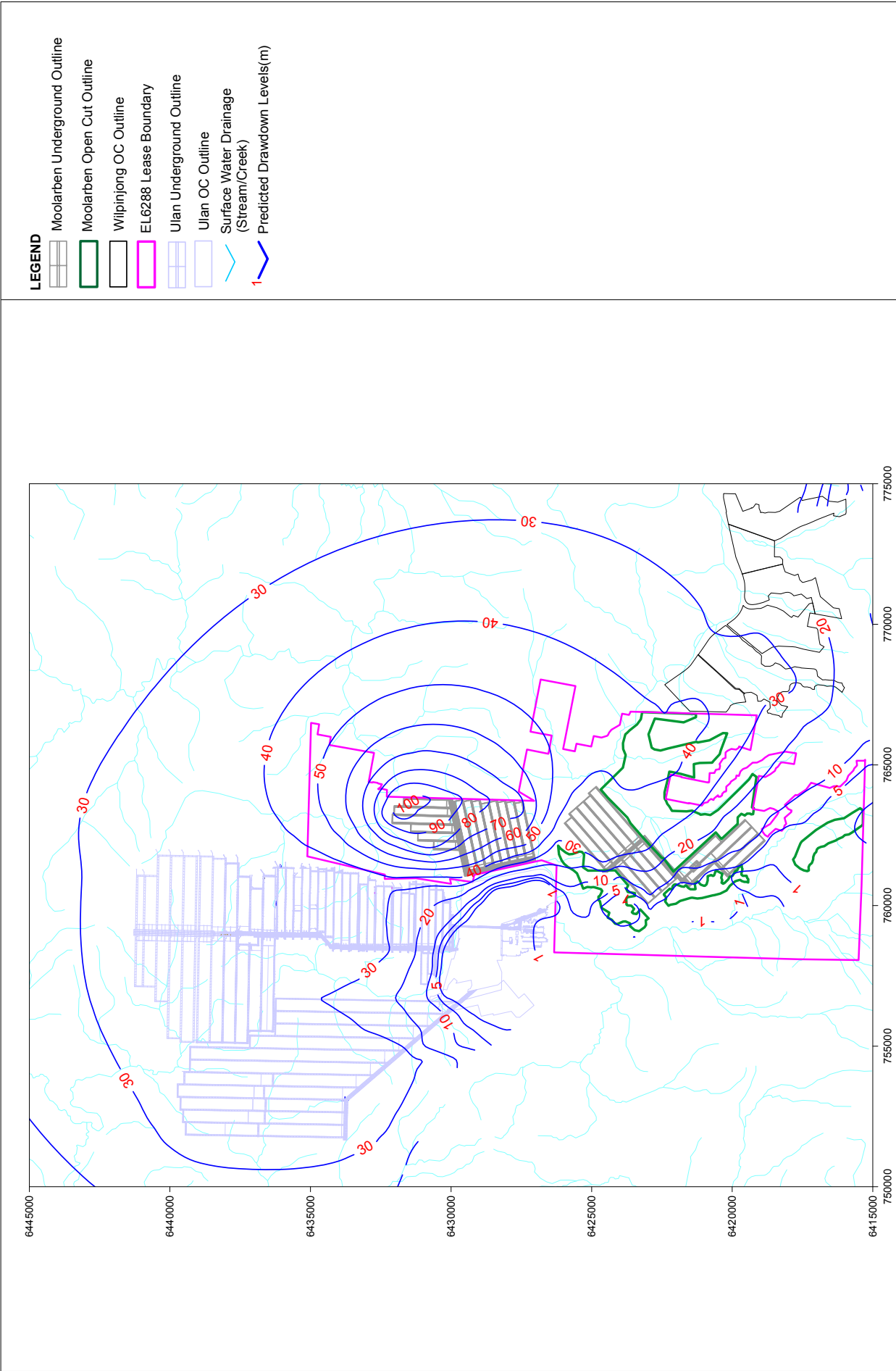


PREDICTED GROUNDWATER LEVELS IN ULAN COAL SEAM-END OF MINING(2042) FIGURE 6.1a

F:\Jobs\S6\S6\300\012 Original Drawings\srf014b.srf

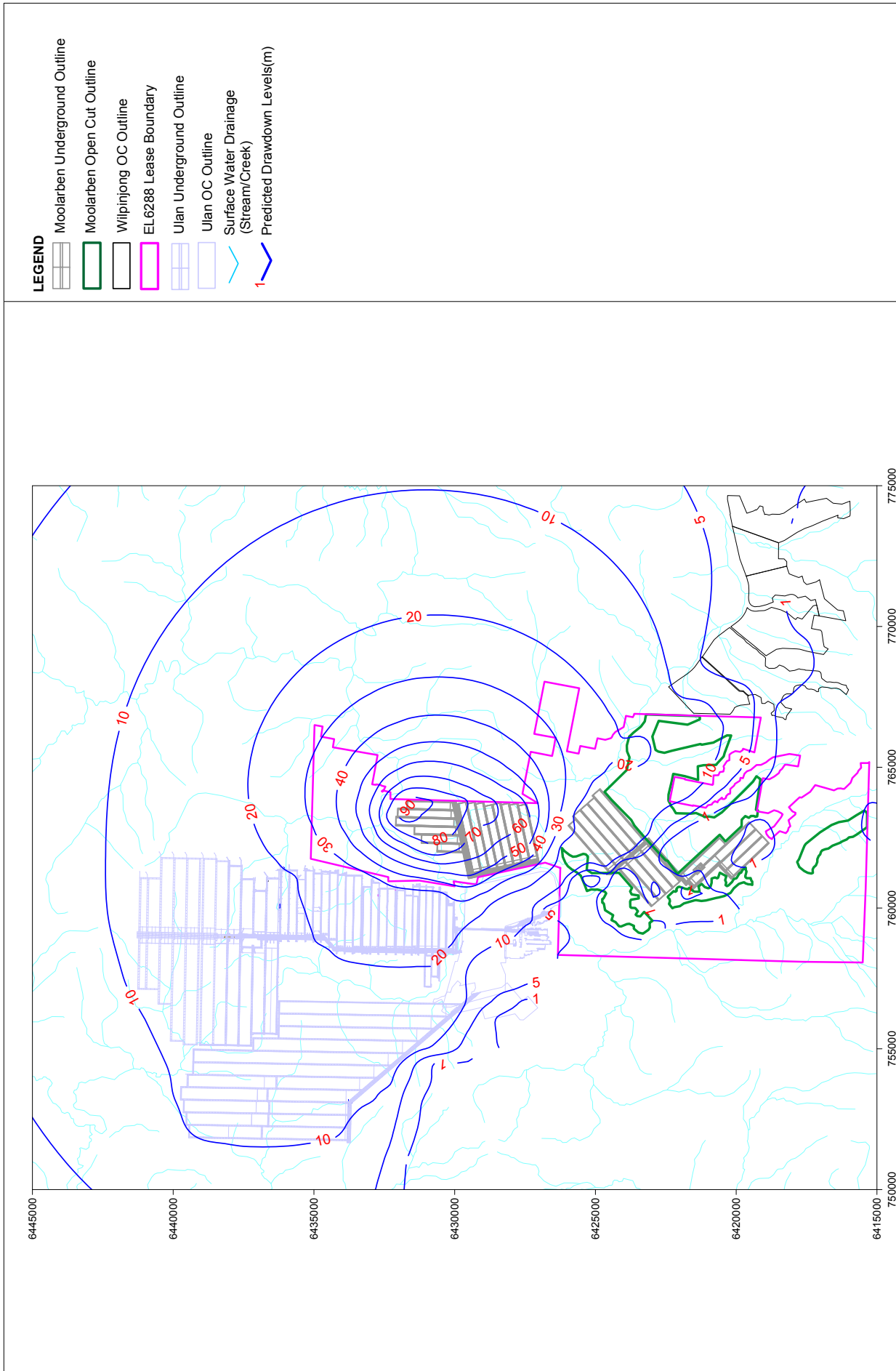




PREDICTED DRAWDOWN IN ULAN COAL SEAM-END OF MINING(2042) FIGURE 6.1b

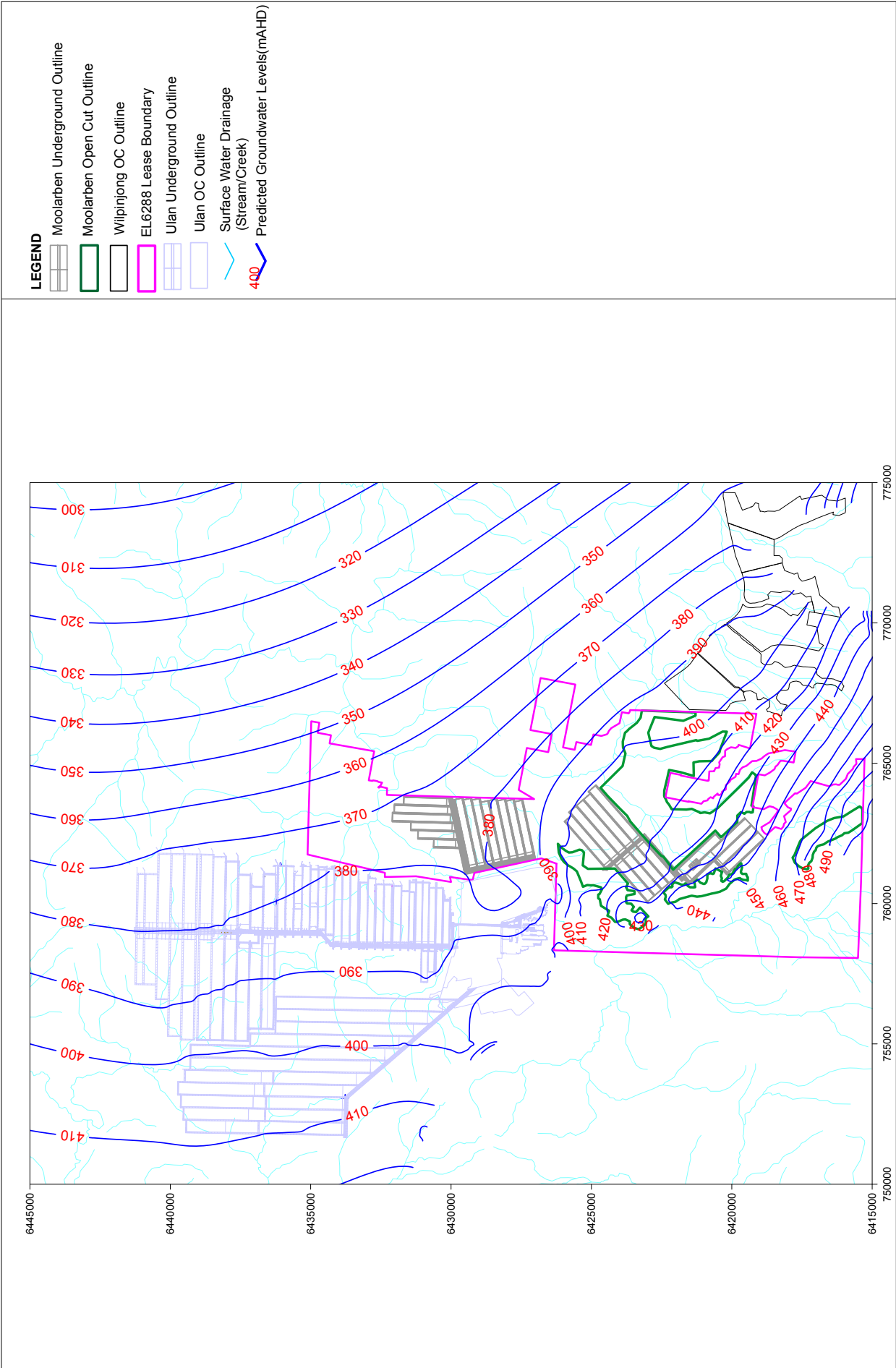
F:\Jobs\Se\6L\300\012 Original Drawings\sr015b.srf













PREDICTED DRAWDOWN DUE TO MOOLARBEN IN ULAN COAL SEAM-END OF MINING(2042) FIGURE 6.1c  
 F:\Jobs\SE\S6\300\012 Original Drawings\sr030b.srf





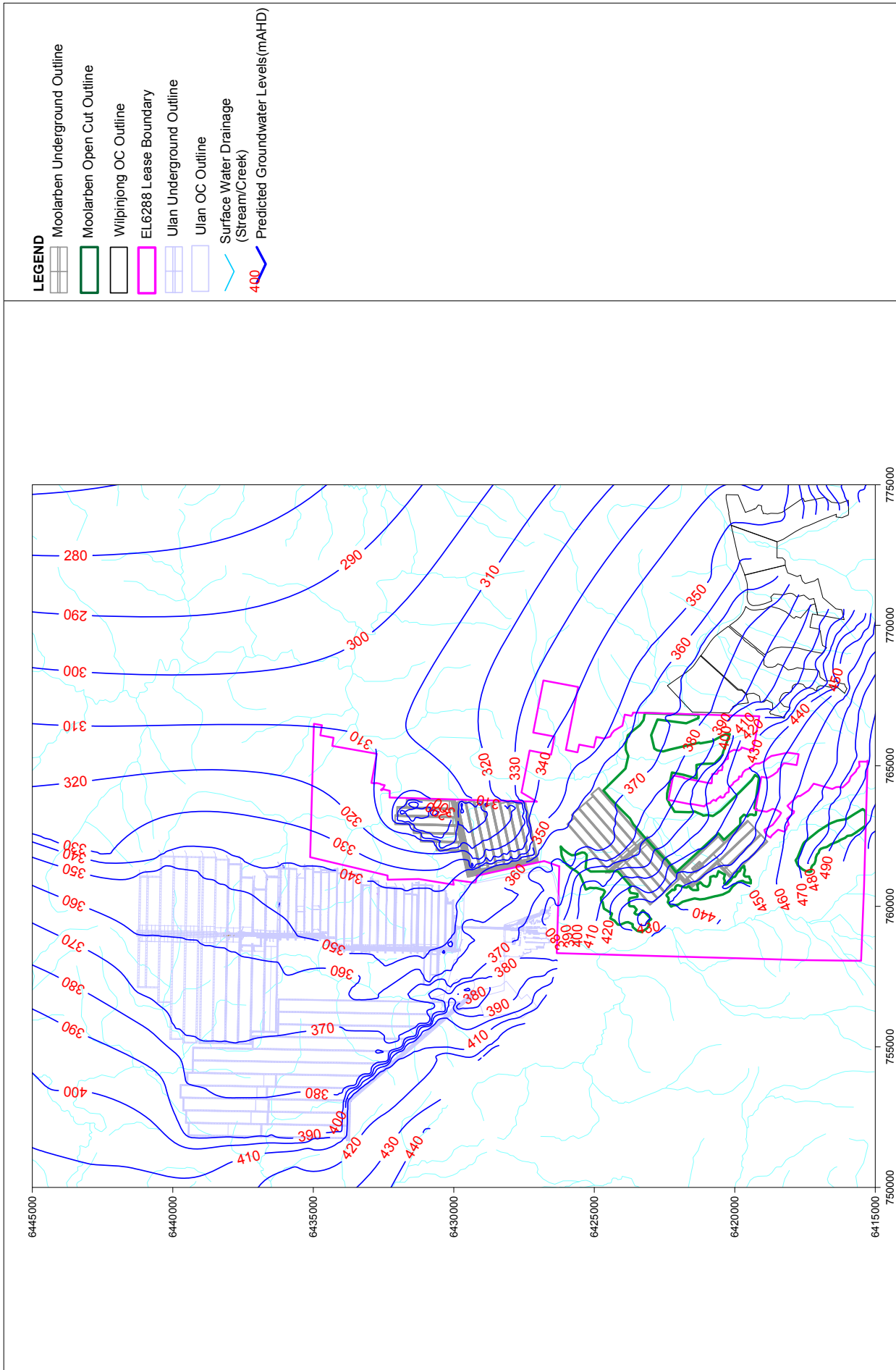
**LEGEND**

-  Moolarben Underground Outline
-  Moolarben Open Cut Outline
-  Wipinjong OC Outline
-  EL6288 Lease Boundary
-  Ulan Underground Outline
-  Ulan OC Outline
-  Surface Water Drainage (Stream/Creek)
-  Predicted Groundwater Levels(mAHD)

**PREDICTED GROUNDWATER LEVELS IN ULAN COAL SEAM-100 YEARS RECOVERY(2142) FIGURE 6.1d**

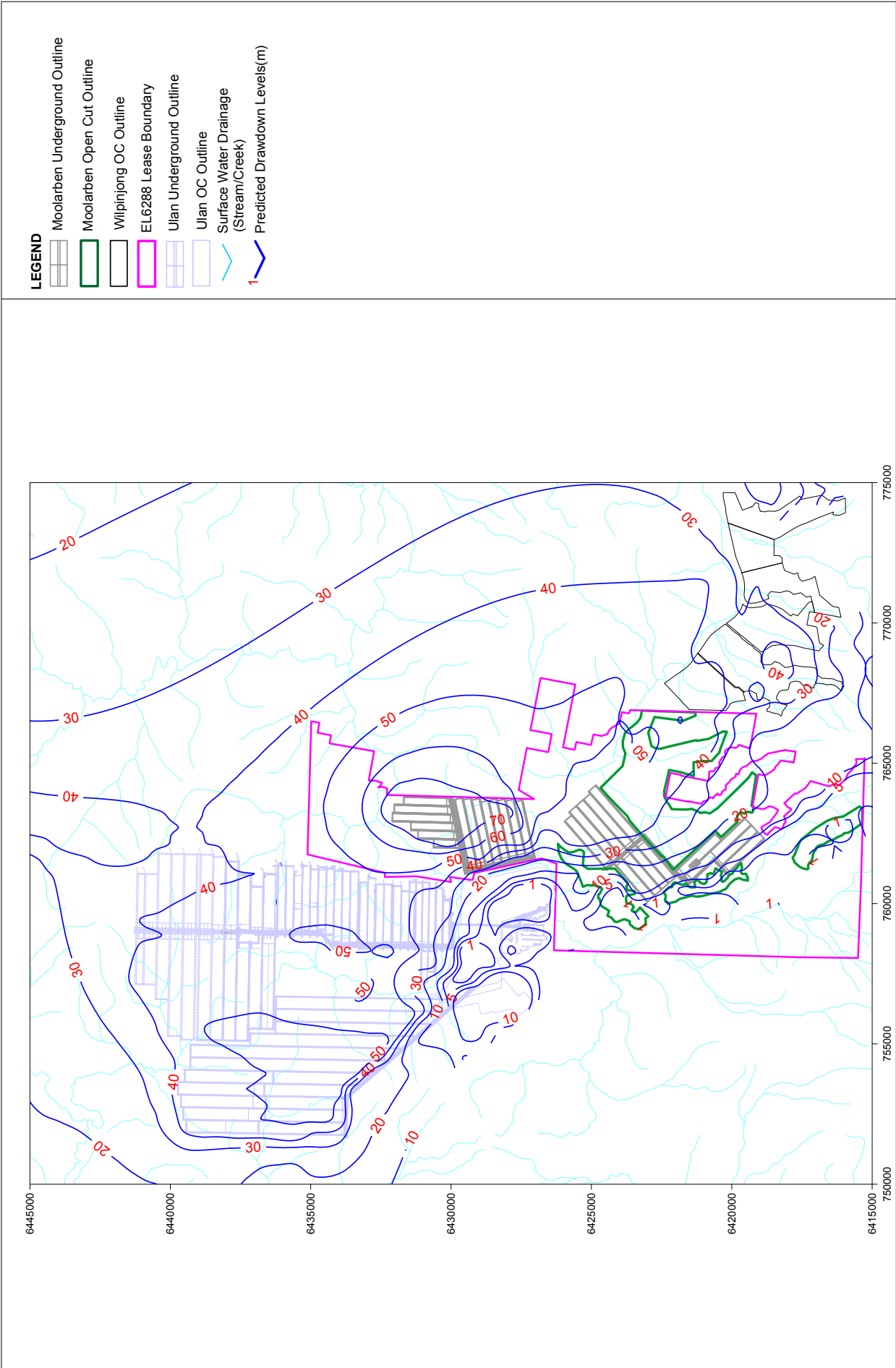
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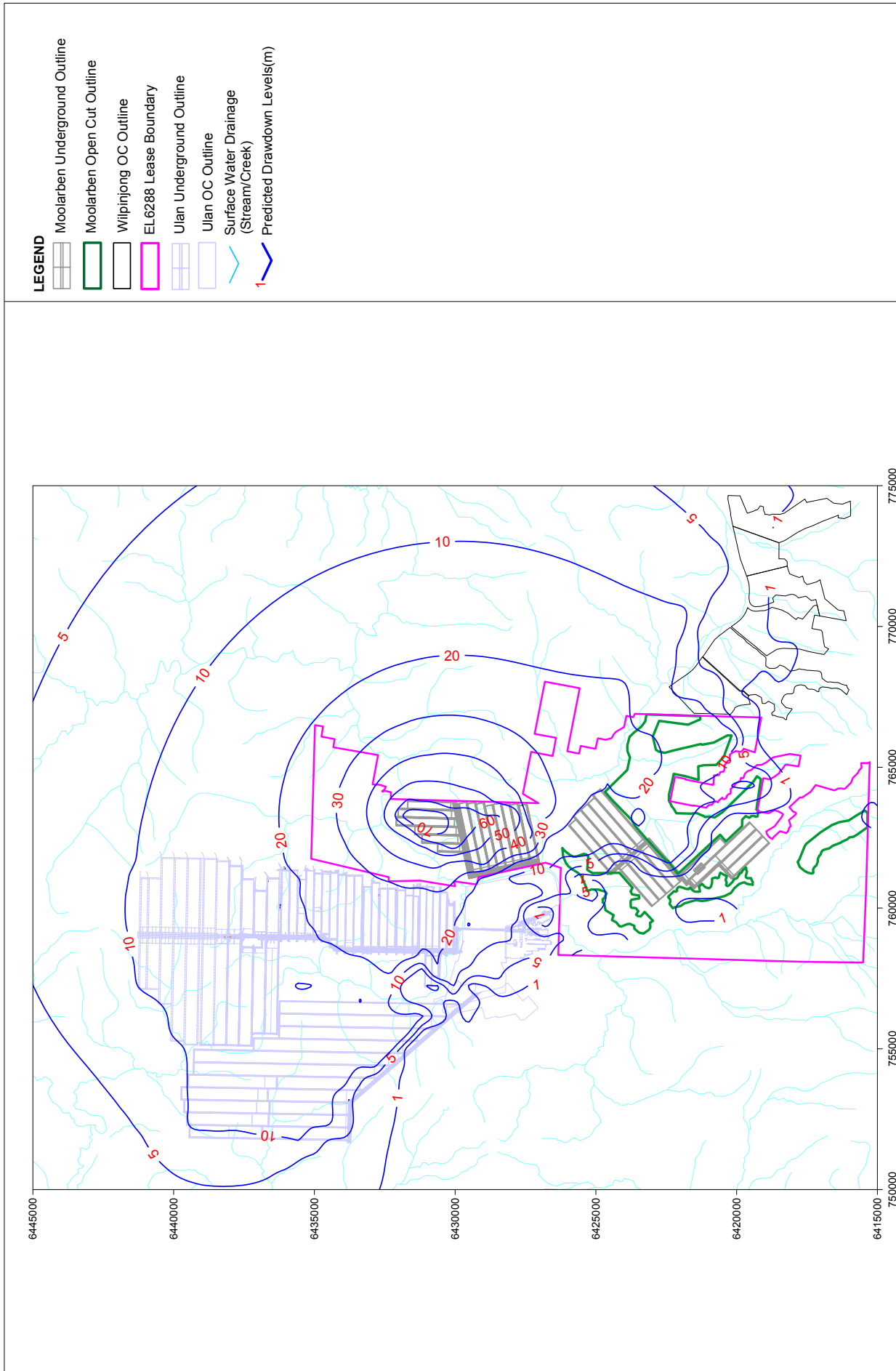
**PREDICTED GROUNDWATER LEVELS IN LOWER PERMIAN-END OF MINING(2042) FIGURE 6.2a**  
 F:\Jobs\S6\S6LU300\012 Original Drawings\srf017b.srf





**PREDICTED DRAWDOWN IN LOWER PERMIAN-END OF MINING(2042) FIGURE 6.2b**  
F:/Jobs/S6/S6L/300/012 Original Drawings/srf018b.srf





PREDICTED DRAWDOWN DUE TO MOOLARBEN IN LOWER PERMIAN-END OF MINING(2042) FIGURE 6.2C  
 F:\Jobs\SE\S6\300\012 Original Drawings\sr031b.srf



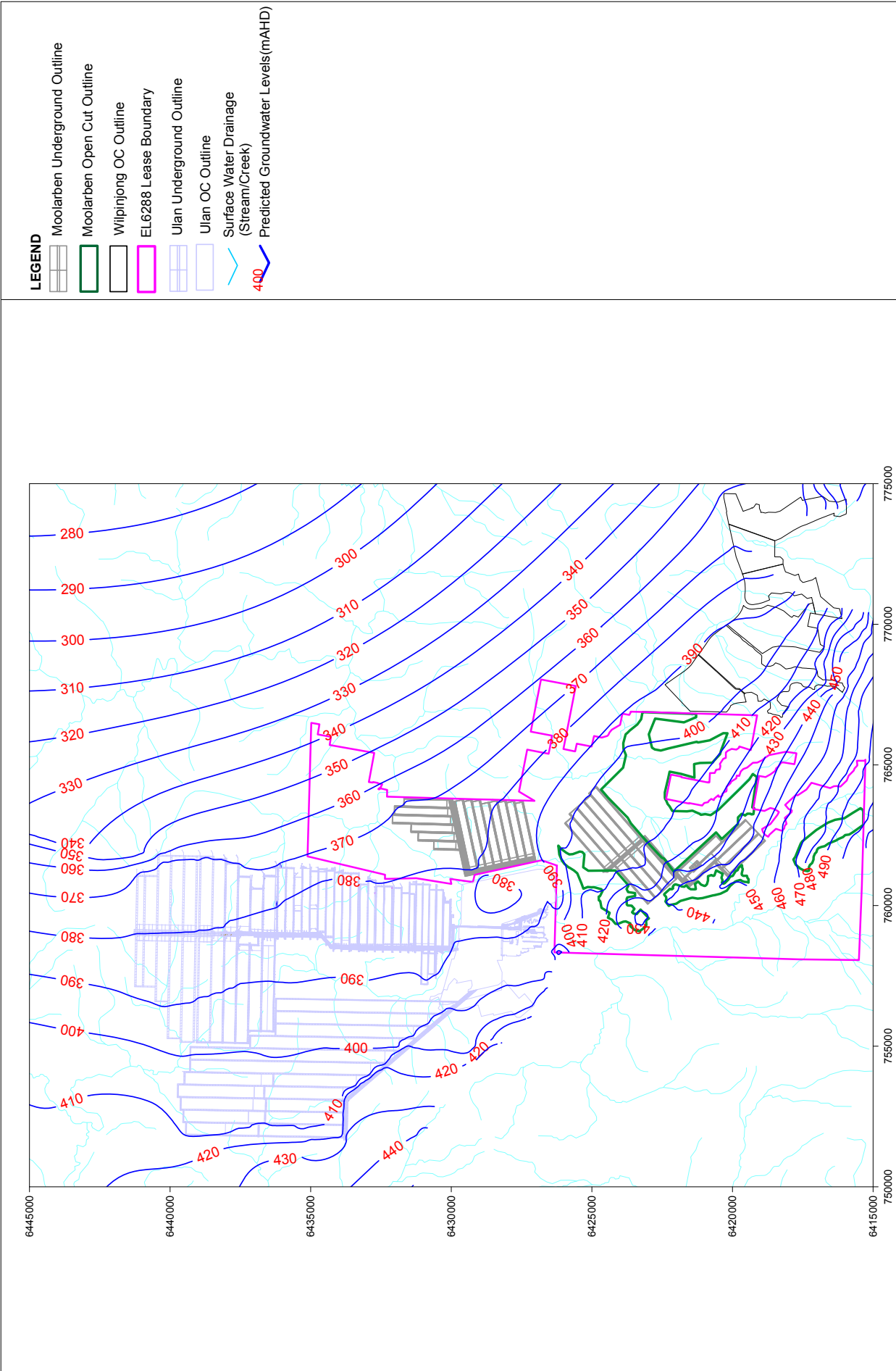
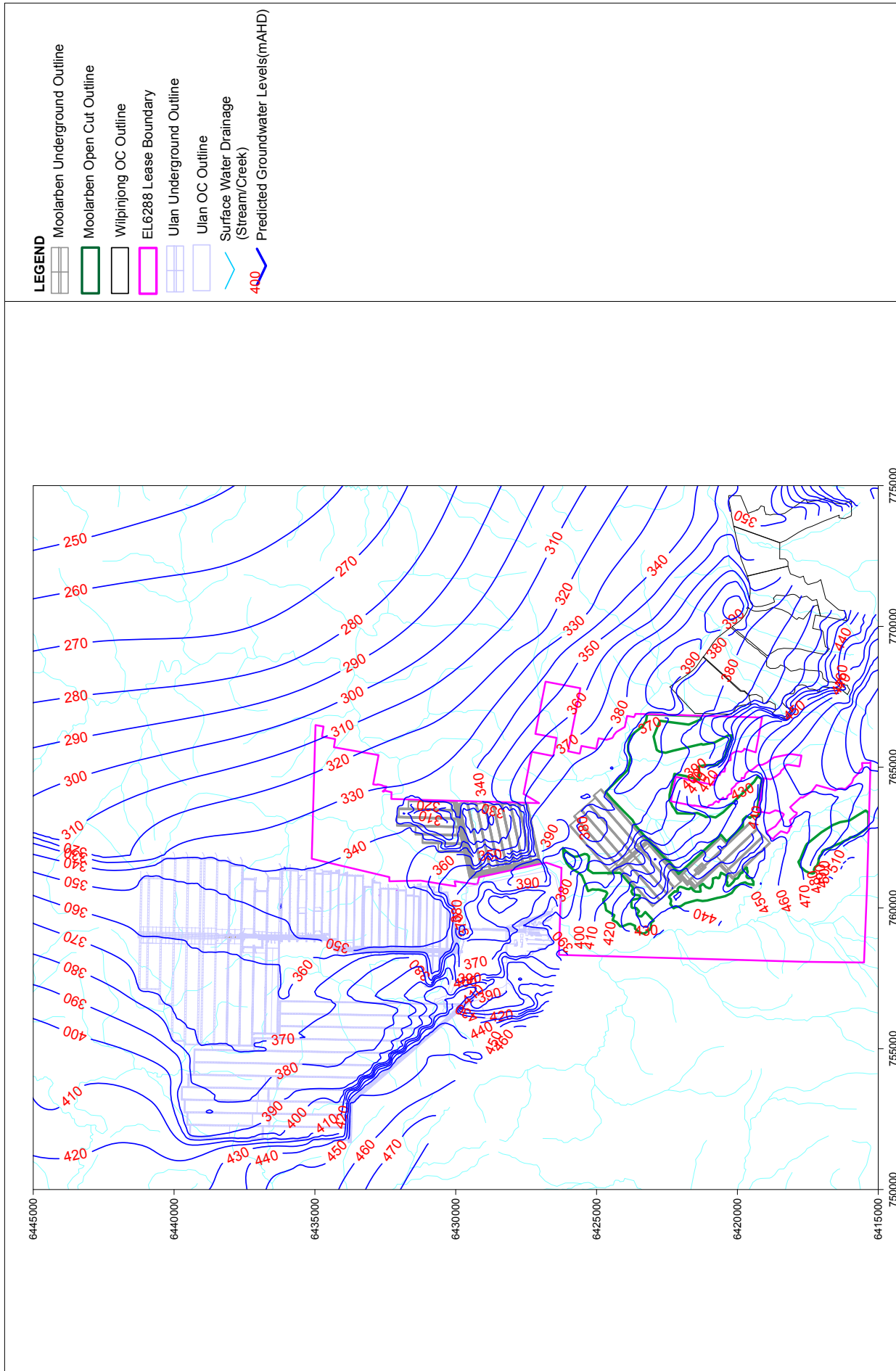


