Black Jack Group**
Cross Symbols (+) - Wallala Fm
Diamond - Clare Sandstone (Coogal Subgroup)
Square Symbols - Benalabri Fm (Coogal Subgroup)
Coloured Diamonds - Hoskissons Coal
Coloured Triangles - Pamboola Fm (incl. Melvilles Coal)
Star Symbols (*) - Interburden
Solid Line - Weathered Coogal Group
- Permian Millie Group**
Triangles - Watermark Fm





XSWM01	XSWM02	XSWM03	XSWM04
XSWM06	XSWM11	XSWM12	XSWM13
XSWM14	XSWM15	XSWM17	WM0002A
WM0011	WM0093A	WM0091A	WM0092A
WM0093B	WM0288A	WM0291	WM0365
WM0424	WM0425A	WM0426A	WM0427A
WM0428A	WM0429A	WM0430A	WM0431A
WM0432A	WM0433	WM0562	WM0563
GW093105_1	GW054938	GW965577_2	GW036305_2
S&D 16	GW065013	GW028622	

Shenhua Watermark Coal

Figure 2-1 Piper Plot of Alluvial Sediments Groundwater and Surface Water Types

Comparison based on most recent available groundwater analytical data and November 2010 surface water analytical data

Quaternary Alluvials

Coloured Circles - Narrabri Fm
Coloured Squares - Gunnedah Fm

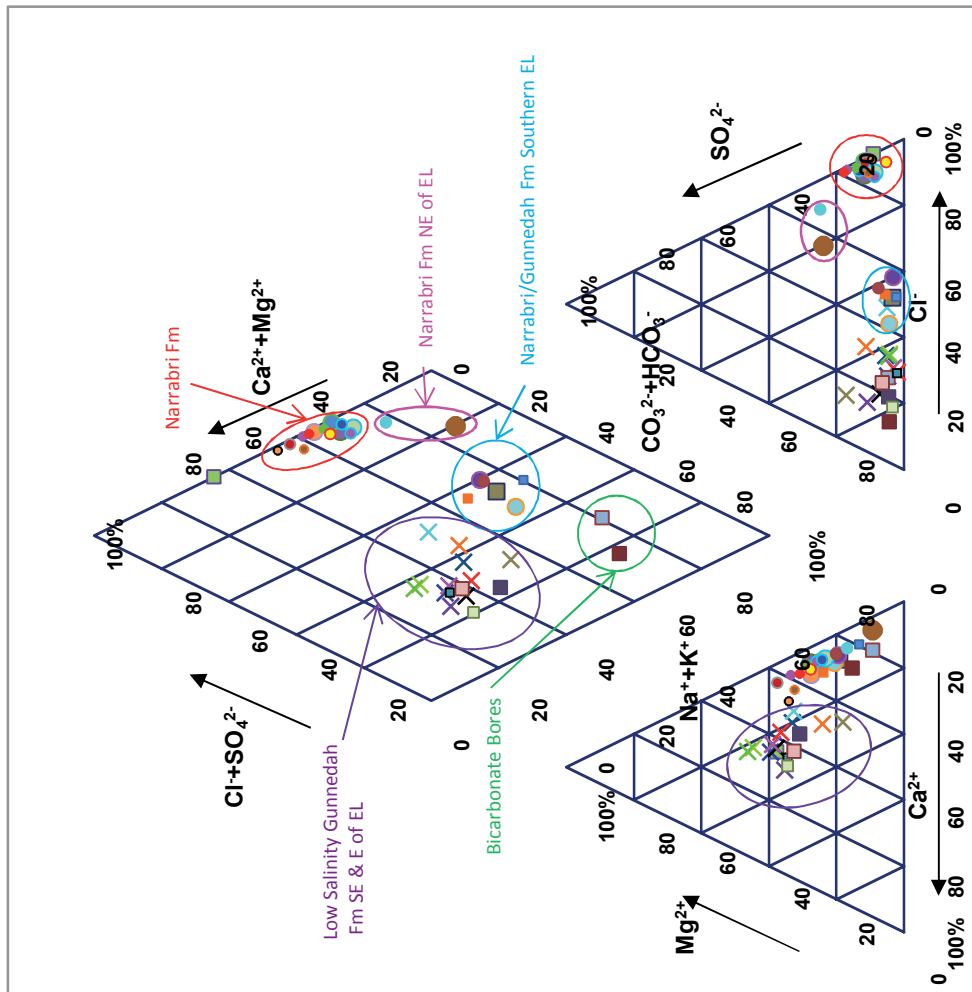


Table 11 Summary of Groundwater pH results by Formation

Formation	No of Samples	Mean pH	Median pH	Minimum pH value	Maximum pH value
Narrabri Formation	64	7.48	7.42	6.09	9.16
Gunnedah Formation	21	7.43	7.54	6.10	8.80
Local Palaeochannel Deposit	9	6.97	7.10	5.06	8.03
Tertiary Volcanics / Dolerite	11	7.37	7.35	7.19	7.58
Digby Formation	7	6.48	6.46	6.14	6.73
Wallala Formation	6	6.37	6.39	5.15	7.82
Coogal Subgroup above Howes Hill Coal	9	6.81	6.84	6.66	6.93
Benelabri Formation above CLR	10	6.65	6.78	5.75	7.37
CLR Sandstone	31	6.98	6.96	6.17	7.69
Benelabri Fm below CLR	75	6.67	6.96	6.04	7.16
Hoskissons Coal	30	7.01	6.79	5.37	8.57
Interburden	85	7.22	6.92	5.09	10.7*
Melvilles Coal	31	7.25	7.02	6.50	9.62
Pamboola Fm below Melvilles Coal	24	7.03	7.11	5.31	7.83
Watermark Formation	50	7.41	7.36	5.39	9.97

* includes WM0062 with consistent high pH >9

7.7.2 Inorganic Chemicals

The results obtained for a range of heavy metals were shown to marginally exceed the ANZECC ecosystem protection guidelines and to a lesser extent, drinking water and stock guidelines. Exceedances of copper, iron, nickel and zinc were most commonly identified. Since these inorganic exceedances are marginal and are not spatially specific either vertically (i.e. to a particular geological formation) or laterally (i.e. to a vicinity or locality within the EL), they are still considered to be a regional characteristic that represent naturally elevated background inorganic groundwater concentrations rather than attributed to potential contamination sources. Many of these inorganic exceedances are comparable to the inorganic background levels estimated previously (GHD, 2011b), based on 2009 – 2010 groundwater data.



Based on current data, it is considered likely that marginally elevated inorganic groundwater chemistry is largely derivative of the mineralogy of each geological formation that either contains or has transmitted the sampled groundwaters. This is supported by the spatial distribution of identified inorganic guideline exceedances, i.e. exceedances were again identified at both higher elevation locations where grazing is the predominant land use, as well as along the alluvial plains, where fertilisers are more likely to be applied.

Sulphate also commonly exceeded the stock watering and both health and aesthetic drinking water guideline values and is associated with the elevated salinity encountered across the lease.

Nitrate (as N) concentrations exceed the ANZECC (2000) Freshwater Ecosystem guideline (0.7 mg/L). Nitrate concentrations are potentially related to the application of fertilisers in the area, however further monitoring is required to assess trends in nitrate concentrations and potential correlations with fertiliser application.

7.7.3 Pesticides

A total of 59 analyses were completed in the Watermark groundwater monitoring bores and all results from the organophosphate pesticides (OPP), organochlorine pesticides (OCP) scans were below the LOR. Bore were selected for triazine herbicide analyses on the basis of screen depth and land use and 25 analyses atrazine and simazine were completed, all results were below the LOR.

7.7.4 Hydrocarbons

PAHs

Selected bores were analysed for TPH identifier compounds such as Polycyclic Aromatic Hydrocarbons (PAHs) all showed laboratory analytical results below limits of reporting for all sampling rounds.

BTEX

Groundwater samples were also analysed for TPH identifier compounds such as BTEX. Of the 53 bores sampled BTEX was detected above LORs in 7 bores. All bores exceeding the LORs were resampled and concentrations below LOR were subsequently reported for 4 bores. The three bores with BTEX concentrations above LORs are:

- Bore WM0042A and WM428 showing benzene concentrations of 2 µg/L and 3 µg/L marginally exceeding the LOR and drinking water guideline value of 1 µg/L. TPHs were below laboratory LORs at this location; and
- WM0427 and WM0428 showing toluene concentrations of 5 µg/L and 4 µg/L marginally exceeding the LOR of 2 µg/L. These are well below the drinking water guideline of values of 25 µg/L (aesthetic) and 800 µg/L (health). TPHs were below laboratory LORs at this location.

Further BTEX analyses of the bores exceeding LORs are included in the ongoing groundwater sampling program to confirm baseline concentrations and assess possible contamination sources.

Hydrocarbons Summary

TPH compounds were identified above reporting limits at 14 bores across the lease including the nested NoW bores at GW93105.

Research into the TPH analysis methods is noted by Zemo and Foote (2003) to show that the reported TPH concentrations in groundwater samples may not represent dissolved petroleum hydrocarbons but rather represent non dissolved petroleum or polar non hydrocarbon compounds. Soluble non hydrocarbons such as polar compounds may be present in groundwater as a result of petroleum degradation, natural organic compounds such as tannins and lignands or other factors. Zemo and Foote (2003) concluded the TPH analysis method based on gas chromatography flame ionisation detection (CG-FID) which is listed as the ALS method reference, is imprecise and should not be used to assess dissolved petroleum hydrocarbons in groundwater without the silica gel clean up method to remove the polar compounds.

The 14 of the 58 bores analysed showed an initial TPH above LOR using the (CG-FID) method. These bore were subsequently resampled either using the CG-FID method or with the silica gel clean up method (ALS analysis method EP071 SG: Total Recoverable Hydrocarbons). All subsequent analyses were below the LOR.

7.8 Isotopic Analyses

A total of 38 groundwater bores were selected for isotopic sampling, to enhance the understanding of groundwater flow from recharge zones and flow between various formations in and around the Watermark EL. Eight NoW monitoring bores were sampled from five sites extending from the Liverpool Ranges to the south to east of Curlewis. Thirty Watermark bores were sampled from within the EL monitoring a range of formation and spatial localities. Sampling was undertaken according to the procedures provided by GNS Science and samples sent to New Zealand for tritium and radiocarbon analyses. From these a radiocarbon age for the groundwater was calculated and has been used to gain a further understanding of the recharge processes.

The results for the GNS sampling are contained in Appendix P. In addition radiocarbon data from published reports including Lavitt (1999), Timms and Ackworth (2002) and Timms et al (2002a) were collated and plotted on plans in Appendix P to provide regional context for the GNS data.

7.8.1 Discussion of Results within EL

Observations drawn from the radiocarbon age dating includes:

- A general trend of increasing groundwater age in the Permian sediments in the eastern EL is observed with groundwater ages ranging from 3,600 to 5,400 years in the elevated areas (WM0157, WM0062) becoming older 9,000 to 17,000 down flow gradient (WM0432 and WM0009R)
- A similar pattern is observed in the south west of the EL with groundwater age increasing from 10,600 years at WM0021 to over 23,000 years at WM0421 and WM426 on the margin of the alluvial plain.
- With the exception of WM0091 which appears anomalous, the age of the groundwater in the Permian sediments on the alluvial plains was typically old ranging from 24,000 to 48,000 years.



- Results from the nested sites in the Permian areas, WM0009 and WM0012, show young water at <100 years is found in the more permeable weathered Permian horizon overlying significantly older water underlying fresh Permian Coals. This suggests poor vertical hydraulic connection between the weathered and underlying fresh Permian sediments at these locations.
- This pattern is also observed on the fringes of the alluvial plains (WM0426 and WM432) where younger water in the Narrabri Formation overlies the older water in the Permian sediments again indicating poor hydraulic connection between these two formations.
- In the central western EL the age of groundwater in the Permian sediments is consistent at 14,000 to 15,000 years in the two bores sampled (WM0036C and WM0233).
- The age of the Gunnedah Formation groundwater is variable ranging from 4,300 years at WM0093A, 12,500 years at WM00427A to 30 500 years at WM291. The lithological and geophysical data at WM0291 was reviewed in light of this radiocarbon age and the Gunnedah Formation interpretation confirmed for the screen interval in this bore. This bore is located on the western most extent of the Gunnedah Formation and the age data suggests it has poor connection within the Gunnedah Formation to the east.
- The Narrabri Formation ages varied <100 years to over 36,000 years indicating varying connectivity with the recharge sources.

7.8.2 Regional Radiocarbon Results

Observations drawn from the radiocarbon age dating includes:

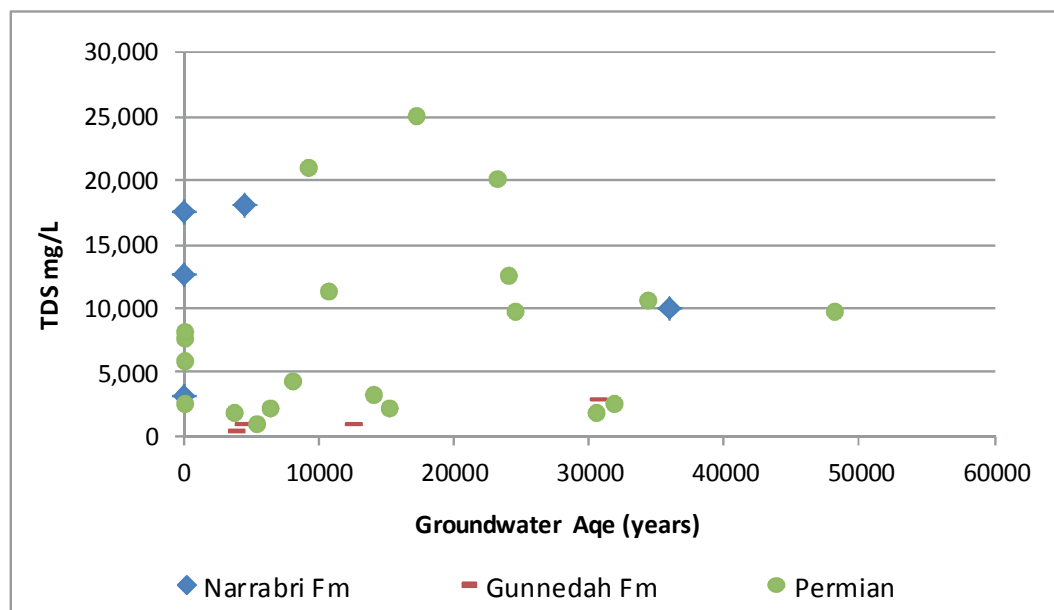
- The age of Gunnedah Formation groundwater is typically in the range 2,000 to 4,000 year in the bores to the east of the EL. The age range of the Gunnedah Formations bores increases to 3,000 to almost 10,000 in the bores to the north east of the EL. Younger Gunnedah Formation groundwater at 1,000 and younger is found to on the eastern margins of the alluvial plains to the north east of the EL.
- One anomalous result was noted at GW0303431-3 with an age of 23,257 and this may be similar to what was observed at WM0291 where the lithological data indicates groundwater was sampled from the Gunnedah Formation but the age data suggests the formation is not in connection with the regional Gunnedah Formation palaeochannel deposits.
- Gunnedah Formation bores to the south of the lease are typically younger at <100 year to 6,000 years. A trend of increasing age down Quirindi Creek is also evident from the Lavitt (1999) data suggesting the headwaters in the Lachlan Fold Belt region to the south east are recharge sources for the alluvial aquifer.
- The results from the one bore that was sampled from the Triassic Digby Formation underlying the alluvial plains (GW030176D) indicated an age of 45,600 suggesting poor connection with the overlying alluvial sediments.
- The age of groundwater samples in the Tertiary basalts at the top of the Mooki River catchment range from <100 years in bores sampled in this investigation to 1,800 to 6,500 years as reported by Timms et al (2002a).

7.8.3 Groundwater Age vs Salinity

A graph of groundwater age data against salinity for the groundwater in and adjacent to the lease area is shown in Figure 22. The graph shows there is a range of ages and TDS values for the Permian sediment groundwater indicating differing locations within the local flow systems and groundwater chemistry associated with the different geological formations. In contrast the Gunnedah Formation bores are all relatively low in salinity and range in age. As previously discussed, the range in age is likely to be associated with varying hydraulic connection to the high permeability palaeochannel deposits with the young, low salinity water which shows a Na-Mg-HCO₃ surface water type recharge influence.

The Narrabri Formation groundwater is typically relatively young and shows a significant range in salinity. The high salinity of generally young age of the groundwater suggests that the remobilisation of salts within the clays is the most likely cause of the high salinity groundwater observed rather than evaporative concentration or lateral connection with the older adjacent saline groundwater from the Permian sediments. The young age generally supports the poor hydraulic connection to the adjacent and underlying older Permian groundwater as noted in some of the hydrograph trends. The one exception to this general observation is bore WM0424 which is both old and saline indicating local connection to the underlying weathered Permian sediments at this location.

Figure 22 Graph of Groundwater Age vs Salinity





7.9 Groundwater Beneficial Uses

The NSW Groundwater Quality Protection Policy (DLWC 1998) states “all groundwater systems should be managed such that their most sensitive identified beneficial use is maintained”. The Groundwater Quality Protection Policy identified the following beneficial uses;

- Ecosystem protection
- Recreation and aesthetics
- Raw water for drinking supply
- Agricultural water, and
- Industrial water.

The policy refers to the NHMRC 1996 Australian Drinking Water Guidelines and ANZECC Australian Water Quality Guidelines for Fresh and Marine Water 1992 as guidance documents to assess beneficial uses. The groundwater quality protection policy also states that the Government will classify beneficial use in all the major groundwater systems in consultation with the local and regional communities. The Water Sharing Plan for the Upper and Lower Namoi Groundwater Sources 2003 Section 38 states “The beneficial uses of these groundwater are:

- (a) Raw water for drinking and
- (b) Agricultural use

Based on the beneficial use classes identified in the ANZECC *Water Quality Guidelines 2001*, and the NHMRC *Raw Water for drinking purposes Guidelines 1996*.

The NHMRC guidelines for drinking water were updated in 2011 and are used in this report.

The Murray Darling Basin Porous Rocks Groundwater Sources Water Sharing Plan 2011 includes the Gunnedah-Oxley Basin MDB Groundwater Sources but does not explicitly refer to beneficial uses of the areas covered by the plan or refer to water quality other than to state one of the plans objectives is to contribute to maintenance of water quality.

To assess the beneficial uses of groundwater within the EL the groundwater salinity as monitored across the site was compared to the NHMRC 2011 and ANZECC 2000 water quality guideline values. It is noted that salinity is not the only water quality indicator influencing beneficial use and the other water quality guideline values for the relevant beneficial uses are shown in Appendix O. Exceedances of the guideline values are highlighted in tabulated dataset in Appendix O.

The TDS data was reviewed and the maximum values for each Watermark groundwater monitoring bore assigned to the broad beneficial use categories as shown in Table 12. Based on the salinity data only, the groundwater in the Permian outcrop areas would largely fall within the stock water salinity range depending on the type of stock. There are 2 bores located in the central elevated area of the EL with lower salinity groundwater within the drinking water quality (fair and poor) guideline values. Some areas would also fall within salinity tolerances for irrigation of some crops however the yields are low in these areas and not generally suitable for irrigation purposes. To assess the quality of water for irrigation it is necessary to consider the sodium adsorption ratio (SAR) and toxicity of specific ions such as sulphate, chloride and sodium. Discussions with the landowners indicated stock watering and domestic supply (non-drinking water and gardens) is the main current use of groundwater bores in the Permian outcrop areas.

The more saline groundwater encountered on the margins of the alluvial plains both within the Permian sediments and Narrabri Formation show TDS values greater than the recommended stock tolerances. As shown in Table 12, 28 of the Watermark groundwater monitoring fall in this category.

For the alluvial plains in areas where the Gunnedah Formation is present to the south of the lease, the groundwater salinity data suggests it would be suitable for irrigation of some crops. Areas closer to the Mooki River also fall within the TDS drinking water categories Fair (WM427A) and Poor (WM91B and WM93B). It is noted WM0091A, WM0093B and WM0427A exceed the aesthetic guideline value for sodium of 180 mg/L. The only groundwater monitoring bores falling within the good drinking water category are found to the east of the lease along the regional Gunnedah Formation palaeochannel. Data from the landowner and NoW monitoring bores also show the groundwater in the south east corner of the EL also falls within the drinking water (good quality) and irrigation beneficial uses consistent with the beneficial uses as identified in the Upper and Lower Namoi WSPs.

Detailed studies of the long term water quality trends in relation to the beneficial uses of the Gunnedah and Narrabri Formations in Zone 3 of the Upper Namoi GMA which includes the Mooki River from Gunnedah to Breeza, have been completed by Timms et al (2010) and more recently Parsons Brinckerhoff (2011). The Parsons Brinckerhoff study concluded that in Zone 3 the Narrabri Formation was generally suitable for stock only but that increasing salinity at some bores was impacting on this use. The beneficial uses identified for the Gunnedah Formation included drinking water, irrigation, and stock watering. They noted that specific toxicity to cotton based on Na and Cl concentrations were observed in 70% of the Gunnedah Formation samples and 32% had a medium to high SAR sodium hazards rating. The study concluded that at some locations there was a change in the classification of beneficial use from irrigation to stock watering at some monitoring bores.

**Table 12 Salinity Criteria for key beneficial use.**

Beneficial Use	TDS Range (mg/L)	Comment	No monitoring bores
Industrial	=>13,000		28 monitoring bores with salinity >13,000 mg/L
Stock ¹	3,000 - 4,000	Loss of production and decline in health of poultry	34 monitoring bores with salinity in the range of 3,000 – 13,000 mg/L TDS
	4,000 – 7,000	Loss of production and decline in health of dairy cattle	
	6,000 – 7,000	Loss of production and decline in health of horses	
	6,000 – 8,000	Loss of production and decline in health of pigs	
	5,000 – 10,000	Loss of production and decline in health of beef cattle	
	10,000 – 13,000	Loss of production and decline in health of sheep	
Irrigation ¹	1,000	If used on early season cotton, final yields could be diminished	7 monitoring bores with salinity in range of 1,000 – 2,145 mg/L
	1,005	Unsuitable for grapes	
	1,140	Unsuitable for corn & oranges	
	1,540	Unsuitable for tomatoes	
	1,875	Unsuitable for broccoli	
	2,010	Unsuitable for rice	
	2,145	Unsuitable for peaches	
	3,350	Unsuitable for soyabeans	21 monitoring bores with salinity in range of 2,145 – 5,350 mg/L
	4,020	Unsuitable for wheat irrigation	
	4,555	Unsuitable for sorghum	
	5,160	Unsuitable for cotton irrigation	
	5,350	Unsuitable for barely irrigation	
Drinking Water²	<600	Good quality drinking water	3 monitoring bores
	600 - 900	Fair quality drinking water	2 monitoring bores
	900 – 1,200	Poor quality drinking water	3 monitoring bores
	>1,200	Unacceptable quality	77 monitoring bores

1 from ANZECC 2000 Chapter 4, 2 from NHMRC 2011 Australian Drinking Water Guidelines

8. Conceptual Groundwater Model

A conceptual hydrogeological model is a representation of a complex groundwater flow system that describes the behaviour of the groundwater system and its interactions between aquifers and with surface water within a catchment. A conceptual model requires compilation of detailed information on the geology, water quality, recharge, rivers, water levels, hydraulic parameters and groundwater usage. The key elements in a conceptual model are defining the extents and hydraulic properties of the aquifers and aquitards and understanding the groundwater flow directions, groundwater recharge and discharge processes.

A conceptual hydrogeological model has been developed based on the distribution of the various formations as modelled for the geological investigations, aquifer testing and groundwater monitoring.

8.1 Groundwater Flow Systems

The current conceptual hydrological/hydrogeological understanding of the EL area is shown by way of two 3-dimensional block diagrams Figures 23 and 24. The block diagrams (conceptual models) illustrate the site layout based on topographic data, the geological model developed from the exploration drilling, and hydrogeological monitoring works undertaken. The conceptual models show inferred groundwater flow directions, inferred locations/settings for recharge (rainfall recharge, rainfall runoff and infiltration) and discharge (surface water evaporation/evapotranspiration, aquifer throughflow) processes.

8.1.1 Aquifer and Aquitards

The aquifers identified in the EL include:

- The Gunnedah Formation is a regional confined aquifer system and has been identified across the southern boundary of EL and to the east and north east of the EL. A variation in water quality within this formation across the southern boundary indicates the highly productive zone of the aquifer is restricted to the south east corner of the EL. The highly productive areas of the Gunnedah Formation are associated with thick coarse deposits in-filling the former palaeochannel and its distribution controlled by the topography at the time of deposition. Geological and geophysical data indicates that with the exception of the south east corner of the EL, the Gunnedah Formation does not extend to the Permian outcrop resulting in Narrabri Formation directly overlying the Permian sediments in these areas. The Gunnedah Formation in the south western and southern parts of the EL displays higher groundwater salinity, lower yields and permeabilities relative to the palaeochannel deposits.
- The Tertiary basalt is of limited extent and observed to be unsaturated where it forms a capping in the elevated areas to the east of the EL but is saturated where it is found at lower elevations with a permeability of around 0.9 m/d.
- The Black Jack Group quartz rich sandstones found above and interbedded with the Benelabri Formation are more permeable, particularly when weathered, with hydraulic conductivity results typically from 0.5 to 5 m/d. The sandstones in the upper part of Black Jack sequence are restricted in extent to the eastern parts the EL. The CLR sandstone is more widespread and is found in the south west pit area extending under the alluvial plains to the south as shown in Figure 23. It is found



to the south east of the EL below the alluvial plains but does not extend northwards to the east pit area. Similarly it is found in an isolated area only in the west pit area.

The Black Jack Group sediments from the Hoskissons Coal and below typically have low permeability, in the order of 0.007 to 0.05 m/d so would not typically be considered as an aquifer that can produce a useful yield as observed in several of the pumping tests which ran dry. Localised fracturing of these formations has been inferred to increase the permeability to over 1 m/d in the central western area as observed around WM036L. Such substantial variations in permeability are typical of the heterogeneity associated with fractured rock aquifers.

The very low permeability values of the Watermark Formation, local palaeochannel and Millie and Bellato Group sediments indicates these formations act as aquitards. The low permeability of the Narrabri Formation typically observed in the EL is consistent with this formation acting as an aquitard confining the Gunnedah Formation to the along the southern lease boundary.

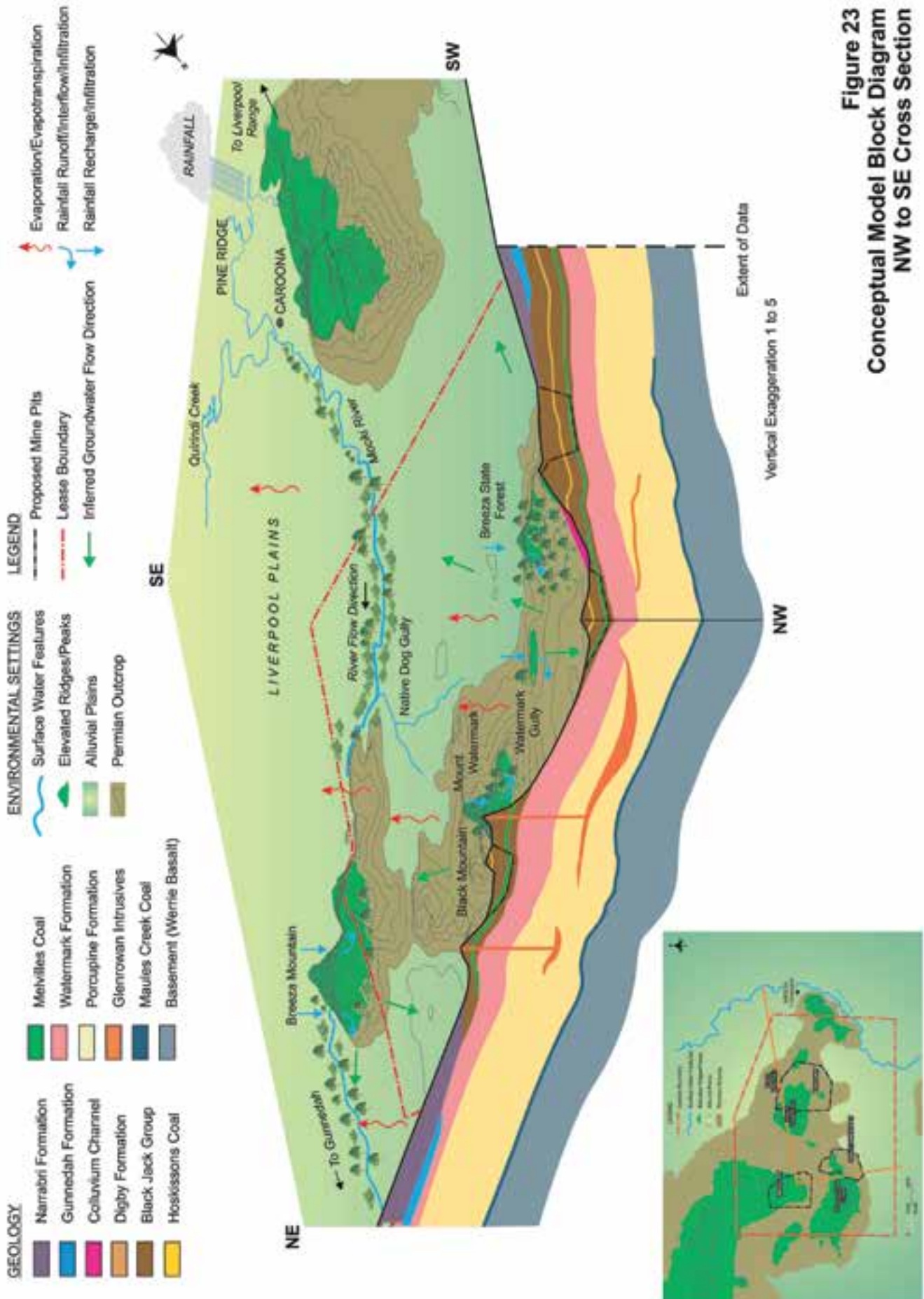
8.1.2 Groundwater Recharge and Discharge

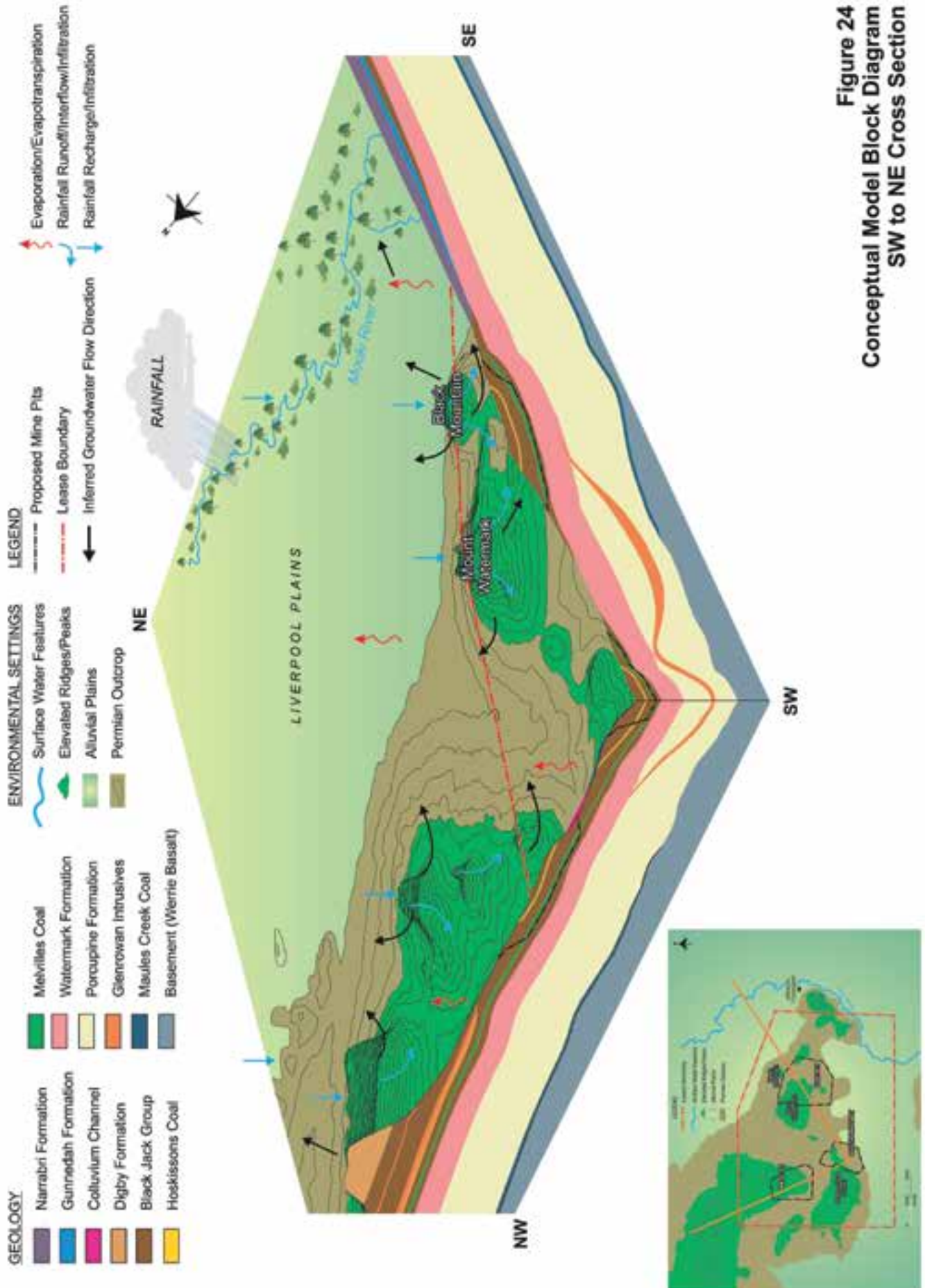
The potentiometric head data for the Permian Triassic sediments, groundwater quality and age data indicate that localised recharge to the Permian and Tertiary Formations occurs in the elevated ridges and peaks within the EL with groundwater flow gradients to the central drainage lines and plains.

Vertical pressure gradients in the Permian outcrop areas are typically downwards, suggesting potential recharge from the weathered zone to the underlying fresher Permian rocks. However as demonstrated by divergent hydrograph trends and difference in groundwater age and chemistry data, the vertical connection between the weathered and fresh Permian sediments is typically poor restricted by the generally low permeability of the fresh Permian sediments. Localised areas of better connection are found associated with faulting and fracturing.

The salinity of the groundwater in the various Permian formations increases down gradient, which is indicative of long residence times consistent with the low permeability. Some seeps and soaks have been observed with the Permian sediments at lower elevations where the water table interests the ground surface forming localised groundwater discharge areas. Upwards vertical hydraulic gradients are observed from the Permian sediments to the overlying alluvial sediments in the vicinity of the Mooki River however the differing age and chemistry of the groundwater suggest limited hydraulic connection.

The Narrabri Formation groundwater is typically relatively young and shows a significant range in salinity. The high salinity and generally young age of the groundwater suggests that the remobilisation of salts within the clays is the most likely cause of the highly saline groundwater observed, rather than evaporative concentration or lateral connection with the older adjacent, saline groundwater from the Permian sediments. The young age generally supports the poor hydraulic connection to the adjacent and underlying older Permian groundwater as noted in some of the hydrograph trends. An exception to this general trend is observed in the Clift Road area where old and saline Narrabri Formation groundwater is of similar water age, quality and type as in the underlying Permian sediments suggesting a localised connection in this area where the weathered CLR sandstones forms the top of the Permian sequence.





The Gunnedah Formation forms a regional aquifer system with significant yield and has been interpreted to occur on the southern boundary of the EL. Access restrictions have prevented drilling along the northern EL alluvial plains boundary but the Gunnedah Formation was not interpreted to occur in the groundwater monitoring bores drilled in this area to date. The Gunnedah Formation is however interpreted to occur immediately to the north and northeast of the EL based on the lithology of existing bores and differentiation of the Gunnedah and Narrabri Formations as described by Pratt (1998) and Lavitt (1999). Recharge to the Gunnedah Formation from the Permian sediments in the EL would appear to be limited based several factors including:

- The restricted distribution of the Gunnedah Formation adjacent to the Permian outcrop area;
- The typically significantly older and more saline groundwater in the Permian sediments;
- Differing water types found in the Permian and Gunnedah Formation sediments; and
- Generally low permeability of the Permian sediments as shown by the aquifer testing.

The only area where similarities in groundwater quality and age are observed in the weathered Permian sediments and Gunnedah Formation suggesting some hydraulic connection, is in the south west of the EL in the vicinity of WM0291. As discussed in Section 7.8.1 this bore is located on the western most extent of the Gunnedah Formation and the age data at >30,000 years suggests the Gunnedah Formation in this area has poor connection within the main palaeochannel deposits to the east. Regional studies by Lavitt (1999) concluded the foothills of the Lachlan Fold Belt are the recharge sources for the alluvial sediments.

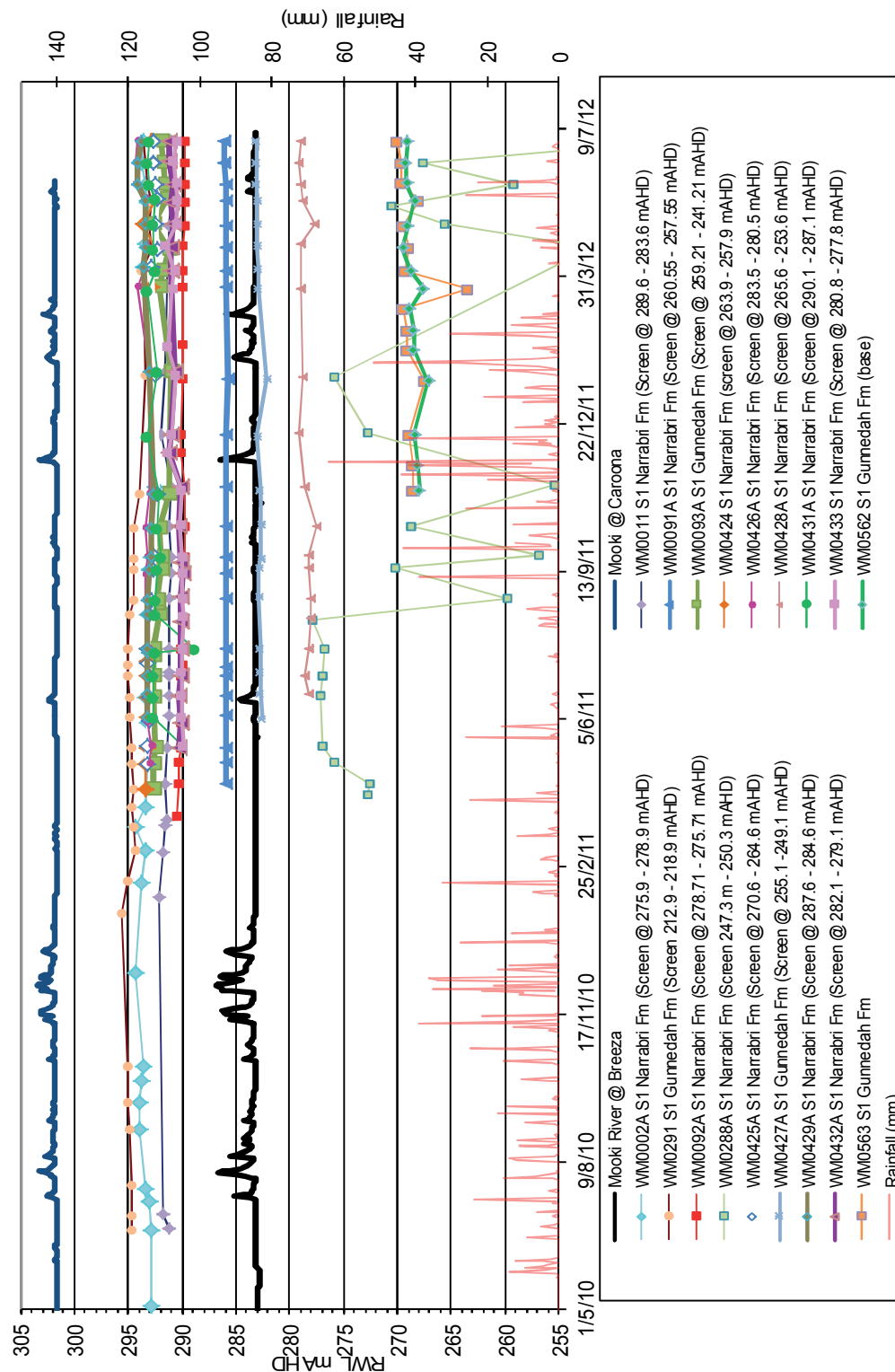
8.1.3 Surface Water Interactions

Figure 25 indicates that with the exception of WM0427A, groundwater elevations of bores on the southern plains area remain higher compared to the Mooki River elevation at Breeza, suggesting potential for groundwater flow towards the river. The groundwater level at WM0427A is at a similar level or marginally below the Mooki River (at Breeza) but the lack of specific river levels adjacent to WM0427A makes it difficult to comment on the potential surface water – groundwater interactions at this site. Bores located in the north eastern plains area screening the Narrabri and underlying Watermark Formations (WM0428, WM0288A) all show groundwater levels below the Mooki River elevation at Breeza but are affected by the low permeability of these formations at this location. The groundwater elevation of the Gunnedah Formation bores downstream of Breeza (WM0562 and WM0563) are lower than the Mooki River elevation (at Breeza) but again the river elevation would need to be adjusted relative to Breeza datum to comment on potential surface water – groundwater interactions at this site.

On a regional scale CSIRO (2007) have modelled the surface water groundwater connectivity in the Namoi catchment using the existing NoW Upper Namoi and Mooki River groundwater models. The Upper Namoi model includes the Mooki River to Breeza and the Mooki River model, the catchment upstream of Breeza. CSIRO classified the Mooki River from Quirindi Creek to the Namoi River as a high losing stream. The modelled river flux results are for July 2006 and the report notes these can change with time but also highlight that the high losing nature of the Mooki River at Breeza is representative of the last 10 years for this river reach. Prior to 1995 the river reach was gaining and the groundwater levels dropped significantly since 2002 due likely to groundwater extraction and decreased rainfall recharge.



Figure 25 Comparison of groundwater levels with Mooki River Elevation.



9. Conclusions and Recommendations

9.1 Conclusions

At the completion of the Stage 4 drilling program, a total of 96 PVC standpipe groundwater monitoring bores and 32 VWP's have been installed throughout the EL. A quarterly groundwater sampling regime has been implemented and groundwater levels were monitored fortnightly when accessible and daily at 22 bores mainly on the alluvial plains installed with downhole dataloggers.

9.1.1 Groundwater Levels

The groundwater elevation plan indicates the potentiometric surface in the Permian sediments is a subdued representation of the topography. Potentiometric head decreases from local topographic highs including Mt. Watermark, Black Mountain and the Breeza State Forest towards areas of lower elevation forming localised groundwater flow regimes within the various sub-catchments.

The groundwater elevation plan for the Quaternary alluvial sediments shows that in the southern portion of the alluvial plains, the potentiometric head decreases to the south east indicating a south east groundwater flow direction towards the Mooki River. In the north-eastern lease area, the potentiometric head decreases to the east and north east with inferred flow direction again towards the Mooki River.

The nested bore sites within both the Permian formations and Quaternary sediments typically show a downwards vertical hydraulic gradient. This is consistent with an inferred recharge mechanism where the relative potentiometric heads indicate potential for downwards groundwater movement from shallower formations to deeper formations controlled by the vertical permeability of the strata.

The bores with upwards vertical hydraulic gradients were generally located in the lower areas of the localised flow systems close to the Mooki River on the alluvial plains and in the local palaeochannel draining to Lake Goran. The exception noted was at bore WM0157 which is located in an inferred recharge area and the upwards gradient is considered likely to be associated with localised fracturing as suggested by the pumping test results from this bore.

9.1.2 Groundwater Flow Systems

The main aquifers identified in the Watermark EL are:

- Unconsolidated sediments associated with the Gunnedah Formation aquifer are found along the southern boundary. The high yielding Gunnedah Formation palaeochannel deposits are found in the south east corner of the EL and to the east and north east of the EL;
- Localised flow systems associated with the weathered Permian quartz rich sandstones which are found interbedded with and overlying the Benelabri Formation; and
- A localised scale fractured rock aquifer associated with Tertiary Basalts where they are saturated is found to the east of the EL. Areas where the Permian strata is more densely fractured also from a local scale fractured rock aquifer.

The salinity of the groundwater in the various Permian formations increases down gradient, which indicates long groundwater residence times. Evaporative losses and concentration of salts in shallow groundwater could also be contributing to the saline groundwater observed in the weathered Permian



sediments adjacent to the alluvial plains where groundwater levels of less than 2 m from the ground surface occur.

Based on some divergent hydrograph trends, differences in groundwater elevation and chemistry data and the generally low permeability of the fresh Permian sediments, the vertical connection between the weathered and fresh Permian formations is considered typically poor. Current data indicates that on the margins of the alluvial plains adjacent to the Permian outcrop (where the Gunnedah Formation is absent) downwards gradients are observed, indicating that the Narrabri Formation is potentially recharging the underlying weathered Permian sediments.

The Gunnedah Formation forms a regional aquifer system and permeability values for this aquifer are typically high, but can vary according to lithology. The formation is described as being deposited in a braided river environment and its extent appears to be restricted to the southern and north eastern margins of the lease. Potential recharge to the Gunnedah Formation aquifer from the Permian outcrop on the EL is considered to be limited based on the restricted distribution of this aquifer adjacent to the Permian outcrop, generally low permeability of the Permian sediments and variations in groundwater quality and ages observed. Recharge to the Gunnedah Formation is typically described as occurring in the upper catchment foothills.

9.1.3 Aquifer Testing

The aquifer testing program included the completion of 8 pumping tests, slug testing of 82 bores, 31 recovery tests in constructed bores and exploration holes and 60 packer tests in 12 exploration holes. The results indicate:

- Based on the more representative pumping test results the Gunnedah Formation hydraulic conductivity is estimated to range from 8.7 m/d in the south west of the lease up to around 18 m/d to the north east of the EL in the regional Gunnedah Formation palaeochannel deposit. The storativity is estimated to be in the range of 2.4 - 5.5 E-05.
- The Narrabri Formation shows a geometric mean permeability of approximately 0.1 m/d which is consistent with its clay dominated lithology
- The Black Jack Group quartz rich sandstones found above and interbedded with the Benelabri Formation form relatively permeable layers when weathered. The permeability of the weathered CLR sandstone ranges from 0.2 to 3.5 m/d.
- Limited testing of the Tertiary volcanics has been completed as it occurs largely to the west of the proposed open cut mining area and is unsaturated at higher elevations. The result obtained indicates a permeability of around 0.9 m/d.
- The Permian formations from the Benelabri Formation (below the CLR sandstone) to the Pamboola Formation span the bulk of the strata that will be exposed in the proposed pits. The pumping test and slug test data indicate mean permeability values typically in the range of 0.01 to 0.05 m/d. The storativity values ranged from 0.05 to 0.0006.
- Local fracturing of the Permian sediments has been shown to increase the permeability to over 1 m/d as shown by the WM036L pumping test results.
- The effect of weathering of the interburden increases the geometric mean permeability value by around one order of magnitude from 0.007 m/d to 0.06 m/d.

- The Watermark Formation has a very low mean permeability value around 0.005 m/d consistent with the very slow groundwater level recovery commonly observed following sampling of these bores.
- Primarily packer testing of Porcupine Formation, Bellata Group sediments and basement rocks indicates very low mean permeability values ranging from 0.005 to 0.0003 m/d.

9.1.4 Groundwater Salinity

The results of the groundwater quality data indicates.

- Groundwater salinity within the Permian sediments varies considerably across the site, from fresh to saline and is strongly dependent upon the geological formation and where in the localised flow system the bore is located. Bores located on or close to the elevated ridges show fresh to brackish groundwater quality, which suggests that these bores are within likely recharge areas. Down-gradient bores screening the same Permian formations typically show saline groundwater quality, consistent with long residence time groundwater. Significant differences in groundwater chemistry occur over short spatial distances both laterally and vertically, suggesting poor connection and possibly the structural influence of groundwater flow, resulting in compartmentalisation of the formations. Permian bores located further out on the alluvial plains tend to show lower salinity relative to the bores located on the margins of the Permian outcrop areas which are typically the most saline.
- Higher groundwater salinities are generally observed in the Black Jack Group formations overlying the Hoskissons Coal which show median salinity values of greater than 10,000 mg/L TDS whereas the Black Jack formations from the Hoskissons Coal and below have median salinity values in the range of 2,000 – 4,000 mg/L TDS.
- Narrabri Formation bores are typically saline with a median TDS >14,000 mg/L compared to the Gunnedah Formation with a median TDS of 830 mg/L. This is consistent with the regional groundwater quality as observed in these formations in numerous studies in the area.
- The most saline groundwater in the Narrabri Formation is found on the southern margin of the alluvial plains. These areas are adjacent to where high salinity groundwater is found in the Permian sediments. Old and saline groundwater is found at one bore in the Clift Road area suggesting a localised lateral connection between the weathered Permian sediments and Narrabri Formation. However young groundwater is found at the other four Narrabri Formation bores fringing the Permian outcrop suggesting other process such as the redistribution of salt entrained in the near surface clays could be contributing to the high salinity of the Narrabri Formation. The presence of lower salinity groundwater in Narrabri Formation bores close to the Mooki River suggests potential localised recharge from the river.



- Brackish young groundwater less than 5,000 mg/L is found in Narrabri Formation to the north east of the EL. Saline groundwater is also found in the adjacent Permian sediments but there appears to be poor lateral connection between the Permian and Narrabri Formation which is likely to be associated with the very low permeability of the fresh and weathered Watermark Formation forming the top of the Permian sequence in this area and the clayey nature of the Narrabri Formation.
- Across the southern lease area bores monitoring the Gunnedah Formation west of the Mooki River show higher groundwater salinity values ranging from 860 mg/L to 2,870 mg/L compared to bores east of the river at less than 500 mg/L TDS. This variation is attributed to past depositional environments resulting in the thicker and coarser sediments accumulating in the regional palaeochannel from the north flowing braided river system. The low salinity of the groundwater in the Gunnedah Formation palaeochannel suggests better connection to the recharge areas in the foothills of the New England Fold Belt and possibly also with surface waters from the Mooki River.

Groundwater Types

Two main groundwater types can be identified in the Permian sediments with the Black Jack Group bores showing a Na-Mg-Cl type water and the underlying Watermark Formation bores a Na-Cl type chemistry. The different water types between the Watermark Formation and Black Jack Group is consistent with the poor hydraulic connection between these two formation limited by the low permeability of the Watermark Formation. Localised areas with proportionally higher sulphate concentrations have been observed around Black Mountain and isolated bores with Na-HCO₃ type water also identified.

The three water types have been identified in the Gunnedah Formation suggesting differing recharge influences. Bores located in and adjacent to the south east of the EL and to the north east all show a low salinity Na-Mg-HCO₃ type water with similar proportions of ions as surface water samples from the Mooki River suggesting a surface water influence. Gunnedah Formation bores (WM0291, WM0093A and WM0427A) all located across the south section of the EL show a HCO₃-Cl-Na with a possible recharge source to the south west based in the published groundwater flow maps. Narrabri Formation bores (WM0093B, WM0091A and GW054938) show a similar HCO₃-Cl-Na water type suggesting some connection between these two formations where the Gunnedah Formation is present.

Gunnedah Formation bores WM0562 and GW036305_2 both to the east of the EL show a Na-HCO₃ type water however the recharge influence for these two bores is unclear at the present with the data available.

Numerous Narrabri Formation bores show Cl-Na-Mg type water. These bores are all located adjacent to the Permian outcrop where the Gunnedah Formation is absent. The bores to the north east of the lease (WM00288A and WM0428A) show proportionally high concentrations of sulphate relative to the Narrabri Formation bores from the southern areas of the lease.

Other Groundwater Constituents and Beneficial Use

Based on the groundwater salinity compared to the threshold values contained in the ANZECC and NHMRC guideline documents, the groundwater beneficial uses identified within the EL include stock watering in the Permian outcrop areas and some areas of the Narrabri Formation and irrigation and drinking water supply for some portions of the Gunnedah Formation.

Marginal exceedances were identified for some inorganic constituents including sulphate sodium and iron, which are likely to represent natural background groundwater quality, with the exception being the elevated nitrate levels, which may be due to the agricultural applications in the area.

Groundwater analyses for pesticides and herbicide showed concentrations below LORs. Some bores showed TPH concentrations above the LORs. These bores were resampled with both conventional TPH and silica gel clean-up methods and all bores subsequently had TPH concentrations below the LOR. Similarly 7 bores showed BTEX concentrations above the LORs and after resampling 2 remain marginally above the LOR for benzene and 1 above the LOR for toluene. Further BTEX analyses of the bores exceeding LORs are included in the ongoing groundwater sampling program to confirm baseline concentrations and assess possible contamination sources.

9.1.5 Radiocarbon analyses

Observations drawn from the radiocarbon age dating from this and previous studies include:

- A general trend of relatively younger water in the Permian sediment in the elevated areas of the EL becoming older down gradient was observed.
- With the exception of WM0091 which appears anomalous, the age of the groundwater in the Permian sediments underlying the alluvial plains within the EL was typically old ranging from 24,000 to 48,000 years.
- Results from the nested Permian bores show young water at <100 years in the weathered horizon overlying significantly older water underlying fresh Permian coals, suggesting poor vertical hydraulic connection. This pattern is also observed on the fringes of the alluvial plains where younger water in the Narrabri Formation overlies the older water in the Permian sediments again indicating poor hydraulic connection between these two formations.
- The age of the Gunnedah Formation groundwater within the EL ranges from 4,300 years to 30,500 years at WM0291 which is located on the western most extent of the Gunnedah Formation and is considered to have poor connection within the regional Gunnedah Formation palaeochannel deposits to the east.
- The age of Gunnedah Formation groundwater to the east of the EL is typically in the range 2,000 to 4,000 years. This age range increases to between 3,000 and almost 10,000 in the bores to the north east of the EL.
- Gunnedah Formation groundwater to the south of the lease is typically younger at <100 year to 6,000 years. A trend of increasing age down Quirindi Creek is also evident from the Lavitt (1999) data suggesting the headwaters in the Lachlan Fold Belt region to the south east are recharge sources for the alluvial aquifer.
- The results from the Digby Formation groundwater underlying the alluvial plains to the south of the lease indicated an age of 45,600 year suggesting poor connection with the overlying alluvial sediments containing younger water.
- The age of groundwater in the Tertiary basalts at the headwaters of the Mooki River catchment ranges from <100 to 6,500 years and is similar to that observed in the Gunnedah Formation which suggests that the basalts are a recharge source for the alluvial aquifers.



9.2 Recommendations

It is recommended to:

- Undertake a groundwater sampling program on a quarterly basis to establish baseline groundwater quality data and trends.
- Continue to regularly monitor the groundwater levels across the lease to assess groundwater level trends and responses to rainfall and groundwater pumping.
- Additional radiocarbon dating of groundwater in selected bores to further understand the local recharge and discharge processes.
- When accessible install a nested groundwater monitoring bore in the northern Watermark Gully area to establish the properties of the alluvial deposits in this area and groundwater chemistry.

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Appendix A

NoW Registered Bores Summary of Groundwater Quality and Yield Data

NoW Registered Bores Groundwater Chemistry and Yield Data

	Use	Year	Depth (m)	SWL	GW intersections depth (m)	Salinity (ppm)	Yield (L/s)	SWL	Lithology
GW060667	D/S	NA			48.2 - 48.7		0.91	24.4	Basalt
GW065708	D/S	22/12/1988	44.2		43.2 - 44.2		0.6	30.2	
GW901913	D/S	24/04/1995	45.5	29.5	42 - 45.5		0.8	29.5	sand and fine gravel
GW023531	Stock	1/10/1965	97.5		82.9		0.01		Sandstone Grey
GW005925	Stock	1/08/1935	70.1		45.7		0.01	33.5	Coal Water Bearing
GW005925	Stock	1/08/1935	70.1		68.9		0.3	46	Coal Water Bearing
GW026719	Stock	10/01/1965	77.7		60		0.01		Coal small bands
GW900315	D/S	26/02/1995	38.1		30.5 - 31.7	potable	3	9.1	Soft Blue Shale
GW900315	D/S	26/02/1995	38.1		36.3 - 38.1		5		Soft Blue Shale
GW013000	Stock	1/07/1957	90.5		82.3		0.32	68.6	Diorite water supply
GW048823	Stock	1/06/1978	3.1		2.4 - 3.1		0.01	2.1	Sand / gravel
GW034888	D/S	1/10/1972	96.9		88.3 - 95	fresh	0.15	21.9	Sandstone Coarse
GW043983	D/S	1/07/1975	32		24.3 - 24.9	1001 - 3000	0.57	19.8	Shale Broken
GW000045	NK	1/03/1916	25.6		21.3		0.86	4.9	Shale
GW004990	NK	1/01/1900	47.2		36.6	good	0.32	30.5	
GW023767	Stock	1/01/1966	61		31.4 - 33.2	stock	0.06	25.6	Shale sandy
GW000031	NK	1/10/1915	109.1		49.1		0.08	45.7	Coal
GW006006	Stock	1/11/1935	126		125.6	fresh		24.4	Sandstone
GW028435	NK	1/04/1965	96		47.9 - 50.3	V salty	0.76	18.3	Coal
GW027762	Stock	1/02/1967	21.3		16.2 - 17.1	good	0.63	8.5	Sand grey gravel water supply
GW054938	D/S	1/06/1982	39.6		35.7 - 36.3	fresh	1.5	4.5	Gravel water supply
GW020268	D/S		14		12.8 - 13.9		0.25	5.8	Basalt rotten water supply
GW026325	Stock	1/01/1966	38.4		21.9 - 32	>14000		18.95	Coal water supply
GW968721	D/S	21/10/2008	43	10	20-41.5		2	10	sandstone coarse
GW064416	D/S	1/11/1987	54.8		42.5 - 42.8		1.51	40.1	Coal water supply
GW029548	D/S	1/05/1968	61		48.8 - 53.7	V brackish	0.63	5.5	Coal water supply
GW005913	NK	1/07/1935	44.5		40.2	hard	0.25	15.2	Basalt water supply
GW017161	Stock	1/10/1961	43.3		40.8 - 43.2		0.51	12.8	Sandstone water supply
GW015510	Stock	1/01/1961	70.1		23.8 - 33.6	Poor	0.76	12.2	Coal water supply



	Use	Year	Depth (m)	SWL	GW intersections depth (m)	Salinity (ppm)	Yield (L/s)	SWL	Lithology
GW015511	Stock	1/02/1961	43.9		34.1 - 43.9	Poor	0.76	9.1	Coal water supply
GW006066	D/S	1/08/1936	54.9		54.9	v salty		6.1	Sand bands nominal unconsolidated
GW016196	Stock	1/11/1960	48.8		20.1 - 21.9	salty			Clay sand mixed
GW016196	Stock	1/11/1960	48.8		45.7 - 48.7	fair	0.76	3.7	Clay fine sand water supply unconsolidated
GW005795	Stock	1/01/1934	48.8		7.9	salty		7.9	Clay
GW005795	Stock	1/01/1934	48.8		18.3	salty		10.4	Clay water bearing
GW005795	Stock	1/01/1934	48.8		48.7	good	0.4	5.5	Gravel water bearing
GW063745	D/S	1/10/1986	42.7		29.1 - 29.4		0.19	16.8	Conglomerate water supply
GW006083	Stock	1/08/1936	61		44.2		0.15	38.1	Coal water supply
GW063686	Stock	1/10/1986	30.5		28.4 - 29		1.5	14.3	Coal water supply
GW006638	Stock	1/07/1940	54.3		9.8	salty	0.13	8.5	Clay water bearing
GW006638	Stock	1/07/1940	54.3		13.7	salty		8.5	Gravel
GW006638	Stock	1/07/1940	54.3		19.8	salty		8.5	Clay water bearing
GW006638	Stock	1/07/1940	54.3		54.3	fresh		6.1	Clay water bearing
GW006015	D/S	1/02/1936	24.4		22.9	good - stock	0.76	19.8	Sand gravel water supply
GW005843	Stock	1/09/1934	56.7		9.8	salty		4.9	Clay water bearing
GW005843	Stock	1/09/1934	56.7		19.8	salty		4.9	Clay water bearing
GW005843	Stock	1/09/1934	56.7		28.7	salty		23.2	Clay water bearing
GW005843	Stock	1/09/1934	56.7		55.5	fresh		50	Gravel water bearing
GW023366	Stock	1/03/1966	54.9		54.9	10001 - 14000		9.1	Gravel sand water supply
GW016197	Stock	1/08/1959	27.4		25.6		0.7	6.1	Gravel sand water supply
GW037713	D/S irrigation	1/10/1973	Final (64) Drilled (76.2)		60.6 - 63.6	good		13.7	Clay some
GW015504	Stock	1/06/1960	Final (34.7) Drilled (34.8)		29.9	Stock	1.01	4	Sandstone water supply
GW036099	DWE Obs	1/05/1975	Final (67.1) Drilled (91.4)		42.7 - 45.7 57.9 - 60.2	7001-10000 1001-3001			Clay brown, gravel Clay some gravel
GW027087	Irrigation	1/12/1965			35.1 - 36.9	Good		6.1	Gravel Coarse
GW027087	Irrigation	1/12/1965			45.7 - 48.7		30.21	4.9	Gravel free water supply/conglomerate free gravel interlayer

	Use	Year	Depth (m)	SWL	GW intersections depth (m)	Salinity (ppm)	Yield (L/s)	SWL	Lithology
GW028580	Irrigation	NK	52		19.2 - 20.1	Good	29.05	5.8	Sand fine water supply
GW032204	Irrigation	1/01/1938	11.6		10.4 - 11.6	Good	20.21	2.7	Gravel water supply
GW037406	Irrigation	1/01/1973	Final (66.1) Drilled (94.5)		21.9 - 23.1	Good		8.2	Sand gravel water supply
GW037406	Irrigation	1/01/1973	Final (66.1) Drilled (94.5)		32.6 - 42.6	Good		7.9	Sand gravel water supply/clay bands/conglomerate
GW037406	Irrigation	1/01/1973	Final (66.1) Drilled (94.5)		45.1 - 56.3	Good		7.9	Clay/gravel/sand water supply with clay bands and stones
GW037406	Irrigation	1/01/1973	Final (66.1) Drilled (94.5)		59.7 - 64.5	Good		7.9	Clay/sand gravel water supply
GW043862	Stock	1/09/1974	43		42 - 42.9	Good	1.26	11.5	Gravel water supply
GW060086	Irrigation	1/12/1967	44.2		6.7 - 7	Good		6.1	Sand water bearing
					37.8 - 43.9	Good		4.6	Gravel water bearing sand
GW022838	Irrigation	1/06/1965	28.8		5.5 - 6.4	Good	0.02	4.9	Clay soft silty
					21.6 - 25.4	Good	1.14	4.9	Sand some gravel/gravel large some sand
GW028951	Stock	1/01/1967	19.8		15.2-19.8	good stock	0.15	15.2	shale
GW020269	Stock	1/01/1963	47.5		9.1		0.04		conglomerate
GW048834	Stock	1/08/1978	15.2		12.1 - 14.3		1.26	2.4	gravel
GW011455	NK	01/01/1956	15.2			7001-10000			
GW022534	D/S waste disposal	1/07/1964	37.8		30.2 - 30.5		0.13		Fracture water supply
					35.4 - 36.3		0.53	27.4	Sandstone fractured water supply

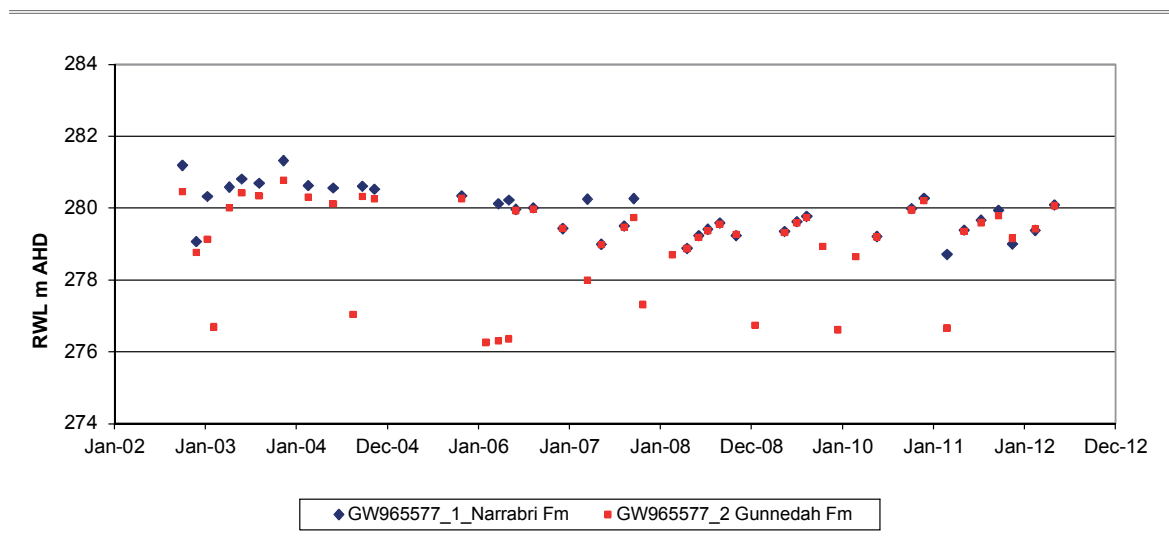
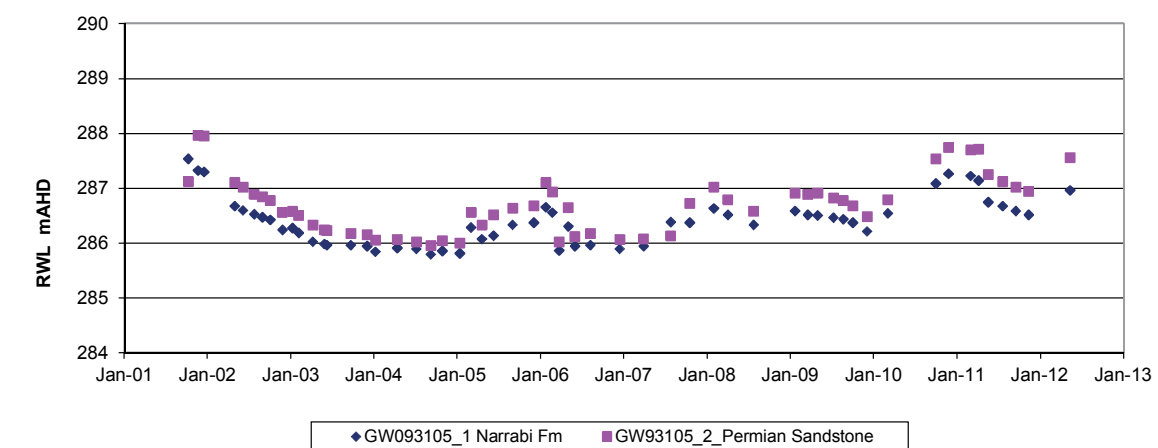
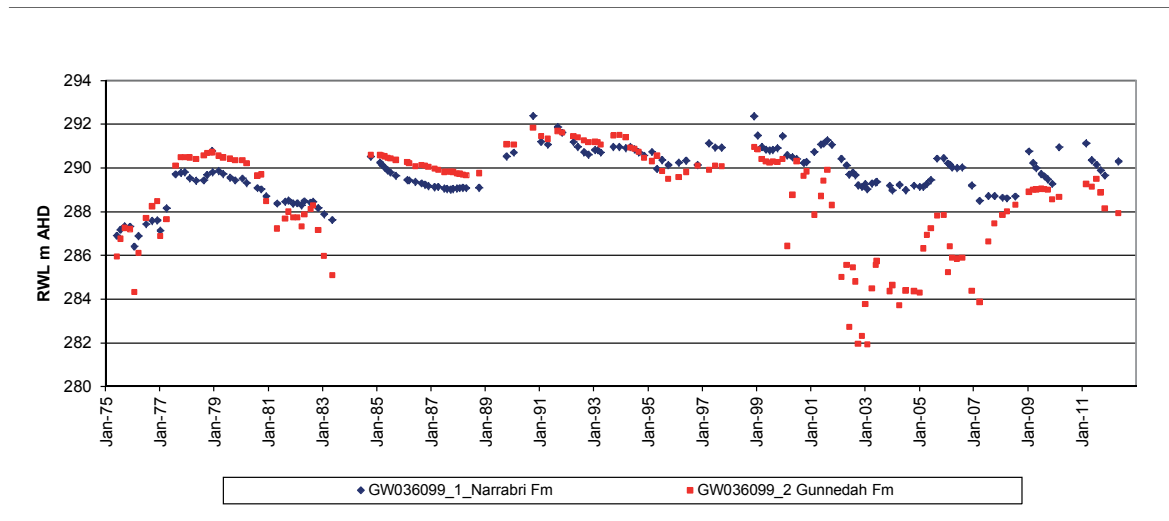
D/S – Domestic and Stock

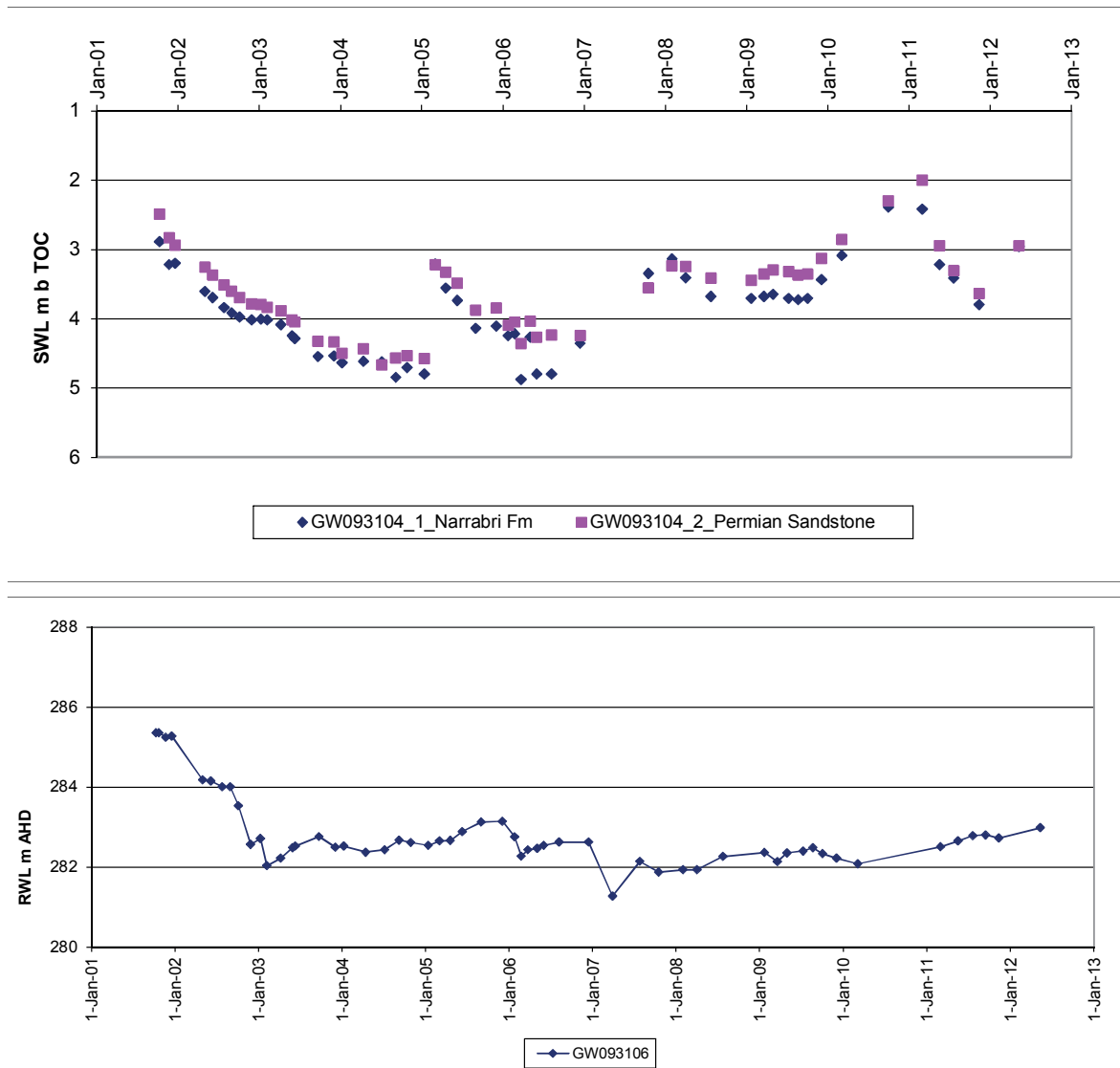
NK – Not Known



Appendix B

NoW Monitoring Bore Hydrographs







Appendix C

NoW Bore Census Summary



Bore Number	Easting	Northing	SWC	Registered use	Updated Use Status	Checked by	Property No.	Date	Total Depth m	GWMA	Comment
Bore Number											
GW000031	251178	6539983	Yes	Unknown	Abandoned	JS	45	1/10/1915	109.1	Gunnedah Basin	
GW000038	250662	6539416	Yes	Unknown	Abandoned	JS	45	1/2/1916	164	Gunnedah Basin	Windmill at house for decoration bore abandoned no pump
GW000045	251659	6540950	Yes	Unknown	Abandoned	GF	40	1/3/1916	25.6	Gunnedah Basin	
GW000043	240954	6539089	NA	Freightlifting (Govt)	Assumed Abandoned	not checked	State Forest	1/6/1917	49.7	Gunnedah Basin	Likely abandoned given age of bore
GW000490	250226	6539960	Yes	Unknown	Abandoned	JS	45	1/1/1900	47.2	Gunnedah Basin	
GW000491	251545	6540489	Yes	listed as Unknown used for stock	Registered in Use	GF	12	1/1/1914	45.7	Gunnedah Basin	refill of older bore advised of location by landowner.
GW000492	250258	6538605	Yes	Unknown	Abandoned	JS	45	1/1/1914	45.7	Gunnedah Basin	
GW000591	242318	6533112	No	Stock	not checked	not checked	20	1/9/1934	56.7	Gunnedah Basin	
GW000592	243795	6535491	Yes	Unknown	Abandoned	GF JS	36	1/7/1935	44.5	Gunnedah Basin	
GW000606	240545	6540620	Yes	Stock	Abandoned	GF JS	34	1/8/1935	70.1	Gunnedah Basin	
GW000606	247676	6542488	Yes	Stock	not checked	not checked	26	1/11/1935	126	Gunnedah Basin	
GW000606	255415	6541099	No	listed as Unknown used for stock	Registered in Use	GF	58	1/1/1956	15.2	Alluvials Zone 3	backlash used for stock and domestic
GW0015504	247946	6533465	No	Stock	not checked	not checked	10	1/6/1960	34.7	Alluvials Zone 7	
GW0015505	247716	6534230	No	Domestic Irrigation Stock	Abandoned	not checked	10	1/5/1960	35.1	Alluvials Zone 7	
GW0015510	245514	6535563	Yes	Stock	Abandoned	GF JS	32	1/1/1961	70.1	Gunnedah Basin	
GW0015511	246009	6535853	Yes	Stock	Abandoned	GF JS	32	1/2/1961	43.9	Gunnedah Basin	
GW0016195	247946	6533465	No	Unknown	not checked	not checked	10	1/5/1961	32.6	Alluvials Zone 7	not on NoW online database, same location GW015504
GW0017161	244740	6535622	Yes	Stock	Abandoned	GF JS	32	1/10/1961	43.3	Gunnedah Basin	
GW0020268	254865	6537450	Yes	Domestic Stock	Registered in Use	GF	11	unknown	14	Alluvials Zone 7	
GW0020269	256380	6538415	Yes	Stock	Registered in Use	GF	12	1/1/1963	47.5	Gunnedah Basin	adjusted location on landowners advise
GW0022350	255148	6537796	Yes	Stock Domestic Irrigation	Registered in Use	GF	11	1/1/1963	17.1	Alluvial Zone 7	close to boundary
GW0022477	255530	6539592	Yes	Stock	Registered in Use	GF	7	1/1/1965	14.3	Gunnedah Basin	
GW0022534	255490	6539036	Yes	Domestic Stock Waste Disposal	Registered irregular Use	GF	7	1/7/1964	37.8	Gunnedah Basin	
GW0022535	255139	6539306	Yes	Stock	Registered in Use	GF	7	1/7/1964	11	Gunnedah Basin	
GW0022923	256826	6541903	No	Irrigation Stock	Registered in Use	GF	58	1/8/1965	18.9	Alluvials Zone 3	
GW0023531	241263	6540514	Yes	Stock	Abandoned	GF JS	34	1/10/1965	97.5	Gunnedah Basin	
GW0023767	250730	6540950	Yes	Stock Reconditioned	Registered in Use	JS	45	1/1/1966	61	Gunnedah Basin	plotted in wrong location in database
GW0026325	252328	6537287	Yes	Stock	Abandoned	GF	48	1/1/1966	38.4	Alluvials Zone 7	decommissioned
GW0026356	252655	6535765	Yes	Stock	Abandoned	GF	48	1/1/1966	45.7	Alluvials Zone 7	not used due to poor water quality
GW0026712	240642	6539913	Yes	Stock	Abandoned	GF JS	34	1/10/1965	45.7	Gunnedah Basin	
GW0027087	254451	6533650	No	Irrigation	Registered not used	GF	17	1/12/1965	53.2	Alluvials Zone 8	Still has pump in bore but not used
GW0027762	250009	6536642	No	Stock	Registered not used	not checked	18	1/2/1967	21.3	Alluvials Zone 7	
GW0028372	254376	6542524	No?	Stock	Abandoned	GF	7	1/1/1950	12.2	Alluvials Zone 3	landowner advised in wrong location (Prop58_b?) or abandoned.
GW0028435	248784	6537152	No	Unknown	Abandoned	not checked	18	1/4/1965	96	Gunnedah Basin	
GW0028442	255714	6541908	No	Domestic	Abandoned	GF	58	1/1/1967	12.2	Alluvials Zone 3	
GW0028580	255750	6533526	No	Irrigation	Abandoned	not checked	13	1/1/1967	52	Alluvials Zone 8	
GW0028767	255033	6533633	No	Irrigation	Registered not used	GF	17	1/1/1961	42.7	Alluvials Zone 8	Not equipped
GW0028951	253310	6541667	Yes	Stock	Registered in Use	GF	40	1/1/1967	19.8	Gunnedah Basin	
GW0028952	253126	6541601	Yes	Stock	Registered in Use	GF	40	1/1/1942	24.7	Gunnedah Basin	Bore drilled into old mine workings
GW0029084	257319	6541205	No	listed as Unknown used for stock	Registered in Use	GF	58	1/10/1967	19.2	Alluvials Zone 3	Advised used as stock bore windmill bore still in use
GW0029360	253643	6540996	Yes	Stock	Registered in Use	GF	37	1/1/1943	36.6	Gunnedah Basin	Bore drilled into old mine workings
GW0029467	247558	6533086	No	Irrigation Stock	Registered in Use	not checked	10	1/2/1967	39.6	Alluvials Zone 7	
GW0029468	247898	6533248	No	Domestic Irrigation Stock	Registered in Use	not checked	10	1/2/1967	64.6	Alluvials Zone 7	
GW0029548	243155	6534612	No	Domestic Stock	Abandoned	not checked	20	1/5/1968	61	Gunnedah Basin	
GW0032204	256206	6535940	No	Irrigation	Registered in Use	GF	43	1/1/1938	11.6	Alluvials Zone 8	Old well now dry no longer used
GW0034888	250920	6540940	Yes	Domestic Stock	Registered in Use	JS	60	1/10/1972	96.9	Gunnedah Basin	
GW0036100	250450	6533864	NA	Monitoring	Abandoned - backfilled	-	13/1975	29.3	Alluvials Zone 7	Listed as backfill on NoW database	
GW0043983	251273	6540478	Yes	Stock	Registered in Use	JS	45	1/7/1975	32	Gunnedah Basin	Listed as backfill on NoW database
GW0044300	249262	6540400	Yes	Stock	Abandoned - backfilled	GF	51	1/2/1975	3.4	Gunnedah Basin	
GW0048823	248430	6540873	Yes	Stock	Abandoned	GF	51	1/6/1978	3.1	Gunnedah Basin	
GW0048834	254539	6542342	Yes	Stock	Registered in Use	GF	7	1/8/1978	15.2	Alluvials Zone 3	
GW0054938	251693	6535200	Yes	Domestic Stock	Registered in Use	GF	48	1/6/1982	39.6	Alluvials Zone 7	Location adjusted advised plotting on wrong side of fence
GW0056979	255480	6541717	No	Test Hole	Abandoned - backfilled	GF	58	1/3/1983	75	Alluvials Zone 3	
GW0060249	249718	6535607	No	Irrigation	Registered in Use	not checked	15	1/1/1962	39.6	Alluvials Zone 7	
GW0060280	249639	6533505	No	Irrigation	Registered not used	not checked	15	1/1/1965	33.5	Alluvials Zone 7	
GW0060667	243398	6540905	Yes	Domestic Stock	Registered not used	MA	48	7/6/1905	52.4	Gunnedah Basin	headworks rusted up SWL 24 m when drilled in 1985
GW0064416	241549	6535343	Yes	Domestic Stock	Registered not used	GF JS	19	1/1/1987	54.8	Gunnedah Basin	
GW0065708	241228	6541931	Yes	Domestic Stock	Registered in Use	GF	42	22/12/1988	44.2	Gunnedah Basin	
GW0093105	254190	6536569	NA	Groundwater Monitoring	Active - Monitoring	-	47	4/7/2001	42	Alluvials Zone 7	
GW0093106	253580	6533581	NA	Groundwater Monitoring	Active - Monitoring	JS	54	30/7/2001	35.5	Alluvials Zone 8	appears to be co-located with D+S bore GW965466
GW0091913	242252	6540852	Yes	Domestic Stock	Registered in Use ?	GF	14	23/1/1997	61	Alluvials Zone 3	used as emergency supply
GW0096466	253580	6533581	No	Domestic Stock	Registered irregular use	not checked	47	6/11/2001	73.2	Alluvials Zone 8	
GW0096567	256198	6533503	NA	Groundwater Monitoring	Active - Monitoring	not checked	30	1/6/2002	65	Alluvials Zone 8	no information
GW00967797	243479	6542193	No	Domestic	Active - Monitoring	not checked	30	1/6/2002	65	Alluvials Zone 8	
GW00968721	249562	6535398	No	Domestic Stock	Not Registered in Use	not checked	18	2/1/10/2008	43	Alluvials Zone 7	used for stock supply
AFrame house bore	253252	6541260	No ?	Domestic	Not Registered in Use	GF	57	unknown	unknown	Gunnedah Basin	windmill closer to house
Property 12_a	255160	6540200	Yes	Domestic	Not Registered in Use	GF	12	unknown	unknown	Gunnedah Basin	windmill
Property 12_b	255445	6540120	Yes	Stock	Not Registered in Use	GF	12	unknown	unknown	Gunnedah Basin	windmill
Property 58_a	255225	6540800	No	Stock and Domestic	Not Registered in Use	GF	58	unknown	unknown	Alluvials Zone 3	stock and domestic on house block
Property 58_b	256360	6541535	No	Stock and Domestic	Not Registered in Use	GF	58	unknown	unknown	Alluvials Zone 3	may be GW28372 plotted incorrectly
Property 58_b	253985	6536950	No	Irrigation ? Stock	Not Registered in Use	GF	8	unknown	unknown	Alluvials Zone 7	
Key				Landowner advised of updated bore location							



Appendix D

Seep / Soak Inspection Photos



Pigs Wallow Coordinates E 243911 N 6538759



Wallaby Soak E 243831 N 6538154



Yarraman Creek E 246657 N 6535641



Property 36 Soak E 244487 N 6535543



Property 36 Soak E 244487 N 6535543



Property 19 Spring Fed Dam E 243227 N 6535286



Property 19 Spring Fed Dam E 243227 N 6535286



Appendix E

Watermark Groundwater Bore Construction Summary



Groundwater Bore Construction Summary

30 June 2012

Bore ID	Easting	Northing	Ground Level (mAHD)	Date Completed	Screen/Piezo Depth (mbgl)	Install Code	Formation Monitored	NoW Bore Licence Number	NoW Groundwater Number
WM0002	245939.58	6534838.04	294.23	30/04/2010	45 - 48 85.4 102	s01 v02 v01	Weathered CLR Sandstone Interburden Melvilles Coal	90BL255143	GW969524
WM0002A	245940.11	6534842.23	294.20	1/05/2010	15.7 - 18.7	s01	Narrabri Fm	90BL255288	GW969525
WM0009R	250504.20	6537999.23	299.15	24/02/2010	45.2 - 48.2	s01	Melvilles Coal	90BL255149	GW969527
WM0009B	250503.45	6537994.17	299.10	17/05/2010	16 - 22	s01	Weathered Interburden	90BL255162	GW969526
WM0011	250889.76	6535326.25	293.06	7/05/2010	6.5 - 9.5	s01	Narrabri Fm	90BL255295	GW969719
WM0011A	250877.01	6535328.36	292.63	4/04/2011	43 - 47	s01	Weathered Interburden	90BL255913	GW970096
WM0012	252096.52	6536479.46	292.20	5/04/2010	33 - 45 66 94	s01 v02 v01	Hoskissons Coal Interburden Melvilles Coal	90BL255159	GW969529
WM0012A	252051.79	6536577.34	293.02	8/04/2010	17 - 23	s01	Weathered CLR Sandstone	90BL255291	GW969528
WM0014	252501.59	6538498.16	302.77	11/04/2010	71 79	v02 v01	Melvilles Coal Pamboola Fm below Melville inc Ben Coal Seam	90BL255576	GW969721
WM0019L	245712.49	6536794.96	327.92	4/03/2011	84 - 90	s01	Melvilles Coal / Interburden	90BL255715	GW969744
WM0021	244515.69	6536073.65	348.85	25/08/2009	55 - 67 118.3	s01 v02	Benelabri Fm above CLR (inc Howes Hill Coal/CLR2 Conglomerate) Hoskissons Coal	90BL255146	GW969466
WM0029	243352.40	6538071.31	350.05	30/09/2009	23.3 - 29.3 (dry) 82	s01 v03	Weathered Benelabri Fm above CLR Hoskissons Coal	90BL255142	GW969467
WM0035A	243544.65	6539434.00	327.47	22/09/2009	29.7 - 36.5	s01	Local Palaeochannel Deposit	90BL255155	GW969468
WM0036C	243526.62	6539999.41	342.39	7/04/2011	68.0 - 74.0	s01	Fractured Interburden	90BL255712	GW969729
WM0036L	243509.56	6539991.30	341.55	28/03/2011	50.5 - 53.5 68.0 - 74.0	s01	Fractured Interburden	90BL255716	GW969751
WM0038L	243503.90	6541016.85	342.29	31/05/2011	80.45 - 83.45	s01	Melvilles Coal	90BL255911	GW970210
WM0042A	245487.26	6541952.45	316.68	6/11/2009	32 - 38	s01	Watermark Fm	90BL255147	GW969469



Bore ID	Easting	Northing	Ground Level (mAHD)	Date Completed	Screen/Piezo Depth (mbgl)	Install Code	Formation Monitored	NoW Bore Licence Number	NoW Groundwater Number
WM0045	244789.67	6544073.33	360.66	6/09/2009	20 - 29	s01	Pamboola Fm below Melvilles including Ben Seam	90BL255148	GW969655
WM0055	250480.87	6538989.93	314.62	21/09/2009	28 - 31	s01	Melvilles Coal	90BL255164	GW969471
WM0055A	250486.07	6538988.21	314.65	22/09/2009	12 - 15	s01	Weathered Interburden	90BL255163	GW969470
WM0059	252486.53	6541474.42	319.09	22/08/2009	17 - 20	s01	Interburden	90BL255150	GW969472
WM0060LR	251502.04	6540667.47	339.66	11/03/2011	40 - 55	s01	Interburden inc. F, E & D Coal seams	90BL255709	GW969740
WM0062	253551.22	6540114.51	317.06	19/09/2009	46.8 - 48.8 73.5 95	s01 v02 v01	Interburden inc. F Coal seam Interburden Melvilles Coal	90BL255151	GW969473
WM0063L	252505.73	65394965.98	306.85	21/04/2011	33.8 - 39.8 49.8 - 73.8	s01	Fractured Interburden Interburden and Melvilles Coal	90BL255912	GW969753
WM0067A	241599.40	6535286.80	312.55	8/12/2009	32.9 - 45.2	s01	Digby Fm	90BL255152	GW969656
WM0091	252516.38	6535139.36	292.54	19/05/2011	55 - 61 69.6	s01 v01	Hoskissons Coal Interburden	90BL255156	GW969766
WM0091A	252509.02	6535097.78	292.55	14/04/2011	32 - 35	s01	Narrabri Fm	90BL255285	GW969712
WM0091B	252512.65	6535168.21	292.54	17/03/2011	40.5 - 46.5	s01	Weathered Benelabri Fm below CLR	90BL255586	GW969757
WM0092	252881.66	6536743.99	292.21	20/03/2011	67 - 76	s01	Melvilles, Ben and B2 Coals	90BL255157	GW969755
WM0092A	252909.45	6536741.03	292.21	18/03/2011	13.5 - 16.5	s01	Narrabri Fm	90BL255286	GW969756
WM0093	247374.49	6534087.70	295.22	11/04/2011	75 - 84	s01	Hoskissons Coal	90BL255158	GW969738
WM0093A	247381.47	6534073.93	295.21	12/04/2011	36 - 54	s01	Gunnedah Fm	90BL255287	GW969842
WM0093B	247390.30	6534059.51	295.19	10/03/2011	28 - 35	s01	Narrabri Fm	90BL255588	GW969759
WM0095L	252211.26	6537099.87	296.68	24/03/2011	35 - 50	s01	Interburden	90BL255713	GW969743
WM0105	252531.89	6537981.66	292.37	3/10/2009	21 - 30 70	s01 v01	Interburden inc. D E coal seams Pamboola Fm below Melvilles Coal	90BL255292	GW969716
WM0116	249001.02	6538044.63	295.49	2/04/2010	26 - 32	s01	Watermark Fm	90BL255577	GW969530
WM0157L	251073.13	6539973.15	364.21	8/03/2011	40 - 52	s01	Hoskissons Coal	90BL255719	GW969752
WM0157	251080.21	6539997.32	366.28	30/09/2009	33 - 42 60	s01 v03	Hoskissons Coal Interburden	90BL255293	GW969717
WM0213LA	250468.37	6541551.44	401.48	6/10/2010	89 - 98	s01	Pamboola Fm / Melvilles Coal	90BL255714	GW969745
WM0222A	253483.08	6540973.66	312.57	28/03/2010	13 - 16	s01	Basalt	90BL255160	GW969659
WM0228A	243488.40	6540490.82	341.37	7/06/2012	6.7 - 12.7	s01	Weathered CLR Sandstone	90BL256043	GW970211

Bore ID	Easting	Northing	Ground Level (mAHD)	Date Completed	Screen/Piezo Depth (mbgl)	Install Code	Formation Monitored	NoW Bore Licence Number	NoW Groundwater Number
WM0228B	243487.75	6540484.68	341.37	6/06/2012	18 - 21	s01	Weathered Benelabri Fm below CLR	90BL255042	GW970212
WM0233	244032.06	6539450.74	323.44	23/03/2010	54.5 - 57.5	s01	Melville, Ben Coal Seams	90BL255283	GW969710
WM0233A	244037.54	6539448.10	323.30	24/03/2010	20.5 - 26.5	s01	Interburden inc F coal seam	90BL255284	GW969711
WM0247	244018.65	6540923.39	356.80	21/03/2010	31.4 - 34.4	s01	Hoskissons Coal	90BL255145	GW969976
WM0247A	244018.65	6540923.39	356.78	19/05/2010	78 - 87	s01	Interburden - fault zone	90BL255144	GW969531
WM0256A	245469.12	6538253.16	331.11	18/01/2010	50.8 - 53.8	s01	Melville Coal	90BL255161	GW969660
WM0260A	246132.38	6537339.85	342.97	11/02/2010	44.4 - 47.4	s01	Interburden - fault zone	90BL255290	GW969715
WM0265A	245815.20	6536245.73	309.99	29/05/2012	16 - 22	s01	Weathered CLR Sandstone	90BL256045	GW972013
WM0265B	245805.36	6536247.00	310.22	29/05/2012	26.5 - 28.5	s01	Weathered Benelabri Fm below CLR	90BL256044	GW972014
WM0269	251021.64	6541996.73	322.86	25/01/2010	17.6 - 22.1	s01	Pamboola below Melv inc Ben and B2 Seam	90BL255289	GW969714
WM0278A	245511.51	6535652.28	300.28	2/06/2012	28 - 31	s01	Weathered CLR Sandstone	90BL256046	GW972015
WM0278B	245504.46	6535653.98	300.49	31/05/2012	34 - 37	s01	Weathered Benelabri Fm below CLR	90BL256041	GW972016
WM0288	254939.71	6543035.78	280.52	23/04/2011	61.4 - 70.4	s01	Watermark Fm	90BL255296	GW969720
WM0288A	254941.55	6543045.56	280.50	20/03/2011	35 - 38	s01	Narrabri Fm	90BL255579	GW969722
WM0290	248938.20	6543928.66	285.25	11/04/2010	51.5 - 54.5 63.5 - 66.5	s01	Watermark Fm	90BL255589	GW969724
WM0291	245685.42	6533374.95	296.93	10/06/2010	75.7 - 81.7	s01	Gunnedah Fm	90BL255592	GW969726
WM0291A	245692.78	6533435.35	295.26	18/03/2011	156.5 - 165.5	s01	Hoskissons Coal	90BL255596	GW969760
WM0291B	245696.08	6533461.09	295.25	27/03/2011	88 - 103	s01	Weathered Coogal Gp above Howes Hill Upper Coal	90BL255597	GW969727
WM0293A	242497.21	6540388.59	324.5	25/05/2010	30 - 33	s01	Local Palaeochannel Deposit	90BL255294	GW969718
WM0330R	245457.71	6539932.73	307.47	3/12/2010	37.4 - 43.4	s01	Watermark Fm	90BL255594	GW969746
WM0333	242510.18	6540397.51	324.56	18/08/2010	78 98	v02 v01	Interburden Melville Coal	90BL255154	GW969658
WM0334	252773.37	6543031.90	296.30	27/08/2010	20 - 26	s01	Pamboola Fm below Melville	90BL255590	GW969725
WM0339A	243383.10	6539684.65	330.30	22/03/2011	50 - 53 68 - 74	s01	Fractured Interburden	90BL255917	GW969754
WM0350	253508.39	6538545.02	292.32	24/09/2010	19.8 - 23.8 90 48	s01 v01 v02	Dolerite Melville Coal Interburden	90BL255584	GW969748



Bore ID	Easting	Northing	Ground Level (mAHD)	Date Completed	Screen/Piezo Depth (mbgl)	Install Code	Formation Monitored	NoW Bore Licence Number	NoW Groundwater Number
WM0360	254863.19	6542460.40	280.72	1/04/2011	31 - 37	s01	Pamboola Fm	90BL255583	GW969723
WM0361	251627.66	6543026.90	290.53	1/09/2010	28 - 34	s01	Pamboola Fm below Melvilles	90BL255591	GW969741
WM0362	251624.93	6543012.00	290.70	3/09/2010	59.2 - 65.2	s01	Watermark Fm	90BL255585	GW969739
WM0363	246124.98	6535835.00	298.09	13/03/2011	17.8 - 32.8	s01	Weathered Benelabri Fm below CLR	90BL255710	GW969742
WM0363A	246126.18	6535841.48	298.23	13/03/2011	18 - 33	s01	Weathered Benelabri Fm below CLR	90BL255587	GW969758
WM0364	244379.53	6534418.02	295.04	14/03/2011	19 - 29	s01	Weathered Coogal Gp above Howes Hill Upper Coal	90BL255711	GW969728
WM0365	247650.57	6535599.53	293.32	15/03/2011	10 - 18	s01	Narrabri Fm	90BL255717	GW969730
WM0398	243021.01	6535067.14	310.75	30/11/2010	68 - 74	s01	Wallala Fm	90BL255581	GW969750
WM0414	245336.76	6539037.89	317.97	29/11/2010	148 - 160	s01	Porcupine Fm - fault zone	90BL255578	GW969747
WM0421	245121.43	6535225.38	296.01	10/12/2010	50 - 59	s01	Fresh CLR Sandstone	90BL255582	GW969761
WM0422	245447.56	6539935.38	307.58	6/12/2010	15 - 20	s01	Weathered Watermark Fm	90BL255580	GW969749
WM0424	245741.99	6533883.24	294.85	7/04/2011	31 - 37	s01	Narrabri Fm	90BL255919	GW969704
WM0425	245815.93	6534447.84	294.57	9/04/2011	34 - 37	s01	Weathered CLR Sandstone	90BL255907	GW969701
WM0425A	245817.84	6534459.39	294.61	10/04/2011	24 - 30	s01	Narrabri Fm	90BL255908	GW969702
WM0426	245955.05	6535339.47	294.46	13/04/2011	21.5 - 27.5	s01	Weathered CLR Sandstone	90BL255905	GW969732
WM0426A	245 948.19	6535335.96	294.49	14/04/2011	11 - 14	s01	Narrabri Fm	90BL255906	GW969709
WM0427	254097.83	6535126.81	293.11	18/04/2011	72 - 78	s01	Weathered Interburden	90BL255909	GW969700
WM0427A	254120.76	6535123.80	293.13	20/04/2011	38 - 44	s01	Gunnedah Fm	90BL255910	GW969703
WM0428	254016.32	6543554.74	279.65	29/04/2011	60 - 66	s01	Weathered Watermark Fm	90BL255718	GW969731
WM0428A	254014.61	6543540.44	279.61	1/05/2011	14 - 26	s01	Narrabri Fm	90BL255918	GW969762
WM0429	245619.4	6535120.25	294.62	8/05/2011	39 - 42	s01	Weathered CLR Sandstone	90BL255936	GW969705
WM0429A	245615.15	6535117.29	294.60	9/05/2011	7 - 10	s01	Narrabri Fm	90BL255937	GW969706
WM0430	246321.62	6535365.64	294.10	6/05/2011	20 - 23	s01	Weathered CLR Sandstone	90BL255938	GW969707
WM0430A	246316.75	6535363.43	294.09	7/05/2011	4 - 7	s01	Narrabri Fm	90BL255939	GW969708
WM0431	246859.17	6535623.38	293.73	5/05/2011	18.5 - 21.5	s01	Weathered Benelabri Fm below CLR	90BL255940	GW969733
WM0431A	246 863.92	6535625.24	293.62	5/05/2011	3.5 - 6.5	s01	Narrabri Fm	90BL255941	GW969734
WM0432	252490.03	6537653.28	292.07	30/04/2011	21 - 24	s01	Weathered Interburden	90BL255942	GW969735
WM0432A	252494.57	6537654.93	292.06	1/05/2011	10 - 13	s01	Narrabri Fm	90BL255943	GW969736

Bore ID	Easting	Northing	Ground Level (mAHD)	Date Completed	Screen/Piezo Depth (mbgl)	Install Code	Formation Monitored	NoW Bore Licence Number	NoW Groundwater Number
WM0433	253430.24	6538207.41	291.84	2/05/2011	11 - 14	s01	Narrabri Fm	90BL255944	GW969737
WM0492	243041.28	6543985.48	380.49	6/08/2011	315	v03	Porcupine Fm	90BL255948	GW969765
					393	v02	Maules Ck Fm		
					418	v01	Maules Ck Lower Coal		
WM0510	249000.25	6543702.24	288.86	12/08/2011	214	v03	Porcupine Fm	90BL255946	GW969764
					253	v02	Maules Ck Middle Coal		
					282	v01	Leard Formation		
WM0514	246002.08	6541296.27	302.90	18/08/2011	280	v03	Porcupine Fm	90BL255947	GW969767
					319	v02	Maules Ck Fm		
					329.5	v01	Maules Ck Lower Coal		
WM0561	259162.41	6543598.83	283.60	28/09/2011	88.7 – 94.7	s01	Weathered Watermark Fm	90BL255999	GW970189
WM0562	259159.72	6543603.12	283.65	10/10/2011	82.5 – 85.5	s01	Gunnedah Fm (base)	90BL255997	GW969696
WM0563	259162.02	6543605.60	283.65	14/10/2011	54 - 63	s01	Gunnedah Fm	90BL255998	GW969763
WM0655	255931.27	6539929.57	303.26	19/06/2012	495	v01	Maules Ck Lower Coal	90BL256059	GW970219
					451	v02	Maules Ck Upper Coal		
					400	v03	Porcupine Fm		
WM0665	259166.15	6543600.90	283.68	24/05/2012	109 - 115	s01	Fresh Watermark Fm	90BL256047	GW970217
WM0675	240985.94	6539025.85	366.43	19/06/2012	239	v01	Melville's Coal	90BL256058	GW970218
					184	v02	Hoskissons Coal		
					168	v03	Benelabri Fm below CLR Sandstone		

Easting and Northings in MGA (94) Zone 56 and elevation in AHD71



Appendix F

Watermark Borehole Logs



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0002

Page: 1 of 5

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 12/04/2010

Drill Co: GOS
Driller: Haydn Brunt
NOW Groundwater Licence #: 90BL255143
Total Depth (m): 122

Easting: 245939.58 **Northing:** 6534838.04 **Elevation:** 294.23
Licensed Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: TG

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
			CLAY brown, stiff		
			CLAY massive brown, stiff with orange mottles		
			CLAY brown, stiff		
			CLAY grey-brown		
			silty CLAY brown-grey, rare sand grains		
			silty CLAY brown, rare lithic chert, rounded, black, fine gravel and shell fragments, rounded ~2mm		
8			silty CLAY brown, some rounded small gravels, more angular shell fragments, sandy in zones		
			sandy CLAY light grey-brown		
			CLAY rounded chert, black lithics and shell fragments		
			sandy CLAY brown-grey, minor rounded lithics		
			sandy CLAY as above with minor chert lithics ~3mm		
			sandy CLAY as above with some rounded lithics		
			sandy CLAY dense with minor gravels		
			silty CLAY brown-grey, minor rounded red lithics		
			silty sandy CLAY brown-orange		
18			sandy SILT orange-brown, angular quartz, green and red lithics		
			sandy SILT orange-brown, with minor small gravels		
			sandy SILT orange-brown, with angular lithics, red and quartz		
			sandy SILT orange-brown, angular, fine to medium grained sands and lithics		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):

**BOREHOLE LOG**

Groundwater Installation

Bore No.: WM0002

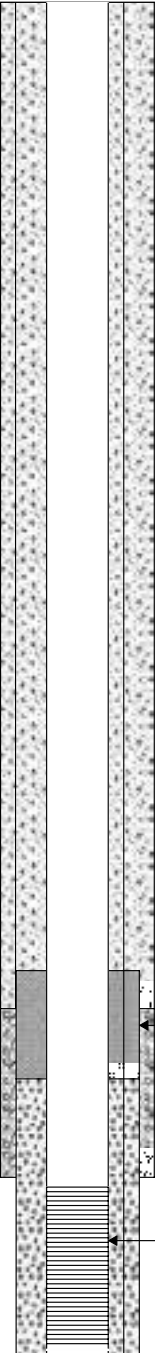
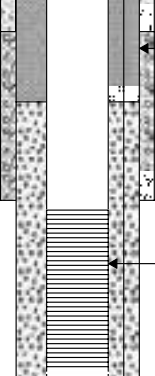
Page: 2 of 5

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 12/04/2010

Drill Co: GOS
Driller: Haydn Brunt
NOW Groundwater Licence #: 90BL255143
Total Depth (m): 122

Easting: 245939.58 **Northing:** 6534838.04 **Elevation:** 294.23
Licensed Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: TG

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			silty SAND orange-brown		
			silty SAND light orange-brown		
			silty SAND light brown-orange, fine grained, quartz and lithics		
			SAND light brown-cream, fine gravel, silty, common coarse grained lithics		
			SAND light brown, fine to medium grained, loose, rounded to angular		
			SAND light brown, fine to coarse grain, angular, common orange-brown shelly fragments		
			SANDSTONE light brown, fine grain, common coarse lithics, angular		
			SANDSTONE light brown, fine to medium grained, common coarse lithics, dark grey subrounded quartz		
33			SANDSTONE light brown, fine to coarse grained, quartz lithics, subrounded quartz, angular lithics		
			SANDSTONE light brown, fine to medium grained, quartz lithics, fine to medium grained, sub rounded, subangular		CLR
			SAND fine grained, silty, pale grey lithics, subrounded/subangular, pale-dark orange lithics		
43			SAND medium grained, clean, quartz, subrounded/subangular, pale orange-brown lithics		
			SANDSTONE quartz-lithic, slightly weathered rock, fine to medium grained, orange, moderately hard		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0002

Page: 3 of 5

Client: Shenhua Watermark Coal P/L
 Project: Shenhua Watermark Project No.: EL7223
 Location: Watermark, Gunnedah, NSW, Australia
 Date Drilled: 12/04/2010

Drill Co: GOS
 Driller: Haydn Brunt
 NOW Groundwater Licence #: 90BL255143
 Total Depth (m): 122

Easting: 245939.58 Northing: 6534838.04 Elevation: 294.23
 Licenced Driller: Phillip Gaffney
 Grid Ref: MGA94 Zone 56 Vertical: AHD
 Logged by: TG

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			CLAYSTONE carbonaceous, fresh rock, hard, broken in part		
			COAL fresh rock, moderately soft SANDSTONE fresh rock, very fine grained, light grey, hard		
			CLAYSTONE fresh rock, grey, hard COAL fresh rock, black, hard		HKU
58			Carbonaceous MUDSTONE fresh rock, dark grey to black, moderately soft		HKL
			SILTSTONE slightly carbonaceous, fresh rock, grey, hard		
			SILTSTONE fine sandy throughout, fresh rock, grey, hard		
			COAL with some claystone inclusions		F
68			SANDSTONE with siltstone, fresh rock, very fine grained, light grey-grey, hard		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):

**BOREHOLE LOG**

Groundwater Installation

Bore No.: WM0002

Page: 4 of 5

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 12/04/2010

Drill Co: GOS
Driller: Haydn Brunt
NOW Groundwater Licence #: 90BL255143
Total Depth (m): 122

Easting: 245939.58 **Northing:** 6534838.04 **Elevation:** 294.23
Licensed Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: TG

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			SANDSTONE fresh rock, fine grained, grey, hard	40mmNB uPVC carrier pipe(CI.18) Threaded, in 6m lengths	
			SANDSTONE minor silty lithic, fresh rock, fine to medium grained, grey, hard		
			COAL fresh rock, black, moderately soft		
			SILTSTONE fine sandy throughout, fresh rock, light grey, hard		E
			SANDSTONE silty, fresh rock, fine grained, dark grey, hard, coaly wisps CLAYSTONE fresh rock, black, hard, silty		
83			SANDSTONE minor silty banded, fresh rock, fine grained, light grey, hard, coaly fragments	10% Bentonite-Cement Grout	
			SANDSTONE fresh rock, light grey, hard, silty	Vibrating Wire Piezometer (V2) at 84.5m. SN#: 12224 Zero rdg: 9057 @26'C	
			CLAYSTONE carbonaceous lithic throughout, fresh rock, grey, hard, coaly lamellae		
			SILTSTONE fine sandy throughout, fresh rock, grey, hard		
93			COAL fresh rock, black, moderately hard		C
			CLAYSTONE slightly carbonaceous, fresh rock, grey, hard		
			SANDSTONE carbonaceous laminae towards top of unit, fresh rock, grey, hard, coaly lamellae		B
			SANDSTONE with siltstone, fresh rock, fine grained, light grey, hard, coaly fragments		A

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0002

Page: 5 of 5

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 12/04/2010

Drill Co: GOS
Driller: Haydn Brunt
NOW Groundwater Licence #: 90BL255143
Total Depth (m): 122

Easting: 245939.58 **Northing:** 6534838.04 **Elevation:** 294.23
Licensed Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: TG

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			COAL fresh rock, black, moderately soft, with siltstone and mudstone CLAYSTONE silty and sandy throughout, fresh rock, light grey, hard Carbonaceous MUDSTONE coaly banded, fresh rock, brown, moderately soft, with trace sand and siltstone SANDSTONE calcareous, fresh rock, fine grained, light grey, hard, coaly wisps, indurated	Vibrating Wire Piezometer (V1) at 102m. SN#: 12049 Zero rdg: 8830 @21°C Grouting holes in carrier pipe PVC End cap	MV
108			END OF BOREHOLE @ 114.74m bgl		
118				V1 initial: 6905 @ 22°C V1 coeff: 0.55190 V2 initial: 6115 @ 22°C V2 coeff: 0.28710	

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0002A

Page: 1 of 1

Client: Shenhua Watermark Coal P/L

Project: Shenhua Watermark Project No.: EL7223

Location: Watermark, Gunnedah, NSW, Australia

Date Drilled: 30/04/2010

Drill Co: GOS

Driller: Haydn Brunt

NOW Groundwater Licence #: 90BL255288

Total Depth (m): 21.5

Easting: 245940.11

Licensed Driller: Phillip Gaffney

Grid Ref: MGA94 Zone 56 Vertical: AHD

Logged by: TG

Northing: 6534842.23

Elevation: 294.2

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
			CLAY brown, stiff	top 3m section not threaded. Joined and glued with PVC socket	
			CLAY massive brown, stiff with orange mottles		
			CLAY brown, stiff	50mm NB ID Cl.18 uPVC Casing threaded, in 3m lengths	
			CLAY grey-brown	Bentonite - Cement Grout 3%	
			silty CLAY brown-grey colour, rare sand grains		
			silty CLAY brown, rare lithic chert, rounded, black, fine gravel and shell fragments, rounded ~2mm		
8			silty CLAY brown, some rounded small gravels, more angular shell fragments, sandy in zones		
			sandy CLAY light grey-brown		
			CLAY rounded chert, black lithics and shell fragments		
			sandy CLAY brown-grey, minor rounded lithics		
			sandy CLAY as above with minor chert lithics ~3mm		
			sandy CLAY as above with some rounded lithics		
			sandy CLAY dense with minor gravels	Bentonite pellets (1/4") Seal	
			silty CLAY brown-grey, minor rounded red lithics	Gravel Pack 1-2mm, washed gravel	
			silty sandy CLAY brown-orange	50mm NB ID Cl. 18 uPVC threaded slotted casing. 0.4mm aperture	
18			sandy SLT orange-brown, angular quartz, green and red lithics	1m PVC Sump w/ threaded endcap specs as per upper casing	
			sandy SLT orange-brown, with minor small gravels		
			SANDSTONE clayey gravelly, distinctly weathered rock, medium to coarse grained, brown	Hole Collapse back to 19.7m	
			END OF BOREHOLE @ 21.5m bgl		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0009B

Page: 1 of 1

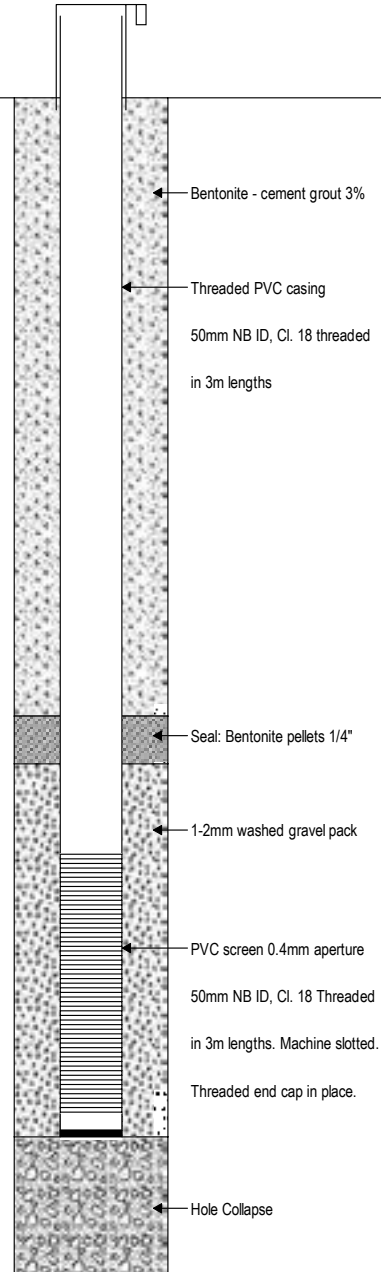
Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 16/05/2010

Drill Co: GOS
Driller: Shane Evans
NOW Groundwater Licence #: 90BL255162
Total Depth (m): 25

Easting: 250503.45 **Northing:** 6537994.17 **Elevation:** 299.1
Licensed Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: GHD

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
	Rotary wash boring		silty CLAY red brown		
8			sandy SILT medium grey to light grey, with clay		
			SILT light grey with clay		
	Rotary triple tube coring		CLAYSTONE light brown		
18			MUDSTONE dark grey		
			GRAVEL subrounded, ranging 10-40mm, with clay SILTSTONE with sandstone		
			Core Loss		
			SILTSTONE		
			SANDSTONE		
			END OF BOREHOLE @ 25m bgl		



NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0009R

Page: 1 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 22/02/2010

Drill Co: GOS
Driller: Shane Evans
NOW Groundwater Licence #: 90BL255149
Total Depth (m): 50.2

Easting: 250504.2 Northing: 6537999.23 Elevation: 299.15
Licenced Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: GHD

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface silty CLAY red brown		
	Rotary wash boring		sandy SLT medium grey to light grey, with clay		
8			SLT light grey with clay		
	Rotary triple tube coring		CORE LOSS		
			CLAYSTONE light brown		
18			MUDSTONE dark grey		
			GRAVEL subrounded, ranging 10-40mm, with clay		
			SLTSTONE with sandstone		
			CONGLOMERATE		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0009R

Page: 2 of 2

Client: Shenhua Watermark Coal P/L
 Project: Shenhua Watermark Project No.: EL7223
 Location: Watermark, Gunnedah, NSW, Australia
 Date Drilled: 22/02/2010

Drill Co: GOS
 Driller: Shane Evans
 NOW Groundwater Licence #: 90BL255149
 Total Depth (m): 50.2

Easting: 250504.2 Northing: 6537999.23 Elevation: 299.15
 Licenced Driller: Phillip Gaffney
 Grid Ref: MGA94 Zone 56 Vertical: AHD
 Logged by: GHD

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			MUDSTONE dark-medium grey, carbonaceous COAL MUDSTONE COAL MUDSTONE COAL MUDSTONE SANDSTONE light grey, fine grained, highly weathered SILTSTONE moderate grey, medium to slightly weathered COAL SILTSTONE moderate grey, minor coal slivers with some fragments of coal and finely embedded sandstone COAL with some sandstone	Gravel and Backfill (Bridge) Seal: Bentonite chips 1/4" Gravel Pack: 1-2mm gravel Screen: 50mm NB uPVC CL18 machine slotted 0.4mm slots threaded, in 3m lengths. Threaded Endcap fitted.	D B MV
35					
45					
			END OF BOREHOLE @ 50.2m bgl		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0011

Page: 1 of 1

Client: Shenhua Watermark Coal P/L

Project: Shenhua Watermark Project No.: EL7223

Location: Watermark, Gunnedah, NSW, Australia

Date Drilled: 20/04/2010

Drill Co: GOS

Driller: Greg Pryor

NOW Groundwater Licence #: 90BL255295

Total Depth (m): 55.1

Easting: 250889.76

Northing: 6535326.25

Elevation: 293.06

Licensed Driller: Phillip Gaffney

Grid Ref: MGA94 Zone 56 Vertical: AHD

Logged by: BSR

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
			TOPSOIL dark brown clay, no coarse fraction, sticky, dense		
			sandy gravelly CLAY dark brown, soft sticky, quartz gravels of up to 3mm, lithics (pink, green, white) up to 3mm	Casing: 50mm NB uPVC Cl.18 threaded in 3m lengths	
			sandy CLAY dark grey-brown, soft, sticky	Bentonite - cement grout 3%	
			CLAY dark grey-brown, trace quartz gravel and pinkish brown lithics 1-2mm	Seal: Bentonite Pellets 1/4"	
			CLAY no gravel/sand fraction	Washed gravel pack 1-2mm	
			CLAY trace coarse gravel, rounded	Screen: 50mm NB uPVC. Cl.18	
8			CLAY Dark grey-blue/black rounded lithics 5mm, very large	Machine slotted 0.4mm aperture	
			CLAY very sticky and cohesive, contains traces of very angular white chips	threaded end cap fitted	
			CLAY brown to grey, slight moisture - stiff	Seal: Bentonite Pellets 1/4"	
			CLAY brown, moist - wet, very stiff. Trace very fine grained sand		
			sandy CLAY brown, fine grained sand, moist-wet, very stiff		
18			CLAY brown, wet, very stiff, trace fine grained sand		
			sandy CLAY brown, fine grained sand, dry - slightly moist, very stiff to stiff		
				Bentonite - cement grout 3%	
				Partial Hole Collapse	
				EOH at 61.2m bgl, hole backfilled with cement-bentonite-grout	

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0011A

Page: 1 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 02/04/2011

Drill Co: Boart Longyear
Driller: Gavin Keith
NOW Groundwater Licence #: 90BL255913
Total Depth (m): 55

Easting: 250877.01 **Northing:** 6535328.36 **Elevation:** 293.06
Licensed Driller: Paul Griffiths
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: TC

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
	Sonic Core		TOPSOIL dark brown clay, no coarse fraction, sticky, dense sandy gravelly CLAY dark brown, soft sticky, quartz gravels of up to 3mm, lithics (pink, green, white) up to 3mm sandy CLAY dark grey-brown, soft, sticky CLAY dark grey-brown, trace quartz gravel and pinkish brown lithics 1-2mm CLAY no gravel/sand fraction CLAY trace coarse gravel, rounded CLAY Dark grey-blue/black rounded lithics 5mm, very large CLAY very sticky and cohesive, contains traces of very angular white chips CLAY brown to grey, slight moisture - stiff silty CLAY brown, moist - wet, very stiff. Trace very fine grained sand sandy CLAY brown, fine grained sand, moist-wet, very stiff silty CLAY brown, wet, very stiff, trace fine grained sand sandy CLAY brown, fine grained sand, dry - slightly moist, very stiff to stiff sandy gravelly CLAY brown, medium plasticity, dry to slightly moist, stiff to very stiff. fine grained sand, gravels less than 20mm, sub angular, red silty CLAY brown, medium plasticity, trace fine grained sand, dry, very stiff sandy CLAY brown, highly plastic, very fine grained sand, trace angular gravel frags < 10mm (weathered siltstone?) wet, very stiff	Casing: 50mm NB uPVC Cl.18 threaded in 3m lengths	QN
8					
18					
28					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0011A

Page: 2 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 02/04/2011

Drill Co: Boart Longyear
Driller: Gavin Keith
NOW Groundwater Licence #: 90BL255913
Total Depth (m): 55

Easting: 250877.01 Northing: 6535328.36 Elevation: 293.06
Licenced Driller: Paul Griffiths
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: TC

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
38			silty CLAY brown, with gravels, < 10mm, sub rounded to sub angular, fine grain polished with fine grained sand SILTSTONE extremely weathered, light grey, with abundant sandy clay, medium plasticity, fine grained sand, rock frags < 70 mm silty CLAY brown, with fine grain sand, with gravels, sub rounded, < 15mm, red-ochre, fine grained polished sandy CLAY brown, with orange and light grey mottling, medium plasticity, fine to medium grained sand with gravels < 40mm, fine gravel polished, sub angular to sub rounded	Bentonite - cement grout 3% Seal: Bentonite Pellets 1/4" Screen: 50mm NB uPVC. Cl.18 Machine slotted 0.4mm aperture Washed gravel pack 1-2mm threaded end cap fitted	
48			SILTSTONE extremely weathered, light grey to white, mottled orange. Weathered to silty clay medium plasticity, dry to moist, friable highly weathered light grey - white friable, dry and hard SILTSTONE extremely weathered, brown with orange and off white mottling, dry, hard to very stiff		
58			END OF BOREHOLE @ 55m bgl		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0012

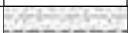
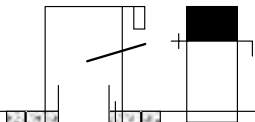
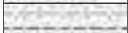
Page: 1 of 5

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 2/04/2010

Drill Co: GOS
Driller: Steve Twigden
NOW Groundwater Licence #: 90BL255159
Total Depth (m): 108.44

Easting: 252096.52 **Northing:** 6536479.46
Licenced Driller: Phillip Gaffney
Grid Ref: MGA94 **Zone 56 Vertical:** AHD
Logged by: TG

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
			silty SAND red-brown		
			silty SAND light grey-brown, medium-coarse grained		
			silty SAND light grey-brown, coarse grained		
			SAND light grey-brown, fine-medium grained		
8			silty SAND light grey-yellow brown, fine-medium grained	Steel surface casing	
			silty SAND light grey-brown, fine-medium grained	Cement with bentonite	
18			silty SAND light grey-brown, fine-medium grained		CLR

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):

**BOREHOLE LOG**

Groundwater Installation

Bore No.: WM0012

Page: 2 of 5

Client: Shenhua Watermark Coal P/L

Project: Shenhua Watermark Project No.: EL7223

Location: Watermark, Gunnedah, NSW, Australia

Date Drilled: 2/04/2010

Drill Co: GOS

Driller: Steve Twigden

NOW Groundwater Licence #: 90BL255159

Total Depth (m): 108.44

Easting: 252096.52

Northing: 6536479.46

Elevation: 292.2

Licenced Driller: Phillip Gaffney

Grid Ref: MGA94 Zone 56 Vertical: AHD

Logged by: TG

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			clayey SAND yellow brown, coarse to fine grained		
			clayey SAND grey-brown, fine grained		
			silty SAND brown, fine grained		
			SAND coaly, distinctly weathered rock, coarse grained, cream, dense		
			stony COAL fresh rock, black		
			SLTSTONE sandy lenses, fresh rock, grey, moderately soft		
			SANDSTONE siliceous banded towards top of unit, fresh rock, fine grained, light grey, hard		
			SLTSTONE carbonaceous lenses with thin sandstone bands, fresh rock, grey, moderately soft		
33			COAL stony towards base of unit, fresh rock, black, moderately soft, brittle, with siltstone and mudstone bands		
			COAL fresh rock, black, moderately soft, interbedded with mudstone (dark grey-black)		HKR
					HKU
43					
					HKL
			SLTSTONE with thin sandstone bands, slightly carbonaceous towards top of unit, fresh rock, light-dark grey, moderately soft		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0012

Page: 3 of 5

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 2/04/2010

Drill Co: GOS
Driller: Steve Twigden
NOW Groundwater Licence #: 90BL255159
Total Depth (m): 108.44

Easting: 252096.52 **Northing:** 6536479.46 **Elevation:** 292.2
Licensed Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: TG

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			SANDSTONE siltstone banded, fresh rock, fine grained, light grey, hard, carbonaceous laminae		
			Carbonaceous MUDSTONE fresh rock, dark grey, moderately hard		
			COAL dull with brights 5% -10%, fresh rock, black, moderately hard		
			Carbonaceous MUDSTONE fresh rock, grey, moderately hard, coaly laminae		
58			COAL fresh rock, black, moderately hard, some mudstone		
			SILT minor carbonaceous laminae, fresh rock, grey, moderately hard		
			Carbonaceous MUDSTONE fresh rock, dark grey to black, moderately hard		
			SANDSTONE coaly lenses towards top of unit, fresh rock, fine grained becoming coarse, light-dark grey, hard, bands of granular conglomerate		
				Cement with bentonite	
				J-Latch backoff joint	
				V2 (SN: 12219) outside of PVC 66m	
68			SANDSTONE litho-feldspathic, fresh rock, fine to medium grained, light grey, moderately hard, coaly wisps		
			Core Loss fresh rock, moderately hard		
			PEBBLE CONGLOMERATE polymictic with minor coaly wisps, fresh rock, pebbly, light grey, moderately hard, broken in part		
			COAL fresh rock, black, soft, some mudstone and sandstone banding		
					G
					F

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0012

Page: 4 of 5

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 2/04/2010

Drill Co: GOS
Driller: Steve Twigden
NOW Groundwater Licence #: 90BL255159
Total Depth (m): 108.44

Easting: 252096.52 Northing: 6536479.46 Elevation: 292.2
Licenced Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: TG

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			SILTSTONE sandy, fresh rock, light grey, moderately hard, carbonaceous laminae, broken in part		
			COAL fresh rock, black, soft, some beds of mudstone and siltstone		E
			SILTSTONE sandy, fresh rock, grey, moderately hard, carbonaceous laminae, broken in part		D
83			Carbonaceous MUDSTONE silty lenses towards top of unit, fresh rock, dark grey to black, moderately hard COAL fresh rock, black, soft, some siltstone bedding	Class 18, 40mm NB uPVC casing Threaded, in 3m lengths	B
			SANDSTONE silty towards top of unit towards base of unit, fresh rock, fine grained, light grey, moderately hard, carbonaceous wisps, broken in part		
			Carbonaceous MUDSTONE bands of coal, fresh rock, black, moderately hard, broken SANDSTONE silty banded towards top of unit, fresh rock, fine to medium grained, light grey, moderately hard		
			Carbonaceous SILTSTONE silty towards top of unit, fresh rock, dark grey to black, moderately hard, broken in part SILTSTONE sideritic, fresh rock, brown-grey, moderately hard, broken in part SILTSTONE fresh rock, sandy banded, grey, moderately hard, carbonaceous laminae		
			COAL fresh rock, black, soft SANDSTONE silty carbonaceous towards top of unit, fresh rock, grey, moderately hard, broken in part SANDSTONE silty pebbly banded, fresh rock, very fine-medium grained, light grey, moderately hard		A
93			COAL fresh rock, black, soft, some bands of siltstone and mudstone		
			SANDSTONE silty, fresh rock, fine grained, dark grey SANDSTONE fresh rock, fine grained, grey-brown	V1 (SN: 12051) outside of PVC 94m	MV

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0012

Page: 5 of 5

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 2/04/2010

Drill Co: GOS
Driller: Steve Twigden
NOW Groundwater Licence #: 90BL255159
Total Depth (m): 108.44

Easting: 252096.52 **Northing:** 6536479.46 **Elevation:** 292.2
Licensed Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: TG

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			SILTSTONE sandy towards top of unit with minor coally wisps, fresh rock, grey COAL fresh rock, some siltstone present, dark grey-black SILTSTONE sandy, fresh rock, light-dark grey, carbonaceous fragments SILTSTONE fossiliferous, fresh rock, grey, carbonaceous laminae END OF BOREHOLE @ 108.51m bgl	Grouting holes	BEN
108					
118					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0012A

Page: 1 of 1

Client: Shenhua Watermark Coal P/L

Project: Shenhua Watermark Project No.: EL7223

Location: Watermark, Gunnedah, NSW, Australia

Date Drilled: 5/04/2010

Drill Co: GOS

Driller: Steve Twigden

NOW Groundwater Licence #: 90BL255291

Total Depth (m): 25

Easting: 252051.79

Northing: 6536577.34

Elevation: 293.02

Licensed Driller: Phillip Gaffney

Grid Ref: MGA94 Zone 56 Vertical: AHD

Logged by: AF

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
			stly SAND red-brown		
			stly SAND light grey-brown, medium-coarse grained		
			stly SAND light grey-brown, coarse grained		
			SAND light grey-brown, fine-medium grained		
8			stly SAND light grey-yellow brown, fine-medium grained		
			stly SAND light grey-brown, fine-medium grained		
18			clayey SAND yellow brown, coarse to fine grained		
			clayey SAND grey-brown, fine grained		
			SILTSTONE		
			END OF BOREHOLE @ 25m bgl		
28					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0014

Page: 1 of 4

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 5/04/2010

Drill Co: GOS
Driller: Malcom Bridge
NOW Groundwater Licence #: 90BL255576
Total Depth (m): 82.11

Easting: 252501.59 **Northing:** 6538498.16 **Elevation:** 302.77
Licensed Driller: Wayne McLean
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: AF

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
			CLAY sandy, with weathered lithic fragments, red-brown, soft, high plasticity		
			CLAY with weathered lithic fragments, brown, soft, high plasticity		
			SILTSTONE with weathered lithic fragments, grey, soft, friable		HKU
			SILTSTONE with weathered lithic fragments, dark brown, soft, friable		
			CLAY with weathered lithic fragments, light-brown, soft, high plasticity		
			CLAY coaly, with weathered lithic fragments, dark grey to black, soft		HKL
			CLAY minor siltstone gravelly, with weathered lithic fragments, dark grey to black, soft		
			MUDSTONE with weathered lithic fragments, yellow-brown, soft, friable		
			MUDSTONE minor sandy lenses, distinctly weathered rock, grey, soft		
			SANDSTONE distinctly weathered rock, fine grained, cream		
			MUDSTONE sandy, distinctly weathered rock, brown		
			SANDSTONE minor silty banded, distinctly weathered rock, fine to medium grained, grey, moderately soft		
			SANDSTONE fresh rock, light grey, hard		
			SANDSTONE siltstone lenses, fresh rock, fine to medium grained, light grey, hard		
			SANDSTONE fresh rock, fine grained, light grey, hard, carbonaceous laminae		
			SANDSTONE minor silty banded, fresh rock, fine grained, light grey, hard, carbonaceous laminae		
			SANDSTONE fresh rock, fine grained, green, moderately hard, interbedded with stony coal		
			SANDSTONE silty, fresh rock, fine grained, green, hard, roots		F
				Cement with bentonite	

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):

**BOREHOLE LOG**

Groundwater Installation

Bore No.: WM0014

Page: 2 of 4

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 5/04/2010

Drill Co: GOS
Driller: Malcom Bridge
NOW Groundwater Licence #: 90BL255576
Total Depth (m): 82.11

Easting: 252501.59 **Northing:** 6538498.16 **Elevation:** 302.77
Licensed Driller: Wayne McLean
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: AF

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
33			SANDSTONE fresh rock, fine to medium grained, light grey, hard, carbonaceous laminae SANDSTONE gravel conglomerate present, minor gravelly, fresh rock, medium grained, light grey, hard, coaly wisps		
43			Carbonaceous MUDSTONE fresh rock, dark grey to black, hard MUDSTONE sandy lenses, fresh rock, grey, hard, carbonaceous laminae SANDSTONE minor silty banded, gravelly, fresh rock, fine grained, light grey, hard CONGLOMERATE fresh rock, light grey, hard, with medium-coarse grained sandstone COAL dull with brights 10% -40%, fresh rock, black, hard Carbonaceous MUDSTONE minor coaly lenses, fresh rock, dark grey to black, hard SILTSTONE minor coaly lenses, fresh rock, grey, moderately hard MUDSTONE fresh rock, grey, moderately soft, friable, minor carbonaceous bands		
			SANDSTONE silty, fresh rock, light grey - grey, moderately hard-hard, some siltstone bands and conglomerate bands towards base		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



**BOREHOLE LOG**

Groundwater Installation

Bore No.: WM0014

Page: 4 of 4

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 5/04/2010

Drill Co: GOS
Driller: Malcom Bridge
NOW Groundwater Licence #: 90BL255576
Total Depth (m): 82.11

Easting: 252501.59 **Northing:** 6538498.16 **Elevation:** 302.77
Licensed Driller: Wayne McLean
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: AF

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			SANDSTONE silty, fresh rock, fine-medium grained, grey, moderately hard COAL fresh rock, black, hard SILTSTONE tuffaceous, fresh rock, off-white, moderately hard, carbonaceous laminae MUDSTONE slightly sandy, fresh rock, dark grey, moderately hard SILTSTONE fresh rock, grey, moderately hard SANDSTONE fresh rock, fine grained, light grey, hard CONGLOMERATE fresh rock, granular, light grey, moderately hard SANDSTONE gravelly with minor coally wisps, fresh rock, medium to coarse grained, light grey, hard, carbonaceous laminae		BEN
83			END OF BOREHOLE @ 82.11m bgl		
93					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0019L

Page: 1 of 3

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 16/04/2010

Drill Co: Depco
Driller: Sam Floss
NOW Groundwater Licence #: 90BL255715
Total Depth (m): 95.8

Easting: 245712.49 **Northing:** 6536794.96 **Elevation:** 327.92
Licensed Driller: Allen Carlon
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: HTD **Checked by:** GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
			TOPSOIL brown		
			CLAY grey		
			SANDSTONE quartz-lithic, fine grained, grey		
			SANDSTONE quartzose, granular, grey		
			SANDSTONE quartzose, coarse to very coarse grained, grey		
8			SANDSTONE quartzose, coarse to very coarse grained, blue		
			CONGLOMERATE quartzose, coarse grained and granular, brown		
18			CLAYSTONE silty, light grey		
			SILTSTONE grey		
			SANDSTONE light grey		
			SILTSTONE with interbedded sandstone, partly carbonaceous, grey		
28			coaly CLAYSTONE black		
			COAL interbedded bright & dull, brights 40-60%		
			SILTSTONE dark grey		
			COAL dull with brights 5%-10%		
			SANDSTONE lithic, medium grained, grey		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):

**BOREHOLE LOG**

Groundwater Installation

Bore No.: WM0019L

Page: 2 of 3

Client: Shenhua Watermark Coal P/L

Project: Shenhua Watermark Project No.: EL7223

Location: Watermark, Gunnedah, NSW, Australia

Date Drilled: 16/04/2010

Drill Co: Depco

Driller: Sam Floss

NOW Groundwater Licence #: 90BL255715

Total Depth (m): 95.8

Easting: 245712.49

Northing: 6536794.96

Elevation: 327.92

Licenced Driller: Allen Carlon

Grid Ref: MGA94 Zone 56 Vertical: AHD

Logged by: HTD

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
43			CLAYSTONE partly carbonaceous, grey		
			stony COAL COAL dull with brights 5% - 10%		HKU
			silty carbonaceous MUDSTONE		HKL
			SILTSTONE grey		
			SILTSTONE interbedded with clay, grey		
			SANDSTONE		
			SANDSTONE grey		
			COAL dull with brights 5% - 10%		F
53			CLAYSTONE sooty, grey		
63			COAL dull with brights 5% - 10%		
			SAND fine to medium grained, grey		E

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0019L

Page: 3 of 3

Client: Shenhua Watermark Coal P/L
 Project: Shenhua Watermark Project No.: EL7223
 Location: Watermark, Gunnedah, NSW, Australia
 Date Drilled: 16/04/2010

Drill Co: Depco
 Driller: Sam Floss
 NOW Groundwater Licence #: 90BL255715
 Total Depth (m): 95.8

Easting: 245712.49 Northing: 6536794.96 Elevation: 327.92
 Licenced Driller: Allen Carlon
 Grid Ref: MGA94 Zone 56 Vertical: AHD
 Logged by: HTD
 Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			COAL dull <1% brights SANDSTONE brown		
			COAL dull with brights 5% -10% SANDSTONE lithic, fine to medium grained, grey		
78			COAL dull <1% brights SANDSTONE with siltstone interbeds, lithic, fine to medium grained, grey		A
			coaly SILTSTONE black COAL dull with brights 5% -10% CLAYSTONE grey		MV
88			SANDSTONE quartzose, fine to medium grained, grey		
			END OF BOREHOLE @ 94.0m bgl		
98					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0021

Page: 1 of 7

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 14/08/2009

Drill Co: GOS
Driller: John Grellet
NOW Groundwater Licence #: 90BL255146
Total Depth (m): 218.8

Easting: 244515.69 Northing: 6536073.65 Elevation: 348.85
Licenced Driller: John Carrigan
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: AF

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
	Rotary wash boring		clayey GRAVEL red-brown, 2-10mm size sandy CLAY yellow-brown-grey, some clayey sand seams		
8			sandy CLAY yellow-brown-light grey, clayey sand lenses clayey SAND red brown-yellow brown, fine to medium grained	HWT steel casing (101.6mm dia.) Piezo cable to surface	
			clayey SAND as above, grading yellow brown to light brown, medium to coarse grained sandy CLAY yellow-brown	Casing: 50mm NB uPVC Cl.18 threaded, in 3m lengths	
18	Rotary triple tube coring		TUFF distinctly weathered rock SILTSTONE extremely weathered rock	Grout: cement bentonite	
			SANDSTONE slightly weathered rock, fine grained CONGLOMERATE sandy, slightly weathered rock, coarse grained		
28			SILTSTONE slightly weathered rock, light grey		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0021

Page: 2 of 7

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 14/08/2009

Drill Co: GOS
Driller: John Grellet
NOW Groundwater Licence #: 90BL255146
Total Depth (m): 218.8

Easting: 244515.69 **Northing:** 6536073.65 **Elevation:** 348.85
Licensed Driller: John Carrigan
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: AF

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
43			CONGLOMERATE slightly weathered rock, coarse grained CONGLOMERATE distinctly weathered rock, coarse grained CONGLOMERATE slightly weathered rock, coarse grained SANDSTONE slightly weathered rock, coarse grained CONGLOMERATE weathered rock, coarse grained SILTSTONE slightly weathered rock, fine grained, dark grey to black Carbonaceous SILTSTONE slightly weathered rock SILTSTONE slightly weathered rock, light grey CLAYSTONE carbonaceous, slightly weathered rock, dark grey to black SILTSTONE slightly weathered rock, fine grained, dark grey to black SANDSTONE slightly weathered rock, light grey COAL slightly weathered rock CLAYSTONE fresh rock, light grey SILTSTONE fresh rock, light grey SANDSTONE slightly weathered rock, medium grained CONGLOMERATE slightly weathered rock, coarse grained, light grey	Seal: bentonite pellets 1/4" Screen: 50mm NB uPVC Cl.18 machine slotted, 0.4mm aperture threaded; 3m lengths	HHU HHL

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0021

Page: 3 of 7

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 14/08/2009

Drill Co: GOS
Driller: John Grellet
NOW Groundwater Licence #: 90BL255146
Total Depth (m): 218.8

Easting: 244515.69 Northing: 6536073.65 Elevation: 348.85
Licenced Driller: John Carrigan
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: AF

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			SILTSTONE extremely weathered rock	Gravel pack: washed; 1-2mm Bentonite - cement grout mild steel j-latch back-off joint Carrier pipe: 40mm NB uPVC CL18 threaded, in 3m lengths	
78			SANDSTONE slightly weathered rock, fine-coarse grained, light grey		
			COAL fresh rock, grey, with siltstone, claystone and sandstone beds		
88			CLAYSTONE carbonaceous, fresh rock		CRU
			SILTSTONE slightly weathered rock, light grey		CRM
			SANDSTONE slightly weathered rock, fine grained, light grey		CRL
			TUFF distinctly weathered rock		
			CLAYSTONE carbonaceous, slightly weathered rock		
			TUFF distinctly weathered rock, brown-grey		
98			COAL fresh rock, with claystone bands		
			CLAYSTONE carbonaceous, fresh rock		
			SANDSTONE fresh rock, fine grained, grey		
			SILTSTONE fresh rock, grey		
			CLAYSTONE carbonaceous, fresh rock, dark grey to black		
			SILTSTONE sandy, slightly weathered rock, dark grey to black		
			SANDSTONE silty, slightly weathered rock, medium grained, dark grey		
			CLAYSTONE		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0021

Page: 4 of 7

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 14/08/2009

Drill Co: GOS
Driller: John Grellet
NOW Groundwater Licence #: 90BL255146
Total Depth (m): 218.8

Easting: 244515.69 **Northing:** 6536073.65 **Elevation:** 348.85
Licensed Driller: John Carrigan
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: AF

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			SANDSTONE silty, slightly weathered rock, medium grained, dark grey SANDSTONE slightly weathered rock, coarse grained, light grey SANDSTONE fresh rock, coarse grained, light grey		CLR
113			COAL distinctly weathered rock, dark grey to black SILTSTONE slightly weathered rock, grey COAL dull with brights 10%-40%, fresh rock CLAYSTONE carbonaceous, fresh rock SILTSTONE slightly weathered rock SILTSTONE fresh rock, light grey CLAYSTONE carbonaceous, fresh rock, dark grey to black sooty COAL slightly weathered rock SILTSTONE fresh rock, light grey COAL fresh rock, with bands of sandstone and claystone		HKU
			CLAYSTONE carbonaceous, fresh rock, dark grey		HKL
123			SANDSTONE fresh rock, fine grained, light grey		
			SILTSTONE fresh rock, light grey COAL fresh rock SANDSTONE fresh rock, with siltstone, light grey		
133					

Vibrating wire piezometer (V2) SN#: 11703
 zero rdg: 8494; gauge: 0.58450; initial: 7274

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0021

Page: 5 of 7

Client: Shenhua Watermark Coal P/L

Project: Shenhua Watermark Project No.: EL7223

Location: Watermark, Gunnedah, NSW, Australia

Date Drilled: 14/08/2009

Drill Co: GOS

Driller: John Grellet

NOW Groundwater Licence #: 90BL255146

Total Depth (m): 218.8

Easting: 244515.69

Northing: 6536073.65

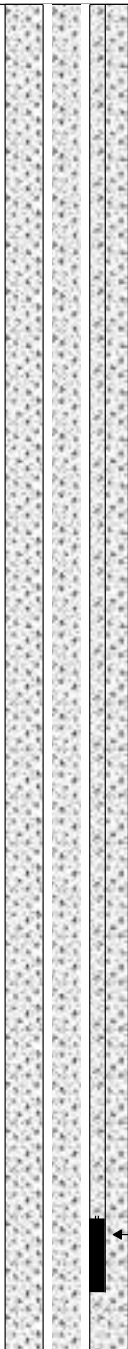
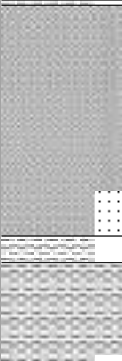
Elevation: 348.85

Licensed Driller: John Carrigan

Grid Ref: MGA94 Zone 56 Vertical: AHD

Logged by: AF

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
148			COAL slightly weathered rock SLTSTONE fresh rock, light grey COAL fresh rock, with claystone bands SLTSTONE slightly weathered rock COAL banded dull <1% brights, fresh rock CLAYSTONE carbonaceous, fresh rock SANDSTONE fresh rock, light grey SANDSTONE medium grained, light grey		D
158			SLTSTONE fresh rock, grey COAL fresh rock, with sand stone, siltstone and claystone beds SLTSTONE fresh rock, grey SLTSTONE		B
168			SANDSTONE fresh rock, coarse grained, light grey SLTSTONE fresh rock, grey CLAYSTONE carbonaceous, fresh rock, dark grey to black SLTSTONE fresh rock, dark grey CLAYSTONE carbonaceous, slightly weathered rock, dark grey to black COAL fresh rock, dark grey to black SLTSTONE fresh rock, grey	 Vibrating wire piezometer (V1) SN#11700 MV zero rdg: 8709; gauge: 0.57420; initial: 6353	

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0021

Page: 6 of 7

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 14/08/2009

Drill Co: GOS
Driller: John Grellet
NOW Groundwater Licence #: 90BL255146
Total Depth (m): 218.8

Easting: 244515.69 **Northing:** 6536073.65 **Elevation:** 348.85
Licensed Driller: John Carrigan
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: AF

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			SANDSTONE fresh rock, medium grained, light grey		
			COAL fresh rock, dark grey to black		
			CLAYSTONE carbonaceous, fresh rock		
			SILTSTONE fresh rock, grey		
			SANDSTONE fresh rock, fine grained, light grey		
			SILTSTONE light grey		
183			SANDSTONE fresh rock, medium grained, light grey		
			CLAYSTONE carbonaceous, fresh rock, dark grey		
			SANDSTONE fresh rock, light grey		
			SILTSTONE fresh rock, light grey		
193			SANDSTONE fresh rock, fine grained, light grey		
203					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):

**BOREHOLE LOG**

Groundwater Installation

Bore No.: WM0021

Page: 7 of 7

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 14/08/2009

Drill Co: GOS
Driller: John Grellet
NOW Groundwater Licence #: 90BL255146
Total Depth (m): 218.8

Easting: 244515.69 **Northing:** 6536073.65 **Elevation:** 348.85
Licensed Driller: John Carrigan
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: AF

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
218			SILTSTONE fresh rock - becoming weathered with depth, grey		
228			END OF BOREHOLE @ 218.8m bgl		
238					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0029

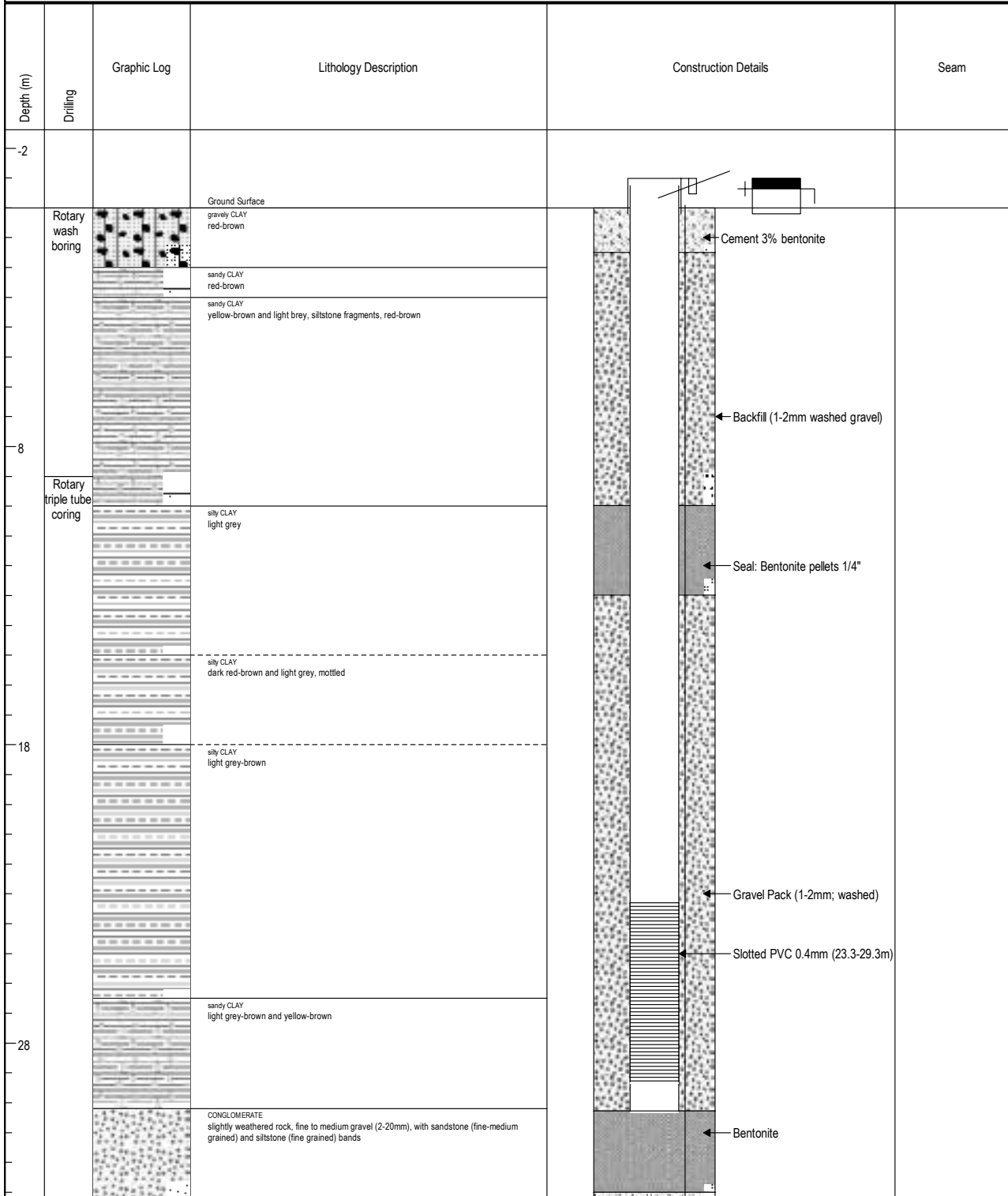
Page: 1 of 5

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 22/09/2009

Drill Co: GOS
Driller: Nathan Carson
NOW Groundwater Licence #: 90BL255142
Total Depth (m): 156.01

Easting: 243352.4 **Northing:** 6538071.31 **Elevation:** 350.05
Licensed Driller: John Carrigan
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: EK

Checked by: Ben Jansen



NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



Groundwater Installation

Bore No.: WM0029

Page: 2 of 5

Elevation: 350.05

Checked by: Ben Jansen

NOTES	
General drilling and construction notes:	Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0029

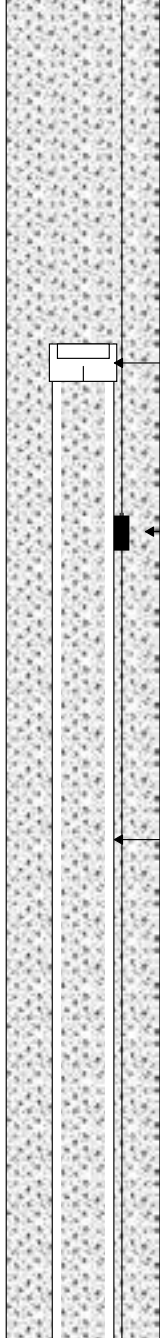
Page: 3 of 5

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 22/09/2009

Drill Co: GOS
Driller: Nathan Carson
NOW Groundwater Licence #: 90BL255142
Total Depth (m): 156.01

Easting: 243352.4 **Northing:** 6538071.31 **Elevation:** 350.05
Licensed Driller: John Carrigan
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: EK

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			COAL with stone bands, fresh rock, fine grained SANDSTONE fresh rock, fine grained COAL with stone bands, fresh rock, fine grained SILTSTONE fresh rock, fine grained, with sandstone (fine grained) COAL fresh rock, with sandstone, siltstone and claystone bands SANDSTONE fresh rock, fine grained, roots	 Mild steel J-latch back-off joint V3 - (SN:11705) Zero rdg: 8708@20°C; gauge: 0.57340; initial: 8341@27°C Class 18; 40mm NB uPVC	HKU HKL

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0029

Page: 4 of 5

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 22/09/2009

Drill Co: GOS
Driller: Nathan Carson
NOW Groundwater Licence #: 90BL255142
Total Depth (m): 156.01

Easting: 243352.4 Northing: 6538071.31 Elevation: 350.05
Licenced Driller: John Carrigan
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: EK

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
113			SILTSTONE fresh rock, fine grained Carbonaceous SILTSTONE fresh rock, fine grained SILTSTONE fresh rock, fine grained SANDSTONE fresh rock, fine grained COAL dull with brights 5% - 10%, fresh rock SANDSTONE fresh rock, fine grained, with siltstone		
123			COAL with stone bands, fresh rock SILTSTONE fresh rock, fine grained, with some claystone and fine band of coal SANDSTONE fresh rock, fine to medium grained		B
133					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0029

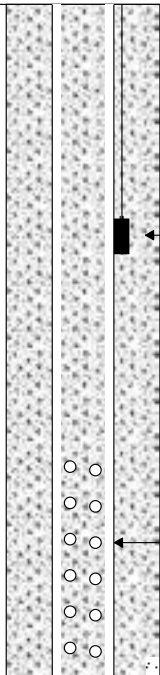
Page: 5 of 5

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 22/09/2009

Drill Co: GOS
Driller: Nathan Carson
NOW Groundwater Licence #: 90BL255142
Total Depth (m): 156.01

Easting: 243352.4 **Northing:** 6538071.31 **Elevation:** 350.05
Licensed Driller: John Carrigan
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: EK

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
148			CLAYSTONE carbonaceous, fresh rock, with siltstone TUFF fresh rock COAL cindered, fresh rock, interbedded with siltstone and sandstone COAL fresh rock with siltstone and claystone SANDSTONE fresh rock, fine to medium grained, coaly lenticles SILTSTONE fresh rock COAL fresh rock SILTSTONE fresh rock	 V1 - (SN: 11701) Zero rdg: 8673@27°C; gauge: 0.56820; initial: 7235 Grouting Holes carrier pipe	MV BEN
158			END OF BOREHOLE @ 156.01m bgl		
168					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0035A

Page: 1 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 16/09/2009
Drill Co: GOS
Driller: Nathan Carson
NOW Groundwater Licence #: 90BL255155
Total Depth (m): 77.36
Easting: 243544.65 Northing: 6539434
Licenced Driller: John Carrigan
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: UNK
Elevation: 327.47
Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
	Rotary triple tube coring		CLAY gravelly, fine gravel (2-6mm) CLAY sandy, medium grained CLAY gravelly, fine to medium gravel (2-20mm) CLAY sandy, fine to medium grained SAND clayey, medium grained CLAY gravelly, medium gravel (6-20mm) CLAY sandy, medium to coarse grained CLAY sandy, medium grained CLAY brown-grey	Casing: 50mm NB Cl.18 uPVC threaded, in 3m lengths Cement grout Seal: Bentonite pellets 1/4"	

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0035A

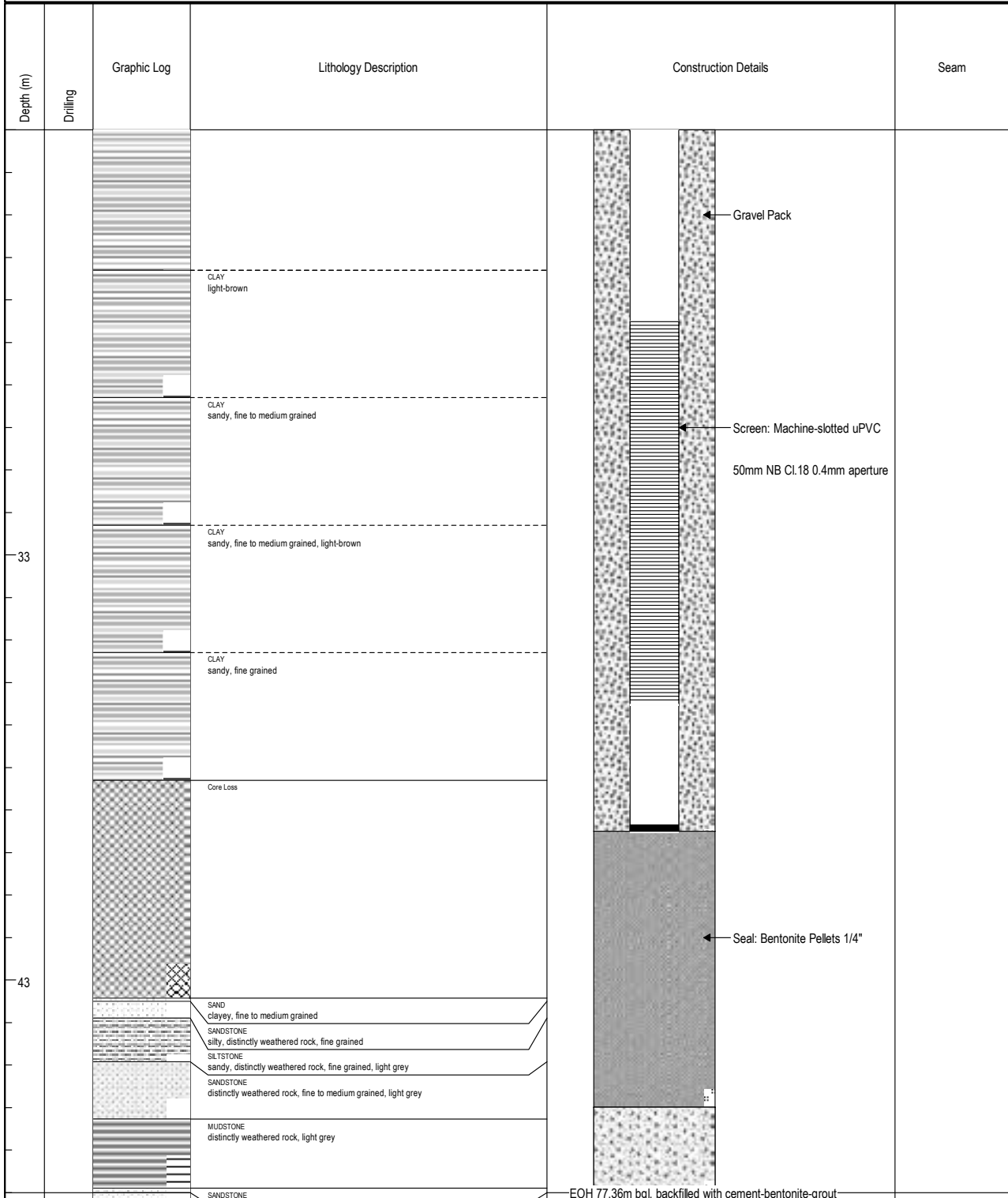
Page: 2 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 16/09/2009

Drill Co: GOS
Driller: Nathan Carson
NOW Groundwater Licence #: 90BL255155
Total Depth (m): 77.36

Easting: 243544.65 **Northing:** 6539434 **Elevation:** 327.47
Licensed Driller: John Carrigan
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: UNK

Checked by: Ben Jansen



NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0036C

Page: 1 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 28/03/2011

Drill Co: Depco
Driller: Sam Floss
NOW Groundwater Licence #: 90BL255712
Total Depth (m): 78

Easting: 243526.62 Northing: 6539999.41 Elevation: 342.39
Licenced Driller: Neil Gill
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: GS
Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
			SAND gravelly, coarse grained, brown-grey		
			SILT light brown		
8			SILT grey		
			gravelly SILT gravelly, coarse grained, iron-stained		
			SILT sandy gravelly, brown		
			SILT gravelly, brown-grey		
			GRAVEL brown-grey		
			SANDSTONE brown-grey		
			SILTSTONE grey		
18			SANDSTONE fine to coarse grained, grey		
			SILTSTONE grey		
			COAL dark grey		HKU
28			SILTSTONE dark grey		HKL
			SANDSTONE very fine grained, grey		
			SILTSTONE sandy, very fine grained, grey		
38					
48					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0036C

Page: 2 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 28/03/2011

Drill Co: Depco
Driller: Sam Floss
NOW Groundwater Licence #: 90BL255712
Total Depth (m): 78

Easting: 243526.62 **Northing:** 6539999.41 **Elevation:** 342.39
Licenced Driller: Neil Gill
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: GS **Checked by:** GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
58			COAL dark grey SANDSTONE light grey SILTSTONE sandy grey SILTSTONE SANDSTONE very fine grained, light grey SILTSTONE	0.4 mm slots, 50mm PVC screen 1-2 mm rounded & sorted qtz	E
68			SANDSTONE silty, very fine grained COAL silty, dark grey	0.4 mm slots, 50mm PVC screen End cap	C BU BL A MV
78			END OF BOREHOLE @ 78m bgl		
88					
98					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):

**BOREHOLE LOG**

Groundwater Installation

Bore No.: WM0036L

Page: 1 of 3

Client: Shenhua Watermark Coal P/L

Project: Shenhua Watermark Project No.: EL7223

Location: Watermark, Gunnedah, NSW, Australia

Date Drilled: 5/10/2010

Drill Co: Depco

Driller: Sam Floss

NOW Groundwater Licence #: 90BL255716

Total Depth (m): 81.1

Easting: 243509.56

Northing: 6539991.3

Elevation: 341.55

Licenced Driller: Allen Carlon

Grid Ref: MGA94 Zone 56 Vertical: AHD

Logged by: PRA

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface	Lockable cover	
			SANDSTONE quartzose minor pebbly, slightly weathered rock, fine to coarse grained, off white, chipped core		
			as above, distinctly weathered rock, orange		
			SILTSTONE sandy, distinctly weathered rock, off white, chipped core		
			SILTSTONE clayey, distinctly weathered rock, purple, chipped core		
			SANDSTONE distinctly weathered rock, very fine grained, brown, chipped core		
8			SANDSTONE minor silty, distinctly weathered rock, fine to medium grained, light brown, chipped core		
			SANDSTONE slightly weathered rock, fine to medium grained, light grey, chipped core		
			SILTSTONE slightly weathered rock, grey, chipped core		
			SILTSTONE minor coaly, slightly weathered rock, dark grey, chipped core		
			SANDSTONE silty, slightly weathered rock, light brown, chipped core		
			SILTSTONE sandy, fresh rock, grey, chipped core		
			SILTSTONE fresh rock, dark grey, chipped core		
			SANDSTONE fresh rock, fine grained, light grey, chipped core		
18			SANDSTONE lithic, fresh rock, medium to coarse grained, light grey, chipped core		
			SANDSTONE silty, fresh rock, medium to coarse grained, grey, chipped core		
			SILTSTONE minor coaly, fresh rock, dark grey, chipped core		
			SILTSTONE minor fine sandy laminae, fresh rock, dark grey, unbroken core		
			Carbonaceous SILTSTONE with coal layers, dull <1% brights, fresh rock, crushed core		
			COAL with mudstone fragments, dull <1% brights, fresh rock, crushed core		HKU
			Carbonaceous MUDSTONE fresh rock, dark grey-black, unbroken core		
			COAL with gravel, dull <1% brights, fresh rock, unbroken core		HKL
28			COAL trace mudstone, dull with brights 10%-40% muddy lenses, fresh rock, broken core		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0036L

Page: 2 of 3

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 5/10/2010

Drill Co: Depco
Driller: Sam Floss
NOW Groundwater Licence #: 90BL255716
Total Depth (m): 81.1

Easting: 243509.56 **Northing:** 6539991.3 **Elevation:** 341.55
Licensed Driller: Allen Carlon
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: PRA **Checked by:** GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
38			SILTSTONE and SANDSTONE sandy, fresh rock, grey		
			SANDSTONE fresh rock, fine grained, light grey, chipped core		
			SILTSTONE sandy, fresh rock, grey, chipped core		
48			SANDSTONE fresh rock, fine to medium grained, light grey, chipped core		
			SILTSTONE fresh rock, dark grey, chipped core		
			COAL silty banded, fresh rock, dark grey-black, chipped core		E
			COAL silty sandy banded, fresh rock, fine to medium grained, grey, chipped core		
			SANDSTONE fresh rock, coarse grained, light grey, chipped core		
58			SANDSTONE silty, fresh rock, fine to medium grained, grey, chipped core		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0036L

Page: 3 of 3

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 5/10/2010

Drill Co: Depco
Driller: Sam Floss
NOW Groundwater Licence #: 90BL255716
Total Depth (m): 81.1

Easting: 243509.56 Northing: 6539991.3
Licenced Driller: Allen Carlon
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: PRA

Elevation: 341.55

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
68			SANDSTONE fresh rock, coarse grained, light grey, chipped core SILTSTONE minor sandy, fresh rock, dark grey, chipped core COAL fresh rock, chipped core SILTSTONE carbonaceous in part, fresh rock, dark grey, chipped core COAL with some silt, fresh rock, chipped core SILTSTONE fresh rock, dark grey, chipped core COAL with thin layers of claystone, dull with brights 5%-10%, fresh rock, unbroken core COAL dull <1% brights, fresh rock, unbroken core COAL with trace carbonaceous mudstone, fresh rock, dark grey-black, unbroken core COAL with finely embedded claystone, bands of coal, fresh rock, brown, unbroken core SILTSTONE sandy banded, fresh rock, crushed core SANDSTONE bands of coal, fresh rock, fine to medium grained, unbroken core		C BU BL A MV
78			END OF BOREHOLE @ 80.93m bgl		
88					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0038L

Page: 1 of 4

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 21/05/2011

Drill Co: Depco
Driller: Sam Floss
NOW Groundwater Licence #: 90BL255911
Total Depth (m): 94

Easting: 243503.9 **Northing:** 6541016.85 **Elevation:** 342.29
Licensed Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: Moultrie **Checked by:** GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface	Lockable cover	
			silty GRAVEL fine poorly graded, subangular to angular, weak iron staining		
			clayey GRAVEL fine, poorly graded, subangular to angular		
			silty GRAVEL fine, subangular to angular, Fe - weak staining		
			Silty CLAY fine, subangular to angular		
			SILTSTONE light grey, distinctly weathered rock, blade drilling with water		
8			SANDSTONE light yellowish grey, fine, Fe - weak staining, distinctly weathered rock, blade drilling with water		
			Core Loss		
			SANDSTONE coarse, subangular conglomerate interbeds, yellow, coarse, distinctly weathered rock		
			Core Loss		
			CONGLOMERATE with some sandstone, fine to coarse, subangular gravels, dark yellowish orange, coarse, distinctly weathered rock		
18			SANDSTONE fine to coarse interbedded sandstone, cream, fine, Fe - weak staining, distinctly weathered rock		
			SILTSTONE and SANDSTONE interlaminated, light grey, fine, Fe - weak staining, distinctly weathered rock, laminated		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):

**BOREHOLE LOG**

Groundwater Installation

Bore No.: WM0038L

Page: 2 of 4

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 21/05/2011

Drill Co: Depco
Driller: Sam Floss
NOW Groundwater Licence #: 90BL255911
Total Depth (m): 94

Easting: 243503.9 **Northing:** 6541016.85 **Elevation:** 342.29
Licensed Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: Moultrie **Checked by:** GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			SANDSTONE minor carbonaceous material inclusion, light yellowish grey, medium, fresh rock		
			SILTSTONE and SANDSTONE Interlaminated medium light grey siltstone, very very light grey, fine, fresh rock, laminated		
			Carbonaceous CLAYSTONE very very dark grey, fresh rock, lenticular		
33			COAL greyish black, fresh rock , interbedded with claystone		HKU
			SILTSTONE and SANDSTONE dark grey, fresh rock, lenticular		HKL
43					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0038L

Page: 3 of 4

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 21/05/2011

Drill Co: Depco
Driller: Sam Floss
NOW Groundwater Licence #: 90BL255911
Total Depth (m): 94

Easting: 243503.9 **Northing:** 6541016.85 **Elevation:** 342.29
Licensed Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: Moultrie **Checked by:** GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			Carbonaceous CLAYSTONE very very dark grey, fresh rock		
			SILTSTONE Lenses of fine grained sandstone in siltstone host, dark grey, fresh rock, lenticular		
			SANDSTONE very very thinly laminated siltstone, grey, fine, fresh rock, wavy bedded, Trace carbonaceous inclusions.		
58			SANDSTONE light grey, medium, fresh rock, Trace carbonaceous inclusions.		
			SILTSTONE and SANDSTONE very very thinly laminated siltstone, light grey, medium, fresh rock, laminated		
			SANDSTONE light grey, fine, fresh rock, minor siltstone laminations with trace carbonaceous inclusions		
			COAL greyish black, fresh rock SILTSTONE light grey, fresh rock, lenticular		F
			SANDSTONE light grey, fine, fresh rock		
			Carbonaceous CLAYSTONE very very dark grey, fresh rock		EU
			SANDSTONE with siltstone, some coal beds, very light grey, fine, fresh rock, lenticular		EL
68			CLAYSTONE carbonaceous, light grey, fresh rock, lenticular, with sand and siltstone		D

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0038L

Page: 4 of 4

Client: Shenhua Watermark Coal P/L Project: Shenhua Watermark Project No.: EL7223 Location: Watermark, Gunnedah, NSW, Australia Date Drilled: 21/05/2011			Drill Co: Depco Driller: Sam Floss NOW Groundwater Licence #: 90BL255911 Total Depth (m): 94			Easting: 243503.9 Northing: 6541016.85 Elevation: 342.29 Licenced Driller: Phillip Gaffney Grid Ref: MGA94 Zone 56 Vertical: AHD Logged by: Moultrie			Checked by: GF		
Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details			Seam				
83			COAL sandy in middle of unit, with claystone beds, greyish black, fresh rock	 Bentonite seal 3mm graded quartz gravel packs 50mm Class 18 MS(1mm)PVC		C					
						B					
						A					
						MV					
93			CONGLOMERATE interbedded fine to medium gravel, subrounded to subangular poorly sorted conglomerate and fine to medium grained well graded sandstone, very very light grey, fine to medium, fresh rock, laminated, Some angular lithic rip ups								
			COAL greyish black SILTSTONE grey, fresh rock, flaser bedded CLAYSTONE light grey, fresh rock, with clay bands SILTSTONE light grey, fresh rock, flaser bedded SANDSTONE very very light grey, medium, fresh rock			B2					
			END OF BOREHOLE @ 93.25m bgl								

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0042A

Page: 1 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 3/11/2009

Drill Co: GOS
Driller: Steve Twigden
NOW Groundwater Licence #: 90BL255147
Total Depth (m): 43

Easting: 245487.26 **Northing:** 6541952.45 **Elevation:** 316.68
Licensed Driller: John Carrigan
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: LT

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
	Rotary wash boring		SAND silty, fine grained		
8			SAND fine grained	Class 18, 50mm NB uPVC threaded, in 3m lengths	
	Rotary triple tube coring		SANDSTONE extremely weathered rock, fine to medium grained	Cement - Bentonite grout	
18			SILTSTONE sandy, distinctly weathered rock, fine grained, light grey		
			SILTSTONE sandy, slightly weathered rock, fine grained, light grey	grout + collapse + void	

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0042A

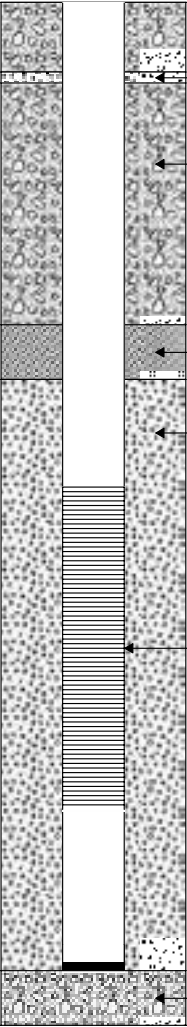
Page: 2 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 3/11/2009

Drill Co: GOS
Driller: Steve Twigden
NOW Groundwater Licence #: 90BL255147
Total Depth (m): 43

Easting: 245487.26 Northing: 6541952.45 Elevation: 316.68
Licenced Driller: John Carrigan
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: LT

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
33			SILTSTONE extremely weathered rock, white SILTSTONE sandy, slightly weathered rock, fine grained, light grey SILTSTONE extremely weathered rock, white SILTSTONE sandy, slightly weathered rock, fine grained, light grey SILTSTONE sandy, fresh rock, light grey SILTSTONE sandy, slightly weathered rock, fine grained, light grey		
43			END OF BOREHOLE @ 42m bgl		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0045

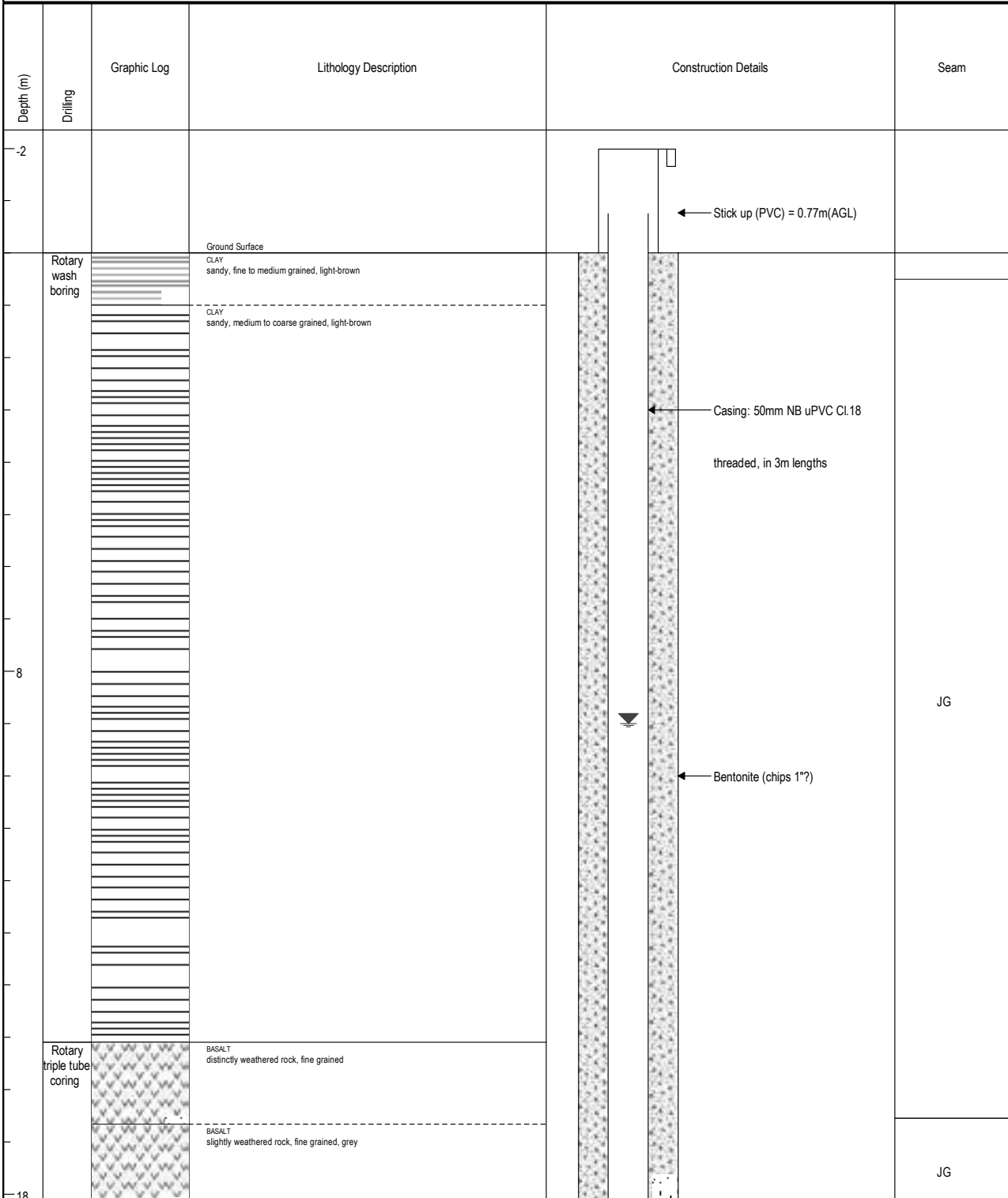
Page: 1 of 2

Client: Shenhua Watermark Coal P/L
 Project: Shenhua Watermark Project No.: EL7223
 Location: Watermark, Gunnedah, NSW, Australia
 Date Drilled: 2/09/2009

Drill Co: GOS
 Driller: Steve Twigden
 NOW Groundwater Licence #: 90BL255148
 Total Depth (m): 59.63

Easting: 244789.67 Northing: 6544073.33 Elevation: 360.66
 Licenced Driller: Wayne McLean
 Grid Ref: MGA94 Zone 56 Vertical: AHD
 Logged by: AM/JG

Checked by: Ben Jansen



NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):

**BOREHOLE LOG**

Groundwater Installation

Bore No.: WM0045

Page: 2 of 2

Client: Shenhua Watermark Coal P/L

Project: Shenhua Watermark Project No.: EL7223

Location: Watermark, Gunnedah, NSW, Australia

Date Drilled: 2/09/2009

Drill Co: GOS

Driller: Steve Twigden

NOW Groundwater Licence #: 90BL255148

Total Depth (m): 59.63

Easting: 244789.67

Northing: 6544073.33

Elevation: 360.66

Licenced Driller: Wayne McLean

Grid Ref: MGA94 Zone 56 Vertical: AHD

Logged by: AM/JG

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			SANDSTONE lithic polymictic, slightly weathered rock, medium to coarse grained, light grey		
			CONGLOMERATE sandy, distinctly weathered rock, coarse grained, light grey		
			SANDSTONE fresh rock, fine to coarse grained, light grey		
			CLAYSTONE carbonaceous, fresh rock, dark grey		
			SANDSTONE fresh rock, light grey		
			CLAYSTONE carbonaceous, fresh rock, grey, interbedded with sandstone		
			MUDSTONE fresh rock, grey		
			COAL fresh rock, black		Ben
			CLAYSTONE carbonaceous, fresh rock, dark grey		
			SANDSTONE fresh rock, fine to medium grained, light grey, coaly lenticles, interbedded with dark grey-black siltstone		
28			MUDSTONE fresh rock, dark grey		
			COAL fresh rock, black		
			CLAYSTONE carbonaceous, slightly weathered rock, grey		
			SANDSTONE silty, fresh rock, fine grained, light grey		
			SIDERITE fresh rock		
			SANDSTONE silty, fresh rock, fine to medium grained, light grey		
			SILTSTONE fresh rock, grey		
			SANDSTONE distinctly weathered rock, fine to medium grained, light grey		
			MUDSTONE fresh rock, grey		
38					
EOH @ 59.63m bgl, backfilled with cement-bentonite-grout					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0055

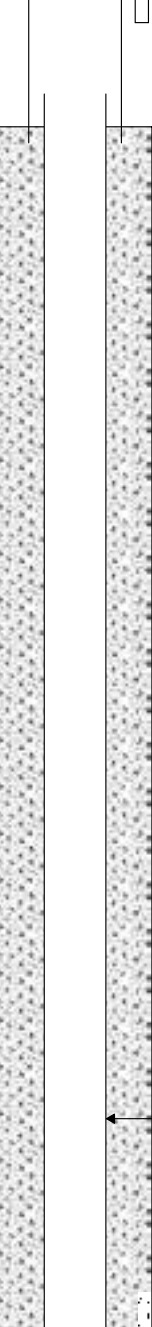
Page: 1 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 18/09/2009

Drill Co: GOS
Driller: Stuart Smith
NOW Groundwater Licence #: 90BL255164
Total Depth (m): 59.75

Easting: 250480.87 **Northing:** 6538989.93 **Elevation:** 314.62
Licensed Driller: John Carrigan
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: AF

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
	Rotary wash boring		sandy CLAY orange, highly plastic, medium to coarse grained sand		
			sandy CLAY light orange-brown, as above		
			clayey SAND orange, medium grained, subangular		
			SAND orange, medium grained, subangular-subrounded		
			SAND fine grained, as above		
			SAND orange, medium to coarse grained		
			SAND orange, medium grained, trace light orange clay		
			SAND poorly sorted medium grained sand, subangular-subrounded		
8			SAND orange, medium grained		
			SAND grading finer grained sand		
			SAND orange, fine grained sand		
			SAND as above, some slightly coarser grained sand		
			SAND as above		
	Rotary triple tube coring		SANDSTONE iron stained, extremely weathered rock, fine-coarse grained, grey		
18					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



Groundwater Installation

Bore No.: WM0055

Page: 2 of 2

Easting: 250480.87 **Northing:** 6538989.93 **Elevation:** 314.62
Licenced Driller: John Carrigan
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: AF **Checked by:** Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
28			SANDSTONE iron stained, slightly weathered rock , medium grained, light grey SANDSTONE fresh rock, fine grained, light grey CLAYSTONE slightly weathered rock , light grey SLTSTONE fresh rock, light grey CLAYSTONE carbonaceous, slightly weathered rock, grey COAL fresh rock, black, with minor carbonaceous, slightly weathered, dark grey claystone CLAYSTONE carbonaceous, distinctly weathered rock, dark grey to black, becoming fresh COAL fresh rock, black, with some claystone SANDSTONE fresh rock, fine-medium grained, light grey SLTSTONE dark grey SLTSTONE fresh rock, light grey CLAYSTONE slightly weathered rock, grey SLTSTONE slightly weathered rock, grey COAL fresh rock, black, with some claystone SANDSTONE fresh rock, medium grained, light grey	Bentonite - cement grout Seal: Bentonite pellets 1/4" Washed Gravel pack 1-2mm Machine slotted 50mmNB uPVC Cl. 18, threaded, in 3m lengths Seal: Bentonite pellets 1/4"	MV BEN
38			SANDSTONE fresh rock, medium grained, light grey	EOH 59.3m b.o.l. backfilled with cement-bentonite-grout	

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0055A

Page: 1 of 1

Client: Shenhua Watermark Coal P/L
 Project: Shenhua Watermark Project No.: EL7223
 Location: Watermark, Gunnedah, NSW, Australia
 Date Drilled: 21/09/2009

Drill Co: GOS
 Driller: Steve Twigden
 NOW Groundwater Licence #: 90BL255163
 Total Depth (m): 17

Easting: 250486.07 Northing: 6538988.21 Elevation: 314.65
 Licenced Driller: John Carrigan
 Grid Ref: MGA94 Zone 56 Vertical: AHD
 Logged by: AF

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
			sandy CLAY orange, highly plastic, medium to coarse grained sand		
			sandy CLAY light orange-brown, as above		
			clayey SAND orange, medium grained, subangular		
			SAND orange, medium grained, subangular-subrounded		
			SAND finer grained, as above		
			SAND orange, medium to coarse grained		
			SAND orange, medium grained, trace light orange clay		
			SAND poorly sorted medium grained sand, subangular-subrounded		
8			SAND orange, medium grained		
			SAND grading finer grained sand		
			SAND orange, fine grained sand		
			SANDSTONE and SILTSTONE		
			END OF BOREHOLE @ 17.34m bgl		
18					

Bentonite - cement grout

Casing: 50mm NB uPVC Cl.18
 threaded, in 3m lengths

Seal: bentonite pellets 1/4"

Washed gravel pack 1-2mm

Screen: 50mmNB Cl.18 uPVC
 machine-slotted 0.4mm aperture
 threaded, in 3m lengths

Collapse

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0059

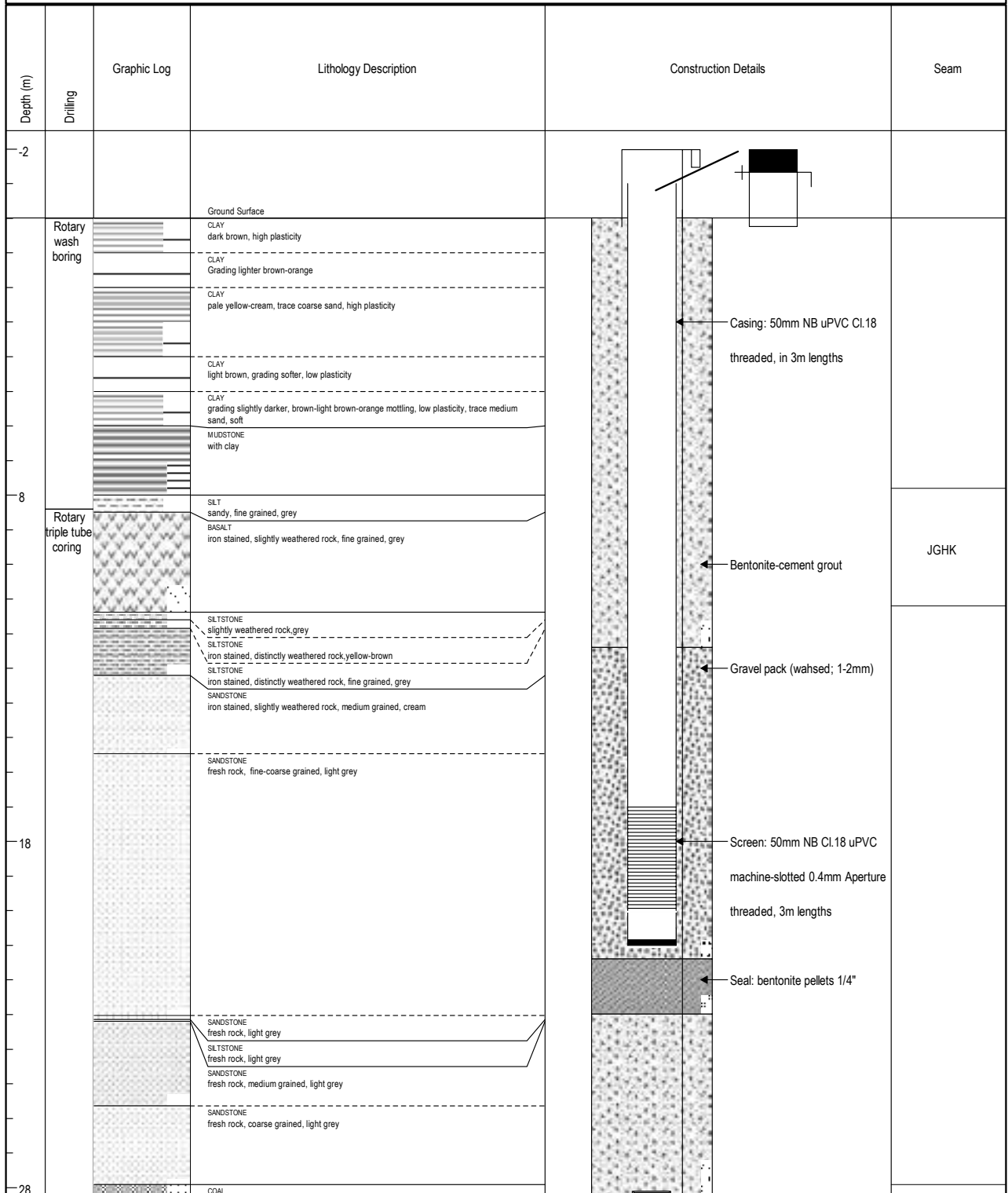
Page: 1 of 3

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 17/08/2009

Drill Co: GOS
Driller: Stuart Smith
NOW Groundwater Licence #: 90BL255150
Total Depth (m): 77.45

Easting: 252486.53 Northing: 6541474.42 Elevation: 319.09
Licenced Driller: John Carrigan
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: TG/AM

Checked by: Ben Jansen



NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0059

Page: 3 of 3

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 17/08/2009

Drill Co: GOS
Driller: Stuart Smith
NOW Groundwater Licence #: 90BL255150
Total Depth (m): 77.45

Easting: 252486.53 Northing: 6541474.42 Elevation: 319.09
Licenced Driller: John Carrigan
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: TG/AM

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
68			SILTSTONE fresh rock, fine grained, light grey SANDSTONE fresh rock, medium-coarse grained, light grey CONGLOMERATE fresh rock, coarse grained and granular, light grey, some sandstone SANDSTONE fresh rock, coarse grained, light grey CLAYSTONE carbonaceous, fresh rock, grey MUDSTONE fresh rock, grey CLAYSTONE carbonaceous, fresh rock, dark grey COAL fresh rock, black, with grey sandstone and claystone CLAYSTONE carbonaceous, fresh rock, dark grey SANDSTONE fresh rock, fine grained, light grey SIDERITE fresh rock, fine grained, grey SANDSTONE fresh rock, fine grained, light grey MUDSTONE fresh rock, grey CLAYSTONE carbonaceous, fresh rock, dark grey COAL fresh rock, black, with claystone SILTSTONE fresh rock, light grey END OF BOREHOLE @ 77.45m bgl	Piezo cable to surface V1 - (SN:11572) zero: 8799@16°C; gauge: 0.28580; initial: 7186 Grouting Holes in carrier pipe Threaded end-cap fitted	BEN B2
78					
88					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0060LR

Page: 1 of 3

Client: Shenhua Watermark Coal P/L
 Project: Shenhua Watermark Project No.: EL7223
 Location: Watermark, Gunnedah, NSW, Australia
 Date Drilled: 23/04/2010

Drill Co: Depco
 Driller: Neil Gill
 NOW Groundwater Licence #: 90BL255709
 Total Depth (m): 96.55

Easting: 251502.04 Northing: 6540667.47 Elevation: 339.66
 Licenced Driller: Sam Floss
 Grid Ref: MGA94 Zone 56 Vertical: AHD
 Logged by: AM Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
			SILT sandy, fine grained, brown		
			SAND silty, fine grained, brown		
8			SAND silty, fine to medium grained, yellow-brown		
			CLAY sandy, fine to medium grained, yellow-brown		
			CLAYSTONE iron stained, extremely weathered rock, fine grained, yellow-brown		
			SANDSTONE iron stained, extremely weathered rock, fine grained, yellow		
			CLAYSTONE carbonaceous iron stained, extremely weathered rock, fine grained, light grey		
18			COAL undifferentiated, extremely weathered rock, fine grained, dark grey-black		HKR
			COAL some trace gravel, dull with brights 5% -10%, distinctly weathered rock, dark grey-black		HKU

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):

**BOREHOLE LOG**

Groundwater Installation

Bore No.: WM0060LR

Page: 2 of 3

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 23/04/2010

Drill Co: Depco
Driller: Neil Gill
NOW Groundwater Licence #: 90BL255709
Total Depth (m): 96.55

Easting: 251502.04 **Northing:** 6540667.47 **Elevation:** 339.66
Licensed Driller: Sam Floss
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: AM **Checked by:** GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			SILTSTONE fresh rock, grey		
			SILTSTONE with thin sandstone bands, fresh rock, dark grey		
			SILTSTONE and SANDSTONE fresh rock, dark grey		
33			COAL with minor sandstone, dull with brights 10%-40%, fresh rock, black		
			CLAYSTONE with siderite, fresh rock, grey		
43			SANDSTONE fresh rock, medium grained, light grey		
					F

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0060LR

Page: 3 of 3

Client: Shenhua Watermark Coal P/L
 Project: Shenhua Watermark Project No.: EL7223
 Location: Watermark, Gunnedah, NSW, Australia
 Date Drilled: 23/04/2010

Drill Co: Depco
 Driller: Neil Gill
 NOW Groundwater Licence #: 90BL255709
 Total Depth (m): 96.55

Easting: 251502.04 Northing: 6540667.47 Elevation: 339.66
 Licenced Driller: Sam Floss
 Grid Ref: MGA94 Zone 56 Vertical: AHD
 Logged by: AM Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			COAL with claystone fragments, dull with brights 5%-10%, fresh rock, black		EU
			SILTSTONE with bands of claystone, carbonaceous, fresh rock, brown-grey		EL
			COAL with claystone and siderite, dull with brights 5%-10%, fresh rock, black		DU
			SILTSTONE with bands of coal, fresh rock, light grey		
			CLAYSTONE with films of coal, fresh rock, grey		DL
58			Carbonaceous MUDSTONE with traces of coal, fresh rock, black		CU
			CLAYSTONE with bands of siderite, fresh rock, grey		
			COAL with mudstone, dull with brights 5%-10%, fresh rock, black		
			CONGLOMERATE fresh rock, coarse grained, light grey		
			SILTSTONE with minor claystone, fresh rock, grey		
			COAL bands of claystone, dull with brights 5%-10%, fresh rock, black		
			SILTSTONE with trace claystone, fresh rock, grey		B
			COAL trace gravel, fresh rock, dark grey		
			SANDSTONE and SILTSTONE with trace siderite, fresh rock, medium grained, light grey		
68			SILTSTONE fresh rock, light grey		
				EOH 96m bgl, backfilled cement-bentonite-grout	

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):

**BOREHOLE LOG**

Groundwater Installation

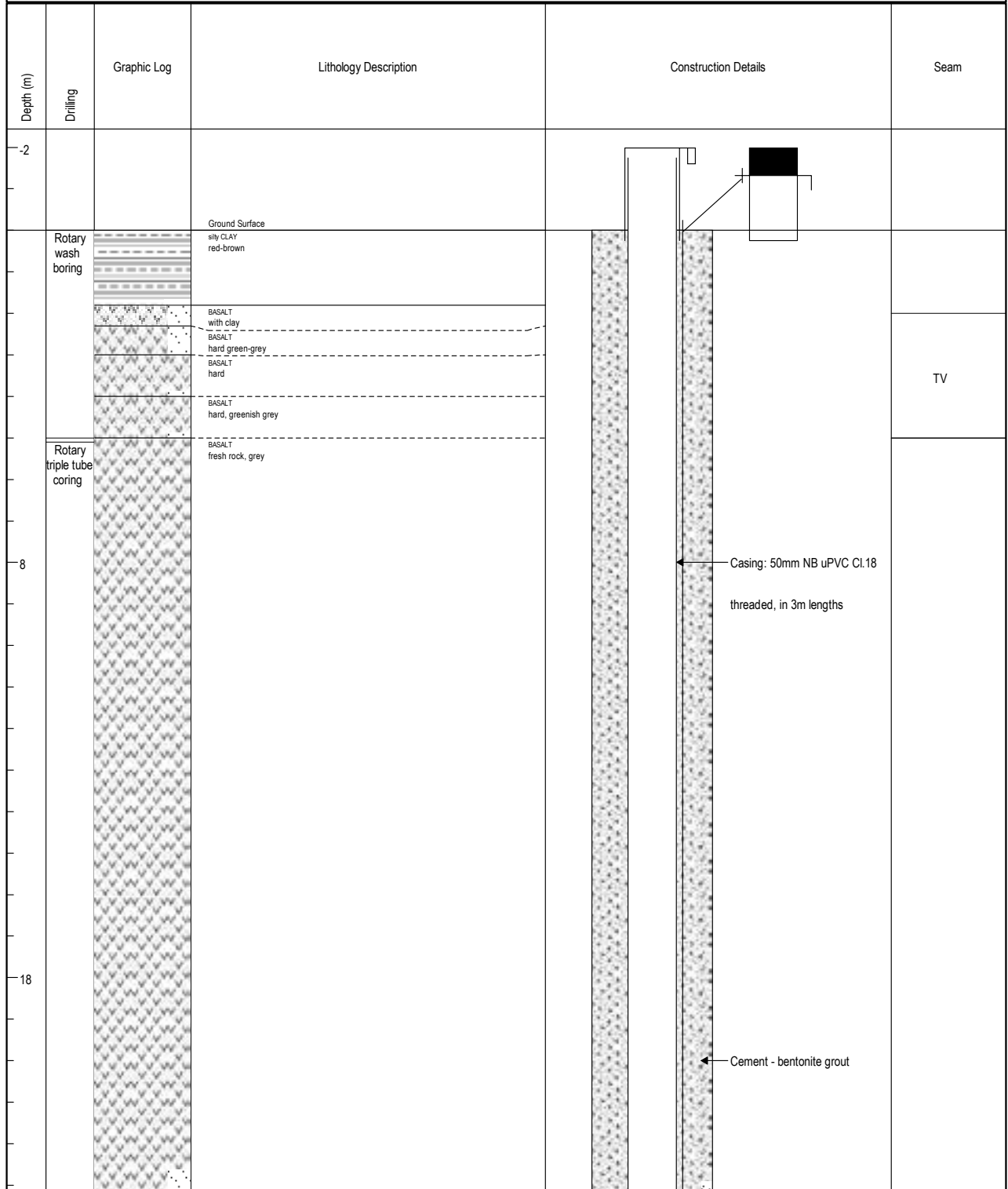
Bore No.: WM0062

Page: 1 of 5

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 11/08/2009

Drill Co: GOS
Driller: Steve Laverie
NOW Groundwater Licence #: 90BL255151
Total Depth (m): 107.27

Easting: 253551.22 **Northing:** 6540114.51 **Elevation:** 317.06
Licensed Driller: John Carrigan
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: SM

Checked by: Ben Jansen**NOTES**

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



Page: 2 of 5

Elevation: 317.06

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
33					TV
43					
			SAND quartzose, fresh rock, coarse grained, light grey		
			COAL fresh rock, with dark grey claystone		F

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0062

Page: 3 of 5

Client: Shenhua Watermark Coal P/L

Project: Shenhua Watermark Project No.: EL7223

Location: Watermark, Gunnedah, NSW, Australia

Date Drilled: 11/08/2009

Drill Co: GOS

Driller: Steve Laverie

NOW Groundwater Licence #: 90BL255151

Total Depth (m): 107.27

Easting: 253551.22

Northing: 6540114.51

Elevation: 317.06

Licensed Driller: John Carrigan

Grid Ref: MGA94 Zone 56 Vertical: AHD

Logged by: SM

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			CLAYSTONE carbonaceous, fresh rock, cream SANDSTONE silty, fresh rock, medium grained, light grey, coaly lenticles SILTSTONE fresh rock, grey, coaly lenticles SANDSTONE silty, fresh rock, medium grained, light grey COAL fresh rock, with grey sandstone and claystone SANDSTONE silty, fresh rock, fine grained, light grey, coaly lenticles SILTSTONE fresh rock, grey CLAYSTONE carbonaceous, fresh rock, dark grey, coaly lenticles COAL fresh rock, dark grey to black, with siltstone and claystone SANDSTONE fresh rock, fine-medium grained, light grey, with coaly lithics SILTSTONE fresh rock, light grey COAL fresh rock, dark grey to black SILTSTONE fresh rock, grey, coaly lenticles SANDSTONE fresh rock, dark grey CLAYSTONE carbonaceous, fresh rock, dark grey to black SILTSTONE fresh rock COAL fresh rock, dark grey to black, with siltstone SANDSTONE silty, fresh rock, fine to medium grained, light grey, coaly lenticles SILTSTONE fresh rock, dark grey, coaly lenticles COAL fresh rock, dark grey to black, with siltstone and claystone SANDSTONE fresh rock, medium grained SILTSTONE sandy, fresh rock, medium grained, light grey, coaly lenticles CONGLOMERATE fresh rock, coarse grained and granular, light grey, coaly lenticles	machine-slotted (0.4mm Ap) threaded, in 3m lengths PVC Sump w/ threaded end-cap Seal: bentonite pellets 1/4" Cement-bentonite grout Piezo cable to surface mild steel j-latch back-off	E D C B

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0062

Page: 4 of 5

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 11/08/2009

Drill Co: GOS
Driller: Steve Laverie
NOW Groundwater Licence #: 90BL255151
Total Depth (m): 107.27

Easting: 253551.22 **Northing:** 6540114.51 **Elevation:** 317.06
Licensed Driller: John Carrigan
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: SM

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			SILTSTONE sandy, fresh rock, light grey, coaly lenticles		
83			CONGLOMERATE fresh rock, coarse grained and granular, light grey, coaly lenticles		
			SANDSTONE silty, fresh rock, fine grained, light grey		
			SILTSTONE sandy, fresh rock, grey		
			SANDSTONE fresh rock, coarse grained, light grey		
93			SILTSTONE fresh rock, light grey, coaly lenticles		
			COAL fresh rock, black, with claystone and siltstone		
			SANDSTONE silty, fresh rock, medium grained, light grey, coaly lenticles		
				V2 @ 73.5m (SN: 11573) zero: 8690@20°C; gauge: 0.28120; initial: 7197@23°C Carrier pipe: 40mm NB cl.18 uPVC threaded, in 3m lengths V1 @ 95.0m (SN: 11575) zero: 9090@23°C; gauge: 0.27190; initial: 6931@24°C	MV