FIGURE 6.2d F:\Jobs\98\96\300\012 Original Drawings\srfd19b.srf

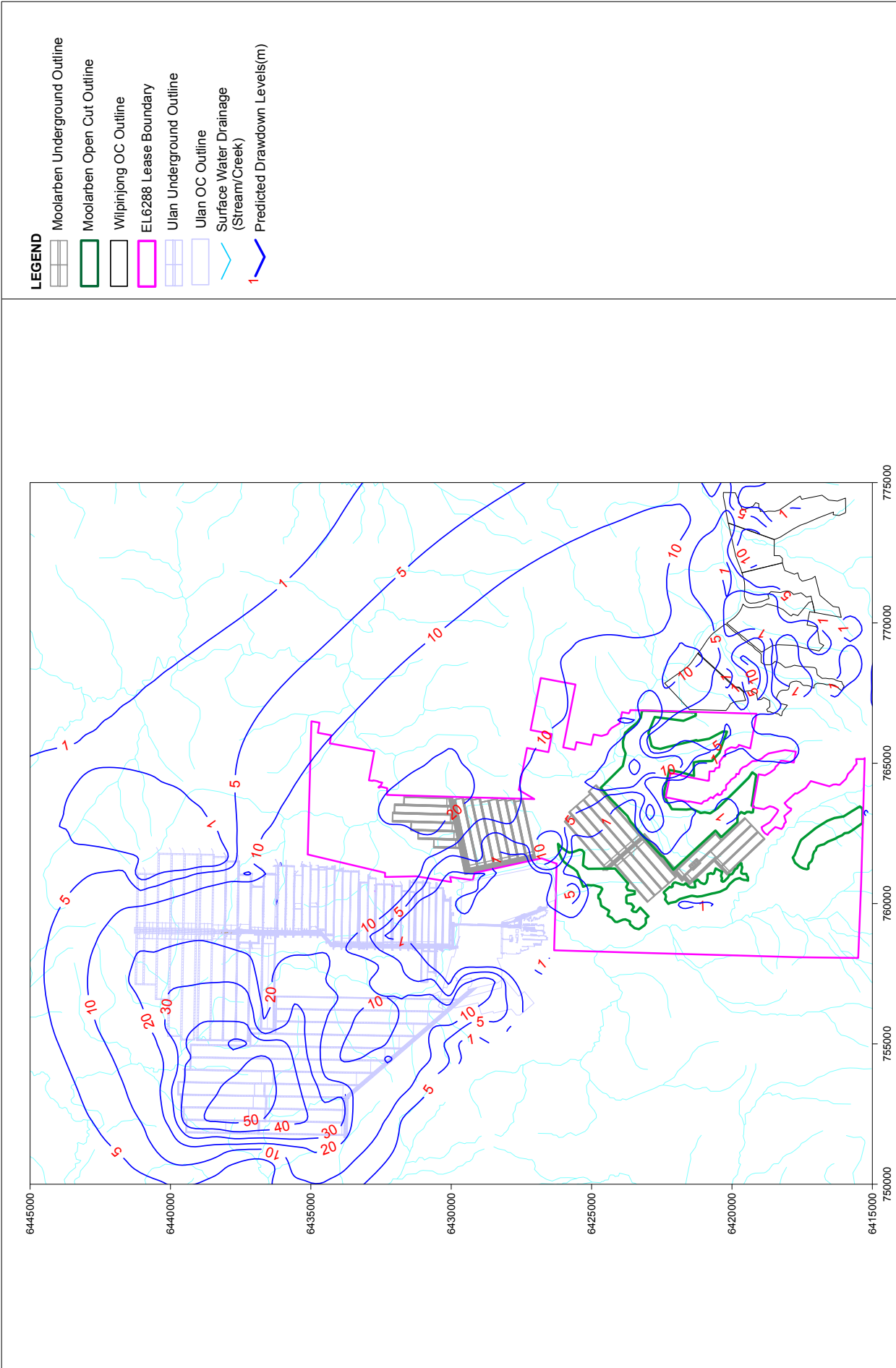






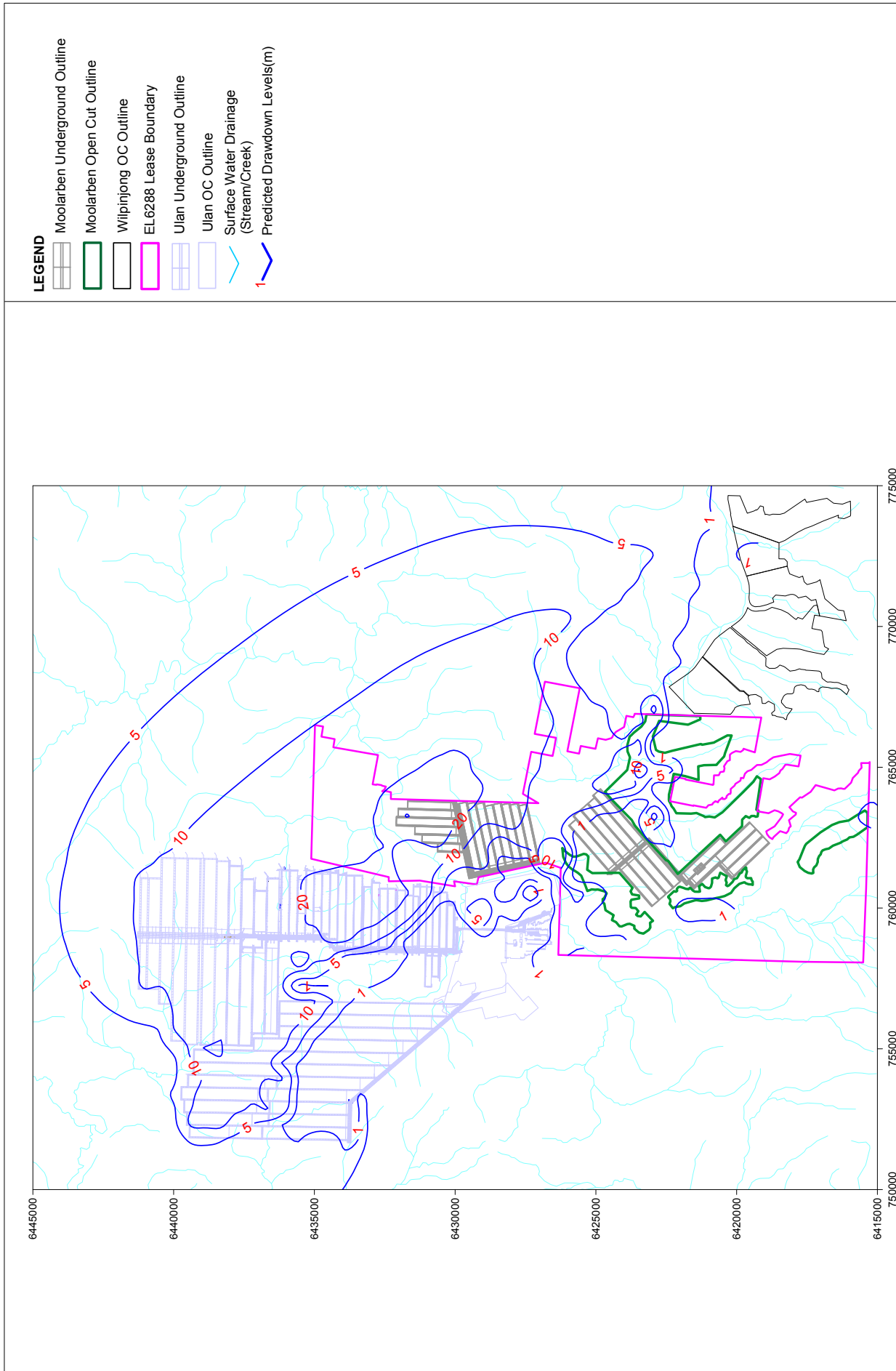
**PREDICTED GROUNDWATER LEVELS IN MIDDLE PERMIAN-END OF MINING(2042)** FIGURE 6.3a  
 F:\Jobs\SS\6L\300012 Original Drawings\rf020b.srf





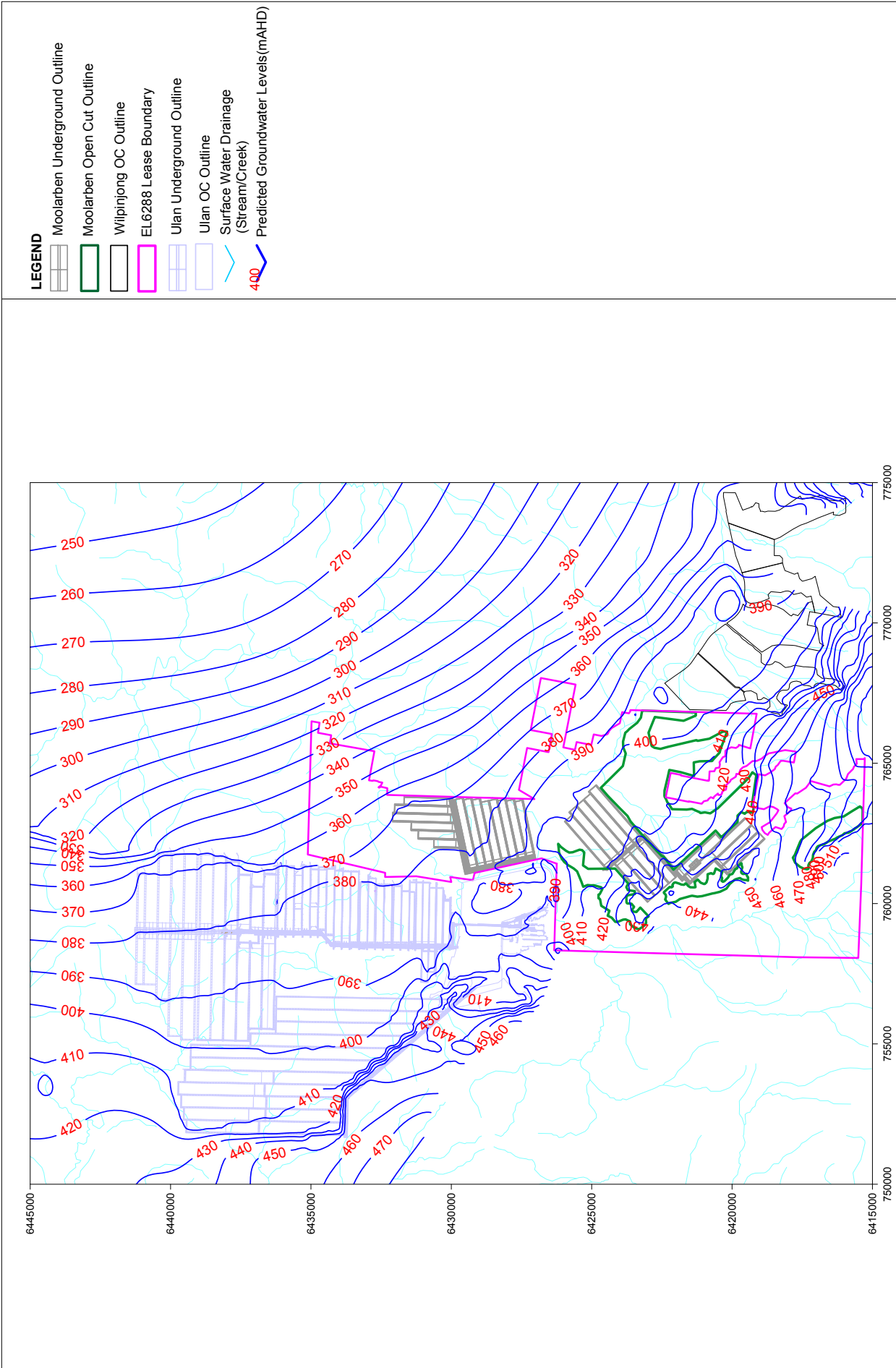
**PREDICTED DRAWDOWN IN MIDDLE PERMIAN-END OF MINING(2042)** FIGURE 6.3b  
F:\Jobs\SG\SG\300\012 Original Drawings\sf021b.srf













PREDICTED DRAWDOWN DUE TO MOOLARBEN IN MIDDLE PERMIAN-END OF MINING(2042) FIGURE 6.3C  
 F:\Jobs\S6\S6L\300\012 Original Drawings\srf032b.srf



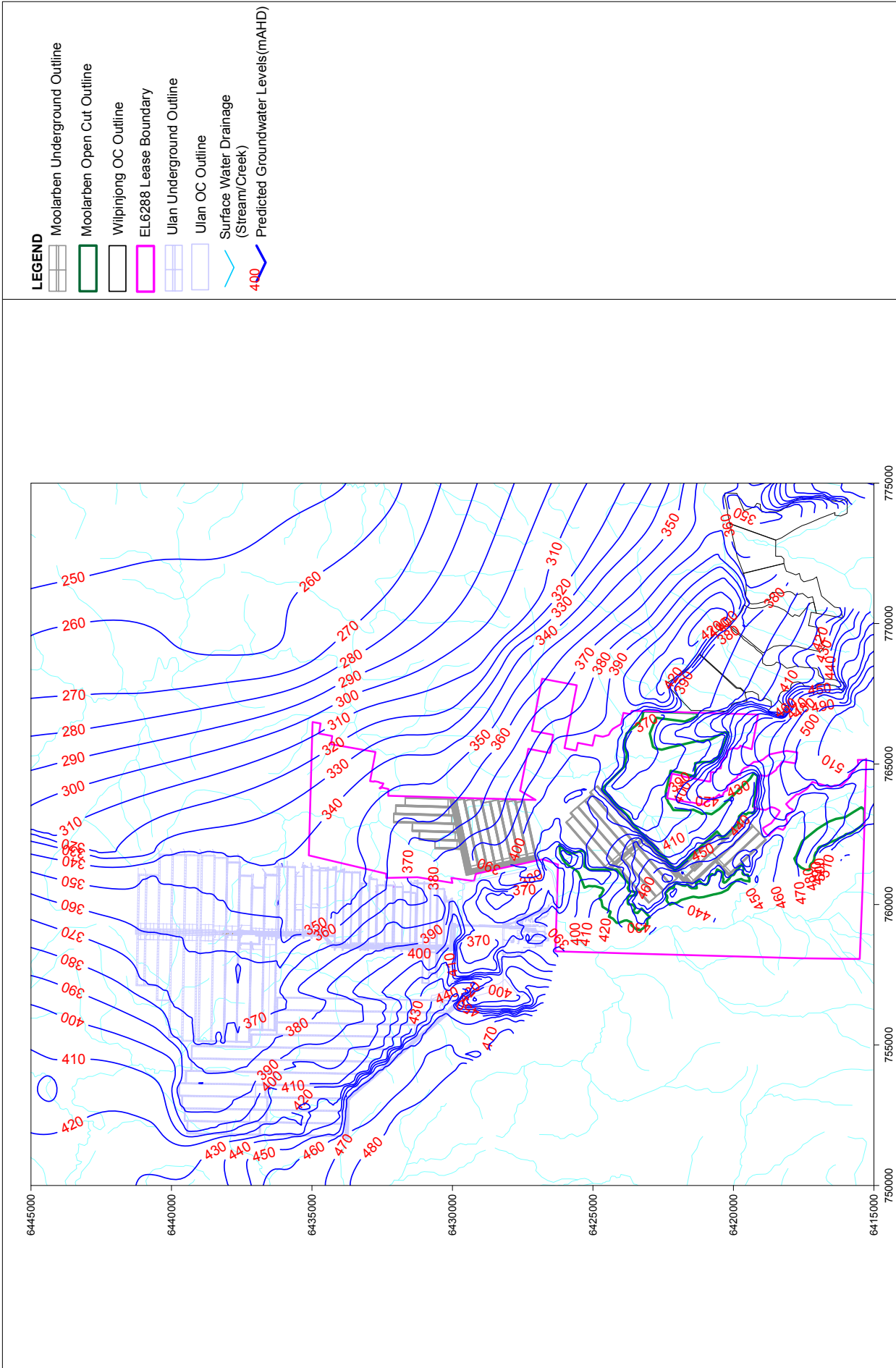


**LEGEND**

-  Moolarben Underground Outline
-  Moolarben Open Cut Outline
-  Wilpinjong OC Outline
-  EL6288 Lease Boundary
-  Ulan Underground Outline
-  Ulan OC Outline
-  Surface Water Drainage (Stream/Creek)
-  Predicted Groundwater Levels(mAHD)

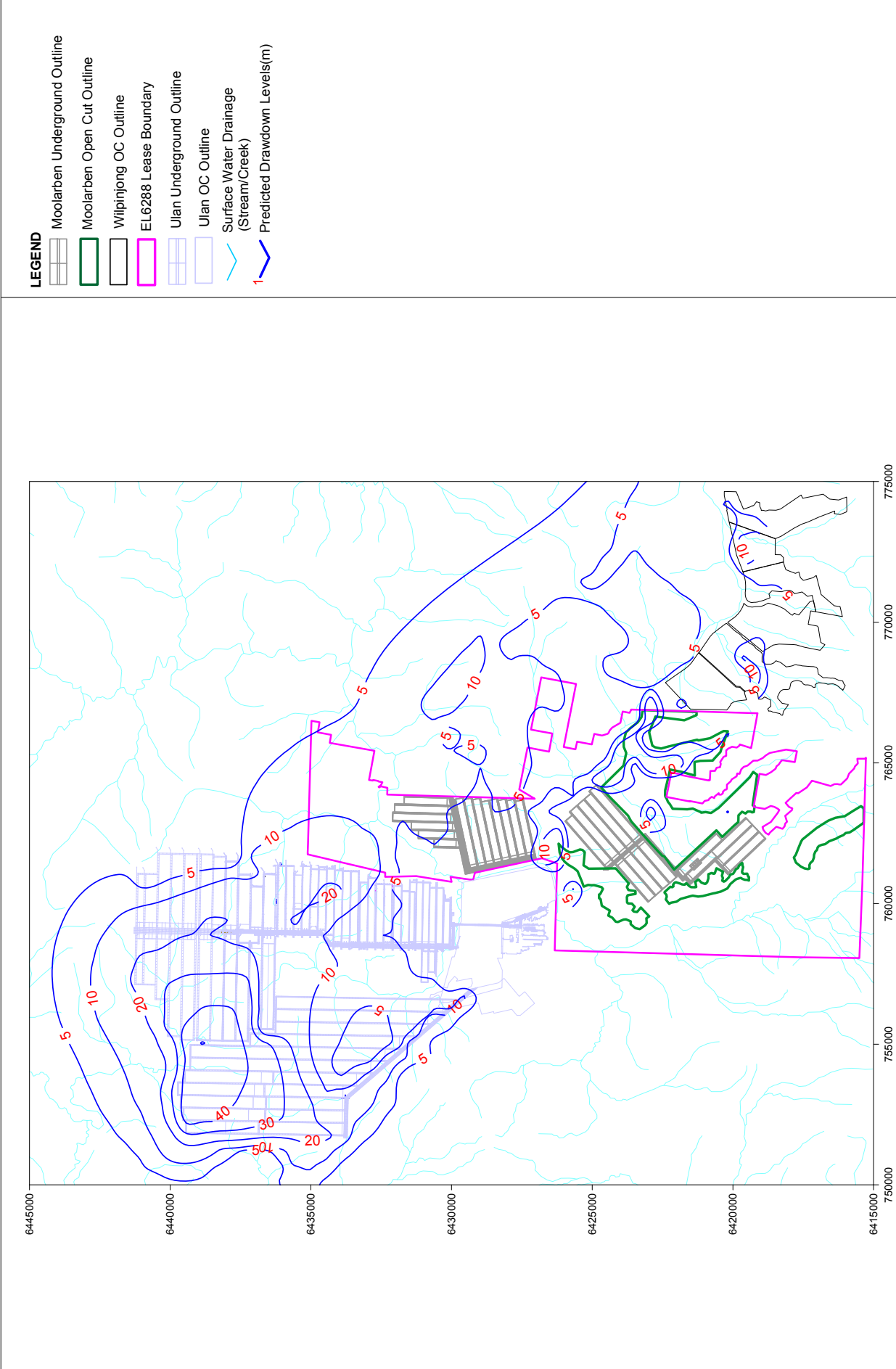
**PREDICTED GROUNDWATER LEVELS IN MIDDLE PERMIAN-100 YEARS RECOVERY(2142)** FIGURE 6.3d  
F:\Jobs\56\56L\300\012 Original Drawings\rf02b.srf





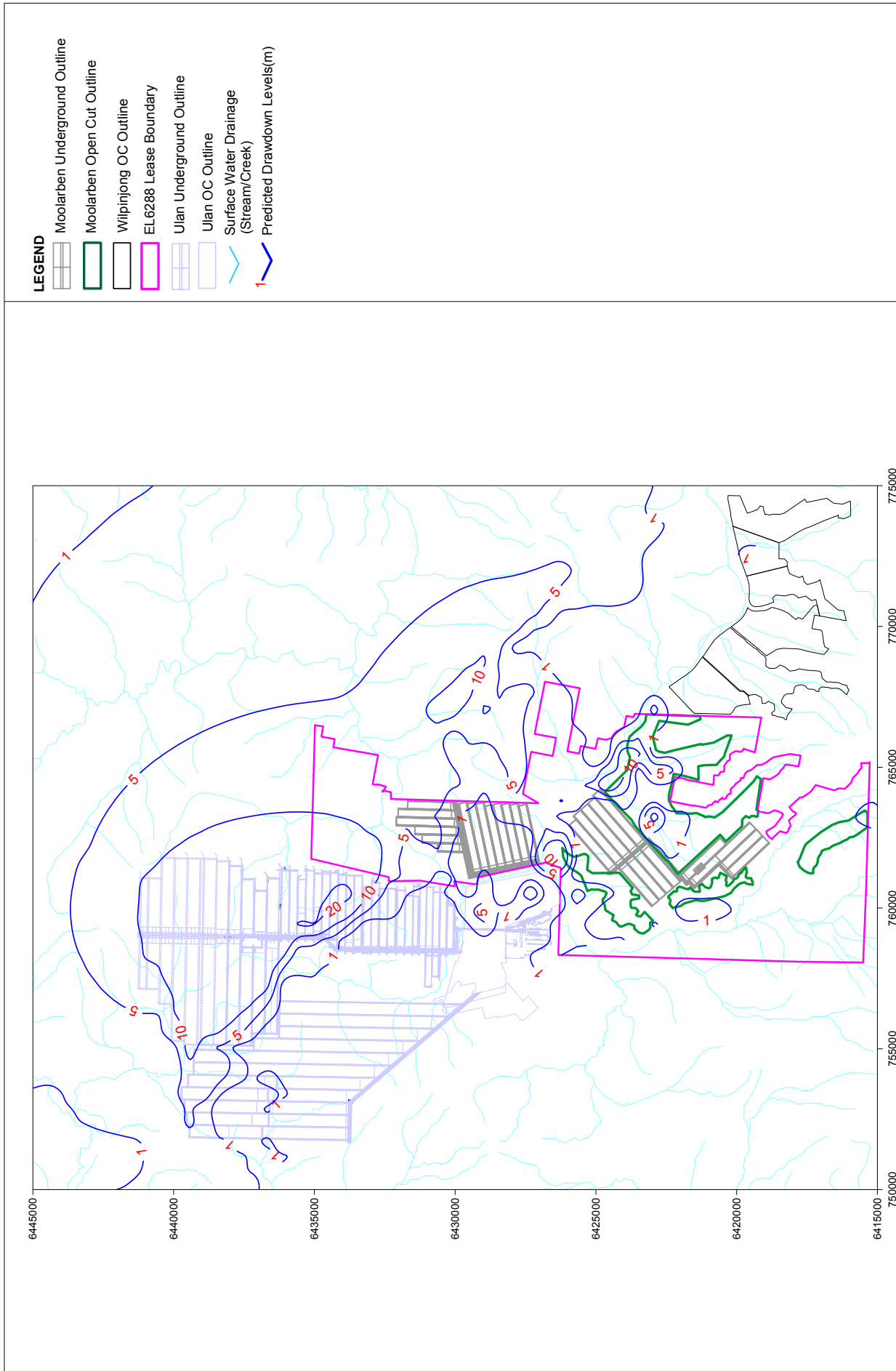
**PREDICTED GROUNDWATER LEVELS IN UPPER PERMIAN-END OF MINING(2042)** FIGURE 6.4a  
 F:\Jobs\SS\6L\3000\12 Original Drawings\rf023b.srf





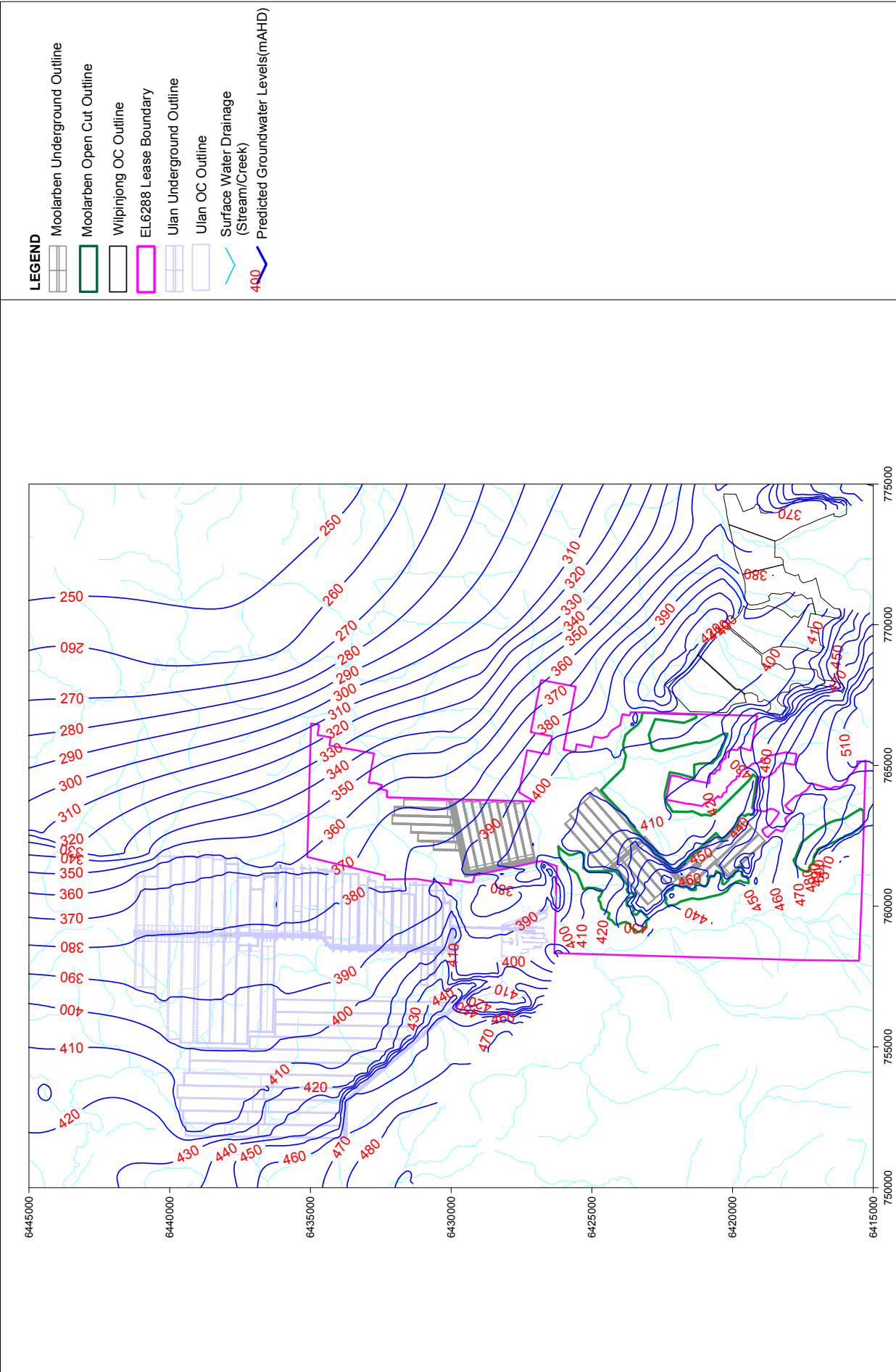
PREDICTED DRAWDOWN IN UPPER PERMIAN-END OF MINING(2042) FIGURE 6.4b  
F:\Jobs\S6\S6L\300\012.Original Drawings\srf024b.srf





PREDICTED DRAWDOWN DUE TO MOOLARBEN IN UPPER PERMIAN-END OF MINING(2042) FIGURE 6.4C  
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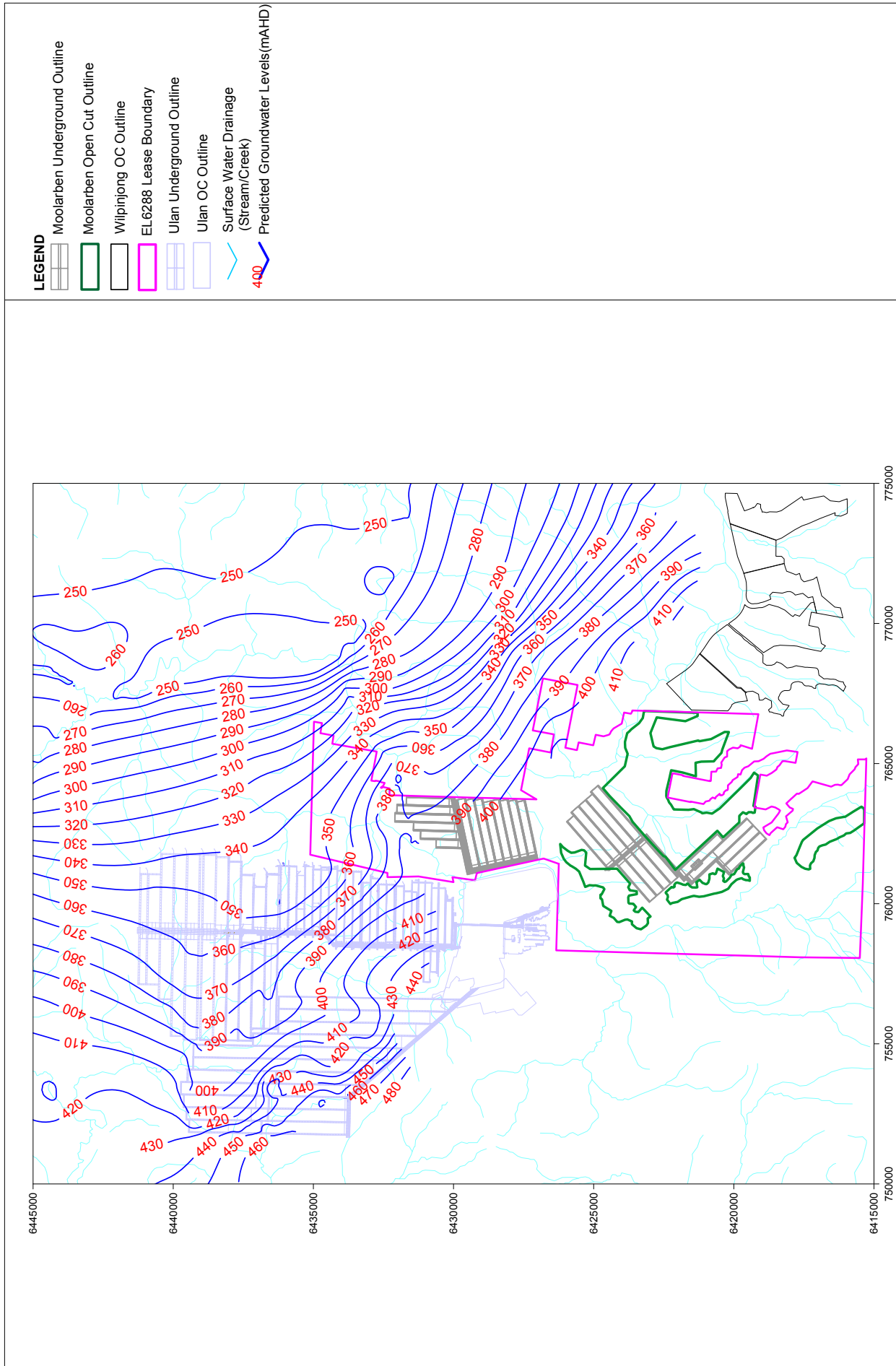




PREDICTED GROUNDWATER LEVELS IN UPPER PERMIAN-100 YEARS RECOVERY(2142) FIGURE 6.4d  
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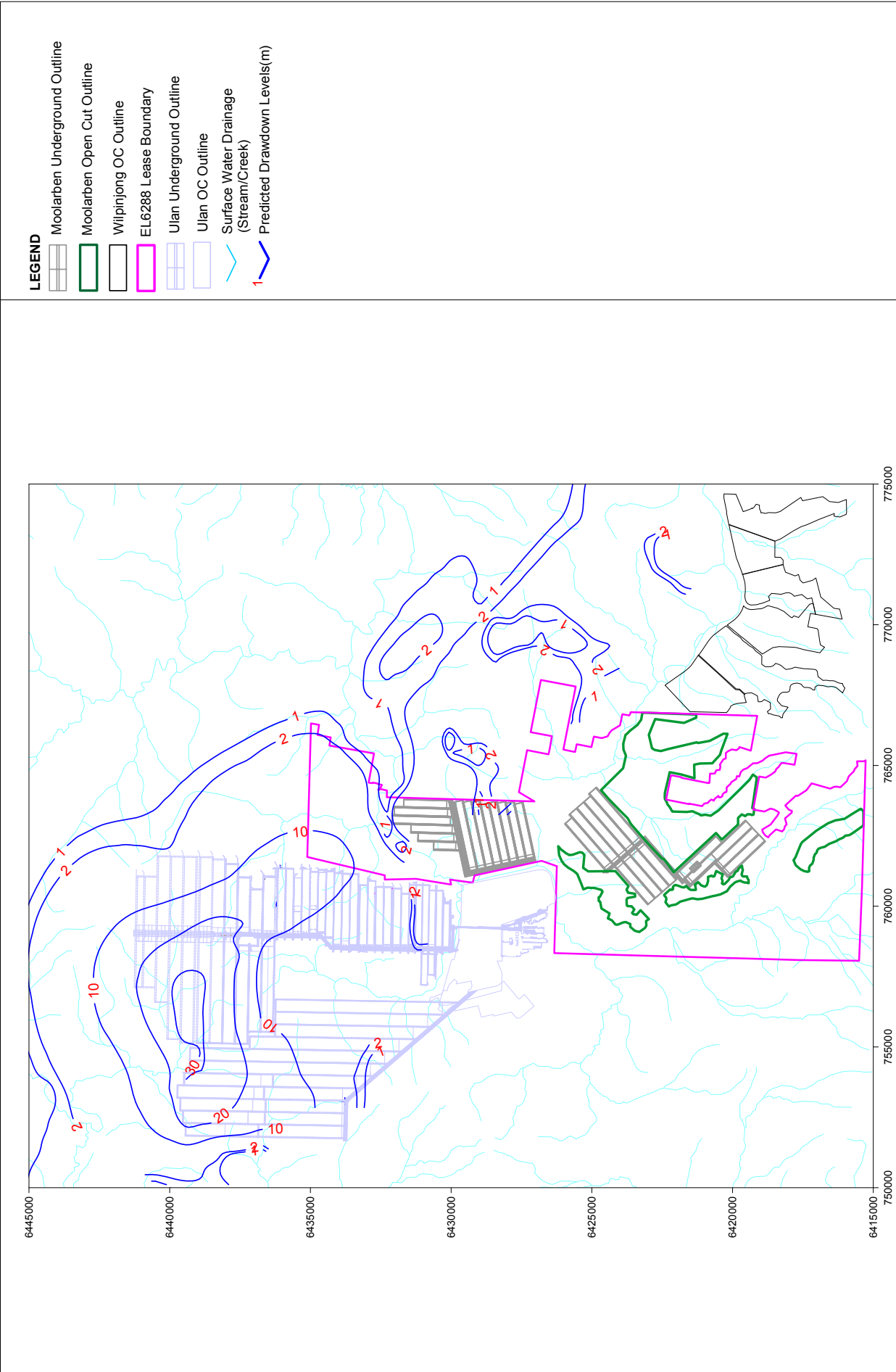






**PREDICTED GROUNDWATER LEVELS IN LOWER TRIASSIC-END OF MINING(2042)** FIGURE 6.5a  
 F:\Jobs\SS6\300012 Original Drawings\sr011b.srf

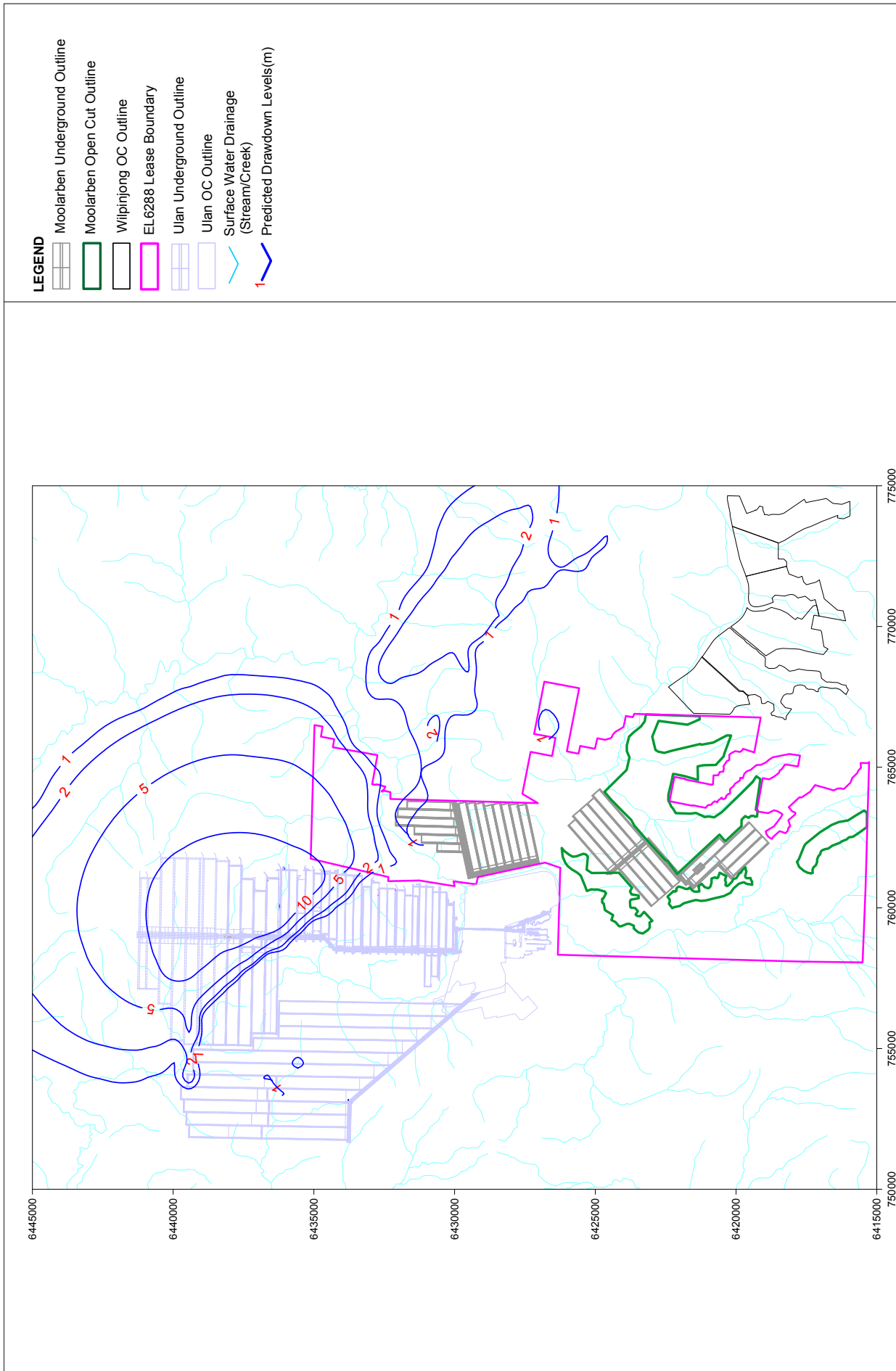




PREDICTED DRAWDOWN IN LOWER TRIASSIC-END OF MINING(2042) FIGURE 6.5b

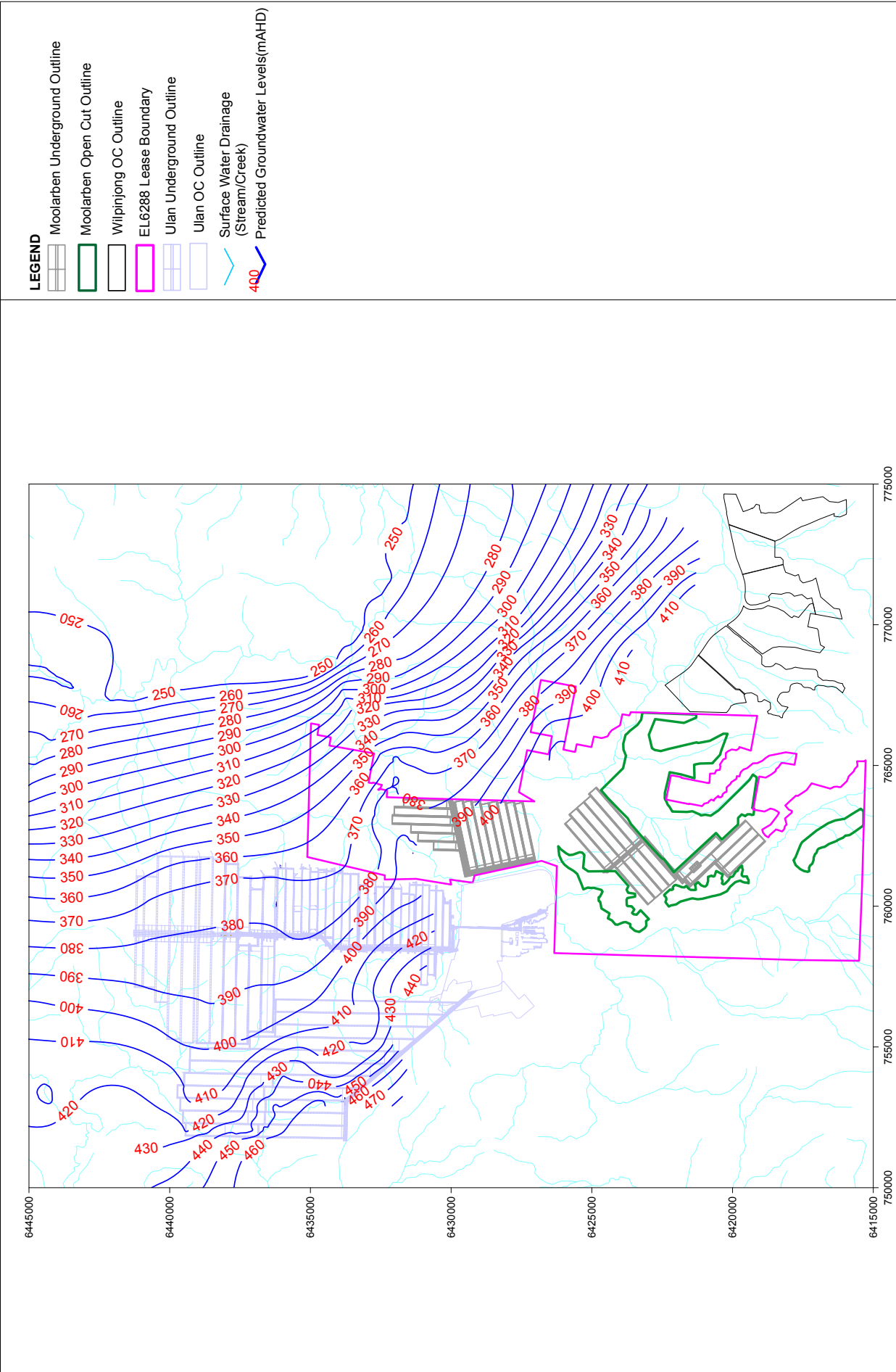
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PREDICTED DRAWDOWN DUE TO MOOLARBEN IN LOWER TRIASSIC-END OF MINING(2042) FIGURE 6.5C  
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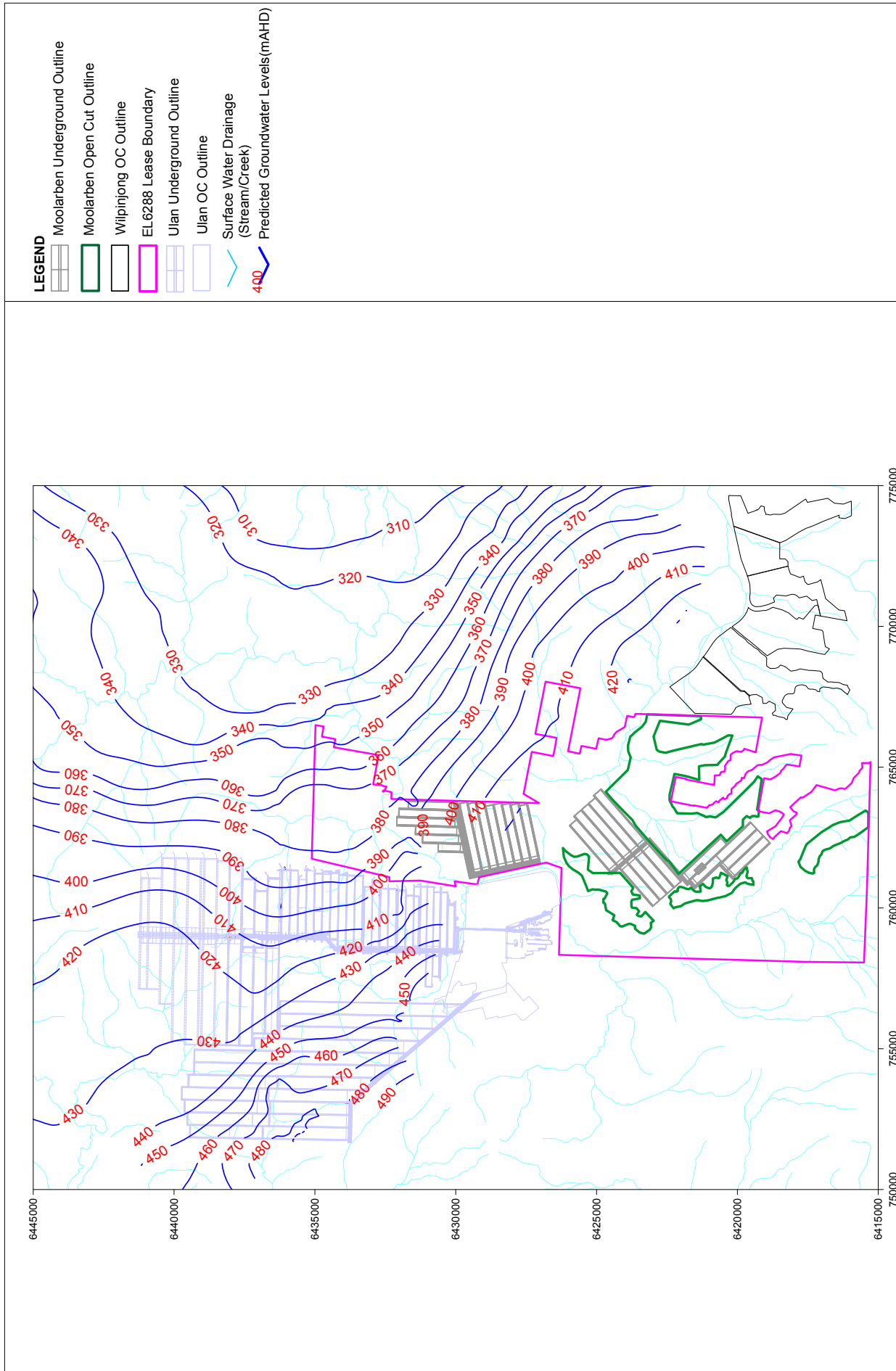




PREDICTED GROUNDWATER LEVELS IN LOWER TRIASSIC-100 YEARS RECOVERY(2142) FIGURE 6.5d

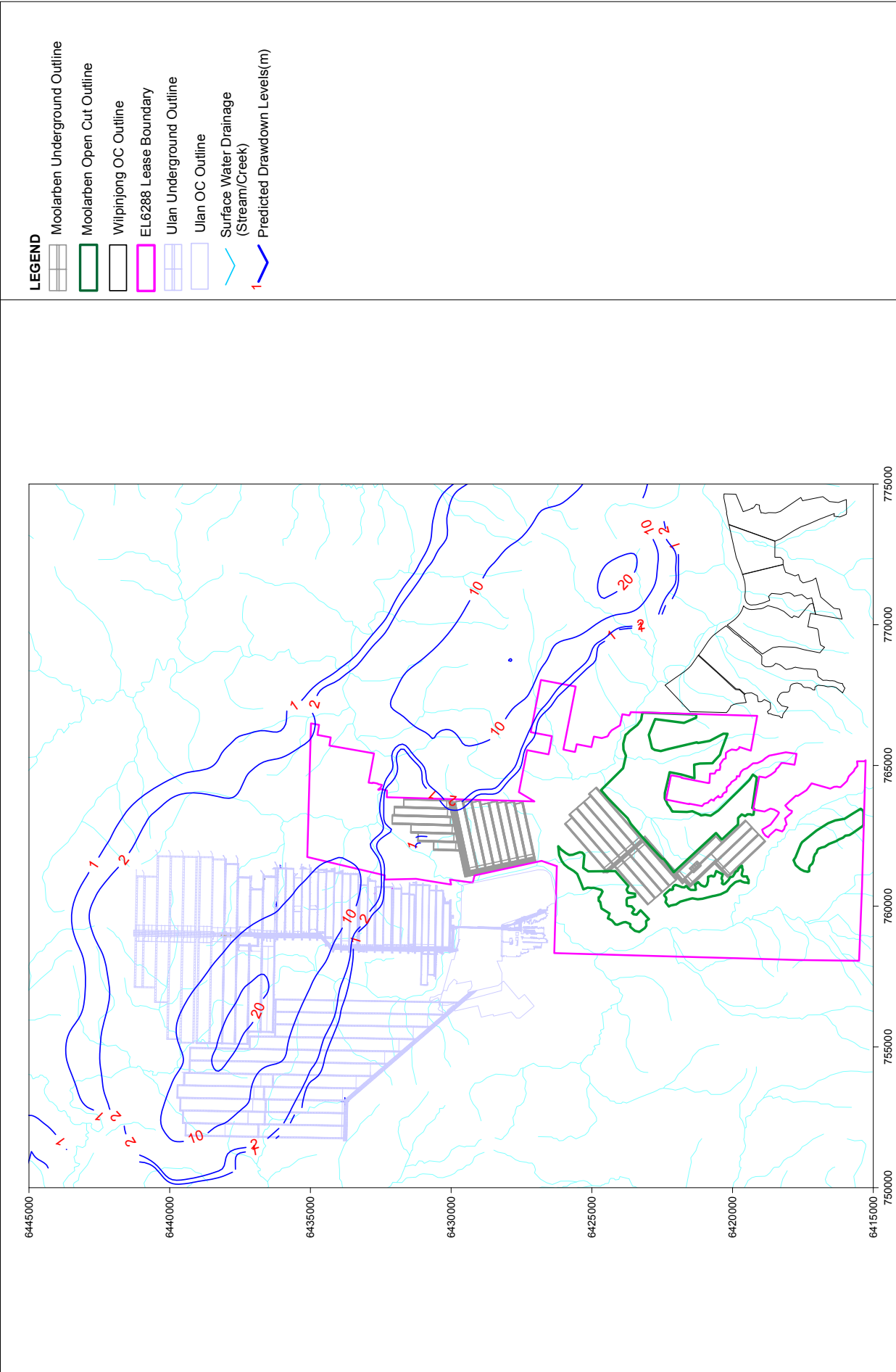
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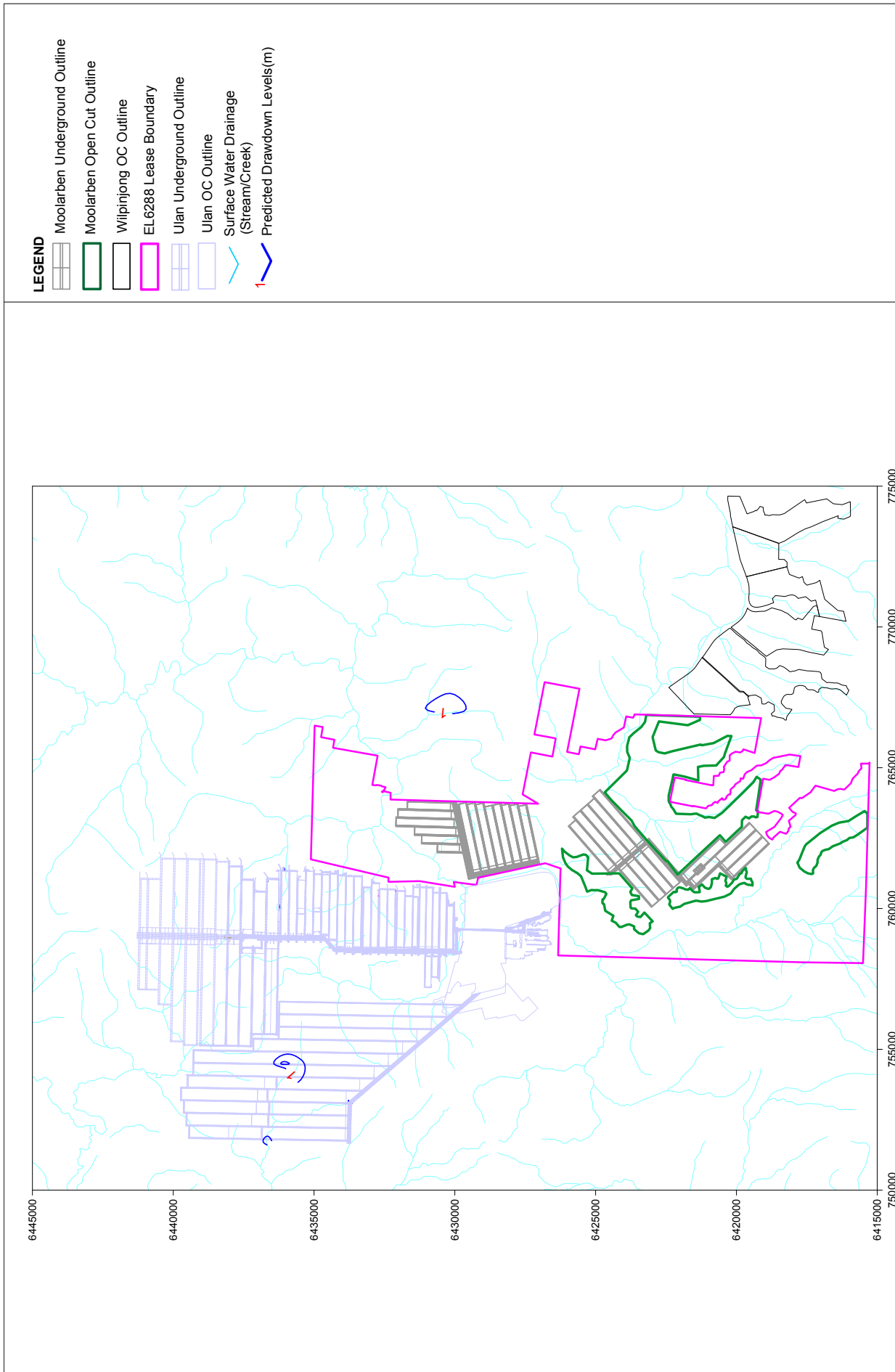
**PREDICTED GROUNDWATER LEVELS IN UPPER TRIASSIC-END OF MINING(2042) FIGURE 6.6a**  
 F:/jobs/S6/S6L/300/012 Original Drawings/str026b.srf