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0062

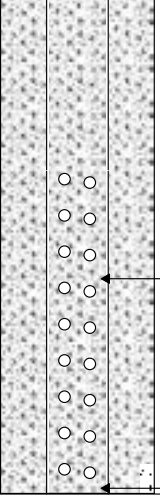
Page: 5 of 5

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 11/08/2009

Drill Co: GOS
Driller: Steve Laverie
NOW Groundwater Licence #: 90BL255151
Total Depth (m): 107.27

Easting: 253551.22 Northing: 6540114.51 Elevation: 317.06
Licenced Driller: John Carrigan
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: SM

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			SIDERITE fresh rock SANDSTONE silty, fresh rock, medium grained, light grey, coaly lenticles SILTSTONE fresh rock, light grey, coaly lenticles CLAYSTONE carbonaceous, fresh rock, brown-grey, coaly lenticles COAL fresh rock, dark grey to black, with claystone SILTSTONE sandy, fresh rock, light grey CLAYSTONE carbonaceous, fresh rock, dark grey COAL fresh rock, dark grey to black SILTSTONE sandy, fresh rock, light grey, coaly lenticles SANDSTONE silty, fresh rock, medium grained, light grey END OF BOREHOLE @ 107.2m bgl	 Grouting holes in carrier pipe Threaded End cap fitted	BEN B2
108					
118					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0063L

Page: 1 of 3

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 5/04/2011

Drill Co: Depco
Driller: Sam Floss
NOW Groundwater Licence #: 90BL255912
Total Depth (m): 79.81

Easting: 252505.73 **Northing:** 6539495.98 **Elevation:** 306.85
Licensed Driller: Allen Carlon
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: ME

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
			ALLUVIUM clayey throughout, extremely weathered rock, fine to medium grained, brown, chipped core moderately soft		
			CLAY minor basaltic clasts, distinctly weathered rock, fine to medium grained, orange, chipped core moderately soft		JGHK
			CLAY silty throughout, distinctly weathered rock, fine to very fine grained, grey-brown, chipped core moderately soft		
			CLAY minor silty throughout, distinctly weathered rock, fine to very fine grained, orange, chipped core moderately soft		
			CLAY distinctly weathered rock, fine to very fine grained, orange, chipped core moderately soft		
			CLAY muddy throughout, distinctly weathered rock, fine to very fine grained, orange, chipped core, very soft		
			MUDSTONE slightly carbonaceous, distinctly weathered rock, fine to very fine grained, dark brown, chipped core, very soft		HKU
			weathered COAL minor muddy throughout, slightly weathered rock, black, chipped core moderately soft		
			MUDSTONE siltstone throughout, fresh rock, fine to very fine grained, brown, cored, moderately hard		
			COAL with minor mudstone dull with brights 5%-10%, fresh rock, black, moderately soft		HKL
			SANDSTONE muddy siltstone throughout, fresh rock, fine to medium grained, light grey, moderately hard		
			SANDSTONE carbonaceous throughout, fresh rock, medium grained, light grey, moderately hard		
			SANDSTONE muddy carbonaceous, fresh rock, medium grained, light grey, moderately hard		
			SANDSTONE with thin bands of coal and mudstone, carbonaceous lenses, fresh rock, medium to		
28				Bentonite pellets	F

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0063L

Page: 2 of 3

Client: Shenhua Watermark Coal P/L

Project: Shenhua Watermark Project No.: EL7223

Location: Watermark, Gunnedah, NSW, Australia

Date Drilled: 5/04/2011

Drill Co: Depco

Driller: Sam Floss

NOW Groundwater Licence #: 90BL255912

Total Depth (m): 79.81

Easting: 252505.73

Northing: 6539495.98

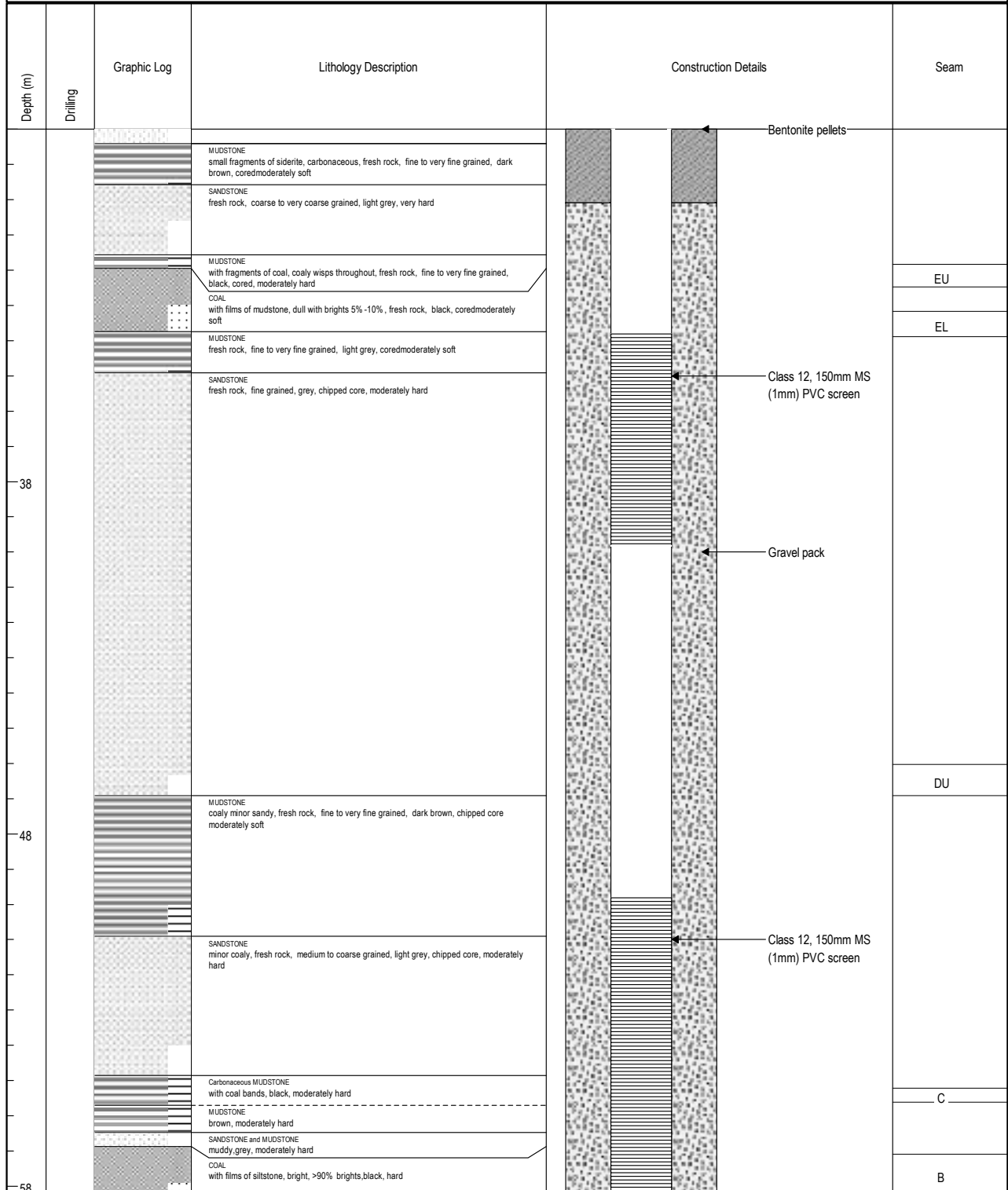
Elevation: 306.85

Licenced Driller: Allen Carlon

Grid Ref: MGA94 Zone 56 Vertical: AHD

Logged by: ME

Checked by: GF



NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0063L

Page: 3 of 3

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 5/04/2011

Drill Co: Depco
Driller: Sam Floss
NOW Groundwater Licence #: 90BL255912
Total Depth (m): 79.81

Easting: 252505.73 **Northing:** 6539495.98 **Elevation:** 306.85
Licensed Driller: Allen Carlson
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: ME **Checked by:** GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
68			SANDSTONE fine grained, grey, hard		
			MUDSTONE grey, unbroken core, moderately hard		
			COAL with thin layers of mudstone, dull with brights 5%-10%, black, hard		MV
			MUDSTONE with minor siltstone, grey, moderately hard		
			SANDSTONE towards middle of unit towards base of unit, fine grained, grey, hard		
			MUDSTONE with films of coal, brown, moderately hard		
			COAL with finely embedded gravel, black, hard		BEN
78			SANDSTONE fine grained, grey, hard		
			END OF BOREHOLE @ 79.81m bgl		
88					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):

**BOREHOLE LOG**

Groundwater Installation

Bore No.: WM0067A

Page: 1 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 7/12/2009

Drill Co: GOS
Driller: Steve Laverie
NOW Groundwater Licence #: 90BL255152
Total Depth (m): 42

Easting: 241599.4 **Northing:** 6535286.8 **Elevation:** 312.55
Licensed Driller: Wayne McLean
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: GHD

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
	Rotary wash boring		TOPSOIL dark grey clay, cohesive, soft, with trace coarse sand-fine gravel		
			silty CLAY pale yellow-brown, soft		
			clayey SAND pale yellow-brown, fine silty sand		
			silty CLAY pale yellow-brown, soft, 50% silt, 50% clay		
8			silty SAND red-yellow, fine to very fine grained		
			SILT orange brown, uniform grained size, minor clay content		
			clayey SILT dark red-brown,		
			silty SAND dark red-brown, fine uniform grain size		
18			gravely CLAY dark red-brown, subrounded/subangular gravel, up to 10mm typically angular gravels and coarse sand up to 1-2m		
			sandy CLAY dark red-brown, minor fresh dark grey mudstone fragments up to 3mm, 25%		
				Cement - bentonite grout	
				50mm NB uPVC CL 18 threaded, in 3m lengths	

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0067A

Page: 2 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 7/12/2009

Drill Co: GOS
Driller: Steve Laverie
NOW Groundwater Licence #: 90BL255152
Total Depth (m): 42

Easting: 241599.4 **Northing:** 6535286.8 **Elevation:** 312.55
Licensed Driller: Wayne McLean
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: GHD

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			sandy CLAY yellow-brown to tan, soft, low cohesivity, fine sand 10-15%		
			clayey SAND yellow-brown, uniform fine grain sand		
	Rotary triple tube coring		CONGLOMERATE highly weathered		
34			SANDSTONE with CONGLOMERITE, highly weathered		
			MUDSTONE carbonaceous, with coarse sand stone and conglomerite		
			COAL		
			SILTSTONE with clay, pale grey, minor weathering		
44			CONGLOMERATE		
			MUDSTONE weathered, pale grey		
			COAL		
			CONGLOMERATE interbedded with mudstone		
			END OF BOREHOLE @ 49m bgl		
				Washed Gravel; 1-2mm bentonite pellets 1/4" Gravel pack; 1-2mm 50mm NB uPVC CI. 18 machine slotted, 0.4mm 0.5m PVC sump, threaded Hole collapse	

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0091

Page: 1 of 2

Client: Shenhua Watermark Coal P/L

Project: Shenhua Watermark Project No.: EL7223

Location: Watermark, Gunnedah, NSW, Australia

Date Drilled: 23/03/2011

Drill Co: Depco

Driller: Damien Lagos

NOW Groundwater Licence #: 90BL255156

Total Depth (m): 450

Easting: 252512.65

Northing: 6535168.21

Elevation: 292.54

Licenced Driller: Allen Carlon

Grid Ref: MGA94 Zone 56 Vertical: AHD

Logged by: DC

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface TOPSOIL clayey, extremely weathered rock, brown, chipped coresoft		
			CLAY slightly sandy, extremely weathered rock, brown, chipped core, very soft		
			CLAY extremely weathered rock, brown, chipped core, very soft		
8			CLAY pebbly towards base of unit, extremely weathered rock, brown, moderately soft		QN
			SAND clayey in part, distinctly weathered rock, fine to coarse grained, brown, soft		
			CLAY sandy in part, distinctly weathered rock, brown, chipped coresoft		
28			SAND pebbly throughout, distinctly weathered rock, fine to coarse grained, brown, chipped core, very soft		
			SILTSTONE with stone bands, fresh rock, grey, broken core, moderately hard		CLR
38					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0091

Page: 2 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 23/03/2011

Drill Co: Depco
Driller: Damien Lagos
NOW Groundwater Licence #: 90BL255156
Total Depth (m): 450

Easting: 252512.65 **Northing:** 6535168.21 **Elevation:** 292.54
Licensed Driller: Allen Carlon
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: DC **Checked by:** GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
48			SANDSTONE fresh rock, medium grained, grey, moderately hard		
			MUDSTONE slightly carbonaceous, fresh rock, grey, moderately hard		HKR
			stony COAL fresh rock, black, cored, moderately soft		HKU
58			MUDSTONE carbonaceous, fresh rock, grey, cored, moderately hard		HKL
			SILTSTONE interbedded with lithic mudstone, fresh rock, grey, cored, moderately hard		
			SANDSTONE interbedded with siltstone, coaly wisps towards top of unit, fresh rock, fine grained, grey, cored, hard		
68			COAL bright, >90% brights, fresh rock, black, cored, moderately hard		
78			EOH 450m bgl, hole backfilled with cement-bentonite-grout		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):

**BOREHOLE LOG**

Groundwater Installation

Bore No.: WM0091A

Page: 1 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 12/04/2011

Drill Co: Go Drill
Driller: Ranold Thorne
NOW Groundwater Licence #: 90BL255285
Total Depth (m): 38

Easting: 252507.30 **Northing:** 6535104.71 **Elevation:** 0
Licensed Driller: Allen Carlon
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: TG **Checked by:** GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
			CLAY silty		
				3% Bentonite Grout	
				50 mm Class 18 PVC Blank	
8			CLAY silty, litho-feldspathic, sandy		
			CLAY sandy silty		
			CLAY sandy litho-feldspathic gravelly		
			CLAY sandy gravelly litho-feldspathic		
			CLAY sandy		
18			CLAY sandy silty		
			CLAY sandy gravelly		
			CLAY sandy		
				Bentonite Pellets	
					QN

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0091A

Page: 2 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 12/04/2011

Drill Co: Go Drill
Driller: Ranold Thorne
NOW Groundwater Licence #: 90BL255285
Total Depth (m): 38

Easting: 252507.30 **Northing:** 6535104.71 **Elevation:** 0
Licensed Driller: Allen Carlon
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: TG

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			CLAY gravelly litho-feldspathic CLAY sandy CLAY gravelly, lithic, fine grained, mottled grey-brown and orange-stained, sub-rounded CLAY slightly gravelly, fine grained, pale brown, firm GRAVEL clayey, lithic, fine grained, pale brown, loose, well to sub-rounded CLAY sandy, slightly gravelly, fine grained, pale brown, firm, sub-angular to sub-rounded CLAY slightly sandy and gravelly, fine grained, pale brown, stiff, high plastic, moist GRAVEL clayey and lithic, firm, pale brown, extremely weathered, loose, sub-rounded END OF BOREHOLE @ 38m bgl	 Void/ Natural Material 22 (Clay swollen & prevented full gravel) 50mm Class 18 MS PVC Screen Gravel Pack 50 mm Class 18 MS PVC Slump	CLR
33					
43					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0091B

Page: 1 of 1

Client: Shenhua Watermark Coal P/L Project: Shenhua Watermark Project No.: EL7223 Location: Watermark, Gunnedah, NSW, Australia Date Drilled: 15/03/2011			Drill Co: Boart Longyear Driller: Gavin Keith NOW Groundwater Licence #: 90BL255586 Total Depth (m): 48.5			Easting: 252512.65 Northing: 6535168.21 Elevation: 292.54 Licensed Driller: Paul Griffiths Grid Ref: MGA94 Zone 56 Vertical: AHD Logged by: GS			Checked by: GF		
Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details			Seam				
-2			Ground Surface								
	Sonic Core					QN					
8			CLAY silty, litho-feldspathic, sandy CLAY sandy silty CLAY sandy litho-feldspathic gravelly CLAY sandy gravelly litho-feldspathic CLAY sandy								
18			CLAY sandy silty CLAY sandy gravelly CLAY sandy CLAY gravelly litho-feldspathic CLAY sandy								
28			CLAY gravelly, lithic, fine grained, mottle grey-brown and orangestiff, sub-rounded CLAY slightly gravelly, fine grained, pale brown, firm								
38			GRAVEL clayey, lithic, fine grained, pale brown, loose, well to sub-rounded CLAY sandy, slightly gravelly, fine grained, pale brown, firm, sub-angular to sub-rounded CLAY slightly sandy and gravelly, fine grained, pale brown, stiff, highly plastic, moist GRAVEL clayey and lithic, firm, pale brown, extremely weathered, loose, sub-rounded MUDSTONE distinctly weathered rock, grey, crushed core SANDSTONE distinctly weathered rock, grey	Bentonite Seal 50 mm Class 18 machine slotted PVC 0.4 mm Slots PVC Sump PVC Endcap			CLR				
48			COAL black END OF BOREHOLE @ 48.5m bgl								

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0092

Page: 1 of 2

Client: Shenhua Watermark Coal P/L
 Project: Shenhua Watermark Project No.: EL7223
 Location: Watermark, Gunnedah, NSW, Australia
 Date Drilled: 2/03/2011

Drill Co: Depco
 Driller: Damien Lagos
 NOW Groundwater Licence #: 90BL255157
 Total Depth (m): 120.39

Easting: 252881.66 Northing: 6536743.99 Elevation: 292.21
 Licenced Driller: Neil Gill
 Grid Ref: MGA94 Zone 56 Vertical: AHD
 Logged by: GS Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface	Lockable Steel Bore Cover	
8			SAND sandy, extremely weathered rock, medium to coarse grained, black	Class 12 100mm PVC Cement bentonite 3% grout	QN
18			CLAY sandy carbonaceous, distinctly weathered rock, dark grey		
28			SILTSTONE sandy, distinctly weathered rock		
			SANDSTONE distinctly weathered rock		
38			SANDSTONE coaly, fresh rock, medium to coarse grained, grey	50 mm Class 18 PVC Threaded	EL
			PEBBLE CONGLOMERATE lithic coaly, fresh rock, fine to medium gravel, grey, hard		
			SANDSTONE coaly silty clasts, fresh rock, medium to coarse grained, dark grey, hard		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0092

Page: 2 of 2

Client: Shenhua Watermark Coal P/L

Project: Shenhua Watermark Project No.: EL7223

Location: Watermark, Gunnedah, NSW, Australia

Date Drilled: 2/03/2011

Drill Co: Depco

Driller: Damien Lagos

NOW Groundwater Licence #: 90BL255157

Total Depth (m): 120.39

Easting: 252881.66

Northing: 6536743.99

Elevation: 292.21

Licenced Driller: Neil Gill

Grid Ref: MGA94 Zone 56 Vertical: AHD

Logged by: GS

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
53			SILTSTONE fresh rock, grey, moderately hard		
			COAL dull <1% brights calcitic clayey		C
			SANDSTONE silty silicified, fresh rock, fine grained, grey, fragmented core, hard		B
63			SANDSTONE fresh rock, medium to coarse grained, grey, hard		
			COAL dull with brights 10%-40% silty, fresh rock, black, cored, hard		
			SANDSTONE fresh rock, medium to coarse grained, grey, cored, hard		
			COAL interbedded with siltstone, clayey dull <1% brights, fresh rock, black, cored, moderately hard		MV
73			SANDSTONE silty, fresh rock, medium to coarse grained, grey, cored, hard		
			COAL dull with brights 10%-40% calcitic, fresh rock, black, cored, hard		Ben
			SILTSTONE coaly clayey, fresh rock, grey, cored, hard		B2
			SANDSTONE fresh rock, fine to coarse grained, grey, cored, hard		
83			COAL dull <1% brights, fresh rock, black, moderately hard		
			SANDSTONE interbedded with clay, fresh rock, cored, hard		
			SANDSTONE coaly, fresh rock, medium to coarse grained, grey, cored, hard		
			EOH 120m bgl, back filled with cement-bentonite-grout		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0092A

Page: 1 of 1

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 17/03/2011

Drill Co: Boart Longyear
Driller: Gavin Keith
NOW Groundwater Licence #: 90BL255286
Total Depth (m): 20.5

Easting: 252909.45 **Northing:** 6536741.03 **Elevation:** 292.21
Licensed Driller: Paul Griffith
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: GS **Checked by:** GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2				Lockable steel bore cover	
	Sonic Core		Ground Surface TOPSOIL dark brown CLAY dark brown Core Loss CLAY light brown CLAY brown CLAY distinctly weathered rock, dark brown SAND silty clayey, green CLAY brown CLAY black CLAY brown SLTSTONE dark grey	50 mm Class 18 Threaded PVC 3% Cement Bentonite Grout Bentonite Seal Gravel pack 50 mm Class 18 Machine slotted PVC 0.4mm slots 0.5m PVC sump PVC end cap Fall back	
8					
18					
			END OF BOREHOLE @ 20m bgl		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):

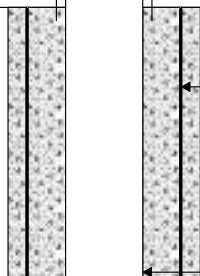
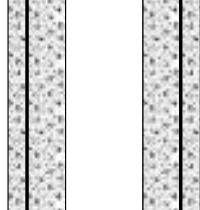
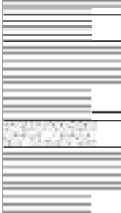
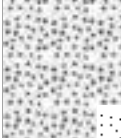


BOREHOLE LOG

Groundwater Installation

Bore No.: WM0093

Page: 1 of 2

Client: Shenhua Watermark Coal P/L Project: Shenhua Watermark Project No.: EL7223 Location: Watermark, Gunnedah, NSW, Australia Date Drilled: 2/04/2011			Drill Co: Go Drill/Depco Driller: Ranold Thorne NOW Groundwater Licence #: 90BL255158 Total Depth (m): 126.3			Easting: 247374.49 Northing: 6534087.7 Elevation: 295.22 Licensed Driller: Neil Gill Grid Ref: MGA94 Zone 56 Vertical: AHD Logged by: BL			Checked by: GF		
Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details			Seam				
-2			Ground Surface								
			CLAY silty, grey-brown, high plasticity								
8			CLAY silty, brown, high plasticity								
18			CLAY sandy, brown, high plasticity, stiff				QN				
			CLAY silty, brown, high plasticity								
28			SAND clayey slightly gravelly, coarse grained								
			CLAY sandy, coarse grained, brown, high plasticity								
38			GRAVEL clayey sandy, fine to medium gravel (2-20mm), quartz, siltstone, jasper								
			CLAY silty, brown, high plasticity, stiff								
48			GRAVEL clayey, medium gravel (6-20mm), quartz, siltstone, jasper				QG				

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

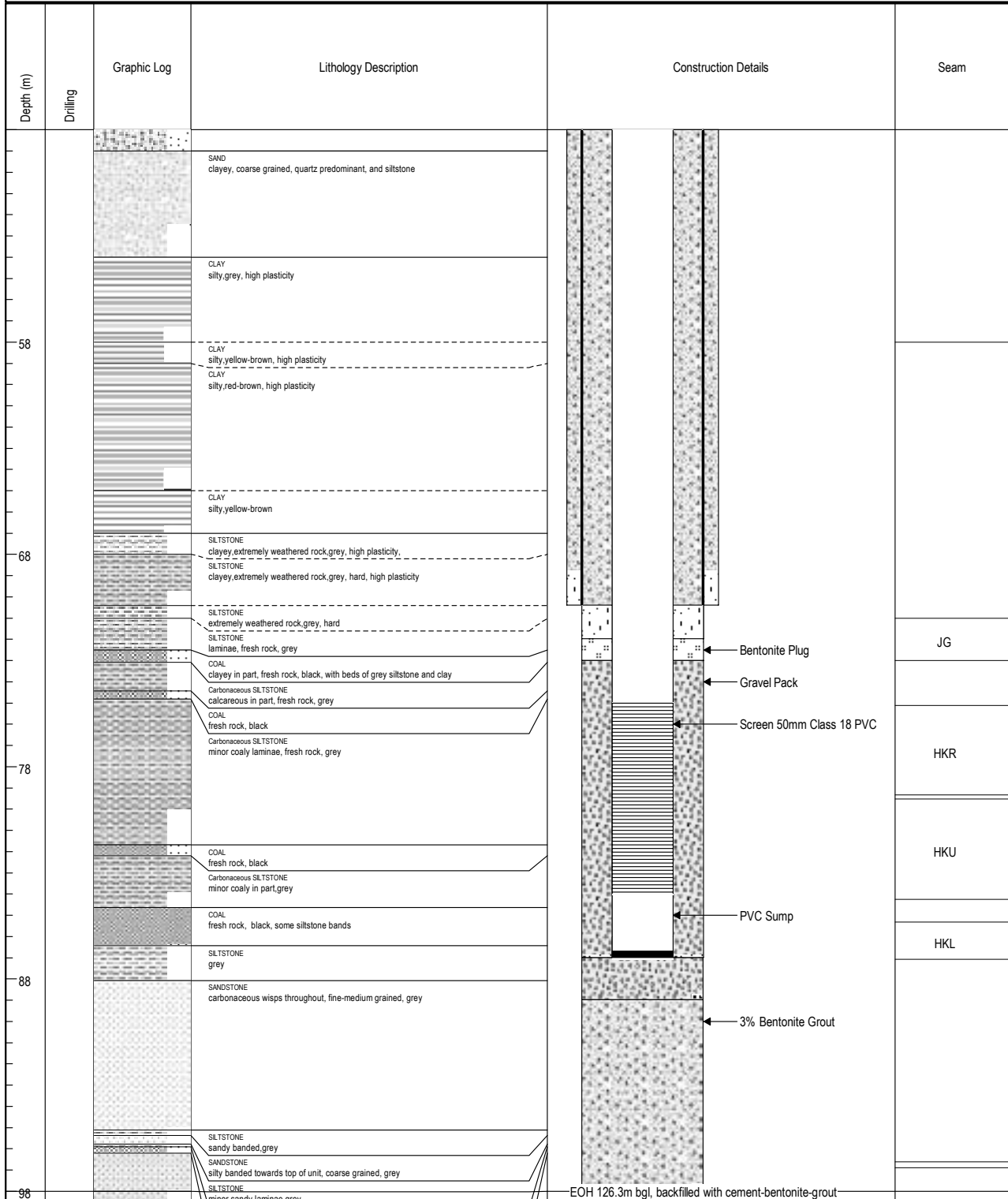
Bore No.: WM0093

Page: 2 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 2/04/2011

Drill Co: Go Drill/Depco
Driller: Ranold Thome
NOW Groundwater Licence #: 90BL255158
Total Depth (m): 126.3

Easting: 247374.49 **Northing:** 6534087.7 **Elevation:** 295.22
Licensed Driller: Neil Gill
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: BL **Checked by:** GF



NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):

**BOREHOLE LOG**

Groundwater Installation

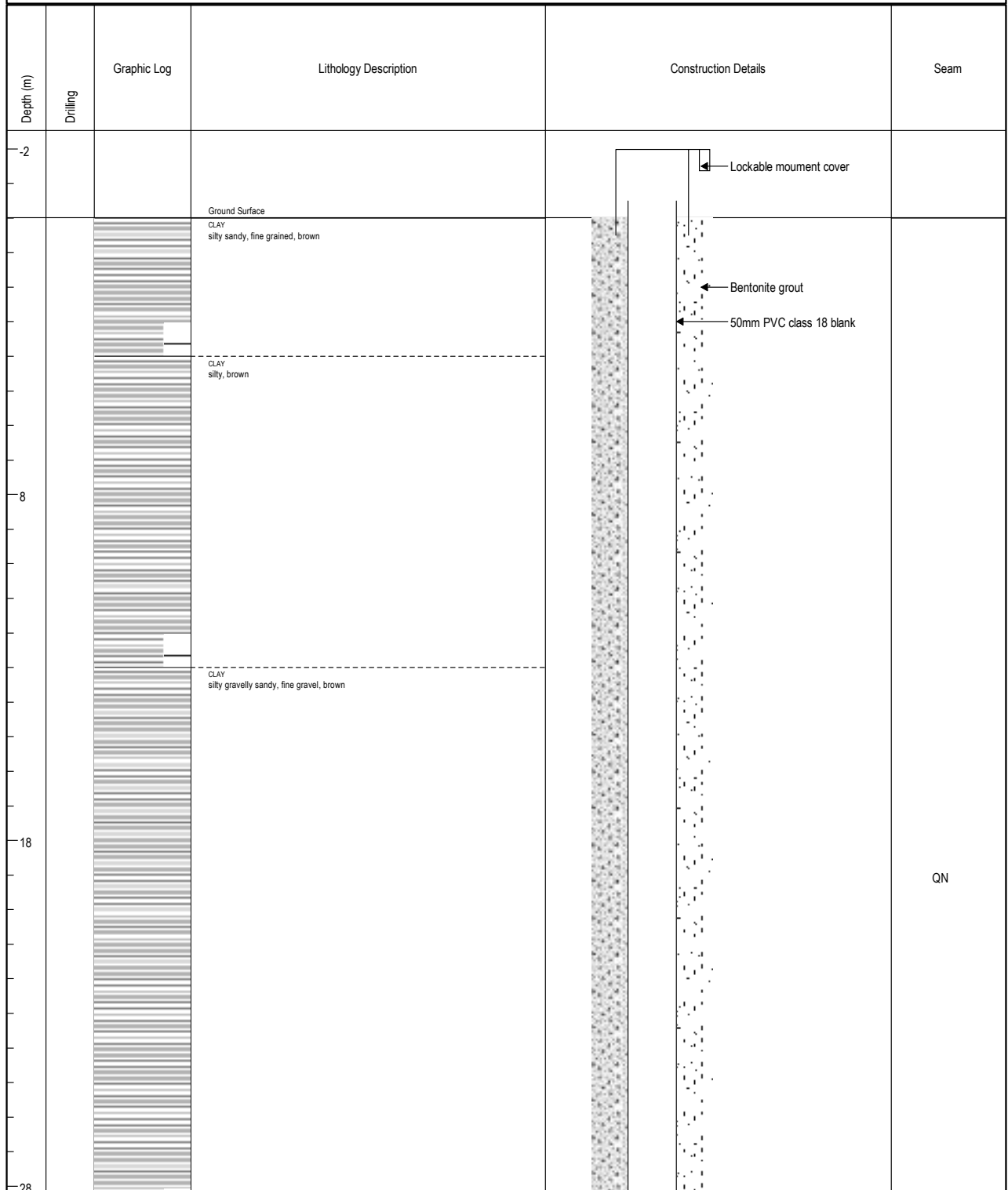
Bore No.: WM0093A

Page: 1 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 9/04/2011

Drill Co: Depco
Driller: Ranold Thorne
NOW Groundwater Licence #: 90BL255287
Total Depth (m): 58

Easting: 247381.47 **Northing:** 6534073.93 **Elevation:** 295.21
Licensed Driller: Neil Gill
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: TC **Checked by:** GF

**NOTES**

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

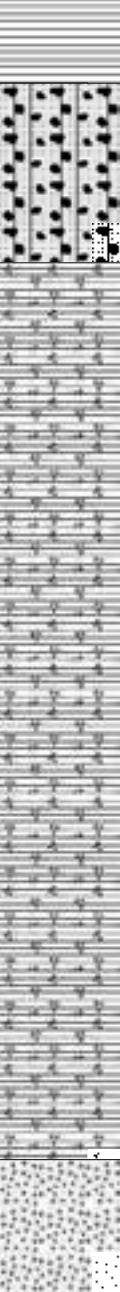
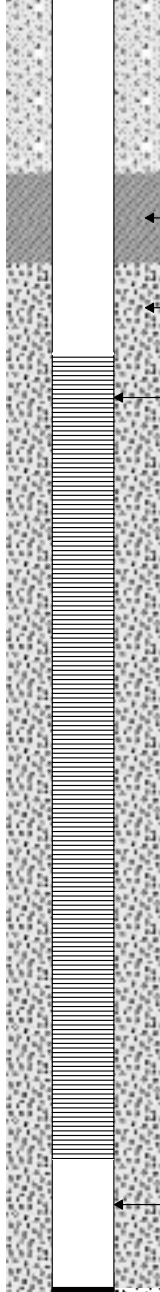
Bore No.: WM0093A

Page: 2 of 2

Client: Shenhua Watermark Coal P/L
 Project: Shenhua Watermark Project No.: EL7223
 Location: Watermark, Gunnedah, NSW, Australia
 Date Drilled: 9/04/2011

Drill Co: Depco
 Driller: Ranold Thorne
 NOW Groundwater Licence #: 90BL255287
 Total Depth (m): 58

Easting: 247381.47 Northing: 6534073.93 Elevation: 295.21
 Licenced Driller: Neil Gill
 Grid Ref: MGA94 Zone 56 Vertical: AHD
 Logged by: TC
 Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			gravelly CLAY sandy, fine gravel, brown clayey GRAVEL sandy, light brown GRAVEL sandy, medium gravel, brown	 Bentonite seal Gravel pack PVC class 18 MS screen PVC sump	
38					
48					
58			END OF BOREHOLE @ 57m bgl		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

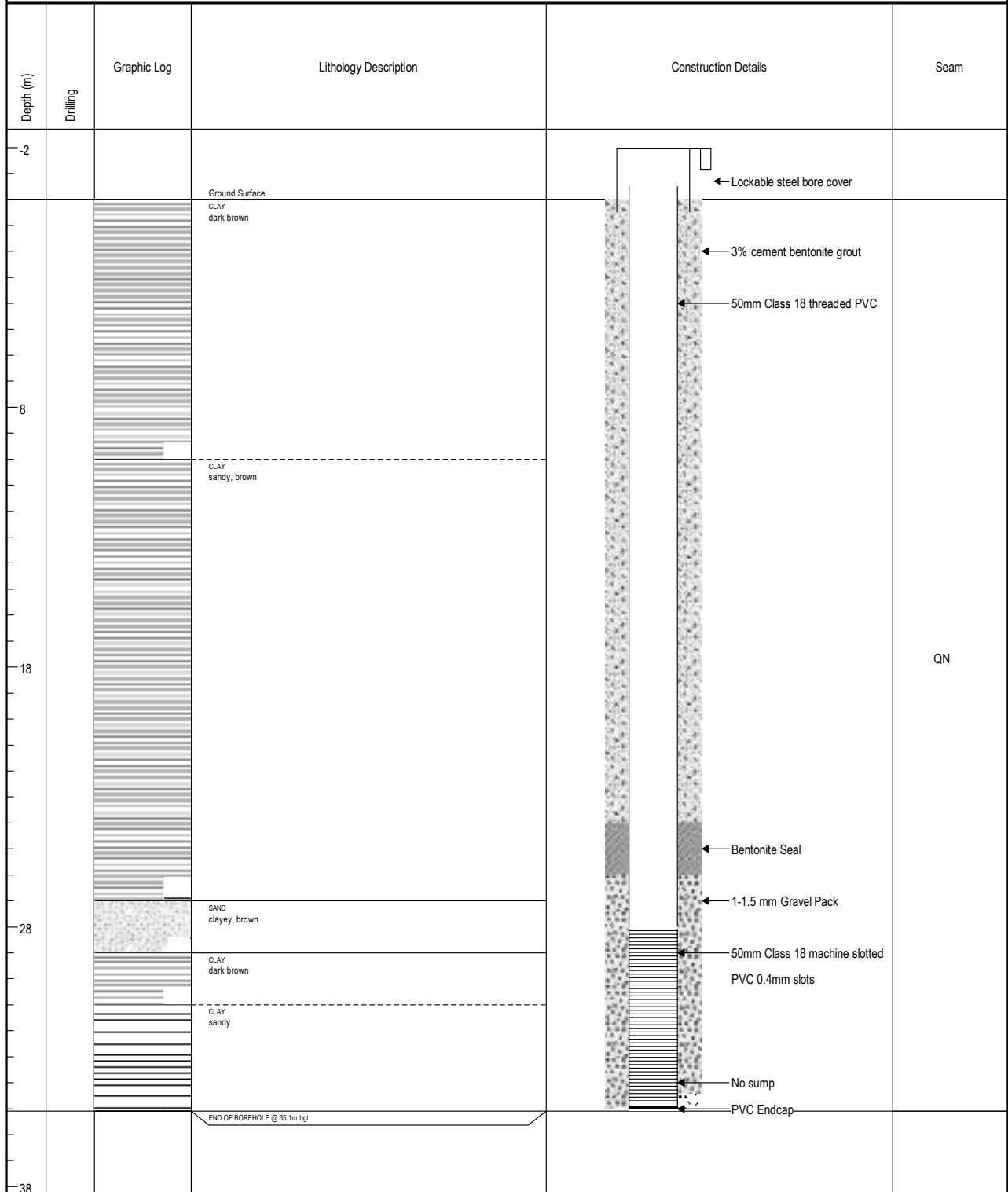
Bore No.: WM0093B

Page: 1 of 1

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 7/03/2011

Drill Co: Boart Longyear
Driller: Gavin Keith
NOW Groundwater Licence #: 90BL255588
Total Depth (m): 35

Easting: 247390.3 Northing: 6534059.51 Elevation: 295.19
Licenced Driller: Paul Rodset
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: BD
Checked by: GF



NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0095L

Page: 1 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 19/05/2010

Drill Co: Depco
Driller: Sam Floss
NOW Groundwater Licence #: 90BL255713
Total Depth (m): 78

Easting: 252211.26 **Northing:** 6537099.87 **Elevation:** 296.68
Licensed Driller: Allen Carlon
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: BSR **Checked by:** GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface	Lockable cover	
			CLAY yellow-brown		
			SAND clayey, coarse grained, light grey		
8			CLAY sandy, medium to coarse grained, yellow-brown		
			MUDSTONE iron stained, extremely weathered rock, yellow-brown		
			SILTSTONE iron stained, distinctly weathered rock, light grey		
			MUDSTONE distinctly weathered rock, grey		
			SILTSTONE fresh rock, grey		
18			SANDSTONE iron stained, distinctly weathered rock, yellow-brown		
			CONGLOMERATE iron stained, distinctly weathered rock, yellow-brown		
			COAL dull with brights 10% -40%, fresh rock, black		
			SANDSTONE silty banded, fresh rock, fine to medium grained, light grey		
28					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):

**BOREHOLE LOG**

Groundwater Installation

Bore No.: WM0095L

Page: 2 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 19/05/2010

Drill Co: Depco
Driller: Sam Floss
NOW Groundwater Licence #: 90BL255713
Total Depth (m): 78

Easting: 252211.26 **Northing:** 6537099.87 **Elevation:** 296.68
Licensed Driller: Allen Carlon
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: BSR **Checked by:** GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
38			COAL dull with brights 5%-10%, fresh rock, black		
			SILTSTONE fresh rock, light grey		
			SANDSTONE fresh rock, fine to medium grained, light grey		
			COAL carbonaceous, fresh rock, grey		
48			MUDSTONE fresh rock, grey		
			SILTSTONE fresh rock, light grey		
			COAL fresh rock, black		
			SILTSTONE fine sandy laminae, fresh rock, grey		
			CONGLOMERATE granular, medium sandy banded, fresh rock, light grey		
58				EOH 78m bgl, backfilled cement-bentonite-grout	

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0105

Page: 1 of 3

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 30/09/2009

Drill Co: GOS
Driller: Stuart Smith
NOW Groundwater Licence #: 90BL255292
Total Depth (m): 71.1

Easting: 252531.89 **Northing:** 6537981.66 **Elevation:** 292.37
Licensed Driller: Wayne McLean
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: JG/AF

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
	Rotary wash boring		CLAY brown, mottled dark grey, trace fine grained gravel, very stiff CLAY yellowish-brown mottled dark grey, very stiff CLAY yellowish-brown, mottled brown, trace coarse grained sand, hard sandy SILT pale whitish brown-pale grey, medium to coarse grained sand, hard		
8	Rotary triple tube coring		SANDSTONE iron stained silty banded, distinctly weathered rock, fine to coarse grained, cream, carbonaceous laminae SANDSTONE iron stained, extremely weathered rock, medium grained, yellow-brown MUDSTONE iron stained, extremely weathered rock, light grey SILTSTONE slightly weathered rock, fine grained, grey CLAYSTONE carbonaceous fossiliferous, slightly weathered rock, dark grey, coaly lentils SANDSTONE slightly weathered rock, fine to medium grained, light grey SANDSTONE iron stained, distinctly weathered rock, medium to coarse grained, yellow-brown, coaly lentils CONGLOMERATE iron stained, distinctly weathered rock, medium to coarse gravel (6-60mm), cream CONGLOMERATE fresh rock, medium to coarse gravel (6-60mm), light grey, coaly lentils		
18					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



Groundwater Installation

Bore No.: WM0105

Page: 2 of 3

Elevation: 292.37

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			SANDSTONE fresh rock, medium grained, light grey, coaly lenticles MUDSTONE fresh rock, light grey, coaly lenticles COAL fresh rock, black, with mudstone and claystone MUDSTONE fresh rock, grey, coaly lenticles SANDSTONE fresh rock, fine grained, light grey, Bioturbation CLAYSTONE carbonaceous, fresh rock, dark grey to black COAL fresh rock, black CLAYSTONE carbonaceous, fresh rock, dark grey to black SANDSTONE fresh rock, medium grained, light grey, coaly lenticles SLTSTONE fresh rock, fine grained, grey SIDERITE iron stained, fresh rock, grey SLTSTONE sandy, fresh rock, fine grained, grey SANDSTONE fresh rock, medium to coarse grained, light grey, coaly lenticles CONGLOMERATE fresh rock, fine to medium gravel (2-20mm), light grey	Screen: 50mm NB Cl.18 uPVC machine-slotted, 0.4mm aperture threaded; in 3m lengths Seal: bentonite pellets 1/4" Cement - bentonite grout	E
33					D
	Rotary triple tube coring		SANDSTONE fresh rock, medium to coarse grained, light grey, coaly lenticles SANDSTONE silty, fresh rock, fine-medium grained, light grey CLAYSTONE carbonaceous, fresh rock, dark grey to black COAL fresh rock, black MUDSTONE fresh rock, grey, coaly lenticles SANDSTONE fresh rock, fine to medium grained, light grey, coaly lenticles		
43					B

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0105

Page: 3 of 3

Client: Shenhua Watermark Coal P/L
 Project: Shenhua Watermark Project No.: EL7223
 Location: Watermark, Gunnedah, NSW, Australia
 Date Drilled: 30/09/2009

Drill Co: GOS
 Driller: Stuart Smith
 NOW Groundwater Licence #: 90BL255292
 Total Depth (m): 71.1

Eastings: 252531.89 Northing: 6537981.66 Elevation: 292.37
 Licenced Driller: Wayne McLean
 Grid Ref: MGA94 Zone 56 Vertical: AHD
 Logged by: JG/AF

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			SILTSTONE fresh rock, grey SILTSTONE sandy, fresh rock, fine grained, grey SILTSTONE fresh rock, light grey SANDSTONE fresh rock, fine to medium grained, light grey SILTSTONE fresh rock, light grey MUDSTONE fresh rock, grey, coaly lenticles CLAYSTONE carbonaceous, fresh rock, dark grey to black COAL fresh rock, black, with mudstone and claystone SILTSTONE fresh rock, light grey, with carbonaceous claystone and mudstone COAL fresh rock, black, with dark grey claystone Core Loss fresh rock SILTSTONE fresh rock, light grey SANDSTONE fresh rock, fine to coarse grained, light grey SILTSTONE fresh rock, light grey COAL fresh rock, black, with claystone SILTSTONE fresh rock, light grey SANDSTONE fresh rock, fine grained, light grey SANDSTONE fresh rock, medium grained, light grey SANDSTONE fresh rock, medium to coarse grained, light grey, coaly lenticles CLAYSTONE carbonaceous, fresh rock, grey, coaly lenticles MUDSTONE fresh rock, light grey SILTSTONE fresh rock, fine grained, light grey SANDSTONE fresh rock, fine grained, light grey SILTSTONE fresh rock, grey SANDSTONE silty, fresh rock, fine grained, light grey END OF BOREHOLE @ 71.1m bgl		A MV BEN B2

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0116

Page: 1 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 30/03/2010

Drill Co: GOS
Driller: Steve Twigden
NOW Groundwater Licence #: 90BL255577
Total Depth (m): 36.34

Easting: 249001.02 Northing: 6538044.63 Elevation: 295.49
Licenced Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: TG

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
			SLTSTONE		
			sooty COAL pebbly, extremely weathered rock, brown, very soft, friable		
			clayey SAND		
			SLTSTONE clayey, distinctly weathered rock, cream, soft, friable		
			SANDSTONE distinctly weathered rock, very fine to fine grained, cream, soft, friable		
8			SANDSTONE slightly weathered rock, fine to medium grained, cream, moderately soft		
			SANDSTONE pebbly towards base of unit, slightly weathered rock, cream, moderately hard		
			SANDSTONE slightly weathered rock, medium to coarse grained, cream, moderately hard		
			Core Loss		
			SANDSTONE slightly weathered rock, coarse to fine grained, cream, moderately hard-moderately soft		
			SLTSTONE slightly weathered rock, grey, moderately soft, friable		
			SANDSTONE slightly weathered rock, fine to medium grained, grey-brown, moderately soft		
			Core Loss		
			SANDSTONE silty, fresh rock, very fine to fine grained, grey, moderately soft		
-18					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0116

Page: 2 of 2

Client: Shenhua Watermark Coal P/L
 Project: Shenhua Watermark Project No.: EL7223
 Location: Watermark, Gunnedah, NSW, Australia
 Date Drilled: 30/03/2010

Drill Co: GOS
 Driller: Steve Twigden
 NOW Groundwater Licence #: 90BL255577
 Total Depth (m): 36.34

Easting: 249001.02 Northing: 6538044.63 Elevation: 295.49
 Licenced Driller: Phillip Gaffney
 Grid Ref: MGA94 Zone 56 Vertical: AHD
 Logged by: TG

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			SILTSTONE fine sandy, fresh rock, fine to medium grained, grey, moderately soft SILTSTONE fresh rock, dark grey, hard SILTSTONE with ironstone minor with thin sandstone bands, fresh rock, grey, moderately hard SANDSTONE silty, fresh rock, fine grained, grey, moderately hard SILTSTONE minor sandy banded, fresh rock, grey, moderately hard SANDSTONE lithic with minor coally wisps, fresh rock, grey, very very soft SILTSTONE lithic, fresh rock, grey, friable SANDSTONE lithic, fresh rock, grey, moderately hard Core Loss SILTSTONE minor with thin sandstone bands towards top of unit, fresh rock, grey, moderately hard SILTSTONE fine sandy, fresh rock, grey, moderately soft to moderately hard	Seal: bentonite pellets 1/4" Washed gravel pack (1-2mm) Screen: 50mm NB uPVC Cl.18 machine-slotted 0.4mm threaded, in 3m lengths PVC sump with threaded end-cap	
28					
			END OF BOREHOLE @ 36.34m bgl		
38					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0157

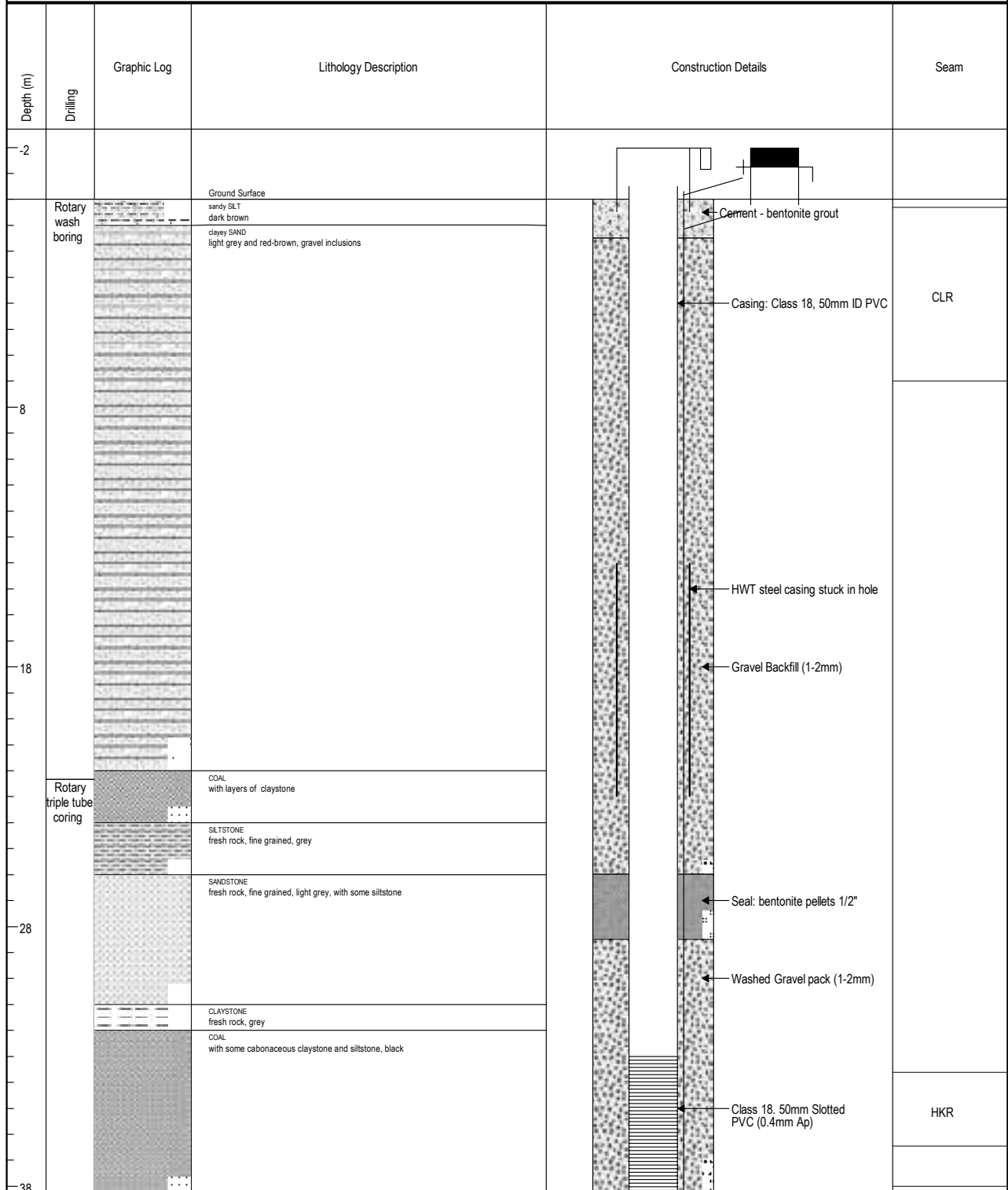
Page: 1 of 3

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 24/09/2009

Drill Co: GOS
Driller: Steve Twigden
NOW Groundwater Licence #: 90BL255293
Total Depth (m): 110.51

Easting: 251080.21 Northing: 6539997.32 Elevation: 366.28
Licenced Driller: Wayne McLean
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: TG

Checked by: Ben Jansen



NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0157

Page: 2 of 3

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 24/09/2009

Drill Co: GOS
Driller: Steve Twigden
NOW Groundwater Licence #: 90BL255293
Total Depth (m): 110.51

Easting: 251080.21 **Northing:** 6539997.32 **Elevation:** 366.28
Licensed Driller: Wayne McLean
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: TG

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
					HKU
					HKL
48			SILTSTONE fresh rock, fine grained, dark grey		
			SANDSTONE fresh rock, medium grained, light grey, with coal bands		
58			COAL with some claystone and layers of siltstone and sandstone, black		
				Class 18, 50mm PVC with endcap	
				Seal: bentonite pellets 1/2"	
				Gravel backfill (1-2mm)	
				mild steel j-latch backoff joint	
				V3 @60m (SN:11510) zero: 8996 @30°C; gauge: 0.26760; initial: 8137@22°C	
				carrier pipe: 40mm NB cl. 18 uPVC threaded, 3m lengths	
68			SILTSTONE slightly weathered rock, grey, with coal bands		E
			COAL with some siltstone layering, black, fresh rock		D
					C
78			COAL with some siltstone imbedded layers		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0157

Page: 3 of 3

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 24/09/2009

Drill Co: GOS
Driller: Steve Twigden
NOW Groundwater Licence #: 90BL255293
Total Depth (m): 110.51

Easting: 251080.21 Northing: 6539997.32 Elevation: 366.28
Licenced Driller: Wayne McLean
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: TG

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
88			SANDSTONE fresh rock, medium grained, light grey		B
98			SILTSTONE with some claystone		
			CLAYSTONE carbonaceous, fresh rock, with layers of thin coal		MV
108			SANDSTONE fresh rock, fine grained, grey, with some coal layers and imbedded claystone		BEN
			CARBONACEOUS CLAYSTONE carbonaceous, fresh rock, brown-grey, with coal layers END OF BOREHOLE @ 110.51m bgl	 V2 @102m (SN: 11702) zero: 8867; gauge: 0.57460; initial: 8035 Grouting Holes V1 @110m (SN: 11698) zero: 8577; gauge: 0.56700; initial: 7624	B2
118					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0157L

Page: 1 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 2/04/2010

Drill Co: Depco
Driller: Jason Wildman
NOW Groundwater Licence #: 90BL255719
Total Depth (m): 112

Easting: 251073.13 **Northing:** 6539973.15 **Elevation:** 364.21
Licensed Driller: Neil Gill
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: AM/TG **Checked by:** GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface SAND extremely weathered rock, fine grained, cream, chipped core		
8				Class 12, 150mm PVC 3% bentonite-cement grout 12" PVC	CLR
18			Carbonaceous SILTSTONE with minor coally wisps, extremely weathered rock, dark grey-black		
			Carbonaceous MUDSTONE with minor coally wisps, distinctly weathered rock, black		
28			SANDSTONE fresh rock, fine grained, light grey		
			Carbonaceous MUDSTONE carbonaceous, fresh rock, brown-grey		
38			COAL interbedded with mudstone, dull with brights 5% -10% , fresh rock, black	Bentonite	HKR

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0157L

Page: 2 of 2

Client: Shenhua Watermark Coal P/L

Project: Shenhua Watermark Project No.: EL7223

Location: Watermark, Gunnedah, NSW, Australia

Date Drilled: 2/04/2010

Drill Co: Depco

Driller: Jason Wildman

NOW Groundwater Licence #: 90BL255719

Total Depth (m): 112

Easting: 251073.13

Northing: 6539973.15

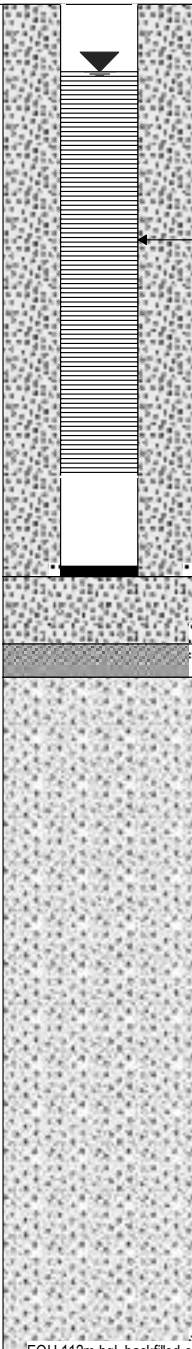
Elevation: 364.21

Licenced Driller: Neil Gill

Grid Ref: MGA94 Zone 56 Vertical: AHD

Logged by: AM/TG

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
48			SILTSTONE fresh rock, fine grained, dark grey		HKU
			SANDSTONE fresh rock, fine grained, light grey		HKL
58			COAL banded dull <1% brights, fresh rock, black		
			CLAYSTONE carbonaceous, fresh rock, brown-grey		
			SILTSTONE fresh rock		EU
68			SANDSTONE fresh rock, fine grained, light grey		EL
			COAL banded dull <1% brights, slightly weathered rock, black		DL
			SANDSTONE carbonaceous, fresh rock, dark grey		CU
78			SANDSTONE carbonaceous, fresh rock, dark grey	EOH 112m bgl. backfilled cement-bentonite-grout	CL

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0213LA

Page: 1 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 6/05/2010

Drill Co: Depco
Driller: Darren Melton
NOW Groundwater Licence #: 90BL255714
Total Depth (m): 101

Easting: 250468.37 **Northing:** 6541551.44 **Elevation:** 401.48
Licensed Driller: Andrew Robinson
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: WDM **Checked by:** GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
			SANDSTONE iron stained, distinctly weathered rock, fine grained, grey		
			SLTSTONE iron stained, distinctly weathered rock, grey		
			SANDSTONE iron stained, distinctly weathered rock, fine grained, cream		
8			SLTSTONE iron stained, slightly weathered rock, light brown		
			Carbonaceous SLTSTONE iron stained, slightly weathered rock, grey		
			COAL banded dull <1% brights, fresh rock, black		HKR
			COAL with mudstone inclusions, carbonaceous, fresh rock, black		
18			COAL imbedded gravel and silt dull with brights 5%-10%, fresh rock, black		HKU
			SLTSTONE		
			SANDSTONE silty banded, fresh rock, fine grained, light grey		
28			COAL with trace fragments of siltstone, dull with brights 10%-40%, fresh rock, black		HKL
			SANDSTONE banded dull <1% brights, fresh rock, black		
			SLTSTONE fresh rock, grey		
			COAL with siltstone, dull with brights 5%-10%, fresh rock, black		
38			COAL with thin films of mudstone, dull with brights 5%-10%, fresh rock, black		
			SANDSTONE silty with small coal deposits, fresh rock, fine grained, light grey		F
48			COAL with thin layers of mudstone dull with brights 5%-10%, fresh rock, black		EU

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0213LA

Page: 2 of 2

Client: Shenhua Watermark Coal P/L Project: Shenhua Watermark Project No.: EL7223 Location: Watermark, Gunnedah, NSW, Australia Date Drilled: 6/05/2010		Drill Co: Depco Driller: Darren Melton NOW Groundwater Licence #: 90BL255714 Total Depth (m): 101		Easting: 250468.37 Northing: 6541551.44 Elevation: 401.48 Licensed Driller: Andrew Robinson Grid Ref: MGA94 Zone 56 Vertical: AHD Logged by: WDM		Checked by: GF
Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam	
63			SANDSTONE with siltstone, lithic, fresh rock, fine grained, light grey			
			COAL with some imbedded mudstone dull with brights 5% -10% , fresh rock, black		DU	
			SANDSTONE with siltstone, lithic, fresh rock, medium grained, light grey		DL	
			COAL with trace imbedded sandstone dull with brights 5% -10% , fresh rock, black			
			SANDSTONE lithic, fresh rock, medium grained, light grey		B	
			COAL with thin layers of claystone and mudstone, dull with brights 5% -10% , fresh rock, black			
93			SANDSTONE		MV	
			coaly MUDSTONE dull with brights 5% -10% , fresh rock, black			
			COAL dull with brights 5% -10% , fresh rock, black		BEN	
			SILTSTONE fresh rock, grey			
			END OF BOREHOLE @ 101m bgl			
103						

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0222A

Page: 1 of 1

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 28/03/2010

Drill Co: GOS
Driller: Shane Evans
NOW Groundwater Licence #: 90BL255160
Total Depth (m): 17.5

Easting: 253483.08 **Northing:** 6540973.66 **Elevation:** 312.8
Licensed Driller: Wayne McLean
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: BSR

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2					
			Ground Surface		
			TOPSOIL clayey silty, brown		
			DOLERITE feldspathic, slightly weathered rock, fine grained, grey, hard, hard		
8					
			SANDSTONE quartz-lithic, slightly weathered rock, fine to medium grained, grey, moderately hard, broken		
			SANDSTONE quartzo-feldspathic pebbly micaceous, slightly weathered rock, medium to coarse grained, grey, moderately hard, coaly wisps		
18			END OF BOREHOLE @ 17.5m bgl		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0228A

Page: 1 of 1

Client: Shenhua Watermark Coal P/L

Project: Shenhua Watermark Project No.: EL7223

Location: Watermark, Gunnedah, NSW, Australia

Date Drilled: 7/06/2012

Drill Co: Depco

Driller: Jason Wildman

NOW Groundwater Licence #: 90BL256043

Total Depth (m): 12.7

Easting: 243488.4

Northing: 6540490.82

Elevation: 341.37

Licenced Driller: Randall Mannion

Grid Ref: MGA94 Zone 56 Vertical: AHD

Logged by: NC

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface silty CLAY brown, medium plasticity, soft	Lockable steel bore cover	
			CLAY brown, medium plasticity, higher clay content	3% bentonite cement grout	
			CLAY red-brown, medium plasticity, soft	50mm class 18 PVC	
			sandy gravelly CLAY fine to coarse grained, brown	Bentonite seal 3-5m	
			sandy gravelly CLAY fine to coarse grained, brown, medium plasticity, higher gravel content		
			gravelly CLAY coarse gravel (>20mm), brown, medium plasticity		
			sandy gravelly CLAY fine grained, less clay content, gravels white and angular		
8			sandy gravelly CLAY fine grained, grey, medium plasticity	Gravel pack, washed qtz	
			clayey SANDSTONE finely interbedded with gravel, fine grained, brown	50mm class 18 PVC MS 0.4mm	
			clayey SANDSTONE finely interbedded with gravel, fine grained, brown	50mm PVC endcap @ 12m	
			END OF BOREHOLE @ 12.7m bgl		
-18					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0228B

Page: 1 of 1

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 6/07/2012

Drill Co: Depco
Driller: Jason Wildman
NOW Groundwater Licence #: 90BL256042
Total Depth (m): 21

Easting: 243487.75 **Northing:** 6540484.68 **Elevation:** 341.37
Licensed Driller: Randall Mannion
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: NC

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2					
			Ground Surface		
			gravelly sandy CLAY fine grained, brown, medium plasticity		
			gravelly sandy CLAY fine grained, brown, medium plasticity, higher clay content	← 3% bentonite cement grout	
			gravelly sandy CLAY fine grained, brown, medium plasticity, reduced amounts of sand	← 50mm class 18 PVC	
			gravelly clayey SANDSTONE medium grained, brown, less gravel and sand, clay content increase, Distinctly weathered rock		
8			gravelly clayey SANDSTONE medium grained, brown, clay content decreased, Distinctly weathered rock		
			gravelly SANDSTONE fine to medium grained, brown, Distinctly weathered rock		
			gravelly SANDSTONE fine to medium grained, less gravel, Distinctly weathered rock		
			gravelly SANDSTONE fine to medium grained, red, increase in clay, white and other gravels, Distinctly weathered rock		
			clayey SANDSTONE red-brown, Distinctly weathered rock	← Bentonite seal	
			gravelly SANDSTONE fine to medium grained, brown, Distinctly weathered rock		
			gravelly SANDSTONE fine to medium grained, brown, increase in clay content, Distinctly weathered rock		
18			gravelly SANDSTONE fine grained, red-brown, Distinctly weathered rock	← Gravel pack, washed qtz	
				← 50mm class 18 PVC MS	
				← 50mm PVC endcap	
			END OF BOREHOLE @ 21m bgl		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0233

Page: 1 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 22/03/2010

Drill Co: GOS
Driller: Malcom Bridge
NOW Groundwater Licence #: 90BL255283
Total Depth (m): 70.7

Easting: 244032.06 Northing: 6539450.74 Elevation: 323.47
Licenced Driller: Wayne McLean
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: BS

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
			sandy CLAY light brown, fine grained sand		
			clayey SAND light brown, fine grained sand		
8			GRAVEL subangular, <40mm, including quartz fragments with clay		
			SAND light brown, fine grained sand		
18			SAND grey, very fine grained		
			SAND grey, fine to medium grained		
			SANDSTONE light grey, fine grained, minor siltstone slivers, slightly weathered		
			MUDSTONE dark grey, slightly weathered		
			COAL		
			SANDSTONE light grey, slightly weathered		
28			SILTSTONE medium grey, slightly weathered		
			SILTSTONE grey, moderately hard, carbonaceous laminae, with sandstone		
				Cement - bentonite grout	F

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0233

Page: 2 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 22/03/2010

Drill Co: GOS
Driller: Malcom Bridge
NOW Groundwater Licence #: 90BL255283
Total Depth (m): 70.7

Easting: 244032.06 **Northing:** 6539450.74 **Elevation:** 323.47
Licensed Driller: Wayne McLean
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: BS

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			SANDSTONE grey, hard, carbonaceous laminae		C
			SILTSTONE grey, moderately hard, carbonaceous		B
			COAL moderately soft		
			MUDSTONE dark grey, carbonaceous		
			COAL		
			SILTSTONE dark grey		
46			SANDSTONE light grey, fine grained		
			SILTSTONE grey, moderately hard, carbonaceous with depth		
			Core Loss		
			COAL moderately soft, with siltstone and claystone		MV
56			SANDSTONE silty, medium grained grading coarser with depth, grey, hard		BEN
			Core Loss		
			COAL moderately soft		
			SILTSTONE and SANDSTONE carbonaceous laminae, grey, moderately hard-moderately soft, sandstone is fine to medium grained		
66			PEBBLE CONGLOMERATE grey, hard, with coarse grained sandstone		B2
			SANDSTONE fine grained, grey, moderately hard		
			END OF BOREHOLE @ 70.75m bgl		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0233A

Page: 1 of 1

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 24/03/2010

Drill Co: GOS
Driller: Shane Evans
NOW Groundwater Licence #: 90BL255284
Total Depth (m): 28

Easting: 244032.06 Northing: 6539450.74 Elevation: 323.47
Licenced Driller: Wayne McLean
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: TC

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
			sandy CLAY light brown, fine grained sand		
			clayey SAND light brown, fine grained sand		
8			GRAVEL subangular, <40mm, including quartz fragments with clay		
			SAND light brown, fine grained sand		
18			SAND grey, ver fine grained		
			SAND grey, fine to medium grained		
			SANDSTONE light grey, fine grained, minor siltstone slivers, slightly weathered		
			MUDSTONE dark grey, slightly weathered		
			COAL		F
			SANDSTONE light grey, slightly weathered		
			SILTSTONE medium grey, slightly weathered		
28			END OF BOREHOLE @ 28.02m bgl		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0247

Page: 1 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 17/03/2010

Drill Co: GOS
Driller: Steve Twigden
NOW Groundwater Licence #: 90BL255145
Total Depth (m): 123.11

Easting: 244018.65 **Northing:** 6540923.39 **Elevation:** 356.8
Licensed Driller: Wayne McLean
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: LM/BR

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
			TOPSOIL silty clay, orange-brown mottled, hard		
			CLAY orange-brown mottled, firm		
8			COAL quartz and chert, very hard clean quartz, very thin coal bands within cemented sandstone		
			SANDSTONE pale grey-white, uniform medium grained sand, very hard		
18			SLTSTONE dark grey, very hard		
				Cement - bentonite grout Casing: 50mm NB Cl.18 uPVC threaded; in 3m lengths Seal: bentonite pellets 1/4"	CLR

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0247

Page: 2 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 17/03/2010

Drill Co: GOS
Driller: Steve Twigden
NOW Groundwater Licence #: 90BL255145
Total Depth (m): 123.11

Easting: 244018.65 Northing: 6540923.39 Elevation: 356.8
Licenced Driller: Wayne McLean
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: LM/BR

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			MUDSTONE very dark grey with coal		
			SILTSTONE dark grey, hard		HKU
			COAL		
			SILTSTONE dark grey, hard		HKL
33			COAL		
			SANDSTONE with some siltstone inclusions and thin layers of mudstone		
				Washed gravel pack 1-2mm	
				Screen: 50mm NB Cl. 18 uPVC machine slotted 0.4mm threaded; in 3m lengths	
				threaded end cap fitted	
43					F
			SILTSTONE and SANDSTONE		
				EOH 123.11m bgl, backfilled with cement-bentonite grout	

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0247A

Page: 1 of 3

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 17/05/2010

Drill Co: GOS
Driller: Shane Evans
NOW Groundwater Licence #: 90BL255144
Total Depth (m): 87

Easting: 244018.65 **Northing:** 6540923.37 **Elevation:** 356.78
Licensed Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: GHD

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
			TOPSOIL silty clay, orange-brown mottled, hard CLAY orange-brown mottled, firm CLAY as above, with pink quartz gravel lithics <1% CLAY pale grey with minor orange-brown mottling, ~1-3% quartz gravels and cobbles SANDSTONE pale grey/white, very hard, ~0.5-1mm diameter SANDSTONE very coarse, very hard, grain size up to 2mm, predominantly quartz grains, with weathered lithics, weathered to orange-brown COAL quartz and chert, very hard clean quartz, very thin coal bands within cemented sandstone SANDSTONE pale grey-white, uniform medium grained sand, very hard SILTSTONE dark grey, very hard MUDSTONE very dark grey with coal SILTSTONE dark grey, hard COAL SILTSTONE dark grey, hard	7" hole 5" PVC Casing 5" hole 50mm NB uPVC Casing Class 18 threaded, 3m lengths 3% bentonite - cement grout tremied in from 34m	CLR HKU HKL

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0247A

Page: 2 of 3

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 17/05/2010

Drill Co: GOS
Driller: Shane Evans
NOW Groundwater Licence #: 90BL255144
Total Depth (m): 87

Easting: 244018.65 Northing: 6540923.37 Elevation: 356.78
Licenced Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: GHD

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			COAL SANDSTONE and SILTSTONE with thin layers of mudstone COAL COAL with traces of sandstone with thin layers of mudstone CLAYSTONE COAL with some claystone inclusions, imbedded silt and sand CARBONACEOUS MUDSTONE with thin layers of coal CLAYSTONE SANDSTONE COAL SILTSTONE with some mudstone inclusions	Seal: 1/4" bentonite pellets (did not reach intended depth due to hole collapse (25L of pellets placed in this zone)) Hole collapse and bentonite pellets (25L of pellets placed in this zone) Hole collapse and bentonite pellets (25L of pellets placed in this zone)	F D

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0247A

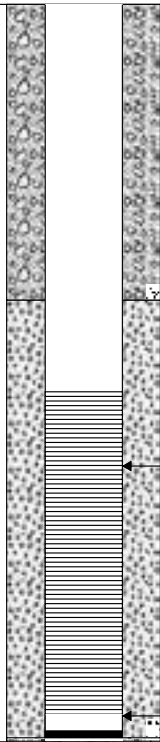
Page: 3 of 3

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 17/05/2010

Drill Co: GOS
Driller: Shane Evans
NOW Groundwater Licence #: 90BL255144
Total Depth (m): 87

Easting: 244018.65 **Northing:** 6540923.37 **Elevation:** 356.78
Licensed Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: GHD

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
78			COAL SILTSTONE and SANDSTONE pale grey to greenish white, predominantly lithic based sandstone to gravel sized lithics		B
			CONGLOMERATE fine grained, bright green lithics, subrounded to 3mm, pale grey lithics to 2mm, black lithics angular to 2mm, lithics of re-washed sandstone and mudstone to 5mm		
			CONGLOMERATE dark grey, with finely laminated mudstone, very hard, water in flow from 86m		
88		END OF BOREHOLE @ 87.17m bgl			
98					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0256A

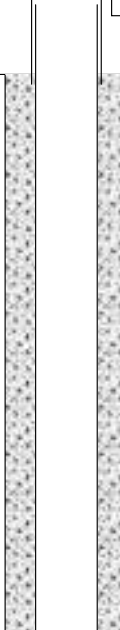
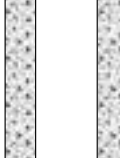
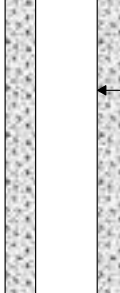
Page: 1 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 20/01/2010

Drill Co: GOS
Driller: Shane Evans
NOW Groundwater Licence #: 90BL255161
Total Depth (m): 58

Easting: 245469.12 Northing: 6538253.16 Elevation: 331.11
Licenced Driller: Wayne McLean
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: GHD

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
	Rotary wash boring		silty GRAVEL fine gravel (2-6mm), brown-grey		
8			CLAY dark grey		
18	Rotary triple tube coring		SANDSTONE silty, fresh rock, fine to medium grained, light grey		
			CARBONACEOUS MUDSTONE fresh rock, dark grey to black		
			COAL fresh rock, black		
28			SANDSTONE with a thin layer of siltstone and fragmented coal segments		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0256A

Page: 2 of 2

Client: Shenhua Watermark Coal P/L
 Project: Shenhua Watermark Project No.: EL7223
 Location: Watermark, Gunnedah, NSW, Australia
 Date Drilled: 20/01/2010

Drill Co: GOS
 Driller: Shane Evans
 NOW Groundwater Licence #: 90BL255161
 Total Depth (m): 58

Easting: 245469.12 Northing: 6538253.16 Elevation: 331.11
 Licenced Driller: Wayne McLean
 Grid Ref: MGA94 Zone 56 Vertical: AHD
 Logged by: GHD

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
41			SILTSTONE fresh rock, grey COAL stone, fresh rock, dark grey SANDSTONE and SILTSTONE with thin films of coal SILTSTONE with imbedded mudstone COAL fresh rock, black MUDSTONE with carbonaceous coal films SILTSTONE and SANDSTONE with some imbedded coal MUDSTONE and COAL interbedded layers of coal and mudstone	Gravel Backfill (1-2mm) Seal: bentonite pellets 1/4" Washed gravel pack (1-2mm) Screen: 50mm NB uPVC Cl. 18 machine slotted 0.4mm threaded, 3m lengths uPVC sump w/ threaded end cap	B A MV
61			END OF BOREHOLE @ 60m bgl		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0260A

Page: 1 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 4/02/2010

Drill Co: GOS
Driller: Haydn Brunt
NOW Groundwater Licence #: 90BL255290
Total Depth (m): 52.3

Easting: 246132.38 Northing: 6537339.85 Elevation: 342.97
Licenced Driller: Wayne McLean
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: BJ

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
	Rotary wash boring		clayey SAND yellow-brown, coarse grained sand clayey SAND light grey-brown, coarse grained sand silty SAND light brown, coarse grained sand clayey SAND light grey-brown, coarse grained sand silty CLAY red-brown Core loss lost sample SILTSTONE grey CARBONACEOUS MUDSTONE with fragments of siderite and a thin film of siltstone SANDSTONE and SILTSTONE with fragments of siderite	Cement-bentonite grout Casing: 50mm NB uPVC Cl. 18 Threaded, 3m lengths	
8					
18					
28	Rotary triple tube coring				

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0260A

Page: 2 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 4/02/2010

Drill Co: GOS
Driller: Haydn Brunt
NOW Groundwater Licence #: 90BL255290
Total Depth (m): 52.3

Easting: 246132.38 **Northing:** 6537339.85 **Elevation:** 342.97
Licensed Driller: Wayne McLean
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: BJ

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			COAL SILTSTONE COAL CARBONACEOUS MUDSTONE with thin films of coal and fragments of siderite near the bottom of the section SANDSTONE COAL Lithic SANDSTONE Silty SAND SANDSTONE with thin layers of coal SILTSTONE SANDSTONE SILTSTONE with fragments of pyrite COAL with sandstone inclusions	 Seal: Bentonite pellets 1/4" Gravel pack (1-2mm) Class 18, 50mm slotted uPVC Machine slotted. 0.4mm aperture. Threaded, 3m lengths uPVC Sump with threaded end-cap Seal: Bentonite pellets 1/4" 7mm blue chip gravel backfill	
38					
48					
58			END OF BOREHOLE @ 52.3m bgl		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):

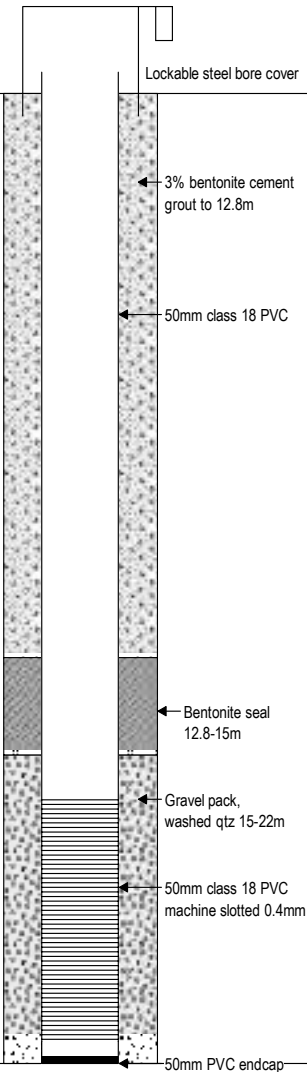
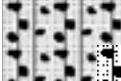
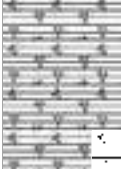
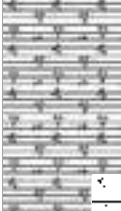


BOREHOLE LOG

Groundwater Installation

Bore No.: WM0265A

Page: 1 of 1

Client: Shenhua Watermark Coal P/L Project: Shenhua Watermark Project No.: EL7223 Location: Watermark, Gunnedah, NSW, Australia Date Drilled: 29/05/2012			Drill Co: Depco Driller: James McKay NOW Groundwater Licence #: 90BL256045 Total Depth (m): 22			Easting: 245815.2 Northing: 6536245.73 Elevation: 309.99 Licenced Driller: Phillip Gaffney Grid Ref: MGA94 Zone 56 Vertical: AHD Logged by: NC			Checked by: GF		
Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details			Seam				
-2			Ground Surface	 Lockable steel bore cover 3% bentonite cement grout to 12.8m 50mm class 18 PVC Bentonite seal 12.8-15m Gravel pack, washed qtz 15-22m 50mm class 18 PVC machine slotted 0.4mm 50mm PVC endcap							
			loamy CLAY dark brown, low plasticity, damp, less cohesive with depth								
			gravelly CLAY brown, medium plasticity, wet								
			CLAY brown, medium plasticity, damp, soft								
			gravelly CLAY brown, damp								
			SANDSTONE brown, cohesive, dry, Distinctly weathered rock								
8			clayey SANDSTONE with quartz bands, coarse grained, brown, becoming lighter in colour with depth, Distinctly weathered rock								
			gravelly CLAY brown								
			gravelly sandy CLAY medium grained, brown, occasional coarse grained gravel bands								
18			gravelly sandy CLAY medium grained, brown, increasing sand and gravel with depth								
		END OF BOREHOLE @ 22m bgl									

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0265B

Page: 1 of 1

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 29/05/2012

Drill Co: Depco
Driller: James McKay
NOW Groundwater Licence #: 90BL256044
Total Depth (m): 28.5

Easting: 245805.36 **Northing:** 6536247 **Elevation:** 310.22
Licensed Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: NC

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface	Lockable steel bore cover	
			loamy CLAY brown, low plasticity, damp		
			silty CLAY brown, dry		
			SANDSTONE grey, crumbles, Distinctly weathered rock		
			gravelly SANDSTONE brown, Distinctly weathered rock		
8			silty SAND brown		
			SANDSTONE fine to medium grained, light-brown		
			clayey SANDSTONE fine to medium grained, light-brown		
			gravelly SANDSTONE coarse grained, grey, occasional coarse grained gravel bands		
			gravelly SANDSTONE coarse grained, grey		
			gravelly SANDSTONE coarse grained, grey		
18			gravelly SANDSTONE fine grained, grey		
			gravelly SANDSTONE fine to medium grained, light-brown, quartz pieces . grains coarser with depth		
28			END OF BOREHOLE @ 28.5m tgl		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0269

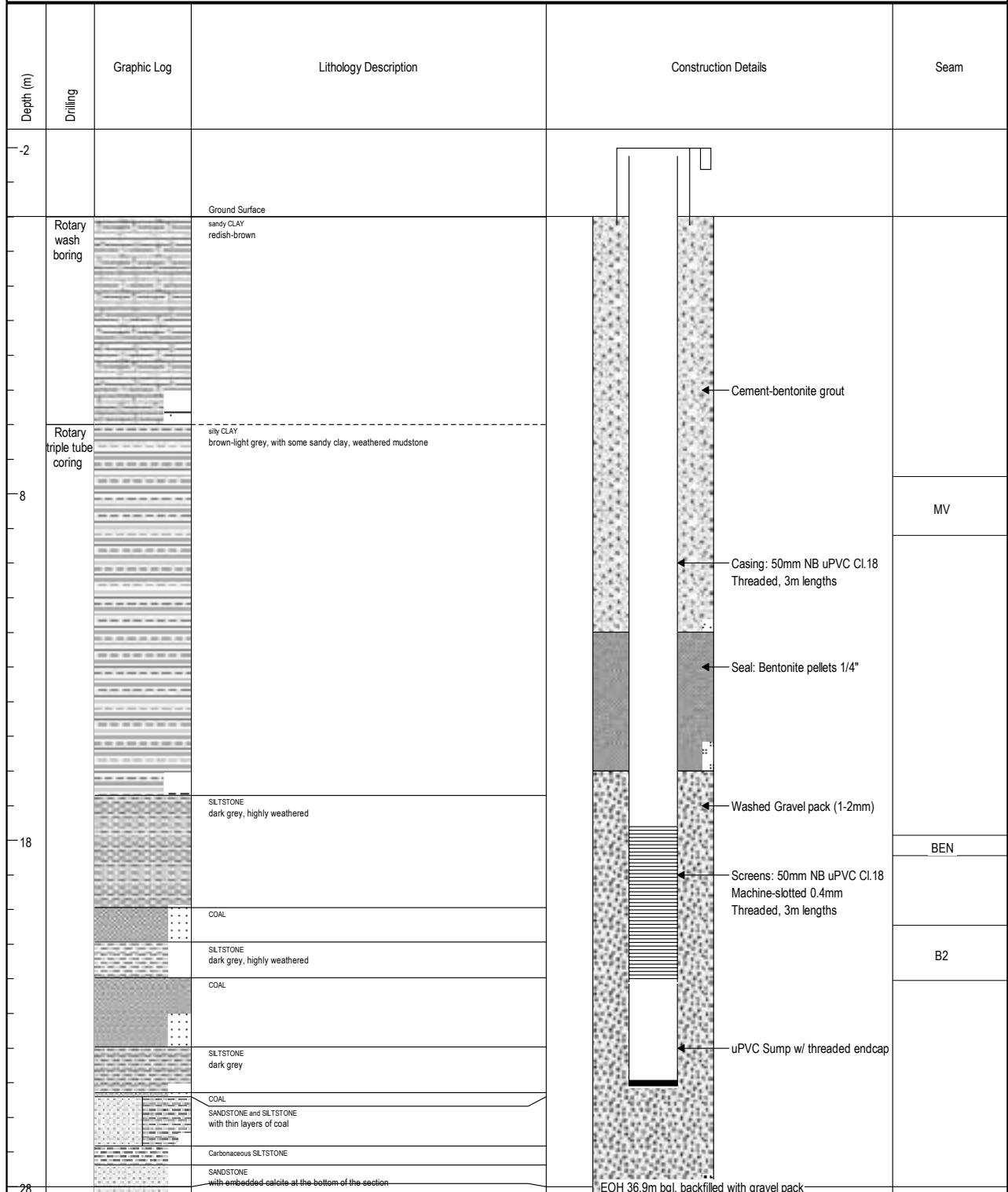
Page: 1 of 1

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 23/01/2010

Drill Co: GOS
Driller: Haydn Brunt
NOW Groundwater Licence #: 90BL255289
Total Depth (m): 36.97

Easting: 251021.64 Northing: 6541996.73 Elevation: 322.86
Licenced Driller: Wayne McLean
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: PA

Checked by: Ben Jansen



NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0278A

Page: 1 of 1

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 2/06/2012

Drill Co: Depco
Driller: Jason Wildman
NOW Groundwater Licence #: 90BL256046
Total Depth (m): 31

Easting: 245511.51 **Northing:** 6535652.28 **Elevation:** 300.28
Licensed Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: NC **Checked by:** GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
			CLAY dark brown, weathered bedrock - conglomerate		
			CLAY fine grained, light-brown, weathered bedrock - conglomerate		
			GRAVEL medium grained, light-brown, weathered bedrock - sandstone and conglomerate		
			GRAVEL medium grained, light-brown, weathered bedrock - sandstone		
8			SAND medium grained, brown-grey, weathered bedrock - sandstone		
			CLAY medium grained, weathered bedrock - sandstone		
18			SAND fine grained		
			SAND fine grained, light-brown, gravels included		
			CLAY fine grained, brown-grey, gravels included		
			CLAY fine grained, light-brown		
28			CONGLOMERATE medium grained, light-brown, black gravels included		
			CLAY medium grained, light-brown		
			END OF BOREHOLE @ 31m bgl		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0278B

Page: 1 of 1

Client: Shenhua Watermark Coal P/L

Project: Shenhua Watermark Project No.: EL7223

Location: Watermark, Gunnedah, NSW, Australia

Date Drilled: 31/05/2012

Drill Co: Depco

Driller: Jason Wildman

NOW Groundwater Licence #: 90BL256041

Total Depth (m): 37

Easting: 245504.46

Northing: 6535653.98

Elevation: 300.49

Licenced Driller: Phillip Gaffney

Grid Ref: MGA94 Zone 56 Vertical: AHD

Logged by: NC

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface silty CLAY red-brown orange, damp, medium plasticity with some gravels	Lockable steel cover	
			gravelly CLAY cobbly, weathered rock, orange, dry, soft	3% bentonite cement grout to 31.5m	
			gravelly SANDSTONE weathered bedrock - sandstone and conglomerate, pinkish brown, dry		
			gravelly SANDSTONE dark brown, high clay content, weathered rock	50mm class 18 threaded PVC	
8			gravelly SANDSTONE fine grained, brown, some clay and sand		
			gravelly SANDSTONE light-brown/pink, clay and sand content		
			clayey SANDSTONE as above, high clay content, medium plasticity		
18			clayey SANDSTONE weathered rock, some sand and gravels, light brown/grey, large sandstone pieces, fine grained		
			gravelly SANDSTONE light grey, clay content, quartz gravels and cobbles		
			CONGLOMERATE as above		
28			CONGLOMERATE gravels and cobbles, rounded, quartz and other stones		
			CONGLOMERATE grey, as above, high sand content medium grained, mostly gravels, some clay content		
			CONGLOMERATE black gravels, sand grains, small amounts of clay	Gravel pack, 3mm washed qtz 33.5-37m	
			END OF BOREHOLE @ 37m bgl	50mm class 18 PVC machine slotted 0.4mm	
-38				50mm PVC endcap	

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0288

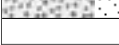
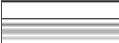
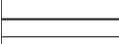
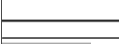
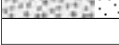
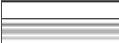
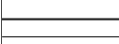
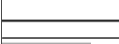
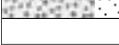
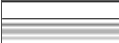
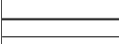
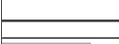
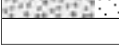
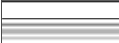
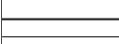
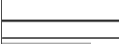
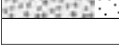
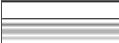
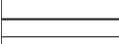
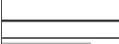
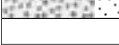
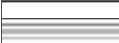
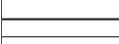
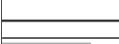
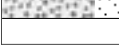
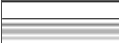
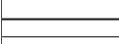
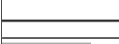
Page: 1 of 3

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 14/04/2011

Drill Co: Depco/Go Drill
Driller:
NOW Groundwater Licence #: 90BL255296
Total Depth (m): 72.4

Easting: 254946.00 **Northing:** 6543039.00 **Elevation:** 280
Licenced Driller: Allen Carlon
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: TG **Checked by:** GF

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
			CLAY silty, grey, firm, low plasticity, moist		
			CLAY silty, grey, firm, low plasticity, moist		
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
			GRAVEL clayey sandy litho-feldspathic, fine to medium grained, brown, loose		
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):

**BOREHOLE LOG**

Groundwater Installation

Bore No.: WM0288

Page: 2 of 3

Client: Shenhua Watermark Coal P/L

Project: Shenhua Watermark Project No.: EL7223

Location: Watermark, Gunnedah, NSW, Australia

Date Drilled: 14/04/2011

Drill Co: Depco/Go Drill

Driller:

NOW Groundwater Licence #: 90BL255296

Total Depth (m): 72.4

Easting: 254946.00

Northing: 6543039.00

Elevation: 280

Licenced Driller: Allen Carlon

Grid Ref: MGA94 Zone 56 Vertical: AHD

Logged by: TG

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
38			CLAY gravelly litho-feldspathic, fine grained, brown, firm, high plasticity, moist CLAY sandy gravelly litho-feldspathic, fine grained, brown, stiff, high plasticity, moist CLAY gravelly litho-feldspathic sandy, fine to medium grained, brown, stiff, high plasticity, moist CLAY gravelly litho-feldspathic, fine grained, brown, stiff, high plasticity, moist GRAVEL clayey litho-feldspathic, fine grained, brown, loose CLAY gravelly litho-feldspathic, fine grained, brown, very very stiff, high plasticity, moist CLAY gravelly litho-feldspathic, fine grained, brown, stiff, medium plasticity, moist CLAY slightly gravelly, fine grained, orange, stiff, medium plasticity, moist		
48			CLAYSTONE clayey iron stained, extremely weathered rock, grey, soft, firm, medium plasticity, moist		
58			CLAYSTONE silty, fresh rock, grey, moderately hard		PW

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

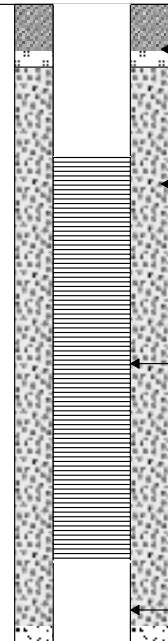
Bore No.: WM0288

Page: 3 of 3

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 14/04/2011

Drill Co: Depco/Go Drill
Driller:
NOW Groundwater Licence #: 90BL255296
Total Depth (m): 72.4

Easting: 254946.00 **Northing:** 6543039.00 **Elevation:** 280
Licensed Driller: Allen Carlon
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: TG **Checked by:** GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
68			CLAYSTONE calcareous, fresh rock, grey, moderately hard CLAYSTONE silty, fresh rock, grey, moderately hard SILTSTONE clayey, fresh rock, cream, moderately soft CLAYSTONE silty, fresh rock, grey, moderately hard, soft CLAY fresh rock, grey, soft, soft CLAYSTONE silty, fresh rock, grey, moderately hard CLAYSTONE slightly silty lithic, fresh rock, grey, moderately hard CLAYSTONE calcareous throughout, fresh rock, grey, hard CLAYSTONE silty, fresh rock, grey, hard CLAYSTONE calcareous, fresh rock, grey, moderately hard CLAYSTONE indurated calcareous, fresh rock, off-white, hard CLAYSTONE silty fine sandy, fresh rock, grey, hard END OF BOREHOLE @ 72.4m bgl	 Bentonite seal Qtz washed graded 2-3mm gravel pack 50mm Class 18 threaded PVC screen 0.4mm slots 50mm PVC end cap	
78					
88					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):

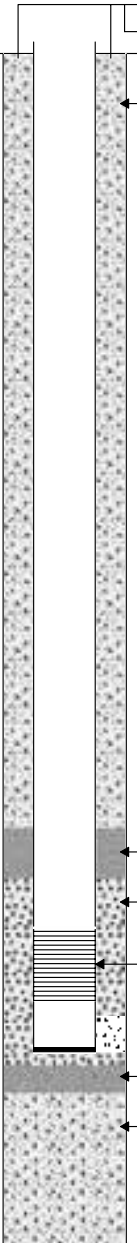


BOREHOLE LOG

Groundwater Installation

Bore No.: WM0288A

Page: 1 of 1

Client: Shenhua Watermark Coal P/L Project: Shenhua Watermark Project No.: EL7223 Location: Watermark, Gunnedah, NSW, Australia Date Drilled: 17/03/2011			Drill Co: Boart Longyear Driller: Gavin Keith NOW Groundwater Licence #: 90BL255579 Total Depth (m): 54			Easting: 254941.55 Northing: 6543045.56 Elevation: 280.5 Licensed Driller: Paul Griffiths Grid Ref: MGA94 Zone 56 Vertical: AHD Logged by: GS			Checked by: GF		
Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details			Seam				
-2			Ground Surface				QN				
	Sonic Core	 CLAY dark grey, slightly stiff, moist, very cohesive, 5-10% fine sand Clayey SAND fine to medium grained, light brown, angular, clay very soft, becoming coarser at 8m GRAVEL CLAY brown, very hard, stiff, moist Silty CLAY brown, 1-5% medium gravel CLAY brown, stiff CLAY gravelly, fine grained, brown GRAVEL Mixed rounded river sediment, quartz, brown and red, in clay matrix 30-40% CLAY light brown CLAY brown, very soft, non-cohesive CLAY stiff, minor gravel/sand, 5-10% , very coarse Sandy CLAY coarse to medium grained, light brown, very angular, stif Sandy CLAY light brown, fine to medium grained, very angular, dark and quarz fragments Sandy CLAY Increasing sand content, angular-subangular, quartz, red and black flecks, some large, well rounded oval shaped gravel Clayey SAND fine to medium grained, light brown, stiff, very cohesive Silty CLAY light brown, 5-10% fine to medium grained sand with black flecks Silty CLAY brown, cohesive, very sticky, ~20% fine to medium grained sand CLAY Very stiff, light grey with brown weathering, dry, very consolidated, no fines, very hard CLAY light brown, moderate-soft clay, minor sand very fine grained CLAY thin bands of light grey and brown clay, stiff, very hard CLAY brown, very hard, dry, very friable, mixed with light grey clay, stiff, bedded with friable brown clay, no flecks but some dark veins END OF BOREHOLE @ 47.72m bgl									

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



Page: 1 of 3

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
			CLAY extremely weathered rock, orange, low plasticity		
			CLAY silty, distinctly weathered rock, orange, medium plasticity		
8					
			SILTSTONE slightly weathered rock, grey, low plasticity		
18					
28					

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0290

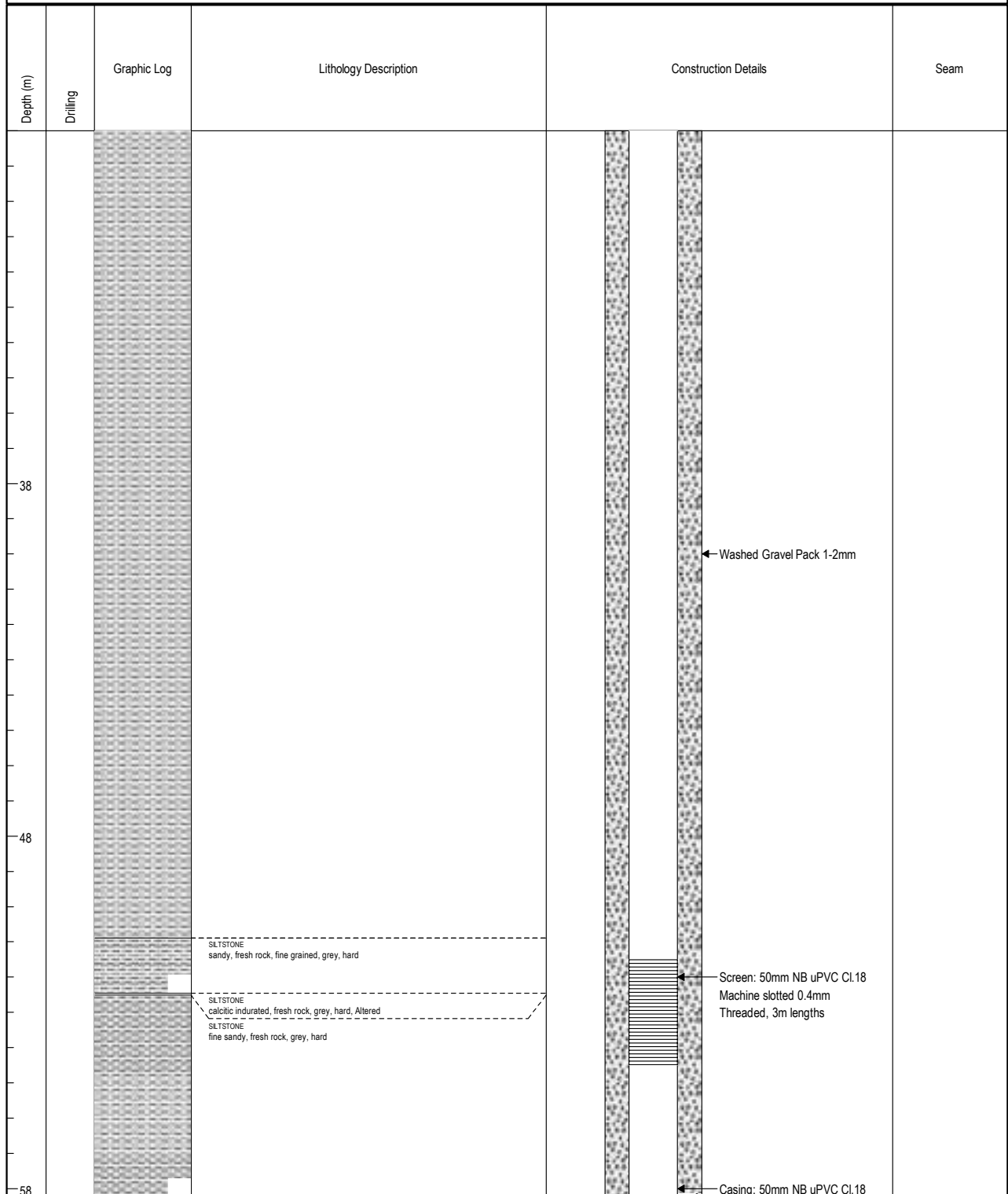
Page: 2 of 3

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 8/04/2010

Drill Co: GOS
Driller: Ryan Anderson
NOW Groundwater Licence #: 90BL255589
Total Depth (m): 78.44

Easting: 248938.2 Northing: 6543928.66 Elevation: 285.25
Licenced Driller: Wayne McLean
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: TG

Checked by: Ben Jansen



NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0290

Page: 3 of 3

Client: Shenhua Watermark Coal P/L
 Project: Shenhua Watermark Project No.: EL7223
 Location: Watermark, Gunnedah, NSW, Australia
 Date Drilled: 8/04/2010

Drill Co: GOS
 Driller: Ryan Anderson
 NOW Groundwater Licence #: 90BL255589
 Total Depth (m): 78.44

Easting: 248938.2 Northing: 6543928.66 Elevation: 285.25
 Licenced Driller: Wayne McLean
 Grid Ref: MGA94 Zone 56 Vertical: AHD
 Logged by: TG

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
				Casing: 50mm NB uPVC Cl.18 Threaded, 3m lengths	
			SILTSTONE heat affected, fresh rock, grey, hard DOLERITE fresh rock, off-white, hard, Altered		
			SILTSTONE heat affected, fresh rock, grey, hard SILTSTONE fresh rock, grey, hard		
			SILTSTONE carbonaceous, fresh rock, grey, moderately hard SILTSTONE fresh rock, grey, hard SILTSTONE heat affected, fresh rock, grey, moderately hard	Screen: 50mm NB uPVC Cl.18 Machine slotted 0.4mm Threaded, 3m lengths	
68			DOLERITE fresh rock, off-white, hard, Altered SILTSTONE heat affected, fresh rock, grey, hard SILTSTONE fine sandy, fresh rock, grey, hard		
78				Casing: 50mm NB uPVC Cl.18 Threaded, 3m lengths Sump with threaded endcap	
			CALCITE indurated silty, fresh rock, off-white, hard SILTSTONE fresh rock, grey, hard END OF BOREHOLE @ 78.44m bgl		
88					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):

**BOREHOLE LOG**

Groundwater Installation

Bore No.: WM0291

Page: 1 of 4

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 1/05/2010

Drill Co: GOS
Driller:
NOW Groundwater Licence #: 90BL255592
Total Depth (m): 142.94

Easting: 245685.42 **Northing:** 6533374.95 **Elevation:** 296.93
Licensed Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: BSR

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
			CLAY moderate brown with cemented clay and silt intrusions		
			CLAY as above, brown to grey, moderate to high plasticity		
			CLAY some tan clay inclusions		
			CLAY some baked white clay inclusions		
			CLAY as above, brown to grey, moderate to high plasticity		
8			CLAY grading brown to dark brown, cemented inclusions		
			CLAY brown to light brown, some darker cemented silt/clay/weathered sandstone inclusions		
18					

125mm NB uPVC Casing
Cl. 12. Threaded

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0291

Page: 2 of 4

Client: Shenhua Watermark Coal P/L
 Project: Shenhua Watermark Project No.: EL7223
 Location: Watermark, Gunnedah, NSW, Australia
 Date Drilled: 1/05/2010

Drill Co: GOS
 Driller:
 NOW Groundwater Licence #: 90BL255592
 Total Depth (m): 142.94

Easting: 245685.42 Northing: 6533374.95 Elevation: 296.93
 Licenced Driller: Phillip Gaffney
 Grid Ref: MGA94 Zone 56 Vertical: AHD
 Logged by: BSR

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			CLAY as above, trace sand (quartz, angular-subrounded, coarse grained to small gravel) chert inclusions		
			CLAY grading more rounded, larger grain size		
			CLAY increased sand and gravel content, abundant large diameter chips (>10mm), ranges from angular to sub rounded		
33			CLAY grading less sand, smaller grain, still some lithic chips		
			SAND coarse grained with small gravel, quartz abundant lithics, well rounded to angular		
43					

Hole diameter: XXmm

Grout: 3%

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0291

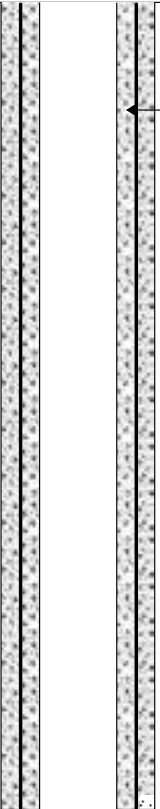
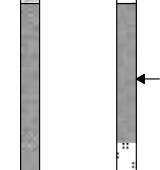
Page: 3 of 4

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 1/05/2010

Drill Co: GOS
Driller:
NOW Groundwater Licence #: 90BL255592
Total Depth (m): 142.94

Easting: 245685.42 Northing: 6533374.95 Elevation: 296.93
Licenced Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: BSR

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
58			SAND smaller grained, less sand SAND smaller abundant sand SAND grading more clayey/weathered silt MUDSTONE extremely weathered with siltstone/sandstone, brown with some orange, white and grey mottling	 Bentonite - cement HQ hole: 96.1mm	
68			CONGLOMERATE small to medium sized inclusions, poor core recovery 63-39m CLAY calcareous in part sandy, extremely weathered rock, yellow-brown, soft, friable	 Seal: 1/4" Bentonite pellets	

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0291

Page: 4 of 4

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 1/05/2010

Drill Co: GOS
Driller:
NOW Groundwater Licence #: 90BL255592
Total Depth (m): 142.94

Easting: 245685.42 **Northing:** 6533374.95 **Elevation:** 296.93
Licensed Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: BSR

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			CONGLOMERATE coaly in part, distinctly weathered rock, pebbly, cream, moderately soft SAND clayey throughout, extremely weathered rock, fine grained, brown, soft CLAY sandy throughout, extremely weathered rock, brown, soft, friable Sandy CLAY sandy, distinctly weathered rock, grey, soft CONGLOMERATE sandy throughout pebbly, distinctly weathered rock, grey, moderately soft CLAY sandy in part, distinctly weathered rock, grey, moderately soft, Puggy SANDSTONE pebbly towards base of unit clayey, distinctly weathered rock, fine grained, green, moderately soft, broken in part CONGLOMERATE granular, slightly weathered rock, gravelly, light grey, moderately soft, Permeable	Washed gravel pack 1-2mm 50mm NB uPVC machine-slotted screen. 0.4mm aperture. Cl. 18. Threaded. In 3m lengths Threaded PVC end cap Seal: 1/4" Bentonite pellets 3% Bentonite - cement grout EOH 143.1m bgl, backfilled cement-bentonite-grout	

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0291A

Page: 1 of 4

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 6/03/2011

Drill Co: Depco
Driller: Damien Lagos
NOW Groundwater Licence #: 90BL255596
Total Depth (m): 462.43

Easting: 245692.78 Northing: 6533435.35 Elevation: 295.26
Licenced Driller: Neil Gill
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: GS

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface	Lockable steel bore cover	
			CLAY brown, stiff	3% Bentonite cement grout Surface casing PVC 114mm 50mm Class 18 PVC threaded	
8			CLAY brown, stiff		
18			CLAY brown, stiff, with sand		
			clayey GRAVEL quartz and lithic gravels, brown/red, well rounded		
			clayey GRAVEL brown, stiff, minor sand		
28			gravelly CLAY brown, angular gravels		
			clayey SAND brown, medium-coarse grained, poorly sorted, well-poorly rounded		
			SAND fine to medium grained, brown red and yellow lithics, well rounded, some clay bands		
38			SAND brown, medium grained, well sorted, mod rounding		
			clayey SAND medium-coarse grained, light brown		
			CLAY red-brown, dense, stiff		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0291A

Page: 2 of 4

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 6/03/2011

Drill Co: Depco
Driller: Damien Lagos
NOW Groundwater Licence #: 90BL255596
Total Depth (m): 462.43

Easting: 245692.78 **Northing:** 6533435.35 **Elevation:** 295.26
Licensed Driller: Neil Gill
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: GS **Checked by:** GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
53			CLAY red-brown, with well rounded sand		
			CLAY brown, with traces of coal, highly weathered, some rounded gravels		
			CLAY brown, medium-coarse sand, fines gravels		
			CLAY brown, with trace sand and shell fragments, becoming more sandy with depth		
			SAND brown, with sub rounded-angular coarse sand and fine gravels		
			sandy CLAY brown, medium-coarse sand		
			sandy CLAY brown-light brown, sub rounded-angular, medium-fine grained		
63			sandy CLAY red/orange becoming brown with depth, increasing sand content, medium grained		
			Carbonaceous SILTSTONE fresh rock, silt sized grains, grey, moderately hard		
			SILTSTONE gravelly, fresh rock, silt sized grains, grey, moderately hard		
73			SANDSTONE fresh rock, fine to medium grained, grey		
83					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0291A

Page: 3 of 4

Client: Shenhua Watermark Coal P/L

Project: Shenhua Watermark Project No.: EL7223

Location: Watermark, Gunnedah, NSW, Australia

Date Drilled: 6/03/2011

Drill Co: Depco

Driller: Damien Lagos

NOW Groundwater Licence #: 90BL255596

Total Depth (m): 462.43

Easting: 245692.78

Licenced Driller: Neil Gill

Grid Ref: MGA94 Zone 56 Vertical: AHD

Logged by: GS

Northing: 6533435.35

Elevation: 295.26

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
98					
108					
118			SILTSTONE and SANDSTONE fresh rock, fine grained, grey SANDSTONE with siltstone, carbonaceous, fresh rock, fine grained, grey		
128			CONGLOMERATE with siltstone and sandstone, fresh rock, fine to medium grained, grey SANDSTONE and SILTSTONE films of coal, fresh rock, fine grained, grey		
			COAL dull with brights 10%-40%, fresh rock, black		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0291A

Page: 4 of 4

Client: Shenhua Watermark Coal P/L
 Project: Shenhua Watermark Project No.: EL7223
 Location: Watermark, Gunnedah, NSW, Australia
 Date Drilled: 6/03/2011

Drill Co: Depco
 Driller: Damien Lagos
 NOW Groundwater Licence #: 90BL255596
 Total Depth (m): 462.43

Easting: 245692.78 Northing: 6533435.35 Elevation: 295.26
 Licenced Driller: Neil Gill
 Grid Ref: MGA94 Zone 56 Vertical: AHD
 Logged by: GS Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			coaly SLTSTONE dull, fresh rock, grey		CRU
			SANDSTONE with silcrete and siltstone, fresh rock, fine grained, grey		CRM
			granule CONGLOMERATE lenses slightly carbonaceous, fresh rock, fine to coarse grained, grey		CRL
143			COAL dull with brights 10%-40%, fresh rock, grey		W
			SLTSTONE fresh rock, grey		
			SANDSTONE interbedded with coal, fresh rock, brown-grey		
153			SANDSTONE interbedded with siltstone, gravelly banded, fresh rock, fine to coarse grained, grey		
			COAL with some thin layers of siltstone and sandstone, dull with brights 10%-40% silty banded, fresh rock, black	Bentonite seal	HKR
				Gravel pack	HKU
163				50mm Class 18 threaded PVC screen	HKL
			SANDSTONE with siltstone, carbonaceous laminae, fresh rock, fine to medium grained, grey		
			SANDSTONE fresh rock, fine to medium grained, grey, hard	Bentonite	
173				3% Bentonite grout cement mix	
			SLTSTONE carbonaceous clayey, fresh rock, silt sized grains, grey, moderately hard		
EOH 462.43m bgl, backfilled cement-bentonite-grout					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0291B

Page: 1 of 3

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 19/03/2011

Drill Co: Depco
Driller: Brad Vanderland
NOW Groundwater Licence #: 90BL255597
Total Depth (m): 107

Eastings: 245696.08 Northing: 6533461.09 Elevation: 295.25
Licenced Driller: Allen Carlon
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: DC
Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
			CLAY silty		
			CLAY sandy		
			CLAY sandy litho-feldspathic		
			GRAVEL clayey sandy litho-feldspathic		
8			CLAY gravelly		
			CLAY silty		
			SILT clayey sandy		
18			SAND silty clayey		
			SAND silty		
			CLAY as above, trace sand (quartz, angular-subrounded, coarse grained to small gravel) chert inclusions		
			CLAY grading more rounded, larger grain size		
28			CLAY increased sand and gravel content, abundant large diameter chips (>10mm), ranges from angular to sub rounded		
			CLAY grading less sand, smaller grain, still some lithic chips		
38					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0291B

Page: 2 of 3

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 19/03/2011

Drill Co: Depco
Driller: Brad Vanderland
NOW Groundwater Licence #: 90BL255597
Total Depth (m): 107

Easting: 245696.08 **Northing:** 6533461.09 **Elevation:** 295.25
Licenced Driller: Allen Carlon
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: DC **Checked by:** GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
48			SAND coarse grained with small gravel, quartz abundant lithics, well rounded to angular		
58			SAND smaller grained, less sand		
			SAND smaller abundant sand		
			SAND grading more clayey/weathered silt		
68			MUDSTONE extremely weathered with siltstone/sandstone, brown with some orange, white and grey mottling		
			CONGLOMERATE small to medium sized inclusions, poor core recovery 63-39m		
			Core Loss		
			CLAY sandy		
78			Core Loss		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0291B

Page: 3 of 3

Client: Shenhua Watermark Coal P/L

Project: Shenhua Watermark Project No.: EL7223

Location: Watermark, Gunnedah, NSW, Australia

Date Drilled: 19/03/2011

Drill Co: Depco

Driller: Brad Vanderland

NOW Groundwater Licence #: 90BL255597

Total Depth (m): 107

Easting: 245696.08

Northing: 6533461.09

Elevation: 295.25

Licenced Driller: Allen Carlon

Grid Ref: MGA94 Zone 56 Vertical: AHD

Logged by: DC

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
88			SAND		
98			SAND gravelly SAND gravelly clayey SAND clayey		
			SAND clayey SAND clayey gravelly SAND gravelly		
108			SANDSTONE silty		
118			END OF BOREHOLE @ 107m bgl		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0293A

Page: 1 of 2

Client: Shenhua Watermark Coal P/L
 Project: Shenhua Watermark Project No.: EL7223
 Location: Watermark, Gunnedah, NSW, Australia
 Date Drilled: 24/05/2010

Drill Co: GOS
 Driller: Shane Evans
 NOW Groundwater Licence #: 90BL255294
 Total Depth (m): 34

Easting: 242497.21 Northing: 6540388.59 Elevation: 324.5
 Licenced Driller: Phillip Gaffney
 Grid Ref: MGA94 Zone 56 Vertical: AHD
 Logged by: UNK

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
			silty CLAY yellow-brown silty CLAY brown, some gravel silty CLAY grey brown sandy CLAY light grey-brown, fine grained sand	 50mm NB uPVC Casing Cl. 18, Threaded, 3m lengths 3% Bentonite - cement grout 107mm hole 0m-25m	
8					
18			clayey SAND light brown clayey SAND coarse grained sand with fine gravel of quartz and siltstone sandy CLAY yellow-brown		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0293A

Page: 2 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 24/05/2010

Drill Co: GOS
Driller: Shane Evans
NOW Groundwater Licence #: 90BL255294
Total Depth (m): 34

Easting: 242497.21 **Northing:** 6540388.59 **Elevation:** 324.5
Licensed Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: UNK

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
33			clayey SAND light grey-brown, coarse grained sand clayey SAND as above, less hard clayey bands of ~100mm thick sandy CLAY light grey-brown, medium grained sand clayey SAND red brown, coarse and fine grained gravel quartz and siltstone		
43			END OF BOREHOLE @ 33.5m bgl		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0330R

Page: 1 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 3/12/2010

Drill Co: GOS
Driller: Paul Bennett
NOW Groundwater Licence #: 90BL255594
Total Depth (m): 120

Easting: 245457 **Northing:** 6539932 **Elevation:** 307.47
Licensed Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: BSR

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface	150mm Lockable steel bore cover	
			TOPSOIL silty sandy, extremely weathered rock, medium to coarse grained, brown		
			SILTSTONE sandy, weathered rock, medium grained, light-brown	125mm PVC class 9	
			SANDSTONE weathered rock, fine to coarse grained, dark brown	3% Bentonite cement	
			Core Loss	50mm uPVC threaded class 18	
			GRAVEL silty sandy, weathered rock, light grey		
			SANDSTONE weathered rock, fine to medium grained, brown		
8			SANDSTONE clayey, weathered rock, medium grained, light-brown		
			SANDSTONE clayey, weathered rock, medium to coarse grained, light-brown		
			SANDSTONE clayey gravelly, weathered rock, medium to coarse grained, light-brown		
18			CLAY silty, weathered rock, brown		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0330R

Page: 2 of 2

Client: Shenhua Watermark Coal P/L

Project: Shenhua Watermark Project No.: EL7223

Location: Watermark, Gunnedah, NSW, Australia

Date Drilled: 3/12/2010

Drill Co: GOS

Driller: Paul Bennett

NOW Groundwater Licence #: 90BL255594

Total Depth (m): 120

Easting: 245457

Licenced Driller: Phillip Gaffney

Grid Ref: MGA94 Zone 56 Vertical: AHD

Logged by: BSR

Northing: 6539932

Elevation: 307.47

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
33			SILTSTONE sandy towards base of unit, slightly weathered rock, grey, soft SILTSTONE slightly weathered rock, grey, soft SILTSTONE partly carbonaceous, slightly weathered rock, grey, soft SILTSTONE slightly weathered rock, grey, soft SILTSTONE sandy towards base of unit, slightly weathered rock, grey, soft, carbonaceous laminae SANDSTONE silty laminae throughout, slightly weathered rock, very fine grained, grey, soft SANDSTONE silty banded throughout, fresh rock, very fine grained, grey, moderately soft SANDSTONE silty laminae towards top of unit, fresh rock, very fine to fine grained, grey, moderately hard SILTSTONE carbonaceous banded, fresh rock, grey, soft Carbonaceous SILTSTONE clayey banded towards base of unit, fresh rock, dark grey to black, moderately soft, carbonaceous laminae CLAYSTONE fresh rock, grey, moderately soft SILTSTONE fine sandy towards base of unit, fresh rock, grey, moderately soft SILTSTONE clayey banded throughout, fresh rock, grey, moderately soft	Bentonite pellets 1-2mm Gravel Pack 50mm PVC screen with 0.4mm slots PVC sump PVC end cap	
43					
			END OF BOREHOLE @ 45.45m bgl		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0333

Page: 1 of 4

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 21/08/2010

Drill Co: GOS
Driller: Jason Wildman
NOW Groundwater Licence #: 90BL255154
Total Depth (m): 98

Easting: 242510.08 **Northing:** 6540397.44 **Elevation:** 324.44
Licensed Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: PRA

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface	Steel surface casing, lockable cap	
			SILT silty iron stained, decomposed, orange, extremely soft, low plasticity		
			SILT clayey sandy iron stained, decomposed, brown, extremely soft, medium plasticity		
			SAND silty clayey lithic-quartz, extremely weathered rock, fine to medium grained, beige, extremely soft, medium plasticity		
8			SILT silty sandy gravelly clayey, extremely weathered rock, light-brown, extremely soft, medium plasticity		
			SAND silty clayey iron stained, extremely weathered rock, fine to medium grained, brown, extremely soft, medium plasticity		
			SAND silty clayey lithic-quartz, extremely weathered rock, fine to medium grained, light-brown, extremely soft, medium plasticity		
18			SAND silty clayey lithic-quartz, extremely weathered rock, fine gravel (2-6mm), light-brown, extremely soft, low plasticity		
			SAND silty clayey lithic-quartz, extremely weathered rock, medium to coarse grained, light-brown, extremely soft, medium plasticity		
			SAND gravelly silty clayey, extremely weathered rock, medium to coarse grained, beige, extremely soft, medium plasticity		
28					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):

**BOREHOLE LOG**

Groundwater Installation

Bore No.: WM0333

Page: 2 of 4

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 21/08/2010

Drill Co: GOS
Driller: Jason Wildman
NOW Groundwater Licence #: 90BL255154
Total Depth (m): 98

Easting: 242510.08 **Northing:** 6540397.44 **Elevation:** 324.44
Licensed Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: PRA

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			SAND silty lithic-quartz, extremely weathered rock, medium to coarse grained, orange, extremely soft, low plasticity		
			SILT sandy clayey, extremely weathered rock, beige, extremely soft, medium plasticity		
			SAND gravelly silty lithic-quartz, extremely weathered rock, beige, extremely soft, non-plastic		
38			SAND silty clayey lithic-quartz, extremely weathered rock, fine to medium grained, beige, extremely soft, medium plasticity		
			SAND silty lithic-quartz, extremely weathered rock, fine gravel (2-6mm), brown-grey, extremely soft, non-plastic		
			SILT sandy clayey, extremely weathered rock, extremely soft, low plasticity		
48			SAND siliceous, extremely weathered rock, fine to medium grained, extremely soft, low plasticity		
			SILT sandy, distinctly weathered rock, light-brown, moderately soft, low plasticity		
			Core Loss		
			PEBBLE CONGLOMERATE lithic-quartz cherty clasts, distinctly weathered rock, red, hard		
			Core Loss		
			PEBBLE CONGLOMERATE cherty lithic-quartz clasts, distinctly weathered rock, red, hard		
			CLAY sandy silty, distinctly weathered rock, light grey, soft, Puggy		
			Core Loss		
			PEBBLE CONGLOMERATE cherty lithic-quartz clasts, distinctly weathered rock, red, hard		
58			Core Loss		

HKU

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0333

Page: 3 of 4

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 21/08/2010

Drill Co: GOS
Driller: Jason Wildman
NOW Groundwater Licence #: 90BL255154
Total Depth (m): 98

Easting: 242510.08 **Northing:** 6540397.44 **Elevation:** 324.44
Licensed Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: PRA

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
					HKL
			PEBBLE CONGLOMERATE cherty lithic-quartz clasts, distinctly weathered rock, red, moderately hard		
			Core Loss		
68			PEBBLE CONGLOMERATE quartz-lithic cherty clasts, distinctly weathered rock, brown, hard		
			CLAY silty, distinctly weathered rock, light brown becoming dark grey to black, soft, non-plastic		
			SILTSTONE fresh rock, dark grey, moderately hard		
			SANDSTONE silty lenses, fresh rock, medium-fine grained, light grey, moderately hard, with siltstone bands		
78					
			SILTSTONE fresh rock, dark grey, moderately hard		
			COAL stoney, fresh rock, moderately soft		F
			SANDSTONE silty banded towards base of unit, fresh rock, fine grained, light grey, moderately hard, carbonaceous laminae		
			COAL interbedded with carbonaceous mudstone, fresh rock, moderately soft		
			COAL with carbonaceous mudstone and some siltstone, fresh rock, moderately soft		E
88			SILTSTONE		

← Tremmie pipe strapped to outside of carrier pipe to 70m bgl

← V2 (12048) outside of PVC casing

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0333

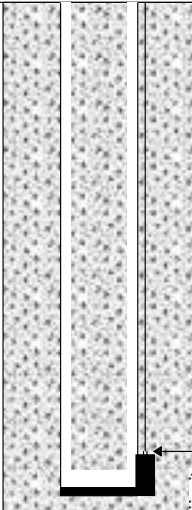
Page: 4 of 4

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 21/08/2010

Drill Co: GOS
Driller: Jason Wildman
NOW Groundwater Licence #: 90BL255154
Total Depth (m): 98

Easting: 242510.08 Northing: 6540397.44 Elevation: 324.44
Licenced Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: PRA

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
98			SANDSTONE fresh rock, fine grained, light grey, moderately hard SILTSTONE with claystone, fresh rock, dark grey-black, soft SANDSTONE carbonaceous towards base of unit, fresh rock, very fine to fine grained, light grey, moderately hard, carbonaceous laminae SILTSTONE fresh rock, dark grey COAL fresh rock, moderately soft SILTSTONE interbedded with sandstone, some coal present, fresh rock, dark grey, moderately hard, roots COAL fresh rock, moderately soft	 V1 (12050) outside of PVC casing	BL A MV
108					
118			END OF BOREHOLE @ 99.35m bgl		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0334

Page: 1 of 1

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 22/08/2010

Drill Co: GOS
Driller: Ryan Anderson
NOW Groundwater Licence #: 90BL255590
Total Depth (m): 30

Easting: 252773.37 **Northing:** 6543031.9 **Elevation:** 296.3
Licensed Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: BKM **Checked by:** GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface	Lockable steel cover	
			CLAY sandy silty, extremely weathered rock, red		
			SLTSTONE distinctly weathered rock, light grey	3% Bentonite grout	
			SANDSTONE distinctly weathered rock, yellow	50 mm Class 18 PVC casing	
			SLTSTONE distinctly weathered rock, light grey		
			SLTSTONE distinctly weathered rock, brown		
8			SANDSTONE distinctly weathered rock, fine grained, orange		
			SANDSTONE distinctly weathered rock, fine grained, yellow		
			SANDSTONE slightly weathered rock, fine grained		
18			SANDSTONE fresh rock	Bentonite pellets	
			SANDSTONE fresh rock	Gravel pack	
			SANDSTONE fresh rock	50mm Class 18 PVC MS screen	
			SANDSTONE fresh rock	Bentonite pellets	
28			SANDSTONE fresh rock	Collapse	
			END OF BOREHOLE @ 30m bgl		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):

**BOREHOLE LOG**

Groundwater Installation

Bore No.: WM0339A

Page: 1 of 2

Client: Shenhua Watermark Coal P/L

Project: Shenhua Watermark Project No.: EL7223

Location: Watermark, Gunnedah, NSW, Australia

Date Drilled: 1/03/2011

Drill Co: Depco

Driller: Damien Lagos

NOW Groundwater Licence #: 90BL255917

Total Depth (m): 363.28

Easting: 243383.1

Licenced Driller: Allen Carlon

Grid Ref: MGA94 Zone 56 Vertical: AHD

Logged by: CG

Northing: 6539684.56

Elevation: 330.3

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
			COLLUVIUM clayey gravelly, decomposed, fine to medium gravel, iron-stained, chipped core		
			COLLUVIUM clayey gravelly, extremely weathered rock, fine to medium gravel, grey-brown, chipped core		
8			SANDSTONE distinctly weathered rock, fine to medium grained, brown, chipped core, moderately hard		
			SANDSTONE distinctly weathered rock, fine to medium grained, orange, chipped core, moderately hard		
18			CLAYSTONE with siltstone, gravelly, fresh rock, fine grained, grey, chipped core, soft		
			coaly CLAYSTONE gravelly, fresh rock, fine grained, grey, chipped core, moderately hard		
			SLTSTONE gravelly, fresh rock, fine grained, grey, chipped coresoft		
28					
			SANDSTONE gravelly coaly, fresh rock, medium to coarse grained, grey, chipped core, hard		
38					
48					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0339A

Page: 2 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 1/03/2011

Drill Co: Depco
Driller: Damien Lagos
NOW Groundwater Licence #: 90BL255917
Total Depth (m): 363.28

Easting: 243383.1 **Northing:** 6539684.56 **Elevation:** 330.3
Licensed Driller: Allen Carlon
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: CG

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			SILTSTONE and SANDSTONE gravelly coaly, fresh rock, medium gravel, grey, chipped core, hard		
			COAL dull with brights 10% -40% muddy silty, fresh rock, black, cored, hard		
			SANDSTONE imbedded with silt, coaly, fresh rock, fine grained, cored, hard		
			COAL dull <1% brights, fresh rock, black, cored, hard		
			SILTSTONE with sandstone, fresh rock, dark grey, cored, hard		
			CLAYSTONE silty calcitic coaly, fresh rock, grey, cored, hard		
58			SANDSTONE coaly, fresh rock, medium to coarse grained, cored		
			SILTSTONE with thin layers of coal, dull <1% brights, fresh rock, black, cored, hard		
			SANDSTONE with trace siltstone, silty coaly, fresh rock, fine to medium grained, grey, cored, hard		
			CLAY imbedded films of coal, fresh rock, dark grey-black, cored, hard		
68			COAL with sand and silt, clayey, fresh rock, black, cored, hard		
			SANDSTONE silty coaly, fresh rock, medium to coarse grained, grey, cored, hard		
			SILTSTONE coaly, fresh rock, grey, cored, hard		
			COAL silty, fresh rock, black, cored, hard		
			coaly MUDSTONE dull with brights 10% -40% , fresh rock, dark grey-black, cored, hard		
78			CLAYSTONE and SANDSTONE fresh rock, grey, cored, hard		
88					
98					
				EOH 363.28m bgl, backfilled with cement-bentonit-grout	

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0350

Page: 1 of 2

Client: Shenhua Watermark Coal P/L		Drill Co: GOS		Easting: 253508.39	Northing: 6538545.02	Elevation: 292.32
Project: Shenhua Watermark		Driller: Jason Wildman		Licensed Driller: Phillip Gaffney		
Location: Watermark, Gunnedah, NSW, Australia		NOW Groundwater Licence #: 90BL255584		Grid Ref: MGA94 Zone 56 Vertical: AHD		
Date Drilled: 20/09/2010		Total Depth (m): 96		Logged by: DC		Checked by: GF
Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details		Seam
-2			Ground Surface			
			TOPSOIL clayey silty, extremely weathered rock, dark brown, chipped core			
			CLAYSTONE sandy in part, distinctly weathered rock, brown, chipped core			
			DOLERITE distinctly weathered rock, brown, chipped core			
8			DOLERITE slightly weathered rock, dark brown, chipped core			TV
			DOLERITE slightly weathered rock, dark brown, chipped core			
			DOLERITE slightly weathered rock, dark brown, chipped core			
18			DOLERITE slightly weathered rock, dark brown, chipped core			
			DOLERITE slightly weathered rock, dark brown, chipped core			
			DOLERITE slightly weathered rock, dark brown, chipped core			
28			MUDSTONE distinctly weathered rock, brown, chipped core			
			MUDSTONE distinctly weathered rock, brown, chipped core			
			MUDSTONE distinctly weathered rock, brown, chipped core			
			SILTSTONE fresh rock, light grey, chipped core			
			SILTSTONE fresh rock, light grey, chipped core			
			SILTSTONE fresh rock, light grey, chipped core			
38			COAL with carbonaceous mudstone, fresh rock, chipped core			
			COAL with carbonaceous mudstone, fresh rock, chipped core			
			COAL with carbonaceous mudstone, fresh rock, chipped core			
			SILTSTONE towards middle of unit, fresh rock, light grey, chipped core			EU
			SILTSTONE towards middle of unit, fresh rock, light grey, chipped core			
			SILTSTONE towards middle of unit, fresh rock, light grey, chipped core			
48			SANDSTONE silty, fresh rock, light grey, chipped core			EL
			SANDSTONE silty, fresh rock, light grey, chipped core			
			SANDSTONE silty, fresh rock, light grey, chipped core			

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0350

Page: 2 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 20/09/2010

Drill Co: GOS
Driller: Jason Wildman
NOW Groundwater Licence #: 90BL255584
Total Depth (m): 96

Easting: 253508.39 **Northing:** 6538545.02 **Elevation:** 292.32
Licensed Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: DC **Checked by:** GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			SANDSTONE silty pebbly, fresh rock, light grey, chipped core COAL with mudstone, fresh rock, chipped core SILTSTONE sandy, fresh rock, light grey, chipped core MUDSTONE fresh rock, grey, chipped core SANDSTONE silty, fresh rock, grey, chipped core SILTSTONE towards middle of unit throughout, fresh rock, grey, chipped core SILTSTONE with trace coal, fresh rock, light grey, chipped core SANDSTONE fresh rock, dark grey, chipped core COAL interbedded with mudstone, silty banded throughout, fresh rock, black, chipped core SANDSTONE silty throughout, fresh rock, light grey, chipped core	V02 (SN12218) (48m) Bentonite/cement grout 10% bent 50mm Class 18 Plain PVC V01 (SN12052) (90)	DL B MV
58					
68					
78					
88					
96			END OF BOREHOLE @ 96m bgl		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0360

Page: 1 of 1

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 23/03/2011
Drill Co: Boart Longyear
Driller: Gavin Keith
NOW Groundwater Licence #: 90BL255583
Total Depth (m): 38
Easting: 254863.19 Northing: 6542460.4 Elevation: 280.72
Licenced Driller: Paul Griffiths
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: SC
Checked by:

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
			TOPSOIL Clay, stiff, very cohesive, minor red clay veins, fine to medium angular quartz sand		
			Silty CLAY light brown, very sticky, cohesive		
			Clayey SILT light brown, cohesive, medium plasticity, minor fine-medium grained sand		
			Clayey SILT As above, low plasticity, very fine-fine grained sand, poorly sorted, brown sand		
			Clayey SILT Light brown, cohesive, medium plasticity		
8			CLAY Brown, stiff, very cohesive, hard		
			CLAY brown, stiff, sticky, 5-10% angular gravel, medium-large granite chips		
			Silty CLAY soft, very cohesive, minor sand, fine-medium grained, ~5%		
			Clayey SAND fine to medium grained, brown, sub-rounded with minor angular fragments		
			SAND iron brown, with minor clay, medium grained with minor coarse grains of grey, black, clear, red and iron colour lithics, moist, soft		
			gravelly SAND with minor clay, subrounded, moist, lithics as above		
18			CLAY sandy granular red-brown, moderately hard		
			CLAY red-brown, hard, very stiff		
			CLAY reddish brown with grey mottles, becoming more iron stained with depth and reduced mottling, very stiff/hard		
			CLAY red-brown, hard, with minor gravel		
			CLAY granular, red-brown, with minor gravel and large fragments of very weathered and brittle sandstone with black coaly inclusions		
			CLAY granular, fine to medium gravel, red, hard		
28			CLAY sandy with minor gravel, iron-stained, hard		
			CLAY Iron red, abundant white to pinkish zones of very weathered sandstone, very brittle and angular, minor sub-rounded gravel, minor black fragments		
			Sandy CLAY Dark iron red, weathered sandstone, very stiff, pink and yellow inclusions, very angular, minor subrounded-subangular, fragments (<5mm)		
			Sandy CLAY iron-stained, very weathered sandstone, grey with iron mottling, black inclusions, some whitish/cream fragments, subrounded-angular		
			Sandy Gravelly CLAY iron red-brown, with large grey and white inclusions, gravel is large with some very angular fragments and some subrounded		
38			CLAY grey and iron colouring, large inclusions of white silt		
			CLAY black white and iron mottling, moderately soft		
			CLAY granular, iron-stained, hard, small (<3mm) black angular inclusions (coal/mudstone)		
			END OF BOREHOLE @ 38m bgl		
				Lockable steel bore cover	
				3% Bentonite grout	
				50mm Class 18 threaded PVC	
					QN
				Bentonite Seal	
				50mm Class 18 machine slotted PVC 0.4mm slots	
				PVC Sump	
				PVC End cap	
					PBL
					PWF
48					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0361

Page: 1 of 1

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 1/09/2010

Drill Co: GOS
Driller: Scott Timlin
NOW Groundwater Licence #: 90BL255591
Total Depth (m): 330

Easting: 251627 **Northing:** 6543028 **Elevation:** 290.53
Licensed Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: BSR

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
			TOPSOIL clayey, red, very very soft SAND gravelly clayey, yellow SANDSTONE distinctly weathered rock, fine to medium grained, yellow, soft SILTSTONE clayey throughout, distinctly weathered rock, yellow, soft SANDSTONE distinctly weathered rock, fine to medium grained, brown, soft SILTSTONE clayey throughout partly carbonaceous, distinctly weathered rock, dark grey, very very soft GRAVEL quartz-lithic pebbly clayey, slightly weathered rock, pebbly, brown, soft SILTSTONE clayey quartz-lithic clasts, distinctly-slightly weathered rock, dark grey, very soft, partly carbonaceous	3% Bentonite grout 50mm class 18 PVC casing Bentonite plug Back fill collapse Gravel pack Class 18 MS PVC 50mm screen PVC sump Bentonite pellets EOH 330.23m bgl, backfilled with cement-bentonite-grout	
8					
18					
28					
38					
48					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):

**BOREHOLE LOG**

Groundwater Installation

Bore No.: WM0362

Page: 1 of 2

Client: Shenhua Watermark Coal P/L

Project: Shenhua Watermark Project No.: EL7223

Location: Watermark, Gunnedah, NSW, Australia

Date Drilled: 1/09/2010

Drill Co: GOS

Driller: Haydn Brunt

NOW Groundwater Licence #: 90BL255585

Total Depth (m): 72

Easting: 251624.93

Northing: 6543012

Elevation: 290.7

Licenced Driller: Phillip Gaffney

Grid Ref: MGA94 Zone 56 Vertical: AHD

Logged by: BKM

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
			SLTSTONE red, chipped core		
			SLTSTONE sandy, fine grained, brown, chipped core		
			SLTSTONE sandy, orange, chipped core		
			SANDSTONE distinctly weathered rock, fine grained, yellow, chipped core		
8			CONGLOMERATE distinctly weathered rock, orange, chipped core		
18					
28			SLTSTONE dark grey, chipped core		
38					
			SLTSTONE brown, chipped core		
48					

Lockable bore cap
cemented from 0.5m

Bentonite pellets

50mm ID Class 18 PVC

Collapse when 24m HWT
surface casing pulled**NOTES**

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0362

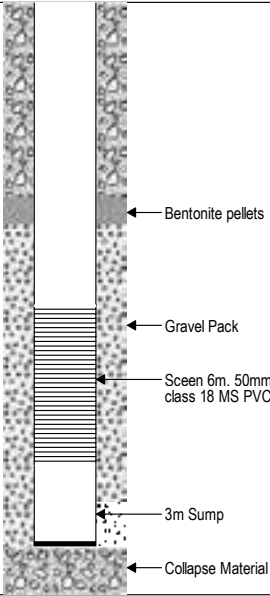
Page: 2 of 2

Client: Shenhua Watermark Coal P/L
 Project: Shenhua Watermark Project No.: EL7223
 Location: Watermark, Gunnedah, NSW, Australia
 Date Drilled: 1/09/2010

Drill Co: GOS
 Driller: Haydn Brunt
 NOW Groundwater Licence #: 90BL255585
 Total Depth (m): 72

Easting: 251624.93 Northing: 6543012 Elevation: 290.7
 Licenced Driller: Phillip Gaffney
 Grid Ref: MGA94 Zone 56 Vertical: AHD
 Logged by: BKM

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
58			SILTSTONE light grey, chipped core		
68			SILTSTONE distinctly weathered rock, dark grey, chipped core		
78			END OF BOREHOLE @ 70m bgl		
88					
98					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0363

Page: 1 of 1

Client: Shenhua Watermark Coal P/L		Drill Co: Depco		Easting: 246124.98	Northing: 6535835	Elevation: 298.09
Project: Shenhua Watermark		Driller: Neil Gill		Licensed Driller:		
Location: Watermark, Gunnedah, NSW, Australia		NOW Groundwater Licence #: 90BL255710		Grid Ref: MGA94 Zone 56 Vertical: AHD		
Date Drilled: 10/03/2011		Total Depth (m): 36.52		Logged by: SC		Checked by: GF
Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details		Seam
-2			Ground Surface	Lockable steel bore cover		
			CLAY red-brown, hard	3% Bentonite cement grout		
			CLAY gravelly sandy, medium to coarse grained, red-brown, soft	150mm Class 12 PVC		
				8 inch HDE casing		
			SAND clayey gravelly, medium to coarse grained, red-brown, soft			W
			CLAY sandy gravelly, medium to coarse grained, yellow-brown, soft			
8			SAND clayey gravelly, medium to coarse grained, red-brown, soft			
			CLAY sandy gravelly, coarse to medium grained, brown			
			CLAY sandy gravelly, medium to coarse grained, brown			
			SAND clayey gravelly, fine to coarse grained, yellow-brown			CLR
				Bentonite pellets		
			CLAY sandy, medium to coarse grained, yellow-brown, very soft			
			GRAVEL sandy clayey, coarse to medium grained, yellow-brown			
			GRAVEL sandy clayey, medium to coarse grained, brown			
18				3-6mm graded gravel		
			GRAVEL clayey sandy, medium to coarse grained, yellow-brown, very soft			
			GRAVEL clayey sandy, medium grained, yellow-brown, very soft			
28						
			GRAVEL clayey sandy, medium to coarse grained, brown, very soft			HKU
			CLAY sandy gravelly, medium to coarse grained, yellow-brown, soft			
				PVC sump		
			GRAVEL sandy clayey, medium to coarse grained, yellow-brown	Collapse material		
			END OF BOREHOLE @ 36m bgl			
38						

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0363A

Page: 1 of 1

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 13/03/2011

Drill Co: Depco
Driller: Sam Floss
NOW Groundwater Licence #: 90BL255587
Total Depth (m): 37.5

Easting: 246126.18 **Northing:** 6535841.48 **Elevation:** 298.23
Licensed Driller: Neil Gill
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: SC **Checked by:** GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface NO RECOVERY	Lockable steel bore cover	
8			CLAY gravelly, brown, soft	Class 18 PVC blank casing 3% Bentonite cement grout	
			CLAY sandy gravelly, medium to coarse grained, brown, soft		
			CLAY sandy gravelly, medium to coarse grained, yellow-brown, soft		
18			SAND clayey gravelly, medium to coarse grained, brown, soft	Bentonite seal	
				1-2mm Gravel pack	
28			CLAY sandy gravelly, medium to coarse grained, yellow, soft	Class 18 PVC slotted casing 0.5mm slots	
			CLAY iron coloured, minor sand and gravels, some grey mottles, soft, moist, angular to subrounded grains/particles		
			GRAVEL clayey sandy, yellow-brown, soft	Sump and end cap	
38			END OF BOREHOLE @ 37.5m bgl		
48					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

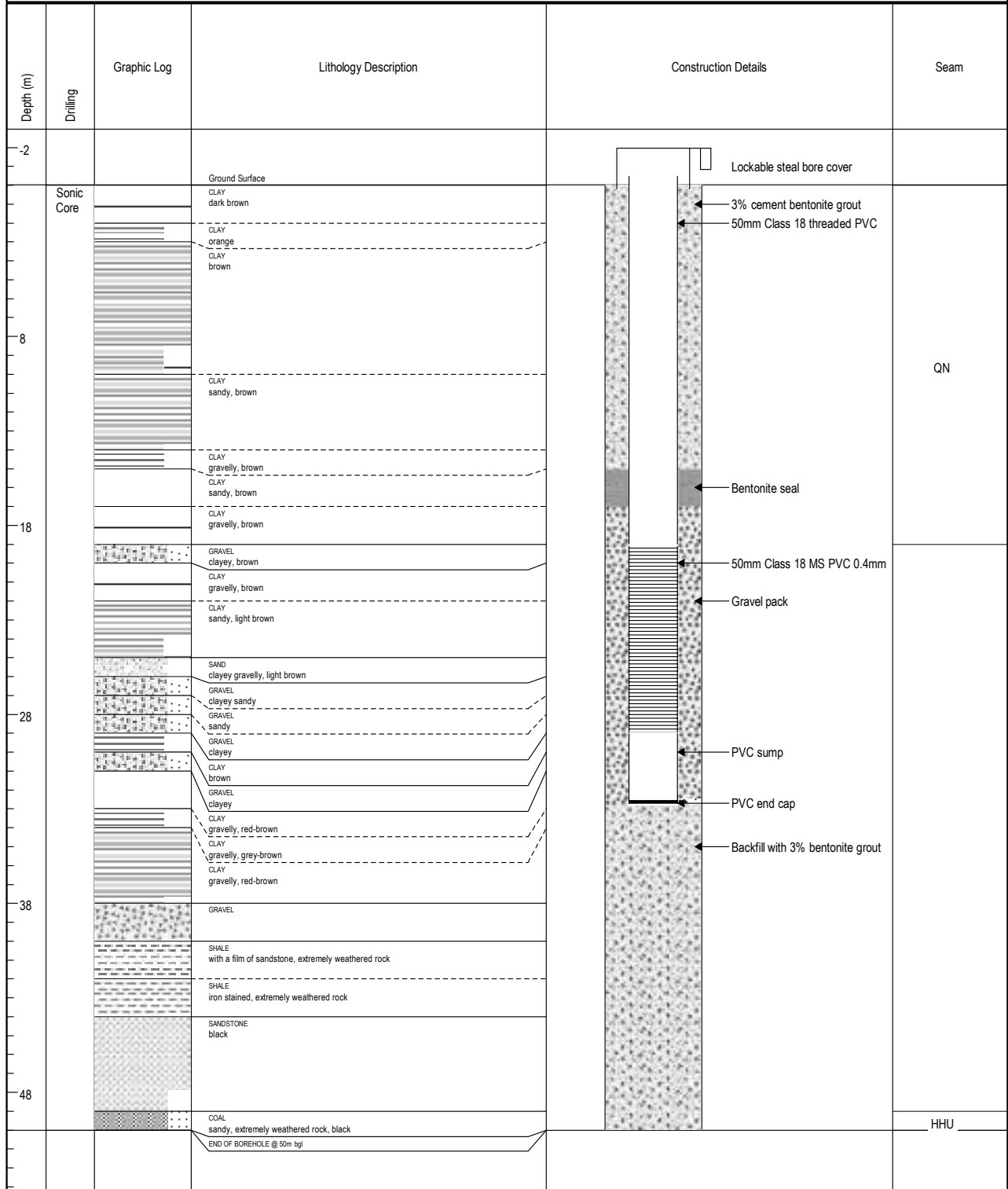
Bore No.: WM0364

Page: 1 of 1

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 11/03/2011

Drill Co: Boart Longyear
Driller: Paul Griffiths
NOW Groundwater Licence #: 90BL255711
Total Depth (m): 50

Easting: 244379.53 Northing: 6534418.02 Elevation: 295.04
Licenced Driller: Gavin Keith
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: BD
Checked by: GF



NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0365

Page: 1 of 1

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 14/03/2011

Drill Co: Boart Longyear
Driller: Gavin Keith
NOW Groundwater Licence #: 90BL255717
Total Depth (m): 20

Easting: 247650.57 **Northing:** 6535599.53 **Elevation:** 293.32
Licensed Driller: Paul Griffiths
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: BD **Checked by:** GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2					
			Ground Surface		
			CLAY brown		
				Lockable steel bore cover	
				3% cement bentonite grout	
				50mm Class 18 threaded PVC	
				Bentonite Seal	
				Gravel pack	
				50mm Class 18 MS PVC 0.4mm screeb	
			CLAY sandy, brown		
			CLAY brown		
			CLAY sandy, medium grained, brown		
			CLAY sandy, fine to medium grained, brown		
			SAND clayey, brown		
			CLAY sandy, medium grained, brown		
			CLAY brown		
			GRAVEL sandy, fine to coarse grained, orange		
			END OF BOREHOLE @ 20m bgl	PVC sump	
				PVC end cap	

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0398

Page: 1 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 30/11/2010

Drill Co: GOS
Driller: Ryan Anderson
NOW Groundwater Licence #: 90BL255581
Total Depth (m): 75.55

Easting: 242800 Northing: 6535120 Elevation: 310.75
Licenced Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: RAD

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
			CLAY iron stained banded, extremely weathered rock, yellow, extremely soft	450mm Steel surface casing with lockable cap	
			CLAY iron stained banded sandy, extremely weathered rock, brown, extremely soft	Cement grout, 3% bentonite	
				50mm PVC screen class 18 threaded	
8					
			SAND gravelly, extremely weathered rock, extremely soft	Bentonite	RDC
				Hole collapse material	
18			SILTSTONE extremely weathered rock, light-brown, extremely soft		
			CLAYSTONE extremely weathered rock, orange and brown, iron stained, extremely soft		
28				1-2mm gravel	
			SANDSTONE slightly weathered rock, medium grained, light grey, moderately hard		
			Core Loss	Bentonite seal	
38					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0398

Page: 2 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 30/11/2010

Drill Co: GOS
Driller: Ryan Anderson
NOW Groundwater Licence #: 90BL255581
Total Depth (m): 75.55

Easting: 242800 **Northing:** 6535120 **Elevation:** 310.75
Licensed Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: RAD

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
48			SANDSTONE silty banded throughout, fresh rock, medium to coarse grained, light grey, hard SILTSTONE clayey laminae, fresh rock, grey, moderately hard CLAYSTONE silty laminae, sandy towards top of unit, fresh rock, light grey, soft SILTSTONE fresh rock, grey, moderately hard CLAYSTONE silty towards base of unit, fresh rock, grey, soft COAL stoney, fresh rock, black, moderately soft	Bentonite seal Gravel pack 50mm PVC screen MS 0.4mm slots 50mm PVC sump	Y
58			CLAYSTONE sandy carbonaceous towards top of unit, fresh rock, grey, moderately soft Carbonaceous MUDSTONE coaly clayey banded, fresh rock, black, moderately soft, with siltstone bands COAL fresh rock, black, soft SILTSTONE fresh rock, dark grey, moderately hard		BZ
68			SANDSTONE lithic, fresh rock, medium grained, light grey, hard CLAYSTONE lithic, fresh rock, medium grained, light grey, hard		
78			END OF BOREHOLE @ 75.55m bgl		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0414

Page: 1 of 4

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 29/11/2010

Drill Co: GOS
Driller: Ryan Anderson
NOW Groundwater Licence #: 90BL255578
Total Depth (m): 302.6

Easting: 245330 Northing: 6539050 Elevation: 317.97
Licenced Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: EAW

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface TOPSOIL clayey ferruginous, distinctly weathered rock, brown, soft CLAY pebbly quartzose, distinctly weathered rock, light grey grading red-brown, soft	Lockable steel bore cover	
8				100mm PVC casing Cement-bentonite 3% grout 50mm PVC casing threaded, class 18	MV
18			GRAVEL silty, clayey at top of unit, fresh rock, off-white, iron stained, moderately hard CLAY sandy gravelly throughout, fresh rock, off-white, moderately hard		
28			GRAVEL pebbly clayey, fresh rock, off-white, moderately soft CLAY sandy gravelly, fresh rock, brown, moderately soft GRAVEL fresh rock, off-white, moderately soft		Ben
38			SANDSTONE with some mudstone, silty bands of coal, fresh rock, fine to coarse grained, grey, moderately soft SANDSTONE silty, fresh rock, fine to medium grained, grey, moderately hard, coaly fragments MUDSTONE fresh rock, dark grey-black, hard, Puggy SILTSTONE and SANDSTONE sandy banded throughout, fresh rock, dark grey, hard		
48					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0414

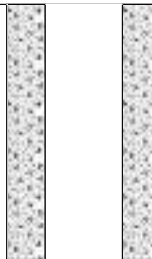
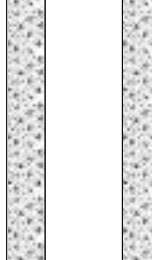
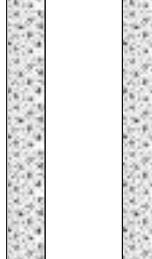
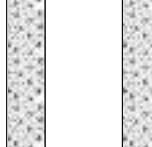
Page: 2 of 4

Client: Shenhua Watermark Coal P/L
 Project: Shenhua Watermark Project No.: EL7223
 Location: Watermark, Gunnedah, NSW, Australia
 Date Drilled: 29/11/2010

Drill Co: GOS
 Driller: Ryan Anderson
 NOW Groundwater Licence #: 90BL255578
 Total Depth (m): 302.6

Easting: 245330 Northing: 6539050 Elevation: 317.97
 Licenced Driller: Phillip Gaffney
 Grid Ref: MGA94 Zone 56 Vertical: AHD
 Logged by: EAW

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
58			SANDSTONE fresh rock, fine to medium grained, grey, hard		
			CORE LOSS SANDSTONE fresh rock, light grey, hard, coaly fragments		
68			SILTSTONE clayey, fresh rock, grey, hard		
78					
88					
98					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):

**BOREHOLE LOG**

Groundwater Installation

Bore No.: WM0414

Page: 3 of 4

Client: Shenhua Watermark Coal P/L

Project: Shenhua Watermark Project No.: EL7223

Location: Watermark, Gunnedah, NSW, Australia

Date Drilled: 29/11/2010

Drill Co: GOS

Driller: Ryan Anderson

NOW Groundwater Licence #: 90BL255578

Total Depth (m): 302.6

Easting: 245330

Licenced Driller: Phillip Gaffney

Grid Ref: MGA94 Zone 56 Vertical: AHD

Logged by: EAW

Northing: 6539050

Elevation: 317.97

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
108					
118					
128					
			SANDSTONE fresh rock, fine grained, light grey, hard		
			SILTSTONE clayey, fresh rock, grey, hard		
138					
				1-2mm Gravel pack	
148					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0414

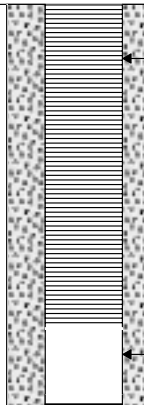
Page: 4 of 4

Client: Shenhua Watermark Coal P/L
 Project: Shenhua Watermark Project No.: EL7223
 Location: Watermark, Gunnedah, NSW, Australia
 Date Drilled: 29/11/2010

Drill Co: GOS
 Driller: Ryan Anderson
 NOW Groundwater Licence #: 90BL255578
 Total Depth (m): 302.6

Easting: 245330 Northing: 6539050 Elevation: 317.97
 Licenced Driller: Phillip Gaffney
 Grid Ref: MGA94 Zone 56 Vertical: AHD
 Logged by: EAW

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
158			SANDSTONE tuffaceous, fresh rock, fine to medium grained, light grey, hard, coaly fragments		JGMC
168			SILTSTONE fresh rock, dark grey, hard		
178					
188					
198				EOH 302.6m bgl, backfilled cement-bentonite-grout	

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):

**BOREHOLE LOG**

Groundwater Installation

Bore No.: WM0421

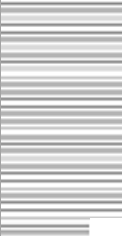
Page: 1 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 10/12/2010

Drill Co: GOS
Driller: Paul Bennett
NOW Groundwater Licence #: 90BL255582
Total Depth (m): 120

Easting: 245200 **Northing:** 6535300 **Elevation:** 296.01
Licensed Driller: Allen Carlon
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: SRW

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
			TOPSOIL distinctly weathered rock, brown, extremely soft		
			CLAY gravelly banded, distinctly weathered rock, brown, moderately soft	150mm Steel lockable cover 3% Cement-bentonite grout 50mm Class 18 PVC threaded	
8			GRAVEL distinctly weathered rock, grey, soft		
18			CONGLOMERATE sandy banded (grey) towards middle of unit, slightly weathered rock, coarse grained, brown, hard		JG
28					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0421

Page: 2 of 2

Client: Shenhua Watermark Coal P/L
 Project: Shenhua Watermark Project No.: EL7223
 Location: Watermark, Gunnedah, NSW, Australia
 Date Drilled: 10/12/2010

Drill Co: GOS
 Driller: Paul Bennett
 NOW Groundwater Licence #: 90BL255582
 Total Depth (m): 120

Easting: 245200 Northing: 6535300 Elevation: 296.01
 Licenced Driller: Allen Carlon
 Grid Ref: MGA94 Zone 56 Vertical: AHD
 Logged by: SRW

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			COAL stone, fresh rock, with trace carbonaceous mudstone		
			SANDSTONE fresh rock, fine grained, grey, hard		CRU
			SILTSTONE sandy banded, fresh rock, grey, moderately hard, with trace mudstone		CRM
			SANDSTONE fresh rock, medium to fine grained, brown, hard, with trace coaly siltstone		CRL
41					
				Bentonite plug (pellets)	
				1-2mm Gravel pack	
51					
				50mm NB class 18 screen PVC 0.4 slots	CLR
				50mm PVC sump	
				PVC end cate class 18	
61			Carbonaceous MUDSTONE fresh rock, brown, hard COAL fresh rock, hard END OF BOREHOLE @ 60.65m tgl		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0422

Page: 1 of 1

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 6/12/2010

Drill Co: GOS
Driller: Adam Jaecocke
NOW Groundwater Licence #: 90BL255580
Total Depth (m): 20

Easting: 245800 Northing: 6539680 Elevation: 307.58
Licenced Driller: Allen Carlon
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: GS

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2					
			Ground Surface TOPSOIL extremely weathered rock	Lockable (150mm) steel bore cover	
			GRAVEL silty sandy, distinctly weathered rock	125mm Class 12 PVC 3% Bentonite cement grout 50mm Class 18 threaded PVC	
8			SANDSTONE distinctly weathered rock		
			CLAYSTONE silty, distinctly weathered rock	Bentonite pellets	
			SANDSTONE distinctly weathered rock, medium to coarse grained	1-2mm Gravel pack	
18			CLAYSTONE silty, distinctly weathered rock	50mm PVC MS 0.4mm screen	
			END OF BOREHOLE @ 20m bgl	PVC end cap	

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0424

Page: 1 of 1

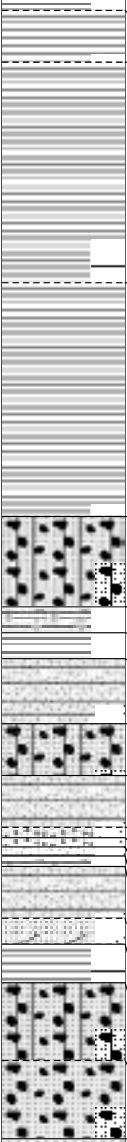
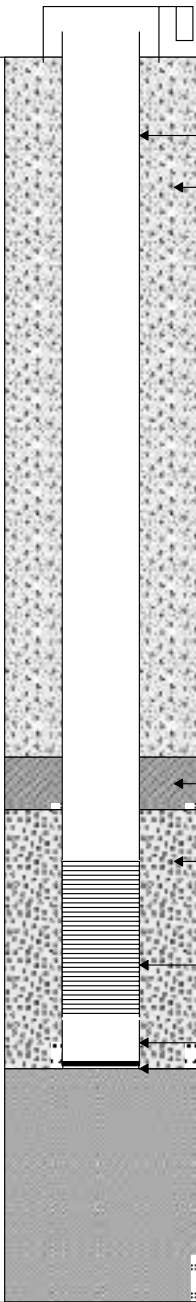
Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 07/04/2011

Drill Co: Boart Longyear
Driller: Gavin Keith
NOW Groundwater Licence #: 90BL255919
Total Depth (m): 39

Easting: 245740 **Northing:** 6533880
Licenced Driller: Paul Griffiths
Grid Ref: MGA94 **Zone 56 Vertical:** AHD
Logged by: SAC

Elevation: 294.85

Checked by: BJ & TC

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
	Sonic Core		CLAY dark brown with trace silt, soft, plastic, damp CLAY reddish brown, slightly soft to slightly firm, plastic, damp CLAY brown, slightly soft to slightly firm, plastic, damp with red, black and white very angular lithics (<2mm) CLAY brown, firm, plastic, damp, black and clear angular lithics (<1mm) gravelly CLAY brown with minor angular to sub-rounded gravels (<10mm), firm, damp, minor red, clear and black very angular lithics (<2mm) SANDY CLAY sandy, brown, fine grained, slightly soft to firm, damp to moist CLAY brown to reddish brown, firm, damp with some black mottles, traces of very fine sand clayey SAND brown to reddish brown, slightly soft to firm, damp, very fine grained, plastic gravelly CLAY brown with minor very weathered white sandstone gravels, very angular and pitted, stiff to hard, damp clayey SAND brown, contains sub-rounded to angular gravel, moist, medium to coarse grained GRAVEL brown with trace clay, medium to coarse grained, wet GRAVEL brown, some sand and minor clay, sub-angular to sub-rounded, wet clayey SAND firm to soft, coarse grained, rounded to sub-angular gravel (2-30mm) sandy CLAY sandy, brown, some claybound gravel clayey SAND brown to reddish brown, very cemented, contains gravel brown, gravels, some clay, moist, soft CLAY brown to pinkish brown, damp, very firm gravelly CLAY sandy gravelly, brown, very firm, coarse to medium grained, gravel <5mm, damp to dry, green, red, clear, black and white lithics iron brown clay with some medium grained sand and gravel, black concretions, SANDSTONE yellow brown to light grey, clay matrix, extremely weathered, very dry	 Lockable steel cover 50 mm Class 18 threaded PVC 3% Cement Bentonite Grout Bentonite Seal 1-2mm Gravel, washed quartz 50mm Class 18 machine slotted PVC 0.4 mm slots 50mm Class 18 PVC Sump 50mm Class 18 PVC End Cap	QN
48			END OF BOREHOLE @ 48 mbgl		CLR

NOTES

General drilling and construction notes:

Development info. Test results (slug, packer, water quality):



Groundwater Installation

Bore No.: WM0425

Page: 1 of 1

Easting: 245815.93 **Northing:** 6534447.84 **Elevation:** 294.57
Licenced Driller: Paul Griffiths
Grid Ref: MGA94 **Zone 56 Vertical:** AHD
Logged by: SAC **Checked by:** TC

Checked by: TC

NOTES

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0425A

Page: 1 of 1

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 10/04/2011

Drill Co: Boart Longyear
Driller: Gavin Keith
NOW Groundwater Licence #: 90BL255908
Total Depth (m): 30

Easting: 245817.84 **Northing:** 6534459.39 **Elevation:** 294.61
Licensed Driller: Paul Griffiths
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: TG **Checked by:** TC

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface	Lockable steel bore cover	
	Sonic Core Sonic		CLAY dark brown, fine sand, high plasticity, firm to stiff, moist CLAY moderate brown, firm to stiff, moist, Becoming stiffer with depth CLAY stiff, brown, trace fine to medium grained sand CLAY moderate brown, very stiff, moist CLAY brown, very stiff, moist, trace fine sub-angular to angular gravel CLAY brown, contains fine angular to sub-angular gravel, moist, stiff to very stiff CLAY brown, moist, very stiff, contains banding SANDY CLAY sandy, pale brown, fine to medium sand, moist, firm to stiff, lithic sands SAND pale brown, contains clay, fine to medium grained, moist, sub-rounded lithics SANDY CLAY sandy, pale brown, fine to medium grained, trace coarse lithics, moist, firm to stiff CLAY moderate brown, trace fine sand, moist, stiff to very stiff CLAY brown, moist, very stiff, trace fine to medium gravel, rounded to sub-rounded, lithics (<20mm) SAND clayey, pale brown, fine to medium sand, moist trace fine to medium gravel, angular to sub-angular lithics SANDSTONE extremely weathered, pale yellowish brown with off white inclusions, fine to medium grained, dry to moist, hard		
8					
18					
28					
			END OF BOREHOLE @ 32 m bgl		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0426

Page: 1 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 11/04/2011

Drill Co: Boart Longyear
Driller: Gavin Keith
NOW Groundwater Licence #: 90BL255905
Total Depth (m): 41

Easting: 245955 **Northing:** 6535340 **Elevation:** 294.46
Licensed Driller: Paul Griffiths
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: SAC

Checked by: TC

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2					
			Ground Surface CLAY medium brown, moist, soft to firm		
	Sonic Core				
	Sonic				
			CLAY iron to medium brown, sub-rounded to angular sandy gravelly (medium to coarse), contains black, yellow and red lithics, damp to moist, very firm to stiff		
			CLAY medium brown with some gravels and minor sands (sub-rounded to angular), damp to moist, very firm to stiff		
8			gravely CLAY light to medium brown, sandy and gravelly, (medium sand and sub-rounded to sub-angular gravel), some greyish mottling, moist, stiff to hard, contains lithics		
			gravely CLAY red, iron and grey, mottled, sandy and gravelly (medium to coarse grained), stiff to hard, moist, contains lithics		
			gravely CLAY dark grey, white and iron mottled, sandy gravelly (coarse grained), stiff to hard, moist, contains lithics		
			gravely CLAY dark brown-grey, iron mottled, sandy gravelly (coarse grained and angular), contains lithics		
			gravely CLAY dark brown, iron, dark grey and white mottling, sandy gravelly (medium to coarse grained, angular-sub-rounded), very stiff to hard, damp to moist		
			gravely CLAY grey and white, contains medium to coarse, very angular gravel and sands, contains black and white lithics, very firm, moist		
18			gravely CLAY red-iron with some coarse sands and sub-rounded to angular gravel, moist and damp		
			gravely CLAY red iron clay with sands and gravel, very stiff to hard, damp		
			gravely CLAY iron and grey, some fine very angular gravels and coarse sand, damp to moist		
				Lockable steel cover	
				3% Cement bentonite grout	
				50mm Class 18 PVC, threaded	
					QN
				Bentonite seal	

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0426

Page: 2 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 11/04/2011

Drill Co: Boart Longyear
Driller: Gavin Keith
NOW Groundwater Licence #: 90BL255905
Total Depth (m): 41

Easting: 245955 **Northing:** 6535340 **Elevation:** 294.46
Licensed Driller: Paul Griffiths
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: SAC

Checked by: TC

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			clayey SAND iron, clayey, fine, slightly soft, damp to moist clayey SAND white / grey with clay traces, coarse grained SANDSTONE iron coloured, crushed, very weak, medium to coarse grained SANDSTONE light brown, iron, grey, crushed, very weak and brittle, medium to coarse grained SAND iron / yellow, trace clay and some very coarse gravel, moist to wet SAND iron and grey, some brown mottles, some clay and minor gravels, moist, fine grained SAND light grey, trace clay and minor gravel, coarse grained, moist SAND iron to red colour SAND grey and iron red, clayey, minor gravel, medium grained, soft, moist CLAYSTONE grey to light brown and iron, dry to damp, moderately weak SAND Red brown, clayey, medium grained, some gravel SAND light brown to red, some clay and gravel, coarse to medium grained, soft, moist SAND red / iron, some gravel and trace clay, coarse to medium grained gravelly SAND iron yellowish, clayey, gravelly, coarse grained, moist SANDSTONE light yellow, iron, coarse, trace clays and gravel CLAY red iron and grey, mottled, minor sub-rounded to angular gravels, moist CLAY dark brown to black, soft, moist CLAY black, soft, moist COAL black, damp	Gravel pack, 1-2 mm washed quartz Class 18 machine slotted PVC, 0.4mm slots 50mm Class 18 PVC Sump 50mm Class 18 PVC End Cap Backfill with 3% cement bentonite grout	CLR
31					
41			END OF BOREHOLE @ 41 mbgl		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0426A

Page: 1 of 1

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 13/04/2011

Drill Co: Boart Longyear
Driller: Gavin Keith
NOW Groundwater Licence #: 90BL255906
Total Depth (m): 15

Easting: 245955 Northing: 6535340 Elevation: 294.49
Licenced Driller: Paul Griffiths
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: SAC

Checked by: TC

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2					
			Ground Surface		
	Sonic Core		CLAY dark brown, damp, slightly soft		
	Sonic				
			CLAY medium brown, damp, slightly firm to slightly soft		
			CLAY medium brown with some gravel (sub-rounded to sub-angular), damp, firm		
			gravely CLAY medium brown with red and grey mottles, gravelly and sandy (medium to coarse grained), sub-rounded to angular, damp, firm, black, red, yellow whitish lithics		
8			gravely CLAY medium brown, gravelly sandy (medium to coarse grained, sub-rounded to angular), damp firm, contains lithics		
			CLAY grey and white, with minor sand and gravel, stiff to hard, damp to dry		
			CLAY light brown-grey with iron mottling with some sand and gravel (medium to coarse grained, angular), damp, stiff to hard		
			CLAY red / iron, with dark red mottles, some medium to coarse sands and gravels, damp to dry, contains red, white, yellow, black lithics		
			CLAY iron brown sandy, contains some medium to coarse gravel, soft, damp, red, black, white and clear lithics		
			CLAY iron and grey, sandy with some medium to coarse gravel, damp, firm, red, black, clear and white lithics		
			CLAY iron brown and grey mottling, contains some medium to coarse sands and gravel, red, black, yellow and clear lithics, firm, damp		
			END OF BOREHOLE @ 17 m bgl		
-18					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0427

Page: 1 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 14/04/2011

Drill Co: Boart Longyear
Driller: George Giacomis
NOW Groundwater Licence #: 90BL255909
Total Depth (m): 80

Easting: 254164 **Northing:** 6535120 **Elevation:** 293.11
Licensed Driller: Shaun Anderson
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: TG

Checked by: TC

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface	Lockable steal cover	
	Sonic Core		CLAY dark, brown, soft, damp	3% cement bentonite	
			CLAY dark brown with some iron mottles, firm, damp		
			CLAY red brown, trace fine gravel and sand, lightly firm, damp, angular red and black lithics	50mm Class 18 threaded PVC	
			firmer than above		
			softer		
			CLAY medium brown, soft, damp to moist		
			CLAY medium brown, trace sand and gravel, damp, firm		
			CLAY medium brown, firm, damp		
8			CLAY dark to medium brown with minor (<3mm, sub-rounded to angular) gravel, firm, damp, red, black, yellow and clear lithics		
			softer		
			CLAY medium brown, minor medium to coarse sand and gravel, very firm, damp, contains lithics		
			CLAY dark brown, trace sand, coarse, angular to sub-rounded lithics		
			CLAY dark brown, very firm, damp		
			CLAY dark brown to black, soft, damp		
18			CLAY sandy, dark brown to black, soft, damp, fine sand		QN
			CLAY iron brown, stiff, damp		
			CLAY iron brown, trace coarse sand and angular (2-5mm) gravel, damp		
			SAND clayey, iron brown, fine, moist, firm		
			SAND iron brown, contains some clay, moist, soft, fine		
			SAND medium to coarse grained		
			CLAY medium brown, stiff, damp with minor (2-15mm, angular to sub-rounded) gravels		
28			CLAY medium brown, iron, very firm, damp with trace gravel		
			CLAY some fine sand, softer		
			SAND clayey with some coarse clay-bound gravel, sub-rounded to angular lithics		
			CLAY medium brown, very firm, moist		
			SAND iron brown, very coarse, trace clay, moist		
			CLAY medium brown, some sand, medium grained, slightly firm, black, clear, white and red lithics		
38			SANDY CLAY sandy, iron brown, firm, moist, fine to medium grained		
			SAND iron brown, some clay, medium to coarse grained, moist, soft, contains lithics		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0427

Page: 2 of 2

Client: Shenhua Watermark Coal P/L Project: Shenhua Watermark Project No.: EL7223 Location: Watermark, Gunnedah, NSW, Australia Date Drilled: 14/04/2011		Drill Co: Boart Longyear Driller: George Giacomis NOW Groundwater Licence #: 90BL255909 Total Depth (m): 80		Easting: 254164 Licenced Driller: Shaun Anderson Grid Ref: MGA94 Zone 56 Vertical: AHD Logged by: TG	Northing: 6535120 Elevation: 293.11 Checked by: TC
Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
50			SAND light brown, medium to coarse grained, minor small gravels, moist		QG
			SAND iron-medium brown, some angular-sub-rounded (2-15mm) gravel and minor clay, medium to coarse grained, moist		
			SAND medium to coarse grained, some clay and gravel, moist		
			CLAY sandy, medium brown, fine grained, moist, soft		
			CLAY grey and iron mottled, with some sand and minor gravel, fine grained, firm, moist		
			medium brown with grey and iron mottles, minor very angular (2-30mm) gravel, very stiff / hard		
			SANDSTONE and SILTSTONE iron brown, grey and white, very weak, weathered, dry to damp		
			SAND clayey, gravels, coarse grained, clay bound, gravels sub-rounded to angular (2-60mm)		
			CLAY dark brown, some gravel, hard, damp to dry		
			SAND clayey with white to grey mottles, coarse grained, contains angular-sub-rounded gravel (2-5mm), very firm to stiff		
60			CLAY brown and white with minor gravel, angular, very firm to stiff, damp		F
			SANDY CLAY very stiff to hard, coarse, very angular, damp		
			clayey SAND clay bound, coarse grained gravel, white inclusions, very stiff, damp		
			CLAY medium brown and grey, stiff, damp, some sand and gravel		
			medium brown, some sand and gravel, medium to coarse grained, very firm to stiff, damp		
			SANDY CLAY pale brown, fine to medium grained sand		
			sandy gravelly, pale brown with minor orange inclusions, gravel fine, sub-rounded to sub-angular		
			sandy gravelly, fine sand, stiff to hard		
			SAND clayey, medium to dark brown, fine sand, trace fine gravel		
			clayey SAND mottled medium dark and brown, fine to medium sand, medium brown, fine grained sand, very minor black inclusions		
70			GRAVEL clayey, mottled medium brown and grey, fine gravel		DU
			CLAY sandy, mottled pale brown and grey, fine to medium sand, minor black inclusions, moist		
			SAND clayey, medium brown, fine to medium sand		
			SANDSTONE pale yellowish brown with minor grey inclusions, fine to medium grained, extremely weathered		
			pale grey / white, minor orange staining, fine to medium lithic sand, slightly weathered, moist, hard		
			END OF BOREHOLE @ 80 m bgl		
80					DL

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0427A

Page: 1 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 18/04/2011

Drill Co: Boart Longyear
Driller: George Giacomis
NOW Groundwater Licence #: 90BL255910
Total Depth (m): 47.5

Easting: 254170 **Northing:** 6535125 **Elevation:** 293.13
Licensed Driller: Shaun Anderson
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: TG

Checked by: TC

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface	Lockable steel cover	
	Sonic Core		CLAY dark brown, firm to soft, moist		
	Sonic		medium to dark brown, trace medium sand, firm to stiff, moist		
			medium brown with black inclusions		
			medium brown, stiff to firm, moist		
			medium brown, trace fine sand, firm, moist		
8			medium brown, firm to stiff, moist		
			contains fine to medium sand, firm to soft, moist		
			trace sand, medium brown, firm to stiff		
			SANDY CLAY fine sand, medium brown, moist, firm, increasing sand content with depth		
			contains fine sand, medium brown, moist, firm, increasing sand content with depth		
			clayey GRAVEL pale brown, fine gravel, sub-rounded with medium to coarse sand		
			SANDY CLAY contains fine sand, medium brown, moist, firm, increasing sand content with depth		
18			SILTY CLAY soft, moist, increasing silt and sand content		
			SAND fine to medium sand, trace fine gravel, lithics, sub-rounded, moist, firm to stiff		
			loose, contains fine gravel and angular to sub-rounded lithics		
			SANDY CLAY contains fine sand, medium brown, moist, firm, increasing sand content with depth		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):

**BOREHOLE LOG**

Groundwater Installation

Bore No.: WM0427A

Page: 2 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 18/04/2011

Drill Co: Boart Longyear
Driller: George Giacomis
NOW Groundwater Licence #: 90BL255910
Total Depth (m): 47.5

Easting: 254170 **Northing:** 6535125 **Elevation:** 293.13
Licensed Driller: Shaun Anderson
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: TG

Checked by: TC

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			contains very fine to fine sand, medium brown, silty, moist, firm, increasing sand content with depth silty, pale to medium brown, fine to medium sand, trace coarse lithics, moist to dry contains clay, pale brown, medium to coarse grained, lithics, sub-rounded lithic gravel SAND fine to medium grained, pale grey brown, trace medium gravel lithics, firm contains very fine to fine sand, medium brown, silty, moist, firm, increasing sand content with depth SANDY CLAY pale grey / brown, contains fine to medium sand, trace gravel CLAY medium brown with orange and black inclusions, moist, firm to stiff SANDY CLAY sandy, medium brown, fine to medium sand, lithic, moist, firm to soft clayey SAND clayey, medium brown, fine to medium lithics, moist, clayey, pale to moderate brown, fine to coarse grained, trace fine to medium lithic gravel SANDY CLAY sandy, medium brown, fine to medium sand, moist, firm, minor orange inclusions clayey SAND clayey, pale to medium brown, fine to medium grained, contains lithics, moist SLTY CLAY silty, medium to dark brown with minor black inclusions, trace fine gravel, lithic, sub-angular, moist, firm to stiff SAND pale brown, medium to coarse grained, trace fine gravel, moist trace medium to coarse lithic gravel, sub-angular Trace clay, pale yellowish brown, moderate to coarse lithic sand with fine lithic gravel, moist clayey SAND clayey, pale brown, fine to coarse lithic sand, moist to dry SANDY CLAY mottled grey-orange, firm, moist, stiff to very stiff grey brown, trace fine sand, moist, firm to stiff	50 mm Class 18 machine slotted PVC 0.4mm Bentonite seal Gravel pack 50mm Class 18 PVC Blank 50mm Class 18 PVC end cap	
33					
43					
			END OF BOREHOLE @ 47.5 mbsl		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0428

Page: 1 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 27/04/2011

Drill Co: Boart Longyear
Driller: Ranold Thome
NOW Groundwater Licence #: 90BL255718
Total Depth (m): 68

Easting: 254017 **Northing:** 6543055 **Elevation:** 279.65
Licensed Driller: Allen Carlon
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: GF

Checked by: TC

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
	Sonic Core Sonic		CLAY silty, dark brown, soft brown silty clay, becoming moderately stiff silty, grey brown, minor gravels, angular lithics silty, soft, red brown grey, dense, minor fine sands and angular trace gravels silty, grey brown, trace lithics, angular soft, trace angular gravels (2-5mm) sandy, brown, fine grained sand, some stiff clay bands and orange sand bands GRAVEL clayey, fine to coarse (2-5mm) lithics, well rounded to angular medium to coarse grained, well rounded to angular CLAY light brown, soft, trace sand and gravel sandy, light brown, minor rounded to angular gravels (up to 5mm) GRAVEL fine, well rounded to angular, fine clay clayey, light grey, gravel fine to coarse, well rounded to angular CLAY light brown-grey, stiff trace coarse gravels slight brown, orange bands, minor fine sands, moderately stiff, some minor gravels minor fine to medium grained sand with some minor gravels, red and black sub-rounded to angular lithics gravelly, brown, minor fine sand, moderately stiff soft grey clay, orange mottled bands, trace fine sand light brown-grey, minor sand and gravels (sub-rounded to angular) gravelly, light brown, quartz sandstone and basalt lithics		QN
-38					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0428

Page: 2 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 27/04/2011

Drill Co: Boart Longyear
Driller: Ranold Thorne
NOW Groundwater Licence #: 90BL255718
Total Depth (m): 68

Easting: 254017 Northing: 6543055 Elevation: 279.65
Licenced Driller: Allen Carlon
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: GF

Checked by: TC

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
48			gravelly, sandy, stiff, gravel lithics, well rounded to angular sandy with gravel, large sandstone lithics sandy, abundant black basalt chips gravelly, very stiff, light grey, minor sand, some orange mottled zones silty, minor gravels light grey (weathered top of permian), uniform strata		
58			SILTSTONE fresh, grey CLAY dark grey, some shell fragments at 60m dark grey		
68			END OF BOREHOLE @ 68 mbsl		
78					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0428A

Page: 1 of 1

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 27/04/2011

Drill Co: Depco
Driller: Ranold Thorne
NOW Groundwater Licence #: 90BL255918
Total Depth (m): 26

Easting: 254017 **Northing:** 6543055 **Elevation:** 279.61
Licenced Driller: Allen Carlon
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: GF

Checked by: TC

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface	Lockable steel cover	
	Sonic		CLAY silty, dark brown, soft brown silty clay, becoming moderately stiff slight brown, orange bands, minor fine sands, moderately stiff, some minor gravels silty, soft, red brown grey, dense, minor fine sands and angular trace gravels slight brown, orange bands, minor fine sands, moderately stiff, some minor gravels slight brown, orange bands, minor fine sands, moderately stiff, some minor gravels fine to coarse (2-5mm) lithics, well rounded to angular GRAVEL medium to coarse grained, well rounded to angular CLAY light brown, soft, trace sand and gravel slight brown, orange bands, minor fine sands, moderately stiff, some minor gravels GRAVEL fine, well rounded to angular, with clay clayey, light grey, gravel fine to coarse, well rounded to angular CLAY light brown-grey, stiff trace coarse gravels slight brown, orange bands, minor fine sands, moderately stiff, some minor gravels		QN
8					
18					
26			END OF BOREHOLE @ 26.0 m bgl		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0429

Page: 1 of 2

Client: Shenhua Watermark Coal P/L

Project: Shenhua Watermark Project No.: EL7223

Location: Watermark, Gunnedah, NSW, Australia

Date Drilled: 7/05/2011

Drill Co: Boart Longyear

Driller: Gavin Keith

NOW Groundwater Licence #: 90BL255936

Total Depth (m): 44

Easting: 245609

Licensed Driller: Shaun Anderson

Grid Ref: MGA94 Zone 56 Vertical: AHD

Logged by: SAC

Northing: 6535187

Elevation: 294.62

Checked by: TC

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
	Sonic Core		CLAY dark brown, very plastic, damp to moist, slightly soft to slightly firm	Lockable steel cover	
	Sonic		medium brown, soft, very plastic, damp to moist, small trace gravels (angular to sub-rounded)	3% Bentonite grout	
			firm	50mm Class 18 threaded PVC	
			light brown, slightly soft, slightly plastic, damp		
			medium brown, slightly orange		
8			medium brown, slightly soft, moderately plastic with minor sand and gravel, coarse grained gravel (angular to sub-rounded)		
			clayey GRAVEL with minor sand, grey brown, coarse grained gravel, sub-rounded to rounded, soft		
			CLAY sandy gravelly, yellow-orange, coarse grained rounded to sub-angular gravel, slightly soft, damp		
			some sand and coarse gravel, grey and orange, damp to moist		
			SAND gravelly, clay bound, soft, moist to damp		
			CLAY sandy gravelly		
			SAND red brown, some sand and coarse gravel, firm, damp		
			CLAY sandy gravelly, orange, red-brown, damp to moist, coarse gravel		
			sandy gravelly, stiff to hard		
18			SAND Clay bound, hard, coarse grained fine gravels, damp		
			clay bound, some iron mottles, coarse grained gravel (sub-rounded to sub-angular), damp		
			CLAY gravelly, some sand, orange brown, coarse (2-40mm) gravel, firm, damp		
			sandy gravelly, red-brown, coarse gravel, damp, non-plastic		
			orange white red and dark grey with some gravel and coarse sand, very firm, stiff, dry to damp		
			red-brown, contains some sand and coarse (2-60mm) rounded to sub-angular gravel, hard, stiff, damp		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0429

Page: 2 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 7/05/2011

Drill Co: Boart Longyear
Driller: Gavin Keith
NOW Groundwater Licence #: 90BL255936
Total Depth (m): 44

Easting: 245609 **Northing:** 6535187 **Elevation:** 294.62
Licensed Driller: Shaun Anderson
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: SAC

Checked by: TC

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			sandy gravelly, orange red, coarse (2-60mm) gravel, medium plasticity, damp to moist sandy gravelly, red, grey and orange sandy gravelly, orange brown sandy gravelly, very hard, well cemented, dry clayey SAND light brown, soft, moist, medium to coarse grained CLAY orange red, some sand and gravel, moist SANDSTONE orange-grey, extremely weathered, fine to coarse grained, moist SILTSTONE light orange grey, dry, very weathered SANDSTONE grey and orange, very weathered, hard, damp SILTSTONE grey light brown, very weathered, weak, dry, hard SILTY CLAY grey light brown, minor gravel, slightly soft, moist clayey SAND orange, fine to medium grained, soft, damp to moist SAND light grey, trace clay, damp, soft reddy orange, coarse grained, damp SANDSTONE light brown, grey, silty, very fine grained, damp dark orange and light grey, medium to coarse grained, very weathered, very hard clayey SAND grey and orange, medium to coarse grained, soft pale yellow grey, some clay, medium to coarse grained, wet, very soft clayey, pale yellow brown yellow orange, trace clay, soft, moist orange and grey, fine grained, soft, damp, clay SANDSTONE orange and grey, very weathered, very weak, medium to coarse grained, moist END OF BOREHOLE @ 44.0 m bgl	Bentonite seal Gravel pack, 2-3mm washed quartz 50mm Class 18 machine slotted screen 50mm Class 18 PVC (Sump) 50mm Class 18 PVC End Cap	CLR

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0429A

Page: 1 of 1

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 8/05/2011

Drill Co: Boart Longyear
Driller: Brad Lines
NOW Groundwater Licence #: 90BL255937
Total Depth (m): 10.5

Easting: 245609 Northing: 6535187 Elevation: 294.6
Licenced Driller: Shaun Anderson
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: SAC

Checked by: TC

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2					
			Ground Surface	Lockable steel cover	
	Sonic Core		CLAY dark brown, soft, damp to moist, very plastic		
	Sonic		medium brown, firm, very plastic, damp to moist with trace small gravel (angular to sub-rounded, blackish lithics)	3% Cement bentonite grout	
8			SANDY CLAY medium brown, firm, moderately plastic with minor sand and gravel, coarse grained, damp	Bentonite seal	
			END OF BOREHOLE @ 10.5 m bgl	Gravel pack, 1-2mm washed quartz 50mm Class 18 machine slotted PVC 50mm Class 18 PVC Sump 50mm Class 18 PVC End Cap	

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0430

Page: 1 of 1

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 5/05/2011

Drill Co: Boart Longyear
Driller: Gavin Keith
NOW Groundwater Licence #: 90BL255938
Total Depth (m): 25

Easting: 246280 **Northing:** 6535400 **Elevation:** 294.10
Licensed Driller: Shaun Anderson
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: SAC

Checked by: TC

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface	Lockable steel cover	
	Sonic Core Sonic		CLAY dark brown, soft, plastic, damp		
			medium brown, slightly firm, slightly plastic with some black lithics (<2mm), damp	3% Bentonite cement grout	
			soft and plastic, damp	50mm Class 18, threaded PVC	
8			brown, some sand and gravel, coarse grained (2-200mm), sub-rounded to angular, firm, plastic, damp		
			sandy gravelly CLAY sandy gravelly, orange / iron brown, coarse grained, sub-rounded to angular (2-10mm), firm, damp, moist		QN
			sandy gravelly, coarse to medium grained, gravel angular to sub-rounded (2-10mm), very firm, damp		
			clayey GRAVEL iron brown, clay bound, hard, coarse, damp to dry		
			clayey SAND gravelly, iron / orange, coarse, firm, moist, very weakly cemented		
			as above, gravelly, angular to sub-rounded (2-30mm), damp, very hard		
			SANDSTONE dark red / orange, very weathered, hard, coarse grained, damp to dry, some grey mottling		
			light grey, very weathered, medium grained, damp, some iron mottling		
18			SAND light brown, medium to coarse grained, some clay, soft, moist		
			SANDSTONE grey and red / orange, very weathered, medium to coarse grained, hard, damp to moist	Bentonite seal	
			SAND iron / orange, some clay, soft, moist to damp, medium to coarse grained	Gravel pack, 1-2mm washed quartz	
			SANDSTONE yellow light grey, fine to coarse grained, very hard, dry to damp		
			SILT grey, hard, damp, weakly cemented	50mm Class 18 screen, 0.4mm	
			clayey SAND light brown, yellow, medium to coarse grained, moist		CLR
			iron / orange, minor clay and some coarse gravel, moist		
			SANDSTONE white to light grey, very fine grained, some gravel in matrix, dry		
			CLAYSTONE iron / orange, hard, dry, moderately cemented	50mm Class 18 PVC Sump	
			grey, moderately cemented, dry, very hard	50mm Class 18 PVC End Cap	
			END OF BOREHOLE @ 25.0 m bgl		
-28					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0430A

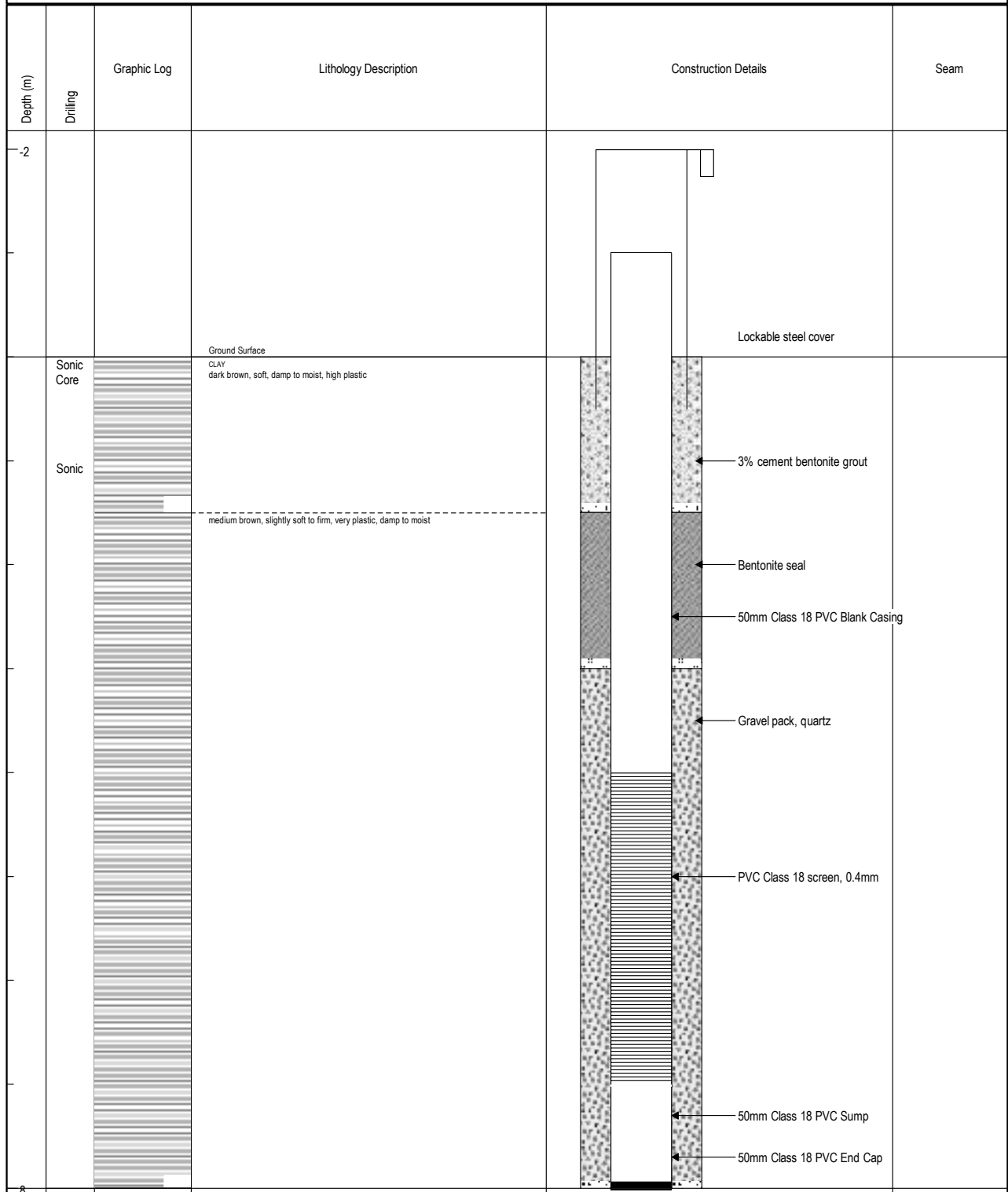
Page: 1 of 1

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 6/05/2011

Drill Co: Boart Longyear
Driller: Brad Lines
NOW Groundwater Licence #: 90BL255939
Total Depth (m): 8

Easting: 246280 Northing: 6535400 Elevation: 294.09
Licenced Driller: Shaun Anderson
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: SAC

Checked by: TC



NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0431

Page: 1 of 1

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 3/05/2011

Drill Co: Boart Longyear
Driller: Gavin Keith
NOW Groundwater Licence #: 90BL255940
Total Depth (m): 23

Easting: 246867 **Northing:** 6535658 **Elevation:** 293.73
Licensed Driller: Shaun Anderson
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: SAC

Checked by: TC

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
	Sonic Core		CLAY dark brown, slightly firm, damp, plastic		
	Sonic		medium brown		
			medium brown, slightly firm, plastic, damp, trace gravels		
			clayey SAND medium brown, medium to coarse grained, moist		
			CLAY medium brown, slightly firm, damp, trace sand and gravel		
8			SANDY CLAY trace gravel		
			SANDSTONE iron and grey and pink mottled, coarse grained, some angular gravel in matrix, damp to dry fine to medium grained, iron and grey mottled, weathered		
			iron with some grey mottling, medium grained, damp to dry grey with some iron mottles		
			CLAY sandy, light iron and yellow, fine to medium grained, firm, damp to dry		
			iron and grey mottled, hard, stiff, dry to damp		
			dark red brown, stiff, hard, damp		
			grey with some mottling, damp to dry, hard, non-plastic		
18			CLAYSTONE grey and iron, very weathered, moderately cemented, dry		
			increased mottling, drier than above		
			clayey GRAVEL Sand and clay matrix, medium to coarse grained, 20 - 70mm gravel / cobbles, very angular, moist, soft		
			SILTY CLAY grey and iron, hard, dry to damp, non-plastic		
			SANDSTONE Red-brown, very weathered, very angular fragments, damp to moist		
			CLAY iron red with grey mottling, dry, very hard, non-plastic black with pink and red mottling, very firm, plastic, damp		
			END OF BOREHOLE @ 22.65 m bgl		

Lockable steel cover

3% Bentonite
cement grout

QN

50mm Class 18 PVC
Blank Casing

Bentonite seal

Gravel pack,
1-2mm quartz

Screen

50mm Class 18 Sump
Class 18 End Cap

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0431A

Page: 1 of 1

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 3/05/2011

Drill Co: Boart Longyear
Driller: Gavin Keith
NOW Groundwater Licence #: 90BL255941
Total Depth (m): 7

Easting: 246867 Northing: 6535658 Elevation: 293.62
Licenced Driller: Shaun Anderson
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: SAC

Checked by: Ben Jansen

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2					
			Ground Surface		
	Sonic Core		CLAY dark brown, soft, moist, high plastic		
	Sonic		medium brown, very firm to stiff, dry to damp, moderately plastic		
				Lockable steel cover	
				Bentonite cement 3% grout	
				50mm Class 18 PVC Blank Casing	
				Bentonite seal	
				Gravel pack, 1-2mm quartz	
				50mm class 18 machine slotted PVC. 0.4mm slots	
				50mm Class 18 PVC Sump	
				50mm Class 18 PVC End Cap	
			END OF BOREHOLE @ 7.0 m bgl		
-8					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0432

Page: 1 of 1

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 29/04/2011

Drill Co: Boart Longyear
Driller: Gavin Keith
NOW Groundwater Licence #: 90BL255942
Total Depth (m): 32

Easting: 252490.03 **Northing:** 6537653.28 **Elevation:** 292.07
Licensed Driller: Shaun Anderson
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: DK **Checked by:** TC

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface	Lockable steel cover	
	Sonic Core Sonic		CLAY black top soil, silty, minor fine sand, dry light grey, moderately stiff, slightly damp, minor fine sands light grey with dark grey banding, dry, very soft stiff, mottled, light grey, very minor fine sand, some staining gravelly CLAY gravelly, very soft, light grey, 20% sub-angular gravels and sand CLAY light brown, stiff orange / brown, dry sandy CLAY brown with grey clay banding, very fine sand light brown / red with light clay banding SAND light grey, very friable, minor clay content, very fine to fine grained yellow, very friable, soft, sandy, minor clay content SANDSTONE light grey, very soft, friable, sand slightly cemented, minor silt content brittle fragments of sandstone, light brown and grey, highly weathered, iron staining, fine to medium grained CLAY light grey / brown clay banding, soft, plastic, damp CLAYSTONE light grey, friable, minor dark grey bedding with some iron staining CLAY silty, very light grey light grey, hard, iron staining, <5% very fine sand clayey GRAVEL orange, very soft and plastic, large boulders (7-100mm), wet clayey SAND clayey, fine - medium grained, iron stained and light grey, minor coal flecks, dry sandy CLAY contains large conglomerate boulders, very hard light brown / orange, very fine sand, dry SANDSTONE light grey chips, large gravel sandstone, cemented, iron staining present CLAY dark black ligneous clay END OF BOREHOLE @ 32 m bgl	50mm Class 18 PVC 3% Bentonite cement grout Bentonite seal Gravel Pack 0.4mm PVC screen 50mm Class 18 PVC Sump 50mm Class 18 PVC End Cap	QN

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0432A

Page: 1 of 1

Client: Shenhua Watermark Coal P/L Project: Shenhua Watermark Project No.: EL7223 Location: Watermark, Gunnedah, NSW, Australia Date Drilled: 1/05/2011		Drill Co: Boart Longyear Driller: Gavin Keith NOW Groundwater Licence #: 90BL255943 Total Depth (m): 13		Easting: 252497 Licenced Driller: Shaun Anderson Grid Ref: MGA94 Zone 56 Vertical: AHD Logged by: DK	Northing: 6537648 Elevation: 292.06 Checked by: TC
Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface CLAY Top Soil SILTY CLAY dark grey / black, very soft, very plastic, minor fine sand	Lockable steel cover	
	Sonic Core Sonic		light grey, soft, dry-damp, minor fine sand light brown, moderately firm, relatively plastic, cohesive, minor fine sand sandy gravelly CLAY brown, moderately stiff, minor coarse sand and gravel, well rounded quartz, red polished gravel brown, moderately stiff, minor coarse sand and gravel, well rounded quartz, red polished gravel brown / red, light grey banding, minor coarse sand and fine gravel	3% cement bentonite grout Bentonite seal Gravel pack, washed qartz 0.4mm slotted screen 50mm Class 18 End Cap	
8			END OF BOREHOLE @ 13 m bgl		
18					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0433

Page: 1 of 1

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 2/05/2011
Drill Co: Boart Longyear
Driller: Gavin Keith
NOW Groundwater Licence #: 90BL255944
Total Depth (m): 15
Easting: 253430.24 **Northing:** 6538207.41 **Elevation:** 291.84
Licenced Driller: Shaun Anderson
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: DK **Checked by:** TC

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
	Sonic Core		CLAY black, cohesive, moderately plastic, 25% fine sand		
	Sonic		light brown / grey, moderately stiff, cohesive, contains fine sand		
			light grey banding		
			becoming firm / brittle		
			gravelly CLAY brown, moderately plastic, firm, fine - medium gravel (angular to sub-angular), clay matrix		
			clayey SAND clayey, dark brown / light grey, minor gravels, very hard		
8			clayey, dark grey stone fragments, with dark grey clays and fine sand, iron staining		
			contains grey clay		
			very soft, sticky, medium to coarse grained, dark brown and dark grey		
			gravelly CLAY Sub-angular cobbles of basalt in wet soft light brown very sticky clay matrix		
			SILTY CLAY silty, grey, large gravel component, large sub-angular basalt fragments		
			silty, stiff, damp, light grey		
			clayey sandy GRAVEL sandy clayey, pale yellow brown		
			SILTY CLAY dark brown / black, soft, damp		
			END OF BOREHOLE @ 15 m bgl		
18					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0492

Page: 1 of 8

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 26/07/2011

Drill Co: Depco
Driller: Damien Lagos
NOW Groundwater Licence #: 90BL255948
Total Depth (m): 438.34

Easting: 243041.28 Northing: 6543985.48 Elevation: 380.49
Licenced Driller: Allen Carlon
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: Moultrie
Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
			SAND extremely weathered rock, very fine grained, brown, soily		
			SANDSTONE extremely weathered rock, very fine grained, cream, sandy		CLR
8			SILTSTONE distinctly weathered rock, light grey		
			SILTSTONE fresh rock, dark grey		
18			SILTSTONE fresh rock, grey		
			COAL dull <1% brights, fresh rock, black		HKR
			SILTSTONE with thin sandstone bands, fresh rock, grey, solid core		
			Carbonaceous MUDSTONE with siltstone and medium grained sandstone, fresh rock, grey, solid core		HKU
			SILTSTONE fresh rock, grey, solid core		
28			COAL dull <1% brights, fresh rock, black		
			SANDSTONE with minor coally wisps, fresh rock, coarse to very coarse grained, brown-grey, solid core		
			Carbonaceous MUDSTONE fresh rock, grey-brown, solid core		
			SILTSTONE coaly muddy, fresh rock, brown-grey, solid core		
			SANDSTONE siltstone, with bands of dull coal, fresh rock, fine grained, light grey		
38					
			Carbonaceous MUDSTONE coaly dull with brights 10% -40%, fresh rock, dark brown		E
			SILTSTONE fresh rock, light grey		
48			SANDSTONE with siltstone carbonaceous, fresh rock, fine grained, light grey		
			CONGLOMERATE coaly wisps pebbly, fresh rock, light grey, coaly wisps		
			Carbonaceous MUDSTONE coaly with fine grained sandstone and schist, fresh rock, brown, solid core		D
			SILTSTONE fresh rock, grey		
58			CONGLOMERATE fresh rock, light grey, very rare coal		
			PEBBLE CONGLOMERATE		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0492

Page: 2 of 8

Client: Shenhua Watermark Coal P/L
 Project: Shenhua Watermark Project No.: EL7223
 Location: Watermark, Gunnedah, NSW, Australia
 Date Drilled: 26/07/2011

Drill Co: Depco
 Driller: Damien Lagos
 NOW Groundwater Licence #: 90BL255948
 Total Depth (m): 438.34

Easting: 243041.28 Northing: 6543985.48 Elevation: 380.49
 Licenced Driller: Allen Carlon
 Grid Ref: MGA94 Zone 56 Vertical: AHD
 Logged by: Moultrie
 Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			SILTSTONE coaly minor, fresh rock, grey		B
			SILTSTONE fresh rock, grey, rarely sandstone in part		MV
68					
			SANDSTONE fresh rock, fine grained, light grey		
78					
			SILTSTONE fresh rock, grey, sandstone in part		
88					
			SANDSTONE siltstone minor, fresh rock, light grey		
98					
108					
118					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):