PREDICTED DRAWDOWN IN UPPER TRIASSIC-END OF MINING(2042) FIGURE 6.6b  
F:\jobs\56\56\300\012 Original Drawings\sm027b.srf





PREDICTED DRAWDOWN DUE TO MOOLARBEN IN UPPER TRIASSIC-END OF MINING(2042) FIGURE 6.6C  
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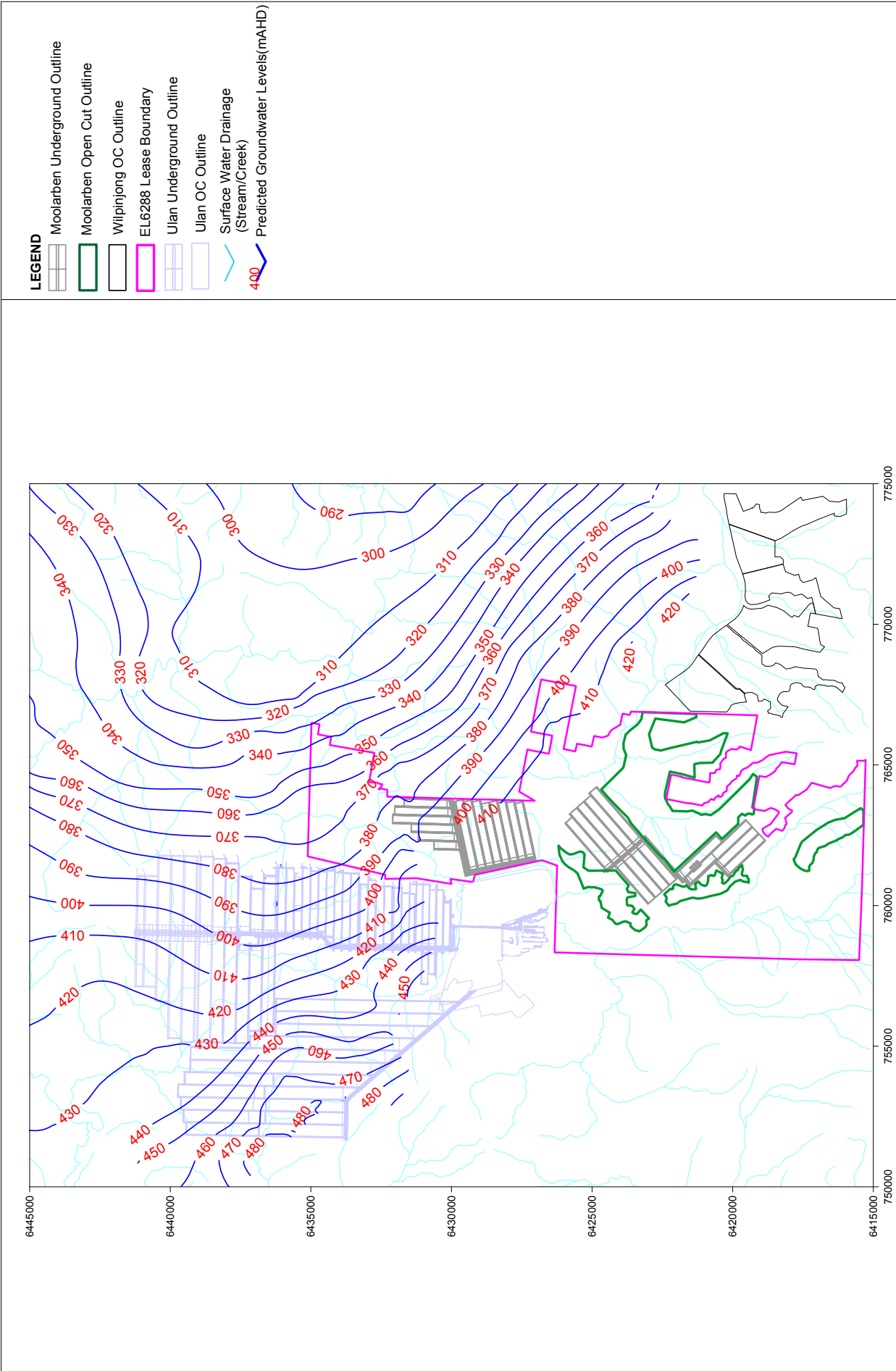
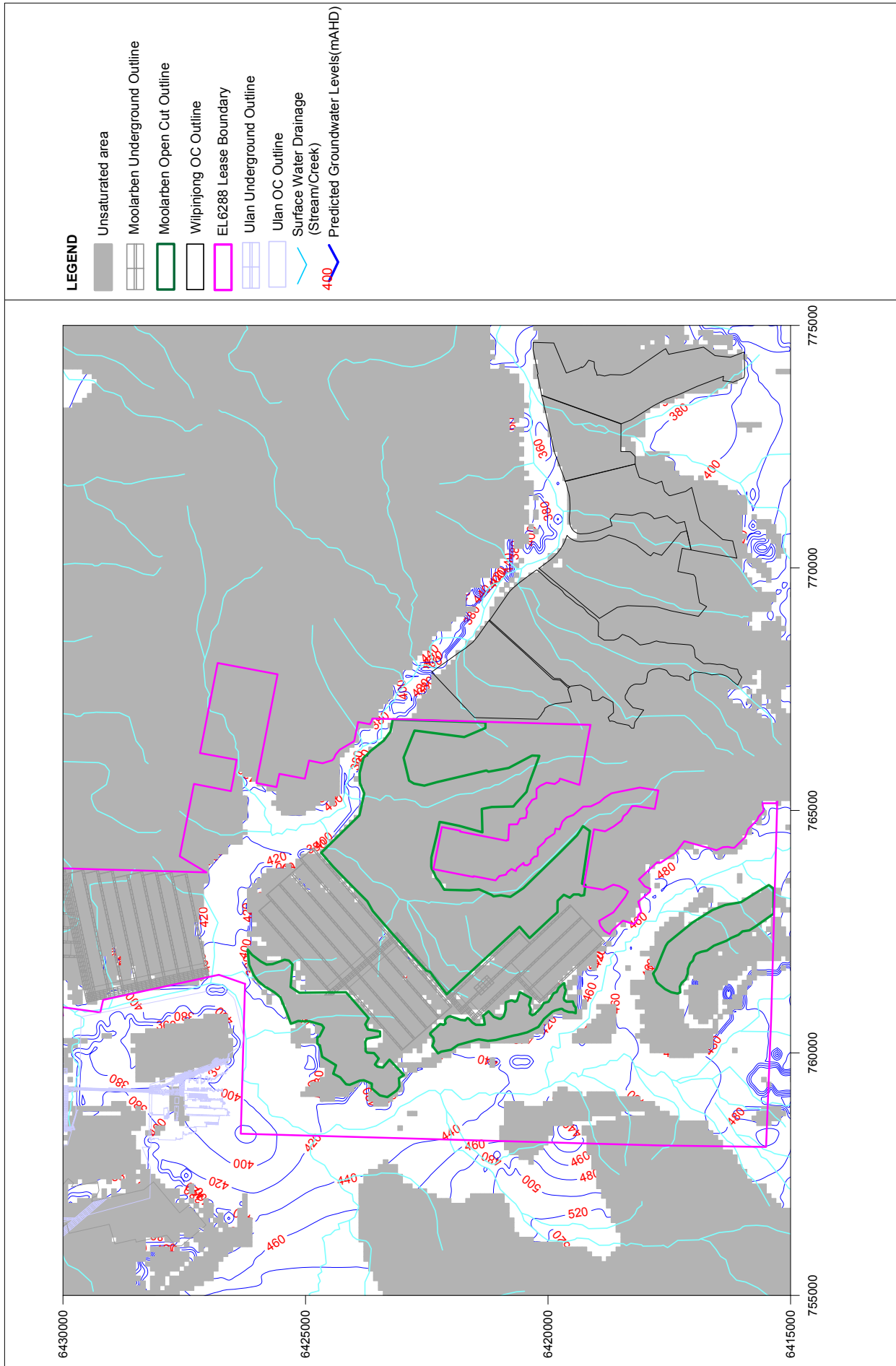


FIGURE 6.6d  
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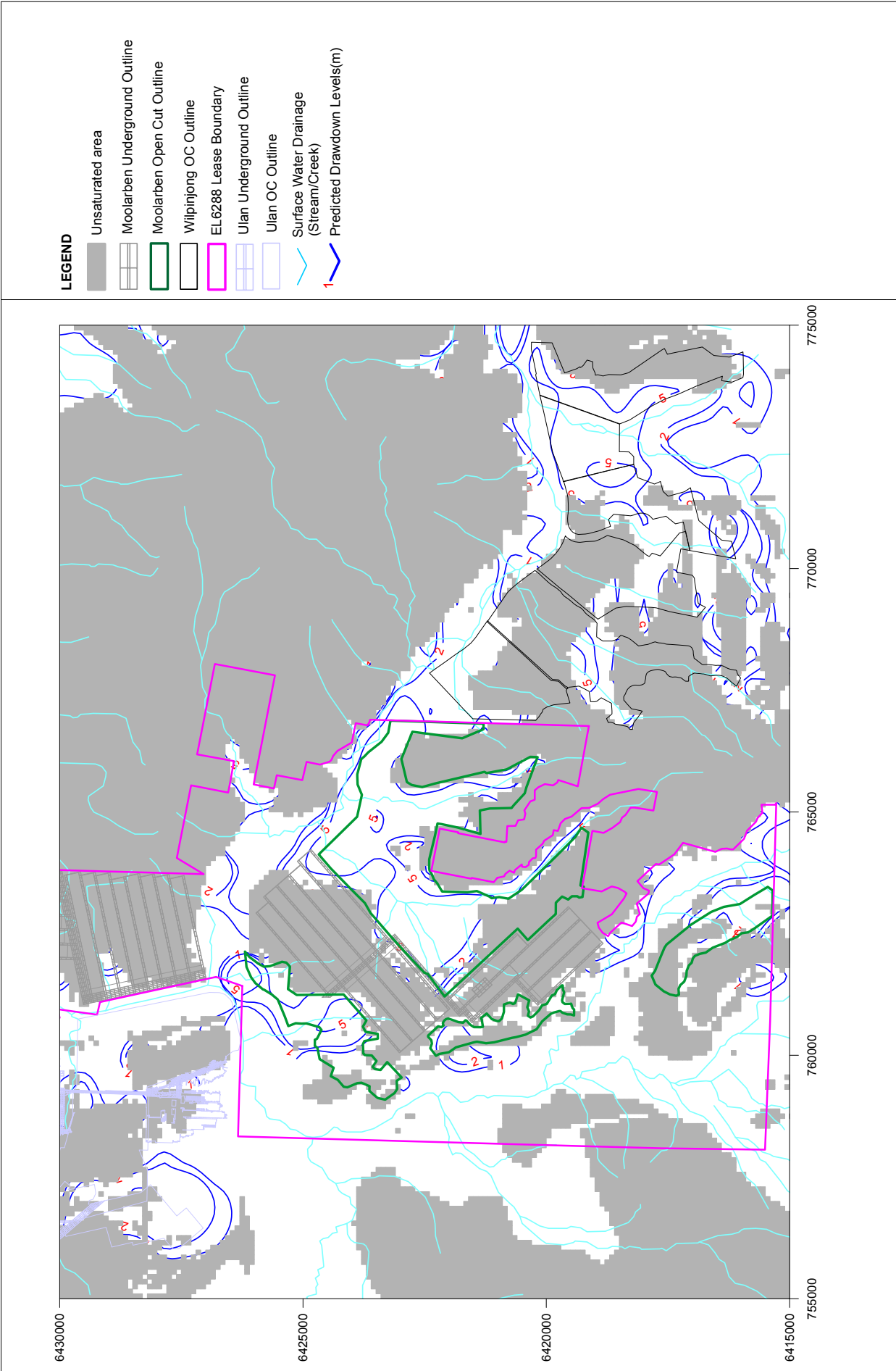






PREDICTED GROUNDWATER LEVELS IN SURFICIAL AQUIFER SYSTEM-END OF MINING(2042) FIGURE 6.7a  
 F:/jobs/SG/S6/L300012 Original Drawings/rf005b.srf

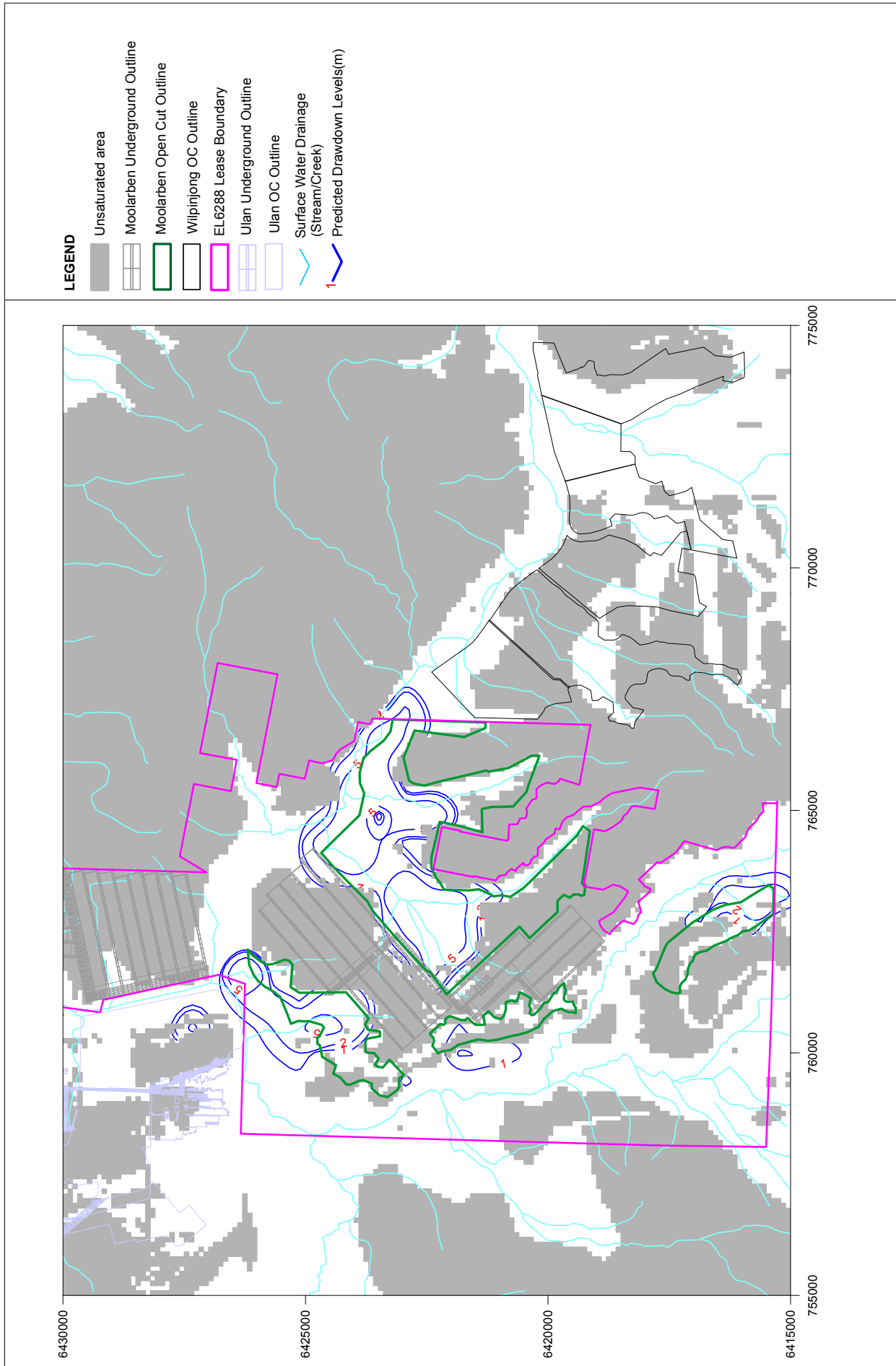




PREDICTED DRAWDOWN IN SURFICIAL AQUIFER SYSTEM-END OF MINING(2042) FIGURE 6.7b

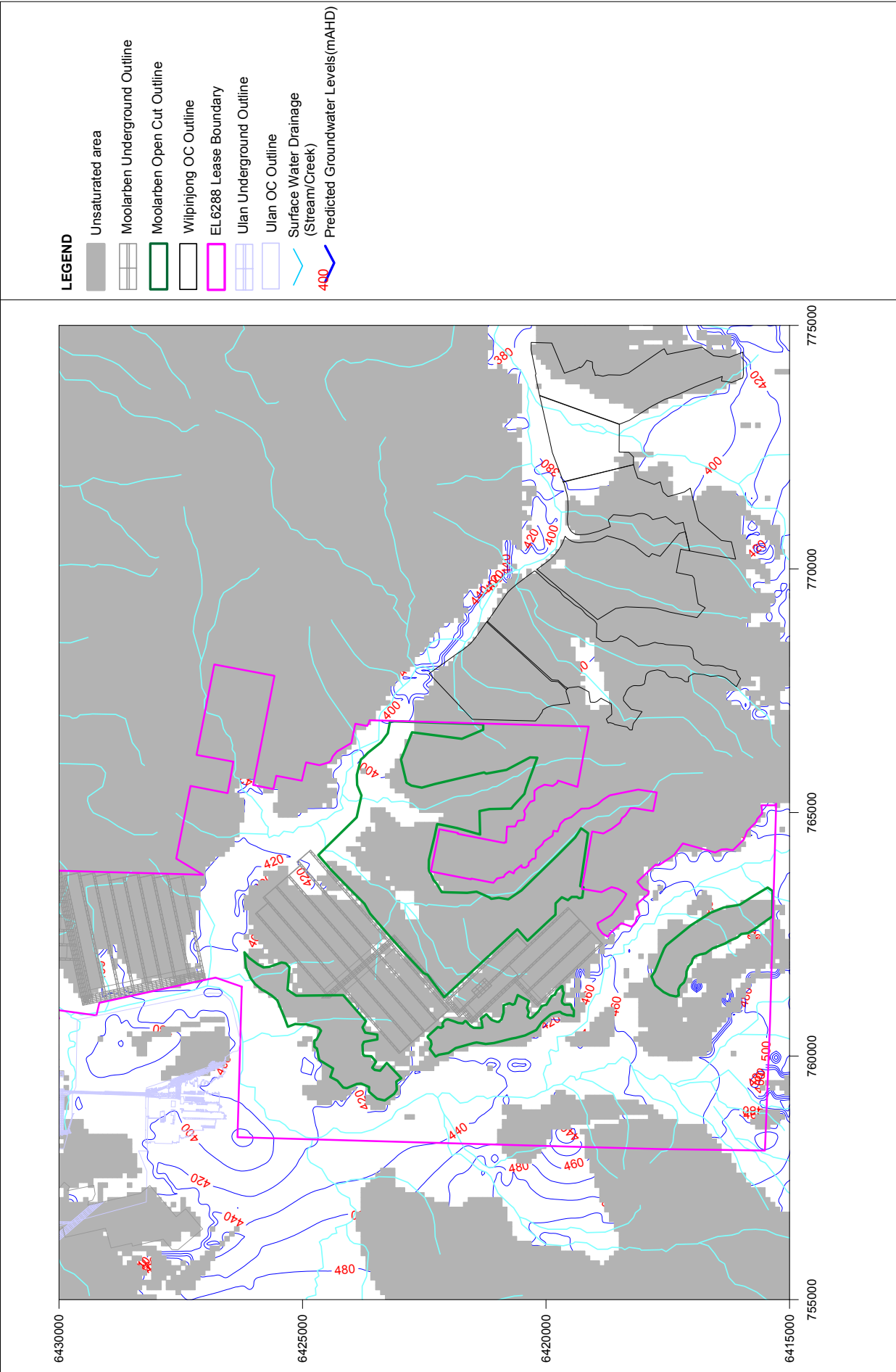
F:\jobs\SS\6\300\012 Original Drawings\sr007b.srf





PREDICTED DRAWDOWN DUE TO MOOLARBEN IN SURFICIAL AQUIFER SYSTEM-END OF MINING(2042) FIGURE 6.7c  
 F:\jobs\66\66L\300012 Original Drawings\66f037b.srf