**BOREHOLE LOG**

Groundwater Installation

Bore No.: WM0492

Page: 3 of 8

Client: Shenhua Watermark Coal P/L
 Project: Shenhua Watermark Project No.: EL7223
 Location: Watermark, Gunnedah, NSW, Australia
 Date Drilled: 26/07/2011

Drill Co: Depco
 Driller: Damien Lagos
 NOW Groundwater Licence #: 90BL255948
 Total Depth (m): 438.34

Easting: 243041.28 Northing: 6543985.48 Elevation: 380.49
 Licenced Driller: Allen Carlon
 Grid Ref: MGA94 Zone 56 Vertical: AHD
 Logged by: Moultrie
 Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
128			SILTSTONE fresh rock, grey, sandstone in part		
138					
148					
158					
168			SANDSTONE with siltstone conglomeratic minor, fresh rock, white		
178			SILTSTONE fresh rock, grey, sandstone in part		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0492

Page: 4 of 8

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 26/07/2011

Drill Co: Depco
Driller: Damien Lagos
NOW Groundwater Licence #: 90BL255948
Total Depth (m): 438.34

Easting: 243041.28 **Northing:** 6543985.48 **Elevation:** 380.49
Licensed Driller: Allen Carlon
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: Moultrie **Checked by:** GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
188			SANDSTONE siltstone conglomeratic minor, fresh rock, grey		
198					
208					
218					
228					
238					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):

**BOREHOLE LOG**

Groundwater Installation

Bore No.: WM0492

Page: 5 of 8

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 26/07/2011

Drill Co: Depco
Driller: Damien Lagos
NOW Groundwater Licence #: 90BL255948
Total Depth (m): 438.34

Easting: 243041.28 **Northing:** 6543985.48 **Elevation:** 380.49
Licensed Driller: Allen Carlon
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: Moultrie **Checked by:** GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
248					
258					
268					
278					
288					
298					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0492

Page: 6 of 8

Client: Shenhua Watermark Coal P/L
 Project: Shenhua Watermark Project No.: EL7223
 Location: Watermark, Gunnedah, NSW, Australia
 Date Drilled: 26/07/2011

Drill Co: Depco
 Driller: Damien Lagos
 NOW Groundwater Licence #: 90BL255948
 Total Depth (m): 438.34

Easting: 243041.28 Northing: 6543985.48 Elevation: 380.49
 Licenced Driller: Allen Carlon
 Grid Ref: MGA94 Zone 56 Vertical: AHD
 Logged by: Moultrie
 Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
308			CONGLOMERATE towards middle of unit sandy, pebbly in parts, fresh rock, light grey, broken core		
318					
328					
338					
348					
358					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

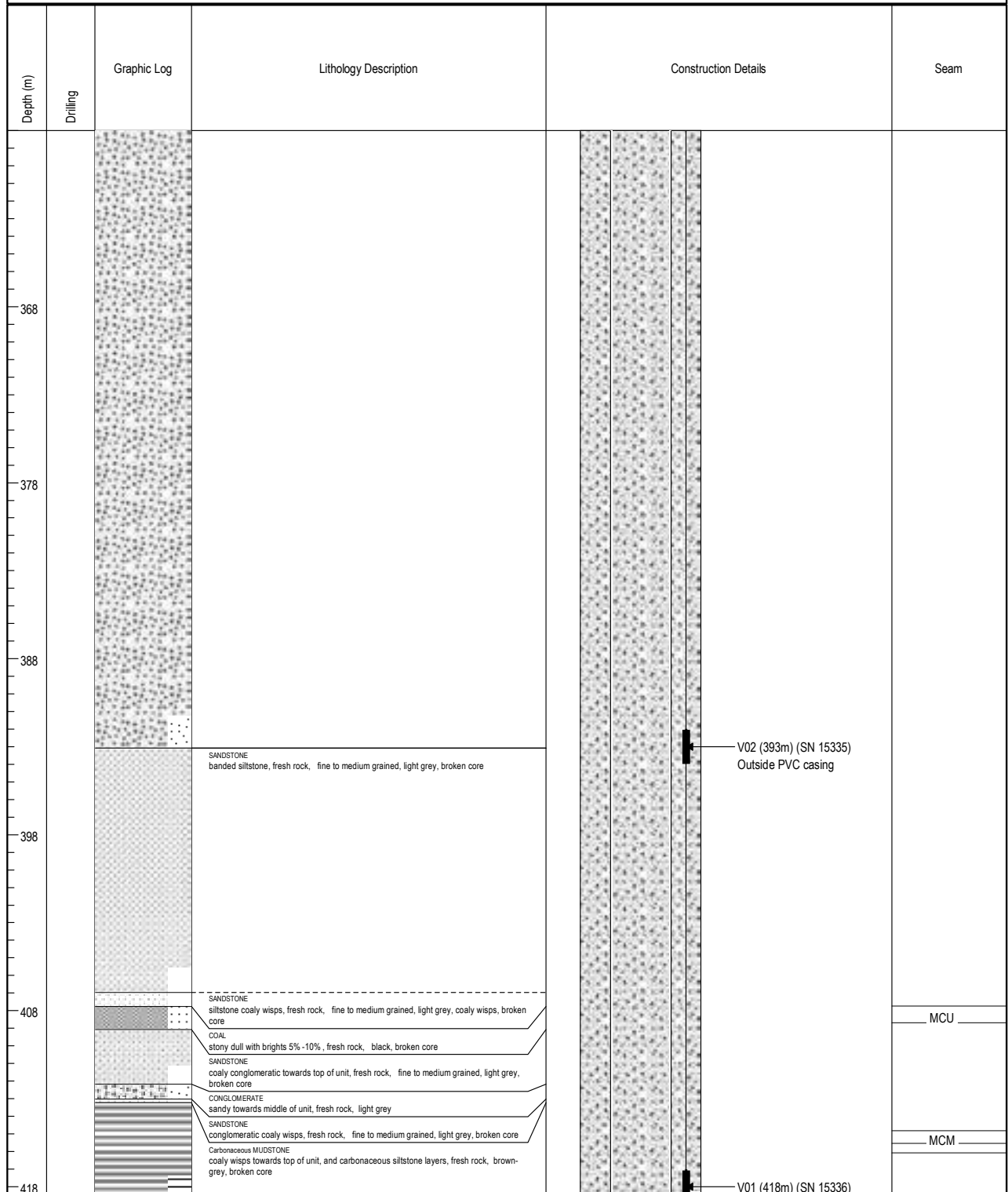
Bore No.: WM0492

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Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 26/07/2011

Drill Co: Depco
Driller: Damien Lagos
NOW Groundwater Licence #: 90BL255948
Total Depth (m): 438.34

Easting: 243041.28 **Northing:** 6543985.48 **Elevation:** 380.49
Licensed Driller: Allen Carlon
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: Moultrie **Checked by:** GF



NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0492

Page: 8 of 8

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 26/07/2011

Drill Co: Depco
Driller: Damien Lagos
NOW Groundwater Licence #: 90BL255948
Total Depth (m): 438.34

Easting: 243041.28 **Northing:** 6543985.48 **Elevation:** 380.49
Licensed Driller: Allen Carlon
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: Moultrie **Checked by:** GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
					
			COAL with thin bands of claystone, fresh rock, black, broken core		MCL
			SILTSTONE fresh rock, grey, solid core, with claystone		MC2
428			COAL pebbly, fresh rock, brown-grey, torbanitic, broken core		
			CLAYSTONE pebbly, fresh rock, brown-grey, broken core, with thin bands of coal		
438			SANDSTONE distinctly weathered rock, cream, broken core		
			BASIC VOLCANIC distinctly weathered rock, red, volcanic rock, broken core		
			END OF BOREHOLE @ 438.34m bgl		
448					
458					
468					
478					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):

**BOREHOLE LOG**

Groundwater Installation

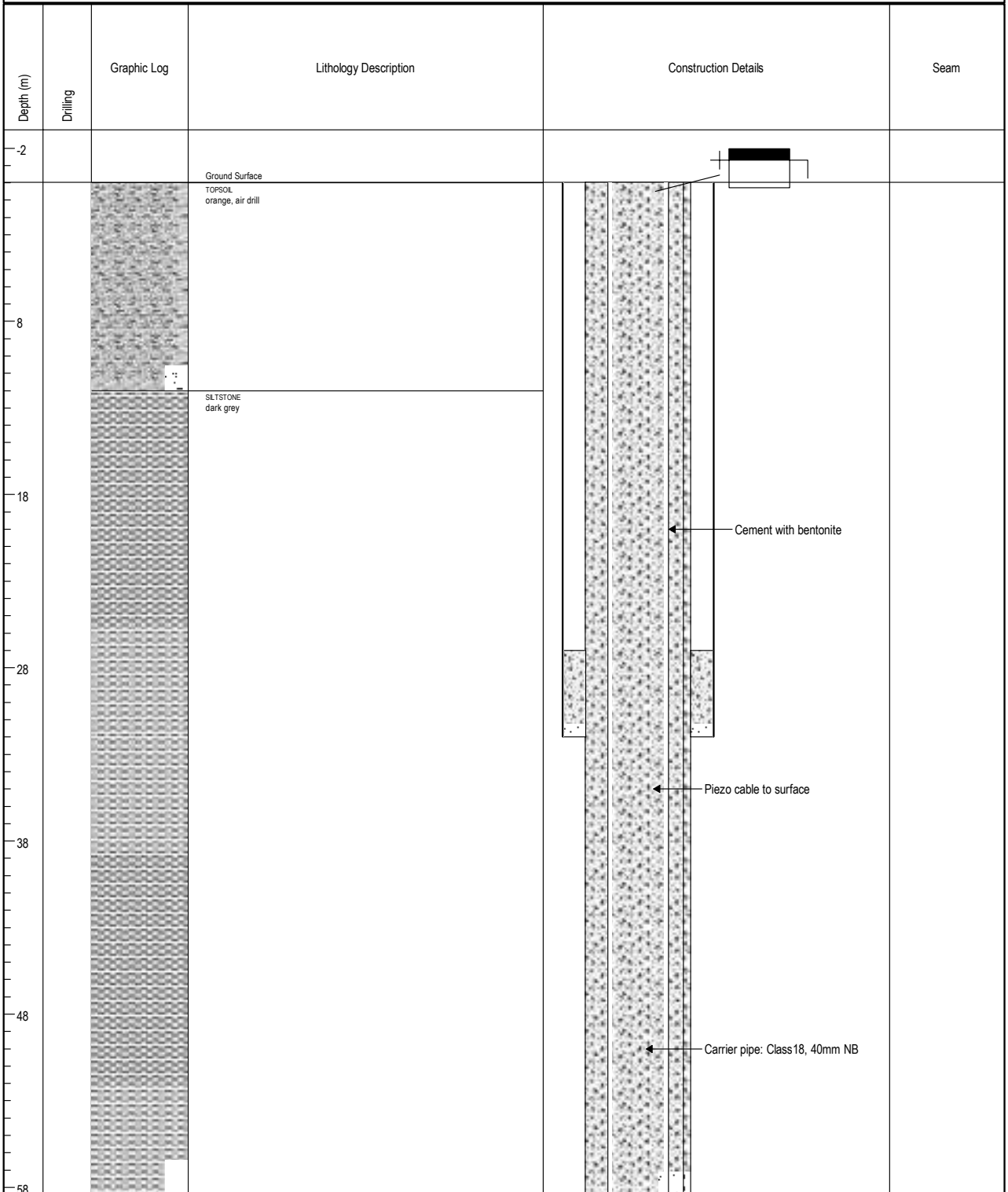
Bore No.: WM0510

Page: 1 of 5

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 7/08/2011

Drill Co: Depco
Driller: Jason Wildman
NOW Groundwater Licence #: 90BL255946
Total Depth (m): 285.26

Easting: 249000.25 Northing: 6543702.24 Elevation: 288.86
Licenced Driller: Allen Carlon
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: Moultrie
Checked by: GF

**NOTES**

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0510

Page: 2 of 5

Client: Shenhua Watermark Coal P/L

Project: Shenhua Watermark Project No.: EL7223

Location: Watermark, Gunnedah, NSW, Australia

Date Drilled: 7/08/2011

Drill Co: Depco

Driller: Jason Wildman

NOW Groundwater Licence #: 90BL255946

Total Depth (m): 285.26

Easting: 249000.25

Licenced Driller: Allen Carlon

Grid Ref: MGA94 Zone 56 Vertical: AHD

Logged by: Moultrie

Northing: 6543702.24

Elevation: 288.86

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
68					
78					
88					
98					
108			SANDSTONE with siltstone, grey		
118					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):

**BOREHOLE LOG**

Groundwater Installation

Bore No.: WM0510

Page: 3 of 5

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 7/08/2011

Drill Co: Depco
Driller: Jason Wildman
NOW Groundwater Licence #: 90BL255946
Total Depth (m): 285.26

Easting: 249000.25 **Northing:** 6543702.24 **Elevation:** 288.86
Licensed Driller: Allen Carlon
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: Moultrie **Checked by:** GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
128					
138					
148					
158					
168					
178			SANDSTONE light grey		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0510

Page: 4 of 5

Client: Shenhua Watermark Coal P/L
 Project: Shenhua Watermark Project No.: EL7223
 Location: Watermark, Gunnedah, NSW, Australia
 Date Drilled: 7/08/2011

Drill Co: Depco
 Driller: Jason Wildman
 NOW Groundwater Licence #: 90BL255946
 Total Depth (m): 285.26

Easting: 249000.25 Northing: 6543702.24 Elevation: 288.86
 Licenced Driller: Allen Carlon
 Grid Ref: MGA94 Zone 56 Vertical: AHD
 Logged by: Moultrie
 Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
188			SANDSTONE with siltstone, finish chip		
198					
208			SANDSTONE pebbly, fresh rock, fine to medium grained, grey, claystone laminae		
218			CLAYSTONE distinctly weathered rock, white, altered SANDSTONE pebbly, fresh rock, fine to medium grained, grey, claystone laminae, solid core		
228			SILTSTONE fresh rock, dark grey SANDSTONE bands of coal, fresh rock, fine to medium grained, grey, claystone laminae		
238			SCHIST bands of coal, fresh rock, grey SANDSTONE carbonaceous wisps, fresh rock, very fine grained, dark grey, with 90% claystone SANDSTONE carbonaceous wisps, fresh rock, fine to medium grained, white COAL dull <1% brights, fresh rock, brown Carbonaceous MUDSTONE bands of coal, fresh rock, brown, and minor sandstone and claystone		
				V03 (214m) (SN 15047) Outside PVC casing	
					MCR

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0510

Page: 5 of 5

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 7/08/2011

Drill Co: Depco
Driller: Jason Wildman
NOW Groundwater Licence #: 90BL255946
Total Depth (m): 285.26

Easting: 249000.25 Northing: 6543702.24 Elevation: 288.86
Licenced Driller: Allen Carlon
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: Moultrie
Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
248			COAL dull with brights 5%-10%, fresh rock, black SANDSTONE bands of coal, fresh rock, fine grained, grey, carbonaceous laminae Carbonaceous MUDSTONE bands of coal, fresh rock, brown-grey, solid core, gradational lower contact SANDSTONE fresh rock, fine grained, grey, carbonaceous wisps, siltstone 35%		MCU
258			Carbonaceous MUDSTONE fresh rock, brown-grey, with coal at base of unit SANDSTONE siltstone laminae, fresh rock, fine grained, grey COAL fresh rock, brown, with siltstone, sandstone and mudstone layers	V02 (253m) (SN 15048) Outside PVC casing	MC6 MCM
268			CLAYSTONE fresh rock, brown-grey, carbonaceous laminae, with thin layers of coal		MCL
278			COAL fresh rock, brown, dull, conchoidal SILTSTONE bands of coal, fresh rock, dark grey, claystone pellets		
288			CLAYSTONE fresh rock, brown-grey, claystone pellets BASIC VOLCANIC distinctly weathered rock, red END OF BOREHOLE @ 285.26m bgl	V01 (282m) (SN 15050) Outside PVC casing Holes for grouting	
298					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0514

Page: 1 of 7

Client: Shenhua Watermark Coal P/L

Project: Shenhua Watermark Project No.: EL7223

Location: Watermark, Gunnedah, NSW, Australia

Date Drilled: 9/08/2011

Drill Co: Depco

Driller: Damien Lagos

NOW Groundwater Licence #: 90BL255947

Total Depth (m): 346.97

Easting: 246002.08

Northing: 6541296.27

Elevation: 302.9

Licenced Driller: Allen Carlon

Grid Ref: MGA94 Zone 56 Vertical: AHD

Logged by: Moultrie

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
			TOPSOIL sandy, extremely weathered rock, orange, sand 70%		
8			SANDSTONE soft throughout, slightly weathered rock, light grey, sub arenitic		
			SANDSTONE minor basaltic siltstone, slightly weathered rock, fine grained, grey, base of weathering		
18			SANDSTONE siltstone towards base of unit, fresh rock, grey		
28			SILTSTONE fresh rock, grey, sub arenitic near base of unit		
38			SANDSTONE tuffaceous throughout siltstone, fresh rock, grey		
48			BASALT fresh rock, green, water hit @ 47m, rare sandstone and quartz throughout		
			SANDSTONE fresh rock, grey, base of water level, quartz throughout		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):

**BOREHOLE LOG**

Groundwater Installation

Bore No.: WM0514

Page: 2 of 7

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 9/08/2011

Drill Co: Depco
Driller: Damien Lagos
NOW Groundwater Licence #: 90BL255947
Total Depth (m): 346.97

Easting: 246002.08 Northing: 6541296.27 Elevation: 302.9
Licenced Driller: Allen Carlon
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: Moultrie

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
60			SANDSTONE fresh rock, coarse grained, grey	 Carrier pipe: Class 18 PVC, 48mm	JGMC
			BASALT siltstone tuffaceous throughout, fresh rock, dark grey		
70			SANDSTONE siltstone throughout, fresh rock, grey		
			BASALT tuffaceous throughout, fresh rock, dark grey		
			SILTSTONE tuffaceous throughout, fresh rock, grey, sandstone throughout		
80			SANDSTONE tuffaceous basaltic and siltstone throughout, fresh rock, medium grained, grey		
90			SILTSTONE fresh rock, grey, tuffaceous, sandstone, basaltic and pyritic throughout		
100			SILTSTONE fresh rock, grey, tuffaceous, sandstone, basaltic and pyritic throughout		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0514

Page: 3 of 7

Client: Shenhua Watermark Coal P/L

Project: Shenhua Watermark Project No.: EL7223

Location: Watermark, Gunnedah, NSW, Australia

Date Drilled: 9/08/2011

Drill Co: Depco

Driller: Damien Lagos

NOW Groundwater Licence #: 90BL255947

Total Depth (m): 346.97

Easting: 246002.08

Northing: 6541296.27

Elevation: 302.9

Licenced Driller: Allen Carlon

Grid Ref: MGA94 Zone 56 Vertical: AHD

Logged by: Moultrie

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
112					
			SANDSTONE tuffaceous, fresh rock, grey		
122			SILTSTONE fresh rock, grey		
132			SANDSTONE with siltstone, fresh rock, medium grained, light grey, hard, large chips, 50% siltstone		
			SILTSTONE fresh rock, grey, rare sandstone		
142			MUDSTONE siltstone, fresh rock, grey, soft, finer		
			SANDSTONE fresh rock, medium grained, grey		
			MUDSTONE siltstone throughout, fresh rock, grey		
			SANDSTONE siltstone throughout, fresh rock, grey		
152			SILTSTONE fresh rock, grey, rare mudstone and sandstone throughout		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):

**BOREHOLE LOG**

Groundwater Installation

Bore No.: WM0514

Page: 4 of 7

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 9/08/2011

Drill Co: Depco
Driller: Damien Lagos
NOW Groundwater Licence #: 90BL255947
Total Depth (m): 346.97

Easting: 246002.08 **Northing:** 6541296.27 **Elevation:** 302.9
Licensed Driller: Allen Carlon
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: Moultrie **Checked by:** GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
164					
174			SANDSTONE basaltic, fresh rock, light grey, basalt 10%		
184			SANDSTONE fresh rock, fine grained, grey		
194			SILTSTONE fresh rock, grey, sandstone throughout	Secondary grout lift	
204			SANDSTONE siltstone towards middle of unit, fresh rock, fine grained, dark grey		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0514

Page: 5 of 7

Client: Shenhua Watermark Coal P/L
 Project: Shenhua Watermark Project No.: EL7223
 Location: Watermark, Gunnedah, NSW, Australia
 Date Drilled: 9/08/2011

Drill Co: Depco
 Driller: Damien Lagos
 NOW Groundwater Licence #: 90BL255947
 Total Depth (m): 346.97

Easting: 246002.08 Northing: 6541296.27 Elevation: 302.9
 Licenced Driller: Allen Carlon
 Grid Ref: MGA94 Zone 56 Vertical: AHD
 Logged by: Moultrie
 Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
216					
226			SANDSTONE fresh rock, medium to fine grained, grey, rare basaltic and quartz throughout		
236					
246			SANDSTONE siltstone basaltic, fresh rock, medium to fine grained, grey		
			SILTSTONE sandy throughout, fresh rock, grey		
256			SANDSTONE siltstone throughout, fresh rock, fine grained, grey		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0514

Page: 6 of 7

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 9/08/2011

Drill Co: Depco
Driller: Damien Lagos
NOW Groundwater Licence #: 90BL255947
Total Depth (m): 346.97

Easting: 246002.08 Northing: 6541296.27 Elevation: 302.9
Licenced Driller: Allen Carlon
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: Moultrie
Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
268					
278			SANDSTONE fresh rock, grey		
			SANDSTONE gravelly towards middle of unit, fresh rock, very coarse grained, light grey		
			PEBBLE CONGLOMERATE fresh rock, light grey		
288			SANDSTONE pebbly silty carbonaceous wisps, fresh rock, medium to coarse grained, light grey		
			PEBBLE CONGLOMERATE fresh rock, light grey		
			SANDSTONE pebbly, fresh rock, medium to coarse grained, light grey, carbonaceous wisps		
298			TUFF fresh rock, light grey, abrupt lower contact, solid core		
			SANDSTONE pebbly, fresh rock, coarse grained, light grey		
			SANDSTONE fresh rock, fine to medium grained, light grey, fault zone		
			SANDSTONE pebbly silty towards base of unit, fresh rock, medium to coarse grained, light grey		
			TUFF fresh rock, light grey		
			SANDSTONE pebbly silty, fresh rock, coarse grained, grey		
308			MUDSTONE fresh rock, white		
			SANDSTONE silty, fresh rock, very coarse grained, grey		
			MUDSTONE fresh rock, white, solid core		

V03 (280m) Outside PVC casing

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0514

Page: 7 of 7

Client: Shenhua Watermark Coal P/L

Project: Shenhua Watermark Project No.: EL7223

Location: Watermark, Gunnedah, NSW, Australia

Date Drilled: 9/08/2011

Drill Co: Depco

Driller: Damien Lagos

NOW Groundwater Licence #: 90BL255947

Total Depth (m): 346.97

Easting: 246002.08

Northing: 6541296.27

Elevation: 302.9

Licenced Driller: Allen Carlon

Grid Ref: MGA94 Zone 56 Vertical: AHD

Logged by: Moultrie

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
320			CLAYSTONE pebbly, fresh rock, dark grey, broken core MUDSTONE sandy, fresh rock, white SANDSTONE pebbly, fresh rock, medium grained, grey SILTSTONE sandy banded throughout, fresh rock, grey, sideritic near top of unit SANDSTONE fresh rock, medium grained, grey, sideritic bands occasional SILTSTONE fresh rock, dark grey SILTSTONE fresh rock, dark grey, sandstone bands throughout SANDSTONE silty, fresh rock, very coarse grained, white, coaly wisps COAL fresh rock, black, with minor sandstone, claystone and mudstone layers	V02 (319m) Outside PVC casing V01 (329.5m) Outside PVC casing Holes for grouting	MCUS MCU MCM MCL MC3
330			SILTSTONE fresh rock, dark grey, pebbles in claystone part CLAYSTONE pebbly, fresh rock, brown, with layers of carbonaceous mudstone COAL fresh rock, black CLAYSTONE pebbly, fresh rock, grey-brown, with carbonaceous mudstone		
340			BASIC VOLCANIC distinctly weathered rock, grey-brown		
350			END OF BOREHOLE @ 346.97m bgl		
360					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0561

Page: 1 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 22/09/2011

Drill Co: Go Drill
Driller: Shannon Hennson
NOW Groundwater Licence #: 90BL255999
Total Depth (m): 96.5

Easting: 259162.41 Northing: 6543598.83 Elevation: 283.6
Licenced Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: BD
Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface	Lockable steel cover PVC cap	
8			CLAY brown, soft-medium, some trace sand CLAY as above, becoming firmer CLAY brown, soft, angular rock fragments CLAY brown, firm, occasional trace sand		
18			CLAY brown, soft-firm, occasional fine sand CLAY brown, soft-firm sandy gravelly CLAY 1-3 mm, fine grained, brown, soft, sub angular-subrounded sandy CLAY firm, medium grained, some poorly sorted gravels sandy CLAY medium-coarse grained, ~40% sand, brown, some gravels gravelly CLAY brown, soft, ~20% gravels, angular-sub angular sandy CLAY fine grained, brown, soft sand ~20%	3% bentonite cement grout	
28			gravelly CLAY soft, brown, fine gravels with occasional large angular ones CLAY with sand, brown, soft CLAY sandy, brown, soft CLAY brown, soft-firm, some small-medium sized gravels CLAY sandy, brown, soft sandy CLAY brown, fine-medium grained, very soft, some gravel clayey GRAVEL moderately sorted, brown, very soft, angular-sub angular gravelly CLAY brown, soft, 1-4mm diameter, moderate-well sorted, angular-sub angular sandy CLAY brown, very soft, fine-medium grained sand sandy CLAY medium to coarse grained, very soft clayey SAND fine to coarse grained gravelly SAND brown, very soft, 1-4mm sorted, sub angular-sub rounded sandy GRAVEL poorly sorted, brown, 1mm-1cm, black, white, red and grey lithics present gravelly CLAY brown, sub rounded to sub angular clayey GRAVEL brown, very soft clayey GRAVEL clayey, brown, very soft, poorly sorted GRAVEL clayey, loose, poorly sorted loose GRAVEL GRAVEL coarse to medium grain size GRAVEL poorly sorted GRAVEL	100mm Class 12 PVC Class 18 50mm threaded PVC	
48			GRAVEL fine to coarse grained, up to 3mm		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0561

Page: 2 of 2

Client: Shenhua Watermark Coal P/L

Project: Shenhua Watermark Project No.: EL7223

Location: Watermark, Gunnedah, NSW, Australia

Date Drilled: 22/09/2011

Drill Co: Go Drill

Driller: Shannon Hennson

NOW Groundwater Licence #: 90BL255999

Total Depth (m): 96.5

Easting: 259162.41

Northing: 6543598.83

Licenced Driller: Phillip Gaffney

Grid Ref: MGA94 Zone 56 Vertical: AHD

Logged by: BD

Elevation: 283.6

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
58			GRAVEL coarse grained, 2-4mm, poorly sorted GRAVEL coarse grained, grains larger clayey GRAVEL poorly sorted GRAVEL with some clay GRAVEL medium grained, mod well sorted GRAVEL coarse grained, mod well sorted GRAVEL fine grained, poorly sorted clayey GRAVEL fine grained, 2mm - 3cm clayey GRAVEL very fine grained, mod sorted		
68			GRAVEL fine grained GRAVEL coarse grained GRAVEL clayey, 2mm-2cm gravelly CLAY grading more clay, soft, 2mm-2cm gravelly CLAY coarse grained, soft, poorly sorted clayey GRAVEL fine grained, soft, poorly sorted		
78			GRAVEL coarse grained, mod well sorted, up 2.2cm GRAVEL medium grained, mod well sorted, up 2.1cm clayey GRAVEL poorly sorted, up to 2cm gravelly CLAY gravelly, fine grained, 1mm-1cm gravelly CLAY gravelly, very fine grained, 1mm-5mm		
88			silty gravelly SAND fine - coarse grained, sub rounded-sub angular, some siltstone present gravelly sandy CLAY chert/siltstone/basalt cobbles, rounded-sub rounded		
			SILTSTONE dark grey, fresh, finely bedded, softer in the top 1.6m, oxidised fractures at 86m		
96			END OF BOREHOLE @ 96.5m bgl	 Bentonite seal Washed quartz gravel Class 18, 50mm threaded PVC, machine slotted 0.4mm screen End PVC cap Fall back	

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0562

Page: 1 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 4/10/2011

Drill Co: Boart Longyear
Driller: Travis Overcash
NOW Groundwater Licence #: 90BL255998
Total Depth (m): 86

Easting: 259159.72 Northing: 6543603.12 Elevation: 283.65
Licenced Driller: Scott Barnes
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: DC
Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
	Sonic Core		CLAY silty, distinctly weathered rock, grey, med moisture content	Locked steel bore cover 2x2m concrete pad	
			CLAY silty sandy, brown, hard, brittle		
			CLAY grey, dry		
			CLAY sandy, fine grained, brown, med moisture		
8			CLAY distinctly weathered rock, brown, damp		
			SAND clayey quartzose, brown, hard, sample crumbles		
			CLAY sandy, distinctly weathered rock, brown, hard		
18			CLAY sandy, distinctly weathered rock, brown, hard, damp		
			CLAY silty, brown, 55% clay 35% silt	Class 18 threaded PVC	
			SAND clayey, fine to coarse grained, brown		
28			CLAY sandy, brown, hard, moisture varies with depth		
			SAND silty gravelly, brown, soft, high moisture content		
			SAND silty, coarse grained, brown, some 7cm cobbles	3% bentonite cement grout	
			CLAY silty, brown, hard, wet		
			GRAVEL clayey sandy, coarse grained, brown, clay content varies with depth		
38			CLAY gravelly quartzose, brown, hard, stiff		
			SAND gravelly, brown, brittle, gravel and cobbles content increases to 70% of total		
			CLAY sandy gravelly, brown, brittle, clay is damp		
48			CLAY gravelly sandy, medium grained, brown, hard		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0562

Page: 2 of 2

Client: Shenhua Watermark Coal P/L

Project: Shenhua Watermark Project No.: EL7223

Location: Watermark, Gunnedah, NSW, Australia

Date Drilled: 4/10/2011

Drill Co: Boart Longyear

Driller: Travis Overcash

NOW Groundwater Licence #: 90BL255998

Total Depth (m): 86

Easting: 259159.72 Northing: 6543603.12

Elevation: 283.65

Licenced Driller: Scott Barnes

Grid Ref: MGA94 Zone 56 Vertical: AHD

Logged by: DC

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
58			CLAY brown, moderately soft, medium plasticity SAND silty, coarse to medium grain size, brown, damp GRAVEL sandy clayey, coarse grained, brown, soft, brittle, damp CLAY brown, moderately soft SAND brown, moderately soft CLAY clayey gravelly, fine to coarse grained, brown, damp SAND clayey gravelly, brown, hard, damp CLAY sandy gravelly, brown, damp, consolidated CLAY sandy, brown, damp, consolidated GRAVEL clayey sandy, coarse grained, brown, poorly sorted GRAVEL clayey, fine to coarse grained, brown CLAY sandy gravelly, fine grained, brown, moderately hard, damp, consolidated CLAY sandy gravelly, fine grained, brown, moderately hard, becoming more sandy and gravelly CLAY gravelly, brown, moderately hard CLAY sandy, brown, damp CLAY sandy gravelly, fine to coarse grained, brown		
68					
78					
88			CLAY sandy, brown CLAY gravelly, brown, damp COBBLE CONGLOMERATE extremely weathered rock, brown CLAY sandy, brown, brittle, partially consolidated SAND with cobbles, brown, damp, unconsolidated SILTSTONE slightly weathered rock, damp END OF BOREHOLE @ 96m bgl		
98					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

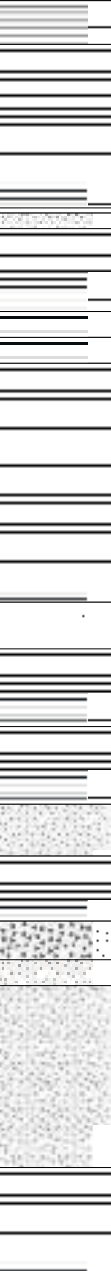
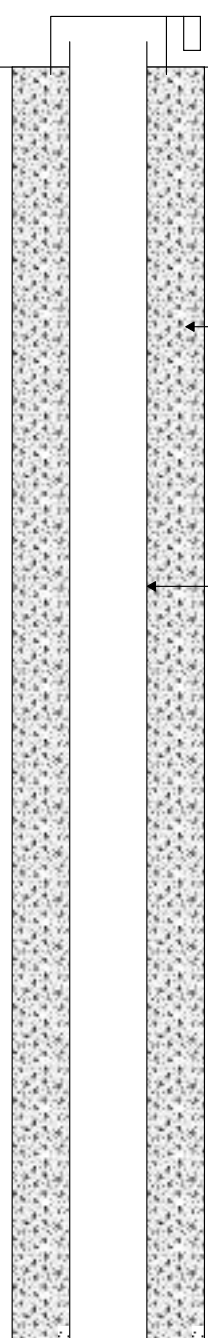
Bore No.: WM0563

Page: 1 of 2

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 11/10/2011

Drill Co: Boart Longyear
Driller: Travis Overcash
NOW Groundwater Licence #: 90BL255997
Total Depth (m): 65

Easting: 259162.02 Northing: 6543605.6 Elevation: 283.65
Licenced Driller: Matthew Davis
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: HB
Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
	Sonic Core		CLAY silty, dark grey to black, homogeneous CLAY silty, brown CLAY sandy, brown, becoming sandier at depth SAND silty, brown CLAY sandy, medium to fine grained, brown, changing lithology with patches CLAY brown CLAY sandy, brown CLAY silty, brown, patches of sandy clay SAND clayey, fine to medium grained, brown CLAY brown CLAY sandy, fine grained, brown, becoming sandier SAND brown CLAY sandy, fine grained, brown GRAVEL clayey, fine grained, brown SAND gravelly, fine to medium grained, brown SAND brown CLAY sandy gravelly, brown	 Lockable steel cover 3% bentonite cement grout Class 18. 50mm threaded PVC	

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0563

Page: 2 of 2

Client: Shenhua Watermark Coal P/L

Project: Shenhua Watermark Project No.: EL7223

Location: Watermark, Gunnedah, NSW, Australia

Date Drilled: 11/10/2011

Drill Co: Boart Longyear

Driller: Travis Overcash

NOW Groundwater Licence #: 90BL255997

Total Depth (m): 65

Easting: 259162.02

Northing: 6543605.6

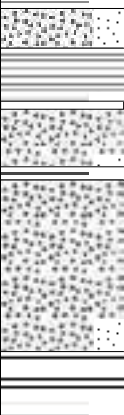
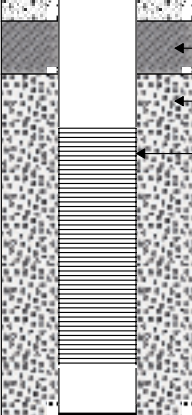
Elevation: 283.65

Licenced Driller: Matthew Davis

Grid Ref: MGA94 Zone 56 Vertical: AHD

Logged by: HB

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
59			GRAVEL sandy, brown CLAY brown GRAVEL clayey sandy, brown, some cobbles CLAY sandy gravelly, brown, some cobbles GRAVEL clayey sandy, brown, some cobbles CLAY sandy, brown	 Bentonite seal Washed quartz gravel Class 18, 50mm threaded PVC, machine slotted 0.4mm	
69			END OF BOREHOLE @ 65m bgl		
79					
89					
99					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):

**BOREHOLE LOG**

Groundwater Installation

Bore No.: WM0655

Page: 1 of 15

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 19/06/2012

Drill Co: Boart Longyear
Driller: Luke Rowe
NOW Groundwater Licence #: 90BL256059
Total Depth (m): 495

Easting: 255931.27 Northing: 6539929.57 Elevation: 303.26
Licenced Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: PM
Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface		
			SOIL dark grey, extremely weathered SILTSTONE dark grey, extremely weathered SILTSTONE medium grey, moderately weathered SILTSTONE medium grey, tuffaceous bands throughout and carbonaceous in part, moderately weathered SILTSTONE medium grey, moderately weathered		
8			COAL undifferentiated: black, moderately weathered SILTSTONE medium grey, moderately weathered COAL undifferentiated: black, moderately weathered SILTSTONE medium grey, moderately weathered COAL undifferentiated: black, moderately weathered		
18			SILTSTONE and CLAYSTONE dark grey, coaly in part increasing in abundance near base of unit and, moderately weathered COAL undifferentiated: black, moderately weathered Carbonaceous SILTSTONE medium orangy-grey, claystone in part and, highly weathered, Orange clay, possible contamination COAL undifferentiated: highly weathered BASALT dark grey, slightly weathered, Minor weathered clays		
28			COAL undifferentiated: black, slightly weathered COAL undifferentiated: black, minor basaltic near top of unit, slightly weathered SANDSTONE medium grey, slightly weathered SANDSTONE medium grey, clasts throughout, fresh SANDSTONE light grey, clasts throughout, fresh, Green clasts present		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0655

Page: 2 of 15

Client: Shenhua Watermark Coal P/L
 Project: Shenhua Watermark Project No.: EL7223
 Location: Watermark, Gunnedah, NSW, Australia
 Date Drilled: 19/06/2012

Drill Co: Boart Longyear
 Driller: Luke Rowe
 NOW Groundwater Licence #: 90BL256059
 Total Depth (m): 495

Easting: 255931.27 Northing: 6539929.57 Elevation: 303.26
 Licenced Driller: Phillip Gaffney
 Grid Ref: MGA94 Zone 56 Vertical: AHD
 Logged by: PM Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
43			COAL undifferentiated: fresh SILTSTONE medium grey, minor carbonaceous bands, fresh SILTSTONE dark grey, minor carbonaceous bands, fresh		CL
			SANDSTONE fine grained: medium grey, fresh		
			COAL undifferentiated: black, fresh		BU
			SILTSTONE medium grey, minor coaly in part, fresh		BL
			COAL undifferentiated: black, fresh		A
			SILTSTONE dark grey, minor coaly in part, fresh		
			COAL undifferentiated: black, minor siltstone in part, fresh		
			SILTSTONE medium grey, fresh		MV
53			COAL undifferentiated: black, fresh		
			SILTSTONE medium grey, fresh		
			SANDSTONE fine grained: light grey, siltstone throughout and minor tuffaceous bands, fresh		
			SILTSTONE medium grey, fresh		
63			COAL undifferentiated: black, fresh		BEN
			SANDSTONE medium grained: light grey, fresh		B2
			COAL undifferentiated: black, fresh		B3
			SILTSTONE medium grey, carbonaceous in part, fresh		
			COAL undifferentiated: black, fresh		B4
			SILTSTONE medium grey, fresh		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):

**BOREHOLE LOG**

Groundwater Installation

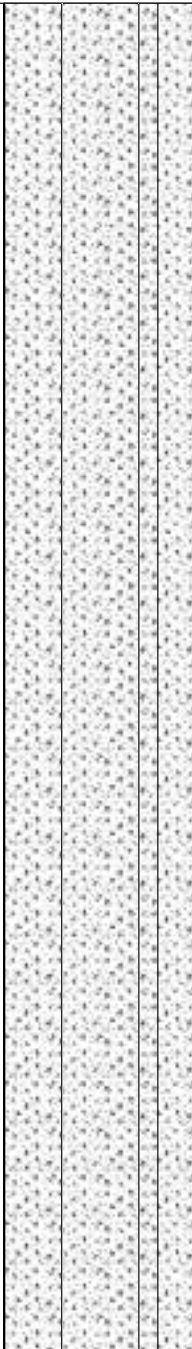
Bore No.: WM0655

Page: 3 of 15

Client: Shenhua Watermark Coal P/L
 Project: Shenhua Watermark Project No.: EL7223
 Location: Watermark, Gunnedah, NSW, Australia
 Date Drilled: 19/06/2012

Drill Co: Boart Longyear
 Driller: Luke Rowe
 NOW Groundwater Licence #: 90BL256059
 Total Depth (m): 495

Easting: 255931.27 Northing: 6539929.57 Elevation: 303.26
 Licenced Driller: Phillip Gaffney
 Grid Ref: MGA94 Zone 56 Vertical: AHD
 Logged by: PM Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			SANDSTONE medium grained: light grey, fresh COAL undifferentiated: black, fresh SANDSTONE very fine grained: medium grey, siltstone throughout, fresh		
78			COAL undifferentiated: black, fresh		B5
			SANDSTONE very fine grained: medium grey, siltstone throughout, fresh		
			Carbonaceous SILTSTONE dark grey, fresh		
			COAL undifferentiated: black, fresh		B6
			SILTSTONE medium grey, fresh		
88			SANDSTONE fine grained: medium grey, siltstone in part, fresh		
98			SILTSTONE medium grey, minor sandstone in part, fresh		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0655

Page: 4 of 15

Client: Shenhua Watermark Coal P/L
 Project: Shenhua Watermark Project No.: EL7223
 Location: Watermark, Gunnedah, NSW, Australia
 Date Drilled: 19/06/2012

Drill Co: Boart Longyear
 Driller: Luke Rowe
 NOW Groundwater Licence #: 90BL256059
 Total Depth (m): 495

Easting: 255931.27 Northing: 6539929.57 Elevation: 303.26
 Licenced Driller: Phillip Gaffney
 Grid Ref: MGA94 Zone 56 Vertical: AHD
 Logged by: PM Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
113					
123					
133					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):

**BOREHOLE LOG**

Groundwater Installation

Bore No.: WM0655

Page: 5 of 15

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 19/06/2012

Drill Co: Boart Longyear
Driller: Luke Rowe
NOW Groundwater Licence #: 90BL256059
Total Depth (m): 495

Easting: 255931.27 **Northing:** 6539929.57 **Elevation:** 303.26
Licensed Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: PM **Checked by:** GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
148			SILTSTONE medium grey, rare calcite ferruginous, fresh		
158			SILTSTONE dark grey, minor sandstone in part, fresh		
168			SILTSTONE dark grey, rare calcite ferruginous, fresh		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0655

Page: 6 of 15

Client: Shenhua Watermark Coal P/L
 Project: Shenhua Watermark Project No.: EL7223
 Location: Watermark, Gunnedah, NSW, Australia
 Date Drilled: 19/06/2012

Drill Co: Boart Longyear
 Driller: Luke Rowe
 NOW Groundwater Licence #: 90BL256059
 Total Depth (m): 495

Easting: 255931.27 Northing: 6539929.57 Elevation: 303.26
 Licenced Driller: Phillip Gaffney
 Grid Ref: MGA94 Zone 56 Vertical: AHD
 Logged by: PM Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			SILTSTONE dark grey, fresh SILTSTONE dark grey, limestone clasts throughout, fresh SILTSTONE dark grey, minor sandstone in part, fresh		
183					
193					
203					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):

**BOREHOLE LOG**

Groundwater Installation

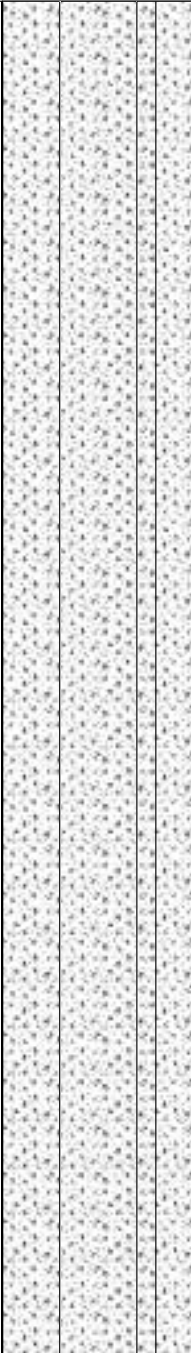
Bore No.: WM0655

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Client: Shenhua Watermark Coal P/L
 Project: Shenhua Watermark Project No.: EL7223
 Location: Watermark, Gunnedah, NSW, Australia
 Date Drilled: 19/06/2012

Drill Co: Boart Longyear
 Driller: Luke Rowe
 NOW Groundwater Licence #: 90BL256059
 Total Depth (m): 495

Easting: 255931.27 Northing: 6539929.57 Elevation: 303.26
 Licenced Driller: Phillip Gaffney
 Grid Ref: MGA94 Zone 56 Vertical: AHD
 Logged by: PM Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
218			SILTSTONE medium grey, sandstone throughout, fresh SILTSTONE dark grey, fresh		
228					
238					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0655

Page: 8 of 15

Client: Shenhua Watermark Coal P/L
 Project: Shenhua Watermark Project No.: EL7223
 Location: Watermark, Gunnedah, NSW, Australia
 Date Drilled: 19/06/2012

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 Driller: Luke Rowe
 NOW Groundwater Licence #: 90BL256059
 Total Depth (m): 495

Easting: 255931.27 Northing: 6539929.57 Elevation: 303.26
 Licenced Driller: Phillip Gaffney
 Grid Ref: MGA94 Zone 56 Vertical: AHD
 Logged by: PM Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
253					
263					
			SILTSTONE dark grey, fresh		
			SILTSTONE dark grey, sandstone throughout, fresh		
273			SANDSTONE fine to medium grained: medium grey, clasts throughout and minor siltstone, fresh		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):

**BOREHOLE LOG**

Groundwater Installation

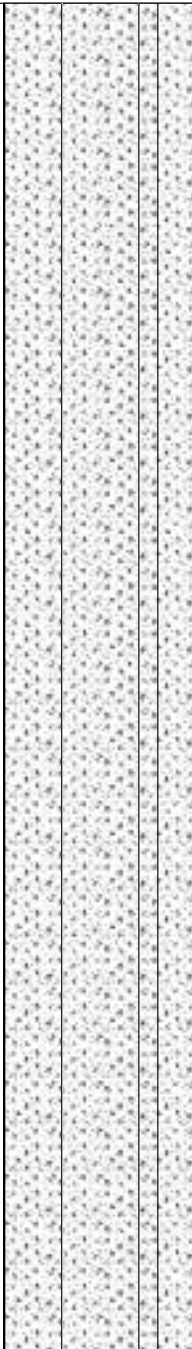
Bore No.: WM0655

Page: 9 of 15

Client: Shenhua Watermark Coal P/L
 Project: Shenhua Watermark Project No.: EL7223
 Location: Watermark, Gunnedah, NSW, Australia
 Date Drilled: 19/06/2012

Drill Co: Boart Longyear
 Driller: Luke Rowe
 NOW Groundwater Licence #: 90BL256059
 Total Depth (m): 495

Easting: 255931.27 Northing: 6539929.57 Elevation: 303.26
 Licenced Driller: Phillip Gaffney
 Grid Ref: MGA94 Zone 56 Vertical: AHD
 Logged by: PM Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
288			SANDSTONE fine to medium grained: medium grey, clasts throughout, fresh		
298					
308					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0655

Page: 10 of 15

Client: Shenhua Watermark Coal P/L
 Project: Shenhua Watermark Project No.: EL7223
 Location: Watermark, Gunnedah, NSW, Australia
 Date Drilled: 19/06/2012

Drill Co: Boart Longyear
 Driller: Luke Rowe
 NOW Groundwater Licence #: 90BL256059
 Total Depth (m): 495

Easting: 255931.27 Northing: 6539929.57 Elevation: 303.26
 Licenced Driller: Phillip Gaffney
 Grid Ref: MGA94 Zone 56 Vertical: AHD
 Logged by: PM Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
323					
333					
343			SANDSTONE fine to medium grained: medium grey, clasts throughout, fresh		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):

**BOREHOLE LOG**

Groundwater Installation

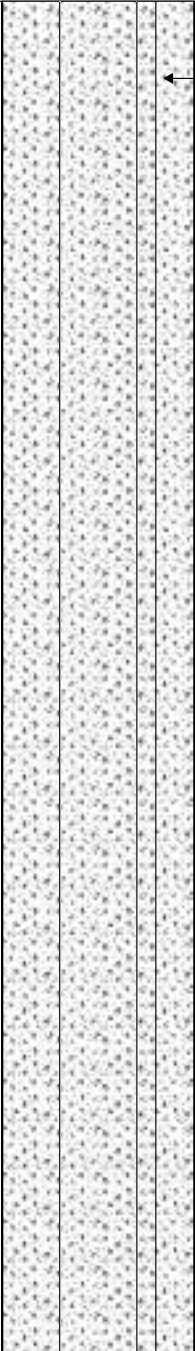
Bore No.: WM0655

Page: 11 of 15

Client: Shenhua Watermark Coal P/L
 Project: Shenhua Watermark Project No.: EL7223
 Location: Watermark, Gunnedah, NSW, Australia
 Date Drilled: 19/06/2012

Drill Co: Boart Longyear
 Driller: Luke Rowe
 NOW Groundwater Licence #: 90BL256059
 Total Depth (m): 495

Easting: 255931.27 Northing: 6539929.57 Elevation: 303.26
 Licenced Driller: Phillip Gaffney
 Grid Ref: MGA94 Zone 56 Vertical: AHD
 Logged by: PM Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
358					
368			CONGLOMERATE medium grey, sandstone matrix, fresh		
378			SANDSTONE fine to medium grained: medium grey, clasts throughout, fresh	 ← 8% bentonite cement grout over VWPs to minimum to 325m	

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



Bore No.: WM0655

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Groundwater Installation

Easting: 255931.27 **Northing:** 6539929.57 **Elevation:** 303.26
Licenced Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: PM **Checked by:** GF

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
393					
403				Piezo V03	
413					
			SANDSTONE medium grained: medium grey, occasional granules throughout, solid core, high strength rock, fresh		

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0655

Page: 13 of 15

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 19/06/2012

Drill Co: Boart Longyear
Driller: Luke Rowe
NOW Groundwater Licence #: 90BL256059
Total Depth (m): 495

Easting: 255931.27 Northing: 6539929.57 Elevation: 303.26
Licenced Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: PM
Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
428			LIMESTONE light greenish-grey, abundant calcite throughout and chloritic disseminated throughout and minor pyritic SANDSTONE medium grained: medium grey, abundant gravelly throughout, solid core, high strength rock, fresh SANDSTONE medium grained: medium grey, siltstone wisps throughout and occasional gravelly, solid core, high strength PEBBLE CONGLOMERATE medium grey, abundant sandstone matrix, solid core, high strength rock, fresh PEBBLE CONGLOMERATE light grey, minor sandstone matrix, solid core, high strength rock, fresh SANDSTONE medium to coarse grained: light grey, solid core, very high strength rock, fresh PEBBLE CONGLOMERATE light grey, occasional cobbles throughout, solid core, high strength rock, fresh SANDSTONE medium to coarse grained: light grey, pebbly bands throughout, solid core, high strength rock, fresh PEBBLE CONGLOMERATE light grey, solid core, high strength rock, fresh SANDSTONE medium grained: light grey, solid core, high strength rock, fresh SANDSTONE coarse grained: light grey, solid core, high strength rock, fresh SANDSTONE very coarse grained: light grey, gravelly near base of unit, solid core, high strength rock, fresh SANDSTONE medium grained: light grey, solid core, high strength rock, fresh SILTSTONE medium grey, carbonaceous near top of unit, solid core, medium strength rock, fresh SANDSTONE fine to medium grained: medium grey, siltstone bands throughout, solid core, high strength rock, fresh SANDSTONE medium to coarse grained: light grey, gravelly bands throughout and siltstone laminae throughout, solid core SANDSTONE medium grained: light grey, occasional carbonaceous wisps throughout and rare pebbles, solid core COAL black, solid core, low strength rock, fresh, pyritic lenses near base of unit COAL black, solid core, low strength rock, fresh Carbonaceous SILTSTONE		MCUS MCU

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0655

Page: 14 of 15

Client: Shenhua Watermark Coal P/L

Project: Shenhua Watermark Project No.: EL7223

Location: Watermark, Gunnedah, NSW, Australia

Date Drilled: 19/06/2012

Drill Co: Boart Longyear

Driller: Luke Rowe

NOW Groundwater Licence #: 90BL256059

Total Depth (m): 495

Easting: 255931.27

Northing: 6539929.57

Elevation: 303.26

Licenced Driller: Phillip Gaffney

Grid Ref: MGA94 Zone 56 Vertical: AHD

Logged by: PM

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
463			SILTSTONE medium grey, carbonaceous wisps near base of unit, broken core, medium strength rock, fresh Carbonaceous SILTSTONE dark grey, solid core, medium strength rock, fresh, with bands of coal SANDSTONE interbedded fine & coarse: medium grey, siltstone bands throughout, solid core, medium strength rock, fresh COAL black, fining upwards, solid core, low strength rock, fresh Carbonaceous SILTSTONE blackish-brown, with beds of coal, broken core, medium strength rock, fresh, mudstone towards base of unit SANDSTONE interbedded fine-coarse, medium grey, carbonaceous near top of unit, broken core, low strength rock, fresh COAL black, solid core, low strength rock, fresh		MC7
473			Carbonaceous SILTSTONE blackish-brown, coaly laminae near base of unit, broken core, medium strength rock, fresh SANDSTONE interbedded fine & coarse: medium grey, broken core, medium strength rock, fresh SANDSTONE interbedded fine & coarse: medium grey, broken core, medium strength rock, fresh SANDSTONE fine - very fine grained: grey, coaly laminae, broken core, medium strength rock, fresh SANDSTONE interbedded fine & coarse: light grey, solid core, medium strength rock, fresh, some siltstone beds SANDSTONE medium to coarse grained: light grey, carbonaceous lenses, solid core, medium strength rock, fresh, beds of very fine grained dark grey sandstone and dark grey siltstone SANDSTONE interbedded fine & coarse: medium grey, carbonaceous wisps, broken core, medium strength rock, fresh, siltstone lenses SILTSTONE dark grey, broken core, medium strength rock, fresh SANDSTONE very fine grained: light grey, solid core, medium strength rock, fresh Carbonaceous SILTSTONE blackish-brown, broken core, medium strength rock, fresh, coal layers COAL black, abundant calcite veins at top and base of unit		MC6
483			SILTSTONE dark grey, abundant coaly laminae, broken core, medium strength rock, fresh SANDSTONE interbedded fine & coarse: medium grey, broken core, medium strength rock, fresh SANDSTONE fine to medium grained: medium grey, fining upwards carbonaceous and siltstone laminae throughout CONGLOMERATE light grey, solid core, medium strength rock, fresh SANDSTONE interbedded fine & coarse: medium grey, carbonaceous bands, broken core, medium strength rock, fresh PEBBLE CONGLOMERATE light grey, angular clasts coaly, broken core, medium strength rock, fresh, EOR: 22 D:3 R:301 CONGLOMERATE grey, siltstone lenses, solid core, high strength rock, fresh, erosional lower contact SANDSTONE fine to coarse grained: light grey, siltstone laminae carbonaceous wisps near base of unit SILTSTONE medium grey, sandstone laminae, solid core, high strength rock, fresh, gradational lower contact		MCM

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0655

Page: 15 of 15

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 19/06/2012

Drill Co: Boart Longyear
Driller: Luke Rowe
NOW Groundwater Licence #: 90BL256059
Total Depth (m): 495

Easting: 255931.27 Northing: 6539929.57 Elevation: 303.26
Licenced Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: PM
Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			SANDSTONE light buffish-grey, minor coaly lenses, solid core, high strength rock, fresh, gradational lower contact COAL black, solid core, low strength rock, fresh, with minor claystone and mudstone CLAYSTONE medium buffish-brown, pebbles carbonaceous bands, solid core, high strength rock, fresh COAL black, broken core, low strength rock, fresh CLAYSTONE medium buffish-brown, pellets carbonaceous bands, broken core, high strength rock, fresh BASALT mottled creamy-red, calcite veins throughout, broken core, high strength rock, fresh		
498					MCL
					MC5
					MC4
					PLF_FL
508			GRANITE medium reddish-grey, broken core, very high strength rock, fresh END OF BOREHOLE @ 504.6m bgl		
518					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0665

Page: 1 of 4

Client: Shenhua Watermark Coal P/L

Project: Shenhua Watermark Project No.: EL7223

Location: Watermark, Gunnedah, NSW, Australia

Date Drilled: 24/05/2012

Drill Co: Depco

Driller: Jason Wildman

NOW Groundwater Licence #: 90BL256047

Total Depth (m): 115

Easting: 259166.15

Northing: 6543600.9

Elevation: 283.68

Licenced Driller: Phillip Gaffney

Grid Ref: MGA94 Zone 56 Vertical: AHD

Logged by: JL

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface	Lockable steel bore cover	
			CLAY with minor sand, brown-black, high plasticity, firm		
			CLAY medium-dark brown, grading higher sand content, highly plastic		
			sandy CLAY medium brown, sand grains <2mm, well graded		
			sandy silty CLAY brown, sand grains smaller than 2mm		
			sandy CLAY fine grained, brown, stiff, plastic, some sand <2mm		
			sandy gravelly CLAY brown, 40% clay, 50% sand, gravel up to 2cm which is cream-opaque		
			clayey gravelly SAND fine to coarse grained, brown, stiff, subangular		
			clayey gravelly SAND fine to coarse grained, brown, subrounded		
			clayey gravelly SAND fine to coarse grained, brown, subrounded, grading to more clay		
			sandy gravelly CLAY fine grained, brown, soft, gravel up to 1cm diameter		
			sandy CLAY fine to medium grained, brown, firm		
			clayey gravelly SAND fine to coarse grained, brown, gravel up to 3cm diameter		
			gravelly clayey SAND fine to coarse grained, brown, gravel up to 3cm diameter		
			clayey SAND medium to coarse grained, brown, subrounded		
			clayey SAND fine to medium grained, brown, subrounded		
			clayey SAND fine to medium grained, brown, subrounded, grading a little more		
			sandy CLAY brown, friable, stiff, grains to 1.5cm		
			clayey SAND brown, grains to 1cm, subrounded, clay m plastic		
			clayey SAND brown, grains to 1cm, subrounded, clay m plastic, grading more play		
			clayey gravelly SAND medium to coarse grained, brown, gravel up to 3 cm, grey		
			gravelly sandy CLAY medium grained, brown, high plasticity, gravel to 3cm		
			sandy silty CLAY coarse grained, brown, sand opaque, l.brown and black		
			sandy silty gravelly CLAY coarse grained, brown, sand opaque, l.brown and black, grading more clay, some gravel 2.5cm diameter		
				3% bentonite cement grout to 103.8m	
				Class 18 100mm threaded PVC to 88m	
				50mm class 18 threaded PVC	

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0665

Page: 2 of 4

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 24/05/2012

Drill Co: Depco
Driller: Jason Wildman
NOW Groundwater Licence #: 90BL256047
Total Depth (m): 115

Easting: 259166.15 Northing: 6543600.9 Elevation: 283.68
Licenced Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: JL

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			clayey SAND medium to coarse grained, brown, sand 3mm opaque, 1 brown black		
			clayey gravelly SAND with thin Sandstone bands, dark grey to black, clay is m.brown		
			clayey gravelly SAND with thin Sandstone bands, dark grey to black, clay is m.brown, less gravel		
			clayey gravelly SAND with thin Sandstone bands, dark grey to black, clay is m.brown, less gravel, more clay nodules		
			clayey SAND coarse grained, red-brown, clay is m.brown		
			clayey SAND red-brown, clay is m.brown		
38			GRAVEL dark grey to black, gravel 1-0.5cm		
			GRAVEL dark grey to black, gravel 1-2cm		
			clayey GRAVEL dark grey to black, gravel 1-2cm, with some minor clay inclusions		
			clayey GRAVEL red-brown, gravel 1-2cm, with some minor clay inclusions, some yellow and black colouring		
			clayey GRAVEL coarse grained, red-brown, with fine gravel (90% <1cm), with some minor clay inclusions, some yellow and black colouring		
48			clayey GRAVEL coarse grained, red-brown, with gravel (0.5-2cm), with some minor clay inclusions, some yellow and black colouring, also subrounded		
			clayey GRAVEL coarse grained, red-brown, with gravel (0.5-2cm), with some minor clay inclusions, some yellow and black colouring, also subrounded, added clay nodules with fine grained sand		
			clayey GRAVEL coarse grained, red-brown, with gravel (0.5-2cm), with some minor clay inclusions, some yellow and black colouring, added clay nodules with fine grained sand		
			sandy GRAVEL fine to coarse grained, brown, with some black and grey, also angular		
			sandy GRAVEL fine to coarse grained, brown, with some black and grey, also angular, with some clay nodules of high plasticity		
			sandy GRAVEL fine to coarse grained, brown, with some black and grey, also angular, less clay		
58					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0665

Page: 3 of 4

Client: Shenhua Watermark Coal P/L

Project: Shenhua Watermark Project No.: EL7223

Location: Watermark, Gunnedah, NSW, Australia

Date Drilled: 24/05/2012

Drill Co: Depco

Driller: Jason Wildman

NOW Groundwater Licence #: 90BL256047

Total Depth (m): 115

Easting: 259166.15

Northing: 6543600.9

Elevation: 283.68

Licenced Driller: Phillip Gaffney

Grid Ref: MGA94 Zone 56 Vertical: AHD

Logged by: JL

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
68			sandy clayey GRAVEL fine grained, dark grey to black, clay highly plastic		
			sandy GRAVEL black, also coloured red and mustard angular and subrounded, grains 0.5cm		
			sandy GRAVEL black, also coloured red and mustard angular and subrounded, grains 0.5cm, some clay (grey and plastic)		
			sandy GRAVEL black, also coloured red and mustard angular and subrounded, grains 0.5cm, some clay (grey and plastic)		
			clayey sandy GRAVEL fine to coarse grained, brown, also orange, clay hi plasticity, 10% sand, gravel 50%, rounded and angular		
			clayey sandy GRAVEL fine to coarse grained, brown, also orange, clay hi plasticity, 5% sand, gravel 50%, rounded and angular		
			gravelly sandy CLAY fine to coarse grained, brown, high plasticity, gravel up to 2cm		
			sandy GRAVEL fine to coarse grained, black, also orange-brown and grey, rounded and sunangular, gravel 1.5cm diam (50%)		
			sandy clayey GRAVEL fine to coarse grained, black, also orange-brown and grey, rounded and sunangular, gravel 1.5cm diam (50%), minor clay		
			sandy GRAVEL fine to coarse grained, black, also orange-brown and grey, rounded and sunangular, gravel <1cm diam (50%)		
			sandy clayey GRAVEL fine to coarse grained, black, also orange-brown and grey, rounded and sunangular, gravel <1cm diam (50%), minor clay		
			clayey GRAVEL black, also has a mustard colour, grey clay, angular and subrounded, 2mm to 1.5cm gravel		
			clayey GRAVEL black, also has a mustard colour, grey clay, angular and subrounded, 2mm to 2cm gravel		
			clayey GRAVEL black, also has a mustard colour, grey clay, angular and subrounded, 2mm to 2cm gravel		
			clayey GRAVEL black, also has a mustard colour, grey clay, angular and subrounded, 2mm to 1.5cm gravel		
			clayey sandy GRAVEL fine to coarse grained, orange, also black, angular - subrounded, clay matrix, gravel 1mm-1cm		
			clayey sandy GRAVEL fine to medium grained, orange, also black, angular - subrounded, clay matrix, gravel 1mm-1cm		
			clayey sandy GRAVEL medium grained, white, also grey and red, clay light brown, clay highly plastic forming a matrix		
			clayey SAND fine to medium grained, red-brown, some gravel at 0.75cm, subrounded - angular, clay probably from high up		
			clayey gravelly SAND fine to medium grained, red-brown, some gravel at 0.75cm, subrounded - angular, more clay, some gravel		
			clayey SAND fine to medium grained, red-brown, some gravel at 0.75cm, subrounded - angular		
			clayey gravelly SAND fine to medium grained, red-brown, some gravel at 0.75cm, subrounded - angular, some gravel		
			clayey GRAVEL white, also yellow-orange, brown-red		
			clayey GRAVEL white, also yellow-orange, brown-red, grading more clay & brown-red gravel, becoming finer (drill crushing?)		
			SILTSTONE brown, yellow-orange, about 30% grey & black chip (watermark?). Distinctly weathered rock		
88			SILTSTONE grey, some coloured chips like above		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):

**BOREHOLE LOG**

Groundwater Installation

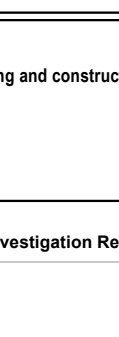
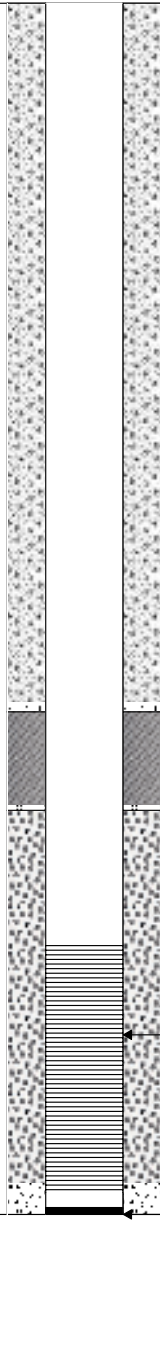
Bore No.: WM0665

Page: 4 of 4

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 24/05/2012

Drill Co: Depco
Driller: Jason Wildman
NOW Groundwater Licence #: 90BL256047
Total Depth (m): 115

Easting: 259166.15 Northing: 6543600.9 Elevation: 283.68
Licenced Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: JL
Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
98			SLTSTONE fine grained, grey, soft, with some gravel <3cm		
			SLTSTONE fine grained, grey, soft		
			SLTSTONE fine grained, grey, soft, with some gravel		
108			SLTSTONE fine grained, grey, soft, with some gravel, more chips		
118			END OF BOREHOLE @ 115m bgl	50mm PVC endcap @ 115m	

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0675

Page: 1 of 9

Client: Shenhua Watermark Coal P/L
 Project: Shenhua Watermark Project No.: EL7223
 Location: Watermark, Gunnedah, NSW, Australia
 Date Drilled: 19/06/2012

Drill Co: Boart Longyear
 Driller: Luke Rowe
 NOW Groundwater Licence #: 90BL256058
 Total Depth (m): 239

Easting: 240985.94 Northing: 6539025.85 Elevation: 366.43
 Licenced Driller: Phillip Gaffney
 Grid Ref: MGA94 Zone 56 Vertical: AHD
 Logged by: AN Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
-2			Ground Surface SOIL dark brown, soft soil, extremely weathered		
8			CONGLOMERATE light brown, granular, low strength rock, weathered, Digby Conglomerate	32mm NB class 18 belled PVC Carrier pipe (glued and screwed)	
18			CONGLOMERATE light brown, granular, medium strength rock, weathered	Second grout lift 4% bentonite cement grout	
28			CONGLOMERATE light grey, granular rare tuffaceous, medium strength rock, fresh	32mm poly pipe tremie line (approx 100m bgl)	RDC

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):

**BOREHOLE LOG**

Groundwater Installation

Bore No.: WM0675

Page: 2 of 9

Client: Shenhua Watermark Coal P/L
 Project: Shenhua Watermark Project No.: EL7223
 Location: Watermark, Gunnedah, NSW, Australia
 Date Drilled: 19/06/2012

Drill Co: Boart Longyear
 Driller: Luke Rowe
 NOW Groundwater Licence #: 90BL256058
 Total Depth (m): 239

Easting: 240985.94 Northing: 6539025.85 Elevation: 366.43
 Licenced Driller: Phillip Gaffney
 Grid Ref: MGA94 Zone 56 Vertical: AHD
 Logged by: AN Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
38					
			CONGLOMERATE light grey, granular rare tuffaceous, medium strength rock, fresh		
			CONGLOMERATE light grey, granular rare tuffaceous, medium strength rock, fresh, Digby Conglomerate		
			Carbonaceous SILTSTONE dark grey, bands, low strength rock, fresh, with bands of coal		DNA
48			CONGLOMERATE light grey, medium strength rock, fresh		
			TUFF white, low strength rock, fresh		
			Carbonaceous SILTSTONE with TUFF, black, medium strength rock, fresh		
			SANDSTONE medium grey, medium strength rock, fresh		
			Carbonaceous SILTSTONE dark grey, medium strength rock, fresh		
58			COAL black, siltstone bands, low strength rock, fresh, tuff (20%) white, sandstone bands, low strength rock, fresh		SGF

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0675

Page: 3 of 9

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 19/06/2012

Drill Co: Boart Longyear
Driller: Luke Rowe
NOW Groundwater Licence #: 90BL256058
Total Depth (m): 239

Easting: 240985.94 **Northing:** 6539025.85 **Elevation:** 366.43
Licensed Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: AN **Checked by:** GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			SILTSTONE dark grey, tuffaceous bands near base of unit, medium strength rock, fresh		
			COAL undifferentiated: black, low strength rock, fresh		
			SILTSTONE dark grey, tuffaceous bands near base of unit, medium strength rock, fresh		
			COAL undifferentiated: black, minor tuffaceous and minor siltstone bands, low strength rock, fresh		CF
			SANDSTONE grey, throughout, medium strength rock, fresh		
			COAL undifferentiated: black, low strength rock, fresh		CFL
			SILTSTONE dark grey, rare pebbly, medium strength rock, fresh		
68					
			CONGLOMERATE light grey, medium strength rock, fresh		
78					
			SILTSTONE medium grey, pebbly, medium strength rock, fresh		
88					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):

**BOREHOLE LOG**

Groundwater Installation

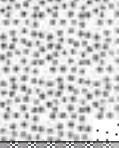
Bore No.: WM0675

Page: 4 of 9

Client: Shenhua Watermark Coal P/L
 Project: Shenhua Watermark Project No.: EL7223
 Location: Watermark, Gunnedah, NSW, Australia
 Date Drilled: 19/06/2012

Drill Co: Boart Longyear
 Driller: Luke Rowe
 NOW Groundwater Licence #: 90BL256058
 Total Depth (m): 239

Easting: 240985.94 Northing: 6539025.85 Elevation: 366.43
 Licenced Driller: Phillip Gaffney
 Grid Ref: MGA94 Zone 56 Vertical: AHD
 Logged by: AN Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
98			SANDSTONE medium grey, carbonaceous near base of unit, medium strength rock, fresh, with minor coal		
			CONGLOMERATE medium grey, medium strength rock, fresh		
			CONGLOMERATE medium grey, medium strength rock, fresh		
108			CONGLOMERATE medium grey, medium strength rock, fresh		
			COAL undifferentiated: black, low strength rock, fresh		BZ
			CONGLOMERATE medium grey, sandstone in part, medium strength rock, fresh		
			CONGLOMERATE medium grey, sandstone in part, medium strength rock, fresh		CLR3
			CONGLOMERATE medium grey, sandstone in part, medium strength rock, fresh		
118					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0675

Page: 5 of 9

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark **Project No.:** EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 19/06/2012

Drill Co: Boart Longyear
Driller: Luke Rowe
NOW Groundwater Licence #: 90BL256058
Total Depth (m): 239

Easting: 240985.94 **Northing:** 6539025.85 **Elevation:** 366.43
Licensed Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: AN **Checked by:** GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			COAL undifferentiated: black, low strength rock, fresh, with some black mudstone		HHR
			SANDSTONE medium grey, medium strength rock, fresh		HHU
128			COAL undifferentiated: black, low strength rock, fresh		HHL
			Carbonaceous SILTSTONE dark grey, low strength rock, fresh		
			SILTSTONE dark grey, medium strength rock, fresh		CLR2
			SANDSTONE light grey, medium strength rock, fresh, with minor coal		
138			SILTSTONE dark grey, medium strength rock, fresh		
			COAL undifferentiated: black, low strength rock, fresh		X
			Carbonaceous SILTSTONE medium strength rock, fresh SILTSTONE (20%): dark grey, medium strength rock, fresh		
148			COAL undifferentiated: black, low strength rock, fresh		

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0675

Page: 6 of 9

Client: Shenhua Watermark Coal P/L
Project: Shenhua Watermark Project No.: EL7223
Location: Watermark, Gunnedah, NSW, Australia
Date Drilled: 19/06/2012

Drill Co: Boart Longyear
Driller: Luke Rowe
NOW Groundwater Licence #: 90BL256058
Total Depth (m): 239

Eastings: 240985.94 Northing: 6539025.85 Elevation: 366.43
Licenced Driller: Phillip Gaffney
Grid Ref: MGA94 Zone 56 Vertical: AHD
Logged by: AN Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			COAL undifferentiated: black, fresh, interbedded with siltstone, mudstone and tuff		
			SANDSTONE fine grained: brownish-grey, tuffaceous laminae throughout, broken core, medium strength rock, fresh		CRU
			SILTSTONE dark grey, soft tuffaceous in part, solid core, medium strength rock, fresh, with some coal		CRM
			SILTSTONE dark grey, abundant tuffaceous laminae, broken core, medium strength rock, fresh, laminated <10mm		CRL
158			TUFF light greenish-grey, solid core, low strength rock, fresh		
			Carbonaceous SILTSTONE dark greyish-black, solid core, medium strength rock, fresh		
			COAL dull, conchoidal: black, solid core, medium strength rock, fresh, interbedded with mudstone		W
			SANDSTONE becoming coarse grained, grey, fining upwards, medium strength rock, fresh, some siltstone bands		
			GRANULE CONGLOMERATE light grey, solid core, medium strength rock, fresh		CLR
168			Carbonaceous SILTSTONE dark grey-brown, coaly laminae, broken core, medium strength rock, fresh		
			SANDSTONE light-medium grey, solid core, medium strength rock, fresh, fine-very fine grained	Piezo V03	
			SANDSTONE fine-coarse: medium grey, solid core, medium strength rock, fresh		
			SANDSTONE medium grained: light grey, solid core, medium strength rock, fresh		
			SANDSTONE fine to medium grained: light grey, solid core, medium strength rock, fresh		
			SANDSTONE medium grained: light grey, siltstone bands near top of unit and near base of unit, solid core, medium strength rock, fresh		
			SANDSTONE interbedded fine & coarse: medium grey, broken core, medium strength rock, fresh, very thinly bedded 10-30mm	8% bentonite cement grout over	
			SANDSTONE fine grained: light grey, solid core, medium strength rock, fresh	VWPs to minimum 130m	
			SILTSTONE medium-dark grey, solid core, medium strength rock, fresh, disturbed bedding		
178					

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0675

Page: 7 of 9

Client: Shenhua Watermark Coal P/L

Project: Shenhua Watermark Project No.: EL7223

Location: Watermark, Gunnedah, NSW, Australia

Date Drilled: 19/06/2012

Drill Co: Boart Longyear

Driller: Luke Rowe

NOW Groundwater Licence #: 90BL256058

Total Depth (m): 239

Easting: 240985.94

Northing: 6539025.85

Elevation: 366.43

Licenced Driller: Phillip Gaffney

Grid Ref: MGA94 Zone 56 Vertical: AHD

Logged by: AN

Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			Carbonaceous SILTSTONE dark grey, solid core, medium strength rock, fresh SILTSTONE medium grey, solid core, medium strength rock, fresh Carbonaceous SILTSTONE dark blackish-grey, sandstone lenses throughout, broken core, medium strength rock, fresh SIDERITE dark grey, sandstone matrix, solid core, medium strength rock, fresh COAL black, very broken core, low strength rock, fresh, with fine mudstone bands Carbonaceous SILTSTONE brownish-black, broken core, medium strength rock, fresh COAL black, solid core, low strength rock, fresh, with carbonaceous siltstone and sandstone beds SANDSTONE very fine grained: medium grey, coarser lenses throughout, very broken core, medium strength rock, fresh SILTSTONE medium grey, coarser bands throughout, broken core, medium strength rock, fresh SANDSTONE interbedded fine & coarse: medium grey, broken core, medium strength rock, fresh SANDSTONE fine to medium grained: medium grey, siltstone lenses throughout, solid core, medium strength rock, fresh SILTSTONE dark grey, rare pyritic lenses, broken core, medium strength rock, fresh SANDSTONE interbedded fine & coarse: medium grey, granular, broken core, medium strength rock, fresh, coal and siltstone beds SILTSTONE dark grey, carbonaceous in part, broken core, medium strength rock, fresh SANDSTONE interbedded fine & coarse: medium grey, very broken core, medium strength rock, fresh, laminated <10mm SANDSTONE medium grained: light grey, solid core, medium strength rock, fresh SANDSTONE interbedded fine & coarse: medium grey, broken core, medium strength rock, fresh, very thinly bedded 10-30mm SANDSTONE medium grained: light-dark grey, occasional siltstone bands, broken core, medium strength rock, fresh SANDSTONE medium grained: light grey, coaly laminae near top of unit siltstone bands throughout, solid core, medium strength rock, fresh COAL black, siltstone laminae near base of unit, broken core, low strength rock, fresh SANDSTONE fine to medium grained: medium grey, broken core, medium strength rock, fresh SILTSTONE medium grey, carbonaceous wisps, broken core, medium strength rock, fresh SIDERITE light brown, solid core, high strength rock, fresh	Piezo V02	HKU HKL E

NOTES

General drilling and construction notes:

Development info, Test results (slug, packer, water quality):



Groundwater Installation

Page: 8 of 9

Easting: 240985.94 **Northing:** 6539025.85 **Elevation:** 366.43
Licenced Driller: Phillip Gaffney
Grid Ref: MGA94 **Zone 56 Vertical:** AHD
Logged by: AN **Checked by:** GF

NOTES	
General drilling and construction notes:	Development info, Test results (slug, packer, water quality):



BOREHOLE LOG

Groundwater Installation

Bore No.: WM0675

Page: 9 of 9

Client: Shenhua Watermark Coal P/L
 Project: Shenhua Watermark Project No.: EL7223
 Location: Watermark, Gunnedah, NSW, Australia
 Date Drilled: 19/06/2012

Drill Co: Boart Longyear
 Driller: Luke Rowe
 NOW Groundwater Licence #: 90BL256058
 Total Depth (m): 239

Easting: 240985.94 Northing: 6539025.85 Elevation: 366.43
 Licenced Driller: Phillip Gaffney
 Grid Ref: MGA94 Zone 56 Vertical: AHD
 Logged by: AN Checked by: GF

Depth (m)	Drilling	Graphic Log	Lithology Description	Construction Details	Seam
			SILTSTONE grey, broken core, medium strength rock, fresh SILTSTONE medium grey, carbonaceous wisps throughout, broken core, medium strength rock, fresh SANDSTONE fine grained: medium grey, carbonaceous laminae throughout coaly laminae near base of unit, very broken core, medium strength SANDSTONE very fine grained: medium grey, coarser bands near base of unit, very broken core, medium strength rock, fresh SANDSTONE medium grained: light grey, carbonaceous laminae near top of unit, broken core, medium strength rock, fresh SANDSTONE medium grained: light grey, fragmented core, medium strength rock, fresh	Piezo V01 Holes for grouting	MV
248			END OF BOREHOLE @ 246.4m bgl		
258					
268					

NOTES

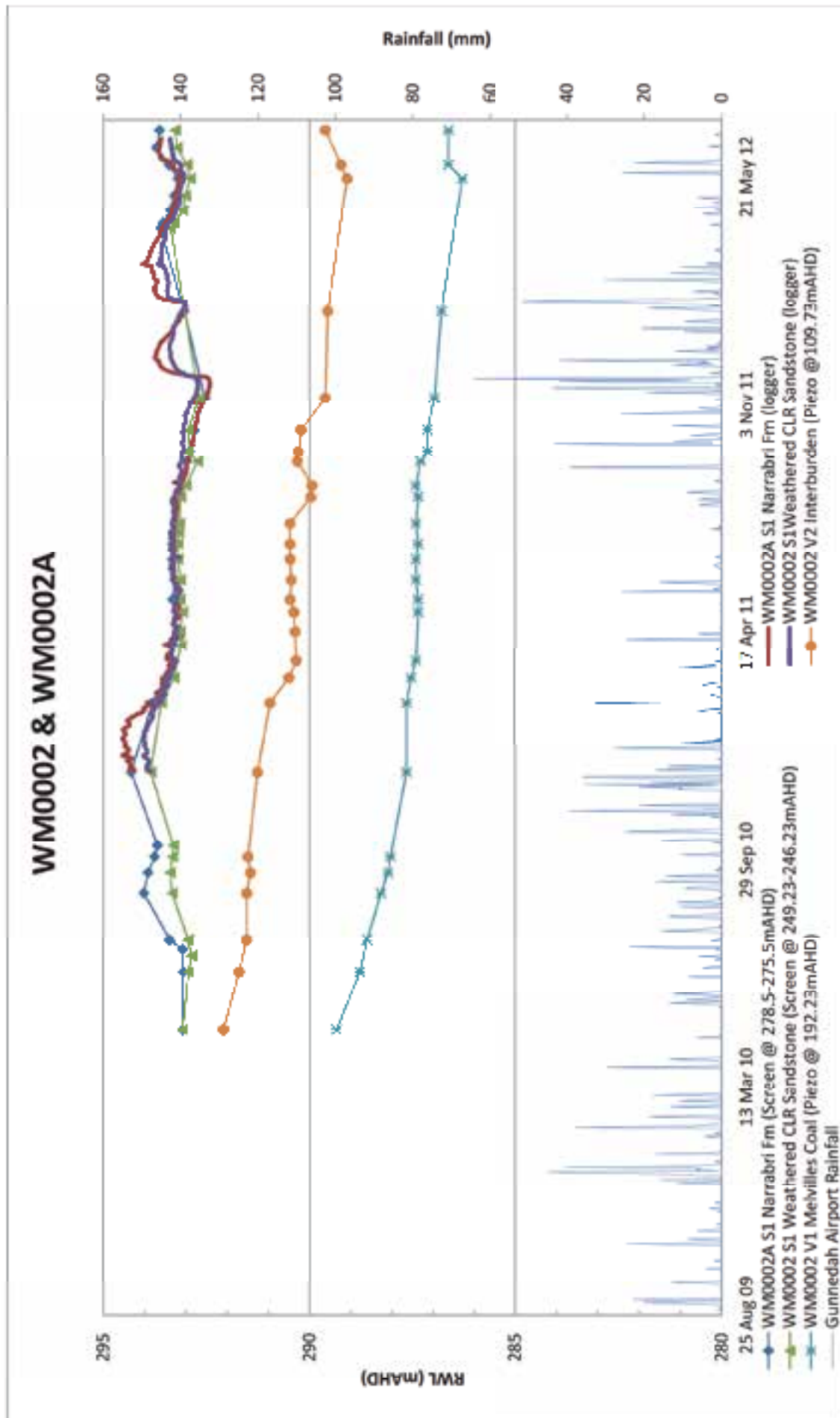
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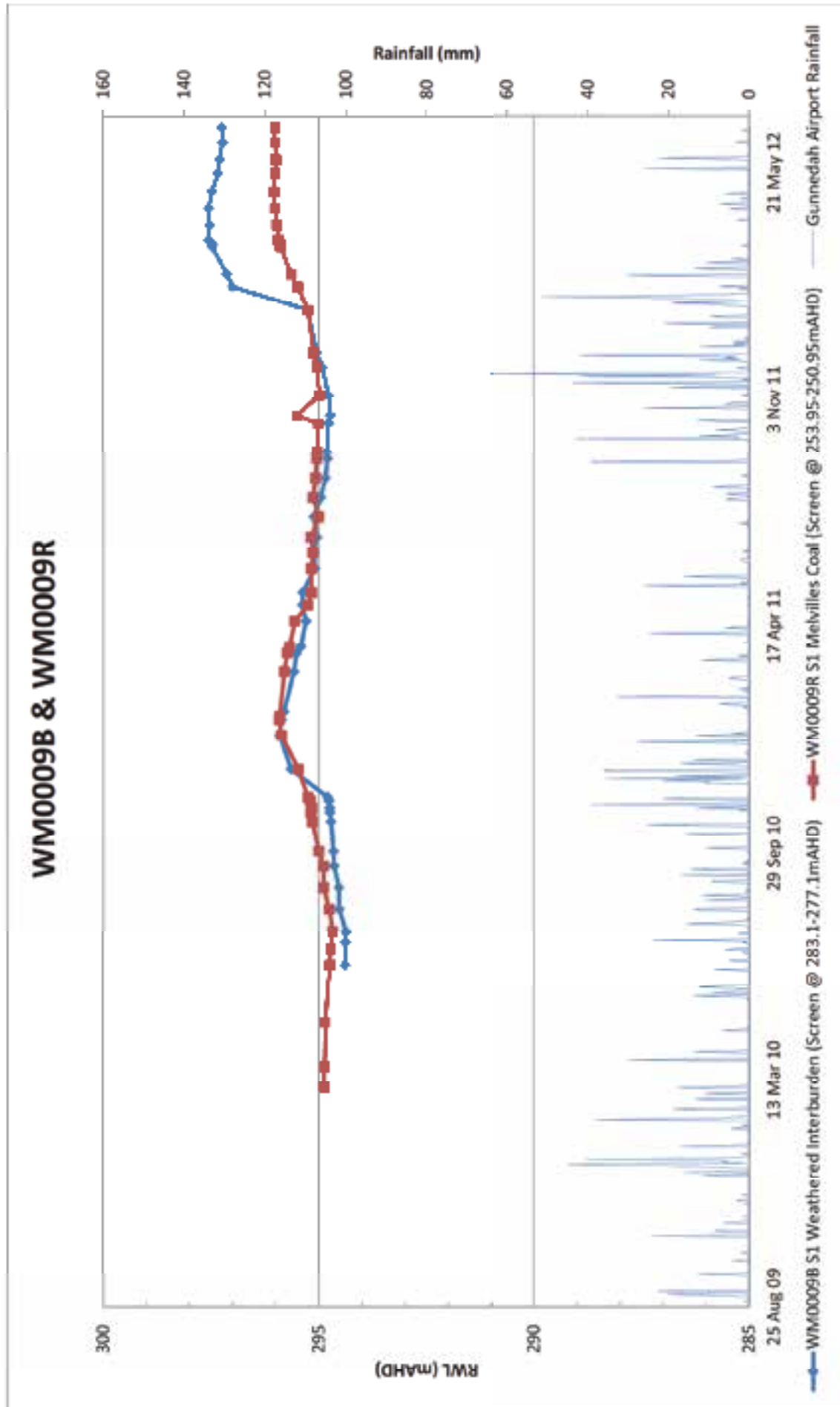
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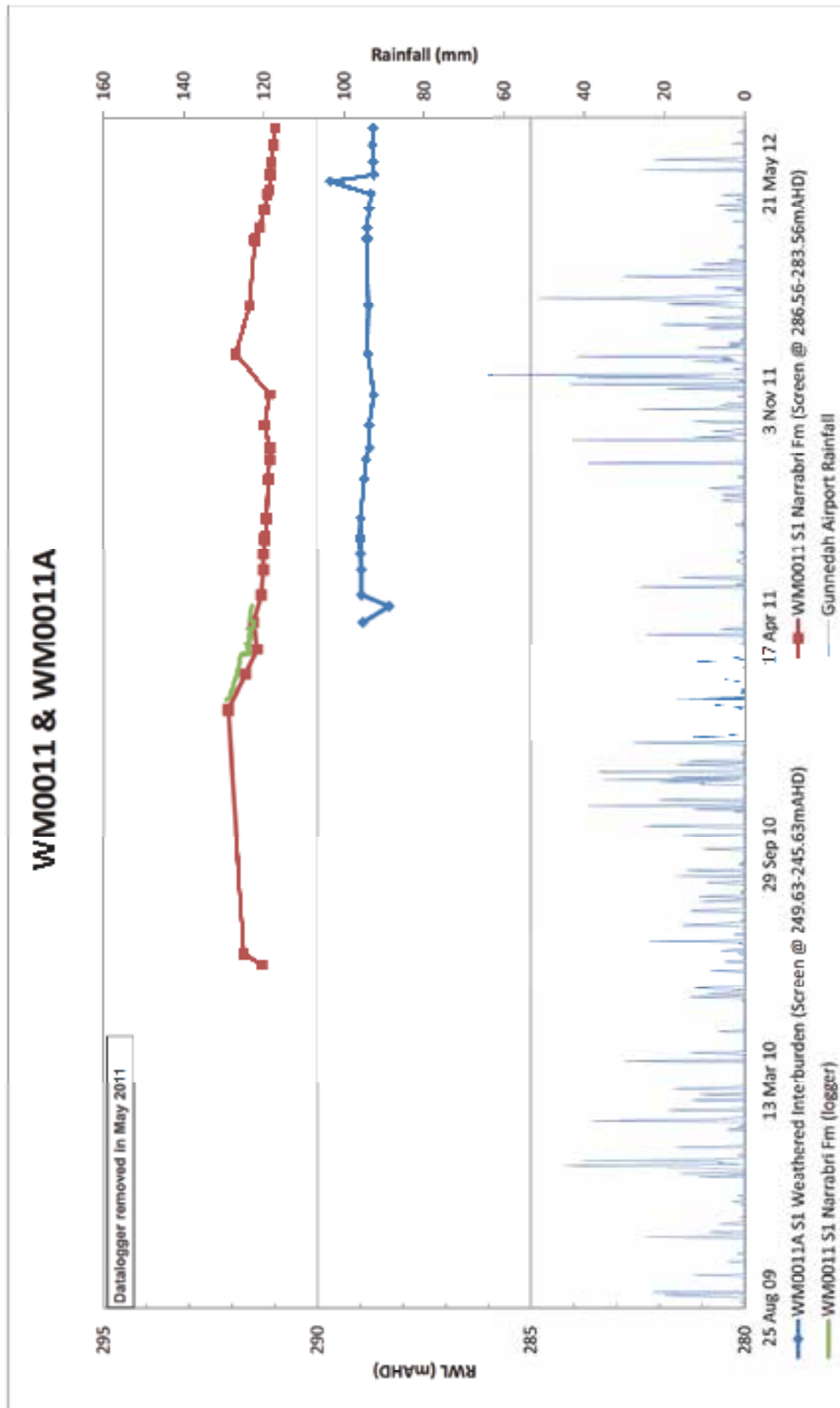