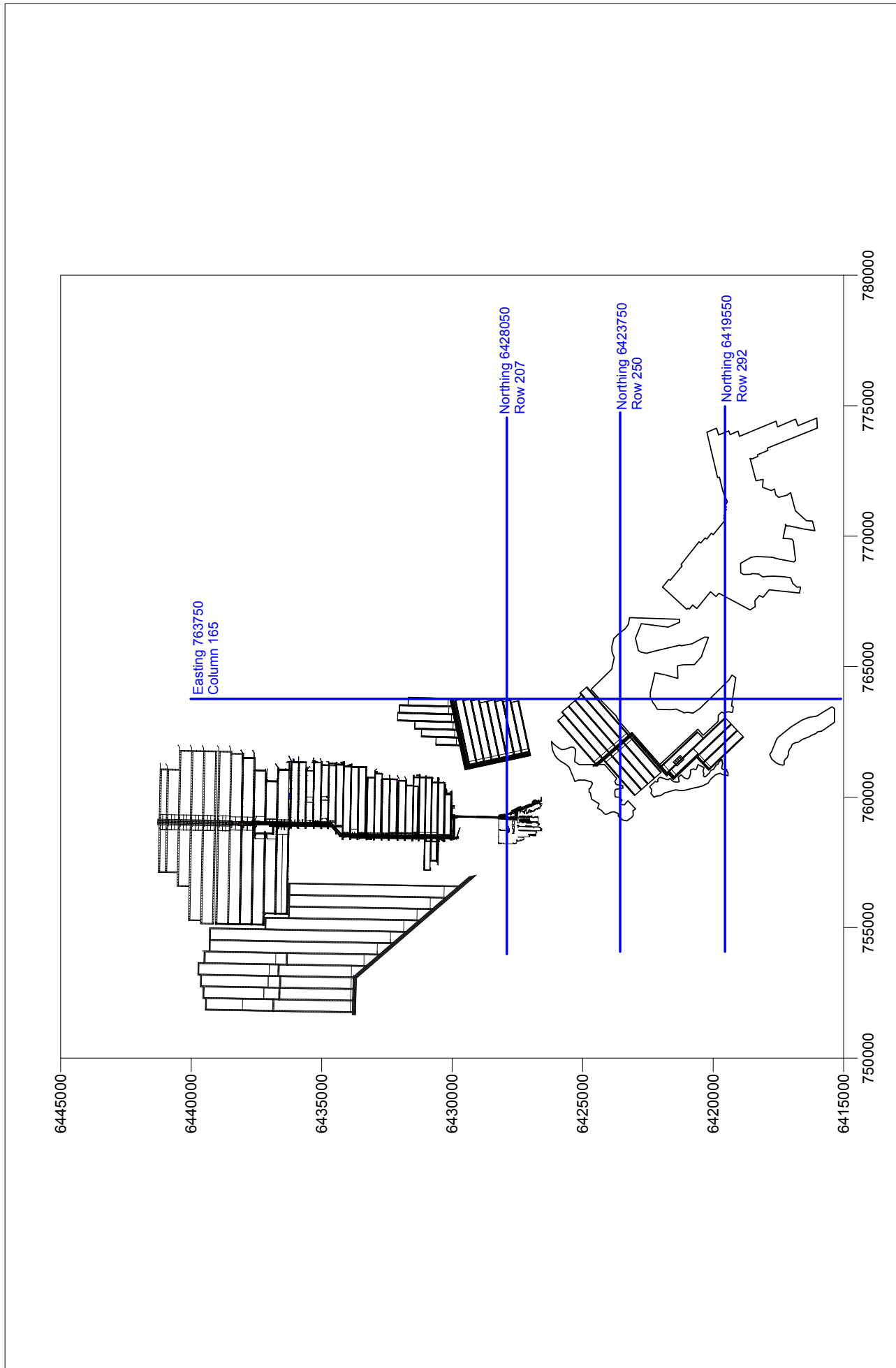




PREDICTED GROUNDWATER LEVELS IN SURFICIAL AQUIFER SYSTEM-100 YEARS RECOVERY(2142) FIGURE 6.7d

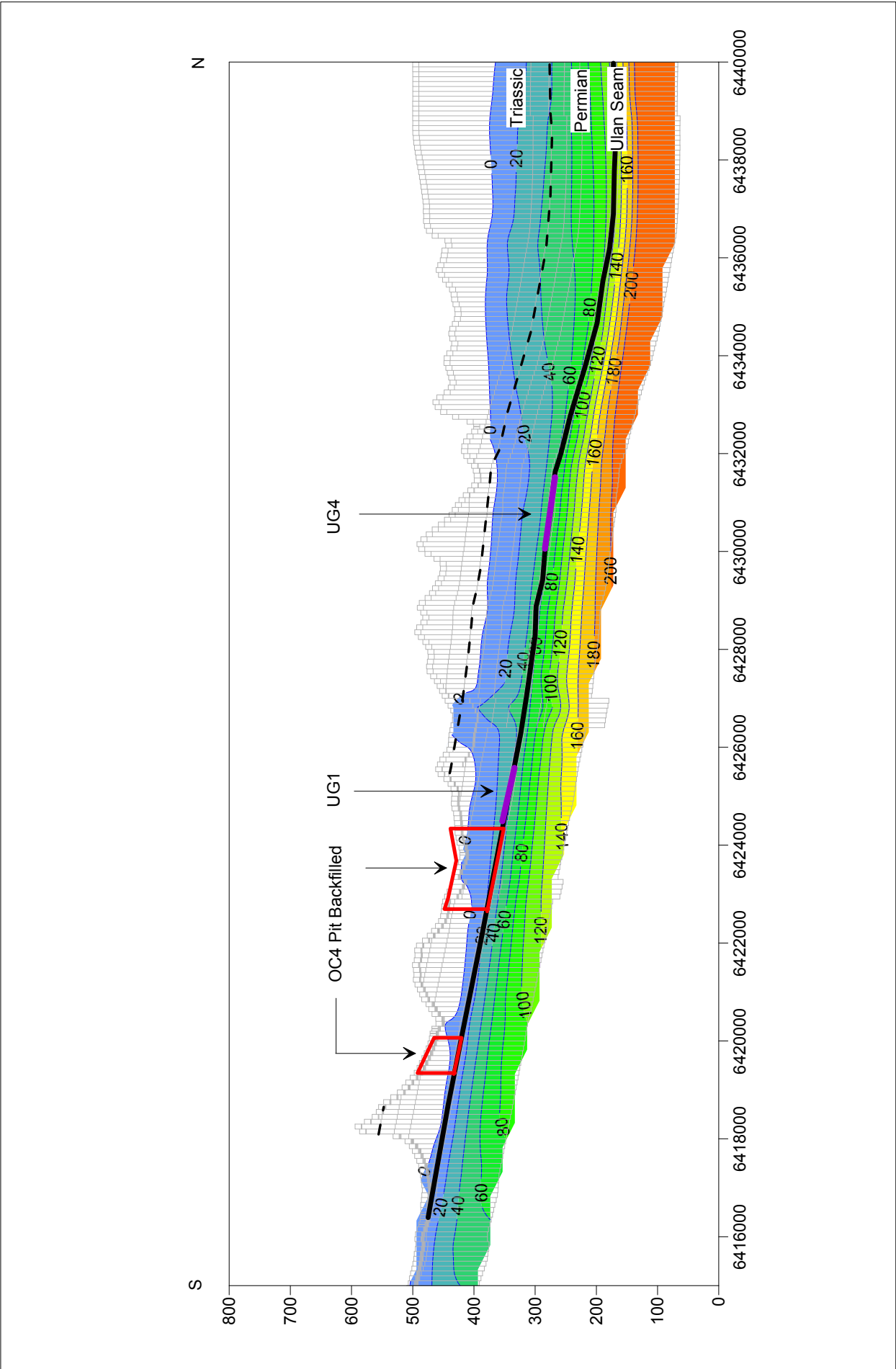
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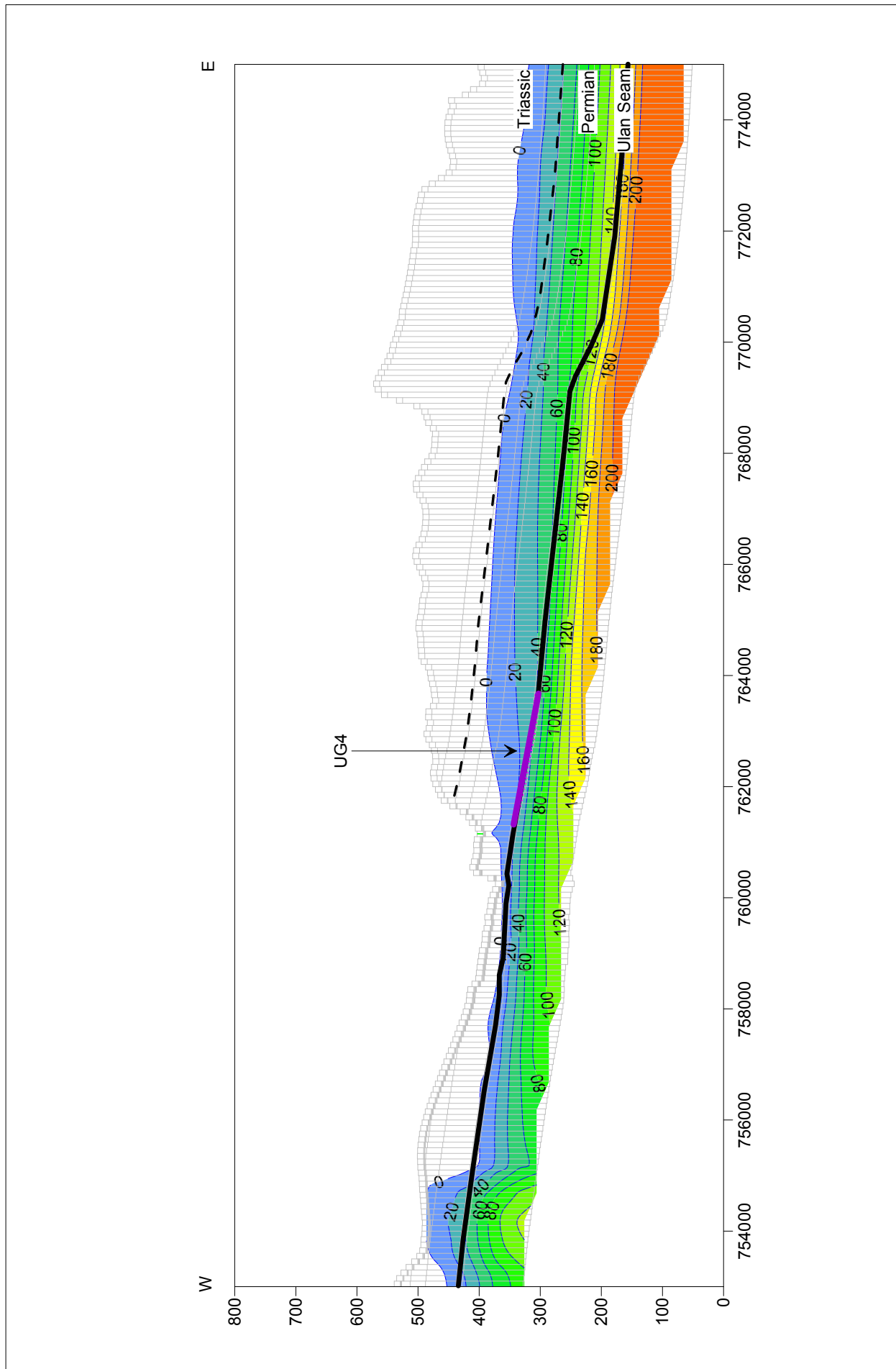
Locations Of Representative Pressure Head Sections **FIGURE 6.8**  
F:\Jobs\56\S6\S6L\300\011 GW Model\pressure head





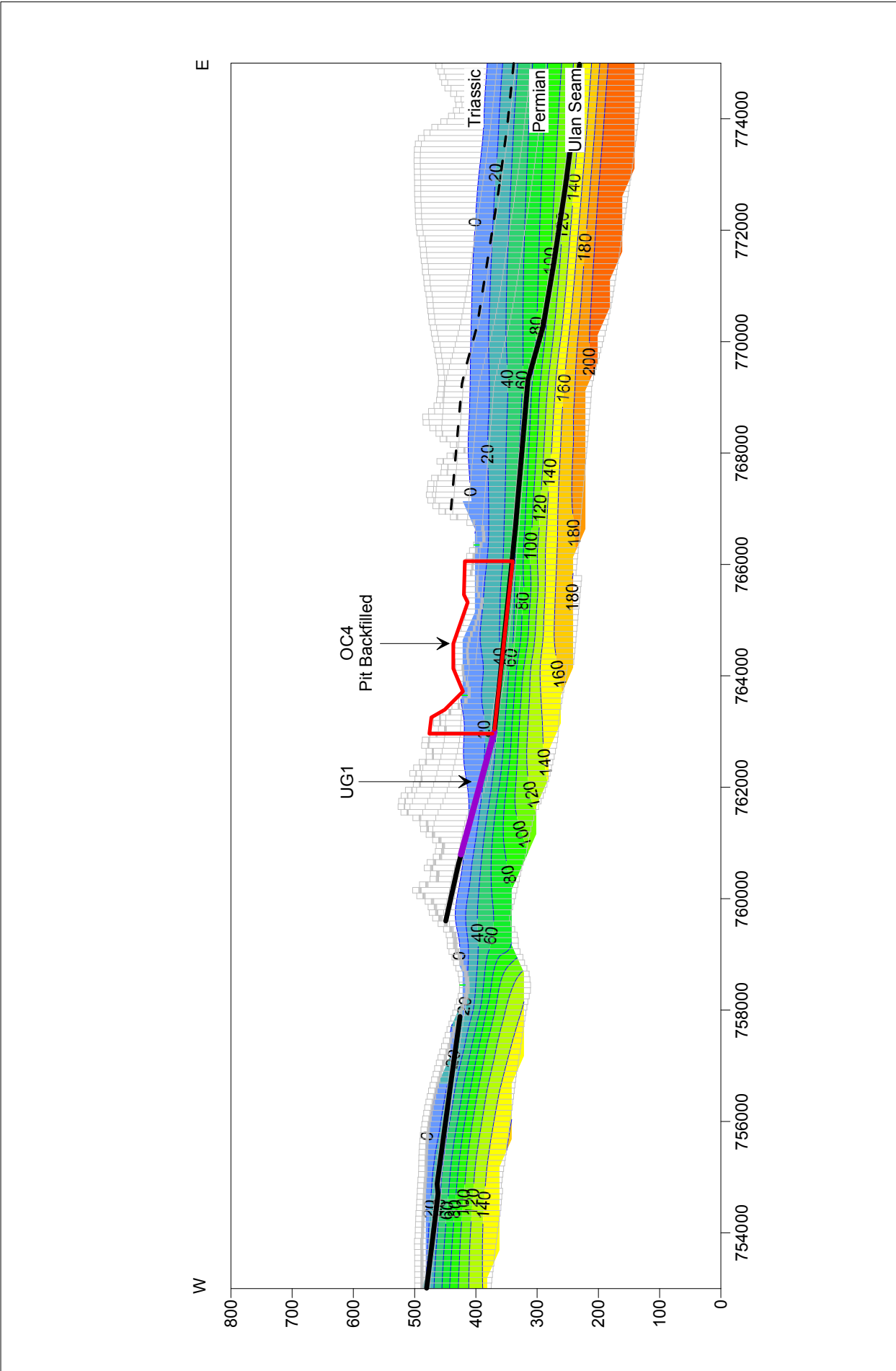
Groundwater Pressure Along Easting 763750 At Start Of Mining FIGURE 6.9a

F:\Jobs\56\56\1300\0111 GW Model\mode\_ archive\Aug2011\pressure head



Groundwater Pressure Along Northing 6428050 At Start Of Mining **FIGURE 6.9b**  
F:\Jobs\S6\S6L300011\_GW\_Model\model\_archive\Aug2011\pressure head

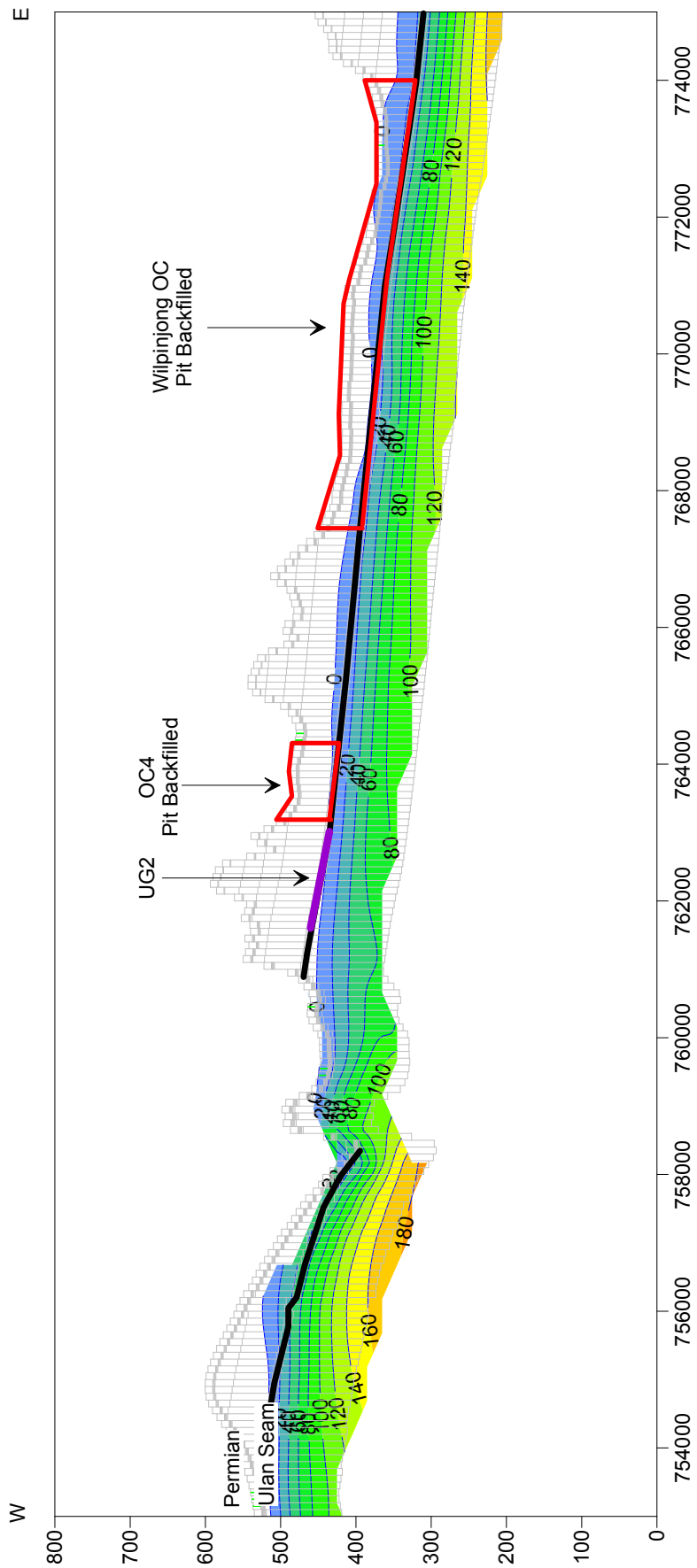




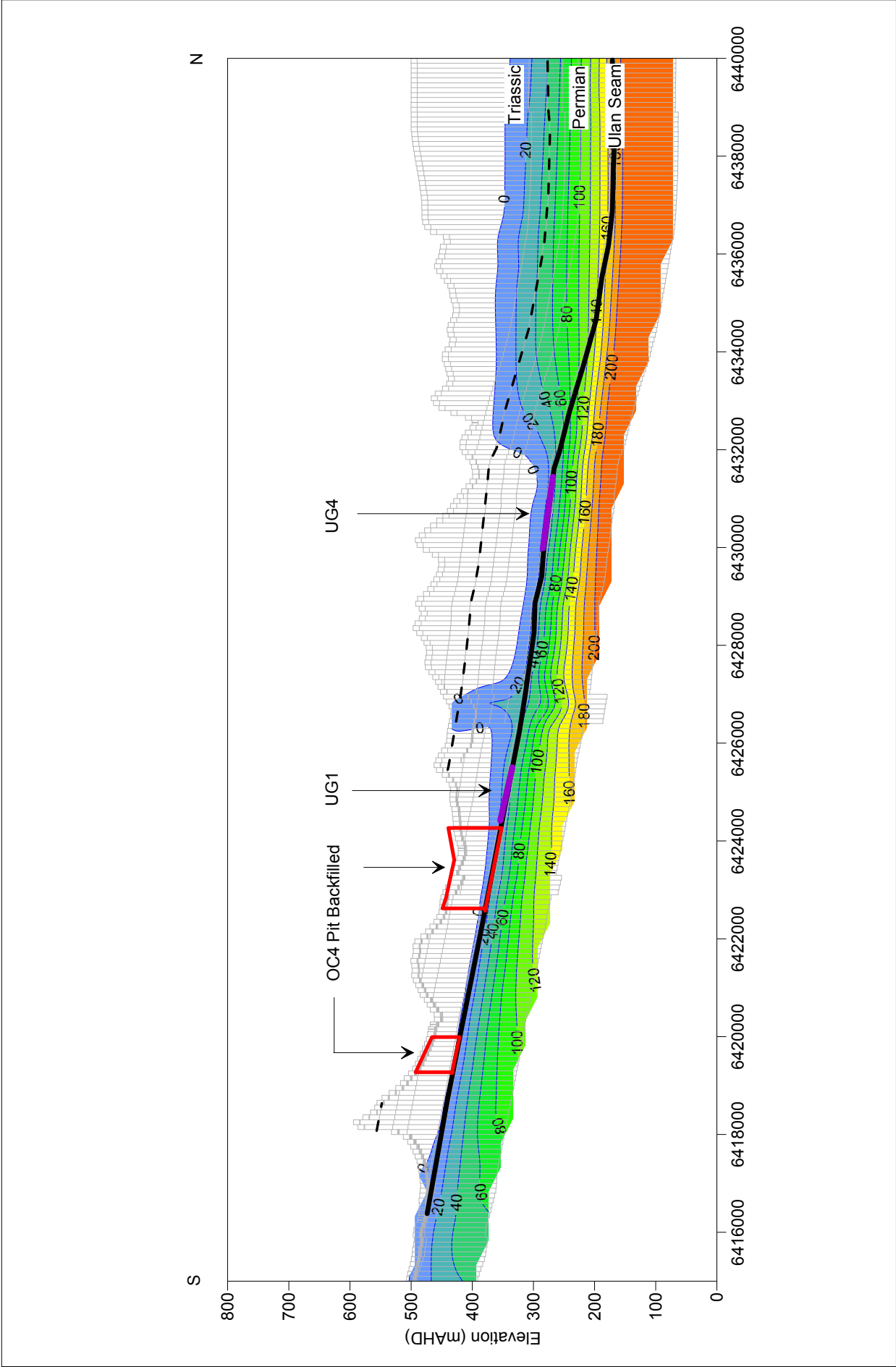
Groundwater Pressure Along Northing 6423750 At Start Of Mining FIGURE 6.9c  
F:\Jobs\S6\S6L\300011 GW Model\model\_archive\Aug2011\pressure head







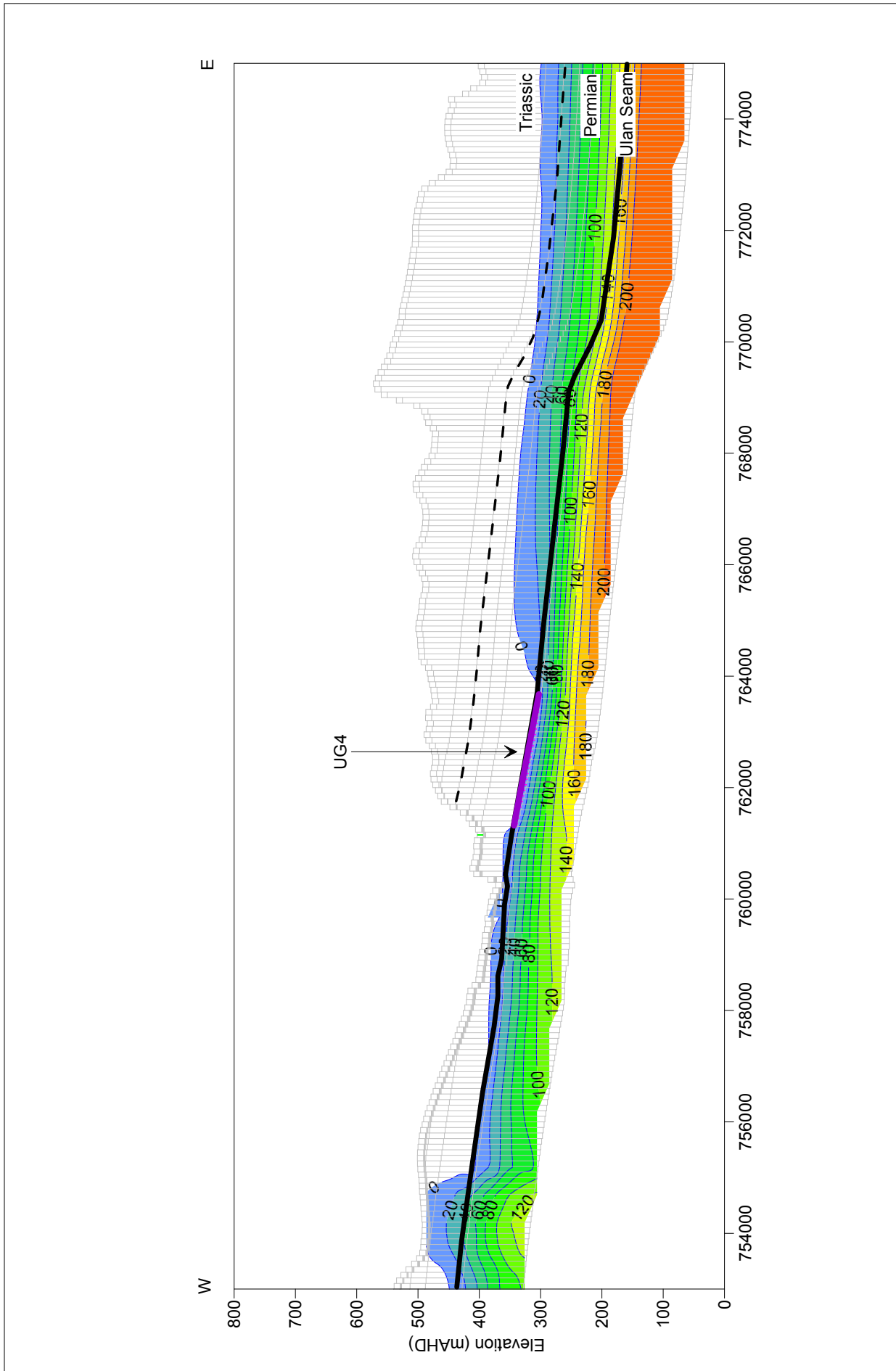
Groundwater Pressure Along Northing 6419550 At Start Of Mining FIGURE 6.9d  
F:\Jobs\56\56L300011\_GW\_Model\model\_archive\Aug2011\pressure head



Groundwater Pressure Along Easting 763750 At The End Of Mining FIGURE 6.10a

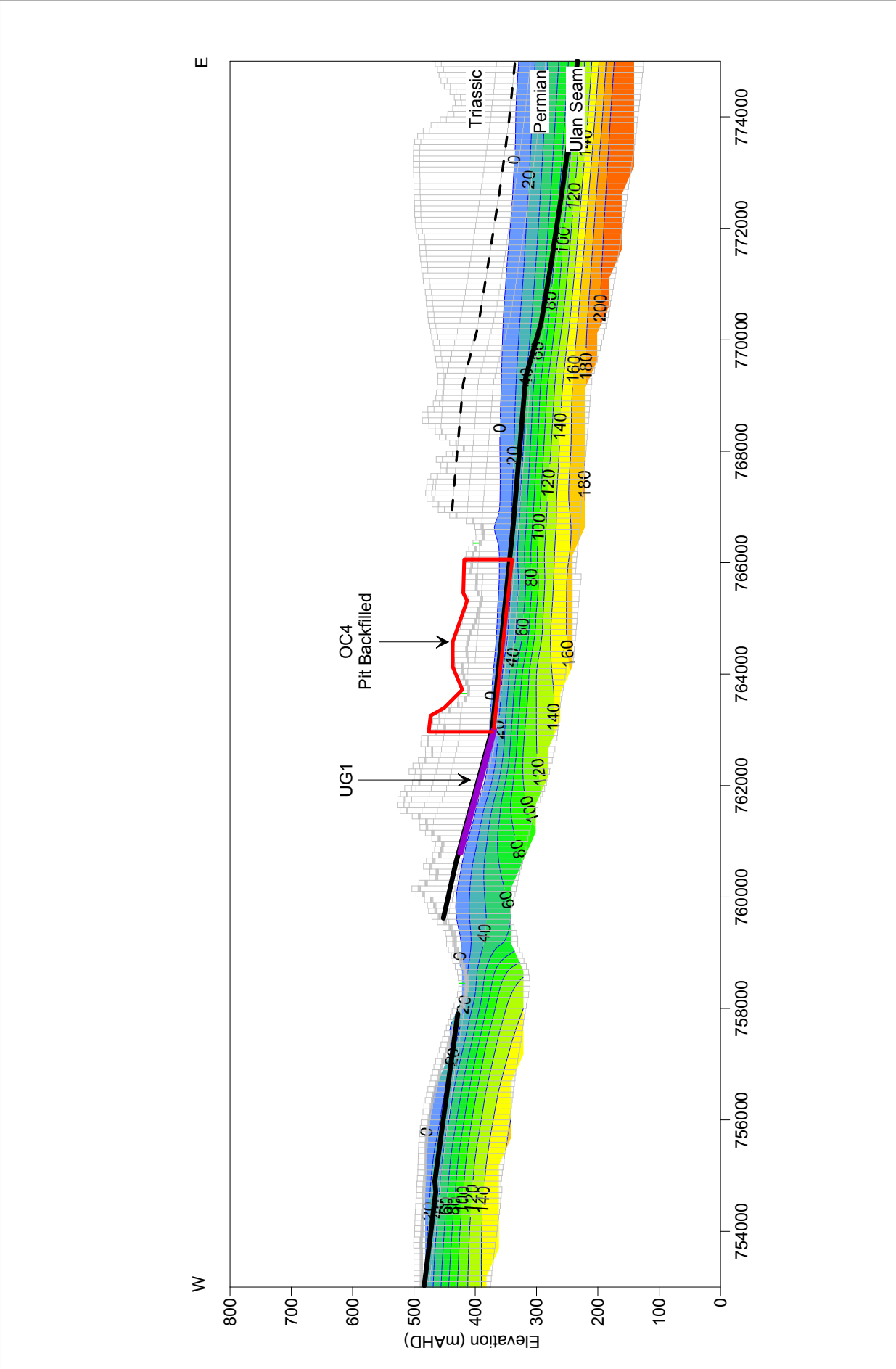
F:\Jobs\S6\S6L300\011 GW Model\pressure head





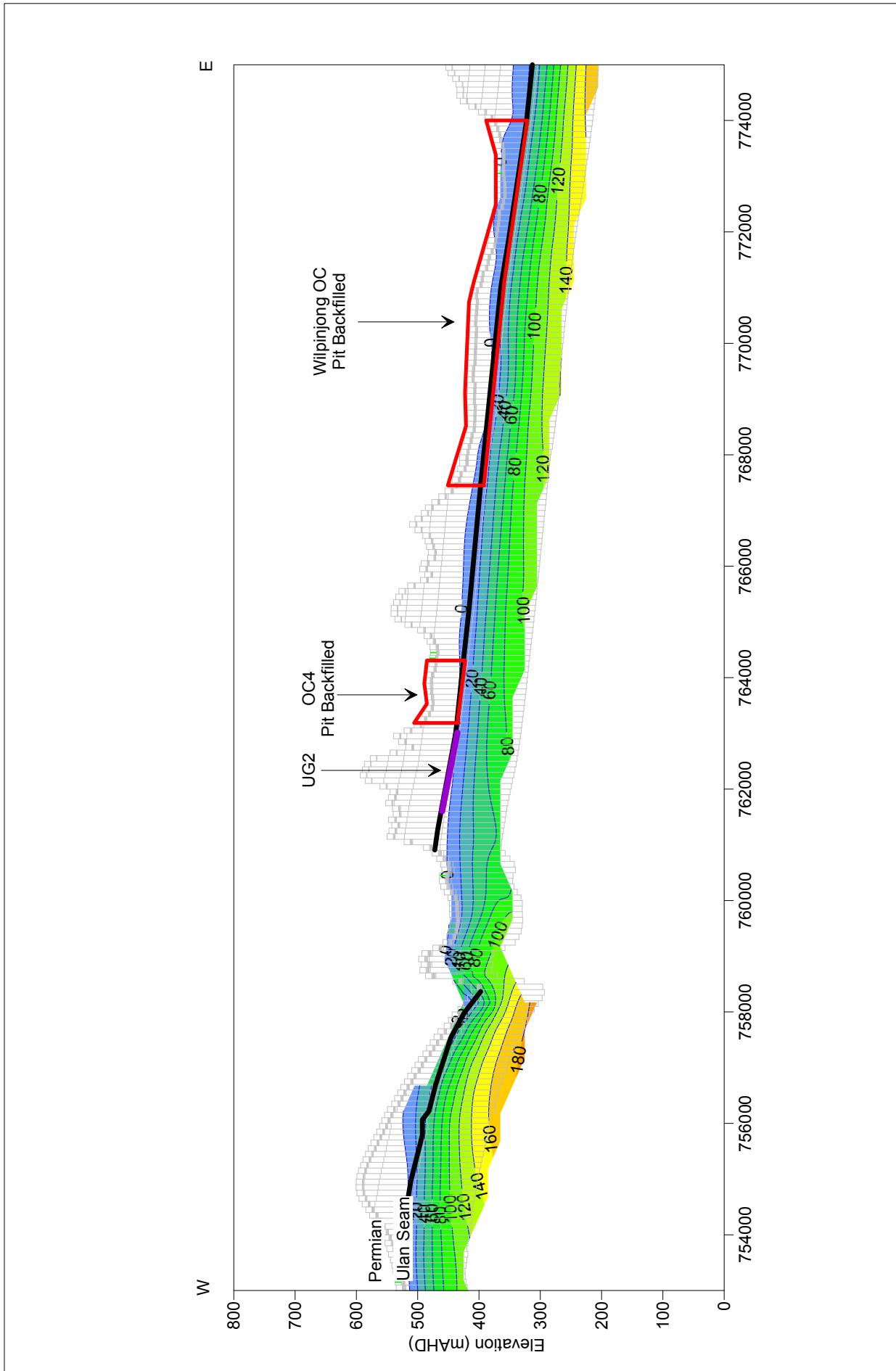
Groundwater Pressure Along Northing 6428050 At The End Of Mining FIGURE 6.10b  
F:\Jobs\S6\S6L300\011 GW Model\pressure head