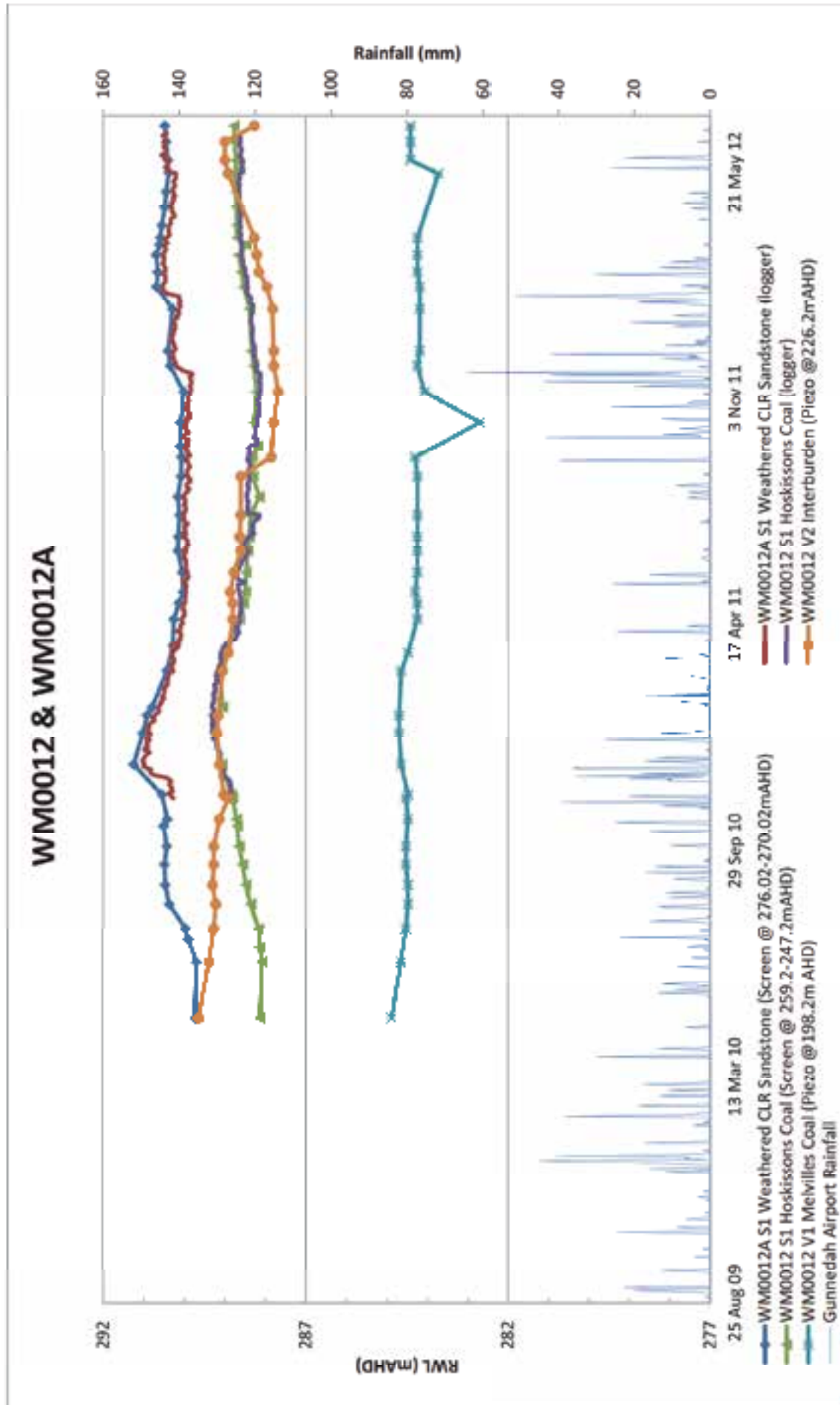
Appendix G

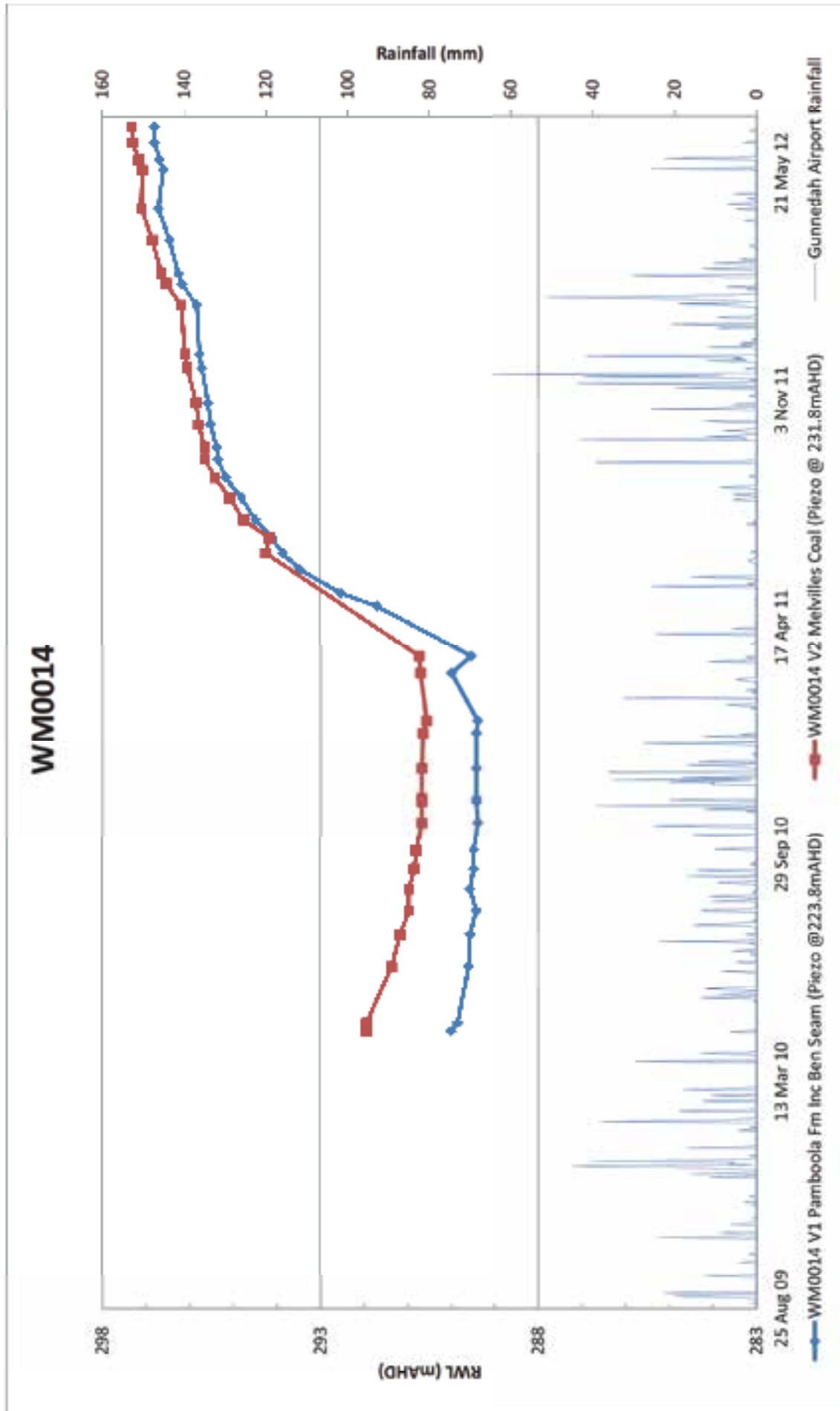
Watermark Bore Hydrographs

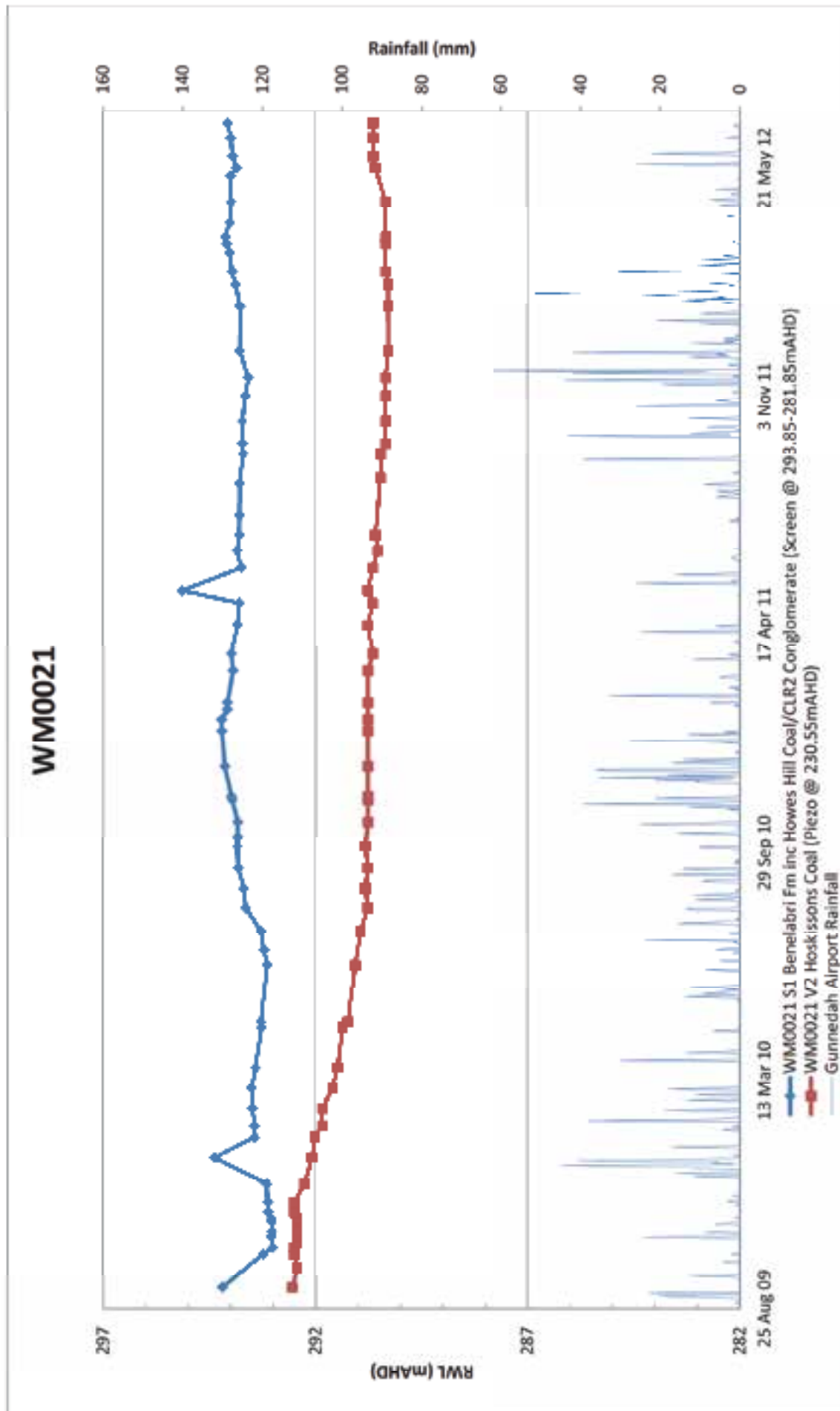


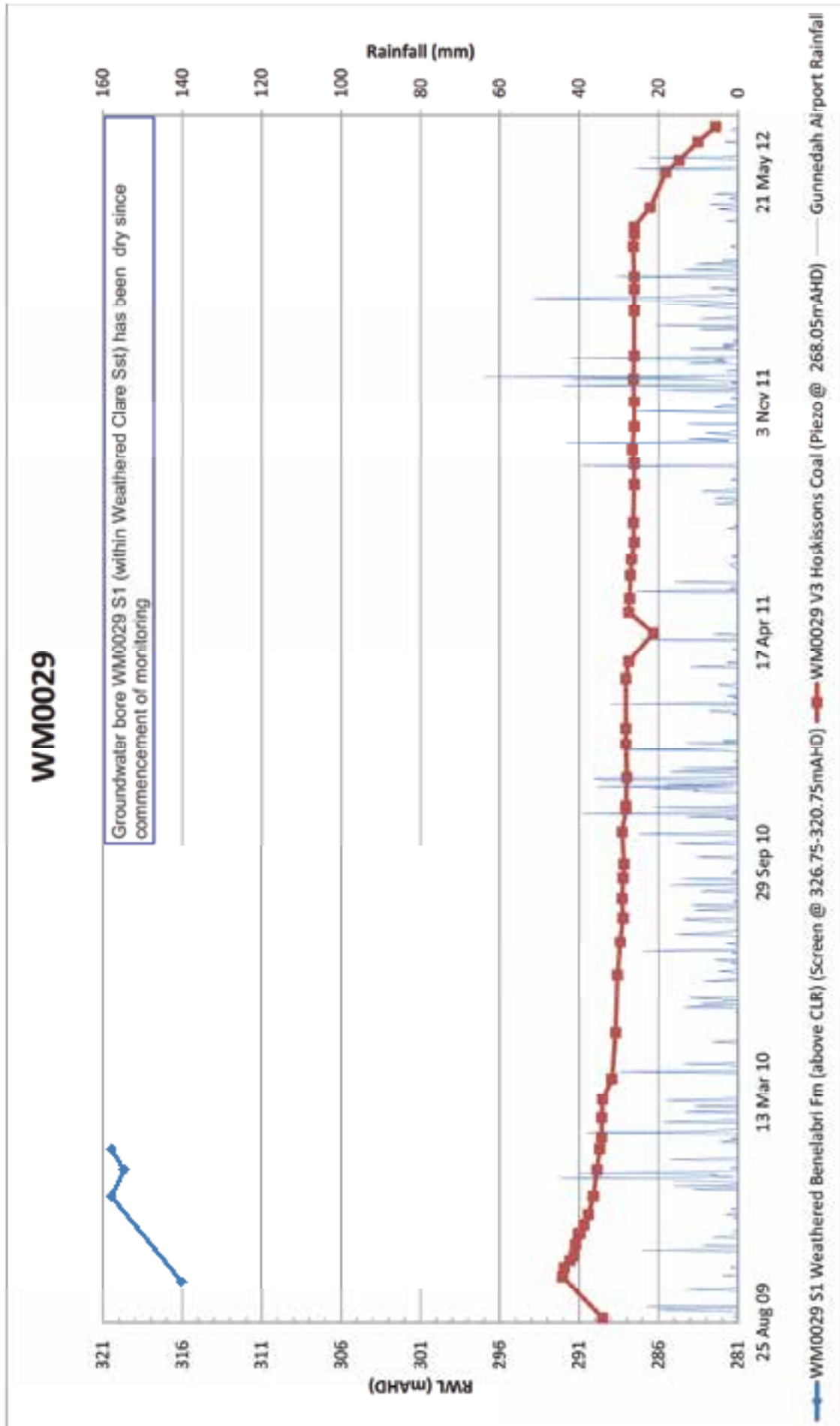


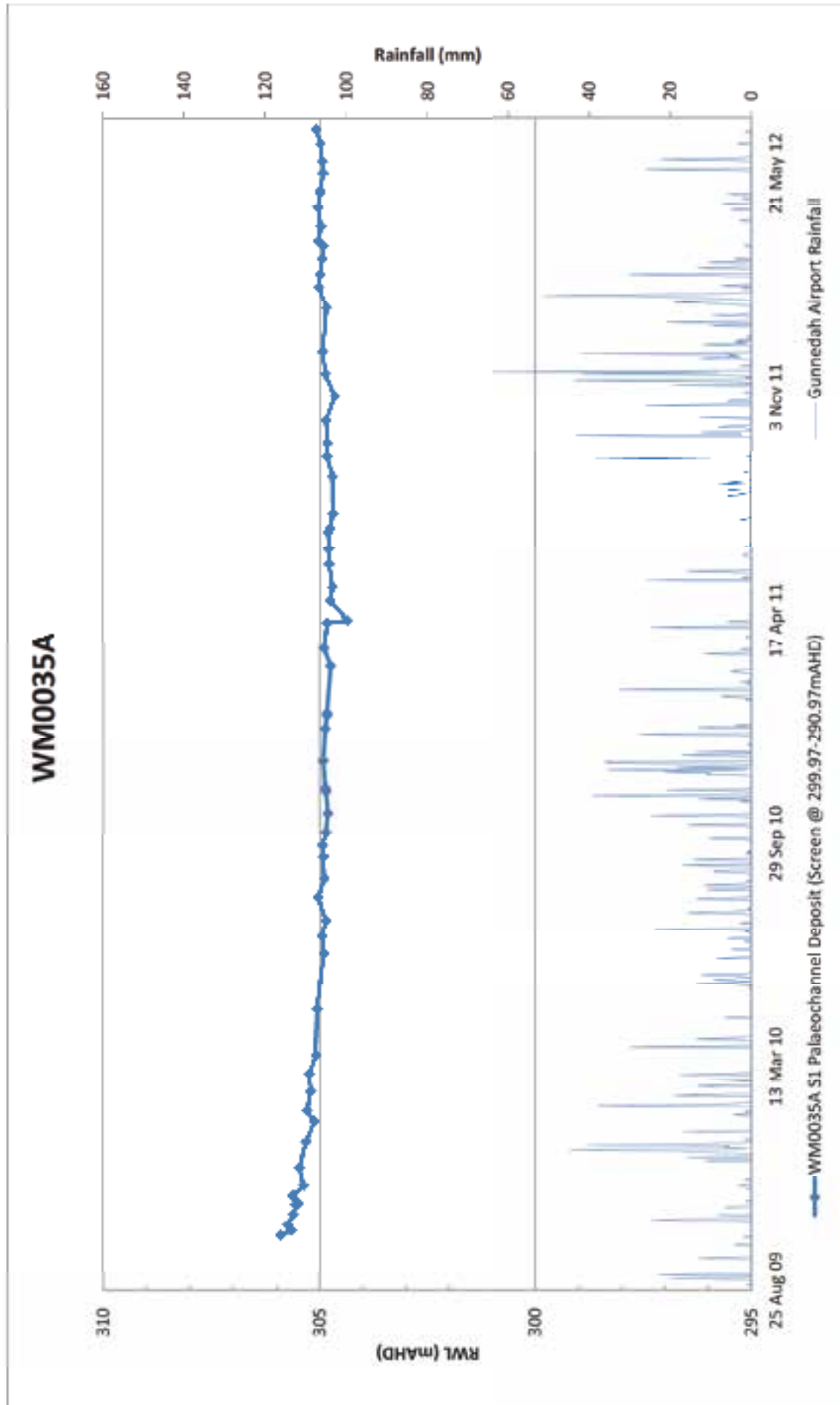


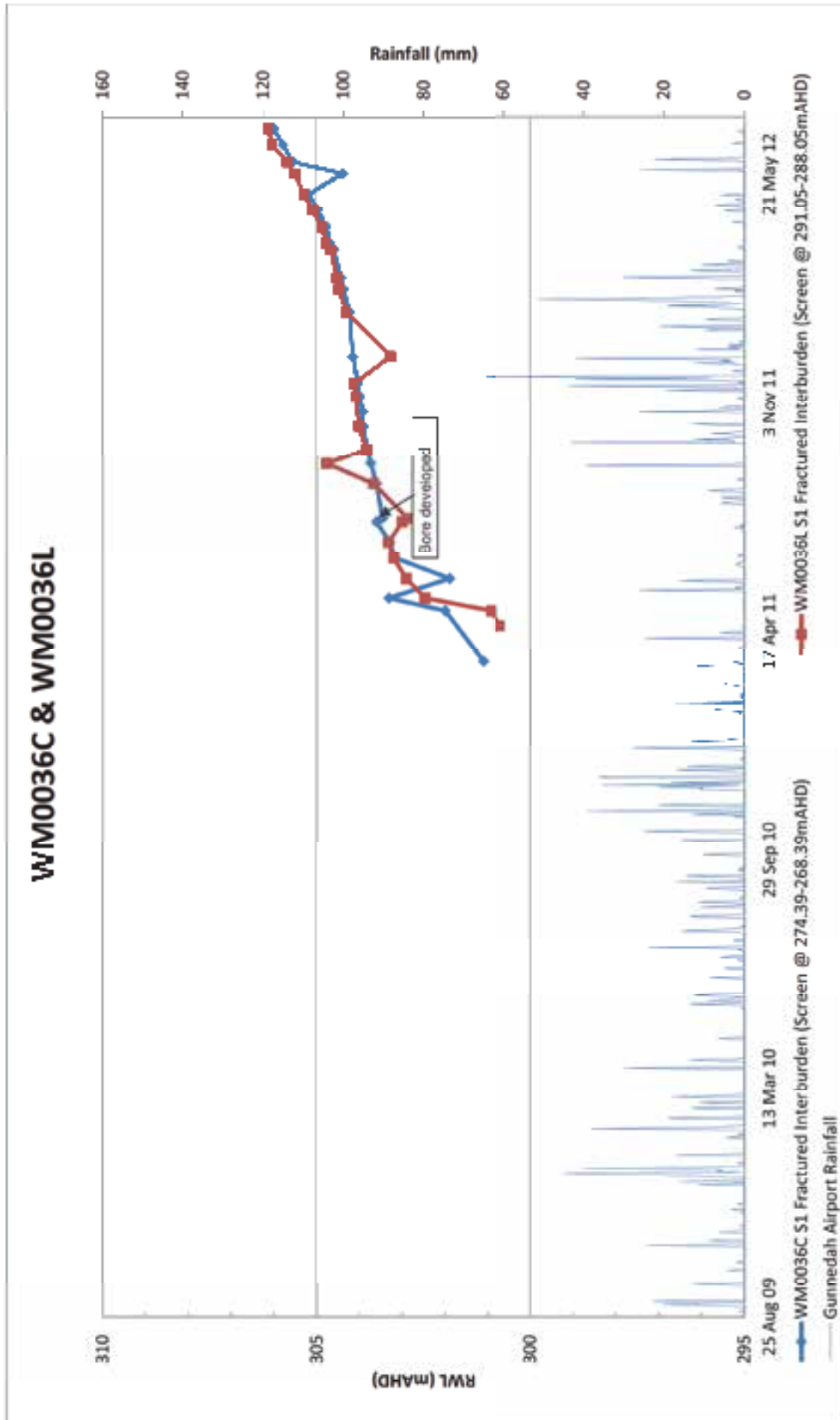


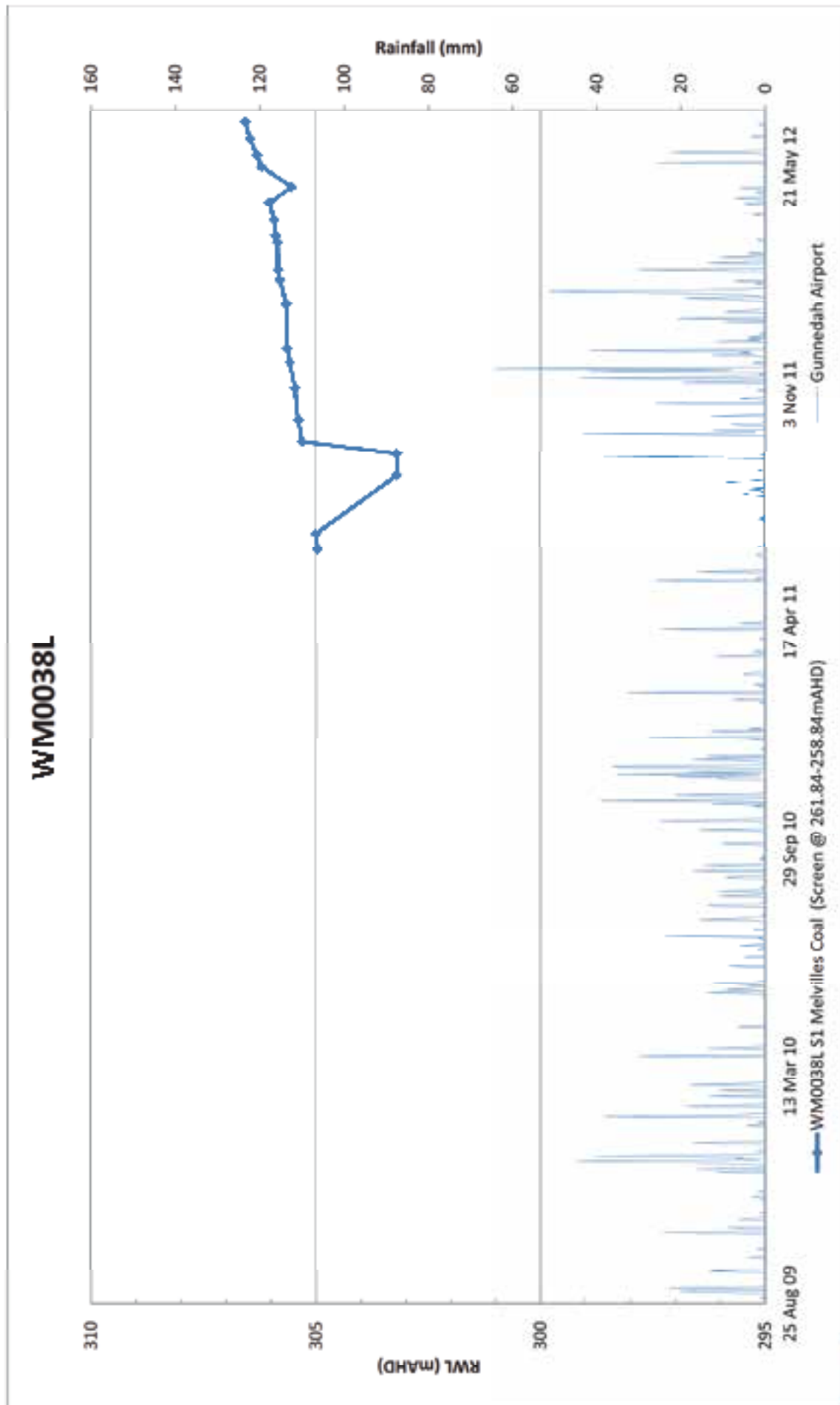


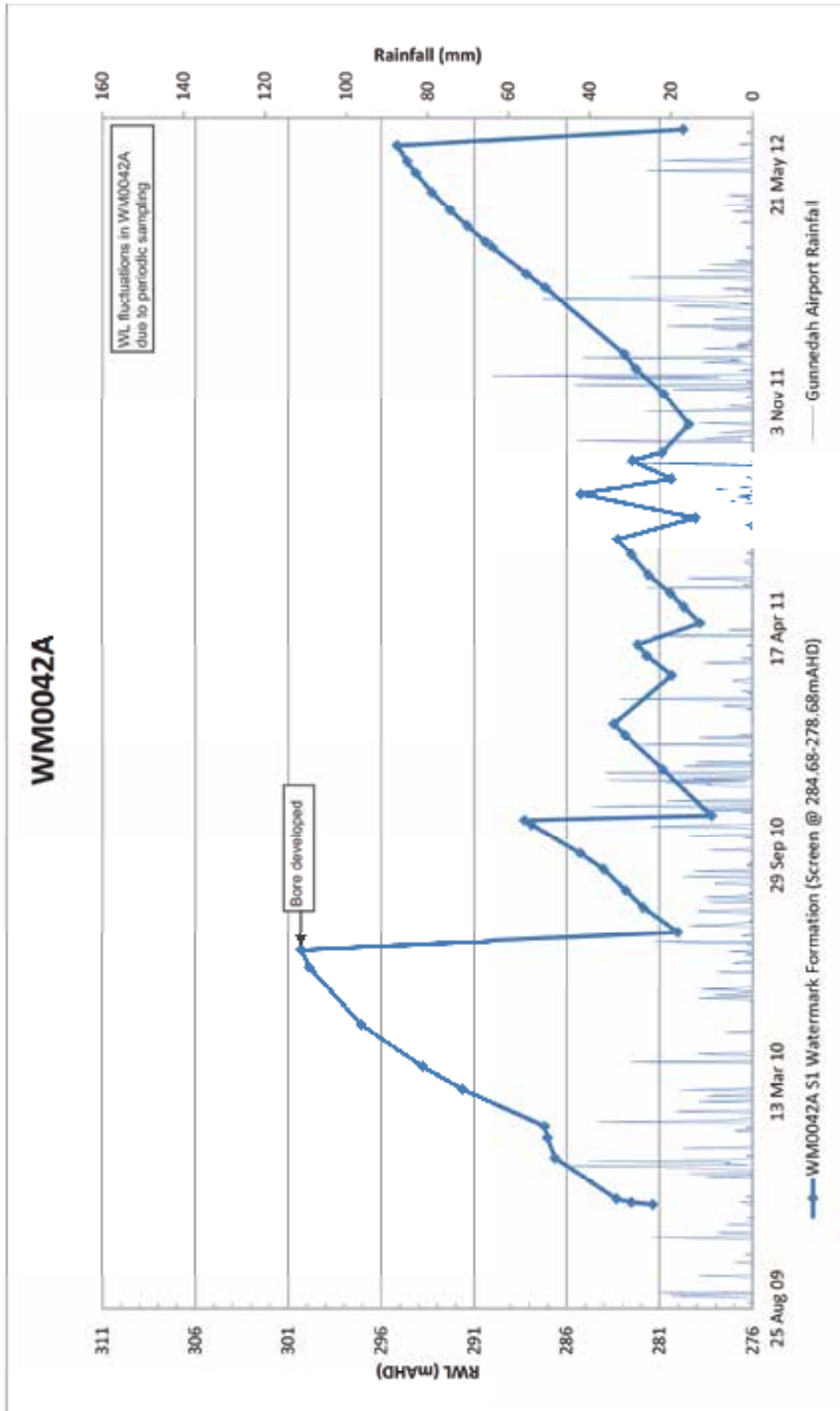


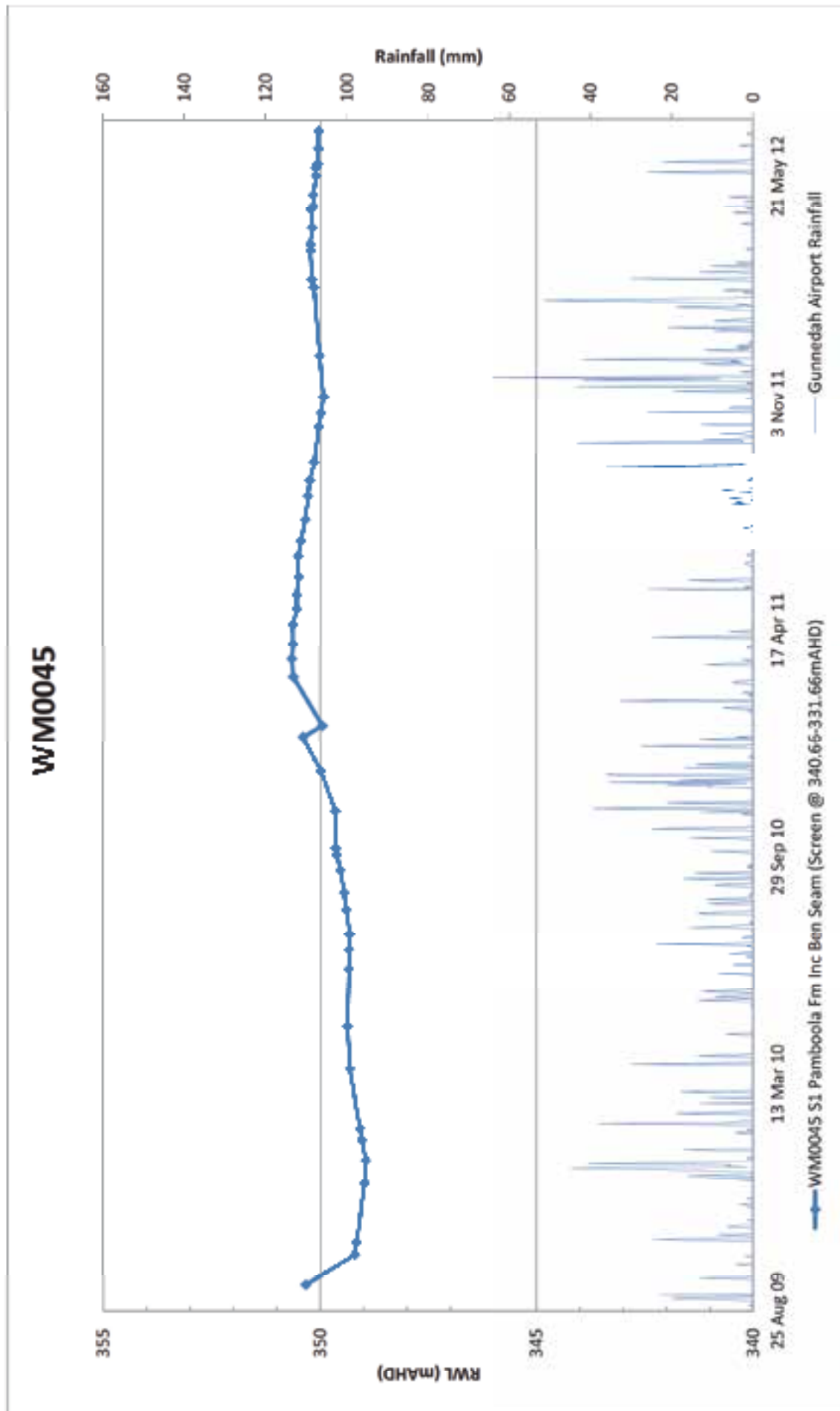


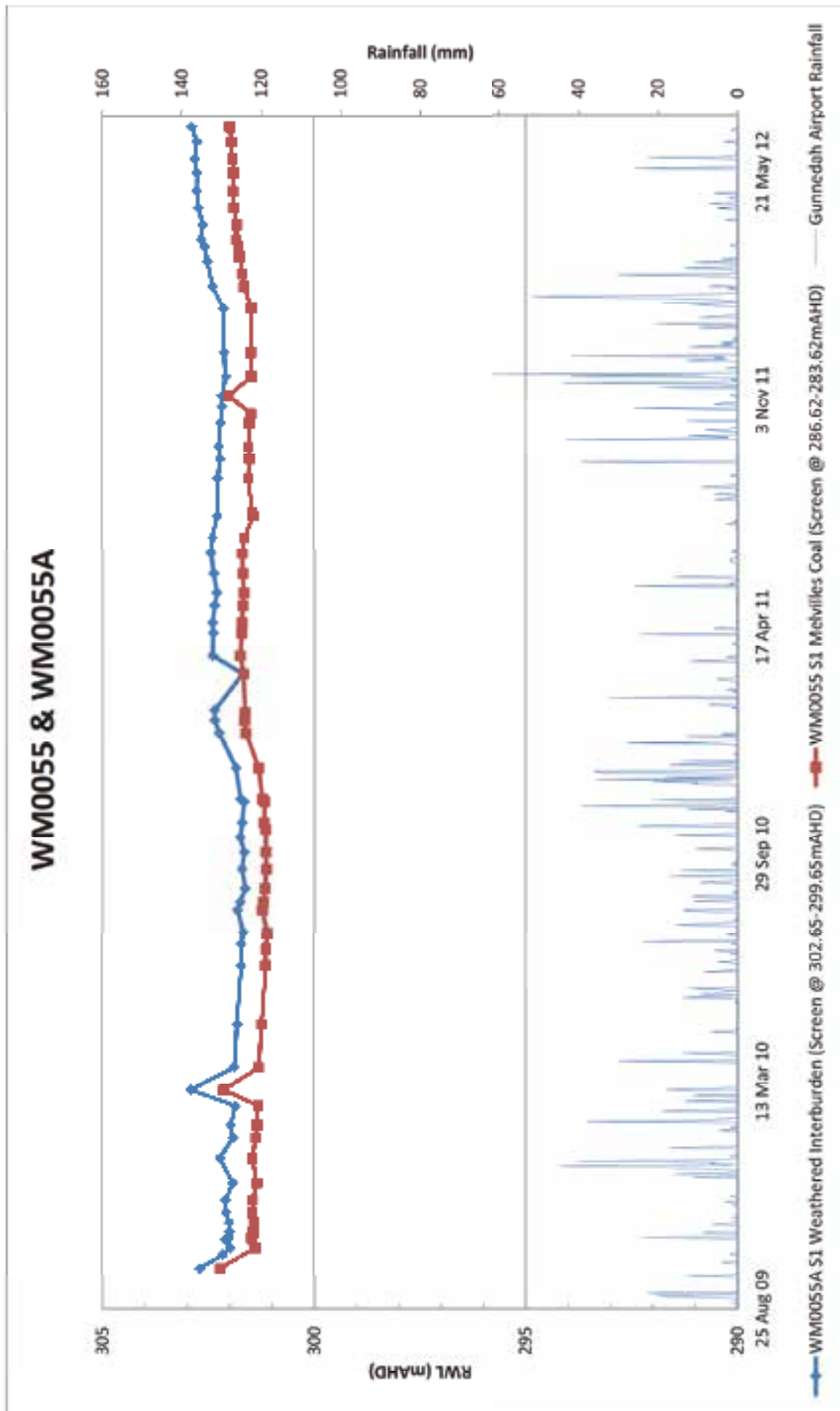


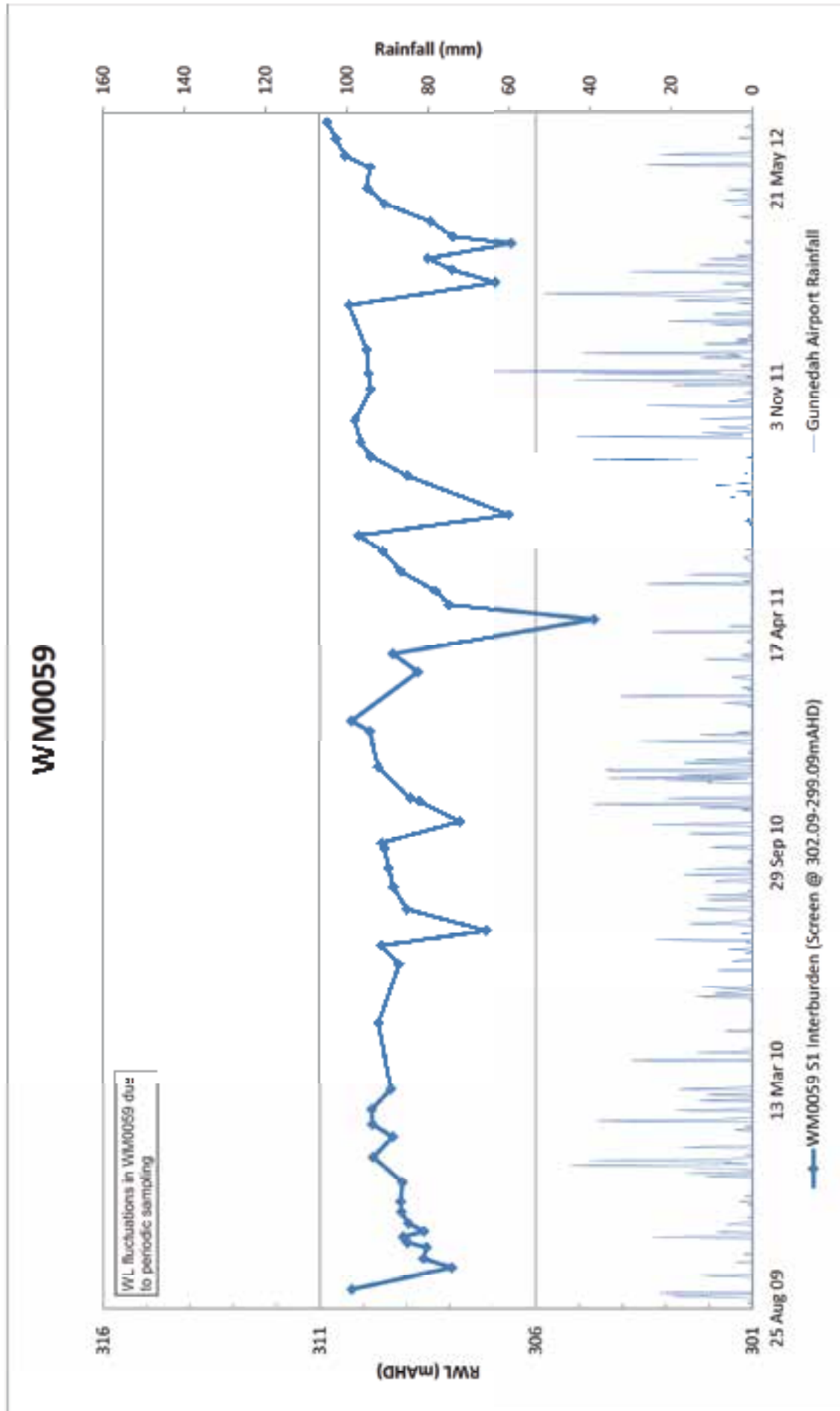


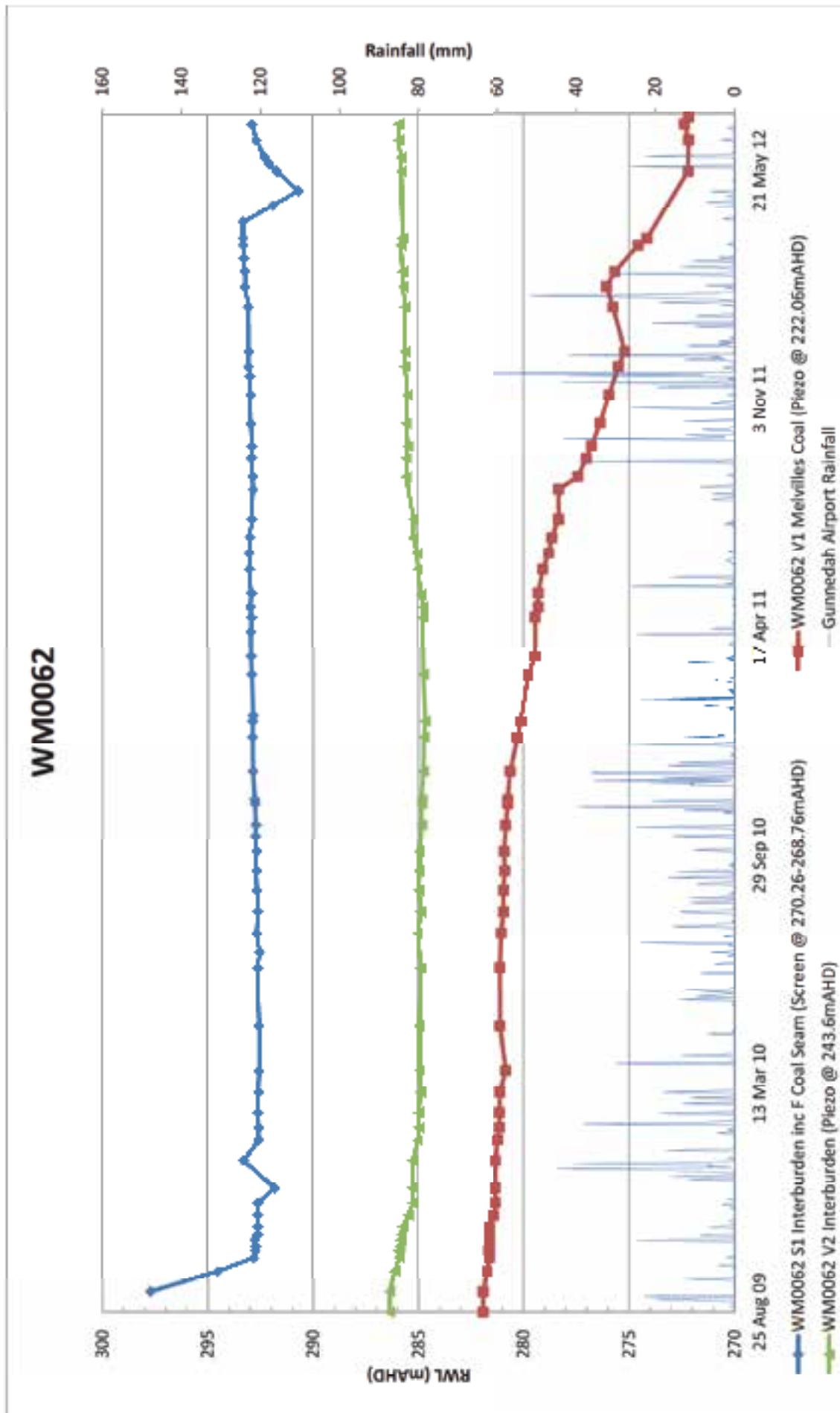


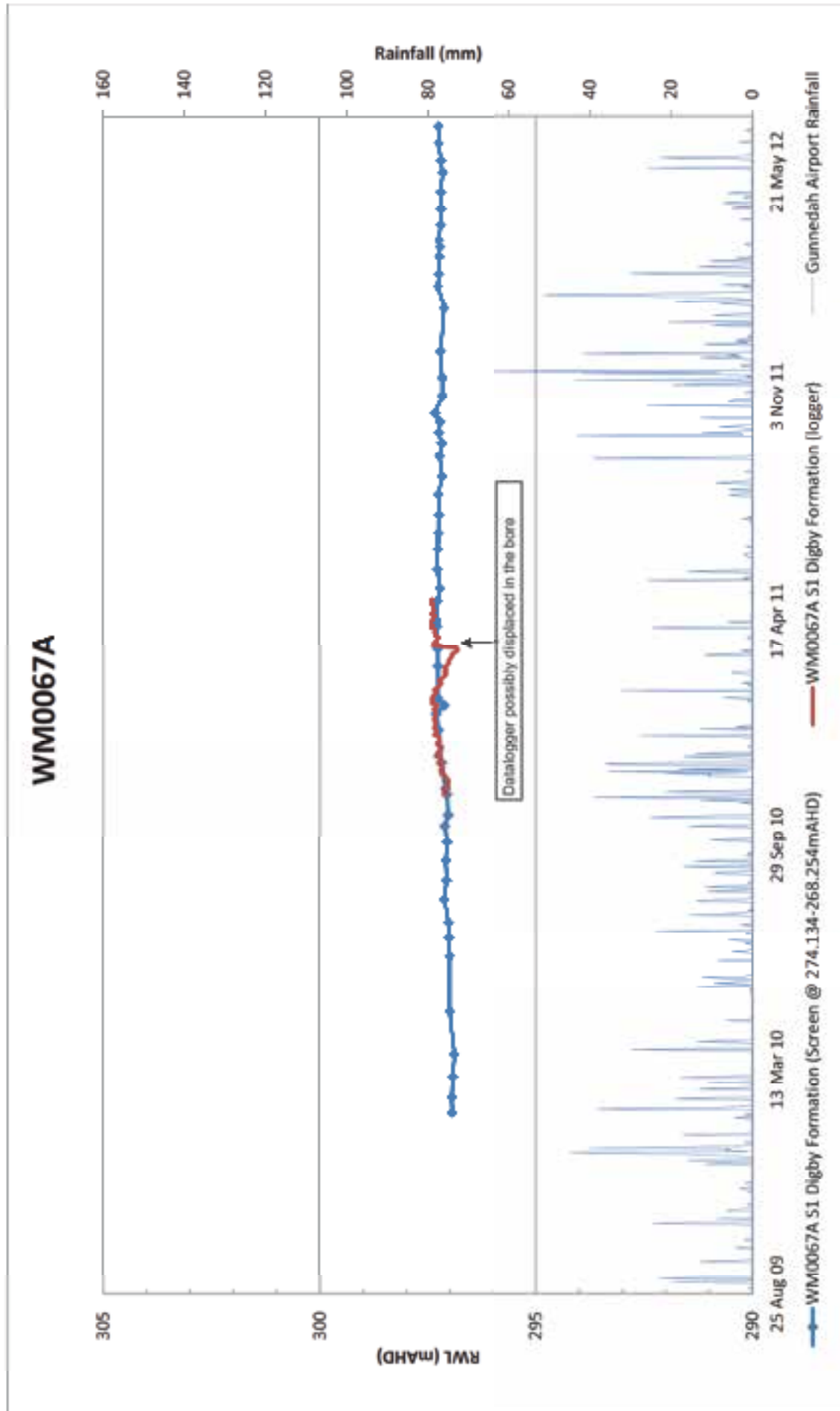


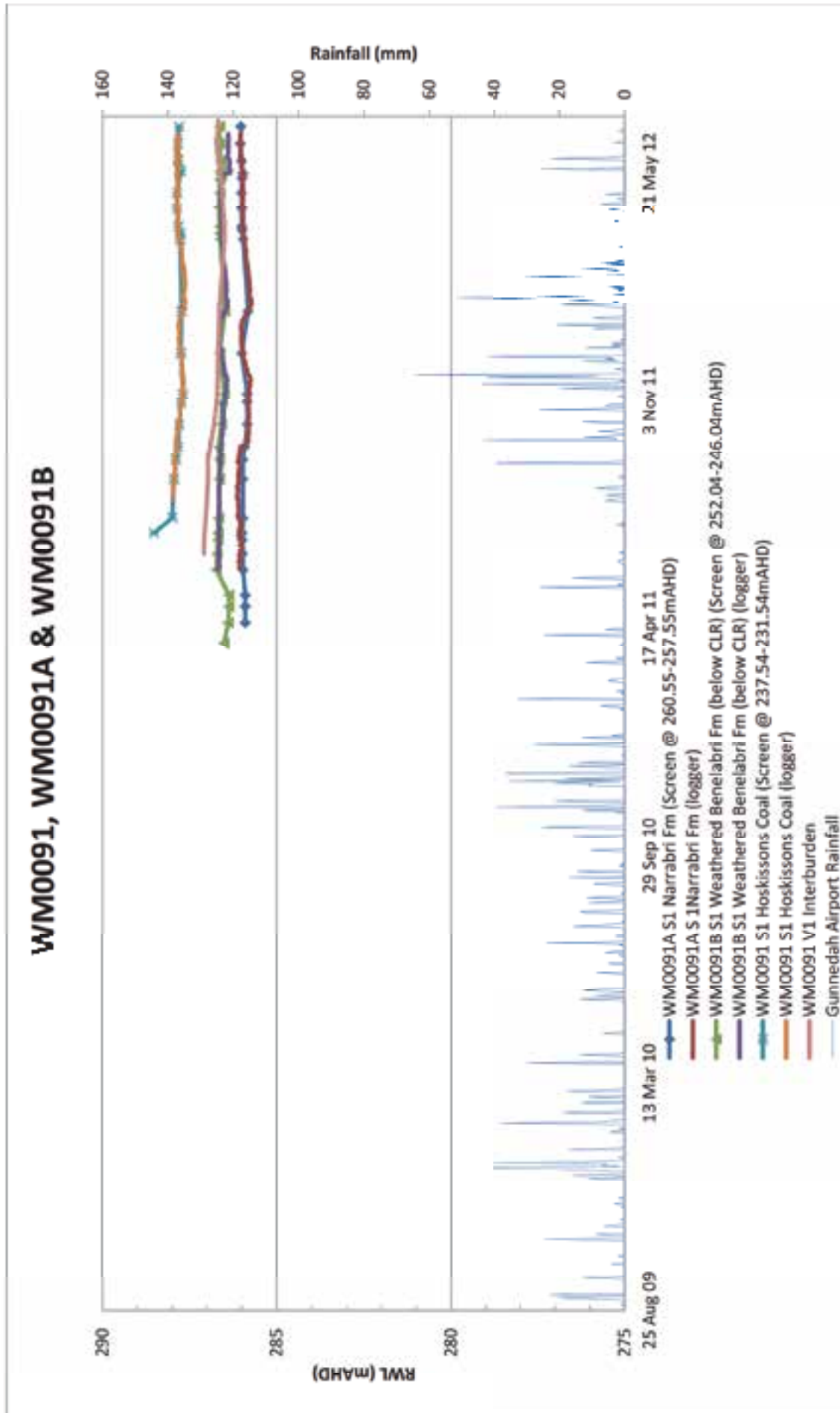


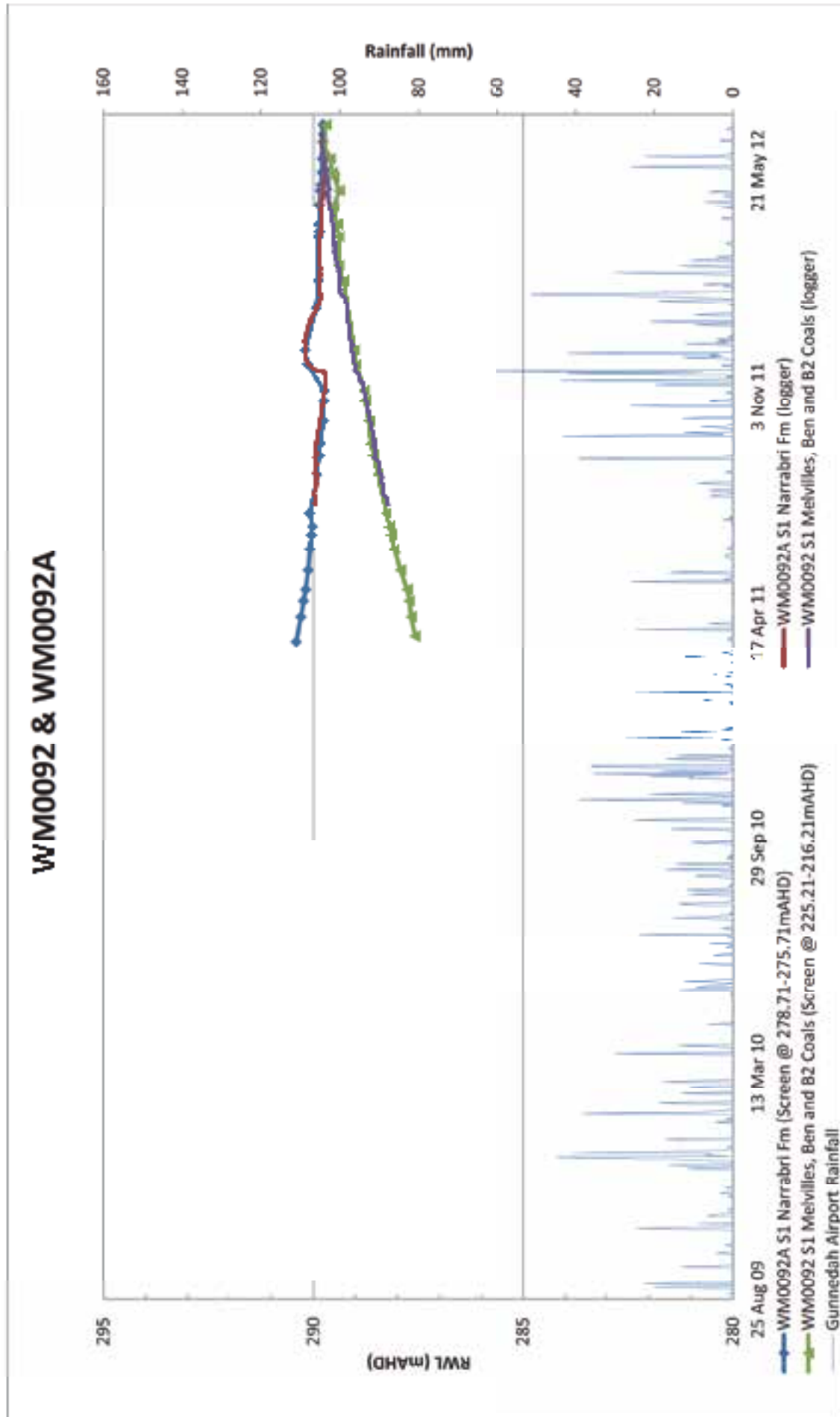




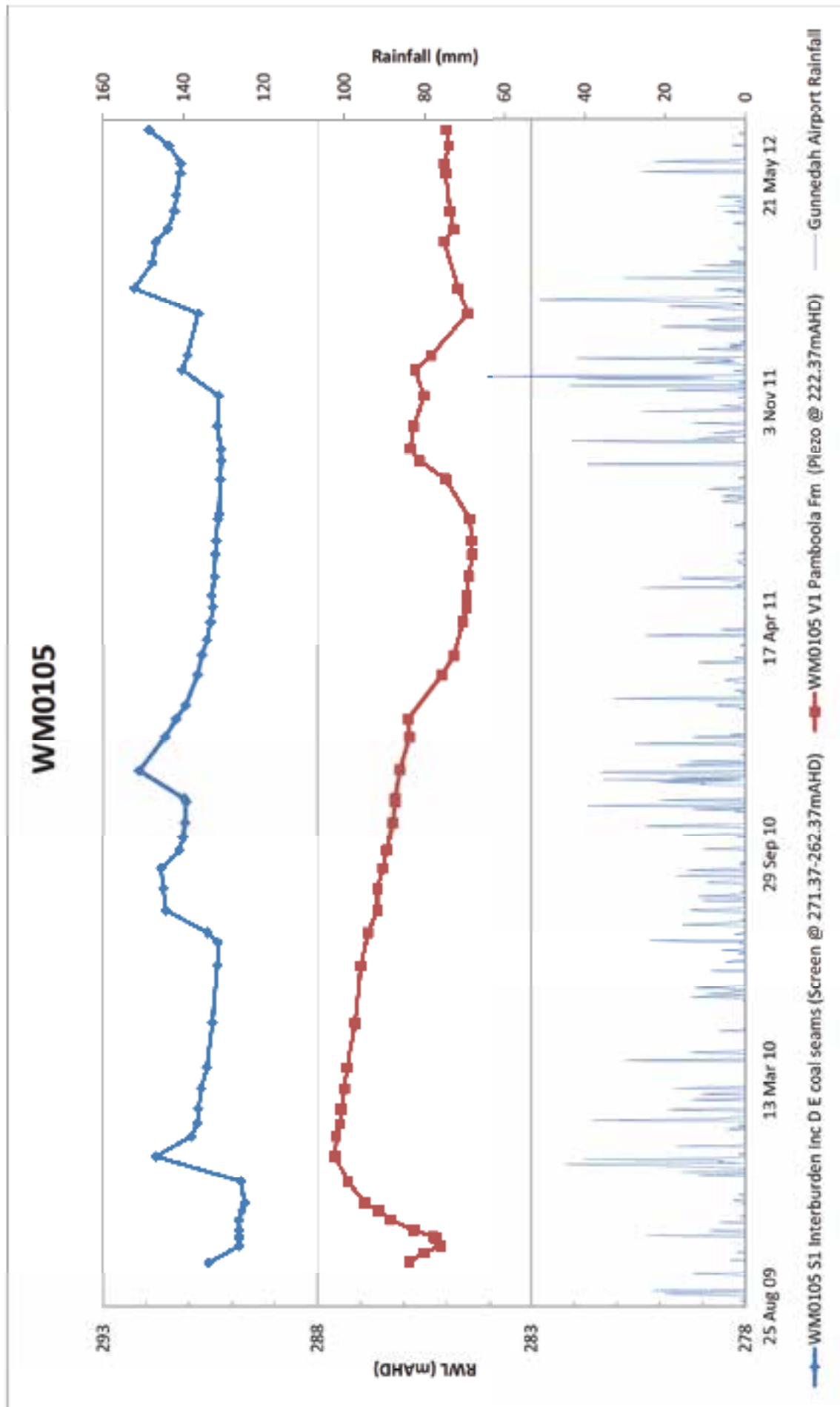


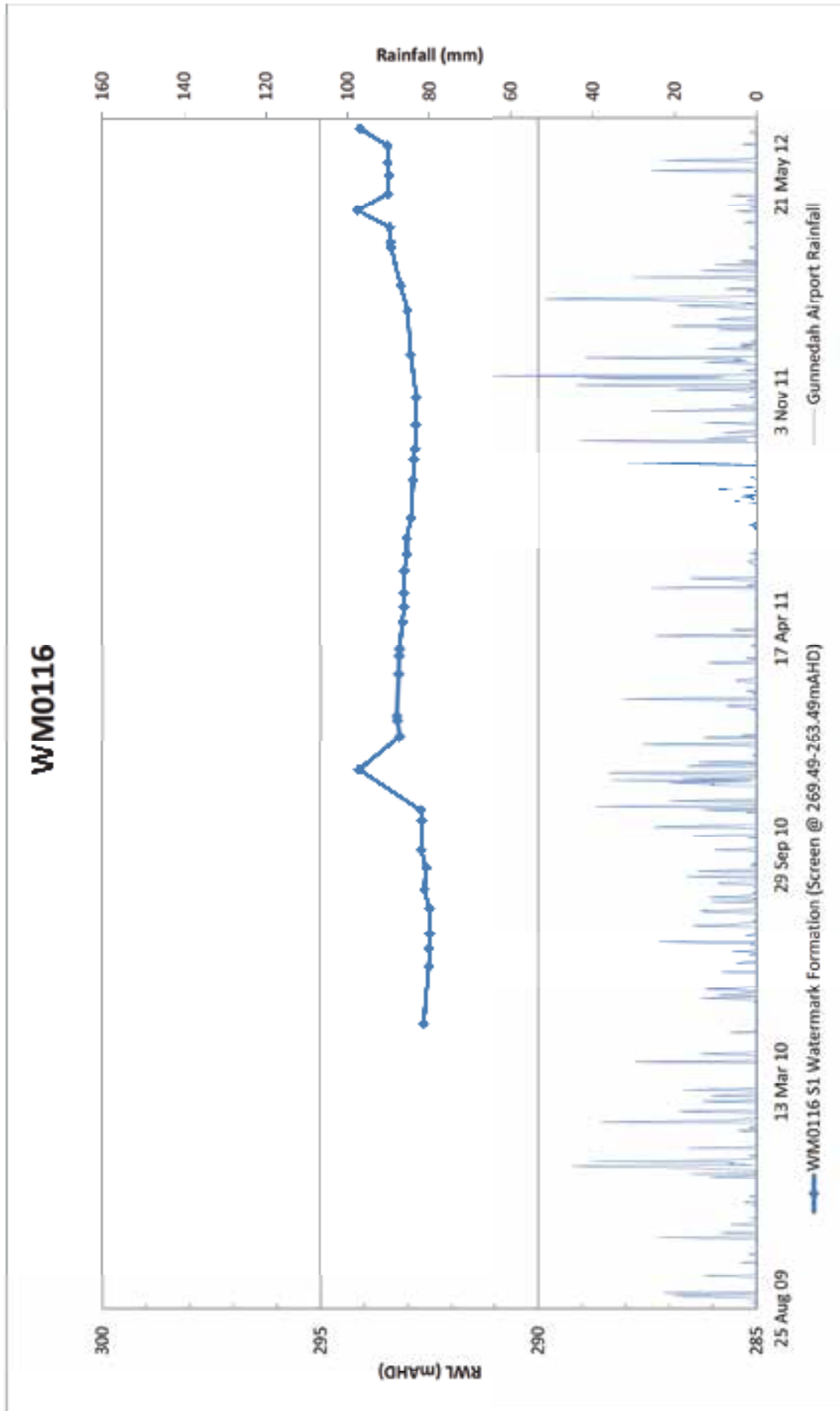


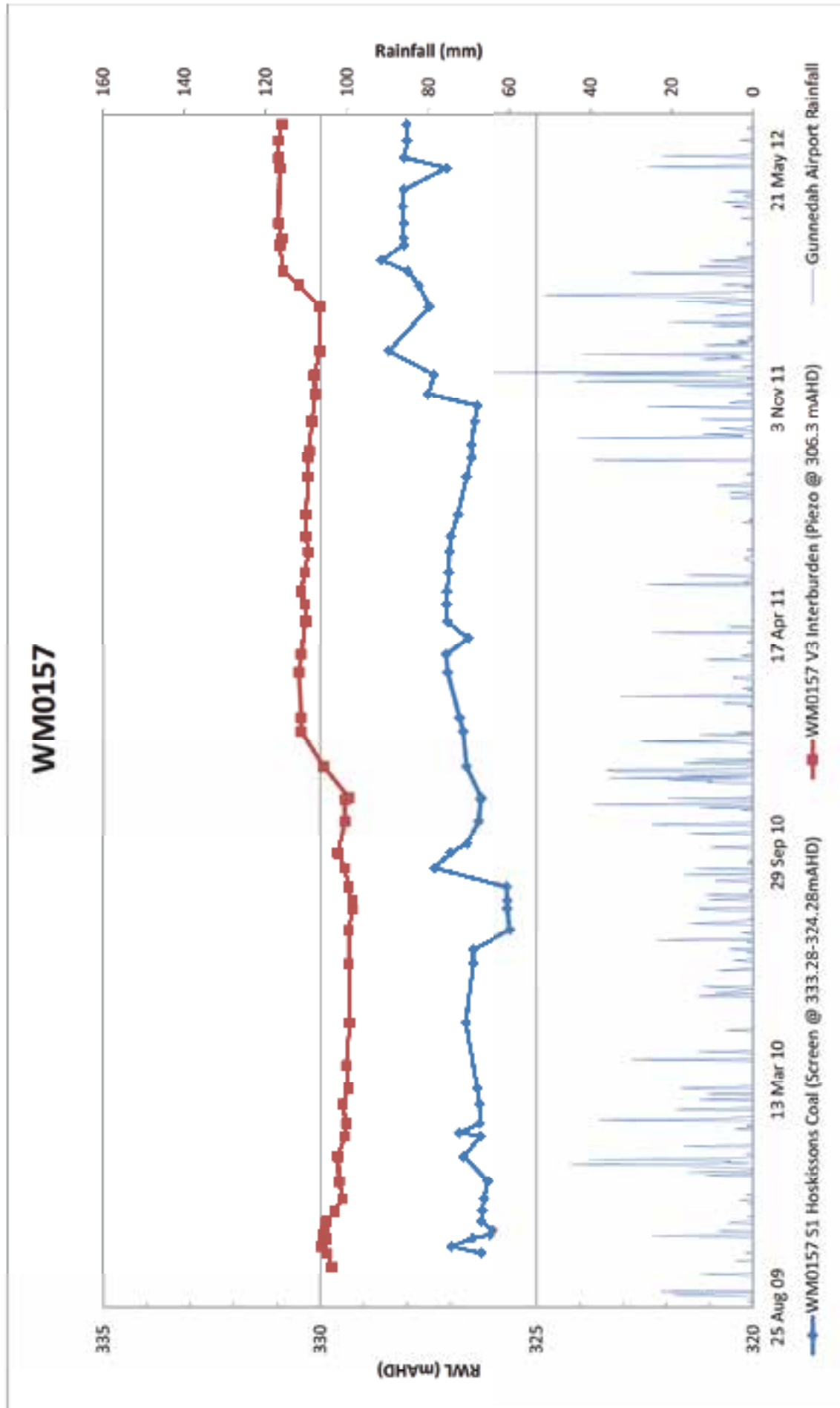


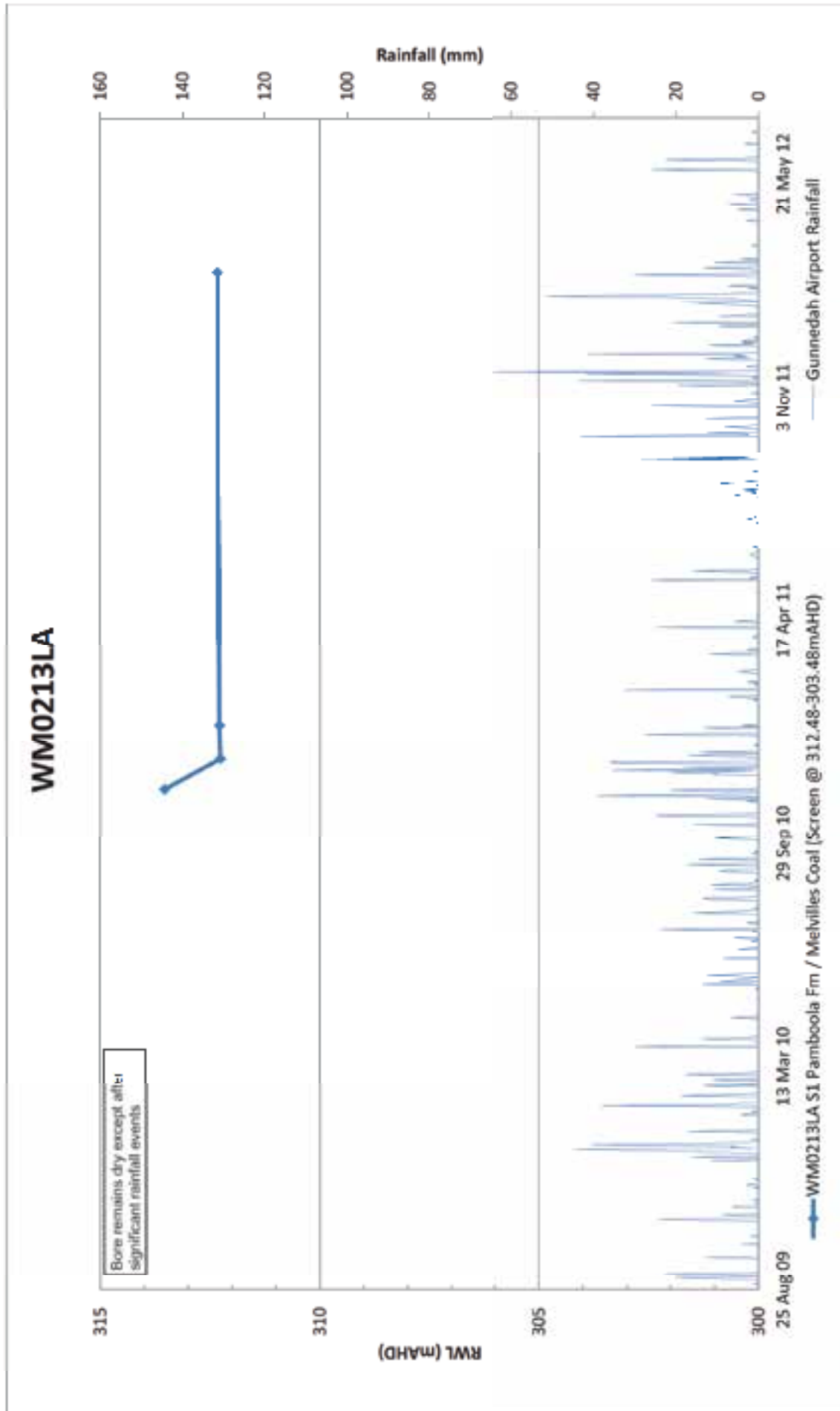


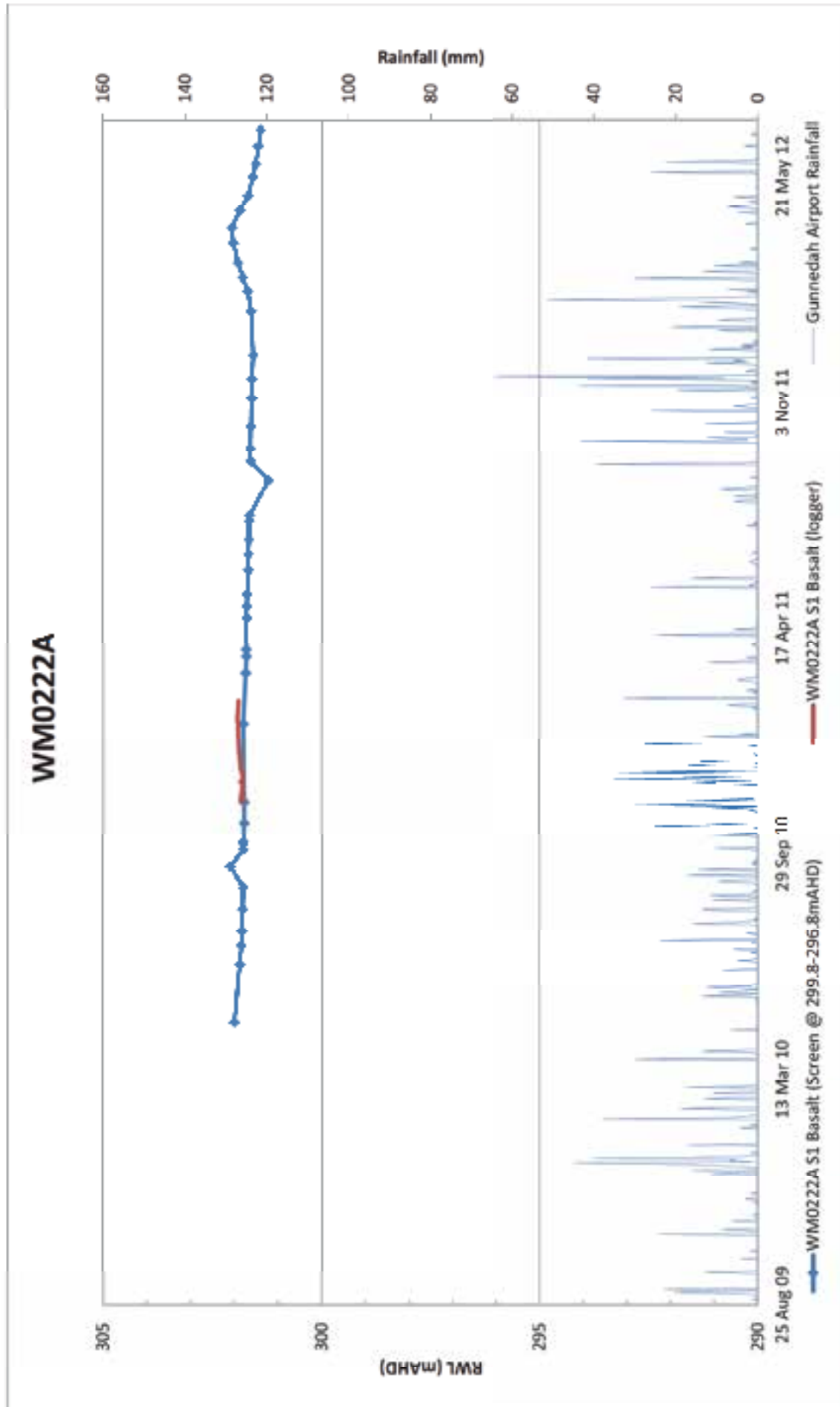


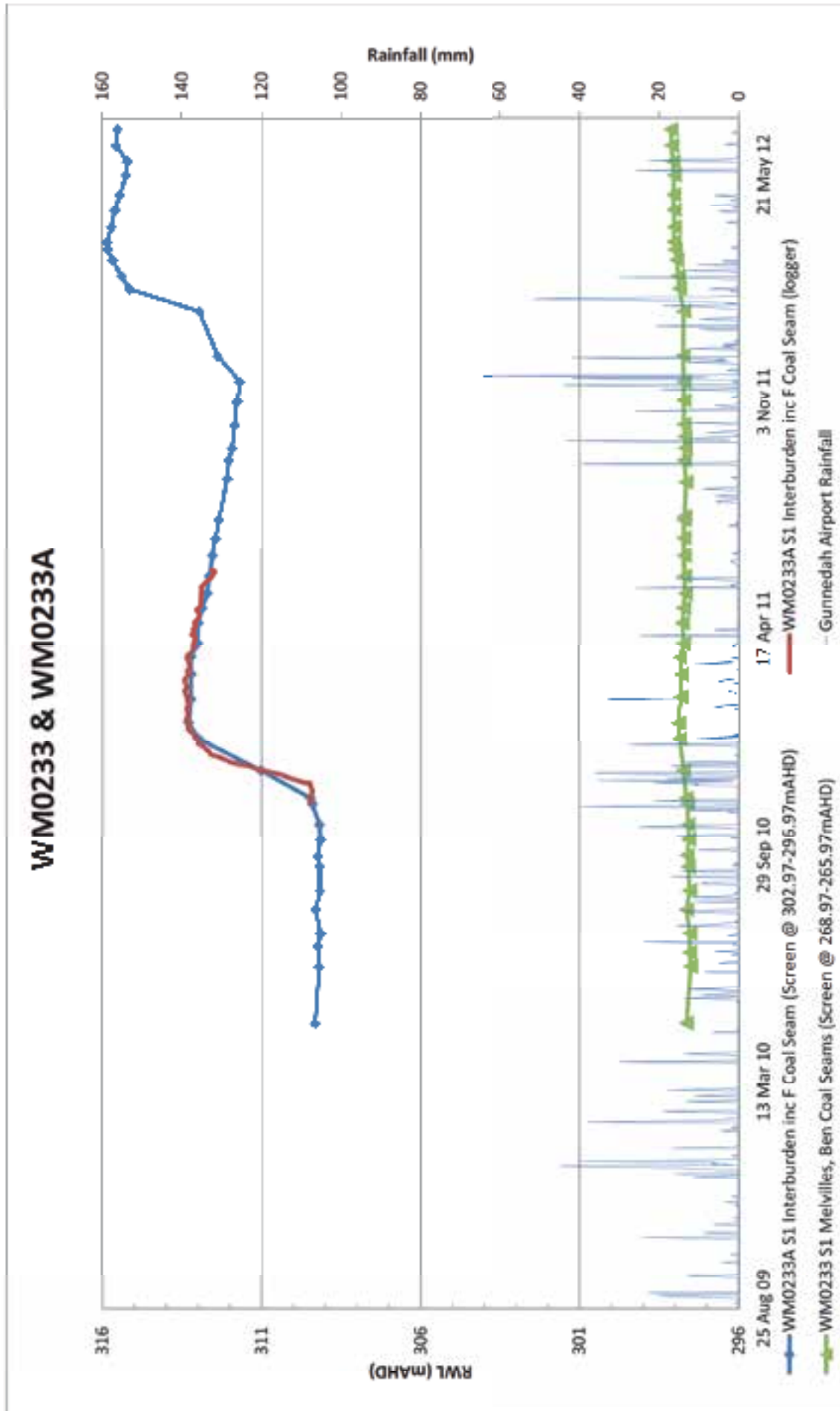


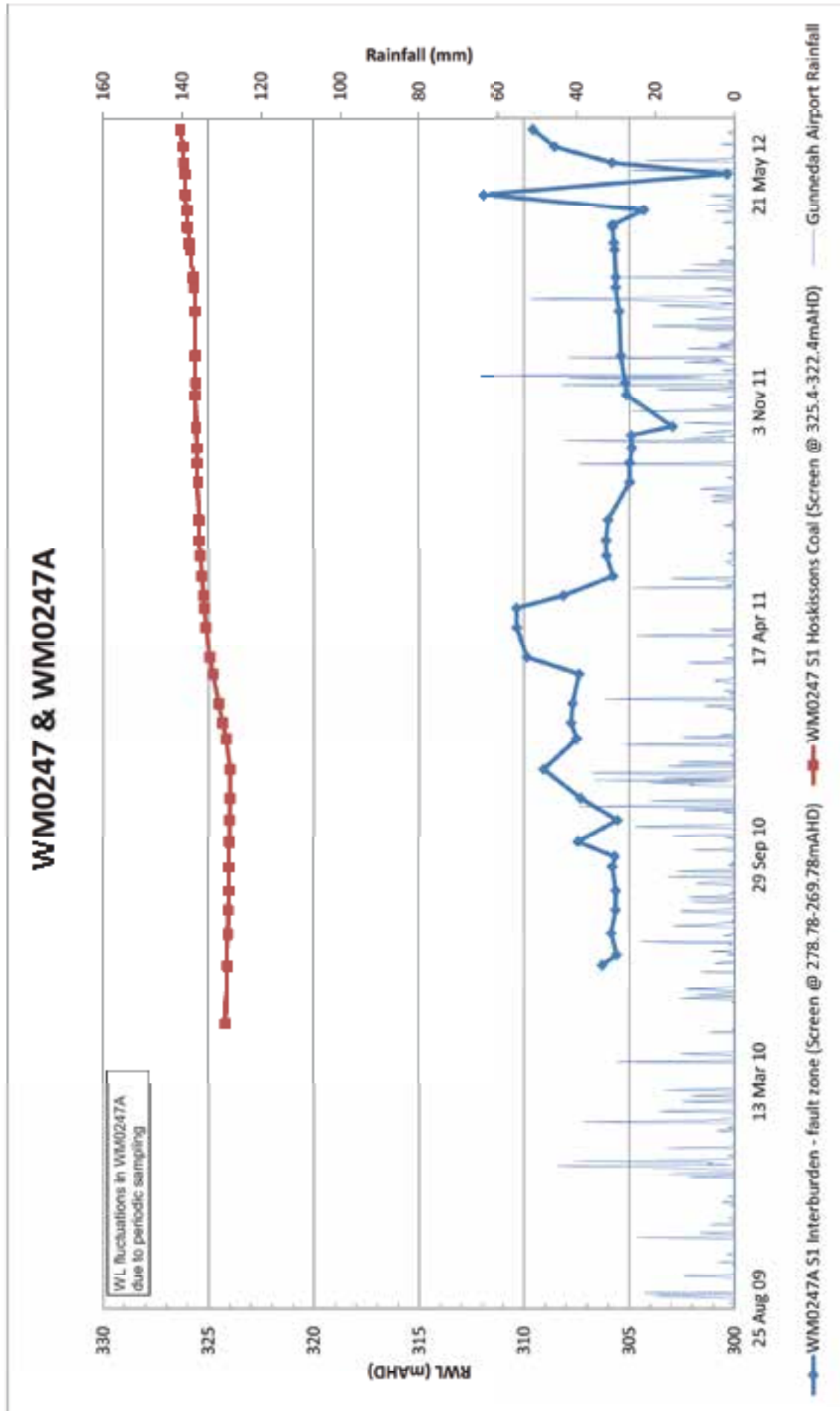


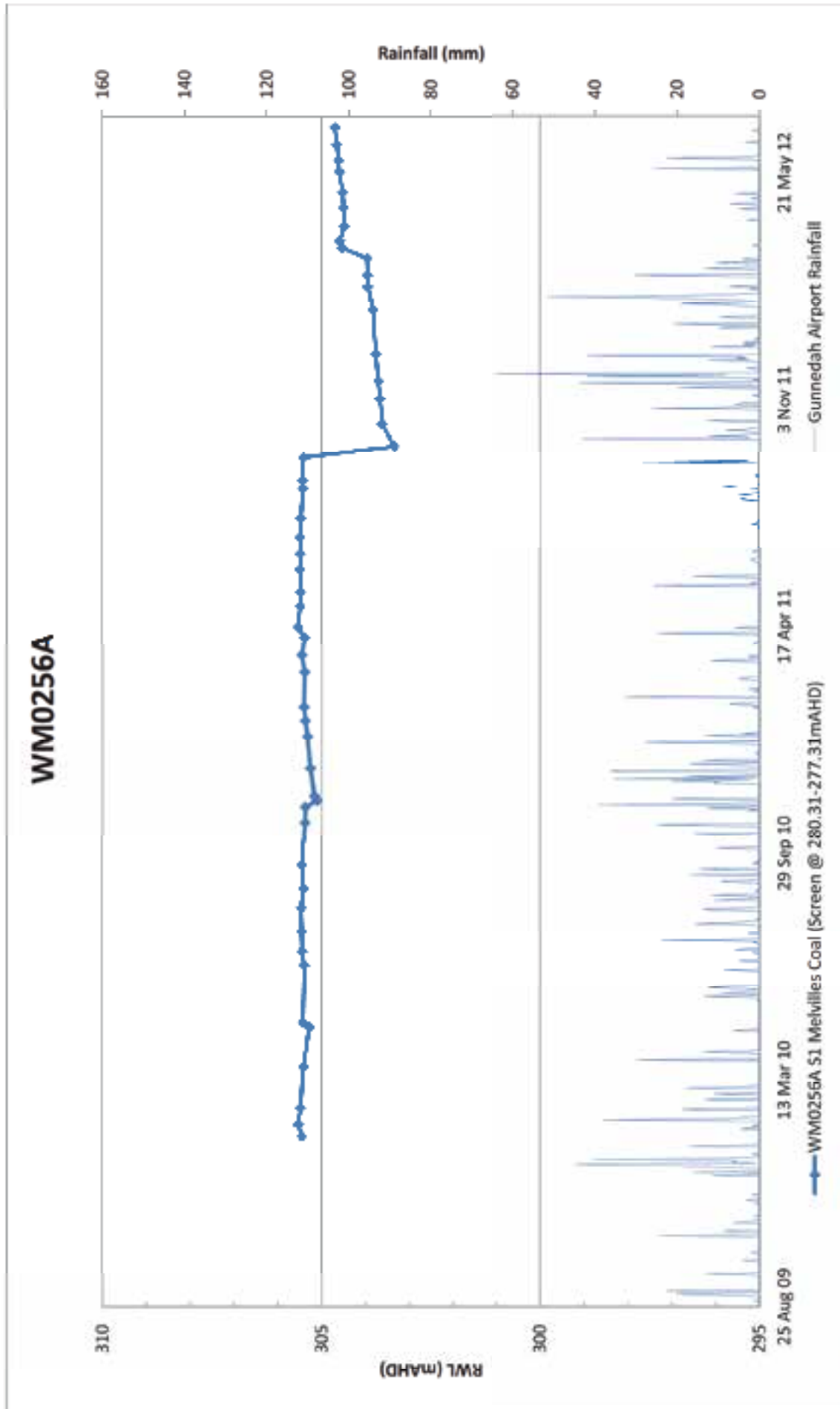


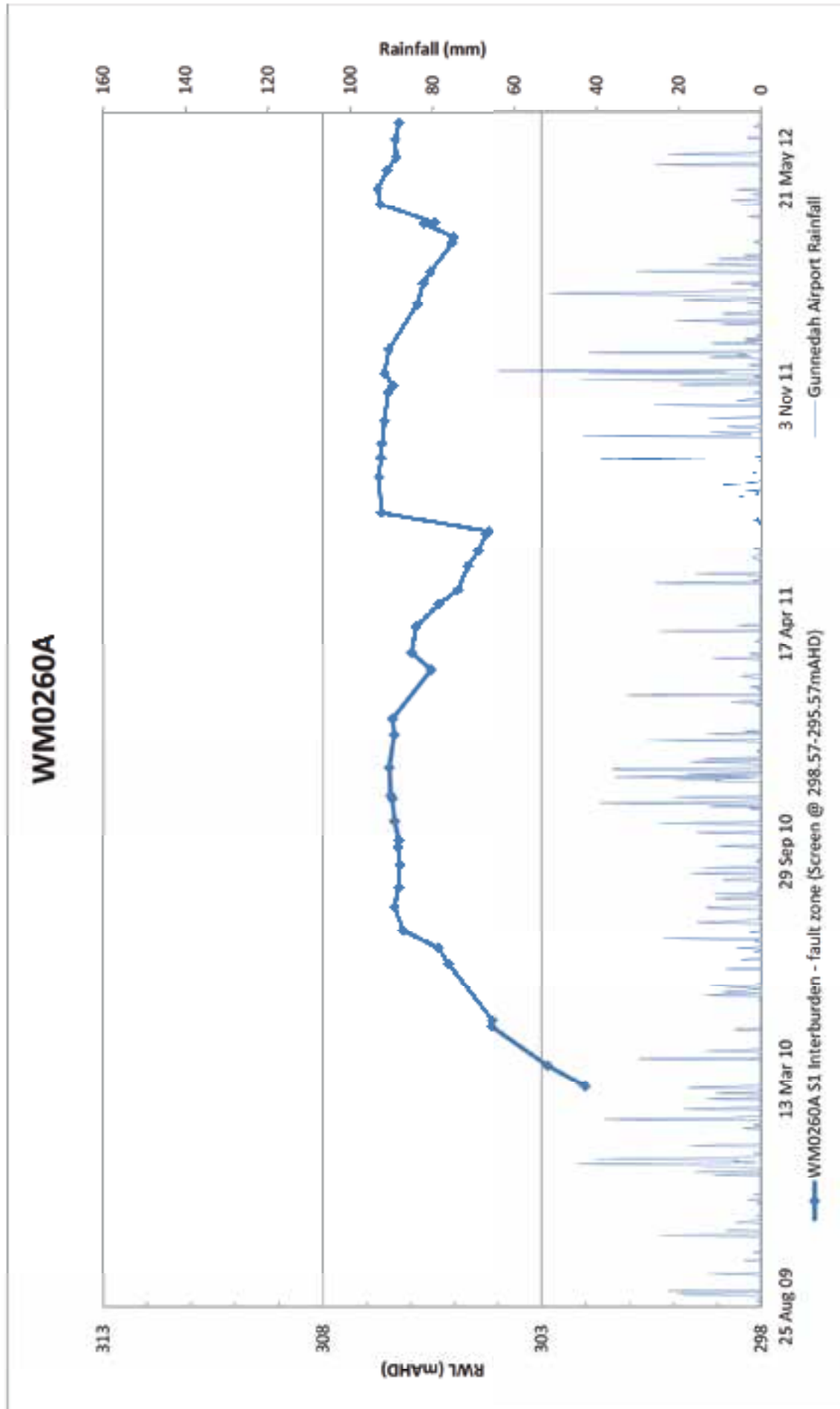


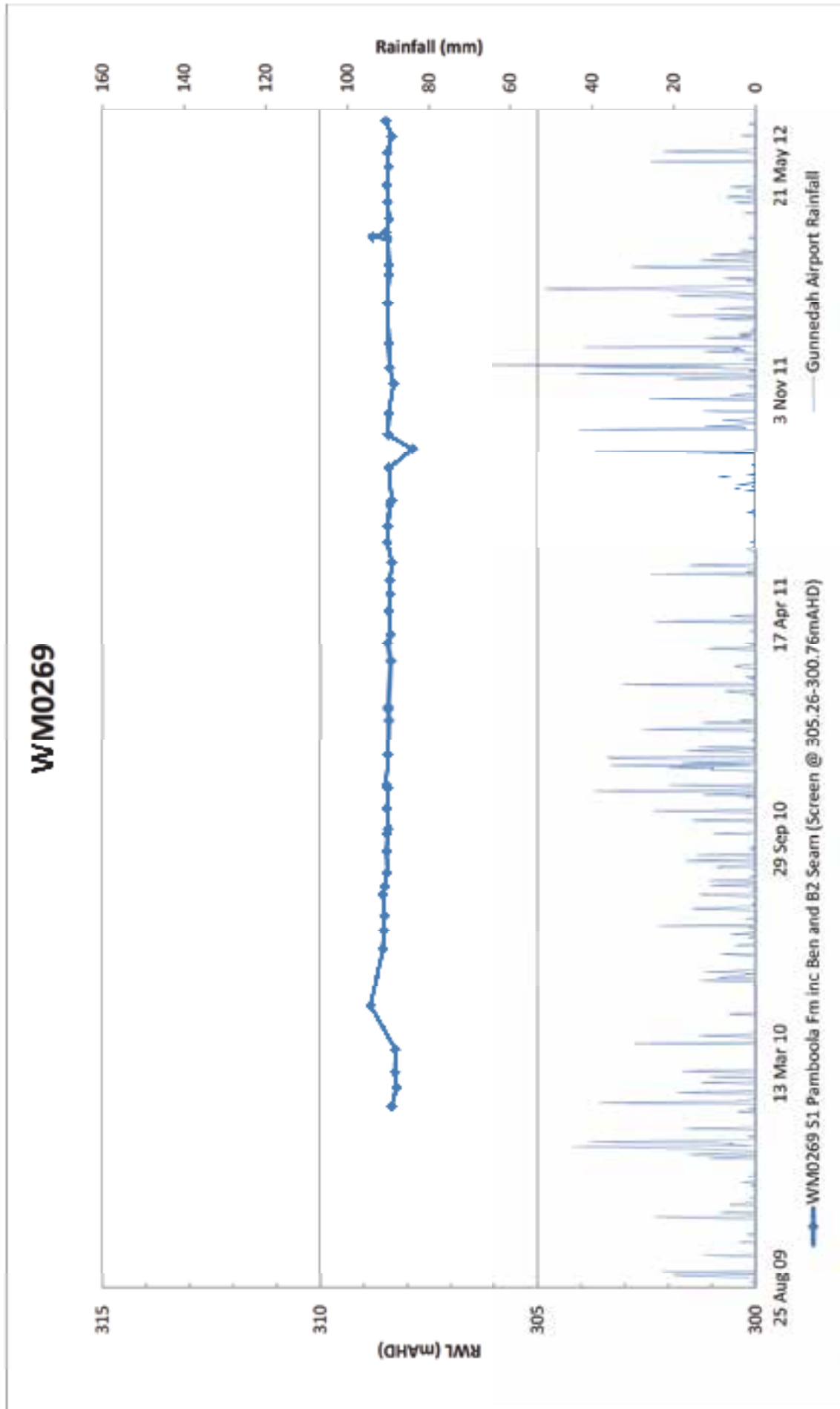


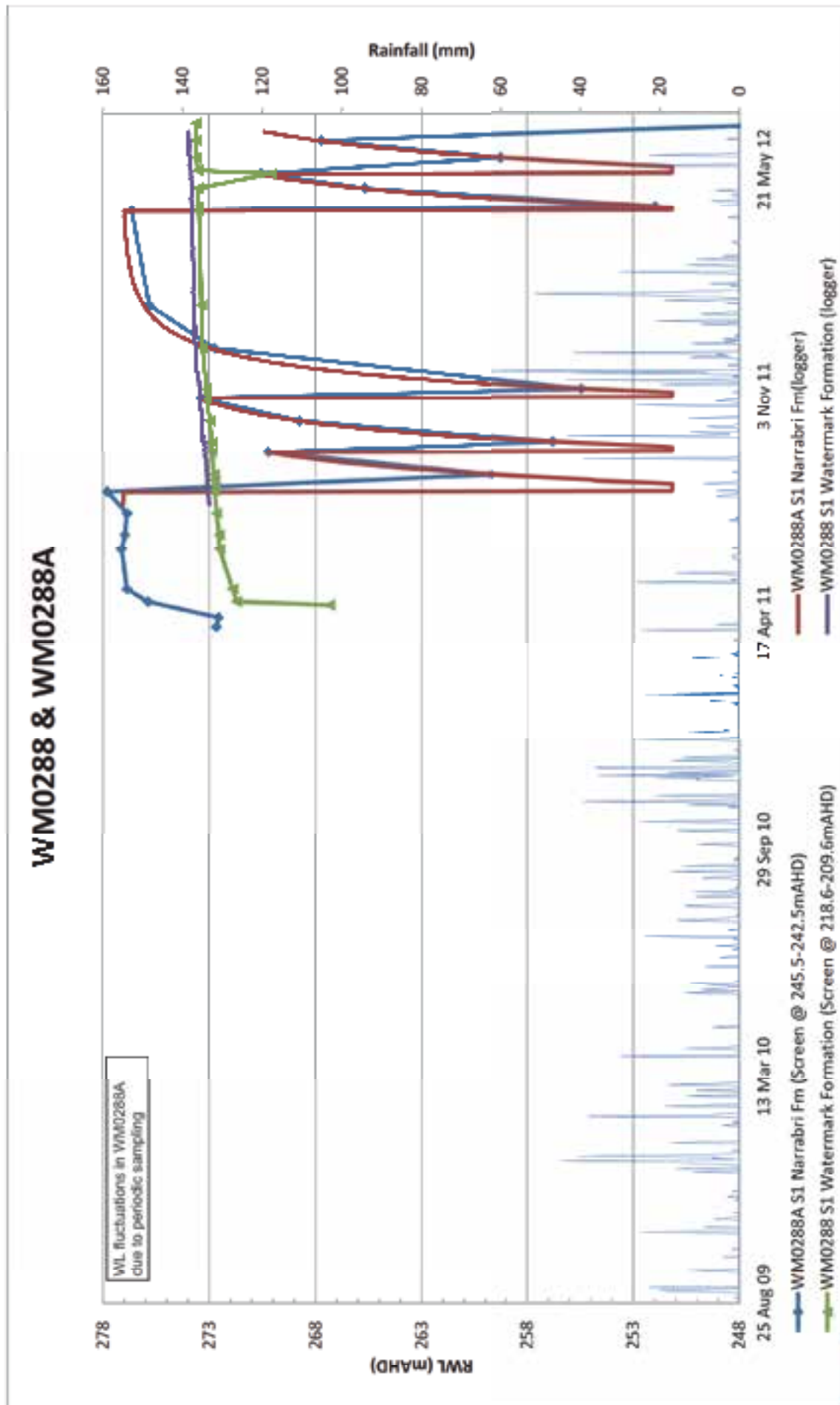


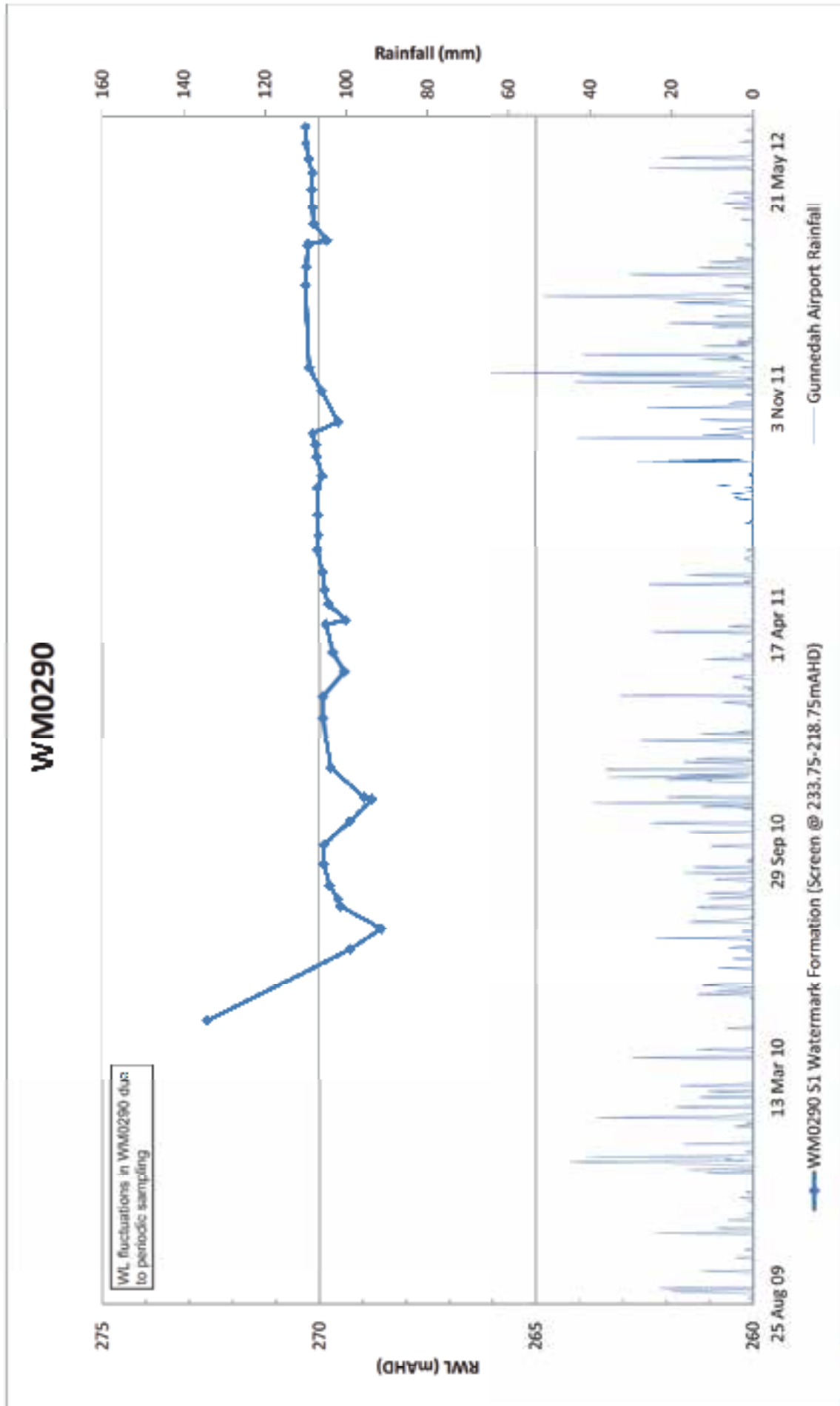


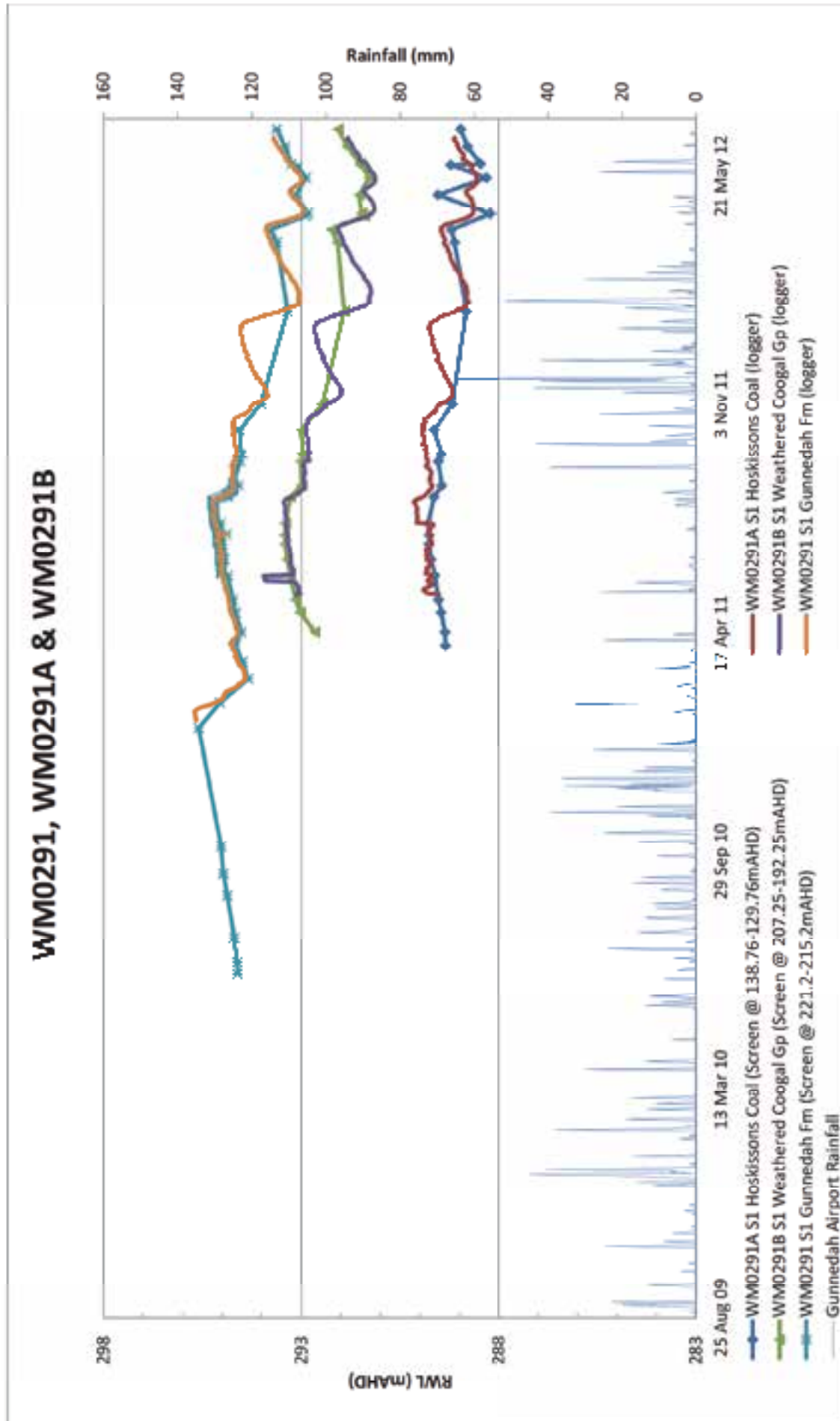


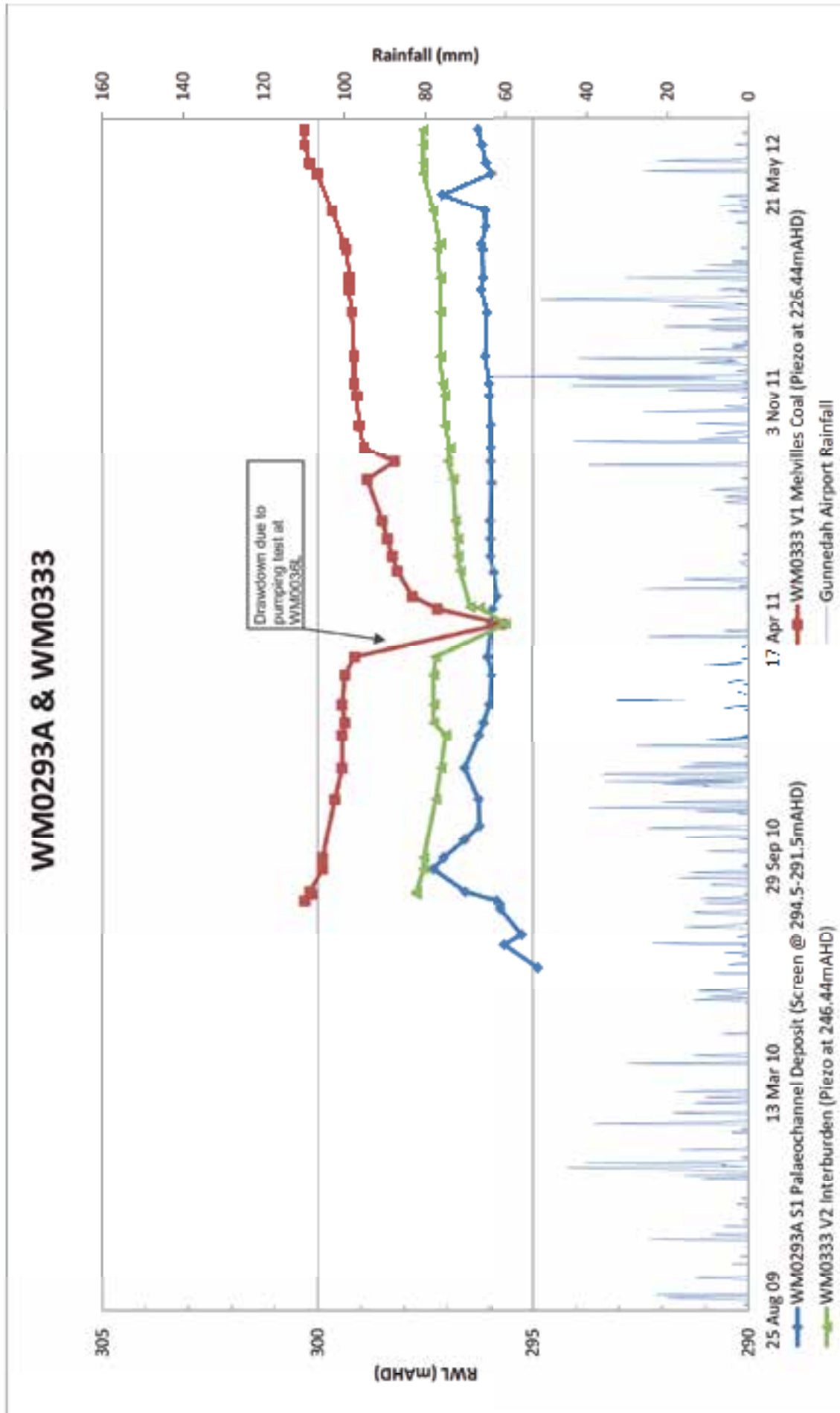


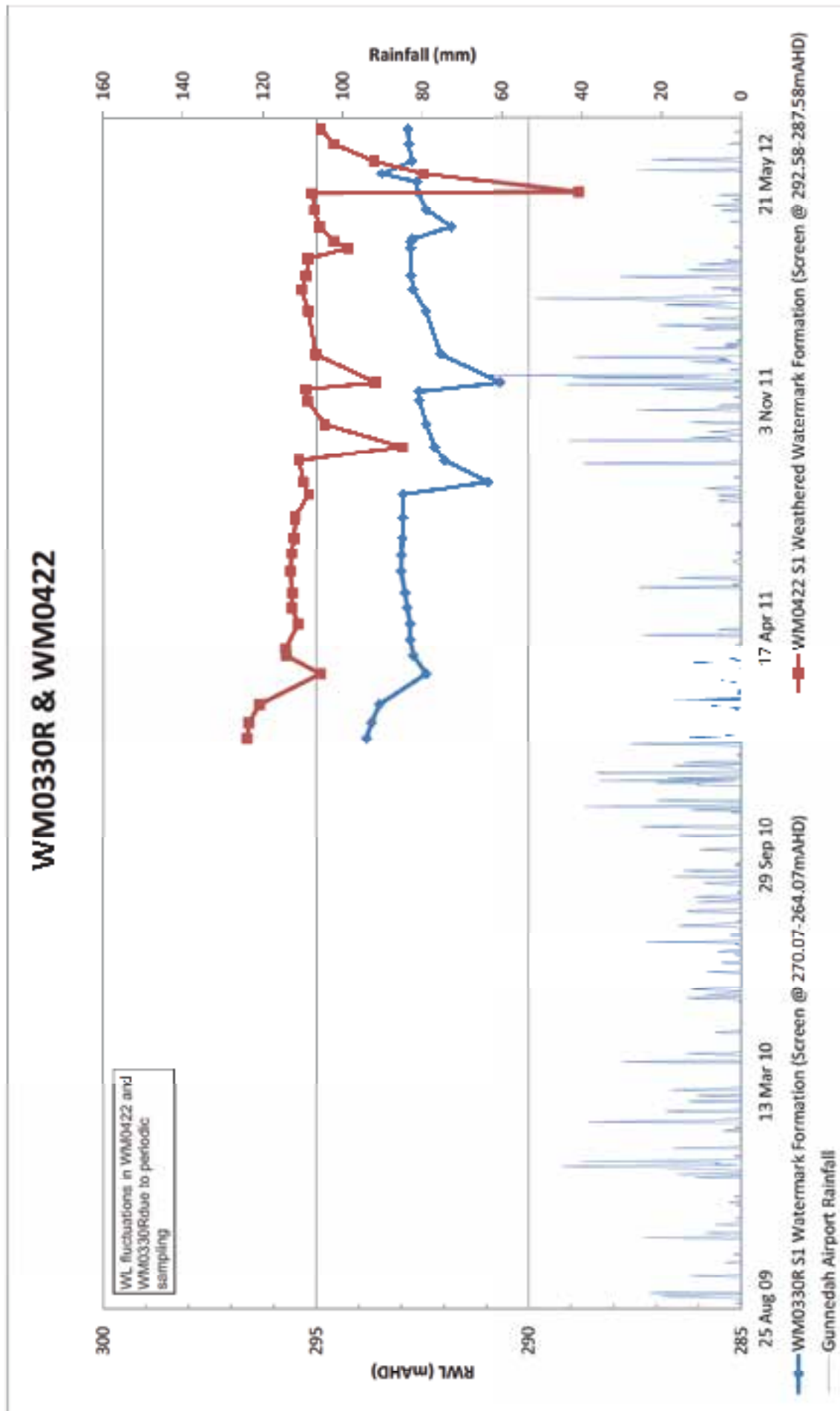


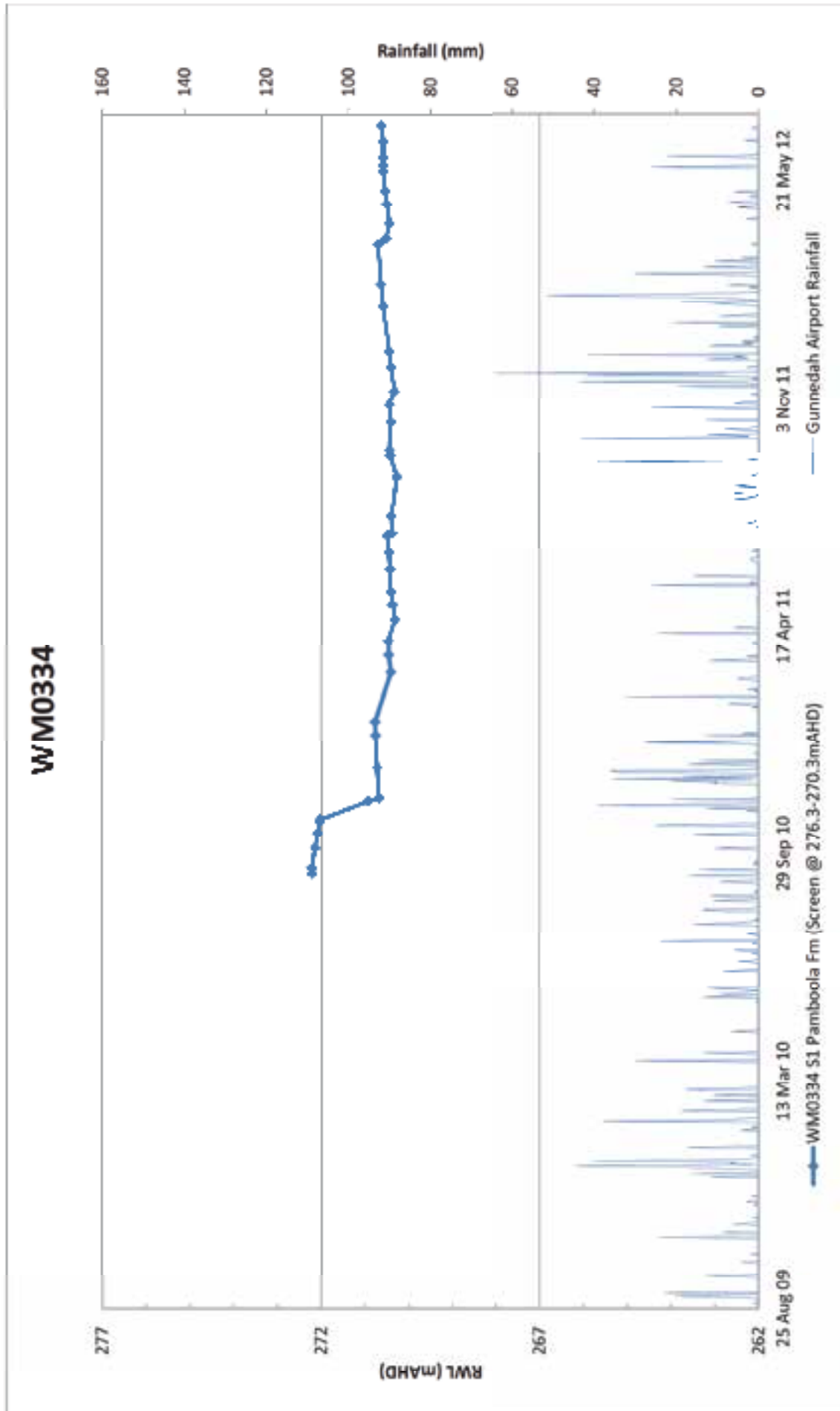


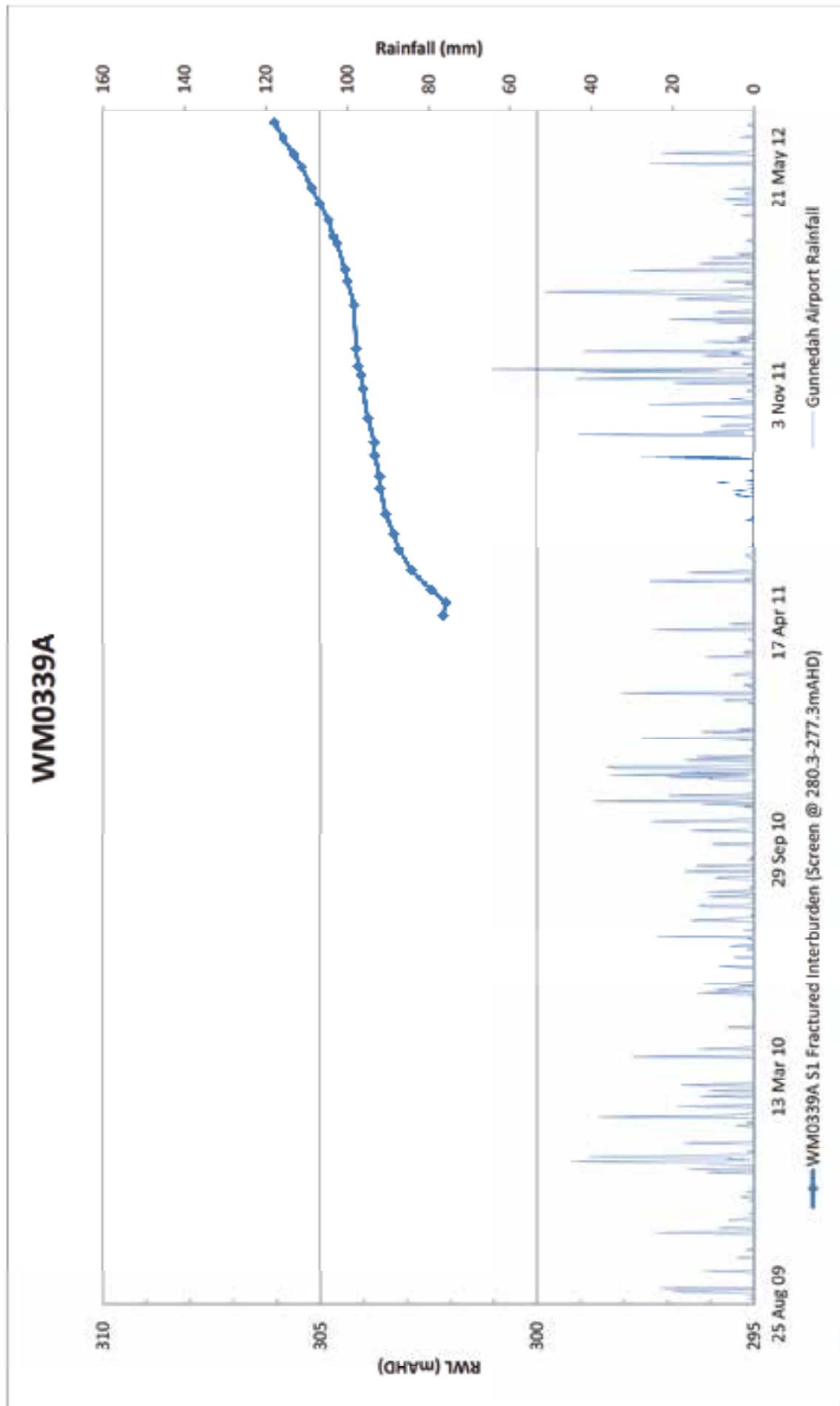


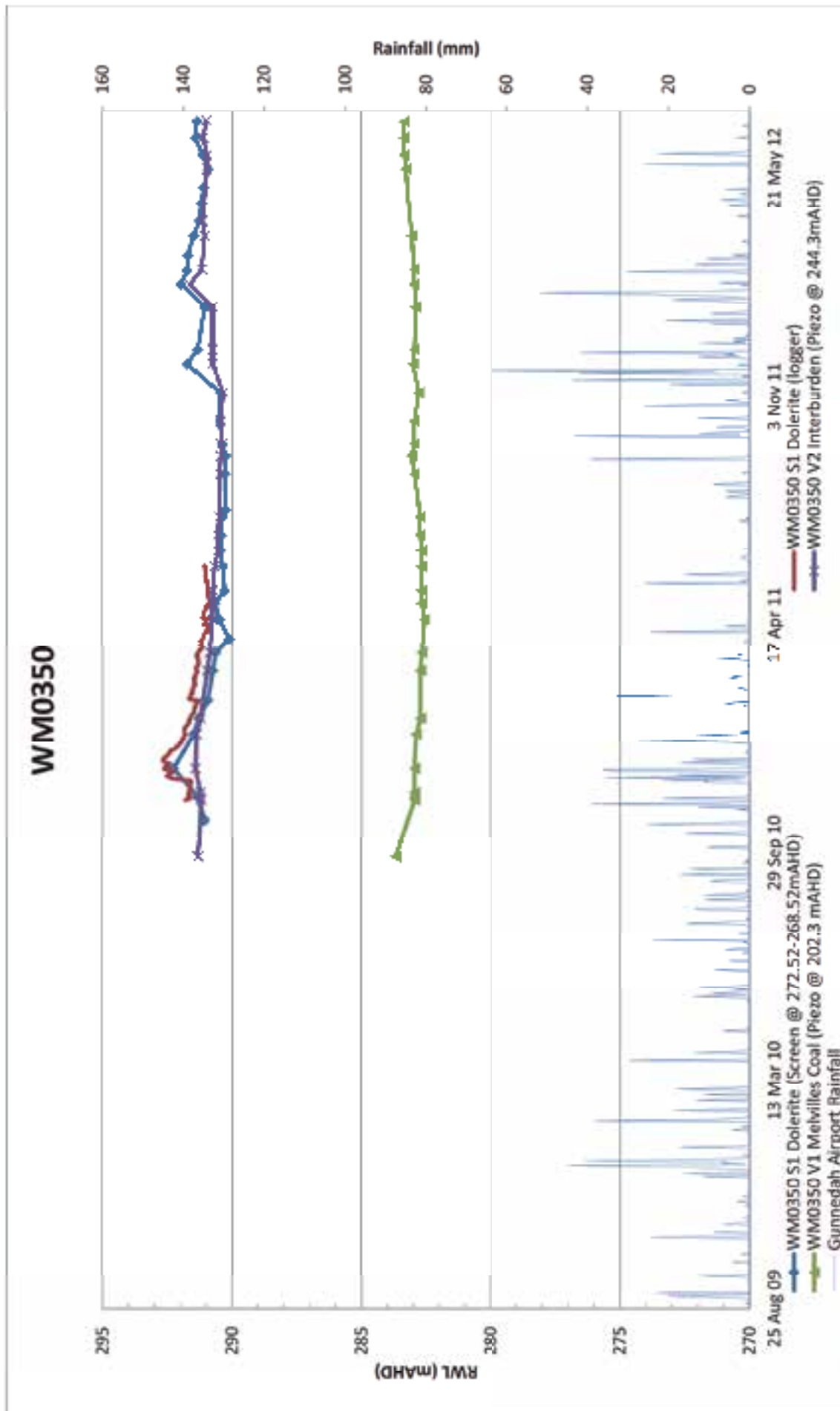


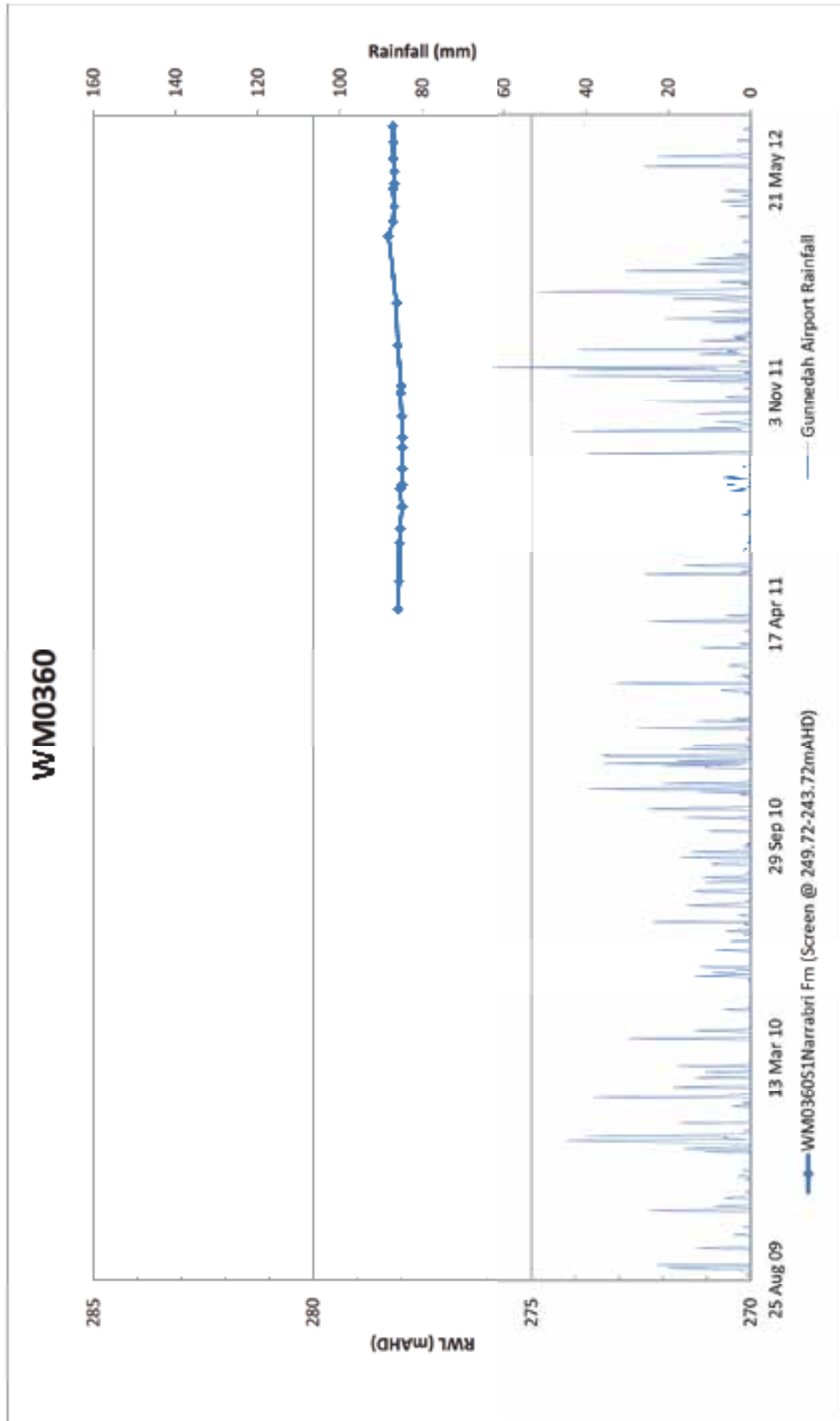


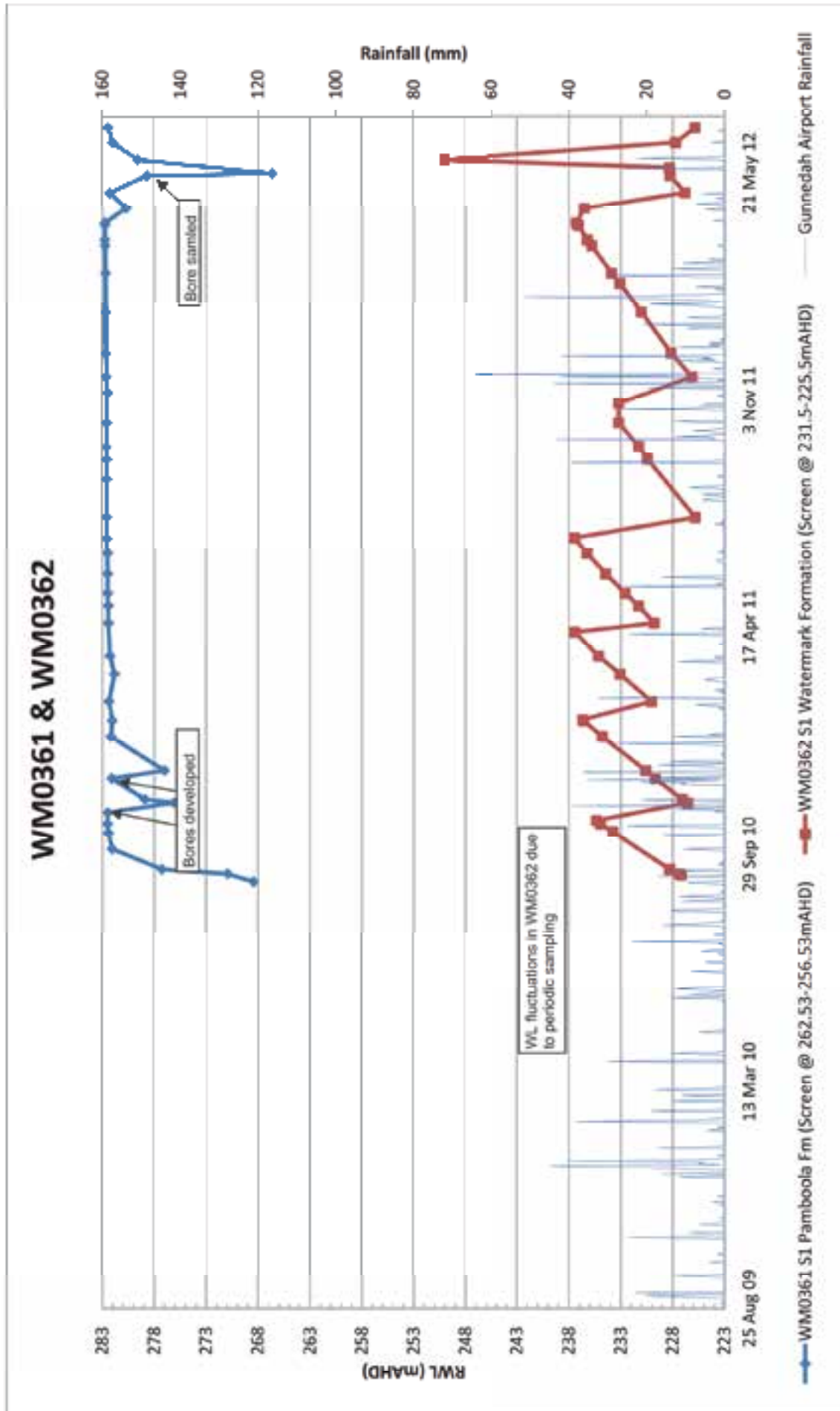


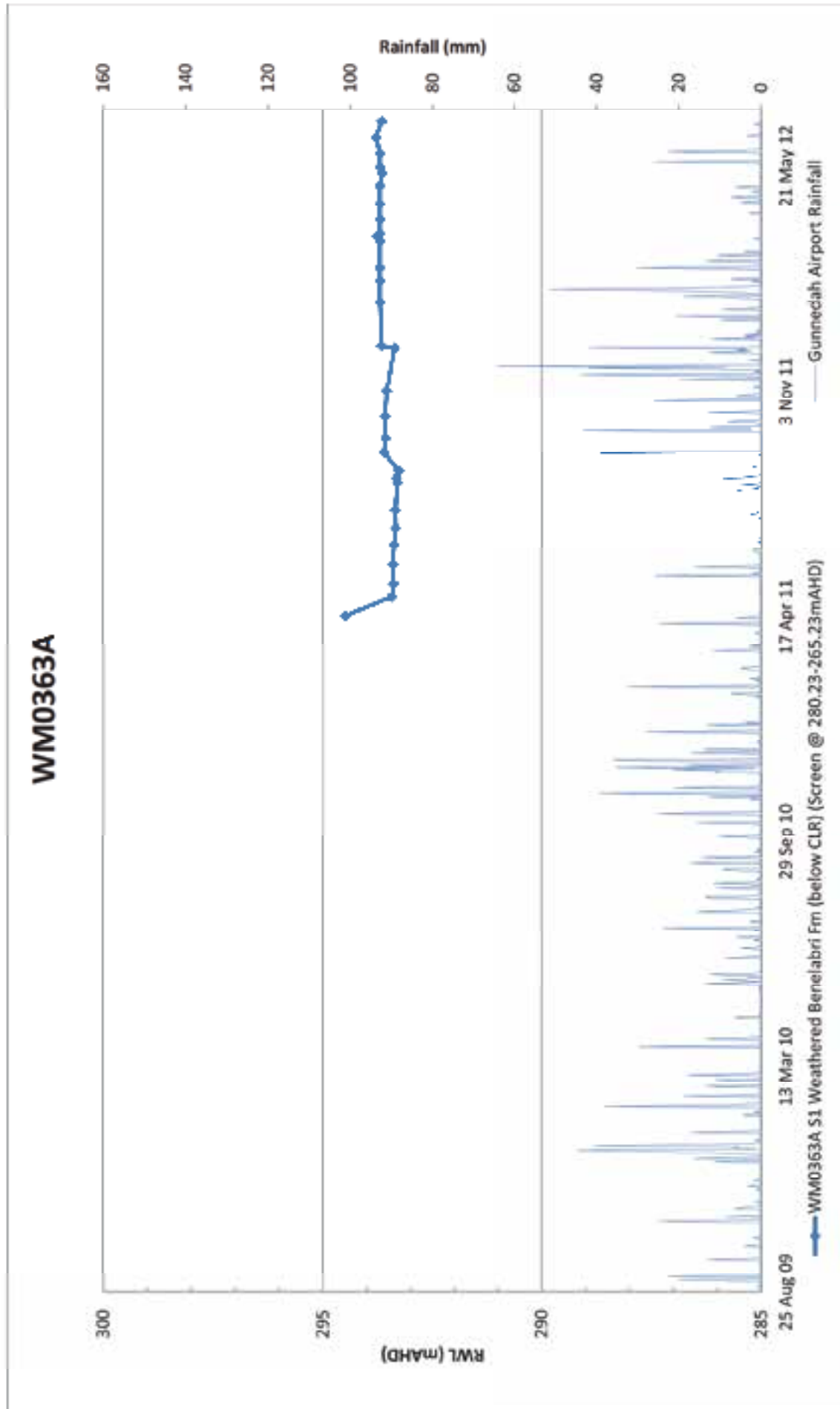


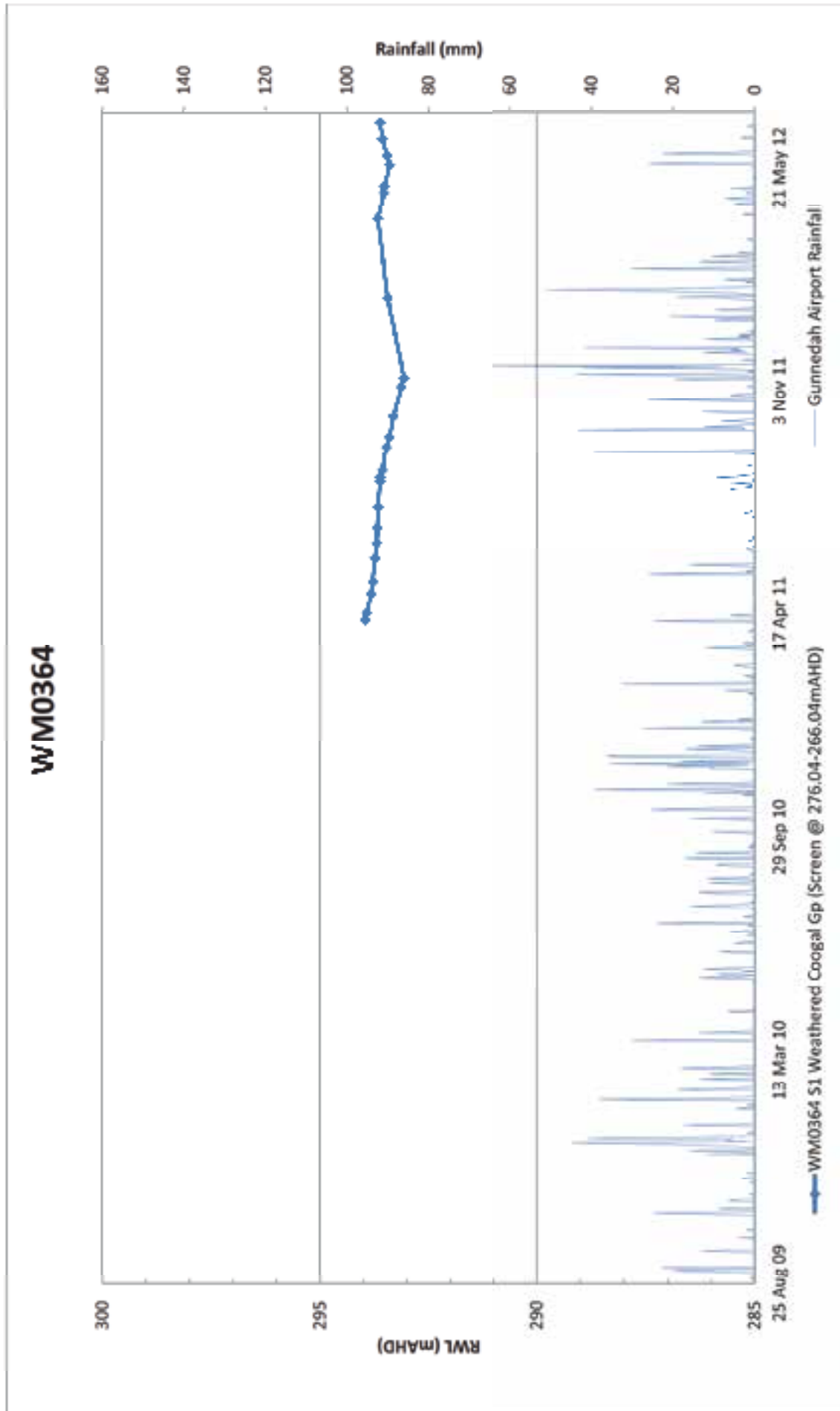


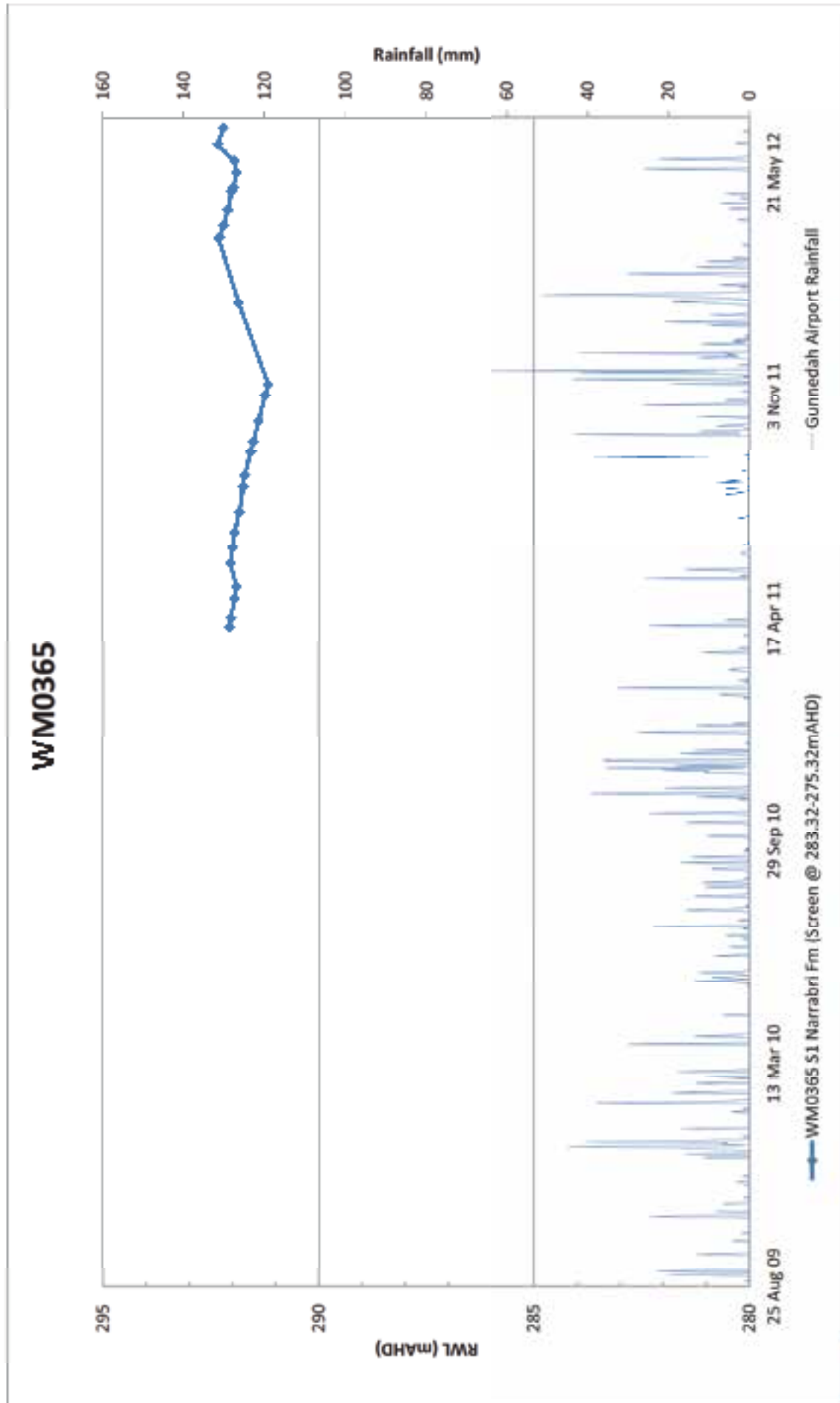


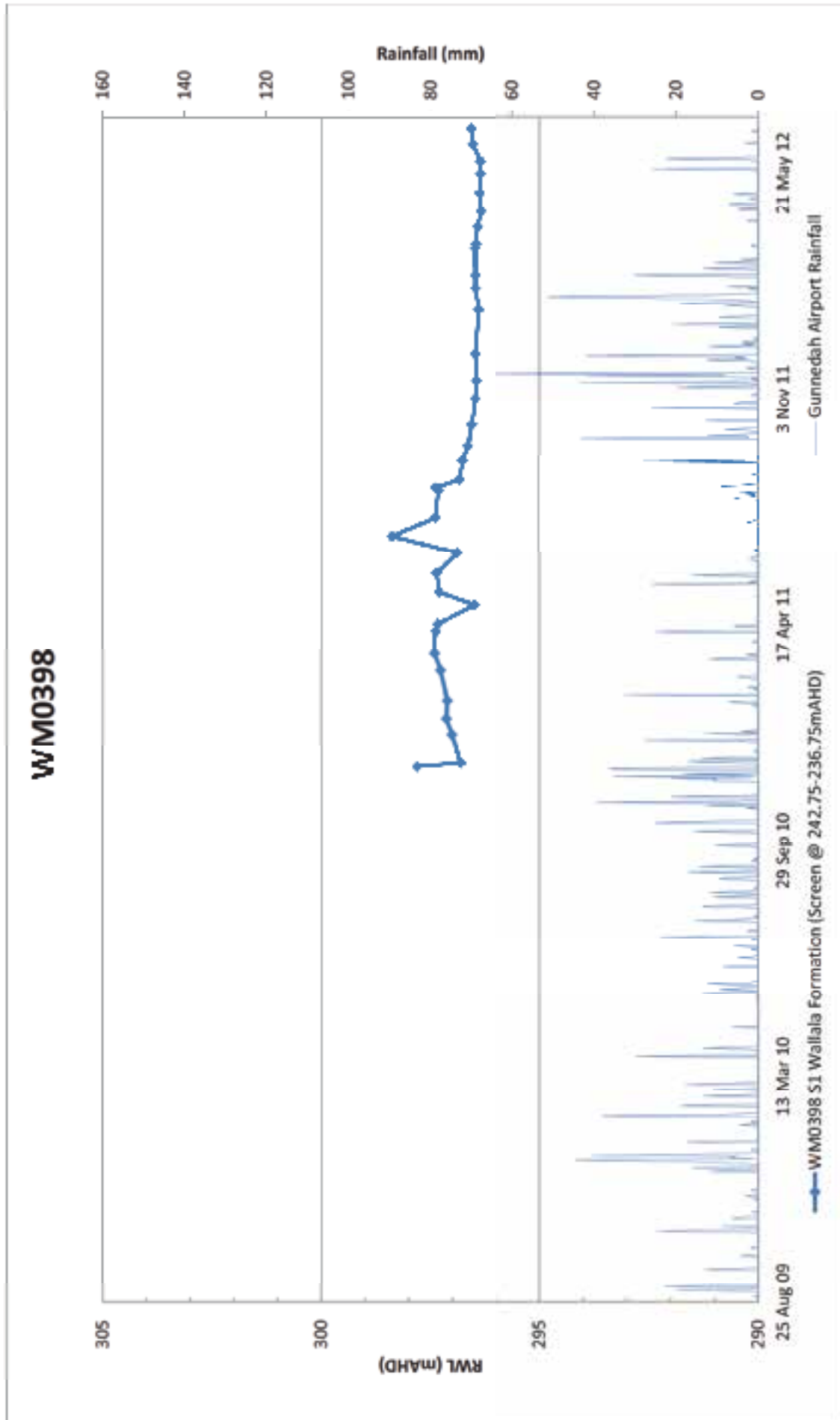


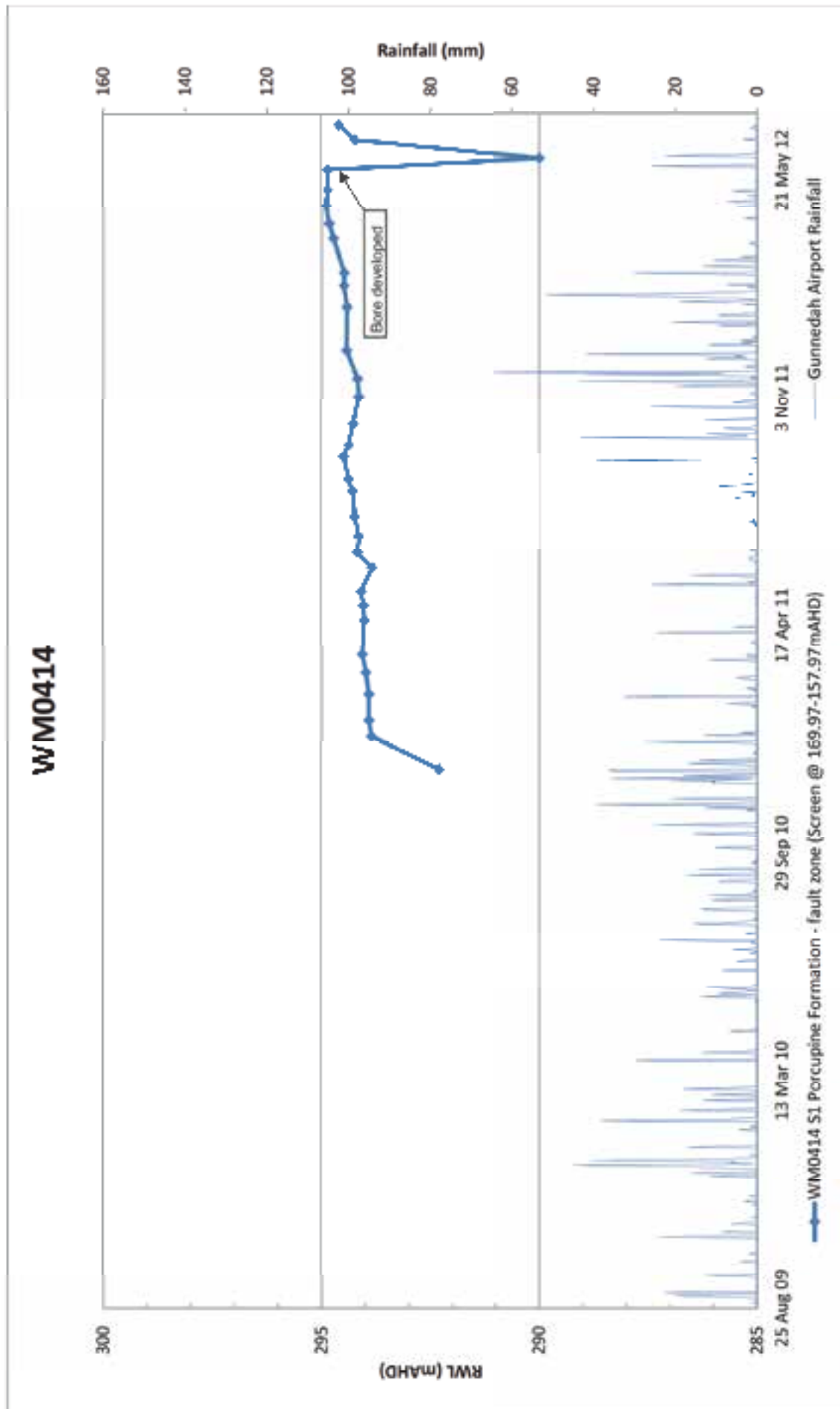


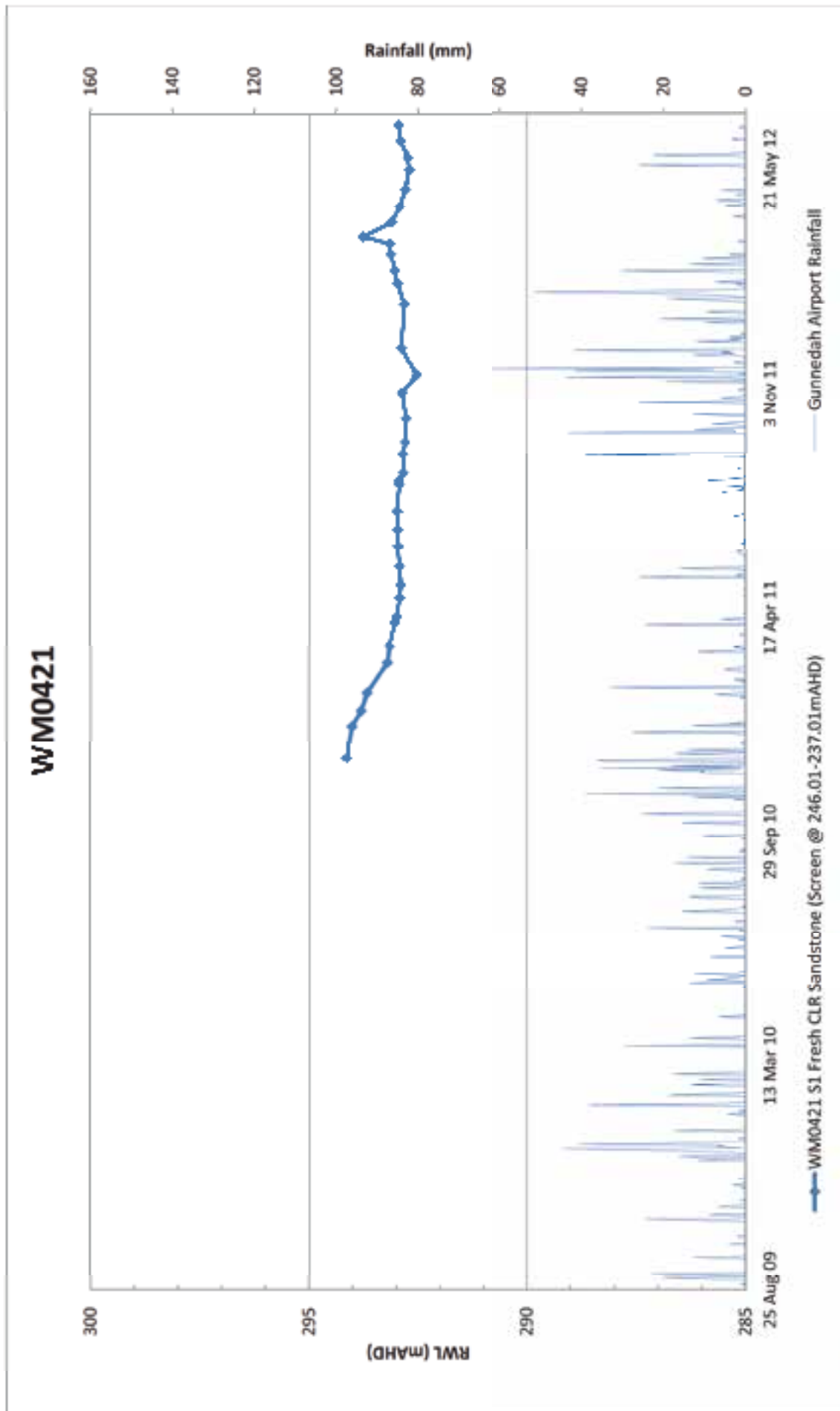


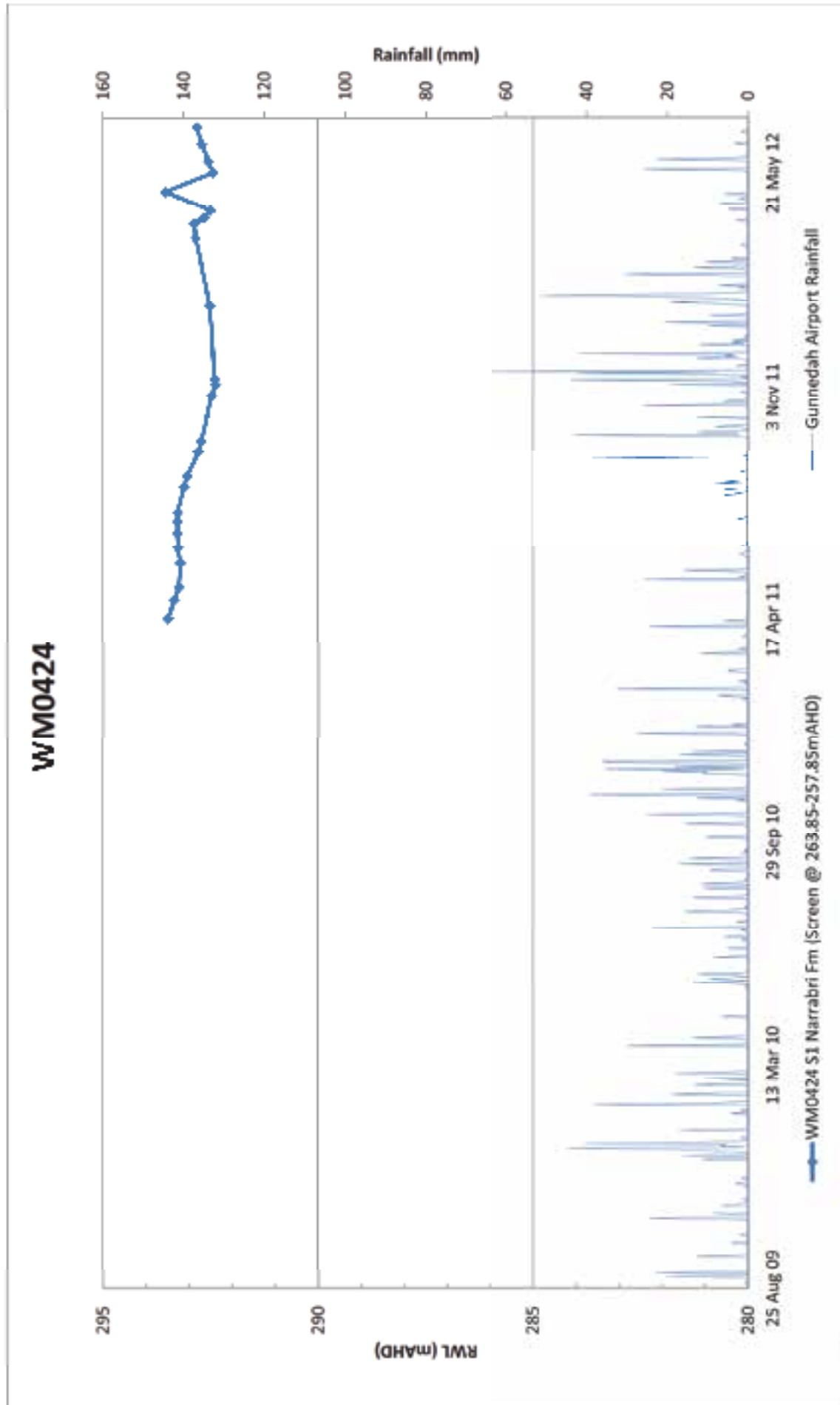


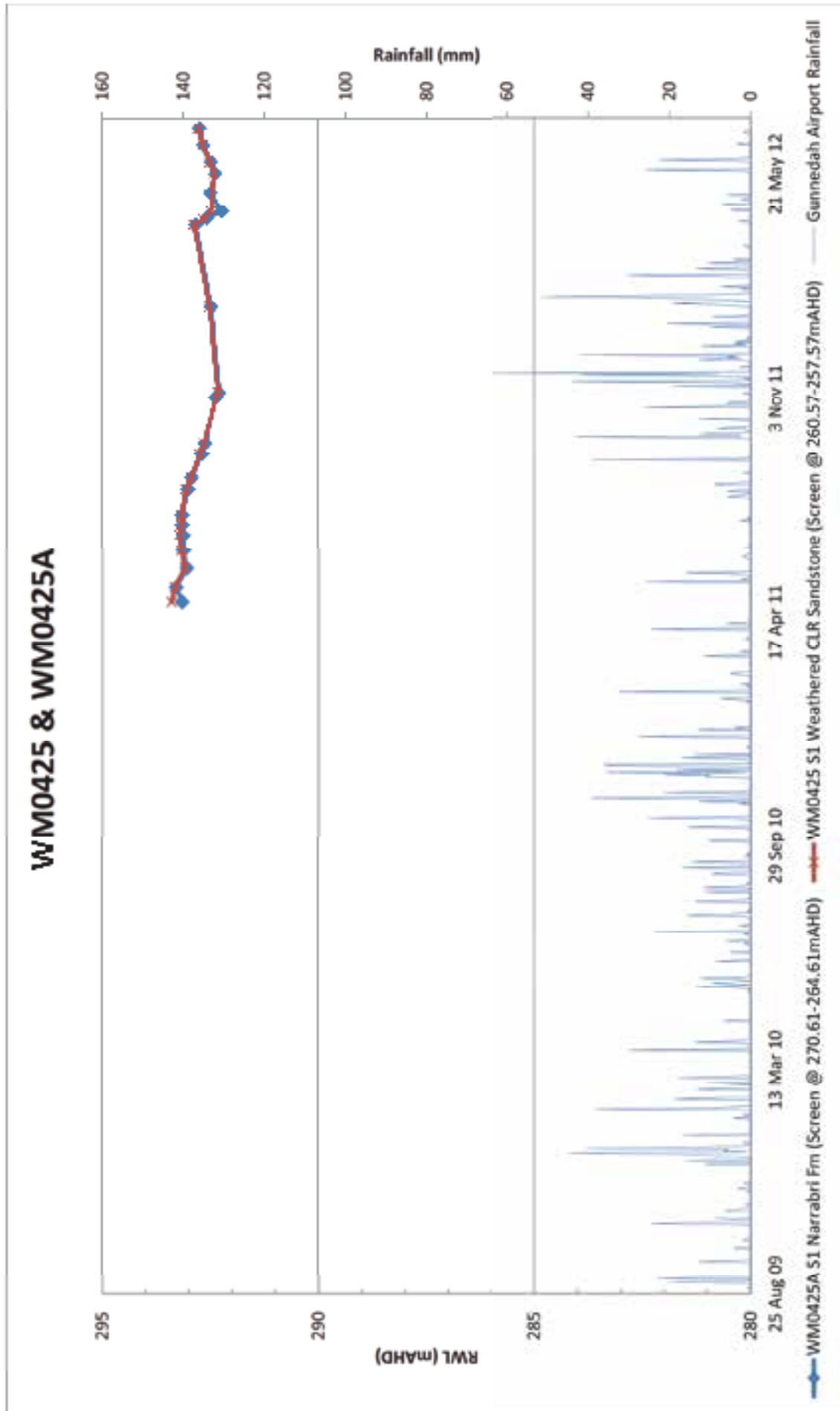


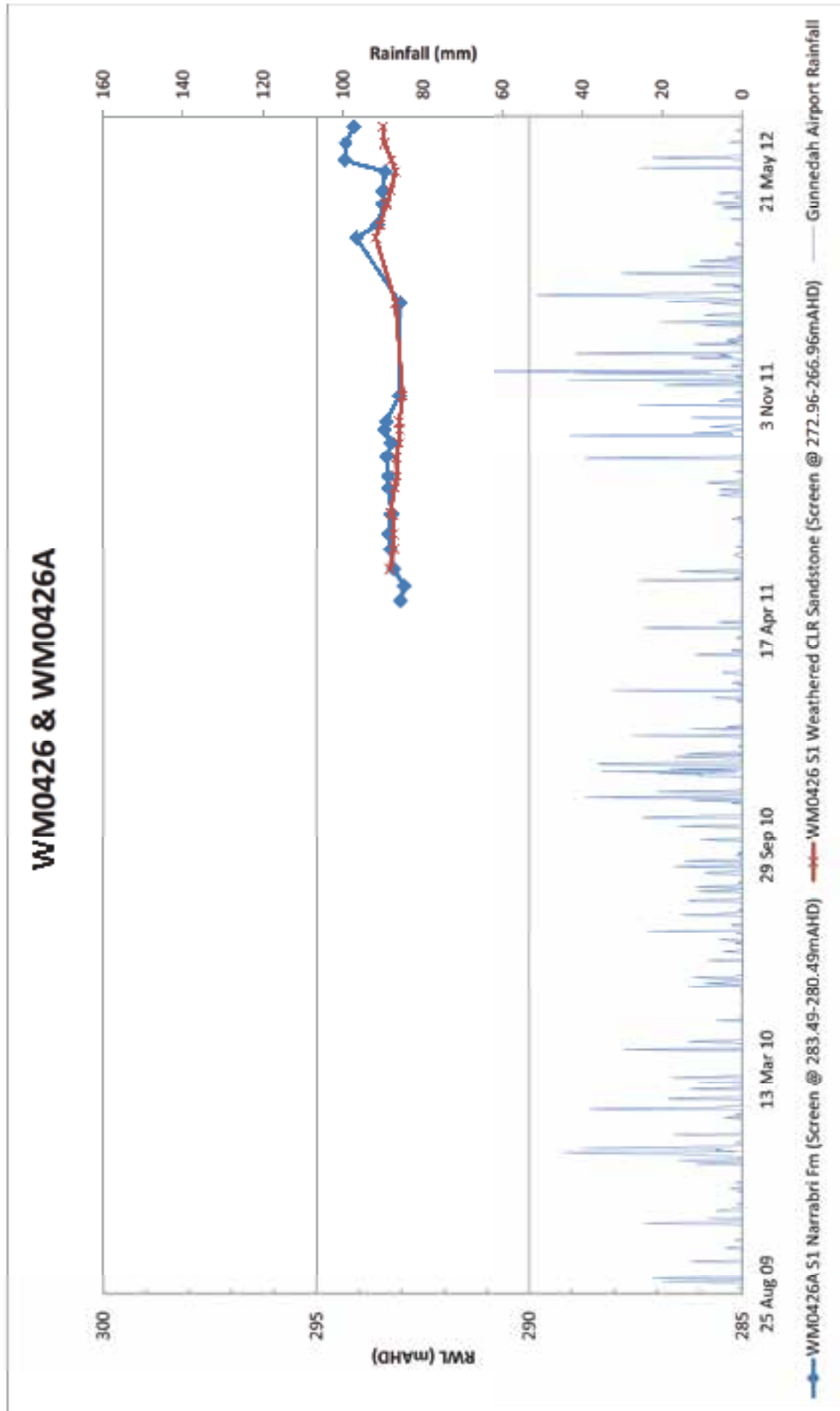




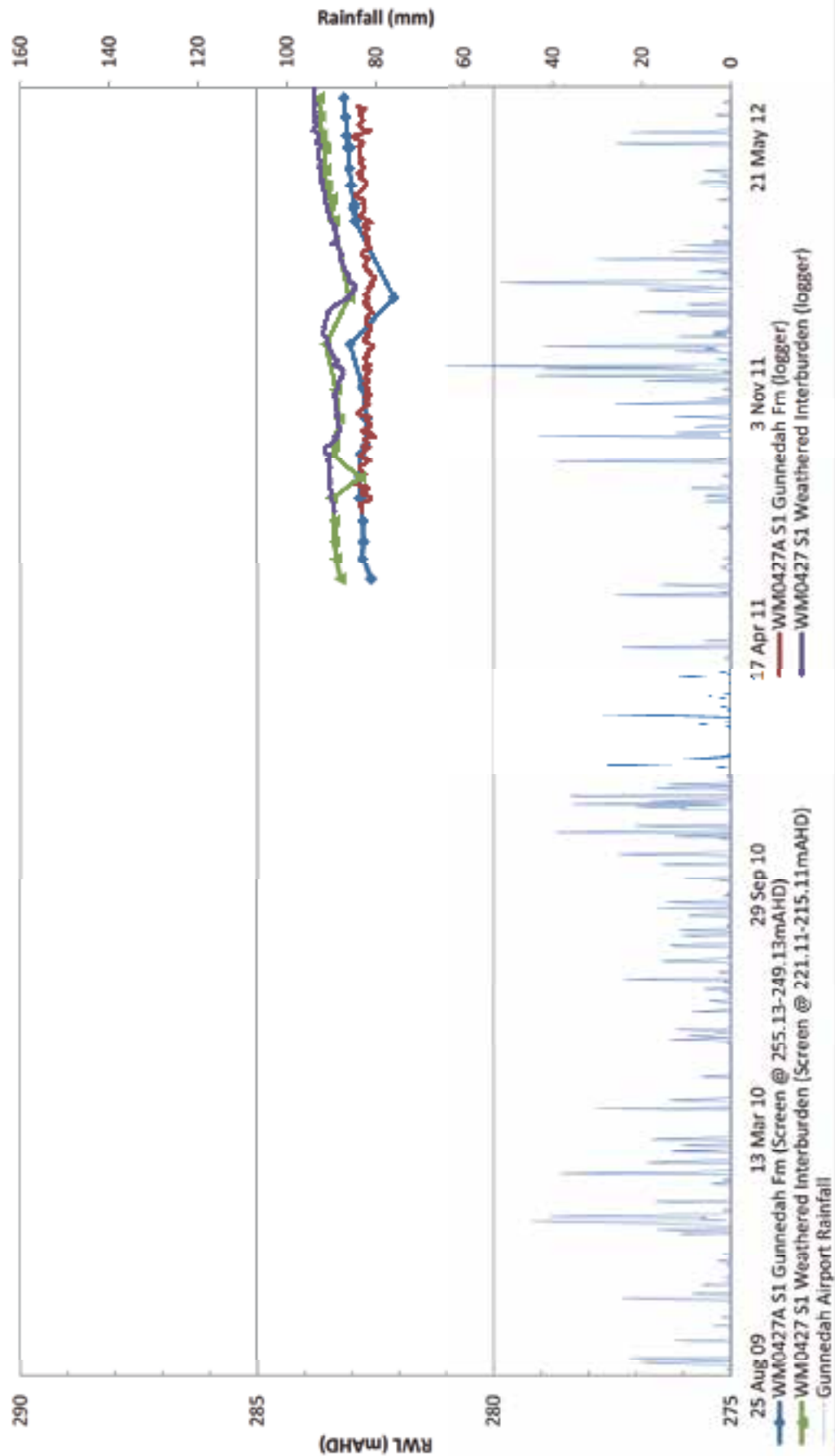


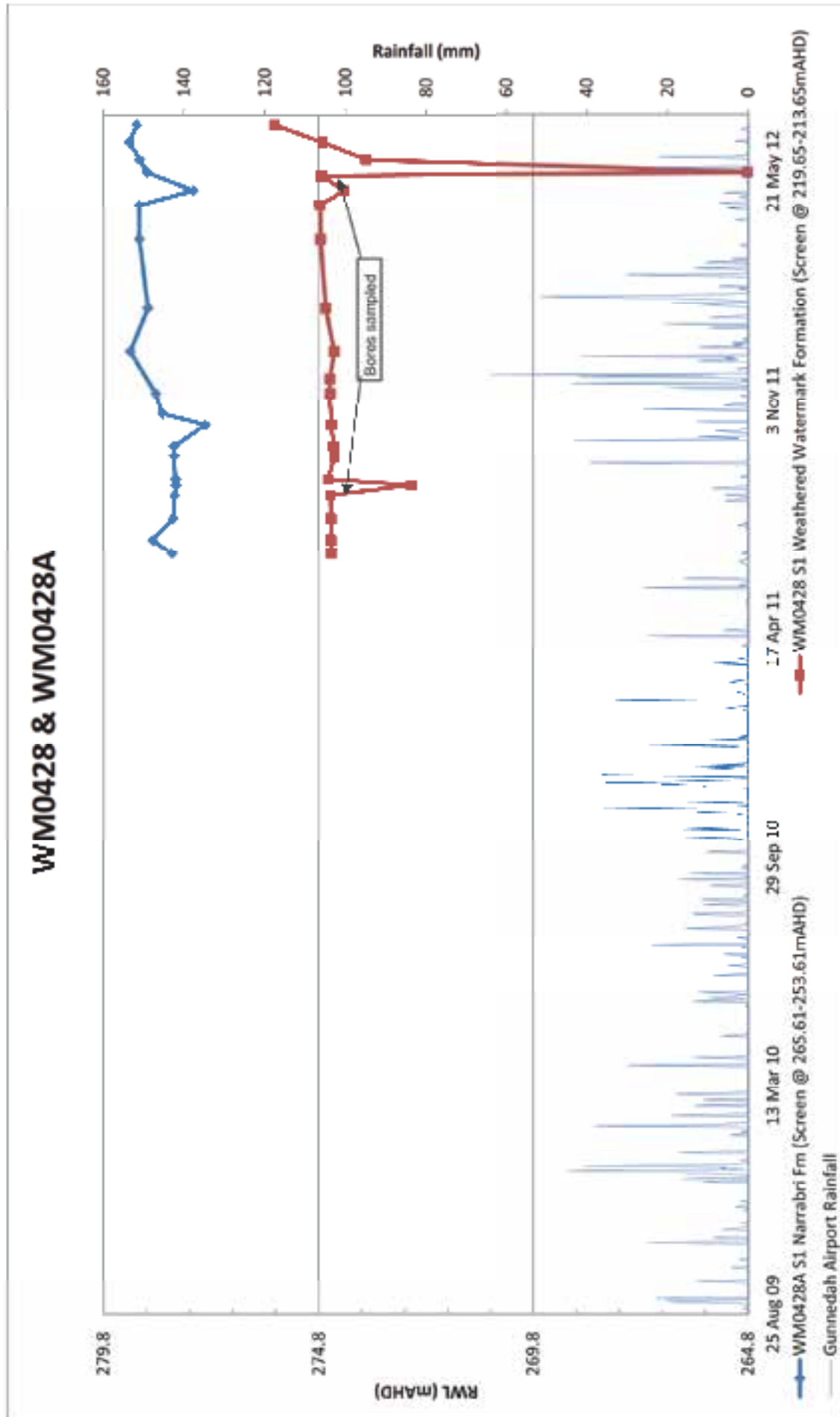




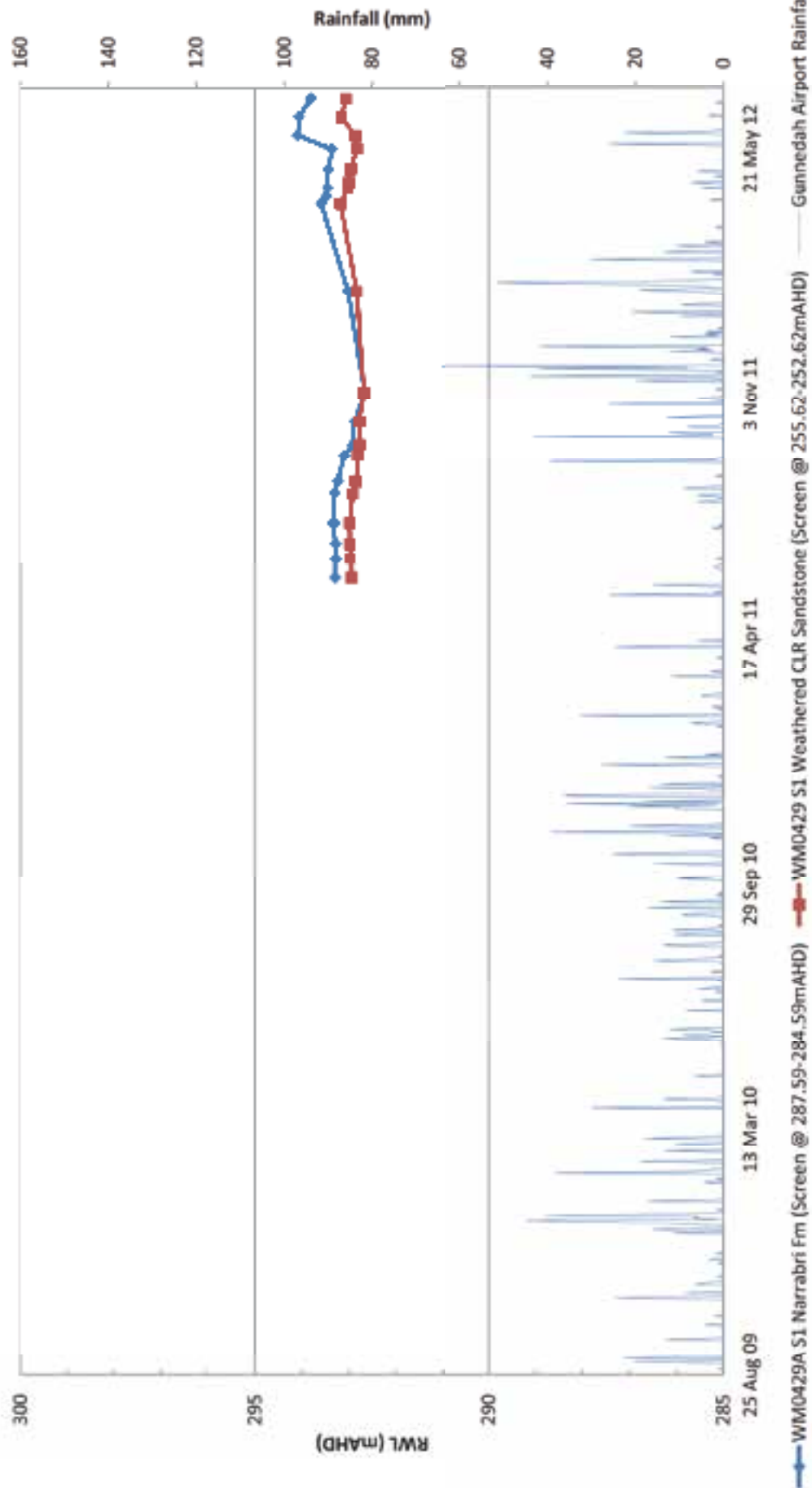


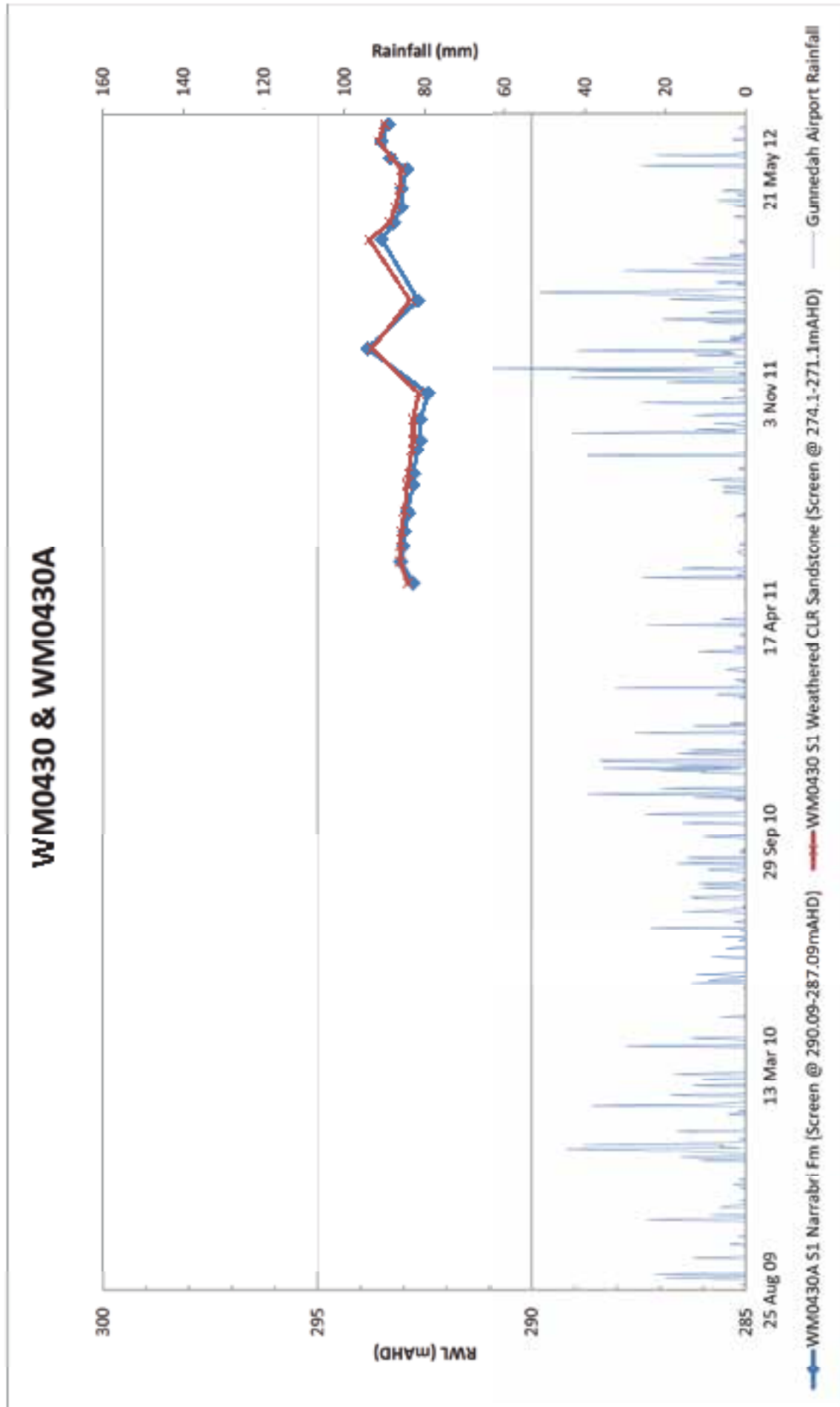
WM0427 & WM0427A

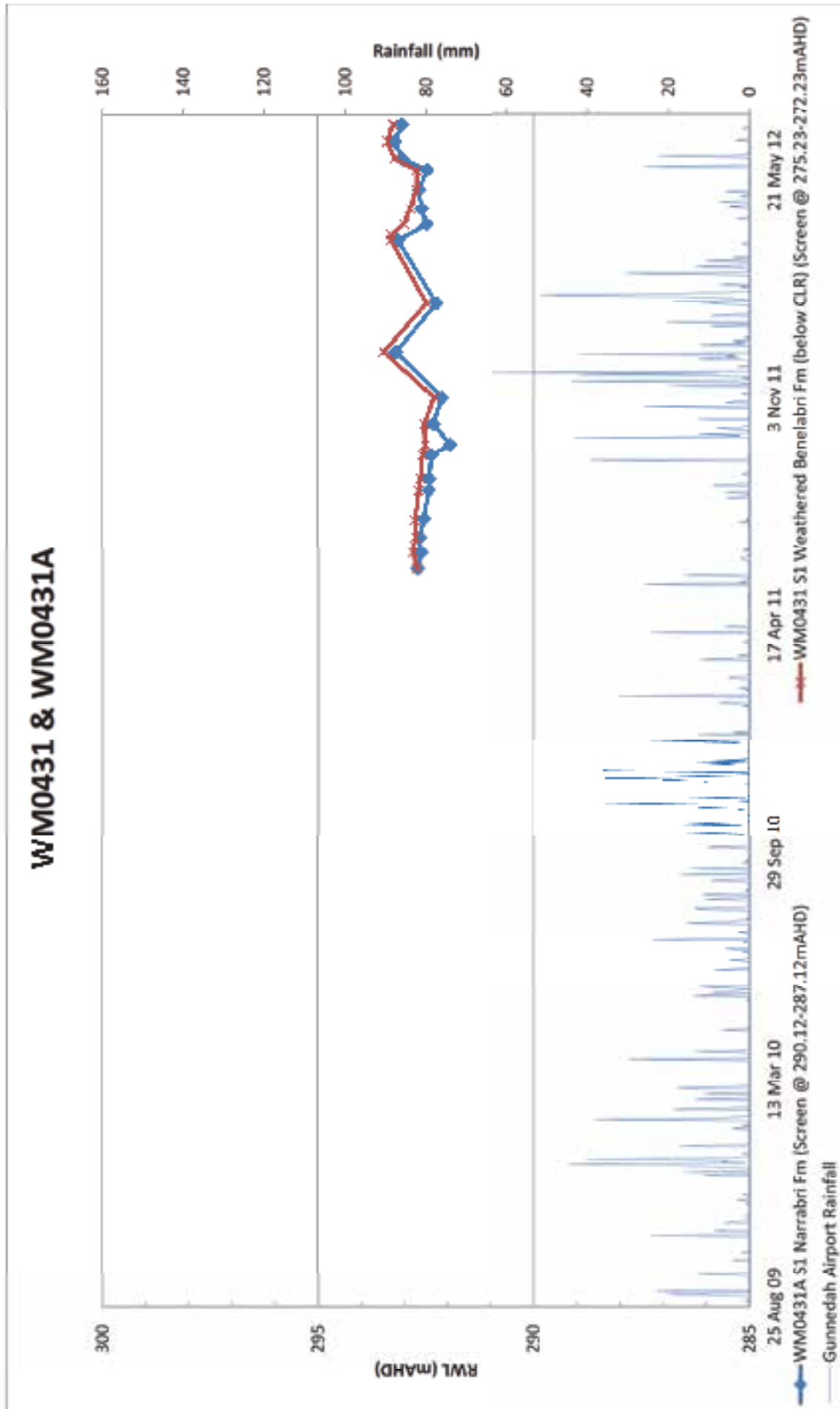


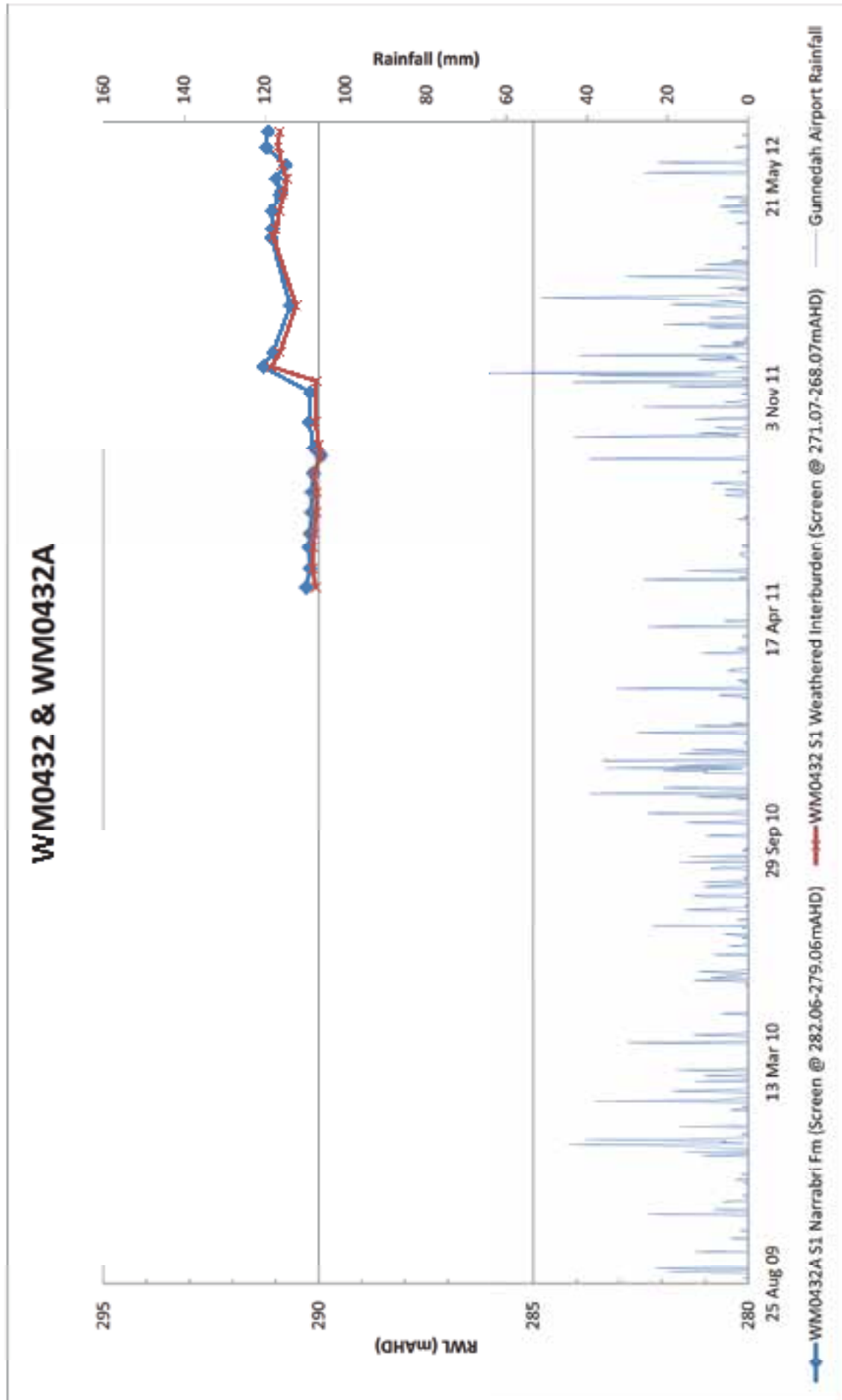


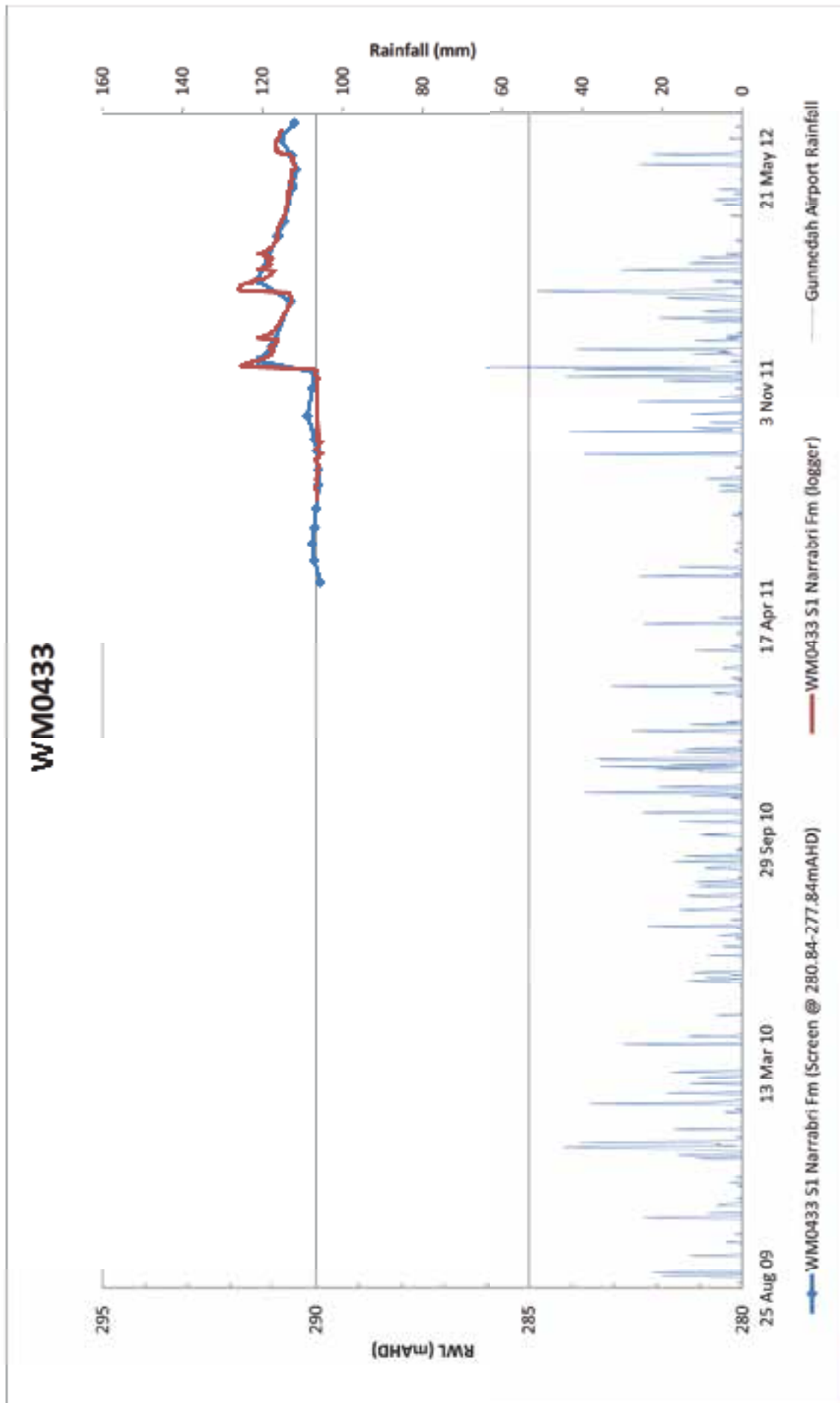
WM0429 & WM0429A

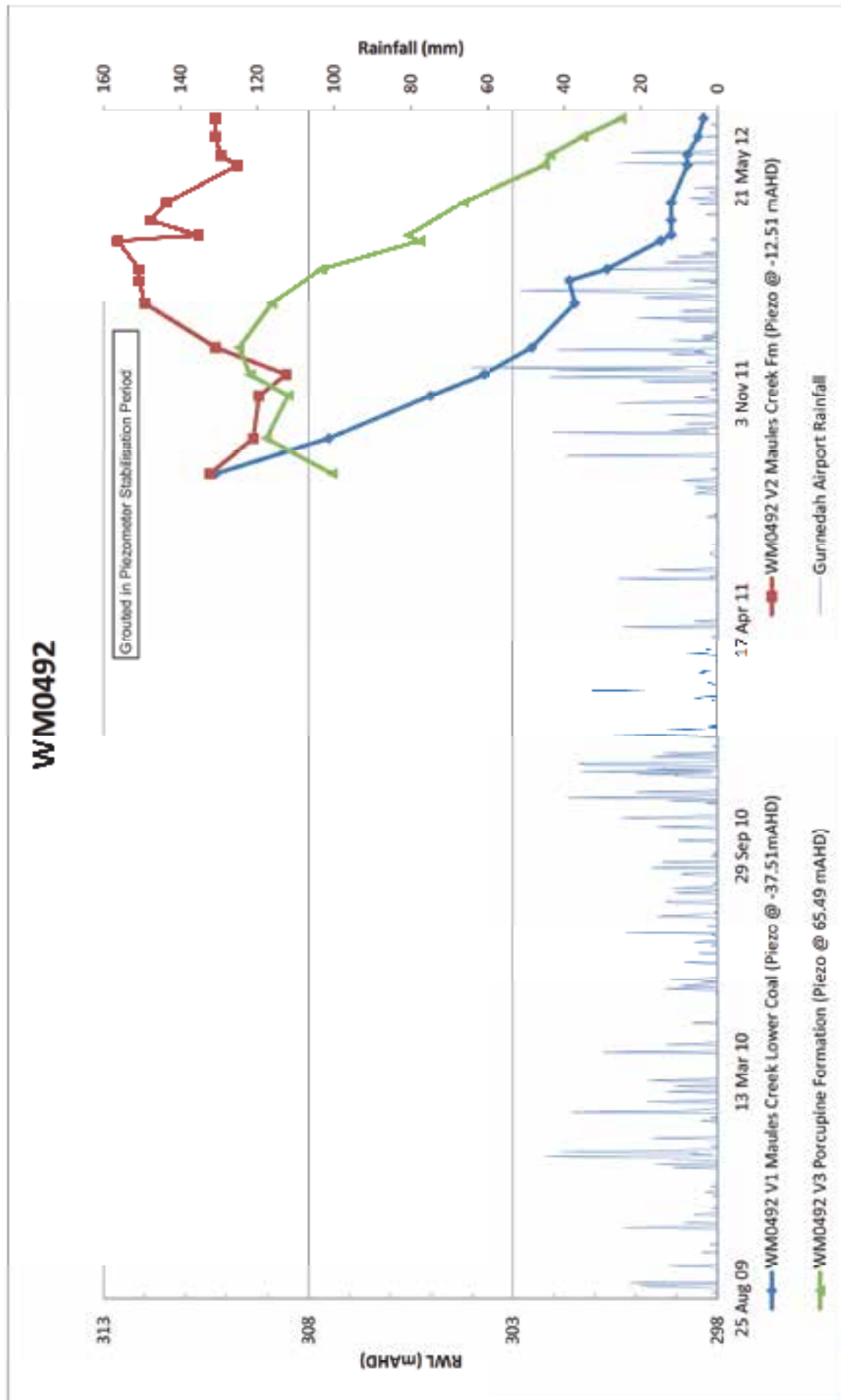


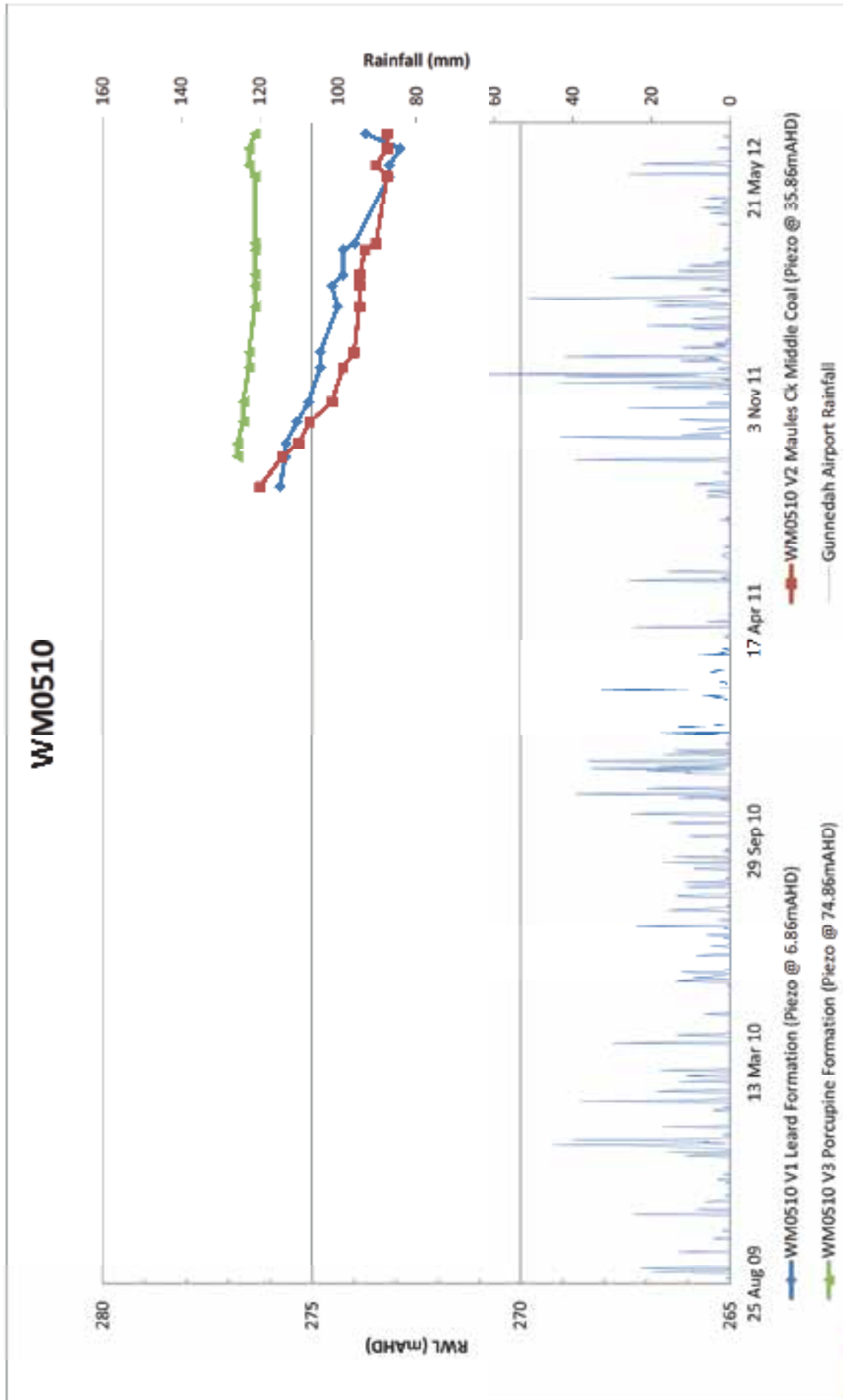


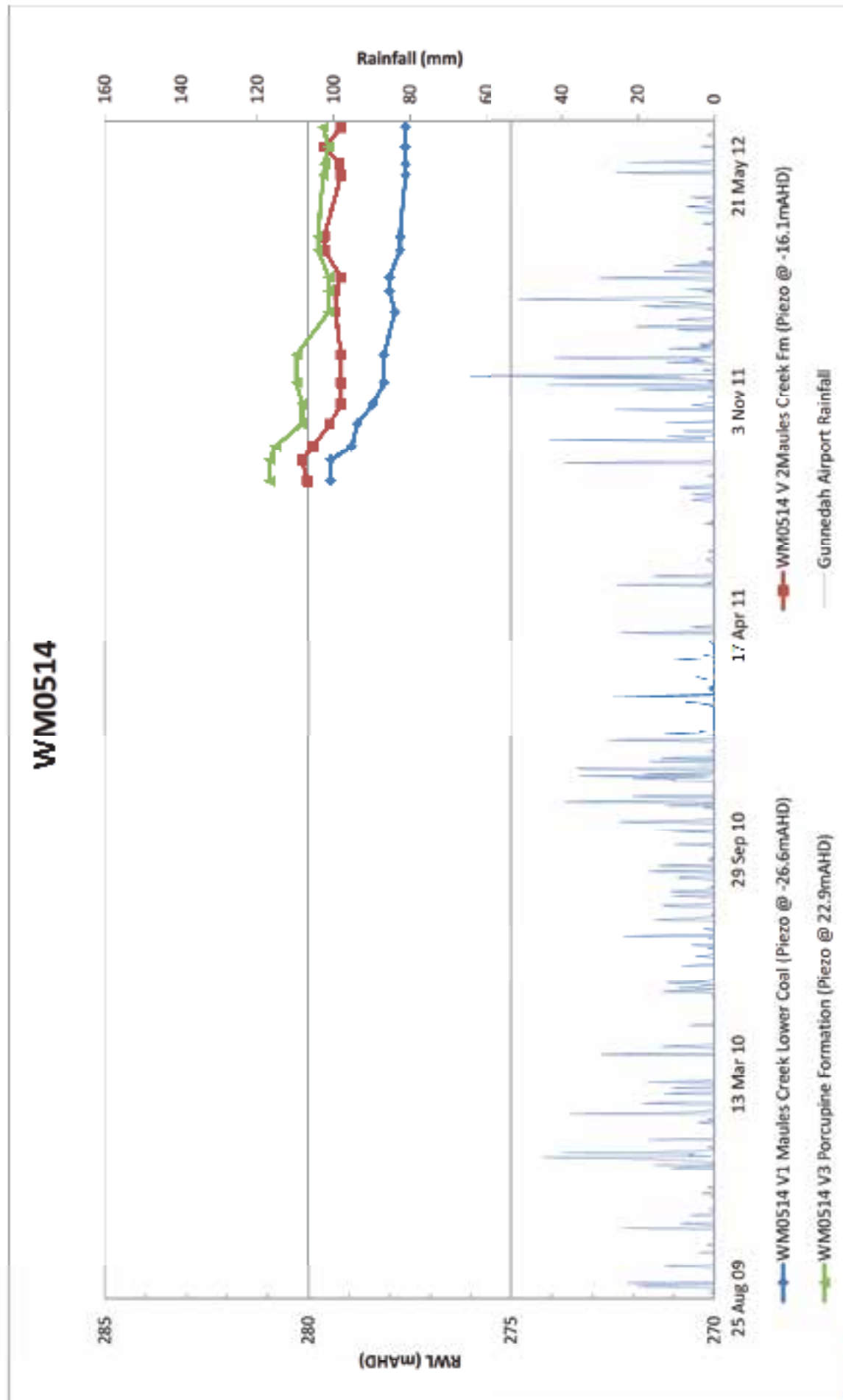


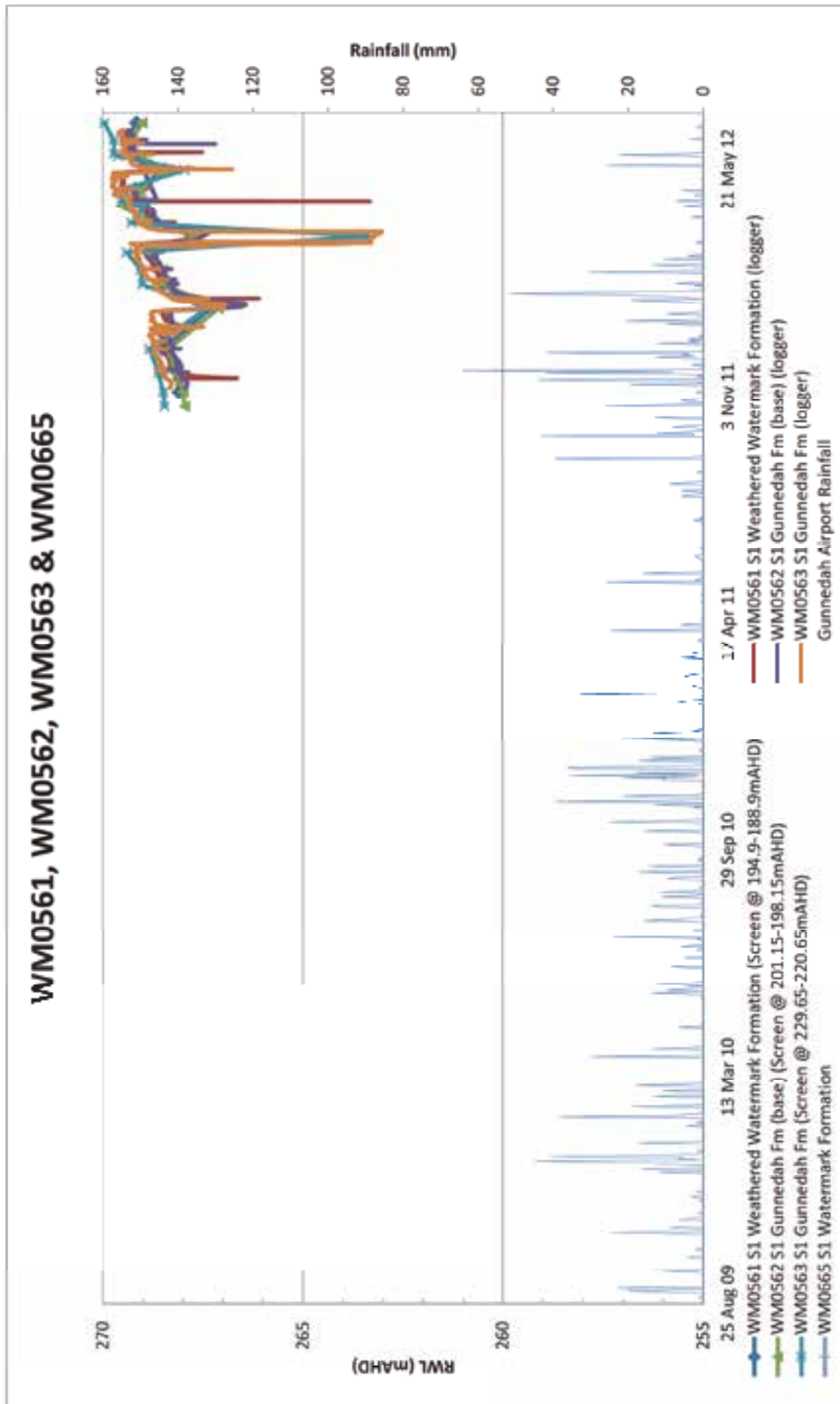














Appendix H

Groundwater Monitoring Data



Bore ID	Installation Type	Date Time	SWL (m btoc)	RWL (mAHD)
WM0002	S1	3/05/2010	2.22	293.07
WM0002	S1	23/06/2010	2.31	292.93
WM0002	S1	7/07/2010	2.37	292.86
WM0002	S1	21/07/2010	2.16	292.94
WM0002	S1	31/08/2010	1.77	293.33
WM0002	S1	18/09/2010	1.72	293.38
WM0002	S1	2/10/2010	1.78	293.32
WM0002	S1	12/10/2010	1.80	293.30
WM0002	S1	15/12/2010	1.25	293.85
WM0002	S1	14/02/2011	1.51	293.60
WM0002	S1	8/03/2011	1.82	293.29
WM0002	S1	6/04/2011	1.98	293.12
WM0002	S1	18/04/2011	1.96	293.14
WM0002	S1	5/05/2011	2.02	293.08
WM0002	S1	16/05/2011	1.96	293.14
WM0002	S1	2/06/2011	1.97	293.14
WM0002	S1	20/06/2011	1.91	293.19
WM0002	S1	4/07/2011	1.91	293.19
WM0002	S1	14/07/2011	1.93	293.18
WM0002	S1	22/07/2011	1.95	293.16
WM0002	S1	14/08/2011	1.97	293.13
WM0002	S1	24/08/2011	2.10	293.00
WM0002	S1	14/09/2011	2.38	292.72
WM0002	S1	23/09/2011	2.15	292.95
WM0002	S1	12/10/2011	2.17	292.93
WM0002	S1	9/11/2011	2.42	292.68
WM0002	S1	6/04/2012	1.75	293.36
WM0002	S1	11/04/2012	1.83	293.27
WM0002	S1	22/04/2012	2.04	293.06
WM0002	S1	5/05/2012	2.09	293.01
WM0002	S1	20/05/2012	2.21	292.89
WM0002	S1	1/06/2012	2.13	292.98
WM0002	S1	16/06/2012	1.89	293.21
WM0002	S1	1/07/2012	1.85	293.26
WM0002	V1	3/05/2010	4.89	289.34
WM0002	V1	23/06/2010	5.46	288.77
WM0002	V1	21/07/2010	5.63	288.60
WM0002	V1	31/08/2010	5.96	288.27
WM0002	V1	18/09/2010	6.13	288.10
WM0002	V1	2/10/2010	6.19	288.04
WM0002	V1	15/12/2010	6.58	287.65
WM0002	V1	14/02/2011	6.58	287.65
WM0002	V1	8/03/2011	6.69	287.54
WM0002	V1	23/03/2011	6.81	287.42
WM0002	V1	5/05/2011	6.86	287.37
WM0002	V1	16/05/2011	6.86	287.37
WM0002	V1	2/06/2011	6.81	287.42
WM0002	V1	20/06/2011	6.81	287.42
WM0002	V1	4/07/2011	6.86	287.37
WM0002	V1	22/07/2011	6.81	287.42
WM0002	V1	14/08/2011	6.86	287.37
WM0002	V1	24/08/2011	6.81	287.42
WM0002	V1	14/09/2011	6.92	287.31
WM0002	V1	23/09/2011	7.09	287.14
WM0002	V1	12/10/2011	7.09	287.14
WM0002	V1	9/11/2011	7.26	286.97
WM0002	V1	24/01/2012	7.43	286.80
WM0002	V1	20/05/2012	7.93	286.30
WM0002	V1	1/06/2012	7.60	286.64
WM0002	V1	1/07/2012	7.60	286.64
WM0002	V2	3/05/2010	2.15	292.08
WM0002	V2	23/06/2010	2.53	291.70
WM0002	V2	21/07/2010	2.71	291.52
WM0002	V2	31/08/2010	2.71	291.52
WM0002	V2	18/09/2010	2.80	291.43
WM0002	V2	2/10/2010	2.74	291.49
WM0002	V2	15/12/2010	2.97	291.26
WM0002	V2	14/02/2011	3.27	290.96
WM0002	V2	8/03/2011	3.73	290.50
WM0002	V2	23/03/2011	3.91	290.32
WM0002	V2	18/04/2011	3.88	290.35
WM0002	V2	5/05/2011	3.85	290.38
WM0002	V2	16/05/2011	3.76	290.47
WM0002	V2	2/06/2011	3.79	290.44
WM0002	V2	20/06/2011	3.76	290.47
WM0002	V2	4/07/2011	3.76	290.47
WM0002	V2	22/07/2011	3.76	290.47
WM0002	V2	14/08/2011	4.26	289.97
WM0002	V2	24/08/2011	4.29	289.94
WM0002	V2	14/09/2011	3.94	290.29
WM0002	V2	23/09/2011	3.97	290.26
WM0002	V2	12/10/2011	4.03	290.20
WM0002	V2	9/11/2011	4.61	289.62
WM0002	V2	24/01/2012	4.67	289.56
WM0002	V2	20/05/2012	5.14	289.09
WM0002	V2	1/06/2012	4.99	289.24
WM0002	V2	1/07/2012	4.61	289.62
WM0002A	S1	3/05/2010	2.30	293.07
WM0002A	S1	23/06/2010	2.31	293.06
WM0002A	S1	13/07/2010	2.29	293.08
WM0002A	S1	21/07/2010	1.98	293.39
WM0002A	S1	31/08/2010	1.35	294.02
WM0002A	S1	18/09/2010	1.45	293.92
WM0002A	S1	2/10/2010	1.61	293.76
WM0002A	S1	12/10/2010	1.68	293.69
WM0002A	S1	15/12/2010	1.04	294.32
WM0002A	S1	14/02/2011	1.56	293.81
WM0002A	S1	8/03/2011	1.88	293.49
WM0002A	S1	23/03/2011	1.04	293.33
WM0002A	S1	6/04/2011	2.00	293.36
WM0002A	S1	5/05/2011	2.15	293.22
WM0002A	S1	16/05/2011	2.05	293.32
WM0002A	S1	2/06/2011	2.10	293.27
WM0002A	S1	20/06/2011	2.04	293.33
WM0002A	S1	4/07/2011	2.05	293.32
WM0002A	S1	14/07/2011	2.08	293.29
WM0002A	S1	22/07/2011	2.12	293.24
WM0002A	S1	14/08/2011	2.16	293.21
WM0002A	S1	24/08/2011	2.26	293.11
WM0002A	S1	14/09/2011	2.38	292.98
WM0002A	S1	23/09/2011	2.46	292.91
WM0002A	S1	12/10/2011	2.58	292.79
WM0002A	S1	9/11/2011	2.83	292.54
WM0002A	S1	24/01/2012	2.33	293.04
WM0002A	S1	6/04/2012	1.77	293.60
WM0002A	S1	11/04/2012	1.82	293.55
WM0002A	S1	22/04/2012	2.00	293.37
WM0002A	S1	5/05/2012	2.09	293.28
WM0002A	S1	20/05/2012	2.18	293.19
WM0002A	S1	1/06/2012	1.96	293.41
WM0002A	S1	16/06/2012	1.66	293.71

Bore ID	Installation Type	Date_Time	SWL (m btoc)	RWL (mAHD)
WM0002A	S1	1/07/2012	1.73	293.64
WM0009B	S1	23/06/2010	5.47	294.39
WM0009B	S1	13/07/2010	5.46	294.39
WM0009B	S1	22/07/2010	5.48	294.37
WM0009B	S1	11/08/2010	5.32	294.53
WM0009B	S1	30/08/2010	5.32	294.54
WM0009B	S1	18/09/2010	5.20	294.65
WM0009B	S1	1/10/2010	5.19	294.66
WM0009B	S1	27/10/2010	5.13	294.72
WM0009B	S1	4/11/2010	5.11	294.75
WM0009B	S1	8/11/2010	5.10	294.75
WM0009B	S1	14/11/2010	5.08	294.77
WM0009B	S1	17/11/2010	5.05	294.80
WM0009B	S1	12/12/2010	4.20	295.65
WM0009B	S1	11/01/2011	3.94	295.91
WM0009B	S1	25/01/2011	3.98	295.87
WM0009B	S1	1/02/2011	4.04	295.81
WM0009B	S1	8/03/2011	4.27	295.58
WM0009B	S1	24/03/2011	4.33	295.52
WM0009B	S1	30/03/2011	4.43	295.42
WM0009B	S1	22/04/2011	4.55	295.30
WM0009B	S1	6/05/2011	4.47	295.38
WM0009B	S1	17/05/2011	4.48	295.38
WM0009B	S1	7/06/2011	4.76	295.10
WM0009B	S1	21/06/2011	4.74	295.11
WM0009B	S1	5/07/2011	4.80	295.05
WM0009B	S1	23/07/2011	4.74	295.12
WM0009B	S1	9/08/2011	4.90	294.96
WM0009B	S1	26/08/2011	5.00	294.85
WM0009B	S1	12/09/2011	5.05	294.80
WM0009B	S1	18/09/2011	5.04	294.81
WM0009B	S1	13/10/2011	5.08	294.77
WM0009B	S1	20/10/2011	5.12	294.73
WM0009B	S1	7/11/2011	5.08	294.77
WM0009B	S1	2/12/2011	4.93	294.92
WM0009B	S1	15/12/2011	4.80	295.06
WM0009B	S1	21/01/2012	4.60	295.25
WM0009B	S1	11/02/2012	2.85	297.00
WM0009B	S1	22/02/2012	2.72	297.13
WM0009B	S1	17/03/2012	2.38	297.47
WM0009B	S1	19/03/2012	2.39	297.46
WM0009B	S1	23/03/2012	2.29	297.56
WM0009B	S1	5/04/2012	2.32	297.53
WM0009B	S1	20/04/2012	2.30	297.55
WM0009B	S1	5/05/2012	2.37	297.48
WM0009B	S1	21/05/2012	2.52	297.33
WM0009B	S1	2/06/2012	2.55	297.31
WM0009B	S1	17/06/2012	2.62	297.23
WM0009B	S1	30/06/2012	2.61	297.24
WM0009R	S1	7/03/2010	5.03	294.87
WM0009R	S1	25/03/2010	5.04	294.87
WM0009R	S1	3/05/2010	5.05	294.85
WM0009R	S1	23/06/2010	5.16	294.74
WM0009R	S1	7/07/2010	5.18	294.72
WM0009R	S1	22/07/2010	5.22	294.68
WM0009R	S1	11/08/2010	5.14	294.76
WM0009R	S1	30/08/2010	5.01	294.89
WM0009R	S1	18/09/2010	5.01	294.89
WM0009R	S1	1/10/2010	4.90	295.00
WM0009R	S1	27/10/2010	4.75	295.15
WM0009R	S1	4/11/2010	4.72	295.19
WM0009R	S1	8/11/2010	4.74	295.16
WM0009R	S1	14/11/2010	4.70	295.20
WM0009R	S1	17/11/2010	4.65	295.25
WM0009R	S1	12/12/2010	4.42	295.48
WM0009R	S1	11/01/2011	4.03	295.87
WM0009R	S1	25/01/2011	3.98	295.92
WM0009R	S1	28/01/2011	3.99	295.91
WM0009R	S1	8/03/2011	4.10	295.80
WM0009R	S1	24/03/2011	4.17	295.73
WM0009R	S1	30/03/2011	4.22	295.68
WM0009R	S1	22/04/2011	4.35	295.56
WM0009R	S1	6/05/2011	4.65	295.26
WM0009R	S1	17/05/2011	4.73	295.17
WM0009R	S1	7/06/2011	4.73	295.18
WM0009R	S1	21/06/2011	4.76	295.14
WM0009R	S1	5/07/2011	4.72	295.18
WM0009R	S1	23/07/2011	4.90	295.00
WM0009R	S1	9/08/2011	4.76	295.14
WM0009R	S1	26/08/2011	4.82	295.08
WM0009R	S1	12/09/2011	4.85	295.05
WM0009R	S1	18/09/2011	4.86	295.04
WM0009R	S1	13/10/2011	4.90	295.01
WM0009R	S1	20/10/2011	4.40	295.50
WM0009R	S1	7/11/2011	4.92	294.98
WM0009R	S1	2/12/2011	4.85	295.05
WM0009R	S1	15/12/2011	4.78	295.12
WM0009R	S1	21/01/2012	4.65	295.25
WM0009R	S1	11/02/2012	4.41	295.49
WM0009R	S1	22/02/2012	4.27	295.64
WM0009R	S1	17/03/2012	4.01	295.89
WM0009R	S1	19/03/2012	4.00	295.90
WM0009R	S1	23/03/2012	3.96	295.94
WM0009R	S1	5/04/2012	3.93	295.97
WM0009R	S1	20/04/2012	3.88	296.02
WM0009R	S1	5/05/2012	3.87	296.04
WM0009R	S1	21/05/2012	3.89	296.02
WM0009R	S1	2/06/2012	3.91	296.00
WM0009R	S1	17/06/2012	3.89	296.01
WM0009R	S1	30/06/2012	3.89	296.02
WM0011	S1	24/06/2010	2.53	291.30
WM0011	S1	4/07/2010	2.10	292.73
WM0011	S1	3/02/2011	1.74	292.99
WM0011	S1	4/02/2011	1.74	292.09
WM0011	S1	7/03/2011	2.14	291.69
WM0011	S1	29/03/2011	2.42	291.41
WM0011	S1	22/04/2011	2.33	291.50
WM0011	S1	16/05/2011	2.51	291.32
WM0011	S1	7/06/2011	2.56	291.27
WM0011	S1	21/06/2011	2.56	291.27
WM0011	S1	4/07/2011	2.59	291.24
WM0011	S1	7/07/2011	2.60	291.22
WM0011	S1	23/07/2011	2.64	291.19
WM0011	S1	26/08/2011	2.68	291.14
WM0011	S1	12/09/2011	2.71	291.12
WM0011	S1	23/09/2011	2.71	291.12
WM0011	S1	13/10/2011	2.59	291.24
WM0011	S1	9/11/2011	2.71	291.12
WM0011	S1	15/12/2011	1.92	291.91
WM0011	S1	26/01/2012	2.24	291.59
WM0011	S1	24/03/2012	2.36	291.47



Bore ID	Installation Type	Date_Time	SWL (m btoc)	RWL (mAHd)
WM0011	S1	26/03/2012	2.38	291.45
WM0011	S1	4/04/2012	2.48	291.35
WM0011	S1	20/04/2012	2.58	291.25
WM0011	S1	4/05/2012	2.65	291.18
WM0011	S1	8/05/2012	2.70	291.13
WM0011	S1	21/05/2012	2.72	291.11
WM0011	S1	1/06/2012	2.76	291.07
WM0011	S1	16/06/2012	2.80	291.03
WM0011	S1	1/07/2012	2.84	290.99
WM0011A	S1	22/04/2011	4.14	288.94
WM0011A	S1	6/05/2011	4.75	288.53
WM0011A	S1	16/05/2011	4.10	288.98
WM0011A	S1	7/06/2011	4.10	288.98
WM0011A	S1	21/06/2011	4.08	289.00
WM0011A	S1	4/07/2011	4.08	289.00
WM0011A	S1	7/07/2011	4.08	289.00
WM0011A	S1	23/07/2011	4.09	288.98
WM0011A	S1	26/08/2011	4.17	288.91
WM0011A	S1	12/09/2011	4.22	288.86
WM0011A	S1	23/09/2011	4.29	288.79
WM0011A	S1	13/10/2011	4.29	288.79
WM0011A	S1	9/11/2011	4.40	288.68
WM0011A	S1	15/12/2011	4.26	288.82
WM0011A	S1	26/01/2012	4.27	288.81
WM0011A	S1	24/03/2012	4.24	288.84
WM0011A	S1	26/03/2012	4.24	288.84
WM0011A	S1	4/04/2012	4.24	288.84
WM0011A	S1	21/04/2012	4.29	288.79
WM0011A	S1	4/05/2012	4.33	288.75
WM0011A	S1	15/05/2012	3.38	289.70
WM0011A	S1	21/05/2012	4.39	288.69
WM0011A	S1	1/06/2012	4.39	288.69
WM0011A	S1	16/06/2012	4.37	288.71
WM0011A	S1	1/07/2012	4.38	288.70
WM0012	S1	4/05/2010	4.78	288.12
WM0012	S1	23/06/2010	4.82	288.08
WM0012	S1	6/07/2010	4.77	288.13
WM0012	S1	22/07/2010	4.74	288.16
WM0012	S1	13/08/2010	4.54	288.37
WM0012	S1	30/08/2010	4.42	288.48
WM0012	S1	17/09/2010	4.34	288.56
WM0012	S1	3/10/2010	4.25	288.65
WM0012	S1	21/10/2010	4.21	288.69
WM0012	S1	27/10/2010	4.19	288.71
WM0012	S1	14/11/2010	4.09	288.81
WM0012	S1	17/11/2010	4.06	288.84
WM0012	S1	14/12/2010	3.83	289.07
WM0012	S1	11/01/2011	3.65	289.25
WM0012	S1	27/01/2011	3.62	289.28
WM0012	S1	3/02/2011	3.85	289.05
WM0012	S1	7/03/2011	3.78	289.12
WM0012	S1	29/03/2011	3.94	288.96
WM0012	S1	22/04/2011	4.27	288.63
WM0012	S1	6/05/2011	4.36	288.55
WM0012	S1	16/05/2011	4.41	288.49
WM0012	S1	2/06/2011	4.43	288.48
WM0012	S1	21/06/2011	4.47	288.43
WM0012	S1	4/07/2011	4.50	288.40
WM0012	S1	23/07/2011	4.53	288.37
WM0012	S1	8/08/2011	4.75	288.15
WM0012	S1	26/08/2011	4.60	288.31
WM0012	S1	12/09/2011	4.58	288.32
WM0012	S1	22/09/2011	4.70	288.20
WM0012	S1	13/10/2011	4.63	288.27
WM0012	S1	9/11/2011	4.69	288.21
WM0012	S1	2/12/2011	4.62	288.29
WM0012	S1	15/12/2011	4.56	288.34
WM0012	S1	21/01/2012	4.52	288.38
WM0012	S1	10/02/2012	4.37	288.53
WM0012	S1	23/02/2012	4.32	288.58
WM0012	S1	9/03/2012	4.25	288.66
WM0012	S1	18/03/2012	4.43	288.47
WM0012	S1	24/03/2012	4.21	288.69
WM0012	S1	4/04/2012	4.20	288.70
WM0012	S1	20/04/2012	4.20	288.70
WM0012	S1	4/05/2012	4.18	288.72
WM0012	S1	21/05/2012	4.16	288.75
WM0012	S1	1/06/2012	4.18	288.72
WM0012	S1	17/06/2012	4.14	288.76
WM0012	S1	1/07/2012	4.14	288.77
WM0012	V1	4/05/2010	7.32	284.88
WM0012	V1	23/06/2010	7.55	284.65
WM0012	V1	22/07/2010	7.67	284.53
WM0012	V1	13/08/2010	7.72	284.48
WM0012	V1	30/08/2010	7.72	284.48
WM0012	V1	17/09/2010	7.67	284.53
WM0012	V1	3/10/2010	7.67	284.53
WM0012	V1	27/10/2010	7.72	284.48
WM0012	V1	14/11/2010	7.67	284.53
WM0012	V1	17/11/2010	7.72	284.48
WM0012	V1	14/12/2010	7.55	284.65
WM0012	V1	11/01/2011	7.50	284.70
WM0012	V1	27/01/2011	7.50	284.70
WM0012	V1	7/03/2011	7.55	284.65
WM0012	V1	23/03/2011	7.72	284.48
WM0012	V1	22/04/2011	7.95	284.25
WM0012	V1	6/05/2011	7.95	284.25
WM0012	V1	16/05/2011	7.90	284.30
WM0012	V1	2/06/2011	7.95	284.25
WM0012	V1	21/06/2011	7.95	284.25
WM0012	V1	4/07/2011	7.95	284.25
WM0012	V1	23/07/2011	7.95	284.25
WM0012	V1	26/08/2011	7.95	284.25
WM0012	V1	12/09/2011	7.90	284.30
WM0012	V1	13/10/2011	9.50	282.70
WM0012	V1	9/11/2011	8.13	284.08
WM0012	V1	2/12/2011	7.95	284.25
WM0012	V1	15/12/2011	8.01	284.19
WM0012	V1	21/01/2012	8.01	284.19
WM0012	V1	10/02/2012	8.01	284.19
WM0012	V1	23/02/2012	7.95	284.25
WM0012	V1	9/03/2012	7.95	284.25
WM0012	V1	24/03/2012	7.95	284.25
WM0012	V1	20/05/2012	8.47	283.73
WM0012	V1	1/06/2012	7.78	284.42
WM0012	V1	17/06/2012	7.78	284.42
WM0012	V1	1/07/2012	7.78	284.42
WM0012	V2	4/05/2010	3.26	289.64
WM0012	V2	23/06/2010	3.51	289.39
WM0012	V2	22/07/2010	3.63	289.27
WM0012	V2	13/08/2010	3.68	289.22

Bore ID	Installation Type	Date_Time	SWL (m btoc)	RWL (mAHd)
WM0012	V2	30/08/2010	3.60	289.30
WM0012	V2	17/09/2010	3.63	289.27
WM0012	V2	3/10/2010	3.63	289.27
WM0012	V2	27/10/2010	3.77	289.13
WM0012	V2	14/11/2010	3.99	288.91
WM0012	V2	17/11/2010	3.88	289.02
WM0012	V2	14/12/2010	3.77	289.13
WM0012	V2	11/01/2011	3.71	289.19
WM0012	V2	27/01/2011	3.74	289.16
WM0012	V2	7/03/2011	3.85	289.05
WM0012	V2	23/03/2011	3.99	288.91
WM0012	V2	22/04/2011	4.10	288.80
WM0012	V2	6/05/2011	4.10	288.80
WM0012	V2	16/05/2011	4.04	288.86
WM0012	V2	2/06/2011	4.13	288.77
WM0012	V2	21/06/2011	4.30	288.60
WM0012	V2	4/07/2011	4.27	288.63
WM0012	V2	23/07/2011	4.30	288.60
WM0012	V2	26/08/2011	4.30	288.60
WM0012	V2	12/09/2011	4.35	287.85
WM0012	V2	13/10/2011	4.41	287.79
WM0012	V2	9/11/2011	4.52	287.68
WM0012	V2	2/12/2011	4.41	287.79
WM0012	V2	15/12/2011	4.41	287.79
WM0012	V2	21/01/2012	4.38	287.82
WM0012	V2	10/02/2012	4.24	287.96
WM0012	V2	23/02/2012	4.04	288.16
WM0012	V2	9/03/2012	3.99	288.21
WM0012	V2	24/03/2012	3.93	288.27
WM0012	V2	20/05/2012	3.99	288.91
WM0012	V2	1/06/2012	3.90	289.00
WM0012	V2	17/06/2012	3.90	289.00
WM0012A	S1	4/05/2010	4.19	289.73
WM0012A	S1	23/06/2010	4.23	289.70
WM0012A	S1	13/07/2010	4.03	289.89
WM0012A	S1	22/07/2010	3.96	289.97
WM0012A	S1	13/08/2010	3.55	290.37
WM0012A	S1	30/08/2010	3.45	290.47
WM0012A	S1	17/09/2010	3.43	290.49
WM0012A	S1	3/10/2010	3.49	290.43
WM0012A	S1	21/10/2010	3.41	290.51
WM0012A	S1	27/10/2010	3.50	290.42
WM0012A	S1	17/11/2010	3.37	290.55
WM0012A	S1	14/12/2010	2.68	291.25
WM0012A	S1	11/01/2011	2.90	291.02
WM0012A	S1	27/01/2011	3.01	290.92
WM0012A	S1	3/02/2011	3.13	290.79
WM0012A	S1	7/03/2011	3.49	290.43
WM0012A	S1	29/03/2011	3.64	290.28
WM0012A	S1	22/04/2011	3.67	290.25
WM0012A	S1	6/05/2011	3.79	290.13
WM0012A	S1	16/05/2011	3.89	290.03
WM0012A	S1	2/06/2011	3.87	290.05
WM0012A	S1	21/06/2011	3.77	290.16
WM0012A	S1	4/07/2011	3.78	290.15
WM0012A	S1	23/07/2011	3.81	290.12
WM0012A	S1	8/08/2011	3.76	290.16
WM0012A	S1	26/08/2011	3.85	290.08
WM0012A	S1	12/09/2011	3.85	290.07
WM0012A	S1	22/09/2011	3.84	290.08
WM0012A	S1	13/10/2011	3.84	290.08
WM0012A	S1	9/11/2011	3.91	290.01
WM0012A	S1	2/12/2011	3.58	290.35
WM0012A	S1	15/12/2011	3.52	290.40
WM0012A	S1	21/01/2012	3.63	290.29
WM0012A	S1	10/02/2012	3.24	290.68
WM0012A	S1	23/02/2012	3.27	290.65
WM0012A	S1	9/03/2012	3.23	290.69
WM0012A	S1	18/03/2012	3.31	290.61
WM0012A	S1	24/03/2012	3.33	290.59
WM0012A	S1	4/04/2012	3.37	290.55
WM0012A	S1	20/04/2012	3.44	290.48
WM0012A	S1	4/05/2012	3.48	290.45
WM0012A	S1	21/05/2012	3.54	290.38
WM0012A	S1	1/06/2012	3.52	290.41
WM0012A	S1	17/06/2012	3.48	290.45
WM0012A	S1	1/07/2012	3.44	290.48
WM0014	V1	27/04/2010	12.77	290.00
WM0014	V1	4/05/2010	12.91	289.86
WM0014	V1	23/06/2010	13.17	289.60
WM0014	V1	21/07/2010	13.20	289.57
WM0014	V1	11/08/2010	13.34	289.43
WM0014	V1	30/08/2010	13.20	289.57
WM0014	V1	17/09/2010	13.28	289.49
WM0014	V1	3/10/2010	13.28	289.49
WM0014	V1	27/10/2010	13.37	289.40
WM0014	V1	14/11/2010	13.34	289.43
WM0014	V1	17/11/2010	13.34	289.43
WM0014	V1	14/12/2010	13.34	289.43
WM0014	V1	14/01/2011	13.34	289.43
WM0014	V1	25/01/2011	13.37	289.40
WM0014	V1	8/03/2011	12.77	290.00
WM0014	V1	23/03/2011	13.22	289.55
WM0014	V1	6/05/2011	11.06	291.71
WM0014	V1	17/05/2011	10.24	292.53
WM0014	V1	7/06/2011	9.30	293.47
WM0014	V1	21/06/2011	8.90	293.87
WM0014	V1	5/07/2011	8.67	294.10
WM0014	V1	21/07/2011	8.28	294.49
WM0014	V1	9/08/2011	7.96	294.81
WM0014	V1	27/08/2011	7.59	295.18
WM0014	V1	12/09/2011	7.42	295.35
WM0014	V1	23/09/2011	7.38	295.38
WM0014	V1	13/10/2011	7.25	295.52
WM0014	V1	1/11/2011	7.20	295.58
WM0014	V1	2/12/2011	7.05	295.72
WM0014	V1	14/12/2011	7.00	295.77
WM0014	V1	26/01/2012	6.94	295.83
WM0014	V1	14/02/2012	6.60	296.17
WM0014	V1	23/02/2012	6.51	296.26
WM0014	V1	23/03/2012	6.31	296.46
WM0014	V1	20/04/2012	6.06	296.71
WM0014	V1	24/05/2012	6.17	296.60
WM0014	V1	2/06/2012	6.09	296.68
WM0014	V1	17/06/2012	5.97	296.80
WM0014	V1	1/07/2012	5.97	296.80
WM0014	V2	27/04/2010	10.83	291.94
WM0014	V2	4/05/2010	10.83	291.94
WM0014	V2	23/06/2010	11.40	291.37
WM0014	V2	21/07/2010	11.60	291.17
WM0014	V2	11/08/2010	11.80	290.97



Bore ID	Installation Type	Date_Time	SWL (m btoc)	RWL (mAHD)
WM0014	V2	30/08/2010	11.80	290.97
WM0014	V2	17/09/2010	11.92	290.85
WM0014	V2	3/10/2010	11.97	290.80
WM0014	V2	27/10/2010	12.09	290.68
WM0014	V2	14/11/2010	12.09	290.68
WM0014	V2	17/11/2010	12.09	290.68
WM0014	V2	14/12/2010	12.09	290.68
WM0014	V2	14/01/2011	12.12	290.65
WM0014	V2	25/01/2011	12.20	290.57
WM0014	V2	8/03/2011	12.06	290.71
WM0014	V2	23/03/2011	12.03	290.74
WM0014	V2	21/06/2011	8.52	294.25
WM0014	V2	5/07/2011	8.61	294.16
WM0014	V2	21/07/2011	8.01	294.76
WM0014	V2	9/08/2011	7.69	295.08
WM0014	V2	27/08/2011	7.35	295.42
WM0014	V2	12/09/2011	7.12	295.65
WM0014	V2	23/09/2011	7.12	295.65
WM0014	V2	13/10/2011	6.98	295.79
WM0014	V2	1/11/2011	6.92	295.85
WM0014	V2	2/12/2011	6.72	296.05
WM0014	V2	14/12/2011	6.67	296.10
WM0014	V2	26/01/2012	6.58	296.19
WM0014	V2	14/02/2012	6.24	296.53
WM0014	V2	23/02/2012	6.12	296.65
WM0014	V2	23/03/2012	5.92	296.85
WM0014	V2	20/04/2012	5.67	297.10
WM0014	V2	24/05/2012	5.70	297.07
WM0014	V2	2/06/2012	5.61	297.16
WM0014	V2	17/06/2012	5.47	297.30
WM0014	V2	1/07/2012	5.44	297.33
WM0019L	S1	23/04/2011	33.10	295.42
WM0019L	S1	18/05/2011	33.07	295.46
WM0019L	S1	7/06/2011	33.01	295.51
WM0019L	S1	20/06/2011	33.00	295.52
WM0019L	S1	6/07/2011	33.01	295.51
WM0019L	S1	24/07/2011	33.01	295.51
WM0019L	S1	24/08/2011	33.06	295.46
WM0019L	S1	10/09/2011	33.00	295.52
WM0019L	S1	23/09/2011	33.03	295.49
WM0019L	S1	13/10/2011	33.01	295.51
WM0019L	S1	7/11/2011	33.11	295.42
WM0019L	S1	24/11/2011	33.00	295.52
WM0019L	S1	15/12/2011	32.98	295.54
WM0019L	S1	26/01/2012	32.98	295.54
WM0019L	S1	21/02/2012	32.89	295.63
WM0019L	S1	17/03/2012	32.93	295.59
WM0019L	S1	22/03/2012	32.91	295.61
WM0019L	S1	4/04/2012	32.93	295.59
WM0019L	S1	20/04/2012	32.93	295.59
WM0019L	S1	4/05/2012	32.92	295.61
WM0019L	S1	23/05/2012	32.95	295.57
WM0019L	S1	1/06/2012	32.91	295.61
WM0019L	S1	16/06/2012	32.88	295.65
WM0019L	S1	30/06/2012	32.86	295.67
WM0021	S1	13/09/2009	55.70	294.19
WM0021	S1	12/10/2009	56.65	293.24
WM0021	S1	18/10/2009	56.89	293.00
WM0021	S1	28/10/2009	56.85	293.05
WM0021	S1	1/11/2009	56.86	293.03
WM0021	S1	10/11/2009	56.86	293.03
WM0021	S1	12/11/2009	56.86	293.03
WM0021	S1	18/11/2009	56.82	293.11
WM0021	S1	27/11/2009	56.81	293.13
WM0021	S1	13/12/2009	56.83	293.15
WM0021	S1	5/01/2010	55.61	294.37
WM0021	S1	23/01/2010	55.55	294.43
WM0021	S1	2/02/2010	55.55	294.43
WM0021	S1	17/02/2010	56.50	293.49
WM0021	S1	7/03/2010	56.48	293.50
WM0021	S1	25/03/2010	56.57	293.41
WM0021	S1	29/04/2010	56.71	293.27
WM0021	S1	4/05/2010	56.70	293.28
WM0021	S1	23/06/2010	56.84	293.14
WM0021	S1	6/07/2010	56.77	293.21
WM0021	S1	22/07/2010	56.71	293.28
WM0021	S1	12/08/2010	56.35	293.64
WM0021	S1	29/08/2010	56.30	293.68
WM0021	S1	16/09/2010	56.16	293.82
WM0021	S1	5/10/2010	56.15	293.84
WM0021	S1	13/10/2010	56.15	293.83
WM0021	S1	26/10/2010	56.15	293.83
WM0021	S1	14/11/2010	56.02	293.96
WM0021	S1	17/11/2010	56.00	293.98
WM0021	S1	14/12/2010	55.84	294.14
WM0021	S1	14/01/2011	55.78	294.21
WM0021	S1	24/01/2011	55.77	294.21
WM0021	S1	2/02/2011	55.91	294.08
WM0021	S1	8/02/2011	55.91	294.08
WM0021	S1	8/03/2011	56.04	293.94
WM0021	S1	23/03/2011	56.00	293.98
WM0021	S1	17/04/2011	56.15	293.84
WM0021	S1	6/05/2011	56.19	293.79
WM0021	S1	17/05/2011	54.85	295.13
WM0021	S1	6/06/2011	56.23	293.75
WM0021	S1	21/06/2011	56.14	293.84
WM0021	S1	5/07/2011	56.19	293.79
WM0021	S1	22/07/2011	56.20	293.79
WM0021	S1	19/08/2011	56.20	293.78
WM0021	S1	14/09/2011	56.28	293.71
WM0021	S1	23/09/2011	56.26	293.72
WM0021	S1	13/10/2011	56.26	293.72
WM0021	S1	4/11/2011	56.33	293.65
WM0021	S1	20/11/2011	56.40	293.58
WM0021	S1	14/12/2011	56.20	293.78
WM0021	S1	22/01/2012	56.21	293.77
WM0021	S1	10/02/2012	56.10	293.88
WM0021	S1	21/02/2012	56.02	293.96
WM0021	S1	8/03/2012	55.96	294.02
WM0021	S1	16/03/2012	55.90	294.08
WM0021	S1	22/03/2012	55.86	294.12
WM0021	S1	4/04/2012	55.96	294.02
WM0021	S1	22/04/2012	55.99	293.99
WM0021	S1	15/05/2012	55.99	293.99
WM0021	S1	22/05/2012	56.12	293.86
WM0021	S1	1/06/2012	56.03	293.95
WM0021	S1	17/06/2012	55.99	293.99
WM0021	S1	30/06/2012	55.91	294.07
WM0021	V2	13/09/2009	292.30	292.55
WM0021	V2	30/09/2009	292.43	292.43
WM0021	V2	12/10/2009	292.49	292.49

Bore ID	Installation Type	Date_Time	SWL (m btoc)	RWL (mAHD)
WM0021	V2	18/10/2009	56.36	292.49
WM0021	V2	22/10/2009	56.42	292.43
WM0021	V2	28/10/2009	56.42	292.43
WM0021	V2	1/11/2009	56.42	292.43
WM0021	V2	10/11/2009	56.42	292.43
WM0021	V2	12/11/2009	56.42	292.43
WM0021	V2	18/11/2009	56.36	292.49
WM0021	V2	27/11/2009	56.36	292.49
WM0021	V2	13/12/2009	56.59	292.26
WM0021	V2	5/01/2010	56.77	292.08
WM0021	V2	23/01/2010	56.83	292.02
WM0021	V2	2/02/2010	57.01	291.84
WM0021	V2	17/02/2010	57.01	291.84
WM0021	V2	7/03/2010	57.25	291.60
WM0021	V2	25/03/2010	57.37	291.48
WM0021	V2	29/04/2010	57.49	291.36
WM0021	V2	4/05/2010	57.61	291.24
WM0021	V2	23/06/2010	57.79	291.06
WM0021	V2	22/07/2010	57.91	290.94
WM0021	V2	12/08/2010	58.08	290.77
WM0021	V2	29/08/2010	58.03	290.82
WM0021	V2	16/09/2010	58.08	290.77
WM0021	V2	5/10/2010	58.03	290.82
WM0021	V2	26/10/2010	58.08	290.77
WM0021	V2	14/11/2010	58.08	290.77
WM0021	V2	17/11/2010	58.08	290.77
WM0021	V2	14/12/2010	58.08	290.77
WM0021	V2	14/01/2011	58.08	290.77
WM0021	V2	24/01/2011	58.08	290.77
WM0021	V2	8/02/2011	58.08	290.77
WM0021	V2	8/03/2011	58.08	290.77
WM0021	V2	23/03/2011	58.20	290.65
WM0021	V2	17/04/2011	58.08	290.77
WM0021	V2	6/05/2011	58.20	290.65
WM0021	V2	17/05/2011	58.08	290.77
WM0021	V2	6/06/2011	58.20	290.65
WM0021	V2	21/06/2011	58.32	290.53
WM0021	V2	5/07/2011	58.26	290.59
WM0021	V2	24/08/2011	58.38	290.47
WM0021	V2	14/09/2011	58.38	290.47
WM0021	V2	23/09/2011	58.50	290.35
WM0021	V2	13/10/2011	58.50	290.35
WM0021	V2	4/11/2011	58.50	290.35
WM0021	V2	20/11/2011	58.50	290.35
WM0021	V2	14/12/2011	58.56	290.29
WM0021	V2	22/01/2012	58.56	290.29
WM0021	V2	10/02/2012	58.56	290.29
WM0021	V2	21/02/2012	58.50	290.35
WM0021	V2	16/03/2012	58.50	290.35
WM0021	V2	22/03/2012	58.50	290.35
WM0021	V2	22/04/2012	58.50	290.35
WM0021	V2	22/05/2012	58.26	290.59
WM0021	V2	1/06/2012	58.20	290.65
WM0021	V2	17/06/2012	58.20	290.65
WM0021	V2	30/06/2012	58.20	290.65
WM0029	S1	30/09/2009	34.90	316.03
WM0029	S1	13/12/2009	30.20	320.45
WM0029	S1	5/01/2010	31.00	319.65
WM0029	S1	23/01/2010	30.20	320.45
WM0029	V3	29/08/2009	60.54	289.51
WM0029	V3	4/10/2009	58.02	292.03
WM0029	V3	12/10/2009	58.14	291.91
WM0029	V3	18/10/2009	58.49	291.56
WM0029	V3	22/10/2009	58.72	291.33
WM0029	V3	1/11/2009	58.84	291.21
WM0029	V3	10/11/2009	59.01	291.04
WM0029	V3	11/11/2009	59.13	290.92
WM0029	V3	18/11/2009	59.37	290.68
WM0029	V3	27/11/2009	59.66	290.39
WM0029	V3	13/12/2009	59.95	290.10
WM0029	V3	5/01/2010	60.18	289.87
WM0029	V3	23/01/2010	60.36	289.69
WM0029	V3	2/02/2010	60.48	289.57
WM0029	V3	19/02/2010	60.48	289.57
WM0029	V3	7/03/2010	60.54	289.51
WM0029	V3	25/03/2010	61.12	288.93
WM0029	V3	4/05/2010	61.35	288.70
WM0029	V3	23/06/2010	61.47	288.58
WM0029	V3	22/07/2010	61.65	288.40
WM0029	V3	12/08/2010	61.82	288.23
WM0029	V3	29/08/2010	61.76	288.29
WM0029	V3	16/09/2010	61.82	288.23
WM0029	V3	28/09/2010	61.88	288.17
WM0029	V3	26/10/2010	61.76	288.29
WM0029	V3	14/11/2010	62.00	288.05
WM0029	V3	17/11/2010	62.00	288.05
WM0029	V3	12/12/2010	62.06	287.99
WM0029	V3	10/01/2011	62.00	288.05
WM0029	V3	24/01/2011	62.00	288.05
WM0029	V3	8/03/2011	62.00	288.05
WM0029	V3	23/03/2011	62.17	287.88
WM0029	V3	17/04/2011	63.75	286.30
WM0029	V3	5/05/2011	62.17	287.88
WM0029	V3	17/05/2011	62.23	287.76
WM0029	V3	6/06/2011	62.29	287.76
WM0029	V3	20/06/2011	62.35	287.70
WM0029	V3	5/07/2011	62.52	287.53
WM0029	V3	22/07/2011	62.47	287.59
WM0029	V3	24/08/2011	62.52	287.53
WM0029	V3	11/09/2011	62.52	287.53
WM0029	V3	23/09/2011	62.41	287.64
WM0029	V3	13/10/2011	62.52	287.53
WM0029	V3	4/11/2011	62.52	287.53
WM0029	V3	24/11/2011	62.47	287.59
WM0029	V3	14/12/2011	62.52	287.53
WM0029	V3	22/01/2012	62.52	287.53
WM0029	V3	10/02/2012	62.52	287.53
WM0029	V3	21/02/2012	62.52	287.53
WM0029	V3	18/03/2012	62.47	287.59
WM0029	V3	29/03/2012	62.52	287.53
WM0029	V3	4/04/2012	62.52	287.53
WM0029	V3	21/04/2012	63.52	286.53
WM0029	V3	22/05/2012	64.52	285.53
WM0029	V3	1/06/2012	65.70	284.70
WM0029	V3	17/06/2012	66.52	283.53
WM0029	V3	30/06/2012	67.64	282.41
WM0035A	S1	14/10/2009	22.42	305.90
WM0035A	S1	18/10/2009	22.68	305.64
WM0035A	S1	23/10/2009	22.59	305.73
WM0035A	S1	1/11/2009	22.71	305.61
WM0035A	S1	10/11/2009	22.78	305.55



Bore ID	Installation Type	Date_Time	SWL (m btoc)	RWL (mAHd)
WM0035A	S1	11/11/2009	22.84	305.48
WM0035A	S1	18/11/2009	22.70	305.62
WM0035A	S1	27/11/2009	22.95	305.37
WM0035A	S1	13/12/2009	22.85	305.47
WM0035A	S1	5/01/2010	23.01	305.31
WM0035A	S1	23/01/2010	23.20	305.12
WM0035A	S1	2/02/2010	23.09	305.29
WM0035A	S1	19/02/2010	23.12	305.20
WM0035A	S1	7/03/2010	23.08	305.24
WM0035A	S1	24/03/2010	23.24	305.08
WM0035A	S1	4/05/2010	23.26	305.07
WM0035A	S1	23/06/2010	23.43	304.90
WM0035A	S1	9/07/2010	23.38	304.95
WM0035A	S1	22/07/2010	23.47	304.85
WM0035A	S1	12/08/2010	23.29	305.03
WM0035A	S1	29/08/2010	23.43	304.89
WM0035A	S1	18/09/2010	23.41	304.91
WM0035A	S1	28/09/2010	23.39	304.94
WM0035A	S1	9/10/2010	23.47	304.86
WM0035A	S1	26/10/2010	23.51	304.81
WM0035A	S1	14/11/2010	23.47	304.85
WM0035A	S1	17/11/2010	23.45	304.87
WM0035A	S1	12/12/2010	23.40	304.92
WM0035A	S1	10/01/2011	23.45	304.87
WM0035A	S1	22/01/2011	23.49	304.83
WM0035A	S1	24/01/2011	23.49	304.83
WM0035A	S1	7/03/2011	23.57	304.75
WM0035A	S1	23/03/2011	23.42	304.90
WM0035A	S1	15/04/2011	23.50	304.82
WM0035A	S1	17/04/2011	23.97	304.35
WM0035A	S1	5/05/2011	23.57	304.75
WM0035A	S1	17/05/2011	23.62	304.70
WM0035A	S1	6/06/2011	23.54	304.78
WM0035A	S1	20/06/2011	23.54	304.79
WM0035A	S1	5/07/2011	23.52	304.80
WM0035A	S1	9/07/2011	23.57	304.75
WM0035A	S1	22/07/2011	23.63	304.70
WM0035A	S1	24/08/2011	23.62	304.70
WM0035A	S1	11/09/2011	23.49	304.83
WM0035A	S1	23/09/2011	23.51	304.81
WM0035A	S1	13/10/2011	23.47	304.85
WM0035A	S1	4/11/2011	23.67	304.65
WM0035A	S1	24/11/2011	23.46	304.87
WM0035A	S1	14/12/2011	23.39	304.93
WM0035A	S1	22/01/2012	23.48	304.84
WM0035A	S1	10/02/2012	23.30	305.02
WM0035A	S1	21/02/2012	23.33	304.99
WM0035A	S1	6/03/2012	23.39	304.93
WM0035A	S1	18/03/2012	23.41	304.91
WM0035A	S1	22/03/2012	23.30	305.02
WM0035A	S1	4/04/2012	23.35	304.97
WM0035A	S1	21/04/2012	23.28	305.04
WM0035A	S1	4/05/2012	23.34	304.99
WM0035A	S1	6/05/2012	23.34	304.98
WM0035A	S1	22/05/2012	23.41	304.92
WM0035A	S1	1/06/2012	23.39	304.94
WM0035A	S1	17/06/2012	23.34	304.98
WM0035A	S1	30/06/2012	23.25	305.08
WM0036C	S1	22/03/2011	42.03	301.10
WM0036C	S1	5/05/2011	41.14	302.00
WM0036C	S1	16/05/2011	39.82	303.31
WM0036C	S1	2/06/2011	41.24	301.89
WM0036C	S1	20/06/2011	39.96	303.17
WM0036C	S1	4/07/2011	39.84	303.30
WM0036C	S1	22/07/2011	39.53	303.60
WM0036C	S1	25/07/2011	39.67	303.46
WM0036C	S1	24/08/2011	39.53	303.61
WM0036C	S1	11/09/2011	39.40	303.74
WM0036C	S1	23/09/2011	39.32	303.81
WM0036C	S1	14/10/2011	39.23	303.90
WM0036C	S1	27/10/2011	39.21	303.92
WM0036C	S1	9/11/2011	39.15	303.99
WM0036C	S1	20/11/2011	39.10	304.03
WM0036C	S1	14/12/2011	38.98	304.15
WM0036C	S1	22/01/2012	38.91	304.22
WM0036C	S1	11/02/2012	38.75	304.38
WM0036C	S1	21/02/2012	38.70	304.43
WM0036C	S1	16/03/2012	38.54	304.59
WM0036C	S1	22/03/2012	38.45	304.68
WM0036C	S1	5/04/2012	38.36	304.77
WM0036C	S1	20/04/2012	38.16	304.97
WM0036C	S1	4/05/2012	37.95	305.18
WM0036C	S1	22/05/2012	38.75	304.39
WM0036C	S1	1/06/2012	37.58	305.55
WM0036C	S1	16/06/2012	37.35	305.79
WM0036C	S1	30/06/2012	37.13	306.01
WM0036L	S1	22/04/2011	41.32	300.72
WM0036L	S1	5/05/2011	41.14	300.91
WM0036L	S1	16/05/2011	39.58	302.47
WM0036L	S1	2/06/2011	39.14	302.91
WM0036L	S1	20/06/2011	38.85	303.20
WM0036L	S1	4/07/2011	38.72	303.33
WM0036L	S1	22/07/2011	39.05	303.00
WM0036L	S1	25/07/2011	39.17	302.88
WM0036L	S1	24/08/2011	38.38	303.67
WM0036L	S1	11/09/2011	37.28	304.77
WM0036L	S1	23/09/2011	38.22	303.83
WM0036L	S1	14/10/2011	38.04	304.01
WM0036L	S1	9/11/2011	37.96	304.09
WM0036L	S1	20/11/2011	37.92	304.13
WM0036L	S1	14/12/2011	38.78	303.27
WM0036L	S1	22/01/2012	37.73	304.32
WM0036L	S1	11/02/2012	37.57	304.48
WM0036L	S1	21/02/2012	37.53	304.52
WM0036L	S1	16/03/2012	37.37	304.68
WM0036L	S1	22/03/2012	37.27	304.78
WM0036L	S1	5/04/2012	37.17	304.88
WM0036L	S1	20/04/2012	36.95	305.10
WM0036L	S1	4/05/2012	36.75	305.30
WM0036L	S1	22/05/2012	36.54	305.51
WM0036L	S1	1/06/2012	36.36	305.69
WM0036L	S1	16/06/2012	36.01	306.03
WM0036L	S1	30/06/2012	35.92	306.13
WM0038L	S1	20/06/2011	38.23	304.96
WM0038L	S1	4/07/2011	38.19	305.01
WM0038L	S1	24/08/2011	39.99	303.20
WM0038L	S1	12/09/2011	39.99	303.20
WM0038L	S1	23/09/2011	37.88	305.31
WM0038L	S1	12/10/2011	37.80	305.40
WM0038L	S1	9/11/2011	37.72	305.47
WM0038L	S1	2/12/2011	37.61	305.58

Bore ID	Installation Type	Date Time	SWL (m btoc)	RWL (mAHd)
WM0038L	S1	14/12/2011	37.56	305.64
WM0038L	S1	22/01/2012	37.53	305.66
WM0038L	S1	12/02/2012	37.39	305.80
WM0038L	S1	21/02/2012	37.35	305.84
WM0038L	S1	16/03/2012	37.34	305.86
WM0038L	S1	22/03/2012	37.29	305.90
WM0038L	S1	5/04/2012	37.26	305.93
WM0038L	S1	20/04/2012	37.15	306.04
WM0038L	S1	4/05/2012	37.65	305.54
WM0038L	S1	22/05/2012	36.98	306.22
WM0038L	S1	1/06/2012	36.88	306.32
WM0038L	S1	15/06/2012	36.73	306.47
WM0038L	S1	30/06/2012	36.61	306.58
WM0042A	S1	15/11/2009	6.64	310.79
WM0042A	S1	25/11/2009	36.63	281.37
WM0042A	S1	27/11/2009	35.48	282.52
WM0042A	S1	30/11/2009	34.68	283.62
WM0042A	S1	5/01/2010	31.38	286.62
WM0042A	S1	23/01/2010	30.98	287.02
WM0042A	S1	2/02/2010	30.27	287.17
WM0042A	S1	7/03/2010	25.82	291.63
WM0042A	S1	27/03/2010	23.71	293.75
WM0042A	S1	3/05/2010	20.37	297.09
WM0042A	S1	23/06/2010	17.54	299.86
WM0042A	S1	8/07/2010	17.09	300.31
WM0042A	S1	23/07/2010	37.37	280.03
WM0042A	S1	14/08/2010	35.51	281.88
WM0042A	S1	29/08/2010	34.58	282.82
WM0042A	S1	17/09/2010	33.38	284.02
WM0042A	S1	1/10/2010	32.14	285.26
WM0042A	S1	26/10/2010	29.51	287.89
WM0042A	S1	30/10/2010	29.13	288.27
WM0042A	S1	3/11/2010	39.18	278.22
WM0042A	S1	14/12/2010	36.56	280.84
WM0042A	S1	13/01/2011	34.55	282.85
WM0042A	S1	23/01/2011	33.93	283.47
WM0042A	S1	7/03/2011	37.05	280.35
WM0042A	S1	24/03/2011	35.71	281.69
WM0042A	S1	3/04/2011	35.22	282.17
WM0042A	S1	22/04/2011	38.55	278.84
WM0042A	S1	6/05/2011	37.70	279.70
WM0042A	S1	18/05/2011	36.98	280.42
WM0042A	S1	3/06/2011	35.80	281.60
WM0042A	S1	21/06/2011	34.88	282.52
WM0042A	S1	5/07/2011	34.14	283.26
WM0042A	S1	24/07/2011	38.33	279.07
WM0042A	S1	14/08/2011	32.15	285.25
WM0042A	S1	27/08/2011	37.05	280.35
WM0042A	S1	12/09/2011	34.95	282.45
WM0042A	S1	19/09/2011	36.53	280.87
WM0042A	S1	14/10/2011	37.97	279.43
WM0042A	S1	10/11/2011	36.62	280.78
WM0042A	S1	2/12/2011	35.13	282.27
WM0042A	S1	15/12/2011	34.52	282.88
WM0042A	S1	12/02/2012	30.26	287.14
WM0042A	S1	24/02/2012	29.25	288.15
WM0042A	S1	18/03/2012	27.41	289.99
WM0042A	S1	23/03/2012	27.00	290.40
WM0042A	S1	6/04/2012	26.03	291.37
WM0042A	S1	20/04/2012	25.09	292.31
WM0042A	S1	6/05/2012	24.12	293.28
WM0042A	S1	23/05/2012	23.25	294.15
WM0042A	S1	2/06/2012	22.79	294.61
WM0042A	S1	16/06/2012	22.25	295.15
WM0042A	S1	30/06/2012	37.66	279.74
WM0045	S1	17/09/2009	11.10	350.33
WM0045	S1	14/10/2009	12.24	349.19
WM0045	S1	25/10/2009	12.28	349.16
WM0045	S1	16/12/2009	12.46	348.97
WM0045	S1	5/01/2010	12.48	348.95
WM0045	S1	23/01/2010	12.40	349.03
WM0045	S1	2/02/2010	12.35	349.08
WM0045	S1	27/03/2010	12.12	349.32
WM0045	S1	3/05/2010	12.07	349.37
WM0045	S1	23/06/2010	12.10	349.34
WM0045	S1	10/07/2010	12.10	349.34
WM0045	S1	23/07/2010	12.12	349.32
WM0045	S1	14/08/2010	12.03	349.40
WM0045	S1	29/08/2010	11.98	349.45
WM0045	S1	18/09/2010	11.90	349.53
WM0045	S1	1/10/2010	11.82	349.61
WM0045	S1	7/10/2010	11.80	349.63
WM0045	S1	9/11/2010	11.78	349.65
WM0045	S1	14/12/2010	11.45	349.98
WM0045	S1	13/01/2011	11.04	350.40
WM0045	S1	23/01/2011	11.48	349.95
WM0045	S1	7/03/2011	10.81	350.62
WM0045	S1	23/03/2011	10.78	350.66
WM0045	S1	5/04/2011	10.81	350.63
WM0045	S1	22/04/2011	10.81	350.63
WM0045	S1	6/05/2011	10.89	350.54
WM0045	S1	18/05/2011	10.89	350.54
WM0045	S1	3/06/2011	10.93	350.50
WM0045	S1	21/06/2011	10.93	350.50
WM0045	S1	5/07/2011	10.99	350.45
WM0045	S1	24/07/2011	11.09	350.34
WM0045	S1	14/08/2011	11.15	350.28
WM0045	S1	27/08/2011	11.19	350.29
WM0045	S1	12/09/2011	11.30	350.14
WM0045	S1	14/10/2011	11.41	350.03
WM0045	S1	26/10/2011	11.46	349.97
WM0045	S1	9/11/2011	11.51	349.92
WM0045	S1	15/12/2011	11.42	350.01
WM0045	S1	14/02/2012	11.29	350.14
WM0045	S1	21/02/2012	11.24	350.19
WM0045	S1	17/03/2012	11.21	350.22
WM0045	S1	22/03/2012	11.20	350.23
WM0045	S1	6/04/2012	11.25	350.18
WM0045	S1	22/04/2012	11.23	350.20
WM0045	S1	25/04/2012	11.28	350.15
WM0045	S1	5/05/2012	11.27	350.16
WM0045	S1	22/05/2012	11.35	350.09
WM0045	S1	29/05/2012	11.34	350.09
WM0045	S1	1/06/2012	11.38	350.06
WM0045	S1	15/06/2012	11.40	350.04
WM0045	S1	30/06/2012	11.40	350.04
WM0055	S1	30/09/2009	13.12	301.32
WM0055	S1	18/10/2009	13.93	301.38
WM0055	S1	25/10/2009	13.86	301.47
WM0055	S1	27/10/2009	13.85	301.47
WM0055	S1	1/11/2009	13.89	301.47



Bore ID	Installation Type	Date_Time	SWL (m btoc)	RWL (mAHD)
WM0055	S1	9/11/2009	13.90	301.42
WM0055	S1	18/11/2009	13.86	301.46
WM0055	S1	29/11/2009	13.87	301.45
WM0055	S1	14/12/2009	13.97	301.35
WM0055	S1	5/01/2010	13.86	301.46
WM0055	S1	23/01/2010	13.94	301.38
WM0055	S1	3/02/2010	13.97	301.35
WM0055	S1	20/02/2010	14.00	301.32
WM0055	S1	6/03/2010	13.19	302.13
WM0055	S1	26/03/2010	14.01	301.31
WM0055	S1	3/05/2010	14.01	301.24
WM0055	S1	24/06/2010	14.18	301.15
WM0055	S1	8/07/2010	14.18	301.14
WM0055	S1	22/07/2010	14.21	301.11
WM0055	S1	11/08/2010	14.09	301.23
WM0055	S1	18/08/2010	14.13	301.20
WM0055	S1	30/08/2010	14.16	301.16
WM0055	S1	16/09/2010	14.19	301.13
WM0055	S1	1/10/2010	14.18	301.14
WM0055	S1	21/10/2010	14.18	301.15
WM0055	S1	27/10/2010	14.14	301.18
WM0055	S1	14/11/2010	14.15	301.17
WM0055	S1	16/11/2010	14.10	301.22
WM0055	S1	14/12/2010	14.01	301.31
WM0055	S1	14/01/2011	13.71	301.61
WM0055	S1	25/01/2011	13.68	301.65
WM0055	S1	1/02/2011	13.69	301.63
WM0055	S1	7/03/2011	13.65	301.67
WM0055	S1	23/03/2011	13.58	301.75
WM0055	S1	12/04/2011	13.61	301.71
WM0055	S1	21/04/2011	13.62	301.71
WM0055	S1	6/05/2011	13.64	301.69
WM0055	S1	17/05/2011	13.66	301.66
WM0055	S1	3/06/2011	13.64	301.69
WM0055	S1	21/06/2011	13.62	301.70
WM0055	S1	5/07/2011	13.67	301.66
WM0055	S1	24/07/2011	13.89	301.44
WM0055	S1	27/07/2011	13.86	301.46
WM0055	S1	26/08/2011	13.77	301.56
WM0055	S1	12/09/2011	13.79	301.53
WM0055	S1	23/09/2011	13.77	301.55
WM0055	S1	14/10/2011	13.79	301.53
WM0055	S1	22/10/2011	13.82	301.50
WM0055	S1	7/11/2011	13.31	302.01
WM0055	S1	24/11/2011	13.83	301.49
WM0055	S1	15/12/2011	13.82	301.50
WM0055	S1	23/01/2012	13.84	301.48
WM0055	S1	11/02/2012	13.66	301.66
WM0055	S1	22/02/2012	13.62	301.70
WM0055	S1	8/03/2012	13.56	301.76
WM0055	S1	17/03/2012	13.53	301.79
WM0055	S1	23/03/2012	13.48	301.84
WM0055	S1	5/04/2012	13.50	301.83
WM0055	S1	20/04/2012	13.43	301.89
WM0055	S1	5/05/2012	13.40	301.92
WM0055	S1	21/05/2012	13.42	301.90
WM0055	S1	2/06/2012	13.39	301.93
WM0055	S1	17/06/2012	13.37	301.95
WM0055	S1	30/06/2012	13.33	301.99
WM0055A	S1	30/09/2009	12.90	302.70
WM0055A	S1	12/10/2009	13.45	302.15
WM0055A	S1	18/10/2009	13.62	301.98
WM0055A	S1	25/10/2009	13.50	302.10
WM0055A	S1	27/10/2009	13.59	302.01
WM0055A	S1	1/11/2009	13.61	302.00
WM0055A	S1	9/11/2009	13.60	302.00
WM0055A	S1	18/11/2009	13.52	302.08
WM0055A	S1	29/11/2009	13.51	302.09
WM0055A	S1	14/12/2009	13.68	301.92
WM0055A	S1	5/01/2010	13.38	302.22
WM0055A	S1	23/01/2010	13.68	301.92
WM0055A	S1	3/02/2010	13.64	301.96
WM0055A	S1	20/02/2010	13.74	301.86
WM0055A	S1	6/03/2010	12.69	302.91
WM0055A	S1	26/03/2010	13.71	301.89
WM0055A	S1	3/05/2010	13.78	301.82
WM0055A	S1	24/06/2010	13.88	301.73
WM0055A	S1	13/07/2010	13.88	301.72
WM0055A	S1	22/07/2010	13.93	301.68
WM0055A	S1	11/08/2010	13.54	301.81
WM0055A	S1	18/08/2010	13.61	301.75
WM0055A	S1	30/08/2010	13.72	301.63
WM0055A	S1	16/09/2010	13.65	301.70
WM0055A	S1	1/10/2010	13.70	301.65
WM0055A	S1	14/10/2010	13.60	301.75
WM0055A	S1	27/10/2010	13.65	301.70
WM0055A	S1	14/11/2010	13.70	301.66
WM0055A	S1	16/11/2010	13.61	301.74
WM0055A	S1	14/12/2010	13.51	301.85
WM0055A	S1	14/01/2011	13.11	302.25
WM0055A	S1	25/01/2011	13.01	302.35
WM0055A	S1	3/02/2011	13.00	302.35
WM0055A	S1	7/03/2011	13.67	301.69
WM0055A	S1	23/03/2011	12.96	302.40
WM0055A	S1	12/04/2011	12.97	302.38
WM0055A	S1	21/04/2011	12.96	302.40
WM0055A	S1	6/05/2011	13.00	302.35
WM0055A	S1	17/05/2011	13.05	302.30
WM0055A	S1	3/06/2011	12.98	302.37
WM0055A	S1	21/06/2011	12.91	302.44
WM0055A	S1	5/07/2011	12.96	302.40
WM0055A	S1	24/07/2011	13.06	302.30
WM0055A	S1	26/08/2011	13.08	302.28
WM0055A	S1	12/09/2011	13.14	302.22
WM0055A	S1	23/09/2011	13.10	302.25
WM0055A	S1	14/10/2011	13.14	302.21
WM0055A	S1	28/10/2011	13.17	302.18
WM0055A	S1	7/11/2011	13.18	302.18
WM0055A	S1	24/11/2011	13.26	302.09
WM0055A	S1	15/12/2011	13.22	302.13
WM0055A	S1	23/01/2012	13.21	302.14
WM0055A	S1	11/02/2012	12.95	302.40
WM0055A	S1	4/03/2012	12.83	302.52
WM0055A	S1	17/03/2012	12.77	302.58
WM0055A	S1	23/03/2012	12.68	302.67
WM0055A	S1	5/04/2012	12.73	302.62
WM0055A	S1	20/04/2012	12.61	302.74
WM0055A	S1	5/05/2012	12.58	302.77
WM0055A	S1	21/05/2012	12.59	302.76
WM0055A	S1	2/06/2012	12.54	302.81
WM0055A	S1	17/06/2012	12.59	302.77

Bore ID	Installation Type	Date_Time	SWL (m btoc)	RWL (mAHD)
WM0055A	S1	30/06/2012	12.46	302.89
WM0059	S1	11/09/2009	9.10	310.26
WM0059	S1	30/09/2009	11.40	307.96
WM0059	S1	8/10/2009	10.75	308.61
WM0059	S1	18/10/2009	10.82	308.54
WM0059	S1	22/10/2009	10.38	308.98
WM0059	S1	27/10/2009	10.28	309.08
WM0059	S1	1/11/2009	10.76	308.60
WM0059	S1	8/11/2009	10.40	308.96
WM0059	S1	18/11/2009	10.53	309.12
WM0059	S1	27/11/2009	10.51	309.14
WM0059	S1	14/12/2009	10.55	309.10
WM0059	S1	5/01/2010	9.95	309.77
WM0059	S1	23/01/2010	10.40	309.32
WM0059	S1	3/02/2010	9.93	309.79
WM0059	S1	16/02/2010	9.92	309.81
WM0059	S1	6/03/2010	10.36	309.36
WM0059	S1	3/05/2010	10.08	309.65
WM0059	S1	24/06/2010	10.50	309.17
WM0059	S1	10/07/2010	10.09	309.58
WM0059	S1	23/07/2010	12.51	307.15
WM0059	S1	11/08/2010	10.68	308.99
WM0059	S1	30/08/2010	10.37	309.30
WM0059	S1	16/09/2010	10.26	309.41
WM0059	S1	3/10/2010	10.16	309.51
WM0059	S1	8/10/2010	10.10	309.57
WM0059	S1	27/10/2010	11.89	307.78
WM0059	S1	13/11/2010	10.96	308.71
WM0059	S1	16/11/2010	10.75	308.92
WM0059	S1	14/12/2010	10.01	309.65
WM0059	S1	14/01/2011	9.82	309.85
WM0059	S1	23/01/2011	9.39	310.28
WM0059	S1	7/03/2011	10.93	308.74
WM0059	S1	23/03/2011	10.35	309.32
WM0059	S1	22/04/2011	15.01	304.66
WM0059	S1	5/05/2011	11.66	308.01
WM0059	S1	17/05/2011	11.34	308.33
WM0059	S1	3/06/2011	10.54	309.13
WM0059	S1	21/06/2011	10.13	309.54
WM0059	S1	5/07/2011	9.56	310.11
WM0059	S1	23/07/2011	13.04	306.62
WM0059	S1	26/08/2011	10.69	308.98
WM0059	S1	12/09/2011	9.84	309.83
WM0059	S1	25/09/2011	9.61	310.06
WM0059	S1	14/10/2011	9.48	310.19
WM0059	S1	10/11/2011	9.84	309.83
WM0059	S1	24/11/2011	9.79	309.88
WM0059	S1	15/12/2011	9.75	309.92
WM0059	S1	23/01/2012	9.34	310.33
WM0059	S1	12/02/2012	12.72	306.95
WM0059	S1	23/02/2012	11.73	307.94
WM0059	S1	4/03/2012	11.17	308.50
WM0059	S1	17/03/2012	13.09	306.58
WM0059	S1	23/03/2012	11.74	307.93
WM0059	S1	5/04/2012	11.23	308.44
WM0059	S1	21/04/2012	10.16	309.51
WM0059	S1	5/05/2012	9.76	309.91
WM0059	S1	23/05/2012	9.82	309.85
WM0059	S1	2/06/2012	9.25	310.42
WM0059	S1	17/06/2012	9.04	310.63
WM0059	S1	1/07/2012	8.84	310.83
WM0060LR	S1	23/04/2011	13.05	327.42
WM0060LR	S1	18/05/2011	12.97	327.49
WM0060LR	S1	3/06/2011	12.94	327.52
WM0060LR	S1	21/06/2011	12.94	327.52
WM0060LR	S1	5/07/2011	12.97	327.49
WM0060LR	S1	23/07/2011	13.01	327.45
WM0060LR	S1	26/08/2011	13.99	326.47
WM0060LR	S1	12/09/2011	13.17	327.29
WM0060LR	S1	25/09/2011	13.02	327.45
WM0060LR	S1	14/10/2011	13.04	327.42
WM0060LR	S1	10/11/2011	13.08	327.38
WM0060LR	S1	24/11/2011	13.05	327.41
WM0060LR	S1	15/12/2011	13.05	327.41
WM0060LR	S1	26/01/2012	12.99	327.47
WM0060LR	S1	11/02/2012	12.69	327.77
WM0060LR	S1	23/02/2012	12.37	328.10
WM0060LR	S1	17/03/2012	12.12	328.34
WM0060LR	S1	23/03/2012	12.08	328.38
WM0060LR	S1	5/04/2012	12.02	328.44
WM0060LR	S1	20/04/2012	11.94	328.52
WM0060LR	S1	5/05/2012	11.90	328.56
WM0060LR	S1	21/05/2012	11.93	328.53
WM0060LR	S1	2/06/2012	11.87	328.59
WM0060LR	S1	17/06/2012	11.85	328.61
WM0060LR	S1	30/06/2012	11.82	328.65
WM0062	S1	12/09/2009	20.80	297.71
WM0062	S1	30/09/2009	24.00	294.51
WM0062	S1	12/10/2009	25.70	292.81
WM0062	S1	18/10/2009	25.77	292.74
WM0062	S1	21/10/2009	25.79	292.72
WM0062	S1	22/10/2009	25.79	292.72
WM0062	S1	27/10/2009	25.75	292.76
WM0062	S1	1/11/2009	25.89	292.62
WM0062	S1	8/11/2009	25.89	292.62
WM0062	S1	18/11/2009	25.88	292.63
WM0062	S1	29/11/2009	25.90	292.61
WM0062	S1	12/12/2009	25.90	291.82
WM0062	S1	5/01/2010	24.43	293.29
WM0062	S1	23/01/2010	25.14	292.58
WM0062	S1	3/02/2010	25.14	292.58
WM0062	S1	16/02/2010	25.12	292.60
WM0062	S1	6/03/2010	25.13	292.59
WM0062	S1	25/03/2010	25.16	292.57
WM0062	S1	3/05/2010	25.16	292.57
WM0062	S1	23/06/2010	25.10	292.62
WM0062	S1	7/07/2010	25.18	292.54
WM0062	S1	23/07/2010	25.05	292.67
WM0062	S1	11/08/2010	25.10	292.62
WM0062	S1	30/08/2010	25.07	292.66
WM0062	S1	16/09/2010	25.04	292.68
WM0062	S1	3/10/2010	25.05	292.67
WM0062	S1	16/10/2010	24.99	292.73
WM0062	S1	26/10/2010	25.01	292.71
WM0062	S1	13/11/2010	24.97	292.75
WM0062	S1	17/11/2010	24.95	292.77
WM0062	S1	12/12/2010	24.87	292.86
WM0062	S1	11/01/2011	24.85	292.88
WM0062	S1	25/01/2011	24.85	292.87
WM0062	S1	30/01/2011	24.87	292.85
WM0062	S1	7/03/2011	24.81	292.92



Bore ID	Installation Type	Date_Time	SWL (m btoc)	RWL (mAHD)
WM0062	S1	23/03/2011	24.78	292.94
WM0062	S1	14/04/2011	24.78	292.95
WM0062	S1	26/04/2011	24.79	292.93
WM0062	S1	5/05/2011	24.77	292.96
WM0062	S1	17/05/2011	24.79	292.93
WM0062	S1	7/06/2011	24.71	293.01
WM0062	S1	21/06/2011	24.71	293.01
WM0062	S1	5/07/2011	24.73	293.00
WM0062	S1	21/07/2011	24.83	292.89
WM0062	S1	16/08/2011	24.87	292.86
WM0062	S1	27/08/2011	24.86	292.86
WM0062	S1	12/09/2011	24.81	292.91
WM0062	S1	23/09/2011	24.81	292.91
WM0062	S1	13/10/2011	24.77	292.95
WM0062	S1	7/11/2011	24.75	292.97
WM0062	S1	23/11/2011	24.73	292.99
WM0062	S1	2/12/2011	24.67	293.06
WM0062	S1	15/12/2011	24.67	293.06
WM0062	S1	23/01/2012	24.66	293.06
WM0062	S1	10/02/2012	24.50	293.22
WM0062	S1	23/02/2012	24.50	293.22
WM0062	S1	6/03/2012	24.45	293.28
WM0062	S1	17/03/2012	24.43	293.29
WM0062	S1	23/03/2012	24.40	293.32
WM0062	S1	6/04/2012	24.39	293.33
WM0062	S1	21/04/2012	25.81	291.91
WM0062	S1	4/05/2012	27.03	290.69
WM0062	S1	21/05/2012	25.99	291.74
WM0062	S1	28/05/2012	25.60	292.12
WM0062	S1	2/06/2012	25.41	292.31
WM0062	S1	17/06/2012	25.04	292.68
WM0062	S1	1/07/2012	24.82	292.90
WM0062	V1	25/08/2009	35.12	281.94
WM0062	V1	12/09/2009	35.12	281.94
WM0062	V1	30/09/2009	35.32	281.74
WM0062	V1	12/10/2009	35.46	281.60
WM0062	V1	18/10/2009	35.40	281.66
WM0062	V1	21/10/2009	35.46	281.60
WM0062	V1	22/10/2009	35.46	281.60
WM0062	V1	27/10/2009	35.43	281.63
WM0062	V1	1/11/2009	35.46	281.60
WM0062	V1	8/11/2009	35.46	281.60
WM0062	V1	18/11/2009	35.65	281.41
WM0062	V1	29/11/2009	35.73	281.33
WM0062	V1	12/12/2009	35.73	281.33
WM0062	V1	5/01/2010	35.73	281.33
WM0062	V1	23/01/2010	35.84	281.22
WM0062	V1	3/02/2010	35.93	281.13
WM0062	V1	16/02/2010	35.93	281.13
WM0062	V1	6/03/2010	35.95	281.11
WM0062	V1	25/03/2010	36.23	280.83
WM0062	V1	3/05/2010	35.95	281.11
WM0062	V1	23/06/2010	35.95	281.11
WM0062	V1	23/07/2010	36.01	281.05
WM0062	V1	11/08/2010	36.12	280.94
WM0062	V1	30/08/2010	36.12	280.94
WM0062	V1	16/09/2010	36.18	280.88
WM0062	V1	3/10/2010	36.15	280.91
WM0062	V1	26/10/2010	36.23	280.83
WM0062	V1	13/11/2010	36.32	280.74
WM0062	V1	17/11/2010	36.32	280.74
WM0062	V1	12/12/2010	36.43	280.63
WM0062	V1	11/01/2011	36.79	280.27
WM0062	V1	25/01/2011	36.95	280.11
WM0062	V1	7/03/2011	37.29	279.77
WM0062	V1	23/03/2011	37.62	279.44
WM0062	V1	26/04/2011	37.62	279.44
WM0062	V1	5/05/2011	37.76	279.30
WM0062	V1	17/05/2011	37.76	279.30
WM0062	V1	7/06/2011	37.98	279.08
WM0062	V1	21/06/2011	38.26	278.80
WM0062	V1	5/07/2011	38.40	278.66
WM0062	V1	21/07/2011	38.73	278.33
WM0062	V1	16/08/2011	38.73	278.33
WM0062	V1	27/08/2011	39.64	277.42
WM0062	V1	12/09/2011	40.03	277.03
WM0062	V1	23/09/2011	40.28	276.78
WM0062	V1	13/10/2011	40.70	276.36
WM0062	V1	7/11/2011	41.11	275.95
WM0062	V1	2/12/2011	41.56	275.50
WM0062	V1	15/12/2011	41.86	275.20
WM0062	V1	23/01/2012	41.31	275.75
WM0062	V1	10/02/2012	41.00	276.06
WM0062	V1	23/02/2012	41.39	275.67
WM0062	V1	17/03/2012	42.50	274.56
WM0062	V1	23/03/2012	42.92	274.14
WM0062	V1	21/05/2012	44.86	272.20
WM0062	V1	17/06/2012	44.89	272.18
WM0062	V1	1/07/2012	44.69	272.37
WM0062	V1	7/07/2012	44.89	272.18
WM0062	V2	25/08/2009	30.68	286.38
WM0062	V2	12/09/2009	30.68	286.38
WM0062	V2	30/09/2009	30.94	286.12
WM0062	V2	12/10/2009	31.16	285.90
WM0062	V2	18/10/2009	31.11	285.95
WM0062	V2	21/10/2009	31.19	285.87
WM0062	V2	22/10/2009	31.19	285.87
WM0062	V2	27/10/2009	31.22	285.84
WM0062	V2	1/11/2009	31.25	285.81
WM0062	V2	8/11/2009	31.31	285.75
WM0062	V2	18/11/2009	31.57	285.49
WM0062	V2	29/11/2009	31.80	285.26
WM0062	V2	12/12/2009	31.77	285.29
WM0062	V2	5/01/2010	31.80	285.26
WM0062	V2	23/01/2010	32.03	285.03
WM0062	V2	3/02/2010	32.08	284.98
WM0062	V2	16/02/2010	32.08	284.98
WM0062	V2	6/03/2010	32.14	284.92
WM0062	V2	25/03/2010	32.11	284.95
WM0062	V2	3/05/2010	32.11	284.95
WM0062	V2	23/06/2010	32.17	284.89
WM0062	V2	23/07/2010	32.03	285.03
WM0062	V2	11/08/2010	32.17	284.89
WM0062	V2	30/08/2010	32.08	284.98
WM0062	V2	16/09/2010	32.11	284.95
WM0062	V2	3/10/2010	32.11	284.95
WM0062	V2	26/10/2010	32.20	284.86
WM0062	V2	13/11/2010	32.20	284.86
WM0062	V2	17/11/2010	32.20	284.86
WM0062	V2	12/12/2010	32.28	284.78
WM0062	V2	11/01/2011	32.31	284.75

Bore ID	Installation Type	Date_Time	SWL (m btoc)	RWL (mAHD)
WM0062	V2	25/01/2011	32.37	284.69
WM0062	V2	7/03/2011	32.28	284.78
WM0062	V2	26/04/2011	32.25	284.81
WM0062	V2	5/05/2011	32.28	284.78
WM0062	V2	16/05/2011	32.17	284.89
WM0062	V2	7/06/2011	32.03	285.03
WM0062	V2	21/06/2011	32.00	285.06
WM0062	V2	5/07/2011	31.82	285.24
WM0062	V2	21/07/2011	31.82	285.24
WM0062	V2	27/08/2011	31.48	285.58
WM0062	V2	12/09/2011	31.48	285.58
WM0062	V2	23/09/2011	31.57	285.49
WM0062	V2	13/10/2011	31.48	285.58
WM0062	V2	7/11/2011	31.54	285.52
WM0062	V2	2/12/2011	31.42	285.64
WM0062	V2	15/12/2011	31.42	285.64
WM0062	V2	23/01/2012	31.42	285.64
WM0062	V2	10/02/2012	31.34	285.72
WM0062	V2	23/02/2012	31.31	285.75
WM0062	V2	17/03/2012	31.22	285.84
WM0062	V2	23/03/2012	31.31	285.75
WM0062	V2	21/05/2012	31.25	285.81
WM0062	V2	2/06/2012	31.22	285.84
WM0062	V2	17/06/2012	31.11	285.95
WM0062	V2	1/07/2012	31.11	285.95
WM0063L	S1	18/05/2011	6.81	300.74
WM0063L	S1	7/06/2011	6.59	300.97
WM0063L	S1	21/06/2011	6.57	300.99
WM0063L	S1	5/07/2011	6.61	300.94
WM0063L	S1	21/07/2011	6.56	300.99
WM0063L	S1	12/09/2011	6.42	301.13
WM0063L	S1	23/09/2011	6.46	301.09
WM0063L	S1	13/10/2011	6.37	301.18
WM0063L	S1	7/11/2011	6.37	301.18
WM0063L	S1	2/12/2011	6.12	301.43
WM0063L	S1	15/12/2011	6.08	301.47
WM0063L	S1	26/01/2012	6.04	301.51
WM0063L	S1	10/02/2012	5.06	302.49
WM0063L	S1	23/02/2012	4.89	302.66
WM0063L	S1	23/03/2012	4.62	302.93
WM0063L	S1	6/04/2012	4.62	302.93
WM0063L	S1	20/04/2012	4.57	302.98
WM0063L	S1	4/05/2012	4.79	302.76
WM0063L	S1	23/05/2012	4.81	302.74
WM0063L	S1	2/06/2012	4.71	302.84
WM0063L	S1	17/06/2012	4.66	302.89
WM0063L	S1	1/07/2012	4.72	302.83
WM0067A	S1	3/02/2010	16.14	296.94
WM0067A	S1	17/02/2010	16.13	296.95
WM0067A	S1	7/03/2010	16.15	296.93
WM0067A	S1	23/03/2010	16.19	296.89
WM0067A	S1	4/05/2010	16.08	297.00
WM0067A	S1	23/06/2010	16.08	297.00
WM0067A	S1	9/07/2010	16.06	297.02
WM0067A	S1	22/07/2010	16.06	297.02
WM0067A	S1	12/08/2010	15.96	297.12
WM0067A	S1	29/08/2010	16.01	297.07
WM0067A	S1	16/09/2010	15.99	297.09
WM0067A	S1	2/10/2010	16.02	297.06
WM0067A	S1	16/10/2010	15.96	297.12
WM0067A	S1	26/10/2010	16.04	297.04
WM0067A	S1	13/11/2010	16.01	297.07
WM0067A	S1	18/11/2010	15.98	297.10
WM0067A	S1	12/12/2010	15.89	297.20
WM0067A	S1	10/01/2011	15.82	297.26
WM0067A	S1	24/01/2011	15.77	297.32
WM0067A	S1	1/02/2011	15.95	297.13
WM0067A	S1	7/02/2011	15.80	297.28
WM0067A	S1	8/03/2011	15.80	297.28
WM0067A	S1	23/03/2011	15.80	297.29
WM0067A	S1	13/04/2011	15.79	297.29
WM0067A	S1	18/04/2011	15.78	297.30
WM0067A	S1	5/05/2011	15.81	297.28
WM0067A	S1	16/05/2011	15.85	297.23
WM0067A	S1	2/06/2011	15.80	297.28
WM0067A	S1	20/06/2011	15.80	297.28
WM0067A	S1	5/07/2011	15.82	297.26
WM0067A	S1	21/07/2011	15.83	297.25
WM0067A	S1	8/08/2011	15.83	297.26
WM0067A	S1	24/08/2011	15.90	297.18
WM0067A	S1	11/09/2011	15.85	297.23
WM0067A	S1	23/09/2011	15.89	297.19
WM0067A	S1	2/10/2011	15.83	297.25
WM0067A	S1	12/10/2011	15.87	297.21
WM0067A	S1	20/10/2011	15.74	297.34
WM0067A	S1	4/11/2011	15.91	297.18
WM0067A	S1	20/11/2011	15.91	297.18
WM0067A	S1	14/12/2011	15.87	297.21
WM0067A	S1	22/01/2012	15.95	297.13
WM0067A	S1	10/02/2012	15.81	297.27
WM0067A	S1	21/02/2012	15.83	297.25
WM0067A	S1	7/03/2012	15.85	297.24
WM0067A	S1	16/03/2012	15.86	297.22
WM0067A	S1	22/03/2012	15.84	297.25
WM0067A	S1	4/04/2012	15.87	297.21
WM0067A	S1	18/04/2012	15.88	29



Bore ID	Installation Type	Date Time	SWL (m btoc)	RWL (mAHD)
WM0091	V1	21/06/2011	5.46	287.08
WM0091	V1	4/07/2011	5.46	287.08
WM0091	V1	26/08/2011	5.57	286.97
WM0091	V1	24/03/2012	6.04	286.50
WM0091	V1	4/04/2012	6.04	286.50
WM0091	V1	24/05/2012	5.92	286.62
WM0091	V1	1/06/2012	5.87	286.67
WM0091	V1	16/06/2012	5.81	286.73
WM0091	V1	1/07/2012	5.87	286.67
WM0091A	S1	22/04/2011	7.58	285.90
WM0091A	S1	6/05/2011	7.58	285.90
WM0091A	S1	16/05/2011	7.58	285.90
WM0091A	S1	7/06/2011	7.52	285.96
WM0091A	S1	21/06/2011	7.50	285.98
WM0091A	S1	4/07/2011	7.49	285.99
WM0091A	S1	10/07/2011	7.49	285.99
WM0091A	S1	23/07/2011	7.51	285.97
WM0091A	S1	26/08/2011	7.51	285.97
WM0091A	S1	12/09/2011	7.51	285.97
WM0091A	S1	23/09/2011	7.56	285.92
WM0091A	S1	13/10/2011	7.64	285.84
WM0091A	S1	2/11/2011	7.64	285.84
WM0091A	S1	9/11/2011	7.64	285.84
WM0091A	S1	15/12/2011	7.48	286.00
WM0091A	S1	21/01/2012	7.66	285.82
WM0091A	S1	24/03/2012	7.52	285.96
WM0091A	S1	1/04/2012	7.49	285.99
WM0091A	S1	4/04/2012	7.48	286.00
WM0091A	S1	20/04/2012	7.48	286.00
WM0091A	S1	4/05/2012	7.48	286.01
WM0091A	S1	17/05/2012	7.49	285.99
WM0091A	S1	21/05/2012	7.51	285.97
WM0091A	S1	1/06/2012	7.48	286.01
WM0091A	S1	16/06/2012	7.44	286.04
WM0091A	S1	1/07/2012	7.45	286.03
WM0091B	S1	4/04/2011	6.62	286.51
WM0091B	S1	22/04/2011	6.75	286.39
WM0091B	S1	6/05/2011	6.76	286.37
WM0091B	S1	16/05/2011	6.76	286.37
WM0091B	S1	7/06/2011	6.40	286.73
WM0091B	S1	21/06/2011	6.42	286.71
WM0091B	S1	4/07/2011	6.45	286.69
WM0091B	S1	10/07/2011	6.45	286.68
WM0091B	S1	23/07/2011	6.47	286.67
WM0091B	S1	26/08/2011	6.48	286.65
WM0091B	S1	12/09/2011	6.48	286.65
WM0091B	S1	23/09/2011	6.47	286.66
WM0091B	S1	13/10/2011	6.55	286.59
WM0091B	S1	1/11/2011	6.56	286.57
WM0091B	S1	9/11/2011	6.63	286.50
WM0091B	S1	15/12/2011	6.50	286.63
WM0091B	S1	21/01/2012	6.64	286.49
WM0091B	S1	24/03/2012	6.51	286.62
WM0091B	S1	29/03/2012	6.49	286.64
WM0091B	S1	4/04/2012	6.50	286.63
WM0091B	S1	21/04/2012	6.48	286.65
WM0091B	S1	4/05/2012	6.50	286.63
WM0091B	S1	16/05/2012	6.50	286.63
WM0091B	S1	20/05/2012	6.55	286.59
WM0091B	S1	23/05/2012	6.51	286.62
WM0091B	S1	1/06/2012	6.53	286.60
WM0091B	S1	16/06/2012	6.50	286.63
WM0091B	S1	1/07/2012	6.49	286.64
WM0092	S1	5/04/2011	5.23	287.59
WM0092	S1	22/04/2011	5.14	287.68
WM0092	S1	6/05/2011	5.09	287.73
WM0092	S1	16/05/2011	5.04	287.78
WM0092	S1	2/06/2011	4.88	287.94
WM0092	S1	21/06/2011	4.74	288.08
WM0092	S1	4/07/2011	4.67	288.15
WM0092	S1	11/07/2011	4.63	288.19
WM0092	S1	23/07/2011	4.55	288.26
WM0092	S1	26/08/2011	4.35	288.47
WM0092	S1	12/09/2011	4.25	288.57
WM0092	S1	23/09/2011	4.18	288.64
WM0092	S1	13/10/2011	4.14	288.68
WM0092	S1	31/10/2011	4.05	288.77
WM0092	S1	9/11/2011	4.03	288.79
WM0092	S1	2/12/2011	3.84	288.98
WM0092	S1	15/12/2011	3.80	289.02
WM0092	S1	14/02/2012	3.53	289.29
WM0092	S1	28/02/2012	3.42	289.40
WM0092	S1	24/03/2012	3.42	289.40
WM0092	S1	4/04/2012	3.38	289.44
WM0092	S1	20/04/2012	3.29	289.53
WM0092	S1	4/05/2012	3.43	289.39
WM0092	S1	16/05/2012	3.30	289.52
WM0092	S1	20/05/2012	3.26	289.56
WM0092	S1	1/06/2012	3.21	289.61
WM0092	S1	16/06/2012	3.01	289.80
WM0092	S1	1/07/2012	3.11	289.71
WM0092A	S1	31/03/2011	2.20	290.41
WM0092A	S1	22/04/2011	2.31	290.30
WM0092A	S1	6/05/2011	2.38	290.24
WM0092A	S1	16/05/2011	2.43	290.19
WM0092A	S1	2/06/2011	2.49	290.13
WM0092A	S1	21/06/2011	2.53	290.09
WM0092A	S1	4/07/2011	2.57	290.05
WM0092A	S1	11/07/2011	2.60	290.02
WM0092A	S1	23/07/2011	2.53	290.09
WM0092A	S1	26/08/2011	2.71	289.91
WM0092A	S1	12/09/2011	2.75	289.87
WM0092A	S1	23/09/2011	2.78	289.84
WM0092A	S1	13/10/2011	2.85	289.77
WM0092A	S1	31/10/2011	2.86	289.76
WM0092A	S1	9/11/2011	2.87	289.75
WM0092A	S1	2/12/2011	2.48	290.14
WM0092A	S1	15/12/2011	2.42	290.20
WM0092A	S1	21/01/2012	2.68	289.94
WM0092A	S1	14/02/2012	2.73	289.89
WM0092A	S1	24/03/2012	2.74	289.88
WM0092A	S1	28/03/2012	2.76	289.86
WM0092A	S1	4/04/2012	2.74	289.88
WM0092A	S1	21/04/2012	2.75	289.87
WM0092A	S1	4/05/2012	2.78	289.84
WM0092A	S1	9/05/2012	2.80	289.82
WM0092A	S1	20/05/2012	2.82	289.80
WM0092A	S1	1/06/2012	2.83	289.79
WM0092A	S1	16/06/2012	2.84	289.78
WM0092A	S1	1/07/2012	2.84	289.78
WM0093	S1	18/04/2011	3.96	292.12

Bore ID	Installation Type	Date Time	SWL (m btoc)	RWL (mAHD)
WM0093	S1	5/05/2011	5.30	290.78
WM0093	S1	16/05/2011	4.01	292.07
WM0093	S1	20/06/2011	3.95	292.13
WM0093	S1	4/07/2011	3.85	292.23
WM0093	S1	18/07/2011	3.78	292.30
WM0093	S1	22/07/2011	3.65	292.43
WM0093	S1	14/08/2011	3.84	292.25
WM0093	S1	22/08/2011	4.18	291.90
WM0093	S1	24/08/2011	4.18	291.90
WM0093	S1	14/09/2011	4.22	291.86
WM0093	S1	23/09/2011	4.24	291.85
WM0093	S1	12/10/2011	3.17	292.91
WM0093	S1	4/11/2011	4.73	291.35
WM0093	S1	26/01/2012	5.32	290.76
WM0093	S1	24/03/2012	5.20	290.88
WM0093	S1	4/04/2012	5.04	291.05
WM0093	S1	6/04/2012	5.05	291.03
WM0093	S1	18/04/2012	5.55	290.53
WM0093	S1	5/05/2012	5.28	290.80
WM0093	S1	22/05/2012	5.64	290.45
WM0093	S1	1/06/2012	5.33	290.76
WM0093	S1	16/06/2012	4.96	291.12
WM0093	S1	1/07/2012	4.69	291.39
WM0093A	S1	18/04/2011	3.51	292.62
WM0093A	S1	5/05/2011	3.42	292.71
WM0093A	S1	16/05/2011	3.62	292.51
WM0093A	S1	20/06/2011	3.45	292.68
WM0093A	S1	4/07/2011	3.45	292.68
WM0093A	S1	17/07/2011	3.45	292.68
WM0093A	S1	22/07/2011	3.45	292.68
WM0093A	S1	14/08/2011	4.01	292.12
WM0093A	S1	22/08/2011	3.88	292.26
WM0093A	S1	24/08/2011	3.87	292.26
WM0093A	S1	14/09/2011	4.19	291.95
WM0093A	S1	23/09/2011	4.17	291.96
WM0093A	S1	12/10/2011	4.04	292.09
WM0093A	S1	31/10/2011	4.40	291.73
WM0093A	S1	4/11/2011	4.87	291.27
WM0093A	S1	26/01/2012	5.12	291.01
WM0093A	S1	24/03/2012	4.05	292.08
WM0093A	S1	4/04/2012	4.35	291.78
WM0093A	S1	18/04/2012	4.93	291.20
WM0093A	S1	5/05/2012	3.49	292.64
WM0093A	S1	22/05/2012	4.69	291.45
WM0093A	S1	31/05/2012	4.52	291.61
WM0093A	S1	1/06/2012	4.52	291.61
WM0093A	S1	16/06/2012	4.33	291.80
WM0093A	S1	1/07/2012	4.20	291.93
WM0093B	S1	10/04/2011	3.38	292.28
WM0093B	S1	18/04/2011	3.11	292.55
WM0093B	S1	5/05/2011	3.20	292.46
WM0093B	S1	16/05/2011	3.21	292.45
WM0093B	S1	20/06/2011	3.21	292.45
WM0093B	S1	4/07/2011	3.05	292.61
WM0093B	S1	17/07/2011	3.05	292.61
WM0093B	S1	22/07/2011	3.05	292.61
WM0093B	S1	14/08/2011	4.01	291.65
WM0093B	S1	22/08/2011	3.47	292.19
WM0093B	S1	24/08/2011	3.46	292.21
WM0093B	S1	14/09/2011	3.78	291.88
WM0093B	S1	23/09/2011	3.77	291.89
WM0093B	S1	12/10/2011	3.63	292.03
WM0093B	S1	4/11/2011	4.47	291.19
WM0093B	S1	14/11/2011	4.28	291.38
WM0093B	S1	26/01/2012	4.72	290.94
WM0093B	S1	24/03/2012	3.65	292.01
WM0093B	S1	4/04/2012	3.95	291.71
WM0093B	S1	18/04/2012	4.53	291.13
WM0093B	S1	5/05/2012	4.09	291.57
WM0093B	S1	22/05/2012	4.29	291.38
WM0093B	S1	1/06/2012	4.11	291.56
WM0093B	S1	16/06/2012	3.92	291.74
WM0093B	S1	1/07/2012	3.80	291.86
WM0095L	S1	22/04/2011	7.04	290.39
WM0095L	S1	6/05/2011	7.13	290.30
WM0095L	S1	16/05/2011	7.20	290.22
WM0095L	S1	2/06/2011	7.19	290.24
WM0095L	S1	21/06/2011	7.21	290.21
WM0095L	S1	4/07/2011	7.25	290.18
WM0095L	S1	23/07/2011	7.31	290.12
WM0095L	S1	12/09/2011	7.38	290.04
WM0095L	S1	23/09/2011	7.44	289.98
WM0095L	S1	13/10/2011	7.51	289.91
WM0095L	S1	9/11/2011	7.51	289.91
WM0095L	S1	2/12/2011	7.00	290.42
WM0095L	S1	15/12/2011	7.00	290.43
WM0095L	S1	26/01/2012	7.29	290.13
WM0095L	S1	10/02/2012	6.84	290.58
WM0095L	S1	23/02/2012	6.83	290.59
WM0095L	S1	24/03/2012	6.81	290.61
WM0095L	S1	4/04/2012	6.87	290.55
WM0095L	S1	20/04/2012	6.90	290.52
WM0095L	S1	5/05/2012	6.95	290.47
WM0095L	S1	20/05/2012	7.10	290.32



Bore ID	Installation Type	Date_Time	SWL (m btoc)	RWL (mAHD)
WM0105	S1	27/10/2010	1.90	291.09
WM0105	S1	14/11/2010	1.92	291.07
WM0105	S1	17/11/2010	1.88	291.11
WM0105	S1	12/12/2010	0.83	292.16
WM0105	S1	11/01/2011	1.44	291.56
WM0105	S1	27/01/2011	1.69	291.30
WM0105	S1	8/02/2011	1.91	291.08
WM0105	S1	7/03/2011	2.19	290.80
WM0105	S1	24/03/2011	2.29	290.70
WM0105	S1	7/04/2011	2.42	290.57
WM0105	S1	23/04/2011	2.50	290.50
WM0105	S1	6/05/2011	2.55	290.44
WM0105	S1	16/05/2011	2.53	290.46
WM0105	S1	2/06/2011	2.59	290.40
WM0105	S1	21/06/2011	2.62	290.38
WM0105	S1	4/07/2011	2.63	290.36
WM0105	S1	23/07/2011	2.67	290.33
WM0105	S1	27/07/2011	2.70	290.30
WM0105	S1	27/08/2011	2.73	290.26
WM0105	S1	12/09/2011	2.76	290.24
WM0105	S1	23/09/2011	2.74	290.25
WM0105	S1	13/10/2011	2.65	290.34
WM0105	S1	9/11/2011	2.69	290.30
WM0105	S1	2/12/2011	1.84	291.15
WM0105	S1	15/12/2011	1.96	291.03
WM0105	S1	21/01/2012	2.21	290.78
WM0105	S1	12/02/2012	0.72	292.27
WM0105	S1	6/03/2012	1.15	291.84
WM0105	S1	24/03/2012	1.22	291.77
WM0105	S1	4/04/2012	1.50	291.49
WM0105	S1	20/04/2012	1.66	291.33
WM0105	S1	5/05/2012	1.70	291.29
WM0105	S1	24/05/2012	1.79	291.20
WM0105	S1	1/06/2012	1.81	291.18
WM0105	S1	17/06/2012	1.53	291.46
WM0105	S1	1/07/2012	1.07	291.93
WM0105	V1	4/10/2009	6.51	285.86
WM0105	V1	12/10/2009	6.86	285.51
WM0105	V1	18/10/2009	7.24	285.13
WM0105	V1	25/10/2009	7.13	285.24
WM0105	V1	26/10/2009	7.08	285.29
WM0105	V1	1/11/2009	6.62	285.75
WM0105	V1	10/11/2009	6.07	286.30
WM0105	V1	18/11/2009	5.79	286.58
WM0105	V1	25/11/2009	5.47	286.90
WM0105	V1	14/12/2009	5.08	287.29
WM0105	V1	5/01/2010	4.78	287.59
WM0105	V1	23/01/2010	4.81	287.56
WM0105	V1	3/02/2010	4.89	287.48
WM0105	V1	16/02/2010	4.92	287.45
WM0105	V1	6/03/2010	5.00	287.37
WM0105	V1	25/03/2010	5.06	287.31
WM0105	V1	3/05/2010	5.25	287.12
WM0105	V1	23/06/2010	5.38	286.99
WM0105	V1	22/07/2010	5.55	286.82
WM0105	V1	11/08/2010	5.77	286.60
WM0105	V1	30/08/2010	5.77	286.60
WM0105	V1	17/09/2010	5.90	286.47
WM0105	V1	3/10/2010	5.99	286.38
WM0105	V1	27/10/2010	6.12	286.25
WM0105	V1	14/11/2010	6.18	286.19
WM0105	V1	17/11/2010	6.18	286.19
WM0105	V1	13/12/2010	6.29	286.08
WM0105	V1	11/01/2011	6.51	285.86
WM0105	V1	27/01/2011	6.48	285.89
WM0105	V1	7/03/2011	7.27	285.10
WM0105	V1	24/03/2011	7.55	284.82
WM0105	V1	23/04/2011	7.76	284.61
WM0105	V1	6/05/2011	7.85	284.52
WM0105	V1	16/05/2011	7.85	284.52
WM0105	V1	2/06/2011	7.90	284.47
WM0105	V1	21/06/2011	7.98	284.39
WM0105	V1	4/07/2011	7.96	284.41
WM0105	V1	23/07/2011	7.93	284.44
WM0105	V1	27/08/2011	7.35	285.02
WM0105	V1	12/09/2011	6.75	285.62
WM0105	V1	23/09/2011	6.53	285.84
WM0105	V1	13/10/2011	6.62	285.76
WM0105	V1	9/11/2011	6.86	285.51
WM0105	V1	2/12/2011	6.64	285.73
WM0105	V1	15/12/2011	7.03	285.34
WM0105	V1	21/01/2012	7.87	284.50
WM0105	V1	12/02/2012	7.65	284.72
WM0105	V1	24/03/2012	7.33	285.04
WM0105	V1	4/04/2012	7.55	284.83
WM0105	V1	20/04/2012	7.46	284.91
WM0105	V1	24/05/2012	7.35	285.02
WM0105	V1	1/06/2012	7.33	285.04
WM0105	V1	17/06/2012	7.44	284.93
WM0105	V1	1/07/2012	7.38	284.99
WM0105	V2	20/04/2012	-105.39	397.76
WM0105	V2	24/05/2012	-105.77	398.14
WM0105	V2	1/06/2012	-105.82	398.19
WM0116	S1	4/05/2010	3.54	292.64
WM0116	S1	23/06/2010	3.66	292.52
WM0116	S1	9/07/2010	3.66	292.51
WM0116	S1	22/07/2010	3.67	292.50
WM0116	S1	13/08/2010	3.67	292.50
WM0116	S1	30/08/2010	3.55	292.62
WM0116	S1	18/09/2010	3.59	292.58
WM0116	S1	4/10/2010	3.48	292.69
WM0116	S1	30/10/2010	3.50	292.67
WM0116	S1	8/11/2010	3.47	292.70
WM0116	S1	14/12/2010	2.06	294.11
WM0116	S1	12/01/2011	2.99	293.19
WM0116	S1	26/01/2011	2.93	293.24
WM0116	S1	30/01/2011	2.92	293.25
WM0116	S1	8/03/2011	2.96	293.21
WM0116	S1	24/03/2011	2.97	293.20
WM0116	S1	30/03/2011	2.98	293.19
WM0116	S1	23/04/2011	3.05	293.12
WM0116	S1	6/05/2011	3.09	293.09
WM0116	S1	18/05/2011	3.08	293.09
WM0116	S1	7/06/2011	3.09	293.08
WM0116	S1	21/06/2011	3.15	293.02
WM0116	S1	6/07/2011	3.15	293.02
WM0116	S1	24/07/2011	3.25	292.93
WM0116	S1	26/08/2011	3.30	292.87
WM0116	S1	13/09/2011	3.32	292.86
WM0116	S1	23/09/2011	3.34	292.83
WM0116	S1	14/10/2011	3.35	292.82

Bore ID	Installation Type	Date_Time	SWL (m btoc)	RWL (mAHD)
WM0116	S1	7/11/2011	3.38	292.80
WM0116	S1	15/12/2011	3.24	292.93
WM0116	S1	23/01/2012	3.17	293.00
WM0116	S1	14/02/2012	3.01	293.16
WM0116	S1	18/03/2012	2.80	293.38
WM0116	S1	23/03/2012	2.78	293.39
WM0116	S1	5/04/2012	2.76	293.42
WM0116	S1	20/04/2012	2.02	294.15
WM0116	S1	5/05/2012	2.72	293.45
WM0116	S1	21/05/2012	2.74	293.43
WM0116	S1	1/06/2012	2.71	293.46
WM0116	S1	16/06/2012	2.72	293.45
WM0116	S1	1/07/2012	2.08	294.10
WM0157	S1	12/10/2009	41.20	326.28
WM0157	S1	18/10/2009	40.51	326.97
WM0157	S1	25/10/2009	40.55	326.48
WM0157	S1	28/10/2009	40.95	326.08
WM0157	S1	1/11/2009	41.01	326.02
WM0157	S1	9/11/2009	40.74	326.28
WM0157	S1	18/11/2009	40.76	326.26
WM0157	S1	29/11/2009	40.80	326.23
WM0157	S1	14/12/2009	40.75	326.13
WM0157	S1	5/01/2010	40.19	326.69
WM0157	S1	23/01/2010	40.58	326.30
WM0157	S1	26/01/2010	40.09	326.79
WM0157	S1	3/02/2010	40.57	326.31
WM0157	S1	20/02/2010	40.56	326.32
WM0157	S1	6/03/2010	40.51	326.38
WM0157	S1	3/05/2010	40.24	326.64
WM0157	S1	24/06/2010	40.41	326.47
WM0157	S1	6/07/2010	40.41	326.47
WM0157	S1	23/07/2010	41.26	325.62
WM0157	S1	11/08/2010	41.20	325.68
WM0157	S1	18/08/2010	41.21	325.67
WM0157	S1	30/08/2010	41.19	325.69
WM0157	S1	16/09/2010	39.52	327.36
WM0157	S1	29/09/2010	39.88	327.00
WM0157	S1	8/10/2010	40.28	326.60
WM0157	S1	27/10/2010	40.53	326.35
WM0157	S1	14/11/2010	40.58	326.30
WM0157	S1	16/11/2010	40.59	326.30
WM0157	S1	14/12/2010	40.25	326.63
WM0157	S1	14/01/2011	40.18	326.71
WM0157	S1	26/01/2011	40.09	326.79
WM0157	S1	7/03/2011	39.82	327.07
WM0157	S1	23/03/2011	39.78	327.10
WM0157	S1	6/04/2011	40.30	326.58
WM0157	S1	21/04/2011	39.81	327.08
WM0157	S1	6/05/2011	39.80	327.09
WM0157	S1	17/05/2011	39.80	327.08
WM0157	S1	3/06/2011	39.85	327.03
WM0157	S1	21/06/2011	39.86	327.02
WM0157	S1	5/07/2011	39.90	326.98
WM0157	S1	24/07/2011	40.06	326.83
WM0157	S1	26/08/2011	40.26	326.62
WM0157	S1	12/09/2011	40.37	326.51
WM0157	S1	23/09/2011	40.37	326.51
WM0157	S1	14/10/2011	40.44	326.44
WM0157	S1	28/10/2011	40.51	326.37
WM0157	S1	7/11/2011	39.38	327.51
WM0157	S1	24/11/2011	39.51	327.37
WM0157	S1	15/12/2011	38.47	328.41
WM0157	S1	23/01/2012	39.40	327.48
WM0157	S1	11/02/2012	39.16	327.72
WM0157	S1	23/02/2012	38.90	327.98
WM0157	S1	4/03/2012	38.30	328.58
WM0157	S1	17/03/2012	38.82	328.06
WM0157	S1	23/03/2012	38.81	328.07
WM0157	S1	5/04/2012	38.81	328.07
WM0157	S1	20/04/2012	38.79	328.09
WM0157	S1	5/05/2012	38.81	328.07
WM0157	S1	24/05/2012	39.80	327.08
WM0157	S1	2/06/2012	38.83	328.06
WM0157	S1	17/06/2012	38.89	327.99
WM0157	S1	1/07/2012	38.87	328.01
WM0157	V3	30/09/2009	36.55	329.73
WM0157	V3	3/10/2009	40.95	325.33
WM0157	V3	12/10/2009	36.44	329.84
WM0157	V3	18/10/2009	36.31	329.97
WM0157	V3	24/10/2009	36.42	329.86
WM0157	V3	25/10/2009	36.42	329.86
WM0157	V3	28/10/2009	36.36	329.92
WM0157	V3	1/11/2009	36.39	329.89
WM0157	V3	9/11/2009	36.42	329.86
WM0157	V3	18/11/2009	36.61	329.67
WM0157	V3	29/11/2009	36.80	329.48
WM0157	V3	14/12/2009	36.72	329.56
WM0157	V3	5/01/2010	36.69	329.59
WM0157	V3	23/01/2010	36.85	329.43
WM0157	V3	3/02/2010	36.88	329.40
WM0157	V3	20/02/2010	36.80	329.48
WM0157	V3	6/03/2010	36.94	329.34
WM0157	V3	26/03/2010	36.88	329.40
WM0157	V3	3/05/2010	36.96	329.32
WM0157	V3	24/06/2010	36.94	329.34
WM0157	V3	23/07/2010	36.94	329.34
WM0157	V3	11/08/2010	37.04	329.24
WM0157	V3	18/08/2010	37.02	329.26
WM0157	V3	30/08/2010	36.94	329.34
WM0157	V3	16/09/2010	36.85	329.43
WM0157	V3	29/09/2010	36.69	329.59
WM0157	V3	27/10/2010	36.85	329.43
WM0157	V3	14/11/2010	36.85	329.43
WM0157	V3	16/11/2010	36.94	329.34
WM0157	V3	14/12/2010	36.36	329.92
WM0157	V3	14/01/2011	35.84	330.44
WM0157	V3	26/01/2011	35.84	330.44
WM0157	V3	7/03/2011	35.79	330.49
WM0157	V3	23/03/2011	35.84	330.44
WM0157	V3	21/04/2011	35.95	330.33
WM0157	V3	6/05/2011	35.93	330.35
WM0157	V3	17/05/2011	35.84	330.44
WM0157	V3	3/06/2011	35.93	330.35
WM0157	V3	21/06/2011	36.01	330.27
WM0157	V3	5/07/2011	35.95	330.33
WM0157	V3	24/07/2011	35.95	330.33
WM0157	V3	26/08/2011	36.01	330.27
WM0157	V3	12/09/2011	36.01	330.27
WM0157	V3	18/09/2011	36.04	330.25
WM0157	V3	14/10/2011	36.09	330.19
WM0157	V3	7/11/2011	36.17	330.11



Bore ID	Installation Type	Date_Time	SWL (m btoc)	RWL (mAHD)
WM0157	V3	24/11/2011	36.14	330.14
WM0157	V3	15/12/2011	36.28	330.00
WM0157	V3	23/01/2012	36.28	330.00
WM0157	V3	11/02/2012	35.79	330.49
WM0157	V3	23/02/2012	35.43	330.85
WM0157	V3	17/03/2012	35.35	330.93
WM0157	V3	23/03/2012	35.41	330.87
WM0157	V3	5/04/2012	35.33	330.96
WM0157	V3	24/05/2012	35.35	330.93
WM0157	V3	2/06/2012	35.33	330.96
WM0157	V3	17/06/2012	35.33	330.96
WM0157	V3	1/07/2012	35.41	330.87
WM0157L	S1	22/07/2011	37.34	327.64
WM0157L	S1	26/08/2011	37.36	327.62
WM0157L	S1	12/09/2011	37.41	327.55
WM0157L	S1	23/09/2011	37.39	327.57
WM0157L	S1	14/10/2011	37.44	327.52
WM0157L	S1	7/11/2011	37.50	327.47
WM0157L	S1	24/11/2011	37.54	327.42
WM0157L	S1	15/12/2011	37.50	327.46
WM0157L	S1	11/02/2012	37.17	327.79
WM0157L	S1	23/02/2012	36.95	328.01
WM0157L	S1	17/03/2012	36.85	328.11
WM0157L	S1	23/03/2012	36.80	328.16
WM0157L	S1	5/04/2012	36.87	328.09
WM0157L	S1	20/04/2012	36.84	328.12
WM0157L	S1	5/05/2012	36.86	328.10
WM0157L	S1	24/05/2012	36.87	328.09
WM0157L	S1	2/06/2012	36.90	328.06
WM0157L	S1	17/06/2012	36.49	328.49
WM0157L	S1	1/07/2012	36.91	328.07
WM0213LA	S1	16/11/2010	88.60	313.54
WM0213LA	S1	14/12/2010	89.87	312.27
WM0213LA	S1	13/01/2011	89.85	312.29
WM0213LA	S1	23/02/2012	89.80	312.34
WM0222A	S1	3/05/2010	11.61	302.00
WM0222A	S1	23/06/2010	11.73	301.87
WM0222A	S1	10/07/2010	11.77	301.83
WM0222A	S1	23/07/2010	11.78	301.82
WM0222A	S1	11/08/2010	11.80	301.81
WM0222A	S1	30/08/2010	11.81	301.79
WM0222A	S1	18/09/2010	11.52	302.08
WM0222A	S1	3/10/2010	11.81	301.79
WM0222A	S1	8/10/2010	11.82	301.78
WM0222A	S1	10/10/2010	11.82	301.78
WM0222A	S1	26/10/2010	11.83	301.77
WM0222A	S1	13/11/2010	11.83	301.77
WM0222A	S1	22/01/2011	11.81	301.79
WM0222A	S1	8/03/2011	11.87	301.74
WM0222A	S1	23/03/2011	11.88	301.72
WM0222A	S1	29/03/2011	11.88	301.73
WM0222A	S1	26/04/2011	11.89	301.71
WM0222A	S1	6/05/2011	11.89	301.71
WM0222A	S1	17/05/2011	11.90	301.70
WM0222A	S1	7/06/2011	11.93	301.68
WM0222A	S1	21/06/2011	11.93	301.68
WM0222A	S1	5/07/2011	11.94	301.66
WM0222A	S1	21/07/2011	11.95	301.65
WM0222A	S1	26/07/2011	11.95	301.65
WM0222A	S1	26/08/2011	12.39	301.21
WM0222A	S1	12/09/2011	11.98	301.63
WM0222A	S1	23/09/2011	11.98	301.62
WM0222A	S1	13/10/2011	11.99	301.61
WM0222A	S1	7/11/2011	12.00	301.60
WM0222A	S1	24/11/2011	12.02	301.59
WM0222A	S1	15/12/2011	12.04	301.57
WM0222A	S1	23/01/2012	12.00	301.60
WM0222A	S1	10/02/2012	11.91	301.69
WM0222A	S1	22/02/2012	11.80	301.80
WM0222A	S1	6/03/2012	11.69	301.91
WM0222A	S1	23/03/2012	11.59	302.01
WM0222A	S1	6/04/2012	11.56	302.05
WM0222A	S1	21/04/2012	11.73	301.87
WM0222A	S1	4/05/2012	11.92	301.68
WM0222A	S1	21/05/2012	12.03	301.57
WM0222A	S1	2/06/2012	12.10	301.50
WM0222A	S1	17/06/2012	12.16	301.44
WM0222A	S1	1/07/2012	12.21	301.39
WM0228A	S1	16/06/2012	11.70	330.37
WM0228A	S1	30/06/2012	12.64	329.43
WM0228B	S1	16/06/2012	21.68	320.39
WM0228B	S1	30/06/2012	21.70	320.37
WM0233	S1	4/05/2010	26.75	297.64
WM0233	S1	23/06/2010	26.87	297.51
WM0233	S1	5/07/2010	26.84	297.54
WM0233	S1	22/07/2010	26.84	297.54
WM0233	S1	12/08/2010	26.75	297.64
WM0233	S1	29/08/2010	26.84	297.55
WM0233	S1	19/09/2010	26.80	297.58
WM0233	S1	29/09/2010	26.77	297.62
WM0233	S1	13/10/2010	26.82	297.57
WM0233	S1	26/10/2010	26.79	297.59
WM0233	S1	13/11/2010	26.78	297.60
WM0233	S1	18/11/2010	26.74	297.64
WM0233	S1	13/12/2010	26.65	297.73
WM0233	S1	10/01/2011	26.53	297.85
WM0233	S1	24/01/2011	26.49	297.89
WM0233	S1	16/02/2011	26.58	297.81
WM0233	S1	8/03/2011	26.60	297.79
WM0233	S1	23/03/2011	26.55	297.83
WM0233	S1	4/04/2011	26.65	297.73
WM0233	S1	22/04/2011	26.62	297.77
WM0233	S1	5/05/2011	26.65	297.73
WM0233	S1	18/05/2011	26.70	297.68
WM0233	S1	2/06/2011	26.68	297.70
WM0233	S1	20/06/2011	26.67	297.72
WM0233	S1	6/07/2011	26.66	297.72
WM0233	S1	22/07/2011	26.67	297.72
WM0233	S1	25/07/2011	26.68	297.70
WM0233	S1	24/08/2011	26.73	297.65
WM0233	S1	12/09/2011	26.67	297.71
WM0233	S1	23/09/2011	26.70	297.69
WM0233	S1	3/10/2011	26.69	297.69
WM0233	S1	14/10/2011	26.66	297.72
WM0233	S1	4/11/2011	26.66	297.72
WM0233	S1	21/11/2011	26.66	297.72
WM0233	S1	14/12/2011	26.64	297.75
WM0233	S1	22/01/2012	26.65	297.73
WM0233	S1	11/02/2012	26.52	297.86
WM0233	S1	22/02/2012	26.48	297.90
WM0233	S1	7/03/2012	26.44	297.94

Bore ID	Installation Type	Date_Time	SWL (m btoc)	RWL (mAHD)
WM0233	S1	16/03/2012	26.39	297.99
WM0233	S1	23/03/2012	26.35	298.03
WM0233	S1	5/04/2012	26.37	298.02
WM0233	S1	20/04/2012	26.35	298.03
WM0233	S1	4/05/2012	26.34	298.05
WM0233	S1	21/05/2012	26.36	298.02
WM0233	S1	2/06/2012	26.32	298.07
WM0233	S1	16/06/2012	26.28	298.10
WM0233	S1	30/06/2012	26.25	298.13
WM0233A	S1	4/05/2010	15.08	309.31
WM0233A	S1	23/06/2010	15.24	309.19
WM0233A	S1	11/07/2010	15.20	309.22
WM0233A	S1	22/07/2010	15.28	309.15
WM0233A	S1	12/08/2010	15.13	309.30
WM0233A	S1	29/08/2010	15.26	309.16
WM0233A	S1	19/09/2010	15.25	309.17
WM0233A	S1	28/09/2010	15.20	309.22
WM0233A	S1	13/10/2010	15.27	309.15
WM0233A	S1	26/10/2010	15.24	309.18
WM0233A	S1	13/11/2010	15.02	309.41
WM0233A	S1	18/11/2010	14.96	309.46
WM0233A	S1	13/12/2010	13.40	311.02
WM0233A	S1	10/01/2011	11.43	312.99
WM0233A	S1	24/01/2011	11.13	313.29
WM0233A	S1	14/02/2011	11.20	313.22
WM0233A	S1	8/03/2011	11.21	313.21
WM0233A	S1	23/03/2011	11.20	313.22
WM0233A	S1	4/04/2011	11.41	313.01
WM0233A	S1	22/04/2011	11.43	313.00
WM0233A	S1	5/05/2011	11.55	312.87
WM0233A	S1	18/05/2011	11.72	312.70
WM0233A	S1	2/06/2011	11.78	312.64
WM0233A	S1	20/06/2011	11.88	312.54
WM0233A	S1	6/07/2011	11.98	312.44
WM0233A	S1	22/07/2011	12.09	312.33
WM0233A	S1	25/07/2011	24.14	300.28
WM0233A	S1	27/08/2011	12.35	312.08
WM0233A	S1	12/09/2011	12.40	312.02
WM0233A	S1	23/09/2011	12.50	311.92
WM0233A	S1	14/10/2011	12.58	311.84
WM0233A	S1	3/11/2011	12.64	311.78
WM0233A	S1	4/11/2011	12.68	311.74
WM0233A	S1	21/11/2011	12.75	311.67
WM0233A	S1	14/12/2011	12.05	312.37
WM0233A	S1	22/01/2012	11.47	312.95
WM0233A	S1	11/02/2012	9.28	315.14
WM0233A	S1	22/02/2012	9.03	315.39
WM0233A	S1	7/03/2012	8.76	315.67
WM0233A	S1	16/03/2012	8.60	315.82
WM0233A	S1	23/03/2012	8.57	315.85
WM0233A	S1	5/04/2012	8.71	315.71
WM0233A	S1	20/04/2012	8.82	315.60
WM0233A	S1	4/05/2012	8.97	315.45
WM0233A	S1	21/05/2012	9.18	315.24
WM0233A	S1	2/06/2012	9.21	315.22
WM0233A	S1	16/06/2012	8.87	315.55
WM0233A	S1	30/06/2012	8.90	315.53
WM0247	S1	4/05/2010	33.39	324.20
WM0247	S1	24/06/2010	33.48	324.11
WM0247	S1	22/07/2010	33.51	324.07
WM0247	S1	12/08/2010	33.52	324.07
WM0247	S1	29/08/2010	33.53	324.05
WM0247	S1	19/09/2010	33.54	324.04
WM0247	S1	11/10/2010	33.58	324.00
WM0247	S1	30/10/2010	33.58	324.00
WM0247	S1	18/11/2010	33.60	323.98
WM0247	S1	14/12/2010	33.61	323.97
WM0247	S1	10/01/2011	33.42	324.16
WM0247	S1	24/01/2011	33.25	324.33
WM0247	S1	10/02/2011	33.07	324.51
WM0247	S1	8/03/2011	32.80	324.78
WM0247	S1	23/03/2011	32.64	324.94
WM0247	S1	18/04/2011	32.46	325.12
WM0247	S1	5/05/2011	32.38	325.21
WM0247	S1	16/05/2011	32.35	325.23
WM0247	S1	2/06/2011	32.26	325.32
WM0247	S1	20/06/2011	32.19	325.39
WM0247	S1	4/07/2011	32.17	325.42
WM0247	S1	22/07/2011	32.12	325.46
WM0247	S1	24/08/2011	32.08	325.50
WM0247	S1	10/09/2011	32.05	325.54
WM0247	S1	23/09/2011	32.03	325.55
WM0247	S1	12/10/2011	32.00	325.58
WM0247	S1	9/11/2011	31.97	325.61
WM0247	S1	20/11/2011	31.98	325.60
WM0247	S1	14/12/2011	31.96	325.62
WM0247	S1	22/01/2012	31.95	325.63
WM0247	S1	12/02/2012	31.90	325.68
WM0247	S1	21/02/2012	31.88	325.71
WM0247	S1	16/03/2012	31.71	325.87
WM0247	S1	21/03/2012	31.69	325.89
WM0247	S1	22/03/2012	31.66	325.92
WM0247	S1	5/04/2012	31.60	325.98
WM0247	S1	20/04/2012	31.56	326.02
WM0247	S1	4/05/2012	31.49	326.09
WM0247	S1	22/05/2012	31.48	326.11
WM0247	S1	1/06/2012	31.42	326.17
WM0247	S1	15/06/2012	31.39	326.19
WM0247	S1	30/06/2012	31.24	326.34
WM0247A	S1	24/06/2010	51.34	306.29
WM0247A	S1	3/07/2010	52.02	305.60
WM0247A	S1	22/07/2010	51.76	305.86
WM0247A	S1	12/08/2010	51.97	305.65
WM0247A	S1	29/08/2010	51.98	305.65
WM0247A	S1	19/09/2010	51.81	305.81
WM0247A	S1	28/09/2010	51.93	305.69
WM0247A	S1	11/10/2010	50.19	307.44
WM0247A	S1	30/10/2010	52.06	305.56
WM0247A	S1	18/11/2010	50.31	307.31
WM0247A	S1	14/12/2010	48.56	309.06
WM0247A	S1	10/01/2011	50.13	307.49
WM0247A	S1	24/01/2011	49.86	307.76
WM0247A	S1	10/02/2011	49.93	307.69
WM0247A	S1	8/03/2011	50.24	307.38
WM0247A	S1	23/03/2011	47.76	309.86
WM0247A	S1	18/04/2011	47.28	310.34
WM0247A	S1	5/05/2011	47.27	310.35
WM0247A	S1	16/05/2011	49.50	308.13
WM0247A	S1	2/06/2011	51.85	305.77
WM0247A	S1	20/06/2011	51.54	306.08
WM0247A	S1	4/07/2011	51.52	306.10



Bore ID	Installation Type	Date_Time	SWL (m btoc)	RWL (mAHD)
WM0247A	S1	22/07/2011	51.61	306.01
WM0247A	S1	24/08/2011	52.65	304.97
WM0247A	S1	10/09/2011	52.64	304.98
WM0247A	S1	23/09/2011	52.75	304.87
WM0247A	S1	4/10/2011	52.72	304.90
WM0247A	S1	12/10/2011	54.68	302.94
WM0247A	S1	9/11/2011	52.49	305.13
WM0247A	S1	20/11/2011	52.43	305.19
WM0247A	S1	14/12/2011	52.22	305.40
WM0247A	S1	22/01/2012	52.14	305.48
WM0247A	S1	12/02/2012	51.98	305.64
WM0247A	S1	21/02/2012	51.98	305.64
WM0247A	S1	16/03/2012	51.93	305.70
WM0247A	S1	22/03/2012	51.89	305.73
WM0247A	S1	5/04/2012	51.83	305.80
WM0247A	S1	7/04/2012	51.82	305.80
WM0247A	S1	20/04/2012	53.32	304.30
WM0247A	S1	4/05/2012	45.68	311.95
WM0247A	S1	22/05/2012	57.28	300.34
WM0247A	S1	1/06/2012	51.80	305.82
WM0247A	S1	15/06/2012	49.08	308.55
WM0247A	S1	30/06/2012	48.04	309.58
WM0256A	S1	23/01/2010	26.44	305.45
WM0256A	S1	2/02/2010	26.36	305.53
WM0256A	S1	17/02/2010	26.41	305.48
WM0256A	S1	25/03/2010	26.48	305.42
WM0256A	S1	29/04/2010	26.61	305.28
WM0256A	S1	3/05/2010	26.48	305.42
WM0256A	S1	23/06/2010	26.50	305.39
WM0256A	S1	5/07/2010	26.45	305.44
WM0256A	S1	22/07/2010	26.44	305.45
WM0256A	S1	12/08/2010	26.43	305.47
WM0256A	S1	29/08/2010	26.48	305.41
WM0256A	S1	19/09/2010	26.45	305.44
WM0256A	S1	26/10/2010	26.51	305.38
WM0256A	S1	9/11/2010	26.52	305.37
WM0256A	S1	14/11/2010	26.79	305.10
WM0256A	S1	18/11/2010	26.73	305.16
WM0256A	S1	13/12/2010	26.64	305.25
WM0256A	S1	10/01/2011	26.57	305.32
WM0256A	S1	24/01/2011	26.52	305.37
WM0256A	S1	5/02/2011	26.49	305.40
WM0256A	S1	8/03/2011	26.51	305.39
WM0256A	S1	23/03/2011	26.44	305.45
WM0256A	S1	7/04/2011	26.51	305.39
WM0256A	S1	17/04/2011	26.37	305.53
WM0256A	S1	5/05/2011	26.40	305.49
WM0256A	S1	17/05/2011	26.41	305.48
WM0256A	S1	6/06/2011	26.40	305.49
WM0256A	S1	20/06/2011	26.41	305.48
WM0256A	S1	5/07/2011	26.40	305.49
WM0256A	S1	22/07/2011	26.42	305.47
WM0256A	S1	17/08/2011	26.47	305.42
WM0256A	S1	24/08/2011	26.46	305.43
WM0256A	S1	13/09/2011	26.48	305.41
WM0256A	S1	23/09/2011	28.55	303.34
WM0256A	S1	13/10/2011	28.28	303.61
WM0256A	S1	4/11/2011	28.23	303.66
WM0256A	S1	20/11/2011	28.19	303.70
WM0256A	S1	14/12/2011	28.13	303.76
WM0256A	S1	22/01/2012	28.07	303.82
WM0256A	S1	11/02/2012	27.95	303.94
WM0256A	S1	21/02/2012	27.95	303.95
WM0256A	S1	7/03/2012	27.94	303.96
WM0256A	S1	16/03/2012	27.36	304.53
WM0256A	S1	22/03/2012	27.31	304.58
WM0256A	S1	4/04/2012	27.41	304.48
WM0256A	S1	20/04/2012	27.40	304.49
WM0256A	S1	4/05/2012	27.37	304.52
WM0256A	S1	22/05/2012	27.30	304.59
WM0256A	S1	1/06/2012	27.29	304.61
WM0256A	S1	15/06/2012	27.24	304.65
WM0256A	S1	30/06/2012	27.19	304.70
WM0260A	S1	20/02/2010	35.73	307.96
WM0260A	S1	7/03/2010	41.68	302.01
WM0260A	S1	25/03/2010	40.83	302.87
WM0260A	S1	29/04/2010	39.53	304.16
WM0260A	S1	4/05/2010	39.56	304.13
WM0260A	S1	23/06/2010	38.56	305.13
WM0260A	S1	7/07/2010	38.32	305.37
WM0260A	S1	22/07/2010	37.53	306.17
WM0260A	S1	12/08/2010	37.33	306.36
WM0260A	S1	29/08/2010	37.42	306.27
WM0260A	S1	18/09/2010	37.45	306.24
WM0260A	S1	3/10/2010	37.40	306.29
WM0260A	S1	9/10/2010	37.43	306.26
WM0260A	S1	26/10/2010	37.32	306.37
WM0260A	S1	14/11/2010	37.27	306.42
WM0260A	S1	17/11/2010	37.24	306.45
WM0260A	S1	12/12/2010	37.20	306.49
WM0260A	S1	10/01/2011	37.32	306.38
WM0260A	S1	24/01/2011	37.28	306.42
WM0260A	S1	8/03/2011	38.16	305.54
WM0260A	S1	23/03/2011	37.71	305.98
WM0260A	S1	15/04/2011	37.82	305.88
WM0260A	S1	5/05/2011	38.34	305.36
WM0260A	S1	17/05/2011	38.77	304.93
WM0260A	S1	7/06/2011	39.00	304.70
WM0260A	S1	20/06/2011	39.24	304.46
WM0260A	S1	6/07/2011	39.41	304.29
WM0260A	S1	8/07/2011	39.47	304.22
WM0260A	S1	24/07/2011	37.03	306.66
WM0260A	S1	24/08/2011	36.98	306.72
WM0260A	S1	10/09/2011	37.02	306.67
WM0260A	S1	23/09/2011	37.04	306.65
WM0260A	S1	13/10/2011	37.10	306.59
WM0260A	S1	7/11/2011	37.18	306.51
WM0260A	S1	13/11/2011	37.30	306.39
WM0260A	S1	24/11/2011	37.10	306.59
WM0260A	S1	29/11/2011	31.01	312.68
WM0260A	S1	15/12/2011	37.20	306.49
WM0260A	S1	24/01/2012	37.85	305.84
WM0260A	S1	11/02/2012	37.98	305.71
WM0260A	S1	21/02/2012	38.14	305.55
WM0260A	S1	17/03/2012	38.64	305.05
WM0260A	S1	22/03/2012	38.68	305.01
WM0260A	S1	3/04/2012	38.01	305.69
WM0260A	S1	4/04/2012	38.24	305.45
WM0260A	S1	20/04/2012	37.01	306.68
WM0260A	S1	4/05/2012	36.94	306.75
WM0260A	S1	20/05/2012	37.16	306.53

Bore ID	Installation Type	Date_Time	SWL (m btoc)	RWL (mAHD)
WM0260A	S1	1/06/2012	37.37	306.33
WM0260A	S1	16/06/2012	37.34	306.35
WM0260A	S1	30/06/2012	37.43	306.26
WM0265A	S1	16/06/2012	16.41	294.53
WM0265A	S1	30/06/2012	18.62	292.33
WM0265B	S1	16/06/2012	16.61	294.52
WM0265B	S1	30/06/2012	7.83	303.30
WM0269	S1	3/02/2010	14.70	308.36
WM0269	S1	20/02/2010	14.82	308.24
WM0269	S1	6/03/2010	14.78	308.28
WM0269	S1	26/03/2010	14.79	308.27
WM0269	S1	4/05/2010	14.22	308.84
WM0269	S1	24/06/2010	15.19	308.56
WM0269	S1	10/07/2010	15.21	308.53
WM0269	S1	23/07/2010	15.22	308.53
WM0269	S1	11/08/2010	15.19	308.56
WM0269	S1	18/08/2010	15.22	308.53
WM0269	S1	30/08/2010	15.28	308.46
WM0269	S1	18/09/2010	15.27	308.47
WM0269	S1	4/10/2010	15.28	308.46
WM0269	S1	9/10/2010	15.30	308.44
WM0269	S1	27/10/2010	15.27	308.47
WM0269	S1	14/11/2010	15.30	308.45
WM0269	S1	16/11/2010	15.25	308.49
WM0269	S1	14/12/2010	15.30	308.45
WM0269	S1	13/01/2011	15.32	308.43
WM0269	S1	23/01/2011	15.30	308.44
WM0269	S1	25/01/2011	15.30	308.44
WM0269	S1	7/03/2011	15.36	308.38
WM0269	S1	23/03/2011	15.29	308.46
WM0269	S1	31/03/2011	15.36	308.39
WM0269	S1	21/04/2011	15.32	308.42
WM0269	S1	6/05/2011	15.35	308.39
WM0269	S1	18/05/2011	15.35	308.39
WM0269	S1	3/06/2011	15.39	308.35
WM0269	S1	21/06/2011	15.28	308.46
WM0269	S1	5/07/2011	15.30	308.45
WM0269	S1	24/07/2011	15.34	308.40
WM0269	S1	28/07/2011	15.38	308.36
WM0269	S1	26/08/2011	15.33	308.41
WM0269	S1	12/09/2011	15.87	307.87
WM0269	S1	25/09/2011	15.30	308.44
WM0269	S1	14/10/2011	15.32	308.42
WM0269	S1	10/11/2011	15.43	308.31
WM0269	S1	24/11/2011	15.34	308.41
WM0269	S1	15/12/2011	15.32	308.42
WM0269	S1	20/01/2012	15.29	308.45
WM0269	S1	14/02/2012	15.32	308.42
WM0269	S1	23/02/2012	15.32	308.42
WM0269	S1	17/03/2012	15.30	308.44
WM0269	S1	19/03/2012	14.94	308.80
WM0269	S1	23/03/2012	15.26	308.48
WM0269	S1	4/04/2012	15.33	308.42
WM0269	S1	20/04/2012	15.29	308.45
WM0269	S1	5/05/2012	15.27	308.47
WM0269	S1	21/05/2012	15.32	308.43
WM0269	S1	2/06/2012	15.29	308.46
WM0269	S1	17/06/2012	15.39	308.36
WM0269	S1	30/06/2012	15.25	308.49
WM0278A	S1	16/06/2012	7.83	292.34
WM0278A	S1	30/06/2012	7.83	292.33
WM0278B	S1	16/06/2012	8.08	293.36
WM0278B	S1	30/06/2012	8.02	293.42
WM0288	S1	3/05/2011	13.28	267.33
WM0288	S1	6/05/2011	8.89	271.71
WM0288	S1	17/05/2011	8.70	271.90
WM0288	S1	21/06/2011	8.09	272.51
WM0288	S1	4/07/2011	8.06	272.54
WM0288	S1	23/07/2011	7.95	272.66
WM0288	S1	12/08/2011	7.86	272.74
WM0288	S1	21/08/2011	7.85	272.75
WM0288	S1	26/08/2011	7.83	272.78
WM0288	S1	15/09/2011	7.72	272.88
WM0288	S1	24/09/2011	7.73	272.87
WM0288	S1	13/10/2011	7.64	272.96
WM0288	S1	2/11/2011	7.49	273.11
WM0288	S1	10/11/2011	7.48	273.12
WM0288	S1	16/12/2011	7.29	273.31
WM0288	S1	23/01/2012	7.24	273.36
WM0288	S1	15/04/2012	7.12	273.48
WM0288	S1	19/04/2012	7.12	273.48
WM0288	S1	5/05/2012	7.07	273.54
WM0288	S1	18/05/2012	10.54	270.06
WM0288	S1	21/05/2012	7.06	273.55
WM0288	S1	1/06/2012	7.02	273.59
WM0288	S1	16/06/2012	6.97	273.63
WM0288	S1	1/07/2012	6.97	273.63
WM0288A	S1	3/05/2010	13.28	267.83
WM0288A	S1	14/04/2011	8.44	272.67
WM0288A	S1	22/04/2011	8.54	272.56
WM0288A	S1	6/05/2011	5.22	275.89
WM0288A	S1	17/05/2011	4.23	276.87
WM0288A	S1	21/06/2011	3.97	277.13
WM0288A	S1	4/07/2011	4.13	276.97
WM0288A	S1	23/07/2011	4.24	276.8



Bore ID	Installation Type	Date_Time	SWL (m btoc)	RWL (mAHD)
WM0290	S1	16/11/2010	16.88	268.97
WM0290	S1	12/12/2010	16.12	269.73
WM0290	S1	11/01/2011	18.94	266.92
WM0290	S1	25/01/2011	15.93	269.92
WM0290	S1	13/02/2011	15.93	269.92
WM0290	S1	7/03/2011	16.43	269.43
WM0290	S1	24/03/2011	16.16	269.69
WM0290	S1	18/04/2011	16.01	269.84
WM0290	S1	22/04/2011	16.46	269.39
WM0290	S1	6/05/2011	16.05	269.80
WM0290	S1	18/05/2011	15.98	269.87
WM0290	S1	3/06/2011	15.92	269.93
WM0290	S1	22/06/2011	15.81	270.04
WM0290	S1	6/07/2011	15.83	270.02
WM0290	S1	24/07/2011	15.82	270.04
WM0290	S1	16/08/2011	15.81	270.04
WM0290	S1	27/08/2011	15.92	269.93
WM0290	S1	12/09/2011	15.79	270.06
WM0290	S1	24/09/2011	15.76	270.09
WM0290	S1	4/10/2011	15.70	270.15
WM0290	S1	14/10/2011	16.28	269.57
WM0290	S1	10/11/2011	15.91	269.95
WM0290	S1	1/12/2011	15.62	270.23
WM0290	S1	12/02/2012	15.53	270.32
WM0290	S1	28/02/2012	15.55	270.30
WM0290	S1	17/03/2012	15.59	270.26
WM0290	S1	19/03/2012	15.60	270.25
WM0290	S1	22/03/2012	16.03	269.82
WM0290	S1	6/04/2012	15.72	270.13
WM0290	S1	20/04/2012	15.69	270.16
WM0290	S1	6/05/2012	15.68	270.18
WM0290	S1	21/05/2012	15.69	270.17
WM0290	S1	2/06/2012	15.61	270.24
WM0290	S1	16/06/2012	15.54	270.31
WM0290	S1	30/06/2012	15.54	270.31
WM0291	S1	23/06/2010	3.10	294.61
WM0291	S1	3/07/2010	3.08	294.62
WM0291	S1	24/07/2010	3.01	294.70
WM0291	S1	30/08/2010	2.83	294.87
WM0291	S1	18/09/2010	2.73	294.97
WM0291	S1	12/10/2010	2.68	295.03
WM0291	S1	24/01/2011	2.11	295.60
WM0291	S1	15/02/2011	2.64	295.06
WM0291	S1	8/03/2011	3.66	294.35
WM0291	S1	23/03/2011	3.21	294.49
WM0291	S1	6/04/2011	3.03	294.67
WM0291	S1	18/04/2011	3.18	294.52
WM0291	S1	5/05/2011	3.03	294.67
WM0291	S1	16/05/2011	2.97	294.73
WM0291	S1	6/06/2011	2.84	294.86
WM0291	S1	7/06/2011	2.68	295.02
WM0291	S1	8/06/2011	2.68	295.02
WM0291	S1	9/06/2011	2.67	295.03
WM0291	S1	10/06/2011	2.68	295.02
WM0291	S1	11/06/2011	2.68	295.02
WM0291	S1	12/06/2011	2.71	294.99
WM0291	S1	13/06/2011	2.68	295.02
WM0291	S1	14/06/2011	2.67	295.04
WM0291	S1	15/06/2011	2.67	295.03
WM0291	S1	16/06/2011	2.68	295.02
WM0291	S1	17/06/2011	2.68	295.02
WM0291	S1	18/06/2011	2.65	295.05
WM0291	S1	19/06/2011	2.64	295.06
WM0291	S1	20/06/2011	2.75	294.95
WM0291	S1	20/06/2011	2.64	295.06
WM0291	S1	21/06/2011	2.71	294.99
WM0291	S1	22/06/2011	2.63	295.07
WM0291	S1	23/06/2011	2.66	295.04
WM0291	S1	24/06/2011	2.66	295.04
WM0291	S1	25/06/2011	2.70	295.00
WM0291	S1	26/06/2011	2.70	295.01
WM0291	S1	27/06/2011	2.66	295.04
WM0291	S1	28/06/2011	2.66	295.04
WM0291	S1	29/06/2011	2.64	295.06
WM0291	S1	30/06/2011	2.64	295.06
WM0291	S1	1/07/2011	2.65	295.05
WM0291	S1	2/07/2011	2.65	295.05
WM0291	S1	3/07/2011	2.63	295.07
WM0291	S1	4/07/2011	2.70	295.01
WM0291	S1	4/07/2011	2.63	295.07
WM0291	S1	5/07/2011	2.59	295.11
WM0291	S1	6/07/2011	2.60	295.10
WM0291	S1	7/07/2011	2.58	295.12
WM0291	S1	8/07/2011	2.61	295.09
WM0291	S1	9/07/2011	2.61	295.09
WM0291	S1	10/07/2011	2.63	295.07
WM0291	S1	11/07/2011	2.58	295.12
WM0291	S1	12/07/2011	2.68	295.02
WM0291	S1	12/07/2011	2.81	294.89
WM0291	S1	13/07/2011	2.59	295.11
WM0291	S1	14/07/2011	2.58	295.12
WM0291	S1	15/07/2011	2.58	295.12
WM0291	S1	16/07/2011	2.59	295.11
WM0291	S1	17/07/2011	2.59	295.11
WM0291	S1	18/07/2011	2.58	295.12
WM0291	S1	19/07/2011	2.57	295.13
WM0291	S1	20/07/2011	2.54	295.16
WM0291	S1	21/07/2011	2.54	295.16
WM0291	S1	22/07/2011	2.65	295.05
WM0291	S1	22/07/2011	2.50	295.20
WM0291	S1	23/07/2011	2.52	295.18
WM0291	S1	24/07/2011	2.51	295.19
WM0291	S1	25/07/2011	2.49	295.21
WM0291	S1	26/07/2011	2.49	295.21
WM0291	S1	27/07/2011	2.49	295.21
WM0291	S1	28/07/2011	2.49	295.21
WM0291	S1	29/07/2011	2.49	295.21
WM0291	S1	30/07/2011	2.50	295.20
WM0291	S1	31/07/2011	2.48	295.22
WM0291	S1	1/08/2011	2.50	295.20
WM0291	S1	2/08/2011	2.50	295.20
WM0291	S1	3/08/2011	2.50	295.20
WM0291	S1	4/08/2011	2.48	295.22
WM0291	S1	5/08/2011	2.50	295.20
WM0291	S1	6/08/2011	2.47	295.23
WM0291	S1	7/08/2011	2.46	295.24
WM0291	S1	8/08/2011	2.45	295.25
WM0291	S1	9/08/2011	2.45	295.25
WM0291	S1	10/08/2011	2.46	295.24
WM0291	S1	11/08/2011	2.49	295.21
WM0291	S1	12/08/2011	2.58	295.13

Bore ID	Installation Type	Date_Time	SWL (m btoc)	RWL (mAHD)
WM0291	S1	13/08/2011	2.65	295.05
WM0291	S1	14/08/2011	2.85	294.85
WM0291	S1	14/08/2011	2.73	294.97
WM0291	S1	15/08/2011	2.80	294.90
WM0291	S1	16/08/2011	2.83	294.87
WM0291	S1	17/08/2011	2.87	294.83
WM0291	S1	18/08/2011	2.92	294.78
WM0291	S1	19/08/2011	2.95	294.75
WM0291	S1	20/08/2011	2.97	294.73
WM0291	S1	21/08/2011	2.99	294.71
WM0291	S1	22/08/2011	2.97	294.73
WM0291	S1	23/08/2011	2.99	294.71
WM0291	S1	24/08/2011	3.11	294.59
WM0291	S1	24/08/2011	2.97	294.73
WM0291	S1	25/08/2011	2.98	294.72
WM0291	S1	14/09/2011	3.15	294.56
WM0291	S1	21/09/2011	3.20	294.50
WM0291	S1	12/10/2011	3.14	294.56
WM0291	S1	4/11/2011	3.68	294.02
WM0291	S1	24/01/2012	4.35	293.35
WM0291	S1	24/03/2012	4.08	293.62
WM0291	S1	4/04/2012	3.93	293.77
WM0291	S1	16/04/2012	4.81	292.89
WM0291	S1	18/04/2012	4.86	292.84
WM0291	S1	5/05/2012	4.57	293.13
WM0291	S1	20/05/2012	4.82	292.89
WM0291	S1	30/05/2012	4.60	293.10
WM0291	S1	1/06/2012	4.45	293.25
WM0291	S1	16/06/2012	4.29	293.41
WM0291	S1	1/07/2012	4.08	293.62
WM0291A	S1	6/04/2011	6.61	289.36
WM0291A	S1	18/04/2011	6.60	289.37
WM0291A	S1	5/05/2011	6.50	289.47
WM0291A	S1	16/05/2011	6.44	289.54
WM0291A	S1	6/06/2011	6.34	289.63
WM0291A	S1	20/06/2011	6.25	289.72
WM0291A	S1	4/07/2011	6.20	289.78
WM0291A	S1	12/07/2011	6.20	289.77
WM0291A	S1	22/07/2011	6.18	289.80
WM0291A	S1	14/08/2011	6.32	289.65
WM0291A	S1	24/08/2011	6.52	289.46
WM0291A	S1	14/09/2011	6.43	289.54
WM0291A	S1	21/09/2011	6.52	289.45
WM0291A	S1	12/10/2011	6.33	289.64
WM0291A	S1	4/11/2011	6.79	289.18
WM0291A	S1	24/01/2012	7.14	288.83
WM0291A	S1	24/03/2012	6.84	289.13
WM0291A	S1	4/04/2012	6.76	289.21
WM0291A	S1	18/04/2012	7.74	288.23
WM0291A	S1	5/05/2012	6.42	289.55
WM0291A	S1	20/05/2012	7.65	288.33
WM0291A	S1	31/05/2012	6.74	289.23
WM0291A	S1	1/06/2012	7.50	288.48
WM0291A	S1	16/06/2012	7.17	288.81
WM0291A	S1	1/07/2012	7.00	288.98
WM0291B	S1	18/04/2011	3.30	292.66
WM0291B	S1	5/05/2011	2.93	293.03
WM0291B	S1	16/05/2011	2.82	293.14
WM0291B	S1	6/06/2011	2.68	293.28
WM0291B	S1	20/06/2011	2.61	293.36
WM0291B	S1	4/07/2011	2.55	293.41
WM0291B	S1	12/07/2011	2.53	293.43
WM0291B	S1	22/07/2011	2.56	293.40
WM0291B	S1	14/08/2011	2.68	293.28
WM0291B	S1	24/08/2011	2.97	293.00
WM0291B	S1	14/09/2011	2.99	293.01
WM0291B	S1	21/09/2011	3.03	292.97
WM0291B	S1	12/10/2011	3.00	293.00
WM0291B	S1	4/11/2011	3.54	292.46
WM0291B	S1	24/01/2012	4.08	291.92
WM0291B	S1	24/03/2012	3.91	292.09
WM0291B	S1	4/04/2012	3.76	292.24
WM0291B	S1	16/04/2012	4.55	291.41
WM0291B	S1	18/04/2012	4.52	291.48
WM0291B	S1	5/05/2012	4.46	291.54
WM0291B	S1	20/05/2012	4.72	291.29
WM0291B	S1	30/05/2012	4.50	291.46
WM0291B	S1	1/06/2012	4.49	291.52
WM0291B	S1	16/06/2012	4.12	291.85
WM0291B	S1	1/07/2012	3.89	292.07
WM0293A	S1	23/06/2010	30.37	294.89
WM0293A	S1	13/07/2010	29.59	295.66
WM0293A	S1	22/07/2010	29.99	295.26
WM0293A	S1	14/08/2010	29.50	295.75
WM0293A	S1	18/08/2010	29.49	295.76
WM0293A	S1	21/08/2010	29.41	295.84
WM0293A	S1	29/08/2010	28.67	296.58
WM0293A	S1	18/09/2010	27.93	297.32
WM0293A	S1	28/09/2010	28.16	297.09
WM0293A	S1	14/10/2010	28.66	296.59
WM0293A	S1	26/10/2010	29.00	296.25
WM0293A	S1	18/11/2010	28.98	296.27
WM0293A	S1	16/12/2010	28.66	296.60
WM0293A	S1	14/01/2011	28.99	296.27
WM0293A	S1	25/01/2011	29.09	296.16
WM0293A	S1	10/02/2011	29.23	296.02
WM0293A	S1	8/03/2011	29.29	295.96
WM0293A	S1	24/03/2011	29.19	295.06
WM0293A	S1	22/04/2011	29.27	295.98
WM0293A	S1	5/05/2011	29.31	295.94
WM0293A	S1	16/05/2011	29.41	295.84
WM0293A	S1	6/06/2011	29.34	295.82
WM0293A	S1	20/06/2011	29.32	295.86
WM0293A	S1	6/07/2011	29.31	296.00
WM0293A	S1	22/07/2011	29.30	296.00
WM0293A	S1	24/08/2011	29.35	295.96
WM0293A	S1	12/09/2011	29.27	295.99
WM0293A	S1	24/09/2011	29.27	295.98
WM0293A	S1	14/10/2011	29.27	295.98
WM0293A	S1	9/11/2011	29.24	296.02
WM0293A	S1	20/11/2011	29.23	296.02
WM0293A	S1	14/12/2011	29.14	296.11
WM0293A	S1	22/01/2012	29.18	296.07
WM0293A	S1	11/02/2012	29.04	296.21
WM0293A	S1	21/02/2012	29.09	296.16
WM0293A	S1	17/03/2012	29.08	296.17
WM0293A	S1	22/03/2012	29.05	296.20
WM0293A	S1	6/04/2012	29.15	296.10
WM0293A	S1	20/04/2012	29.13	296.12
WM0293A	S1	4/05/2012	28.14	297.11
WM0293A	S1	23/05/2012	29.28	295.97



Bore ID	Installation Type	Date_Time	SWL (m btoc)	RWL (mAHD)
WM0293A	S1	1/06/2012	29.16	296.10
WM0293A	S1	17/06/2012	29.11	296.20
WM0293A	S1	30/06/2012	29.03	296.28
WM0330R	S1	27/08/2010	13.54	294.56
WM0330R	S1	15/12/2010	20.10	288.01
WM0330R	S1	10/01/2011	14.28	293.82
WM0330R	S1	24/01/2011	14.40	293.70
WM0330R	S1	9/02/2011	14.58	293.52
WM0330R	S1	8/03/2011	15.68	292.42
WM0330R	S1	24/03/2011	15.38	292.72
WM0330R	S1	7/04/2011	15.31	292.79
WM0330R	S1	21/04/2011	15.31	292.80
WM0330R	S1	5/05/2011	15.24	292.87
WM0330R	S1	18/05/2011	15.19	292.92
WM0330R	S1	6/06/2011	15.09	293.01
WM0330R	S1	20/06/2011	15.10	293.00
WM0330R	S1	6/07/2011	15.13	292.97
WM0330R	S1	24/07/2011	15.14	292.96
WM0330R	S1	13/08/2011	15.15	292.95
WM0330R	S1	24/08/2011	17.14	290.97
WM0330R	S1	12/09/2011	16.11	291.99
WM0330R	S1	24/09/2011	15.89	292.21
WM0330R	S1	14/10/2011	15.69	292.41
WM0330R	S1	4/11/2011	15.53	292.57
WM0330R	S1	12/11/2011	15.52	292.58
WM0330R	S1	20/11/2011	17.43	290.67
WM0330R	S1	15/12/2011	16.03	292.08
WM0330R	S1	22/01/2012	15.68	292.42
WM0330R	S1	10/02/2012	15.38	292.72
WM0330R	S1	22/02/2012	15.33	292.77
WM0330R	S1	17/03/2012	15.32	292.78
WM0330R	S1	23/03/2012	15.32	292.78
WM0330R	S1	25/03/2012	15.36	292.74
WM0330R	S1	5/04/2012	16.28	291.83
WM0330R	S1	20/04/2012	15.69	292.41
WM0330R	S1	6/05/2012	15.50	292.61
WM0330R	S1	15/05/2012	15.46	292.64
WM0330R	S1	22/05/2012	14.65	293.45
WM0330R	S1	2/06/2012	15.35	292.76
WM0330R	S1	17/06/2012	15.28	292.82
WM0330R	S1	30/06/2012	15.26	292.85
WM0333	V1	21/08/2010	24.13	300.31
WM0333	V1	27/08/2010	24.30	300.14
WM0333	V1	29/08/2010	24.25	300.19
WM0333	V1	18/09/2010	24.54	299.90
WM0333	V1	28/09/2010	24.54	299.90
WM0333	V1	18/11/2010	24.83	299.61
WM0333	V1	16/12/2010	25.00	299.44
WM0333	V1	14/01/2011	25.00	299.44
WM0333	V1	25/01/2011	25.06	299.38
WM0333	V1	10/02/2011	25.00	299.44
WM0333	V1	8/03/2011	25.06	299.38
WM0333	V1	24/03/2011	25.29	299.15
WM0333	V1	22/04/2011	28.71	295.73
WM0333	V1	5/05/2011	27.21	297.23
WM0333	V1	16/05/2011	26.63	297.81
WM0333	V1	7/06/2011	26.28	298.16
WM0333	V1	20/06/2011	26.16	298.28
WM0333	V1	6/07/2011	26.05	298.39
WM0333	V1	12/07/2011	25.93	298.51
WM0333	V1	27/08/2011	25.58	298.86
WM0333	V1	12/09/2011	26.34	298.22
WM0333	V1	24/09/2011	25.64	298.92
WM0333	V1	14/10/2011	25.52	299.04
WM0333	V1	9/11/2011	25.47	299.10
WM0333	V1	20/11/2011	25.41	299.15
WM0333	V1	14/12/2011	25.41	299.15
WM0333	V1	22/01/2012	25.35	299.21
WM0333	V1	11/02/2012	25.29	299.27
WM0333	V1	21/02/2012	25.29	299.27
WM0333	V1	17/03/2012	25.23	299.33
WM0333	V1	22/03/2012	25.18	299.39
WM0333	V1	20/04/2012	24.77	299.67
WM0333	V1	23/05/2012	24.42	300.02
WM0333	V1	1/06/2012	24.25	300.19
WM0333	V1	17/06/2012	24.13	300.31
WM0333	V1	30/06/2012	24.13	300.31
WM0333	V2	27/08/2010	26.72	297.72
WM0333	V2	29/08/2010	26.72	297.72
WM0333	V2	18/09/2010	26.89	297.55
WM0333	V2	28/09/2010	26.89	297.55
WM0333	V2	18/11/2010	27.17	297.27
WM0333	V2	16/12/2010	27.29	297.15
WM0333	V2	14/01/2011	27.40	297.04
WM0333	V2	25/01/2011	27.12	297.32
WM0333	V2	10/02/2011	27.12	297.32
WM0333	V2	8/03/2011	27.12	297.32
WM0333	V2	24/03/2011	27.17	297.27
WM0333	V2	22/04/2011	28.81	295.63
WM0333	V2	6/05/2011	28.19	296.25
WM0333	V2	6/05/2011	27.97	296.47
WM0333	V2	7/06/2011	27.74	296.70
WM0333	V2	20/06/2011	27.68	296.76
WM0333	V2	6/07/2011	27.68	296.76
WM0333	V2	22/07/2011	27.63	296.81
WM0333	V2	27/08/2011	27.57	296.87
WM0333	V2	12/09/2011	27.57	296.99
WM0333	V2	24/09/2011	27.63	296.93
WM0333	V2	14/10/2011	27.51	297.05
WM0333	V2	9/11/2011	27.51	297.05
WM0333	V2	20/11/2011	27.46	297.10
WM0333	V2	14/12/2011	27.40	297.16
WM0333	V2	22/01/2012	27.40	297.16
WM0333	V2	21/02/2012	27.40	297.16
WM0333	V2	17/03/2012	27.34	297.22
WM0333	V2	22/03/2012	27.40	297.16
WM0333	V2	20/04/2012	27.12	297.32
WM0333	V2	23/05/2012	26.89	297.55
WM0333	V2	1/06/2012	26.89	297.55
WM0333	V2	17/06/2012	26.89	297.55
WM0333	V2	30/06/2012	26.89	297.55
WM0334	S1	27/08/2010	20.66	276.50
WM0334	S1	30/08/2010	21.98	275.19
WM0334	S1	5/09/2010	22.62	274.54
WM0334	S1	12/09/2010	24.95	272.21
WM0334	S1	17/09/2010	24.94	272.22
WM0334	S1	4/10/2010	25.02	272.14
WM0334	S1	17/10/2010	25.08	272.09
WM0334	S1	27/10/2010	25.13	272.03
WM0334	S1	29/10/2010	25.13	272.03
WM0334	S1	14/11/2010	26.24	270.92

Bore ID	Installation Type	Date_Time	SWL (m btoc)	RWL (mAHD)
WM0334	S1	17/11/2010	26.48	270.68
WM0334	S1	14/12/2010	26.44	270.72
WM0334	S1	11/01/2011	26.40	270.76
WM0334	S1	23/01/2011	26.39	270.77
WM0334	S1	8/03/2011	26.75	270.41
WM0334	S1	23/03/2011	26.70	270.46
WM0334	S1	4/04/2011	26.70	270.47
WM0334	S1	23/04/2011	26.84	270.32
WM0334	S1	6/05/2011	26.80	270.36
WM0334	S1	17/05/2011	26.76	270.40
WM0334	S1	6/06/2011	26.74	270.43
WM0334	S1	21/06/2011	26.71	270.45
WM0334	S1	6/07/2011	26.68	270.48
WM0334	S1	8/07/2011	26.78	270.39
WM0334	S1	23/07/2011	26.77	270.39
WM0334	S1	26/08/2011	26.90	270.27
WM0334	S1	14/09/2011	26.74	270.42
WM0334	S1	19/09/2011	26.72	270.44
WM0334	S1	14/10/2011	26.75	270.41
WM0334	S1	29/10/2011	26.72	270.44
WM0334	S1	10/11/2011	26.83	270.33
WM0334	S1	1/12/2011	26.77	270.39
WM0334	S1	15/12/2011	26.72	270.44
WM0334	S1	24/01/2012	26.58	270.58
WM0334	S1	12/02/2012	26.53	270.63
WM0334	S1	18/03/2012	26.47	270.69
WM0334	S1	23/03/2012	26.64	270.52
WM0334	S1	5/04/2012	26.73	270.43
WM0334	S1	22/04/2012	26.66	270.50
WM0334	S1	4/05/2012	26.63	270.53
WM0334	S1	21/05/2012	26.59	270.57
WM0334	S1	26/05/2012	26.58	270.58
WM0334	S1	2/06/2012	26.58	270.58
WM0334	S1	16/06/2012	26.59	270.58
WM0334	S1	30/06/2012	26.55	270.62
WM0339A	S1	23/04/2011	28.68	302.17
WM0339A	S1	5/05/2011	28.74	302.11
WM0339A	S1	16/05/2011	28.40	302.46
WM0339A	S1	2/06/2011	27.95	302.90
WM0339A	S1	20/06/2011	27.67	303.18
WM0339A	S1	4/07/2011	27.55	303.31
WM0339A	S1	22/07/2011	27.36	303.49
WM0339A	S1	13/08/2011	27.23	303.62
WM0339A	S1	24/08/2011	27.22	303.63
WM0339A	S1	11/09/2011	27.11	303.75
WM0339A	S1	23/09/2011	27.10	303.75
WM0339A	S1	14/10/2011	26.95	303.90
WM0339A	S1	9/11/2011	26.83	304.02
WM0339A	S1	21/11/2011	26.79	304.06
WM0339A	S1	29/11/2011	26.72	304.13
WM0339A	S1	14/12/2011	26.68	304.17
WM0339A	S1	22/01/2012	26.63	304.22
WM0339A	S1	12/02/2012	26.48	304.37
WM0339A	S1	22/02/2012	26.41	304.44
WM0339A	S1	16/03/2012	26.24	304.61
WM0339A	S1	22/03/2012	26.14	304.71
WM0339A	S1	5/04/2012	26.04	304.81
WM0339A	S1	20/04/2012	25.84	305.01
WM0339A	S1	4/05/2012	25.65	305.21
WM0339A	S1	22/05/2012	25.43	305.43
WM0339A	S1	2/06/2012	25.25	305.61
WM0339A	S1	16/06/2012	25.00	305.85
WM0339A	S1	30/06/2012	24.80	306.05
WM0350	S1	27/10/2010	1.87	291.08
WM0350	S1	28/10/2010	1.90	291.05
WM0350	S1	17/11/2010	1.62	291.33
WM0350	S1	12/12/2010	0.69	292.26
WM0350	S1	11/01/2011	1.47	291.49
WM0350	S1	25/01/2011	1.67	291.28
WM0350	S1	10/02/2011	2.02	290.93
WM0350	S1	8/03/2011	2.21	290.74
WM0350	S1	24/03/2011	2.33	290.62
WM0350	S1	5/04/2011	2.85	290.10
WM0350	S1	22/04/2011	2.48	290.48
WM0350	S1	6/05/2011	2.31	290.65
WM0350	S1	17/05/2011	2.68	290.28
WM0350	S1	7/06/2011	2.61	290.35
WM0350	S1	21/06/2011	2.52	290.43
WM0350	S1	5/07/2011	2.54	290.41
WM0350	S1	21/07/2011	2.59	290.36
WM0350	S1	27/07/2011	2.70	290.25
WM0350	S1	27/08/2011	2.69	290.27
WM0350	S1	12/09/2011	2.71	290.24
WM0350	S1	23/09/2011	2.59	290.36
WM0350	S1	13/10/2011	2.48	290.47
WM0350	S1	7/11/2011	2.50	290.45
WM0350	S1	2/12/2011	1.23	291.72
WM0350	S1	15/12/2011	1.63	291.32
WM0350	S1	21/01/2012	1.91	291.04
WM0350	S1	10/02/2012	0.99	291.96
WM0350	S1	22/02/2012	1.23	291.73
WM0350	S1	6/03/2012	1.25	291.71
WM0350	S1	23/03/2012	1.48	291.48
WM0350	S1	5/04/2012	1.70	291.25
WM0350	S1	21/04/2012	1.79	291.16
WM0350	S1	5/05/2012	1.86	291.09
WM0350	S1	21/05/2012	2.03	290.93
WM0350	S1	2/06/2012	1.82	291.13
WM0350	S1	17/06/2012	1.55	291.41
WM0350	S1	1/07/2012	1.61	291.34
WM0350	V1	26/09/2010	8.65	283.67
WM0350	V1	14/11/2010	9.37	282.95
WM0350	V1	17/11/2010	9.37	283.95
WM0350	V1	21/11/2010	9.37	282.95
WM0350	V1	12/12/2010	9.37	282.95
WM0350	V1	11/01/2011	9.43	282.89
WM0350	V1	25/01/2011	9.60	282.72
WM0350	V1	8/03/2011	9.60	282.72
WM0350	V1	24/03/2011	9.65	282.67
WM0350	V1	22/04/2011	9.77	282.55
WM0350	V1	6/05/2011	9.65	282.67
WM0350	V1	17/05/2011	9.65	282.67
WM0350	V1	7/06/2011	9.65	282.67
WM0350	V1	21/06/2011	9.65	282.67
WM0350	V1	5/07/2011	9.60	282.72
WM0350	V1	21/07/2011	9.60	282.72
WM0350	V1	27/08/2011	9.37	282.95
WM0350	V1	12/09/2011	9.26	283.06
WM0350	V1	23/09/2011	9.37	282.95
WM0350	V1	13/10/2011	9.37	282.95
WM0350	V1	7/11/2011	9.54	282.78



Bore ID	Installation Type	Date_Time	SWL (m btoe)	RWL (mAHD)
WM0350	V1	2/12/2011	9.32	283.00
WM0350	V1	15/12/2011	9.37	282.95
WM0350	V1	21/01/2012	9.43	282.89
WM0350	V1	10/02/2012	9.37	282.95
WM0350	V1	23/02/2012	9.37	282.95
WM0350	V1	23/03/2012	9.26	283.06
WM0350	V1	5/04/2012	3.55	288.77
WM0350	V1	21/05/2012	9.04	283.28
WM0350	V1	2/06/2012	9.08	283.34
WM0350	V1	17/06/2012	8.98	283.34
WM0350	V1	1/07/2012	8.98	283.34
WM0350	V2	26/09/2010	1.02	291.30
WM0350	V2	14/11/2010	1.13	291.19
WM0350	V2	17/11/2010	1.10	291.22
WM0350	V2	21/11/2010	1.10	291.22
WM0350	V2	12/12/2010	0.91	291.41
WM0350	V2	11/01/2011	0.96	291.36
WM0350	V2	25/01/2011	1.10	291.22
WM0350	V2	8/03/2011	1.36	290.96
WM0350	V2	24/03/2011	1.47	290.85
WM0350	V2	22/04/2011	1.56	290.76
WM0350	V2	6/05/2011	1.59	290.73
WM0350	V2	17/05/2011	1.59	290.73
WM0350	V2	7/06/2011	1.67	290.65
WM0350	V2	21/06/2011	1.78	290.54
WM0350	V2	5/07/2011	1.78	290.54
WM0350	V2	21/07/2011	1.84	290.48
WM0350	V2	27/08/2011	1.87	290.45
WM0350	V2	12/09/2011	1.90	290.42
WM0350	V2	23/09/2011	1.93	290.39
WM0350	V2	13/10/2011	1.90	290.42
WM0350	V2	7/11/2011	1.98	290.34
WM0350	V2	2/12/2011	1.59	290.73
WM0350	V2	15/12/2011	1.59	290.73
WM0350	V2	21/01/2012	1.59	290.73
WM0350	V2	10/02/2012	0.71	291.61
WM0350	V2	23/02/2012	1.16	291.16
WM0350	V2	23/03/2012	1.27	291.05
WM0350	V2	5/04/2012	1.19	291.13
WM0350	V2	21/05/2012	1.36	290.96
WM0350	V2	2/06/2012	1.36	290.96
WM0350	V2	17/06/2012	1.22	291.10
WM0350	V2	2/07/2012	1.33	290.99
WM0360	S1	22/04/2011	3.08	278.06
WM0360	S1	6/05/2011	3.95	277.19
WM0360	S1	17/05/2011	3.11	278.03
WM0360	S1	21/06/2011	3.12	278.02
WM0360	S1	4/07/2011	3.14	278.00
WM0360	S1	23/07/2011	3.18	277.97
WM0360	S1	8/08/2011	3.14	278.00
WM0360	S1	9/08/2011	3.14	278.00
WM0360	S1	12/08/2011	3.17	277.97
WM0360	S1	26/08/2011	3.17	277.97
WM0360	S1	15/09/2011	3.18	277.96
WM0360	S1	24/09/2011	3.20	277.95
WM0360	S1	13/10/2011	3.17	277.97
WM0360	S1	3/11/2011	3.15	277.99
WM0360	S1	10/11/2011	3.16	277.98
WM0360	S1	16/12/2011	3.08	278.07
WM0360	S1	23/01/2012	3.05	278.09
WM0360	S1	23/03/2012	2.87	278.27
WM0360	S1	5/04/2012	2.97	278.17
WM0360	S1	19/04/2012	3.00	278.14
WM0360	S1	5/05/2012	2.97	278.17
WM0360	S1	10/05/2012	3.00	278.14
WM0360	S1	21/05/2012	3.00	278.14
WM0360	S1	1/06/2012	2.99	278.16
WM0360	S1	16/06/2012	2.98	278.16
WM0360	S1	30/06/2012	2.97	278.17
WM0361	S1	5/09/2010	22.90	268.44
WM0361	S1	12/09/2010	20.40	270.94
WM0361	S1	16/09/2010	14.09	277.25
WM0361	S1	4/10/2010	9.28	282.06
WM0361	S1	18/10/2010	8.92	282.42
WM0361	S1	26/10/2010	8.86	282.48
WM0361	S1	5/11/2010	8.86	282.48
WM0361	S1	13/11/2010	15.23	276.11
WM0361	S1	16/11/2010	12.44	278.90
WM0361	S1	5/12/2010	9.24	282.10
WM0361	S1	12/12/2010	14.32	277.02
WM0361	S1	11/01/2011	9.16	282.18
WM0361	S1	25/01/2011	9.30	282.04
WM0361	S1	11/02/2011	8.98	282.36
WM0361	S1	7/03/2011	9.51	281.84
WM0361	S1	23/03/2011	9.07	282.27
WM0361	S1	21/04/2011	8.93	282.42
WM0361	S1	6/05/2011	8.91	282.43
WM0361	S1	17/05/2011	8.86	282.48
WM0361	S1	3/06/2011	8.86	282.48
WM0361	S1	21/06/2011	8.84	282.50
WM0361	S1	5/07/2011	8.82	282.52
WM0361	S1	23/07/2011	8.80	282.55
WM0361	S1	26/08/2011	8.79	282.55
WM0361	S1	12/09/2011	8.77	282.57
WM0361	S1	23/09/2011	8.80	282.55
WM0361	S1	14/10/2011	8.79	282.56
WM0361	S1	10/11/2011	8.88	282.46
WM0361	S1	24/11/2011	8.77	282.58
WM0361	S1	15/12/2011	8.72	282.62
WM0361	S1	20/01/2012	8.69	282.65
WM0361	S1	23/02/2012	8.65	282.70
WM0361	S1	18/03/2012	8.61	282.73
WM0361	S1	23/03/2012	8.60	282.74
WM0361	S1	5/04/2012	8.60	282.74
WM0361	S1	7/04/2012	8.60	282.74
WM0361	S1	20/04/2012	10.62	280.72
WM0361	S1	4/05/2012	9.05	282.29
WM0361	S1	19/05/2012	12.63	278.71
WM0361	S1	21/05/2012	24.67	266.67
WM0361	S1	2/06/2012	11.79	279.56
WM0361	S1	17/06/2012	9.32	282.02
WM0361	S1	30/06/2012	8.95	282.40
WM0362	S1	11/09/2010	64.29	227.18
WM0362	S1	12/09/2010	64.11	227.36
WM0362	S1	16/09/2010	63.19	228.28
WM0362	S1	19/10/2010	57.72	233.75
WM0362	S1	26/10/2010	56.53	234.94
WM0362	S1	29/10/2010	56.33	235.34
WM0362	S1	13/11/2010	64.91	226.57
WM0362	S1	16/11/2010	64.41	227.06
WM0362	S1	5/12/2010	61.80	229.67

Bore ID	Installation Type	Date_Time	SWL (m btoc)	RWL (mAHD)
WM0362	S1	12/12/2010	60.89	230.59
WM0362	S1	11/01/2011	56.70	234.77
WM0362	S1	25/01/2011	54.89	236.58
WM0362	S1	26/01/2011	54.84	236.63
WM0362	S1	11/02/2011	61.42	230.05
WM0362	S1	7/03/2011	58.41	233.07
WM0362	S1	23/03/2011	56.32	235.15
WM0362	S1	13/04/2011	54.06	237.42
WM0362	S1	21/04/2011	61.70	229.78
WM0362	S1	6/05/2011	60.18	231.30
WM0362	S1	17/05/2011	58.89	232.59
WM0362	S1	3/06/2011	57.03	234.44
WM0362	S1	21/06/2011	55.22	236.25
WM0362	S1	5/07/2011	54.02	237.45
WM0362	S1	23/07/2011	65.65	225.83
WM0362	S1	12/09/2011	61.04	230.43
WM0362	S1	23/09/2011	60.19	231.28
WM0362	S1	14/10/2011	58.27	233.20
WM0362	S1	31/10/2011	58.27	233.20
WM0362	S1	24/11/2011	65.30	226.17
WM0362	S1	15/12/2011	63.31	228.16
WM0362	S1	20/01/2012	60.46	231.01
WM0362	S1	14/02/2012	58.39	233.08
WM0362	S1	23/02/2012	57.60	233.87
WM0362	S1	18/03/2012	55.67	235.80
WM0362	S1	23/03/2012	55.26	236.21
WM0362	S1	5/04/2012	54.38	237.09
WM0362	S1	7/04/2012	54.20	237.27
WM0362	S1	20/04/2012	54.97	236.50
WM0362	S1	4/05/2012	64.66	226.81
WM0362	S1	19/05/2012	63.22	228.25
WM0362	S1	26/05/2012	63.15	228.32
WM0362	S1	2/06/2012	41.48	250.00
WM0362	S1	17/06/2012	63.77	227.71
WM0362	S1	30/06/2012	65.63	225.84
WM0363	S1	18/04/2011	4.96	293.70
WM0363	S1	5/05/2011	5.48	293.19
WM0363	S1	16/05/2011	5.03	293.63
WM0363	S1	2/06/2011	5.03	293.63
WM0363	S1	20/06/2011	5.05	293.61
WM0363	S1	5/07/2011	5.08	293.58
WM0363	S1	21/07/2011	5.59	293.07
WM0363	S1	14/08/2011	5.07	293.59
WM0363	S1	24/08/2011	5.17	293.49
WM0363	S1	10/09/2011	5.01	293.79
WM0363	S1	23/09/2011	5.29	293.51
WM0363	S1	12/10/2011	5.09	293.71
WM0363	S1	4/11/2011	5.19	293.61
WM0363	S1	24/11/2011	5.20	293.60
WM0363	S1	14/12/2011	5.05	293.75
WM0363	S1	22/01/2012	5.05	293.75
WM0363	S1	10/02/2012	4.72	294.08
WM0363	S1	21/02/2012	4.70	294.11
WM0363	S1	16/03/2012	4.64	294.16
WM0363	S1	22/03/2012	4.63	294.17
WM0363	S1	4/04/2012	4.65	294.15
WM0363	S1	18/04/2012	5.06	293.74
WM0363	S1	4/05/2012	4.71	294.09
WM0363	S1	21/05/2012	4.78	294.02
WM0363	S1	1/06/2012	3.76	295.94
WM0363	S1	16/06/2012	4.73	293.93
WM0363	S1	30/06/2012	4.77	293.89
WM0363A	S1	18/04/2011	4.32	294.48
WM0363A	S1	5/05/2011	5.38	293.43
WM0363A	S1	16/05/2011	5.42	293.38
WM0363A	S1	2/06/2011	5.40	293.40
WM0363A	S1	20/06/2011	5.43	293.37
WM0363A	S1	5/07/2011	5.47	293.34
WM0363A	S1	21/07/2011	5.46	293.34
WM0363A	S1	14/08/2011	5.51	293.29
WM0363A	S1	18/08/2011	5.48	293.32
WM0363A	S1	24/08/2011	5.54	293.26
WM0363A	S1	10/09/2011	5.52	293.61
WM0363A	S1	23/09/2011	5.56	293.56
WM0363A	S1	12/10/2011	5.55	293.57
WM0363A	S1	4/11/2011	5.58	293.54
WM0363A	S1	24/11/2011	6.60	292.52
WM0363A	S1	12/12/2011	5.44	293.36
WM0363A	S1	14/12/2011	5.46	293.66
WM0363A	S1	22/01/2012	5.43	293.69
WM0363A	S1	10/02/2012	5.10	293.69
WM0363A	S1	21/02/2012	5.07	293.69
WM0363A	S1	16/03/2012	5.03	293.69
WM0363A	S1	20/03/2012	5.05	293.75
WM0363A	S1	22/03/2012	5.00	293.69
WM0363A	S1	4/04/2012	5.03	293.69
WM0363A	S1	18/04/2012	4.67	293.69
WM0363A	S1	4/05/2012	5.10	293.69
WM0363A	S1	15/05/2012	5.16	293.64
WM0363A	S1	21/05/2012	5.18	293.69
WM0363A	S1	1/06/2012	5.19	293.69
WM0363A	S1	16/06/2012	5.02	293.79
WM0363A	S1	30/06/2012	5.15	293.66
WM0364	S1	12/04/2011	1.52	293.95
WM0364	S1	18/04/2011	1.55	293.92
WM0364	S1	5/05/2011	1.65	293.82
WM0364	S1	16/05/2011	1.69	293.78
WM0364	S1	6/06/2011	1.73	293.74
WM0364	S1	20/06/2011	1.78	293.69
WM0364	S1	4/07/2011	1.80	293.67
WM0364	S1	22/07/2011	1.82	293.65
WM0364	S1	14/08/2011	1.86	293.61
WM0364	S1	18/08/2011	1.86	293.61
WM0364	S1	24/08/2011	1.91	293.56
WM0364	S1	14/09/2011	2.00	293.47
WM0364	S1	23/09/2011	2.08	293.39
WM0364	S1	12/10/2011	2.17	293.30
WM0364	S1	7/11/2011	2.35	293.12
WM0364	S1	15/11/2011	2.42	293.06
WM0364	S1	26/01/2012	2.03	293.44
WM0364	S1	6/04/2012	1.81	293.66
WM0364	S1	29/04/2012	1.95	293.52
WM0364	S1	5/05/2012	1.96	293.51
WM0364	S1	24/05/2012	2.08	293.39
WM0364	S1	1/06/2012	2.03	293.45
WM0364	S1	16/06/2012	1.91	293.56
WM0364	S1	1/07/2012	1.86	293.61
WM0365	S1	10/04/2011	1.71	292.06
WM0365	S1	18/04/2011	1.74	292.03
WM0365	S1	5/05/2011	1.82	291.95
WM0365	S1	16/05/2011	1.86	291.91



Bore ID	Installation Type	Date_Time	SWL (m btoc)	RWL (mAHD)
WM0365	S1	6/06/2011	1.73	292.04
WM0365	S1	20/06/2011	1.79	291.99
WM0365	S1	4/07/2011	1.83	291.95
WM0365	S1	22/07/2011	1.94	291.84
WM0365	S1	14/08/2011	2.02	291.75
WM0365	S1	24/08/2011	2.06	291.71
WM0365	S1	14/09/2011	2.20	291.58
WM0365	S1	23/09/2011	2.26	291.51
WM0365	S1	12/10/2011	2.38	291.39
WM0365	S1	4/11/2011	2.53	291.24
WM0365	S1	14/11/2011	2.60	291.17
WM0365	S1	26/01/2012	1.92	291.85
WM0365	S1	24/03/2012	1.45	292.32
WM0365	S1	25/03/2012	1.47	292.30
WM0365	S1	4/04/2012	1.57	292.21
WM0365	S1	18/04/2012	1.67	292.10
WM0365	S1	5/05/2012	1.75	292.02
WM0365	S1	9/05/2012	1.79	291.98
WM0365	S1	22/05/2012	1.88	291.90
WM0365	S1	1/06/2012	1.83	291.95
WM0365	S1	16/06/2012	1.44	292.33
WM0365	S1	1/07/2012	1.56	292.21
WM0398	S1	13/12/2010	13.64	297.80
WM0398	S1	16/12/2010	14.64	296.81
WM0398	S1	10/01/2011	14.43	297.02
WM0398	S1	24/01/2011	14.30	297.14
WM0398	S1	9/02/2011	14.32	297.12
WM0398	S1	8/03/2011	14.17	297.28
WM0398	S1	23/03/2011	14.03	297.41
WM0398	S1	12/04/2011	14.06	297.38
WM0398	S1	18/04/2011	14.11	297.33
WM0398	S1	5/05/2011	14.95	296.49
WM0398	S1	16/05/2011	14.14	297.30
WM0398	S1	2/06/2011	14.08	297.36
WM0398	S1	20/06/2011	14.55	296.89
WM0398	S1	5/07/2011	13.06	298.39
WM0398	S1	21/07/2011	14.05	297.39
WM0398	S1	14/08/2011	14.12	297.32
WM0398	S1	17/08/2011	14.07	297.37
WM0398	S1	24/08/2011	14.61	296.84
WM0398	S1	10/09/2011	14.67	296.77
WM0398	S1	23/09/2011	14.80	296.64
WM0398	S1	12/10/2011	14.89	296.55
WM0398	S1	4/11/2011	14.97	296.48
WM0398	S1	20/11/2011	15.00	296.44
WM0398	S1	14/12/2011	14.97	296.47
WM0398	S1	22/01/2012	15.05	296.39
WM0398	S1	10/02/2012	14.97	296.47
WM0398	S1	21/02/2012	14.98	296.47
WM0398	S1	16/03/2012	14.96	296.48
WM0398	S1	20/03/2012	14.98	296.46
WM0398	S1	4/04/2012	15.02	296.42
WM0398	S1	18/04/2012	15.10	296.34
WM0398	S1	4/05/2012	15.06	296.38
WM0398	S1	21/05/2012	15.09	296.35
WM0398	S1	1/06/2012	15.09	296.35
WM0398	S1	16/06/2012	15.03	296.54
WM0398	S1	30/06/2012	15.00	296.57
WM0414	S1	12/12/2010	26.45	292.30
WM0414	S1	10/01/2011	24.90	293.86
WM0414	S1	24/01/2011	24.84	293.92
WM0414	S1	16/02/2011	24.84	293.92
WM0414	S1	7/03/2011	24.77	293.99
WM0414	S1	23/03/2011	24.69	294.07
WM0414	S1	22/04/2011	24.74	294.02
WM0414	S1	5/05/2011	24.73	294.03
WM0414	S1	17/05/2011	24.66	294.10
WM0414	S1	7/06/2011	24.92	293.84
WM0414	S1	20/06/2011	24.59	294.17
WM0414	S1	5/07/2011	24.62	294.14
WM0414	S1	22/07/2011	24.53	294.23
WM0414	S1	13/08/2011	24.47	294.29
WM0414	S1	24/08/2011	24.38	294.38
WM0414	S1	13/09/2011	24.26	294.50
WM0414	S1	23/09/2011	24.38	294.38
WM0414	S1	12/10/2011	24.48	294.28
WM0414	S1	4/11/2011	24.61	294.15
WM0414	S1	20/11/2011	24.58	294.18
WM0414	S1	15/12/2011	24.33	294.43
WM0414	S1	22/01/2012	24.34	294.42
WM0414	S1	10/02/2012	24.27	294.49
WM0414	S1	21/02/2012	24.28	294.48
WM0414	S1	22/03/2012	24.03	294.73
WM0414	S1	4/04/2012	23.93	294.83
WM0414	S1	20/04/2012	23.86	294.90
WM0414	S1	4/05/2012	23.90	294.86
WM0414	S1	22/05/2012	23.91	294.85
WM0414	S1	1/06/2012	28.76	290.00
WM0414	S1	17/06/2012	24.52	294.24
WM0414	S1	30/06/2012	24.16	294.60
WM0421	S1	13/12/2010	2.52	294.13
WM0421	S1	10/01/2011	2.64	294.02
WM0421	S1	24/01/2011	2.69	293.81
WM0421	S1	9/02/2011	2.82	293.67
WM0421	S1	8/03/2011	3.29	293.21
WM0421	S1	23/03/2011	3.34	293.15
WM0421	S1	13/04/2011	3.46	293.04
WM0421	S1	18/04/2011	3.51	292.98
WM0421	S1	5/05/2011	3.57	292.93
WM0421	S1	16/05/2011	3.60	292.89
WM0421	S1	2/06/2011	3.56	292.93
WM0421	S1	20/06/2011	3.53	292.96
WM0421	S1	5/07/2011	3.52	292.97
WM0421	S1	21/07/2011	3.51	292.98
WM0421	S1	14/08/2011	3.56	292.93
WM0421	S1	17/08/2011	3.56	292.93
WM0421	S1	24/08/2011	3.66	292.83
WM0421	S1	10/09/2011	3.65	292.84
WM0421	S1	21/09/2011	3.70	292.79
WM0421	S1	12/10/2011	3.72	292.78
WM0421	S1	4/11/2011	3.63	292.86
WM0421	S1	20/11/2011	3.96	292.53
WM0421	S1	14/12/2011	3.61	292.88
WM0421	S1	22/01/2012	3.68	292.81
WM0421	S1	10/02/2012	3.52	292.97
WM0421	S1	21/02/2012	3.47	293.03
WM0421	S1	7/03/2012	3.37	293.12
WM0421	S1	16/03/2012	3.34	293.15
WM0421	S1	22/03/2012	2.73	293.76
WM0421	S1	4/04/2012	3.39	293.10
WM0421	S1	18/04/2012	3.58	292.91

Bore ID	Installation Type	Date_Time	SWL (m btoc)	RWL (mAHD)
WM0421	S1	4/05/2012	3.70	292.79
WM0421	S1	21/05/2012	3.79	292.70
WM0421	S1	1/06/2012	3.76	292.73
WM0421	S1	16/06/2012	3.60	292.90
WM0421	S1	30/06/2012	3.55	292.95
WM0422	S1	13/12/2010	14.21	294.03
WM0422	S1	15/12/2010	20.36	287.88
WM0422	S1	10/01/2011	11.62	296.62
WM0422	S1	24/01/2011	11.66	296.58
WM0422	S1	9/02/2011	11.91	296.33
WM0422	S1	8/03/2011	13.34	294.91
WM0422	S1	24/03/2011	12.54	295.71
WM0422	S1	30/03/2011	12.52	295.72
WM0422	S1	21/04/2011	12.82	295.43
WM0422	S1	5/05/2011	12.67	295.58
WM0422	S1	18/05/2011	12.68	295.56
WM0422	S1	6/06/2011	12.64	295.61
WM0422	S1	22/06/2011	12.67	295.58
WM0422	S1	6/07/2011	12.73	295.51
WM0422	S1	22/07/2011	12.75	295.49
WM0422	S1	25/07/2011	12.76	295.49
WM0422	S1	13/08/2011	13.07	295.17
WM0422	S1	24/08/2011	12.94	295.30
WM0422	S1	12/09/2011	12.84	295.40
WM0422	S1	24/09/2011	15.27	292.97
WM0422	S1	14/10/2011	13.45	294.79
WM0422	S1	4/11/2011	13.04	295.20
WM0422	S1	14/11/2011	13.00	295.24
WM0422	S1	20/11/2011	14.64	293.60
WM0422	S1	15/12/2011	13.23	295.01
WM0422	S1	22/01/2012	13.06	295.18
WM0422	S1	10/02/2012	12.90	295.34
WM0422	S1	22/02/2012	13.01	295.23
WM0422	S1	8/03/2012	13.05	295.19
WM0422	S1	17/03/2012	14.00	294.24
WM0422	S1	23/03/2012	13.66	294.58
WM0422	S1	5/04/2012	13.32	294.92
WM0422	S1	20/04/2012	13.20	295.04
WM0422	S1	5/05/2012	13.14	295.10
WM0422	S1	6/05/2012	19.42	288.82
WM0422	S1	22/05/2012	15.77	292.48
WM0422	S1	2/06/2012	14.60	293.64
WM0422	S1	17/06/2012	13.66	294.58
WM0422	S1	30/06/2012	13.36	294.89
WM0424	S1	18/04/2011	1.84	293.49
WM0424	S1	5/05/2011	1.98	293.34
WM0424	S1	16/05/2011	2.09	293.24
WM0424	S1	6/06/2011	2.12	293.20
WM0424	S1	20/06/2011	2.07	293.25
WM0424	S1	4/07/2011	2.06	293.27
WM0424	S1	14/07/2011	2.06	293.26
WM0424	S1	22/07/2011	2.06	293.27
WM0424	S1	14/08/2011	2.20	293.12
WM0424	S1	24/08/2011	2.28	293.04
WM0424	S1	14/09/2011	2.53	292.79
WM0424	S1	24/09/2011	2.61	292.71
WM0424	S1	4/11/2011	2.84	292.48
WM0424	S1	14/11/2011	2.93	292.39
WM0424	S1	19/11/2011	2.92	292.41
WM0424	S1	24/01/2012	2.80	292.52
WM0424	S1	24/03/2012	2.48	292.84
WM0424	S1	6/04/2012	2.44	292.88
WM0424	S1	11/04/2012	2.67	292.65
WM0424	S1	18/04/2012	2.82	292.50
WM0424	S1	5/05/2012	1.77	293.55
WM0424	S1	22/05/2012	2.88	292.45
WM0424	S1	1/06/2012	2.78	292.55
WM0424	S1	16/06/2012	2.62	292.70
WM0424	S1	1/07/2012	2.51	292.82
WM0425	S1	5/05/2011	1.75	293.40
WM0425	S1	18/05/2011	1.83	293.32
WM0425	S1	4/06/2011	2.06	293.10
WM0425	S1	20/06/2011	1.98	293.17
WM0425	S1	4/07/2011	1.95	293.20
WM0425	S1	13/07/2011	1.98	293.18
WM0425	S1	22/07/2011	1.98	293.17
WM0425	S1	14/08/2011	2.09	293.06
WM0425	S1	24/08/2011	2.20	292.95
WM0425	S1	14/09/2011	2.41	292.74
WM0425	S1	24/09/2011	2.50	292.65
WM0425	S1	4/11/2011	1.72	293.43
WM0425	S1	9/11/2011	2.82	292.33
WM0425	S1	24/01/2012	2.63	292.52
WM0425	S1	6/04/2012	2.27	292.88
WM0425	S1	11/04/2012	2.49	292.66
WM0425	S1	18/04/2012	2.66	292.49
WM0425	S1	5/05/2012	1.62	293.53
WM0425	S1	22/05/2012	2.73	292.42
WM0425	S1	1/06/2012	2.64	292.51
WM0425	S1	16/06/2012	2.47	292.68
WM0425	S1	1/07/2012	2.38	292.78
WM0425A	S1	5/05/2011	1.94	293.16
WM0425A	S1	18/05/2011	1.80	293.29
WM0425A	S1	4/06/2011	2.04	293.05
WM0425A	S1	20/06/2011	1.97	293.13
WM0425A	S1	4/07/2011	1.97	293.12
WM0425A	S1	13/07/2011	1.95	293.14
WM0425A	S1	22/07/2011	1.95	293.15
WM0425A	S1	14/08/2011	2.08	



Bore ID	Installation Type	Date_Time	SWL (m btoc)	RWL (mAHD)
WM0426	S1	23/09/2011	1.86	293.06
WM0426	S1	5/10/2011	1.87	293.05
WM0426	S1	12/10/2011	1.86	293.06
WM0426	S1	4/11/2011	1.95	292.98
WM0426	S1	26/01/2012	1.78	293.14
WM0426	S1	24/03/2012	1.31	293.61
WM0426	S1	4/04/2012	1.41	293.51
WM0426	S1	22/04/2012	1.55	293.37
WM0426	S1	24/04/2012	1.57	293.35
WM0426	S1	5/05/2012	1.66	293.26
WM0426	S1	22/05/2012	1.78	293.14
WM0426	S1	1/06/2012	1.69	293.24
WM0426	S1	16/06/2012	1.52	293.40
WM0426	S1	1/07/2012	1.48	293.44
WM0426A	S1	5/05/2011	1.91	293.04
WM0426A	S1	18/05/2011	1.99	292.95
WM0426A	S1	2/06/2011	1.75	293.19
WM0426A	S1	20/06/2011	1.67	293.28
WM0426A	S1	4/07/2011	1.64	293.30
WM0426A	S1	21/07/2011	1.68	293.26
WM0426A	S1	22/07/2011	1.71	293.23
WM0426A	S1	14/08/2011	1.63	293.31
WM0426A	S1	24/08/2011	1.62	293.33
WM0426A	S1	10/09/2011	1.59	293.36
WM0426A	S1	23/09/2011	1.69	293.25
WM0426A	S1	5/10/2011	1.53	293.41
WM0426A	S1	12/10/2011	1.57	293.37
WM0426A	S1	4/11/2011	1.88	293.06
WM0426A	S1	26/01/2012	1.91	293.04
WM0426A	S1	24/03/2012	0.87	294.07
WM0426A	S1	4/04/2012	1.38	293.56
WM0426A	S1	22/04/2012	1.51	293.43
WM0426A	S1	24/04/2012	1.51	293.43
WM0426A	S1	5/05/2012	1.48	293.46
WM0426A	S1	22/05/2012	1.56	293.38
WM0426A	S1	1/06/2012	0.61	294.34
WM0426A	S1	16/06/2012	0.63	294.31
WM0426A	S1	1/07/2012	0.82	294.12
WM0427	S1	5/06/2011	10.44	283.25
WM0427	S1	22/06/2011	10.35	283.34
WM0427	S1	6/07/2011	10.33	283.37
WM0427	S1	23/07/2011	10.33	283.36
WM0427	S1	10/08/2011	10.27	283.42
WM0427	S1	27/08/2011	10.87	282.82
WM0427	S1	15/09/2011	10.28	283.42
WM0427	S1	22/09/2011	10.31	283.38
WM0427	S1	14/10/2011	10.43	283.26
WM0427	S1	7/11/2011	10.36	283.34
WM0427	S1	14/12/2011	10.14	283.55
WM0427	S1	21/01/2012	10.63	283.06
WM0427	S1	23/03/2012	10.30	283.39
WM0427	S1	5/04/2012	10.23	283.46
WM0427	S1	10/04/2012	10.25	283.44
WM0427	S1	21/04/2012	10.16	283.53
WM0427	S1	4/05/2012	10.11	283.58
WM0427	S1	21/05/2012	10.12	283.57
WM0427	S1	23/05/2012	10.10	283.59
WM0427	S1	1/06/2012	10.06	283.63
WM0427	S1	16/06/2012	10.02	283.67
WM0427	S1	1/07/2012	10.00	283.69
WM0427A	S1	5/06/2011	11.11	282.60
WM0427A	S1	22/06/2011	10.94	282.77
WM0427A	S1	6/07/2011	10.95	282.76
WM0427A	S1	23/07/2011	10.95	282.77
WM0427A	S1	10/08/2011	10.88	282.84
WM0427A	S1	27/08/2011	10.87	282.84
WM0427A	S1	15/09/2011	10.88	282.83
WM0427A	S1	22/09/2011	11.00	282.71
WM0427A	S1	14/10/2011	11.01	282.70
WM0427A	S1	7/11/2011	10.94	282.78
WM0427A	S1	9/11/2011	10.94	282.78
WM0427A	S1	14/12/2011	10.67	283.04
WM0427A	S1	21/01/2012	11.60	282.11
WM0427A	S1	23/03/2012	10.78	282.93
WM0427A	S1	2/04/2012	10.75	282.96
WM0427A	S1	5/04/2012	10.75	282.96
WM0427A	S1	21/04/2012	10.69	283.02
WM0427A	S1	5/05/2012	10.66	283.05
WM0427A	S1	21/05/2012	10.65	283.06
WM0427A	S1	23/05/2012	10.64	283.07
WM0427A	S1	1/06/2012	10.61	283.11
WM0427A	S1	16/06/2012	10.58	283.14
WM0427A	S1	1/07/2012	10.55	283.17
WM0428	S1	22/06/2011	6.05	274.51
WM0428	S1	4/07/2011	6.04	274.52
WM0428	S1	23/07/2011	6.04	274.51
WM0428	S1	12/08/2011	6.03	274.52
WM0428	S1	21/08/2011	7.92	272.64
WM0428	S1	26/08/2011	5.98	274.58
WM0428	S1	15/09/2011	6.13	274.43
WM0428	S1	24/09/2011	6.11	274.45
WM0428	S1	13/10/2011	6.05	274.51
WM0428	S1	9/11/2011	6.02	274.54
WM0428	S1	22/11/2011	6.01	274.54
WM0428	S1	16/12/2011	6.12	274.44
WM0428	S1	23/01/2012	5.92	274.64
WM0428	S1	23/03/2012	5.80	274.76
WM0428	S1	22/04/2012	5.79	274.77
WM0428	S1	5/05/2012	6.35	274.21
WM0428	S1	21/05/2012	15.74	264.82
WM0428	S1	1/06/2012	6.86	273.70
WM0428	S1	16/06/2012	5.85	274.71
WM0428	S1	1/07/2012	4.73	275.83
WM0428A	S1	22/06/2011	2.20	278.21
WM0428A	S1	4/07/2011	1.75	278.66
WM0428A	S1	23/07/2011	2.24	278.16
WM0428A	S1	12/08/2011	2.27	278.14
WM0428A	S1	21/08/2011	2.30	278.11
WM0428A	S1	26/08/2011	2.28	278.13
WM0428A	S1	15/09/2011	2.26	278.15
WM0428A	S1	24/09/2011	2.24	278.16
WM0428A	S1	13/10/2011	2.98	277.43
WM0428A	S1	23/10/2011	1.98	278.43
WM0428A	S1	9/11/2011	1.82	278.59
WM0428A	S1	16/12/2011	1.23	279.18
WM0428A	S1	23/01/2012	1.64	278.77
WM0428A	S1	23/03/2012	1.44	278.97
WM0428A	S1	22/04/2012	1.44	278.97
WM0428A	S1	5/05/2012	2.70	277.71
WM0428A	S1	18/05/2012	5.82	274.59
WM0428A	S1	21/05/2012	1.62	278.79

Bore ID	Installation Type	Date_Time	SWL (m btoc)	RWL (mAHD)
WM0428A	S1	1/06/2012	1.45	278.96
WM0428A	S1	16/06/2012	1.22	279.19
WM0428A	S1	1/07/2012	1.39	279.02
WM0429	S1	6/06/2011	2.23	292.94
WM0429	S1	22/06/2011	2.21	292.96
WM0429	S1	4/07/2011	2.20	292.97
WM0429	S1	20/07/2011	2.20	292.97
WM0429	S1	22/07/2011	2.20	292.97
WM0429	S1	14/08/2011	2.26	292.91
WM0429	S1	24/08/2011	2.33	292.84
WM0429	S1	14/09/2011	2.38	292.80
WM0429	S1	23/09/2011	2.41	292.76
WM0429	S1	12/10/2011	2.40	292.77
WM0429	S1	4/11/2011	2.50	292.67
WM0429	S1	26/01/2012	2.35	292.82
WM0429	S1	6/04/2012	2.00	293.17
WM0429	S1	19/04/2012	2.15	293.12
WM0429	S1	24/04/2012	2.18	292.99
WM0429	S1	5/05/2012	2.22	292.95
WM0429	S1	22/05/2012	2.36	292.82
WM0429	S1	1/06/2012	2.32	292.86
WM0429	S1	16/06/2012	2.01	293.16
WM0429	S1	1/07/2012	2.12	293.05
WM0429A	S1	6/06/2011	1.73	293.29
WM0429A	S1	22/06/2011	1.74	293.28
WM0429A	S1	4/07/2011	1.75	293.28
WM0429A	S1	20/07/2011	1.70	293.32
WM0429A	S1	22/07/2011	1.70	293.32
WM0429A	S1	14/08/2011	1.73	293.30
WM0429A	S1	24/08/2011	1.79	293.23
WM0429A	S1	14/09/2011	1.93	293.09
WM0429A	S1	23/09/2011	2.11	292.92
WM0429A	S1	12/10/2011	2.15	292.87
WM0429A	S1	4/11/2011	2.37	292.65
WM0429A	S1	26/01/2012	2.01	293.01
WM0429A	S1	6/04/2012	1.44	293.58
WM0429A	S1	12/04/2012	1.55	293.47
WM0429A	S1	19/04/2012	1.57	293.45
WM0429A	S1	5/05/2012	1.59	293.43
WM0429A	S1	21/05/2012	1.67	293.35
WM0429A	S1	1/06/2012	0.94	294.08
WM0429A	S1	16/06/2012	0.97	294.06
WM0429A	S1	1/07/2012	1.22	293.80
WM0430	S1	18/05/2011	1.85	292.90
WM0430	S1	6/06/2011	1.67	293.08
WM0430	S1	20/06/2011	1.68	293.07
WM0430	S1	4/07/2011	1.71	293.04
WM0430	S1	22/07/2011	1.78	292.98
WM0430	S1	14/08/2011	1.84	292.91
WM0430	S1	24/08/2011	1.87	292.88
WM0430	S1	14/09/2011	1.95	292.80
WM0430	S1	23/09/2011	1.98	292.77
WM0430	S1	12/10/2011	1.98	292.77
WM0430	S1	4/11/2011	2.11	292.64
WM0430	S1	14/12/2011	1.02	293.73
WM0430	S1	26/01/2012	0.91	294.84
WM0430	S1	20/03/2012	0.96	293.79
WM0430	S1	4/04/2012	1.44	293.31
WM0430	S1	18/04/2012	1.57	293.18
WM0430	S1	5/05/2012	1.67	293.05
WM0430	S1	22/05/2012	1.71	293.05
WM0430	S1	1/06/2012	1.47	293.28
WM0430	S1	16/06/2012	1.18	293.58
WM0430	S1	1/07/2012	1.31	293.44
WM0430A	S1	18/05/2011	1.88	292.78
WM0430A	S1	6/06/2011	1.60	293.06
WM0430A	S1	20/06/2011	1.66	293.00
WM0430A	S1	4/07/2011	1.70	292.97
WM0430A	S1	20/07/2011	1.78	292.88
WM0430A	S1	22/07/2011	1.76	292.90
WM0430A	S1	14/08/2011	1.88	292.78
WM0430A	S1	24/08/2011	1.90	292.76
WM0430A	S1	14/09/2011	1.99	292.67
WM0430A	S1	23/09/2011	2.06	292.60
WM0430A	S1	12/10/2011	2.06	292.60
WM0430A	S1	4/11/2011	2.24	292.42
WM0430A	S1	14/12/2011	0.83	293.84
WM0430A	S1	26/01/2012	2.01	292.65
WM0430A	S1	20/03/2012	1.16	293.50
WM0430A	S1	4/04/2012	1.44	293.22
WM0430A	S1	18/04/2012	1.62	293.04
WM0430A	S1	5/05/2012	1.63	293.03
WM0430A	S1	22/05/2012	1.75	292.92
WM0430A	S1	1/06/2012	1.36	293.31
WM0430A	S1	16/06/2012	1.15	293.52
WM0430A	S1	1/07/2012	1.32	293.34
WM0431	S1	6/06/2011	1.76	292.71
WM0431	S1	20/06/2011	1.67	292.80
WM0431	S1	4/07/2011	1.73	292.74
WM0431	S1	19/07/2011	1.72	292.76
WM0431	S1	14/08/2011	1.81	292.67
WM0431	S1	24/08/2011	1.84	292.63
WM0431	S1	14/09/2011	1.89	292.58
WM0431	S1	23/09/2011	1.95	292



Bore ID	Installation Type	Date_Time	SWL (m btoc)	RWL (mAHD)
WM0431A	S1	21/03/2012	1.18	293.15
WM0431A	S1	4/04/2012	1.85	292.49
WM0431A	S1	18/04/2012	1.73	292.60
WM0431A	S1	5/05/2012	1.67	292.66
WM0431A	S1	22/05/2012	1.85	292.48
WM0431A	S1	1/06/2012	1.28	293.05
WM0431A	S1	16/06/2012	1.11	293.22
WM0431A	S1	1/07/2012	1.28	293.05
WM0432	S1	16/05/2011	2.54	290.07
WM0432	S1	2/06/2011	2.47	290.14
WM0432	S1	21/06/2011	2.49	290.13
WM0432	S1	4/07/2011	2.51	290.10
WM0432	S1	23/07/2011	2.55	290.06
WM0432	S1	10/08/2011	2.56	290.05
WM0432	S1	27/08/2011	2.51	290.11
WM0432	S1	12/09/2011	2.65	289.96
WM0432	S1	22/09/2011	2.62	289.99
WM0432	S1	13/10/2011	2.54	290.08
WM0432	S1	19/11/2011	2.56	290.06
WM0432	S1	2/12/2011	1.51	291.10
WM0432	S1	15/12/2011	1.72	290.90
WM0432	S1	26/01/2012	2.09	290.52
WM0432	S1	28/03/2012	1.56	291.05
WM0432	S1	4/04/2012	1.62	290.99
WM0432	S1	20/04/2012	1.71	290.90
WM0432	S1	5/05/2012	1.78	290.83
WM0432	S1	8/05/2012	1.81	290.80
WM0432	S1	20/05/2012	1.88	290.74
WM0432	S1	1/06/2012	1.77	290.85
WM0432	S1	17/06/2012	1.68	290.94
WM0432	S1	1/07/2012	1.71	290.90
WM0432A	S1	16/05/2011	2.46	290.29
WM0432A	S1	2/06/2011	2.55	290.20
WM0432A	S1	21/06/2011	2.52	290.23
WM0432A	S1	4/07/2011	2.55	290.20
WM0432A	S1	23/07/2011	2.59	290.17
WM0432A	S1	10/08/2011	2.60	290.16
WM0432A	S1	27/08/2011	2.63	290.13
WM0432A	S1	12/09/2011	2.80	289.95
WM0432A	S1	19/09/2011	2.64	290.11
WM0432A	S1	13/10/2011	2.53	290.22
WM0432A	S1	9/11/2011	2.55	290.20
WM0432A	S1	2/12/2011	1.46	291.29
WM0432A	S1	15/12/2011	1.70	291.06
WM0432A	S1	26/01/2012	2.09	290.66
WM0432A	S1	27/03/2012	1.66	291.09
WM0432A	S1	4/04/2012	1.68	291.07
WM0432A	S1	20/04/2012	1.66	291.09
WM0432A	S1	5/05/2012	1.85	290.91
WM0432A	S1	8/05/2012	1.87	290.88
WM0432A	S1	20/05/2012	1.77	290.98
WM0432A	S1	1/06/2012	1.99	290.77
WM0432A	S1	17/06/2012	1.53	291.22
WM0432A	S1	1/07/2012	1.58	291.18
WM0433	S1	18/05/2011	2.38	289.90
WM0433	S1	6/06/2011	2.24	290.04
WM0433	S1	21/06/2011	2.19	290.09
WM0433	S1	6/07/2011	2.24	290.04
WM0433	S1	23/07/2011	2.28	289.99
WM0433	S1	13/08/2011	2.34	289.94
WM0433	S1	26/08/2011	2.33	289.95
WM0433	S1	12/09/2011	2.29	289.99
WM0433	S1	23/09/2011	2.26	290.02
WM0433	S1	14/10/2011	2.08	290.20
WM0433	S1	7/11/2011	2.19	290.09
WM0433	S1	22/11/2011	2.24	290.04
WM0433	S1	2/12/2011	0.92	291.36
WM0433	S1	15/12/2011	1.25	291.03
WM0433	S1	24/01/2012	1.68	290.60
WM0433	S1	12/02/2012	0.91	291.37
WM0433	S1	22/03/2012	1.38	290.90
WM0433	S1	23/03/2012	1.39	290.89
WM0433	S1	4/04/2012	1.53	290.75
WM0433	S1	21/04/2012	0.74	291.54
WM0433	S1	5/05/2012	1.73	290.55
WM0433	S1	7/05/2012	1.73	290.55
WM0433	S1	21/05/2012	1.82	290.46
WM0433	S1	2/06/2012	1.71	290.57
WM0433	S1	17/06/2012	1.44	290.84
WM0433	S1	1/07/2012	1.77	290.51
WM0492	V1	7/08/2011	74.16	306.33
WM0492	V1	24/08/2011	70.23	310.26
WM0492	V1	24/09/2011	72.98	307.51
WM0492	V1	1/11/2011	75.47	305.02
WM0492	V1	20/11/2011	76.78	303.71
WM0492	V1	14/12/2011	77.96	302.53
WM0492	V1	22/01/2012	79.00	301.49
WM0492	V1	11/02/2012	78.87	301.62
WM0492	V1	21/02/2012	79.79	300.70
WM0492	V1	17/03/2012	81.10	299.39
WM0492	V1	22/03/2012	81.36	299.13
WM0492	V1	4/04/2012	81.36	299.13
WM0492	V1	20/04/2012	81.36	299.13
WM0492	V1	23/05/2012	81.75	298.74
WM0492	V1	1/06/2012	81.75	298.74
WM0492	V1	17/06/2012	82.01	298.48
WM0492	V1	3/07/2012	82.15	298.34
WM0492	V2	7/08/2011	74.98	305.51
WM0492	V2	24/08/2011	70.09	310.40
WM0492	V2	24/09/2011	71.15	309.35
WM0492	V2	1/11/2011	71.28	309.21
WM0492	V2	20/11/2011	71.94	308.55
WM0492	V2	14/12/2011	70.22	310.27
WM0492	V2	22/01/2012	68.50	311.99
WM0492	V2	11/02/2012	68.37	312.13
WM0492	V2	21/02/2012	68.37	312.13
WM0492	V2	17/03/2012	67.84	312.66
WM0492	V2	22/03/2012	69.82	310.67
WM0492	V2	4/04/2012	68.63	311.86
WM0492	V2	20/04/2012	69.03	311.46
WM0492	V2	23/05/2012	70.75	309.74
WM0492	V2	1/06/2012	70.35	310.14
WM0492	V2	17/06/2012	70.22	310.27
WM0492	V2	3/07/2012	70.22	310.27
WM0492	V3	7/08/2011	79.47	301.02
WM0492	V3	24/08/2011	73.06	307.43
WM0492	V3	24/09/2011	71.46	309.03
WM0492	V3	1/11/2011	71.99	308.50
WM0492	V3	20/11/2011	71.06	309.43
WM0492	V3	14/12/2011	70.79	309.70
WM0492	V3	22/01/2012	71.59	308.90

Bore ID	Installation Type	Date_Time	SWL (m btoc)	RWL (mAHD)
WM0492	V3	21/02/2012	72.79	307.70
WM0492	V3	17/03/2012	75.20	305.29
WM0492	V3	22/03/2012	74.93	305.56
WM0492	V3	20/04/2012	76.26	304.23
WM0492	V3	23/05/2012	78.27	302.22
WM0492	V3	1/06/2012	78.40	302.09
WM0492	V3	17/06/2012	79.20	301.29
WM0492	V3	3/07/2012	80.13	300.36
WM0510	V1	16/08/2011	13.10	275.76
WM0510	V1	12/09/2011	13.23	275.63
WM0510	V1	24/09/2011	13.23	275.63
WM0510	V1	14/10/2011	13.51	275.35
WM0510	V1	1/11/2011	13.78	275.08
WM0510	V1	2/12/2011	14.06	274.80
WM0510	V1	16/12/2011	14.06	274.80
WM0510	V1	26/01/2012	14.47	274.39
WM0510	V1	14/02/2012	14.33	274.53
WM0510	V1	24/02/2012	14.61	274.25
WM0510	V1	17/03/2012	14.61	274.25
WM0510	V1	23/03/2012	14.88	273.98
WM0510	V1	23/05/2012	15.71	273.15
WM0510	V1	2/06/2012	15.71	273.15
WM0510	V1	17/06/2012	15.98	272.88
WM0510	V1	30/06/2012	15.16	273.70
WM0510	V2	16/08/2011	12.62	276.24
WM0510	V2	12/09/2011	13.15	275.71
WM0510	V2	24/09/2011	13.55	275.32
WM0510	V2	14/10/2011	13.81	275.05
WM0510	V2	1/11/2011	14.34	274.52
WM0510	V2	2/12/2011	14.60	274.26
WM0510	V2	16/12/2011	14.87	273.99
WM0510	V2	26/01/2012	15.00	273.86
WM0510	V2	14/02/2012	15.00	273.86
WM0510	V2	24/02/2012	15.00	273.86
WM0510	V2	17/03/2012	15.13	273.73
WM0510	V2	23/03/2012	15.40	273.46
WM0510	V2	23/05/2012	15.66	273.20
WM0510	V2	2/06/2012	15.40	273.46
WM0510	V2	17/06/2012	15.66	273.20
WM0510	V2	30/06/2012	15.66	273.20
WM0510	V3	12/09/2011	12.08	276.78
WM0510	V3	24/09/2011	12.08	276.78
WM0510	V3	14/10/2011	12.22	276.64
WM0510	V3	1/11/2011	12.22	276.64
WM0510	V3	2/12/2011	12.36	276.50
WM0510	V3	16/12/2011	12.36	276.50
WM0510	V3	26/01/2012	12.50	276.36
WM0510	V3	14/02/2012	12.50	276.36
WM0510	V3	24/02/2012	12.50	276.36
WM0510	V3	17/03/2012	12.50	276.36
WM0510	V3	23/03/2012	12.50	276.36
WM0510	V3	23/05/2012	12.50	276.36
WM0510	V3	2/06/2012	12.36	276.50
WM0510	V3	17/06/2012	12.36	276.50
WM0510	V3	30/06/2012	12.50	276.36
WM0514	V1	24/08/2011	23.45	279.45
WM0514	V1	12/09/2011	23.45	279.45
WM0514	V1	24/09/2011	23.98	278.92
WM0514	V1	14/10/2011	24.11	278.79
WM0514	V1	1/11/2011	24.50	278.40
WM0514	V1	20/11/2011	24.77	278.13
WM0514	V1	15/12/2011	24.77	278.13
WM0514	V1	22/01/2012	25.03	277.87
WM0514	V1	10/02/2012	24.90	278.00
WM0514	V1	22/02/2012	24.90	278.00
WM0514	V1	17/03/2012	25.16	277.74
WM0514	V1	29/03/2012	25.16	277.74
WM0514	V1	23/05/2012	25.29	277.61
WM0514	V1	2/06/2012	25.29	277.61
WM0514	V1	17/06/2012	25.29	277.61
WM0514	V1	5/07/2012	25.29	277.61
WM0514	V2	24/08/2011	22.88	280.02
WM0514	V2	12/09/2011	22.75	280.15
WM0514	V2	24/09/2011	23.02	279.88
WM0514	V2	14/10/2011	23.43	279.47
WM0514	V2	1/11/2011	23.71	279.19
WM0514	V2	20/11/2011	23.71	279.19
WM0514	V2	15/12/2011	23.71	279.19
WM0514	V2	22/01/2012	23.57	279.33
WM0514	V2	10/02/2012	23.57	279.33
WM0514	V2	22/02/2012	23.71	279.19
WM0514	V2	17/03/2012	23.30	279.60
WM0514	V2	29/03/2012	23.30	279.60
WM0514	V2	23/05/2012	23.71	279.19
WM0514	V2	2/06/2012	23.67	279.23
WM0514	V2	17/06/2012	23.30	279.60
WM0514	V2	4/07/2012	23.71	279.19
WM0514	V3	24/08/2011	21.96	280.94
WM0514	V3	12/09/2011	21.96	280.94
WM0514	V3	24/09/2011	22.09	280.81
WM0514	V3	14/10/2011	22.75	280.15
WM0514	V3	1/11/2011	22.75	280.15
WM0514	V3	20/11/2011	22.61	280.29
WM0514	V3	15/12/2011	22.61	280.29
WM0514	V3	22/01/2012	23.40	279.50
WM0514	V3	10/02/2012	23.40	279.50
WM0514	V3	22/02/2012	23.40	279.50
WM0514	V3	17/03/2012	23.14	279.76
WM0514	V3	29/03/2012	23.14	279.76
WM0514	V3	23/05/2012	23.27	279.63
WM0514	V3	2/06/2012	23.30	279.60
WM0514	V3	17/06/2012	23.40	279.50
WM0514	V3	4/07/2012	23.27	279.63
WM0561	S1	7/11/2011	16.18	268.10
WM0561	S1	24/11/2011	16.14	268.14
WM0561	S1	15/12/2011	15.78	268.51
WM0561	S1	20/01/2012	16.97	267.31
WM0561	S1	10/02/2012	15.77	268.51
WM0561	S1	23/02/2012	15.68	268.60
WM0561	S1	9/03/2012	15.42	268.86
WM0561	S1	23/03/2012	16.53	267.75
WM0561	S1	4/04/2012	15.61	268.67
WM0561	S1	19/04/2012	15.28	269.00
WM0561	S1	23/04/2012	15.21	269.07
WM0561	S1	4/05/2012	15.09	269.19
WM0561	S1	21/05/2012	15.84	268.44
WM0561	S1	2/06/2012	15.02	269.27
WM0561	S1	5/06/2012	14.94	269.34
WM0561	S1	16/06/2012	14.88	269.41
WM0561	S1	1/07/2012	15.12	269.16
WM0562	S1	25/10/2011	16.30	267.96

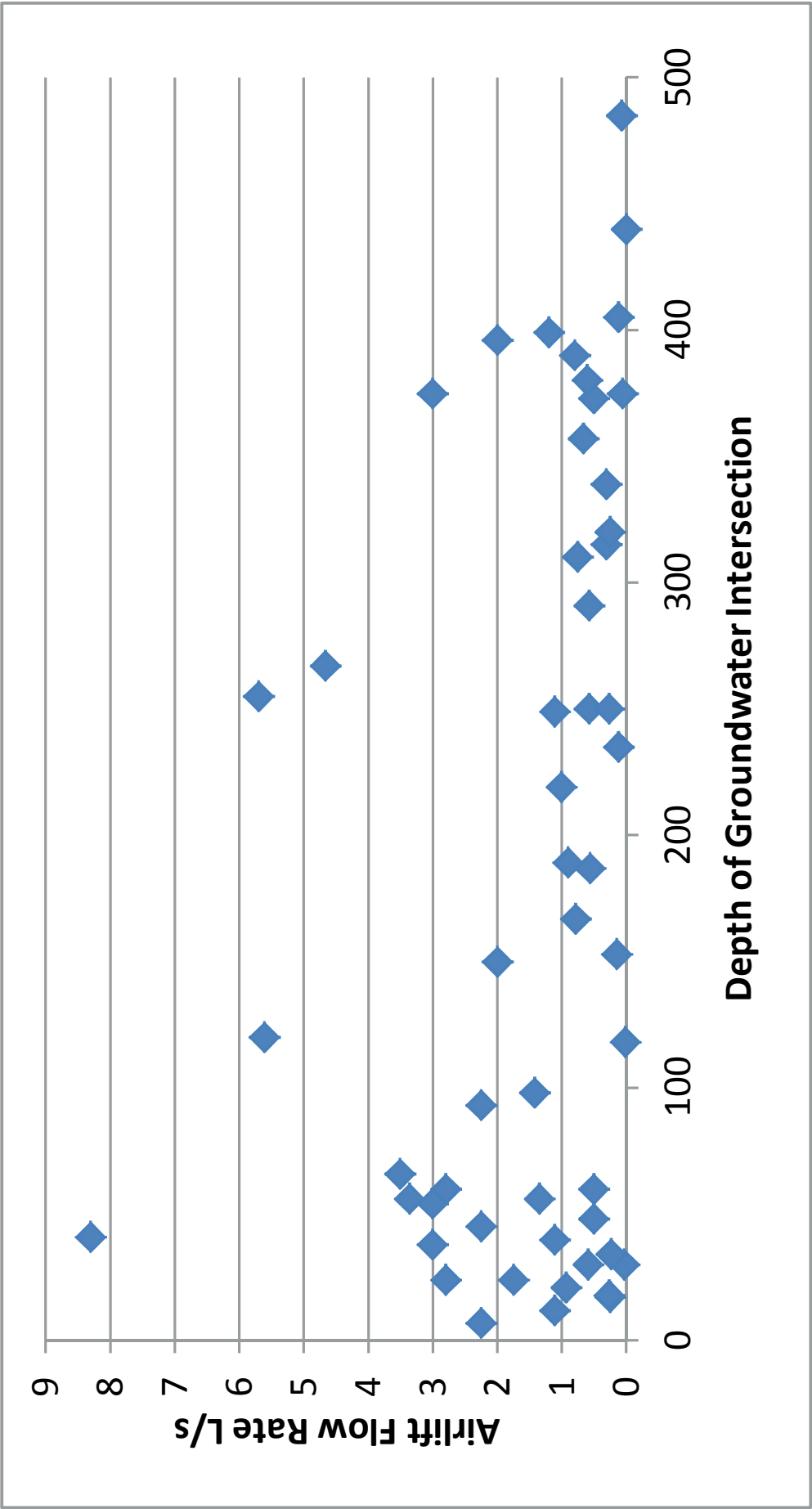


Bore ID	Installation Type	Date_Time	SWL (m btoc)	RWL (mAHD)
WM0562	S1	7/11/2011	16.27	268.00
WM0562	S1	24/11/2011	16.08	268.18
WM0562	S1	15/12/2011	15.89	268.37
WM0562	S1	20/01/2012	17.15	267.11
WM0562	S1	10/02/2012	15.80	268.46
WM0562	S1	23/02/2012	15.75	268.51
WM0562	S1	9/03/2012	15.40	268.86
WM0562	S1	23/03/2012	16.64	267.62
WM0562	S1	4/04/2012	15.51	268.75
WM0562	S1	19/04/2012	14.72	269.54
WM0562	S1	24/04/2012	15.22	269.04
WM0562	S1	4/05/2012	15.20	269.06
WM0562	S1	21/05/2012	15.89	268.37
WM0562	S1	2/06/2012	15.13	269.13
WM0562	S1	4/06/2012	15.04	269.23
WM0562	S1	16/06/2012	14.99	269.27
WM0562	S1	1/07/2012	15.24	269.02
WM0563	S1	25/10/2011	15.76	268.46
WM0563	S1	7/11/2011	15.74	268.49
WM0563	S1	24/11/2011	15.61	268.61
WM0563	S1	15/12/2011	15.39	268.83
WM0563	S1	20/01/2012	16.82	267.40
WM0563	S1	10/02/2012	15.21	269.01
WM0563	S1	23/02/2012	15.17	269.06
WM0563	S1	9/03/2012	14.82	269.40
WM0563	S1	23/03/2012	20.83	263.40
WM0563	S1	4/04/2012	14.94	269.28
WM0563	S1	19/04/2012	15.30	268.92
WM0563	S1	23/04/2012	14.69	269.53
WM0563	S1	4/05/2012	14.75	269.47
WM0563	S1	21/05/2012	16.26	267.96
WM0563	S1	2/06/2012	14.60	269.62
WM0563	S1	4/06/2012	14.51	269.71
WM0563	S1	16/06/2012	14.50	269.73
WM0563	S1	1/07/2012	14.26	269.96
WM0655	V1	1/07/2012	35.05	268.21
WM0655	V2	1/07/2012	31.95	271.31
WM0655	V3	1/07/2012	33.60	269.66
WM0665	S1	16/06/2012	107.77	176.51
WM0665	S1	30/06/2012	91.00	193.28
WM0675	V1	1/07/2012	82.25	284.18
WM0675	V2	1/07/2012	77.82	288.61
WM0675	V3	1/07/2012	151.30	215.13



Appendix I

Exploration Drilling Groundwater Intersection Data





Stage 4 Investigations

Water Strikes Location Plan



SHEHUA WATERMARK COAL PTY LIMITED
 華潤水電煤有限公司

G:\221455\IGIS\Maps\Deliverables\Hydrology\001_221455_Shenhua_GWSHikes.mxd
© 2011. Whilst every care has been taken to prepare this map, GHD (and DATA_CUSTODIAN) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.

Data source: Navteq 2009, GHD 2009; BDiGregorio & JLearnmonth



Bore	Date	Depth (m)	Description	Yield Estimate (L/s)
WM0063L	13/04/2011	56.14	DR24 cored 2.14m in 8C bore WM0063L to advance to 56.14m. Significant water is being produced - 12-13,000 L/hr (3.3 - 3.6 L/s)	3.3 - 3.6
WM0063L	01/04/2011	267	Rig DR26 has significant downhole water production (up 280 l /min). A downhole log was achieved for the top 135m	4.7
WM0108L	01/04/2011	24	Water stike at 24m Siltstone 2.8 L/sec	2.8
WM0108L	02/04/2011	60	Flow measured at 2.8 L/sec	2.8
WM0256L	21/07/2011	24	Hit water ~ 3130L/hr (unconsolidated gravels)	1.7
WM0256L	26/07/2011	36-96	Airlifted bore, calucaled approx flow of 3.5L/s (60 m of open hole, short air lift - till water ran clear)	3.5
WM0266L	28/06/2011	32.0 - 40.3	Measured by hydrogeologist at 28/6/2011 airlift test to confirm flow rate at 3 L/s	3
WM0412	31/10/2010	375	152 sec/9 L, 120 psi, pH 8.65, TDS 2.16 ppK, Temp. 25.9,	0.06
WM0412	31/10/2010	405	76sec/9L, 120 psi,	0.12
WM0413	06/11/2010	21	DEP-24, 9.7sec/9L, air hammer	0.93
WM0413	06/11/2010	7	Approx 4 sec/9 L	2.25
WM0413	06/11/2010	45	Approx 4 sec/9 L	2.25
WM0413	06/11/2010	93	Approx 4 sec/9 L	2.25
WM0413	07/11/2010	189	0.9 L/s, has made 7,500 L in 1.5 hrs on air, 120 psi, EC 17.12 mS, PH 7.55, Temp 22.9, D.O. 4.64, Redox -50 mV	0.9
WM0413	07/11/2010	219	1 L/s, 140 psi, EC 16.91 mS, pH 7.68, Redox -51 mV	1
WM0413	07/11/2010	249	1.1 L/s, 140 psi	1.1
WM0416	15/07/2011	153		<0.2
WM0416	15/07/2011	249.49		0.57
WM0416	15/07/2011	255	Significant inflow in dolerite	5.7
WM0416	15/07/2011	279	not additional was intersected as no increased in flow rate	5.7
WM0416	15/07/2011	291	flow rate decreased	0.58
WM0416	15/07/2011	315	flow rate decreased	0.3
WM0416	15/07/2011	339	flow rate decreased	0.3
WM0416	15/07/2011	357	flow rate slight increase	0.67
WM0416	15/07/2011	363	not additional was intersected as no increased in flow rate	5.7
WM0416	15/07/2011	373	flow rate decreased	0.5
WM0416	15/07/2011	380	flow rate decreased	0.6
WM0416	15/07/2011	399	flow rate decreased	1.2
WM0418	05/07/2011	485	no significant flow throughout drilling. Max flow approx. 0.07 L/sec tested using bucket with outlet pump from V-notch weir	0.07
WM0442	20/11/2010	287	Depco - 26 Bore basically dry all the way to the 287m. (Siltstone 220 - 320m)	
WM0442	21/11/2010	310	40 - 50 L/min from 310m	0.75
WM0442	21/11/2010	320	Airlifting from 320 m Yield ranging from 0.2 - 1.0 L/sec (mean value 0.25 L/sec), ph 9.92; Temp. 25.3°C; EC 2.83 mS	0.25
WM0478A	07/08/2011	375	water producing between 374-377m	<3.8
WM0485	07/07/2011	60	water strike in palaeochannel (unconsolidated sediments)	0.5
WM0486	11/07/2011	17		0.25
WM0488	19/07/2011	56	Took v notch @ 56m nearly 1250gal/hr (Also noted that water was hit at 17m and 25m just below coal seams)	1.35
WM0499	29/07/2011	unknown		1
WM0508	06/08/2011	73.5	groundwater strike at 73.5m while drilling with air, b/w Caroon Middle and Lower seams	not recorded
WM0520	14/08/2011	30	hit groundwater	0.02
WM0568	03/12/2011	40	Depco Rig 26 driller comment "large amounts of groundwater encountered at 40 m". Drilling on air encountered groundwater underneath a basalt Cap. Hole was cased off to 36m and cemented so as to prevent groundwater inflow. Driller estimated the flow rate to be approximately 4000 L/hr	"large"
WM0589	02/12/2011	12	Drilling on air encountered groundwater again. Flow rate approximately 4000 L/hr (driller estimate). Formation producing water is a sandstone/siltstone (difficult to verify due to poor quality chip returns)	1.1
WM0589	02/12/2011	40	Hit groundwater	1.1
WM0581	07/11/2011	118	Drilling on air. Another exploration bore 200 m away (WM0605) drilled to approximately 400 m and did not intersect any significant water strikes. Base of weathering at 0606 was 22 mbgl. Cut air drilling because could no longer store water (lifter approx 16,000 L of water), added 10,000 L of mud, lost drill returns,	0.01
WM0606	22/01/2012	115 - 120		
WM0606	09/02/2012	120	110mm v notch flow approx 5.6 L/s	5.6
WM0606	09/02/2012	190	110mm v notch flow approx 5.6 L/s, no additional flow	5.6
WM0606	09/02/2012	220	Hit groundwater during air drilling. Flowed for ~20 minutes (Geo Candy)	5.6
WM0606	10/02/2012	270	110mm v notch flow approx 5.6 L/s	
WM0606	11/02/2012	357	110mm v notch flow approx 5.6 L/s	
WM0606	10/02/2012	360	Hit groundwater during airdrilling. Flowed at least 2 hours (Left overnight) (Geo Candy)	5.6
WM0611	10/02/2012	25	Hit very little water- not enough to bring to the surface.	
WM0619	24/02/2012	24-250	Impax 5 struck water at ~24 m (close to base of weathering, first coal seam 25m). Air blade Flow rate measured to be 0.5L/sec and is possible fractured/fault zone. EC is 1700 to 2700uS/cm (fresher at shallower depths) and pH 8.3-9.5.	0.5
WM0619	09/03/2012	20-180	13 seconds > 9L, 12 seconds > 9L, 10 seconds >9L (yield est is an average of these)	0.5
WM0596	24/01/2012	167	Clare sandstone. Taken using v-notch (4cm)	0.78
WM068L	21/03/2012	235	hole already drilled to about 400m, estimating yield by airlifting as tripping rods in for core runs etc - flow rate into a 10L bucket. Less salty and lower pH up the top of the hole. Refer notes on file for WQ readings (air rig water strikes). SWL would come to about 17mbgl	0.11
WM0387L	05/04/2012	150	overnight and drillers est about 10,000L removed when tripping in a full run.	2
WM0387L	04/04/2012	396	gaining water, neighbouring bore 11.32mbtoc. WQ available on daily notes	2
WM0387L	04/04/2012	440	gaining water, neighbouring bore 11.32mbtoc. WQ available on daily notes	0.5 - 2
WM0646	14/04/2012	18	gaining water, cased off at 48m bgl to stop any contact with property owners bore.	0.267
WM0646	14/04/2012	30	Neighbouring bore 11.345mbtoc. WQ available on daily notes	0.59
WM0646	14/04/2012	48	Gaining water (~85L/minute). Driller noted that it was saline with a hint of sulfur	0.5
WM0600AL	20/04/2012	98	Gaining water from about 30m, immediately below basalt in upper (minor) coal seam. AL at 54m prior to surface casing being installed. Low salinity (approx 1000uS) and relatively neutral pH (7.8). Refer scanned field notes for more detail	1.42
WM0663	13/05/2012	54	Gaining water from 16m, in gravel material, minor (10% basalt lithics)	3
WM0687	28/06/2012	34	Drilled 35-41m in 5 hrs. Gained about 150,000L of water, location was to the left of dip road on the edge of the alluvials, down gradient from the basalt. Conductivity ~18700uS, pH was neutral. See field notes for more detail. Dipped water bore near by and SWL was ~1.1m bgl at a total depth of 26m. Hole abandoned.	0.24
WM0687	29/06/2012	41		8.3

Sheet1

N:\AU\Gunnedah\Projects\22\14551\Newcastle\04 Hydrogeology\Groundwater\02. Airlift Tests, Flow Rates, Bore Development\Groundwater Strikes Air Drilling\Daily report inflow data 2011_appendix I 19/07/2012



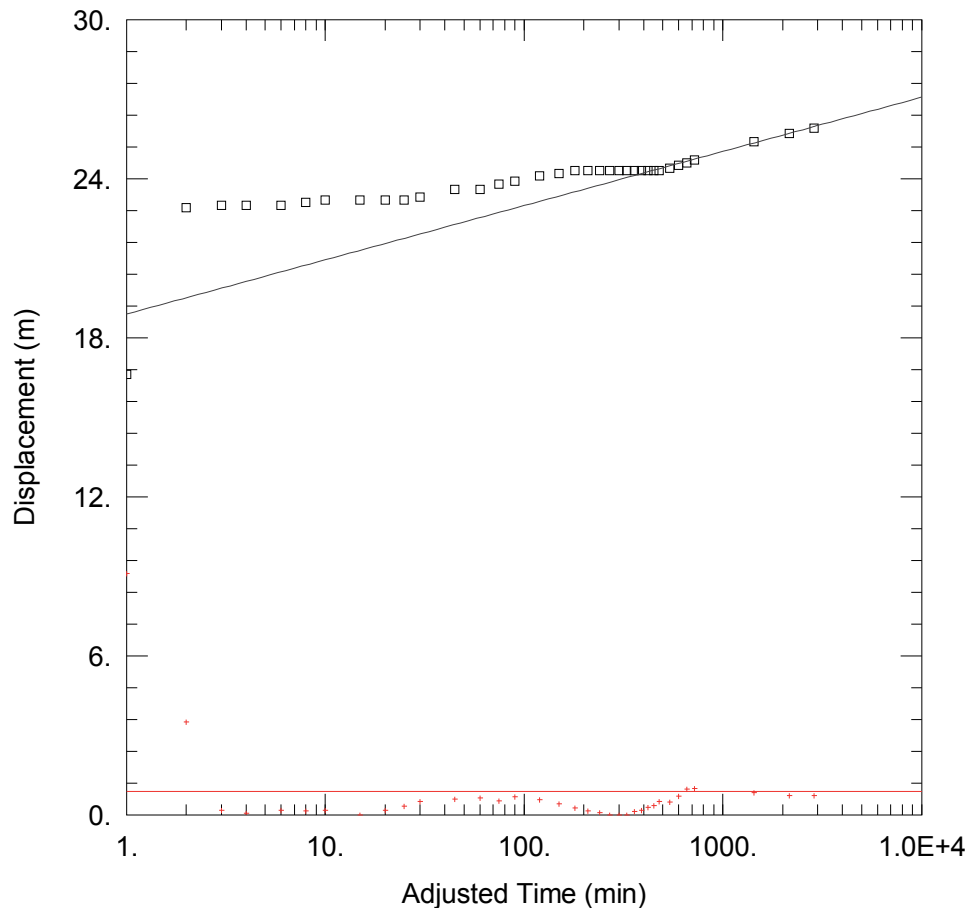
Appendix J

Pumping Testing Analyses and Summary of Results



Shenhua Watermark Coal Pumping Tests - Summary of Analytical Results

Test	File Name (aqt)	Active Bore	Model	Solution Method	Transmissivity m ² /day	K m/day	Ss	S	Comment
90BL254822 48 hr Constant Rate 17/05/2011 Gunnedah Fm	90BL254822_CRtest_CJ	90BL254822	confined	Cooper-Jacob (late time)	139.3				straight line fit to late time data
	90BL254822_CRtest_DB	90BL254822	confined	Dougherty-Babu	195.6				good fit to drawdown & recovery data
	WM0093A_DB	WM0093A	confined	Dougherty-Babu	195.3				1.7E-05 good fit to drawdown, underestimates recovery (possible recharge)
	WM0093A_CJ	WM0093A	confined	Cooper-Jacob (late time)	157.2				3.6E-05 straight line fit to late time data
	WM0093A_recovery	WM0093A	confined	Thels (recovery)	144.1				straight line fit to late time data
	WM0093B_DB	WM0093B	confined	Dougherty-Babu	162.0				8.5E-06 good fit to drawdown & recovery data
	WM0093B_CJ	WM0093B	confined	Cooper-Jacob (late time)	168.8				8.5E-06 straight line fit to late time data
	WM0036L_DB	WM0036L	Leaky	Moench	166				2.41E-05
	WM0036L_CJ	WM0036L	Confined	Cooper-Jacob (late time)	4.081				OK fit for late time & recovery.
	WM0036L_F_Moench	WM0036L	fractured	Moench with slab blocks	14.920				good fit to drawdown & recovery data
WM0036L 7 day Constant Rate 09/04/2011 Fractured Interburden	WM0036L_PC	WM0036L	Confined	Papadopolous-Cooper	7.44	0.758			
	WM0339_Moench.aqt	WM0339	Leaky	Moench	11.23				3.4E-05 Good fit to drawdown data
	WM0339_CJ.aqt	WM0339	confined	Cooper-Jacob (late time)	14.04				2.47E-05 OK fit to drawdown & recovery data
	WM0339_DB.aqt	WM0339	confined	Dougherty-Babu	10.98				3.71E-05 OK fit to drawdown & recovery data
	WM0036_CJ	WM0036C	confined	Cooper-Jacob (late time)	19.91				2.03E-04 straight line fit to late time data before late interference or change to pump rate
	WM0036_Thels	WM0036C	confined	Thels (recovery)	27.33				
	WM0036_Moench	WM0036C	Leaky	Moench	24.61				9.82E-05 Good fit to drawdown data
	WM0036C_DB	WM0036C	confined	Dougherty-Babu	49.57				2.95E-03 average fit to drawdown, overestimates recovery, not included in mean calculations
	WM0036C_DB	WM0036C	fractured	Moench with slab blocks	1.744				Overestimates recovery
	WM0363L	WM0363L	unconfined	Moench	19.30				5.08E-04
WM0363L Weathered to Fresh Bondlabri Fm below CLR Sandstone	WM0363L_resid_DD	WM0363L	unconfined	Moench (residual drawdown)	0.011				De-watered casing - OK fit
	WM0363A_Thels	WM0363A	unconfined	Thels	0.056				De-watered casing - OK late time fit
	WM0363A_cooperjacob	WM0363A	unconfined	Cooper-Jacob	0.078				9.41E-04 OK fit for recovery
	WM0363A_Neuman	WM0363A	unconfined	Neuman	0.129				3.22E-04 straight line fit, OK late time only
	WM0363A_Moench	WM0363A	unconfined	Moench	0.079				9.08E-04 OK fit to recovery data, drawdown data poor fit
	WM0157L_RECOVERY	WM0157L	confined	Thels (recovery)	0.018				9.27E-03 Good fit for recovery data, moderate fit for drawdown
	WM0157_3day_N	WM0157	unconfined	Neuman	0.05				5.08E-03
	WM0157_CJ	WM0157	unconfined	Cooper-Jacob (late time)	1.194				straight line fit to mid time (late time gravel pack) response?
	WM0157_3day_Q3_N	WM0157	Leaky	Moench	4.632				0.001 late time straight line fit, however displacement small & derivative not good
	WM0157_3day_Q3_H	WM0157	Leaky	Neuman-Witherspoon	15.62				0.098 not included in analyses
WM0157L Hoskissons Coal	WM0157_3day_Q3_H	WM0157	Leaky	Harush (storage in aquitard)	0.172				average fit, however minimal displacement & disturbance when pump removed from pump bore
	WM0019L_DB	WM0019L	confined	Dougherty-Babu	2.90				3.57E-05 limited data set from WVP, greater displacement good fit with limited data
	WM0019L_PC	WM0019L	confined	Papadopolous-Cooper	2.970				4.32E-05 limited data set from WVP, good fit recovery data
	WM0019L_CJ	WM0019L	confined	Cooper-Jacob (late time)	2.52				0.05
	WM0019L_residualDD	WM0019L	confined	Thels (recovery)	0.101				De-watered casing - OK - good fit, better late time recovery fit
	WM0019L_sgarwal	WM0019L	confined	Thels (Agarwal)	0.009				De-watered casing - OK - good fit
	WM0019L_DB_resid_DD	WM0019L	confined	Dougherty-Babu (recovery)	0.016				De-watered casing - late time straight line fit
	WM0060L_CJ	WM0060L	unconfined	Cooper-Jacob (late time)	0.007				De-watered casing - late time recovery fit
	WM0060L_F_Moench	WM0060L	fractured	Moench with slab blocks	0.033				De-watered casing - late time recovery fit
	WM0060L_F_Barker	WM0060L	fractured	Barker	0.100				Late time recovery fit poor fit for early time
WM0060L Interburden	GW043938_CJ	GW043938	unconfined	Cooper-Jacob (late time)	1.673				0.02742 good fit to dataset
	GW043938_M	GW043938	unconfined	Moench	1.268				0.03871 good fit to late drawdown data and recovery
	GW043938_N	GW043938	unconfined	Neuman	1.223				0.04165 Good fit to recovery data
	GW043938_M_Leaky	GW043938	Leaky	Moench	1.673				0.02742 good fit to drawdown & recovery data
	WM0095L_PumpTest_DB	WM0095L	confined	Dougherty-Babu	1.72				0.03
	WM0095L_PumpTest_F_Moench	WM0095L	fractured	Moench with slab blocks	0.525				good fit except for late time recovery
	WM0095L_Recovery	WM0095L	confined	Thels (recovery)	0.007				good fit except for late time recovery
	WM0563_PC	WM0563	confined	Papadopolous-Cooper	0.046				straight line fit to mid time (late time gravel pack) response?
	WM0563_DB	WM0563	confined	Dougherty-Babu	0.531				2.88E-06 OK match except for early time, and for late time recovery
	WM0563_H	WM0563	Leaky	Recovery	1.329				2.63E-06 OK match except for early time, and for late time recovery
GW967044 Gunnedah Fm	WM0563_H	WM0563	Leaky	Harush	853.6				straight line match good fit to majority of data
	WM0563_NW	WM0563	Leaky	Neuman-Witherspoon	851				5.85E-05 straight line match to intermediate time when derivative is steady
		WM0563	Leaky	Adopted value	850.8				5.94E-05 good fit to drawdown & recovery data and best match to derivative data
			Adopted value		850				5.98E-05

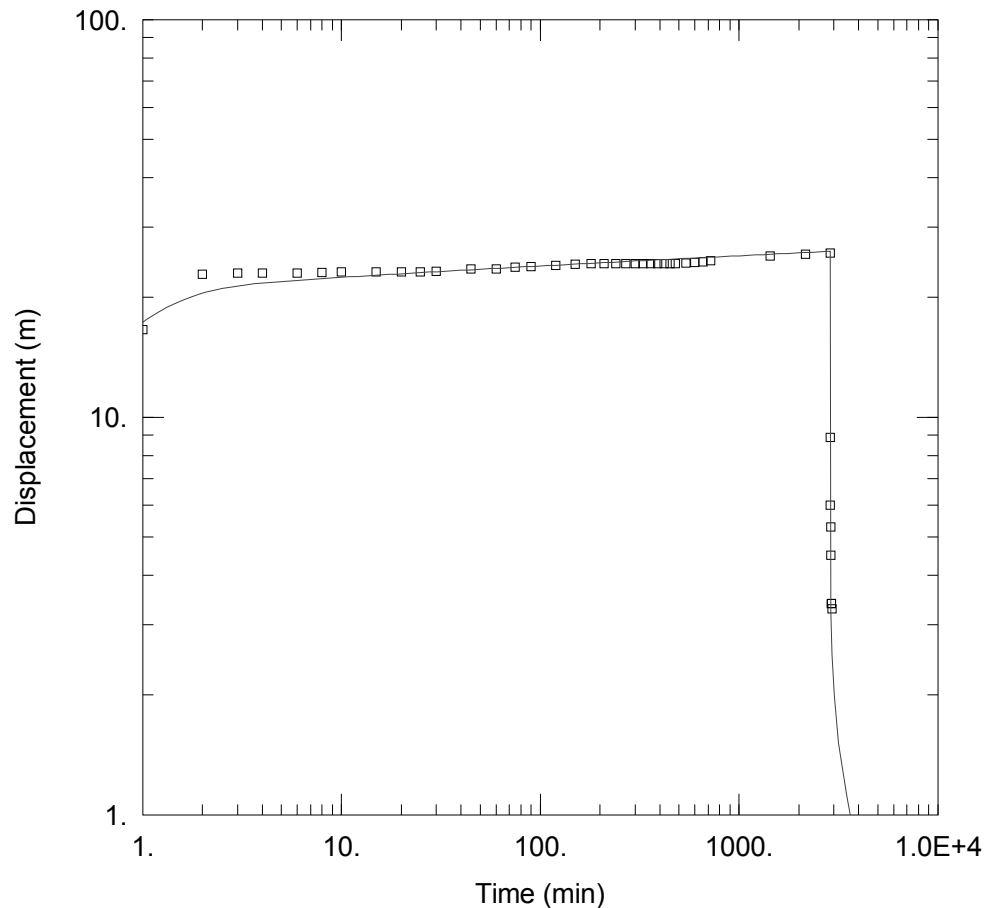
90BL254822Data Set: N:\...\Clift_CRtest_CJ.aqtDate: 09/14/12Time: 13:31:40PROJECT INFORMATIONCompany: GHDClient: ShenhuaProject: 2214551Location: EL7223 South WestTest Well: 90BL254822Test Date: 17/5/2010AQUIFER DATASaturated Thickness: 20.9 mAnisotropy Ratio (K_z/K_r): 0.001WELL DATAPumping Wells

Well Name	X (m)	Y (m)
Clift Water Bore	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ Clift Water Bore	0	0

SOLUTIONAquifer Model: ConfinedSolution Method: Cooper-Jacob $T = 139.3 \text{ m}^2/\text{day}$ $S = 1.103\text{E-}8$



90BL254822

Data Set: N:\...\Clift_CRtest_DB.aqt

Date: 09/14/12

Time: 13:39:10

PROJECT INFORMATION

Company: GHD

Client: Shenhua

Project: 2214551

Location: EL7223 South West

Test Well: 90BL254822

Test Date: 17/5/2010

AQUIFER DATA

Saturated Thickness: 20.9 m

Anisotropy Ratio (Kz/Kr): 0.001

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
Clift Water Bore	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ Clift Water Bore	0	0

SOLUTION

Aquifer Model: Confined

Solution Method: Dougherty-Babu

T = 195.6 m²/day

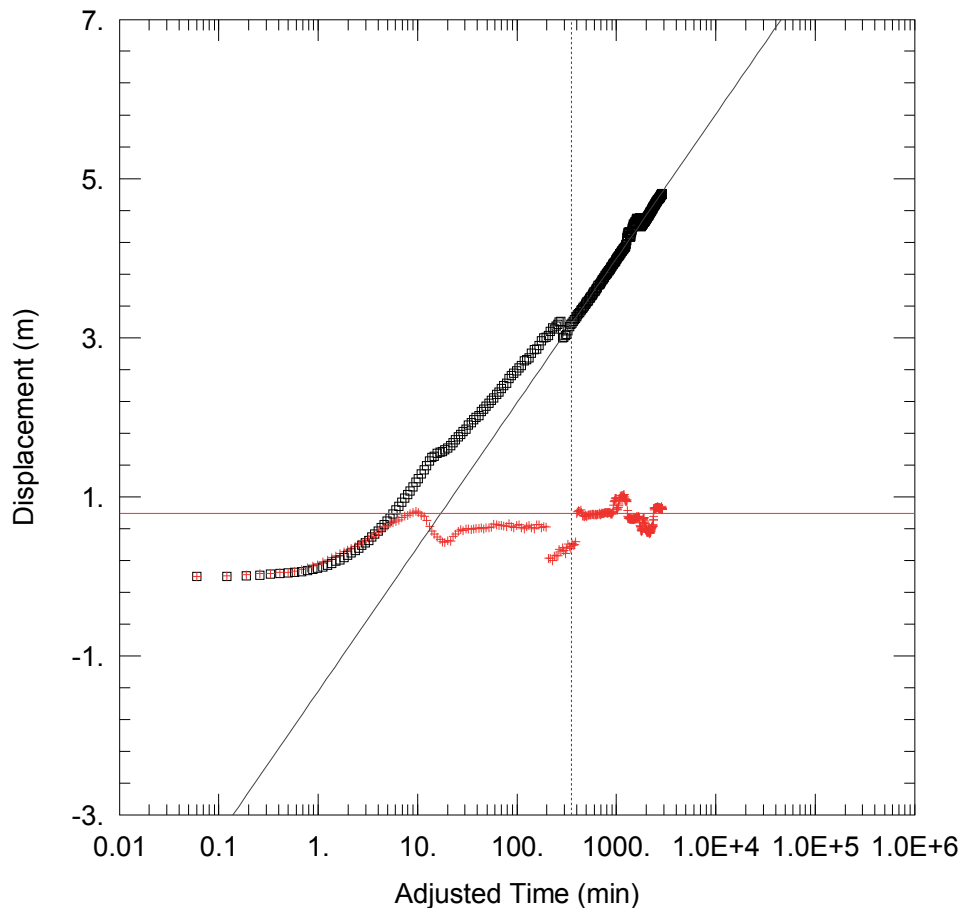
S = 1.0E-10

Kz/Kr = 0.001

Sw = 0.4867

r(w) = 0.107 m

r(c) = 0.107 m

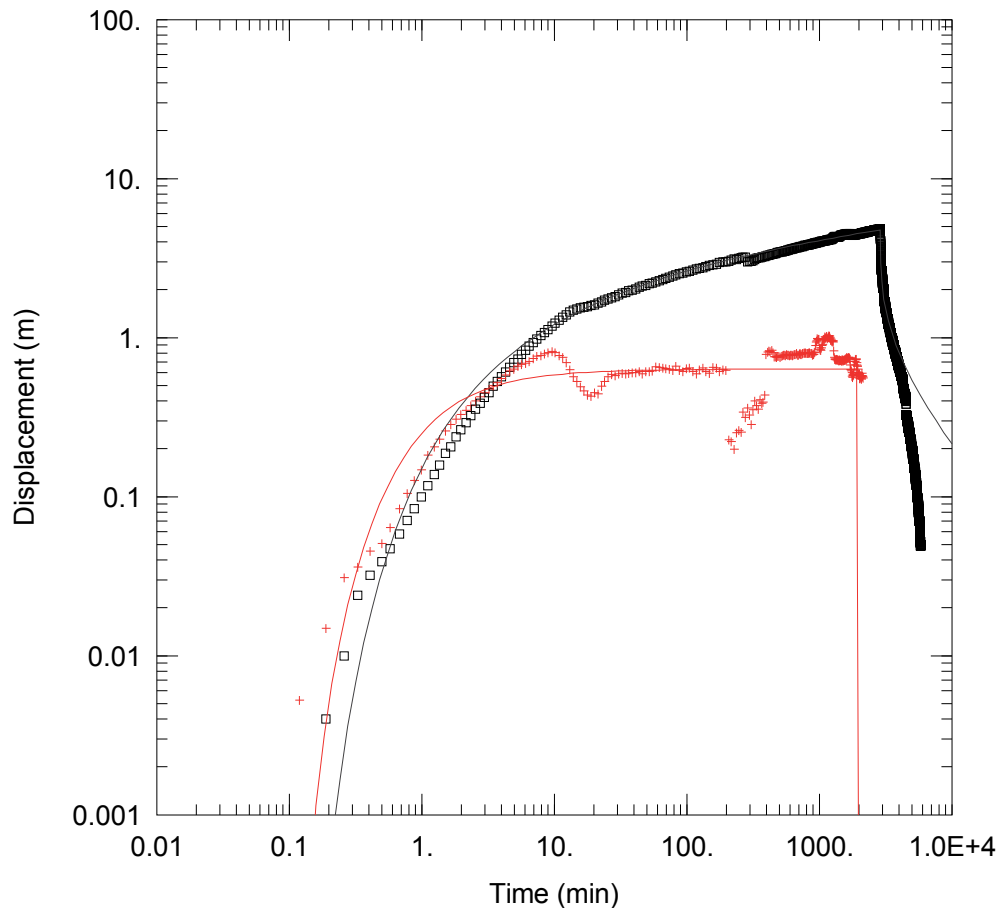
90BL254822Data Set: N:\...\Clift_WaterBore_CR_WM0093A_CJ.aqtDate: 09/14/12Time: 13:44:01PROJECT INFORMATIONCompany: GHDClient: Shenhua Watermark CoalProject: 22 - 15702- 13Location: EL7223 South WestTest Well: 90BL254822Test Date: 17/05/2011AQUIFER DATASaturated Thickness: 33. mAnisotropy Ratio (Kz/Kr): 1.WELL DATAPumping Wells

Well Name	X (m)	Y (m)
Clift Water Bore	247431	6534273

Observation Wells

Well Name	X (m)	Y (m)
□ WM0093A	247381.47	6534073.93

SOLUTIONAquifer Model: ConfinedSolution Method: Cooper-JacobT = 157.2 m²/dayS = 3.651E-5



90BL254822

Data Set: N:\...\Clift_WaterBore_CR_WM0093A.aqt

Date: 09/14/12

Time: 13:41:10

PROJECT INFORMATION

Company: GHD

Client: Shenhua Watermark Coal

Project: 22 - 15702- 13

Location: EL7223 South West

Test Well: 90BL254822

Test Date: 17/05/2011

AQUIFER DATA

Saturated Thickness: 33. m

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
Clift Water Bore	247431	6534273

Observation Wells

Well Name	X (m)	Y (m)
□ WM0093A	247381.47	6534073.93

SOLUTION

Aquifer Model: Confined

Solution Method: Dougherty-Babu

T = 195.3 m²/day

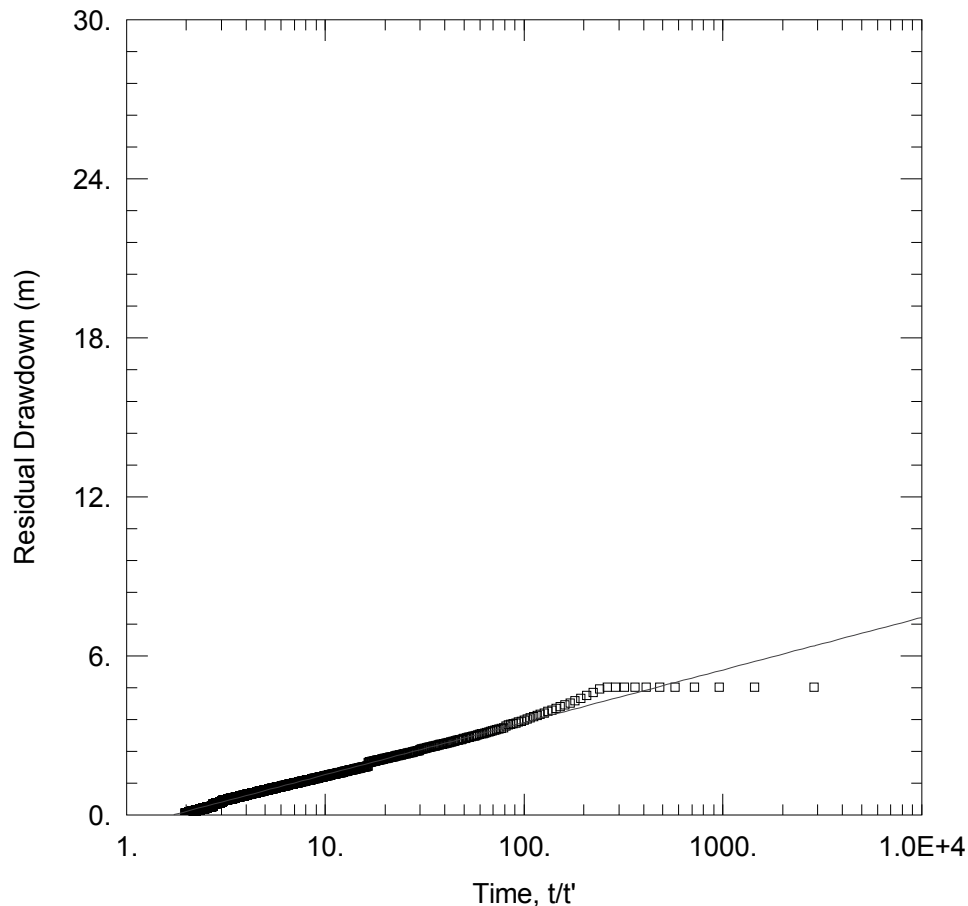
S = 1.17E-5

Kz/Kr = 1.

Sw = -5.

r(w) = 0.107 m

r(c) = 0.107 m

90BL254822

Data Set: N:\...\Clift WaterBore_CR_WM0093A_recovery.aqt

Date: 09/14/12

Time: 13:42:39

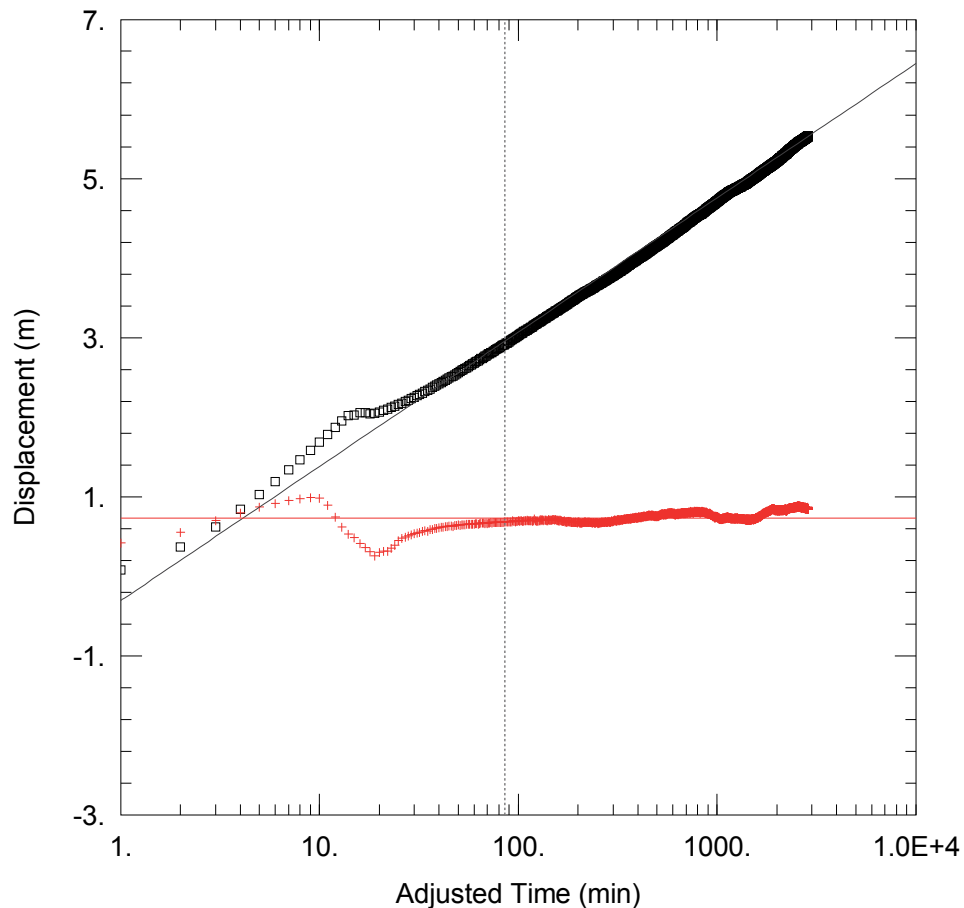
PROJECT INFORMATIONCompany: GHDClient: Shenhua Watermark CoalProject: 22 - 15702- 13Location: EL7223 South WestTest Well: 90BL254822Test Date: 17/05/2011AQUIFER DATASaturated Thickness: 33. mAnisotropy Ratio (Kz/Kr): 1.WELL DATAPumping Wells

Well Name	X (m)	Y (m)
Clift Water Bore	247431	6534273

Observation Wells

Well Name	X (m)	Y (m)
□ WM0093A	247381.47	6534073.93

SOLUTIONAquifer Model: ConfinedSolution Method: Theis (Recovery)T = 144.1 m²/dayS/S' = 1.727



90BL254822

Data Set: N:\...\Clift_WaterBore_CR_WM0093B_CJ.aqt

Date: 09/14/12

Time: 13:46:52

PROJECT INFORMATION

Company: GHD

Client: Shenhua Watermark Coal

Project: 22 - 15702- 13

Location: EL7223 South West

Test Well: 90BL254822

Test Date: 17/05/2011

AQUIFER DATA

Saturated Thickness: 20.9 m

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
Clift Water Bore	247431	6534273

Observation Wells

Well Name	X (m)	Y (m)
□ WM0093B	247390.3	6534059.51

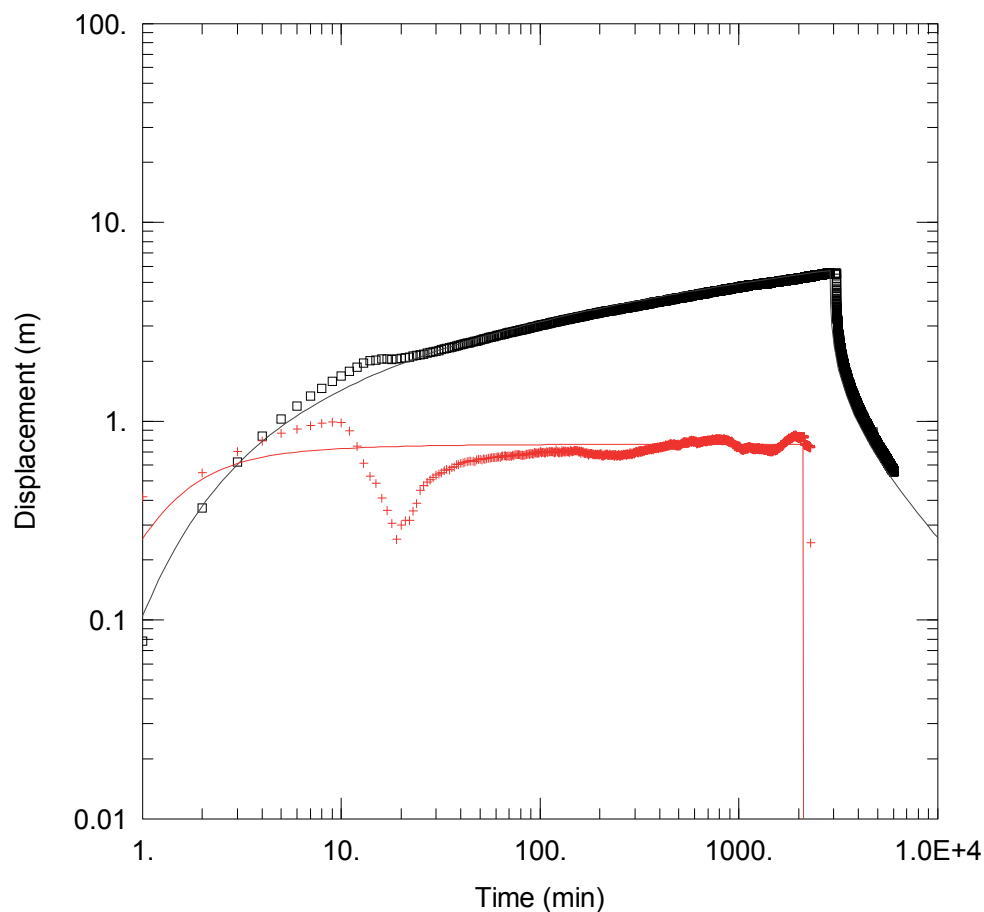
SOLUTION

Aquifer Model: Confined

Solution Method: Cooper-Jacob

T = 168.8 m²/day

S = 8.495E-6

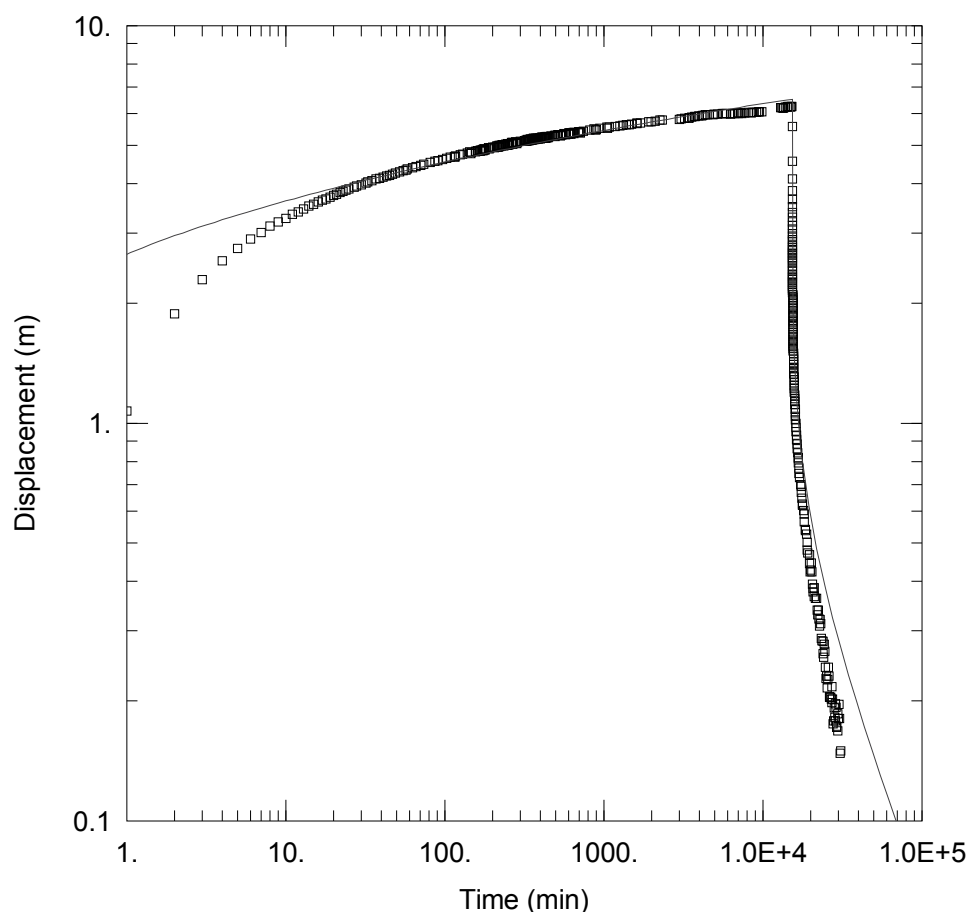
90BL254822Data Set: N:\...\Clift_WaterBore_CR_WM0093B.aqtDate: 09/14/12Time: 13:45:22PROJECT INFORMATIONCompany: GHDClient: Shenhua Watermark CoalProject: 22 - 15702- 13Location: EL7223 South WestTest Well: 90BL254822Test Date: 17/05/2011AQUIFER DATASaturated Thickness: 20.9 mAnisotropy Ratio (Kz/Kr): 1.WELL DATAPumping Wells

Well Name	X (m)	Y (m)
Clift Water Bore	247431	6534273

Observation Wells

Well Name	X (m)	Y (m)
□ WM0093B	247390.3	6534059.51

SOLUTIONAquifer Model: ConfinedSolution Method: Dougherty-BabuT = 162. m²/dayS = 8.584E-6Kz/Kr = 1.Sw = -0.2r(w) = 0.107 mr(c) = 0.107 m



GW967044

Data Set: N:\...\WM0563_PC.aqtDate: 09/14/12Time: 13:13:32

PROJECT INFORMATION

Company: GHDClient: ShenhuaProject: 221570213Test Well: GW967044Test Date: 16/03/2012

AQUIFER DATA

Saturated Thickness: 32. mAnisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

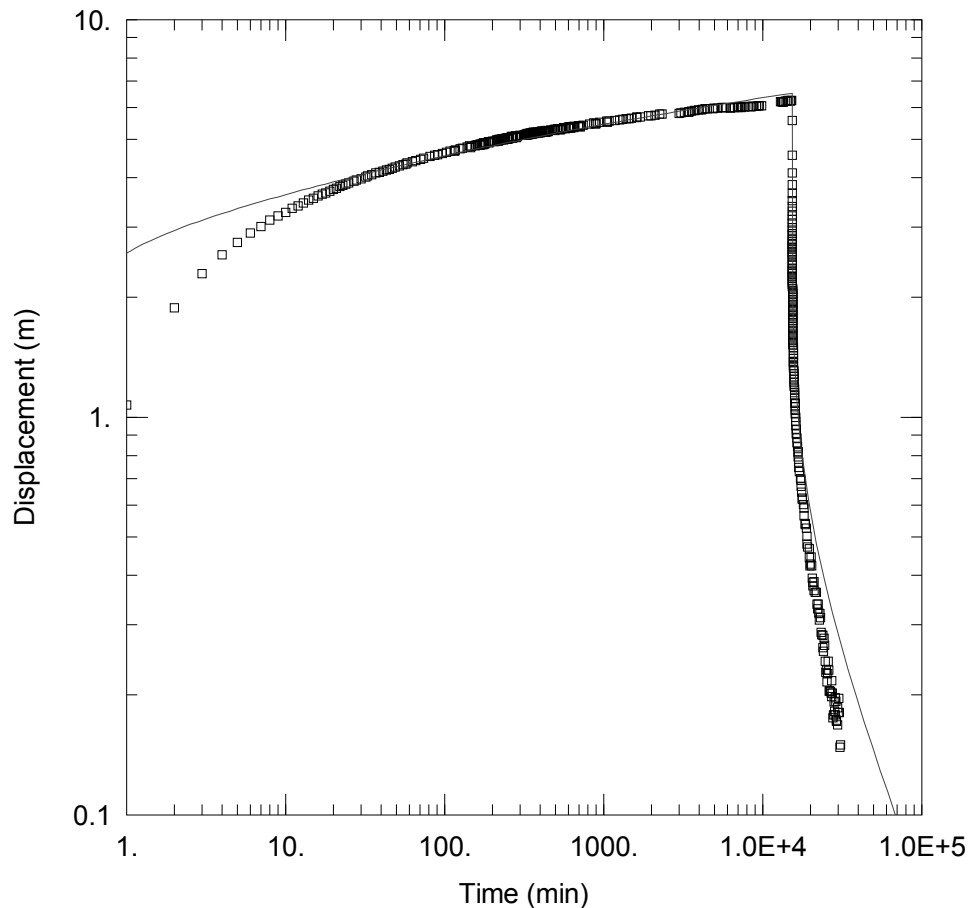
Well Name	X (m)	Y (m)
GW967044	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ WM0563	27.5	0

SOLUTION

Aquifer Model: ConfinedSolution Method: Papadopoulos-CooperT = 1321.2 m²/dayS = 2.851E-6r(w) = 0.175 mr(c) = 0.175 m

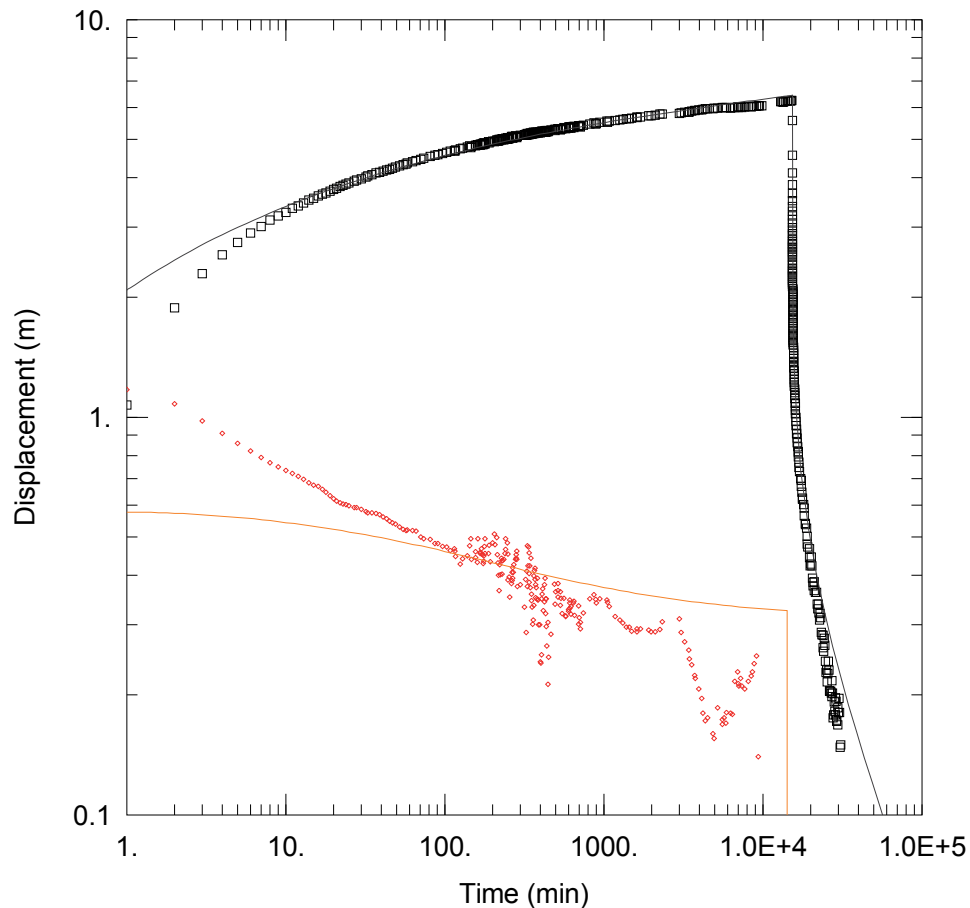
GW976044Data Set: N:\...W\WM0563_DB.aqtDate: 09/14/12Time: 13:14:33PROJECT INFORMATIONCompany: GHDClient: ShenhuaProject: 221570213Test Well: GW967044Test Date: 16/03/2012AQUIFER DATASaturated Thickness: 32. mAnisotropy Ratio (Kz/Kr): 0.001WELL DATAPumping Wells

Well Name	X (m)	Y (m)
GW967044	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ WM0563	27.5	0

SOLUTIONAquifer Model: ConfinedSolution Method: Dougherty-BabuT = 1329.2 m²/dayS = 2.625E-6Kz/Kr = 0.001Sw = 10.r(w) = 0.175 mr(c) = 0.175 m



GW967044

Data Set: N:\...\WM0563_leaky hantush.aqt

Date: 09/14/12

Time: 13:15:37

PROJECT INFORMATION

Company: GHD

Client: Shenhua

Project: 221570213

Test Well: GW967044

Test Date: 16/03/2012

AQUIFER DATA

Saturated Thickness: 32. m

Aquitard Thickness (b'): 1. m

Anisotropy Ratio (Kz/Kr): 1.

Aquitard Thickness (b''): 1. m

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
GW967044	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ WM0563	27.5	0

SOLUTION

Aquifer Model: Leaky

Solution Method: Hantush

$T = 851. \text{ m}^2/\text{day}$

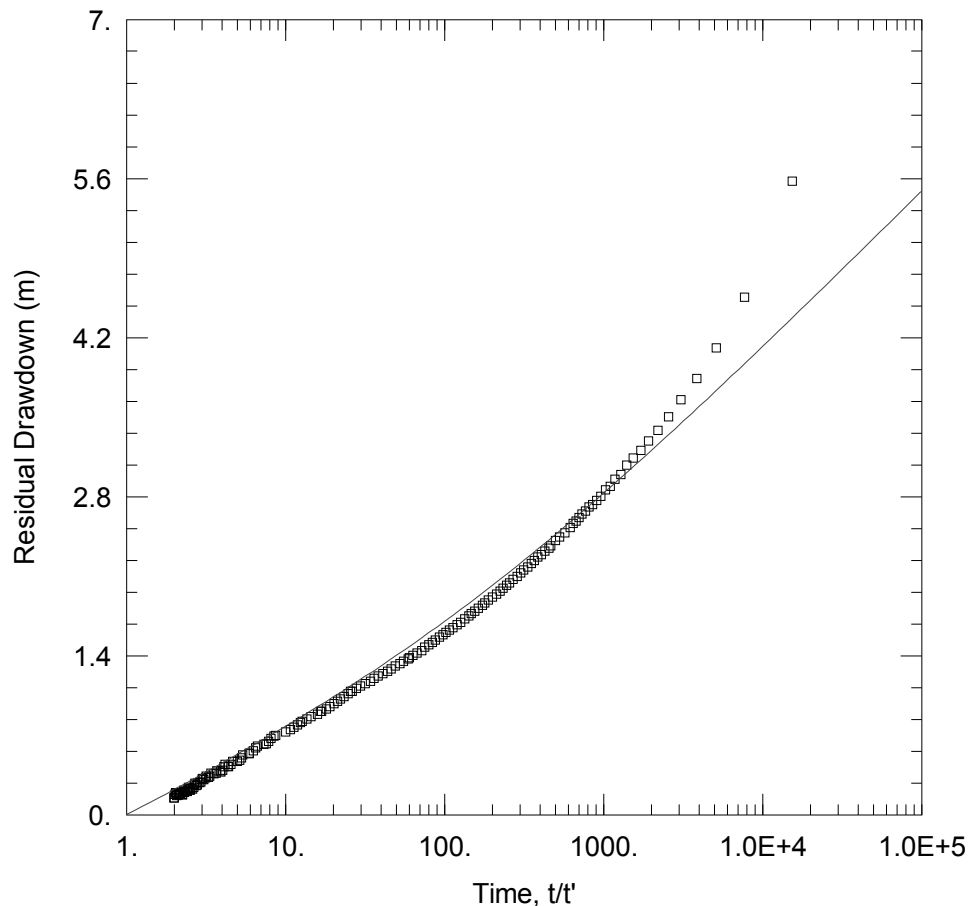
$S = 5.534\text{E-}5$

$r/B' = 1.0\text{E-}5$

$\beta' = 0.005157$

$r/B'' = 0.$

$\beta'' = 0.$

GW967044

Data Set: N:\...WM0563_Theis.aqt
Date: 09/14/12

Time: 13:18:05

PROJECT INFORMATION

Company: GHD
Client: Shenhua
Project: 221570213
Test Well: GW967044
Test Date: 16/03/2012

AQUIFER DATA

Saturated Thickness: 32. m
Aquitard Thickness (b'): 1. m

Anisotropy Ratio (Kz/Kr): 1.
Aquitard Thickness (b''): 1. m

WELL DATAPumping Wells

Well Name	X (m)	Y (m)
GW967044	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ WM0563	27.5	0

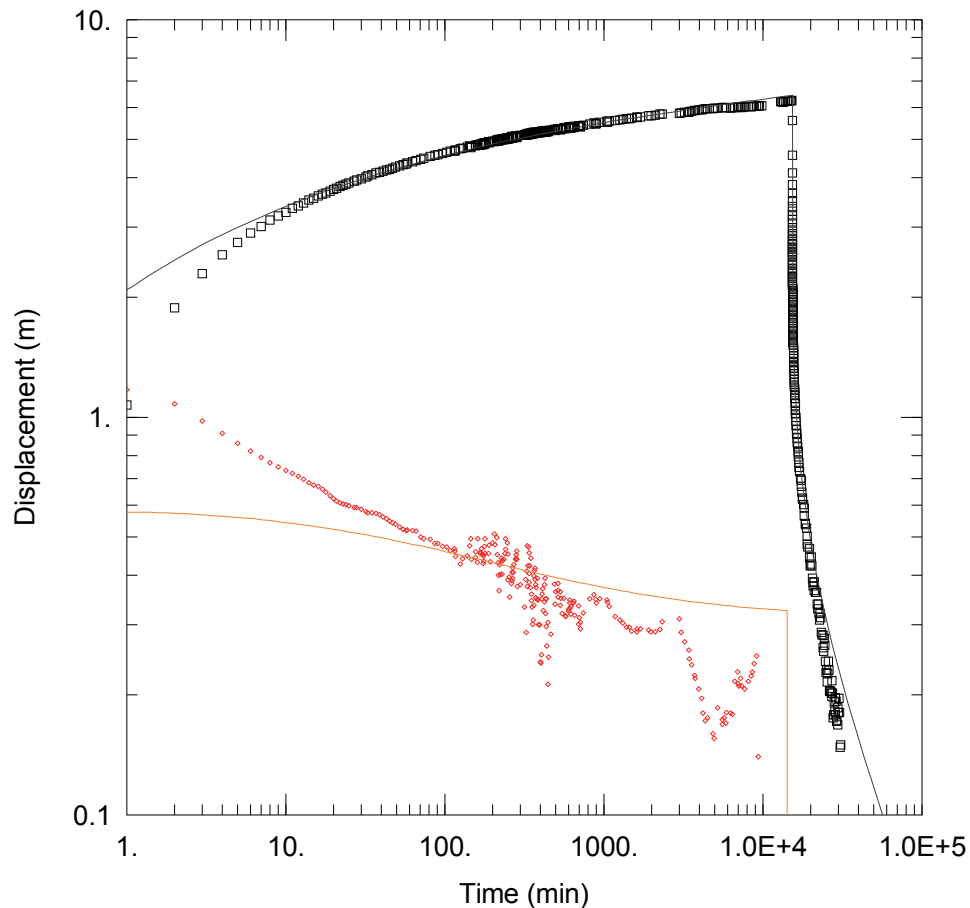
SOLUTION

Aquifer Model: Leaky

Solution Method: Hantush

$T = 853.6 \text{ m}^2/\text{day}$
 $r/B' = 1.0\text{E-}5$
 $r/B'' = 0.$

$S = 4.292\text{E-}8$
 $\beta' = 0.0001383$
 $\beta'' = 0.$



GW967044

Data Set: N:\...\WM0563_leaky NW.aqt

Date: 09/14/12

Time: 13:19:46

PROJECT INFORMATION

Company: GHD

Client: Shenhua

Project: 221570213

Test Well: GW967044

Test Date: 16/03/2012

AQUIFER DATA

Saturated Thickness: 32. m

Aquitard Thickness (b'): 1. m

Anisotropy Ratio (Kz/Kr): 1.