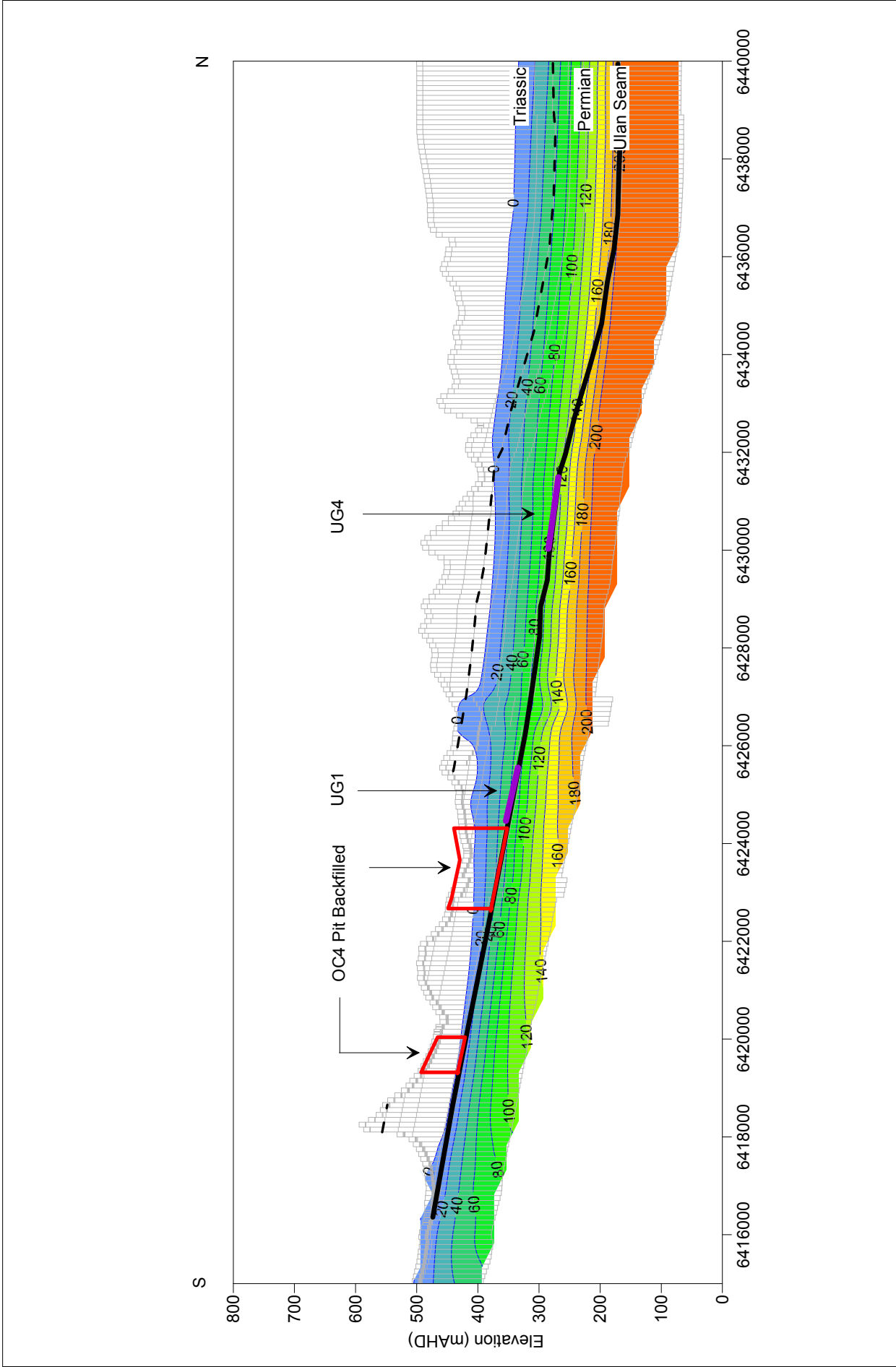
Groundwater Pressure Along Northing 6423750 At The End Of Mining FIGURE 6.10C  
F:\Jobs\6423750\6423750\_011\_GW\_Model\pressure head





Groundwater Pressure Along Northing 6419550 At The End Of Mining **FIGURE 6.10d**  
F:\Jobs\S6\S6L300\011 GW Model\pressure head

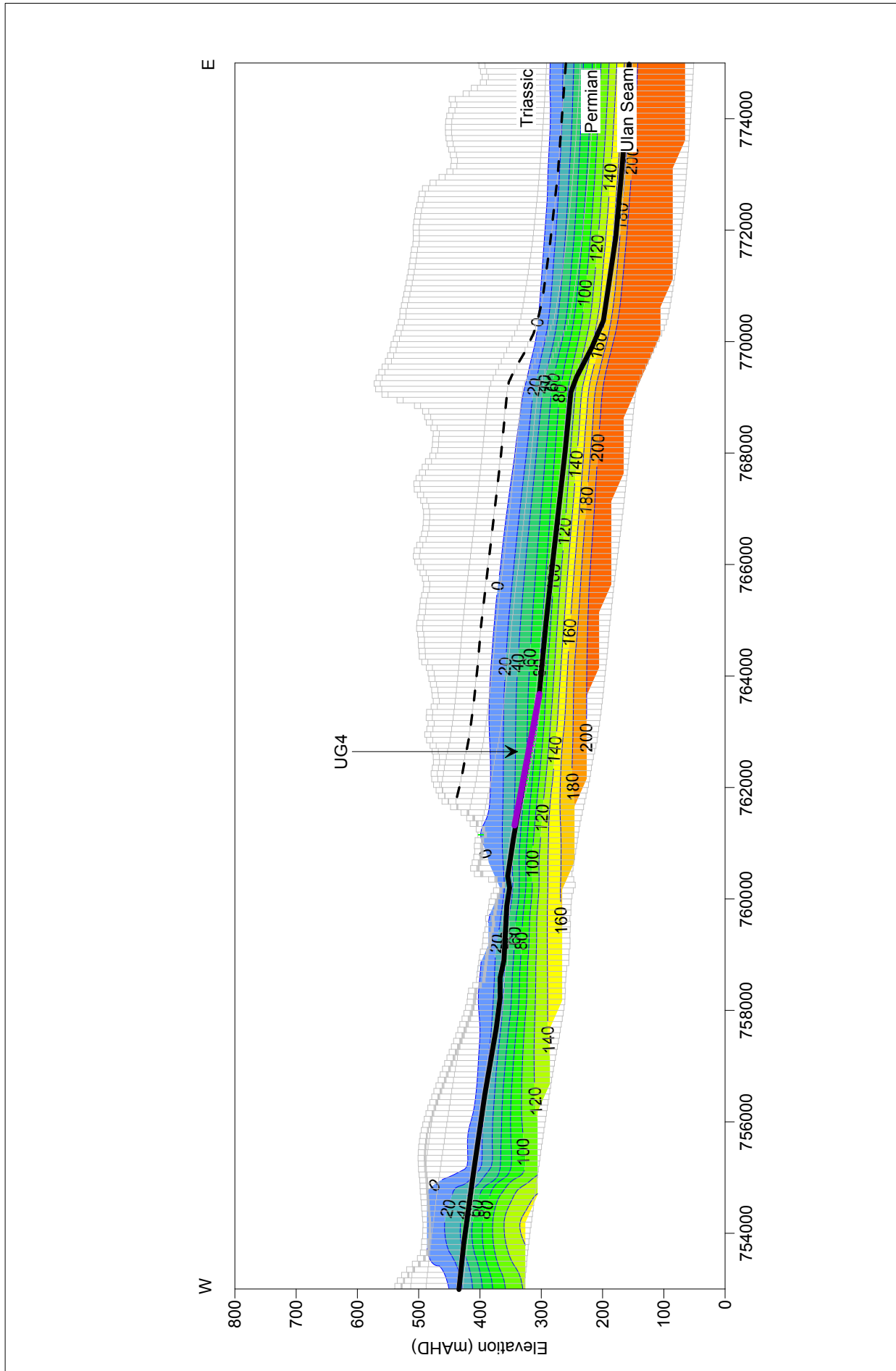




Groundwater Pressure Along Easting 763750 Following 100 Years Recovery FIGURE 6.11a

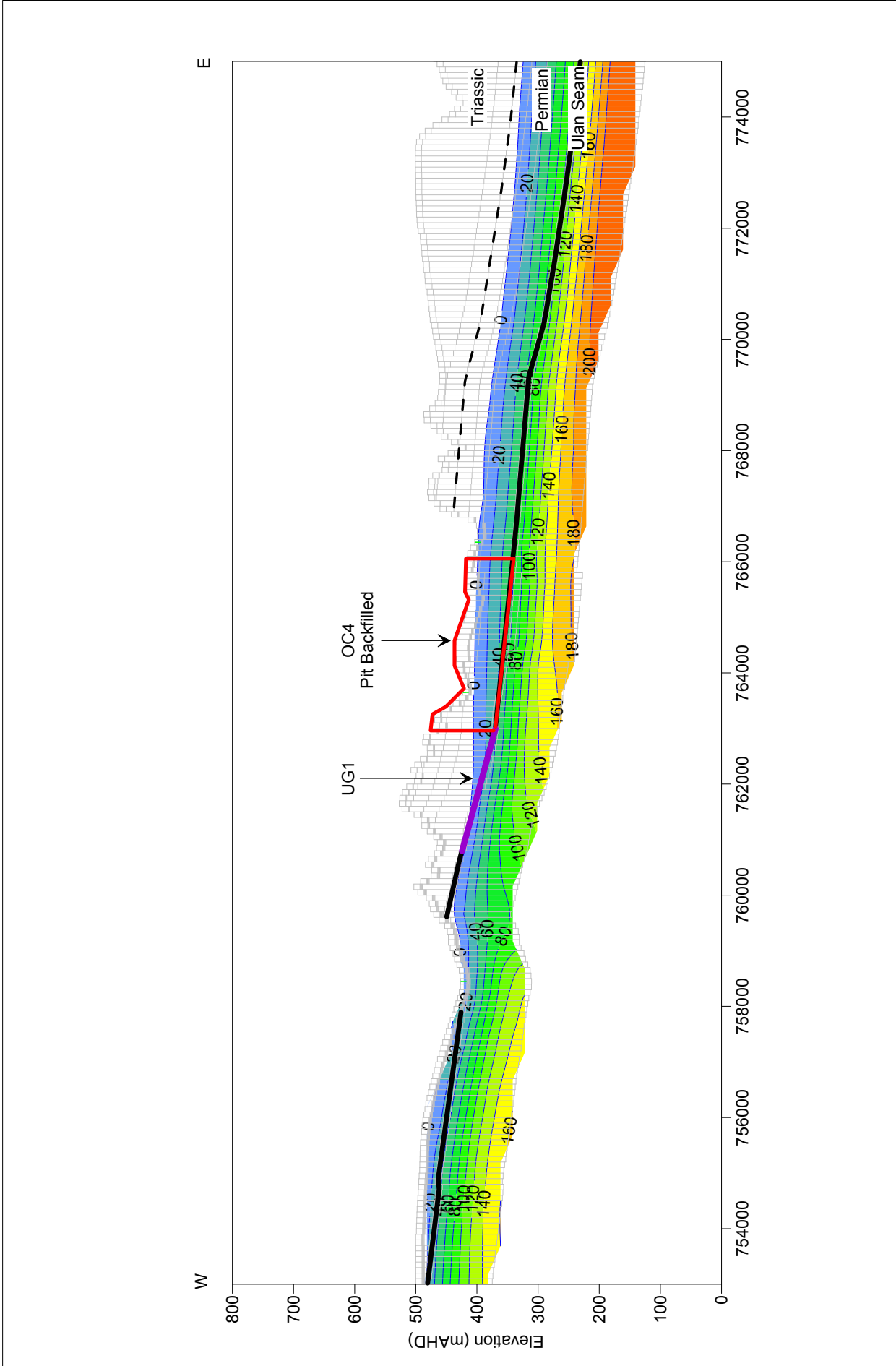
F:\Jobs\56\56L300011 GW Model\pressure head





Groundwater Pressure Along Northing 6428050 Following 100 Years Recovery FIGURE 6.11b  
F:\Jobs\S6\S6L\300\011 GW Model\pressure head

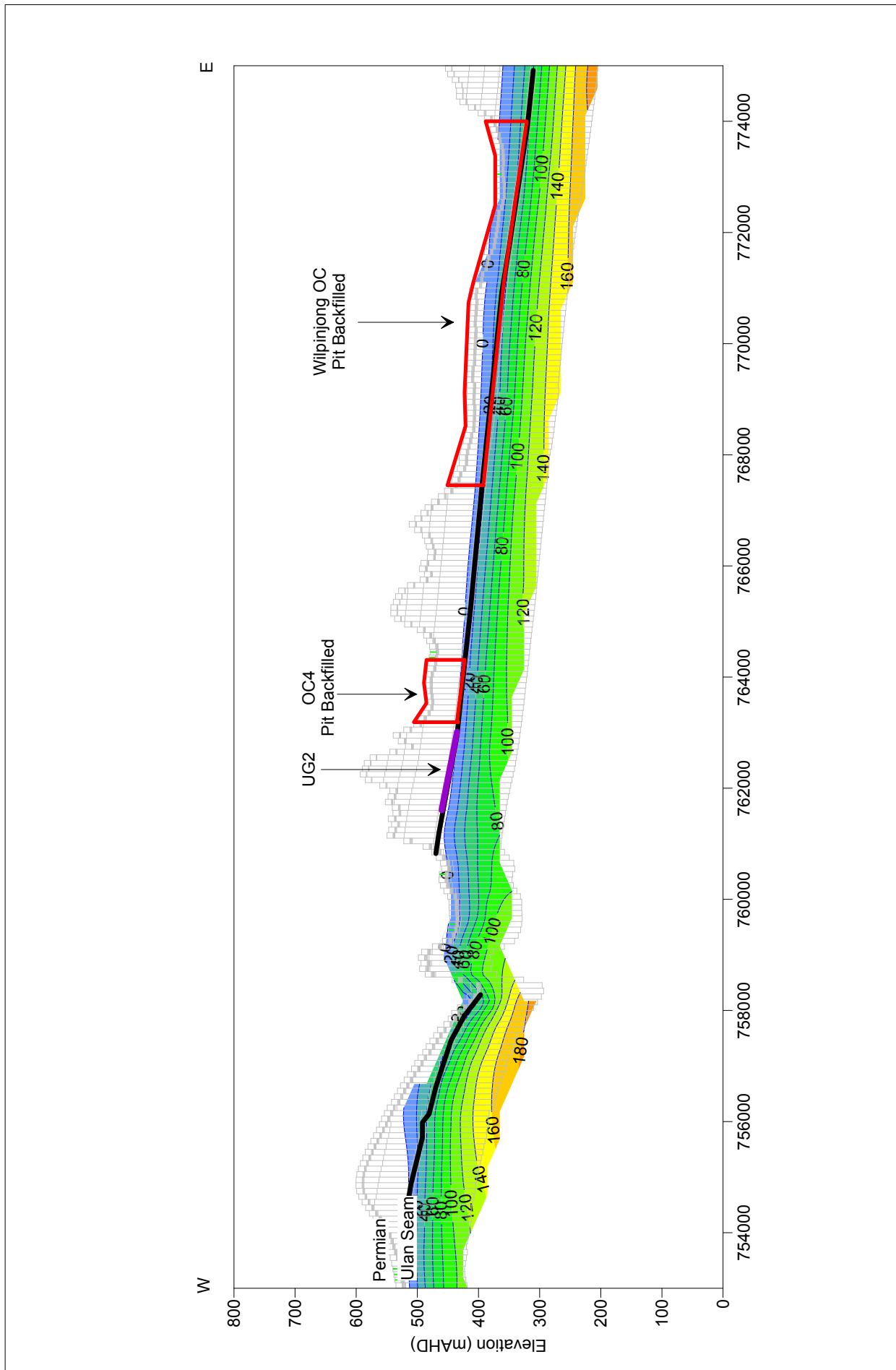




Groundwater Pressure Along Northing 6423750 Following 100 Years Recovery FIGURE 6.11c  
F:\Jobs\56\56L300011 GW Model\pressure head







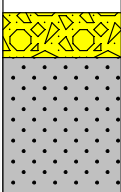
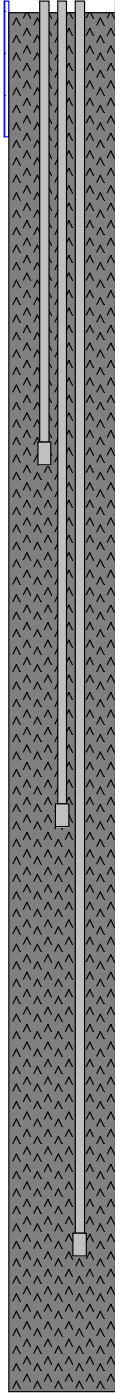
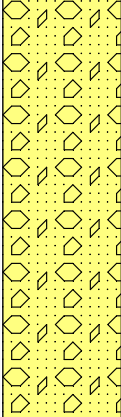
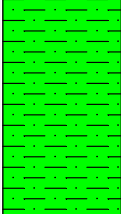
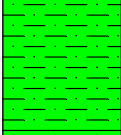
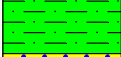
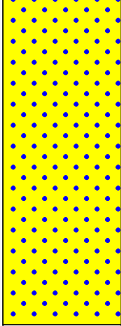
Groundwater Pressure Along Northing 6419550 Following 100 Years Recovery **FIGURE 6.11d**  
F:\Jobs\S6\S6L\3000111 GW Model\pressure head


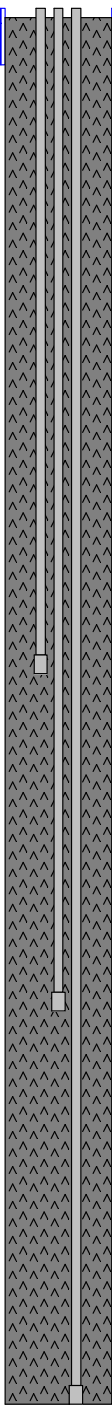











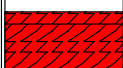
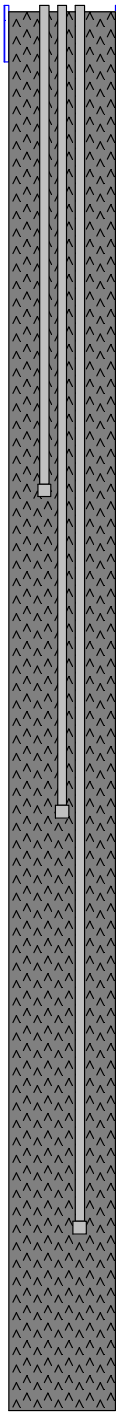
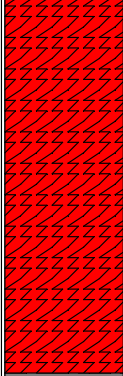
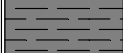
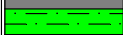
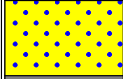
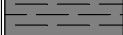
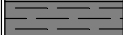
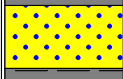

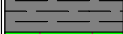



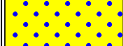
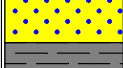
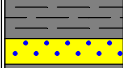


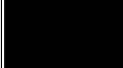

**APPENDIX A:  
PIEZOMETER AND TEST BORE DETAILS AND  
CONSTRUCTION LOGS**

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RPS Aquaterra		COMPOSITE WELL LOG			Well No: PZ128		
Suite 4, 125 Melville Parade Como WA 6152 Australia Tel: (+61) (08) 9368 4044 Fax: (+61) (08) 9368 4055		Client: Moolarben Coal Mines Pty		Project: Moolarben Coal Hydrogeology			
		Commenced: 26/11/2007		Method: DHH		Area: The Drip	
		Completed: 26/11/2007		Fluid: Air		East: 763226.685	
		Drilled: Intertech		Bit Record: 6.5" (0-5.5m)		North: 6432120.054	
Logged By: NW		120mm (5.5-61m)		Elevation: 409.52			
Static Water Level:						Date:	
Depth (mbgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion		
					Diagram	Notes	
0			Gravel: off white/creamy/pinky-brown, subrounded to rounded, moderately well sorted, quartz rich.  Sand: red-brown, medium to coarse, subangular to subrounded, well sorted.	Completed with vibrating wires at 20m, 36m and 55m.		125mm Class 9 PVC Surface casing	
10			GRAVELLY SAND: silty, off white- light grey, sand fine to medium, very consistent composition. 9-11m Clay band, light grey, gravels fine, subangular to subrounded, of light dark grey mudstone and quartz. 19-20m, red brown, as previous.				
20			Mudstone: and quartzite. Interbedded, light grey and red brown mudstone, and variable colour quartzite. Some red brown iron staining on mudstone. indurated, hard (samples appears as relatively fresh fine, angular to subangular gravels.				
30			Mudstone: light mid grey indurated, hard.				
40			Mudstone: dark grey, slightly carbonaceous.				
50			Sandstone: Quartz sandstone and mudstone, light dark grey, speckled quartzite sandstones interbedded with dark grey mudstone. 54-57m, band of dark grey black mudstone.				
60						Fully grouted	

Depth (mbgl)		Geology	Graphic Log	Lithological Description	Field Notes	Well Completion	
						Diagram	Notes
0				Silty Sand: with occasional fine gravels, off white-light tan brown, very uniform composition but colour banding. Sand fine to medium. Gravels of grey mudstone, subrounded. 14-15m and 18-22m, off white creamy color. 22-23m red-brown. 25-27m clay rich band, light grey.	Completed with vibrating wires at 35m, 53m and 74m.		125mm Class 9 PVC Surface casing
10							
20							
30				SILTY GRAVEL: grey brown, gravels, fine to medium, of grey mudstone, subangular to subrounded.			
40				Silty Sand: with occasional fine gravels. Sand generally fine to medium with some coarser bands. Gravels of grey mudstone, subangular to subrounded. 35-36m, coarser sand layer.			Fully grouted
50							
60				Mudstone: light dark grey interbedded mudstone, hard, some red-brown xxx? mudstone and variable colour quartzite	Fracture at 61m. Airlift 0.1/s		
65				Mudstone: Dark grey, hard.			
70				Mudstone: Black, carbonaceous, hard.			
75				Sandstone: Quartz sandstone and mudstone.			

RPS Aquaterra		COMPOSITE WELL LOG			Well No: PZ130		
Suite 4, 125 Melville Parade Como WA 6152 Australia Tel: (+61) (08) 9368 4044 Fax: (+61) (08) 9368 4055		Client: Moolarben Coal Mines Pty		Project: Moolarben Coal Hydrogeology			
		Commenced: 28/11/2007		Method: DHH		Area: Murrumbidgee Valley	
		Completed: 29/11/2007		Fluid: Air		East: 760940.112	
		Drilled: Intertech		Bit Record: 6.5" (0-4m)		North: 6422437.705	
Logged By: JR		120mm (4-111m)		Elevation: 535.069			
Static Water Level:						Date:	
Depth (mbgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion		
					Diagram	Notes	
0			Basalt: Red/brown, highly weathered, soft.	The Gap Airlift 0.15l/s Completed with vibrating wires at 38.5m, 64m and 97m.		125mm Class 9 PVC Surface casing	
10			Basalt: Black to dark grey, generally massive and hard, variable fracturing evident.				Fully grouted
20			Shale: medium grey, soft, slightly silty.				
30			Mudstone: Medium brown, soft, silty.				
40			Sandstone: Light to medium brown, fine to medium grained, argillaceous.				
50			Shale: Black, friable, carbonaceous.				
55			Shale: Medium grey, friable, silty and sandy.				
60			Sandstone: Medium brown to buff coloured, coarse to very coarse grained, angular to sub-angular, quartzose.				
65			Shale: Dark grey to black, friable, variably carbonaceous.				
70			Claystone: Medium grey, soft.				
75			Coal: Black, soft.				
80			Shale: Medium grey, friable.				
85			Coal: Black, friable to soft.				
90			Shale: Medium grey, friable.				
95			Sandstone: Light grey, coarse to very coarse grained, sub-angular to angular, lightly argillaceous.				
100			Shale: medium grey, friable, silty and sandy.				
105			Sandstone: Medium grey, friable, very argillaceous.				
110			Shale: Medium to dark grey, friable, variably silty and sandy, carbonaceous.				
115			Coal: Black, friable, occasionally vitreous, minor shale bands.				
120			Shale: Medium grey to dark grey, friable, silty, sandy.				




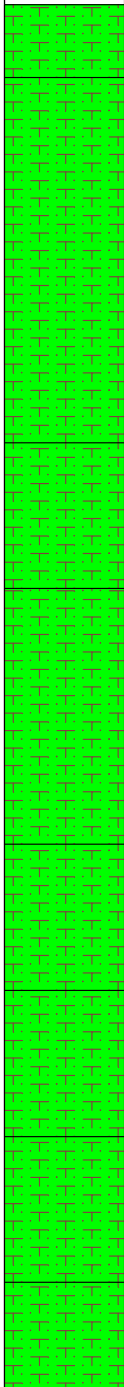
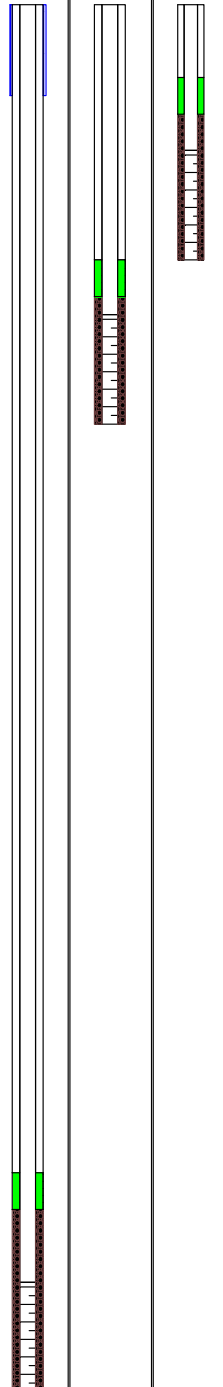


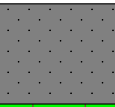

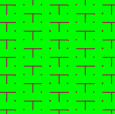
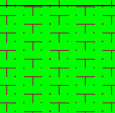
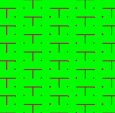
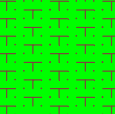
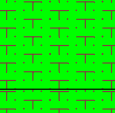
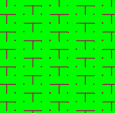
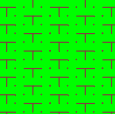


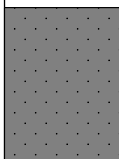
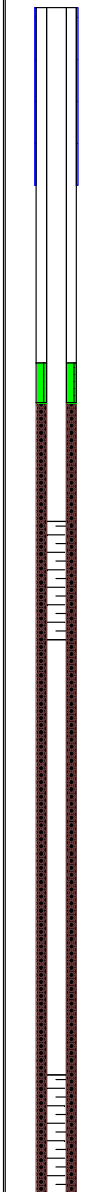
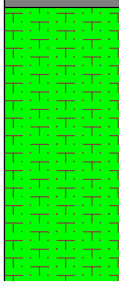
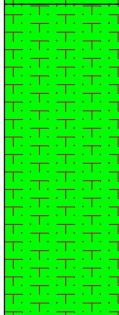
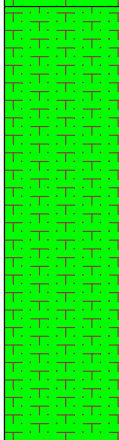
RPS Aquaterra		COMPOSITE WELL LOG		Well No: PZ134 & PZ155		
Suite 4, 125 Melville Parade Como WA 6152 Australia Tel: (+61) (08) 9368 4044 Fax: (+61) (08) 9368 4055		Client: Moolarben Coal Mines Pty		Project: Moolarben Coal Hydrogeology		
		Commenced: 12/12/2007	Method: DHH	Area: Murrumbidgee Valley		
		Completed: 12/12/2007	Fluid: Air	East: 763464		
		Drilled: Intertech	Bit Record: 6.5" (0-2.5m)	North: 6422445		
Logged By: NW		120mm (2.5-26m)		Elevation: See below		
Static Water Level:		Date:				
Depth (mbgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion	
					Diagram	Notes
0			REGOLITH: Regolith, light grey-tan/reddy brown, mudstone and sandstone with minor clay.	Line 2 Elevations (mAHD) PZ134 = 447.56 PZ155 = 447.87		50mm PVC End Cap 125mm Class 9 PVC Surface casing PZ155 50mm Class 18 PVC Blank casing
			CLAYSTONE: Minor sand lens, light grey/brown, soft, friable.			Bentonite seal
			CLAYSTONE: Minor sand lens, light mid grey, soft, friable.			Gravel Pack
			CLAYSTONE: Minor sand lens, light brown, soft, friable.			50mm Class 18 PVC Screen
			CLAYSTONE: Minor sand lens, light dark grey, soft, friable.			
10			CLAYSTONE: Black, carbonaceous, partly siliceous, hard.			
			CLAYSTONE: Light mid grey, with minor sand lens, sand medium, coarse.			
			CLAYSTONE: Mid-dark grey, laminated, hard.			PZ134 50mm Class 18 PVC Blank casing Bentonite seal
20			CLAYSTONE: Black, carbonaceous, moderately soft.	Yield 0.5L/s at 23-24m		Gravel Pack
			CLAYSTONE: Light grey - creamy grey, slightly clayey.	PZ134 TD = 26m PZ155 TD = 10m		50mm Class 18 PVC Screen
			CLAYSTONE: Mid grey, laminated, hard.			
30						