Aquitard Thickness (b''): 1. m

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
GW967044	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ WM0563	27.5	0

SOLUTION

Aquifer Model: Leaky

Solution Method: Neuman-Witherspoon

T = 851. m²/day

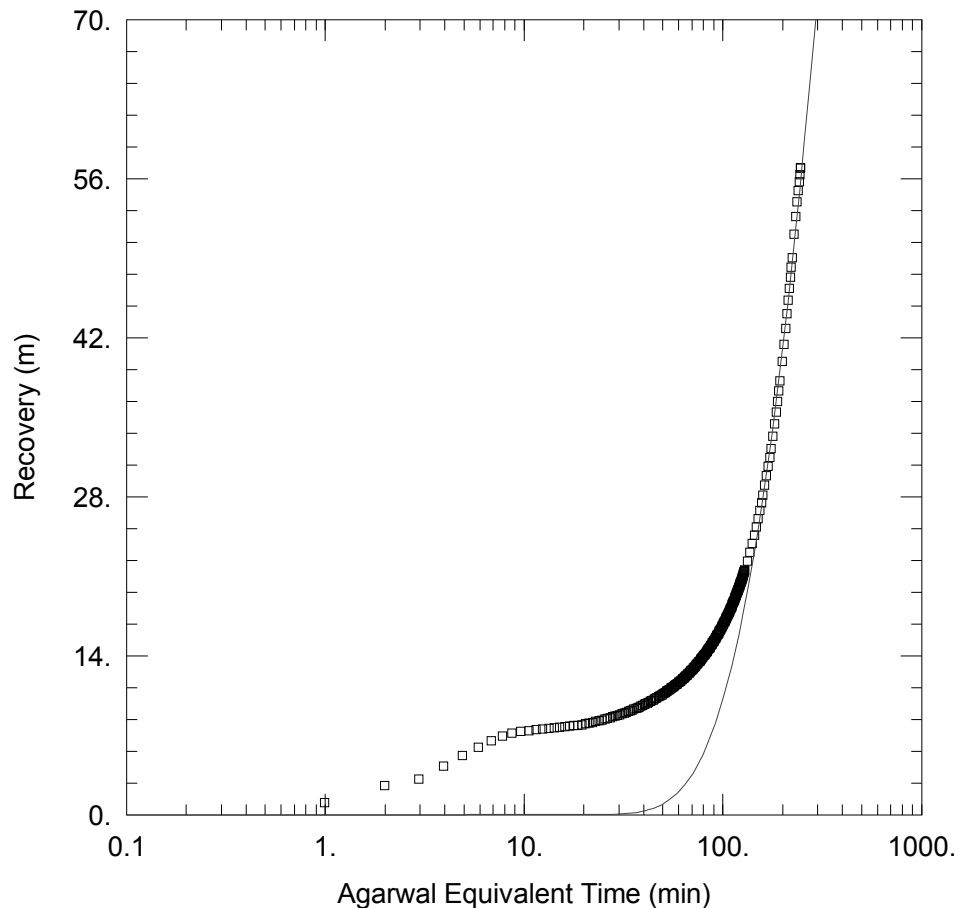
S = 5.533E-5

r/B = 1.0E-5

β = 0.005157

T2 = 1.44E+8 m²/day

S2 = 1.0E-10

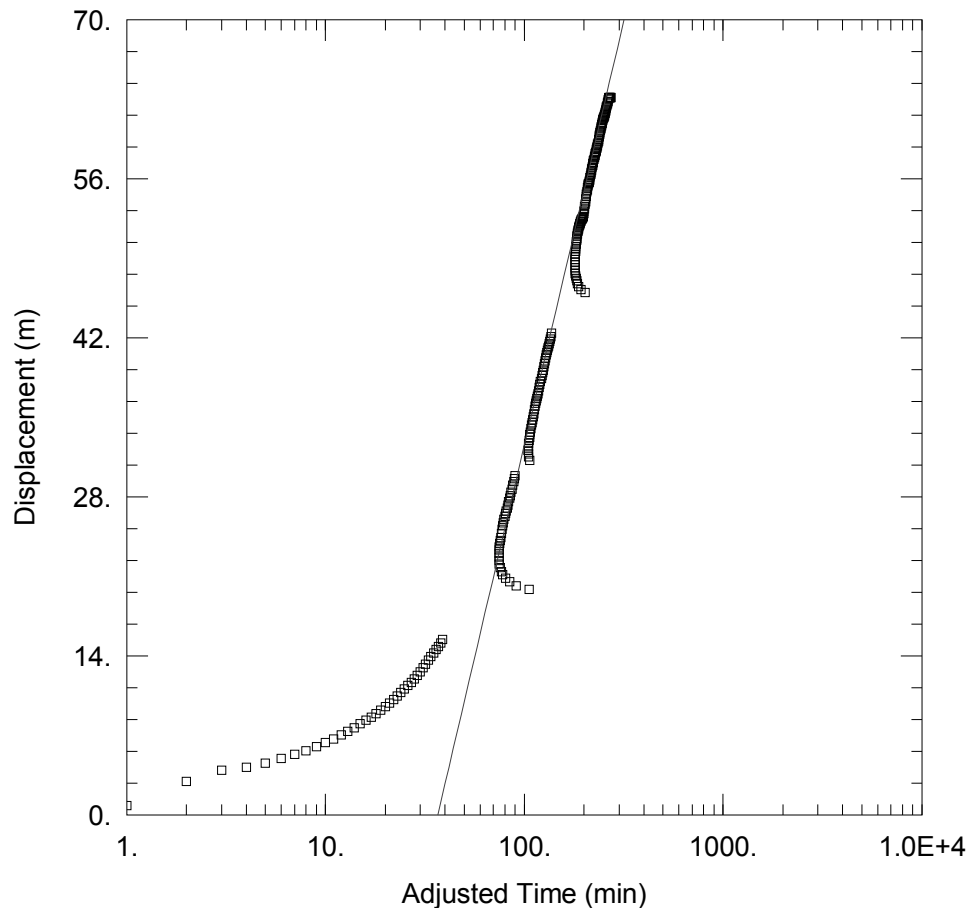
WM0019L_PUMPTESTData Set: N:\...\WM0019L_agarwal.aqtDate: 10/24/11Time: 12:07:14PROJECT INFORMATIONCompany: GHDClient: ShenhuaProject: 2214551Location: WatermarkTest Well: WM0019LTest Date: 29/3/2011WELL DATAPumping Wells

Well Name	X (m)	Y (m)
WM0019L	245712	6536794

Observation Wells

Well Name	X (m)	Y (m)
□ WM0019L	245712	6536794

SOLUTIONAquifer Model: ConfinedSolution Method: TheisT = 0.0333 m²/dayS = 2.989Kz/Kr = 1.b = 60. m



WM0019L PUMPTEST

Data Set: N:\...\WM0019L_CJ.aqtDate: 09/14/12Time: 14:19:21

PROJECT INFORMATION

Company: GHDClient: ShenhuaProject: 2214551Location: EL7223Test Well: WM0019LTest Date: 29/3/2011

AQUIFER DATA

Saturated Thickness: 60. mAnisotropy Ratio (Kz/Kr): 0.1317

WELL DATA

Pumping Wells

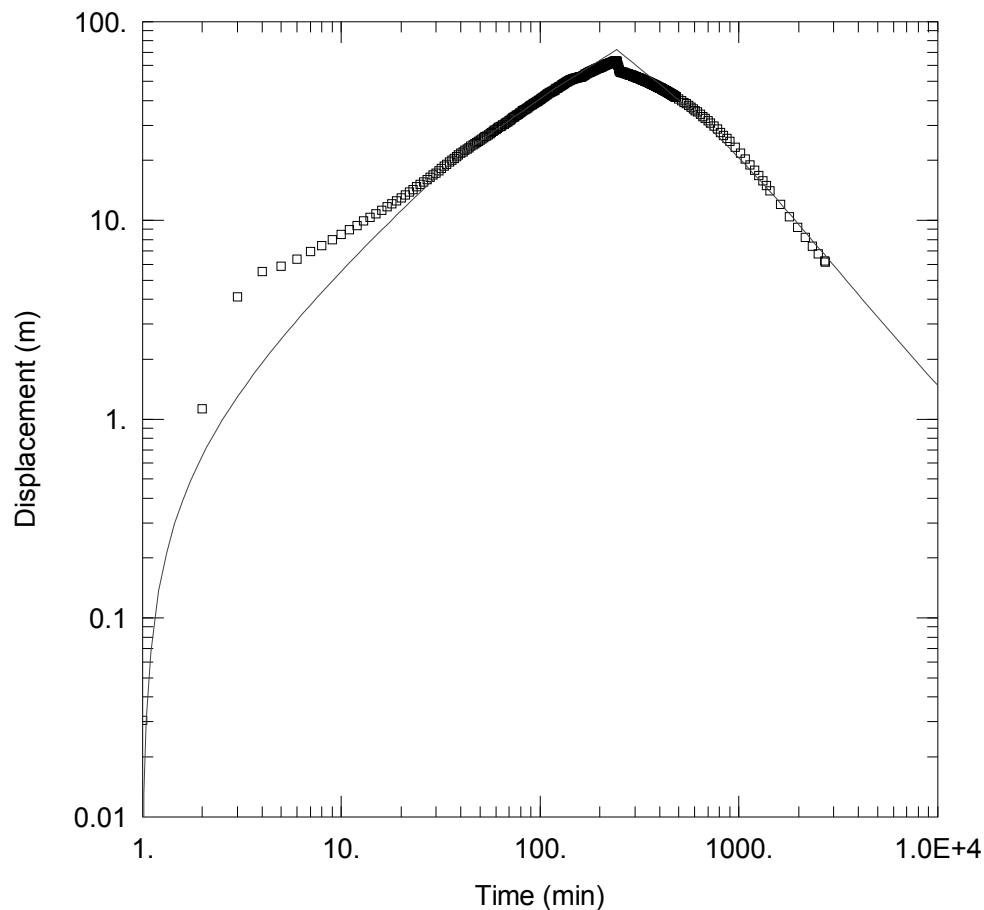
Well Name	X (m)	Y (m)
WM0019L	245712	6536794

Observation Wells

Well Name	X (m)	Y (m)
□ WM0019L	245712	6536794

SOLUTION

Aquifer Model: ConfinedSolution Method: Cooper-JacobT = 0.01654 m²/dayS = 0.1686

WM0019L_PUMPTEST

Data Set: N:\...\WM0019L_DB.aqt
Date: 09/14/12

Time: 14:17:34

PROJECT INFORMATION

Company: GHD
Client: Shenhua
Project: 2214551
Location: EL7223
Test Well: WM0019L
Test Date: 29/3/2011

AQUIFER DATA

Saturated Thickness: 60. m

Anisotropy Ratio (Kz/Kr): 0.1317

WELL DATAPumping Wells

Well Name	X (m)	Y (m)
WM0019L	245712	6536794

Observation Wells

Well Name	X (m)	Y (m)
□ WM0019L	245712	6536794

SOLUTION

Aquifer Model: Confined

Solution Method: Dougherty-Babu

T = 0.1005 m²/day

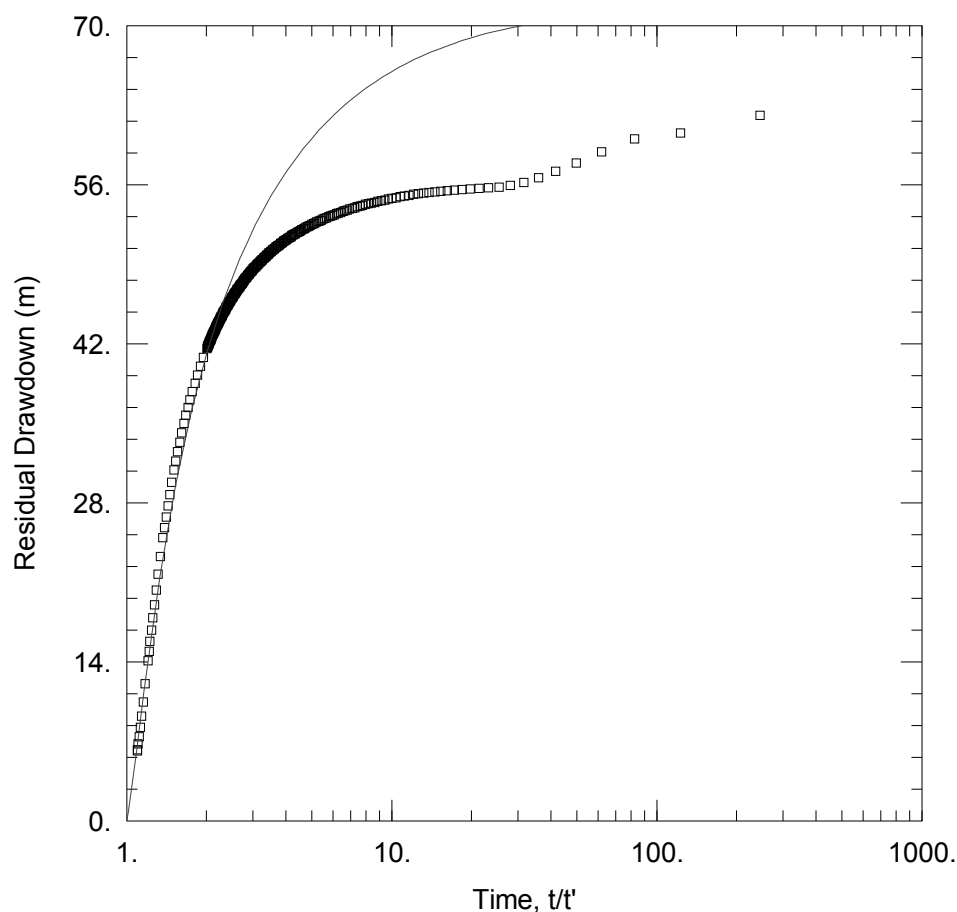
S = 0.1779

Kz/Kr = 0.1317

Sw = -0.7795

r(w) = 0.075 m

r(c) = 0.075 m



WM0019L PUMPTEST

Data Set: N:\...\WM0019L_DB_resid_DD.aqt

Date: 10/24/11

Time: 12:07:53

PROJECT INFORMATION

Company: GHD

Client: Shenhua

Project: 2214551

Location: Watermark

Test Well: WM0019L

Test Date: 29/3/2011

AQUIFER DATA

Saturated Thickness: 60. m

Anisotropy Ratio (K_z/K_r): 0.1317

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WM0019L	245712	6536794

Observation Wells

Well Name	X (m)	Y (m)
□ WM0019L	245712	6536794

SOLUTION

Aquifer Model: Confined

Solution Method: Dougherty-Babu

$T = 0.1005 \text{ m}^2/\text{day}$

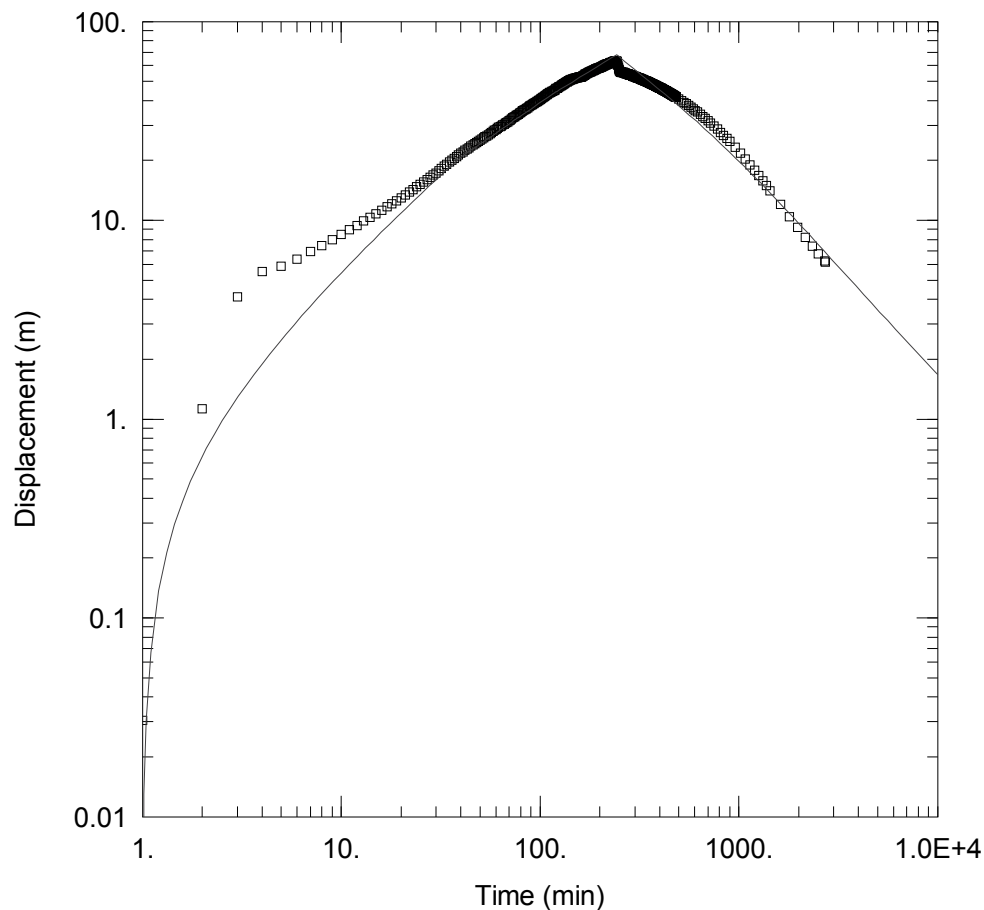
$S = 0.1779$

$K_z/K_r = 0.1317$

$S_w = -0.7795$

$r(w) = 0.075 \text{ m}$

$r(c) = 0.075 \text{ m}$

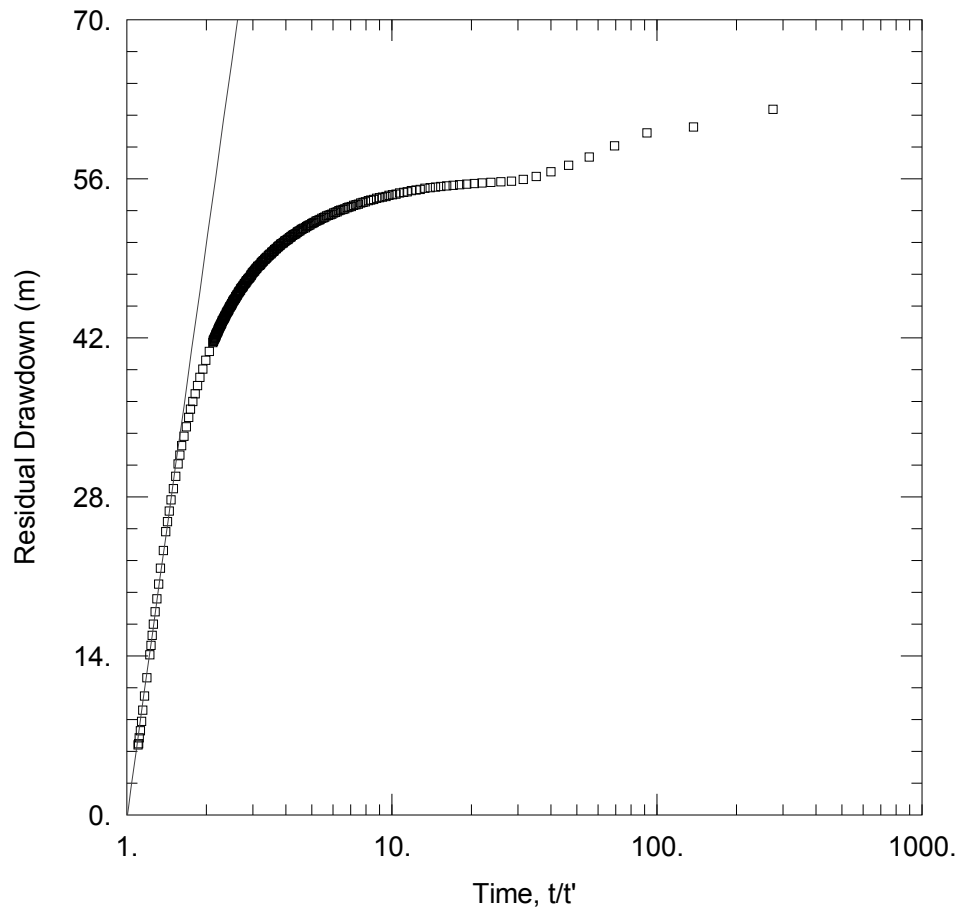
WM0019L_PUMPTESTData Set: N:\...\WM0019L_PC.aqtDate: 09/14/12Time: 14:18:18PROJECT INFORMATIONCompany: GHDClient: ShenhuaProject: 2214551Location: EL7223Test Well: WM0019LTest Date: 29/3/2011AQUIFER DATASaturated Thickness: 60. mAnisotropy Ratio (Kz/Kr): 0.1317WELL DATAPumping Wells

Well Name	X (m)	Y (m)
WM0019L	245712	6536794

Observation Wells

Well Name	X (m)	Y (m)
□ WM0019L	245712	6536794

SOLUTIONAquifer Model: ConfinedSolution Method: Papadopoulos-CooperT = 0.009256 m²/dayS = 0.14r(w) = 0.075 mr(c) = 0.075 m



WM0019L PUMPTEST

Data Set: N:\...\WM0019L_residualDD.aqt

Date: 10/24/11

Time: 12:06:14

PROJECT INFORMATION

Company: GHD

Client: Shenhua

Project: 2214551

Location: Watermark

Test Well: WM0019L

Test Date: 29/3/2011

AQUIFER DATA

Saturated Thickness: 60. m

Anisotropy Ratio (K_z/K_r): 0.1317

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WM0019L	245712	6536794

Observation Wells

Well Name	X (m)	Y (m)
□ WM0019L	245712	6536794

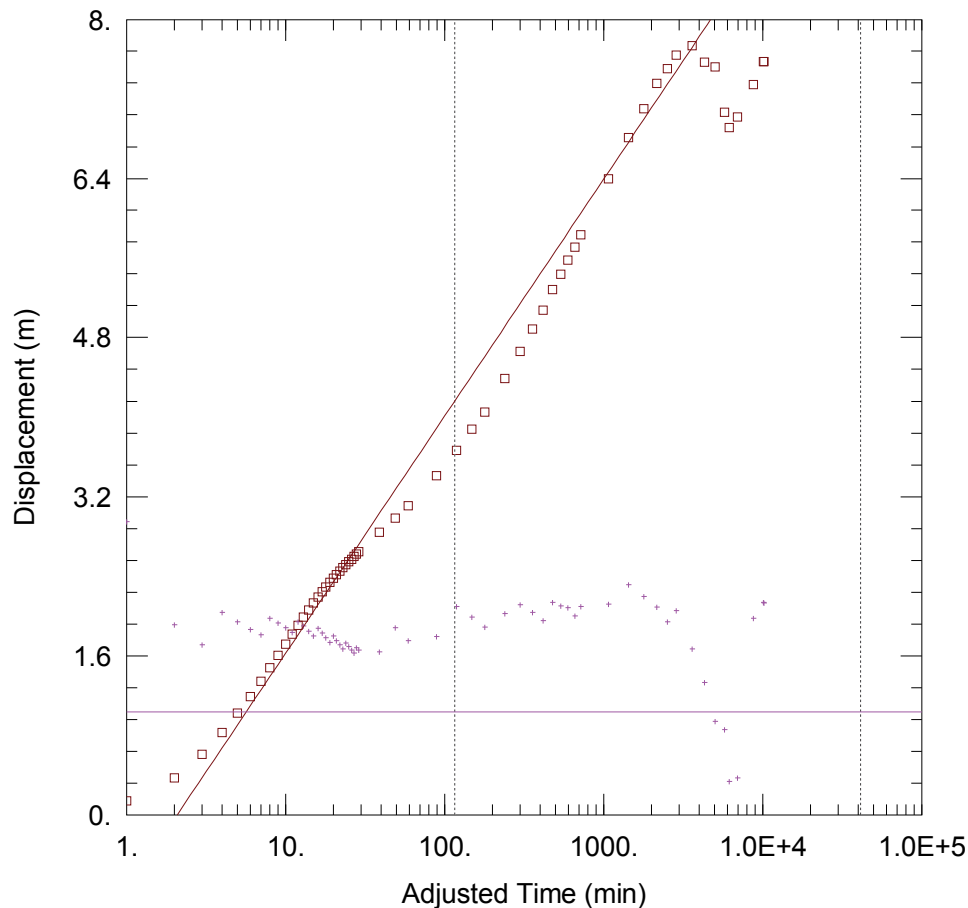
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

$T = 0.00734 \text{ m}^2/\text{day}$

$S/S' = 1.007$



WM0036L CONSTANT RATE TEST

Data Set: N:\...\WM0036C_CJ.aqtDate: 09/14/12Time: 13:54:25

PROJECT INFORMATION

Company: GHDClient: ShenhuaProject: 22\14551Location: EL7223Test Well: WM0036LTest Date: 9/04/2011

AQUIFER DATA

Saturated Thickness: 53. mAnisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

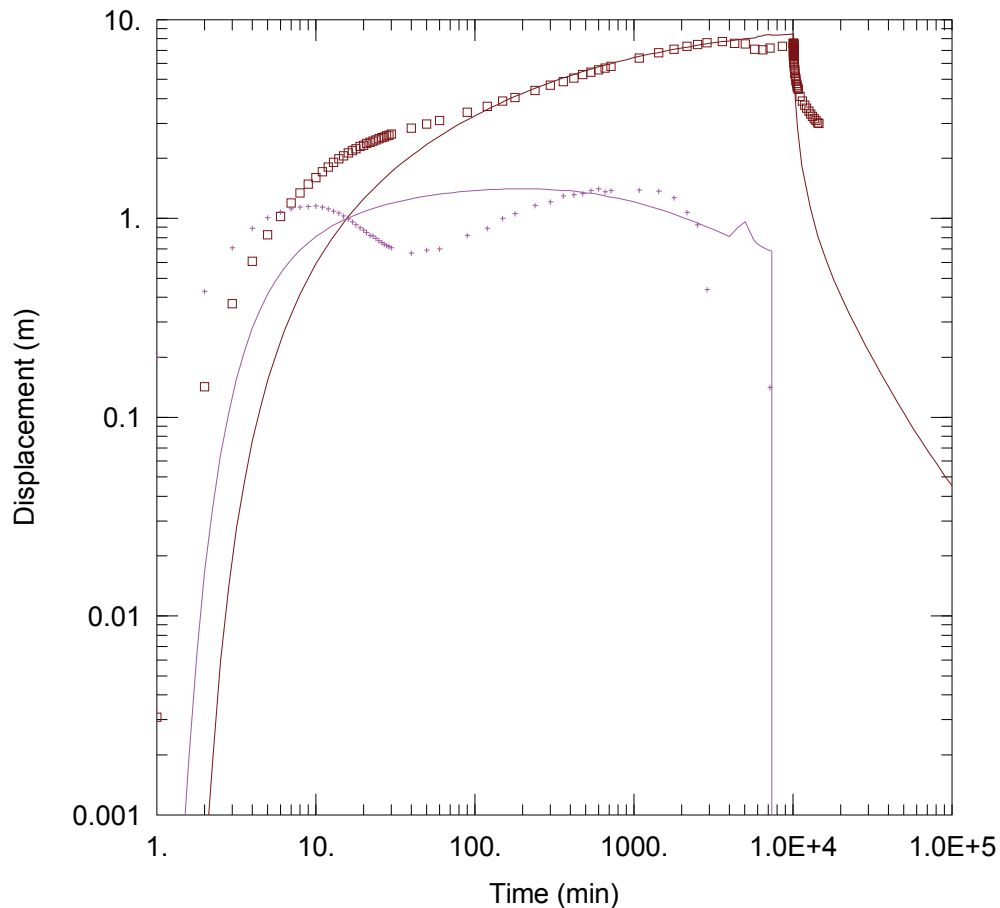
Well Name	X (m)	Y (m)
WM0036L	243510	6539991

Observation Wells

Well Name	X (m)	Y (m)
□ WM0036C	243526	6539999

SOLUTION

Aquifer Model: ConfinedSolution Method: Cooper-JacobT = 19.91 m²/dayS = 0.0002026



WM0036L CONSTANT RATE TEST

Data Set: N:\...\WM0036C_DB.aqt

Date: 09/14/12

Time: 13:49:31

PROJECT INFORMATION

Company: GHD

Client: Shenhua

Project: 22\14551

Location: EL7223

Test Well: WM0036L

Test Date: 9/04/2011

AQUIFER DATA

Saturated Thickness: 53. m

Anisotropy Ratio (Kz/Kr): 0.001

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WM0036L	243510	6539991

Observation Wells

Well Name	X (m)	Y (m)
WM0036C	243526	6539999

SOLUTION

Aquifer Model: Confined

Solution Method: Dougherty-Babu

T = 49.57 m²/day

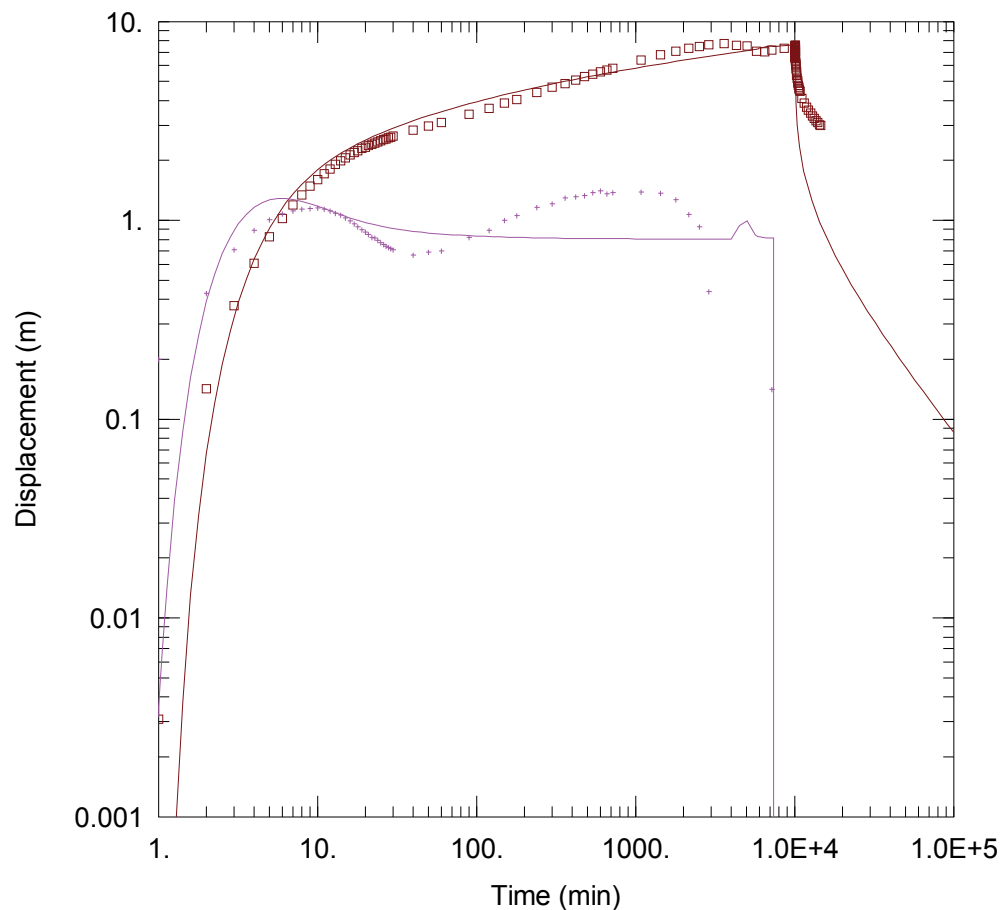
S = 0.002953

Kz/Kr = 0.001

Sw = -4.161

r(w) = 0.0875 m

r(c) = 0.075 m



WM0036L CONSTANT RATE TEST

Data Set: N:\...\WM0036C_F_M.aqtDate: 09/14/12Time: 13:50:42

PROJECT INFORMATION

Company: GHDClient: ShenhuaProject: 22\14551Location: EL7223Test Well: WM0036LTest Date: 9/04/2011

AQUIFER DATA

Saturated Thickness: 53. mSlab Block Thickness: 1. m

WELL DATA

Pumping Wells

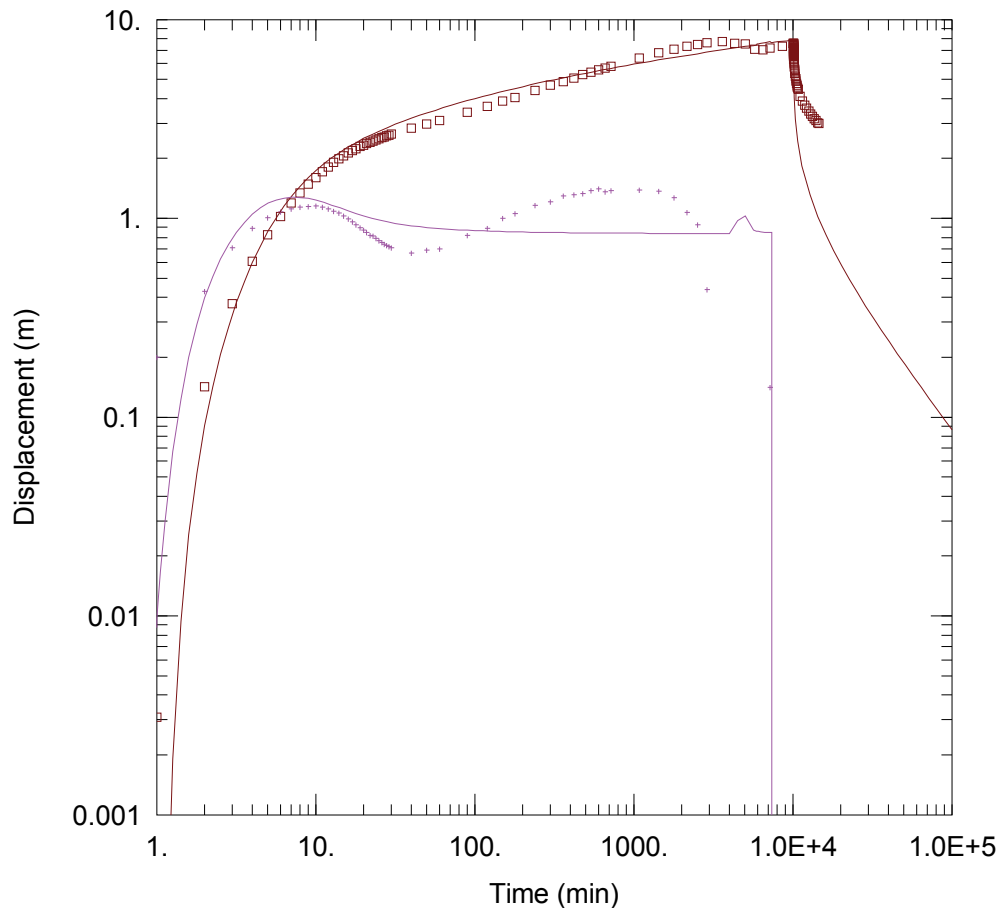
Well Name	X (m)	Y (m)
WM0036L	243510	6539991

Observation Wells

Well Name	X (m)	Y (m)
□ WM0036C	243526	6539999

SOLUTION

Aquifer Model: FracturedSolution Method: Moench w/slab blocksK = 1.744 m/daySs = 5.879E-6 m⁻¹K' = 1.183E-5 m/daySs' = 1.173E-7 m⁻¹Sw = 1.825Sf = 0.3506r(w) = 0.0875 mr(c) = 0.075 m



WM0036L CONSTANT RATE TEST

Data Set: N:\...\WM0036C_Moench.aqt

Date: 09/14/12

Time: 13:51:58

PROJECT INFORMATION

Company: GHD

Client: Shenhua

Project: 22\14551

Location: EL7223

Test Well: WM0036L

Test Date: 9/04/2011

AQUIFER DATA

Saturated Thickness: 53. m

Aquitard Thickness (b'): 1. m

Anisotropy Ratio (Kz/Kr): 0.001

Aquitard Thickness (b''): 1. m

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WM0036L	243510	6539991

Observation Wells

Well Name	X (m)	Y (m)
□ WM0036C	243526	6539999

SOLUTION

Aquifer Model: Leaky

Solution Method: Moench (Case 3)

$T = 24.61 \text{ m}^2/\text{day}$

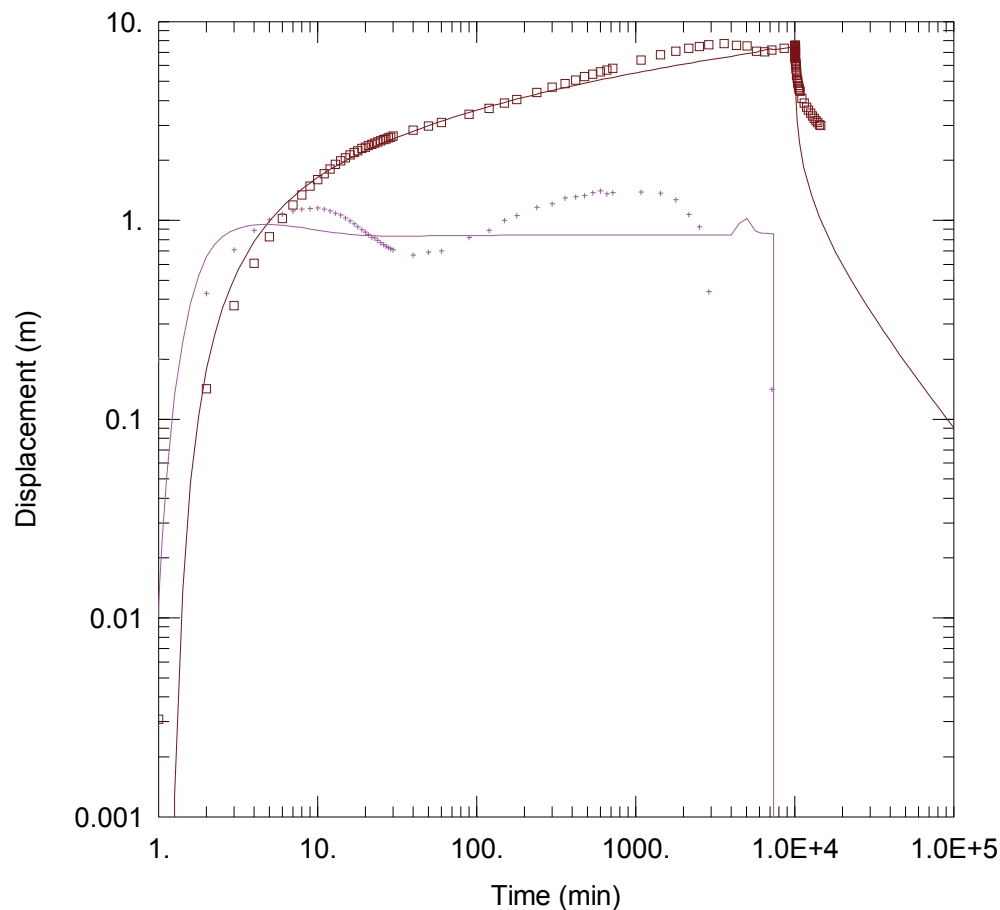
$S = 9.823\text{E-}5$

$1/B' = 4.736\text{E-}5 \text{ m}^{-1}$

$\beta'/r = 2.978\text{E-}8 \text{ m}^{-1}$

$1/R'' = 0 \text{ m}^{-1}$

$R''/r = 0 \text{ m}^{-1}$



WM0036L CONSTANT RATE TEST

Data Set: N:\...\WM0036C.aqtDate: 09/14/12Time: 14:00:53

PROJECT INFORMATION

Company: GHDClient: ShenhuaProject: 22\14551Location: EL7223Test Well: WM0036LTest Date: 9/04/2011

WELL DATA

Pumping Wells

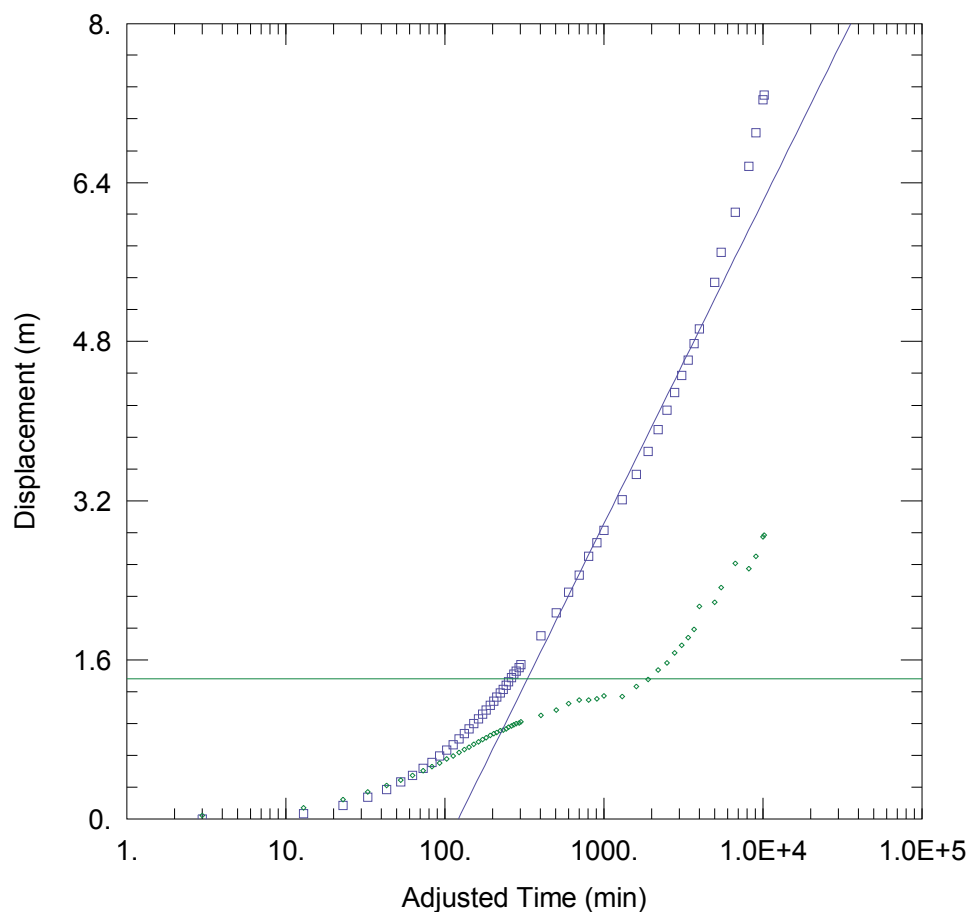
Well Name	X (m)	Y (m)
WM0036L	243510	6539991

Observation Wells

Well Name	X (m)	Y (m)
WM0036C	243526	6539999

SOLUTION

Aquifer Model: ConfinedSolution Method: TheisT = 24.45 m²/dayS = 0.0003199Kz/Kr = 1.b = 53. m



WM0036L CONSTANT RATE TEST

Data Set: N:\...\WM0339_CJ.aqt

Date: 09/14/12

Time: 14:10:30

PROJECT INFORMATION

Company: GHD

Client: Shenhua

Project: 22\14551

Location: EL7223

Test Well: WM0036L

Test Date: 9/04/2011

AQUIFER DATA

Saturated Thickness: 53. m

Anisotropy Ratio (Kz/Kr): 0.003586

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WM0036L	243510	6539991

Observation Wells

Well Name	X (m)	Y (m)
□ WM0339	243381	6539681

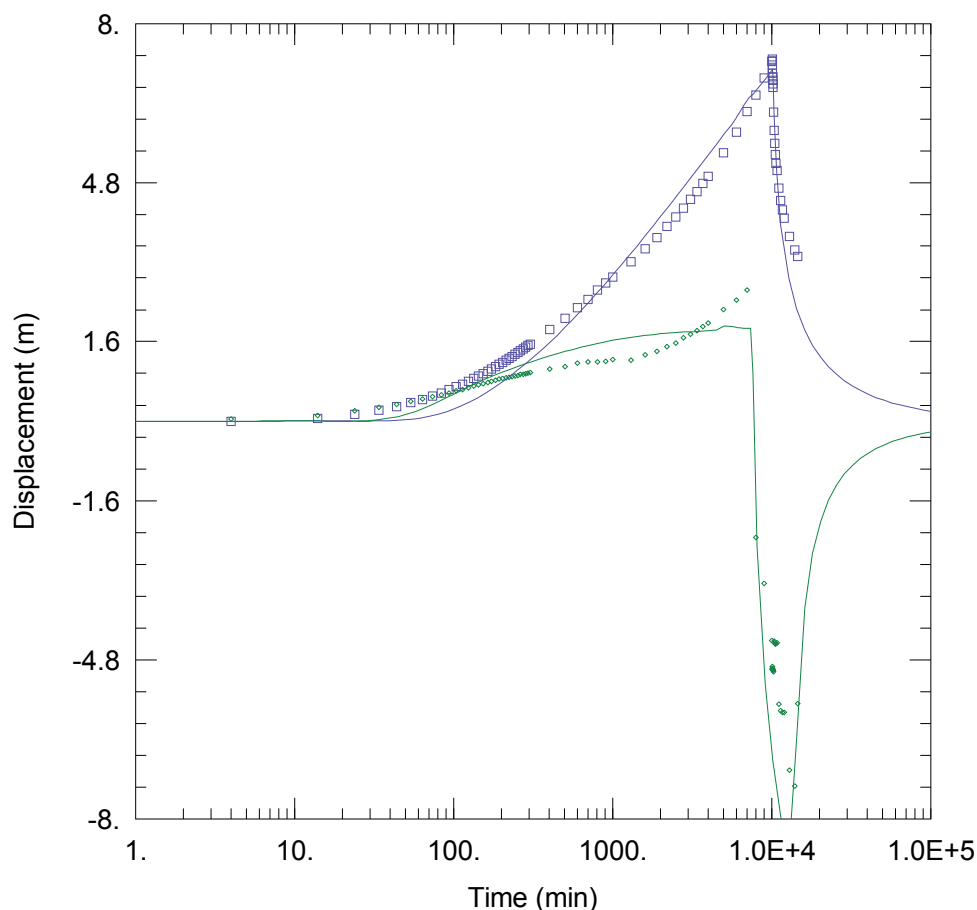
SOLUTION

Aquifer Model: Confined

Solution Method: Cooper-Jacob

T = 14.64 m²/day

S = 2.47E-5



WM0036L CONSTANT RATE TEST

Data Set: N:\...\WM0339_DB.aqtDate: 09/14/12Time: 14:11:57

PROJECT INFORMATION

Company: GHDClient: ShenhuaProject: 22\14551Location: EL7223Test Well: WM0036LTest Date: 9/04/2011

AQUIFER DATA

Saturated Thickness: 53. mAnisotropy Ratio (Kz/Kr): 0.003586

WELL DATA

Pumping Wells

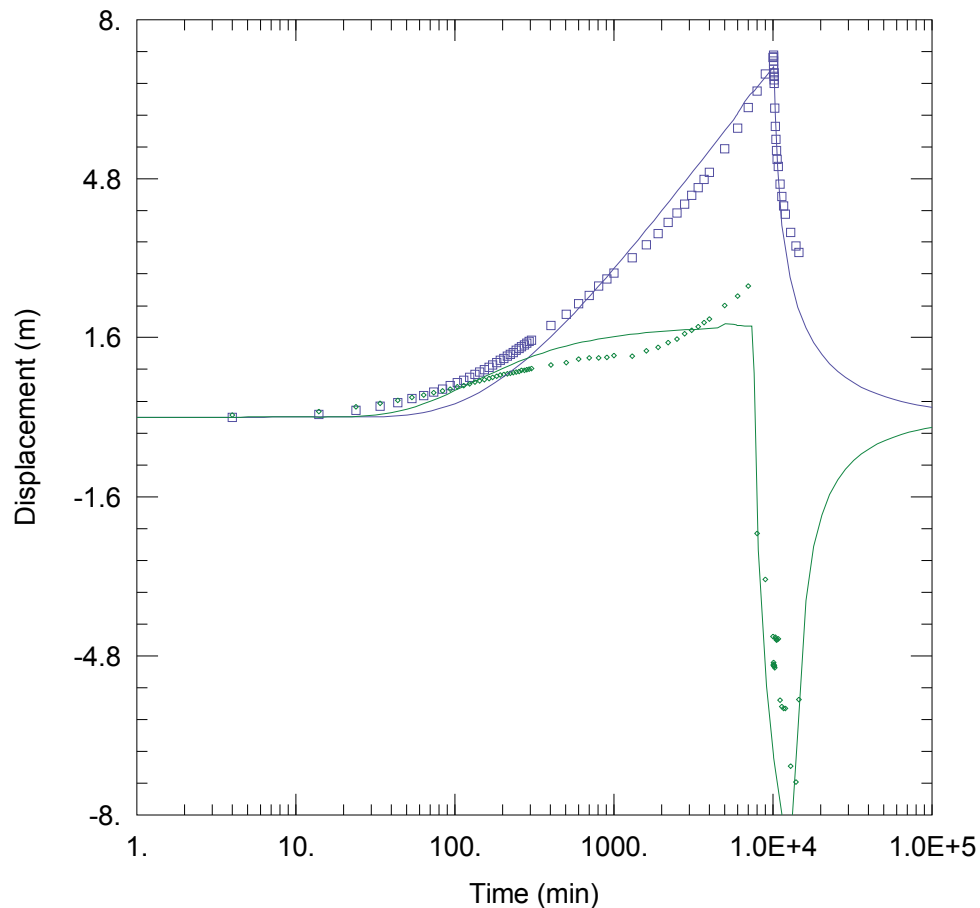
Well Name	X (m)	Y (m)
WM0036L	243510	6539991

Observation Wells

Well Name	X (m)	Y (m)
□ WM0339	243381	6539681

SOLUTION

Aquifer Model: ConfinedSolution Method: Dougherty-BabuT = 10.98 m²/dayS = 3.706E-5Kz/Kr = 0.003586Sw = -5.r(w) = 0.0875 mr(c) = 0.075 m



WM0036L CONSTANT RATE TEST

Data Set: N:\...\WM0339_F_Moench.aqt

Date: 09/14/12

Time: 14:08:48

PROJECT INFORMATION

Company: GHD

Client: Shenhua

Project: 22\14551

Location: EL7223

Test Well: WM0036L

Test Date: 9/04/2011

AQUIFER DATA

Saturated Thickness: 53. m

Aquitard Thickness (b'): 1. m

Anisotropy Ratio (Kz/Kr): 2.492E-7

Aquitard Thickness (b''): 1. m

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WM0036L	243510	6539991

Observation Wells

Well Name	X (m)	Y (m)
□ WM0339	243381	6539681

SOLUTION

Aquifer Model: Leaky

T = 11.23 m²/day

r/B' = 1.0E-5

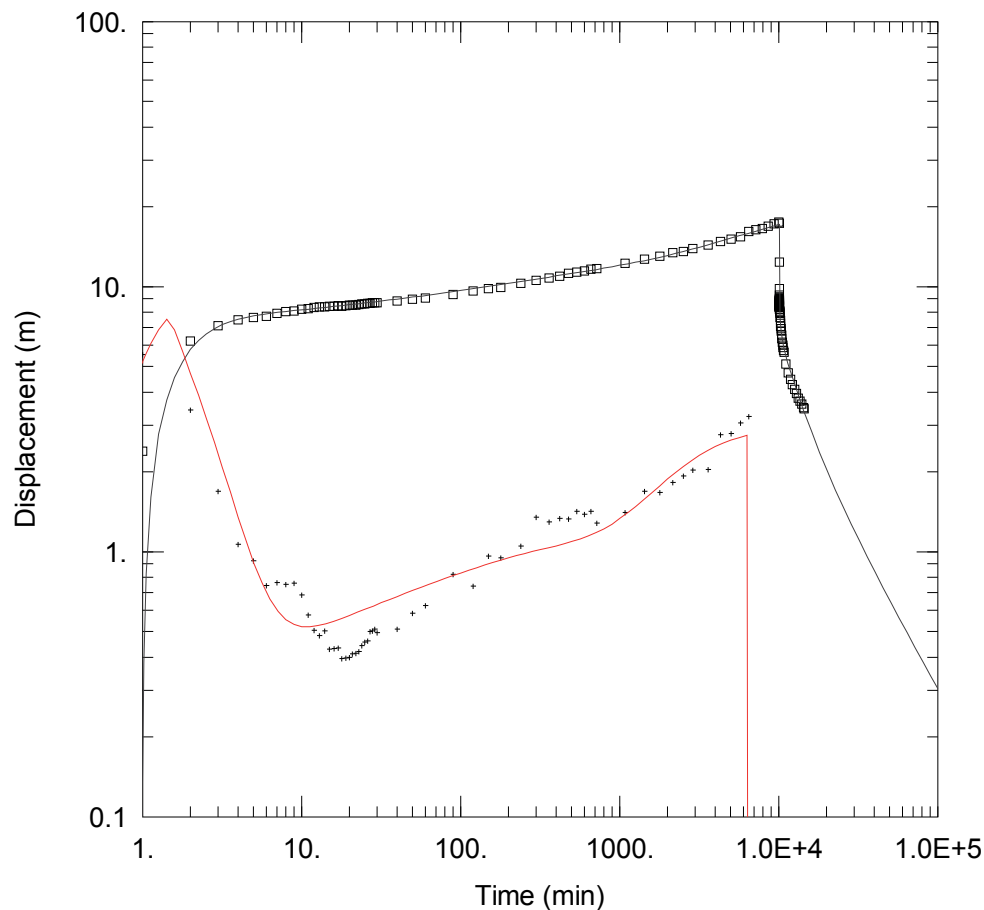
r/R'' = 0

Solution Method: Moench (Case 3)

S = 3.452E-5

B' = 1.0E-5

R'' = 0



WM0036L CONSTANT RATE TEST

Data Set: N:\...\WM0036L_F_Moench.aqtDate: 09/14/12Time: 14:03:09

PROJECT INFORMATION

Company: GHDClient: ShenhuaProject: 22\14551Location: EL7223Test Well: WM0036LTest Date: 9/04/2011

AQUIFER DATA

Saturated Thickness: 53. mSlab Block Thickness: 1. m

WELL DATA

Pumping Wells

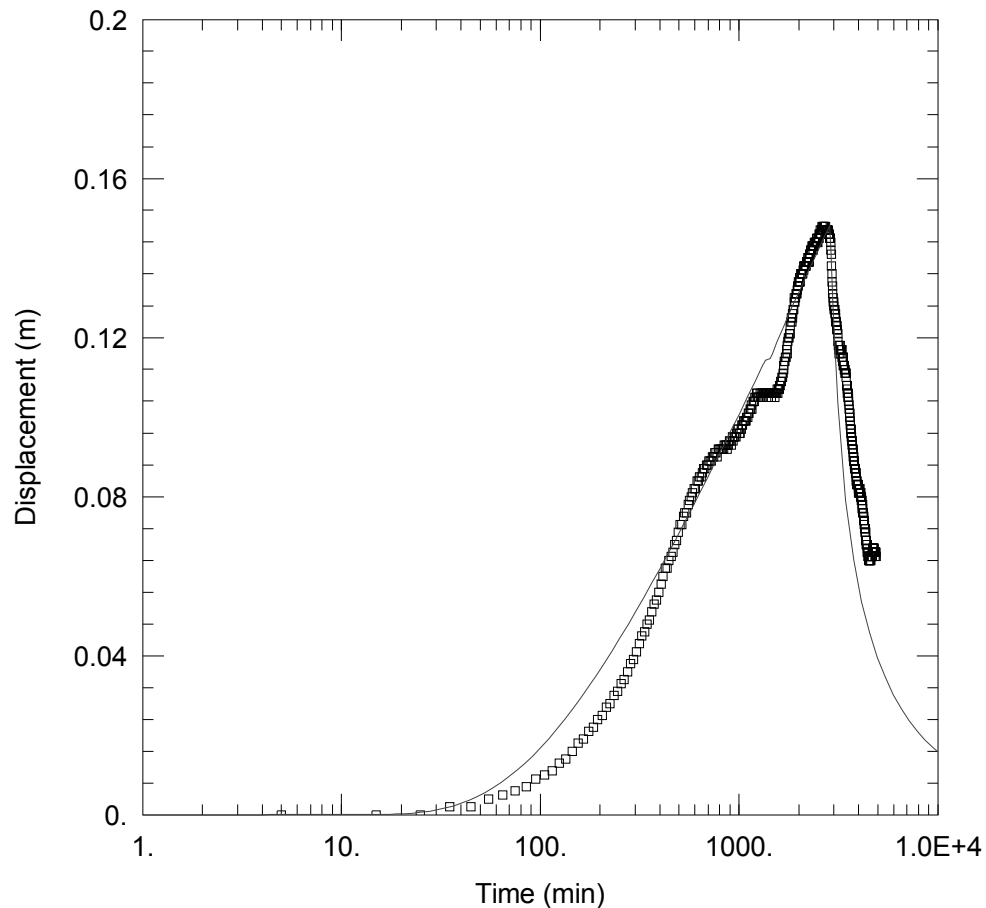
Well Name	X (m)	Y (m)
WM0036L	243510	6539991

Observation Wells

Well Name	X (m)	Y (m)
□ WM0036L	243510	6539991

SOLUTION

Aquifer Model: FracturedSolution Method: Moench w/slab blocksK = 0.7577 m/daySs = 0.0005591 m⁻¹K' = 0.5631 m/daySs' = 0.2511 m⁻¹Sw = -1.518Sf = 0.125r(w) = 0.0875 mr(c) = 0.075 m



WM0060LR PUMPING TEST

Data Set: N:\...\SolarBore_CJ_Unconfined.aqt

Date: 09/14/12

Time: 16:37:13

PROJECT INFORMATION

Company: GHD

Client: Shenhua

Project: 2214551

Location: Watermark

Test Well: WM0060LR

Test Date: 26/11/2009

AQUIFER DATA

Saturated Thickness: 16.89 m

Aquitard Thickness (b'): 1. m

Anisotropy Ratio (Kz/Kr): 1.613E-7

Aquitard Thickness (b''): 1. m

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WM0060LR	251502.04	6540667.47

Observation Wells

Well Name	X (m)	Y (m)
□ Solar Bore	251502.04	6540800.47

SOLUTION

Aquifer Model: Leaky

T = 1.673 m²/min

r/B' = 0.00311

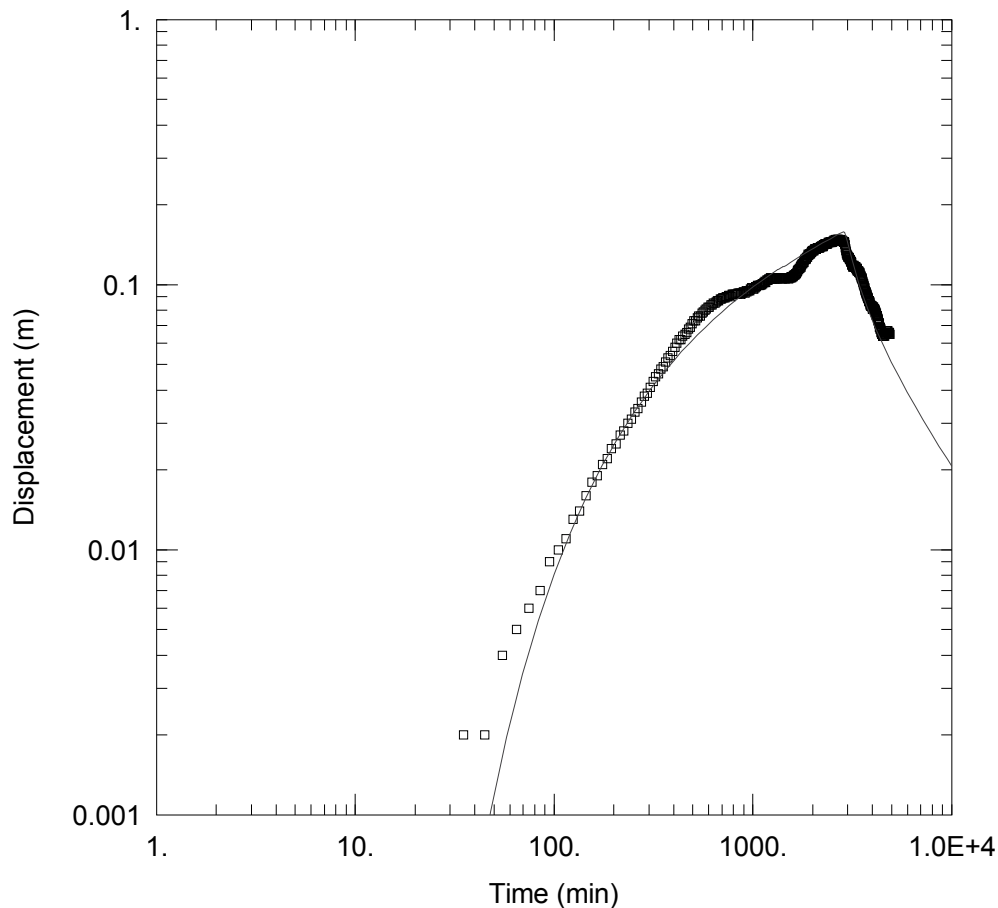
r/R'' = 0

Solution Method: Moench (Case 3)

S = 0.02742

B' = 1.0E-5

R'' = 0



WM0060LR PUMPING TEST

Data Set: N:\...\SolarBore_Neuman.aqtDate: 09/14/12Time: 17:02:12

PROJECT INFORMATION

Company: GHDClient: ShenhuaProject: 2214551Location: WatermarkTest Well: WM0060LRTest Date: 26/11/2009

AQUIFER DATA

Saturated Thickness: 16.89 mAnisotropy Ratio (K_z/K_r): 2.262E-5

WELL DATA

Pumping Wells

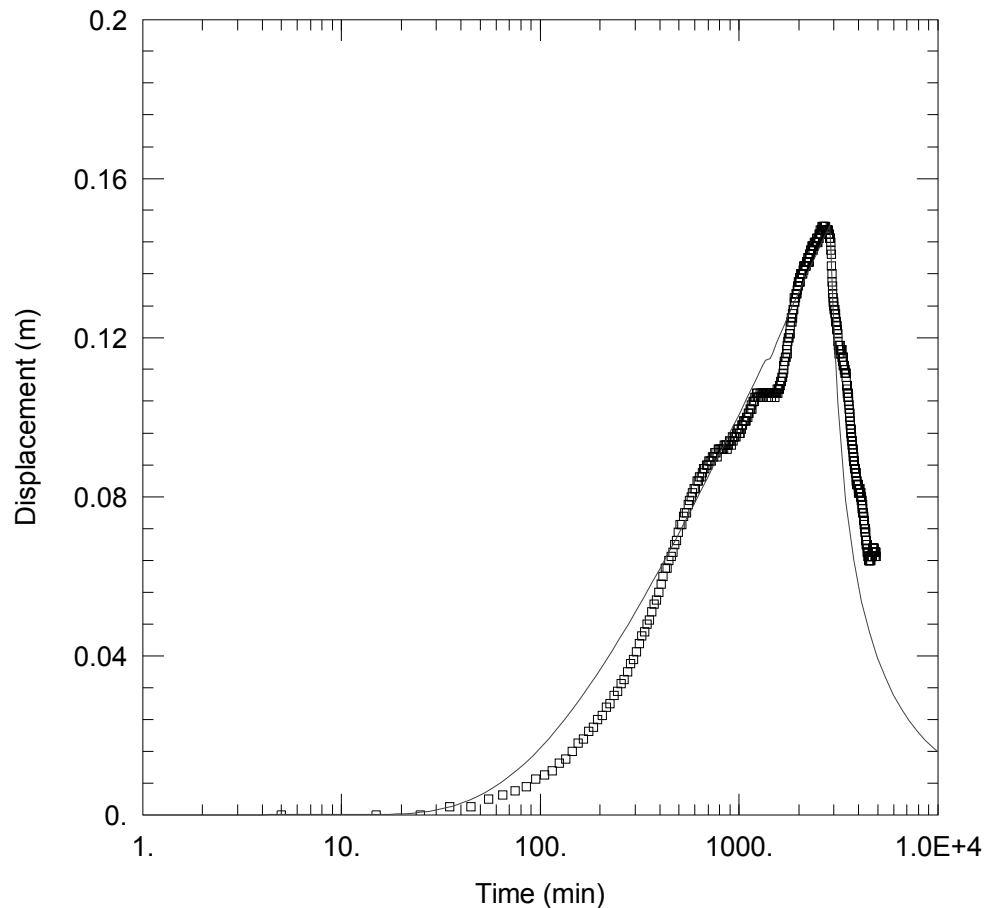
Well Name	X (m)	Y (m)
WM0060LR	251502.04	6540667.47

Observation Wells

Well Name	X (m)	Y (m)
□ GW043938	251502.04	6540800.47

SOLUTION

Aquifer Model: UnconfinedSolution Method: MoenchT = 1.266 m²/minS = 0.03781Sy = 0.001 β = 0.001403Sw = 0.r(w) = 1. mr(c) = 0.05 malpha = 1.0E+30 min⁻¹



WM0060LR PUMPING TEST

Data Set: N:\...\SolarBore_Mench(C3)_Unconfined.aqt

Date: 09/14/12

Time: 16:40:30

PROJECT INFORMATION

Company: GHD

Client: Shenhua

Project: 2214551

Location: Watermark

Test Well: WM0060LR

Test Date: 26/11/2009

AQUIFER DATA

Saturated Thickness: 16.89 m

Aquitard Thickness (b'): 1. m

Anisotropy Ratio (Kz/Kr): 1.613E-7

Aquitard Thickness (b''): 1. m

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WM0060LR	251502.04	6540667.47

Observation Wells

Well Name	X (m)	Y (m)
□ Solar Bore	251502.04	6540800.47

SOLUTION

Aquifer Model: Leaky

$T = 1.673 \text{ m}^2/\text{min}$

$r/B' = 0.00311$

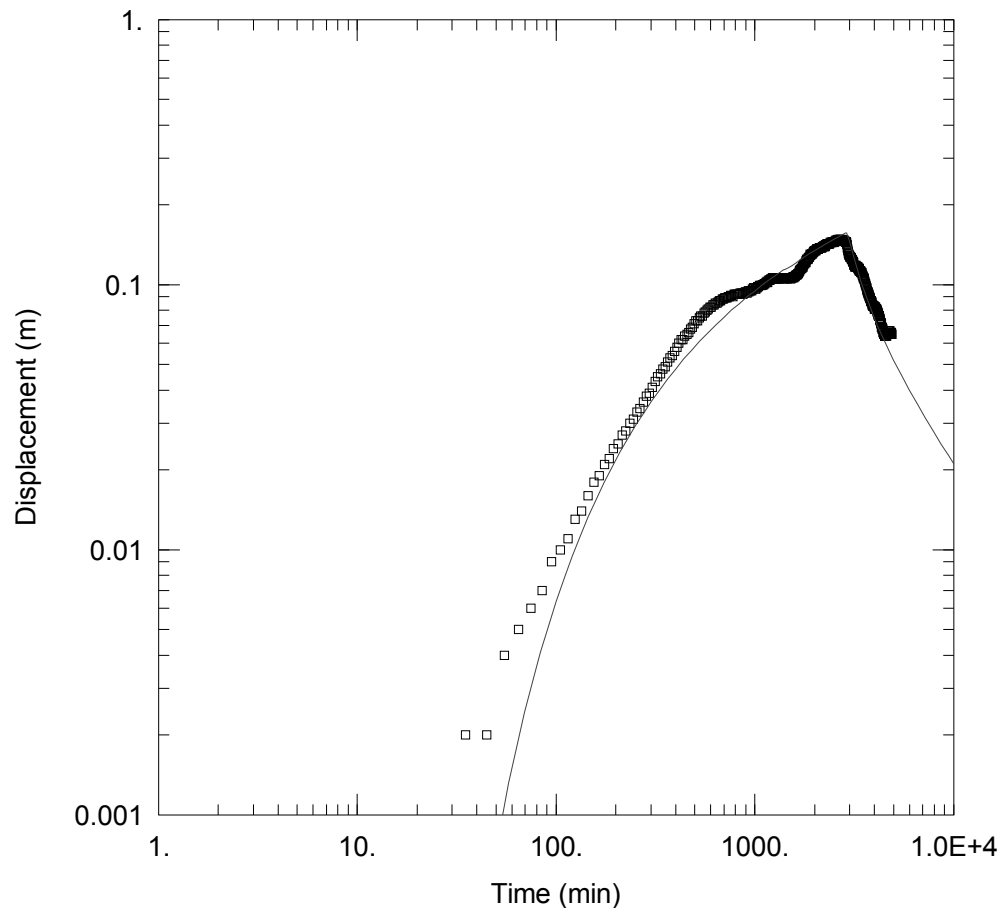
$r/R'' = 0$

Solution Method: Moench (Case 3)

$S = 0.02742$

$\beta' = 1.0E-5$

$R'' = 0$

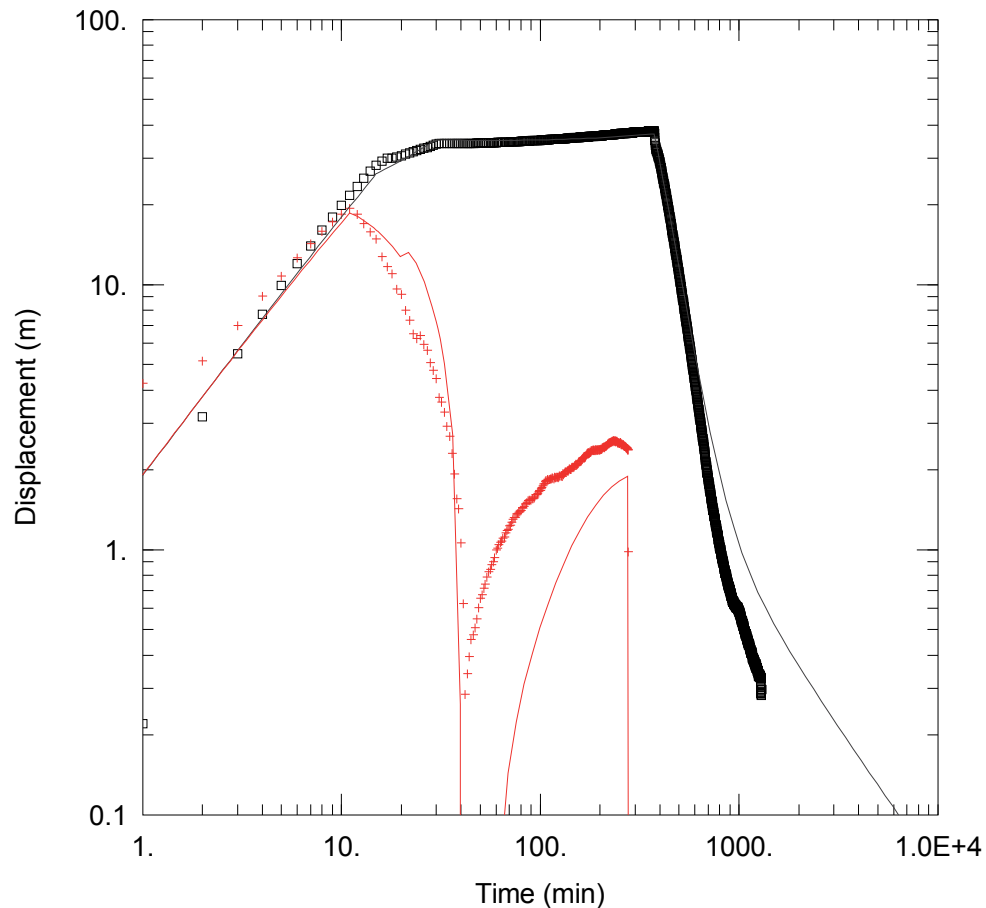
WM0060LR PUMPING TESTData Set: N:\...\SolarBore_Neuman.aqtDate: 09/14/12Time: 16:43:24PROJECT INFORMATIONCompany: GHDClient: ShenhuaProject: 2214551Location: WatermarkTest Well: WM0060LRTest Date: 26/11/2009AQUIFER DATASaturated Thickness: 16.89 mWELL DATAPumping Wells

Well Name	X (m)	Y (m)
WM0060LR	251502.04	6540667.47

Observation Wells

Well Name	X (m)	Y (m)
□ Solar Bore	251502.04	6540800.47

SOLUTIONAquifer Model: UnconfinedSolution Method: Neuman $T = 1.223 \text{ m}^2/\text{min}$ $S = 0.04165$ $S_y = 0.4999$ $\beta = 1.0\text{E-}5$



WM0095L PUMPTEST

Data Set: N:\...\WM0095L_PumpTest_DB.aqt

Date: 09/14/12

Time: 14:14:23

PROJECT INFORMATION

Company: GHD

Client: Shenhua

Project: 2214551

Location: EL7223

Test Well: WM0095L

Test Date: 7/4/2011

AQUIFER DATA

Saturated Thickness: 17. m

Anisotropy Ratio (Kz/Kr): 0.001

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WM095L	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ WM095L	0	0

SOLUTION

Aquifer Model: Confined

Solution Method: Dougherty-Babu

T = 0.525 m²/day

S = 1.0E-10

Kz/Kr = 0.001

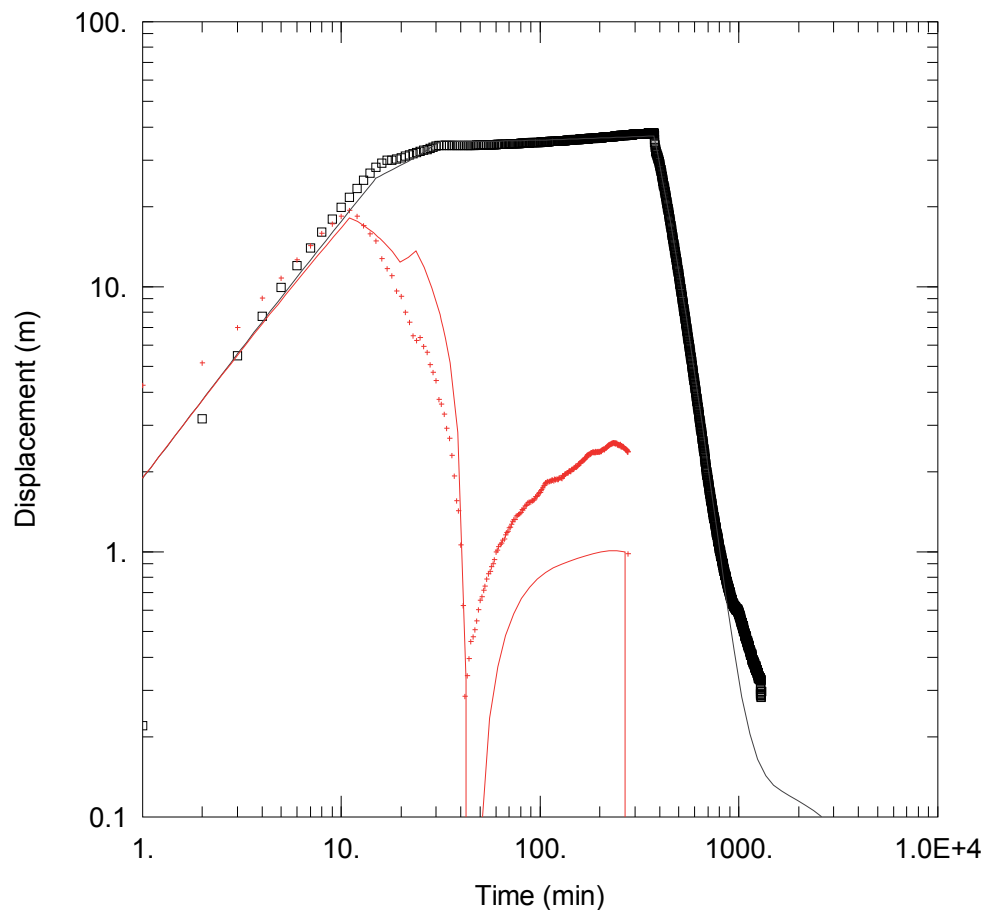
Sw = 0.5197

r(w) = 0.135 m

r(c) = 0.075 m

C = 1 min²/m⁵

P = 1.5

WM0095L_PUMPTEST

Data Set: N:\...WM0095L_PumpTest_F_Moench.aqt

Date: 09/14/12

Time: 14:15:24

PROJECT INFORMATIONCompany: GHDClient: ShenhuaProject: 2214551Location: EL7223Test Well: WM0095LTest Date: 7/4/2011AQUIFER DATASaturated Thickness: 17. mSlab Block Thickness: 1. mWELL DATAPumping Wells

Well Name	X (m)	Y (m)
WM095L	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ WM095L	0	0

SOLUTIONAquifer Model: FracturedSolution Method: Moench w/slab blocks

K = 0.007684 m/day

K' = 1.938E-6 m/day

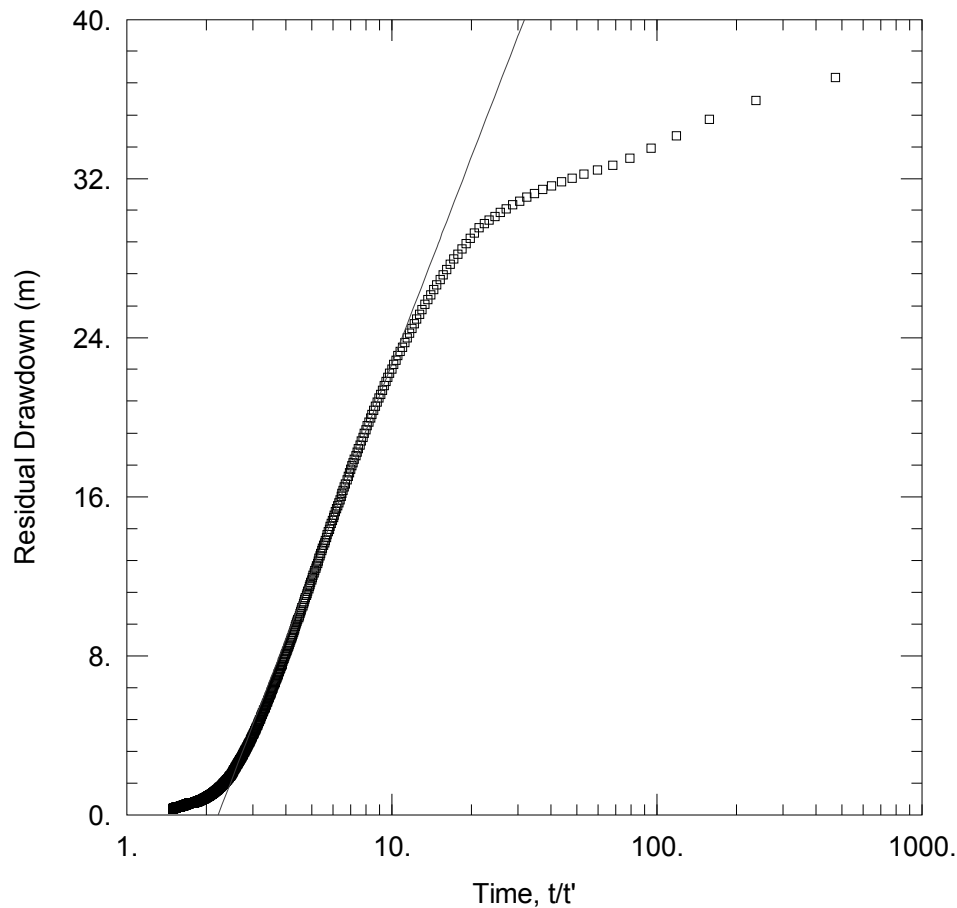
Sw = -4.495

r(w) = 0.135 m

Ss = 2.535E-9 m⁻¹Ss' = 0.0001829 m⁻¹

Sf = 0.01469

r(c) = 0.075 m



WM0095L PUMPTEST

Data Set: N:\...\WM0095L_Recovery.aqt

Date: 09/14/12

Time: 14:16:15

PROJECT INFORMATION

Company: GHD

Client: Shenhua

Project: 2214551

Location: EL7223

Test Well: WM0095L

Test Date: 7/4/2011

AQUIFER DATA

Saturated Thickness: 17. m

Anisotropy Ratio (Kz/Kr): 0.001

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WM095L	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ WM095L	0	0

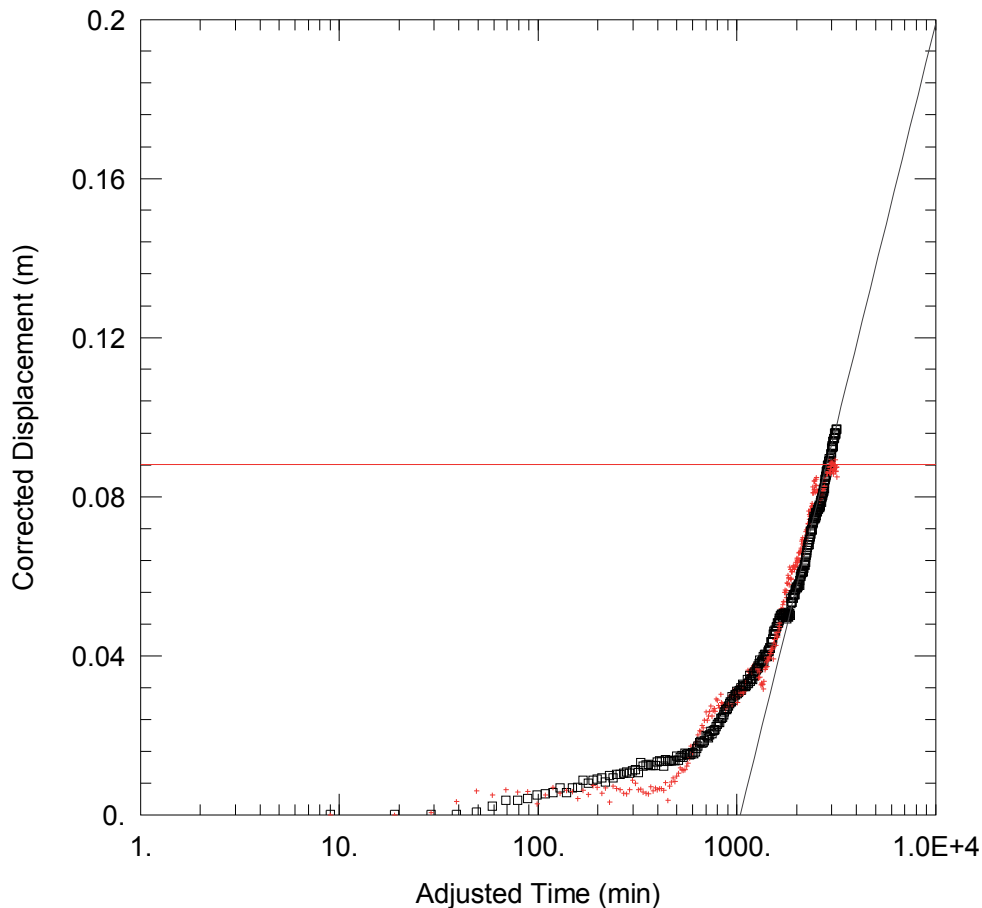
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

T = 0.04575 m²/day

S/S' = 2.215

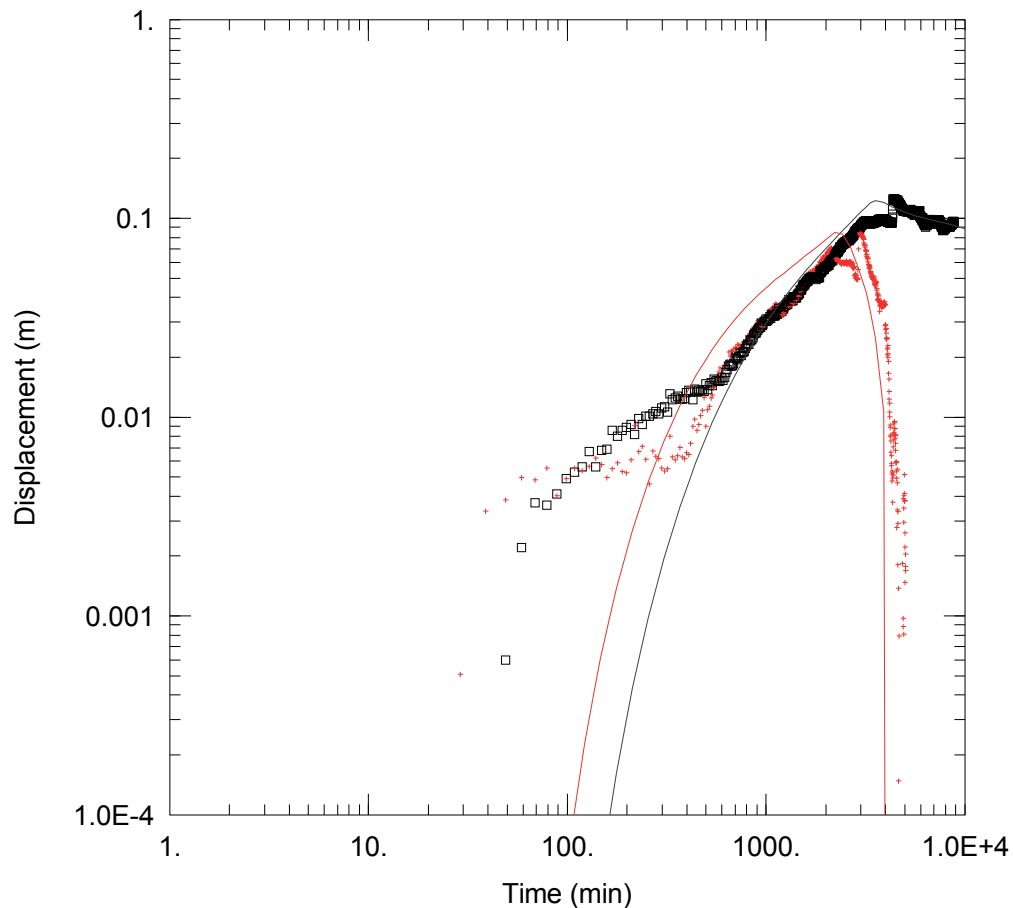
WM0157OBS_3DAY CRData Set: N:\...\WM0157_3dayCR_CJ.aqtDate: 10/24/11Time: 12:24:13PROJECT INFORMATIONCompany: GHDClient: ShenhuaProject: 2214551Location: WatermarkTest Well: WM0157LTest Date: 29/3/2011AQUIFER DATASaturated Thickness: 26. mAnisotropy Ratio (Kz/Kr): 1.WELL DATAPumping Wells

Well Name	X (m)	Y (m)
WM0157L	251073	6539973

Observation Wells

Well Name	X (m)	Y (m)
□ WM0157	251080	6539997

SOLUTIONAquifer Model: UnconfinedSolution Method: Cooper-JacobT = 15.62 m²/dayS = 0.04066



WM0157OBS_3DAY CR

Data Set: N:\...\WM0157_3dayCR_M.aqt

Date: 10/24/11

Time: 12:16:57

PROJECT INFORMATION

Company: GHD

Client: Shenhua

Project: 2214551

Location: Watermark

Test Well: WM0157L

Test Date: 29/3/2011

AQUIFER DATA

Saturated Thickness: 26. m

Anisotropy Ratio (Kz/Kr): 2.536

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WM0157L	251073	6539973

Observation Wells

Well Name	X (m)	Y (m)
□ WM0157	251080	6539997

SOLUTION

Aquifer Model: Unconfined

Solution Method: Moench

T = 1.372 m²/day

S = 0.08913

Sy = 0.0775

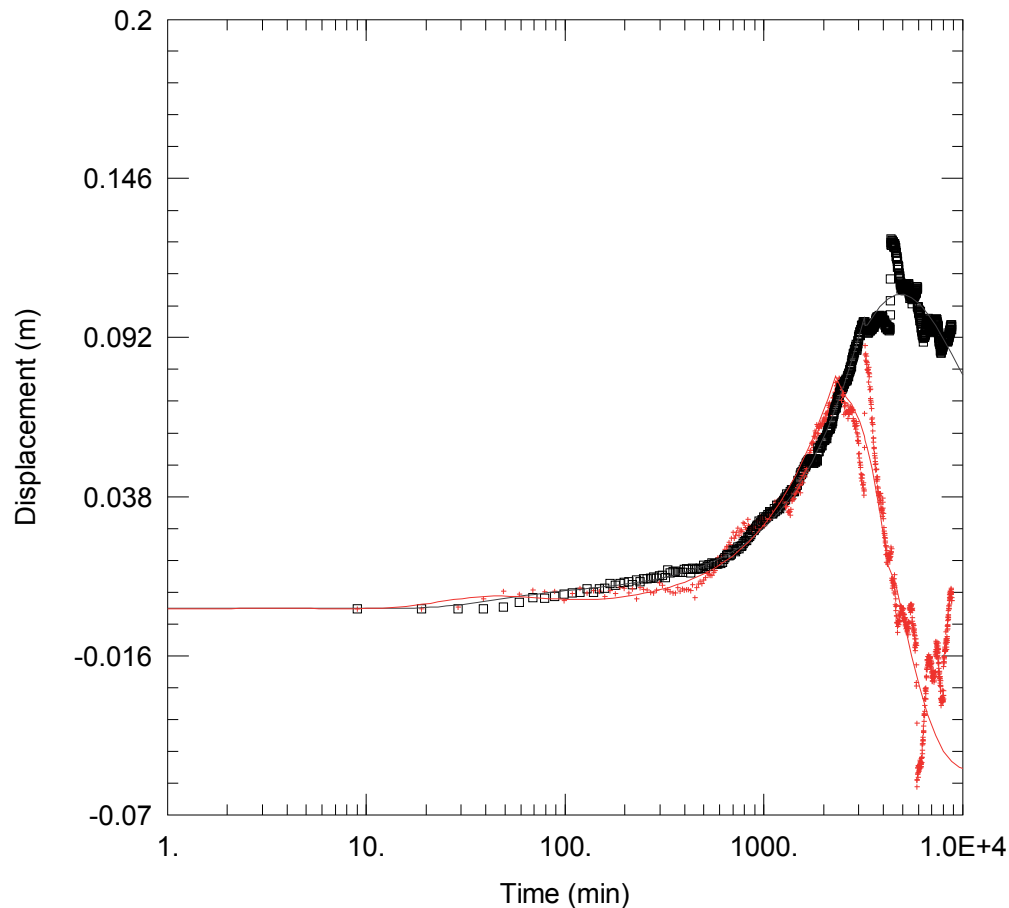
B = 2.344

Sw = -5.

r(w) = 0.135 m

r(c) = 0.075 m

alpha = 1.0E+30 min⁻¹

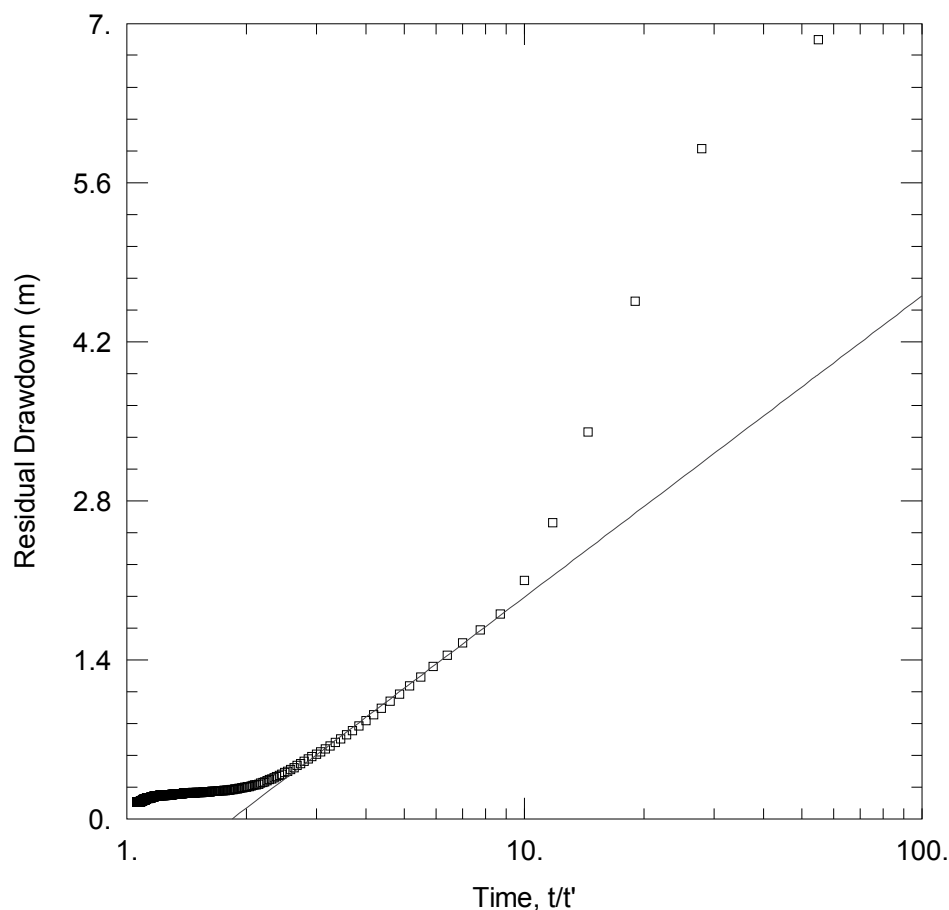
WM0157OBS_3DAY CRData Set: N:\...\WM0157_3dayCR_Nueman.aqtDate: 09/14/12Time: 16:16:18PROJECT INFORMATIONCompany: GHDClient: ShenhuaProject: 2214551Location: WatermarkTest Well: WM0157LTest Date: 29/3/2011AQUIFER DATASaturated Thickness: 12. mWELL DATAPumping Wells

Well Name	X (m)	Y (m)
WM0157L	251073	6539973

Observation Wells

Well Name	X (m)	Y (m)
□ WM0157	251080	6539997

SOLUTIONAquifer Model: UnconfinedSolution Method: NeumanT = 4.632 m²/dayS = 0.001585Sy = 0.05361β = 4.961



WM0157L_RECOVERY

Data Set: N:\...\WM0157L_RECOVERY.aqt

Date: 10/24/11

Time: 12:25:10

PROJECT INFORMATION

Company: GHDClient: ShenhuaProject: 2214551Location: WatermarkTest Well: WM0157LTest Date: 28/3/2011

AQUIFER DATA

Saturated Thickness: 12. mAnisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

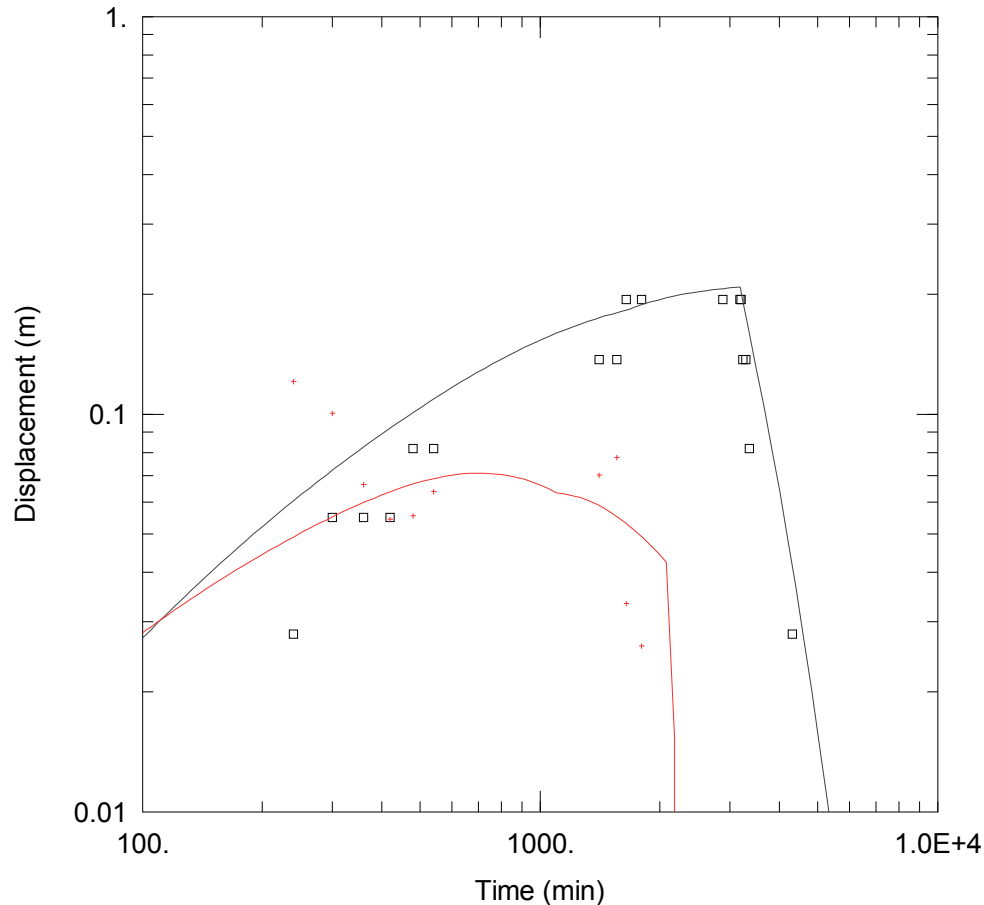
Well Name	X (m)	Y (m)
WM0157L	251073	6539973

Observation Wells

Well Name	X (m)	Y (m)
□ WM0157L	251073	6539973

SOLUTION

Aquifer Model: ConfinedSolution Method: Theis (Recovery)T = 1.194 m²/dayS/S' = 1.845

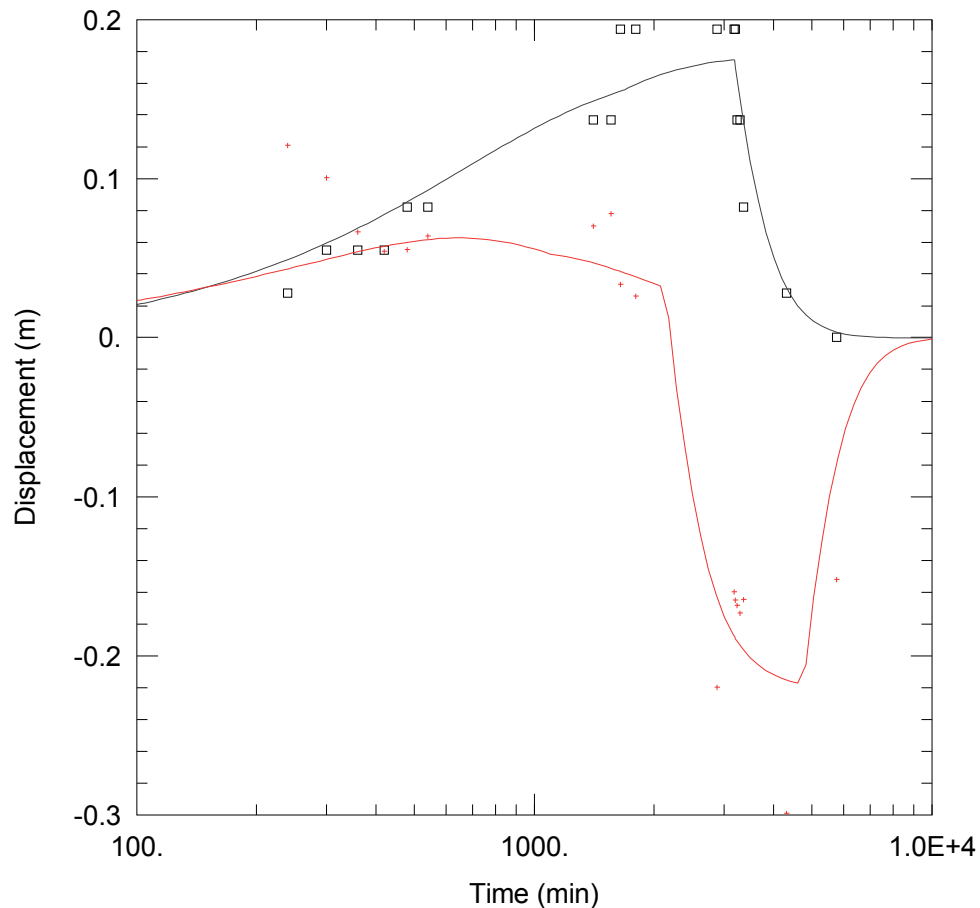
WM0157_V03Data Set: N:\...\WM0157V03_CJ.aqtDate: 09/14/12Time: 16:30:25PROJECT INFORMATIONCompany: GHDClient: ShenhuaProject: 2214551Location: WatermarkTest Well: WM0157LTest Date: 29/3/2011AQUIFER DATASaturated Thickness: 26. mAquitard Thickness (b'): 1. mAnisotropy Ratio (Kz/Kr): 0.001008Aquitard Thickness (b''): 1. mWELL DATAPumping Wells

Well Name	X (m)	Y (m)
WM0157L	251073	6539973

Observation Wells

Well Name	X (m)	Y (m)
□ WM0157_V03	251080.21	6539997.32

SOLUTIONAquifer Model: LeakySolution Method: Hantush $T = 2.968 \text{ m}^2/\text{day}$ $S = 4.317\text{E-}5$ $r/B' = 1.485$ $\beta' = 6.983$ $r/R'' = 0$ $R'' = 0$



WM0157_V03

Data Set: N:\...\WM0157V03_CJ.aqt

Date: 09/14/12

Time: 16:23:21

PROJECT INFORMATION

Company: GHD

Client: Shenhua

Project: 2214551

Location: Watermark

Test Well: WM0157L

Test Date: 29/3/2011

AQUIFER DATA

Saturated Thickness: 26. m

Aquitard Thickness (b'): 1. m

Anisotropy Ratio (Kz/Kr): 0.001008

Aquitard Thickness (b''): 1. m

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WM0157L	251073	6539973

Observation Wells

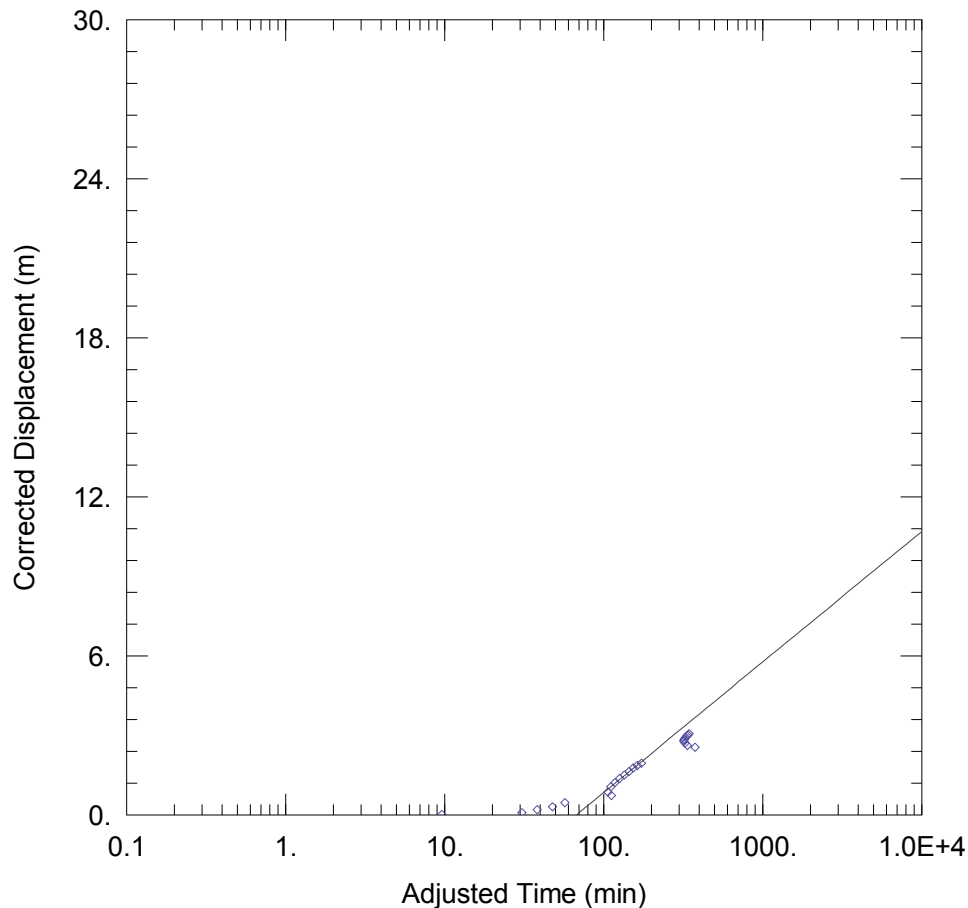
Well Name	X (m)	Y (m)
WM0157_V03	251080.21	6539997.32

SOLUTION

Aquifer Model: Leaky

Solution Method: Neuman-Witherspoon

 $T = 2.79 \text{ m}^2/\text{day}$ $S = 3.57\text{E-}5$ $r/B = 1.676$ $\beta = 8.779$ $T2 = 1.44\text{E+}8 \text{ m}^2/\text{day}$ $S2 = 1.0\text{E-}10$

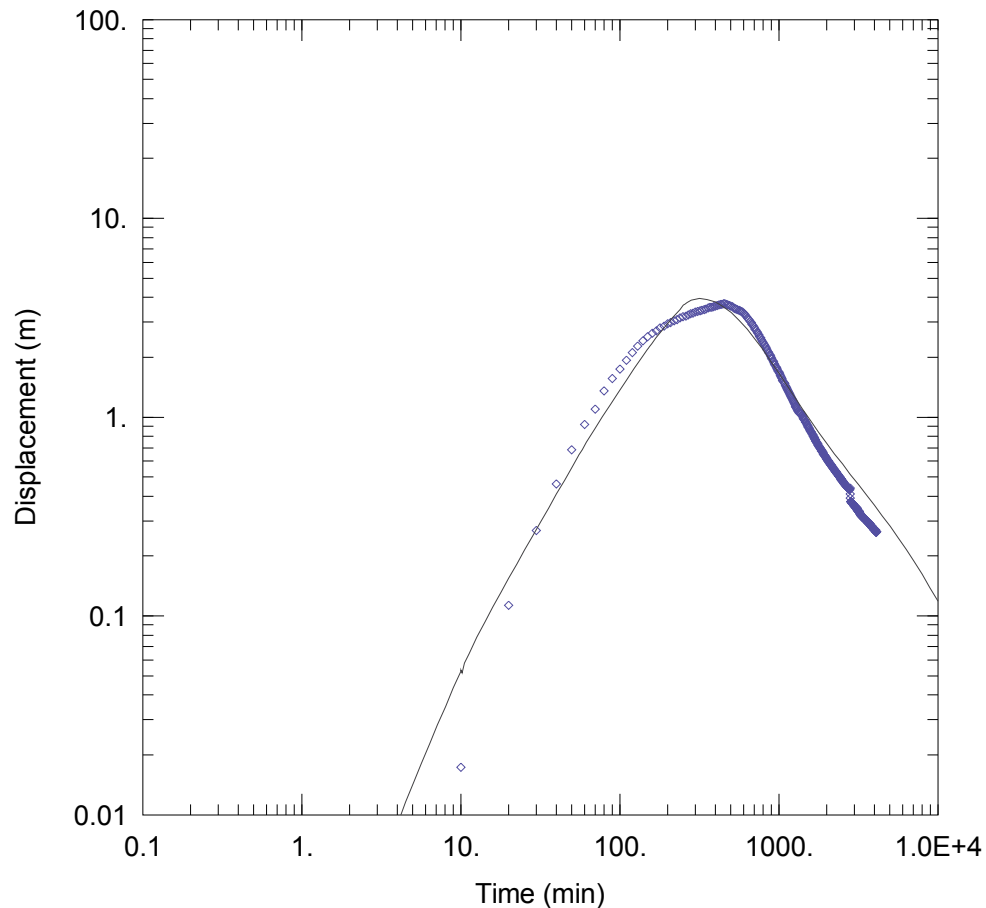
WM0363_PUMPING TESTData Set: N:\...\WM0363A_cooperjacob.aqtDate: 05/15/12Time: 15:16:04PROJECT INFORMATIONCompany: GHDClient: ShenhuaProject: 2214551Location: WatermarkTest Well: WM0363Test Date: 6/4/2011AQUIFER DATASaturated Thickness: 35. mAnisotropy Ratio (Kz/Kr): 0.3548WELL DATAPumping Wells

Well Name	X (m)	Y (m)
WM0363L	0	0

Observation Wells

Well Name	X (m)	Y (m)
◊ WM0363A	6.5	0

SOLUTIONAquifer Model: UnconfinedSolution Method: Cooper-JacobT = 0.1286 m²/dayS = 0.0003223



WM0363_PUMPING TEST

Data Set: N:\...\WM0363A_moench.aqt

Date: 09/14/12

Time: 15:55:41

PROJECT INFORMATION

Company: GHD

Client: Shenhua

Project: 2214551

Location: Watermark

Test Well: WM0363

Test Date: 6/4/2011

AQUIFER DATA

Saturated Thickness: 35. m

Anisotropy Ratio (Kz/Kr): 29.52

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WM0363L	0	0

Observation Wells

Well Name	X (m)	Y (m)
◊ WM0363A	6.5	0

SOLUTION

Aquifer Model: Unconfined

Solution Method: Moench

T = 0.01795 m²/day

S = 0.009273

Sy = 0.5

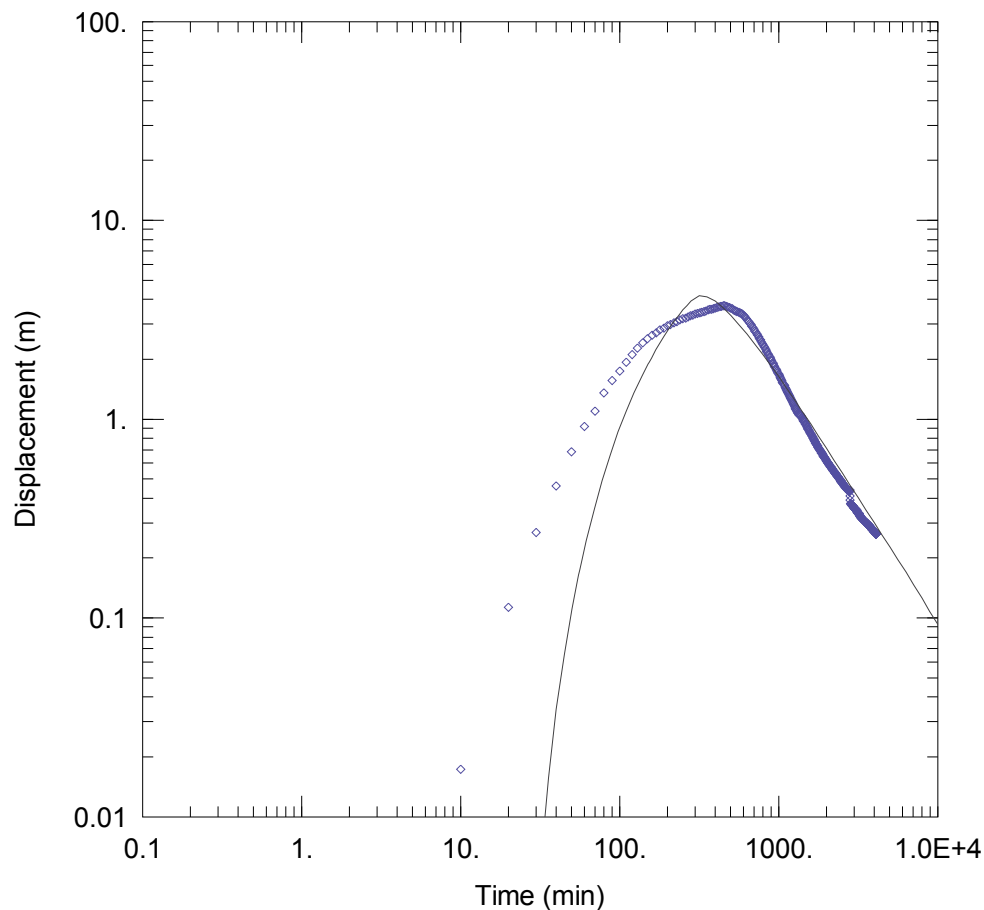
Kz/Kr = 29.52

Sw = -3.873

r(w) = 0.135 m

r(c) = 0.075 m

alpha = 9.736E+7 min⁻¹



WM0363_PUMPING TEST

Data Set: N:\...\WM0363A_Neuman.aqtDate: 09/14/12Time: 15:57:32

PROJECT INFORMATION

Company: GHDClient: ShenhuaProject: 2214551Location: WatermarkTest Well: WM0363Test Date: 6/4/2011

AQUIFER DATA

Saturated Thickness: 35. m

WELL DATA

Pumping Wells

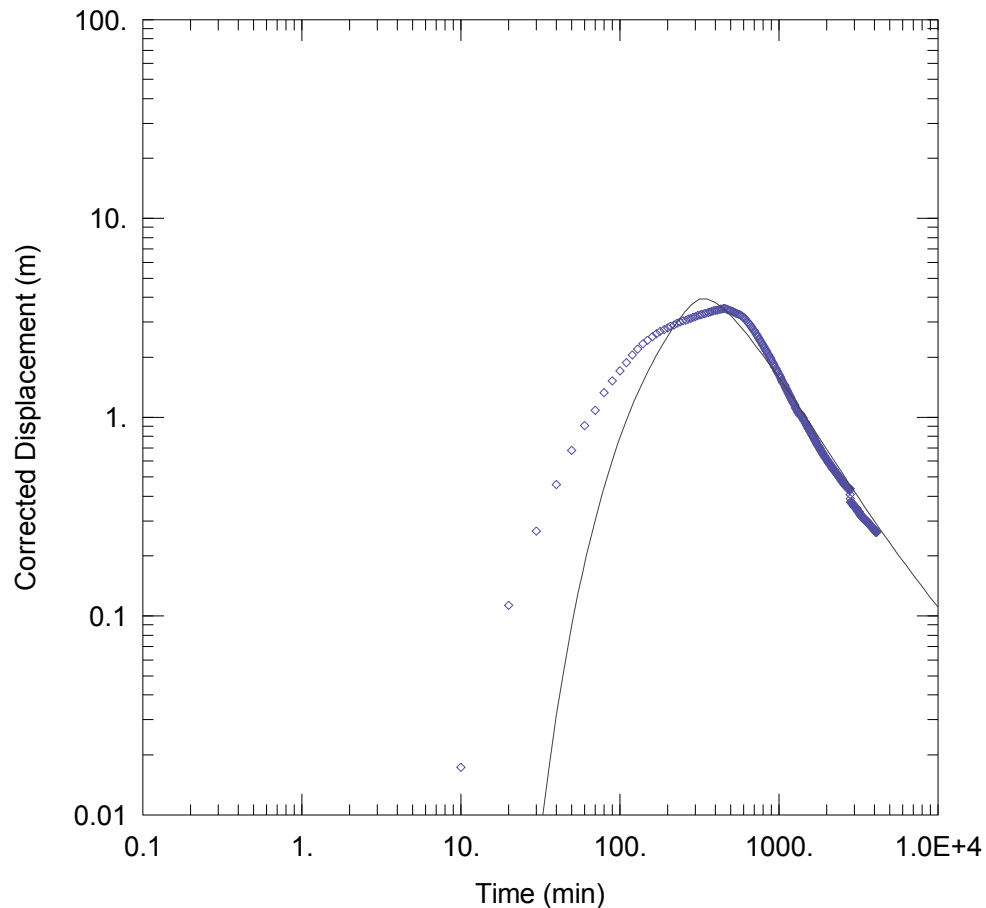
Well Name	X (m)	Y (m)
WM0363L	0	0

Observation Wells

Well Name	X (m)	Y (m)
◊ WM0363A	6.5	0

SOLUTION

Aquifer Model: UnconfinedSolution Method: NeumanT = 0.07936 m²/dayS = 0.0008999Sy = 0.5Kz/Kr = 67.22



WM0363_PUMPING TEST

Data Set: N:\...\WM0363A.aqtDate: 05/15/12Time: 15:00:42

PROJECT INFORMATION

Company: GHDClient: ShenhuaProject: 2214551Location: WatermarkTest Well: WM0363Test Date: 6/4/2011

WELL DATA

Pumping Wells

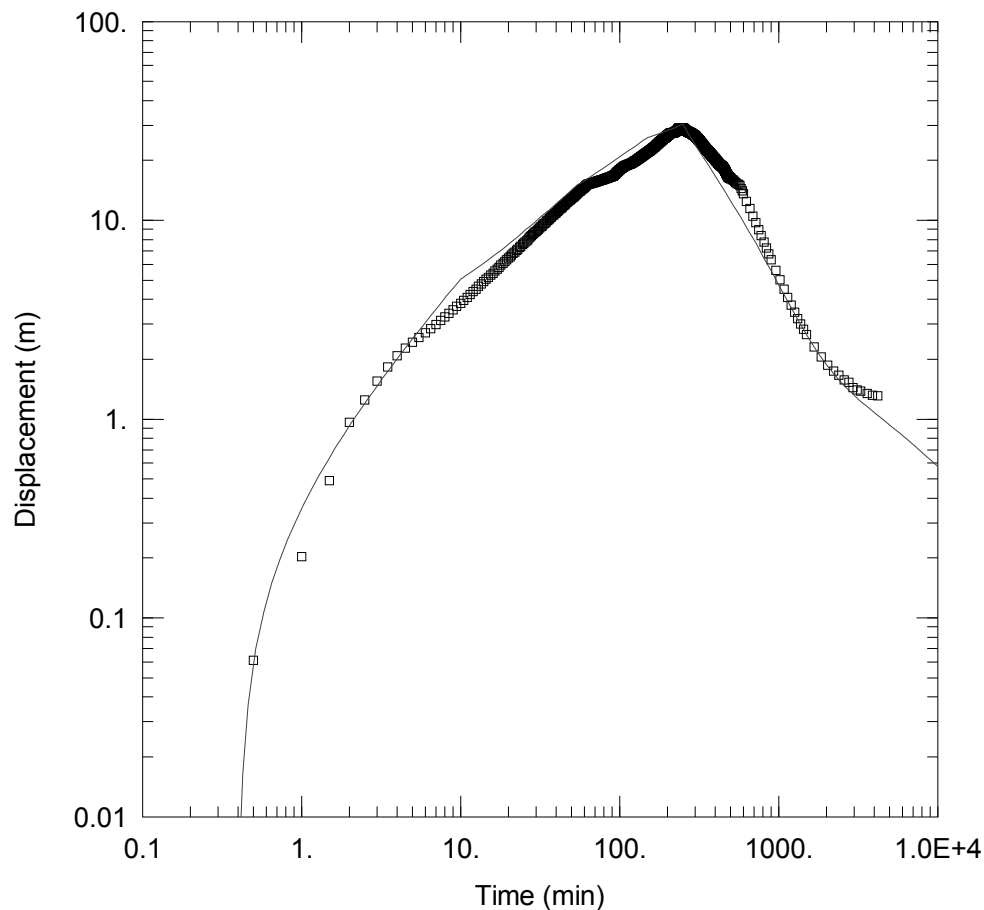
Well Name	X (m)	Y (m)
WM0363L	0	0

Observation Wells

Well Name	X (m)	Y (m)
◊ WM0363A	6.5	0

SOLUTION

Aquifer Model: UnconfinedSolution Method: TheisT = 0.07845 m²/dayS = 0.000941Kz/Kr = 0.3548b = 35. m

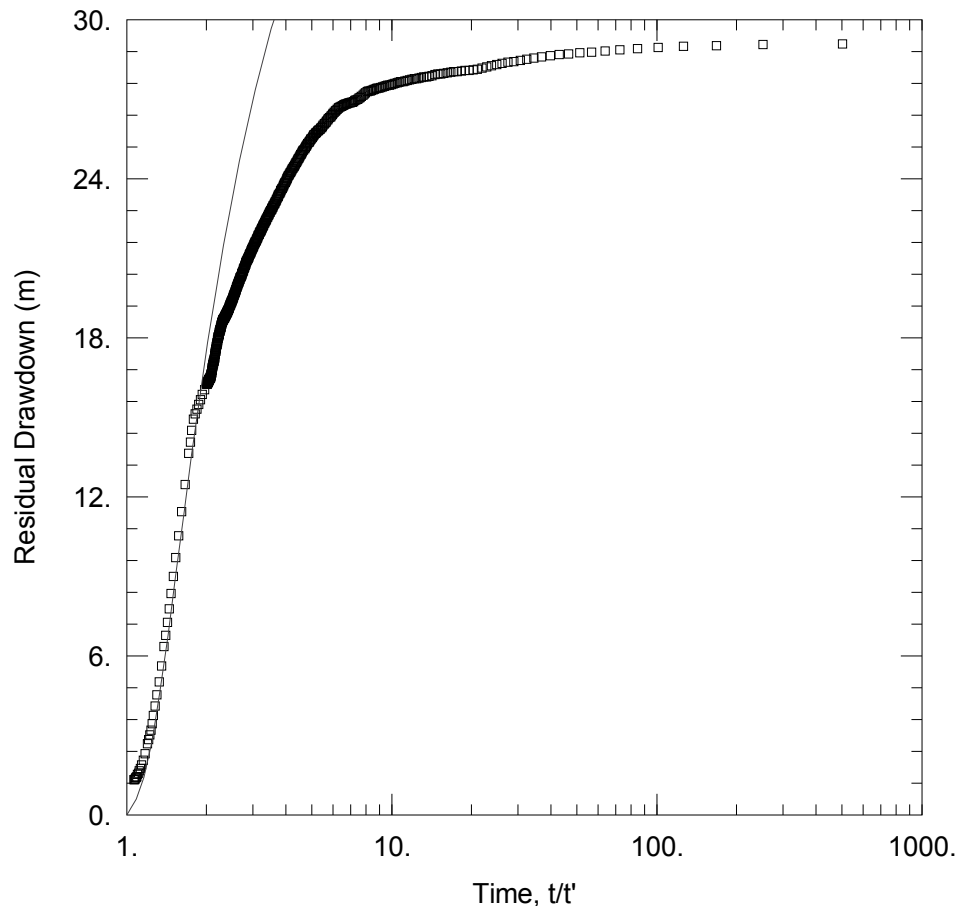
WM0363_PUMPING TESTData Set: N:\...\WM0363L.aqtDate: 10/24/11Time: 11:59:30PROJECT INFORMATIONCompany: GHDClient: ShenhuaProject: 2214551Location: WatermarkTest Well: WM0363Test Date: 6/4/2011AQUIFER DATASaturated Thickness: 35. mAnisotropy Ratio (Kz/Kr): 288.4WELL DATAPumping Wells

Well Name	X (m)	Y (m)
WM0363L	251627	6543026

Observation Wells

Well Name	X (m)	Y (m)
□ WM0363L	251627	6543026

SOLUTIONAquifer Model: UnconfinedSolution Method: MoenchT = 0.0109 m²/dayS = 0.003467Sy = 0.007082Kz/Kr = 288.4Sw = -2.303r(w) = 0.135 mr(c) = 0.075 malpha = 1.0E+30 min⁻¹



WM0363_PUMPING TEST

Data Set: N:\...\WM0363L_resid_DD.aqtDate: 10/24/11Time: 12:00:23

PROJECT INFORMATION

Company: GHDClient: ShenhuaProject: 2214551Location: WatermarkTest Well: WM0363Test Date: 6/4/2011

AQUIFER DATA

Saturated Thickness: 35. mAnisotropy Ratio (Kz/Kr): 1000.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WM0363L	251627	6543026

Observation Wells

Well Name	X (m)	Y (m)
□ WM0363L	251627	6543026

SOLUTION

Aquifer Model: UnconfinedSolution Method: MoenchT = 0.05563 m²/dayS = 0.4197Sy = 0.001Kz/Kr = 1000.Sw = 1.9r(w) = 0.135 mr(c) = 0.075 malpha = 1.0E+30 min⁻¹



Appendix K

Slug Test Analyses and Summary of Results



Slug Test Summary

Shenhua Hydrogeological Data Analysis Stage 4 report

Groundwater Monitoring Bore	Monitored Geological Formation	Date	Analytical Solution (m/day)				Average K (m/day)	Comments
			Bouwer Rice	Hvorslev	Springer-Gelhar	KGS	Bulter Zhan	
WM0002A	Narrabri Fm	30/06/2010	3.45E-01	-	-	2.46E-01	-	2.95E-01
WM0011	Narrabri Fm	17/09/2011	1.20E-01	1.40E-01	-	-	-	1.30E-01
WM0091A	Narrabri Fm	17/09/2011	3.00E-02	5.80E-02	-	-	-	4.40E-02
WM0092A	Narrabri Fm	17/09/2011	1.47E-01	1.66E-01	-	-	-	1.57E-01
WM0093B	Narrabri Fm	10/04/2011	2.90E+00	3.38E+00	-	-	-	3.14E+00
WM0288A	Narrabri Fm	17/06/2011	3.00E-03	3.00E-03	-	-	-	3.00E-03
WM0365	Narrabri Fm	26/04/2011	1.75E-01	2.28E-01	-	-	-	2.01E-01
WM0424	Narrabri Fm	3/06/2011	4.60E-01	5.41E-01	-	-	-	5.01E-01
WM0425A	Narrabri Fm	27/05/2011	4.33E-01	4.86E-01	-	-	-	4.60E-01
WM0426A	Narrabri Fm	4/06/2011	5.10E-02	6.60E-02	-	-	-	5.85E-02
WM0428A	Narrabri Fm	17/06/2011	5.37E-01	6.94E-01	-	-	-	6.16E-01
WM0429A	Narrabri Fm	20/05/2011	1.80E-02	2.70E-02	-	-	-	2.25E-02
WM0430A	Narrabri Fm	21/05/2011	3.54E-01	4.76E-01	-	-	-	4.15E-01
WM0431A	Narrabri Fm	22/05/2011	7.00E-03	1.00E-02	-	-	-	8.50E-03
WM0432A	Narrabri Fm	22/05/2011	2.00E-02	2.40E-02	-	-	-	2.20E-02
WM0433	Narrabri Fm	22/05/2011	5.30E-02	6.60E-02	-	-	-	5.95E-02
WM0093A	Gunnedah Fm	17/09/2011	4.09E+00	4.95E+00	-	4.19E+00	-	Springer-Gelhar Model: N/A (critically damped)
WM0291	Gunnedah Fm	31/08/2010	-	8.55E+00	7.90E+00	5.83E+00	6.54E+00	7.21E+00
WM0427A	Gunnedah Fm	3/06/2011	-	-	2.85E+01	-	-	2.85E+01
WM0562	Gunnedah Fm (base)	22/10/2011	1.93E+00	1.64E+00	-	-	-	1.79E+00
WM0563	Gunnedah Fm (mid)	22/10/2011	-	-	6.18E+00	-	-	6.18E+00
WM0035A	Palaechannel Deposit	11/11/2009	4.70E-04	6.20E-04	-	-	-	5.45E-04
WM0293A	Palaechannel Deposit	8/08/2010	7.57E-03	7.38E-03	-	-	-	7.47E-03
WM0222A	Basalt	9/04/2011	8.10E-01	1.03E+00	-	-	-	9.20E-01
WM0350	Dolerite	8/04/2011	1.22E-02	1.24E-02	-	-	-	1.23E-02
WM0067A	Digby Formation	27/03/2010	2.80E-02	3.50E-02	-	-	-	3.15E-02
WM0398	Wallala Fm	16/12/2010	5.90E-01	5.60E-01	-	-	-	5.75E-01
WM0291B	Weathered Coogal Gp above Howes Hill Upper Coal	7/09/2011	-	-	7.57E+00	-	-	7.57E+00
WM0364	Weathered Coogal Gp above Howes Hill Upper Coal	17/09/2011	3.74E+00	4.77E+00	-	3.39E+00	-	3.97E+00
WM0021	Benelabri Fm above CLR	7/04/2011	-	-	6.82E+00	-	-	6.82E+00
WM0421	Fresh CLR Sandstone	12/02/2011	-	4.70E-01	-	-	-	4.70E-01
WM0265A	Weathered Clare Sandstone	23/06/2012	1.14E+00	-	-	-	-	1.14E+00

Shenhua Hydrogeological Data Analysis
Stage 4 report

Slug Test Summary

Groundwater Monitoring Bore	Monitored Geological Formation	Date	Analytical Solution (m/day)				Average K (m/day)	Comments
			Bouwer Rice	Hvorslev	Springer-Gelhar	KGS	Bulter Zhan	
WM0002	Weathered CLR Sandstone	1/07/2010	1.45E+00	-	-	1.02E+00	-	1.23E+00
WM0425	Weathered CLR Sandstone	27/05/2011	8.50E-02	9.40E-02	-	-	-	8.95E-02
WM0426	Weathered CLR Sandstone	4/06/2011	1.52E-01	1.83E-01	-	-	-	1.68E-01
WM0429	Weathered CLR Sandstone	8/07/2011	1.00E-01	1.17E-01	-	-	-	1.09E-01
WM0012A	Weathered CLR Sandstone	1/07/2010	3.66E+00	-	-	3.34E+00	-	3.50E+00
WM0430	Weathered CLR Sandstone	21/05/2011	1.80E-02	1.90E-02	-	-	-	1.85E-02
WM0278A	Weathered CLR Sandstone	23/06/2012	2.63E+00	-	-	-	-	2.63E+00
WM0263A	Weathered Benelabri Formation below CLR	16/10/2011	1.10E-02	1.30E-02	-	-	-	1.20E-02
WM0431	Weathered Benelabri Formation below CLR	22/05/2011	1.90E-02	1.70E-02	-	-	-	1.80E-02
WM0091B	Weathered Benelabri Fm (below CLR)	17/09/2011	1.80E-02	2.50E-02	-	-	-	2.15E-02
WM0265B	Weathered Benelabri Formation Below CLR	23/06/2012	4.10E-02	-	-	-	-	4.10E-02
WM0278B	Weathered Benelabri Formation below CLR	23/06/2012	4.91E-01	-	-	-	-	4.91E-01
WM0012	Hoskissons Coal	1/07/2010	7.96E-02	-	-	5.22E-02	-	6.59E-02
WM0091	Hoskissons Coal	16/11/2011	7.59E-02	8.04E-02	-	-	-	7.82E-02
WM0093	Hoskissons Coal	17/09/2011	3.60E-03	3.60E-03	-	-	-	3.60E-03
WM0157	Hoskissons Coal	11/11/2009	1.00E-04	2.24E-04	-	-	-	1.62E-04
WM0247	Hoskissons Coal	17/09/2011	2.30E-02	3.30E-02	-	-	-	2.80E-02
WM0291A	Hoskissons Coal	7/09/2011	6.59E-02	6.59E-02	-	5.10E-02	-	6.09E-02
WM0339A	Fractured Interburden	17/09/2011	4.50E-01	5.20E-01	-	-	-	4.85E-01
WM0059	Interburden	11/11/2009	2.90E-04	3.54E-04	-	-	-	3.22E-04
WM0247A	Interburden	7/08/2010	1.10E-04	1.67E-04	-	-	-	1.38E-04
WM0260A	Interburden	26/03/2010	1.00E-03	1.00E-03	-	-	-	1.00E-03
WM0062	Interburden / F Coal seam	11/11/2009	4.87E-03	5.27E-03	-	-	-	5.07E-03
WM0105	Interburden inc D E coal seams	11/11/2009	2.04E-02	3.36E-02	-	-	-	2.70E-02
WM0233A	Interburden inc F coal Seams	4/08/2010	3.27E-01	4.38E-01	-	-	-	3.83E-01
WM0099B	Weathered Interburden	25/03/2010	2.64E+00	-	-	1.78E+00	-	2.21E+00
WM0011A	Weathered Interburden	17/09/2011	2.00E-03	2.00E-03	-	-	-	2.00E-03 Very Slow Recovery
WM0055A	Weathered Interburden	11/11/2009	7.49E-03	1.28E-02	-	-	-	1.01E-02
WM0427	Weathered Interburden	5/06/2011	2.00E-01	2.00E-01	-	-	-	2.00E-01
WM0432	Weathered Interburden	22/05/2011	1.06E-01	1.21E-01	-	-	-	1.14E-01
WM0009R	Melville's Coal	1/07/2010	4.00E-03	5.00E-03	-	-	-	4.50E-03
WM0055	Melville's Coal	11/11/2009	1.13E-01	1.23E-01	-	-	-	1.18E-01

Shenhua Hydrogeological Data Analysis
Stage 4 report

Slug Test Summary

Groundwater Monitoring Bore	Monitored Geological Formation	Date	Analytical Solution (m/day)					Average K (m/day)	Comments
			Bouwer Rice	Hvorslev	Springer-Gelhar	KGS	Bulter Zhan		
WM0256A	Melville Coal	27/03/2010	6.00E-03	7.00E-03	-	-	-	6.50E-03	
WM0092	Melville, Ben and B2 Coals	17/09/2011	5.70E-02	6.10E-02	-	-	-	5.90E-02	
WM0233	Melville and Ben Coals	4/08/2010	3.50E-01	3.88E-01				3.69E-01	
WM0360	Pamboola Fm below Melville	17/06/2011	1.94E-02	2.50E-02	-	-	-	2.22E-02	
WM0334	Pamboola Fm below Melville	17/10/2010	1.30E-02	1.60E-02	-	-	-	1.45E-02	
WM0361	Pamboola Fm below Melville	18/10/2010	2.30E-03	-	-	-	-	2.30E-03	
WM0269	Pamboola Fm below Melville inc Ben and B2 Seam	26/03/2010	6.00E-03	8.00E-03	-	-	-	7.00E-03	
WM0045	Pamboola Fm below Melville inc Ben Seam	26/03/2010	2.80E-02	3.50E-02	-	-	-	3.15E-02	
WM0422	Weathered Watermark Fm	9/04/2011	1.51E-03	2.53E-03	-	-	-	2.02E-03	
WM0428	Weathered Watermark Fm	10/07/2011	1.50E-03	1.50E-03	-	-	-	1.50E-03	
WM0561	Weathered Watermark Fm	19/11/2011	1.90E-02	1.50E-02	-	-	-	1.70E-02	
WM0042A	Watermark Fm	20/10/2010	2.80E-03	3.30E-03	-	-	-	3.05E-03	
WM0116	Watermark Fm	1/07/2010	3.18E-02	-	-	2.17E-04	-	1.60E-02	
WM0288	Watermark Fm	6/09/2011	2.17E-02	2.65E-02	-	-	-	2.41E-02	
WM0290	Watermark Fm	6/08/2010	6.75E-04	7.63E-04	-	-	-	7.19E-04	
WM0330R	Watermark Fm	15/12/2010	1.85E-02	1.60E-02	-	-	-	1.73E-02	
WM0362	Watermark Fm	19/10/2010	2.10E-03	2.30E-03	-	-	-	2.20E-03	
WM0414	Porcupine Fm	8/04/2011	2.14E-04	-	-	-	-	2.14E-04	



Shenhua Hydrogeological Data Analysis
Stage 4 report

Slug Test Summary
by Aquifer

Formation	No. of Slug Tests by Formation	Average K (m/day)	Min K (m/day)	Max K (m/day)	Geomean K (m/day)
Narrabri Fm	16	3.83E-01	3.00E-03	3.14E+00	1.10E-01
Gunnedah Fm	5	9.62E+00	1.79E+00	2.85E+01	6.31E+00
Local Palaeochannel Deposit	2	4.01E-03	5.45E-04	7.47E-03	2.02E-03
Tertiary Volcanics	1	9.20E-01	9.20E-01	9.20E-01	9.20E-01
Dolerite	1	1.23E-02	1.23E-02	1.23E-02	1.23E-02
Digby Formation	1	3.15E-02	3.15E-02	3.15E-02	3.15E-02
Wallala Fm	1	5.75E-01	5.75E-01	5.75E-01	5.75E-01
Weathered Coogal Gp above Howes Hill Upper Coal	2	5.77E+00	3.97E+00	7.57E+00	5.48E+00
Benelabri Fm above CLR	1	6.82E+00	6.82E+00	6.82E+00	6.82E+00
Weathered CLR Sandstone	8	1.11E+00	1.85E-02	3.50E+00	3.75E-01
Fresh CLR Sandstone	1	4.70E-01	4.70E-01	4.70E-01	4.70E-01
Weathered Benelabri Formation below CLR	5	1.17E-01	1.20E-02	4.91E-01	3.93E-02
Hoskissons Coal	6	3.95E-02	1.62E-04	7.82E-02	1.31E-02
Interburden (All)	12	2.86E-01	1.38E-04	2.21E+00	1.80E-02
Weathered Interburden	5	5.07E-01	2.00E-03	2.21E+00	6.33E-02
Fresh Interburden	7	1.29E-01	7.33E-03	1.38E-04	4.85E-01
Fractured/fault zones Interburden	3	1.62E-01	1.38E-04	4.85E-01	4.86E-01
Melvilles Coal Seam	3	4.32E-02	4.50E-03	1.18E-01	1.51E-02
Melvilles, including Ben and B2 Coals	2	2.14E-01	5.90E-02	3.69E-01	4.28E-01
Melvilles Coal all (inc. Ben and B2 Seams)	5	1.12E-01	4.50E-03	3.69E-01	3.76E-02
Pamboola Fm below Melvilles	5	1.55E-02	2.30E-03	3.15E-02	1.10E-02
Watermark Fm	6	1.06E-02	7.19E-04	2.41E-02	5.64E-03
Weathered Watermark Fm	3	6.84E-03	1.50E-03	1.70E-02	3.72E-03
Porcupine Fm	1	2.14E-04	2.14E-04	2.14E-04	2.14E-04



Slug Test Analyses not included due to document size and can be provided upon request



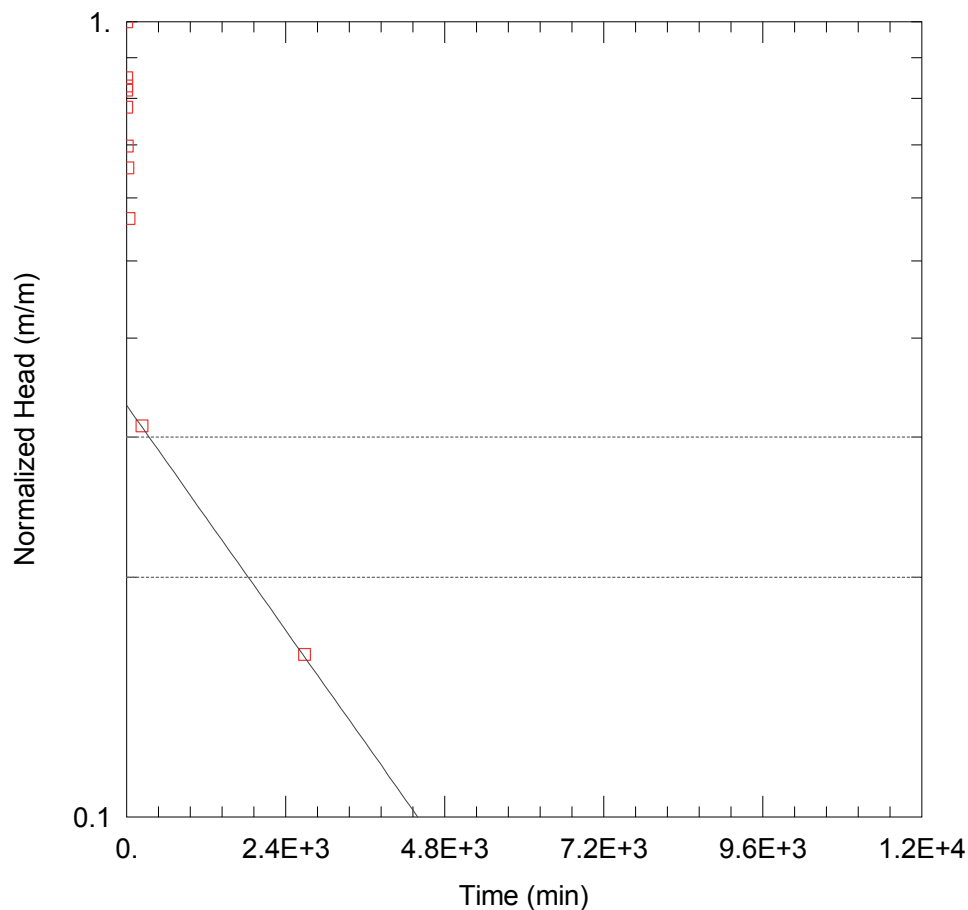
Appendix L

Recovery Test Analyses and Summary of Results



Bore ID	Monitored Formation	Pumping / Slug Test K (m/day)	Recovery Test Transmissivity (m ² /day)	Recovery Test Adopted K (m/day)
WM0012	Hoskissons Coal	6.59E-02	4.54E-02	4.54E-03
WM0019L	Melville's Coal / Interburden	8.30E-03	2.82E-01	2.82E-03
WM0038L	Melville's Coal	-	8.58E-01	9.45E-02
WM0060LR	Interburden	1.15E-01	4.46E+01	1.49E+00
WM0092	Melville's, Ben and B2 Coals	5.90E-02	5.55E-01	2.78E-02
WM0233	Melville's, Ben and Coal seams	3.69E-01	6.01E+00	1.95E-01
WM0233A	Interburden	3.83E-01	1.82E+00	1.66E-01
WM0256A	Melville's Coal	6.50E-03	1.77E-02	5.91E-04
WM0288	Fresh Watermark Fm	2.41E-02	4.60E-01	7.67E-02
WM0291A	Hoskissons Coal	-	9.89E-02	1.98E-03
WM0361	Pamboola Fm below Melville's	2.30E-03	1.36E-03	6.79E-05
WM0414	Porcupine Fm	2.14E-04	NA	1.77E-05
WM0429	Weathered CLR Sandstone	1.09E-01	3.89E+00	2.99E-01
WM0429A	Narrabri Fm	2.25E-02	1.38E-01	1.38E-02
WM0430	Weathered CLR Sandstone	1.85E-02	6.87E-01	4.58E-02
WM0430A	Narrabri Fm	4.15E-01	2.64E-01	2.64E-02
WM0431	Weathered Benelabri Fm below CLR	1.80E-02	3.57E+00	3.57E-01
WM0432	Weathered Interburden	1.14E-01	3.32E-01	2.21E-02
WM0432A	Narrabri Fm	2.20E-02	3.23E-02	2.15E-03
WM0433	Narrabri Fm	5.95E-02	4.19E+00	4.19E-01
WM0561	Weathered Watermark Fm	1.70E-02	7.85E-03	1.31E-03
WM0665	Fresh Watermark Fm	-	NA	2.88E-06
WM228A	Weathered CLR Sandstone	-	NA	1.28E-04
WM228B	Weathered Benelabri Fm below CLR	-	NA	5.67E-05
Exploration Holes Airlifted				
WM0108	Open Hole		7.63E+00	2.05E-01
WM0137	Open Hole		8.41E+00	6.95E-01
WM0215	Open Hole		4.09E-02	1.25E-03
WM0221	Open Hole		1.95E+00	6.31E-02
WM0277	Open Hole		4.90E-02	1.50E-03
WM0266L	Open Hole		2.64E+00	8.79E-02
WM0268	Open Hole		2.07E-01	3.09E-02

Note : Pump test Result shaded



WM0228A AGE SLUG TEST (RECOVERY)

Data Set: N:\...\228Ashallow_slug_recov.aqt

Date: 07/02/12

Time: 16:56:26

PROJECT INFORMATION

Company: GHD

Client: Shenhua

Project: 221570264

Test Well: WM0228A

Test Date: 10/06/2012

AQUIFER DATA

Saturated Thickness: 4. m

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (228A)

Initial Displacement: 4. m

Static Water Column Height: 4. m

Total Well Penetration Depth: 6. m

Screen Length: 6. m

Casing Radius: 0.025 m

Well Radius: 0.025 m

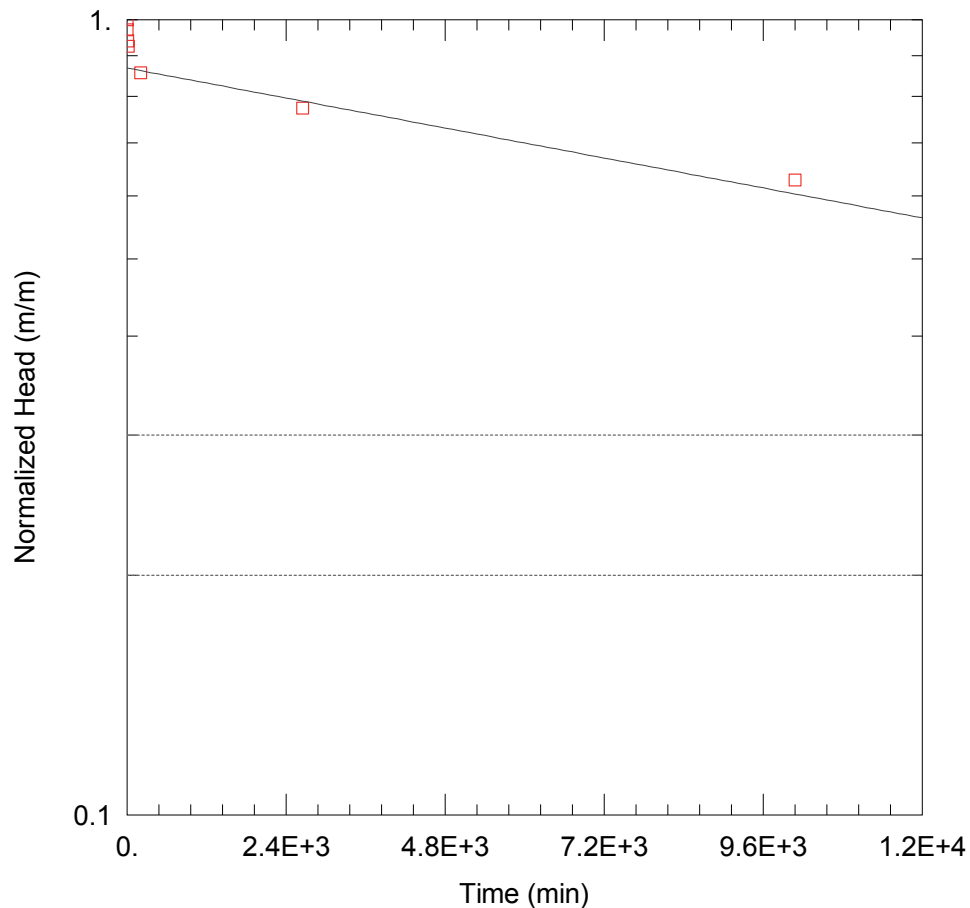
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

$K = 0.0001281$ m/day

$y_0 = 1.317$ m



WM0228B AGE SLUG TEST (RECOVERY)

Data Set: N:\...\228Bdeep_slug_recov.aqt

Date: 07/02/12

Time: 17:03:37

PROJECT INFORMATION

Company: GHD

Client: Shenhua

Project: 221570264

Test Well: WM0228B

Test Date: 9/06/2012

AQUIFER DATA

Saturated Thickness: 1. m

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (228 Deep)

Initial Displacement: 0.721 m

Static Water Column Height: 0.721 m

Total Well Penetration Depth: 3. m

Screen Length: 3. m

Casing Radius: 0.025 m

Well Radius: 0.025 m

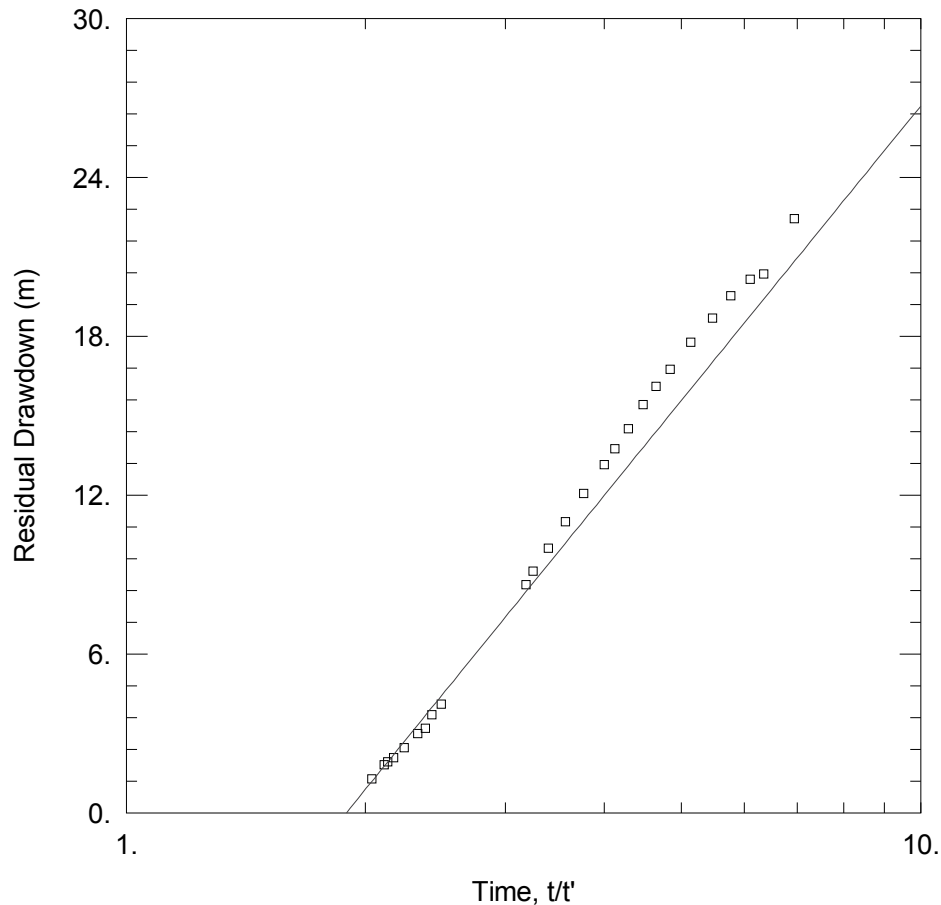
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

$K = 5.667E-5$ m/day

$y_0 = 0.6264$ m

WM0038L RECOVERY

Data Set: N:\...\WM0038L.aqt
Date: 07/16/12

Time: 12:00:33

PROJECT INFORMATION

Company: Shenhua
Client: Watermark Coal
Project: 3128754
Location: Watermark
Test Well: WM0038L
Test Date: 29/02/2012

AQUIFER DATA

Saturated Thickness: 9.08 m

Anisotropy Ratio (Kz/Kr): 1.

WELL DATAPumping Wells

Well Name	X (m)	Y (m)
WM0038L	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ WM0038L	0	0

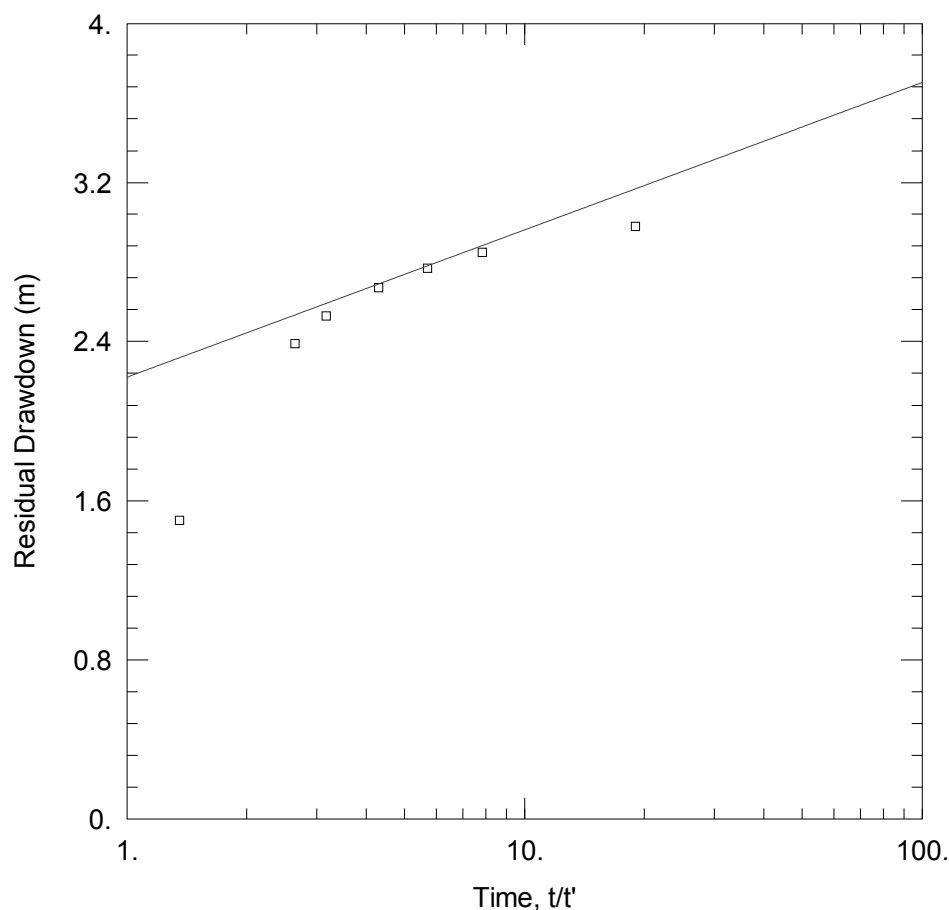
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

T = 0.8577 m²/day

S/S' = 1.894



WELL TEST ANALYSIS

Data Set: N:\...\WM0060LR.aqt

Date: 03/29/12

Time: 15:06:44

PROJECT INFORMATION

Company: GHD

Client: Shenhua

Project: 2214551

Location: Gunnedeh

Test Well: WM0060LR

Test Date: 11/03/2011

AQUIFER DATA

Saturated Thickness: 30. m

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WM0060LR	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ WM0060LR	0	0

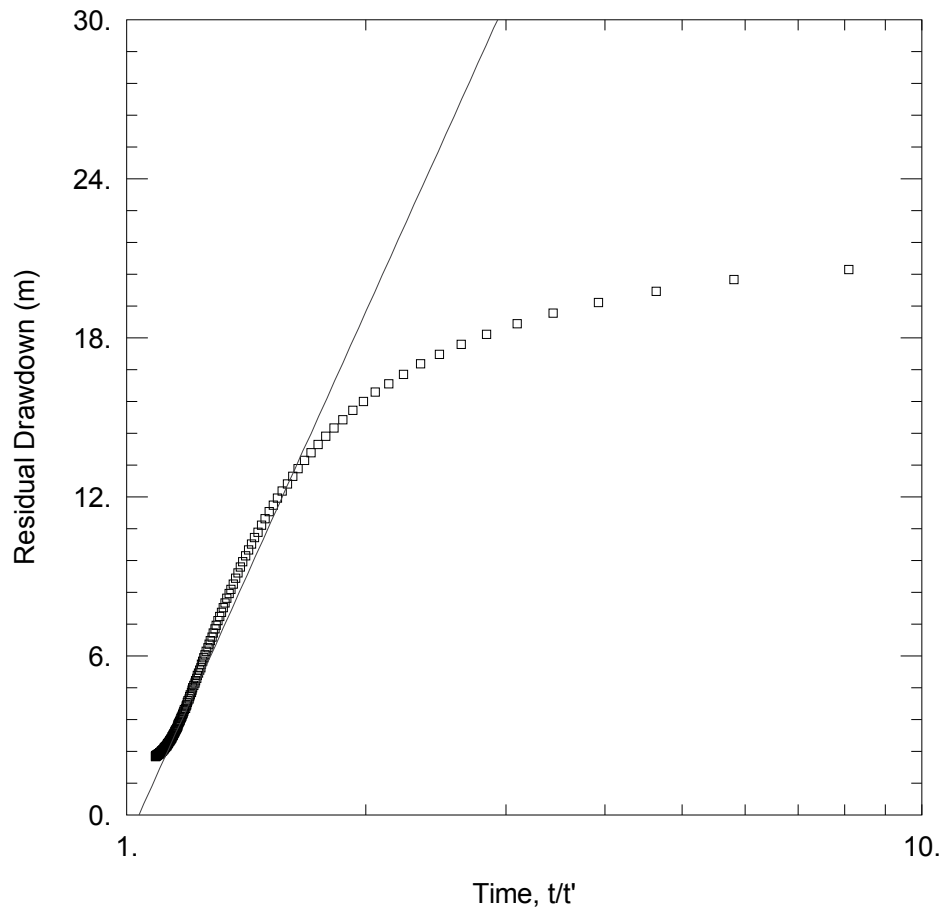
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

T = 44.56 m²/day

S/S' = 0.001014



AIRLIFT TEST

Data Set: N:\...\WM0092.aqt
Date: 03/29/12

Time: 15:14:34

PROJECT INFORMATION

Company: GHD
Client: Shenhua
Project: 2214551
Location: Curlewis
Test Well: WM0092
Test Date: 20/03/2011

AQUIFER DATA

Saturated Thickness: 20. m

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WM0092	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ WM0092	0	0

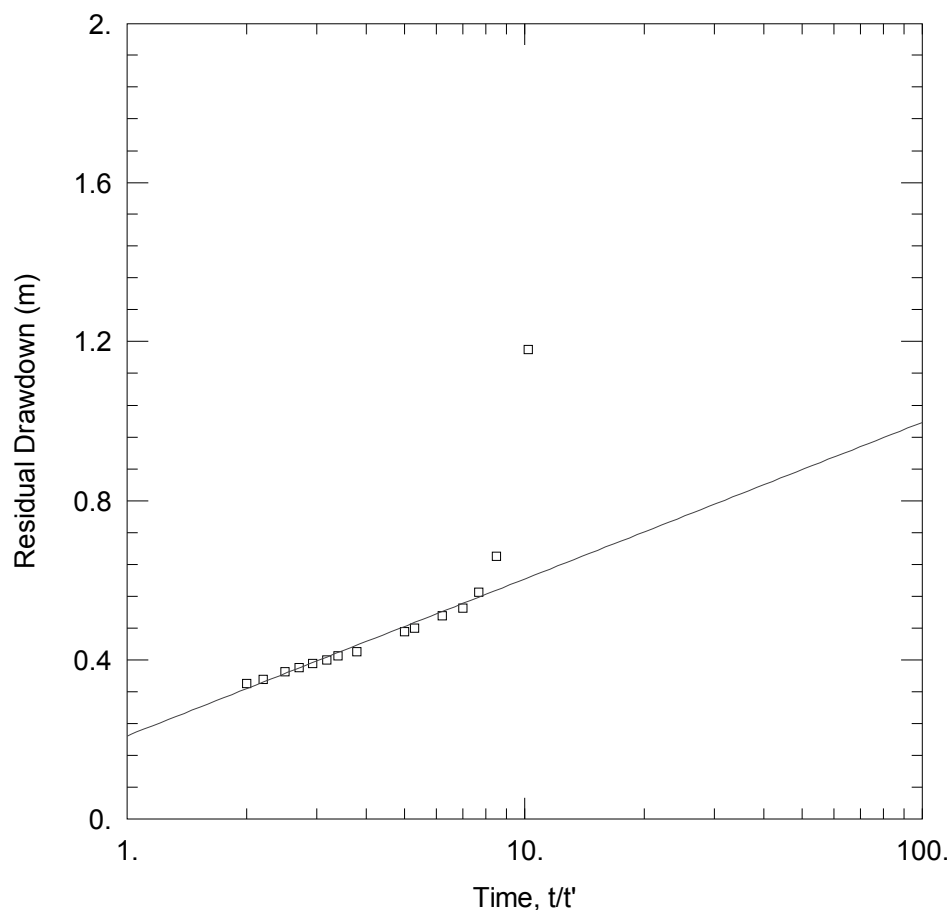
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

$T = 0.5554 \text{ m}^2/\text{day}$

$S/S' = 1.038$



WELL TEST ANALYSIS

Data Set: N:\...WM0108.aqt

Date: 03/29/12

Time: 15:17:32

PROJECT INFORMATION

Company: GHD

Client: Shenhua

Project: 2214551

Location: Watermark

Test Well: WM0108

Test Date: 6/3/2010

AQUIFER DATA

Saturated Thickness: 37.19 m

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WM0108	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ WM0108	0	0

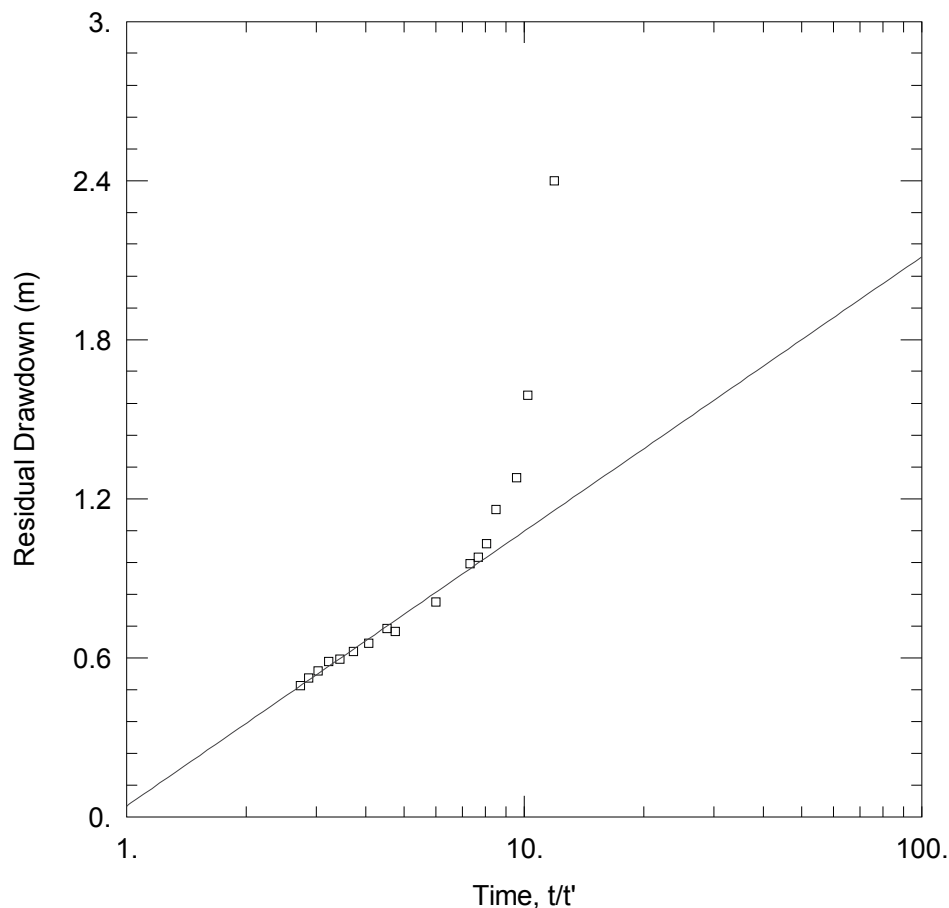
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

T = 7.631 m²/day

S/S' = 0.2965



WELL TEST ANALYSIS

Data Set: N:\...\WM0137.aqt
Date: 03/29/12

Time: 15:19:33

PROJECT INFORMATION

Company: GHD
Client: Shenhua
Project: 2214551
Location: Watermark
Test Well: WM0137
Test Date: 24/10/2009

AQUIFER DATA

Saturated Thickness: 12. m

Anisotropy Ratio (K_z/K_r): 5760.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WM0137	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ WM0137	0	0

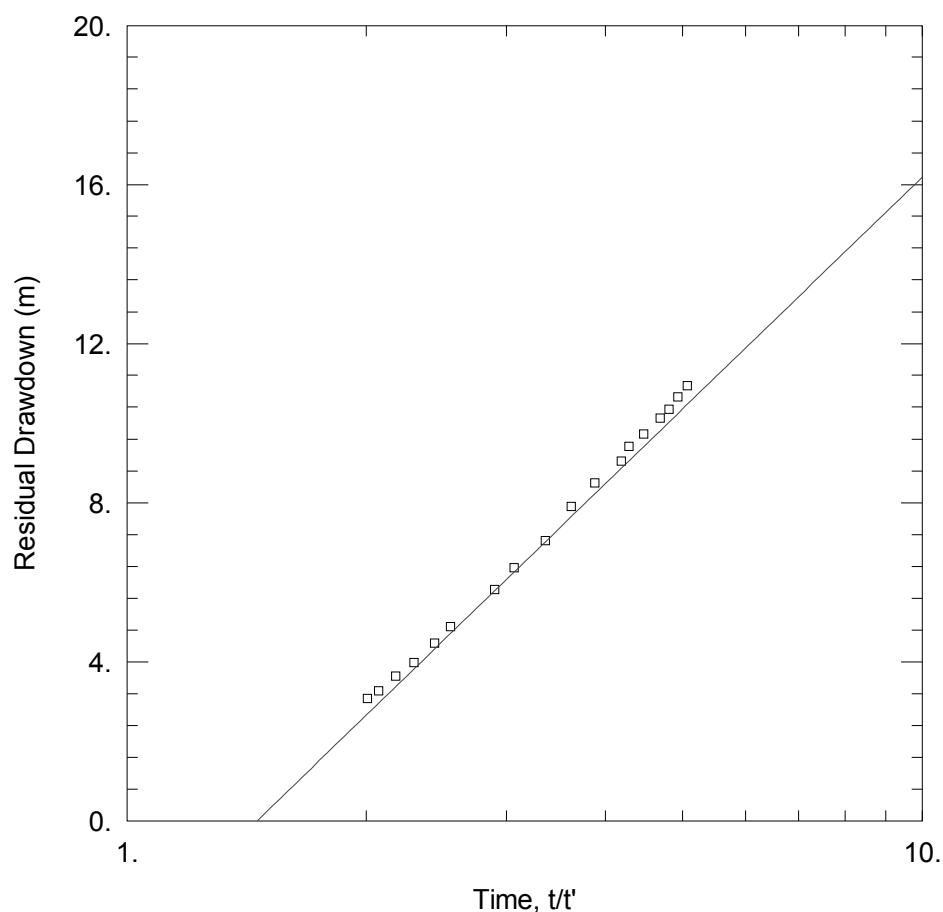
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

$T = 8.406 \text{ m}^2/\text{day}$

$S/S' = 0.9156$



WELL TEST ANALYSIS

Data Set: N:\...\WM0215.aqtDate: 03/29/12Time: 15:24:02

PROJECT INFORMATION

Company: GHDClient: ShenhuaProject: 2214551Location: WatermarkTest Well: WM0215Test Date: 3/11/2009

AQUIFER DATA

Saturated Thickness: 32.66 mAnisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

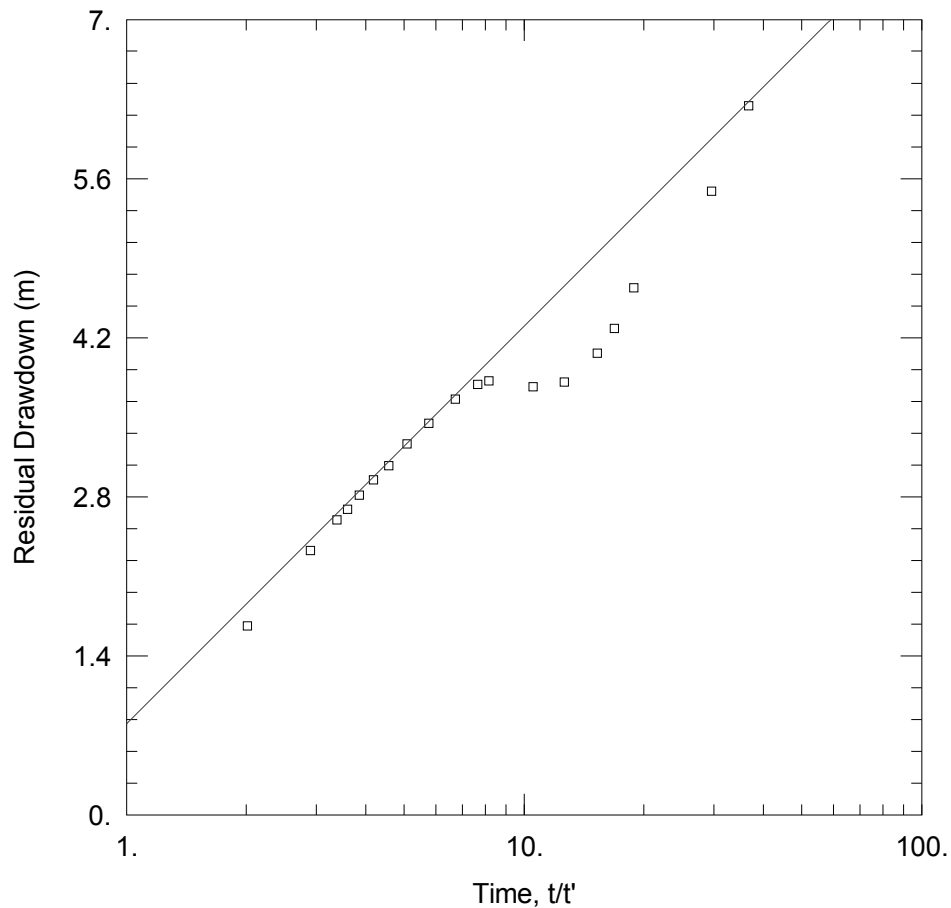
Well Name	X (m)	Y (m)
WM0215	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ WM0215	0	0

SOLUTION

Aquifer Model: ConfinedSolution Method: Theis (Recovery)T = 0.04091 m²/dayS/S' = 1.459



WELL TEST ANALYSIS

Data Set: N:\...\WM0221.aqtDate: 03/29/12Time: 15:25:25

PROJECT INFORMATION

Company: GHDClient: ShenhuaProject: 2214551Location: WatermarkTest Well: WM0221Test Date: 26/11/2009

AQUIFER DATA

Saturated Thickness: 30.84 mAnisotropy Ratio (K_z/K_r): 3.804

WELL DATA

Pumping Wells

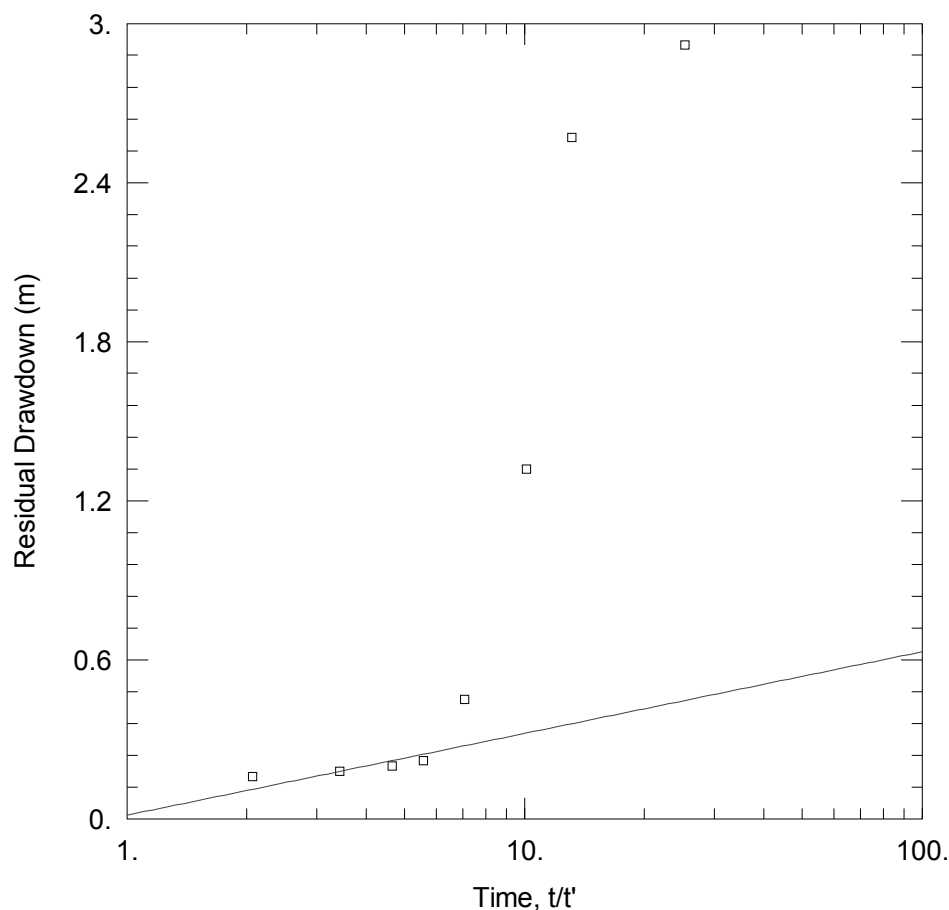
Well Name	X (m)	Y (m)
WM0221	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ WM0221	0	0

SOLUTION

Aquifer Model: ConfinedSolution Method: Theis (Recovery) $T = 1.945 \text{ m}^2/\text{day}$ $S/S' = 0.5915$



WELL TEST ANALYSIS

Data Set: N:\...WM0233.aqt

Date: 03/29/12

Time: 15:27:59

PROJECT INFORMATION

Company: GHD

Client: Shenhua

Project: 2214551

Location: Watermark

Test Well: WM0233

AQUIFER DATA

Saturated Thickness: 30.82 m

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WM0233	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ WM0233	0	0

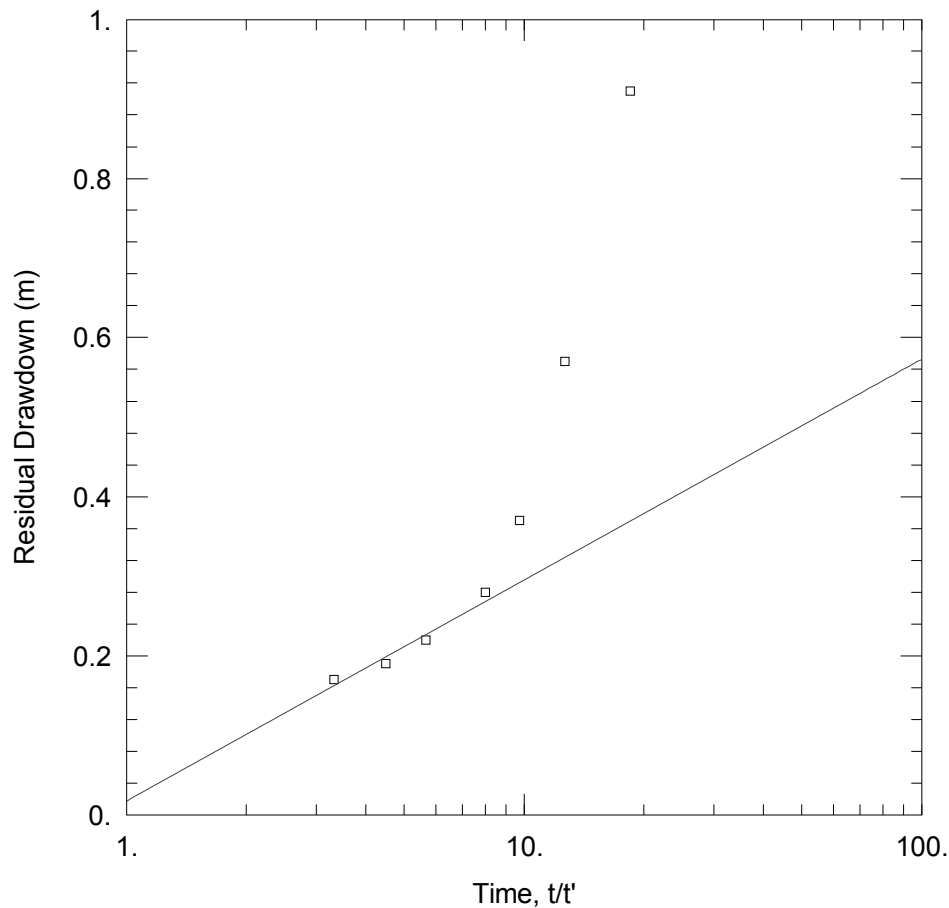
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

T = 6.011 m²/day

S/S' = 0.9057



WELL TEST ANALYSIS

Data Set: N:\...\WM0233A.aqt
Date: 03/29/12

Time: 15:29:49

PROJECT INFORMATION

Company: GHD
Client: Shenhua
Project: 2214551
Location: Watermark
Test Well: WM0233A

AQUIFER DATA

Saturated Thickness: 11. m

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WM0233A	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ WM0233A	0	0

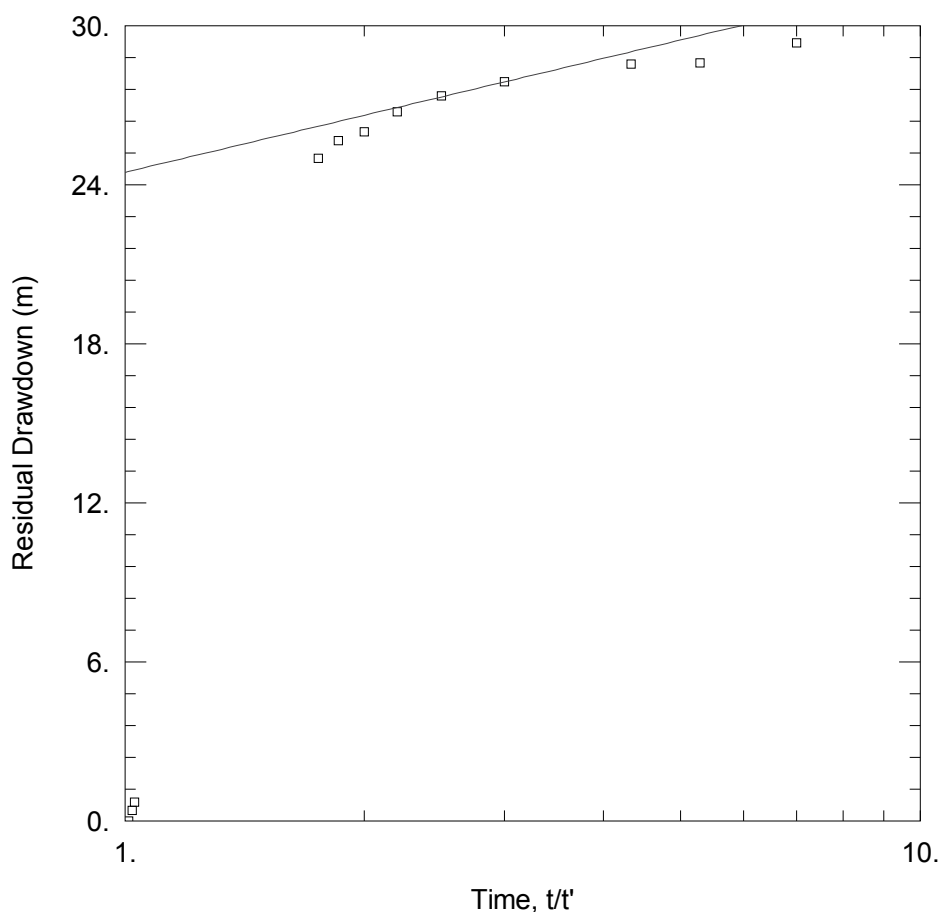
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

T = 1.824 m²/day

S/S' = 0.8685



WELL TEST ANALYSIS

Data Set: N:\...WM0256A.aqt

Date: 03/29/12

Time: 15:34:09

PROJECT INFORMATION

Company: GHD

Client: Shenhua

Project: 2214551

Location: Watermark

Test Well: WM0256A

Test Date: 23/1/2010

AQUIFER DATA

Saturated Thickness: 30. m

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WM0256A	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ WM0256A	0	0

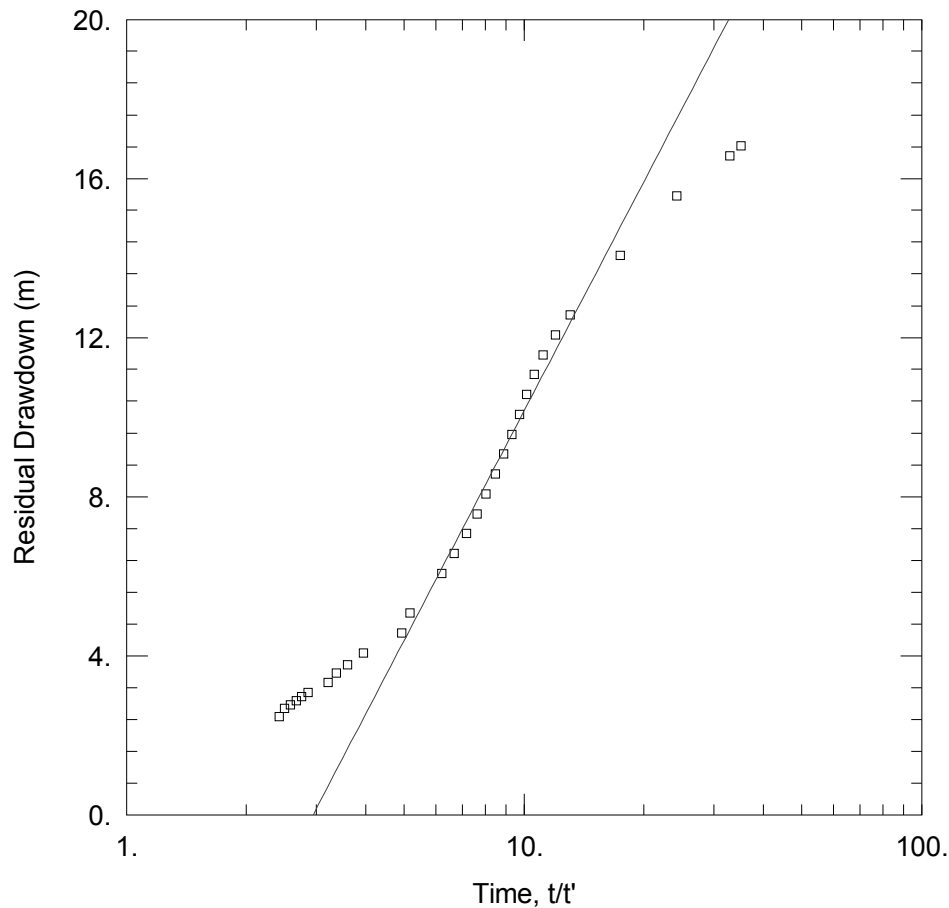
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

T = 0.01773 m²/day

S/S' = 0.0003763



WELL TEST ANALYSIS

Data Set: N:\...\WM0266L.aqt
Date: 03/29/12

Time: 15:35:58

PROJECT INFORMATION

Company: GHD
Client: Shenhua
Project: 2214551
Location: Gunnedeh
Test Well: WM0266L
Test Date: 28/06/2011

AQUIFER DATA

Saturated Thickness: 30. m

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WM0266L	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ WM0266L	0	0

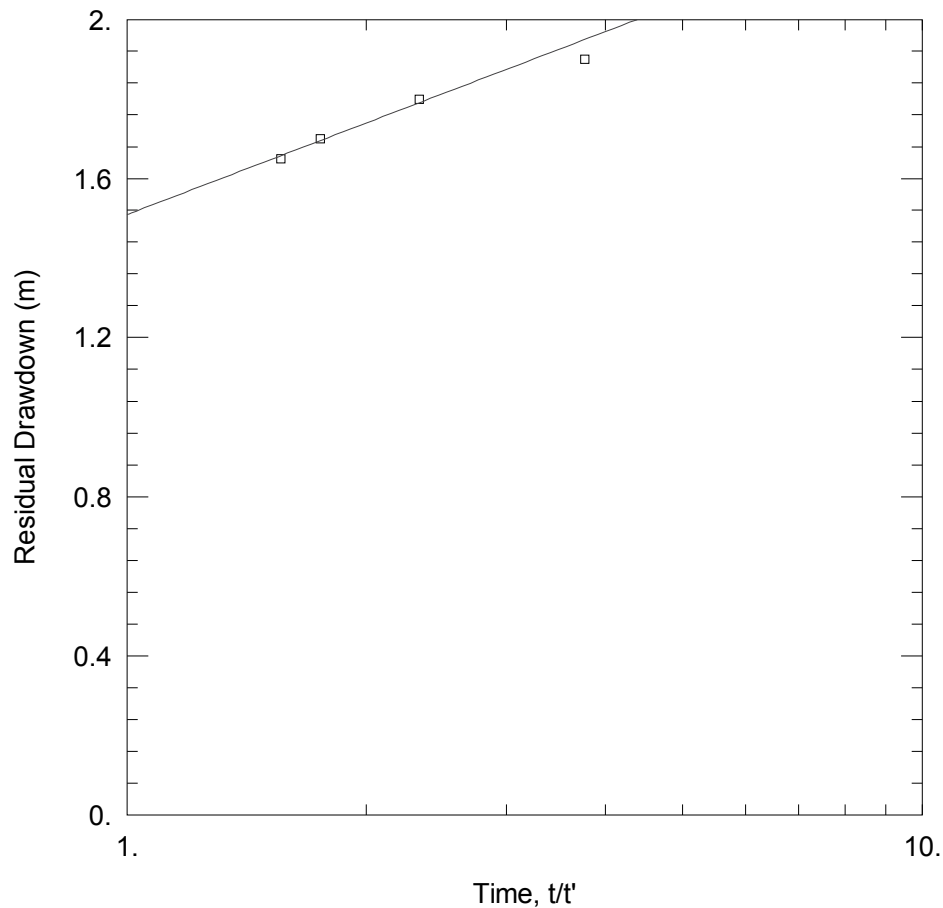
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

$T = 2.637 \text{ m}^2/\text{day}$

$S/S' = 2.951$



WELL TEST ANALYSIS

Data Set: N:\...\WM0268.aqt
 Date: 03/29/12

Time: 15:36:44

PROJECT INFORMATION

Company: GHD
 Client: Shenhua
 Project: 2214551
 Location: Watermark
 Test Well: WM0268
 Test Date: 19/1/2010

AQUIFER DATA

Saturated Thickness: 6.7 m

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WM0268	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ WM0268	0	0

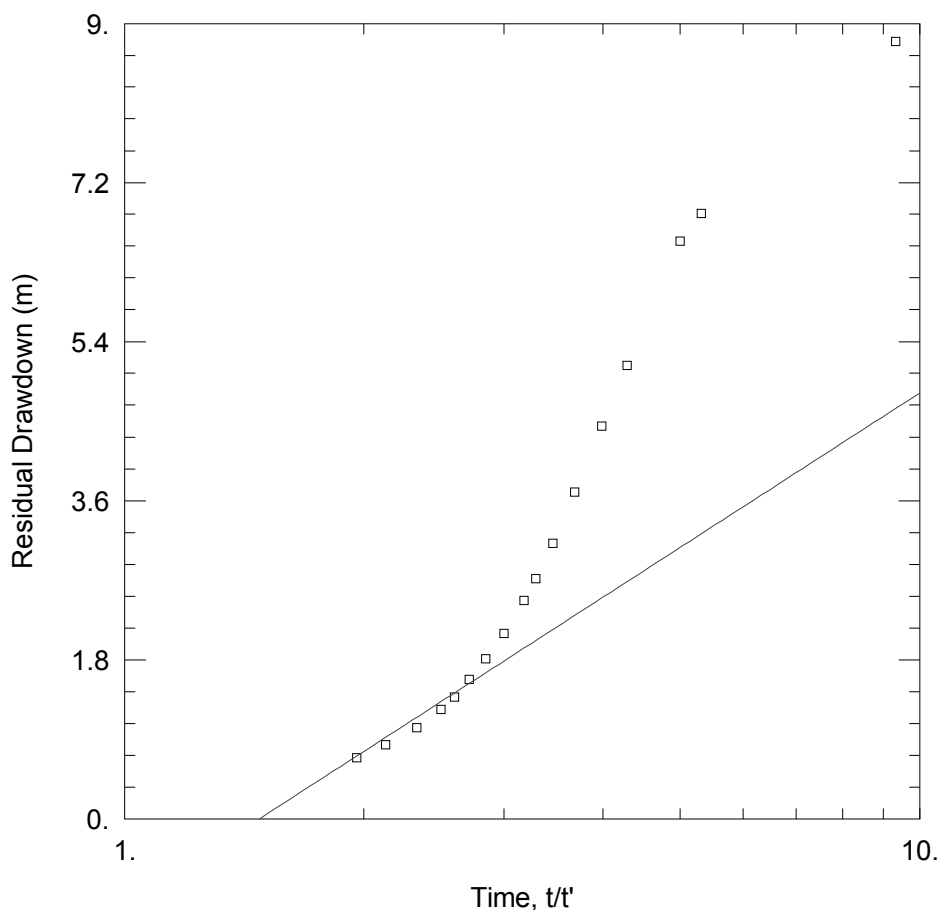
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

T = 0.2069 m²/day

S/S' = 0.01066



WELL TEST ANALYSIS

Data Set: N:\...\WM0277.aqt
Date: 03/29/12

Time: 15:37:23

PROJECT INFORMATION

Company: GHD
Client: Shenhua
Project: 2214551
Location: Watermark
Test Well: WM0277
Test Date: 6/3/2010

AQUIFER DATA

Saturated Thickness: 32.62 m

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WM0277	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ WM0277	0	0

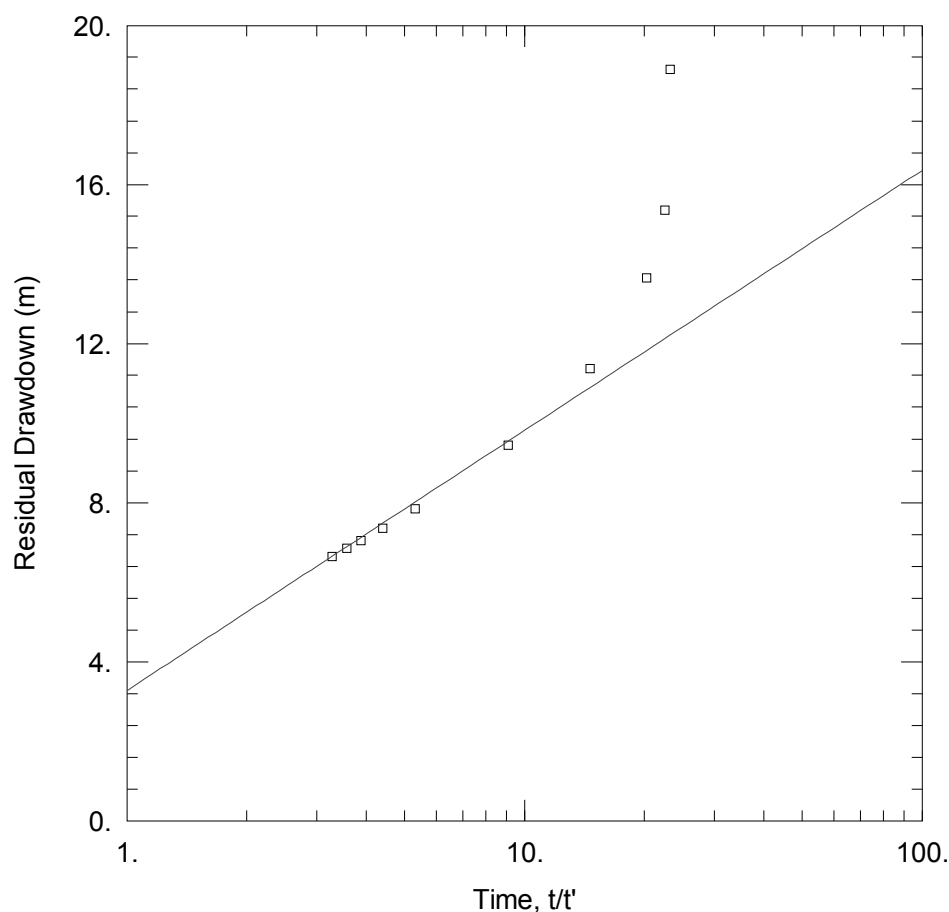
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

T = 0.04911 m²/day

S/S' = 1.48



WELL TEST ANALYSIS

Data Set: N:\...\WM0288.aqt

Date: 03/29/12

Time: 15:39:21

PROJECT INFORMATION

Company: GHD

Client: Shenhua

Project: 2214551

Location: Gunnedeh

Test Well: WM0288

Test Date: 22/04/2011

AQUIFER DATA

Saturated Thickness: 30. m

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WM0288	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ WM0288	0	0

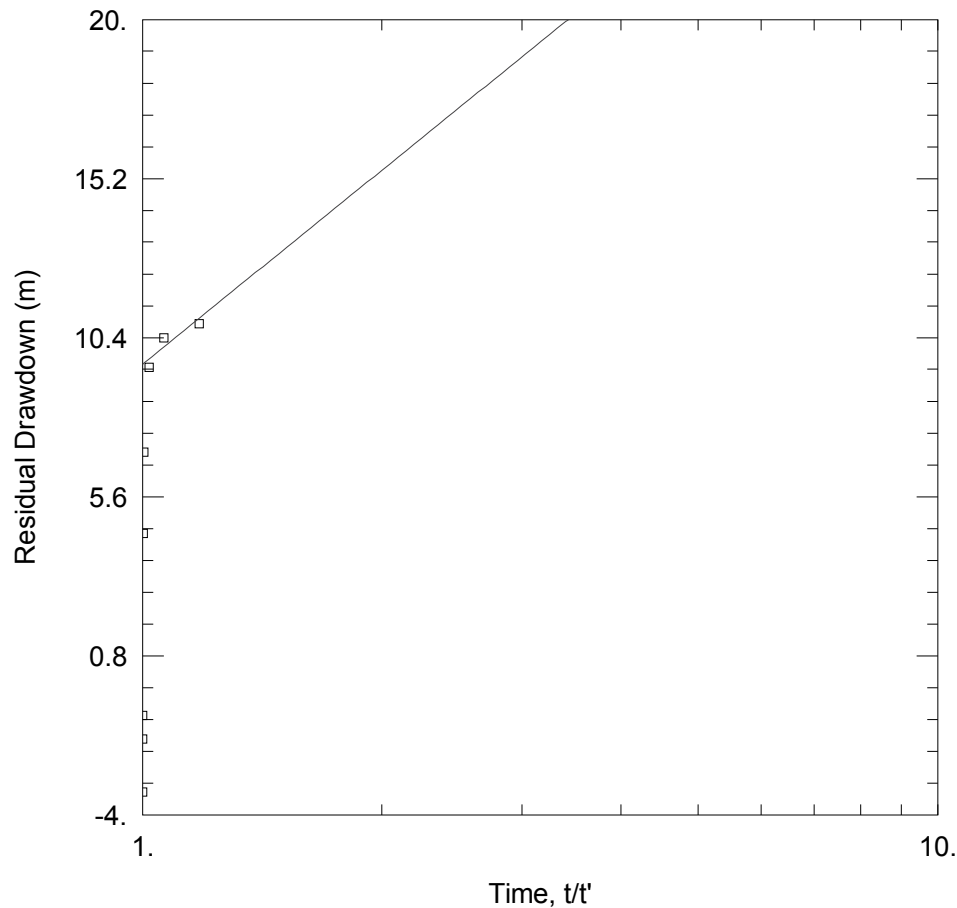
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

T = 0.4599 m²/day

S/S' = 0.3162



WELL TEST ANALYSIS

Data Set: N:\...\WM0361.aqt
Date: 03/29/12

Time: 15:48:21

PROJECT INFORMATION

Company: GHD
Client: Shenhua
Project: 2214551
Location: Gunnedeh
Test Well: WM0361
Test Date: 6/9/2010

AQUIFER DATA

Saturated Thickness: 20. m

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WM0361	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ WM0361	0	0

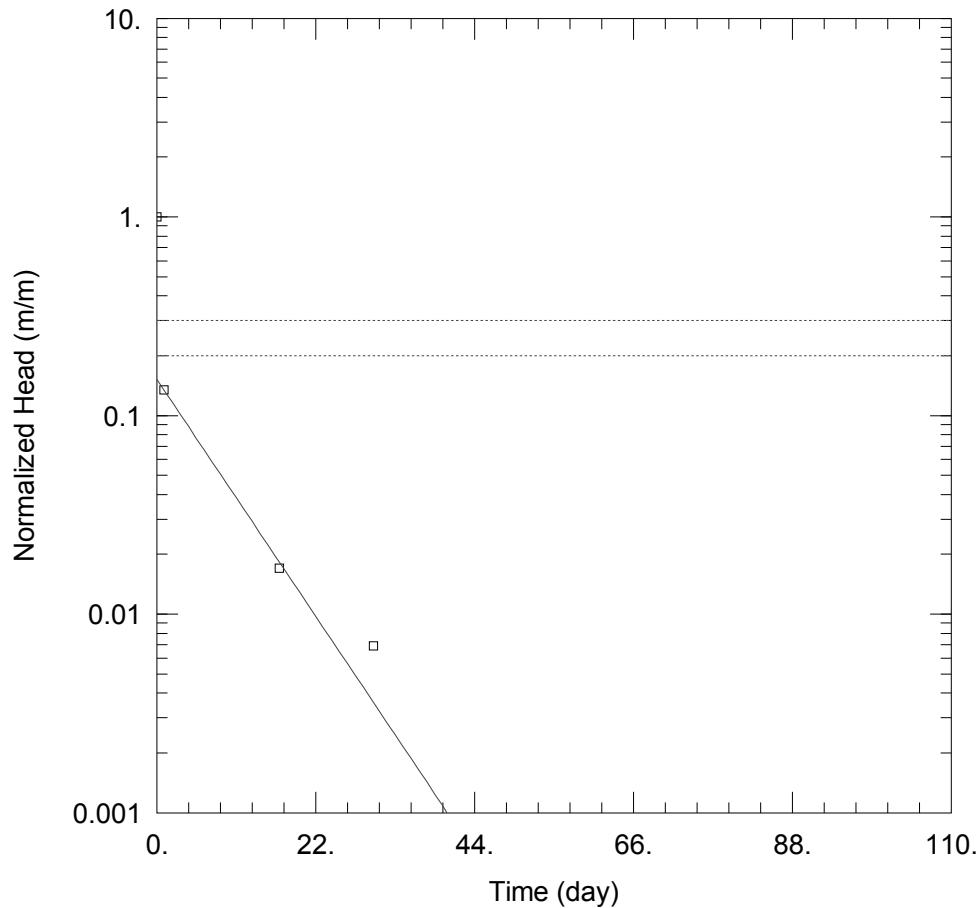
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

$T = 0.001358 \text{ m}^2/\text{day}$

$S/S' = 0.3208$



WELL TEST ANALYSIS

Data Set: N:\...\WM0414_second Development.aqt

Date: 09/20/12

Time: 09:36:20

PROJECT INFORMATION

Company: GHD

Client: Shenhua Watermark

Project: 2214551

Location: Gunnedah

Test Well: WM0414

Test Date: May 2012

AQUIFER DATA

Saturated Thickness: 60. m

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WM0414)

Initial Displacement: 36.09 m

Static Water Column Height: 23.91 m

Total Well Penetration Depth: 136.1 m

Screen Length: 12. m

Casing Radius: 0.025 m

Well Radius: 0.075 m

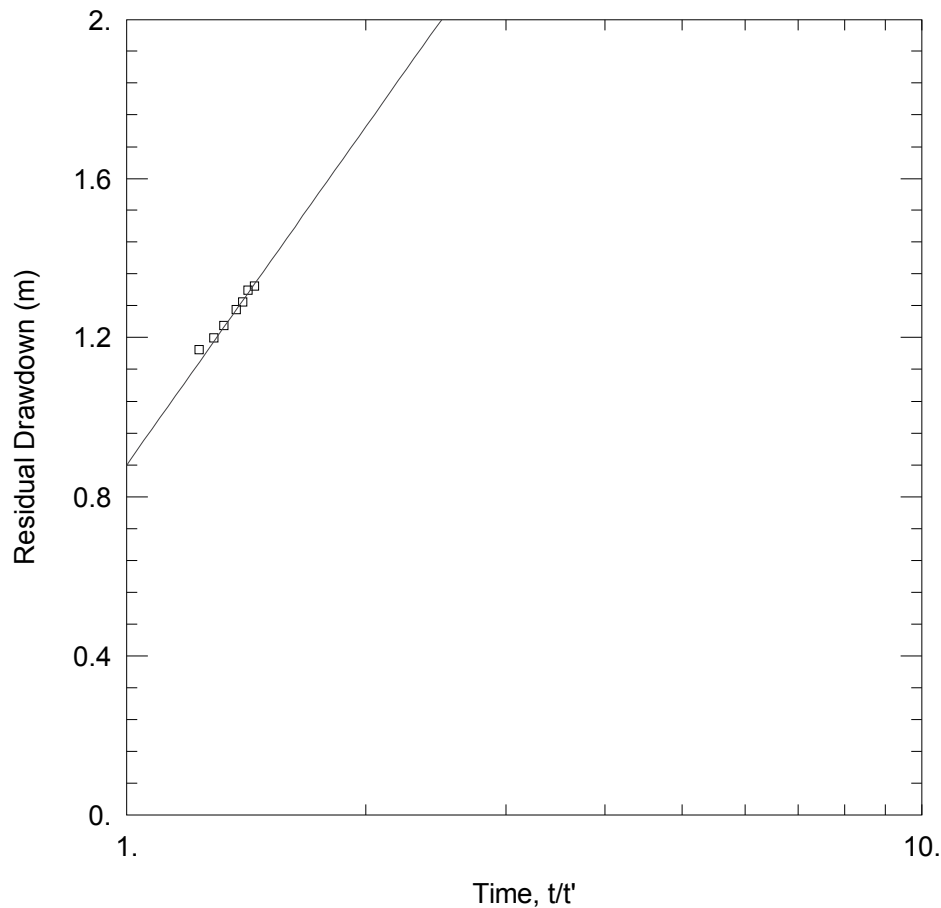
SOLUTION

Aquifer Model: Confined

Solution Method: Bouwer-Rice

K = 1.766E-5 m/day

y0 = 5.498 m



WELL TEST ANALYSIS

Data Set: N:\...\WM0429.aqt
Date: 03/29/12

Time: 15:53:29

PROJECT INFORMATION

Company: GHD
Client: Shenhua
Project: 2214551
Location: Gunnedeh
Test Well: WM0429
Test Date: 08/05/2011

AQUIFER DATA

Saturated Thickness: 15. m

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WM0429	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ WM0429	0	0

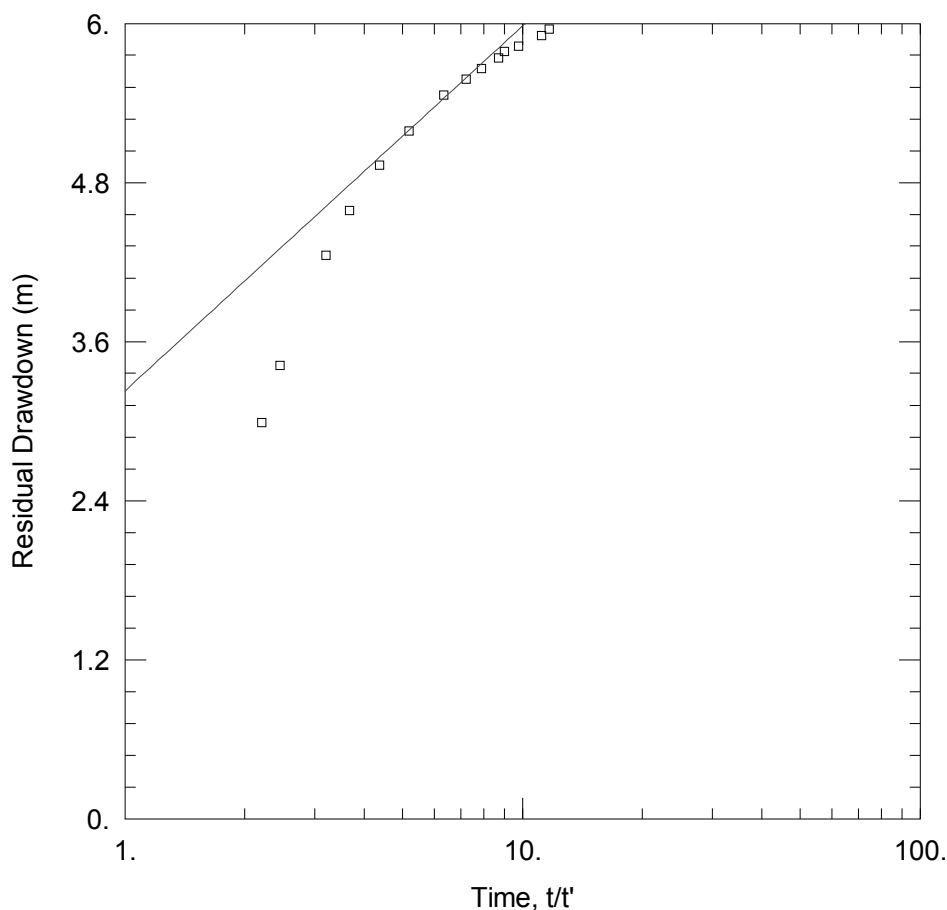
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

$T = 3.885 \text{ m}^2/\text{day}$

$S/S' = 0.4893$



WELL TEST ANALYSIS

Data Set: N:\...\WM0429A.aqtDate: 03/29/12Time: 15:55:01

PROJECT INFORMATION

Company: GHDClient: ShenhuaProject: 2214551Location: GunnedehTest Well: WM0429ATest Date: 08/05/2011

AQUIFER DATA

Saturated Thickness: 10. mAnisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

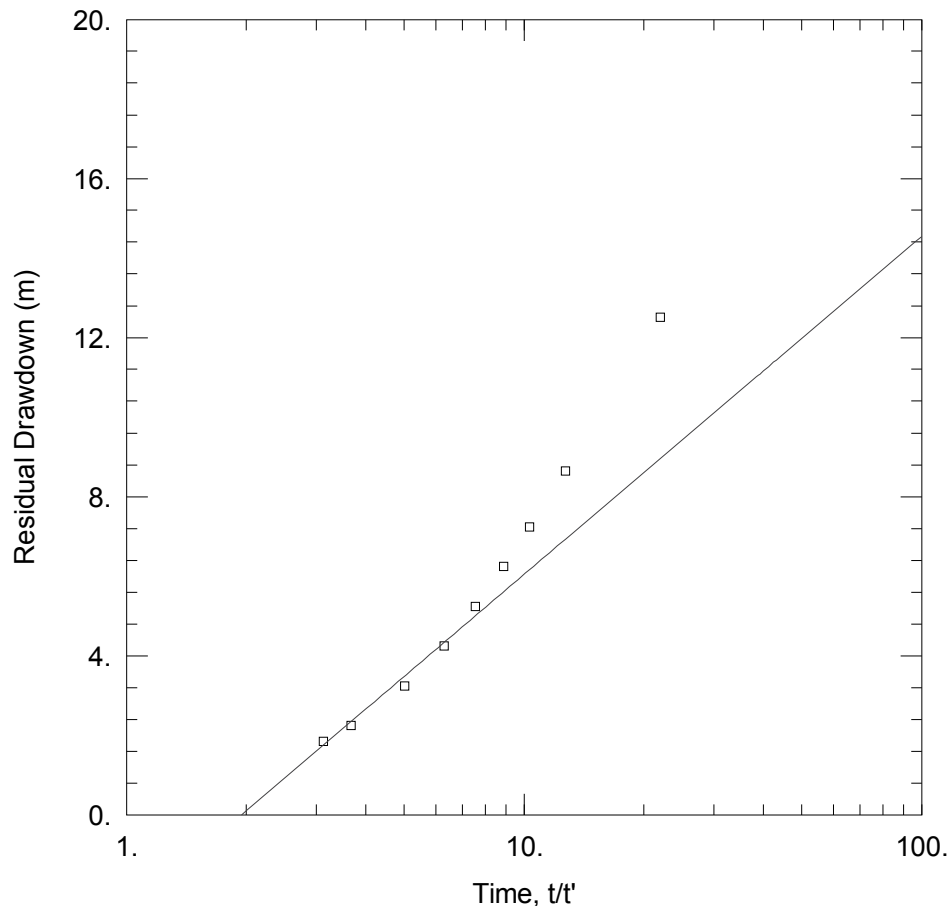
Well Name	X (m)	Y (m)
WM0429A	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ WM0429A	0	0

SOLUTION

Aquifer Model: ConfinedSolution Method: Theis (Recovery)T = 0.138 m²/dayS/S' = 0.06732



WELL TEST ANALYSIS

Data Set: N:\...\WM0430.aqt
Date: 03/29/12

Time: 15:56:18

PROJECT INFORMATION

Company: GHD
Client: Shenhua
Project: 2214551
Location: Gunnedeh
Test Well: WM0430
Test Date: 06/05/2011

AQUIFER DATA

Saturated Thickness: 15. m

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WM0430	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ WM0430	0	0

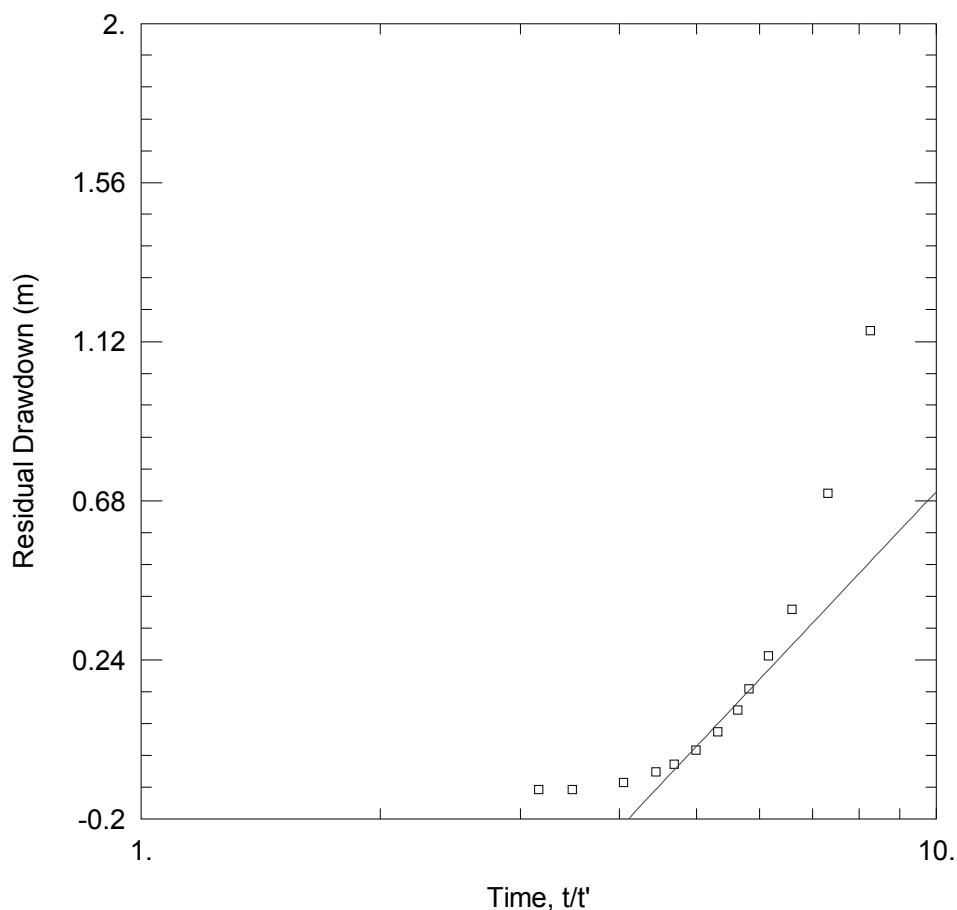
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

$T = 0.6871 \text{ m}^2/\text{day}$

$S/S' = 1.95$



WELL TEST ANALYSIS

Data Set: N:\...\WM0430A.aqt

Date: 03/29/12

Time: 15:58:22

PROJECT INFORMATION

Company: GHD

Client: Shenhua

Project: 2214551

Location: Gunnedeh

Test Well: WM0430A

Test Date: 06/05/2011

AQUIFER DATA

Saturated Thickness: 10. m

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WM0430A	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ WM0430A	0	0

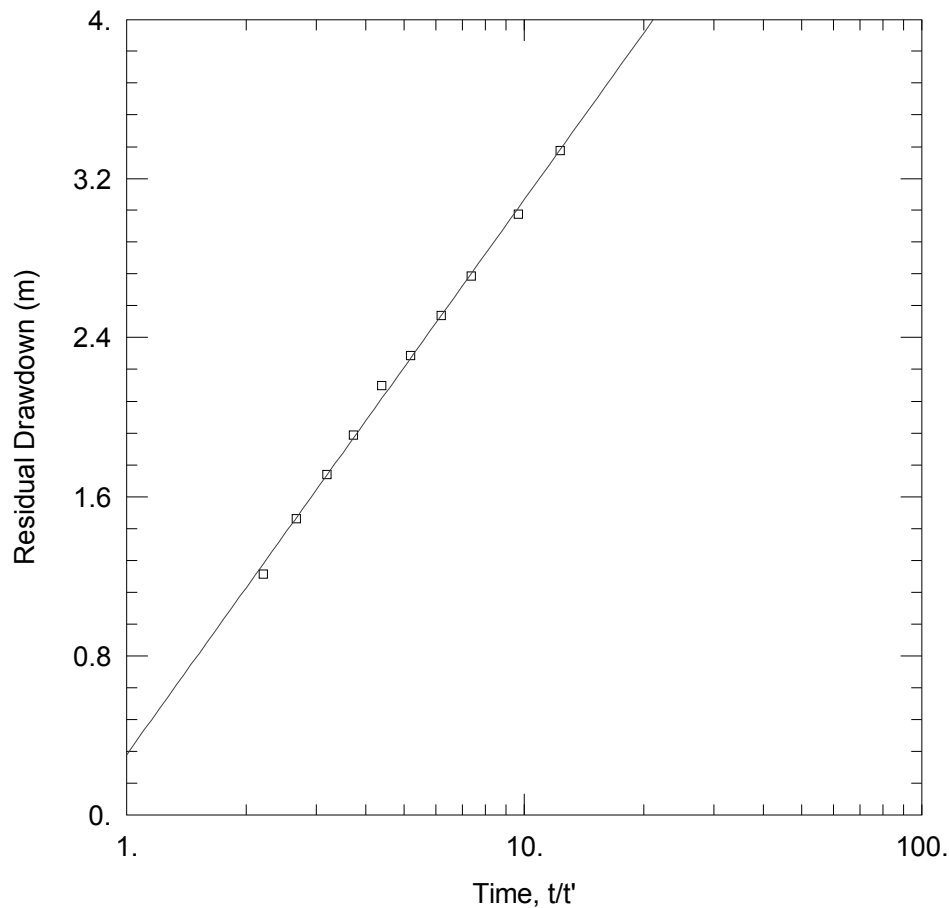
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

T = 0.2642 m²/day

S/S' = 4.999



WELL TEST ANALYSIS

Data Set: N:\...\WM0431.aqt
Date: 03/29/12

Time: 15:59:09

PROJECT INFORMATION

Company: GHD
Client: Shenhua
Project: 2214551
Location: Gunnedeh
Test Well: WM0431
Test Date: 04/05/2011

AQUIFER DATA

Saturated Thickness: 10. m

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WM0431	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ WM0431	0	0

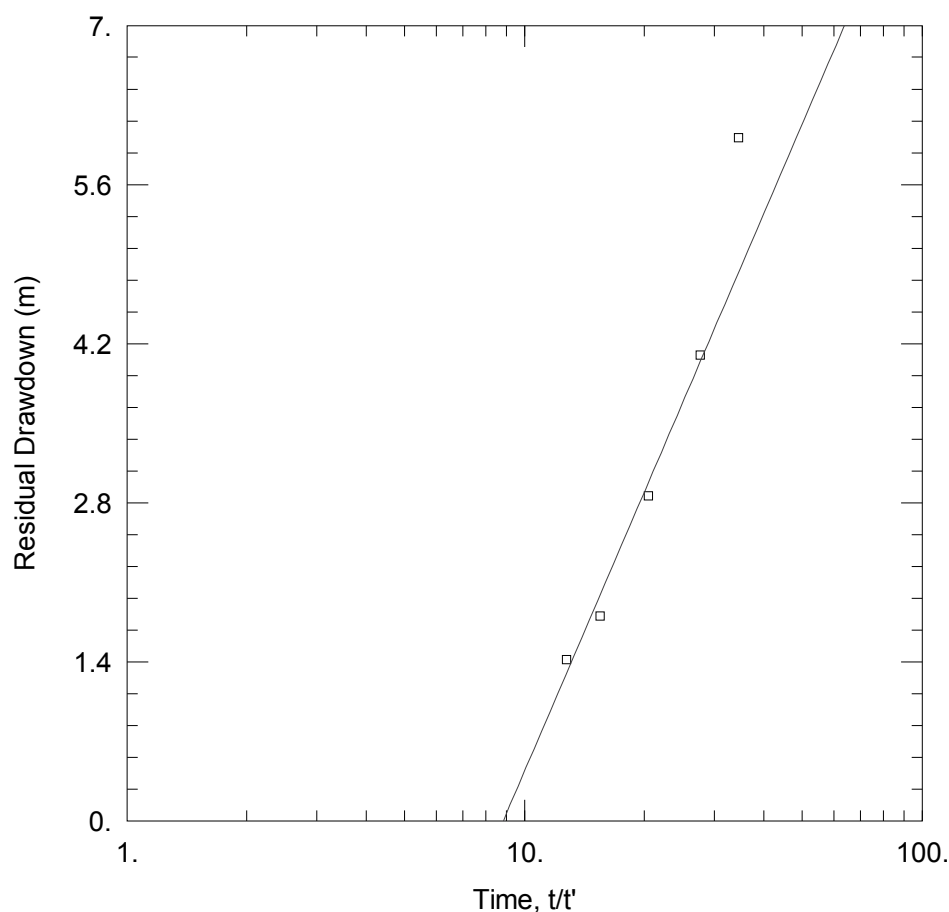
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

$T = 3.569 \text{ m}^2/\text{day}$

$S/S' = 0.7808$



WELL TEST ANALYSIS

Data Set: N:\...\WM0432.aqtDate: 03/29/12Time: 16:00:20

PROJECT INFORMATION

Company: GHDClient: ShenhuaProject: 2214551Location: GunnedehTest Well: WM0432Test Date: 30/04/2011

AQUIFER DATA

Saturated Thickness: 15. mAnisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

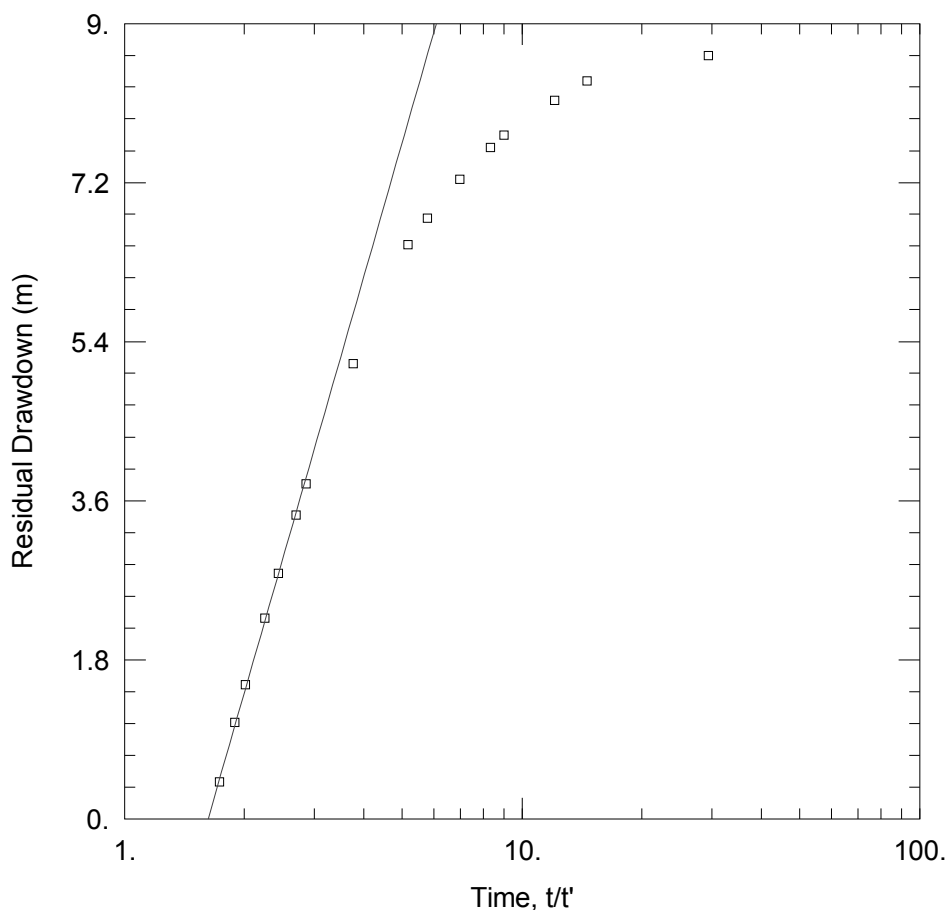
Well Name	X (m)	Y (m)
WM0432	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ WM0432	0	0

SOLUTION

Aquifer Model: ConfinedSolution Method: Theis (Recovery)T = 0.332 m²/dayS/S' = 8.855



WELL TEST ANALYSIS

Data Set: N:\...WM0432A.aqt
Date: 03/29/12

Time: 16:01:38

PROJECT INFORMATION

Company: GHD
Client: Shenhua
Project: 2214551
Location: Gunnedeh
Test Well: WM0432A
Test Date: 30/04/2011

AQUIFER DATA

Saturated Thickness: 15. m

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WM0432A	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ WM0432A	0	0

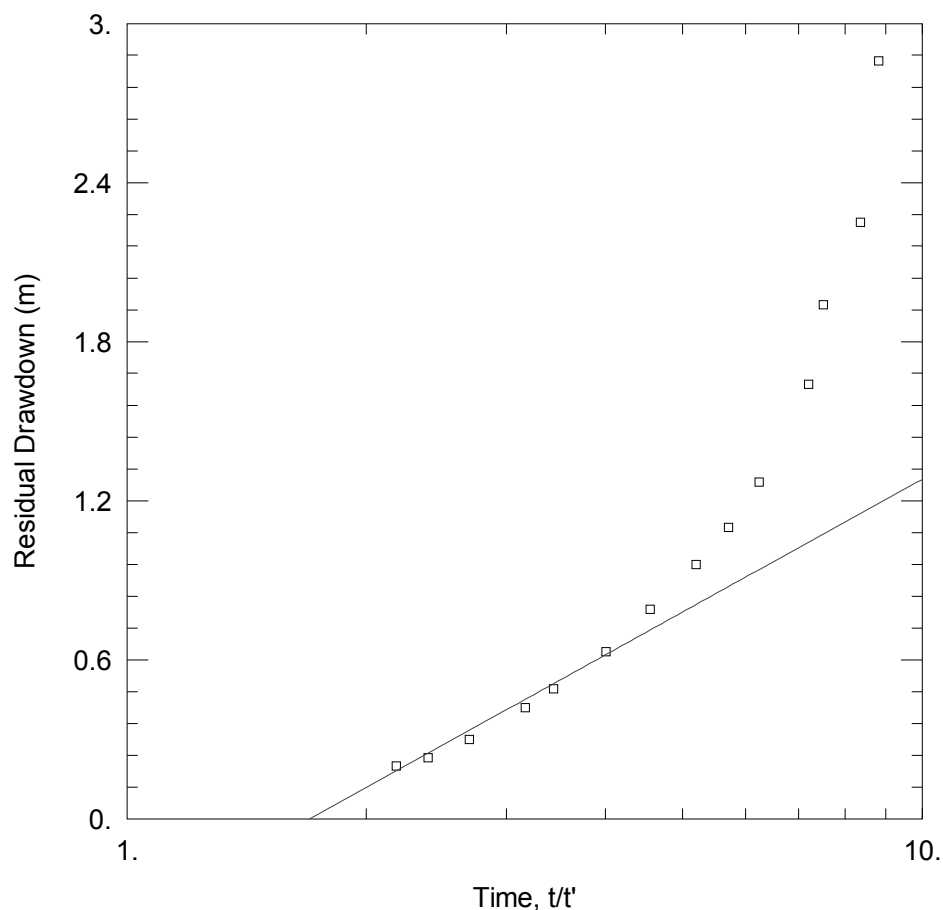
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

T = 0.03232 m²/day

S/S' = 1.626



WELL TEST ANALYSIS

Data Set: N:\...\WM0433.aqt

Date: 03/29/12

Time: 16:02:41

PROJECT INFORMATION

Company: GHD

Client: Shenhua

Project: 2214551

Location: Gunnedeh

Test Well: WM0433

Test Date: 02/05/2011

AQUIFER DATA

Saturated Thickness: 10. m

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WM0433	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ WM0433	0	0

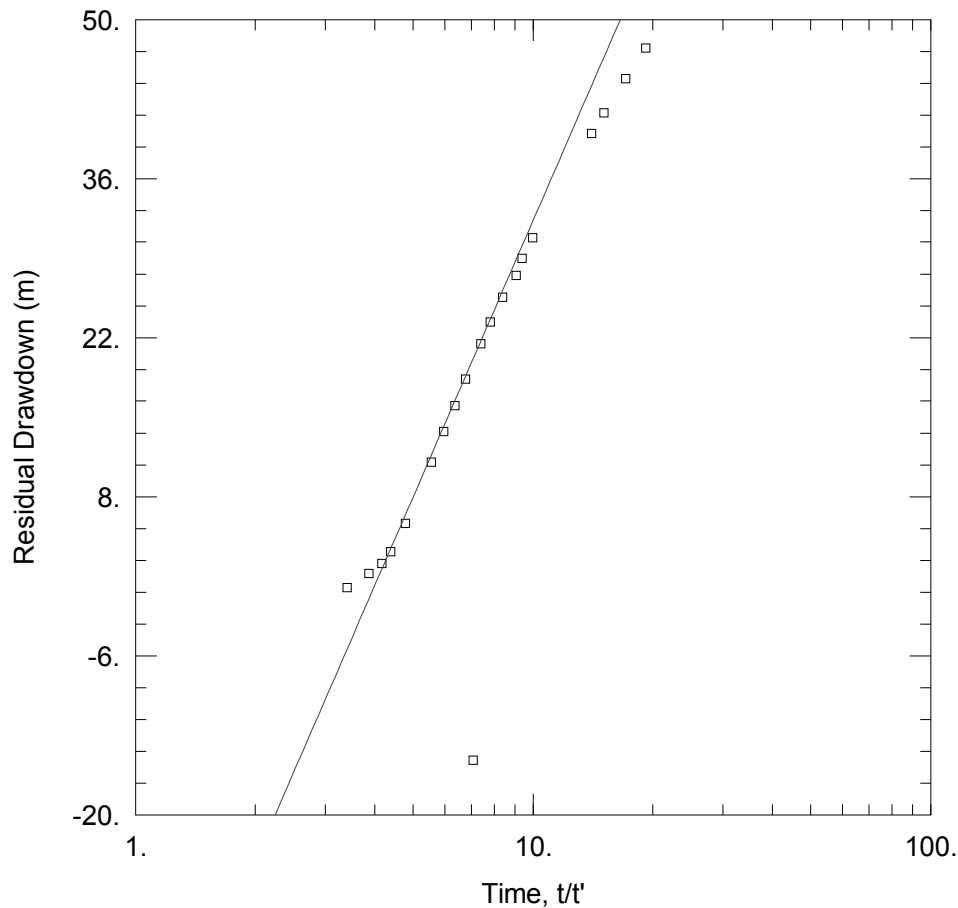
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

T = 4.189 m²/day

S/S' = 1.7



WELL TEST ANALYSIS

Data Set: N:\...\WM0561.aqt
Date: 03/29/12

Time: 16:04:33

PROJECT INFORMATION

Company: GHD
Client: Shenhua
Project: 2214551
Location: Gunnedeh
Test Well: WM0561
Test Date: 24/10/2012

AQUIFER DATA

Saturated Thickness: 50. m

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
WM0561	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ WM0561	0	0

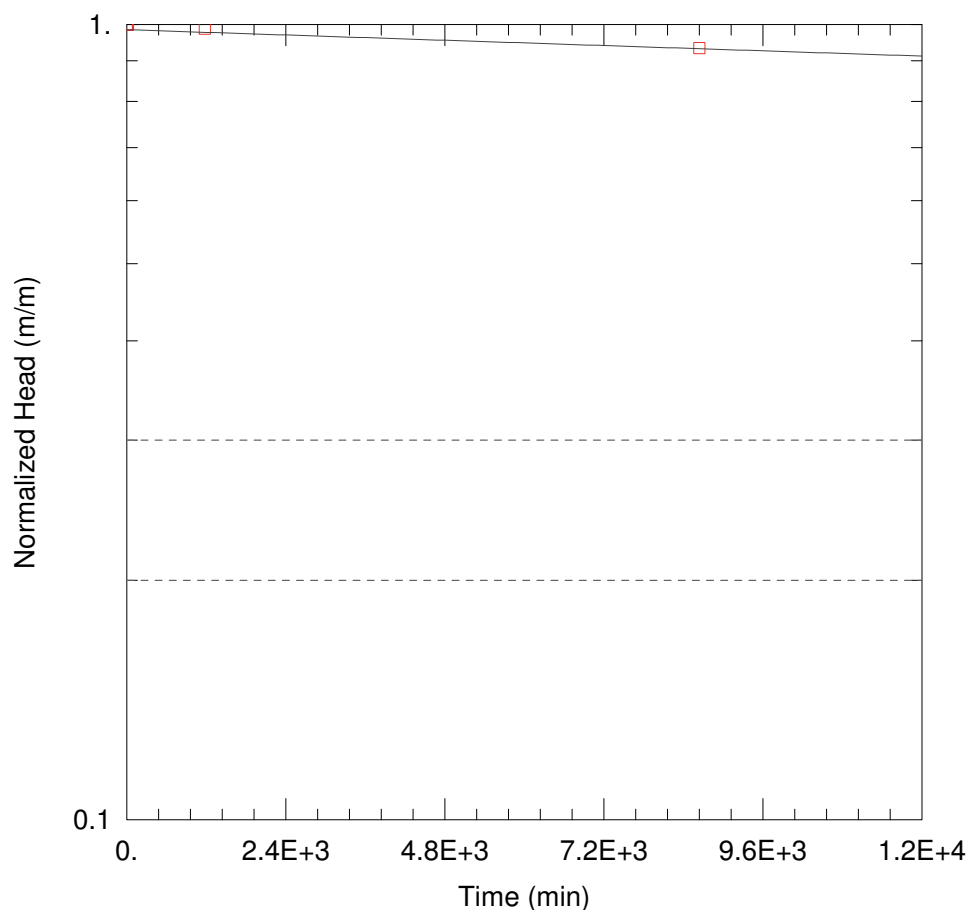
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

T = 0.007853 m²/day

S/S' = 3.983



WM0665 AGE SLUG TEST (RECOVERY)

Data Set: C:\Work\GHD\gunnadah\WM665_slug_recov.aqt

Date: 07/02/12

Time: 08:10:04

PROJECT INFORMATION

Company: GHD

Client: Shenhua

Project: 221570264

Test Well: WM0665

Test Date: 10/06/2012

AQUIFER DATA

Saturated Thickness: 93.5 m

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (WM665)

Initial Displacement: 92.33 m

Static Water Column Height: 93.5 m

Total Well Penetration Depth: 93.5 m

Screen Length: 6. m

Casing Radius: 0.025 m

Well Radius: 0.025 m

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

$K = 2.883E-6$ m/day

$y_0 = 90.92$ m



Appendix M

Packer Data Analyses and Summary of Results



March 2010

Shenhua Permeability Testing Summary

Project: 221455109

Formation	Borehole	WM0073		Top	EOH or bottom	Test Interval	TEST	Interpreted Conductivity (to total depth)	Adopted Conductivity (Individual Formation)
	Interval #	Tester	Date/Time	(mbgs)	(mbgs)	(mbgs)	TYPE	(m/s)	(m/s)
Watermark Fm	1	CK/DC	10/03/2010 0:00	243.2	269	25.8	Lugeon	6.60E-08	6.6E-08
Pamboola	2	CK/DC	11/03/2010 9:45	222.2	269	46.8	Lugeon	3.20E-08	1.0E-08
Melville COAL	3	CK	11/03/2010 0:00	213.2	269	55.8	Lugeon	4.60E-08	6.0E-08
Pamboola	4	CK	11/03/2010 0:00	192.2	269	76.8	Lugeon	2.30E-08	1.0E-08
Dolerite Intrusive	5	CK	12/03/2010 0:00	174.2	269	94.8	Falling Head	2.70E-08	2.0E-08
Weathered Dolerite	6	CK	12/03/2010 10:30	162.2	269	106.8	Falling Head	4.00E-08	6.0E-08
Arakula/Pamboola	7	CK	12/03/2010 13:30	150.2	269	118.8	Falling Head	2.20E-08	1.0E-08
Hoskissons COAL	8	CK	12/03/2010 15:00	138.2	269	130.8	Lugeon	2.70E-08	4.0E-08
Hoskissons COAL	8b	CK	13/03/2010 7:00	138.2	269	130.8	Falling Head	3.20E-08	4.0E-08
Coogal Sub Group	9	CK	13/03/2010 10:33	51.2	269	217.8	Falling Head	1.80E-08	3.0E-08
Formation	Borehole	WM0232		Top	EOH or bottom	Test Interval	TEST		
	Interval #	Tester	Date/Time	(mbgs)	(mbgs)	(mbgs)	TYPE	(m/s)	(m/s)
Pamboola	1	CK	15/03/2010 7:00	51.2	63	11.8	Lugeon	6.00E-08	6.0E-08
Ben Seam	2	CK	15/03/2010 10:50	45.2	63	17.8	Lugeon	5.70E-07	1.6E-06
Melville COAL	3	CK	15/03/2010 12:25	36.2	63	26.8	Lugeon	1.40E-06	3.0E-06
Interseam COAL	4	CK	15/03/2010 13:55	24.2	63	38.8	Lugeon	1.20E-06	7.5E-07
Formation	Borehole	WM0107		Top	EOH or bottom	Test Interval	TEST		
	Interval #	Tester	Date/Time	(mbgs)	(mbgs)	length [m]	TYPE	(m/s)	(m/s)
Pamboola	1	CK	14/03/2010 16:00	64	83	19	Lugeon	4.70E-06	3.2E-08
Melville	2	CK	15/03/2010 7:55	58	83	25	Lugeon	3.20E-08	3.2E-08
Interburden	3	CK	15/03/2010 10:35	31	83	52	Lugeon	3.10E-06	5.9E-06
Interburden inc F Seam	4	CK	15/03/2010 12:05	19	83	64	Lugeon	1.70E-07	3.2E-08
Formation	Borehole	WM0156		Top	EOH or bottom	Test Interval	TEST		
	Interval #	Tester	Date/Time	(mbgs)	(mbgs)	length [m]	TYPE	(m/s)	(m/s)
Pamboola	1	CK	18/03/2010 15:50	105.35	119	13.65	Lugeon	5.40E-08	5.4E-08
Melville	2	CK	19/03/2010 7:15	99.45	119	19.55	Lugeon	6.30E-09	1.0E-09
Below FED	3	CK	19/03/2010 8:45	63.45	119	55.55	Lugeon	1.10E-09	1.0E-09
Abandon - packer bypass	4	CK	19/03/2010 9:50	42.45	119	76.55	Lugeon		
Below Hoskissons	5	CK	19/03/2010 11:35	30.45	119	88.55	Lugeon	2.00E-08	5.0E-08
Abandon - UNSATURATED	6	CK		15.45	119	103.55			
Formation	Borehole	WM0247		Top	EOH or bottom	Test Interval	TEST		
	Interval #	Tester	Date/Time	(mbgs)	(mbgs)	length [m]	TYPE	(m/s)	(m/s)
Pamboola	1	CK	20/03/2010 11:00	76.2	122	45.8	Lugeon	6.80E-08	6.8E-08
Abandon - No MELVILLE	2	CK		64.2	122	57.8	Lugeon		
Formation	Borehole	WM0002		Top	EOH or bottom	Test Interval	TEST		
	Interval #	Tester	Date/Time	(mbgs)	(mbgs)	(mbgs)	TYPE	(m/s)	(m/s)
Pamboola Fm	1	AF	27/04/2010 7:00	103.5	114.6	11.1	Lugeon	3.10E-06	1.3E-07
Melville COAL	2	AF	27/04/2010 8:50:00 AM	97.5	114.6	17.1	Lugeon	1.30E-07	1.3E-07
Interburden 58.5 to base	3	AF	27/04/2010 13:00:00 AM	58.5	114.6	56.1	Lugeon	1.20E-06	1.3E-07
Hoskissons Coal	4	AF	27/04/2010 13:24:00 AM	49.5	114.6	65.1	Lugeon	3.00E-07	1.4E-06
Formation	Borehole	WM00291		Top	EOH or bottom	Test Interval	TEST		
	Interval #	Tester	Date/Time	(mbgs)	(mbgs)	(mbgs)	TYPE	(m/s)	(m/s)
Benelabri Fm above Caroon Coal	1	MO	23/05/2010 13:04	97.3	111.4	14.1	Lugeon	3.10E-08	3.10E-08



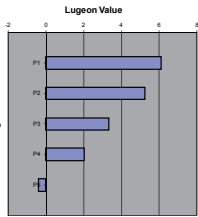
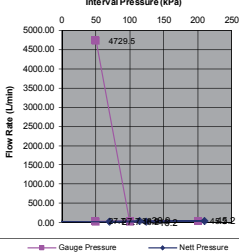
WATER PRESSURE TEST										Revision :	1.1
Job No. :	22/1455102	Hole No. :	WM0002	Drilling Method :	HQ	Vertical depth to Groundwater	Immediately prior to test (m bgl) :	0.40	Used in analysis (m bgl) :	0.40	
Client :	Shenhua Australia	Dip (Deg) :	90	Hole Diameter (m) :	0.096	Tested Length (m) :	11.10	Pressure Gauge Height (m agl) :	2.25	Presumed Water Temperature :	20
Project :	Curlewis	Interval Top (m) :	103.50	Packer Type :	Pneumatic - Wireline - Single			Casing Inner Diameter (mm) :	60.3		
Location :	Curlewis	Interval Base (m) :	114.60	Rock tested :							
Tested By :	AF	Computed By :	AF	Water Meter Reading in: Litres				Checked By :	CK	Date :	27-Apr-10
Date :	27-Apr-10	Date :	27-Apr-10								
Pressure Stage	Gauge Pressure kPa	No	Actual Time (h:m:s)	Time Intervals (min)	Water Meter Readings Reading (Litres)	Volume (L)	Discharge (L/min)	Discharge/m (L/min/m)	Remarks		
P1	50 7 Psi 434	0	0:00:00	0	0.0	40.869	0.00	0.00	0.00	c : 1	
		1	0:01:00	01:00	29.0	40.898	29.00	29.00	2.61		
		2	0:02:00	01:00	59.0	40.928	30.00	30.00	2.70		
		3	0:03:00	01:00	89.0	40.958	30.00	30.00	2.70		
		4	0:04:00	01:00	120.0	40.989	31.00	31.00	2.79		
		5	0:05:00	01:00	152.0	41.021	32.00	32.00	2.88		
		6	0:06:00	01:00	179.0	41.048	27.00	27.00	2.43		
		7	0:07:00	01:00	209.0	41.078	30.00	30.00	2.70		
		8	0:08:00	01:00	239.0	41.108	30.00	30.00	2.70		
		9	0:09:00	01:00	269.0	41.138	30.00	30.00	2.70		
		10	0:10:00	01:00	299.0	41.168	30.00	30.00	2.70		
Total :						299.00	26.94	26.94	Start Date & Time : 27-Apr-10 07:20		
Average:						29.900	2.694	2.694			
P2	100 14 Psi	0	0:00:00	0	0.0	41.168	0.00	0.00	0.00	c : 1	
		1	0:01:00	01:00	18.0	41.186	18.00	18.00	1.62		
		2	0:02:00	01:00	61.0	41.229	43.00	43.00	3.87		
		3	0:03:00	01:00	101.0	41.269	40.00	40.00	3.60		
		4	0:04:00	01:00	142.0	41.310	41.00	41.00	3.69		
		5	0:05:00	01:00	183.0	41.351	41.00	41.00	3.69		
		6	0:06:00	01:00	224.0	41.392	41.00	41.00	3.69		
		7	0:07:00	01:00	264.0	41.432	40.00	40.00	3.60		
		8	0:08:00	01:00	305.0	41.473	41.00	41.00	3.69		
		9	0:09:00	01:00	344.0	41.512	39.00	39.00	3.51		
		10	0:10:00	01:00	385.0	41.553	41.00	41.00	3.69		
Total :						385.00	34.68	34.68	27-Apr-10 12:40		
Average:						38.500	3.468	3.468			
P3	200 28 Psi	0	0:00:00	0	51.0	41.604	0.00	0.00	0.00	c : 1	
		1	0:01:00	01:00	55.0	41.659	4.00	4.00	0.36		
		2	0:02:00	01:00	118.0	41.722	63.00	63.00	5.68		
		3	0:03:00	01:00	168.0	41.772	50.00	50.00	4.50		
		4	0:04:00	01:00	223.0	41.827	55.00	55.00	4.95		
		5	0:05:00	01:00	278.0	41.882	55.00	55.00	4.95		
		6	0:06:00	01:00	334.0	41.938	56.00	56.00	5.05		
		7	0:07:00	01:00	388.0	41.992	54.00	54.00	4.86		
		8	0:08:00	01:00	442.0	42.046	54.00	54.00	4.86		
		9	0:09:00	01:00	495.0	42.099	53.00	53.00	4.77		
		10	0:10:00	01:00	552.0	42.156	57.00	57.00	5.14		
Total :						501.00	45.14	45.14	27-Apr-10 12:40		
Average:						50.100	4.514	4.514			
P4	100 14 Psi	0	0:00:00	0	0.0	42.156	0.00	0.00	0.00	c : 1	
		1	0:01:00	01:00	0.0	42.156	0.00	0.00	0.00		
		2	0:02:00	01:00	0.0	42.156	0.00	0.00	0.00		
		3	0:03:00	01:00	0.0	42.156	0.00	0.00	0.00		
		4	0:04:00	01:00	45.0	42.201	45.00	45.00	4.05		
		5	0:05:00	01:00	80.0	42.236	35.00	35.00	3.15		
		6	0:06:00	01:00	120.0	42.276	40.00	40.00	3.60		
		7	0:07:00	01:00	159.0	42.315	39.00	39.00	3.51		
		8	0:08:00	01:00	203.0	42.359	44.00	44.00	3.96		
		9	0:09:00	01:00	238.0	42.394	35.00	35.00	3.15		
		10	0:10:00	01:00	276.0	42.432	38.00	38.00	3.42		
Total :						276.00	24.86	24.86	27-Apr-10 12:40		
Average:						27.600	2.486	2.486			
P5	50 7 Psi	1	0:00:00	0	0.00	42.432	0.00	0.00	0.00	c : 1	
		2	0:01:00	01:00	33.00	42.465	33.00	33.00	2.97		
		3	0:02:00	01:00	64.00	42.496	31.00	31.00	2.79		
		4	0:03:00	01:00	92.00	42.524	28.00	28.00	2.52		
		5	0:04:00	01:00	121.00	42.553	29.00	29.00	2.61		
		6	0:05:00	01:00	150.00	42.582	29.00	29.00	2.61		
		7	0:06:00	01:00	178.00	42.610	28.00	28.00	2.52		
		8	0:07:00	01:00	207.00	42.639	29.00	29.00	2.61		
		9	0:08:00	01:00	235.00	42.667	28.00	28.00	2.52		
		10	0:09:00	01:00	263.00	42.695	28.00	28.00	2.52		
		11	0:10:00	01:00	291.00	42.723	28.00	28.00	2.52		
Total :						291.00	26.22	26.22	Finish Date & Time : 27-Apr-10 12:40		
Average:						29.100	2.622	2.622			
TEST RESULTS											
Stage No.	Lugeon Value	Lugeon Value Curve		Nett Pressures	Pressure Vs Flow		Interpreted Result & Hydraulic Conductivity				
P1	39.4			68.3			K = Q/H x 6.10889 x 10 ⁻⁶ x ((log(2L/D))/L), where				
P2	30.6			113.3			H _{LOSS} 6.56 kPa				
P3	22.1			204.7			Stage No. P4				
P4	20.8			119.4			Gauge Pressure 100 kPa				
P5	38.2			68.7			Q 27.60 L/min				
Flow Type				Comments:		Interpreted Result 21 uL					
TURBULENT FLOW						Reported Permeability at Stage P4					
K = 2.9E-06 m/s											

WATER PRESSURE TEST														
Job No. : 22/1455102		Hole No. : WM0002		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 1.1						
Client : Shenhua Australia		Dip (Deg) : 90		Hole Diameter (m) : 0.096		Immediately prior to test (m bgl) : 0.40		Used in analysis (m bgl) : 0.40						
Project :		Interval Top (m) : 97.50		Tested Length (m) : 17.10		Pressure Gauge Height (m agl) : 2.25		Presumed Water Temperature : 20						
Location : Curlewis		Interval Base (m) : 114.60		Packer Type: Pneumatic - Wireline - Single		Casing Inner Diameter (mm) : 60.3								
Tested By : AF		Computed By : AF		Rock tested :										
Date : 27-Apr-10		Date : 27-Apr-10		Water Meter Reading in: Litres		Checked By : CK		Date : 27-Apr-10						
Pressure Stage	Gauge Pressure kPa	No	Actual Time (h:m:s)	Time Intervals (min)	Water Meter Readings Reading (Litres)	Volume (L)	Discharge (L/min)	Discharge/m (L/min/m)	Remarks					
P1	50 7 Psi 434	0	0:00:00	0	0.0	42.753	0.00	0.00	c : 1					
		1	0:01:00	01:00	1.6	42.754	1.60	1.60						
		2	0:02:00	01:00	2.9	42.756	1.30	1.30						
		3	0:03:00	01:00	4.6	42.757	1.70	1.70						
		4	0:04:00	01:00	6.0	42.759	1.40	1.40						
		5	0:05:00	01:00	7.4	42.760	1.40	1.40						
		6	0:06:00	01:00	8.7	42.761	1.30	1.30						
		7	0:07:00	01:00	10.0	42.763	1.30	1.30						
		8	0:08:00	01:00	11.5	42.764	1.50	1.50						
		9	0:09:00	01:00	12.8	42.765	1.30	1.30						
		10	0:10:00	01:00	14.4	42.767	1.60	1.60						
Total :						14.40	0.84	Start Date & Time : 27-Apr-10 08:50						
Average:						1.440	0.084							
P2	100 14 Psi	0	0:00:00	0	0.0	42.767	0.00	0.00	c : 1					
		1	0:01:00	01:00	1.8	42.769	1.80	1.80						
		2	0:02:00	01:00	4.4	42.771	2.60	2.60						
		3	0:03:00	01:00	7.0	42.774	2.60	2.60						
		4	0:04:00	01:00	9.4	42.776	2.40	2.40						
		5	0:05:00	01:00	11.6	42.779	2.20	2.20						
		6	0:06:00	01:00	13.8	42.781	2.20	2.20						
		7	0:07:00	01:00	16.0	42.783	2.20	2.20						
		8	0:08:00	01:00	17.8	42.785	1.80	1.80						
		9	0:09:00	01:00	19.7	42.787	1.90	1.90						
		10	0:10:00	01:00	21.6	42.789	1.90	1.90						
Total :						21.60	1.26	27-Apr-10 08:50						
Average:						2.160	0.126							
P3	200 28 Psi	0	0:00:00	0	4.2	42.793	0.00	0.00	c : 1					
		1	0:01:00	01:00	4.2	42.797	0.00	0.00						
		2	0:02:00	01:00	8.2	42.801	4.00	4.00						
		3	0:03:00	01:00	11.6	42.804	3.40	3.40						
		4	0:04:00	01:00	15.0	42.808	3.40	3.40						
		5	0:05:00	01:00	18.2	42.811	3.20	3.20						
		6	0:06:00	01:00	21.4	42.814	3.20	3.20						
		7	0:07:00	01:00	25.0	42.818	3.60	3.60						
		8	0:08:00	01:00	27.6	42.820	2.60	2.60						
		9	0:09:00	01:00	30.8	42.824	3.20	3.20						
		10	0:10:00	01:00	33.6	42.826	2.80	2.80						
Total :						29.40	1.72	27-Apr-10 08:50						
Average:						2.940	0.172							
P4	100 14 Psi	0	0:00:00	0	0.0	42.826	0.00	0.00	c : 1					
		1	0:01:00	01:00	0.0	42.826	0.00	0.00						
		2	0:02:00	01:00	0.0	42.826	0.00	0.00						
		3	0:03:00	01:00	0.0	42.826	0.00	0.00						
		4	0:04:00	01:00	2.2	42.829	2.20	2.20						
		5	0:05:00	01:00	4.0	42.830	1.80	1.80						
		6	0:06:00	01:00	6.0	42.832	2.00	2.00						
		7	0:07:00	01:00	8.0	42.834	2.00	2.00						
		8	0:08:00	01:00	10.0	42.836	2.00	2.00						
		9	0:09:00	01:00	11.8	42.838	1.80	1.80						
		10	0:10:00	01:00	13.9	42.840	2.10	2.10						
Total :						13.90	0.81	27-Apr-10 08:50						
Average:						1.390	0.081							
P5	50 7 Psi	1	0:00:00	0	0.00	42.840	0.00	0.00	c : 1					
		2	0:01:00	01:00	2.00	42.842	2.00	2.00						
		3	0:02:00	01:00	3.10	42.843	1.10	1.10						
		4	0:03:00	01:00	4.20	42.845	1.10	1.10						
		5	0:04:00	01:00	5.60	42.846	1.40	1.40						
		6	0:05:00	01:00	6.70	42.847	1.10	1.10						
		7	0:06:00	01:00	7.90	42.848	1.20	1.20						
		8	0:07:00	01:00	9.00	42.849	1.10	1.10						
		9	0:08:00	01:00	10.20	42.851	1.20	1.20						
		10	0:09:00	01:00	11.50	42.852	1.30	1.30						
		11	0:10:00	01:00	12.70	42.853	1.20	1.20						
Total :						12.70	0.74	Finish Date & Time : 27-Apr-10 08:50						
Average:						1.270	0.074							
TEST RESULTS														
Stage No.	Lugeon Value	Lugeon Value Curve		Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity								
P1	1.1			76.0		K = Q/H x 6.10889 x 10 ⁻⁶ x ((log(2L/D))/L), where H _{LOSS} 0.02 kPa Stage No. P4 Gauge Pressure 100 kPa Q 1.39 L/min H 12.8 m Interpreted Result 1 uL Reported Permeability at Stage P4								
P2	1.0			125.9										
P3	0.8			225.9										
P4	0.6			126.0										
P5	1.0			76.0										
Flow Type		Comments:												
TURBULENT FLOW		K = 9.9E-08 m/s												



WATER PRESSURE TEST										Revision :	1.1
Job No. :	22/1455102	Hole No. :	WM0002	Drilling Method :	HQ	Vertical depth to Groundwater	Immediately prior to test (m bgl) :	0.40			
Client :	Shenhua Australia	Dip (Deg) :	90	Hole Diameter (m) :	0.096		Used in analysis (m bgl) :	0.40			
Project :		Interval Top (m) :	58.50	Tested Length (m) :	56.10		Pressure Gauge Height (m agl) :	2.25			
Location :	Curlewis	Interval Base (m) :	114.60	Packer Type:	Pneumatic - Wireline - Single			Presumed Water Temperature :	20		
Tested By :	AF	Computed By :	AF	Rock tested :			Casing Inner Diameter (mm) :	60.3			
Date :	27-Apr-10	Date :	27-Apr-10	Water Meter Reading in:	Litres	Checked By :	CK		Date :	27-Apr-10	
Pressure Stage	Gauge Pressure kPa	No	Actual Time (h:m:s)	Time Intervals (min)	Water Meter Readings Reading (Litres)	Volume (L)	Discharge (L/min)	Discharge/m (L/min/m)	Remarks		
P1	50 7 Psi 434	0	0:00:00	0	0.0	43.112	0.00	0.00	0.00	c :	1
		1	0:01:00	01:00	41.0	43.153	41.00	41.00	0.73		
		2	0:02:00	01:00	81.0	43.193	40.00	40.00	0.71		
		3	0:03:00	01:00	121.0	43.233	40.00	40.00	0.71		
		4	0:04:00	01:00	161.0	43.273	40.00	40.00	0.71		
		5	0:05:00	01:00	201.0	43.313	40.00	40.00	0.71		
		6	0:06:00	01:00	242.0	43.354	41.00	41.00	0.73		
		7	0:07:00	01:00	283.0	43.395	41.00	41.00	0.73		
		8	0:08:00	01:00	325.0	43.437	42.00	42.00	0.75		
		9	0:09:00	01:00	367.0	43.479	42.00	42.00	0.75		
		10	0:10:00	01:00	409.0	43.521	42.00	42.00	0.75		
Total :						409.00	7.29	Start Date & Time :			
Average:						40.900	0.729	27-Apr-10 10:50			
P2	100 14 Psi	0	0:00:00	0	0.0	43.521	0.00	0.00	0.00	c :	1
		1	0:01:00	01:00	45.0	43.566	45.00	45.00	0.80		
		2	0:02:00	01:00	104.0	43.625	59.00	59.00	1.05		
		3	0:03:00	01:00	163.0	43.684	59.00	59.00	1.05		
		4	0:04:00	01:00	220.0	43.741	57.00	57.00	1.02		
		5	0:05:00	01:00	277.0	43.798	57.00	57.00	1.02		
		6	0:06:00	01:00	334.0	43.855	57.00	57.00	1.02		
		7	0:07:00	01:00	393.0	43.914	59.00	59.00	1.05		
		8	0:08:00	01:00	445.0	43.966	52.00	52.00	0.93		
		9	0:09:00	01:00	498.0	44.019	53.00	53.00	0.94		
		10	0:10:00	01:00	550.0	44.071	52.00	52.00	0.93		
Total :						550.00	9.80	27-Apr-10 10:50			
Average:						55.000	0.980	27-Apr-10 10:50			
P3	200 28 Psi	0	0:00:00	0	73.0	44.144	0.00	0.00	0.00	c :	1
		1	0:01:00	01:00	71.0	44.215	-2.00	-2.00	-0.04		
		2	0:02:00	01:00	143.0	44.287	72.00	72.00	1.28		
		3	0:03:00	01:00	217.0	44.361	74.00	74.00	1.32		
		4	0:04:00	01:00	294.0	44.438	77.00	77.00	1.37		
		5	0:05:00	01:00	377.0	44.521	83.00	83.00	1.48		
		6	0:06:00	01:00	452.0	44.596	75.00	75.00	1.34		
		7	0:07:00	01:00	524.0	44.668	72.00	72.00	1.28		
		8	0:08:00	01:00	596.0	44.740	72.00	72.00	1.28		
		9	0:09:00	01:00	670.0	44.814	74.00	74.00	1.32		
		10	0:10:00	01:00	741.0	44.885	71.00	71.00	1.27		
Total :						668.00	11.91	27-Apr-10 10:50			
Average:						66.800	1.191	27-Apr-10 10:50			
P4	100 14 Psi	0	0:00:00	0	0.0	44.885	0.00	0.00	0.00	c :	1
		1	0:01:00	01:00	0.0	44.885	0.00	0.00	0.00		
		2	0:02:00	01:00	0.0	44.885	0.00	0.00	0.00		
		3	0:03:00	01:00	0.0	44.885	0.00	0.00	0.00		
		4	0:04:00	01:00	54.0	44.939	54.00	54.00	0.96		
		5	0:05:00	01:00	106.0	44.991	52.00	52.00	0.93		
		6	0:06:00	01:00	158.0	45.043	52.00	52.00	0.93		
		7	0:07:00	01:00	213.0	45.098	55.00	55.00	0.98		
		8	0:08:00	01:00	262.0	45.147	49.00	49.00	0.87		
		9	0:09:00	01:00	313.0	45.198	51.00	51.00	0.91		
		10	0:10:00	01:00	364.0	45.249	51.00	51.00	0.91		
Total :						364.00	6.49	27-Apr-10 10:50			
Average:						36.400	0.649	27-Apr-10 10:50			
P5	50 7 Psi	1	0:00:00	0	0.00	45.249	0.00	0.00	0.00	c :	1
		2	0:01:00	01:00	38.00	45.287	38.00	38.00	0.68		
		3	0:02:00	01:00	75.00	45.324	37.00	37.00	0.66		
		4	0:03:00	01:00	113.00	45.362	38.00	38.00	0.68		
		5	0:04:00	01:00	150.00	45.399	37.00	37.00	0.66		
		6	0:05:00	01:00	187.00	45.436	37.00	37.00	0.66		
		7	0:06:00	01:00	225.00	45.474	38.00	38.00	0.68		
		8	0:07:00	01:00	262.00	45.511	37.00	37.00	0.66		
		9	0:08:00	01:00	300.00	45.549	38.00	38.00	0.68		
		10	0:09:00	01:00	338.00	45.587	38.00	38.00	0.68		
		11	0:10:00	01:00	376.00	45.625	38.00	38.00	0.68		
Total :						376.00	6.70	Finish Date & Time :			
Average:						37.600	0.670	27-Apr-10 10:50			
TEST RESULTS											
Stage No.	Lugeon Value	Lugeon Value Curve		Nett Pressures	Pressure Vs Flow		Interpreted Result & Hydraulic Conductivity				
P1	11.7			62.4			K = Q/H x 6.10889 x 10 ⁻⁶ x (log(2L/D))/L, where				
P2	9.7			101.4			H _{LOSS} 10.81 kPa				
P3	6.3			189.9			Stage No. P4				
P4	5.6			115.2			Gauge Pressure 100 kPa				
P5	10.4			64.5			Q 36.40 L/min				
						H 11.7 m					
						Interpreted Result 6 uL					
						Reported Permeability at Stage P4					
Flow Type											
TURBULENT FLOW											
Comments:											
K = 1.0E-06 m/s											



WATER PRESSURE TEST										Revision :	1.1
Job No. :	22/1455102	Hole No. :	WM0002	Drilling Method :	HQ	Vertical depth to Groundwater	Immediately prior to test (m bgl) :	0.40			0.40
Client :	Shenhua Australia	Dip (Deg) :	90	Hole Diameter (m) :	0.096		Used in analysis (m bgl) :	0.40			0.40
Project :		Interval Top (m) :	49.50	Tested Length (m) :	65.10		Pressure Gauge Height (m agl) :	2.25			2.25
Location :	Curlewis	Interval Base (m) :	114.60	Packer Type :	Pneumatic - Wireline - Single			Presumed Water Temperature :	20		
Tested By :	AF	Computed By :	AF	Rock tested :				Casing Inner Diameter (mm) :	60.3		
Date :	27-Apr-10	Date :	27-Apr-10	Water Meter Reading in:	Litres	Checked By :	CK	Date :	27-Apr-10		
Pressure Stage	Gauge Pressure kPa	No	Actual Time (h:m:s)	Time Intervals (min)	Water Meter Readings Reading (Litres)	Volume (L)	Discharge (L/min)	Discharge/m (L/min/m)	Remarks		
P1	50 7 Psi 434	0	0:00:00	0	0.0	45.902	0.00	0.00	0.00	c : 1	
		1	0:01:00	01:00	27.0	45.929	27.00	27.00	0.41		
		2	0:02:00	01:00	55.5	45.957	28.50	28.50	0.44		
		3	0:03:00	01:00	82.5	45.984	27.00	27.00	0.41		
		4	0:04:00	01:00	111.0	46.013	28.50	28.50	0.44		
		5	0:05:00	01:00	139.0	46.041	28.00	28.00	0.43		
		6	0:06:00	01:00	166.5	46.068	27.50	27.50	0.42		
		7	0:07:00	01:00	194.5	46.096	28.00	28.00	0.43		
		8	0:08:00	01:00	222.5	46.124	28.00	28.00	0.43		
		9	0:09:00	01:00	250.5	46.152	28.00	28.00	0.43		
		10	0:10:00	01:00	277.0	46.179	26.50	26.50	0.41		
Total :						277.00	4.25	Start Date & Time :			
Average:						27.700	0.425	27-Apr-10 12:10			
P2	100 14 Psi	0	0:00:00	0	0.0	46.179	0.00	0.00	0.00	c : 1	
		1	0:01:00	01:00	34.5	46.213	34.50	34.50	0.53		
		2	0:02:00	01:00	76.5	46.255	42.00	42.00	0.65		
		3	0:03:00	01:00	118.5	46.297	42.00	42.00	0.65		
		4	0:04:00	01:00	158.5	46.337	40.00	40.00	0.61		
		5	0:05:00	01:00	197.0	46.376	38.50	38.50	0.59		
		6	0:06:00	01:00	235.5	46.414	38.50	38.50	0.59		
		7	0:07:00	01:00	274.0	46.453	38.50	38.50	0.59		
		8	0:08:00	01:00	312.0	46.491	38.00	38.00	0.58		
		9	0:09:00	01:00	350.5	46.529	38.50	38.50	0.59		
		10	0:10:00	01:00	388.5	46.567	38.00	38.00	0.58		
Total :						388.50	5.97	27-Apr-10 12:10			
Average:						38.850	0.597				
P3	200 28 Psi	0	0:00:00	0	57.0	46.624	0.00	0.00	0.00	c : 1	
		1	0:01:00	01:00	57.0	46.681	0.00	0.00	0.00		
		2	0:02:00	01:00	111.0	46.735	54.00	54.00	0.83		
		3	0:03:00	01:00	168.5	46.793	57.50	57.50	0.88		
		4	0:04:00	01:00	225.0	46.849	56.50	56.50	0.87		
		5	0:05:00	01:00	280.0	46.904	55.00	55.00	0.84		
		6	0:06:00	01:00	327.0	46.951	47.00	47.00	0.72		
		7	0:07:00	01:00	379.0	47.003	52.00	52.00	0.80		
		8	0:08:00	01:00	425.0	47.049	46.00	46.00	0.71		
		9	0:09:00	01:00	469.0	47.093	44.00	44.00	0.68		
		10	0:10:00	01:00	509.0	47.133	40.00	40.00	0.61		
Total :						452.00	6.94	27-Apr-10 12:10			
Average:						45.200	0.694				
P4	100 14 Psi	0	0:00:00	0	0.0	47.133	0.00	0.00	0.00	c : 1	
		1	0:01:00	01:00	0.0	47.133	0.00	0.00	0.00		
		2	0:02:00	01:00	0.0	47.133	0.00	0.00	0.00		
		3	0:03:00	01:00	0.0	47.133	0.00	0.00	0.00		
		4	0:04:00	01:00	24.0	47.157	24.00	24.00	0.37		
		5	0:05:00	01:00	48.5	47.182	24.50	24.50	0.38		
		6	0:06:00	01:00	74.0	47.207	25.50	25.50	0.39		
		7	0:07:00	01:00	100.0	47.233	26.00	26.00	0.40		
		8	0:08:00	01:00	126.0	47.259	26.00	26.00	0.40		
		9	0:09:00	01:00	150.0	47.283	24.00	24.00	0.37		
		10	0:10:00	01:00	162.0	47.295	12.00	12.00	0.18		
Total :						162.00	2.49	27-Apr-10 12:10			
Average:						16.200	0.249				
P5	50 7 Psi	1	0:00:00	0	-47295.00		0.00	0.00	0.00	c : 1	
		2	0:01:00	01:00	0.00		47295.00	47295.00	726.50		
		3	0:02:00	01:00	0.00		0.00	0.00	0.00		
		4	0:03:00	01:00	0.00		0.00	0.00	0.00		
		5	0:04:00	01:00	0.00		0.00	0.00	0.00		
		6	0:05:00	01:00	0.00		0.00	0.00	0.00		
		7	0:06:00	01:00	0.00		0.00	0.00	0.00		
		8	0:07:00	01:00	0.00		0.00	0.00	0.00		
		9	0:08:00	01:00	0.00		0.00	0.00	0.00		
		10	0:09:00	01:00	0.00		0.00	0.00	0.00		
		11	0:10:00	01:00	0.00		0.00	0.00	0.00		
Total :						47295.00	726.50	Finish Date & Time :			
Average:						4729.500	72.650	27-Apr-10 12:10			
TEST RESULTS											
Stage No.	Lugeon Value	Lugeon Value Curve		Nett Pressures	Pressure Vs Flow		Interpreted Result & Hydraulic Conductivity				
P1	6.1			69.8			$K = Q/H \times 6.10889 \times 10^{-6} \times (\log(2L/D))/L$, where H _{LOSS} 6.23 kPa Stage No. P1 Gauge Pressure 50 kPa Q 27.70 L/min H 7.1 m Interpreted Result 6 uL Reported Permeability at Stage P1				
P2	5.2			113.8							
P3	3.3			209.5							
P4	2.0			123.8							
P5	-0.4			-177074.0							
Flow Type											
TURBULENT FLOW											
Comments:											
K = 1.1E-06 m/s											

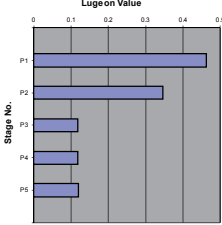
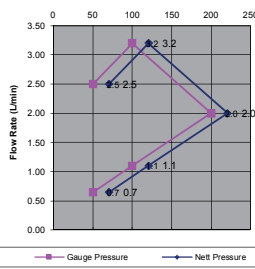


WATER PRESSURE TEST									
Job No. : 22/1455102		Hole No. : WM0073		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 1.1	
Client : Shenhua Australia		Dip (Deg) : 90		Hole Diameter (m) : 0.096		Immediately prior to test (m bgl) : 0.40		Used in analysis (m bgl) : 0.40	
Project : Curlewis		Interval Top (m) : 243.00		Tested Length (m) : 26.00		Pressure Gauge Height (m agl) : 2.25		Presumed Water Temperature : 20	
Location : Curlewis		Interval Base (m) : 269.00		Packer Type: Pneumatic - Wireline - Single		Casing Inner Diameter (mm) : 60.3		Date : 10-Mar-10	
Tested By : DC/CK		Computed By : CK		Rock tested :		Water Meter Reading in: Litres		Checked By :	
Date : 9-Mar-10		Date : 9-Mar-10		Water Meter Reading in: Litres		Checked By :		Date : 10-Mar-10	
Pressure Stage	Gauge Pressure kPa	No	Actual	Time	Water Meter Readings	Volume	Discharge	Discharge/m	Remarks
			Time (h:m:s)	Intervals (min)	Reading (Litres)	m3	(L)	(L/min)	
P1	50					Total :	0.00	0.00	Start Date & Time : 10-Mar-10 00:00
	7 Psi					Average:	3.500	0.135	
P2	100					Total :	0.00	0.00	09-Mar-07 13:34
	14 Psi					Average:	1.600	0.062	
P3	200					Total :	0.00	0.00	09-Mar-07 13:49
	28 Psi					Average:	2.100	0.081	
P4	100					Total :	0.00	0.00	09-Mar-07 13:59
	14 Psi					Average:	1.200	0.046	
P5	50					Total :	0.00	0.00	Finish Date & Time : 09-Mar-07 14:21
	7 Psi					Average:	0.800	0.031	
TEST RESULTS									
Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow		Interpreted Result & Hydraulic Conductivity			
P1	1.8		75.8			K = Q/H x 6.10889 x 10^-6 x ((log(2L/D))/L), where			
P2	0.5		126.0			H LOSS 0.01 kPa			
P3	0.4		225.9			Stage No. P5			
P4	0.4		126.0			Gauge Pressure 50 kPa			
P5	0.4		76.0			Q 0.80 L/min			
Flow Type			Comments:		H 7.7 m				
VOID FILLING					Interpreted Result 0 uL				
					Reported Permeability at Stage P5				
					K = 6.6E-08 m/s				

WATER PRESSURE TEST									
Job No. : 22/1455102		Hole No. : WM0073		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 1.1	
Client : Shenhua Australia		Dip (Deg) : 90		Hole Diameter (m) : 0.096		Immediately prior to test (m bgl) : 0.40		Used in analysis (m bgl) : 0.40	
Project : Curlewis		Interval Top (m) : 222.00		Tested Length (m) : 47.00		Pressure Gauge Height (m agl) : 1.70		Presumed Water Temperature : 1	
Location : Curlewis		Interval Base (m) : 269.00		Packer Type : Pneumatic - Wireline - Single		Casing Inner Diameter (mm) : 60.3		Date : 10-Mar-10	
Tested By : CK		Computed By : CK		Rock tested :		Checked By : AF		Date : 10-Mar-10	
Date : 10-Mar-10		Date : 10-Mar-10		Water Meter Reading in: Litres		Volume (L)		Discharge (L/min)	
Pressure Stage	Gauge Pressure kPa	No	Actual Time (h:m:s)	Time Intervals (min)	Water Meter Readings Reading (Litres)	Volume (L)	Discharge (L/min)	Discharge/m (L/min/m)	Remarks
P1	50					Total : 0.00	0.00	0.00	Start Date & Time : 10-Mar-07 08:20
P2	100					Average: 9.000	0.191	0.00	10-Mar-10 00:00
P3	200					Total : 0.00	0.00	0.00	10-Mar-10 00:00
P4	100					Average: 1.100	0.023	0.00	10-Mar-10 00:00
P5	50					Total : 0.00	0.00	0.00	Finish Date & Time : 10-Mar-10 00:00
						Average: 1.900	0.040	0.00	
						Total : 0.00	0.00	0.00	
						Average: 1.000	0.021	0.00	
						Total : 0.00	0.00	0.00	
						Average: 0.600	0.013	0.00	
TEST RESULTS									
Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity				
P1	2.7		69.7		K = Q/H x 6.10889 x 10^-5 x ((log(2L/D))/L), where				
P2	0.2		120.6		H LOSS 0.01 kPa				
P3	0.2		220.5		Stage No. P5				
P4	0.2		120.6		Gauge Pressure 50 kPa				
P5	0.2		70.6		Q 0.60 L/min				
					H 7.2 m				
					Interpreted Result 0 uL				
					Reported Permeability at Stage P5				
Flow Type					K = 3.2E-08 m/s				
VOID FILLING									

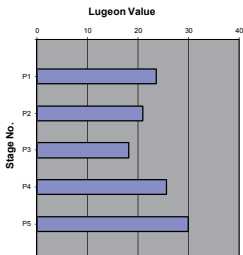
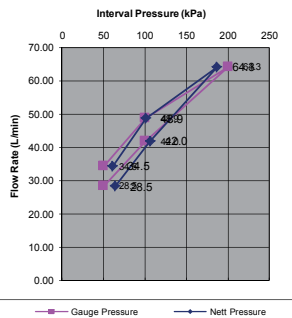


WATER PRESSURE TEST										
Job No. : 22/1455102		Hole No. : WM0073		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 1.1		
Client : Shenhua Australia		Dip (Deg) : 90		Hole Diameter (m) : 0.096		Immediately prior to test (m bgl) : 0.40		Used in analysis (m bgl) : 0.40		
Project : Interval Top (m) : 213.00		Tested Length (m) : 56.00		Packer Type : Pneumatic - Wireline - Single		Pressure Gauge Height (m agl) : 1.70		Presumed Water Temperature : 1		
Location : Curlewis		Interval Base (m) : 269.00		Rock tested :		Casing Inner Diameter (mm) : 60.3		Date : 11-Mar-10		
Tested By : CK		Computed By : CK		Water Meter Reading in : Litres		Checked By :		Date : 11-Mar-10		
Pressure Stage	Gauge Pressure kPa	No	Actual	Time	Water Meter Readings		Volume	Discharge	Discharge/m	
			Time (h:m:s)	Intervals (min)	Reading (Litres)	m3	(L)	(L/min)	(L/min/m)	
P1	50		Total : 0.00				0.00	0.00	Start Date & Time : 11-Mar-10 11:00	
P2	100		Average: 1.000				0.018	0.018		
P3	200		Total : 0.00				0.00	0.00	11-Mar-10 00:00	
P4	100		Average: 1.375				0.025	0.025		
P5	50		Total : 0.00				0.00	0.00	11-Mar-10 00:00	
			Average: 1.250				0.022	0.022		
			Total : 0.00				0.00	0.00	11-Mar-10 00:00	
			Average: 0.700				0.013	0.013		
			Total : 0.00				0.00	0.00	Finish Date & Time : 11-Mar-10 00:00	
			Average: 0.100				0.002	0.002		
TEST RESULTS										
Stage No.	Lugeon Value	Lugeon Value Curve		Nett Pressures	Pressure Vs Flow		Interpreted Result & Hydraulic Conductivity			
P1	0.3			70.6			K = Q/H x 6.10889 x 10^-6 x ((log(2L/D))/L), where			
P2	0.2			120.6			H LOSS 0.00 kPa			
P3	0.1			220.6			Stage No. P5			
P4	0.1			120.6			Gauge Pressure 50 kPa			
P5	0.0			70.6			Q 0.10 L/min			
Flow Type								H 7.2 m		
VOID FILLING								Interpreted Result 0 uL		
								Reported Permeability at Stage P5		
								K = 4.6E-09 m/s		

WATER PRESSURE TEST										
Job No. : 22/1455102		Hole No. : WM0073		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 1.1		
Client : Shenhua Australia		Dip (Deg) : 90		Hole Diameter (m) : 0.096		Immediately prior to test (m bgl) : 0.40		Used in analysis (m bgl) : 0.40		
Project : Watermark		Interval Top (m) : 192.20		Tested Length (m) : 76.80		Pressure Gauge Height (m agl) : 1.70		Presumed Water Temperature : 1		
Location : Curlewis		Interval Base (m) : 269.00		Packer Type : Pneumatic - Wireline - Single		Casing Inner Diameter (mm) : 60.3		Date : 11-Mar-10		
Tested By : CK		Computed By : CK		Rock tested :		Water Meter Reading in : Litres		Checked By :		
Date : 11-Mar-10		Date : 11-Mar-10		Water Meter Reading in : Litres		Checked By :		Date : 11-Mar-10		
Pressure Stage	Gauge Pressure kPa	No	Actual	Time	Water Meter Readings		Volume (L)	Discharge (L/min)	Discharge/m (L/min/m)	Remarks
			(h.m.s)	(min)	Reading (Litres)	m3				
P1	50						Total : 0.00	0.00		c : 1 Start Date & Time : 11-Mar-10 14:25
P2	100						Average: 2.500	0.033		
P3	200						Total : 0.00	0.00		11-Mar-10 00:00
P4	100						Average: 3.200	0.042		
P5	50						Total : 0.00	0.00		11-Mar-10 00:00
							Average: 1.100	0.014		
							Total : 0.00	0.00		Finish Date & Time : 11-Mar-10 00:00
							Average: 0.650	0.008		
TEST RESULTS										
Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity					
P1	0.5		70.5		$K = Q/H \times 6.10889 \times 10^{-6} \times ((\log(2L/D))/L)$, where $H_{LOSS} = 0.01$ kPa Stage No. P5 Gauge Pressure 50 kPa Q 0.65 L/min H 7.2 m Interpreted Result 0 uL Reported Permeability at Stage P5 K = 2.3E-08 m/s					
P2	0.3		120.5							
P3	0.1		220.5							
P4	0.1		120.6							
P5	0.1		70.6							
Flow Type			VOID FILLING							



WATER PRESSURE TEST									
Job No. : 22/1455102		Hole No. : WM0073		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 1.1	
Client : Shenhua Australia		Dip (Deg) : 90		Hole Diameter (m) : 0.096		Immediately prior to test (m bgl) : 0.40		Used in analysis (m bgl) : 0.40	
Project : Interval Top (m) : 138.20		Tested Length (m) : 130.80		Pressure Gauge Height (m agl) : 1.70		Presumed Water Temperature : 1		Casing Inner Diameter (mm) : 60.3	
Location : Curlewis		Interval Base (m) : 269.00		Packer Type : Pneumatic - Wireline - Single		Date : 12-Mar-10		Date : 12-Mar-10	
Tested By : CK		Computed By : CK		Rock tested :		Water Meter Reading in : Litres		Checked By : AF	
Pressure Stage	Gauge Pressure kPa	No	Actual Time (h:m:s)	Time Intervals (min)	Water Meter Readings Reading (Litres)	Volume (L)	Discharge (L/min)	Discharge/m (L/min/m)	Remarks
P1	50					Total : 0.00	0.00	0.00	Start Date & Time : 12-Mar-10 15:20
P2	100					Average : 3.900	0.030	0.030	12-Mar-10 00:00
P3	200					Total : 0.00	0.00	0.00	12-Mar-10 00:00
P4	100					Average : 4.100	0.031	0.031	12-Mar-10 00:00
P5	50					Total : 0.00	0.00	0.00	Finish Date & Time : 12-Mar-10 00:00
						Average : 1.200	0.009	0.009	
TEST RESULTS									
Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity				
P1	0.4		70.4		$K = Q/H \times 6.10889 \times 10^{-6} \times ((\log(2L/D))/L)$, where $H_{LOSS} = 0.02$ kPa Stage No. P5 Gauge Pressure 50 kPa Q 1.20 L/min H 7.2 m Interpreted Result 0 uL Reported Permeability at Stage P5 K = 2.7E-08 m/s				
P2	0.3		120.4						
P3	0.1		220.5						
P4	0.1		120.6						
P5	0.1		70.6						
Flow Type			VOID FILLING						

WATER PRESSURE TEST										
Job No. : 22/1455102		Hole No. : WM0107		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 1.1		
Client : Shenhua Australia		Dip (Deg) : 90		Hole Diameter (m) : 0.096		Immediately prior to test (m bgl) : 0.40		Used in analysis (m bgl) : 0.40		
Project :		Interval Top (m) : 64.00		Tested Length (m) : 19.00		Pressure Gauge Height (m agl) : 1.70		Presumed Water Temperature : 1		
Location : Curlewis		Interval Base (m) : 83.00		Packer Type: Pneumatic - Wireline - Single		Presumed Water Temperature : 1		Casing Inner Diameter (mm) : 60.3		
Tested By : DC/CK		Computed By : DC/CK		Rock tested :		Casing Inner Diameter (mm) : 60.3		Date : 10-Mar-10		
Date : 9-Mar-10		Date : 9-Mar-10		Water Meter Reading in: Litres		Checked By :		Date : 10-Mar-10		
Pressure Stage	Gauge Pressure kPa	No	Actual	Time	Water Meter Readings		Volume	Discharge	Discharge/m	Remarks
			Time (h:m:s)	Intervals (min)	Reading (Litres)		(L)	(L/min)	(L/min/m)	
P1	50						Total : 0.00 Average: 28.500	0.00 1.500		c : 1 Start Date & Time : 10-Mar-10 00:00
P2	100						Total : 0.00 Average: 42.000	0.00 2.211		
P3	200						Total : 0.00 Average: 64.300	0.00 3.384		09-Mar-07 13:49
P4	100						Total : 0.00 Average: 48.900	0.00 2.574		09-Mar-07 13:59
P5	50						Total : 0.00 Average: 34.500	0.00 1.816		Finish Date & Time : 09-Mar-07 14:21
TEST RESULTS										
Stage No.	Lugeon Value	Lugeon Value Curve		Nett Pressures	Pressure Vs Flow		Interpreted Result & Hydraulic Conductivity			
P1	23.5			63.8			K = Q/H x 6.10889 x 10 ⁻⁶ x ((log(2L/D))/L), where			
P2	20.8			106.0			H _{LOSS} 9.87 kPa			
P3	18.1			186.7			Stage No. P5			
P4	25.5			100.9			Gauge Pressure 50 kPa			
P5	29.9			60.7			Q 34.50 L/min			
							H 6.2 m			
							Interpreted Result 30 uL			
							Reported Permeability at Stage P5			
Flow Type							K = 4.7E-06 m/s			
VOID FILLING										



WATER PRESSURE TEST									
Job No. : 22/1455102		Hole No. : WM0073		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 1.1	
Client : Shenhua Australia		Dip (Deg) : 90		Hole Diameter (m) : 0.096		Immediately prior to test (m bgl) : 0.40		Used in analysis (m bgl) : 0.40	
Project :		Interval Top (m) : 58.00		Tested Length (m) : 25.00		Pressure Gauge Height (m agl) : 1.70		Presumed Water Temperature : 1	
Location : Curlewis		Interval Base (m) : 83.00		Packer Type : Pneumatic - Wireline - Single		Casing Inner Diameter (mm) : 60.3		Date : 9-Mar-06	
Tested By : DC/CK		Computed By : DC/CK		Rock tested :		Water Meter Reading in: Litres		Checked By :	
Date : 9-Mar-10		Date : 9-Mar-10		Water Meter Reading in: Litres		Checked By :		Date : 9-Mar-06	
Pressure Stage	Gauge Pressure kPa	No	Actual	Time	Water Meter Readings		Volume	Discharge	Discharge/m
			Time (h:m:s)	Intervals (min)	Reading (Litres)	m3	(L)	(L/min)	(L/min/m)
P1	50						Total : 0.00	0.00	Start Date & Time : 09-Mar-07 13:20
							Average: 0.460	0.018	
P2	100						Total : 0.00	0.00	
							Average: 0.690	0.028	09-Mar-07 13:34
P3	200						Total : 0.00	0.00	
							Average: 1.010	0.040	09-Mar-07 13:49
P4	100						Total : 0.00	0.00	
							Average: 0.760	0.030	09-Mar-07 13:59
P5	50						Total : 0.00	0.00	Finish Date & Time : 09-Mar-07 14:21
							Average: 0.000	0.000	
TEST RESULTS									
Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow		Interpreted Result & Hydraulic Conductivity			
P1	0.3		70.6			K = Q/H x 6.10889 x 10^-6 x ((log(2L/D))/L), where			
P2	0.2		120.6			H LOSS 0.00 kPa			
P3	0.2		220.6			Stage No. Average			
P4	0.3		120.6			Gauge Pressure 100 kPa			
P5	0.0		70.6			Q 0.58 L/min			
Flow Type			Comments:		H 12.3 m				
VOID FILLING					Interpreted Result 0 uL				
					Reported Permeability at Stage Average				
					K = 3.2E-08 m/s				

WATER PRESSURE TEST

Job No. : 22/1455102		Hole No. : WM0073		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 1.1			
Client : Shenhua Australia		Dip (Deg) : 90		Hole Diameter (m) : 0.096				Immediately prior to test (m bgl) : 0.40			
Project :		Interval Top (m) : 31.00		Tested Length (m) : 52.00				Used in analysis (m bgl) : 0.40			
Location : Curlewis		Interval Base (m) : 83.00		Packer Type: Pneumatic - Wireline - Single				Pressure Gauge Height (m agl) : 1.70			
Tested By : DC/CK		Computed By : DC/CK		Rock tested :				Presumed Water Temperature : 1			
Date : 9-Mar-10		Date : 9-Mar-10		Water Meter Reading in: Litres		Checked By :		Casing Inner Diameter (mm) : 60.3			
								Date : 9-Mar-06			
Pressure Stage	Gauge Pressure kPa	No	Actual	Time	Water Meter Readings		Volume	Discharge	Discharge/m	Remarks	
			Time	Intervals	Reading		(L)	(L/min)	(L/min/m)		
			(h:m:s)	(min)	(Litres)	m3					
P1	50		Total :						0.00	0.00	c : 1
			Average:						53.000	1.019	Start Date & Time : 09-Mar-07 13:20
P2	100		Total :						0.00	0.00	09-Mar-07 13:34
			Average:						71.000	1.365	
P3	200		Total :						0.00	0.00	09-Mar-07 13:49
			Average:						100.000	1.923	
P4	100		Total :						0.00	0.00	09-Mar-07 13:59
			Average:						73.800	1.419	
P5	50		Total :						0.00	0.00	Finish Date & Time : 09-Mar-07 14:21
			Average:						55.900	1.075	

TEST RESULTS

Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity
P1	21.1		48.3		$K = Q/H \times 6.10889 \times 10^{-6} \times ((\log(2L/D))/L)$, where $H_{LOSS} = 41.79 \text{ kPa}$ Stage No. Average Gauge Pressure 100 kPa Q 70.74 L/min H 8.0 m Interpreted Result 19 uL Reported Permeability at Stage Average K = 3.1E-06 m/s
P2	16.9		80.7		
P3	13.6		141.7		
P4	18.3		77.5		
P5	23.5		45.8		
Flow Type		Comments:			
VOID FILLING					



WATER PRESSURE TEST									
Job No. : 22/1455102		Hole No. : WM0073		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 1.1	
Client : Shenhua Australia		Dip (Deg) : 90		Hole Diameter (m) : 0.0757		Immediately prior to test (m bgl) : 0.40		Used in analysis (m bgl) : 0.40	
Project :		Interval Top (m) : 19.00		Tested Length (m) : 64.00		Pressure Gauge Height (m agl) : 1.70		Presumed Water Temperature : 1	
Location : Curlewis		Interval Base (m) : 83.00		Packer Type : Pneumatic - Wireline - Single		Casing Inner Diameter (mm) : 60.3		Date : 9-Mar-06	
Tested By : DC/CK		Computed By : DC/CK		Rock tested :		Water Meter Reading in: Litres		Checked By :	
Date : 9-Mar-10		Date : 9-Mar-10		Water Meter Reading in: Litres		Checked By :		Date : 9-Mar-06	
Pressure Stage	Gauge Pressure kPa	No	Actual Time (h:m:s)	Time Intervals (min)	Water Meter Readings (Litres)	Volume (L)	Discharge (L/min)	Discharge/m (L/min/m)	Remarks
P1						Total : 0.00	0.00	0.00	c : 1
						Average: 0.900	0.014	0.014	Start Date & Time : 09-Mar-07 13:20
P2	23					Total : 0.00	0.00	0.00	
						Average: 1.700	0.027	0.027	09-Mar-07 13:34
P3	34					Total : 0.00	0.00	0.00	
						Average: 4.100	0.064	0.064	09-Mar-07 13:49
P4	24					Total : 0.00	0.00	0.00	
						Average: 2.400	0.038	0.038	09-Mar-07 13:59
P5	11					Total : 0.00	0.00	0.00	Finish Date & Time : 09-Mar-07 14:21
						Average: 1.600	0.025	0.025	
TEST RESULTS									
Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity				
P1	0.7		20.6		K = Q/H x 6.10889 x 10 ⁻⁶ x ((log(2L/D))/L), where				
P2	0.6		43.5		H _{LOSS} 0.10 kPa				
P3	1.2		54.3		Stage No. Average				
P4	0.8		44.5		Gauge Pressure 18 kPa				
P5	0.8		31.5		Q 2.14 L/min				
Flow Type					H 4.0 m				
VOID FILLING					Interpreted Result 1 uL				
					Reported Permeability at Stage Average				
					K = 1.7E-07 m/s				

WATER PRESSURE TEST

Job No. : 22/1455102		Hole No. : WM0156		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 1.1	
Client : Shenhua Australia		Dip (Deg) : 90		Hole Diameter (m) : 0.096		Immediately prior to test (m bgl) : 0.40		Used in analysis (m bgl) : 0.40	
Project : Curlewis		Interval Top (m) : 105.00		Tested Length (m) : 14.00		Pressure Gauge Height (m agl) : 1.70		Presumed Water Temperature : 1	
Location : Curlewis		Interval Base (m) : 119.00		Packer Type : Pneumatic - Wireline - Single		Casing Inner Diameter (mm) : 60.3		Date : 18-Mar-10	
Tested By : CK		Computed By : CK		Rock tested :		Water Meter Reading in: Litres		Checked By :	
Date : 18-Mar-10		Date : 18-Mar-10		Water Meter Reading in: Litres		Checked By :		Date : 18-Mar-10	

Pressure Stage	Gauge Pressure kPa	No	Actual	Time	Water Meter Readings		Volume (L)	Discharge (L/min)	Discharge/m (L/min/m)	Remarks
			(h:m:s)	(min)	Reading (Litres)	m3				
P1	50						Total : 0.00	0.00		c : 1 Start Date & Time :
							Average: 0.630	0.045		
P2	100						Total : 0.00	0.00		
							Average: 0.700	0.050		
P3	200						Total : 0.00	0.00		
							Average: 1.120	0.080		
P4	100						Total : 0.00	0.00		
							Average: 0.880	0.063		
P5	50						Total : 0.00	0.00		Finish Date & Time :
							Average: 0.630	0.045		

TEST RESULTS

Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity
P1	0.6		70.6		$K = Q/H \times 6.10889 \times 10^{-6} \times ((\log(2L/D))/L)$, where H_{LOSS} 0.01 kPa Stage No. P3 Gauge Pressure 200 kPa Q 1.12 L/min H 22.5 m Interpreted Result 0 uL Reported Permeability at Stage P3 K = 5.4E-08 m/s
P2	0.4		120.6		
P3	0.4		220.6		
P4	0.5		120.6		
P5	0.6		70.6		

Flow Type

VOID FILLING

Comments:



WATER PRESSURE TEST										
Job No. : 22/1455102		Hole No. : WM0156		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 1.1		
Client : Shenhua Australia		Dip (Deg) : 90		Hole Diameter (m) : 0.096		Immediately prior to test (m bgl) : 0.40		Used in analysis (m bgl) : 0.40		
Project :		Interval Top (m) : 99.50		Tested Length (m) : 19.50		Pressure Gauge Height (m agl) : 1.70		Presumed Water Temperature : 1		
Location : Curlewis		Interval Base (m) : 119.00		Packer Type : Pneumatic - Wireline - Single		Casing Inner Diameter (mm) : 60.3				
Tested By : CK		Computed By : CK		Rock tested :						
Date : 19-Mar-10		Date : 19-Mar-10		Water Meter Reading in: Litres		Checked By :		Date : 19-Mar-10		
Pressure Stage	Gauge Pressure kPa	No	Actual	Time	Water Meter Readings		Volume (L)	Discharge (L/min)	Discharge/m (L/min/m)	Remarks
			Time (h:m:s)	Intervals (min)	Reading (Litres)	m3				
P1	50						Total : 0.00	0.00		c : 1 Start Date & Time :
							Average: 0.100	0.005		
P2	100						Total : 0.00	0.00		
							Average: 1.000	0.051		
P3	200						Total : 0.00	0.00		
							Average: 1.730	0.089		
P4	100						Total : 0.00	0.00		
							Average: 0.100	0.005		
P5	50						Total : 0.00	0.00		Finish Date & Time :
							Average: 0.000	0.000		
TEST RESULTS										
Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity					
P1	0.1		70.6		$K = Q/H \times 6.10889 \times 10^{-6} \times ((\log(2L/D))/L)$, where $H_{LOSS} = 0.03$ kPa Stage No. P3 Gauge Pressure 200 kPa Q 1.73 L/min H 22.5 m Interpreted Result 0 uL Reported Permeability at Stage P3 K = 6.3E-08 m/s					
P2	0.4		120.6							
P3	0.4		220.6							
P4	0.0		120.6							
P5	0.0		70.6							
Flow Type			Comments:							
VOID FILLING										

WATER PRESSURE TEST

Job No. : 22/1455102	Hole No. : WM0156	Drilling Method : HQ	Vertical depth to Groundwater	Revision : 1.1
Client : Shenhua Australia	Dip (Deg) : 90	Hole Diameter (m) : 0.096	Immediately prior to test (m bgl) : 0.40	
Project : Curlewis	Interval Top (m) : 63.45	Tested Length (m) : 55.55	Used in analysis (m bgl) : 0.40	
Location : Curlewis	Interval Base (m) : 119.00	Packer Type : Pneumatic - Wireline - Single	Pressure Gauge Height (m agl) : 1.70	
Tested By : CK	Computed By : CK	Rock tested :	Presumed Water Temperature : 1	
Date : 19-Mar-10	Date : 19-Mar-10	Water Meter Reading in: Litres	Casing Inner Diameter (mm) : 60.3	
Checked By :	Date : 19-Mar-10			

Pressure Stage	Gauge Pressure kPa	No	Actual	Time	Water Meter Readings		Volume (L)	Discharge (L/min)	Discharge/m (L/min/m)	Remarks
			(h:m:s)	(min)	Reading (Litres)	m3				
P1	50						Total : 0.00	0.00		c : 1
							Average: 0.120	0.002		Start Date & Time :
P2	100						Total : 0.00	0.00		
							Average: 0.880	0.016		
P3	200						Total : 0.00	0.00		
							Average: 0.740	0.013		
P4	100						Total : 0.00	0.00		
							Average: 0.200	0.004		
P5	50						Total : 0.00	0.00		Finish Date & Time :
							Average: 0.140	0.003		

TEST RESULTS					
Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity
P1	0.0		70.6		$K = Q/H \times 6.10889 \times 10^{-6} \times ((\log(2L/D))/L)$, where $H_{LOSS} = 0.01$ kPa Stage No. P3 Gauge Pressure 200 kPa Q 0.74 L/min H 22.5 m Interpreted Result 0 uL Reported Permeability at Stage P3 K = 1.1E-08 m/s
P2	0.1		120.6		
P3	0.1		220.6		
P4	0.0		120.6		
P5	0.0		70.6		

Flow Type		Comments:
VOID FILLING		



WATER PRESSURE TEST									
Job No. : 22/1455102	Hole No. : WM0156	Drilling Method : HQ	Vertical depth to Groundwater	Revision : 1.1	Immediately prior to test (m bgl) : 0.40				
Client : Shenhua Australia	Dip (Deg) : 90	Hole Diameter (m) : 0.096	Groundwater	Used in analysis (m bgl) : 0.40					
Project :	Interval Top (m) : 30.45	Tested Length (m) : 88.55		Pressure Gauge Height (m agl) : 1.70					
Location : Curlewis	Interval Base (m) : 119.00	Packer Type : Pneumatic - Wireline - Single		Presumed Water Temperature : 1					
Tested By : CK	Computed By : CK	Rock tested :		Casing Inner Diameter (mm) : 60.3					
Date : 17-Mar-10	Date : 17-Mar-10	Water Meter Reading in: Litres	Checked By :	Date : 17-Mar-10					
Pressure Stage	Gauge Pressure kPa	No	Actual Time (h:m:s)	Time Intervals (min)	Water Meter Readings Reading (Litres)	Volume (L)	Discharge (L/min)	Discharge/m (L/min/m)	Remarks
P1	50					Total : 0.00	0.00		c : 1
						Average: 1.030	0.012		Start Date & Time : 17-Mar-10 00:00
P2	100					Total : 0.00	0.00		
						Average: 0.830	0.009		09-Mar-07 13:34
P3	200					Total : 0.00	0.00		
						Average: 1.580	0.018		09-Mar-07 13:49
P4	100					Total : 0.00	0.00		
						Average: 0.870	0.010		09-Mar-07 13:59
P5	50					Total : 0.00	0.00		Finish Date & Time : 09-Mar-07 14:21
						Average: 0.640	0.007		
TEST RESULTS									
Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity				
P1	0.2		70.6		$K = Q/H \times 6.10889 \times 10^{-6} \times ((\log(2L/D))/L)$, where H_{LOSS} 0.00 kPa Stage No. P5 Gauge Pressure 50 kPa Q 0.64 L/min H 7.2 m Interpreted Result 0 uL Reported Permeability at Stage P5 K = 2.0E-08 m/s				
P2	0.1		120.6						
P3	0.1		220.6						
P4	0.1		120.6						
P5	0.1		70.6						
Flow Type			Comments:						
VOID FILLING									

WATER PRESSURE TEST									
Job No. : 22/1455102		Hole No. : WM0232		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 1.1	
Client : Shenhua Australia		Dip (Deg) : 90		Hole Diameter (m) : 0.096		Immediately prior to test (m bgl) : 0.40		Used in analysis (m bgl) : 0.40	
Project :		Interval Top (m) : 51.20		Tested Length (m) : 11.80		Pressure Gauge Height (m agl) : 1.70		Presumed Water Temperature : 1	
Location : Curlewis		Interval Base (m) : 63.00		Packer Type : Pneumatic - Wireline - Single		Casing Inner Diameter (mm) : 60.3			
Tested By : CK		Computed By : DC/CK		Rock tested :					
Date : 15-Mar-10		Date :		Water Meter Reading in: Litres		Checked By :		Date :	
Pressure Stage	Gauge Pressure kPa	No	Actual Time (h:m:s)	Time Intervals (min)	Water Meter Readings Reading (Litres)	Volume (L)	Discharge (L/min)	Discharge/m (L/min/m)	Remarks
P1	50 7 Psi					Total : 0.00 Average: 0.600	0.00 0.051		c : 1 Start Date & Time :
P2	23					Total : 0.00 Average: 3.220	0.00 0.273		
P3	34					Total : 0.00 Average: 1.430	0.00 0.121		
P4	24					Total : 0.00 Average: 0.220	0.00 0.019		
P5	11					Total : 0.00 Average: 0.125	0.00 0.011		Finish Date & Time :
TEST RESULTS									
Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity				
P1	0.7		70.6		$K = Q/H \times 6.10889 \times 10^{-6} \times ((\log(2L/D))/L)$, where H_{LOSS} 0.00 kPa Stage No. P4 Gauge Pressure 24 kPa Q 0.22 L/min H 4.5 m Interpreted Result 0 uL Reported Permeability at Stage P4 K = 6.0E-08 m/s				
P2	6.3		43.5						
P3	2.2		54.6						
P4	0.4		44.6						
P5	0.3		31.6						
Flow Type			Comments:						
VOID FILLING									



WATER PRESSURE TEST									
Job No. : 22/1455102		Hole No. : WM0232		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 1.1	
Client : Shenhua Australia		Dip (Deg) : 90		Hole Diameter (m) : 0.096		Immediately prior to test (m bgl) : 0.40		Used in analysis (m bgl) : 0.40	
Project :		Interval Top (m) : 45.20		Tested Length (m) : 17.80		Pressure Gauge Height (m agl) : 1.70		Presumed Water Temperature : 1	
Location : Curlewis		Interval Base (m) : 63.00		Packer Type : Pneumatic - Wireline - Single		Casing Inner Diameter (mm) : 60.3			
Tested By : CK		Computed By : DC/CK		Rock tested :					
Date : 15-Mar-10		Date :		Water Meter Reading in: Litres		Checked By :		Date :	
Pressure Stage	Gauge Pressure kPa	No	Actual Time (h:m:s)	Time Intervals (min)	Water Meter Readings Reading (Litres)	Volume (L)	Discharge (L/min)	Discharge/m (L/min/m)	Remarks
P1	50					Total : 0.00	0.00	0.00	c : 1
						Average: 5.300	0.298		Start Date & Time :
P2	100					Total : 0.00	0.00		
						Average: 8.800	0.494		
P3	200					Total : 0.00	0.00		
						Average: 11.050	0.621		
P4	100					Total : 0.00	0.00		
						Average: 8.150	0.458		
P5	50					Total : 0.00	0.00		Finish Date & Time :
						Average: 7.000	0.393		
TEST RESULTS									
Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity				
P1	4.2		70.4		$K = Q/H \times 6.10889 \times 10^{-6} \times ((\log(2L/D))/L)$, where H_{LOSS} 0.57 kPa Stage No. Average Gauge Pressure 100 kPa Q 8.06 L/min H 12.2 m Interpreted Result 4 uL Reported Permeability at Stage Average $K = 5.8E-07$ m/s				
P2	4.1		119.9						
P3	2.8		219.6						
P4	3.8		120.0						
P5	5.6		70.2						
Flow Type			Comments:						
VOID FILLING									

WATER PRESSURE TEST

Job No. : 22/1455102		Hole No. : WM0232		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 1.1		
Client : Shenhua Australia		Dip (Deg) : 90		Hole Diameter (m) : 0.096				Immediately prior to test (m bgl) : 0.40		
Project :		Interval Top (m) : 36.20		Tested Length (m) : 26.80				Used in analysis (m bgl) : 0.40		
Location : Curlewis		Interval Base (m) : 63.00		Packer Type: Pneumatic - Wireline - Single				Pressure Gauge Height (m agl) : 1.70		
Tested By : CK		Computed By : CK		Rock tested :				Presumed Water Temperature : 1		
Date : 15-Mar-10		Date :		Water Meter Reading in: Litres		Checked By :		Date : 60.3		
Pressure Stage	Gauge Pressure kPa	No	Actual	Time	Water Meter Readings		Volume	Discharge	Discharge/m	Remarks
			Time (h:m:s)	Intervals (min)	Reading (Litres)		m3	(L)	(L/min)	
P1	50						Total : 0.00	0.00	0.00	c : 1 Start Date & Time :
							Average: 18.800	0.701		
P2	100						Total : 0.00	0.00	0.00	
							Average: 29.300	1.093		
P3	200						Total : 0.00	0.00	0.00	
							Average: 33.300	1.243		
P4	100						Total : 0.00	0.00	0.00	
							Average: 30.100	1.123		
P5	50						Total : 0.00	0.00	0.00	Finish Date & Time :
							Average: 22.700	0.847		

TEST RESULTS

Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity
P1	10.4		67.7		$K = Q/H \times 6.10889 \times 10^{-6} \times ((\log(2L/D))/L)$, where $H_{LOSS} = 6.01 \text{ kPa}$ Stage No. Average Gauge Pressure 100 kPa Q 26.84 L/min H 11.7 m
P2	9.6		113.7		Interpreted Result 10 uL
P3	5.9		211.7		Reported Permeability at Stage Average
P4	9.9		113.3		
P5	12.7		66.4		
Flow Type		Comments:			K = 1.4E-06 m/s
VOID FILLING					



WATER PRESSURE TEST									
Job No. : 22/1455102		Hole No. : WM0232		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 1.1	
Client : Shenhua Australia		Dip (Deg) : 90		Hole Diameter (m) : 0.096		Immediately prior to test (m bgl) : 0.40		Used in analysis (m bgl) : 0.40	
Project :		Interval Top (m) : 24.30		Tested Length (m) : 38.70		Pressure Gauge Height (m agl) : 1.70		Presumed Water Temperature : 1	
Location : Curlewis		Interval Base (m) : 63.00		Packer Type : Pneumatic - Wireline - Single		Casing Inner Diameter (mm) : 60.3			
Tested By : CK		Computed By : CK		Rock tested :					
Date : 15-Mar-10		Date :		Water Meter Reading in: Litres		Checked By :		Date :	
Pressure Stage	Gauge Pressure kPa	No	Actual Time (h:m:s)	Time Intervals (min)	Water Meter Readings Reading (Litres)	Volume (L)	Discharge (L/min)	Discharge/m (L/min/m)	Remarks
P1	50					Total : 0.00	0.00	0.00	c : 1
						Average: 24.300	0.628		Start Date & Time :
P2	100					Total : 0.00	0.00		
						Average: 27.600	0.713		
P3	200					Total : 0.00	0.00		
						Average: 32.000	0.827		
P4	100					Total : 0.00	0.00		
						Average: 30.000	0.775		
P5	50					Total : 0.00	0.00		Finish Date & Time :
						Average: 0.000	0.000		
TEST RESULTS									
Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity				
P1	9.5		65.9		K = Q/H x 6.10889 x 10 ⁻⁶ x ((log(2L/D))/L), where				
P2	6.2		114.6		H _{LOSS} 7.12 kPa				
P3	3.9		212.5		Stage No. P4				
P4	6.8		113.5		Gauge Pressure 100 kPa				
P5	0.0		70.6		Q 30.00 L/min				
Flow Type					H 11.6 m				
VOID FILLING					Interpreted Result 7 uL				
					Reported Permeability at Stage P4				
					K = 1.2E-06 m/s				

WATER PRESSURE TEST									
Job No. : 22/1455102		Hole No. : WM0247		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 1.1	
Client : Shenhua Australia		Dip (Deg) : 90		Hole Diameter (m) : 0.096		Immediately prior to test (m bgl) : 0.40		Used in analysis (m bgl) : 0.40	
Project : Curlewis		Interval Top (m) : 76.20		Tested Length (m) : 45.80		Pressure Gauge Height (m agl) : 1.70		Presumed Water Temperature : 1	
Location : Curlewis		Interval Base (m) : 122.00		Packer Type : Pneumatic - Wireline - Single		Casing Inner Diameter (mm) : 60.3			
Tested By : CK		Computed By : CK		Rock tested :					
Date : 20-Mar-10		Date : 20-Mar-10		Water Meter Reading in: Litres		Checked By :		Date : 20-Mar-10	
Pressure Stage	Gauge Pressure kPa	No	Actual Time (h:m:s)	Time Intervals (min)	Water Meter Readings (Litres)	Volume (L)	Discharge (L/min)	Discharge/m (L/min/m)	Remarks
P1	50					Total : 0.00	0.00	0.00	c : 1
	7 Psi					Average: 1.237	0.027		Start Date & Time :
P2	100					Total : 0.00	0.00	0.00	
						Average: 0.000	0.000		
P3	200					Total : 0.00	0.00	0.00	
						Average: 0.000	0.000		
P4	100					Total : 0.00	0.00	0.00	
						Average: 0.000	0.000		
P5	50					Total : 0.00	0.00	0.00	Finish Date & Time :
						Average: 0.000	0.000		
TEST RESULTS									
Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity				
P1	0.4		70.6		$K = Q/H \times 6.10889 \times 10^{-6} \times ((\log(2L/D))/L)$, where $H_{LOSS} = 0.01$ kPa Stage No. P1 Gauge Pressure 50 kPa Q 1.24 L/min H 7.2 m Interpreted Result 0 uL Reported Permeability at Stage P1 K = 6.8E-08 m/s				
P2	0.0		120.6						
P3	0.0		220.6						
P4	0.0		120.6						
P5	0.0		70.6						
Flow Type			Comments:						
VOID FILLING									



WATER PRESSURE TEST									
Job No. : 221455102		Hole No. : WM0291		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 1.1	
Client : Shenhua		Dip (Deg) : 90		Hole Diameter (m) : 0.096		Immediately prior to test (m bgl) : 0.40		Used in analysis (m bgl) : 0.40	
Project : Watermark		Interval Top (m) : 97.33		Tested Length (m) : 14.11		Pressure Gauge Height (m agl) : 2.25		Presumed Water Temperature : 20	
Location : Watermark		Interval Base (m) : 111.44		Packer Type : Pneumatic - Wireline - Single		Casing Inner Diameter (mm) : 60.3		Date : 23-May-10	
Tested By : AF/ MO		Computed By : AF		Rock tested : Sandstone		Water Meter Reading in: Litres		Checked By :	
Date : 23-May-10		Date : 24-May-10		Water Meter Reading in: Litres		Checked By :		Date :	
Pressure Stage	Gauge Pressure kPa	No	Actual Time (h:m:s)	Time Intervals (min)	Water Meter Readings Reading (Litres)	Volume (L)	Discharge (L/min)	Discharge/m (L/min/m)	Remarks
P1	50					Total : 0.00	0.00		c : 1
	7 Psi					Average: 0.242	0.017		Start Date & Time : 23-May-10 13:55
P2	100					Total : 0.00	0.00		
	14 Psi					Average: 0.366	0.026		23-May-10 13:55
P3	200					Total : 0.01	0.00		
	28 Psi					Average: 0.740	0.052		23-May-10 13:55
P4	100					Total : 0.00	0.00		
	14 Psi					Average: 0.260	0.018		23-May-10 13:55
P5	50					Total : 0.00	0.00		Finish Date & Time : 23-May-10 14:45
	7 Psi					Average: 0.240	0.017		
TEST RESULTS									
Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity				
P1	0.2		76.0		K = Q/H x 6.10889 x 10 ⁻⁶ x ((log(2L/D))/L), where H _{LOSS} 0.00 kPa Stage No. Average Gauge Pressure 100 kPa Q 0.37 L/min H 12.8 m Interpreted Result 0 uL Reported Permeability at Stage Average K = 3.1E-08 m/s				
P2	0.2		126.0						
P3	0.2		226.0						
P4	0.1		126.0						
P5	0.2		76.0						
Flow Type			Comments:						
LAMINAR FLOW									



September 2011

Project: 221455109

Shenhua Stage 4 Hydrogeological Program Packer Testing Summary

Shenhua Watermark Coal Packer Test Data - Analytical Summary - 2011 Program

Formation	Formation Interval		Borehole	Test #	Tester	Date/Time	Test Interval		TEST TYPE	Interpreted Conductivity (to total depth)	Adopted Conductivity (Individual Formation)	Adopted Conductivity (Individual Formation)
	Top (mbgl)	Base (mbgl)					Top (mbgs)	EOH or bottom (mbgs)				
Floor Material	340.3	EOH (352)	1	CK	24/08/2011 11:53	343.15	352	8.85	Single Packer Lugeon	(m/s)	(m/s)	(m/d)
Maules Creek Formation	310.5	340.3	2	CK	24/08/2011 13:31	310.15	352	41.85	Single Packer Lugeon	2.20E-09	2.2E-09	1.9E-04
Porcupine Formation	192.5	310.5	3	CK	24/08/2011 16:15	196.15	352	155.85	Single Packer Lugeon	1.30E-09	9.4E-10	8.1E-05
Maules Creek Lower	338.65	340.3	4	CK	25/08/2011 10:15	338.65	340.65	2	Straddle Packer Lugeon	3.30E-09	3.9E-09	3.4E-04
Maules Creek Mid	332.65	334.65	5	CK	25/08/2011 12:34	332.65	334.65	2	Straddle Packer Lugeon	4.60E-08	4.6E-08	4.0E-03
Maules Creek Upper	314.65	318.65	6	CK	25/08/2011 16:10	315.05	319.05	4	Straddle Packer Lugeon	6.10E-08	6.1E-08	5.3E-03
									Straddle Packer Lugeon	3.80E-08	3.8E-08	3.3E-03
Formation	Formation Interval		Borehole	Test #	Tester	Date/Time	Test Interval		TEST TYPE	Interpreted Conductivity (to total depth)	Adopted Conductivity (Individual Formation)	Adopted Conductivity (Individual Formation)
	Top (mbgl)	Base (mbgl)					Top (mbgs)	EOH or bottom (mbgs)				
Floor Material	442.63	EOH (495.27)	1	CK	30/08/2011 8:30	442.55	495.27	52.72	Single Packer Lugeon	(m/s)	(m/s)	(m/d)
Maules Creek Formation	421.06	442.63	2	CK	30/08/2011 10:50	421.05	495.27	74.22	Single Packer Lugeon	4.90E-09	4.9E-09	4.2E-04
Porcupine Formation	305	421.06	3	CK	30/08/2011 13:20	313.15	495.27	182.12	Single Packer Lugeon	2.40E-09	2.4E-09	2.1E-04
Maules Creek Lower	436.34	440.26	4	CK	31/08/2011 8:30	436.15	440.65	4.5	Straddle Packer Lugeon	1.20E-09	1.2E-09	1.0E-04
Maules Creek Mid	430.15	433.89	5	CK	31/08/2011 10:55	429.05	433.55	4.5	Straddle Packer Lugeon	2.60E-08	2.6E-08	2.2E-03
Maules Creek Upper	422.24	428.5	6	CK	31/08/2011 13:52	422.35	428.85	6.5	Straddle Packer Lugeon	5.50E-09	5.5E-09	4.8E-04
Roof Material	418.35	422.24	7	CK	31/08/2011 16:23	418.35	422.35	4	Straddle Packer Lugeon	1.60E-08	1.6E-08	1.4E-03
									Straddle Packer Lugeon	8.70E-09	8.7E-09	7.5E-04
Formation	Formation Interval		Borehole	Test #	Tester	Date/Time	Test Interval		TEST TYPE	Interpreted Conductivity (to total depth)	Adopted Conductivity (Individual Formation)	Adopted Conductivity (Individual Formation)
	Top (mbgl)	Base (mbgl)					Top (mbgs)	EOH or bottom (mbgs)				
Floor Material	425.8	EOH (450.3)	1	CK	4/09/2011 12:17	425.9	450.3	24.4	Single Packer Lugeon	(m/s)	(m/s)	(m/d)
Maules Creek Formation	383.7	425.8	2	CK	4/09/2011 14:12	383.6	450.3	66.7	Single Packer Lugeon	5.60E-09	5.6E-09	4.8E-04
Porcupine Formation	320.7	383.7	3	CK	4/09/2011 16:04	320.9	450.3	129.4	Single Packer Lugeon	2.90E-09	1.3E-09	1.1E-04
Maules Creek Lower	424.5	425.8	-	-	-	-	-	-	Single Packer Lugeon	9.20E-10	9.2E-10	7.9E-05
Maules Creek Mid	415.5	418.9	4	DK	5/09/2011 9:10	415.4	419.4	4	Straddle Packer Lugeon	4.50E-08	4.5E-08	0.0E+00
Maules Creek Upper	401.6	403.7	5	DK	5/09/2011 11:48	401.6	404.1	2.5	Straddle Packer Lugeon	4.50E-08	4.5E-08	3.9E-03
Roof Material	398.6	401.6	6	DK	5/09/2011 13:55	398.6	401.6	3	Straddle Packer Lugeon	3.20E-08	3.2E-08	2.8E-03

2011 Packer Tests
Stage 4 Hydrogeological Program Packer Testing Summary

2/08/2012



WATER PRESSURE TEST									
Job No. : 22/1455102		Hole No. : MMC042		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 1.1	
Client : Shenhua Australia		Dip (Deg) : 90		Hole Diameter (m) : 0.096		Immediately prior to test (m bgl) : 0.00		Used in analysis (m bgl) : 0.00	
Project :		Interval Top (m) : 343.05		Tested Length (m) : 8.95		Pressure Gauge Height (m agl) : 1.20		Presumed Water Temperature : 20	
Location : Curlewis		Interval Base (m) : 352.00		Packer Type: Pneumatic - Wireline - Single		Casing Inner Diameter (mm) : 96.0			
Tested By : CK		Computed By : CK		Rock tested :					
Date : 24-Aug-11		Date : 26-Aug-11		Water Meter Reading in: Litres		Checked By :		Date :	
Pressure Stage	Gauge Pressure kPa	No	Actual Time (h:m:s)	Time Intervals (min)	Water Meter Readings Reading (Litres)	Volume (L)	Discharge (L/min)	Discharge/m (L/min/m)	Remarks
P1	100					Total : Average:	0.000	0.000	c : 1 Start Date & Time :
P2	200					Total : Average:	0.000	0.000	
P3	400					Total : Average:	0.060	0.007	
P5	28 Psi					Total : Average:	0.00	0.00	Finish Date & Time :
	7 Psi								
TEST RESULTS									
Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity				
P1	0.0		111.8		$K = Q/H \times 6.10889 \times 10^{-6} \times ((\log(2L/D))/L)$, where H_{LOSS} 0.00 kPa Stage No. P3 Gauge Pressure 400 kPa Q 0.06 L/min H 42.0 m Interpreted Result 0 uL Reported Permeability at Stage P3 $K = 2.2E-09$ m/s				
P2	0.0		211.8						
P3	0.0		411.8						
P4									
P5	0.0		11.8						
Flow Type		Comments:							
LOW PERMEABILITY									



WATER PRESSURE TEST

Job No. : 22/1455102		Hole No. : MMC042		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 1.1	
Client : Shenhua Australia		Dip (Deg) : 90		Hole Diameter (m) : 0.096		Immediately prior to test (m bgl) : 0.00		Used in analysis (m bgl) : 0.00	
Project :		Interval Top (m) : 310.05		Tested Length (m) : 41.95		Pressure Gauge Height (m agl) : 1.20		Presumed Water Temperature : 20	
Location : Curlewis		Interval Base (m) : 352.00		Packer Type : Pneumatic - Wireline - Single		Casing Inner Diameter (mm) : 96.0			
Tested By : CK		Computed By : CK		Rock tested :					
Date : 24-Aug-11		Date : 26-Aug-11		Water Meter Reading in: Litres		Checked By :		Date :	

Pressure Stage	Gauge Pressure kPa	No	Actual	Time	Water Meter Readings	Volume	Discharge	Discharge/m	Remarks
			(h:m:s)	(min)	Reading (Litres)	m3	(L/min)	(L/min/m)	
P1	100					Total :			Start Date & Time : 1
	7 Psi					Average:	0.017	0.000405244	
P2	200					Total :			
	14 Psi					Average:	0.065	0.002	
P3	400					Total :			
	28 Psi					Average:	0.000	0.000	
P4	600					Total :			
	14 Psi					Average:	0.170	0.004	

TEST RESULTS

Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity
P1	0.0		111.8		$K = Q/H \times 6.10889 \times 10^{-8} \times ((\log(2L/D))/L)$, where $H_{LOSS} = 0.00$ kPa Stage No. P2 Gauge Pressure 200 kPa Q 0.07 L/min H 21.6 m Interpreted Result 0 uL Reported Permeability at Stage P2 K = 1.3E-09 m/s
P2	0.0		211.8		
P3	0.0		411.8		
P4	0.0		611.8		
P5	0.0				

Flow Type

LOW PERMEABILITY

Comments:

**WATER PRESSURE TEST**

Job No. : 22/1455102	Hole No. : MMC042	Drilling Method : HQ	Vertical depth to Groundwater	Revision : 1.1
Client : Shenhua Australia	Dip (Deg) : 90	Hole Diameter (m) : 0.096	Immediately prior to test (m bgl) : 0.00	Used in analysis (m bgl) : 0.00
Project :	Interval Top (m) : 196.05	Tested Length (m) : 155.95	Pressure Gauge Height (m agl) : 1.20	Presumed Water Temperature : 20
Location : Curlewis	Interval Base (m) : 352.00	Packer Type : Pneumatic - Wireline - Single	Presumed Water Temperature : 20	Casing Inner Diameter (mm) : 96.0
Tested By : CK	Computed By : CK	Rock tested :		
Date : 24-Aug-11	Date : 26-Aug-11	Water Meter Reading in: Litres	Checked By :	Date :

Pressure Stage	Gauge Pressure kPa	No	Actual	Time	Water Meter Readings	Volume	Discharge	Discharge/m	Remarks
			Time (h:m:s)	Intervals (min)	Reading (Litres)	m3	(L/min)	(L/min/m)	
P1	100					Total : Average:			c : Start Date & Time : 1
P2	200					Total : Average:	0.520	0.003	
P3	400					Total : Average:	0.690	0.000	
P4	200					Total : Average:	1.000	0.006	
P5	100					Total : Average:	0.370	0.002	Finish Date & Time :

TEST RESULTS					
Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity
P1	0.0		111.8		$K = Q/H \times 6.10889 \times 10^{-6} \times ((\log(2L/D))/L)$, where H_{LOSS} 0.01 kPa Stage No. P3 Gauge Pressure 400 kPa Q 1.00 L/min H 42.0 m Interpreted Result 0 uL Reported Permeability at Stage P3 K = 3.3E-09 m/s
P2	0.0		211.8		
P3	0.0		411.8		
P4	0.0		211.8		
P5	0.0		111.8		
Flow Type			Comments:		
LOW PERMEABILITY					

WATER PRESSURE TEST									
Job No. : 22/1455102		Hole No. : MMC042		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 1.1	
Client : Shenhua Australia		Dip (Deg) : 90		Hole Diameter (m) : 0.096		Immediately prior to test (m bgl) : 0.00		Used in analysis (m bgl) : 0.00	
Project :		Interval Top (m) : 338.65		Tested Length (m) : 2.00		Pressure Gauge Height (m agl) : 1.20		Presumed Water Temperature : 20	
Location : Curlewis		Interval Base (m) : 340.65		Packer Type: Pneumatic - Wireline - Double		Casing Inner Diameter (mm) : 96.0			
Tested By : CK		Computed By : CK		Rock tested :					
Date : 25-Aug-11		Date : 26-Aug-11		Water Meter Reading In: Litres		Checked By :		Date :	
Pressure Stage	Gauge Pressure kPa	No	Actual Time (h:m:s)	Time Intervals (min)	Water Meter Readings Reading (Litres)	Volume (m3)	Discharge (L/min)	Discharge/m (L/min/m)	Remarks
P1	100								
P2	200								
P3	400								
Total :									
Average:							0.000	0.000	
Total :									
Average:							0.290	0.145	
Total :									
Average:							0.390	0.195	
TEST RESULTS									
Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity				
P1	0.0		111.8		$K = Q/H \times 6.10889 \times 10^{-8} \times ((\log(2L/D))/L)$, where H_{LOSS} 0.00 kPa Stage No. P3 Gauge Pressure 400 kPa Q 0.39 L/min H 42.0 m Interpreted Result 0 uL Reported Permeability at Stage P3				
P2	0.7		211.8						
P3	0.5		411.8						
P4									
P5									
Flow Type			Comments:						
LOW PERMEABILITY			K = 4.6E-08 m/s						



WATER PRESSURE TEST									
Job No. : 22/1455102		Hole No. : MMC042		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 1.1	
Client : Shenhua Australia		Dip (Deg) : 90		Hole Diameter (m) : 0.096		Immediately prior to test (m bgl) : 0.00		Used in analysis (m bgl) : 0.00	
Project :		Interval Top (m) : 332.65		Tested Length (m) : 2.00		Pressure Gauge Height (m agl) : 1.20		Presumed Water Temperature : 20	
Location : Curlewis		Interval Base (m) : 334.65		Packer Type: Pneumatic - Wireline - Double		Casing Inner Diameter (mm) : 96.0			
Tested By : CK		Computed By : CK		Rock tested :					
Date : 25-Aug-11		Date : 26-Aug-11		Water Meter Reading In: Litres		Checked By :		Date :	
Pressure Stage	Gauge Pressure kPa	No	Actual Time (h:m:s)	Time Intervals (min)	Water Meter Readings Reading (Litres)	Volume (L)	Discharge (L/min)	Discharge/m (L/min/m)	Remarks
	100					Total : 0.00	0.00	0.00	c :
	7 Psi					Average: 0.000	0.000	0.000	Start Date & Time :
	200					Total : 0.00	0.00	0.00	
	14 Psi					Average: 0.150	0.075	0.075	
	400					Total : 0.00	0.00	0.00	
	28 Psi					Average: 0.520	0.260	0.260	
	200					Total : 0.00	0.00	0.00	
	14 Psi					Average: 0.110	0.055	0.055	
	100					Total : 0.00	0.00	0.00	Finish Date & Time :
	7 Psi					Average: 0.000	0.000	0.000	
TEST RESULTS									
Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity				
P1	0.0		111.8		$K = Q/H \times 6.10889 \times 10^{-8} \times ((\log(2L/D))/L)$, where H _{LOSS} 0.00 kPa Stage No. P3 Gauge Pressure 400 kPa Q 0.52 L/min H 42.0 m Interpreted Result 1 uL Reported Permeability at Stage P3 K = 6.1E-08 m/s				
P2	0.4		211.8						
P3	0.6		411.8						
P4	0.3		211.8						
P5	0.0		111.8						
Flow Type				Comments:					
LOW PERMEABILITY									

WATER PRESSURE TEST									
Job No. : 22/1455102		Hole No. : MMC042		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 1.1	
Client : Shenhua Australia		Dip (Deg) : 90		Hole Diameter (m) : 0.096		Immediately prior to test (m bgl) : 0.00		Used in analysis (m bgl) : 0.00	
Project :		Interval Top (m) : 315.05		Tested Length (m) : 4.00		Pressure Gauge Height (m agl) : 0.80		Presumed Water Temperature : 20	
Location : Curlewis		Interval Base (m) : 319.05		Packer Type: Pneumatic - Wireline - Double		Casing Inner Diameter (mm) : 96.0			
Tested By : CK		Computed By : CK		Rock tested :					
Date : 25-Aug-11		Date : 26-Aug-11		Water Meter Reading In: Litres		Checked By :		Date :	
Pressure Stage	Gauge Pressure kPa	No	Actual Time (h:m:s)	Time Intervals (min)	Water Meter Readings Reading (Litres)	Volume (L)	Discharge (L/min)	Discharge/m (L/min/m)	Remarks
P1	100					Total : 0.00	0.00	0.00	c : 1
P2	200					Average: 0.270	0.068		Start Date & Time :
P3	400					Total : 0.00	0.00	0.00	
P4	200					Average: 0.400	0.100		
P5	100					Total : 0.00	0.00	0.00	Finish Date & Time :
						Average: 0.160	0.040		
						Total : 0.00	0.00	0.00	
						Average: 0.100	0.025		
TEST RESULTS									
Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity				
P1	0.6		107.8		$K = Q/H \times 6.10889 \times 10^{-8} \times ((\log(2L/D))/L)$, where H_{LOSS} 0.00 kPa Stage No. Average Gauge Pressure 200 kPa Q 0.27 L/min H 21.2 m Interpreted Result 0 uL Reported Permeability at Stage Average K = 3.8E-08 m/s				
P2	0.5		207.8						
P3	0.3		407.8						
P4	0.2		207.8						
P5	0.2		107.8						
Flow Type				Comments:					
VOID FILLING									



WATER PRESSURE TEST									
Job No. : 22/1455102		Hole No. : MMC046		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 1.1	
Client : Shenhua Australia		Dip (Deg) : 90		Hole Diameter (m) : 0.096		Immediately prior to test (m bgl) : 0.00		Used in analysis (m bgl) : 0.00	
Project :		Interval Top (m) : 442.55		Tested Length (m) : 16.72		Pressure Gauge Height (m agl) : 0.80		Presumed Water Temperature : 20	
Location : Curlewis		Interval Base (m) : 459.27		Packer Type: Pneumatic - Wireline - Single		Casing Inner Diameter (mm) : 96.0			
Tested By : CK		Computed By : CK		Rock tested :					
Date : 30-Aug-11		Date : 1-Sep-11		Water Meter Reading in: Litres		Checked By :		Date :	
Pressure Stage	Gauge Pressure kPa	No	Actual	Time	Water Meter Readings		Volume	Discharge	Discharge/m
			Time (h:m:s)	Intervals (min)	Reading (Litres)	m3	(L)	(L/min)	(L/min/m)
P1	100						Total : Average:	0.050	0.002990431
P2	150						Total : Average:	0.016	0.001
P3	600						Total : Average:	0.324	0.019
TEST RESULTS									
Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow		Interpreted Result & Hydraulic Conductivity			
P1	0.0		107.8			K = Q/H x 6.10889 x 10^-5 x ((log(2L/D))/L), where			
P2	0.0		157.8			H LOSS 0.00 kPa			
P3	0.0		607.8			Stage No. P3			
P4						Gauge Pressure 600 kPa			
P5						Q 0.32 L/min			
Flow Type			Comments:		H 62.0 m				
LOW PERMEABILITY					Interpreted Result 0 uL				
					Reported Permeability at Stage P3				
					K = 4.9E-09 m/s				

WATER PRESSURE TEST

Job No. : 22/1455102	Hole No. : MMC046	Drilling Method : HQ	Vertical depth to Groundwater	Revision : 1.1
Client : Shenhua Australia	Dip (Deg) : 90	Hole Diameter (m) : 0.096	Immediately prior to test (m bgl) : 0.00	Used in analysis (m bgl) : 0.00
Project :	Interval Top (m) : 421.05	Tested Length (m) : 38.22	Pressure Gauge Height (m agl) : 1.30	Presumed Water Temperature : 20
Location : Curlewis	Interval Base (m) : 459.27	Packer Type : Pneumatic - Wireline - Single	Presumed Water Temperature : 20	Casing Inner Diameter (mm) : 96.0
Tested By : CK	Computed By : CK	Rock tested :		
Date : 30-Aug-11	Date : 1-Sep-11	Water Meter Reading in: Litres	Checked By :	Date :

Pressure Stage	Gauge Pressure kPa	No	Actual	Time	Water Meter Readings		Volume	Discharge	Discharge/m	Remarks
			(h:m:s)	(min)	Reading (Litres)	m3	(L/min)	(L/min/m)		
P1	100						Total : Average:			c : 1 Start Date & Time :
P2	150						Total : Average:	0.077 0.002		
P3	600						Total : Average:	0.010 0.000261643		
								0.324 0.008		

Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity
P1	0.0		112.7 162.7 612.7		$K = Q/H \times 6.10889 \times 10^{-6} \times ((\log(2L/D))/L)$, where H_{LOSS} 0.00 kPa Stage No. P3 Gauge Pressure 600 kPa Q 0.32 L/min H 62.5 m Interpreted Result 0 uL Reported Permeability at Stage P3 K = 2.4E-09 m/s
P2	0.0				
P3	0.0				
P4					
P5					

Flow Type	LOW PERMEABILITY	Comments:



WATER PRESSURE TEST									
Job No. : 22/1455102		Hole No. : MMC046		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 1.1	
Client : Shenhua Australia		Dip (Deg) : 90		Hole Diameter (m) : 0.096		Immediately prior to test (m bgl) : 0.00		Used in analysis (m bgl) : 0.00	
Project : Curlewis		Interval Top (m) : 313.15		Tested Length (m) : 146.12		Pressure Gauge Height (m agl) : 1.20		Presumed Water Temperature : 20	
Location : Curlewis		Interval Base (m) : 459.27		Packer Type : Pneumatic - Wireline - Single		Casing Inner Diameter (mm) : 96.0		Date : 30-Aug-11	
Tested By : CK		Computed By : CK		Rock tested :		Water Meter Reading in: Litres		Checked By :	
Date : 30-Aug-11		Date : 1-Sep-11		Water Meter Reading in: Litres		Checked By :		Date :	
Pressure Stage	Gauge Pressure kPa	No	Actual Time (h:m:s)	Time Intervals (min)	Water Meter Readings Reading (Litres)	Volume (L)	Discharge (L/min)	Discharge/m (L/min/m)	Remarks
P1	150					Total : 0.000	0.000	0.000	Start Date & Time : 1
P2	300					Average: 0.177	0.001		
P3	600					Total : 0.516	0.004		
P4	300					Average: 0.121	0.001		
TEST RESULTS									
Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow		Interpreted Result & Hydraulic Conductivity			
P1	0.0		161.8			K = Q/H x 6.10889 x 10^-6 x ((log(2L/D))/L), where			
P2	0.0		311.8			H LOSS 0.00 kPa			
P3	0.0		611.8			Stage No. P3			
P4	0.0		311.8			Gauge Pressure 600 kPa			
P5	0.0					Q 0.52 L/min			
Flow Type			Comments:		H 62.4 m				
LOW PERMEABILITY					Interpreted Result 0 uL				
					Reported Permeability at Stage P3				
					K = 1.2E-09 m/s				

WATER PRESSURE TEST									
Job No. : 22/1455102		Hole No. : MMC046		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 1.1	
Client : Shenhua Australia		Dip (Deg) : 90		Hole Diameter (m) : 0.096		Immediately prior to test (m bgl) : 0.00		Used in analysis (m bgl) : 0.00	
Project :		Interval Top (m) : 436.15		Tested Length (m) : 5.00		Pressure Gauge Height (m agl) : 1.20		Presumed Water Temperature : 20	
Location : Curlewis		Interval Base (m) : 441.15		Packer Type : Pneumatic - Wireline - Double		Casing Inner Diameter (mm) : 96.0			
Tested By : CK		Computed By : CK		Rock tested :					
Date : 31-Aug-11		Date : 1-Sep-11		Water Meter Reading in: Litres		Checked By :		Date :	
Pressure Stage	Gauge Pressure kPa	No	Actual Time (h:m:s)	Time Intervals (min)	Water Meter Readings (Litres)	Volume (m3)	Discharge (L/min)	Discharge/m (L/min/m)	Remarks
P1	100								c : 1
P2	300								Start Date & Time :
P3	600								
P4	300								
TEST RESULTS									
Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity				
P1	0.0		111.8		$K = Q/H \times 6.10889 \times 10^{-6} \times ((\log(2L/D))/L)$, where H_{LOSS} 0.00 kPa Stage No. P3 Gauge Pressure 600 kPa Q 0.67 L/min H 62.4 m Interpreted Result 0 uL Reported Permeability at Stage P3 K = 2.6E-08 m/s				
P2	0.1		311.8						
P3	0.2		611.8						
P4	0.1		311.8						
P5									
Flow Type			Comments:						
LOW PERMEABILITY									

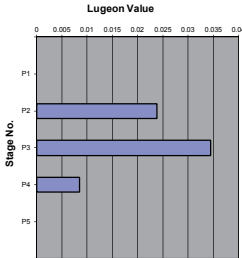
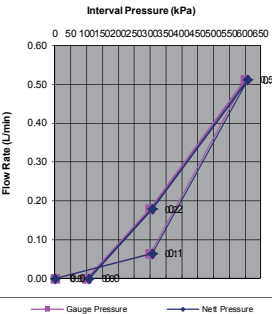


WATER PRESSURE TEST										
Job No. : 22/1455102		Hole No. : MMC046		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 1.1		
Client : Shenhua Australia		Dip (Deg) : 90		Hole Diameter (m) : 0.096		Immediately prior to test (m bgl) : 0.00		Used in analysis (m bgl) : 0.00		
Project : Curlewis		Interval Top (m) : 429.80		Tested Length (m) : 4.50		Pressure Gauge Height (m agl) : 0.80		Presumed Water Temperature : 20		
Location : Curlewis		Interval Base (m) : 434.30		Packer Type: Pneumatic - Wireline - Single		Casing Inner Diameter (mm) : 96.0				
Tested By : CK		Computed By : CK		Rock tested :						
Date : 31-Aug-11		Date : 1-Sep-11		Water Meter Reading in: Litres		Checked By :		Date :		
Pressure Stage	Gauge Pressure kPa	No	Actual Time		Water Meter Readings		Volume (L)	Discharge (L/min)	Discharge/m (L/min/m)	Remarks
			(h:m:s)	(min)	Reading (Litres)	m3				
P1	150						Total :			Start Date & Time : 1
							Average:	0.000	0.000	
P2	300						Total :			
							Average:	0.000	0.000	
P3	600						Total :			
							Average:	0.128	0.028	
TEST RESULTS										
Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity					
P1	0.0		157.8		$K = Q/H \times 6.10889 \times 10^{-6} \times ((\log(2L/D))/L)$, where $H_{LOSS} = 0.00$ kPa Stage No. P3 Gauge Pressure 600 kPa $Q = 0.13$ L/min $H = 62.0$ m Interpreted Result 0 uL Reported Permeability at Stage P3 $K = 5.5E-09$ m/s					
P2	0.0		307.8							
P3	0.0		607.8							
P4										
P5										
Flow Type			Comments:							
LOW PERMEABILITY										

WATER PRESSURE TEST									
Job No. : 22/1455102		Hole No. : MMC046		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 1.1	
Client : Shenhua Australia		Dip (Deg) : 90		Hole Diameter (m) : 0.096		Immediately prior to test (m bgl) : 0.00		Used in analysis (m bgl) : 0.00	
Project : Curlewis		Interval Top (m) : 422.35		Tested Length (m) : 6.50		Pressure Gauge Height (m agl) : 1.50		Presumed Water Temperature : 20	
Location : Curlewis		Interval Base (m) : 428.85		Packer Type : Pneumatic - Wireline - Double		Casing Inner Diameter (mm) : 96.0		Date : 31-Aug-11	
Tested By : CK		Computed By : CK		Rock tested :		Checked By :		Date : 1-Sep-11	
Date : 31-Aug-11		Date : 1-Sep-11		Water Meter Reading in: Litres		Checked By :		Date :	
Pressure Stage	Gauge Pressure kPa	No	Actual Time (h:m:s)	Time Intervals (min)	Water Meter Readings Reading (Litres)	Volume (m3)	Discharge (L/min)	Discharge/m (L/min/m)	Remarks
P1	150								c : 1
P2	300								Start Date & Time :
P3	600								
TEST RESULTS									
Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity				
P1	0.0		164.7 314.7 614.7		$K = Q/H \times 6.10889 \times 10^{-6} \times ((\log(2L/D))/L)$, where H_{LOSS} 0.00 kPa Stage No. P3 Gauge Pressure 600 kPa Q 0.51 L/min H 62.7 m Interpreted Result 0 uL Reported Permeability at Stage P3 K = 1.6E-08 m/s				
P2	0.0								
P3	0.1								
P4									
P5									
Flow Type		Comments:							
LOW PERMEABILITY									



WATER PRESSURE TEST										
Job No. : 22/1455102		Hole No. : MMC046		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 1.1		
Client : Shenhua Australia		Dip (Deg) : 90		Hole Diameter (m) : 0.096		Immediately prior to test (m bgl) : 0.00		Used in analysis (m bgl) : 0.00		
Project : Curlewis		Interval Top (m) : 418.35		Tested Length (m) : 4.00		Pressure Gauge Height (m agl) : 1.00		Presumed Water Temperature : 20		
Location : Curlewis		Interval Base (m) : 422.35		Packer Type: Pneumatic - Wireline - Double		Casing Inner Diameter (mm) : 96.0		Date : 31-Aug-11		
Tested By : CK		Computed By : CK		Rock tested :		Water Meter Reading in: Litres		Checked By :		
Date : 31-Aug-11		Date : 1-Sep-11		Water Meter Reading in: Litres		Checked By :		Date :		
Pressure Stage	Gauge Pressure kPa	No	Actual	Time	Water Meter Readings		Volume	Discharge	Discharge/m	
			Time (h:m:s)	Intervals (min)	Reading (Litres)	m3	(L)	(L/min)	(L/min/m)	
P1	150		Total : 0.000						Average: 0.000	
P2	300		Total : 0.010						Average: 0.003	
P3	600		Total : 0.184						Average: 0.046	
TEST RESULTS										
Stage No.	Lugeon Value	Lugeon Value Curve		Nett Pressures		Pressure Vs Flow		Interpreted Result & Hydraulic Conductivity		
P1	0.0			159.8				K = Q/H x 6.10889 x 10^-6 x ((log(2L/D))/L), where		
P2	0.0			309.8				H LOSS 0.00 kPa		
P3	0.1			609.8				Stage No. P3		
P4								Gauge Pressure 600 kPa		
P5								Q 0.18 L/min		
Flow Type								H 62.2 m		
LOW PERMEABILITY								Interpreted Result 0 uL		
								Reported Permeability at Stage P3		
								K = 8.7E-09 m/s		

WATER PRESSURE TEST									
Job No. : 22/1455102		Hole No. : MMC049		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 1.1	
Client : Shenhua Australia		Dip (Deg) : 90		Hole Diameter (m) : 0.096				Immediately prior to test (m bgl) : 0.00	
Project :		Interval Top (m) : 425.90		Tested Length (m) : 24.40				Used in analysis (m bgl) : 0.00	
Location : Curlewis		Interval Base (m) : 450.30		Packer Type: Pneumatic - Wireline - Single				Pressure Gauge Height (m agl) : 0.80	
Tested By : CK		Computed By : DK		Rock tested :				Presumed Water Temperature : 20	
Date : 4-Sep-11		Date : 5-Sep-11		Water Meter Reading in: Litres		Checked By :		Casing Inner Diameter (mm) : 96.0	
Date : 4-Sep-11		Date : 5-Sep-11		Water Meter Reading in: Litres		Checked By :		Date :	
Pressure Stage	Gauge Pressure kPa	No	Actual Time (h:m:s)	Time Intervals (min)	Water Meter Readings Reading (Litres)	Volume (L)	Discharge (L/min)	Discharge/m (L/min/m)	Remarks
P1	100					Total : Average:	0.000	0	c : Start Date & Time : 1
P2	300					Total : Average:	0.179	0.007	
P3	600					Total : Average:	0.511	0.021	
P4	300					Total : Average:	0.064	0.003	
TEST RESULTS									
Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity				
P1	0.0		107.8		$K = Q/H \times 6.10889 \times 10^{-6} \times ((\log(2L/D))/L)$, where H_{LOSS} 0.00 kPa Stage No. P3 Gauge Pressure 600 kPa Q 0.51 L/min H 62.0 m Interpreted Result 0 uL Reported Permeability at Stage P3 $K = 5.6E-09$ m/s				
P2	0.0		307.8						
P3	0.0		607.8						
P4	0.0		307.8						
P5									
Flow Type			Comments:						
LOW PERMEABILITY									



WATER PRESSURE TEST									
Job No. : 22/1455102		Hole No. : MMC049		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 1.1	
Client : Shenhua Australia		Dip (Deg) : 90		Hole Diameter (m) : 0.096		Immediately prior to test (m bgl) : 0.00		Used in analysis (m bgl) : 0.00	
Project : Curlewis		Interval Top (m) : 383.60		Tested Length (m) : 66.70		Pressure Gauge Height (m agl) : 1.30		Presumed Water Temperature : 20	
Location : Curlewis		Interval Base (m) : 450.30		Packer Type : Pneumatic - Wireline - Single		Casing Inner Diameter (mm) : 96.0		Date : 4-Sep-11	
Tested By : CK		Computed By : DK		Rock tested :		Water Meter Reading in: Litres		Checked By :	
Date : 4-Sep-11		Date : 5-Sep-11		Water Meter Reading in: Litres		Checked By :		Date :	
Pressure Stage	Gauge Pressure kPa	No	Actual Time (h:m:s)	Time Intervals (min)	Water Meter Readings Reading (Litres)	Volume (L)	Discharge (L/min)	Discharge/m (L/min/m)	Remarks
P1	150					Total : #VALUE!	#VALUE!	#VALUE!	Start Date & Time : 1
						Average: 0.048	0.001		
P2	300					Total : #VALUE!	#VALUE!	#VALUE!	
						Average: 0.250	0.003748126		
P3	600					Total : #VALUE!	#VALUE!	#VALUE!	
						Average: 0.631	0.009		
P4	300					Total : #VALUE!	#VALUE!	#VALUE!	
						Average: 0.052	0.001		
TEST RESULTS									
Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity				
P1	0.0		162.7		$K = Q/H \times 6.10889 \times 10^{-6} \times ((\log(2L/D))/L)$, where $H_{LOSS} = 0.00$ kPa Stage No. P3 Gauge Pressure 600 kPa $Q = 0.63$ L/min $H = 62.5$ m Interpreted Result 0 uL Reported Permeability at Stage P3 $K = 2.9E-09$ m/s				
P2	0.0		312.7						
P3	0.0		612.7						
P4	0.0		312.7						
P5	0.0		12.7						
Flow Type			Comments:						
LOW PERMEABILITY									

WATER PRESSURE TEST

Job No. : 22/1455102	Hole No. : MMC049	Drilling Method : HQ	Vertical depth to Groundwater	Revision : 1.1
Client : Shenhua Australia	Dip (Deg) : 90	Hole Diameter (m) : 0.096	Immediately prior to test (m bgl) : 0.00	Used in analysis (m bgl) : 0.00
Project :	Interval Top (m) : 320.90	Tested Length (m) : 129.40	Pressure Gauge Height (m agl) : 1.20	Presumed Water Temperature : 20
Location : Curlewis	Interval Base (m) : 450.30	Packer Type : Pneumatic - Wireline - Single	Presumed Water Temperature : 20	Casing Inner Diameter (mm) : 96.0
Tested By : CK	Computed By : DK	Rock tested :		
Date : 4-Sep-11	Date : 5-Sep-11	Water Meter Reading in: Litres	Checked By :	Date :

Pressure Stage	Gauge Pressure kPa	No	Actual	Time	Water Meter Readings	Volume	Discharge	Discharge/m	Remarks
			(h:m:s)	(min)	Reading (Litres)	m3	(L/min)	(L/min/m)	
P1	150					Total : Average:			c : 1 Start Date & Time :
P2	300					Total : Average:	0.000	0.000	
P3	600					Total : Average:	0.005	0.000	
P4	300					Total : Average:	0.354	0.003	
						Total : Average:	0.000	0.000	

Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity
P1	0.0		161.8		$K = Q/H \times 6.10889 \times 10^{-6} \times ((\log(2L/D))/L)$, where H_{LOSS} 0.00 kPa Stage No. P3 Gauge Pressure 600 kPa Q 0.35 L/min H 62.4 m Interpreted Result 0 uL Reported Permeability at Stage P3 $K = 9.2E-10$ m/s
P2	0.0		311.8		
P3	0.0		611.8		
P4	0.0		311.8		
P5	0.0				

Flow Type	Comments:
LOW PERMEABILITY	



WATER PRESSURE TEST									
Job No. : 22/1455102		Hole No. : MMC049		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 1.1	
Client : Shenhua Australia		Dip (Deg) : 90		Hole Diameter (m) : 0.096		Immediately prior to test (m bgl) : 0.00		Used in analysis (m bgl) : 0.00	
Project : Curlewis		Interval Top (m) : 415.40		Tested Length (m) : 4.00		Pressure Gauge Height (m agl) : 1.20		Presumed Water Temperature : 20	
Location : Curlewis		Interval Base (m) : 419.40		Packer Type: Pneumatic - Wireline - Double		Casing Inner Diameter (mm) : 96.0			
Tested By : DK		Computed By : DK		Rock tested :					
Date : 5-Sep-11		Date : 6-Sep-11		Water Meter Reading in: Litres		Checked By :		Date :	
Pressure Stage	Gauge Pressure kPa	No	Actual Time (h:m:s)	Time Intervals (min)	Water Meter Readings Reading (Litres)	Volume (m3)	Discharge (L/min)	Discharge/m (L/min/m)	Remarks
P1	100								
P2	200								
P3	500								
P4	200								
P5	100								
TEST RESULTS									
Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity				
P1	0.8		111.8		$K = Q/H \times 6.10889 \times 10^{-6} \times ((\log(2L/D))/L)$, where $H_{LOSS} = 0.00$ kPa Stage No. P5 Gauge Pressure 100 kPa Q 0.18 L/min H 11.4 m Interpreted Result 0 uL Reported Permeability at Stage P5 K = 4.5E-08 m/s				
P2	0.1		211.8						
P3	0.1		511.8						
P4	0.0		211.8						
P5	0.4		111.8						
Flow Type			Comments:						
LOW PERMEABILITY									

WATER PRESSURE TEST									
Job No. : 22/1455102		Hole No. : MMC049		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 1.1	
Client : Shenhua Australia		Dip (Deg) : 90		Hole Diameter (m) : 0.096		Immediately prior to test (m bgl) : 0.00		Used in analysis (m bgl) : 0.00	
Project : Curlewis		Interval Top (m) : 401.60		Tested Length (m) : 2.50		Pressure Gauge Height (m agl) : 0.80		Presumed Water Temperature : 20	
Location : Curlewis		Interval Base (m) : 404.10		Packer Type : Pneumatic - Wireline - Double		Presumed Water Temperature : 20		Casing Inner Diameter (mm) : 96.0	
Tested By : DK		Computed By : DK		Rock tested :		Checked By :		Date :	
Date : 5-Sep-11		Date : 6-Sep-11		Water Meter Reading in: Litres		Volume (L)		Discharge (L/min)	
Pressure Stage	Gauge Pressure kPa	No	Actual Time (h:m:s)	Time Intervals (min)	Water Meter Readings (Litres)	Volume (L)	Discharge (L/min)	Discharge/m (L/min/m)	Remarks
P1	150					Total : 0.027	0.011		Start Date & Time :
P2	300					Average: 0.015	0.006		
P3	600					Total : 0.470	0.188		
P4	300					Average: 0.001	0.000		
P5	150					Total : 0.030	0.012		Finish Date & Time :
TEST RESULTS									
Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity				
P1	0.1		157.8		$K = Q/H \times 6.10889 \times 10^{-6} \times ((\log(2L/D))/L)$, where H_{LOSS} 0.00 kPa Stage No. P3 Gauge Pressure 600 kPa Q 0.47 L/min H 62.0 m Interpreted Result 0 uL Reported Permeability at Stage P3 K = 3.2E-08 m/s				
P2	0.0		307.8						
P3	0.3		607.8						
P4	0.0		307.8						
P5	0.1		157.8						
Flow Type			Comments:						
DILATION									



WATER PRESSURE TEST									
Job No. : 22/1455102		Hole No. : MMC049		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 1.1	
Client : Shenhua Australia		Dip (Deg) : 90		Hole Diameter (m) : 0.096		Immediately prior to test (m bgl) : 0.00		Used in analysis (m bgl) : 0.00	
Project : Curlewis		Interval Top (m) : 398.60		Tested Length (m) : 3.00		Pressure Gauge Height (m agl) : 1.50		Presumed Water Temperature : 20	
Location : Curlewis		Interval Base (m) : 401.60		Packer Type : Pneumatic - Wireline - Double		Casing Inner Diameter (mm) : 96.0		Date : 5-Sep-11	
Tested By : DK		Computed By : DK		Rock tested :		Water Meter Reading in: Litres		Checked By :	
Date : 5-Sep-11		Date : 6-Sep-11		Water Meter Reading in: Litres		Checked By :		Date :	
Pressure Stage	Gauge Pressure kPa	No	Actual Time (h:m:s)	Time Intervals (min)	Water Meter Readings Reading (Litres)	Volume (L)	Discharge (L/min)	Discharge/m (L/min/m)	Remarks
P1	150								
P2	300								
P3	600								
P4	300								
P5	150								
TEST RESULTS									
Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow		Interpreted Result & Hydraulic Conductivity			
P1	0.0		164.7			K = Q/H x 6.10889 x 10 ⁻⁶ x ((log(2L/D))/L), where			
P2	0.0		314.7			H _{LOSS} 0.00 kPa			
P3	0.2		614.7			Stage No. P3			
P4	0.0		314.7			Gauge Pressure 600 kPa			
P5	0.1		164.7			Q 0.31 L/min			
						H 62.7 m			
						Interpreted Result 0 uL			
						Reported Permeability at Stage P3			
						K = 1.8E-08 m/s			
Flow Type				Comments:					
DILATION									

Shenhua Stage 4 Hydrogeological Program
Packer Testing Summary

June 2012

Shenhua Watermark Coal
Packer Test Data - Analytical Summary - 2012 Program

Formation	Formation Interval		Borehole	Test #	Tester	Date/Time	Test Interval			TEST TYPE	Interpreted Conductivity (to total depth)	Adopted Conductivity (Individual Formation)	Adopted Conductivity (Individual Formation)
	Top (mbgl)	Base (mbgl)					Top (mbgs)	EOH or bottom (mbgs)	Test Length (m)				
Volcanic Basement	498	504.6	1	DK	12/06/2012 11:00	504.6	499.08	504.6	5.52	Single Packer Lugeon	3.90E-08	3.9E-08	3.4E-03
Below Maules Creek Upper	453	504.6	2	DK	12/06/2012 15:30	504.6	453.65	504.6	50.95	Single Packer Lugeon	5.90E-09	1.9E-09	1.6E-04
Maules Creek Upper	446	453	3	DK	13/06/2012 12:05	453	447.65	451.65	4	Straddle Packer Lugeon	5.50E-08	5.5E-08	4.8E-03
Above Maules Creek Upper	426	446	4	DK	13/06/2012 15:23	446	436.35	440.35	4	Straddle Packer Lugeon	6.10E-08	6.1E-08	5.3E-03
Above Maules Creek Upper	426	446	5	DK	14/06/2012 8:30	446	427.55	431.55	4	Straddle Packer Lugeon	3.00E-08	3.0E-08	2.6E-03
Porcupine Formation	182	426	6	DK	14/06/2012 12:15	426	415.35	419.35	4	Straddle Packer Lugeon	2.30E-08	2.3E-08	2.0E-03
Formation	Formation Interval		Borehole	Test #	Tester	Date/Time	Test Interval			TEST TYPE	Interpreted Conductivity (to total depth)	Adopted Conductivity (Individual Formation)	Adopted Conductivity (Individual Formation)
	Top (mbgl)	Base (mbgl)					Top (mbgs)	EOH or bottom (mbgs)	Test Length (m)				
Below Melvilles	240	246.43	1	DK	15/06/2012 8:30	246.43	241.1	246.43	5.33	Single Packer Lugeon	1.10E-07	1.1E-07	9.5E-03
Below Hoskissons Lower	182.5	237	3	DK	15/06/2012 16:00	237	186.9	246.43	59.53	Single Packer Lugeon	1.30E-08	3.5E-09	3.0E-04
Hoskissons Upper Roof	165	240	6	DK	16/06/2012 14:30	240	175.6	246.43	70.83	Single Packer Lugeon	2.50E-08	8.8E-08	7.6E-03
Melvilles Coal	237	240	2	DK	15/06/2012 11:17	240	237.1	240.1	3	Straddle Packer Lugeon	5.70E-08	2.4E-09	2.1E-04
Hoskissons Coal Lower	182.5	185.2	4	DK	16/06/2012 9:30	185.2	182.8	184.8	2	Straddle Packer Lugeon	2.40E-07	2.4E-07	2.1E-02
Hoskissons Coal Upper	180.3	182.5	5	DK	16/06/2012 11:55	182.5	180.9	182.9	2	Straddle Packer Lugeon	2.20E-07	2.2E-07	1.9E-02
Benelabri - Below Clare SS u	165	167	7	DK	16/06/2012 8:30	167	169.5	172.5	3	Straddle Packer Lugeon	3.10E-07	3.1E-07	2.7E-02
Caroona Coal	149	152.4	8	DK	17/06/2012 11:32	152.4	157.3	160.3	3	Straddle Packer Lugeon	3.20E-07	3.2E-07	2.8E-02

2012 Packer Tests
2012 Hydrogeological Program Packer Testing Summary

2/08/2012

**WATER PRESSURE TEST**

Job No. :	2215702 64	Hole No. :	WM0655	Drilling Method :	HQ	Vertical depth	Revision :	0.0
Client :	Shenhua Watermark	Dip (Deg) :	90	Hole Diameter (m) :	0.096	to	Immediately prior to test (m bgl) :	0.00
Project :		Interval Top (m) :	499.08	Tested Length (m) :	5.52	Groundwater	Used in analysis (m bgl) :	0.00
Location :	Curlewis	Interval Base (m) :	504.60	Packer Type :	Pneumatic - Wireline - Single		Pressure Gauge Height (m agl) :	0.80
Tested By :	DK	Computed By :	DK	Rock tested :			Presumed Water Temperature :	20
Date :	12-Jun-12	Date :	12-Jul-12	Water Meter Reading in:	Litres	Checked By :	Casing Inner Diameter (mm) :	96.0
Pressure Stage	Gauge Pressure kPa	No	Actual Time	Water Meter Readings	Volume	Discharge	Discharge/m	
			Time Intervals	Reading	(L)	(L/min)	(L/min/m)	Remarks
			(h:m:s)	(min)	(Litres)	m3		
P1	80				Total :			c : 1
					Average:	0.067	0.012137681	Start Date & Time :
P2	200				Total :			
					Average:	0.653	0.118	
P3	400				Total :			
					Average:	0.705	0.128	

TEST RESULTS

Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity
P1	0.1		87.8		$K = Q/H \times 6.10889 \times 10^{-6} \times ((\log(2L/D))/L)$, where H _{LOSS} 0.00 kPa
P2	0.6		207.8		Stage No. P3
P3	0.3		407.8		Gauge Pressure 400 kPa Q 0.71 L/min H 41.6 m
Flow Type				Interpreted Result 0 uL	Reported Permeability at Stage P3
LOW PERMEABILITY				K = 3.9E-08 m/s	

WATER PRESSURE TEST

Job No. : 2215702 64	Hole No. : WM0655	Drilling Method : HQ	Vertical depth to Groundwater	Revision : 0.0
Client : Shenhua Watermark	Dip (Deg) : 90	Hole Diameter (m) : 0.096	Immediately prior to test (m bgl) : 0.00	Used in analysis (m bgl) : 0.00
Project :	Interval Top (m) : 453.65	Tested Length (m) : 50.95	Pressure Gauge Height (m agl) : 0.80	Presumed Water Temperature : 20
Location : Curlewis	Interval Base (m) : 504.60	Packer Type : Pneumatic - Wireline - Single	Presumed Water Temperature : 20	Casing Inner Diameter (mm) : 96.0
Tested By : DK	Computed By : DK	Rock tested :		
Date : 12-Jun-12	Date : 12-Jul-12	Water Reading in: Litres	Checked By :	Date :

Pressure Stage	Gauge Pressure kPa	No	Actual	Time	Water Meter Readings		Volume (L)	Discharge (L/min)	Discharge/m (L/min/m)	Remarks
			(h:m:s)	(min)	Reading (Litres)	m3				
P1	90						Total : Average:			c : 1 Start Date & Time :
P2	200						Total : Average:	0.000 0.000		
P3	300						Total : Average:	0.467 0.009165849		
P4	200						Total : Average:	0.415 0.008		
P5	90						Total : Average:	0.344 0.007		Finish Date & Time :
	7 Psi							0.000 0.000		

TEST RESULTS

Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity
P1	0.0		97.8		$K = Q/H \times 6.10889 \times 10^{-6} \times ((\log(2L/D))/L)$, where H_{LOSS} 0.00 kPa Stage No. P4 Gauge Pressure 200 kPa Q 0.34 L/min H 21.2 m Interpreted Result 0 uL Reported Permeability at Stage P4 K = 5.9E-09 m/s
P2	0.0		207.8		
P3	0.0		307.8		
P4	0.0		207.8		
P5	0.0		97.8		

Flow Type

LOW PERMEABILITY

Comments:



WATER PRESSURE TEST									
Job No. :	2215702 64	Hole No. :	WM0655	Drilling Method :	HQ	Vertical depth to Groundwater	Revision :	0.0	
Client :	Shenhua Watermark	Dip (Deg) :	90	Hole Diameter (m) :	0.096		Immediately prior to test (m bgl) :	0.00	
Project :		Interval Top (m) :	447.65	Tested Length (m) :	4.00		Used in analysis (m bgl) :	0.00	
Location :	Curlewis	Interval Base (m) :	451.65	Packer Type :	Pneumatic - Wireline - Single		Pressure Gauge Height (m agl) :	0.80	
Tested By :	DK	Computed By :	DK	Rock tested :			Presumed Water Temperature :	20	
Date :	13-Jun-12	Date :	12-Jul-12	Water Meter Reading in: Litres		Checked By :		Casing Inner Diameter (mm) :	96.0
Pressure Stage	Gauge Pressure kPa	No	Actual Time (h:m:s)	Time Intervals (min)	Water Meter Readings Reading (Litres)	Volume (L)	Discharge (L/min)	Discharge/m (L/min/m)	Remarks
P1	90					Total : Average:			c : Start Date & Time : 1
P2	200					Total : Average:	0.010	0.003	
P3	400					Total : Average:	1.010	0.253	
P4	200					Total : Average:	1.192	0.298	
						Total : Average:	0.400	0.100	
TEST RESULTS									
Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity				
P1	0.0		97.8		$K = Q/H \times 6.10889 \times 10^{-8} \times ((\log(2L/D))/L)$, where H_{LOSS} 0.00 kPa Stage No. P4 Gauge Pressure 200 kPa Q 0.40 L/min H 21.2 m Interpreted Result 0 uL Reported Permeability at Stage P4 K = 5.5E-08 m/s				
P2	1.2		207.8						
P3	0.7		407.8						
P4	0.5		207.8						
Flow Type			Comments:						
LOW PERMEABILITY									

WATER PRESSURE TEST									
Job No. : 2215702 64		Hole No. : MMC046		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 1.1	
Client : Shenhua Watermark		Dip (Deg) : 90		Hole Diameter (m) : 0.096		Immediately prior to test (m bgl) : 0.00		Used in analysis (m bgl) : 0.00	
Project :		Interval Top (m) : 436.35		Tested Length (m) : 4.00		Pressure Gauge Height (m agl) : 0.80		Presumed Water Temperature : 20	
Location : Curlewis		Interval Base (m) : 440.35		Packer Type: Pneumatic - Wireline - Double		Casing Inner Diameter (mm) : 96.0			
Tested By : DK		Computed By : DK		Rock tested :					
Date : 13-Jun-12		Date : 12-Jun-12		Water Meter Reading in: Litres		Checked By :		Date :	
Pressure Stage	Gauge Pressure kPa	No	Actual Time (h:m:s)	Time Intervals (min)	Water Meter Readings Reading (Litres)	Volume (L)	Discharge (L/min)	Discharge/m (L/min/m)	Remarks
P1	80					Total :			c : Start Date & Time :
P2	200					Average: 0.000	0.000		
P3	400					Average: 0.492	0.123		
						Average: 0.433	0.108		
P4	200					Average: 0.444	0.111		
TEST RESULTS									
Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity				
P1	0.0		87.8		$K = Q/H \times 6.10889 \times 10^{-6} \times ((\log(2L/D))/L)$, where H_{LOSS} 0.00 kPa Stage No. P4 Gauge Pressure 200 kPa Q 0.44 L/min H 21.2 m Interpreted Result 1 uL Reported Permeability at Stage P4 K = 6.1E-08 m/s				
P2	0.6		207.8						
P3	0.3		407.8						
P4	0.5		207.8						
P5	#DIV/0!		#DIV/0!						
Flow Type		Comments:							
LOW PERMEABILITY									



WATER PRESSURE TEST									
Job No. : 2215702 64		Hole No. : WM0655		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 1.1	
Client : Shenhua Watermark		Dip (Deg) : 90		Hole Diameter (m) : 0.096		Immediately prior to test (m bgl) : 0.00		Used in analysis (m bgl) : 0.00	
Project : Curlewis		Interval Top (m) : 427.55		Tested Length (m) : 4.00		Pressure Gauge Height (m agl) : 0.80		Presumed Water Temperature : 20	
Location : Curlewis		Interval Base (m) : 431.55		Packer Type : Pneumatic - Wireline - Single		Casing Inner Diameter (mm) : 96.0		Date : 14-Jun-12	
Tested By : DK		Computed By : DK		Rock tested :		Water Meter Reading in: Litres		Checked By :	
Date : 14-Jun-12		Date : 12-Jul-12		Water Meter Reading in: Litres		Checked By :		Date :	
Pressure Stage	Gauge Pressure kPa	No	Actual Time (h:m:s)	Time Intervals (min)	Water Meter Readings Reading (Litres)	Volume (L)	Discharge (L/min)	Discharge/m (L/min/m)	Remarks
P1	100					Total : 0.316	0.079		Start Date & Time :
P2	200					Average: 0.646	0.162		
P3	400					Total : 0.422	0.106		
P4	200					Average: 0.400	0.100		
P5	100					Total : 0.030	0.008		Finish Date & Time :
TEST RESULTS									
Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity				
P1	0.7		107.8		K = Q/H x 6.10889 x 10^-6 x ((log(2L/D))/L), where				
P2	0.8		207.8		H Loss 0.00 kPa				
P3	0.3		407.8		Stage No. P3				
P4	0.5		207.8		Gauge Pressure 400 kPa				
P5	0.1		107.8		Q 0.42 L/min				
Flow Type					H 41.6 m				
LOW PERMEABILITY					Interpreted Result 0 uL				
					Reported Permeability at Stage P3				
					K = 3.0E-08 m/s				

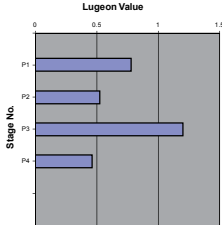
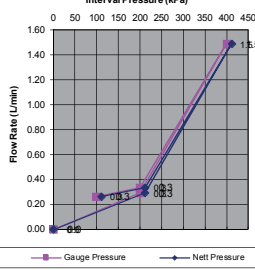
WATER PRESSURE TEST									
Job No. : 2215702 64		Hole No. : Wm0655		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 1.1	
Client : Shenhua Watermark		Dip (Deg) : 90		Hole Diameter (m) : 0.096		Immediately prior to test (m bgl) : 0.00		Used in analysis (m bgl) : 0.00	
Project :		Interval Top (m) : 422.35		Tested Length (m) : 6.50		Pressure Gauge Height (m agl) : 1.50		Presumed Water Temperature : 20	
Location : Curlewis		Interval Base (m) : 428.85		Packer Type: Pneumatic - Wireline - Double		Casing Inner Diameter (mm) : 96.0			
Tested By : DK		Computed By : DK		Rock tested :					
Date : 15-Jun-12		Date : 12-Jul-12		Water Meter Reading in: Litres		Checked By :		Date :	
Pressure Stage	Gauge Pressure kPa	No	Actual Time (h:m:s)	Time Intervals (min)	Water Meter Reading (Litres)	Volume (m3)	Discharge (L/min)	Discharge/m (L/min/m)	Remarks
P1	100								c : Start Date & Time : Average: 0.278 0.043 Total : Average: 0.485 0.075 Total : Average: 0.485 0.075 Total : Average: 0.340 0.052 Total : Average: 0.095 0.015 Finish Date & Time :
P2	200								
P3	400								
P4	200								
P5	100								
TEST RESULTS									
Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity				
P1	0.4		114.7		$K = Q/H \times 6.10889 \times 10^{-5} \times ((\log(2L/D))/L)$, where H_{LOSS} 0.00 kPa Stage No. P3 Gauge Pressure 400 kPa Q 0.49 L/min H 42.3 m Interpreted Result 0 uL Reported Permeability at Stage P3 K = 2.3E-08 m/s				
P2	0.3		214.7						
P3	0.2		414.7						
P4	0.2		214.7						
P5	0.1		114.7						
Flow Type				Comments:					
LOW PERMEABILITY									

**WATER PRESSURE TEST**

Job No. : 221570264		Hole No. : WM0675		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 1.0		
Client : Shenhua Watermakr Co		Dip (Deg) : 90		Hole Diameter (m) : 0.096				Immediately prior to test (m bgl) : 0.00		
Project :		Interval Top (m) : 241.10		Tested Length (m) : 5.33				Used in analysis (m bgl) : 0.00		
Location : Curlewis		Interval Base (m) : 246.43		Packer Type: Pneumatic - Wireline - Single				Pressure Gauge Height (m agl) : 1.20		
Tested By : DK		Computed By : DK		Rock tested :				Presumed Water Temperature : 20		
Date : 15-Jun-12		Date : 12-Jul-12		Water Meter Reading in: Litres		Checked By :		Casing Inner Diameter (mm) : 96.0		
Pressure Stage	Gauge Pressure kPa	No	Actual	Time	Water Meter Readings		Volume	Discharge	Discharge/m	Remarks
			Time	Intervals	Reading		(L)	(L/min)	(L/min/m)	
			(h:m:s)	(min)	(Litres)	m3				
P1	100						Total :			c : 1
							Average:	0.880	0.165103189	
P2	200						Total :			
							Average:	1.206	0.226	
P3	400						Total :			
							Average:	1.940	0.364	
P4	200						Total :			
							Average:	0.772	0.145	
P5	100						Total :			Finish Date & Time :
							Average:	0.730	0.137	

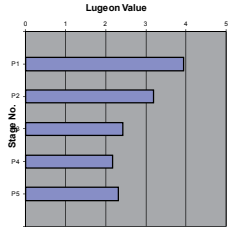
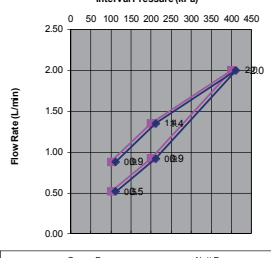
TEST RESULTS

Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity
P1	1.5		111.8		$K = Q/H \times 6.10889 \times 10^{-6} \times ((\log(2L/D))/L)$, where H_{LOSS} 0.03 kPa Stage No. P3 Gauge Pressure 400 kPa Q 1.94 L/min H 42.0 m Interpreted Result 1 uL Reported Permeability at Stage P3 K = 1.1E-07 m/s
P2	1.1		211.8		
P3	0.9		411.7		
P4	0.7		211.8		
P5	1.2		111.8		
Flow Type		LOW PERMEABILITY			

WATER PRESSURE TEST									
Job No. : 221570264		Hole No. : WM0675		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 1.1	
Client : Shenhua Watermark Co		Dip (Deg) : 90		Hole Diameter (m) : 0.096		Immediately prior to test (m bgl) : 0.00		Used in analysis (m bgl) : 0.00	
Project :		Interval Top (m) : 237.10		Tested Length (m) : 3.00		Pressure Gauge Height (m agl) : 1.20		Presumed Water Temperature : 20	
Location : Curlewis		Interval Base (m) : 240.10		Packer Type : Pneumatic - Wireline - Single		Casing Inner Diameter (mm) : 96.0			
Tested By : DK		Computed By : CK		Rock tested :					
Date : 15-Jun-12		Date : 12-Jul-12		Water Meter Reading in: Litres		Checked By :		Date :	
Pressure Stage	Gauge Pressure kPa	No	Actual Time (h:m:s)	Time Intervals (min)	Water Meter Readings (Litres)	Volume (m3)	Discharge (L/min)	Discharge/m (L/min/m)	Remarks
P1	100								
P2	200								
P3	400								
P4	200								
Total :									
Average:							0.263	0.088	
Total :									
Average:							0.335	0.111666667	
Total :									
Average:							1.485	0.495	
Total :									
Average:							0.293	0.098	
TEST RESULTS									
Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity				
P1	0.8		111.8		$K = Q/H \times 6.10889 \times 10^{-6} \times ((\log(2L/D))/L)$, where H_{LOSS} 0.00 kPa Stage No. P2 Gauge Pressure 200 kPa Q 0.34 L/min H 21.6 m Interpreted Result 1 uL Reported Permeability at Stage P2 $K = 5.7E-08$ m/s				
P2	0.5		211.8						
P3	1.2		411.7						
P4	0.5		211.8						
Flow Type		Comments:							
LOW PERMEABILITY									



WATER PRESSURE TEST									
Job No. : 221570264		Hole No. : WM0675		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 1.1	
Client : Shenhua Watermark Co		Dip (Deg) : 90		Hole Diameter (m) : 0.096		Immediately prior to test (m bgl) : 0.00		Used in analysis (m bgl) : 0.00	
Project : Curlewis		Interval Top (m) : 186.90		Tested Length (m) : 59.53		Pressure Gauge Height (m agl) : 1.20		Presumed Water Temperature : 20	
Location : Curlewis		Interval Base (m) : 246.43		Packer Type : Pneumatic - Wireline - Single		Casing Inner Diameter (mm) : 96.0			
Tested By : Dk		Computed By : DK		Rock tested :					
Date : 15-Jul-12		Date : 12-Jul-12		Water Meter Reading in: Litres		Checked By :		Date :	
Pressure Stage	Gauge Pressure kPa	No	Actual Time (h:m:s)	Time Intervals (min)	Water Meter Readings Reading (Litres)	Volume (L)	Discharge (L/min)	Discharge/m (L/min/m)	Remarks
P1	80					Total : Average:			c : 1 Start Date & Time :
P2	200					Total : Average:	0.620	0.010	
P3	400					Total : Average:	0.850	0.014	
P4	200					Total : Average:	1.700	0.029	
P5	80					Total : Average:	0.800	0.013	Finish Date & Time :
TEST RESULTS									
Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity				
P1	0.1		91.8		$K = Q/H \times 6.10889 \times 10^{-5} \times ((\log(2L/D))/L)$, where $H_{LOSS} = 0.02$ kPa Stage No. P3 Gauge Pressure 400 kPa Q 1.70 L/min H 42.0 m Interpreted Result 0 uL Reported Permeability at Stage P3 K = 1.3E-08 m/s				
P2	0.1		211.8						
P3	0.1		411.7						
P4	0.1		211.8						
P5	0.1		91.8						
Flow Type			Comments:						
LOW PERMEABILITY									

WATER PRESSURE TEST									
Job No. : 2.22E+08		Hole No. : WM0675		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 0.0	
Client : Shenhua Watermark		Dip (Deg) : 90		Hole Diameter (m) : 0.096		Immediately prior to test (m bgl) : 0.00		Used in analysis (m bgl) : 0.00	
Project :		Interval Top (m) : 182.80		Tested Length (m) : 2.00		Pressure Gauge Height (m agl) : 1.20		Presumed Water Temperature : 20	
Location : Curlewis		Interval Base (m) : 184.80		Packer Type : Pneumatic - Wireline - Double		Casing Inner Diameter (mm) : 96.0			
Tested By : Dk		Computed By : DK		Rock tested :					
Date : 16-Jul-12		Date : 12-Jul-12		Water Meter Reading in: Litres		Checked By :		Date :	
Pressure Stage	Gauge Pressure kPa	No	Actual Time (h:m:s)	Time Intervals (min)	Water Meter Readings Reading (Litres)	Volume (L)	Discharge (L/min)	Discharge/m (L/min/m)	Remarks
P1	100					Total : 0.880	0.440		Start Date & Time : 1
P2	200					Average : 1.350	0.675		
P3	400					Total : 2.000	1.000		
P4	200					Average : 0.920	0.460		
P5	100					Total : 0.518	0.259		Finish Date & Time :
TEST RESULTS									
Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity				
P1	3.9		111.8		$K = Q/H \times 6.10889 \times 10^{-6} \times ((\log(2L/D))/L)$, where H_{Loss} 0.03 kPa Stage No. P3 Gauge Pressure 400 kPa Q 2.00 L/min H 42.0 m Interpreted Result 2 uL Reported Permeability at Stage P3 K = 2.4E-07 m/s				
P2	3.2		211.8						
P3	2.4		411.7						
P4	2.2		211.8						
P5	2.3		111.8						
Flow Type			Comments:						
LOW PERMEABILITY									

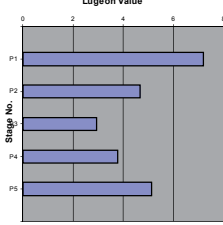
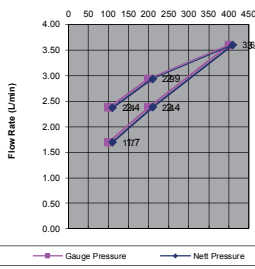


WATER PRESSURE TEST									
Job No. : 221570264		Hole No. : WM0675		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 1.1	
Client : Shenhua Watermark Coal		Dip (Deg) : 90		Hole Diameter (m) : 0.096		Immediately prior to test (m bgl) : 0.00		Used in analysis (m bgl) : 0.00	
Project : Curlewis		Interval Top (m) : 180.90		Tested Length (m) : 2.00		Pressure Gauge Height (m agl) : 0.80		Presumed Water Temperature : 20	
Location : Curlewis		Interval Base (m) : 182.90		Packer Type : Pneumatic - Wireline - Single		Casing Inner Diameter (mm) : 96.0			
Tested By : Dk		Computed By : DK		Rock tested :					
Date : 15-Jul-12		Date : 12-Jul-12		Water Meter Reading in: Litres		Checked By :		Date :	
Pressure Stage	Gauge Pressure kPa	No	Actual Time (h:m:s)	Time Intervals (min)	Water Meter Readings Reading (Litres)	Volume (L)	Discharge (L/min)	Discharge/m (L/min/m)	Remarks
P1	100					Total : 0.622	0.311		Start Date & Time : 1
P2	200					Average : 0.800	0.400		
P3	400					Total : 2.160	1.080		
P4	200					Average : 0.600	0.300		
P5	100					Total : 0.589	0.295		Finish Date & Time :
TEST RESULTS									
Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow		Interpreted Result & Hydraulic Conductivity			
P1	2.9		107.8			K = Q/H x 6.10889 x 10^-6 x ((log(2L/D))/L), where			
P2	1.9		207.8			H LOSS 0.01 kPa			
P3	2.6		407.8			Stage No. Average			
P4	1.4		207.8			Gauge Pressure 200 kPa			
P5	2.7		107.8			Q 0.95 L/min			
Flow Type					H 21.2 m		Interpreted Result 2 uL		
LOW PERMEABILITY					Reported Permeability at Stage Average		K = 2.2E-07 m/s		

WATER PRESSURE TEST									
Job No. : 221570264		Hole No. : WM0675		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 1.1	
Client : Shenhua Watermark Coal		Dip (Deg) : 90		Hole Diameter (m) : 0.096		Immediately prior to test (m bgl) : 0.00		Used in analysis (m bgl) : 0.00	
Project :		Interval Top (m) : 175.40		Tested Length (m) : 71.03		Pressure Gauge Height (m agl) : 1.50		Presumed Water Temperature : 20	
Location : Curlew		Interval Base (m) : 246.43		Packer Type : Pneumatic - Wireline - Double		Casing Inner Diameter (mm) : 96.0			
Tested By : DK		Computed By : DK		Rock tested :					
Date : 15-Jul-12		Date : 12-Jul-12		Water Meter Reading in: Litres		Checked By :		Date :	
Pressure Stage	Gauge Pressure kPa	No	Actual Time (h:m:s)	Time Intervals (min)	Water Meter Readings (Litres)	Volume (L)	Discharge (L/min)	Discharge/m (L/min/m)	Remarks
P1	100					Total : 2.500	0.035		Start Date & Time : 1
P2	200					Total : 2.800	0.039		
P3	400					Total : 3.900	0.055		
P4	200					Total : 2.380	0.034		
P5	100					Total : 2.070	0.029		Finish Date & Time :
TEST RESULTS									
Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity				
P1	0.3		114.7		$K = Q/H \times 6.10889 \times 10^{-5} \times ((\log(2L/D))/L)$, where H_{Loss} 0.12 kPa Stage No. P3 Gauge Pressure 400 kPa Q 3.90 L/min H 42.3 m Interpreted Result 0 uL Reported Permeability at Stage P3 K = 2.5E-08 m/s				
P2	0.2		214.6						
P3	0.1		414.6						
P4	0.2		214.7						
P5	0.3		114.7						
Flow Type			LOW PERMEABILITY						



WATER PRESSURE TEST									
Job No. : 221570264	Hole No. : WM0675	Drilling Method : HQ	Vertical depth to Groundwater	Revision : 1.1	Immediately prior to test (m bgl) : 0.00				
Client : Shenhua Watermark Coal	Dip (Deg) : 90	Hole Diameter (m) : 0.096	Used in analysis (m bgl) : 0.00	Pressure Gauge Height (m agl) : 1.00	Presumed Water Temperature : 20				
Project : Curlew	Interval Top (m) : 169.50	Tested Length (m) : 3.00	Packer Type : Pneumatic - Wireline - Double	Casing Inner Diameter (mm) : 96.0					
Location : Curlew	Interval Base (m) : 172.50	Rock tested :							
Tested By : Dk	Computed By : DK	Water Meter Reading in: Litres	Checked By :	Date :					
Date : 15-Jul-12	Date : 12-Jul-12								
Pressure Stage	Gauge Pressure kPa	No	Actual Time (h:m:s)	Time Intervals (min)	Water Meter Readings Reading (Litres)	Volume (m3)	Discharge (L/min)	Discharge/m (L/min/m)	Remarks
P1	100								Start Date & Time : 1
P2	200								
P3	400								
P4	200								
P5	100								Finish Date & Time :
TEST RESULTS									
Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity				
P1	3.9		109.8		$K = Q/H \times 6.10889 \times 10^{-8} \times (\log(2L/D))/L$, where H _{LOSS} 0.01 kPa Stage No. P1 Gauge Pressure 100 kPa Q 1.28 L/min H 11.2 m Interpreted Result 4 uL Reported Permeability at Stage P1 K = 4.2E-07 m/s				
P2	2.6		209.8						
P3	1.5		409.8						
P4	2.8		209.8						
P5	7.4		109.8						
Flow Type									
LOW PERMEABILITY									

WATER PRESSURE TEST									
Job No. : 221570264		Hole No. : MMC049		Drilling Method : HQ		Vertical depth to Groundwater		Revision : 1.1	
Client : Shenhua Watermark Co		Dip (Deg) : 90		Hole Diameter (m) : 0.096		Immediately prior to test (m bgl) : 0.00		Used in analysis (m bgl) : 0.00	
Project :		Interval Top (m) : 157.30		Tested Length (m) : 3.00		Pressure Gauge Height (m agl) : 1.00		Presumed Water Temperature : 20	
Location : Curlewis		Interval Base (m) : 160.30		Packer Type : Pneumatic - Wireline - Double		Casing Inner Diameter (mm) : 96.0			
Tested By : Dk		Computed By : DK		Rock tested :					
Date : 15-Jul-12		Date : 12-Jul-12		Water Meter Reading in: Litres		Checked By :		Date :	
Pressure Stage	Gauge Pressure kPa	No	Actual Time (h:m:s)	Time Intervals (min)	Water Meter Readings Reading (Litres)	Volume (L)	Discharge (L/min)	Discharge/m (L/min/m)	Remarks
P1	100								Start Date & Time : 1
P2	200								
P3	400								
P4	200								
P5	100								Finish Date & Time :
TEST RESULTS									
Stage No.	Lugeon Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity				
P1	7.2		109.8		$K = Q/H \times 6.10889 \times 10^{-6} \times ((\log(2L/D))/L)$, where H_{LOSS} 0.10 kPa Stage No. P3 Gauge Pressure 400 kPa Q 3.60 L/min H 41.8 m Interpreted Result 3 uL Reported Permeability at Stage P3 K = 3.2E-07 m/s				
P2	4.7		209.7						
P3	2.9		409.7						
P4	3.8		209.8						
P5	5.1		109.8						
Flow Type									
LOW PERMEABILITY									



Appendix N

Groundwater Sampling QA/QC



Surrogate Variation > 25% or outside lab LCL or UCL or outside lab LCL or UCL

SDG	Sample_Type	Matrix_Type	SampleCode	Field_ID	Sampled_Date-Time	Compound	Recovery %	Unit	Comments
ES1101902	MB	WATER	1938613-002_ES1101902		31/01/2011	Dibromo-DDE	65.6	%	
ES1101902	LCS	WATER	1938613-009_ES1101902		31/01/2011	DEF	72.3	%	
ES1101902	LCS	WATER	1938613-009_ES1101902		31/01/2011	Dibromo-DDE	70.3	%	
ES1102106	MB	WATER	1941766-001_ES1102106		2/02/2011	DEF	64.6	%	
ES1102106	MB	WATER	1941766-001_ES1102106		2/02/2011	Dibromo-DDE	68.9	%	
ES1102106	LCS	WATER	1941766-032_ES1102106		2/02/2011	DEF	60	%	
ES1102106	LCS	WATER	1941766-032_ES1102106		2/02/2011	Dibromo-DDE	64.9	%	
ES1102436	MB	WATER	1947699-001_ES1102436		7/02/2011	DEF	60.7	%	
ES1102436	MB	WATER	1947699-001_ES1102436		7/02/2011	Dibromo-DDE	70.9	%	
ES1102436	LCS	WATER	1947699-007_ES1102436		7/02/2011	DEF	64.4	%	Recovery less than lower data quality objective
ES1102436	LCS	WATER	1947699-007_ES1102436		7/02/2011	Dibromo-DDE	50	%	
ES1102635	LCS	WATER	1951743-014_ES1102635		9/02/2011	DEF	51.9	%	Recovery less than lower data quality objective
ES1102635	LCS	WATER	1951743-014_ES1102635		9/02/2011	Dibromo-DDE	60.8	%	
ES1102635	MB	WATER	1951743-018_ES1102635		9/02/2011	DEF	60.6	%	
ES1102635	MB	WATER	1951743-018_ES1102635		9/02/2011	Dibromo-DDE	69.5	%	
ES1102773	LCS	WATER	1954629-003_ES1102773		10/02/2011	DEF	71.2	%	
ES1102773	LCS	WATER	1954629-003_ES1102773		10/02/2011	Dibromo-DDE	58	%	
ES1102773	LAB_D	WATER	1955141-004_ES1102773		8/02/2011	1,2-Dichloroethane	130	%	
ES1102977	MB	WATER	1959085-001_ES1102977		14/02/2011	DEF	74	%	
ES1102977	MB	WATER	1959085-001_ES1102977		14/02/2011	Dibromo-DDE	62.3	%	
ES1102977	LCS	WATER	1959085-010_ES1102977		14/02/2011	Dibromo-DDE	67.7	%	
ES1103167	MB	WATER	1962722-001_ES1103167		16/02/2011	DEF	62.9	%	
ES1103167	MB	WATER	1962722-001_ES1103167		16/02/2011	Dibromo-DDE	66.8	%	
ES1103167	LCS	WATER	1962722-015_ES1103167		16/02/2011	Dibromo-DDE	65.2	%	
ES1103282	LCS	WATER	1964892-013_ES1103282		17/02/2011	DEF	70.5	%	
ES1103282	LCS	WATER	1964892-013_ES1103282		17/02/2011	Dibromo-DDE	63.7	%	
ES1103379	MB	WATER	1967057-001_ES1103379		18/02/2011	DEF	62.8	%	
ES1103379	MB	WATER	1967057-001_ES1103379		18/02/2011	Dibromo-DDE	60.2	%	
ES1103379	LCS	WATER	1967057-027_ES1103379		18/02/2011	Dibromo-DDE	66.6	%	
ES1103379	MB	WATER	1967238-001_ES1103379		18/02/2011	1,2-Dichloroethane	127	%	Recovery greater than upper data quality objective
ES1103514	MB	WATER	1970270-001_ES1103514		21/02/2011	1,2-Dichloroethane	126	%	Recovery greater than upper data quality objective
ES1103514	LAB_D	WATER	1970270-004_ES1103514		17/02/2011	1,2-Dichloroethane	127	%	
ES1103514	MB	WATER	1972350-001_ES1103514		22/02/2011	DEF	74.6	%	
ES1103514	MB	WATER	1972350-001_ES1103514		22/02/2011	Dibromo-DDE	63.4	%	
ES1106749	MB	WATER	2035157-001_ES1106749		31/03/2011	DEF	71	%	
ES1106749	MB	WATER	2035157-001_ES1106749		31/03/2011	Dibromo-DDE	60.3	%	
ES1106749	LCS	WATER	2035157-002_ES1106749		31/03/2011	DEF	72.5	%	
ES1106749	LCS	WATER	2035157-002_ES1106749		31/03/2011	Dibromo-DDE	72.6	%	
ES1106749	LAB_D	WATER	2035157-004_ES1106749		30/03/2011	DEF	71.5	%	
ES1106749	LAB_D	WATER	2035157-004_ES1106749		30/03/2011	Dibromo-DDE	63.8	%	
ES1106749	MS	WATER	2035157-005_ES1106749		30/03/2011	DEF	68.6	%	
ES1106749	MS	WATER	2035157-005_ES1106749		30/03/2011	Dibromo-DDE	61.1	%	
ES1106845	MB	WATER	2041734-001_ES1106845		5/04/2011	DEF	57.3	%	
ES1106845	MB	WATER	2041734-001_ES1106845		5/04/2011	Dibromo-DDE	51.9	%	
ES1106845	LCS	WATER	2041734-002_ES1106845		5/04/2011	DEF	72.7	%	
ES1106845	LCS	WATER	2041734-002_ES1106845		5/04/2011	Dibromo-DDE	72.4	%	
ES1106845	LAB_D	WATER	2041734-004_ES1106845		31/03/2011	Dibromo-DDE	58.5	%	
ES1106845	MS	WATER	2041734-005_ES1106845		31/03/2011	DEF	73.3	%	
ES1106845	MS	WATER	2041734-005_ES1106845		31/03/2011	Dibromo-DDE	55.3	%	
ES1107088	MB	WATER	2043912-001_ES1107088		6/04/2011	DEF	63.6	%	
ES1107088	MB	WATER	2043912-001_ES1107088		6/04/2011	Dibromo-DDE	55.6	%	
ES1107088	LCS	WATER	2043912-018_ES1107088		6/04/2011	DEF	71	%	
ES1107088	LCS	WATER	2043912-018_ES1107088		6/04/2011	Dibromo-DDE	70.9	%	
ES1107200	MB	WATER	2048122-001_ES1107200		8/04/2011	DEF	72.6	%	
ES1107200	MB	WATER	2048122-001_ES1107200		8/04/2011	Dibromo-DDE	65.4	%	
ES1107200	LAB_D	WATER	2048122-004_ES1107200		5/04/2011	DEF	70.4	%	
ES1107200	LAB_D	WATER	2048122-004_ES1107200		5/04/2011	Dibromo-DDE	62.1	%	
ES1107200	MS	WATER	2048122-005_ES1107200		5/04/2011	DEF	51.4	%	
ES1107200	MS	WATER	2048122-005_ES1107200		5/04/2011	Dibromo-DDE	61.9	%	
ES1107461	MB	WATER	2052236-001_ES1107461		11/04/2011	Dibromo-DDE	65.9	%	
ES1107461	LCS	WATER	2052236-013_ES1107461		11/04/2011	DEF	73.6	%	
ES1107461	LCS	WATER	2052236-013_ES1107461		11/04/2011	Dibromo-DDE	69	%	
ES1107676	MB	WATER	2062534-001_ES1107676		17/04/2011	Dibromo-DDE	66.7	%	
ES1107676	LAB_D	WATER	2062534-030_ES1107676		20/04/2011	Dibromo-DDE	71.2	%	
ES1107676	MS	WATER	2062534-031_ES1107676		10/04/2011	DEF	74.6	%	
ES1107801	MB	WATER	2062551-001_ES1107801		17/04/2011	Dibromo-DDE	68.6	%	
ES1107801	LCS	WATER	2062551-011_ES1107801		17/04/2011	Dibromo-DDE	128	%	
ES1107801	LAB_D	WATER	2063006-016_ES1107801		11/04/2011	1,2-Dichloroethane	126	%	
ES1108034	MB	WATER	2068628-001_ES1108034		20/04/2011	DEF	60.7	%	
ES1108034	MB	WATER	2068628-001_ES1108034		20/04/2011	Dibromo-DDE	63.5	%	
ES1108034	LCS	WATER	2068628-002_ES1108034		20/04/2011	DEF	61.6	%	
ES1108034	LCS	WATER	2068628-002_ES1108034		20/04/2011	Dibromo-DDE	51.7	%	
ES1108034	LAB_D	WATER	2068628-004_ES1108034		19/04/2011	DEF	59.8	%	
ES1108034	LAB_D	WATER	2068628-004_ES1108034		19/04/2011	Dibromo-DDE	58.1	%	
ES1108034	MS	WATER	2068628-005_ES1108034		19/04/2011	DEF	45.1	%	
ES1108034	MS	WATER	2068628-005_ES1108034		19/04/2011	Dibromo-DDE	40.9	%	
ES1108034	LAB_D	WATER	2068628-042_ES1108034		18/04/2011	Dibromo-DDE	54.5	%	
ES1114934	MB	WATER	2207664-001_ES1114934		14/07/2011	Dibromo-DDE	74.9	%	
ES1114934	LCS	WATER	2207664-015_ES1114934		14/07/2011	Dibromo-DDE	70	%	
ES1115139	MB	WATER	2212545-001_ES1115139		18/07/2011	2,4,6-Tribromophe	60.7	%	
ES1115139	MB	WATER	2212545-001_ES1115139		18/07/2011	Phenol-d6	33.6	%	
ES1115139	MB	WATER	2212545-001_ES1115139		18/07/2011	2-Chlorophenol-D	69.9	%	
ES1115139	MB	WATER	2212545-001_ES1115139		18/07/2011	2-Fluorobiphenyl	74.6	%	
ES1115139	LCS	WATER	2212545-002_ES1115139		18/07/2011	2,4,6-Tribromophe	67.2	%	
ES1115139	LCS	WATER	2212545-002_ES1115139		18/07/2011	Phenol-d6	35.1	%	
ES1115139	LCS	WATER	2212545-002_ES1115139		18/07/2011	2-Chlorophenol-D	74.6	%	
ES1115337	MB	WATER	2215730-001_ES1115337		20/07/2011	Dibromo-DDE	67.6	%	
ES1115337	LCS	WATER	2215730-030_ES1115337		20/07/2011	Dibromo-DDE	71.3	%	
ES1115556	MB	WATER	2218368-001_ES1115556		21/07/2011	2,4,6-Tribromophe	60.6	%	
ES1115556	MB	WATER	2218368-001_ES1115556		21/07/2011	Phenol-d6	23.9	%	
ES1115556	MB	WATER	2218368-001_ES1115556		21/07/2011	Anthracene-d10	72.8	%	
ES1115556	MB	WATER	2218368-001_ES1115556		21/07/2011	2-Chlorophenol-D	56.1	%	
ES1115556	MB	WATER	2218368-001_ES1115556		21/07/2011	2-Fluorobiphenyl	58	%	
ES1115556	LCS	WATER	2218368-024_ES1115556		21/07/2011	Phenol-d6	27.9	%	
ES1115556	LCS	WATER	2218368-024_ES1115556		21/07/2011	4-Terphenyl-d14	74.9	%	
ES1115556	LCS	WATER	2218368-024_ES1115556		21/07/2011	Anthracene-d10	70.3	%	
ES1115556	LCS	WATER	2218368-024_ES1115556		21/07/2011	2-Chlorophenol-D	69.7	%	
ES1115556	LCS	WATER	2218368-024_ES1115556		21/07/2011	2-Fluorobiphenyl	71.6	%	
ES1115556	LAB_D	WATER	2218368-025_ES1115556		19/07/2011	2,4,6-Tribromophe	61.4	%	
ES1115556	LAB_D	WATER	2218368-025_ES1115556		19/07/2011	Phenol-d6	24.9	%	
ES1115556	LAB_D	WATER	2218368-025_ES1115556		19/07/2011	2-Chlorophenol-D	53.8	%	
ES1115556	LAB_D	WATER	2218368-025_ES1115556		19/07/2011	2-Fluorobiphenyl	58.8	%	
ES1115556	MS	WATER	2218368-026_ES1115556		19/07/2011	Phenol-d6	34.8	%	
ES1115556	MS	WATER	2218368-026_ES1115556		19/07/2011	Anthracene-d10	72.3	%	
ES1115556	MS	WATER	2218368-026_ES1115556		19/07/2011	2-Chlorophenol-D	74.7	%	
ES1115556	MS	WATER	2218368-026_ES1115556		19/07/2011	2-Fluorobiphenyl	72	%	
ES1117196	MB	WATER	2263911-001_ES1117196		11/08/2011	DEF	126	%	
ES1117673	MB	WATER	2263157-001_ES1117673		17/08/2011	Phenol-d6	31.4	%	
ES1117673	MB	WATER	2263157-001_ES1117673		17/08/2011	4-Terphenyl-d14	71.1	%	
ES1117673	MB	WATER	2263157-001_ES1117673		17/08/2011	2-Chlorophenol-D	55.5	%	
ES1117673	MB	WATER	2263157-001_ES1117673		17/08/2011	2-Fluorobiphenyl	67.8	%	
ES1117673	LCS	WATER	2263157-009_ES1117673		17/08/2011	Phenol-d6	39.6	%	
ES1117673	LCS	WATER	2263157-009_ES1117673		17/08/2011	2-Chlorophenol-D	66.6	%	
ES1117818	MB	WATER	2264770-001_ES1117818		18/08/2011	Phenol-d6	16.8	%	
ES1117818	MB	WATER	2264770-001_ES1117818		18/08/2011	Anthracene-d10	70.4	%	
ES1117818	MB	WATER	2264770-001_ES1117818		18/08/2011	2-Chlorophenol-D	49.5	%	
ES1117818	MB	WATER	2264770-001_ES1117818		18/08/2011	2-Fluorobiphenyl	52.4	%	
ES1117818	LCS	WATER	2264770-007_ES1117818		18/08/2011	Phenol-d6	33.2	%	
ES1117818	LCS	WATER	2264770-007_ES1117818		18/08/2011	2-Fluorobiphenyl	66.3	%	
ES1117847	MB	WATER	2268757-001_ES11178						



ES1118212	LCS	WATER	2273365-007_ES1118212	24/08/2011	Phenol-d6	41.1	%	
ES1118212	LCS	WATER	2273365-007_ES1118212	24/08/2011	2-Chlorophenol-D-74.8		%	
ES1122791	MB	WATER	2374255-001_ES1122791	20/10/2011	2,4,6-Tribromophe54.4		%	
ES1122791	MB	WATER	2374255-001_ES1122791	20/10/2011	Phenol-d6	19.9	%	
ES1122791	MB	WATER	2374255-001_ES1122791	20/10/2011	4-Terphenyl-d14	67.4	%	
ES1122791	MB	WATER	2374255-001_ES1122791	20/10/2011	Anthracene-d10	58.4	%	
ES1122791	MB	WATER	2374255-001_ES1122791	20/10/2011	2-Chlorophenol-D-55.6		%	
ES1122791	MB	WATER	2374255-001_ES1122791	20/10/2011	2-Fluorobiphenyl	59.6	%	
ES1122791	LCS	WATER	2374255-022_ES1122791	20/10/2011	Phenol-d6	34.5	%	
ES1122791	LCS	WATER	2374255-022_ES1122791	20/10/2011	2-Chlorophenol-D-66.3		%	
ES1122791	LCS	WATER	2374255-022_ES1122791	20/10/2011	2-Fluorobiphenyl	71.4	%	
ES1123334	LCS	WATER	2390828-007_ES1123334	31/10/2011	Dibromo-DDE	73.4	%	
ES1123744	MB	WATER	2393369-001_ES1123744	1/11/2011	2,4,6-Tribromophe62.1		%	
ES1123744	MB	WATER	2393369-001_ES1123744	1/11/2011	Phenol-d6	26.7	%	
ES1123744	MB	WATER	2393369-001_ES1123744	1/11/2011	4-Terphenyl-d14	57.1	%	
ES1123744	MB	WATER	2393369-001_ES1123744	1/11/2011	Anthracene-d10	65.9	%	
ES1123744	MB	WATER	2393369-001_ES1123744	1/11/2011	2-Chlorophenol-D-58.7		%	
ES1123744	MB	WATER	2393369-001_ES1123744	1/11/2011	2-Fluorobiphenyl	72.9	%	
ES1123744	LCS	WATER	2393369-015_ES1123744	1/11/2011	Phenol-d6	47.5	%	
ES1123829	MB	WATER	2396241-001_ES1123829	2/11/2011	2,4,6-Tribromophe51.5		%	
ES1123829	MB	WATER	2396241-001_ES1123829	2/11/2011	Phenol-d6	24.2	%	
ES1123829	MB	WATER	2396241-001_ES1123829	2/11/2011	4-Terphenyl-d14	61.5	%	
ES1123829	MB	WATER	2396241-001_ES1123829	2/11/2011	Anthracene-d10	58.8	%	
ES1123829	MB	WATER	2396241-001_ES1123829	2/11/2011	2-Chlorophenol-D-51.4		%	
ES1123829	MB	WATER	2396241-001_ES1123829	2/11/2011	2-Fluorobiphenyl	59.7	%	
ES1123829	LCS	WATER	2396241-007_ES1123829	2/11/2011	2,4,6-Tribromophe70.8		%	
ES1123829	LCS	WATER	2396241-007_ES1123829	2/11/2011	Phenol-d6	32.1	%	
ES1123829	LCS	WATER	2396241-007_ES1123829	2/11/2011	2-Chlorophenol-D-63.2		%	
ES1123829	LCS	WATER	2396241-007_ES1123829	2/11/2011	2-Fluorobiphenyl	74.2	%	
ES1123829	LAB_D	WATER	2396241-016_ES1123829	2/11/2011	2,4,6-Tribromophe61.4		%	
ES1123829	LAB_D	WATER	2396241-016_ES1123829	2/11/2011	Phenol-d6	27.8	%	
ES1123829	LAB_D	WATER	2396241-016_ES1123829	2/11/2011	4-Terphenyl-d14	70.6	%	
ES1123829	LAB_D	WATER	2396241-016_ES1123829	2/11/2011	Anthracene-d10	62.9	%	
ES1123829	LAB_D	WATER	2396241-016_ES1123829	2/11/2011	2-Chlorophenol-D-58.7		%	
ES1123829	LAB_D	WATER	2396241-016_ES1123829	2/11/2011	2-Fluorobiphenyl	59.7	%	
ES1123829	MB	WATER	2398248-001_ES1123829	3/11/2011	Toluene-D8	126	%	Recovery greater than upper data quality objective
ES1123829	MS	WATER	2398248-005_ES1123829	1/11/2011	4-Bromofluorobenz73.1		%	
ES1123983	MB	WATER	2399575-001_ES1123983	4/11/2011	2,4,6-Tribromophe69.5		%	
ES1123983	MB	WATER	2399575-001_ES1123983	4/11/2011	Phenol-d6	21.9	%	
ES1123983	MB	WATER	2399575-001_ES1123983	4/11/2011	2-Chlorophenol-D-55.2		%	
ES1123983	LCS	WATER	2399575-007_ES1123983	4/11/2011	Phenol-d6	28	%	
ES1123983	LCS	WATER	2399575-007_ES1123983	4/11/2011	Anthracene-d10	63.7	%	
ES1123983	LCS	WATER	2399575-007_ES1123983	4/11/2011	2-Chlorophenol-D-64		%	
ES1124104	MB	WATER	2402701-001_ES1124104	7/11/2011	2,4,6-Tribromophe44.3		%	
ES1124104	MB	WATER	2402701-001_ES1124104	7/11/2011	Phenol-d6	14.4	%	
ES1124104	MB	WATER	2402701-001_ES1124104	7/11/2011	4-Terphenyl-d14	64.6	%	
ES1124104	MB	WATER	2402701-001_ES1124104	7/11/2011	Anthracene-d10	63	%	
ES1124104	MB	WATER	2402701-001_ES1124104	7/11/2011	2-Chlorophenol-D-29.3		%	Recovery less than lower data quality objective
ES1124104	MB	WATER	2402701-001_ES1124104	7/11/2011	2-Fluorobiphenyl	36.4	%	
ES1124104	LCS	WATER	2402701-007_ES1124104	7/11/2011	Phenol-d6	29.2	%	
ES1124104	LCS	WATER	2402701-007_ES1124104	7/11/2011	2-Chlorophenol-D-66.1		%	
ES1124104	LCS	WATER	2402701-007_ES1124104	7/11/2011	2-Fluorobiphenyl	66.6	%	
ES1125920	MB	WATER	2440308-001_ES1125920	28/11/2011	2,4,6-Tribromophe72.7		%	
ES1125920	MB	WATER	2440308-001_ES1125920	28/11/2011	Phenol-d6	20.6	%	
ES1125920	MB	WATER	2440308-001_ES1125920	28/11/2011	4-Terphenyl-d14	70.3	%	
ES1125920	MB	WATER	2440308-001_ES1125920	28/11/2011	2-Chlorophenol-D-57.6		%	
ES1125920	MB	WATER	2440308-001_ES1125920	28/11/2011	2-Fluorobiphenyl	65.4	%	
ES1125920	LAB_D	WATER	2440308-004_ES1125920	24/11/2011	Phenol-d6	18.7	%	RPD exceeds LOR based limits
ES1125920	LAB_D	WATER	2440308-004_ES1125920	24/11/2011	4-Terphenyl-d14	71.7	%	RPD exceeds LOR based limits
ES1125920	LAB_D	WATER	2440308-004_ES1125920	24/11/2011	2-Chlorophenol-D-42.8		%	
ES1125920	LAB_D	WATER	2440308-004_ES1125920	24/11/2011	2-Fluorobiphenyl	70	%	
ES1125920	MS	WATER	2440308-005_ES1125920	24/11/2011	Phenol-d6	22.3	%	
ES1125920	MS	WATER	2440308-005_ES1125920	24/11/2011	4-Terphenyl-d14	65	%	
ES1125920	MS	WATER	2440308-005_ES1125920	24/11/2011	2-Chlorophenol-D-65.4		%	
ES1125920	LCS	WATER	2440308-007_ES1125920	28/11/2011	Phenol-d6	37.9	%	RPD exceeds LOR based limits
ES1125920	LAB_D	WATER	2440308-013_ES1125920	24/11/2011	Phenol-d6	25.8	%	RPD exceeds LOR based limits
ES1125920	LAB_D	WATER	2440308-013_ES1125920	24/11/2011	2-Chlorophenol-D-56.9		%	
ES1125920	LAB_D	WATER	2440308-013_ES1125920	24/11/2011	2-Fluorobiphenyl	62.6	%	
ES1126879	LCS	WATER	2466951-011_ES1126879	12/12/2011	DEF	73	%	
ES1126879	LAB_D	WATER	2466951-013_ES1126879	5/12/2011	DEF	68.4	%	
ES1126879	LAB_D	WATER	2466951-013_ES1126879	5/12/2011	Dibromo-DDE	68.3	%	
ES1126879	MS	WATER	2466951-014_ES1126879	5/12/2011	DEF	62.1	%	
ES1126879	MS	WATER	2466951-014_ES1126879	5/12/2011	Dibromo-DDE	62.7	%	
ES1207884	MB	WATER	2658311-001_ES1207884	4/04/2012	DEF	70.9	%	
ES1208498	MB	WATER	2674726-001_ES1208498	16/04/2012	DEF	63.8	%	
ES1208498	MB	WATER	2674726-001_ES1208498	16/04/2012	Dibromo-DDE	74.4	%	
ES1208498	LCS	WATER	2674726-002_ES1208498	16/04/2012	DEF	70.6	%	
ES1208498	LCS	WATER	2674726-002_ES1208498	16/04/2012	Dibromo-DDE	70.4	%	
ES1208498	LAB_D	WATER	2674726-004_ES1208498	9/04/2012	DEF	54.1	%	
ES1208498	LAB_D	WATER	2674726-004_ES1208498	9/04/2012	Dibromo-DDE	66.5	%	
ES1208498	MS	WATER	2674726-005_ES1208498	9/04/2012	DEF	69.4	%	
ES1209788	MB	WATER	2684180-001_ES1209788	26/04/2012	Dibromo-DDE	70.2	%	
ES1209788	LCS	WATER	2684180-002_ES1209788	26/04/2012	DEF	70	%	
ES1209788	LCS	WATER	2684180-002_ES1209788	26/04/2012	Dibromo-DDE	71.6	%	
ES1210003	MB	WATER	2699927-001_ES1210003	30/04/2012	DEF	65.1	%	
ES1210003	MB	WATER	2699927-001_ES1210003	30/04/2012	Dibromo-DDE	65.5	%	
ES1210003	LCS	WATER	2699927-007_ES1210003	30/04/2012	DEF	66.6	%	
ES1210003	LCS	WATER	2699927-007_ES1210003	30/04/2012	Dibromo-DDE	66.7	%	
ES1211859	MS	WATER	2734046-005_ES1211859	8/05/2012	Toluene-D8	129	%	
ES1213374	MB	WATER	2758859-001_ES1213374	30/05/2012	Dibromo-DDE	71.5	%	
ES1213374	LCS	WATER	2758859-002_ES1213374	30/05/2012	Dibromo-DDE	70	%	
ES1214076	LAB_D	WATER	2781666-004_ES1214076	5/08/2012	Toluene-D8	130	%	
ES1101902	Normal	WATER	ES1101902001	27/01/2011	DEF	68.8	%	
ES1101902	Normal	WATER	ES1101902001	27/01/2011	Dibromo-DDE	63.9	%	
ES1101902	Normal	WATER	ES1101902002	27/01/2011	DEF	54.4	%	
ES1101902	Normal	WATER	ES1101902002	27/01/2011	Dibromo-DDE	51.6	%	
ES1101902	Normal	WATER	ES1101902003	27/01/2011	DEF	64.6	%	
ES1101902	Normal	WATER	ES1101902003	27/01/2011	Dibromo-DDE	63	%	
ES1101902	Normal	WATER	ES1101902004	27/01/2011	DEF	67.9	%	
ES1101902	Normal	WATER	ES1101902004	27/01/2011	Dibromo-DDE	64	%	
ES1101902	Normal	WATER	ES1101902005	27/01/2011	DEF	70.1	%	
ES1101902	Normal	WATER	ES1101902005	27/01/2011	Dibromo-DDE	65.7	%	
ES1101902	Normal	WATER	ES1101902006	27/01/2011	DEF	71.2	%	
ES1101902	Normal	WATER	ES1101902006	27/01/2011	Dibromo-DDE	67.4	%	
ES1101902	Normal	WATER	ES1101902007	27/01/2011	DEF	74	%	
ES1101902	Normal	WATER	ES1101902007	27/01/2011	Dibromo-DDE	74.4	%	
ES1101902	Normal	WATER	ES1101902008	27/01/2011	DEF	70.8	%	
ES1101902	Normal	WATER	ES1101902008	27/01/2011	Dibromo-DDE	68.8	%	
ES1102106	Normal	WATER	ES1102106001	31/01/2011	DEF	61.2	%	
ES1102106	Normal	WATER	ES1102106002	31/01/2011	DEF	61.6	%	
ES1102106	Normal	WATER	ES1102106002	31/01/2011	Dibromo-DDE	61.8	%	
ES1102106	Normal	WATER	ES1102106003	31/01/2011	Dibromo-DDE	65.2	%	
ES1102106	Normal	WATER	ES1102106004	31/01/2011	DEF	71.6	%	
ES1102106	Normal	WATER	ES1102106004	31/01/2011	Dibromo-DDE	60.7	%	
ES1102436	Normal	WATER	ES1102436001	3/02/2011	Dibromo-DDE	60.6	%	
ES1102436	Normal	WATER	ES1102436002	3/02/2011	DEF	60.4	%	
ES1102436	Normal	WATER	ES1102436003	3/02/2011	DEF	68.9	%	
ES1102436	Normal	WATER	ES1102436003	3/02/2011	Dibromo-DDE	67.8	%	
ES1102436	Normal	WATER	ES1102436004	3/02/2011	Dibromo-DDE	70.8	%	
ES1102635	Normal	WATER	ES1102635001	7/02/2011	DEF	63.2	%	
ES1102635	Normal	WATER	ES1102635001	7/02/2011	Dibromo-DDE	66.5	%	
ES1102635	Normal	WATER	ES1102635002	7/02/2011	DEF	63	%	
ES1102635	Normal	WATER	ES1102635002	7/02/2011	Dibromo-DDE	62.6	%	
ES1102977	Normal	WATER	ES1102977001	9/02/2011	DEF	69.7	%	
ES1102977	Normal	WATER	ES1102977001	9/02/2011	Dibromo-DDE	69	%	
ES1102977	Normal	WATER	ES1102977002	10/02/2011	DEF	71.5	%	
ES1103167	Normal	WATER	ES1103167001	13/02/2011	Dibromo-DDE	66.1	%	
ES1103167	Rinsate	WATER	ES1103167002	13/02/2011	Dibromo-DDE	67.5	%	
ES1103167	Normal	WATER	ES1103167004	14/02/2011	DEF	64.8	%	
ES1103167	Normal	WATER	ES1103167004	14/				



ES1103167	Normal	WATER	ES1103167005	WM0002A	14/02/2011	Dibromo-DDE	73.4	%
ES1103167	Normal	WATER	ES1103167006	WM0002	14/02/2011	DEF	61.6	%
ES1103167	Normal	WATER	ES1103167006	WM0002	14/02/2011	Dibromo-DDE	70.5	%
ES1103167	Normal	WATER	ES1103167007	WM0330R	14/02/2011	Dibromo-DDE	66.3	%
ES1103282	Normal	WATER	ES1103282001	WM0233A	14/02/2011	DEF	60.6	%
ES1103282	Normal	WATER	ES1103282002	WM0291	15/02/2011	DEF	64.9	%
ES1103379	Normal	WATER	ES1103379001	WM0233	16/02/2011	DEF	57.5	%
ES1103379	Normal	WATER	ES1103379001	WM0233	16/02/2011	Dibromo-DDE	59.2	%
ES1103514	Normal	WATER	ES1103514001	GW028622	17/02/2011	Dibromo-DDE	69	%
ES1103514	Normal	WATER	ES1103514002	P16-SD	17/02/2011	1,2-Dichloroethane	127	%
ES1103514	Normal	WATER	ES1103514002	P16-SD	17/02/2011	Dibromo-DDE	71.1	%
ES1103514	Normal	WATER	ES1103514003	GW065013	17/02/2011	1,2-Dichloroethane	131	%
ES1103514	Normal	WATER	ES1103514003	GW065013	17/02/2011	Dibromo-DDE	72.4	%
ES1103514	Normal	WATER	ES1103514004	GW965577-2	17/02/2011	DEF	70.2	%
ES1103514	Normal	WATER	ES1103514004	GW965577-2	17/02/2011	Dibromo-DDE	64.2	%
ES1106749	Normal	WATER	ES1106749002	WM0116	30/03/2011	DEF	70.3	%
ES1106749	Normal	WATER	ES1106749002	WM0116	30/03/2011	Dibromo-DDE	62.2	%
ES1106749	Normal	WATER	ES1106749003	WM0009B	30/03/2011	DEF	67.9	%
ES1106749	Normal	WATER	ES1106749003	WM0009B	30/03/2011	Dibromo-DDE	61.8	%
ES1106749	Normal	WATER	ES1106749004	WM0009R	30/03/2011	DEF	62.7	%
ES1106749	Normal	WATER	ES1106749004	WM0009R	30/03/2011	Dibromo-DDE	61.6	%
ES1106749	Field_D	WATER	ES1106749005	QC3_30.3.11	30/03/2011	DEF	61.2	%
ES1106749	Field_D	WATER	ES1106749005	QC3_30.3.11	30/03/2011	Dibromo-DDE	63.2	%
ES1106845	Normal	WATER	ES1106845001	WM0092A	31/03/2011	DEF	72.8	%
ES1106845	Normal	WATER	ES1106845001	WM0092A	31/03/2011	Dibromo-DDE	65.9	%
ES1107088	Normal	WATER	ES1107088002	WM0091B	4/04/2011	DEF	71.3	%
ES1107088	Normal	WATER	ES1107088002	WM0091B	4/04/2011	Dibromo-DDE	49.6	%
ES1107200	Normal	WATER	ES1107200001	WM0092	5/04/2011	Dibromo-DDE	56.5	%
ES1107200	Normal	WATER	ES1107200003	GW93105_1	5/04/2011	DEF	63.1	%
ES1107200	Normal	WATER	ES1107200003	GW93105_1	5/04/2011	Dibromo-DDE	54.7	%
ES1107200	Normal	WATER	ES1107200004	GW93105_2	5/04/2011	Dibromo-DDE	65.8	%
ES1107461	Normal	WATER	ES1107461006	WM0291A	6/04/2011	Dibromo-DDE	73.8	%
ES1107461	Rinsate	WATER	ES1107461007	QC7_6.4.11	6/04/2011	Dibromo-DDE	73.8	%
ES1107676	Normal	WATER	ES1107676002	WM0095B	10/04/2011	Dibromo-DDE	65.3	%
ES1107801	Normal	WATER	ES1107801003	WM0364	12/04/2011	1,2-Dichloroethane	131	%
ES1108034	Normal	WATER	ES1108034001	WM0288A	14/04/2011	DEF	61.1	%
ES1108034	Normal	WATER	ES1108034001	WM0288A	14/04/2011	Dibromo-DDE	58.1	%
ES1115139	Normal	WATER	ES1115139002	WM0002A	14/07/2011	Phenol-d6	34.5	%
ES1115337	Field_D	WATER	ES1115337004	QC4_17-7-11	17/07/2011	Dibromo-DDE	60.3	%
ES1115337	Normal	WATER	ES1115337005	WM0093A	17/07/2011	Dibromo-DDE	63.7	%
ES1115556	Normal	WATER	ES1115556001	WM0365	19/07/2011	2,4,6-Tribromophe	64.7	%
ES1115556	Normal	WATER	ES1115556001	WM0365	19/07/2011	Phenol-d6	24.3	%
ES1115556	Normal	WATER	ES1115556001	WM0365	19/07/2011	2-Chlorophenol-D	53.8	%
ES1115556	Normal	WATER	ES1115556001	WM0365	19/07/2011	2-Fluorobiphenyl	55.4	%
ES1115556	Field_D	WATER	ES1115556002	QC-6	19/07/2011	2,4,6-Tribromophe	55.1	%
ES1115556	Field_D	WATER	ES1115556002	QC-6	19/07/2011	Phenol-d6	19.6	%
ES1115556	Field_D	WATER	ES1115556002	QC-6	19/07/2011	Anthracene-d10	70.2	%
ES1115556	Field_D	WATER	ES1115556002	QC-6	19/07/2011	2-Chlorophenol-D	47	%
ES1115556	Field_D	WATER	ES1115556002	QC-6	19/07/2011	2-Fluorobiphenyl	52.9	%
ES1117673	Normal	WATER	ES1117673001	WM0042A	14/08/2011	2,4,6-Tribromophe	65.1	%
ES1117673	Normal	WATER	ES1117673001	WM0042A	14/08/2011	Phenol-d6	27.6	%
ES1117673	Normal	WATER	ES1117673001	WM0042A	14/08/2011	4-Terphenyl-d14	54.9	%
ES1117673	Normal	WATER	ES1117673001	WM0042A	14/08/2011	2-Chlorophenol-D	63.6	%
ES1117818	Normal	WATER	ES1117818002	WM0290	16/08/2011	2,4,6-Tribromophe	54.6	%
ES1117818	Normal	WATER	ES1117818002	WM0290	16/08/2011	Phenol-d6	19.1	%
ES1117818	Normal	WATER	ES1117818002	WM0290	16/08/2011	4-Terphenyl-d14	72.1	%
ES1117818	Normal	WATER	ES1117818002	WM0290	16/08/2011	Anthracene-d10	74.7	%
ES1117818	Normal	WATER	ES1117818002	WM0290	16/08/2011	2-Chlorophenol-D	64	%
ES1117818	Normal	WATER	ES1117818002	WM0290	16/08/2011	2-Fluorobiphenyl	57.8	%
ES1117847	Normal	WATER	ES1117847001	WM0062	16/08/2011	2,4,6-Tribromophe	55.7	%
ES1117847	Normal	WATER	ES1117847001	WM0062	16/08/2011	Phenol-d6	20.2	%
ES1117847	Normal	WATER	ES1117847001	WM0062	16/08/2011	2-Chlorophenol-D	44.9	%
ES1117847	Normal	WATER	ES1117847001	WM0062	16/08/2011	2-Fluorobiphenyl	57.9	%
ES1118212	Normal	WATER	ES1118212002	WM0288A	21/08/2011	Phenol-d6	33.7	%
ES1118212	Normal	WATER	ES1118212002	WM0288A	21/08/2011	4-Terphenyl-d14	68	%
ES1118212	Normal	WATER	ES1118212002	WM0288A	21/08/2011	2-Chlorophenol-D	67.2	%
ES1122791	Normal	WATER	ES1122791001	WM0011A	19/10/2011	2,4,6-Tribromophe	55	%
ES1122791	Normal	WATER	ES1122791001	WM0011A	19/10/2011	Phenol-d6	31.7	%
ES1122791	Normal	WATER	ES1122791001	WM0011A	19/10/2011	4-Terphenyl-d14	51.8	%
ES1122791	Normal	WATER	ES1122791001	WM0011A	19/10/2011	Anthracene-d10	35.9	%
ES1122791	Normal	WATER	ES1122791001	WM0011A	19/10/2011	2-Chlorophenol-D	64.7	%
ES1122791	Normal	WATER	ES1122791001	WM0011A	19/10/2011	2-Fluorobiphenyl	32.9	%
ES1123334	Normal	WATER	ES1123334001	WM0561	25/10/2011	DEF	71.4	%
ES1123334	Normal	WATER	ES1123334001	WM0561	25/10/2011	Dibromo-DDE	61.2	%
ES1123744	Normal	WATER	ES1123744004	WM0042A	30/10/2011	2,4,6-Tribromophe	58	%
ES1123744	Normal	WATER	ES1123744004	WM0042A	30/10/2011	Phenol-d6	25.2	%
ES1123744	Normal	WATER	ES1123744004	WM0042A	30/10/2011	1,2-Dichloroethane	129	%
ES1123744	Normal	WATER	ES1123744004	WM0042A	30/10/2011	4-Terphenyl-d14	54.2	%
ES1123744	Normal	WATER	ES1123744004	WM0042A	30/10/2011	Anthracene-d10	62.5	%
ES1123744	Normal	WATER	ES1123744004	WM0042A	30/10/2011	2-Chlorophenol-D	53.2	%
ES1123744	Normal	WATER	ES1123744004	WM0042A	30/10/2011	2-Fluorobiphenyl	70.6	%
ES1123829	Normal	WATER	ES1123829001	WM0092A	31/10/2011	2,4,6-Tribromophe	56	%
ES1123829	Normal	WATER	ES1123829001	WM0092A	31/10/2011	Phenol-d6	29.8	%
ES1123829	Normal	WATER	ES1123829001	WM0092A	31/10/2011	2-Chlorophenol-D	59.8	%
ES1123829	Normal	WATER	ES1123829001	WM0092A	31/10/2011	2-Fluorobiphenyl	63.7	%
ES1123829	Normal	WATER	ES1123829003	WM0091	1/11/2011	2,4,6-Tribromophe	68.5	%
ES1123829	Normal	WATER	ES1123829003	WM0091	1/11/2011	Phenol-d6	25.9	%
ES1123829	Normal	WATER	ES1123829003	WM0091	1/11/2011	Anthracene-d10	65.5	%
ES1123829	Normal	WATER	ES1123829003	WM0091	1/11/2011	2-Chlorophenol-D	57.7	%
ES1123829	Normal	WATER	ES1123829003	WM0091	1/11/2011	2-Fluorobiphenyl	63.5	%
ES1123963	Normal	WATER	ES1123963001	WM0091A	21/12/2011	Phenol-d6	19.1	%
ES1123963	Normal	WATER	ES1123963001	WM0091A	21/12/2011	Anthracene-d10	70.8	%
ES1123963	Normal	WATER	ES1123963001	WM0091A	21/12/2011	2-Chlorophenol-D	52	%
ES1124104	Normal	WATER	ES1124104001	WM0362	3/11/2011	2,4,6-Tribromophe	63.8	%
ES1124104	Normal	WATER	ES1124104001	WM0362	3/11/2011	Phenol-d6	18.5	%
ES1124104	Normal	WATER	ES1124104001	WM0362	3/11/2011	2-Chlorophenol-D	52	%
ES1124104	Normal	WATER	ES1124104001	WM0362	3/11/2011	2-Fluorobiphenyl	72.8	%
ES1124104	Normal	WATER	ES1124104002	WM0288A	3/11/2011	2,4,6-Tribromophe	64.7	%
ES1124104	Normal	WATER	ES1124104002	WM0288A	3/11/2011	Phenol-d6	24.1	%
ES1124104	Normal	WATER	ES1124104002	WM0288A	3/11/2011	2-Chlorophenol-D	55.2	%
ES1124104	Normal	WATER	ES1124104002	WM0288A	3/11/2011	2-Fluorobiphenyl	71.2	%
ES1124104	Normal	WATER	ES1124104003	WM0360	3/11/2011	2,4,6-Tribromophe	62.4	%
ES1124104	Normal	WATER	ES1124104003	WM0360	3/11/2011	Phenol-d6	18.5	%
ES1124104	Normal	WATER	ES1124104003	WM0360	3/11/2011	2-Chlorophenol-D	41.4	%
ES1124104	Normal	WATER	ES1124104003	WM0360	3/11/2011	2-Fluorobiphenyl	52.8	%
ES1125920	Normal	WATER	ES1125920002	WM0062	23/11/2011	2,4,6-Tribromophe	59.8	%
ES1125920	Normal	WATER	ES1125920002	WM0062	23/11/2011	Phenol-d6	21.3	%
ES1125920	Normal	WATER	ES1125920002	WM0062	23/11/2011	4-Terphenyl-d14	53.1	%
ES1125920	Normal	WATER	ES1125920002	WM0062	23/11/2011	2-Chlorophenol-D	48.8	%
ES1125920	Normal	WATER	ES1125920002	WM0062	23/11/2011	2-Fluorobiphenyl	73.3	%
ES1125920	Field_D	WATER	ES1125920003	DUP01	23/11/2011	2,4,6-Tribromophe	53.9	%
ES1125920	Field_D	WATER	ES1125920003	DUP01	23/11/2011	Phenol-d6	21.3	%
ES1125920	Field_D	WATER	ES1125920003	DUP01	23/11/2011	4-Terphenyl-d14	51.8	%
ES1125920	Field_D	WATER	ES1125920003	DUP01	23/11/2011	2-Chlorophenol-D	46	%
ES1125920	Field_D	WATER	ES1125920003	DUP01	23/11/2011	2-Fluorobiphenyl	71.8	%
ES1125920	Rinsate	WATER	ES1125920004	RINSATE 01	23/11/2011	Phenol-d6	29.2	%
ES1125920	Rinsate	WATER	ES1125920004	RINSATE 01	23/11/2011	1,2-Dichloroethane	133	%
ES1125920	Rinsate	WATER	ES1125920004	RINSATE 01	23/11/2011	4-Terphenyl-d14	65.9	%
ES1125920	Rinsate	WATER	ES1125920004	RINSATE 01	23/11/2011	2-Chlorophenol-D	70.4	%
ES1126879	Normal	WATER	ES1126879002	GW040832 (D)	5/12/2011	DEF	72.4	%
ES1126879	Normal	WATER	ES1126879002	GW040832 (D)	5/12/2011	Dibromo-DDE	70.5	%
ES1126879	Normal	WATER	ES1126879003	GW030060 (S)	5/12/2011	Dibromo-DDE	72.4	%
ES1126879	Normal	WATER	ES1126879004	GW030060 (D)	5/12/2011	Dibromo-DDE	72.6	%
ES1205329	Normal	WATER	ES1205329004	WM0062	6/03/2012	1,2-Dichloroethane	136	%
ES1207884	Normal	WATER	ES1207884003	WM0427A	2/04/2012	DEF	70.9	%
ES1208498	Normal	WATER	ES1208498001	WM0427	10/04/2012	DEF	60	