RPS Aquaterra		COMPOSITE WELL LOG			Well No: PZ135 & PZ136	
Suite 4, 125 Melville Parade Como WA 6152 Australia Tel: (+61) (08) 9368 4044 Fax: (+61) (08) 9368 4055		Client: Moolarben Coal Mines Pty		Project: Moolarben Coal Hydrogeology		
		Commenced: 13/12/2007	Method: DHH	Area: Murrumbidgee Valley		
		Completed: 13/12/2007	Fluid: Air	East: 763286		
		Drilled: Intertech	Bit Record: 6.5" (0-2.5m)	North: 6422481		
Logged By: NW		120mm (2.5-24m)		Elevation: See below		
Static Water Level:		Date:				
Depth (mbgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion	
					Diagram	Notes
0			REGOLITH: Tan brown, clayey silt. CLAYSTONE: Light tan-brown, highly weathered, slightly clayey, friable. CLAYSTONE: Light mid grey, soft, friable. CLAYSTONE: Light brown, soft, friable. CLAYSTONE: Mid grey, laminated carbonaceous. CLAYSTONE: Black, carbonaceous, indurated, hard. CLAYSTONE: Mid-dark grey, laminated, hard, minor sandstone lenses 19-20m.	Line 2 Elevations (mAHD) PZ135 = 439.45 PZ136 = 439.25		50mm PVC End Cap 125mm Class 9 PVC Surface casing PZ135 50mm Class 18 PVC Blank casing Bentonite Seal Gravel Pack 50mm Class 18 PVC Screen
10				Yield 1L/s at 20-21m PZ135 TD = 16m PZ136 TD = 24m		PZ136 50mm Class 18 PVC Blank casing Bentonite seal Gravel Pack 50mm Class 18 PVC Screen
20						PZ136 50mm Class 18 PVC Blank casing Bentonite seal Gravel Pack 50mm Class 18 PVC Screen
30						PZ136 50mm Class 18 PVC Blank casing Bentonite seal Gravel Pack 50mm Class 18 PVC Screen

RPS Aquaterra		COMPOSITE WELL LOG			Well No: PZ137 & PZ149	
Suite 4, 125 Melville Parade Como WA 6152 Australia Tel: (+61) (08) 9368 4044 Fax: (+61) (08) 9368 4055		Client: Moolarben Coal Mines Pty		Project: Moolarben Coal Hydrogeology		
		Commenced: 13/12/2007	Method: DHH	Area: Murrumbidgee Valley		
		Completed: 14/12/2007	Fluid: Air	East: 764002		
		Drilled: Intertech	Bit Record: 6.5" (0-5.5m)	North: 6420285		
Logged By: NW		120mm (5.5-30m)		Elevation: See below		
Static Water Level:		Date:				
Depth (mbgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion	
					Diagram	Notes
0			REGOLITH: Mid brown, predominately silty sandstone, highly weathered, poorly sorted. Some pinky white rounded quartz.	Line 3 Elevations (mAHD) PZ137 = 479.01 PZ149 = 478.23		50mm PVC End Cap 125mm Class 9 PVC Surface casing
			CLAYSTONE: Mid brown.			PZ149 50mm Class 18 PVC Blank casing Bentonite seal
			CLAYSTONE: Dark brown/black.			Gravel Pack 50mm Class 18 PVC Screen
10			CLAYSTONE: Light grey claystone with fine sand lens, sand medium to coarse, laminated, moderately soft.			50mm Class 18 PVC Blank casing PZ137
			CLAYSTONE: Dark grey/black, carbonaceous, hard.			Bentonite seal Gravel Pack
20			CLAYSTONE: Light mid grey, soft, becoming sandy at 25-26m.	Moisture at 20-21m		50mm Class 18 PVC Screen
			CLAYSTONE: Mid grey - grey brown, laminated, moderately hard.			Backfill
30				PZ149 TD = 11m PZ137 TD = 30m		

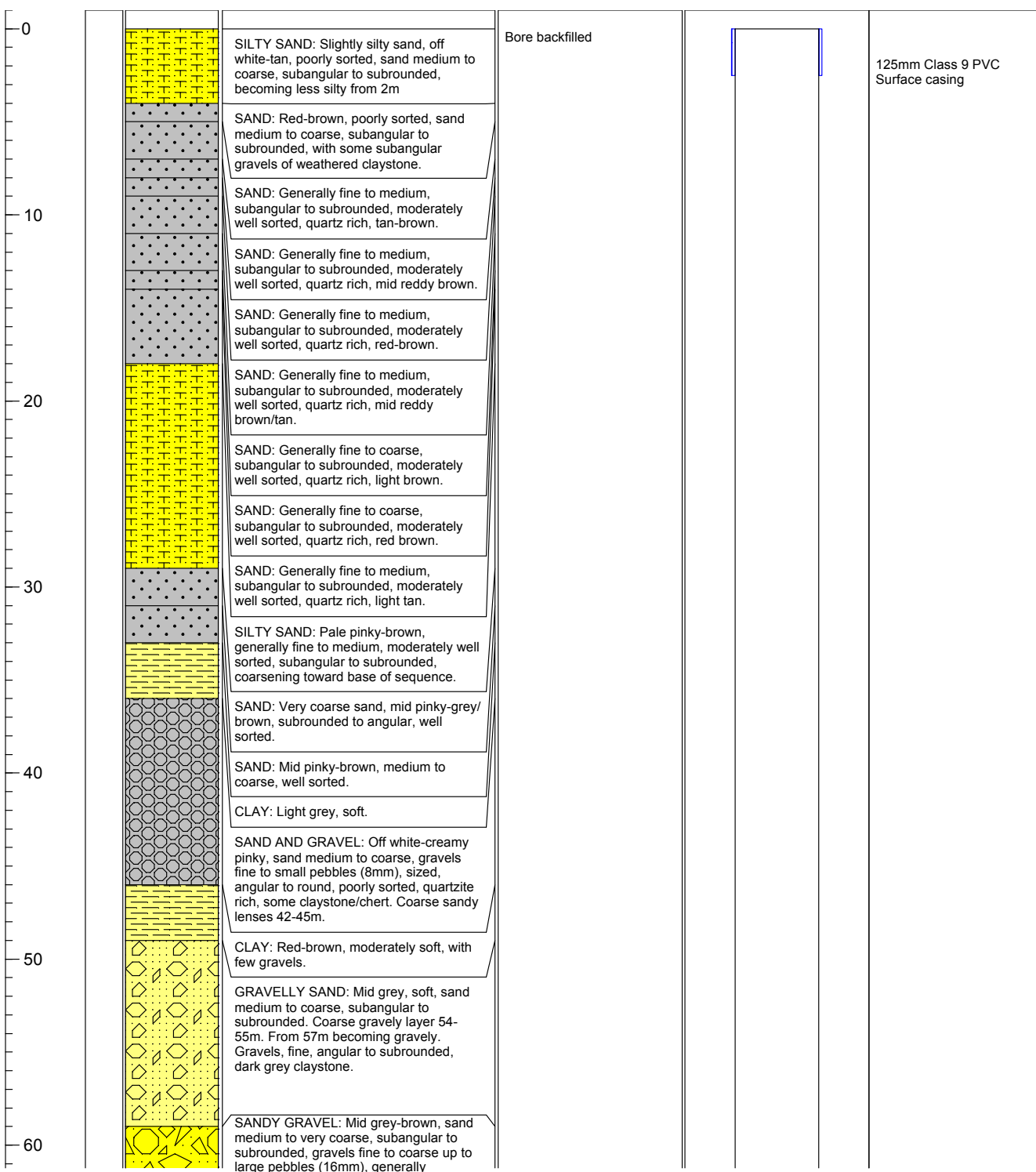
Depth (mbgl)		Geology	Graphic Log	Lithological Description	Field Notes	Well Completion		
						Diagram	Notes	
				<h2 style="margin: 0;">COMPOSITE WELL LOG</h2>		<b>Well No:</b> PZ138, PZ146 & PZ154		
		Suite 4, 125 Melville Parade Como WA 6152 Australia Tel: (+61) (08) 9368 4044 Fax: (+61) (08) 9368 4055		<b>Client:</b> Moolarben Coal Mines Pty		<b>Project:</b> Moolarben Coal Hydrogeology		
				<b>Commenced:</b> 29/01/2008	<b>Method:</b> DHH	<b>Area:</b> Murrumbidgee Valley		
				<b>Completed:</b> 29/01/2008	<b>Fluid:</b> Air	<b>East:</b> 762604		
				<b>Drilled:</b> Intertech	<b>Bit Record:</b> 6.5" (0-2.5m)	<b>North:</b> 6420386		
				<b>Logged By:</b> NW	120mm (2.5-38m)	<b>Elevation:</b> See below		
				<b>Static Water Level:</b>		<b>Date:</b>		
						<b>Well Completion</b>		
0			CLAYSTONE: Light grey/brown, friable.		Line 3  Elevations (mAHD) PZ138=486.17 PZ146=485.84 PZ154=486.23		50mm PVC End Cap 125mm Class 9 PVC Surface casing PZ154 50mm Class 18 PVC Blank casing Bentonite seal	
			CLAYSTONE: Very light pinky brown/light mid-grey, highly weathered, soft to friable. Increasingly sandy 7-11m.				Gravel Pack 50mm Class 18 PVC Screens	
			CLAYSTONE: Mid-dark grey, soft, moderate indurated (12-14m), becoming harder with increasing sand 14-16m.				PZ146 Bentonite seal	
			CLAYSTONE: Light- mid grey, friable-hard, some sandy layers of medium-coarse sandstone throughout.				Gravel Pack 50mm Class 18 PVC Screens	
			CLAYSTONE: Mid grey, friable-hard, some sandy lenses of medium-coarse sandstone throughout.					
			CLAYSTONE: Light dark grey-brown with thin sandstone bands throughout. Sandstone medium- coarse, friable.					
			CLAYSTONE: Light mid grey, soft, slightly sandy.					
			CLAYSTONE: Light grey brown, interbedded with hard dark grey/black carbonaceous mudstone/shale and light grey/brown medium-coarse grained sandstone .				Moisture at 35.5m PZ154 TD = 7m PZ146TD=11.5m PZ138 TD = 38m	
30						PZ138 50mm Class 18 PVC Blank casing Bentonite seal Gravel Pack 50mm Class 18 PVC Screens		

RPS Aquaterra		COMPOSITE WELL LOG		Well No: PZ139 & PZ148		
Suite 4, 125 Melville Parade Como WA 6152 Australia Tel: (+61) (08) 9368 4044 Fax: (+61) (08) 9368 4055		Client: Moolarben Coal Mines Pty		Project: Moolarben Coal Hydrogeology		
		Commenced: 30/01/2008	Method: DHH	Area: Murrumbidgee Valley		
		Completed: 30/01/2008	Fluid: Air	East: 762941		
		Drilled: Intertech	Bit Record: 6.5" (0-2.5m)	North: 6420371		
Logged By: NW		120mm (2.5-66m)		Elevation: See below		
Static Water Level:		Date:				
Depth (mbgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion	
					Diagram	Notes
0			REGOLITH: light brown/pinky brown, weathered claystone and sandstone with some pebbles of quartz, siliceous claystone. Highly variable and poorly sorted, increasingly sandy 3-5m.	Line 3 Elevations (mAHD) PZ139 = 476.20 PZ148 = 475.68		50mm PVC End Cap 125mm Class 9 PVC Surface casing 50mm Class 18 PVC Blank casing Bentonite Seal Gravel pack 50mm Class 18 PVC Screen
10			CLAYSTONE: Light-dark brown, hard with sand lenses from 8-10m.			
20			CLAYSTONE: Light-dark grey, carbonaceous, minor sand lenses 15-17m, minor sand lenses 25-32m.			
30			CLAYSTONE: Light dark grey, hard, minor sand lenses.			
40			CLAYSTONE: Light dark grey, hard, minor sand lenses.	Screen set in Ulan Coal seam		
50			CLAYSTONE: Dark grey, carbonaceous, hard.			
60			COAL: Dark grey/black, carbonaceous, hard.	PZ148 TD = 11.5m PZ139 TD = 66m	50mm Class 18 PVC Blank casing Bentonite seal Gravel Pack 50mm Class 18 PVC Screen	
70			CLAYSTONE: Mid grey, hard.			

RPS Aquaterra		COMPOSITE WELL LOG			Well No: PZ140 & PZ147	
Suite 4, 125 Melville Parade Como WA 6152 Australia Tel: (+61) (08) 9368 4044 Fax: (+61) (08) 9368 4055		Client: Moolarben Coal Mines Pty		Project: Moolarben Coal Hydrogeology		
		Commenced: 30/01/2008	Method: DHH	Area: Murrumbidgee Valley		
		Completed: 31/01/2008	Fluid: Air	East: 762783		
		Drilled: Intertech	Bit Record: 6.5" (0-4.5m)	North: 6420385		
Logged By: NW		120mm (4.5-30m)		Elevation: See below		
Static Water Level:		Date:				
Depth (mbgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion	
					Diagram	Notes
0			REGOLITH: Light brown/pink brown, highly weathered claystone with medium to coarse sandstone bands, very variable and poorly sorted. 3-4m, dominated by pink/yellow claystone, weathering to clay.	Line 3 Elevations (mAHD) PZ140 = 482.45 PZ147 = 482.45		50mm PVC End Cap 125mm Class 9 PVC Surface casing  PZ147 50mm Class 18 PVC Blank casing Bentonite seal Gravel Pack 50mm Class 18 PVC Screen 8-11m
10			CLAYSTONE: Light pinky brown-tan brown, soft, 9-10m sandy.	Moisture at 11m		
20			CLAYSTONE: Mid dark grey/black, carbonaceous, generally friable, minor sands lenses 17-19m.			
30			CLAYSTONE: Light-mid grey, generally friable, some hard layers, minor sand lens 27-28m.	TD PZ147 = 11m TD PZ140 = 30m		PZ140 50mm Class 18 PVC Blank casing  50mm Class 18 PVC Screen 13-16m and 27-30m

 Suite 4, 125 Melville Parade Como WA 6152 Australia Tel: (+61) (08) 9368 4044 Fax: (+61) (08) 9368 4055	<b>COMPOSITE WELL LOG</b>		<b>Well No:</b> PZ142
	<b>Client:</b> Moolarben Coal Mines Pty		<b>Project:</b> Moolarben Coal Hydrogeology
	<b>Commenced:</b> 11/01/2008	<b>Method:</b> DHH	<b>Area:</b> Murrumbidgee Valley
	<b>Completed:</b> 14/01/2008	<b>Fluid:</b> Air/Mud	<b>East:</b>
<b>Drilled:</b> Intertech	<b>Bit Record:</b> 8" (0-2.5m)	<b>North:</b>	<b>Elevation:</b>
<b>Logged By:</b> NW	4.75" (2.5-120m)	<b>Static Water Level:</b>	
<b>Date:</b>			

Depth (m bgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion	
					Diagram	Notes



RPS Aquaterra		COMPOSITE WELL LOG			Well No: PZ142		
Suite 4, 125 Melville Parade Como WA 6152 Australia Tel: (+61) (08) 9368 4044 Fax: (+61) (08) 9368 4055		Client: Moolarben Coal Mines Pty		Project: Moolarben Coal Hydrogeology			
		Commenced: 11/01/2008		Method: DHH		Area: Murrumbidgee Valley	
		Completed: 14/01/2008		Fluid: Air/Mud		East:	
		Drilled: Intertech		Bit Record: 8" (0-2.5m)		North:	
Logged By: NW		4.75" (2.5-120m)		Elevation:			
Static Water Level:						Date:	
Depth (mbgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion		
					Diagram	Notes	
			subrounded to well rounded, quartz rich with some claystone.				
			SANDY GRAVEL: Mid grey-brown, sand medium to coarse, gravels fine to medium subangular to rounded, poorly sorted, quartzite rich.				
70			GRAVEL: Mid dark grey, claystone, generally subrounded to rounded, well sorted. Band of lighter off white-creamy claystone 72-73m.				
			SAND: Coarse to very coarse, mid grey, poorly sorted, subangular to rounded, quartz rich with grey claystone.				
80			SAND: Gravely sand grading into sandy gravel from 81m. Grey brown sand, medium to coarse, poorly sorted, gravels generally subangular to rounded grains of quartzite and claystone.				
			SAND: Light off grey-brown, medium to coarse, moderately well sorted, subangular to subrounded. Coarsening/grading with fine gravels from 96m, gravels subrounded to rounded, quartzite.				
90							
100			GRAVEL: Off white/cream/pinky/tan/grey. Generally subrounded to rounded, moderately well sorted, medium to coarse grains of quartz, chert and claystone.				
110							
			CLAYSTONE: Bedrock?				
120				TD = 120m			


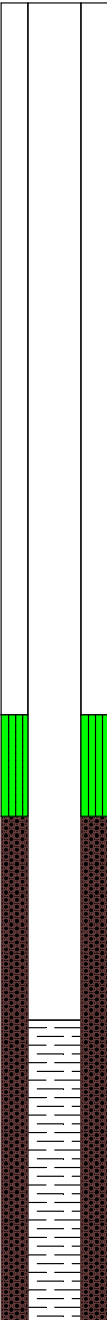
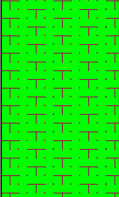



RPS Aquaterra		COMPOSITE WELL LOG			Well No: PZ143 & PZ145	
Suite 4, 125 Melville Parade Como WA 6152 Australia Tel: (+61) (08) 9368 4044 Fax: (+61) (08) 9368 4055		Client: Moolarben Coal Mines Pty		Project: Moolarben Coal Hydrogeology		
		Commenced: 14/01/2008	Method: DHH	Area: Murrumbidgee Valley		
		Completed: 14/01/2008	Fluid: Air	East: 763397		
		Drilled: Intertech	Bit Record: 6.5" (0-2.5m)	North: 6420306		
Logged By: NW		120mm (2.5-27m)		Elevation: See below		
Static Water Level:		Date:				
Depth (mbgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion	
					Diagram	Notes
0			CLAY: Pale, grey-brown, minor brown/tan chert, grey claystone and sand.	Line 3 Elevations (mAHD) PZ143 = 464.08 PZ145 = 463.88		50mm PVC End Cap 125mm Class 9 PVC Surface casing PZ145 50mm Class 18 PVC Blank casing Bentonite seal
			CLAYSTONE: Light grey/brown, highly weathered, friable.			
			CLAYSTONE: Light pinky white/red brown, soft.			Gravel Pack
			CLAYSTONE: Mid grey, hard.			50mm Class 18 PVC Screen
10			CLAYSTONE: Light dark grey, hard laminated.			
20			CLAYSTONE: Black, carbonaceous.			
			CLAYSTONE: Light-mid grey, hard 25-26m, interbedded with softer yellow brown claystone.	Moisture at 25m PZ145 TD = 7m PZ 143 TD = 27		PZ143 50mm Class 18 PVC Blank casing Bentonite seal Gravel Pack 50mm Class 18 PVC Screen
30						

RPS Aquaterra		COMPOSITE WELL LOG			Well No: PZ141, PZ144 & PZ153		
Suite 4, 125 Melville Parade Como WA 6152 Australia Tel: (+61) (08) 9368 4044 Fax: (+61) (08) 9368 4055		Client: Moolarben Coal Mines Pty		Project: Moolarben Coal Hydrogeology			
		Commenced: 15/01/2008		Method: DHH		Area: Murrumbidgee Valley	
		Completed: 15/01/2008		Fluid: Air		East: 763764	
		Drilled: Intertech		Bit Record: 6.5" (0-2.5m)		North: 6420202	
Logged By: NW		120mm (2.5-28m)		Elevation: See below			
Static Water Level:						Date:	
Depth (mbgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion		
					Diagram	Notes	
0			REGOLITH: Light mid brown-red/grey, predominately red brown claystone and chert with minor, coarse sand. CLAYSTONE: Light pinky white/red brown, soft interbedded. CLAYSTONE: Mid grey, friable. CLAYSTONE: Black, hard siliceous, interbedded with softer black claystone. CLAYSTONE: Light mid grey, soft, friable. CLAYSTONE: Light-dark grey, generally friable, becoming harder with depth. Thin sand (fine-coarse) lenses. 18-20m dark grey, carbonaceous. CLAYSTONE: Light-dark grey, interbedded. 20-22m light grey, soft, interbedded. 22-24m with minor sand lenses.	Line 3 Elevations (mAHD) PZ141=476.52 PZ144=467.37 PZ153=467.47		50mm PVC End Cap 125mm Class p PVC Surface casing Bentonite seal PZ153 Gravel Pack 50mm Class 18 PVC Screen  PZ141 Bentonite seal Gravel Pack 50mm Class 18 PVC Screen  PZ144 50mm Class 18 PVC Blank casing Bentonite seal Gravel Pack 50mm Class 18 PVC Screen	
10							
20				PZ153 TD = 3.5m PZ141 TD = 9m PZ144 TD = 28m			
30							

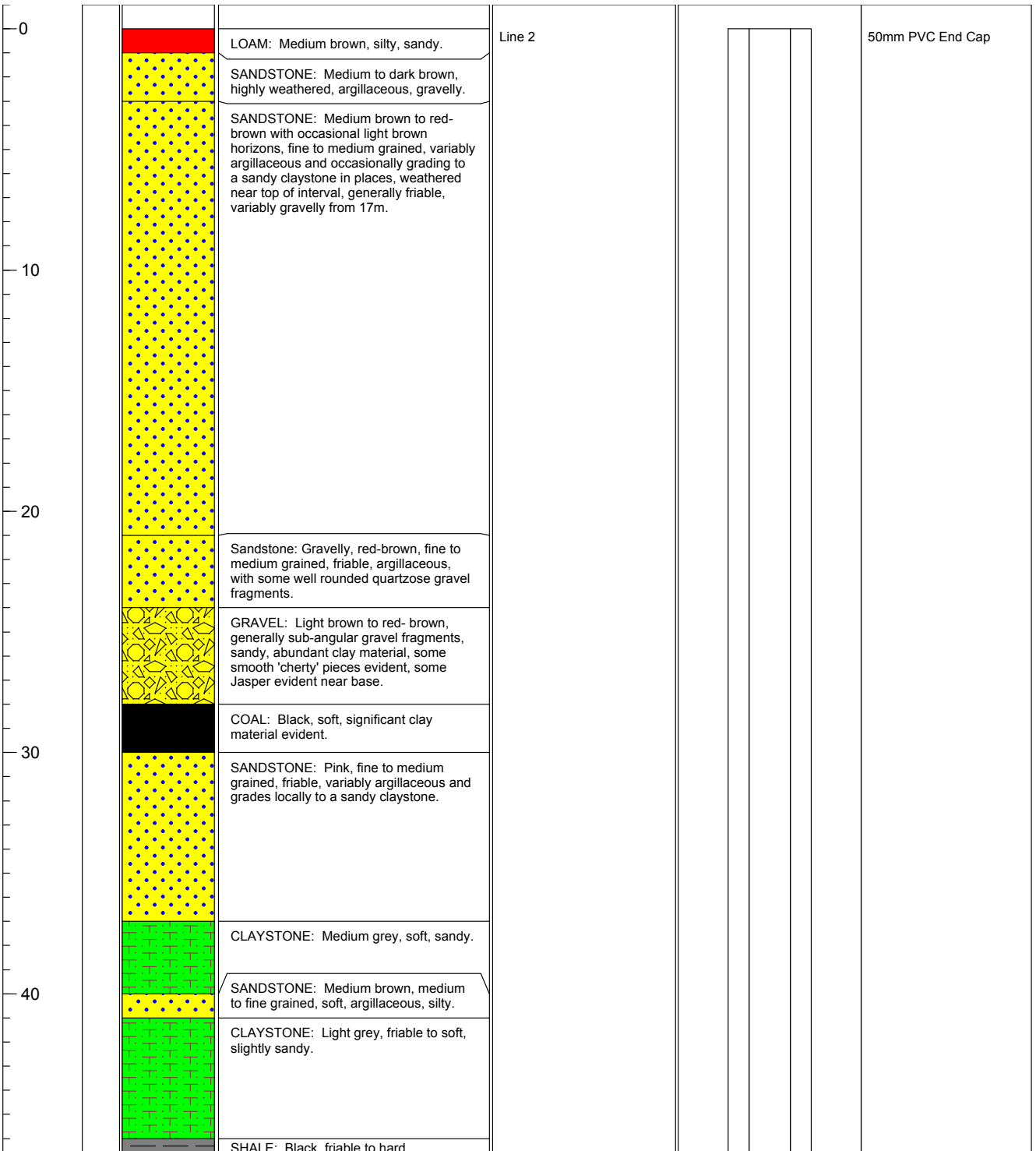
RPS Aquaterra		COMPOSITE WELL LOG		Well No: PZ150 & PZ152		
Suite 4, 125 Melville Parade Como WA 6152 Australia Tel: (+61) (08) 9368 4044 Fax: (+61) (08) 9368 4055		Client: Moolarben Coal Mines Pty		Project: Moolarben Coal Hydrogeology		
		Commenced: 22/01/2008	Method: DHH	Area: Helm Property		
		Completed: 22/01/2008	Fluid: Air	East: 765783		
		Drilled: Intertech	Bit Record: 6.5" (0-2.5m)	North: 6421557		
Logged By: JR		120mm (2.5-88.5m)		Elevation:		
Static Water Level:		Date:				
Depth (mbgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion	
					Diagram	Notes
0			Topsoil: medium brown to buff, clayey, silty. Mudstone: Light grey to buff, soft, occasionally silty.	Helm Bore East		
10			Shale: Medium to dark grey, friable, silty. Shale: Black, friable, sandy, carbonaceous. Shale: Medium to dark grey, silty, friable. Shale: Black, friable, sandy, very carbonaceous.	Yield: 0.3L/s at 11-13m PZ152 TD=13m		50mm PVC End Cap PZ152 50mm Class 18 PVC Blank casing Bentonite seal Gravel Pack 50mm Class 18 PVC Screens
20			Sandstone: Light grey, fine to medium grey, friable, argillaceous. Coal: Black, friable, shaley.			
30			Sandstone: Medium grey, fine grained, friable, silty, argillaceous. Shale: Dark grey, friable, silty, carbonaceous.			
40			Coal: Black, soft, silty. Shale: Dark grey, friable, silty.			PZ150 50mm Class 18 PVC Blank casing
50			Sandstone: Light grey, friable, slightly argillaceous. Coal: Black, soft.	Yield: 0.15L/s at 47-48m		
60			Shale: Black, friable, carbonaceous. Coal: Black, soft.			
70			Shale: Dark grey to black, friable, variably carbonaceous - but becoming very carbonaceous from 64m. Coal: Black, soft to friable.			
80			Shale: Dark grey, friable, carbonaceous.	PZ150 TD=88.5m		Bentonite seal Gravel Pack 50mm Class 18 PVC Screens
90			Shale: Dark grey, friable, carbonaceous.			