ES1210003	Normal	WATER	ES1210003003	WM0427	25/04/2012	Dibromo-DDE	62.5	%
ES1211859	Trip_B	WATER	ES1211859004	TB2_10.5.12	10/05/2012	1,2-Dichloroethane	126	%
ES1212991	Normal	WATER	ES1212991003	WM0427	23/05/2012	1,2-Dichloroethane	129	%
ES1213374	Normal	WATER	ES1213374002	WM0361	27/05/2012	Dibromo-DDE	66.8	%
SE88966	LCS	water	LCSSE88966	WM0093A_1	17/07/2011	Surrogate	74	%
SE89006	LCS	Water	LCSSE89006			Surrogate	74	%
SE106155-1	Interlab_D	WATER	SE106155-1_QC3-6.3.12	QC3-6.3.12	6/03/2012	04-1,2-dichloroeth:71		µg/L
SE88966	Interlab_D	water	SE88966-1	QC5_17.7.11	17/07/2011	d14-p-Terphenyl (71)		%
SE88966	Interlab_D	water	SE88966-1	QC5_17.7.11	17/07/2011	Surrogate	130	%
SE89006	Interlab_D	water	SE89006-1	QC7	19/07/2011	2-fluorobiphenyl (572)		%
SE89006	Interlab_D	water	SE89006-1	QC7	19/07/2011	p-Terphenyl-d14	60	%
SE89006	Interlab_D	water	SE89006-1	QC7	19/07/2011	Surrogate	66	%
SE89006	Interlab_D	water	SE89006-1	QC7	19/07/2011	Nitrobenzene-d5	72	%



Matrix Spike Recoveries less than 70% or greater than 130% or outside lab LCL or UCL

SampleCode	Sampled_Date/Time	Method_Name	Compound	Recovery %	Result_Type	Comments
1318667-005_ES0916235	23/10/2009	EK059G: NOX as N by Discrete Analyser	Nitrite + Nitrate as N	27.5	REG	Recovery less than lower data quality objective
1326507-005_ES0916519	27/10/2009	EK059G: NOX as N by Discrete Analyser	Nitrite + Nitrate as N	56.7	REG	Recovery less than lower data quality objective
178402-1-012_ES1020533	13/10/2010	EK071G: Reactive Phosphorus as P by discrete analyser	Reactive Phosphorus as P	23.2	REG	Recovery less than lower data quality objective
1811590-006_ES1021975	1/11/2010	EG035T: Total Recoverable Mercury by FIMS	Mercury	49.9	REG	Recovery less than lower data quality objective
1941765-005_ES102106	31/01/2011	EK059G: Nitrite plus Nitrate as N (NOX) by Discrete Analyser	Nitrite + Nitrate as N	46.8	REG	Recovery less than lower data quality objective
2035157-005_ES1106749	30/03/2011	EP068T: Organophosphorus Pesticide Surrogate	DEF	68.6	SUR	
2035157-005_ES1106749	30/03/2011	EP068S: Organochlorine Pesticide Surrogate	Dibromo-DDE	61.1	SUR	
2038571-041_ES1106845	30/03/2011	EG035F: Dissolved Mercury by FIMS	Mercury	57.3	REG	Recovery less than lower data quality objective
2041734-005_ES1106845	31/03/2011	EP068B: Organophosphorus Pesticides (OP)	Bromophos-ethyl	66.1	REG	Recovery less than lower data quality objective
2041734-005_ES1106845	31/03/2011	EP068S: Organochlorine Pesticide Surrogate	Dibromo-DDE	55.3	SUR	
2047592-006_ES1107200	5/04/2011	EG035F: Dissolved Mercury by FIMS	Mercury	37.1	REG	Recovery less than lower data quality objective
2048122-005_ES1107200	5/04/2011	EP068B: Organophosphorus Pesticides (OP)	Pirimphos-ethyl	69.6	REG	Recovery less than lower data quality objective
2048122-005_ES1107200	5/04/2011	EP068B: Organophosphorus Pesticides (OP)	Bromophos-ethyl	62.4	REG	Recovery less than lower data quality objective
2048122-005_ES1107200	5/04/2011	EP068A: Organochlorine Pesticides (OC)	Dieldrin	68.4	REG	Recovery less than lower data quality objective
2048122-005_ES1107200	5/04/2011	EP068T: Organophosphorus Pesticide Surrogate	DEF	51.4	SUR	
2048122-005_ES1107200	5/04/2011	EP068S: Organochlorine Pesticide Surrogate	Dibromo-DDE	61.9	SUR	
2062534-031_ES1107676	10/04/2011	EP080071: Total Recoverable Hydrocarbons - NEPM 2010 Dr>C10 - C16 Fraction		142	REG	
2062534-031_ES1107676	10/04/2011	EP080071: Total Recoverable Hydrocarbons - NEPM 2010 Dr>C16 - C34 Fraction		140	REG	
2062534-031_ES1107676	10/04/2011	EP080071: Total Recoverable Hydrocarbons - NEPM 2010 Dr>C10 - C16 Fraction		142	REG	
2062534-031_ES1107676	10/04/2011	EP080071: Total Recoverable Hydrocarbons - NEPM 2010 Dr>C16 - C34 Fraction		140	REG	
2062551-009_ES1107801	14/04/2011	EP080071: Total Recoverable Hydrocarbons - NEPM 2010 Dr>C34 - C40 Fraction		136	REG	
2062551-009_ES1107801	14/04/2011	EP080071: Total Recoverable Hydrocarbons - NEPM 2010 Dr>C34 - C40 Fraction		136	REG	
2068628-005_ES1108034	19/04/2011	EP080071: Total Recoverable Hydrocarbons - NEPM 2010 Dr>C34 - C40 Fraction		131	REG	
2068628-005_ES1108034	19/04/2011	EP068B: Organophosphorus Pesticides (OP)	Bromophos-ethyl	63.2	REG	Recovery less than lower data quality objective
2068628-005_ES1108034	19/04/2011	EP068A: Organochlorine Pesticides (OC)	4,4'-DDT	66.2	REG	Recovery less than lower data quality objective
2068628-005_ES1108034	19/04/2011	EP068T: Organophosphorus Pesticide Surrogate	DEF	45.1	SUR	
2068628-005_ES1108034	19/04/2011	EP080071: Total Petroleum Hydrocarbons	C29 - C36 Fraction	132	REG	
2068628-005_ES1108034	19/04/2011	EP080071: Total Recoverable Hydrocarbons - NEPM 2010 Dr>C34 - C40 Fraction		131	REG	
2068628-005_ES1108034	19/04/2011	EP068S: Organochlorine Pesticide Surrogate	Dibromo-DDE	40.9	SUR	
2204959-011_ES1114810	8/07/2011	EK057G: Nitrite as N by Discrete Analyser	Nitrite as N	43	REG	Recovery less than lower data quality objective
2204959-011_ES1114865	8/07/2011	EK057G: Nitrite as N by Discrete Analyser	Nitrite as N	43	REG	Recovery less than lower data quality objective
2218368-026_ES1115556	19/07/2011	EP075(SIM): Phenolic Compound Surrogates	Phenol-d6	34.8	SUR	
2218368-026_ES1115556	19/07/2011	EP080071: Total Petroleum Hydrocarbons	C15 - C28 Fraction	151	REG	
2218368-026_ES1115556	19/07/2011	EP080071: Total Recoverable Hydrocarbons - NEPM 2010 Dr>C16 - C34 Fraction		141	REG	
2218368-026_ES1115556	19/07/2011	EP080071: Total Petroleum Hydrocarbons	C29 - C36 Fraction	142	REG	
2263013-053_ES1117673	13/08/2011	EK057G: Nitrite as N by Discrete Analyser	Nitrite as N	48.8	REG	Recovery less than lower data quality objective
2263157-005_ES1117673	16/08/2011	EP080071: Total Petroleum Hydrocarbons	C15 - C28 Fraction	136	REG	
2390828-005_ES1123334	27/10/2011	EP080071: Total Petroleum Hydrocarbons	C29 - C36 Fraction	141	REG	
2396241-005_ES1123829	2/11/2011	EP080071: Total Recoverable Hydrocarbons - NEPM 2010 Dr>C16 - C34 Fraction		150	REG	
2396241-005_ES1123829	2/11/2011	EP080071: Total Petroleum Hydrocarbons	C15 - C28 Fraction	143	REG	
2424727-007_ES1125074	16/11/2011	EG020F: Dissolved Metals by ICP-MS	Chromium	44.6	REG	Recovery less than lower data quality objective
2432105-030_ES1125579	21/11/2011	EK059G: Nitrite plus Nitrate as N (NOX) by Discrete Analyser	Nitrite + Nitrate as N	28.4	REG	Recovery less than lower data quality objective
2440308-005_ES1125920	24/11/2011	EP075(SIM): Phenolic Compound Surrogates	Phenol-d6	22.3	SUR	
2440308-005_ES1125920	24/11/2011	EP075(SIM): PAH Surrogates	4-Terphenyl-d14	65	SUR	
2440308-005_ES1125920	24/11/2011	EP075(SIM): Phenolic Compound Surrogates	2-Chlorophenol-D4	65.4	SUR	
2466951-014_ES1126879	5/12/2011	EP068B: Organophosphorus Pesticides (OP)	Bromophos-ethyl	66.4	REG	Recovery less than lower data quality objective
2466951-014_ES1126879	5/12/2011	EP068A: Organochlorine Pesticides (OC)	Heptachlor	69.9	REG	Recovery less than lower data quality objective
2466951-014_ES1126879	5/12/2011	EP068T: Organophosphorus Pesticide Surrogate	DEF	62.1	SUR	
2466951-014_ES1126879	5/12/2011	EP068S: Organochlorine Pesticide Surrogate	Dibromo-DDE	62.7	SUR	
2671247-005_ES1206666	10/04/2012	EK059G: Nitrite plus Nitrate as N (NOX) by Discrete Analyser	Nitrite + Nitrate as N	25	REG	Recovery less than lower data quality objective
2674726-005_ES1206498	9/04/2012	EP068B: Organophosphorus Pesticides (OP)	Pirimphos-ethyl	69.4	REG	Recovery less than lower data quality objective
2674726-005_ES1206498	9/04/2012	EP068T: Organophosphorus Pesticide Surrogate	DEF	69.4	SUR	
2697087-006_ES1209788	23/04/2012	EG035F: Dissolved Mercury by FIMS	Mercury	38.8	REG	Recovery less than lower data quality objective
2719047-028_ES1211265	8/05/2012	ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	Sulfate as SO4 - Turbidimetric	45.8	REG	Recovery less than lower data quality objective
2722586-005_ES1211155	8/05/2012	EK059G: Nitrite plus Nitrate as N (NOX) by Discrete Analyser	Nitrite + Nitrate as N	42.8	REG	Recovery less than lower data quality objective
2757754-074_ES1213374	28/05/2012	ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	Sulfate as SO4 - Turbidimetric	56.6	REG	Recovery less than lower data quality objective
S11-Mb33719-SPK	30/03/2011	E045 Sulphate	Sulphate (S)	32	SC	



Laboratory Control Samples, Error > 25%

SDG	Matrix_Type	SampleCode	Method_Name	OriginalChemName	Recovery %	Unit	Result_Type	Comments
ES0916519	WATER	1323592-052_ES0916519	ED009: Anions	Sulfate	74	%	REG	
ES1013519	WATER	1648121-027_ES1013519	ED009: Anions	Fluoride	71.3	%	REG	
ES1101902	WATER	1938613-003_ES1101902	EP080/071: Total Petroleum Hydrocarbons	C10 - C14 Fraction	67.5	%	REG	
ES1101902	WATER	1938613-009_ES1101902	EP068A: Organochlorine Pesticides (OC)	Endosulfan sulfate	68.7	%	REG	
ES1101902	WATER	1938613-009_ES1101902	EP068A: Organochlorine Pesticides (OC)	Hexachlorobenzene (HCB)	67.1	%	REG	
ES1101902	WATER	1938613-009_ES1101902	EP068A: Organochlorine Pesticides (OC)	beta-BHC	74.6	%	REG	
ES1101902	WATER	1938613-009_ES1101902	EP068A: Organochlorine Pesticides (OC)	delta-BHC	73.2	%	REG	
ES1101902	WATER	1938613-009_ES1101902	EP068A: Organochlorine Pesticides (OC)	Endrin ketone	71.4	%	REG	
ES1101902	WATER	1938613-009_ES1101902	EP068A: Organochlorine Pesticides (OC)	gamma-BHC	73.2	%	REG	
ES1101902	WATER	1938613-009_ES1101902	EP068B: Organophosphorus Pesticides (OP)	Monocrotophos	11	%	REG	
ES1101902	WATER	1938613-009_ES1101902	EP068A: Organochlorine Pesticides (OC)	Methoxychlor	71.6	%	REG	
ES1101902	WATER	1938613-009_ES1101902	EP068T: Organophosphorus Pesticide Surrogate	DEF	72.3	%	SUR	
ES1101902	WATER	1938613-009_ES1101902	EP068B: Organophosphorus Pesticides (OP)	Demeton-S-methyl	74.8	%	REG	
ES1101902	WATER	1938613-009_ES1101902	EP068S: Organochlorine Pesticide Surrogate	Dibromo-DDE	70.3	%	SUR	
ES1102106	WATER	1941766-002_ES1102106	EP080/071: Total Petroleum Hydrocarbons	C10 - C14 Fraction	67.5	%	REG	
ES1102106	WATER	1941766-032_ES1102106	EP068A: Organochlorine Pesticides (OC)	Endosulfan sulfate	70.6	%	REG	
ES1102106	WATER	1941766-032_ES1102106	EP068B: Organophosphorus Pesticides (OP)	Malathion	74.8	%	REG	
ES1102106	WATER	1941766-032_ES1102106	EP068A: Organochlorine Pesticides (OC)	beta-BHC	71.8	%	REG	
ES1102106	WATER	1941766-032_ES1102106	EP068A: Organochlorine Pesticides (OC)	delta-BHC	71.7	%	REG	
ES1102106	WATER	1941766-032_ES1102106	EP068B: Organophosphorus Pesticides (OP)	Diazinon	74.5	%	REG	
ES1102106	WATER	1941766-032_ES1102106	EP068A: Organochlorine Pesticides (OC)	Endrin ketone	73.8	%	REG	
ES1102106	WATER	1941766-032_ES1102106	EP068A: Organochlorine Pesticides (OC)	gamma-BHC	73.2	%	REG	
ES1102106	WATER	1941766-032_ES1102106	EP068A: Organochlorine Pesticides (OC)	Dieldrin	72.3	%	REG	
ES1102106	WATER	1941766-032_ES1102106	EP068B: Organophosphorus Pesticides (OP)	Monocrotophos	19.3	%	REG	Recovery less than lower control limit
ES1102106	WATER	1941766-032_ES1102106	EP068A: Organochlorine Pesticides (OC)	Methoxychlor	72.4	%	REG	
ES1102106	WATER	1941766-032_ES1102106	EP068A: Organochlorine Pesticides (OC)	4,4'-DDE	72	%	REG	
ES1102106	WATER	1941766-032_ES1102106	EP068A: Organochlorine Pesticides (OC)	Heptachlor	74.6	%	REG	
ES1102106	WATER	1941766-032_ES1102106	EP068T: Organophosphorus Pesticide Surrogate	DEF	60	%	SUR	
ES1102106	WATER	1941766-032_ES1102106	EP068B: Organophosphorus Pesticides (OP)	Azinphos Methyl	64	%	REG	
ES1102106	WATER	1941766-032_ES1102106	EP068B: Organophosphorus Pesticides (OP)	Demeton-S-methyl	68	%	REG	
ES1102106	WATER	1941766-032_ES1102106	EP068S: Organochlorine Pesticide Surrogate	Dibromo-DDE	64.9	%	SUR	
ES1102436	WATER	1947699-007_ES1102436	EP068A: Organochlorine Pesticides (OC)	Hexachlorobenzene (HCB)	73.3	%	REG	
ES1102436	WATER	1947699-007_ES1102436	EP068A: Organochlorine Pesticides (OC)	beta-BHC	73.1	%	REG	
ES1102436	WATER	1947699-007_ES1102436	EP068B: Organophosphorus Pesticides (OP)	Monocrotophos	26.9	%	REG	
ES1102436	WATER	1947699-007_ES1102436	EP068A: Organochlorine Pesticides (OC)	4,4'-DDE	74.9	%	REG	
ES1102436	WATER	1947699-007_ES1102436	EP068A: Organochlorine Pesticides (OC)	Heptachlor	70.6	%	REG	
ES1102436	WATER	1947699-007_ES1102436	EP068T: Organophosphorus Pesticide Surrogate	DEF	64.4	%	SUR	Recovery less than lower data quality objective
ES1102436	WATER	1947699-007_ES1102436	EP068B: Organophosphorus Pesticides (OP)	Azinphos Methyl	49.6	%	REG	
ES1102436	WATER	1947699-007_ES1102436	EP068B: Organophosphorus Pesticides (OP)	Demeton-S-methyl	67.9	%	REG	
ES1102436	WATER	1947699-007_ES1102436	EP068S: Organochlorine Pesticide Surrogate	Dibromo-DDE	50	%	SUR	
ES1102635	WATER	1951743-014_ES1102635	EP068B: Organophosphorus Pesticides (OP)	Monocrotophos	10.6	%	REG	
ES1102635	WATER	1951743-014_ES1102635	EP068T: Organophosphorus Pesticide Surrogate	DEF	51.9	%	SUR	Recovery less than lower data quality objective
ES1102635	WATER	1951743-014_ES1102635	EP068B: Organophosphorus Pesticides (OP)	Azinphos Methyl	48	%	REG	
ES1102635	WATER	1951743-014_ES1102635	EP068B: Organophosphorus Pesticides (OP)	Demeton-S-methyl	64.3	%	REG	
ES1102635	WATER	1951743-014_ES1102635	EP068S: Organochlorine Pesticide Surrogate	Dibromo-DDE	60.8	%	SUR	
ES1102773	WATER	1954629-003_ES1102773	EP068A: Organochlorine Pesticides (OC)	Heptachlor epoxide	73.8	%	REG	
ES1102773	WATER	1954629-003_ES1102773	EP068A: Organochlorine Pesticides (OC)	Hexachlorobenzene (HCB)	74.4	%	REG	
ES1102773	WATER	1954629-003_ES1102773	EP068C: Triazines	Simazine	68.9	%	REG	
ES1102773	WATER	1954629-003_ES1102773	EP068C: Triazines	Atrazine	60.8	%	REG	
ES1102773	WATER	1954629-003_ES1102773	EP068A: Organochlorine Pesticides (OC)	cis-Chlordane	62.6	%	REG	Recovery less than lower control limit
ES1102773	WATER	1954629-003_ES1102773	EP068A: Organochlorine Pesticides (OC)	trans-Chlordane	61.4	%	REG	Recovery less than lower control limit
ES1102773	WATER	1954629-003_ES1102773	EP068B: Organophosphorus Pesticides (OP)	Monocrotophos	22.4	%	REG	
ES1102773	WATER	1954629-003_ES1102773	EP068A: Organochlorine Pesticides (OC)	Heptachlor	71.4	%	REG	
ES1102773	WATER	1954629-003_ES1102773	EP068T: Organophosphorus Pesticide Surrogate	DEF	71.2	%	SUR	
ES1102773	WATER	1954629-003_ES1102773	EP068S: Organochlorine Pesticide Surrogate	Dibromo-DDE	58	%	SUR	
ES1102773	WATER	1954629-008_ES1102773	EP080/071: Total Petroleum Hydrocarbons	C10 - C14 Fraction	64	%	REG	
ES1102977	WATER	1959085-010_ES1102977	EP068A: Organochlorine Pesticides (OC)	Endosulfan sulfate	73	%	REG	
ES1102977	WATER	1959085-010_ES1102977	EP068A: Organochlorine Pesticides (OC)	delta-BHC	72.3	%	REG	
ES1102977	WATER	1959085-010_ES1102977	EP068A: Organochlorine Pesticides (OC)	4,4'-DDT	73.7	%	REG	
ES1102977	WATER	1959085-010_ES1102977	EP068A: Organochlorine Pesticides (OC)	Endrin ketone	72.4	%	REG	
ES1102977	WATER	1959085-010_ES1102977	EP068B: Organophosphorus Pesticides (OP)	Dimethoate	74.9	%	REG	
ES1102977	WATER	1959085-010_ES1102977	EP068B: Organophosphorus Pesticides (OP)	Monocrotophos	19.2	%	REG	
ES1102977	WATER	1959085-010_ES1102977	EP068A: Organochlorine Pesticides (OC)	Methoxychlor	73.2	%	REG	
ES1102977	WATER	1959085-010_ES1102977	EP068B: Organophosphorus Pesticides (OP)	Azinphos Methyl	72.5	%	REG	
ES1102977	WATER	1959085-010_ES1102977	EP068S: Organochlorine Pesticide Surrogate	Dibromo-DDE	67.7	%	SUR	
ES1103167	WATER	1962722-002_ES1103167	EP080/071: Total Petroleum Hydrocarbons	C10 - C14 Fraction	63.5	%	REG	
ES1103167	WATER	1962722-015_ES1103167	EP068A: Organochlorine Pesticides (OC)	Endosulfan sulfate	72	%	REG	
ES1103167	WATER	1962722-015_ES1103167	EP068A: Organochlorine Pesticides (OC)	delta-BHC	70.5	%	REG	
ES1103167	WATER	1962722-015_ES1103167	EP068A: Organochlorine Pesticides (OC)	cis-Chlordane	74.1	%	REG	
ES1103167	WATER	1962722-015_ES1103167	EP068A: Organochlorine Pesticides (OC)	Endrin ketone	73.2	%	REG	
ES1103167	WATER	1962722-015_ES1103167	EP068B: Organophosphorus Pesticides (OP)	Dimethoate	73.6	%	REG	
ES1103167	WATER	1962722-015_ES1103167	EP068B: Organophosphorus Pesticides (OP)	Dichlorvos	67.1	%	REG	
ES1103167	WATER	1962722-015_ES1103167	EP068B: Organophosphorus Pesticides (OP)	Monocrotophos	20.2	%	REG	
ES1103167	WATER	1962722-015_ES1103167	EP068A: Organochlorine Pesticides (OC)	Methoxychlor	70	%	REG	
ES1103167	WATER	1962722-015_ES1103167	EP068A: Organochlorine Pesticides (OC)	Endrin aldehyde	62.9	%	REG	Recovery less than lower control limit
ES1103167	WATER	1962722-015_ES1103167	EP068B: Organophosphorus Pesticides (OP)	Carbophenothion	73.4	%	REG	
ES1103167	WATER	1962722-015_ES1103167	EP068B: Organophosphorus Pesticides (OP)	Azinphos Methyl	62.8	%	REG	
ES1103167	WATER	1962722-015_ES1103167	EP068S: Organochlorine Pesticide Surrogate	Dibromo-DDE	65.2	%	SUR	
ES1103282	WATER	1964892-002_ES1103282	EP080/071: Total Petroleum Hydrocarbons	C10 - C14 Fraction	66.1	%	REG	
ES1103282	WATER	1964892-013_ES1103282	EP068A: Organochlorine Pesticides (OC)	Endosulfan sulfate	72.3	%	REG	
ES1103282	WATER	1964892-013_ES1103282	EP068C: Triazines	Simazine	70.3	%	REG	
ES1103282	WATER	1964892-013_ES1103282	EP068C: Triazines	Atrazine	61.7	%	REG	
ES1103282	WATER	1964892-013_ES1103282	EP068B: Organophosphorus Pesticides (OP)	Fenatrophos	73.3	%	REG	
ES1103282	WATER	1964892-013_ES1103282	EP068A: Organochlorine Pesticides (OC)	cis-Chlordane	65.9	%	REG	Recovery less than lower control limit
ES1103282	WATER	1964892-013_ES1103282	EP068A: Organochlorine Pesticides (OC)	trans-Chlordane	66.9	%	REG	Recovery less than lower control limit
ES1103282	WATER	1964892-013_ES1103282	EP068A: Organochlorine Pesticides (OC)	Endrin ketone	74.6	%	REG	
ES1103282	WATER	1964892-013_ES1103282	EP068B: Organophosphorus Pesticides (OP)	Dichlorvos	66	%	REG	
ES1103282	WATER	1964892-013_ES1103282	EP068B: Organophosphorus Pesticides (OP)	Monocrotophos	14	%	REG	
ES1103282	WATER	1964892-013_ES1103282	EP068A: Organochlorine Pesticides (OC)	Endosulfan sulfate	73.2	%	REG	
ES1103282	WATER	1964892-013_ES1103282	EP068A: Organochlorine Pesticides (OC)	Methoxychlor	63	%	REG	
ES1103282	WATER	1964892-013_ES1103282	EP068A: Organochlorine Pesticides (OC)	Heptachlor	73.5	%	REG	
ES1103282	WATER	1964892-013_ES1103282	EP068T: Organophosphorus Pesticide Surrogate	DEF	70.5	%	SUR	
ES1103282	WATER	1964892-013_ES1103282	EP068B: Organophosphorus Pesticides (OP)	Demeton-S-methyl	71	%	REG	
ES1103282	WATER	1964892-013_ES1103282	EP068S: Organochlorine Pesticide Surrogate	Dibromo-DDE	63.7	%	SUR	
ES1103379	WATER	1967057-027_ES1103379	EP068B: Organophosphorus Pesticides (OP)	Monocrotophos	18.1	%	REG	
ES1103379	WATER	1967057-027_ES1103379	EP068A: Organochlorine Pesticides (OC)	Methoxychlor	74	%	REG	
ES1103379	WATER	1967057-027_ES1103379	EP068S: Organochlorine Pesticide Surrogate	Dibromo-DDE	66.6	%	SUR	
ES1103379	WATER	1967238-002_ES1103379	EP080: BTEX	meta- & para-Xylene	71.9	%	REG	
ES1103514	WATER	1972350-002_ES1103514	EP080/071: Total Petroleum Hydrocarbons	C10 - C14 Fraction	61.5	%	REG	
ES1103514	WATER	1972350-012_ES1103514	EP068B: Organophosphorus Pesticides (OP)	Monocrotophos	21.2	%	REG	
ES1103514	WATER	1972350-012_ES1103514	EP068B: Organophosphorus Pesticides (OP)	Azinphos Methyl	70.6	%	REG	
ES1103741	WATER	1974551-009_ES1103741	EG020F: Dissolved Metals by ICP-MS	Lead	128	%	REG	Recovery greater than upper control limit
ES1103741	WATER	1974551-009_ES1103741	EG020F: Dissolved Metals by ICP-MS	Molybdenum	126	%	REG	Recovery greater than upper control limit
ES1106749	WATER	2035157-002_ES1106749	EP068A: Organochlorine Pesticides (OC)	Endosulfan sulfate	70.1	%	REG	
ES1106749	WATER	2035157-002_ES1106749	EP068A: Organochlorine Pesticides (OC)	Hexachlorobenzene (HCB)	70.6	%	REG	
ES1106749	WATER	2035157-002_ES1106749	EP068B: Organophosphorus Pesticides (OP)	Malathion	73.8	%	REG	
ES1106749	WATER	2035157-002_ES1106749	EP068B: Organophosphorus Pesticides (OP)	Parathion-methyl	73.6	%	REG	
ES1106749	WATER	2035157-002_ES1106749	EP068A: Organochlorine Pesticides (OC)	alpha-BHC	74.2	%	REG	
ES1106749	WATER	2035157-002_ES1106749	EP068A: Organochlorine Pesticides (OC)	beta-BHC	64.8	%	REG	
ES1106749	WATER	2035157-002_ES1106749	EP068A: Organochlorine Pesticides (OC)	delta-BHC	70.5	%	REG	
ES1106749	WATER	2035157-002_ES1106749	EP068B: Organophosphorus Pesticides (OP)	Prothios	73.4	%	REG	
ES1106749	WATER	2035157-002_ES1106749	EP068A: Organochlorine Pesticides (OC)	cis-Chlordane	72.6	%	REG	
ES1106749	WATER	2035157-002_ES1106749	EP068A: Organochlorine Pesticides (OC)	Endrin ketone	68.6	%	REG	
ES1106749	WATER	2035157-002_ES1106749	EP068B: Organophosphorus Pesticides (OP)	Parathion	73.2	%	REG	
ES1106749	WATER	2035157-002_ES1106749	EP068A: Organochlorine Pesticides (OC)	gamma-BHC	73	%	REG	
ES1106749	WATER	2035157-002_ES1106749	EP068B: Organophosphorus Pesticides (OP)	Dimethoate	72.1	%	REG	
ES1106749	WATER	2035157-002_ES1106749	EP068B: Organophosphorus Pesticides (OP)	Dichlorvos	67.2	%	REG	
ES1106749	WATER	2035157-002_ES1106749	EP068B: Organophosphorus Pesticides (OP)	Monocrotophos	50	%	REG	
ES1106749	WATER	2035157-002_ES1106749	EP068A: Organochlorine Pesticides (OC)	Methoxychlor	69.1	%	REG	
ES1106749	WATER	2035157-002_ES1106749	EP068A: Organochlorine Pesticides (OC)	4,4'-DDE	72.9	%	REG	
ES1106749								



ES1106845	WATER	2041734-002	ES1106845	EP068T: Organophosphorus Pesticide Surrogate	DEF	72.7	%	SUR	
ES1106845	WATER	2041734-002	ES1106845	EP068B: Organophosphorus Pesticides (OP)	Carbophenothion	74	%	REG	
ES1106845	WATER	2041734-002	ES1106845	EP068B: Organophosphorus Pesticides (OP)	Azinphos Methyl	62.2	%	REG	
ES1106845	WATER	2041734-002	ES1106845	EP068S: Organochlorine Pesticide Surrogate	Dibromo-DDE	72.4	%	SUR	
ES1107088	WATER	2043912-002	ES1107088	EP080/071: Total Petroleum Hydrocarbons	C10 - C14 Fraction	68.5	%	REG	
ES1107088	WATER	2043912-018	ES1107088	EP068B: Organophosphorus Pesticides (OP)	Monocrotophos	15.4	%	REG	
ES1107088	WATER	2043912-018	ES1107088	EP068T: Organophosphorus Pesticide Surrogate	DEF	71	%	SUR	
ES1107088	WATER	2043912-018	ES1107088	EP068S: Organochlorine Pesticide Surrogate	Dibromo-DDE	70.9	%	SUR	
ES1107200	WATER	2047603-003	ES1107200	EG020F: Dissolved Metals by ICP-MS	Vanadium	71.4	%	REG	Recovery less than lower control limit
ES1107200	WATER	2048122-018	ES1107200	EP068B: Organophosphorus Pesticides (OP)	Chlorpyrifos	71.9	%	REG	
ES1107200	WATER	2048122-018	ES1107200	EP068B: Organophosphorus Pesticides (OP)	Parathion	70	%	REG	
ES1107200	WATER	2048122-018	ES1107200	EP068B: Organophosphorus Pesticides (OP)	Monocrotophos	14.5	%	REG	
ES1107200	WATER	2048122-018	ES1107200	EP068A: Organochlorine Pesticides (OC)	Endrin aldehyde	64.9	%	REG	Recovery less than lower control limit
ES1107200	WATER	2048122-018	ES1107200	EP068B: Organophosphorus Pesticides (OP)	Azinphos Methyl	59.3	%	REG	
ES1107461	WATER	2050498-003	ES1107461	EG020F: Dissolved Metals by ICP-MS	Vanadium	72.9	%	REG	Recovery less than lower control limit
ES1107461	WATER	2052236-002	ES1107461	EP080/071: Total Recoverable Hydrocarbons	>C16 - C34 Fraction	127	%	REG	
ES1107461	WATER	2052236-002	ES1107461	EP080/071: Total Recoverable Hydrocarbons	>C34 - C40 Fraction	72.4	%	REG	
ES1107461	WATER	2052236-002	ES1107461	EP080/071: Total Recoverable Hydrocarbons	>C16 - C34 Fraction	127	%	REG	
ES1107461	WATER	2052236-002	ES1107461	EP080/071: Total Recoverable Hydrocarbons	>C34 - C40 Fraction	72.4	%	REG	
ES1107461	WATER	2052236-013	ES1107461	EP068A: Organochlorine Pesticides (OC)	Hexachlorobenzene (HCB)	70.3	%	REG	
ES1107461	WATER	2052236-013	ES1107461	EP068A: Organochlorine Pesticides (OC)	delta-BHC	66.1	%	REG	Recovery less than lower control limit
ES1107461	WATER	2052236-013	ES1107461	EP068B: Organophosphorus Pesticides (OP)	Diazinon	71.7	%	REG	
ES1107461	WATER	2052236-013	ES1107461	EP068B: Organophosphorus Pesticides (OP)	Monocrotophos	27.5	%	REG	
ES1107461	WATER	2052236-013	ES1107461	EP068A: Organochlorine Pesticides (OC)	Endrin aldehyde	74.3	%	REG	
ES1107461	WATER	2052236-013	ES1107461	EP068T: Organophosphorus Pesticide Surrogate	DEF	73.6	%	SUR	
ES1107461	WATER	2052236-013	ES1107461	EP068S: Organochlorine Pesticide Surrogate	Dibromo-DDE	69	%	SUR	
ES1107461	WATER	2052623-009	ES1107461	EG020F: Dissolved Metals by ICP-MS	Vanadium	70.2	%	REG	Recovery less than lower control limit
ES1107461	WATER	2052623-043	ES1107461	EG020F: Dissolved Metals by ICP-MS	Vanadium	70.2	%	REG	Recovery less than lower control limit
ES1107676	WATER	2055148-009	ES1107676	EG020F: Dissolved Metals by ICP-MS	Vanadium	72.7	%	REG	Recovery less than lower control limit
ES1107801	WATER	2059799-003	ES1107801	EG020F: Dissolved Metals by ICP-MS	Vanadium	74.9	%	REG	Recovery less than lower control limit
ES1107801	WATER	2059806-028	ES1107801	EG020F: Dissolved Metals by ICP-MS	Boron	73.6	%	REG	
ES1107801	WATER	2059806-028	ES1107801	EG020F: Dissolved Metals by ICP-MS	Vanadium	72.8	%	REG	Recovery less than lower control limit
ES1107676	WATER	2062534-002	ES1107676	EP080/071: Total Petroleum Hydrocarbons	C10 - C14 Fraction	62	%	REG	
ES1107676	WATER	2062534-002	ES1107676	EP068A: Organochlorine Pesticides (OC)	Heptachlor epoxide	73.1	%	REG	
ES1107676	WATER	2062534-002	ES1107676	EP068A: Organochlorine Pesticides (OC)	Endosulfan sulfate	67.3	%	REG	
ES1107676	WATER	2062534-002	ES1107676	EP068C: Triazines	Atrazine	72.6	%	REG	
ES1107676	WATER	2062534-002	ES1107676	EP068A: Organochlorine Pesticides (OC)	beta-BHC	70.5	%	REG	
ES1107676	WATER	2062534-002	ES1107676	EP068A: Organochlorine Pesticides (OC)	delta-BHC	59	%	REG	Recovery less than lower control limit
ES1107676	WATER	2062534-002	ES1107676	EP068A: Organochlorine Pesticides (OC)	Endrin ketone	65	%	REG	
ES1107676	WATER	2062534-002	ES1107676	EP068A: Organochlorine Pesticides (OC)	Dieldrin	73.8	%	REG	
ES1107676	WATER	2062534-002	ES1107676	EP068B: Organophosphorus Pesticides (OP)	Monocrotophos	18	%	REG	
ES1107676	WATER	2062534-002	ES1107676	EP068A: Organochlorine Pesticides (OC)	Methoxychlor	72.1	%	REG	
ES1107676	WATER	2062534-002	ES1107676	EP068A: Organochlorine Pesticides (OC)	4,4'-DDE	72.8	%	REG	
ES1107676	WATER	2062534-002	ES1107676	EP068B: Organophosphorus Pesticides (OP)	Demeton-S-methyl	139	%	REG	
ES1107801	WATER	2062551-002	ES1107801	EP080/071: Total Recoverable Hydrocarbons	>C16 - C34 Fraction	136	%	REG	
ES1107801	WATER	2062551-002	ES1107801	EP080/071: Total Petroleum Hydrocarbons	C15 - C28 Fraction	134	%	REG	
ES1107801	WATER	2062551-002	ES1107801	EP080/071: Total Recoverable Hydrocarbons	>C16 - C34 Fraction	136	%	REG	
ES1107801	WATER	2062551-011	ES1107801	EP068A: Organochlorine Pesticides (OC)	delta-BHC	71	%	REG	
ES1107801	WATER	2062551-011	ES1107801	EP068B: Organophosphorus Pesticides (OP)	Monocrotophos	41.8	%	REG	
ES1107801	WATER	2062551-011	ES1107801	EP068S: Organochlorine Pesticide Surrogate	Dibromo-DDE	128	%	REG	
ES1108268	WATER	2068393-002	ES1108268	EA015: Total Dissolved Solids	Total Dissolved Solids @180	126	%	REG	
ES1108034	WATER	2068628-002	ES1108034	EP068A: Organochlorine Pesticides (OC)	Hexachlorobenzene (HCB)	61.8	%	REG	
ES1108034	WATER	2068628-002	ES1108034	EP068A: Organochlorine Pesticides (OC)	delta-BHC	66.1	%	REG	Recovery less than lower control limit
ES1108034	WATER	2068628-002	ES1108034	EP068B: Organophosphorus Pesticides (OP)	Dichlorvos	72.2	%	REG	
ES1108034	WATER	2068628-002	ES1108034	EP068B: Organophosphorus Pesticides (OP)	Monocrotophos	12.7	%	REG	
ES1108034	WATER	2068628-002	ES1108034	EP068T: Organophosphorus Pesticide Surrogate	DEF	61.6	%	SUR	
ES1108034	WATER	2068628-002	ES1108034	EP068S: Organochlorine Pesticide Surrogate	Dibromo-DDE	51.7	%	SUR	
ES1114865	WATER	2203505-002	ES1114865	EP068B: Organophosphorus Pesticides (OP)	Monocrotophos	22.2	%	REG	
ES1114810	WATER	2205469-003	ES1114810	EP068B: Organophosphorus Pesticides (OP)	Monocrotophos	23.1	%	REG	
ES1114810	WATER	2205469-012	ES1114810	EP080/071: Total Petroleum Hydrocarbons	C10 - C14 Fraction	71	%	REG	
ES1114810	WATER	2205469-012	ES1114810	EP080/071: Total Recoverable Hydrocarbons	>C10 - C16 Fraction	72.8	%	REG	
ES1114810	WATER	2205469-012	ES1114810	EP080/071: Total Petroleum Hydrocarbons	C29 - C36 Fraction	74	%	REG	
ES1114810	WATER	2205469-012	ES1114810	EP080/071: Total Recoverable Hydrocarbons	>C34 - C40 Fraction	71.3	%	REG	
ES1114934	WATER	2207664-002	ES1114934	EP080/071: Total Petroleum Hydrocarbons	C10 - C14 Fraction	71.5	%	REG	
ES1114934	WATER	2207664-015	ES1114934	EP068A: Organochlorine Pesticides (OC)	Hexachlorobenzene (HCB)	70.5	%	REG	
ES1114934	WATER	2207664-015	ES1114934	EP068A: Organochlorine Pesticides (OC)	cis-Chlordane	74.1	%	REG	
ES1114934	WATER	2207664-015	ES1114934	EP068A: Organochlorine Pesticides (OC)	trans-Chlordane	72	%	REG	
ES1114934	WATER	2207664-015	ES1114934	EP068B: Organophosphorus Pesticides (OP)	Monocrotophos	21.1	%	REG	
ES1114934	WATER	2207664-015	ES1114934	EP068B: Organophosphorus Pesticides (OP)	Azinphos Methyl	67.4	%	REG	
ES1114934	WATER	2207664-015	ES1114934	EP068S: Organochlorine Pesticide Surrogate	Dibromo-DDE	70	%	SUR	
ES1115139	WATER	2212545-002	ES1115139	EP075(SIM)S: Phenolic Compound Surrogates	2,4,6-Trisubstituted Phenol	67.2	%	SUR	
ES1115139	WATER	2212545-002	ES1115139	EP075(SIM)S: Phenolic Compound Surrogates	Phenol-d6	35.1	%	SUR	
ES1115139	WATER	2212545-002	ES1115139	EP075(SIM)S: Phenolic Compound Surrogates	2-Chlorophenol-D4	74.6	%	SUR	
ES1115337	WATER	2215730-030	ES1115337	EP068A: Organochlorine Pesticides (OC)	Hexachlorobenzene (HCB)	69.1	%	REG	
ES1115337	WATER	2215730-030	ES1115337	EP068B: Organophosphorus Pesticides (OP)	Monocrotophos	22.8	%	REG	
ES1115337	WATER	2215730-030	ES1115337	EP068S: Organochlorine Pesticide Surrogate	Dibromo-DDE	71.3	%	SUR	
ES1115556	WATER	2218368-024	ES1115556	EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	Anthracene	69.6	%	REG	
ES1115556	WATER	2218368-024	ES1115556	EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	Pyrene	74.6	%	REG	
ES1115556	WATER	2218368-024	ES1115556	EP075(SIM)S: Phenolic Compound Surrogates	Phenol-d6	27.9	%	SUR	
ES1115556	WATER	2218368-024	ES1115556	EP075(SIM)T: PAH Surrogates	4-Terphenyl-d14	74.9	%	SUR	
ES1115556	WATER	2218368-024	ES1115556	EP075(SIM)T: PAH Surrogates	Anthracene-d10	70.3	%	SUR	
ES1115556	WATER	2218368-024	ES1115556	EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	Benzo(b)fluoranthene	71.9	%	REG	
ES1115556	WATER	2218368-024	ES1115556	EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	Fluoranthene	72	%	REG	
ES1115556	WATER	2218368-024	ES1115556	EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	Benzo(k)fluoranthene	70.6	%	REG	
ES1115556	WATER	2218368-024	ES1115556	EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	Acenaphthylene	71.3	%	REG	
ES1115556	WATER	2218368-024	ES1115556	EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	Chrysene	72.5	%	REG	
ES1115556	WATER	2218368-024	ES1115556	EP075(SIM)S: Phenolic Compound Surrogates	2-Chlorophenol-D4	69.7	%	SUR	
ES1115556	WATER	2218368-024	ES1115556	EP075(SIM)T: PAH Surrogates	2-Fluorobiphenyl	71.6	%	SUR	
ES1115556	WATER	2218368-024	ES1115556	EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	Benzo(a)pyrene	71.2	%	REG	
ES1115556	WATER	2218368-024	ES1115556	EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	Benzo(a)anthracene	72.3	%	REG	
ES1115556	WATER	2218368-024	ES1115556	EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	Acenaphthene	69.8	%	REG	
ES1115556	WATER	2218368-024	ES1115556	EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	Phenanthrene	66.7	%	REG	
ES1115556	WATER	2218368-024	ES1115556	EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	Fluorene	72.7	%	REG	
ES1115556	WATER	2218368-024	ES1115556	EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	Naphthalene	63.8	%	REG	
ES1115556	WATER	2218469-002	ES1115556	EP071 SG: TRHs (NEPM 2010 draft) - Silica ge	>C10 - C16 Fraction	68.4	%	REG	
ES1115556	WATER	2218766-002	ES1115556	EP080/071: Total Recoverable Hydrocarbons	C6 - C10 Fraction	126	%	REG	
ES1116052	WATER	2229439-026	ES1116052	EA015: Total Dissolved Solids	Total Dissolved Solids @180	126	%	REG	
ES1117196	WATER	2253911-002	ES1117196	EP068B: Organophosphorus Pesticides (OP)	Monocrotophos	24.2	%	REG	
ES1117196	WATER	2253911-011	ES1117196	EP080/071: Total Petroleum Hydrocarbons	C10 - C14 Fraction	59.5	%	REG	
ES1117196	WATER	2253911-011	ES1117196	EP080/071: Total Recoverable Hydrocarbons	>C10 - C16 Fraction	68.6	%	REG	
ES1117673	WATER	2263157-002	ES1117673	EP080/071: Total Recoverable Hydrocarbons	>C10 - C16 Fraction	64	%	REG	
ES1117673	WATER	2263157-009	ES1117673	EP075(SIM)S: Phenolic Compound Surrogates	Phenol-d6	39.6	%	SUR	
ES1117673	WATER	2263157-009	ES1117673	EP075(SIM)S: Phenolic Compound Surrogates	2-Chlorophenol-D4	65.6	%	SUR	
ES1117673	WATER	2263157-009	ES1117673	EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	Fluorene	63.8	%	REG	Recovery less than lower control limit
ES1117818	WATER	2264770-007	ES1117818	EP075(SIM)S: Phenolic Compound Surrogates	Phenol-d6	33.2	%	SUR	
ES1117818	WATER	2264770-007	ES1117818	EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	Indeno(1,2,3-cd)pyrene	73.2	%	REG	
ES1117818	WATER	2264770-007	ES1117818	EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	Benzo(b)fluoranthene	73.3	%	REG	
ES1117818	WATER	2264770-007	ES1117818	EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	Acenaphthene	66.8	%	REG	
ES1117818	WATER	2264770-007	ES1117818	EP075(SIM)T: PAH Surrogates	2-Fluorobiphenyl	66.3	%	SUR	
ES1117818	WATER	2264770-007	ES1117818	EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	Benzo(a)pyrene	72.8	%	REG	
ES1117818	WATER	2264770-007	ES1117818	EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	Dibenz(a,h)anthracene	73.1	%	REG	
ES1117818	WATER								



ES1123334	WATER	2390828-007_ES1123334	EP068A: Organochlorine Pesticides (OC)	Endrin ketone	74.6	%	REG	
ES1123334	WATER	2390828-007_ES1123334	EP068B: Organophosphorus Pesticides (OP)	Monocrotophos	23.8	%	REG	
ES1123334	WATER	2390828-007_ES1123334	EP068B: Organophosphorus Pesticides (OP)	Azinphos Methyl	73.8	%	REG	
ES1123334	WATER	2390828-007_ES1123334	EP068S: Organochlorine Pesticide Surrogate	Dibromo-DDE	73.4	%	SUR	
ES1123744	WATER	2393369-007_ES1123744	EP080/071: Total Recoverable Hydrocarbons -	>C10 - C16 Fraction	73.2	%	REG	
ES1123744	WATER	2393369-015_ES1123744	EP075(SIM)S: Phenolic Compound Surrogates	Phenol-d6	47.5	%	SUR	
ES1123829	WATER	2396241-002_ES1123829	EP080/071: Total Recoverable Hydrocarbons -	>C10 - C16 Fraction	71.2	%	REG	
ES1123829	WATER	2396241-002_ES1123829	EP080/071: Total Recoverable Hydrocarbons -	C29 - C36 Fraction	74.2	%	REG	
ES1123829	WATER	2396241-007_ES1123829	EP075(SIM)S: Phenolic Compound Surrogates	2,4,6-Trichlorophenol	70.8	%	SUR	
ES1123829	WATER	2396241-007_ES1123829	EP075(SIM)S: Phenolic Compound Surrogates	Phenol-d6	32.1	%	SUR	
ES1123829	WATER	2396241-007_ES1123829	EP075(SIM)S: Phenolic Compound Surrogates	2-Chlorophenol-D4	63.2	%	SUR	
ES1123829	WATER	2396241-007_ES1123829	EP075(SIM)JT: PAH Surrogates	2-Fluorobiphenyl	74.2	%	SUR	
ES1123829	WATER	2396241-007_ES1123829	EP075(SIM)B: Polynuclear Aromatic Hydrocarbc	Acenaphthene	71.2	%	REG	
ES1123829	WATER	2396241-007_ES1123829	EP075(SIM)B: Polynuclear Aromatic Hydrocarbc	Fluorene	73.4	%	REG	
ES1123829	WATER	2396241-007_ES1123829	EP075(SIM)B: Polynuclear Aromatic Hydrocarbc	Naphthalene	69.2	%	REG	
ES1123829	WATER	2398248-002_ES1123829	EP080: BTEXN	ortho-Xylene	73.5	%	REG	
ES1123983	WATER	2399575-002_ES1123983	EP075(SIM)S: Total Recoverable Hydrocarbons -	>C10 - C16 Fraction	73.2	%	REG	
ES1123983	WATER	2399575-007_ES1123983	EP075(SIM)B: Polynuclear Aromatic Hydrocarbc	Anthracene	68.8	%	REG	
ES1123983	WATER	2399575-007_ES1123983	EP075(SIM)B: Polynuclear Aromatic Hydrocarbc	Pyrene	69.6	%	REG	
ES1123983	WATER	2399575-007_ES1123983	EP075(SIM)S: Phenolic Compound Surrogates	Phenol-d6	28	%	SUR	
ES1123983	WATER	2399575-007_ES1123983	EP075(SIM)JT: PAH Surrogates	Anthracene-d10	63.7	%	SUR	
ES1123983	WATER	2399575-007_ES1123983	EP075(SIM)B: Polynuclear Aromatic Hydrocarbc	Fluoranthene	61.6	%	REG	Recovery less than lower control limit
ES1123983	WATER	2399575-007_ES1123983	EP075(SIM)S: Phenolic Compound Surrogates	2-Chlorophenol-D4	64	%	SUR	
ES1123983	WATER	2399575-007_ES1123983	EP075(SIM)B: Polynuclear Aromatic Hydrocarbc	Phenanthrene	69.9	%	REG	
ES1123983	WATER	2399575-007_ES1123983	EP075(SIM)B: Polynuclear Aromatic Hydrocarbc	Naphthalene	71.1	%	REG	
ES1123829	WATER	2400527-002_ES1123829	EA015: Total Dissolved Solids	Total Dissolved Solids @180	128	%	REG	
ES1124104	WATER	2402701-007_ES1124104	EP075(SIM)S: Phenolic Compound Surrogates	Phenol-d6	29.2	%	SUR	
ES1124104	WATER	2402701-007_ES1124104	EP075(SIM)B: Polynuclear Aromatic Hydrocarbc	Acenaphthylene	68.9	%	REG	
ES1124104	WATER	2402701-007_ES1124104	EP075(SIM)S: Phenolic Compound Surrogates	2-Chlorophenol-D4	66.1	%	SUR	
ES1124104	WATER	2402701-007_ES1124104	EP075(SIM)JT: PAH Surrogates	2-Fluorobiphenyl	66.6	%	SUR	
ES1124104	WATER	2402701-007_ES1124104	EP075(SIM)B: Polynuclear Aromatic Hydrocarbc	Acenaphthene	69.9	%	REG	
ES1124104	WATER	2402701-007_ES1124104	EP075(SIM)B: Polynuclear Aromatic Hydrocarbc	Fluorene	72	%	REG	
ES1125920	WATER	2440308-002_ES1125920	EP080/071: Total Recoverable Hydrocarbons -	>C10 - C16 Fraction	68.6	%	REG	
ES1125920	WATER	2440308-007_ES1125920	EP075(SIM)S: Phenolic Compound Surrogates	Phenol-d6	37.9	%	SUR	
ES1126879	WATER	2466951-011_ES1126879	EP068B: Organophosphorus Pesticides (OP)	Dichlorvos	72.6	%	REG	
ES1126879	WATER	2466951-011_ES1126879	EP068B: Organophosphorus Pesticides (OP)	Monocrotophos	15.8	%	REG	
ES1126879	WATER	2466951-011_ES1126879	EP068T: Organophosphorus Pesticide Surrogat	DEF	73	%	SUR	
ES1126879	WATER	2466951-011_ES1126879	EP068B: Organophosphorus Pesticides (OP)	Azinphos Methyl	72.2	%	REG	
ES1127006	WATER	2471551-011_ES1127006	EP068B: Organophosphorus Pesticides (OP)	Monocrotophos	26.1	%	REG	
ES1127393	WATER	2480708-002_ES1127393	EP068B: Organophosphorus Pesticides (OP)	Bromophos-ethyl	70.8	%	REG	
ES1127393	WATER	2480708-002_ES1127393	EP068B: Organophosphorus Pesticides (OP)	Monocrotophos	25.3	%	REG	
ES1127393	WATER	2480708-002_ES1127393	EP068A: Organochlorine Pesticides (OC)	Endrin	70.1	%	REG	
ES1127393	WATER	2480708-002_ES1127393	EP068A: Organochlorine Pesticides (OC)	Methoxychlor	66.2	%	REG	
ES1127393	WATER	2480708-002_ES1127393	EP068A: Organochlorine Pesticides (OC)	Heptachlor	64.4	%	REG	
ES1127393	WATER	2480708-002_ES1127393	EP068B: Organophosphorus Pesticides (OP)	Carbophenothion	71.6	%	REG	
ES1127393	WATER	2480708-002_ES1127393	EP068B: Organophosphorus Pesticides (OP)	Demeton-S-methyl	65.3	%	REG	
ES1205329	WATER	2617441-002_ES1205329	EP071 SG: Total Recoverable Hydrocarbons (N	>C10 - C16 Fraction	74.8	%	REG	
ES1205329	WATER	2617441-002_ES1205329	EP071 SG: Total Petroleum Hydrocarbons -	Sili C10 - C14 Fraction	61	%	REG	
ES1207239	WATER	2654002-002_ES1207239	EP071 SG: Total Recoverable Hydrocarbons (N	>C10 - C16 Fraction	73.6	%	REG	
ES1207884	WATER	2658311-002_ES1207884	EP068A: Organochlorine Pesticides (OC)	Heachlorobenzene (HCB)	56.9	%	REG	
ES1207884	WATER	2658311-002_ES1207884	EP068B: Organophosphorus Pesticides (OP)	Chlorpyrifos	68.6	%	REG	
ES1207884	WATER	2658311-002_ES1207884	EP068A: Organochlorine Pesticides (OC)	Aldrin	74.9	%	REG	
ES1207884	WATER	2658311-002_ES1207884	EP068B: Organophosphorus Pesticides (OP)	Monocrotophos	22.7	%	REG	
ES1208498	WATER	2674726-002_ES1208498	EP068C: Triazines	Simazine	66	%	REG	
ES1208498	WATER	2674726-002_ES1208498	EP068B: Organophosphorus Pesticides (OP)	Chlorpyrifos	73.7	%	REG	
ES1208498	WATER	2674726-002_ES1208498	EP068B: Organophosphorus Pesticides (OP)	Dimethoate	70.4	%	REG	
ES1208498	WATER	2674726-002_ES1208498	EP068B: Organophosphorus Pesticides (OP)	Monocrotophos	18.6	%	REG	
ES1208498	WATER	2674726-002_ES1208498	EP068A: Organochlorine Pesticides (OC)	Endrin aldehyde	65.8	%	REG	
ES1208498	WATER	2674726-002_ES1208498	EP068T: Organophosphorus Pesticide Surrogat	DEF	70.6	%	SUR	
ES1208498	WATER	2674726-002_ES1208498	EP068B: Organophosphorus Pesticides (OP)	Azinphos Methyl	68.5	%	REG	
ES1208498	WATER	2674726-002_ES1208498	EP068B: Organophosphorus Pesticides (OP)	Demeton-S-methyl	71	%	REG	
ES1208498	WATER	2674726-002_ES1208498	EP068S: Organochlorine Pesticide Surrogate	Dibromo-DDE	70.4	%	SUR	
ES1208498	WATER	2674726-007_ES1208498	EP080/071: Total Recoverable Hydrocarbons -	>C10 - C16 Fraction	72.6	%	REG	
ES1209788	WATER	2694180-002_ES1209788	EP068B: Organophosphorus Pesticides (OP)	Monocrotophos	21.5	%	REG	
ES1209788	WATER	2694180-002_ES1209788	EP068A: Organochlorine Pesticides (OC)	Endrin aldehyde	65.9	%	REG	
ES1209788	WATER	2694180-002_ES1209788	EP068T: Organophosphorus Pesticide Surrogat	DEF	70	%	SUR	
ES1209788	WATER	2694180-002_ES1209788	EP068S: Organochlorine Pesticide Surrogate	Dibromo-DDE	70.8	%	SUR	
ES1209788	WATER	2694180-007_ES1209788	EP080/071: Total Recoverable Hydrocarbons -	>C10 - C16 Fraction	74.8	%	REG	
ES1209788	WATER	2698038-002_ES1209788	EP080/071: Total Recoverable Hydrocarbons -	>C10 - C16 Fraction	74.3	%	REG	
ES1210003	WATER	2699927-002_ES1210003	EP080/071: Total Petroleum Hydrocarbons	C15 - C28 Fraction	126	%	REG	
ES1210003	WATER	2699927-002_ES1210003	EP080/071: Total Recoverable Hydrocarbons -	>C34 - C40 Fraction	70.7	%	REG	
ES1210003	WATER	2699927-007_ES1210003	EP068B: Organophosphorus Pesticides (OP)	Monocrotophos	24	%	REG	
ES1210003	WATER	2699927-007_ES1210003	EP068T: Organophosphorus Pesticide Surrogat	DEF	66.6	%	SUR	
ES1210003	WATER	2699927-007_ES1210003	EP068S: Organochlorine Pesticide Surrogate	Dibromo-DDE	66.7	%	SUR	
ES1210003	WATER	2699970-002_ES1210003	EP071 SG: Total Recoverable Hydrocarbons (N	>C10 - C16 Fraction	74.8	%	REG	
ES1210335	WATER	2711082-041_ES1210335	EG020F: Dissolved Metals by ICP-MS	Iron	71.6	%	REG	Recovery less than lower control limit
ES1210335	WATER	2711082-041_ES1210335	EG020F: Dissolved Metals by ICP-MS	Nickel	71.7	%	REG	Recovery less than lower control limit
ES1210335	WATER	2711082-041_ES1210335	EG020F: Dissolved Metals by ICP-MS	Arsenic	70.9	%	REG	Recovery less than lower control limit
ES1210335	WATER	2711082-041_ES1210335	EG020F: Dissolved Metals by ICP-MS	Chromium	70.3	%	REG	Recovery less than lower control limit
ES1210335	WATER	2711082-041_ES1210335	EG020F: Dissolved Metals by ICP-MS	Copper	72.9	%	REG	Recovery less than lower control limit
ES1210335	WATER	2711082-041_ES1210335	EG020F: Dissolved Metals by ICP-MS	Zinc	70.8	%	REG	Recovery less than lower control limit
ES1211859	WATER	2730349-007_ES1211859	EP080/071: Total Recoverable Hydrocarbons -	>C10 - C16 Fraction	72.1	%	REG	
ES1212991	WATER	2755252-002_ES1212991	EP080/071: Total Recoverable Hydrocarbons -	>C10 - C16 Fraction	68.6	%	REG	
ES1213374	WATER	2758589-002_ES1213374	EP068A: Organochlorine Pesticides (OC)	alpha-BHC	74.8	%	REG	
ES1213374	WATER	2758589-002_ES1213374	EP068A: Organochlorine Pesticides (OC)	gamma-BHC	74.5	%	REG	
ES1213374	WATER	2758589-002_ES1213374	EP068B: Organophosphorus Pesticides (OP)	Monocrotophos	33.8	%	REG	
ES1213374	WATER	2758589-002_ES1213374	EP068A: Organochlorine Pesticides (OC)	Endrin aldehyde	68.2	%	REG	
ES1213374	WATER	2758589-002_ES1213374	EP068S: Organochlorine Pesticide Surrogate	Dibromo-DDE	70	%	SUR	
ES1213749	WATER	2767499-031_ES1213749	EG020F: Dissolved Metals by ICP-MS	Iron	72.5	%	REG	
ES1216398	WATER	2825352-007_ES1216398	EP080/071: Total Recoverable Hydrocarbons -	>C10 - C16 Fraction	73.9	%	REG	
295220	WATER	LCS_L_295220_WATER	E013 Organochlorine Pesticides (OC)	4,4-DDT	70	%	REG	
SE88966	water	LCSSE88966	AN420 - SVOCs by GC/MS	Chlorpyrifos-ethyl	74	%	REG	
SE88966	water	LCSSE88966	AN400 - OC and OP Pesticides by GC-ECD	delta-BHC	126	%	REG	
SE88966	water	LCSSE88966	AN400 - OC and OP Pesticides by GC-ECD	p,p-DDT	70	%	REG	
SE88966	water	LCSSE88966	AN400 - OC and OP Pesticides by GC-ECD	Heptachlor	129	%	REG	
SE88966	water	LCSSE88966	AN410 - BTEX / C6-C9 by Purge & Trap GC-MS	Surrogate	74	%	SUR	
SE88966	water	LCSSE88966	AN410 - BTEX / C6-C9 by Purge & Trap GC-MS	TRH C6 - C9 P&T in µg/L	128	%	REG	
SE89006	Water	LCSSE89006	AN422 - PAHs by GC/MS	Anthracene	73	%	REG	
SE89006	Water	LCSSE89006	AN420 - SVOCs by GC/MS	Chlorpyrifos-ethyl	74	%	REG	
SE89006	Water	LCSSE89006	AN400 - OC and OP Pesticides by GC-ECD	delta-BHC	126	%	REG	
SE89006	Water	LCSSE89006	AN400 - OC and OP Pesticides by GC-ECD	p,p-DDT	70	%	REG	
SE89006	Water	LCSSE89006	AN400 - OC and OP Pesticides by GC-ECD	Heptachlor	129	%	REG	
SE89006	Water	LCSSE89006	AN410 - BTEX / C6-C9 by Purge & Trap GC-MS	Surrogate	74	%	SUR	
SE89006	Water	LCSSE89006	AN410 - BTEX / C6-C9 by Purge & Trap GC-MS	TRH C6 - C9 P&T in µg/L	128	%	REG	
SE106155-1	WATER	SE106155-1_LB015844-0000 VOCs in Water	m/p-xylene		127	%	REG	



SDG	Matrix_Type	SampleCode	Field_ID	Sampled_Date-Time	Volatility	ChemName	Result	Sampled_to Extraction_Days	Sampled_to Analysis_Days	Major Exceedance
ES1103282	WATER	ES1103282001	WM0233A	14/02/2011	VOC	Ethylbenzene	2 µg/L	8	8	N
ES1103282	WATER	ES1103282001	WM0233A	14/02/2011	VOC	Xylene (o)	2 µg/L	8	8	N
ES1103282	WATER	ES1103282001	WM0233A	14/02/2011	VOC	C6 - C9	20 µg/L	8	8	N
ES1103282	WATER	ES1103282001	WM0233A	14/02/2011	VOC	Xylene (m & p)	2 µg/L	8	8	N
ES1103282	WATER	ES1103282001	WM0233A	14/02/2011	VOC	Toluene	5 µg/L	8	8	N
ES1103282	WATER	ES1103282001	WM0233A	14/02/2011	VOC	Benzene	1 µg/L	8	8	N
ES1107676	WATER	ES1107676002	WM0093B	10/04/2011	VOC	Ethylbenzene	2 µg/L	9	9	N
ES1107676	WATER	ES1107676002	WM0093B	10/04/2011	VOC	C6-C36	20 µg/L	9	9	N
ES1107676	WATER	ES1107676002	WM0093B	10/04/2011	VOC	Toluene	5 µg/L	9	9	N
ES1107676	WATER	ES1107676002	WM0093B	10/04/2011	VOC	Xylene (m & p)	2 µg/L	9	9	N
ES1107676	WATER	ES1107676002	WM0093B	10/04/2011	VOC	C6 - C9	20 µg/L	9	9	N
ES1107676	WATER	ES1107676002	WM0093B	10/04/2011	VOC	Xylene (o)	2 µg/L	9	9	N
ES1107676	WATER	ES1107676002	WM0093B	10/04/2011	VOC	Xylene Total	2 µg/L	9	9	N
ES1107676	WATER	ES1107676002	WM0093B	10/04/2011	VOC	BTEX	1 µg/L	9	9	N
ES1107676	WATER	ES1107676002	WM0093B	10/04/2011	VOC	Benzene	1 µg/L	9	9	N
ES1107676	WATER	ES1107676003	WM0365	10/04/2011	VOC	C6-C36	250 µg/L	9	9	N
ES1107676	WATER	ES1107676003	WM0365	10/04/2011	VOC	C6 - C9	240 µg/L	9	9	N
ES1107676	WATER	ES1107676003	WM0365	10/04/2011	VOC	BTEX	1 µg/L	9	9	N
ES1107676	WATER	ES1107676003	WM0365	10/04/2011	VOC	Xylene (m & p)	2 µg/L	9	9	N
ES1107676	WATER	ES1107676003	WM0365	10/04/2011	VOC	Toluene	5 µg/L	9	9	N
ES1107676	WATER	ES1107676003	WM0365	10/04/2011	VOC	Xylene Total	2 µg/L	9	9	N
ES1107676	WATER	ES1107676003	WM0365	10/04/2011	VOC	Xylene (o)	2 µg/L	9	9	N
ES1107676	WATER	ES1107676003	WM0365	10/04/2011	VOC	Ethylbenzene	2 µg/L	9	9	N
ES1107676	WATER	ES1107676003	WM0365	10/04/2011	VOC	Benzene	1 µg/L	9	9	N
ES1108034	WATER	ES1108034001	WM0288A	14/04/2011	VOC	Xylene (o)	2 µg/L	11	11	N
ES1108034	WATER	ES1108034001	WM0288A	14/04/2011	VOC	Xylene (m & p)	2 µg/L	11	11	N
ES1108034	WATER	ES1108034001	WM0288A	14/04/2011	VOC	C6 - C9	190 µg/L	11	11	N
ES1108034	WATER	ES1108034001	WM0288A	14/04/2011	VOC	Xylene Total	2 µg/L	11	11	N
ES1108034	WATER	ES1108034001	WM0288A	14/04/2011	VOC	C6-C36	210 µg/L	11	11	N
ES1108034	WATER	ES1108034001	WM0288A	14/04/2011	VOC	Toluene	5 µg/L	11	11	N
ES1108034	WATER	ES1108034001	WM0288A	14/04/2011	VOC	Benzene	1 µg/L	11	11	N
ES1108034	WATER	ES1108034001	WM0288A	14/04/2011	VOC	Ethylbenzene	2 µg/L	11	11	N
ES1108034	WATER	ES1108034001	WM0288A	14/04/2011	VOC	BTEX	1 µg/L	11	11	N
ES1207884	WATER	ES1207884003	WM0427A	2/04/2012	VOC	BTEX	1 µg/L	9	9	N
ES1207884	WATER	ES1207884003	WM0427A	2/04/2012	VOC	Xylene (o)	2 µg/L	9	9	N
ES1207884	WATER	ES1207884003	WM0427A	2/04/2012	VOC	C6 - C9	20 µg/L	9	9	N
ES1207884	WATER	ES1207884003	WM0427A	2/04/2012	VOC	Xylene (m & p)	2 µg/L	9	9	N
ES1207884	WATER	ES1207884003	WM0427A	2/04/2012	VOC	Ethylbenzene	2 µg/L	9	9	N
ES1207884	WATER	ES1207884003	WM0427A	2/04/2012	VOC	Benzene	1 µg/L	9	9	N
ES1207884	WATER	ES1207884003	WM0427A	2/04/2012	VOC	Xylene Total	2 µg/L	9	9	N
ES1207884	WATER	ES1207884003	WM0427A	2/04/2012	VOC	Toluene	2 µg/L	9	9	N
ES1209788	WATER	ES1209788001	WM0428	22/04/2012	VOC	Benzene	6 µg/L	8	8	N
ES1209788	WATER	ES1209788001	WM0428	22/04/2012	VOC	Xylene (m & p)	2 µg/L	8	8	N
ES1209788	WATER	ES1209788001	WM0428	22/04/2012	VOC	C6 - C9	20 µg/L	8	8	N
ES1209788	WATER	ES1209788001	WM0428	22/04/2012	VOC	Xylene Total	2 µg/L	8	8	N
ES1209788	WATER	ES1209788001	WM0428	22/04/2012	VOC	Xylene (o)	2 µg/L	8	8	N
ES1209788	WATER	ES1209788001	WM0428	22/04/2012	VOC	Toluene	5 µg/L	8	8	N
ES1209788	WATER	ES1209788001	WM0428	22/04/2012	VOC	Ethylbenzene	2 µg/L	8	8	N
ES1209788	WATER	ES1209788001	WM0428	22/04/2012	VOC	BTEX	11 µg/L	8	8	N
ES1212991	WATER	ES1212991003	WM0427	23/05/2012	VOC	Toluene	5 µg/L	8	8	N
ES1212991	WATER	ES1212991003	WM0427	23/05/2012	VOC	Xylene Total	2 µg/L	8	8	N
ES1212991	WATER	ES1212991003	WM0427	23/05/2012	VOC	Xylene (m & p)	2 µg/L	8	8	N
ES1212991	WATER	ES1212991003	WM0427	23/05/2012	VOC	Benzene	1 µg/L	8	8	N
ES1212991	WATER	ES1212991003	WM0427	23/05/2012	VOC	Xylene (o)	2 µg/L	8	8	N
ES1212991	WATER	ES1212991003	WM0427	23/05/2012	VOC	Ethylbenzene	2 µg/L	8	8	N
ES1212991	WATER	ES1212991003	WM0427	23/05/2012	VOC	BTEX	5 µg/L	8	8	N
ES1212991	WATER	ES1212991003	WM0427	23/05/2012	VOC	C6 - C9	20 µg/L	8	8	N
ES1213374	WATER	ES1213374002	WM0361	27/05/2012	VOC	Ethylbenzene	2 µg/L	8	8	N
ES1213374	WATER	ES1213374002	WM0361	27/05/2012	VOC	Xylene (m & p)	2 µg/L	8	8	N
ES1213374	WATER	ES1213374002	WM0361	27/05/2012	VOC	C6 - C9	20 µg/L	8	8	N
ES1213374	WATER	ES1213374002	WM0361	27/05/2012	VOC	Toluene	2 µg/L	8	8	N
ES1213374	WATER	ES1213374002	WM0361	27/05/2012	VOC	BTEX	1 µg/L	8	8	N
ES1213374	WATER	ES1213374002	WM0361	27/05/2012	VOC	Xylene Total	2 µg/L	8	8	N
ES1213374	WATER	ES1213374002	WM0361	27/05/2012	VOC	Xylene (o)	2 µg/L	8	8	N
ES1213374	WATER	ES1213374002	WM0361	27/05/2012	VOC	Benzene	1 µg/L	8	8	N
ES1214076	WATER	ES1214076001	WM0561	5/06/2012	VOC	C6 - C9	20 µg/L	8	8	N
ES1214076	WATER	ES1214076001	WM0561	5/06/2012	VOC	Xylene (o)	2 µg/L	8	8	N
ES1214076	WATER	ES1214076001	WM0561	5/06/2012	VOC	Benzene	1 µg/L	8	8	N
ES1214076	WATER	ES1214076001	WM0561	5/06/2012	VOC	Xylene Total	2 µg/L	8	8	N
ES1214076	WATER	ES1214076001	WM0561	5/06/2012	VOC	Toluene	2 µg/L	8	8	N
ES1214076	WATER	ES1214076001	WM0561	5/06/2012	VOC	Ethylbenzene	2 µg/L	8	8	N
ES1214076	WATER	ES1214076001	WM0561	5/06/2012	VOC	Xylene (m & p)	2 µg/L	8	8	N
ES1214076	WATER	ES1214076001	WM0561	5/06/2012	VOC	BTEX	2 µg/L	8	8	N
295220	WATER	S11-Ma33719	QC4_30.3.10	30/03/2011	VOC	C6 - C9	0.02 MG/L	2	19	N
295220	WATER	S11-Ma33719	QC4_30.3.10	30/03/2011	VOC	BTEX	0.01 MG/L	2	19	N
295220	WATER	S11-Ma33719	QC4_30.3.10	30/03/2011	VOC	Ethylbenzene	0.001 MG/L	2	19	N
295220	WATER	S11-Ma33719	QC4_30.3.10	30/03/2011	VOC	Xylene (o)	0.001 MG/L	2	19	N
295220	WATER	S11-Ma33719	QC4_30.3.10	30/03/2011	VOC	Xylene Total	0.003 MG/L	2	19	N
295220	WATER	S11-Ma33719	QC4_30.3.10	30/03/2011	VOC	Xylene (m & p)	0.002 MG/L	2	19	N
295220	WATER	S11-Ma33719	QC4_30.3.10	30/03/2011	VOC	Benzene	0.001 MG/L	2	19	N
295220	WATER	S11-Ma33719	QC4_30.3.10	30/03/2011	VOC	Toluene	0.001 MG/L	2	19	N
ES1107676	WATER	ES1107676002	WM0093B	10/04/2011	SVOC	C6 - C10 Fraction	20 µg/L	9	9	N
ES1107676	WATER	ES1107676002	WM0093B	10/04/2011	SVOC	TPH C6 - C10 Fraction	20 µg/L	9	9	N
ES1107676	WATER	ES1107676002	WM0093B	10/04/2011	SVOC	C6-C10	20 µg/L	9	9	N
ES1107676	WATER	ES1107676002	WM0093B	10/04/2011	SVOC	Naphthalene	5 µg/L	9	9	N
ES1107676	WATER	ES1107676003	WM0365	10/04/2011	SVOC	TPH C6 - C10 Fraction	250 µg/L	9	9	N
ES1107676	WATER	ES1107676003	WM0365	10/04/2011	SVOC	C6-C10	250 µg/L	9	9	N
ES1107676	WATER	ES1107676003	WM0365	10/04/2011	SVOC	C6 - C10 Fraction	250 µg/L	9	9	N
ES1107676	WATER	ES1107676003	WM0365	10/04/2011	SVOC	Naphthalene	5 µg/L	9	9	N
ES1108034	WATER	ES1108034001	WM0288A	14/04/2011	SVOC	C6 - C10 Fraction	210 µg/L	11	11	N
ES1108034	WATER	ES1108034001	WM0288A	14/04/2011	SVOC	TPH C6 - C10 Fraction	210 µg/L	11	11	N
ES1108034	WATER	ES1108034001	WM0288A	14/04/2011	SVOC	C6-C10	210 µg/L	11	11	N
ES1108034	WATER	ES1108034001	WM0288A	14/04/2011	SVOC	Naphthalene	5 µg/L	11	11	N
ES1207884	WATER	ES1207884003	WM0427A	2/04/2012	SVOC	C6-C10	20 µg/L	9	9	N
ES1207884	WATER	ES1207884003	WM0427A	2/04/2012	SVOC	C6 - C10 Fraction	20 µg/L	9	9	N
ES1207884	WATER	ES1207884003	WM0427A	2/04/2012	SVOC	Naphthalene	5 µg/L	9	9	N
ES1209788	WATER	ES1209788001	WM0428	22/04/2012	SVOC	C6 - C10 Fraction	20 µg/L	8	8	N
ES1209788	WATER	ES1209788001	WM0428	22/04/2012	SVOC	C6-C10	20 µg/L	8	8	N
ES1209788	WATER	ES1209788001	WM0428	22/04/2012	SVOC	Naphthalene	5 µg/L	8	8	N
ES1212991	WATER	ES1212991003	WM0427	23/05/2012	SVOC	C6-C10	20 µg/L	8	8	N
ES1212991	WATER	ES1212991003	WM0427	23/05/2012	SVOC	C6 - C10 Fraction	20 µg/L	8	8	N
ES1212991	WATER	ES1212991003	WM0427	23/05/2012	SVOC	Naphthalene	5 µg/L	8	8	N
ES1213374	WATER	ES1213374002	WM0361	27/05/2012	SVOC	C6-C10	20 µg/L	8	8	N
ES1213374	WATER	ES1213374002	WM0361	27/05/2012	SVOC	C6 - C10 Fraction	20 µg/L	8	8	N
ES1213374	WATER	ES1213374002	WM0361	27/05/2012	SVOC	Naphthalene	5 µg/L	8	8	N
ES1214076	WATER	ES1214076001	WM0561	5/06/2012	SVOC	C6 - C10 Fraction	20 µg/L	8	8	N
ES1214076	WATER	ES1214076001	WM0561	5/06/2012	SVOC	C6-C10	20 µg/L	8	8	N
ES1214076	WATER	ES1214076001	WM0561	5/06/2012	SVOC	Naphthalene	5 µg/L	8	8	N
295220	WATER	S11-Ma33719	QC4_30.3.10	30/03/2011	SVOC	C15 - C28	0.1 MG/L	2	19	N
295220	WATER	S11-Ma33719	QC4_30.3.10	30/03/2011	SVOC	C29-C36	0.1 MG/L	2	19	N
295220	WATER	S11-Ma33719	QC4_30.3.10	30/03/2011	SVOC	Phthalate	0.002 MG/L	2	19	N
295220	WATER	S11-Ma33719	QC4_30.3.10	30/03/2011	SVOC	Dieldrin	0.002 MG/L	2	19	N
295220	WATER	S11-Ma33719								



295220	WATER	S11-Ma33719	QC4 30.3.10	30/03/2011	SVOC	Chlorpyrifos	0.002 MG/L	2	19	N
295220	WATER	S11-Ma33719	QC4 30.3.10	30/03/2011	SVOC	Endosulfan sulphate	0.0005 MG/L	2	19	N
295220	WATER	S11-Ma33719	QC4 30.3.10	30/03/2011	SVOC	Prothiofos	0.002 MG/L	2	19	N
295220	WATER	S11-Ma33719	QC4 30.3.10	30/03/2011	SVOC	Heptachlor	0.0005 MG/L	2	19	N
295220	WATER	S11-Ma33719	QC4 30.3.10	30/03/2011	SVOC	DDT	0.0005 MG/L	2	19	N
295220	WATER	S11-Ma33719	QC4 30.3.10	30/03/2011	SVOC	Mevinphos (Phos)	0.002 MG/L	2	19	N
295220	WATER	S11-Ma33719	QC4 30.3.10	30/03/2011	SVOC	Methoxychlor	0.002 MG/L	2	19	N
295220	WATER	S11-Ma33719	QC4 30.3.10	30/03/2011	SVOC	Azinophos methyl	0.002 MG/L	2	19	N
295220	WATER	S11-Ma33719	QC4 30.3.10	30/03/2011	SVOC	Dichlorvos	0.002 MG/L	2	19	N
295220	WATER	S11-Ma33719	QC4 30.3.10	30/03/2011	SVOC	C10 - C14	0.05 MG/L	2	19	N
295220	WATER	S11-Ma33719	QC4 30.3.10	30/03/2011	SVOC	+C10 - C36 (Sum)	0.1 MG/L	2	19	N
295220	WATER	S11-Ma33719	QC4 30.3.10	30/03/2011	SVOC	Fenthion	0.002 MG/L	2	19	N
295220	WATER	S11-Ma33719	QC4 30.3.10	30/03/2011	SVOC	Parathion	0.002 MG/L	2	19	N
295220	WATER	S11-Ma33719	QC4 30.3.10	30/03/2011	SVOC	Endrin ketone	0.0005 MG/L	2	19	N
295220	WATER	S11-Ma33719	QC4 30.3.10	30/03/2011	SVOC	Endosulfan I	0.0005 MG/L	2	19	N
295220	WATER	S11-Ma33719	QC4 30.3.10	30/03/2011	SVOC	g-BHC (Lindane)	0.0005 MG/L	2	19	N
295220	WATER	S11-Ma33719	QC4 30.3.10	30/03/2011	SVOC	Demeton (total)	0.004 MG/L	2	19	N
295220	WATER	S11-Ma33719	QC4 30.3.10	30/03/2011	SVOC	Stirophos	0.002 MG/L	2	19	N
295220	WATER	S11-Ma33719	QC4 30.3.10	30/03/2011	SVOC	4,4-DDE	0.0005 MG/L	2	19	N
295220	WATER	S11-Ma33719	QC4 30.3.10	30/03/2011	SVOC	Endrin aldehyde	0.0005 MG/L	2	19	N
295220	WATER	S11-Ma33719	QC4 30.3.10	30/03/2011	SVOC	Endrin	0.0005 MG/L	2	19	N
295220	WATER	S11-Ma33719	QC4 30.3.10	30/03/2011	SVOC	Monocrotophos	0.02 MG/L	2	19	N
295220	WATER	S11-Ma33719	QC4 30.3.10	30/03/2011	SVOC	Dieldrin	0.0005 MG/L	2	19	N
295220	WATER	S11-Ma33719	QC4 30.3.10	30/03/2011	SVOC	Coumaphos	0.002 MG/L	2	19	N
295220	WATER	S11-Ma33719	QC4 30.3.10	30/03/2011	SVOC	Dimethoate	0.002 MG/L	2	19	N
ES1000549	WATER	ES1000549001	WM0055A	9/01/2010	Low Stability	Chloride	883 mg/L	11	9	N
ES1000549	WATER	ES1000549001	WM0055A	9/01/2010	Low Stability	Sulphate	36 mg/L	11	9	N
ES1000549	WATER	ES1000549001	WM0055A	9/01/2010	Low Stability	Fluoride	0.02 mg/L	11	9	N
ES1000549	WATER	ES1000549002	WM0055	9/01/2010	Low Stability	Chloride	831 mg/L	11	9	N
ES1000549	WATER	ES1000549002	WM0055	9/01/2010	Low Stability	Sulphate	116 mg/L	11	9	N
ES1000549	WATER	ES1000549002	WM0055	9/01/2010	Low Stability	Fluoride	0.46 mg/L	11	9	N
ES1000549	WATER	ES1000549003	WM0042A	10/01/2010	Low Stability	Chloride	349 mg/L	10	9	N
ES1000549	WATER	ES1000549003	WM0042A	10/01/2010	Low Stability	Sulphate	325 mg/L	10	9	N
ES1000549	WATER	ES1000549003	WM0042A	10/01/2010	Low Stability	Fluoride	0.16 mg/L	10	9	N
ES1000549	WATER	ES1000549004	WM0157	9/01/2010	Low Stability	Sulphate	226 mg/L	11	9	N
ES1000549	WATER	ES1000549004	WM0157	9/01/2010	Low Stability	Chloride	472 mg/L	11	9	N
ES1000549	WATER	ES1000549004	WM0157	9/01/2010	Low Stability	Fluoride	0.51 mg/L	11	9	N
ES1000549	WATER	ES1000549006	WM0059	8/01/2010	Low Stability	Sulphate	1180 mg/L	12	9	N
ES1000549	WATER	ES1000549006	WM0059	8/01/2010	Low Stability	Chloride	523 mg/L	12	9	N
ES1000549	WATER	ES1000549006	WM0059	8/01/2010	Low Stability	Fluoride	0.08 mg/L	12	9	N
ES1000549	WATER	ES1000549007	WM0062	7/01/2010	Low Stability	Chloride	189 mg/L	13	9	N
ES1000549	WATER	ES1000549007	WM0062	7/01/2010	Low Stability	Sulphate	377 mg/L	13	9	N
ES1000549	WATER	ES1000549007	WM0062	7/01/2010	Low Stability	Fluoride	0.55 mg/L	13	9	N
ES1000549	WATER	ES1000549008	WM0045	10/01/2010	Low Stability	Chloride	944 mg/L	10	9	N
ES1000549	WATER	ES1000549008	WM0045	10/01/2010	Low Stability	Sulphate	386 mg/L	10	9	N
ES1000549	WATER	ES1000549008	WM0045	10/01/2010	Low Stability	Fluoride	0.12 mg/L	10	9	N
ES1000549	WATER	ES1000549009	WM0105	11/01/2010	Low Stability	Chloride	8740 mg/L	9	9	N
ES1000549	WATER	ES1000549009	WM0105	11/01/2010	Low Stability	Sulphate	1910 mg/L	9	9	N
ES1000549	WATER	ES1000549009	WM0105	11/01/2010	Low Stability	Fluoride	1.22 mg/L	9	9	N
ES1000551	WATER	ES1000551001	SURFACE WATER	11/01/2010	Low Stability	Sulphate	1.98 mg/L	9	9	N
ES1000551	WATER	ES1000551002	SURFACE WATER	11/01/2010	Low Stability	Sulphate	17.1 mg/L	9	9	N
ES1000551	WATER	ES1000551003	SURFACE WATER	11/01/2010	Low Stability	Sulphate	7.47 mg/L	9	9	N
ES1000551	WATER	ES1000551004	SURFACE WATER	11/01/2010	Low Stability	Sulphate	2.08 mg/L	9	9	N
ES1000551	WATER	ES1000551005	SURFACE WATER	12/01/2010	Low Stability	Sulphate	0.5 mg/L	8	9	N
ES1000551	WATER	ES1000551006	SURFACE WATER	11/01/2010	Low Stability	Sulphate	8.82 mg/L	9	9	N
ES1000551	WATER	ES1000551007	TAP WATER	12/01/2010	Low Stability	Sulphate	125 mg/L	8	9	N
ES1000551	WATER	ES1000551008	TAP WATER	12/01/2010	Low Stability	Sulphate	39.6 mg/L	8	9	N
ES1000829	WATER	ES1000829001	GW065708	14/01/2010	Low Stability	Sulphate	124 mg/L	8	9	N
ES1000829	WATER	ES1000829001	GW065708	14/01/2010	Low Stability	Chloride	582 mg/L	8	9	N
ES1000829	WATER	ES1000829001	GW065708	14/01/2010	Low Stability	Fluoride	0.3 mg/L	11	9	N
ES1000829	WATER	ES1000829002	GW054938	14/01/2010	Low Stability	Sulphate	86 mg/L	8	9	N
ES1000829	WATER	ES1000829002	GW054938	14/01/2010	Low Stability	Chloride	422 mg/L	8	9	N
ES1000829	WATER	ES1000829002	GW054938	14/01/2010	Low Stability	Fluoride	0.1 mg/L	11	9	N
ES1000829	WATER	ES1000829003	WM0035A	15/01/2010	Low Stability	Fluoride	0.3 mg/L	10	9	N
ES1000829	WATER	ES1000829004	WM0067A	16/01/2010	Low Stability	Fluoride	0.3 mg/L	9	9	N
ES1000829	WATER	ES1000829005	WM0021	17/01/2010	Low Stability	Fluoride	0.2 mg/L	8	9	N
ES1001404	WATER	ES1001404001	WM0256A	23/01/2010	Low Stability	Sulphate	120 mg/L	11	9	N
ES1001404	WATER	ES1001404001	WM0256A	23/01/2010	Low Stability	Fluoride	0.4 mg/L	10	9	N
ES1002789	WATER	ES1002789001	WM0142A	12/02/2010	Low Stability	Sulphate	345 mg/L	8	9	N
ES1002789	WATER	ES1002789001	WM0142A	12/02/2010	Low Stability	Chloride	1050 mg/L	8	9	N
ES1002789	WATER	ES1002789001	WM0142A	12/02/2010	Low Stability	Fluoride	0.4 mg/L	8	9	N
ES1013519	WATER	ES1013519001	WM0256A	6/07/2010	Low Stability	Sulphate	286 mg/L	9	9	N
ES1013519	WATER	ES1013519001	WM0256A	6/07/2010	Low Stability	Chloride	851 mg/L	9	9	N
ES1013519	WATER	ES1013519001	WM0256A	6/07/2010	Low Stability	Fluoride	0.42 mg/L	9	9	N
ES1013519	WATER	ES1013519002	WM0012	6/07/2010	Low Stability	Sulphate	383 mg/L	9	9	N
ES1013519	WATER	ES1013519002	WM0012	6/07/2010	Low Stability	Chloride	2390 mg/L	9	9	N
ES1013519	WATER	ES1013519002	WM0012	6/07/2010	Low Stability	Fluoride	0.02 mg/L	9	9	N
ES1013519	WATER	ES1013519003	WM0021	6/07/2010	Low Stability	Sulphate	999 mg/L	9	9	N
ES1013519	WATER	ES1013519003	WM0021	6/07/2010	Low Stability	Chloride	5330 mg/L	9	9	N
ES1013519	WATER	ES1013519003	WM0021	6/07/2010	Low Stability	Fluoride	0.2 mg/L	9	9	N
ES1013519	WATER	ES1013519004	WM0157	7/07/2010	Low Stability	Sulphate	304 mg/L	8	9	N
ES1013519	WATER	ES1013519004	WM0157	7/07/2010	Low Stability	Chloride	496 mg/L	8	9	N
ES1013519	WATER	ES1013519004	WM0157	7/07/2010	Low Stability	Fluoride	0.46 mg/L	8	9	N
ES1013519	WATER	ES1013519005	WM0009R	7/07/2010	Low Stability	Sulphate	3300 mg/L	8	9	N
ES1013519	WATER	ES1013519005	WM0009R	7/07/2010	Low Stability	Chloride	10700 mg/L	8	9	N
ES1013519	WATER	ES1013519005	WM0009R	7/07/2010	Low Stability	Fluoride	0.02 mg/L	8	9	N
ES1013519	WATER	ES1013519006	WM0002	7/07/2010	Low Stability	Sulphate	687 mg/L	8	9	N
ES1013519	WATER	ES1013519006	WM0002	7/07/2010	Low Stability	Chloride	5070 mg/L	8	9	N
ES1013519	WATER	ES1013519006	WM0002	7/07/2010	Low Stability	Fluoride	0.02 mg/L	8	9	N
ES1013741	WATER	ES1013741001	WM0116	11/07/2010	Low Stability	Chloride	7380 mg/L	9	9	N
ES1013741	WATER	ES1013741001	WM0116	11/07/2010	Low Stability	Sulphate	3600 mg/L	9	9	N
ES1013741	WATER	ES1013741001	WM0116	11/07/2010	Low Stability	Fluoride	0.02 mg/L	9	9	N
ES1013741	WATER	ES1013741002	WM0222A	11/07/2010	Low Stability	Chloride	260 mg/L	9	9	N
ES1013741	WATER	ES1013741002	WM0222A	11/07/2010	Low Stability	Sulphate	89 mg/L	9	9	N
ES1013741	WATER	ES1013741002	WM0222A	11/07/2010	Low Stability	Fluoride	0.02 mg/L	9	9	N
ES1013741	WATER	ES1013741003	WM0042A	11/07/2010	Low Stability	Chloride	338 mg/L	9	9	N
ES1013741	WATER	ES1013741003	WM0042A	11/07/2010	Low Stability	Sulphate	588 mg/L	9	9	N
ES1013741	WATER	ES1013741003	WM0042A	11/07/2010	Low Stability	Fluoride	0.02 mg/L	9	9	N
ES1013741	WATER	ES1013741004	WM0059	11/07/2010	Low Stability	Chloride	562 mg/L	9	9	N
ES1013741	WATER	ES1013741004	WM0059	11/07/2010	Low Stability	Sulphate	1490 mg/L	9	9	N
ES1013741	WATER	ES1013741004	WM0059	11/07/2010	Low Stability	Fluoride	0.02 mg/L	9	9	N
ES1013741	WATER	ES1013741005	WM0269	11/07/2010	Low Stability	Chloride	908 mg/L	9	9	N
ES1013741	WATER	ES1013741005	WM0269	11/07/2010	Low Stability	Sulphate	2760 mg/L	9	9	N
ES1013741	WATER	ES1013741005	WM0269	11/07/2010	Low Stability	Fluoride	0.02 mg/L	9	9	N
ES1013741	WATER	ES1013741006	WM0045	11/07/2010	Low Stability	Chloride	990 mg/L	9	9	N
ES1013741	WATER	ES1013741006	WM0045	11/07/2010	Low Stability	Sulphate	354 mg/L	9	9	N
ES1013741	WATER	ES1013741006	WM0045	11/07/2010	Low Stability	Fluoride	0.02 mg/L	9	9	N
ES1013741	WATER	ES1013741007	WM0067A	11/07/2010	Low Stability	Sulphate	669 mg/L	9	9	N
ES1013741	WATER	ES1013741007	WM0067A	11/07/2010	Low Stability	Chloride	3750 mg/L	9	9	N
ES1013741	WATER	ES1013741007	WM0067A	11/07/2010	Low Stability	Fluoride	0.02 mg/L	9	9	N
ES1013741	WATER	ES1013741008	WM0035A	11/07/2010	Low Stability	Sulphate	761 mg/L	9	9	N
ES1013741	WATER	ES1013741008	WM0035A	11/07/2010	Low Stability	Chloride	1200 mg/L	9	9	N
ES1013741	WATER	ES1013741008	WM0035A	11/07/2010	Low Stability					

ES1102436	WATER	ES1102436002	WM0012A	3/02/2011	Low Stability	Fluoride	0.4 mg/L		8	N
ES1102436	WATER	ES1102436003	WM0011	3/02/2011	Low Stability	Fluoride	0.1 mg/L		8	N
ES1102436	WATER	ES1102436004	WM0055A	3/02/2011	Low Stability	Fluoride	0.4 mg/L		8	N
ES1102773	WATER	ES1102773001	WM0105	8/02/2011	Low Stability	Fluoride	0.3 mg/L		8	N
ES1102773	WATER	ES1102773002	DUO2	8/02/2011	Low Stability	Fluoride	0.3 mg/L		8	N
ES1102977	WATER	ES1102977001	WM0421	9/02/2011	Low Stability	Fluoride	0.2 mg/L		8	N
ES1103167	WATER	ES1103167001	WM0398	13/02/2011	Low Stability	Fluoride	0.1 mg/L		8	N
ES1103167	WATER	ES1103167002	RINSATE 1	13/02/2011	Low Stability	Fluoride	0.1 mg/L		8	N
ES1103282	WATER	ES1103282001	WM0233A	14/02/2011	Low Stability	Fluoride	0.3 mg/L		8	N
ES1107676	WATER	ES1107676001	WM0095L	7/04/2011	Low Stability	Fluoride	0.3 mg/L		10	N
ES1108433	WATER	ES1108433001	WM0062	19/04/2011	Low Stability	Fluoride	0.5 mg/L		8	N
ES1108433	WATER	ES1108433002	WM0059	19/04/2011	Low Stability	Fluoride	0.2 mg/L		8	N
ES1108613	WATER	ES1108613001	WM0045	20/04/2011	Low Stability	Fluoride	0.3 mg/L		8	N
295645	WATER	S11-Ap30232	QC5 4.4.11	4/04/2011	Low Stability	Sulphate as S	180 MG/L	2	9	N
295645	WATER	S11-Ap30232	QC5 4.4.11	4/04/2011	Low Stability	Chloride	1400 MG/L	2	9	N
295645	WATER	S11-Ap30232	QC5 4.4.11	4/04/2011	Low Stability	Fluoride	0.7 MG/L	2	9	N
295220	WATER	S11-Ma33719	QC4 30.3.10	30/03/2011	Low Stability	Sulphate as S	96 MG/L	2	19	Y
295220	WATER	S11-Ma33719	QC4 30.3.10	30/03/2011	Low Stability	Chloride	1100 MG/L	2	19	Y
295220	WATER	S11-Ma33719	QC4 30.3.10	30/03/2011	Low Stability	Fluoride	0.8 MG/L	2	19	Y
SE103366-1	WATER	SE103366-1 QC2	QC2 14.11.11	14/11/2011	Low Stability	Sulphate	1600 mg/L	7	10	N
SE103366-1	WATER	SE103366-1 QC2	QC2 14.11.11	14/11/2011	Low Stability	Chloride	7500 mg/L	7	10	N
SE103366-1	WATER	SE103366-1 QC2	QC2 14.11.11	14/11/2011	Low Stability	Fluoride	0.4 mg/L	7	10	N
SE103366-1	WATER	SE103366-1 QC2	QC2 14.11.11	14/11/2011	Low Stability	Bromide	50 mg/L	7	10	N
SE106155-1	WATER	SE106155-1 QC2-6	QC2-6.3.12	6/03/2012	Low Stability	Sulphate	140 mg/L	3	8	N
SE106155-1	WATER	SE106155-1 QC2-6	QC2-6.3.12	6/03/2012	Low Stability	Chloride	290 mg/L	3	8	N
SE106155-1	WATER	SE106155-1 QC2-6	QC2-6.3.12	6/03/2012	Low Stability	Bromide	0.83 mg/L	3	8	N
SE106155-1	WATER	SE106155-1 QC2-6	QC2-6.3.12	6/03/2012	Low Stability	Fluoride	0.38 mg/L	3	8	N
SE106155-1	WATER	SE106155-1 QC3-6	QC3-6.3.12	6/03/2012	Low Stability	Sulphate	150 mg/L	3	8	N
SE106155-1	WATER	SE106155-1 QC3-6	QC3-6.3.12	6/03/2012	Low Stability	Chloride	65 mg/L	3	8	N
SE106155-1	WATER	SE106155-1 QC3-6	QC3-6.3.12	6/03/2012	Low Stability	Fluoride	0.49 mg/L	3	8	N
SE106155-1	WATER	SE106155-1 QC3-6	QC3-6.3.12	6/03/2012	Low Stability	Bromide	0.36 mg/L	3	8	N
SE106573-1	WATER	SE106573-1 QC8	QC8 20.3.12	20/03/2012	Low Stability	Chloride	13000 mg/L	3	8	N
SE106573-1	WATER	SE106573-1 QC8	QC8 20.3.12	20/03/2012	Low Stability	Sulphate	3100 mg/L	3	8	N
SE106573-1	WATER	SE106573-1 QC8	QC8 20.3.12	20/03/2012	Low Stability	Fluoride	1 mg/L	3	8	N
SE106573-1	WATER	SE106573-1 QC8	QC8 20.3.12	20/03/2012	Low Stability	Bromide	580 mg/L	3	8	N
SE107811-1	WATER	SE107811-1 QC2	QC2 30.4.12	30/04/2012	Low Stability	Chloride	6000 mg/L	4	8	N
SE107811-1	WATER	SE107811-1 QC2	QC2 30.4.12	30/04/2012	Low Stability	Sulphate	1100 mg/L	4	8	N
SE107811-1	WATER	SE107811-1 QC2	QC2 30.4.12	30/04/2012	Low Stability	Fluoride	0.31 mg/L	4	8	N
SE107811-1	WATER	SE107811-1 QC2	QC2 30.4.12	30/04/2012	Low Stability	Bromide	29 mg/L	4	8	N
SE108106-1	WATER	SE108106-1 QC4	QC4 8.5.12	8/05/2012	Low Stability	Chloride	11000 mg/L	3	9	N
SE108106-1	WATER	SE108106-1 QC4	QC4 8.5.12	8/05/2012	Low Stability	Sulphate	3000 mg/L	3	9	N
SE108106-1	WATER	SE108106-1 QC4	QC4 8.5.12	8/05/2012	Low Stability	Fluoride	2 mg/L	3	9	N
SE108106-1	WATER	SE108106-1 QC4	QC4 8.5.12	8/05/2012	Low Stability	Bromide	54 mg/L	3	9	N
SE79835	water	SE79835-1	TRIPLICATE	11/07/2010	Low Stability	Chloride	1000 mg/L	5	8	N
SE79835	water	SE79835-1	TRIPLICATE	11/07/2010	Low Stability	Sulphate	2900 mg/L	5	8	N
SE79835	water	SE79835-1	TRIPLICATE	11/07/2010	Low Stability	Fluoride	0.42 mg/L	5	8	N
SE79907	water	SE79907-1	TRIPLICATE	13/07/2010	Low Stability	Sulphate	320 mg/L	3	9	N
SE79907	water	SE79907-1	TRIPLICATE	13/07/2010	Low Stability	Chloride	1100 mg/L	3	9	N
SE79907	water	SE79907-1	TRIPLICATE	13/07/2010	Low Stability	Fluoride	0.56 mg/L	3	9	N
SE89442	water	SE89442-1	QC8 10.8.11	10/08/2011	Low Stability	Sulphate	44 mg/L	8	8	N
SE89442	water	SE89442-1	QC8 10.8.11	10/08/2011	Low Stability	Chloride	220 mg/L	8	8	N
SE89442	water	SE89442-1	QC8 10.8.11	10/08/2011	Low Stability	Fluoride	0.099 mg/L	8	8	N

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			ES1117474				ES120781				ES125074				ES125074				ES125920				ES125920				ES127393				ES127393				ES1205329				ES1205329
			QC9_10.8.11	RPD	WM0427A	QC01_22.9.11	RPD	WM0364	QC1	WM0364	QC1	RPD	WM0602	DUP01	RPD	WM0602	DUP01	RPD	WM0602	DUP01	RPD	WM0602	DUP01	RPD	WM0602	DUP01	RPD	WM0602	DUP01	RPD	WM0602	DUP01	RPD	WM0602	DUP01	RPD			
			10/08/2011		22/09/2011		22/09/2011		15/11/2011		15/11/2011		23/11/2011		23/11/2011		11/12/2011		11/12/2011		11/12/2011		11/12/2011		11/12/2011		11/12/2011		11/12/2011		6/03/2012		6/03/2012						
Filter	ChemName	Units																																					
Alkalinity by PC Titrator	Alkalinity (hydroxide) as CaCO3	mg/l	<1.0	0	<1.0	<1.0	0	<1.0	<1.0	0	<1.0	<1.0	0	<1.0	<1.0	0	<1.0	<1.0	0	<1.0	<1.0	0	<1.0	<1.0	0	<1.0	<1.0	0	<1.0	<1.0	0	<1.0	<1.0	0					
Alkalinity by PC Titrator	Alkalinity (total) as CaCO3	mg/l	451	2	447	448	0	717	717	0	436	444	2	236	236	0	227	224	1																				
Alkalinity by PC Titrator	Bicarbonate Alkalinity as CaCO3	mg/l	451	2	447	448	0	717	717	0	353	302	16	235	236	0	227	224	1																				
Alkalinity by PC Titrator	Alkalinity (Carbonate as CaCO3)	mg/l																																					
Alkalinity by PC Titrator	Carbonate Alkalinity as CaCO3	mg/l	<1.0	0	<1.0	<1.0	0	<1.0	<1.0	0	83	142	52			<1.0	<1.0	0	<1.0	<1.0	0	<1.0	<1.0	0	<1.0	<1.0	0	<1.0	<1.0	0	<1.0	<1.0	0						
Alkalinity by PC Titrator	Alkalinity (Bicarbonate)	mg/l																																					
Alkalinity by PC Titrator	Alkalinity (Carbonate)	mg/l																																					
Alkalinity by PC Titrator	Bicarbonate as CaCO3	mg/l																																					
Alkalinity by PC Titrator	Carbonate as CaCO3	mg/l																																					
Chloride by Discrete Analyser	Chloride	mg/l	238	1	246	244	1	7620	7590	0	48	39	21	62	61	2	349	341	2																				
Dissolved Metals by ICP-MS - Suite A	Aluminium (Filtered)	mg/l																																					
Dissolved Metals by ICP-MS - Suite A	Antimony (Filtered)	mg/l																																					
Dissolved Metals by ICP-MS - Suite A	Arsenic (Filtered)	mg/l	<0.001	0	0.001	<0.001	0	<0.001	<0.001	0	0.004	0.002	67	0.002	0.002	0	<0.001	<0.001	0	<0.001	<0.001	0	<0.001	<0.001	0	<0.001	<0.001	0	<0.001	<0.001	0	<0.001	<0.001	0					
Dissolved Metals by ICP-MS - Suite A	Barium (Filtered)	mg/l																																					
Dissolved Metals by ICP-MS - Suite A	Beryllium (Filtered)	mg/l																																					
Dissolved Metals by ICP-MS - Suite A	Boron (Filtered)	mg/l																																					
Dissolved Metals by ICP-MS - Suite A	Cadmium (Filtered)	mg/l	<0.0001	0	<0.0001	<0.0001	0	<0.0001	<0.0001	0	<0.0001	<0.0001	0	<0.0001	<0.0001	0	<0.0001	<0.0001	0	<0.0001	<0.0001	0	<0.0001	<0.0001	0	<0.0001	<0.0001	0	<0.0001	<0.0001	0	<0.0001	<0.0001	0					
Dissolved Metals by ICP-MS - Suite A	Chromium (III-VI) (Filtered)	mg/l	<0.001	0	<0.001	<0.001	0	0.006	0.006	0	<0.001	<0.001	0	<0.001	<0.001	0	<0.001	<0.001	0	<0.001	<0.001	0	<0.001	<0.001	0	<0.001	<0.001	0	<0.001	<0.001	0	<0.001	<0.001	0					
Dissolved Metals by ICP-MS - Suite A	Cobalt (Filtered)	mg/l																																					
Dissolved Metals by ICP-MS - Suite A	Copper (Filtered)	mg/l	<0.001	67	0.001	0.001	0	0.008	0.008	0	<0.001	<0.001	0	0.003	0.003	0	0.003	0.003	0	0.003	0.002	40																	
Dissolved Metals by ICP-MS - Suite A	Iron (Filtered)	mg/l	<0.001	0	<0.05	<0.05	0	<0.5	<0.5	0	0.14	0.09	43	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0					
Dissolved Metals by ICP-MS - Suite A	Lead (Filtered)	mg/l	<0.001	0	<0.001	<0.001	0	<0.001	<0.001	0	<0.001	<0.001	0	<0.001	<0.001	0	<0.001	<0.001	0	<0.001	<0.001	0	<0.001	<0.001	0	<0.001	<0.001	0	<0.001	<0.001	0	<0.001	<0.001	0					
Dissolved Metals by ICP-MS - Suite A	Manganese (Filtered)	mg/l																																					
Dissolved Metals by ICP-MS - Suite A	Molybdenum (Filtered)	mg/l																																					
Dissolved Metals by ICP-MS - Suite A	Nickel (Filtered)	mg/l	<0.001	0	<0.001	<0.001	0	0.011	0.01	10	0.001	0.001	0	0.001	0.001	0	0.001	0.001	0	0.005	0.005	0																	
Dissolved Metals by ICP-MS - Suite A	Selenium (Filtered)	mg/l																																					
Dissolved Metals by ICP-MS - Suite A	Thallium (Filtered)	mg/l																																					
Dissolved Metals by ICP-MS - Suite A	Tin (Filtered)	mg/l																																					
Dissolved Metals by ICP-MS - Suite A	Vanadium (Filtered)	mg/l																																					
Dissolved Metals by ICP-MS - Suite A	Zinc (Filtered)	mg/l	<0.005	0	0.005	<0.005	0	0.045	0.047	4	0.007	0.006	15	0.023	<0.005	129	0.025	0.031	21																				
Dissolved Metals by ICP-MS - Suite B	Mercury (Filtered)	mg/l																																					
Dissolved Metals by ICP-MS - Suite B	Silver (Filtered)	mg/l																																					
Dissolved Metals by ICP-MS - Suite B	Strontium (Filtered)	mg/l																																					
Dissolved Metals by ICP-MS - Suite B	Thorium (Filtered)	ug/l																																					
Dissolved Metals by ICP-MS - Suite B	Titanium (Filtered)	mg/l																																					
Dissolved Metals by ICP-MS - Suite B	Uranium (Filtered)	mg/l																																					
Fluoride by PC Titrator	Fluoride	mg/l	0.1	0	0.1	0.1	0	0.2	0.2	0	0.6	0.4	40	0.2	0.2	0	0.6	0.5	18																				
Ionic Balance by PCT DA and ICPAES	Anions Total	meq/L	16.4	1	16.6	16.6	0	257	262	2	12.2	11.1	9																										
Ionic Balance by PCT DA and ICPAES	Cations Total	meq/L	16.8	17	17.8	18	1	275	265	4	13.1	11.7	11																										
Ionic Balance by PCT DA and ICPAES	Ionic Balance	%	0.9	113	3.39	4.2	21	3.42	0.46	153	3.47	2.7	25																										
Ionic Balance by PCT DA and Turbi S04 DA	Anions Total	meq/L																																					
Ionic Balance by PCT DA and Turbi S04 DA	Cations Total	meq/L																																					
Ionic Balance by PCT DA and Turbi S04 DA	Ionic Balance	%																																					
Ionic Balance by PCT DA and Turbi S04 DA	Major Cations - Filtered	mg/l	32	0	29	31	7	374	255	38	1	<1.0	0	13	14	7	140	136	3																				
Ionic Balance by PCT DA and Turbi S04 DA	Major Cations - Dissolved	mg/l	49	0	51	51	0	916	826	10	<1.0	<1.0	0	9	8	12	85	83	2																				
Ionic Balance by PCT DA and Turbi S04 DA	Major Cations - Dissolved	mg/l	5	0	5	5	0	18	16	12	1	1	0	2	2	0	<1.0	<1.0	0																				
Ionic Balance by PCT DA and Turbi S04 DA	Major Cations - Dissolved	mg/l	253	1	276	280	1	4150	4230	2	299	269	11	126	128	2	76	75	1																				
Ionic Balance by PCT DA and Turbi S04 DA	Nitrate (as N)	mg/L	0.02	40	0.03	0.04	29	0.04	0.09	77	0.02	<0.01	67	0.11	0.11	0	3.55	3.54	0																				
Ionic Balance by PCT DA and Turbi S04 DA	Nitrate and Nitrite as N (NOx) by Discrete Analyser	mg/L	0.02	40	0.04	0.05	22	0.04	0.09	77	0.02	<0.01	67	0.11	0.11	0	3.55	3.54	0																				
Ionic Balance by PCT DA and Turbi S04 DA	Nitrite (as N)	mg/L	<0.01	0	0.01	0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0																				
PAH/Phenols (GC/MS - SM)	Acenaphthene	ug/L									<1.0	<1.0	0																										
PAH/Phenols (GC/MS - SM)	Acenaphthylene	ug/L									<1.0	<1.0	0																										
PAH/Phenols (GC/MS - SM)	Anthracene	ug/L									<1.0	<1.0	0																										
PAH/Phenols (GC/MS - SM)	Benzo(a)anthracene	ug/L									<1.0	<1.0	0																										
PAH/Phenols (GC/MS - SM)	Benzo(a)pyrene	ug/L									<0.5	<0.5	0																										
PAH/Phenols (GC/MS - SM)	Benzo(b)fluoranthene	ug/L																																					

WATERMARK
 COAL PROJECT

Hydrogeological Investigation Report: Stage 4 Program
 Environmental Impact Statement February 2013
 Hansen Bailey



Filter	ChemName	Units	ES1125074	Interlab_D	RPD	ES1117474	Interlab_D	RPD	ES1102106	ES1102108	RPD	ES1106642	ES1106642	RPD	ES1106749	ES1106749	RPD	ES1107461	ES1107461
			WM0384	QC2, 14.11.11		WM0427A	QC8, 10.8.11		WM0157	DUPLICATE		WM0012A	QC1, 29.3.11		WM0008	QC3, 30.3.11		WM0002	QC5, 6.4.11
			15/11/2011	15/11/2011		10/08/2011	10/08/2011		31/01/2011	31/01/2011		29/03/2011	29/03/2011		30/03/2011	30/03/2011		6/04/2011	6/04/2011
Alkalinity by PC Titrator	Alkalinity (Hydroxide) as CaCO3	mg/l	<1.0			<1.0			<1.0	<1.0	0	<1.0	<1.0	0	<1.0	<1.0	0	<1.0	<1.0
Alkalinity by PC Titrator	Alkalinity (total) as CaCO3	mg/l	717	870	19	458	<2.0	198	554	437	24	656	656	0	709	674	5	687	708
Alkalinity by PC Titrator	Alkalinity (Carbonate) as CaCO3	mg/l	717			458			554	416	28	656	656	0	709	674	5	687	708
Alkalinity by PC Titrator	Alkalinity (Carbonate as CaCO3)	mg/l																	
Alkalinity by PC Titrator	Alkalinity (Bicarbonate)	mg/l	<1.0			<1.0			<1.0	21	182	<1.0	<1.0	0	<1.0	<1.0	0	<1.0	<1.0
Alkalinity by PC Titrator	Alkalinity (Carbonate)	mg/l																	
Alkalinity by PC Titrator	Bicarbonate as CaCO3	mg/l																	
Alkalinity by PC Titrator	Carbonate as CaCO3	mg/l																	
Chloride by Discrete Analyser	Chloride	mg/l	7620	7500	2	236	220	7	550	58	162	4680	4660	0	1120	1120	0	5480	5570
Dissolved Metals by ICP-MS - Suite A	Aluminium (Filtered)	mg/l							<0.01	0.44	191								
Dissolved Metals by ICP-MS - Suite A	Antimony (Filtered)	mg/l							<0.001	<0.001	0								
Dissolved Metals by ICP-MS - Suite A	Arsenic (Filtered)	mg/l	<0.001	<0.001	0	<0.001			0.002	<0.001	67	0.002	0.002	0	<0.001	<0.001	0	0.002	0.003
Dissolved Metals by ICP-MS - Suite A	Barium (Filtered)	mg/l							0.146	0.022	148								
Dissolved Metals by ICP-MS - Suite A	Beryllium (Filtered)	mg/l							<0.001	<0.001	0								
Dissolved Metals by ICP-MS - Suite A	Boron (Filtered)	mg/l							0.18	0.24	29								
Dissolved Metals by ICP-MS - Suite A	Cadmium (Filtered)	mg/l	<0.0001	<0.0001	0	<0.0001			<0.0001	0.0001	0	0.0002	0.0001	67	<0.0001	<0.0001	0	<0.0001	<0.0001
Dissolved Metals by ICP-MS - Suite A	Chromium (III+VI) (Filtered)	mg/l	0.006	<0.001	143	0.001			<0.005	<0.005	0	<0.005	<0.005	0	<0.001	<0.001	0	<0.005	<0.005
Dissolved Metals by ICP-MS - Suite A	Cobalt (Filtered)	mg/l							0.001	<0.001	0								
Dissolved Metals by ICP-MS - Suite A	Copper (Filtered)	mg/l	0.008	<0.001	156	0.002			0.001	<0.001	0	0.003	0.003	0	0.002	0.002	0	0.001	0.002
Dissolved Metals by ICP-MS - Suite A	Iron (Filtered)	mg/l	<0.5	0.27	0	<0.05			5.4	0.22	184	0.13	<0.05	89	<0.05	<0.05	0	10.6	10.4
Dissolved Metals by ICP-MS - Suite A	Lead (Filtered)	mg/l	<0.001	<0.001	0	<0.001			<0.001	<0.001	0	<0.001	<0.001	0	<0.001	<0.001	0	<0.001	<0.001
Dissolved Metals by ICP-MS - Suite A	Manganese (Filtered)	mg/l							0.624	0.01	194								
Dissolved Metals by ICP-MS - Suite A	Molybdenum (Filtered)	mg/l							0.007	0.01	35								
Dissolved Metals by ICP-MS - Suite A	Nickel (Filtered)	mg/l	0.011	0.01	10	<0.001			0.004	0.002	67	0.007	0.008	13	0.002	0.002	0	0.014	0.016
Dissolved Metals by ICP-MS - Suite A	Selenium (Filtered)	mg/l							<0.01	<0.01	0								
Dissolved Metals by ICP-MS - Suite A	Thallium (Filtered)	mg/l							<0.001	<0.001	0								
Dissolved Metals by ICP-MS - Suite A	Tin (Filtered)	mg/l							0.001	0.007	150								
Dissolved Metals by ICP-MS - Suite A	Vanadium (Filtered)	mg/l							<0.01	<0.01	0								
Dissolved Metals by ICP-MS - Suite A	Zinc (Filtered)	mg/l	0.045	0.056	22	<0.005			0.022	0.011	67	0.853	0.833	2	0.118	0.115	3	0.014	0.036
Dissolved Mercury by FIMS	Mercury (Filtered)	mg/l							<0.0001	<0.0001	0								
Dissolved Metals by ICP-MS - Suite B	Silver (Filtered)	mg/l							<0.001	<0.001	0								
Dissolved Metals by ICP-MS - Suite B	Strontium (Filtered)	mg/l							2.05	0.141	174								
Dissolved Metals by ICP-MS - Suite B	Thorium (Filtered)	mg/l							<1.0	<1.0	0								
Dissolved Metals by ICP-MS - Suite B	Titanium (Filtered)	mg/l							<0.01	<0.01	0								
Dissolved Metals by ICP-MS - Suite B	Uranium (Filtered)	mg/l							<1.0	<1.0	0								
Fluoride by PC Titrator	Fluoride	mg/l	0.2	<0.4	0	0.1	0.099	1	0.7	0.4	55	0.4	0.4	0	1	0.7	35	0.4	0.4
Ionic Balance by PCT DA and ICPAES	Anions Total	meq/L	257			16.5			34.1	12	96	169	168	1	52.3	51.3	2	182	184
Ionic Balance by PCT DA and ICPAES	Cations Total	meq/L	275			16.6			33.6	13	88	181	175	3	51.3	54.6	6	165	172
Ionic Balance by PCT DA and ICPAES	Ionic Balance	%	3.42			0.25			0.68	3.82	140	3.48	1.99	54	0.96	3.1	105	4.76	3.64
Ionic Balance by PCT DA and Turb SO4 DA	Anions Total	meq/L																	
Ionic Balance by PCT DA and Turb SO4 DA	Cations Total	meq/L																	
Ionic Balance by PCT DA and Turb SO4 DA	Ionic Balance	%																	
Major Cations - Dissolved	Calcium (Filtered)	mg/l	374	330	13	32	33	3	168	3	193	136	129	5	156	168	7	224	243
Major Cations - Dissolved	Magnesium (Filtered)	mg/l	916	880	4	49	47	4	164	2	195	539	508	6	215	232	8	572	580
Major Cations - Dissolved	Potassium (Filtered)	mg/l	19	22	20	5	4.8	4	26	3	169	14	14	0	14	15	7	24	26
Major Cations - Dissolved	Sodium (Filtered)	mg/l	4150	3800	9	250	230	8	256	290	12	2080	2000	3	585	614	5	2440	2550
Nitrate as N by Discrete Analyser	Nitrate (as N)	mg/l	0.04	<0.005	156	0.03			0.19	0.04	130	2.66	2.59	3	4.59	4.64	1	<0.01	<0.01
Nitrite and Nitrate as N (NOx) by Discrete Analyser	Nitrogen (Total Oxidised)	mg/l	0.04			0.03			0.23	0.05	129	2.66	2.59	3	4.59	4.64	1	<0.01	<0.01
Nitrite as N by Discrete Analyser	Nitrite (as N)	mg/l	<0.01	<0.005	0	<0.01			0.04	0.01	129	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01
PAH/Phenols (GC/MS - SIM)	Acenaphthylene	ug/L																	
PAH/Phenols (GC/MS - SIM)	Anthracene	ug/L																	
PAH/Phenols (GC/MS - SIM)	Benzo(a)anthracene	ug/L																	
PAH/Phenols (GC/MS - SIM)	Benzo(a)pyrene	ug/L																	
PAH/Phenols (GC/MS - SIM)	Benzo(b)fluoranthene	ug/L																	
PAH/Phenols (GC/MS - SIM)	Benzo(g,h,i)perylene	ug/L																	
PAH/Phenols (GC/MS - SIM)	Benzo(k)fluoranthene	ug/L																	
PAH/Phenols (GC/MS - SIM)	Chrysene	ug/L																	
PAH/Phenols (GC/MS - SIM)	Dibenz(a,h)anthracene	ug/L																	
PAH/Phenols (GC/MS - SIM)	Fluoranthene	ug/L																	
PAH/Phenols (GC/MS - SIM)	Fluorene	ug/L																	
PAH/Phenols (GC/MS - SIM)	Indeno(1,2,3-c,d)pyrene	ug/L																	
PAH/Phenols (GC/MS - SIM)	Naphthalene	ug/L																	
PAH/Phenols (GC/MS - SIM)	Phenanthrene	ug/L																	
PAH/Phenols (GC/MS - SIM)	Polycyclic aromatic hydrocarbons	ug/L																	
PAH/Phenols (GC/MS - SIM)	Pyrene	ug/L																	
Pesticides by GC/MS	4,4-DDE	ug/L							<0.5	<0.5	0				<0.5	<0.5	0		
Pesticides by GC/MS	b-BHC	ug/L							<0.5	<0.5	0				<0.5	<0.5	0		
Pesticides by GC/MS	Aldrin	ug/L							<0.5	<0.5	0				<0.5	<0.5	0		
Pesticides by GC/MS	Atrazine	mg/l																	
Pesticides by GC/MS	Azinophos methyl	ug/L							<0.5	<0.5	0				<0.5	<0.5	0		
Pesticides by GC/MS	b-BHC	ug/L							<0.5	<0.5	0				<0.5	<0.5	0		
Pesticides by GC/MS	Bromophos-ethyl	ug/L							<0.5	<0.5	0				<0.5	<0.5	0		
Pesticides by GC/MS	Carbophenothion	ug/L							<0.5	<0.5	0				<0.5	<0.5	0		
Pesticides by GC/MS	Chlordane (cis)	ug/L							<0.5	<0.5	0				<0.5	<0.5	0		
Pesticides by GC/MS	Chlordane (trans)	ug/L							<0.5	<0.5	0				<0.5	<0.5	0		
Pesticides by GC/MS	Chlorfenvinphos	ug/L							<0.5	<0.5	0				<0.5	<0.5	0		
Pesticides by GC/MS	Chlorpyrifos	ug/L							<0.5	<0.5	0				<0.5	<0.5	0		
Pesticides by GC/MS	Chlorpyrifos-methyl	ug/L							<0.5	<0.5	0				<0.5	<0.5	0		
Pesticides by GC/MS	d-BHC	ug/L							<0.5	<0.5	0				<0.5	<0.5	0		
Pesticides by GC/MS	DDD	ug/L							<0.5	<0.5	0				<0.5	<0.5	0		
Pesticides by GC/MS	DDT	ug/L							<2.0	<2.0	0				<2.0	<2.0	0		
Pesticides by GC/MS	Demeton-S-methyl	ug/L							<0.5	<0.5	0				<0.5	<0.5	0		
Pesticides by GC/MS	Diazinon	ug/L							<0.5	<0.5	0				<0.5	<0.5	0		
Pesticides by GC/MS	Dichlorvos	ug/L							<0.5	<0.5	0				<0.5	<0.5	0		
Pesticides by GC/MS	Dieldrin	ug/L							<0.5	<0.5	0				<0.5	<0.5	0		
Pesticides by GC/MS	Dimethoate	ug/L							<0.5	<0.5	0				<0.5	<0.5	0		
Pesticides by GC/MS	Endosulfan I	ug/L							<0.5	<0.5	0				<0.5	<0.5	0		
Pesticides by GC/MS	Endosulfan II	ug/L				</													

Filter	ChemName	Units	ES1107088		Interlab_D		ES1106749		Interlab_D	
			RPD	WMO2334	GC5-4.4.11	4/04/2011	RPD	WMO098	GC4-30.3.10	30/03/2011
Alkalinity by PC Titrator	Alkalinity (Hydroxide) as CaCO3	mg/l	0					<1.0	<5.0	0
Alkalinity by PC Titrator	Alkalinity (total) as CaCO3	mg/l	3					709	610	15
Alkalinity by PC Titrator	Bicarbonate Alkalinity as CaCO3	mg/l	3	687	650	6		709	610	15
Alkalinity by PC Titrator	Alkalinity (Carbonate as CaCO3)	mg/l								
Alkalinity by PC Titrator	Carbonate Alkalinity as CaCO3	mg/l	0	<1.0	<5.0	0	<1.0	<5.0		0
Alkalinity by PC Titrator	Alkalinity (Bicarbonate)	mg/l								
Alkalinity by PC Titrator	Alkalinity (Carbonate)	mg/l								
Alkalinity by PC Titrator	Bicarbonate as CaCO3	mg/l								
Alkalinity by PC Titrator	Carbonate as CaCO3	mg/l								
Chloride by Discrete Analyser	Chloride	mg/l	2	1360	1400	3	1120	1100		2
Dissolved Metals by ICP-MS - Suite A	Aluminium (Filtered)	mg/l								
Dissolved Metals by ICP-MS - Suite A	Antimony (Filtered)	mg/l								
Dissolved Metals by ICP-MS - Suite A	Barium (Filtered)	mg/l	40	0.006	0.006	0	<0.001	0.002		67
Dissolved Metals by ICP-MS - Suite A	Beryllium (Filtered)	mg/l								
Dissolved Metals by ICP-MS - Suite A	Boron (Filtered)	mg/l								
Dissolved Metals by ICP-MS - Suite A	Cadmium (Filtered)	mg/l	0	<0.0001	<0.0001	0	<0.0001	<0.0001		0
Dissolved Metals by ICP-MS - Suite A	Chromium (III+VI) (Filtered)	mg/l	0	<0.005	0.013	89	<0.001	0.007		150
Dissolved Metals by ICP-MS - Suite A	Cobalt (Filtered)	mg/l								
Dissolved Metals by ICP-MS - Suite A	Copper (Filtered)	mg/l	67	0.001	0.003	100	0.002	0.004		67
Dissolved Metals by ICP-MS - Suite A	Iron (Filtered)	mg/l	2	0.82	0.79	4	<0.05	<0.05		0
Dissolved Metals by ICP-MS - Suite A	Lead (Filtered)	mg/l	0	<0.001	<0.001	0	<0.001	<0.001		0
Dissolved Metals by ICP-MS - Suite A	Manganese (Filtered)	mg/l								
Dissolved Metals by ICP-MS - Suite A	Molybdenum (Filtered)	mg/l								
Dissolved Metals by ICP-MS - Suite A	Nickel (Filtered)	mg/l	13	0.012	0.019	45	0.002	0.005		86
Dissolved Metals by ICP-MS - Suite A	Selenium (Filtered)	mg/l								
Dissolved Metals by ICP-MS - Suite A	Thallium (Filtered)	mg/l								
Dissolved Metals by ICP-MS - Suite A	Tin (Filtered)	mg/l								
Dissolved Metals by ICP-MS - Suite A	Vanadium (Filtered)	mg/l								
Dissolved Metals by ICP-MS - Suite A	Zinc (Filtered)	mg/l	88	0.016	0.017	6	0.118	0.11		7
Dissolved Mercury by FIMS	Mercury (Filtered)	mg/l								
Dissolved Metals by ICP-MS - Suite B	Silver (Filtered)	mg/l								
Dissolved Metals by ICP-MS - Suite B	Strontium (Filtered)	mg/l								
Dissolved Metals by ICP-MS - Suite B	Thorium (Filtered)	µg/l								
Dissolved Metals by ICP-MS - Suite B	Titanium (Filtered)	µg/l								
Dissolved Metals by ICP-MS - Suite B	Uranium (Filtered)	µg/l								
Fluoride by PC Titrator	Fluoride	mg/l	0	1	0.7	35	1	0.8		22
Ionic Balance by PCT DA and ICPAES	Anions Total	meq/L	1				52.3			
Ionic Balance by PCT DA and ICPAES	Cations Total	meq/L	4				51.3			
Ionic Balance by PCT DA and ICPAES	Ionic Balance	%	27				0.96			
Ionic Balance by PCT DA and Turb SO4 DA	Anions Total	meq/L								
Ionic Balance by PCT DA and Turb SO4 DA	Cations Total	meq/L								
Ionic Balance by PCT DA and Turb SO4 DA	Ionic Balance	%								
Major Cations - Dissolved	Calcium (Filtered)	mg/l	8	195	200	3	156	180		14
Major Cations - Dissolved	Magnesium (Filtered)	mg/l	1	216	210	3	215	230		7
Major Cations - Dissolved	Potassium (Filtered)	mg/l	8	24	23	4	14	14		0
Major Cations - Dissolved	Sodium (Filtered)	mg/l	4	886	780	9	585	510		14
Nitrate as N by Discrete Analyser	Nitrate (as N)	mg/l	0	<0.01	<0.01	0	4.59	6.3		31
Nitrite and Nitrate as N (NOx) by Discrete Analyser	Nitrogen (Total Oxidised)	mg/l	0				4.59			
Nitrite as N by Discrete Analyser	Nitrite (as N)	mg/l	0	<0.01	<0.01	0	<0.01	<0.01		0
PAHPhenols (GC/MS - SIM)	Acenaphthylene	µg/L								
PAHPhenols (GC/MS - SIM)	Anthracene	µg/L								
PAHPhenols (GC/MS - SIM)	Benz(a)anthracene	µg/L								
PAHPhenols (GC/MS - SIM)	Benz(a)pyrene	µg/L								
PAHPhenols (GC/MS - SIM)	Benzo(b)fluoranthene	µg/L								
PAHPhenols (GC/MS - SIM)	Benzo(g,h,i)perylene	µg/L								
PAHPhenols (GC/MS - SIM)	Benzo(k)fluoranthene	µg/L								
PAHPhenols (GC/MS - SIM)	Chrysene	µg/L								
PAHPhenols (GC/MS - SIM)	Dibenz(a,h)anthracene	µg/L								
PAHPhenols (GC/MS - SIM)	Fluoranthene	µg/L								
PAHPhenols (GC/MS - SIM)	Fluorene	µg/L								
PAHPhenols (GC/MS - SIM)	Indeno(1,2,3-c,d)pyrene	µg/L								
PAHPhenols (GC/MS - SIM)	Naphthalene	µg/L								
PAHPhenols (GC/MS - SIM)	Phenanthrene	µg/L								
PAHPhenols (GC/MS - SIM)	Polycyclic aromatic hydrocarbons	µg/L								
PAHPhenols (GC/MS - SIM)	Pyrene	µg/L								
Pesticides by GC/MS	4,4-DDE	µg/L					<0.5	<0.5		0
Pesticides by GC/MS	α-BHC	µg/L					<0.5	<0.5		0
Pesticides by GC/MS	Aldrin	µg/L					<0.5	<0.5		0
Pesticides by GC/MS	Atrazine	mg/l								
Pesticides by GC/MS	Azinphos methyl	µg/L					<0.5	<2.0		0
Pesticides by GC/MS	β-BHC	µg/L					<0.5	<0.5		0
Pesticides by GC/MS	Bromophos-ethyl	µg/L					<0.5	<2.0		0
Pesticides by GC/MS	Carbophenothion	µg/L					<0.5	<2.0		0
Pesticides by GC/MS	Chlordane (cis)	µg/L					<0.5	<0.5		0
Pesticides by GC/MS	Chlordane (trans)	µg/L					<0.5	<0.5		0
Pesticides by GC/MS	Chlorfenvinphos	µg/L					<0.5	<2.0		0
Pesticides by GC/MS	Chlorpyrifos	µg/L					<0.5	<2.0		0
Pesticides by GC/MS	Chlorpyrifos-methyl	µg/L					<0.5	<2.0		0
Pesticides by GC/MS	d-BHC	µg/L					<0.5	<0.5		0
Pesticides by GC/MS	DDD	µg/L					<0.5	<0.5		0
Pesticides by GC/MS	DDT	µg/L					<2.0	<2.0		0
Pesticides by GC/MS	Demeton-S-methyl	µg/L					<0.5	<2.0		0
Pesticides by GC/MS	Diazinon	µg/L					<0.5	<2.0		0
Pesticides by GC/MS	Dichlorvos	µg/L					<0.5	<2.0		0
Pesticides by GC/MS	Dieldrin	µg/L					<0.5	<0.5		0
Pesticides by GC/MS	Dimethoate	µg/L					<0.5	<2.0		0
Pesticides by GC/MS	Endosulfan I	µg/L					<0.5	<0.5		0
Pesticides by GC/MS	Endosulfan II	µg/L					<0.5	<0.5		0
Pesticides by GC/MS	Endosulfan sulphate	µg/L					<0.5	<0.5		0
Pesticides by GC/MS	Endrin	µg/L					<0.5	<0.5		0
Pesticides by GC/MS	Endrin aldehyde	µg/L					<0.5	<0.5		0
Pesticides by GC/MS	Endrin ketone	µg/L					<0.5	<0.5		0
Pesticides by GC/MS	Ethion	µg/L					<0.5	<2.0		0
Pesticides by GC/MS	Fenamiphos	µg/L					<0.5	<2.0		0
Pesticides by GC/MS	Fenitrothion	µg/L					<0.5	<2.0		0
Pesticides by GC/MS	γ-BHC (Lindane)	µg/L					<0.5	<0.5		0
Pesticides by GC/MS	Heptachlor	µg/L					<0.5	<0.5		0
Pesticides by GC/MS	Heptachlor epoxide	µg/L					<0.5	<0.5		0
Pesticides by GC/MS	Hexachlorobenzene	µg/L					<0.5	<0.5		0
Pesticides by GC/MS	Malathion	µg/L					<0.5	<2.0		0
Pesticides by GC/MS	Methoxychlor	µg/L					<2.0	<2.0		0
Pesticides by GC/MS	Methyl parathion	µg/L					<2.0	<2.0		0
Pesticides by GC/MS	Monocrotophos	µg/L					<2.0	<20.0		0
Pesticides by GC/MS	Parathion	µg/L					<2.0	<2.0		0
Pesticides by GC/MS	Primphos-ethyl	µg/L					<0.5	<2.0		0
Pesticides by GC/MS	Prothiofos	µg/L					<0.5	<2.0		0
Pesticides by GC/MS	Simazine	mg/l								
pH by PC Titrator	pH (Lab)	pH Units	0	7.03	6.8	3	7.31	6.9		6
Reactive Phosphorus as P-By Discrete Analyser	Reactive Phosphorus as P	mg/l	0				<0.01			
Sulfate (Turbidimetric) as SO4 2- by Discrete Anal	Sulfate	mg/l	1				314			
Total Dissolved Solids (High Level)	TDS	mg/l	1	4220	3600	16	3000	3300		10
Total Dissolved Solids (High Level)	TDS	mg/l								
TPH - Semivolatile Fraction	>C10 - C16 Fraction	mg/l								
TPH - Semivolatile Fraction	C10 - C36	mg/l								
TPH - Semivolatile Fraction	C10 - C14	µg/L					<50.0	<50.0		0
TPH - Semivolatile Fraction	TPH >C16 - C34 Fraction	mg/l								
TPH - Semivolatile Fraction	C15 - C28	µg/L					<100.0	<100.0		0
TPH - Semivolatile Fraction	TPH >C34 - C40 Fraction	mg/l								
TPH - Semivolatile Fraction	C29-C36	µg/L					<50.0	<100.0		0
TPH - Semivolatile Fraction	C10 - C40 (Sum of total)	µg/L					<50.0	<100.0		0
TPH - Semivolatile Fraction	>C10 - C38 (Sum of total)	µg/L					<50.0	<100.0		0
TPH Volatiles/BTEX	Benzene	µg/L					<1.0	<1.0		0
TPH Volatiles/BTEX	C6 - C10 Fraction minus BTEX (F1)	µg/L								
TPH Volatiles/BTEX	C6-C8	µg/L								
TPH Volatiles/BTEX	BTEX	µg/L								
TPH Volatiles/BTEX	Ethylbenzene	µg/L					<2.0	<1.0		0
TPH Volatiles/BTEX	Naphthalene	µg/L								
TPH Volatiles/BTEX	Toluene	µg/L					<5.0	<1.0		0
TPH Volatiles/BTEX	C9 - C9	µg/L					<50.0	<20.0		0
TPH Volatiles/BTEX	Xylene (m & p)	µg/L					<2.0	<2.0		0
TPH Volatiles/BTEX	Xylene (o)	µg/L					<2.0	<1.0		0
TPH Volatiles/BTEX	Xylene Total	µg/L								
Standard Anions	Chloride	mg/l								
Standard Anions	Fluoride	mg/l								
Standard Anions	Sulphate	mg/l								



Hansen Bailey

ID		Field ID	Field Name	Field Type	ES151519	ES151520	ES151521	ES151522	ES151523	ES151524	ES151525	ES151526	ES151527	ES151528	ES151529	ES151530	ES151531	ES151532	ES151533	ES151534	ES151535	ES151536	ES151537	ES151538	ES151539	ES151540	ES151541	ES151542	ES151543	ES151544	ES151545	ES151546	ES151547	ES151548	ES151549	ES151550	ES151551	ES151552	ES151553	ES151554	ES151555	ES151556	ES151557	ES151558	ES151559	ES151560	ES151561	ES151562	ES151563	ES151564	ES151565	ES151566	ES151567	ES151568	ES151569	ES151570	ES151571	ES151572	ES151573	ES151574	ES151575	ES151576	ES151577	ES151578	ES151579	ES151580	ES151581	ES151582	ES151583	ES151584	ES151585	ES151586	ES151587	ES151588	ES151589	ES151590	ES151591	ES151592	ES151593	ES151594	ES151595	ES151596	ES151597	ES151598	ES151599	ES151600	ES151601	ES151602	ES151603	ES151604	ES151605	ES151606	ES151607	ES151608	ES151609	ES151610	ES151611	ES151612	ES151613	ES151614	ES151615	ES151616	ES151617	ES151618	ES151619	ES151620	ES151621	ES151622	ES151623	ES151624	ES151625	ES151626	ES151627	ES151628	ES151629	ES151630	ES151631	ES151632	ES151633	ES151634	ES151635	ES151636	ES151637	ES151638	ES151639	ES151640	ES151641	ES151642	ES151643	ES151644	ES151645	ES151646	ES151647	ES151648	ES151649	ES151650	ES151651	ES151652	ES151653	ES151654	ES151655	ES151656	ES151657	ES151658	ES151659	ES151660	ES151661	ES151662	ES151663	ES151664	ES151665	ES151666	ES151667	ES151668	ES151669	ES151670	ES151671	ES151672	ES151673	ES151674	ES151675	ES151676	ES151677	ES151678	ES151679	ES151680	ES151681	ES151682	ES151683	ES151684	ES151685	ES151686	ES151687	ES151688	ES151689	ES151690	ES151691	ES151692	ES151693	ES151694	ES151695	ES151696	ES151697	ES151698	ES151699	ES151700	ES151701	ES151702	ES151703	ES151704	ES151705	ES151706	ES151707	ES151708	ES151709	ES151710	ES151711	ES151712	ES151713	ES151714	ES151715	ES151716	ES151717	ES151718	ES151719	ES151720	ES151721	ES151722	ES151723	ES151724	ES151725	ES151726	ES151727	ES151728	ES151729	ES151730	ES151731	ES151732	ES151733	ES151734	ES151735	ES151736	ES151737	ES151738	ES151739	ES151740	ES151741	ES151742	ES151743	ES151744	ES151745	ES151746	ES151747	ES151748	ES151749	ES151750	ES151751	ES151752	ES151753	ES151754	ES151755	ES151756	ES151757	ES151758	ES151759	ES151760	ES151761	ES151762	ES151763	ES151764	ES151765	ES151766	ES151767	ES151768	ES151769	ES151770	ES151771	ES151772	ES151773	ES151774	ES151775	ES151776	ES151777	ES151778	ES151779	ES151780	ES151781	ES151782	ES151783	ES151784	ES151785	ES151786	ES151787	ES151788	ES151789	ES151790	ES151791	ES151792	ES151793	ES151794	ES151795	ES151796	ES151797	ES151798	ES151799	ES151800	ES151801	ES151802	ES151803	ES151804	ES151805	ES151806	ES151807	ES151808	ES151809	ES151810	ES151811	ES151812	ES151813	ES151814	ES151815	ES151816	ES151817	ES151818	ES151819	ES151820	ES151821	ES151822	ES151823	ES151824	ES151825	ES151826	ES151827	ES151828	ES151829	ES151830	ES151831	ES151832	ES151833	ES151834	ES151835	ES151836	ES151837	ES151838	ES151839	ES151840	ES151841	ES151842	ES151843	ES151844	ES151845	ES151846	ES151847	ES151848	ES151849	ES151850	ES151851	ES151852	ES151853	ES151854	ES151855	ES151856	ES151

[illegible]



Appendix O

Tabulated Groundwater Chemistry Data

Field				Inorganics																BTEX														
Disolved Oxygen (In-situ)	EC (field)	pH (field)	Temp (In-situ)	Redox (In-situ)	Alkalinity (Bicarbonate)	Alkalinity (Hydroxide) as CaCO3	Alkalinity (total) as CaCO3	Anions Total	Bicarbonate Alkalinity as CaCO3	Bicarbonate as CaCO3	Alkalinity (Carbonate as CaCO3)	Carbonate	Carbonate Alkalinity as CaCO3	Carbonate as CaCO3	Cations Total	Chloride	Fluoride	Ionic Balance	Nitrate (as N)	Nitrite (as N)	Nitrogen (Total Oxidised)	pH (Lab)	Reactive Phosphorus as P	Sulphate	TDS	Thorium (Filtered)	TKN (as N)	TSS	Benzene	Ethylbenzene	Toluene	Xylene (m & p)	Xylene (o)	
mg/L	uS/cm	pH Units	oC	mV	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	%	mg/L	mg/L	mg/L	pH Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
1	1	1	1	1	1	1	1	0.01	1	1	1	1	1	1	0.01	0.5	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.5	1	0.5	1	1	1	1	1	2	2	2
																	1.5						250		800		1	0.1			3	25		
																	1						500		800					1	300	800		
																			0.7											950			350	
																2				10	30			100										
SQL																																		
ADWIG 2011 Aesthetic																																		
ADWIG 2011 Health																																		
ANZECC (2000) Agriculture, Parks & Gardens																																		
ANZECC (2000) Ecosystems Fresh Water (95%)																																		
ANZECC (2000) Stock Watering																																		
LocCode	Sampled Date-Time	Monitoring Unit																																
17/02/2011	3W/0298622	Narrabri Fm	-	-	-	<1	310	7.79	310	-	-	-	<1	-	7.8	47	0.1	0.1	0.19	<0.01	0.19	7.15	0.02	13	414	<1	-	-	<1	<2	<5	<2	<2	<2
5/12/2011	3W/030060_1	Gunnedah Fm	0	6059	7.97	<1	323	-	323	-	<1	-	-	-	-	1840	0.1	-	0.02	<0.01	0.02	7.97	0.24	333	3360	<1	-	-	-	-	-	-	-	-
2/12/2011	3W/030060_2	Gunnedah Fm	0	1658	8.02	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5/12/2011	3W/030060_2	Gunnedah Fm	0.16	2804	6.37	<1	253	-	253	-	<1	-	-	-	37.4	86	0.7	4.13	0.04	<0.01	0.04	6.85	0.02	<1	2160	<1	-	-	-	-	-	-	-	-
11/12/2011	3W/030176_2	Digby Formation	-	-	-	<1	1600	34.4	1600	-	<1	-	-	-	-	26	321	0.57	0.1	<0.01	<0.01	7.02	<0.01	<1	340	1600	<1	-	-	-	-	-	-	-
7/12/2009	3W/034888	-	-	-	-	<1	489	25.9	489	-	-	-	-	-	-	210	0.4	-	0.02	<0.01	0.02	7.48	0.14	47	846	<1	-	-	-	-	-	-	-	-
6/12/2011	3W/036203_1	Narrabri Fm	0.75	3299	7.17	<1	344	-	344	-	<1	-	-	-	-	210	0.4	-	0.02	<0.01	0.02	7.71	0.15	132	2140	<1	-	-	-	-	-	-	-	-
6/12/2011	3W/036203_2	Gunnedah Fm	0.06	1243	6.85	<1	221	-	221	-	<1	-	-	-	-	915	0.3	-	0.02	<0.01	0.02	7.71	0.15	132	2140	<1	-	-	-	-	-	-	-	-
11/12/2011	3W/036305_2	-	0.51	615	7.86	<1	235	6.8	235	-	<1	-	-	-	6.92	62	0.2	0.85	0.11	<0.01	0.11	7.99	0.05	17	404	<1	-	-	-	-	-	-	-	-
5/12/2011	3W/040832_1	Weathered Basalt	0.08	2030	7.42	<1	567	-	567	-	<1	-	-	-	-	492	0.1	-	0.2	0.02	0.22	7.87	0.19	17	1510	<1	-	-	-	-	-	-	-	-
5/12/2011	3W/040832_2	Weathered Basalt	0.04	1906	7.45	<1	563	-	563	-	<1	-	-	-	-	422	0.1	-	0.72	<0.01	0.72	7.9	0.14	13	1500	<1	-	-	-	-	-	-	-	-
14/01/2010	3W/054938	Narrabri Fm	-	-	-	<1	483	23.4	483	-	-	-	-	-	21.3	422	0.1	4.64	0.02	<0.01	0.02	6.8	0.09	86	1200	<1	-	-	-	-	-	-	-	-
17/02/2011	3W/065013	-	-	-	-	<1	295	8.35	295	-	-	-	-	-	8.06	68	0.1	1.81	0.25	<0.01	0.25	7.25	0.03	26	452	<1	-	-	<1	<2	<5	<2	<2	<2
14/01/2010	3W/065708	Clay	-	-	-	<1	519	29.4	519	-	-	-	-	-	26.8	582	0.3	4.67	<0.01	<0.01	<0.01	6.41	<0.01	124	1570	<1	-	-	<1	<2	<5	<2	<2	<2
5/04/2011	3W/093105_1	Narrabri Fm	0.38	13,300	7.32	<1	320	150	320	-	<1	-	-	-	137	4800	0.2	4.59	<0.01	<0.01	<0.01	7.6	0.07	393	8260	<1	-	-	<1	<2	<5	<2	<2	<2
5/04/2011	3W/093105_2	Weathered Permian	0.6	4200	7.51	<1	382	42.7	382	-	<1	-	-	-	41.6	1100	0.4	1.32	0.06	<0.01	0.06	7.81	0.06	194	2340	<1	-	-	<1	<2	<5	<2	<2	<2
17/02/2011	3W/965577	Narrabri Fm	-	-	-	<1	293	8.33	293	-	<1	-	-	-	8.03	80	0.1	-	0.14	<0.01	0.14	7.48	0.03	11	444	<1	-	-	<1	<2	<5	<2	<2	<2
17/02/2011	3W/965577_2	Gunnedah Fm	6.67	859	7.78	<1	297	8.51	297	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17/02/2011	P16	-	-	-	-	<1	331	54.6	331	-	<1	-	-	-	8.39	84	0.1	0.73	0.38	<0.01	0.38	7.18	0.03	9	440	<1	-	-	<1	<2	<5	<2	<2	<2
15/09/2009	WM00038	-	-	-	-	<1	331	54.6	331	-	<1	-	-	-	54.5	1480	0.47	0.1	0.02	<0.01	0.02	7.49	<0.01	305	3010	<1	-	-	<1	<2	<5	<2	<2	<2
14/10/2009	WM00049	-	-	-	-	<1	1500	46.8	1500	-	-	-	-	-	42.4	578	0.55	4.98	0.02	<0.01	0.02	6.73	<0.01	20.1	2230	<1	-	-	<1	<2	<5	<2	<2	<2
6/03/2010	WM0108	-	-	-	-	<1	252	123	252	-	<1	-	-	-	112	3610	0.29	4.95	<0.01	0.01	0.01	7.49	<0.01	781	8570	<1	-	-	<1	<2	<5	<2	<2	<2
24/10/2009	WM0137	-	-	-	-	<1	1150	126	1150	-	<1	-	-	-	119	3360	0.27	2.87	0.03	<0.01	0.03	7.7	<0.01	382	7020	<1	-	-	<1	<2	<5	<2	<2	<2
12/02/2010	WM0142A	-	-	-	-	<1	867	54.2	867	-	<1	-	-	-	49.7	1050	0.4	4.3	0.08	0.03	0.1	7.51	0.05	345	3250	<1	-	-	<1	<2	<5	<2	<2	<2
3/11/2009	WM0215	-	-	-	-	<1	1670	65.8	1300	-	-	-	-	-	62.7	419	0.66	2.41	<0.01	<0.01	9.08	<0.01	989	3830	<1	-	-	<1	<2	<5	<2	<2	<2	<2
26/11/2009	WM0221	-	-	-	-	<1	682	17	600	-	-	-	-	-	82	18	102	1.22	2.92	0.01	<0.01	8.68	0.03	22.6	1070	<1	-	-	<1	<2	<5	<2	<2	<2
14/10/2009	WM0224	-	-	-	-	<1	488	10.6	375	-	-	-	-	-	112	963	76.9	0.43	4.84	0.01	9.33	<0.01	30.9	5780	<1	-	-	<1	<2	<5	<2	<2	<2	<2
8/03/2010	WM0227	-	-	-	-	<1	592	14.9	508	-	-	-	-	-	84	15.3	71.3	1	1.38	<0.01	0.04	8.82	0.03	50.4	880	<1	-	-	<1	<2	<5	<2	<2	<2
4/04/2012	WM0387L	-	-	-	-	<1	1400	38.6	1140	-	-	-	-	-	40.3	341	2.4	2.12	0.02	<0.01	0.02	8.88	<0.01	46	2230	<1	-	-	<1	<2	<5	<2	<2	<2
29/04/2012	WM0600BL	-	-	-	-	<1	4290	118	3870	-	<1	-	-	-	107	1140	4.6	4.98	<0.01	<0.01	<0.01	8.87	<0.01	46	2230	<1	-	-	<1	<2	<5	<2	<2	<2
14/05/2012	WM0663	-	-	-	-	<1	349	10	349	-	<1	-	-	-	97.6	92	-	1.47	-	-	-	-	-	-	-	-	-	-	<1	<2	<5	<2	<2	<2



Herbicides			Lead		Metals																											
Simazine			Lead	Lead (Filtered)	Aluminium (Filtered)	Antimony (Filtered)	Arsenic	Arsenic (Filtered)	Barium	Barium (Filtered)	Beryllium	Beryllium (Filtered)	Boron	Cadmium	Cadmium (Filtered)	Calcium (Filtered)	Chromium (III+VI)	Chromium (III+VI) (Filtered)	Cobalt	Cobalt (Filtered)	Copper	Copper (Filtered)	Iron	Iron (Filtered)	Magnesium (Filtered)	Manganese	Manganese (Filtered)	Mercury	Mercury (Filtered)	Molybdenum (Filtered)		
mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L		
0.0005	0.001	0.001	0.001	0.001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.05	0.001	0.001	1	0.001	0.001	0.001	0.001	1	1	0.3	0.3	0.1	0.1	0.001	0.001	0.001	0.001		
0.02	0.01	0.01	0.2	0.003	0.01	0.01	0.01	0.01	2	2	0.06	0.06	4	0.002	0.002		0.1	0.1	0.05	0.05	2	2	2	0.2	0.2	0.2	0.2	0.001	0.001	0.05		
0.0032	0.0034	0.0034	0.055								0.1	0.1	0.5	0.01	0.01		0.1	0.1	0.05	0.05	0.014	0.014	0.2	0.2	0.2	0.2	0.002	0.002	0.0006			
	0.1	0.1	5				0.2						5	0.01	0.01	1000	1	1	1	1	5	5				1.9	1.9	0.002	0.002	0.15		
Loc Code			Sampled Date-Time		Monitoring Unit																											
			17/02/2011		<0.001	<0.001	<0.001	-	0.032	-	<0.001	<0.05	-	0.0007	51	0.001	0.001	-	<0.001	-	<0.001	-	<0.001	-	<0.05	33	-	<0.001	-	<0.001		
			5/12/2011		<0.001	-	-	<0.001	-	-	-	-	-	-	<0.001	64	<0.001	<0.001	-	-	-	<0.001	-	<0.05	178	-	-	-	-	-		
			2/12/2011		-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	-	-	-	<0.001	-	<0.05	51	-	-	-	-		
			5/12/2011		<0.001	-	-	<0.001	-	-	-	-	-	-	<0.001	22	<0.001	<0.001	-	-	-	<0.001	-	2.67	79	-	-	-	-	-		
			11/12/2011		<0.001	-	-	<0.001	-	-	-	-	-	-	<0.001	92	<0.001	<0.001	-	-	-	<0.001	-	6.29	126	-	-	-	-	-		
			7/12/2009		0.003	-	<0.001	<0.001	-	-	-	-	-	0.0014	134	0.002	-	-	-	-	0.009	0.002	0.002	<0.05	35	-	-	-	-	-		
			8/12/2011		<0.0005	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	<0.001	51	<0.001	<0.001	-	-	-	0.002	<0.05	75	-	-	-	-	-	-		
			8/12/2011		<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	-	<0.001	124	<0.001	<0.001	-	-	-	0.001	<0.05	9	-	-	-	-	-	-		
			11/12/2011		<0.0005	<0.001	<0.001	0.002	-	-	-	-	-	-	<0.001	13	<0.001	<0.001	-	-	-	0.003	<0.05	9	-	-	-	-	-	-		
			5/12/2011		<0.0005	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	<0.001	63	<0.001	<0.001	-	-	-	0.001	<0.05	188	-	-	-	-	-	-		
			5/12/2011		<0.0005	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	<0.001	64	<0.001	<0.001	-	-	-	0.002	<0.05	169	-	-	-	-	-	-		
			14/01/2010		<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	<0.001	25	<0.001	<0.001	-	-	-	<0.001	<0.05	52	-	-	<0.001	-	<0.001	<0.001		
			17/02/2011		<0.001	<0.001	<0.001	<0.001	<0.001	-	-	<0.001	<0.05	<0.001	47	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.05	32	-	-	<0.001	-	<0.001	<0.001		
			14/01/2010		<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	<0.001	84	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.05	76	-	-	-	-	-	-		
			5/04/2011		<0.001	<0.001	<0.001	<0.001	0.053	-	<0.001	0.11	<0.001	183	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	0.002	0.002	<0.05	462	1	1	<0.001	<0.001	0.007			
			5/04/2011		<0.001	<0.001	<0.001	<0.001	0.056	-	<0.001	0.1	<0.001	37	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.05	100	0.004	0.004	<0.001	<0.001	0.007			
			17/02/2011		<0.001	<0.001	<0.001	<0.001	0.034	-	<0.001	<0.05	<0.001	43	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.014	<0.05	37	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		
			17/02/2011		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
			17/02/2011		<0.001	<0.001	<0.001	<0.001	0.038	-	<0.001	<0.05	<0.001	50	<0.001	<0.001	0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.05	35	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		
			15/09/2009		<0.001	-	<0.001	-	-	-	-	-	-	<0.001	263	<0.001	<0.001	<0.001	0.002	0.002	0.002	4.19	266	-	-	-	-	-	-	-		
			14/10/2009		0.002	-	0.002	-	-	-	-	-	-	<0.001	141	0.216	0.216	0.216	0.015	0.015	0.015	0.015	56.6	126	-	-	-	-	-	-		
			6/03/2010		0.012	-	0.001	-	-	-	-	-	-	<0.001	500	0.005	0.005	0.005	0.014	0.014	0.014	9.58	590	-	-	-	-	-	-	-		
			24/10/2009		<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	<0.001	200	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.07	206	-	-	-	-	-	-		
			12/02/2010		0.039	0.039	0.013	0.013	0.445	0.002	0.002	-	0.002	126	0.016	0.016	0.016	0.021	0.021	0.021	0.072	24.2	207	0.444	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
			3/11/2009		-	-	0.005	0.005	-	-	-	-	<0.001	6	0.002	0.002	0.002	0.002	0.002	0.002	0.012	4.18	45	-	-	-	-	-	-	-		
			26/11/2009		0.004	-	-	-	-	-	-	-	-	<0.001	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.05	<1	-	-	-	-	-	-		
			14/10/2009		0.151	-	-	-	-	-	-	-	-	0.007	3	0.26	0.26	0.26	-	-	-	1.56	260	<1	-	-	-	-	-	-	-	
			8/03/2010		0.037L	-	0.006	0.006	-	-	-	-	-	0.001	11	0.013	0.013	0.013	-	-	-	0.055	13.9	25	-	-	-	-	-	-	-	
			4/04/2012		0.012	-	-	-	0.002	-	-	-	-	<0.001	7	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.05	13	-	-	-	-	-	-		
			14/05/2012		0.0063	-	-	-	0.004	-	-	-	-	<0.001	10	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	0.002	0.15	4	-	-	-	-	-	-		

	Nickel	Nickel (Filtered)	Phosphorus	Potassium (Filtered)	Selenium (Filtered)	Silver (Filtered)	Sodium (Filtered)	Strontium (Filtered)	Thallium (Filtered)	Tin (Filtered)	Titanium (Filtered)	Vanadium	Vanadium (Filtered)	Zinc	Zinc (Filtered)	Organic	Organochlorine Pesticides																					
																	4,4-DDE	a-BHC	Aldrin	B-BHC	Chlordane (cis)	Chlordane (trans)	δ-BHC	DDD	DDT	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	Endrin aldehyde	Endrin ketone	g-BHC (Lindane)	Heptachlor	Heptachlor epoxide			
mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQC	0.001	0.001	0.01	1	0.01	0.001	180	0.001	0.001	0.001	0.01	1	0.01	0.005	0.005	1																						
ADWVG 2011 Aesthetic	0.02	0.02			0.01	0.1								3	3																							
ADWVG 2011 Health	0.2	0.2	0.05		0.02							17		3																					10	0.3		
ANZECC (2000) Agriculture, Parks & Gardens	0.2	0.2										10	0.1	2																								
ANZECC (2000) Ecosystems Fresh Water (95%)	0.011	0.011			0.005	0.00005								0.008	0.008																							
ANZECC (2000) Stock Watering	1	1			0.02							200		20	20																							
LocCode	Sampled Date-Time																Monitoring Unit																					
GW029622	-	<0.001	-	2	<0.01	<0.001	58	0.637	<0.001	<0.001	<0.01	2	<0.01	-	<0.005	-																						
Narrabri Fm	-	0.007	-	3			1100	-	-	-	-	-	-	-	0.015	-																						
GW030060_1	-		-																																			
GW030060_2	-	0.003	-	3			277	-	-	-	-	-	-	-	0.014	-																						
Gunnedah Fm	-		-																																			
GW030176_2	-	0.003	-	69			564	-	-	-	-	-	-	-	0.035	-																						
Digby Formation	-		-																																			
GW034888	-	0.02	-	20			193	-	-	-	-	-	-	-	2.06	-																						
GW0356203_1	-	0.002	-	2			194	-	-	-	-	-	-	-	0.016	-																						
GW0356203_2	-	0.003	-	3			508	-	-	-	-	-	-	-	0.013	-																						
GW036305_2	-	0.001	-	2			128	-	-	-	-	-	-	-	0.023	-																						
11/12/2011	-	0.002	-	2			135	-	-	-	-	-	-	-	0.023	-																						
Weathered Basalt	-	0.002	-	<1			128	-	-	-	-	-	-	-	0.013	-																						
Weathered Basalt	-	0.002	-	1			128	-	-	-	-	-	-	-	0.013	-																						
GW040532_2	-	<0.001	-	1			365	-	-	-	-	-	-	-	0.005	-																						
GW040532_2	-	<0.001	-	1			365	-	-	-	-	-	-	-	0.005	-																						
Narrabri Fm	-	<0.001	-	2	<0.01	<0.001	70	0.777	<0.001	<0.001	<0.01	2	<0.01	-	0.006	-																						
GW056513	-	<0.001	-	7			371	-	-	-	-	-	-	-	0.007	-																						
Clay	-	0.003	-	7			371	-	-	-	-	-	-	-	0.005	-																						
GW065708	-	0.004	-	5	<0.01	<0.001	260	7.43	<0.001	<0.001	<0.01	4	<0.01	-	0.02	-																						
GW083105_1	-	0.004	-	2	<0.01	<0.001	723	1.61	<0.001	<0.001	<0.01	3	<0.01	-	0.036	-																						
Weathered Permian	-	0.004	-	2	<0.01	<0.001	723	1.61	<0.001	<0.001	<0.01	3	<0.01	-	0.036	-																						
GW965577	-	<0.001	-	3	<0.01	<0.001	64	0.763	<0.001	<0.001	<0.01	2	<0.01	-	0.052	-																						
Narrabri Fm	-	<0.001	-	3	<0.01	<0.001	64	0.763	<0.001	<0.001	<0.01	2	<0.01	-	0.052	-																						
Gunnedah Fm	-	<0.001	-	3	<0.01	<0.001	66	0.743	<0.001	<0.001	<0.01	1	<0.01	-	0.022	-																						
P16	-	<0.001	-	3	<0.01	<0.001	66	0.743	<0.001	<0.001	<0.01	1	<0.01	-	0.022	-																						
GW036222	-	0.001	-	27	<0.01	<0.001	430							0.007																								
WM0038	-	0.001	-	14			566							0.026																								
WM0049	-	0.011	-	14			566							0.026																								
WM0108	-	0.007	-	32			855							0.068																								
WM0137	-	<0.001	-	32			2090							<0.005																								
WM0142A	-	0.034	-	143	20		595					0.04		0.298																								
WM0215	-	0.007	-	17			1340							0.025																								
WM0221	-	<0.001	-	4			409							<0.005																								
WM0224	-	0.67	-	8			174							1.07																								
WM0227	-	0.014	-	12			285							0.091																								
WM0387L	-	0.001	-	7			889							0.006																								
WM0600BL	-	0.001	-	11			2430							0.023																								
WM0683	-	0.001	-	2			79							-																								
WM0687	-	0.001	-	5			3820							-																								



	Organophosphorous Pesticides												Pesticides					TPH								
	Hexachlorobenzene	Methoxychlor	Azinphos methyl	Bromophos-ethyl	Carbophenothion	Chlorfenvinphos	Chlorpyrifos	Chlorpyrifos-methyl	Diazinon	Dichlorvos	Dimethoate	Ethion	Malathion	Methyl parathion	Monocrotophos	Prothiophos	Atrazine	Demeton-S-methyl	Fenamiphos	Parathion	Phosphos-ethyl	C10 - C14	C6 - C9	C15 - C28	C29- C36	+C10 - C36 (Sum of total)
ECOL	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
ADWG 2011 Aesthetic	0.5	2	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	2	2	0.5	0.0005	0.5	0.5	2	0.5	50	20	100	50	50
ADWG 2011 Health		300	10			10		4	5	7	4	7	70	0.7	2		0.02		0.5	20	0.5					
ANZECC (2000) Agriculture, Parks & Gardens																	0.02									
ANZECC (2000) Ecosystems Fresh Water (95%)											0.15		0.05				0.013			0.004						
ANZECC (2000) Stock Watering																										
LocCode	Sampled Date-Time		Monitoring Unit																							
GW028622	17/02/2011		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Narrabri Fm			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-
Gunnedah Fm	2/12/2011		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-
GW030060 1	5/12/2011		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-
GW030060 2	5/12/2011		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-
GW030176 2	11/12/2011		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-
Digby Formation	7/12/2009		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-
GW034888			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-
GW036203 1	6/12/2011		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-
GW036203 2	6/12/2011		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-
GW036305 2	11/12/2011		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-
GW040832 1	5/12/2011		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-
Weathered Basalt	5/12/2011		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-
GW040832 2	5/12/2011		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-
Weathered Basalt	5/12/2011		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-
Narrabri Fm	17/02/2011		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-
GW050513	14/01/2010		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-
GW065708	14/01/2010		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-
GW093105 1	5/04/2011		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-
Weathered Permian	5/04/2011		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-
GW096577 2	17/02/2011		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-
GW965577 2	17/02/2011		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-
P16	17/02/2011		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-
WM0038	15/09/2009		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-
WM0049	14/10/2009		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-
WM0108	6/03/2010		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-
WM0137	24/10/2009		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-
WM0142A	12/02/2010		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-
WM0215	3/11/2009		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-
WM0221	26/11/2009		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-
WM0224	14/10/2009		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-
WM0227	8/03/2010		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-
WM0387L	4/04/2012		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-
WM0600BL	29/04/2012		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-
WM0663	14/05/2012		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-

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Category		Subcategory										Item										Value										Unit																			
		Group 1					Group 2					Group 3					Group 4					Group 5					Group 6					Group 7					Group 8														
Item ID		Item Name										Item Description										Item Price										Item Weight										Item Volume									
1		Item 1										Item 2										Item 3										Item 4										Item 5									
2		Item 6										Item 7										Item 8										Item 9										Item 10									
3		Item 11										Item 12										Item 13										Item 14										Item 15									
4		Item 16										Item 17										Item 18										Item 19										Item 20									
5		Item 21										Item 22										Item 23										Item 24										Item 25									
6		Item 26										Item 27										Item 28										Item 29										Item 30									
7		Item 31										Item 32										Item 33										Item 34										Item 35									
8		Item 36										Item 37										Item 38										Item 39										Item 40									
9		Item 41										Item 42										Item 43										Item 44										Item 45									
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Appendix P

GNS Groundwater Dating Results and Groundwater Age Plots

Letter Report No: 2012/148LR
Project No: 633W1106

8 June 2012

Hansen Bailey
6/127-129 John Street
Singleton, NSW 2330
Australia

Attention: Melissa Walker

Dear Melissa



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Tritium and radiocarbon results for Watermark isotope samples

This report presents the analytical results of tritium and radiocarbon analyses for the Watermark isotope samples (Table 1). Radiocarbon ages have also been calculated. It appears that complex mixing and exchange processes take place in this groundwater system, with the presence of modern tritium in conjunction with low radiocarbon concentrations.

Radiocarbon age determination

As water passes through the unsaturated zone it gains dissolved inorganic carbon (DIC) from plant respiration and through the oxidation of soil organic matter. This DIC has a distinct isotopic signature which is characteristic of modern organic matter ($\delta^{13}\text{C} \approx -25\text{‰}$, 100 ‰mC; Mook & de Vries, 2001). In addition, the dissolution of fossil carbonates present in the soil or within the aquifer matrix dilutes the concentration of ^{14}C , as these fossil carbonates typically contain no modern carbon. The ^{13}C isotopic signature also moves away from that of plant material towards the signature of marine carbonates (around 0‰). The relationship between ^{13}C and ^{14}C concentrations for DIC in groundwater is illustrated in Figure 1.

Radiocarbon ages are calculated using the equation:

$$t = (1/\lambda) \ln (q \cdot a_0 / a_t)$$

where λ is the ^{14}C decay factor ($1/\lambda = 8267$ yr), a_0 is the initial ^{14}C activity, a_t is the ^{14}C activity after time t and q is a parameter that defines how much the radiocarbon signal has been diluted by sources of "dead" (i.e. radiocarbon free) carbon. (Stewart et al., 2004). For this report q was determined from $\delta^{13}\text{C}$ values of the DIC using a simple isotopic mixing model and assuming an initial ^{14}C input of 100 ‰mC.

DISCLAIMER

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**Table 1 Analytical results and calculated radiocarbon ages**

Site ID	Sampling Date	Tritium ¹ (TU)	$\delta^{13}\text{C}$ ² (‰)	^{14}C ³ (%mC)	TDIC ⁴ (mmol.kg ⁻¹)	^{14}C age ⁵ (years)	^{14}C age range (years)
WM0009B	18/09/2011	0.437 ± 0.016	-12.4	76.70	17.3	<100	-
WM0009R	18/09/2011	0.015 ± 0.012	-13.3	6.89	6.1	17141	15908 - 18259
WM0012	22/09/2011	0.037 ± 0.012	-10.7	0.67	8.2	34309	32937 - 35800
WM0012A	22/09/2011	0.220 ± 0.014	-11.0	76.06	14.9	<100	-
WM0067A	02/10/2011	0.092 ± 0.012	-9.5	49.20	5.9	<100	-
WM0233	03/10/2011	0.047 ± 0.012	-11.7	8.67	13.2	13938	12705 - 15055
WM0274A	03/10/2011	0.057 ± 0.013	Insufficient carbon			-	-
WM0290	04/10/2011	0.107 ± 0.015	-0.1	0.52	83.2	<100	-
WM0291	21/09/2011	0.099 ± 0.013	-7.6	0.75	23.9	30596	29248 - 31855
WM0291A	21/09/2011	0.264 ± 0.015	-7.3	1.50	22.5	24528	23265 - 25679
WM0291B	21/09/2011	0.030 ± 0.012	-6.1	0.07	30	48135	43512 - 58551
WM0421	21/09/2011	0.038 ± 0.015	-9.5	2.28	11.2	23241	21996 - 24371
WM0426A	05/10/2011	0.084 ± 0.013	-8.7	20.28	10.6	4465	3233 - 5580
WM0426	05/10/2011	0.081 ± 0.013	-8.8	1.94	6.76	23964	22714 - 25100
WM0427A	22/09/2011	0.000 ± 0.012	-9.4	8.26	10	12530	11297 - 13646
WM0427	22/09/2011	0.109 ± 0.013	-9.6	0.82	14.3	31804	30474 - 33039
WM0432A	22/09/2011	0.038 ± 0.013	-8.2	41.09	3.8	<100	-
WM0432	22/09/2011	0.012 ± 0.012	-11.2	14.81	7.5	9148	7916 - 10263
WM0091	01/11/2011	0.282 ± 0.016	-9.8	14.73	12.5	8090	6857 - 9205
WM0428A	23/10/2011	0.038 ± 0.013	-9.6	65.03	7.1	<100	-
WM0091B	01/11/2011	-0.016 ± 0.011	-9.8	0.96	8.5	30470	29169 - 31669
WM0055	22/10/2011	0.065 ± 0.013	-12.4	23.08	18.8	6325	5092 - 7440
WM0093A	31/10/2011	-0.019 ± 0.012	-9.9	23.42	7.9	4342	3109 - 5457
WM0036C	31/10/2011	0.037 ± 0.013	-16.1	10.28	7	15168	13835 - 16284
WM0157	30/10/2011	0.297 ± 0.016	-12.8	32.77	10.6	3688	2457 - 4804
WM0091A	02/11/2011	0.006 ± 0.012	-9.8	12.70	9.3	9320	8087 - 10436
GW040832(D)	05/12/2011	0.675 ± 0.020	-11.6	103.96	13.1	<100	-
GW036203(S)	06/12/2011	-0.013 ± 0.012	-10.9	18.52	5.4	7078	5845 - 8193
WM0062	23/11/2011	0.071 ± 0.013	-13.6	28.49	9	5347	4115 - 6462
DUPE01	23/11/2011	0.067 ± 0.016	-12.1	23.18	9	6084	4852 - 7199
WM0011	07/11/2011	0.151 ± 0.014	-12.3	52.03	2.3	<100	-
GW036305(D)	11/12/2011	0.006 ± 0.012	-13.5	34.03	5.3	3816	2584 - 4931
WM0424	19/11/2011	0.017 ± 0.012	-10.0	0.51	10.2	36033	34571 - 37447
GW036203(D)	06/12/2011	0.017 ± 0.012	-7.7	9.39	8.7	9822	8589 - 10938
GW030060(S)	05/12/2011	0.130 ± 0.013	-12.9	35.67	7.3	3052	1820 - 4166
GW030060(D)	05/12/2011	-0.009 ± 0.012	-12.0	23.52	5.8	5899	4667 - 7013
GW030176(D)	11/12/2011	0.033 ± 0.013	-3.9	0.06	42.8	45675	40515 - 60529
WM0021	11/12/2011	0.020 ± 0.013	-13.3	14.69	12	10638	9406 - 11753
GW040832(S)	05/12/2011	0.865 ± 0.022	-11.3	106.63	13.6	<100	-

¹ Tritium concentrations are expressed as $^3\text{H}/^1\text{H}$ ratios where 1 tritium unit (TU) signifies a ratio of 1×10^{-18} .

² ^{13}C concentrations are expressed as δ values in ‰ with respect to VPDB (Vienna PDB, the international standard).

³ Concentrations of ^{14}C in percent modern carbon (relative to the NBS oxalic acid standard corrected for decay since 1950; Stuiver & Polach, 1977) as reported by the Rafter radiocarbon laboratory have been de-normalised and corrected to the year of sampling for the groundwater age calculation and are denoted as %mC (Mook & de Vries, 2001).

⁴ TDIC = total dissolved inorganic carbon expressed in mmol.kg⁻¹.

⁵ ^{14}C age is in uncalibrated radiocarbon years.

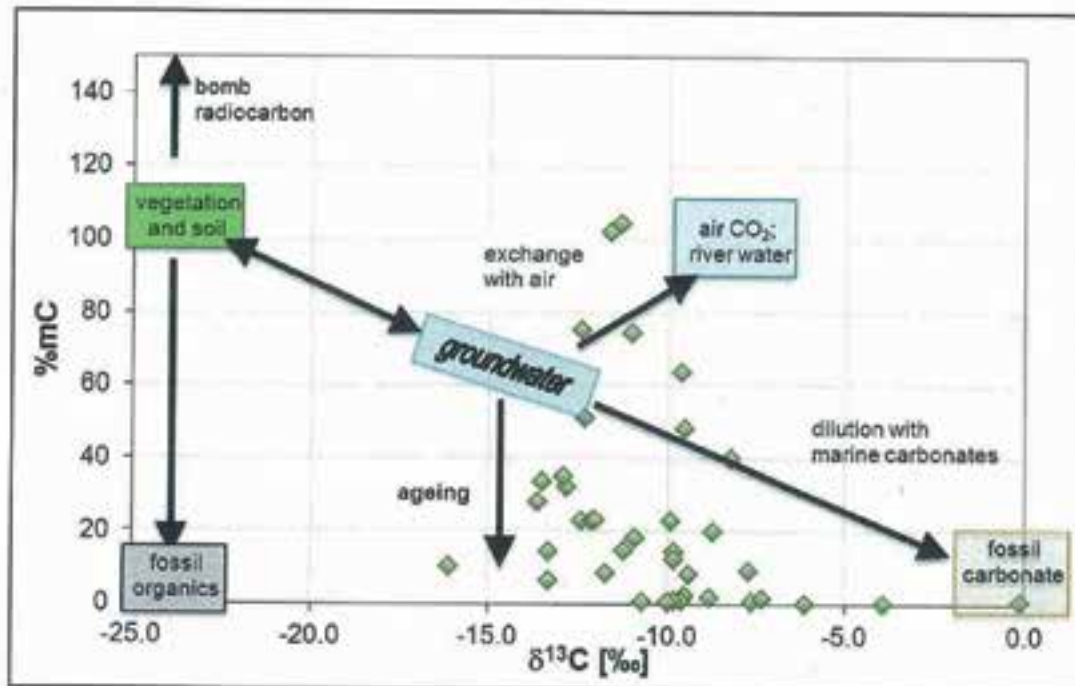


Figure 1 The relationship between $^{13}\text{C}/^{12}\text{C}$ ratios and ^{14}C concentrations for dissolved inorganic carbon in groundwater (After Mook & de Vries, 2001).

Major assumptions which may affect the calculated dates are:

- (1) that the ^{14}C input to the system at the time of recharge was the same as modern input (i.e. ~ 100 %mC). Comparison to ^{14}C calibration curves indicates that actual recharge ages may be slightly older due to higher radiocarbon concentrations in the past; the offset is approximately +3000 years for an uncalibrated radiocarbon age of 14000 years and +4000 years for an uncalibrated radiocarbon age around 33000 years (Reimer et al., 2009).
- (2) the isotopic signature of bicarbonate sourced from the decay of organic material is of modern origin at the time of recharge (i.e. $\delta^{13}\text{C} \approx -25\text{‰}$, 100 %mC). It is also possible that carbon may originate from older organic carbon present within the aquifer matrix, with low or even zero modern carbon. If some of the bicarbonate originates from older organic carbon, then the radiocarbon ages could be younger than those shown in Table 1.
- (3) recharge is predominantly from land surface recharge and acquires DIC from soil CO_2 and decay of modern organic material with $\delta^{13}\text{C} \approx -25\text{‰}$. If there is significant recharge from rivers, then the initial ^{13}C signature of the DIC may be different and the resulting dilution factor q would vary.

To illustrate how these assumptions can affect the radiocarbon ages, an age range has been calculated by varying the calculation parameters (a_0 , q) each by $\pm 10\%$. These age ranges are indicative only and should not be considered as the absolute uncertainties for these calculations.

The majority of samples exhibit substantial dilution of the initial ^{14}C input by marine carbonate (Figure 2). For instance sample WM0290 which, although having a radiocarbon concentration of 0.52 %mC, has a radiocarbon age of <100 years. This is due to nearly all the DIC from this sample being derived from marine carbonates with $\delta^{13}\text{C} \approx 0$ ‰.

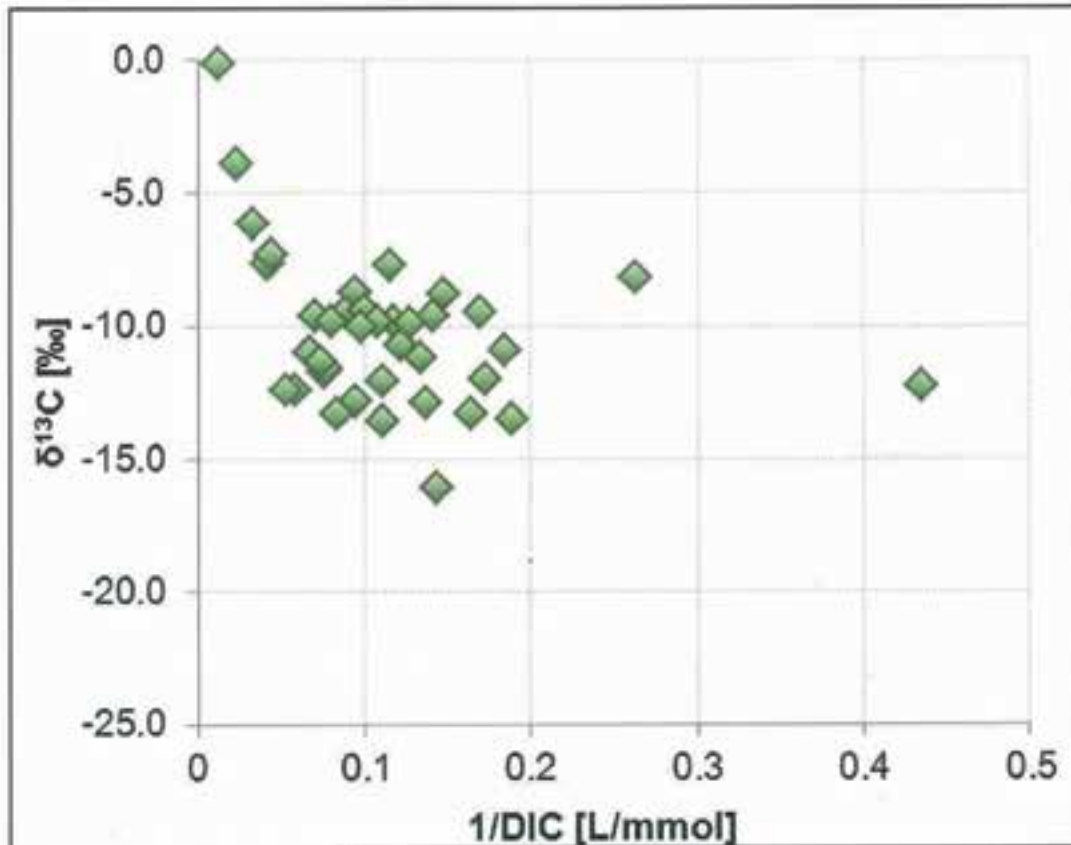


Figure 2 Plot of 1/DIC vs $\delta^{13}\text{C}$. As DIC concentrations increase (i.e. 1/DIC decreases), $\delta^{13}\text{C}$ tends towards zero (i.e. the isotopic signature of marine carbonate).

Comparison of radiocarbon to tritium concentrations.

Radiocarbon ages greater than 100 years should have tritium concentrations that are statistically indistinguishable from zero (i.e. within $\pm 2 \times$ the standard error). However for the Watermark samples there are many instances where the radiocarbon age is substantially older than 100 years but there is still significant tritium present in the water. This is illustrated in Figure 3. Samples with modern radiocarbon ages (<100 years) are indicated as triangles. Samples with older radiocarbon ages (green diamonds) can be distributed into two groups, those with zero tritium (which plot between the blue vertical dashed lines) and those with significant tritium concentrations (which plot to the right of the dashed lines).

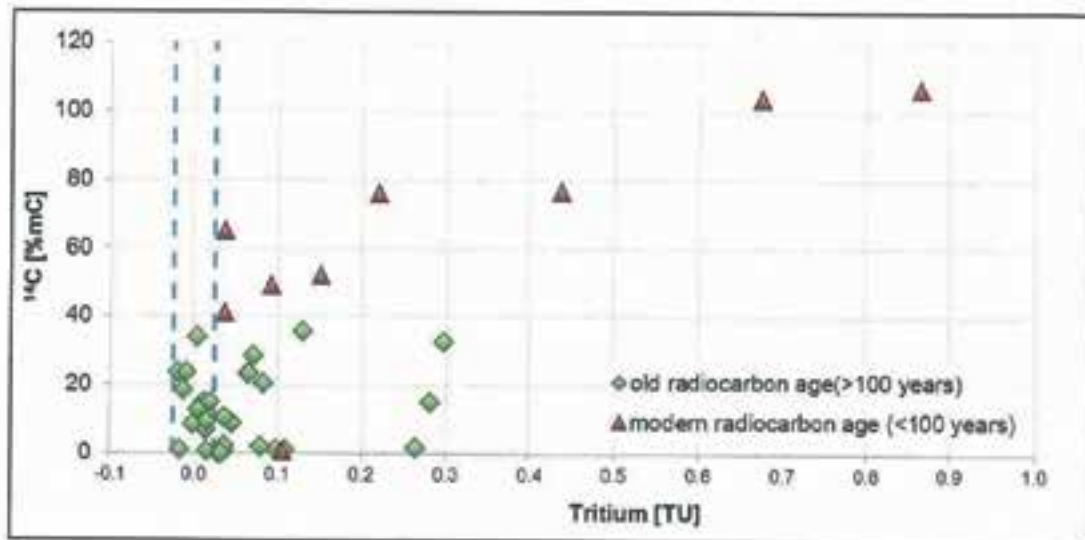


Figure 3 The relationship between ^{14}C and tritium concentrations.

The reason for the discrepancy between radiocarbon and tritium is unclear. Several possible reasons include:

- (1) Inadequate bore construction leading to leakage of modern water down the bore. In some cases a substantial proportion of modern water would be necessary to achieve the observed tritium concentrations.
- (2) Contribution of organic carbon which is not modern to the system (i.e. not 100 %mC). Modelling shows that in order to reconcile the radiocarbon and tritium results, the radiocarbon concentrations of the organic carbon contribution to the system would have to range from 0.3 %mC to 100 %mC.
- (3) Contamination of samples with tritium, such as exposure to extraneous tritium while sampling due to the sampler wearing a luminous watch.

It is not possible with the present data to exclude any one of these possibilities. If the presence of young water is a concern, it is recommended that further monitoring of tritium concentrations is undertaken at appropriate intervals to establish the proportion of young water present.

Yours sincerely



Rob van der Raaij
Scientist, Isotope Hydrology

Uwe Morgenstern
(Reviewer)



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Shenhua Hydrogeological Data Analysis

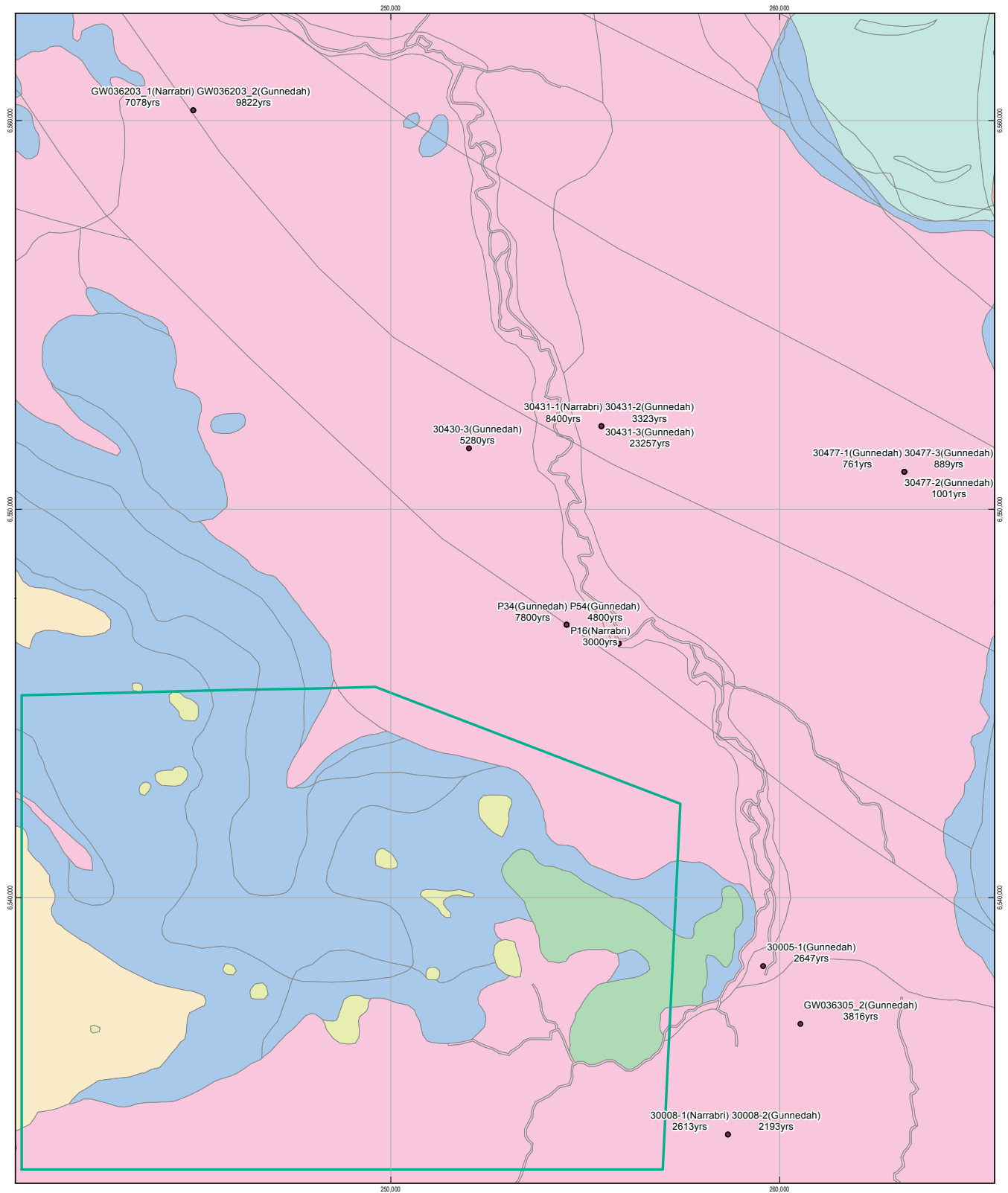
Stage 4 report

Isotope data collection

Bore ID	Eastings GDA94	Northing GDA94	Sample Date	Aquifer/screen	Age (years)	Reference
248108-1	256654	6487784	Jul-00	Colluvium-alluvium 6 - 7 m	4435	Table 5.5 (Timms, WA, Acworth, RI, 2002A)
248108-3	256654	6487784	Mar-97	Weathered Basalt 20.7 - 21.7 m	4897	Table 5.5 (Timms, WA, Acworth, RI, 2002A)
248108-3	256654	6487784	Jul-00	Weathered Basalt 20.7 - 21.7 m	6511	Table 5.5 (Timms, WA, Acworth, RI, 2002A)
248110-3	257190	6487168	Jul-00	Basalt 17-17 m	1836	Table 5.5 (Timms, WA, Acworth, RI, 2002A)
P16	254525	6547016	Mar-00	Narrabri screen 2 - 5 m	3000	Table 6.4 (Timms, WA, Acworth, RI, 2002B)
P34	254525	6547016	Mar-00	Gunnedah Fm ? 32 - 33.5 m	7800	Table 6.4 (Timms, WA, Acworth, RI, 2002B)
P54	254525	6547016	Mar-00	Gunnedah Fm 52.2 - 53.7 m	4800	Table 6.4 (Timms, WA, Acworth, RI, 2002B)
30005-1	259585	6538237	25/03/1998	Gunnedah Fm (75m)	2647	Table 16 (Lavitt, 1999)
30008-1	258679	6533902	29/03/1998	Narrabri Fm (19.2-25.3)	2613	Table 16 (Lavitt, 1999)
30008-2	258679	6533902	29/03/1998	Gunnedah Fm (38.1-44.2)	2193	Table 16 (Lavitt, 1999)
30024-3	277092	6510399	28/03/1998	Gunnedah Fm ? (23-29m)	415	Table 16 (Lavitt, 1999)
30063-1	265082	6519749	26/03/1998	Gunnedah Fm (24-27m)	609	Table 16 (Lavitt, 1999)
30064-2	269586	6518001	27/03/1998	Gunnedah Fm ? (35-39m)	modern	Table 16 (Lavitt, 1999)
30064-3	269586	6518001	27/03/1998	Gunnedah Fm (47.3-51.8m)	91	Table 16 (Lavitt, 1999)
30064-4	269586	6518001	27/03/1998	Gunnedah Fm (73.2-80.5m)	1783	Table 16 (Lavitt, 1999)
30078-1	257418	6524381	25/03/1998	Gunnedah Fm (33-39m)	1590	Table 16 (Lavitt, 1999)
30080-2	257423	6523025	25/03/1998	Gunnedah Fm (44-50m)	1959	Table 16 (Lavitt, 1999)
30082-1	259645	6521783	26/03/1998	Gunnedah Fm (44.9-55.6m)	1266	Table 16 (Lavitt, 1999)
30084-1	263133	6520660	28/03/1998	Gunnedah Fm ? (39.6-45.7m)	609	Table 16 (Lavitt, 1999)
30184-2	274379	6513792	28/03/1998	Gunnedah Fm (32-36.6m)	519	Table 16 (Lavitt, 1999)
30430-3	252018	6551559	24/03/1998	Gunnedah Fm (53.3-56.3m)	5280	Table 16 (Lavitt, 1999)
30431-1	255424	6552132	31/03/1998	Narrabri Fm (20-21m)	8400	Table 16 (Lavitt, 1999)
30431-2	255424	6552132	31/03/1998	Gunnedah Fm (54.3-57.3m)	3323	Table 16 (Lavitt, 1999)
30431-3	255424	6552132	31/03/1998	Gunnedah Fm (81.7-84.7m)	23257	Table 16 (Lavitt, 1999)
30477-1	263216	6550954	30/03/1998	Narrabri Fm (26.8-29.9m)	761	Table 16 (Lavitt, 1999)
30477-2	263216	6550954	30/03/1998	Gunnedah (41.4-44.2m)	1001	Table 16 (Lavitt, 1999)
30477-3	263216	6550954	30/03/1998	Gunnedah (57.9-61m)	889	Table 16 (Lavitt, 1999)
36168-2	255872	6546534	24/03/1998	Gunnedah (54.9-57.9m)	3360	Table 16 (Lavitt, 1999)



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- LEGEND**
- Shenhua Lease Boundary
 - Groundwater Age by Formation
 - Basalt
 - Benelabri
 - Clare Sst
 - Colluvium
 - Digby
 - Gunnedah
 - Hoskissons
 - Interburden
 - Melville
 - Narrabri
 - Pamboola
 - Watermark
 - Geology**
 - Carboniferous: New England Orogen Units
 - Cretaceous: Keelindi Beds
 - Devonian Parry Group
 - Jurassic: Surat Basin Units
 - Permian: Black Jack, Millie Groups Werrie Basalt
 - Quaternary Alluvials
 - Tertiary Volcanics
 - Triassic: Digby and Napperby Fm

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Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



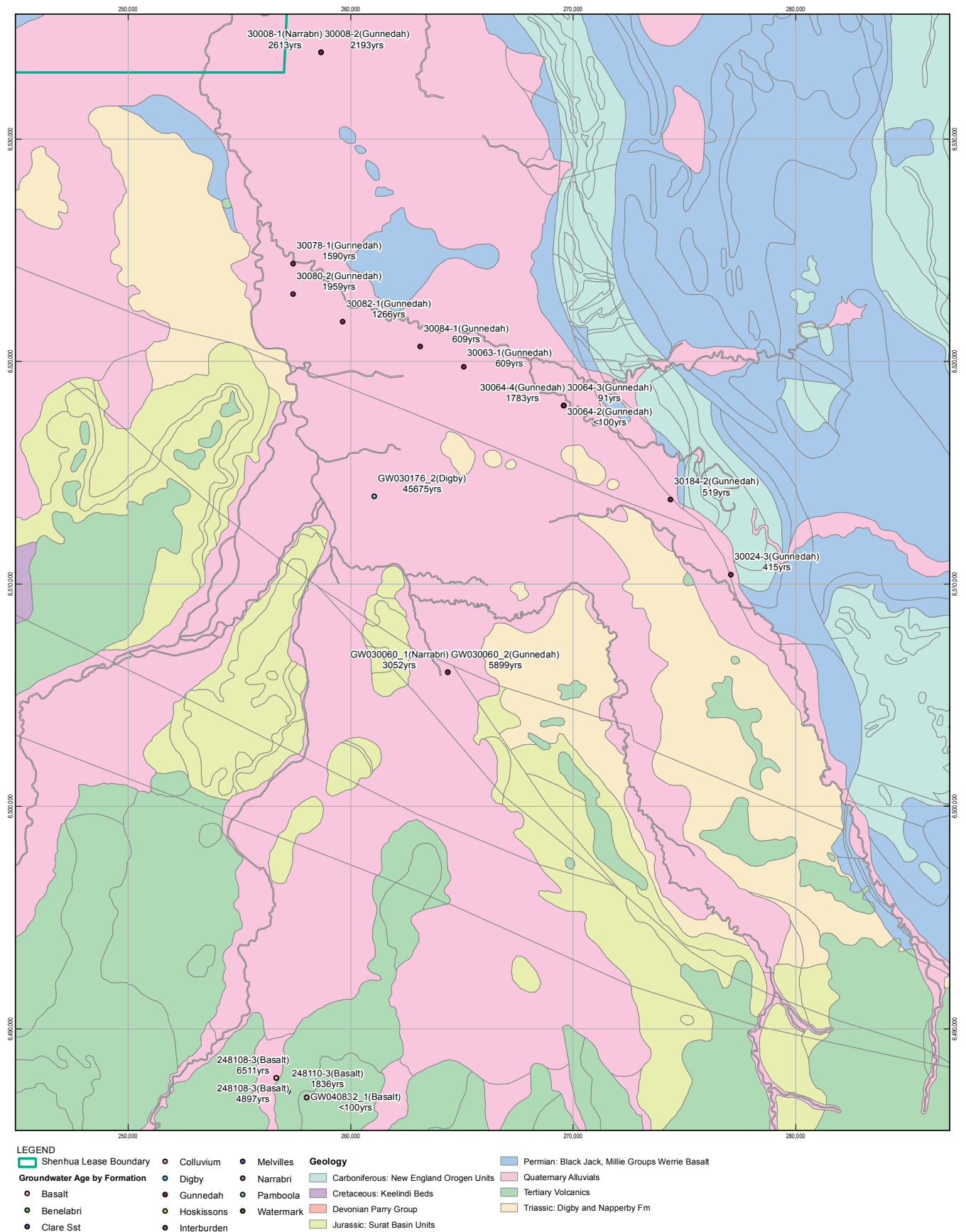
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Shenhua Watermark Coal Pty Ltd
Isotope and Stygofauna Investigations

**Isotope Analysis
Northern Location Plan**

Job Number | 22-15702-13
Revision | A
Date | 19 Jul 2012

G:\22\14551\GIS\Maps\Deliverables\Hydrogeology\Stygo_Iso_BoreLocation.mxd 8/180 Lonsdale St Melb VIC 3000 Australia T 61 3 8687 8000 F 61 3 8687 8111 E melmail@ghd.com.au W www.ghd.com.au
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