RPS Aquaterra		COMPOSITE WELL LOG			Well No: PZ151		
Suite 4, 125 Melville Parade Como WA 6152 Australia Tel: (+61) (08) 9368 4044 Fax: (+61) (08) 9368 4055		Client: Moolarben Coal Mines Pty		Project: Moolarben Coal Hydrogeology			
		Commenced: 21/02/2008		Method: DHH		Area: Helm Property	
		Completed: 21/02/2008		Fluid: Air		East: 764826	
		Drilled: Intertech		Bit Record: 6.5" (0-2.5m)		North: 6421716	
Logged By: JR		120mm (2.5-71.5m)		Elevation:			
Static Water Level:						Date:	
Depth (mbgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion		
					Diagram	Notes	
0			Topsoil: Grey/brown, clayey. Mudstone: Light grey to medium brown, highly weathered. Mudstone: Light grey to buff, soft, occasionally silty. Mudstone: Light to dark grey, soft. Shale: Medium to dark grey, friable, silty. Shale: Medium to light grey, soft, silty. Shale: Medium to dark grey, soft to friable, variably silty and sandy (grading to an argillaceous sandstone in lenses), variably carbonaceous - but generally increasingly carbonaceous with depth, (very carbonaceous lenses at 48 - 49m, 52 - 53m, 54 - 55m). Coal: Black, soft, clayey. Shale: Dark grey, friable, carbonaceous. Coal: Black, friable, occasionally vitreous, shaley horizons over 64 - 64m). Shale: Medium grey, friable.	Helm Bore West Screens set in Ulan seam Moisture at 19-20m 0.2L/s at 34-35m PZ151 TD=71.5m		50mm PVC End Cap 50mm Class 18 PVC Blank casing Bentonite seal Gravel Pack 50mm Class 18 PVC Screens	


Depth (mbgl)		Geology	Graphic Log	Lithological Description	Field Notes	Well Completion	
						Diagram	Notes
0				CLAYSTONE: Pale cream-off white, friable.	Helm Bore East		50mm PVC End Cap
10				CLAYSTONE: Dark grey, hard, indurated.	TD = 13m		50mm Class 18 PVC Blank casing  Bentonite seal  Gravel Pack  50mm Class 18 PVC Screens

 Suite 4, 125 Melville Parade Como WA 6152 Australia Tel: (+61) (08) 9368 4044 Fax: (+61) (08) 9368 4055	<b>COMPOSITE WELL LOG</b>		<b>Well No:</b> PZ156
	<b>Client:</b> Moolarben Coal Mines Pty		<b>Project:</b> Moolarben Coal Hydrogeology
	<b>Commenced:</b> 26/02/2008	<b>Method:</b> DHH	<b>Area:</b> Murrumbidgee Valley
	<b>Completed:</b> 29/02/2008	<b>Fluid:</b> Air	<b>East:</b> 763282
<b>Drilled:</b> Intertech	<b>Bit Record:</b> 6.25" (0-30.5m)	<b>North:</b> 6426196	
<b>Logged By:</b> JR	120mm (30.5-136m)	<b>Elevation:</b>	
<b>Static Water Level:</b>			<b>Date:</b>

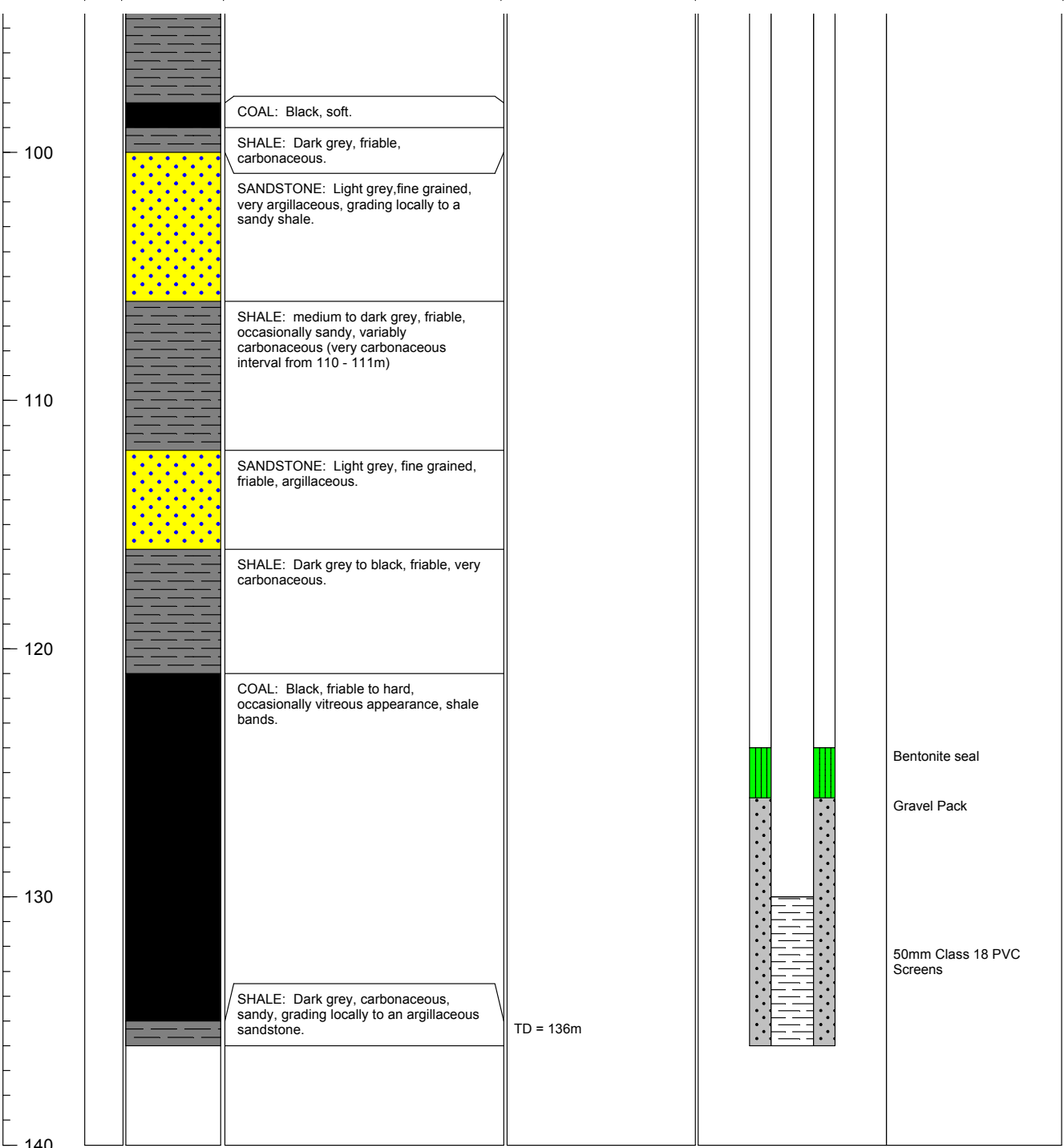
Depth (mbgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion	
					Diagram	Notes




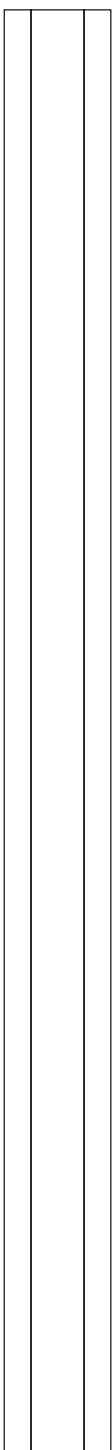
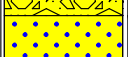
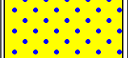
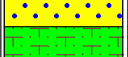
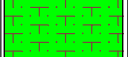
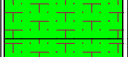
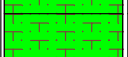
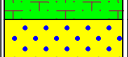


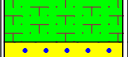
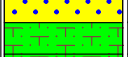
RPS Aquaterra		COMPOSITE WELL LOG			Well No: PZ156	
Suite 4, 125 Melville Parade Como WA 6152 Australia Tel: (+61) (08) 9368 4044 Fax: (+61) (08) 9368 4055		Client: Moolarben Coal Mines Pty		Project: Moolarben Coal Hydrogeology		
		Commenced: 26/02/2008	Method: DHH	Area: Murrumbidgee Valley		
		Completed: 29/02/2008	Fluid: Air	East: 763282		
		Drilled: Intertech	Bit Record: 6.25" (0-30.5m)	North: 6426196		
Logged By: JR		120mm (30.5-136m)		Elevation:		
Static Water Level:		Date:				
Depth (m bgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion	
					Diagram	Notes
50			carbonaceous.  SHALE: Medium to dark grey, friable, variably carbonaceous. (very carbonaceous at 53 - 54m and 55 - 56m), occasionally sandy.			
60			SANDSTONE: Light grey, fine grained, argillaceous and silty (grades locally to a siltstone).			
			SHALE: Dark grey to medium grey, friable, variably carbonaceous.			
70			SANDSTONE: Light grey, fine grained, argillaceous and silty (grades locally to a siltstone).			
			COAL: Black, hard, occasionally sandy.	Yield: 2L/s at 74-76m. Screen set in Ulan Seam.		50mm Class 18 PVC Blank casing
			SANDSTONE: Light grey, fine grained, argillaceous and silty (grades locally to a siltstone).			
80			SHALE: Medium to dark grey, friable, variably carbonaceous.			
			COAL: Black, soft.			
90			SHALE: Medium to dark grey, friable, variably sandy - grading locally to an argillaceous sandstone, variably carbonaceous.			


 <p>Suite 4, 125 Melville Parade Como WA 6152 Australia Tel: (+61) (08) 9368 4044 Fax: (+61) (08) 9368 4055</p>	<b>COMPOSITE WELL LOG</b>		<b>Well No:</b> PZ156
	<b>Client:</b> Moolarben Coal Mines Pty		<b>Project:</b> Moolarben Coal Hydrogeology
	<b>Commenced:</b> 26/02/2008	<b>Method:</b> DHH	<b>Area:</b> Murrumbidgee Valley
	<b>Completed:</b> 29/02/2008	<b>Fluid:</b> Air	<b>East:</b> 763282
<b>Drilled:</b> Intertech	<b>Bit Record:</b> 6.25" (0-30.5m)	<b>North:</b> 6426196	
<b>Logged By:</b> JR	120mm (30.5-136m)	<b>Elevation:</b>	
<b>Static Water Level:</b>		<b>Date:</b>	

Depth (mbgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion	
					Diagram	Notes

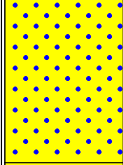
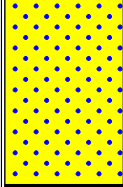

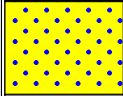
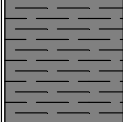
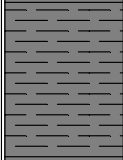
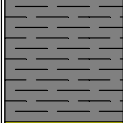
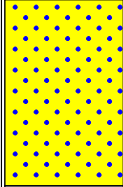
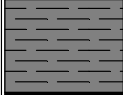



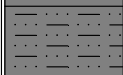




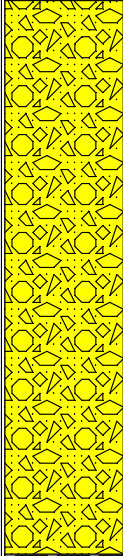
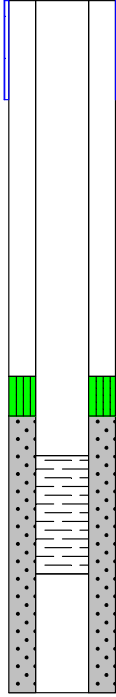
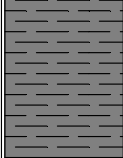
RPS Aquaterra		COMPOSITE WELL LOG			Well No: PZ157	
Suite 4, 125 Melville Parade Como WA 6152 Australia Tel: (+61) (08) 9368 4044 Fax: (+61) (08) 9368 4055		Client: Moolarben Coal Mines Pty		Project: Moolarben Coal Hydrogeology		
		Commenced: 5/03/2008	Method: DHH	Area: Murrumbidgee Valley		
		Completed: 6/03/2008	Fluid: Air	East: 763825	North: 6425386	
		Drilled: Intertech	Bit Record: 8" (0-2.5m)	Elevation:	Date:	
Logged By: JR		120mm (2.5-122)				
Static Water Level:						
Depth (m bgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion	
					Diagram	Notes
0			GRAVEL: Medium to dark brown to dark grey, coarse to very coarse grained, (mostly clear and frosted crystalline fragments, some slightly weathered basalt fragments), clayey, sandy.	Line 2		50mm PVC End Cap
			SANDSTONE: Light grey to light brown, very fine to fine grained, soft to friable (weathered), silty, clayey.			
			CLAYSTONE: Light grey to cream, soft, silty.			
10			CLAYSTONE: Buff, soft, silty.			
			CLAYSTONE: Light grey to white, soft, silty.			
			SANDSTONE: Buff to light red-brown, soft to friable, argillaceous, silty.			
			CLAYSTONE: Medium brown to red brown, soft, silty.			
			CLAYSTONE: Light to medium grey, soft, silty.			
20			SANDSTONE: Medium grey to buff, very fine to fine grained, soft, argillaceous.			
			CLAYSTONE: Medium red brown, soft, silty.			
			CLAYSTONE: Medium to light grey, soft, variably silty and sandy.			
30			CLAYSTONE: With shale, medium grey, soft to friable, slightly silty.			
			SHALE: Medium to dark grey, friable, silty.			
40			SHALE: Light to medium grey, friable, silty and sandy.	Moisture at 40-42m		
			SANDSTONE: Light to medium grey, very fine to fine grained, silty, argillaceous.	Yield: 0.2L/s at 44-45m		


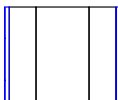
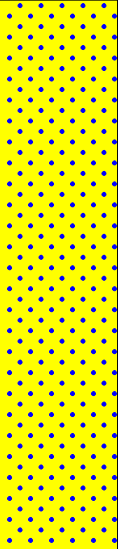
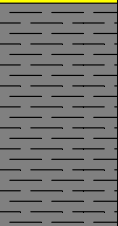











 Suite 4, 125 Melville Parade Como WA 6152 Australia Tel: (+61) (08) 9368 4044 Fax: (+61) (08) 9368 4055	<b>COMPOSITE WELL LOG</b>		<b>Well No:</b> PZ157
	<b>Client:</b> Moolarben Coal Mines Pty		<b>Project:</b> Moolarben Coal Hydrogeology
	<b>Commenced:</b> 5/03/2008	<b>Method:</b> DHH	<b>Area:</b> Murrumbidgee Valley
	<b>Completed:</b> 6/03/2008	<b>Fluid:</b> Air	<b>East:</b> 763825
<b>Drilled:</b> Intertech	<b>Bit Record:</b> 8" (0-2.5m)	<b>North:</b> 6425386	
<b>Logged By:</b> JR	120mm (2.5-122)	<b>Elevation:</b>	
<b>Static Water Level:</b>			<b>Date:</b>

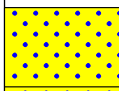
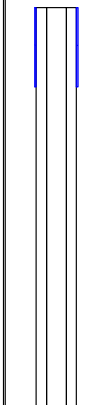
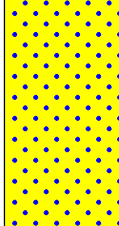
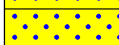

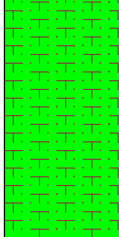

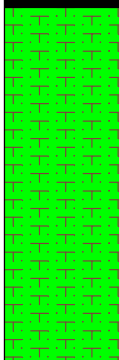
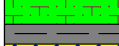
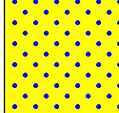
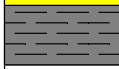

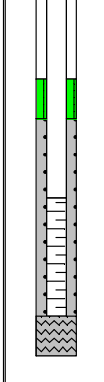
Depth (mbgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion	
					Diagram	Notes

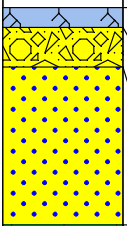
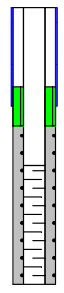
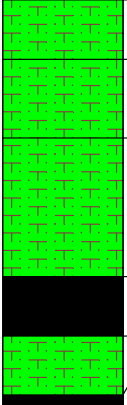
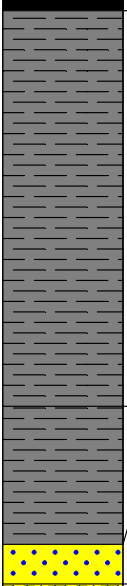
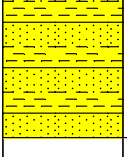
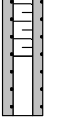
50							
			SANDSTONE: Medium grey, fine to medium grained, sub-angular to sub-rounded, friable, silty.				
60			COAL: Black, soft, silty, occasionally vitreous, evidence of shale bands.				50mm Class 18 PVC Blank casing
			SANDSTONE: Medium grey, very fine to fine grained, friable, silty and very argillaceous.				
			SHALE: Medium to dark grey, friable, sandy.				
70			SHALE: Dark grey to black, friable, silty and sandy, carbonaceous to very carbonaceous.				
			SHALE: Medium to dark grey, friable, silty and sandy, slightly carbonaceous.				
80			SANDSTONE: Medium grey, very fine to fine grained, friable silty with shale interbeds.				
			SHALE: Medium to dark grey, silty, sandy (grades locally to an argillaceous sandstone), friable, carbonaceous.				
			COAL: Black, soft, sandy.	Yield: 0.5L/s at 87-88m			
90			SHALE: Dark grey, friable, silty, carbonaceous.				
			SHALE: Light to medium grey, silty.				
			SILTSTONE: Medium grey, friable, argillaceous and sandy.				

RPS Aquaterra		COMPOSITE WELL LOG			Well No: PZ157		
Suite 4, 125 Melville Parade Como WA 6152 Australia Tel: (+61) (08) 9368 4044 Fax: (+61) (08) 9368 4055		Client: Moolarben Coal Mines Pty		Project: Moolarben Coal Hydrogeology			
		Commenced: 5/03/2008		Method: DHH		Area: Murrumbidgee Valley	
		Completed: 6/03/2008		Fluid: Air		East: 763825	
		Drilled: Intertech		Bit Record: 8" (0-2.5m)		North: 6425386	
Logged By: JR		120mm (2.5-122)		Elevation:			
Static Water Level:						Date:	
Depth (mbgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion		
					Diagram	Notes	
100			SHALE: Medium to dark grey, friable, silty and sandy.  COAL: Black, soft, silty.  SHALE: Dark grey to black, siliceous, indurated.  COAL: Black, friable to hard, vitreous.  SHALE: Black, friable to hard, carbonaceous.	Yield: 2.4L/s at 95-100m		Bentonite seal  Gravel Pack   50mm Class 18 PVC Screens	
110		COAL: Black, friable to hard, often vitreous, becoming shaly over bottom 0.5 metre.	Screens set in Ulan Coal Seam  TD = 122m				
120		SANDSTONE: Light grey, coarse grained, quartzite, sub-angular.					
130							
140							

RPS Aquaterra		COMPOSITE WELL LOG			Well No: PZ158		
Suite 4, 125 Melville Parade Como WA 6152 Australia Tel: (+61) (08) 9368 4044 Fax: (+61) (08) 9368 4055		Client: Moolarben Coal Mines Pty		Project: Moolarben Coal Hydrogeology			
		Commenced: 10/03/2008		Method: DHH		Area: Murrumbidgee Valley	
		Completed: 10/03/2008		Fluid: Air		East: 762247	
		Drilled: Intertech		Bit Record: 6.5" (0-2.5m)		North: 6422887	
Logged By: JR		120mm (2.5-18)		Elevation:			
Static Water Level:						Date:	
Depth (mbgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion		
					Diagram	Notes	
0			GRAVEL: Medium grey to red-brown, variable grain size up to 30 mm, sub-angular to sub-rounded, mostly quartzose fragments (some feldspathic noted), variably sandy and grades locally to a gravely sand (particularly at 3 - 6 m and 10 - 11 m).	Line 2		50mm PVC End Cap	
						125mm Class 12 PVC Surface casing	
						50mm Class 18 PVC Blank casing	
10			SHALE: Medium grey, friable.			Bentonite seal	
						Gravel Pack	
						50mm Class 18 PVC Screens	
20				TD = 18m		50mm Class 18 PVC Blank casing	
30							

RPS Aquaterra		COMPOSITE WELL LOG		Well No: PZ159			
Suite 4, 125 Melville Parade Como WA 6152 Australia Tel: (+61) (08) 9368 4044 Fax: (+61) (08) 9368 4055		Client: Moolarben Coal Mines Pty		Project: Moolarben Coal Hydrogeology			
		Commenced: 11/03/2008		Method: DHH		Area: Murrumbidgee Valley	
		Completed: 11/03/2008		Fluid: Air		East: 762256	
		Drilled: Intertech		Bit Record: 6.5" (0-2.5m)		North: 6422887	
Logged By: JR		120mm (2.5-27.5m)		Elevation:			
Static Water Level:		Date:					
Depth (mbgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion		
					Diagram	Notes	
0			GRAVEL: Medium grey to red brown, variable grain size up to 40 mm, sub-angular to sub-rounded, predominantly quartzose fragments, sandy.	Line 2		50mm PVC End Cap	
			SANDSTONE: Medium red brown to buff, coarse to very coarse grained, weathered near the top of interval, variably gravelly but increasingly gravelly near base, soft to friable.		125mm Class 12 PVC Surface casing		
10			SHALE: Medium - dark grey, soft to friable, carbonaceous horizons.			50mm Class 18 PVC Blank casing	
20			COAL: Black, soft to friable.			Bentonite seal	
			SHALE: Medium grey, soft to friable, sandy.			Gravel Pack	
			SHALE: Medium grey, soft to friable.			50mm Class 18 PVC Screens	
			SANDSTONE: Light - medium grey, fine grained, argillaceous, some gravel evident, soft to friable, damp.			50mm Class 18 PVC Blank casing	
			SHALE: Sandstone interbeds; light to medium grey, soft to friable, damp.				
			SHALE: Light grey, soft to friable, slightly sandy at discreet horizons.				
30				TD = 27.5m			

RPS Aquaterra		COMPOSITE WELL LOG			Well No: PZ160 & PZ161		
Suite 4, 125 Melville Parade Como WA 6152 Australia Tel: (+61) (08) 9368 4044 Fax: (+61) (08) 9368 4055		Client: Moolarben Coal Mines Pty		Project: Moolarben Coal Hydrogeology			
		Commenced: 11/03/2008		Method: DHH		Area: Murrumbidgee Valley	
		Completed: 11/03/2008		Fluid: Air		East: 762451	
		Drilled: Intertech		Bit Record: 6.5" (0-2.5m)		North: 6422846	
Logged By: JR		120mm (2.5-31m)		Elevation:			
Static Water Level:						Date:	
Depth (mbgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion		
					Diagram	Notes	
0			SANDSTONE: White to buff, medium to coarse grained, gravelly and argillaceous, weathered.	Line 2		50mm PVC End Cap  125mm Class 12 PVC Surface casing  PZ161 50mm Class 18 PVC Blank casing  Bentonite seal Gravel Pack  50mm Class 18 PVC Screens  Fall back (9-10m)	
			SANDSTONE: White grading to buff (occasional pink horizons), fine to medium grained, argillaceous and silty, soft to friable, moderately weathered from 2 - 6m.				
			SANDSTONE: Light brown, medium to coarse grained, argillaceous, soft to friable.				
			SHALE: Medium brown/grey, indurated, siliceous.				
10			CLAYSTONE: Medium brown to buff, soft, slightly sandy.				
			COAL: Black, soft.				
			CLAYSTONE: Light-medium grey, occasionally sandy.				
20			SHALE: Medium-dark grey, friable.				
			SANDSTONE: Cream coloured, medium to coarse grained, sub-angular, quartzose.	Water strikes at 26.5.			
			SHALE: Medium to dark grey, friable.				
30				PZ161 TD = 10m PZ160 TD = 31m		PZ 160  50mm Class 18 PVC Blank casing  Bentonite seal  Gravel Pack  50mm Class 18 PVC Screens  Fall back (30-31m)	

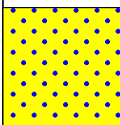
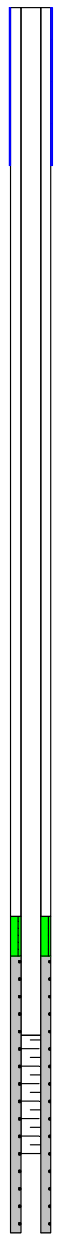
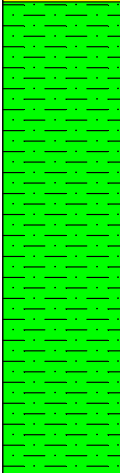
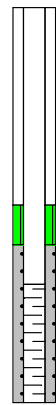
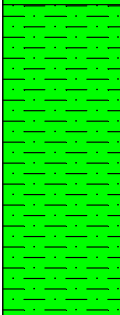
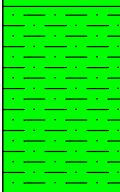
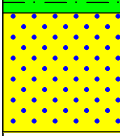
RPS Aquaterra		COMPOSITE WELL LOG		Well No: PZ162 & PZ163		
Suite 4, 125 Melville Parade Como WA 6152 Australia Tel: (+61) (08) 9368 4044 Fax: (+61) (08) 9368 4055		Client: Moolarben Coal Mines Pty		Project: Moolarben Coal Hydrogeology		
		Commenced: 12/03/2008	Method: DHH	Area: Murrumbidgee Valley		
		Completed: 12/03/2008	Fluid: Air	East: 762647	North: 6422826	
		Drilled: Intertech	Bit Record: 6.5" (0-2.5m)	Elevation:	Date:	
Logged By: JR	120mm (2.5-34m)	Static Water Level:	Date:			
Depth (mbgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion	
					Diagram	Notes
0			TOPSOIL: Dark brown, sandy, gravelly. GRAVEL: Medium red/brown, sandy, silty, clayey. Some gravel fragments up to 20mm. SANDSTONE: Buff to light brown, very fine to fine grained, moderately clayey, weathered.	Line 2		50mm PVC End Cap 125mm Class 12 PVC Surface casing PZ163 Bentonite seal Gravel Pack 50mm Class 18 PVC Blank casing 50mm Class 18 PVC Screens
10			CLAYSTONE: Light grey, soft. CLAYSTONE: Light brown, soft, silty. CLAYSTONE: Grey brown to medium brown, soft, silty. COAL: Black with a brown hue, soft. CLAYSTONE: Dark brown, soft. COAL: Black, soft.			
20			SHALE: Medium grey, soft. SHALE: Medium grey, sandy (grading to an argillaceous sandstone), soft. SANDSTONE: Light grey, medium to coarse grained, sub-angular to sub-rounded, quartzose, poorly cemented, soft.			
30			SHALE AND SANDSTONE INTERBEDDED: Dark grey, soft to friable. SANDSTONE: Very fine grained, silty, argillaceous.	PZ 163 TD = 7m PZ 162 TD = 34m		PZ162 50mm Class 18 PVC Blank casing Bentonite seal Gravel Pack 50mm Class 18 PVC Screens 50mm Class 18 PVC Blank casing

RPS Aquaterra		COMPOSITE WELL LOG			Well No: PZ164 & PZ165	
Suite 4, 125 Melville Parade Como WA 6152 Australia Tel: (+61) (08) 9368 4044 Fax: (+61) (08) 9368 4055		Client: Moolarben Coal Mines Pty		Project: Moolarben Coal Hydrogeology		
		Commenced: 12/03/2008	Method: DHH	Area: Murrumbidgee Valley		
		Completed: 12/03/2008	Fluid: Air	East: 762989		
		Drilled: Intertech	Bit Record: 6.5" (0-2.5m)	North: 6422548		
Logged By: JR		120mm (2.5-26.5m)		Elevation:		
Static Water Level:		Date:				
Depth (mbgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion	
					Diagram	Notes
0			TOPSOIL: Medium brown, clayey, silty, sandy, gravely.  SANDSTONE: Medium brown to grey brown, fine to medium grained, increasingly argillaceous with depth, weathered, soft.	Line 2		50mm PVC End Cap 125mm Class 12 PVC Surface Casing PZ165 Bentonite seal Gravel Pack
			MUDSTONE: Pink brown to medium brown, soft.	Possible bridging of gravel pack		50mm Class 18 PVC Screens
			MUDSTONE: Light grey, soft.		PZ164 Gravel Pack	
			SHALE: Medium grey to black, soft, variably carbonaceous - with coal interbeds.	PZ165 TD = 6m PZ164 TD = 26.5m		
10			COAL: Black, soft.		50mm Class 18 PVC Screens	
			SHALE: Medium grey, soft, carbonaceous.	50mm Class 18 PVC Screens		
			SANDSTONE: Medium grey brown, very fine to fine grained, soft to friable, silty, argillaceous.		50mm Class 18 PVC Screens	
20			SANDSTONE: Light grey, medium to coarse grained, angular to sub-angular, poorly cemented. Water strike at 21m.	50mm Class 18 PVC Screens		
			SHALE / SILTSTONE: Dark grey, friable.		50mm Class 18 PVC Screens	
			COAL: Black, soft.	50mm Class 18 PVC Screens		
			SHALE: Dark grey, friable, with interbedded Siltstone: Medium grey, argillaceous.		50mm Class 18 PVC Screens	
30						



RPS Aquaterra		COMPOSITE WELL LOG			Well No: PZ166 & PZ167	
Suite 4, 125 Melville Parade Como WA 6152 Australia Tel: (+61) (08) 9368 4044 Fax: (+61) (08) 9368 4055		Client: Moolarben Coal Mines Pty		Project: Moolarben Coal Hydrogeology		
		Commenced: 13/03/2008	Method: DHH	Area: Murrumbidgee Valley		
		Completed: 13/03/2008	Fluid: Air	East: 762864		
		Drilled: Intertech	Bit Record: 6.5" (0-2.5m)	North: 6422750		
Logged By: JR		120mm (2.5-36m)		Elevation:		
Static Water Level:		Date:				
Depth (m bgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion	
					Diagram	Notes
0			TOPSOIL: Medium brown, loamy, sandy, gravelly. SAND: Medium red/brown, fine to medium grained, clayey, gravelly. SAND: Weathered sandstone, Medium grey to light grey/brown, fine to medium grained (occasional coarse grained horizons near base of interval), some gravelly horizons, quartzose, sub-angular to sub-rounded.	Line 2		50mm PVC End Cap 125mm Class 12 PVC Surface casing 50mm Class 18 PVC Blank casing PZ167 Bentonite seal Gravel Pack
10			SAND: Weathered sandstone, Medium brown, coarse grained, sub-angular to sub-rounded, gravelly, quartzose, argillaceous. SAND: Weathered sandstone, Medium brown, fine to coarse grained, sub-angular, with gravelly interbeds: quartzose gravel fragments to 10mm.			50mm Class 18 PVC Screens PZ166 Bentonite seal Gravel Pack 50mm Class 18 PVC Screens
20			GRAVEL: Light grey to light brown, quartzose, angular, variably sandy, gravel fragments 10 - 20 mm.	PZ166: Hole collapsed below 16m		PZ166: Fall back (16-36m)
30						
				PZ167 TD = 9m PZ166 TD = 36m		




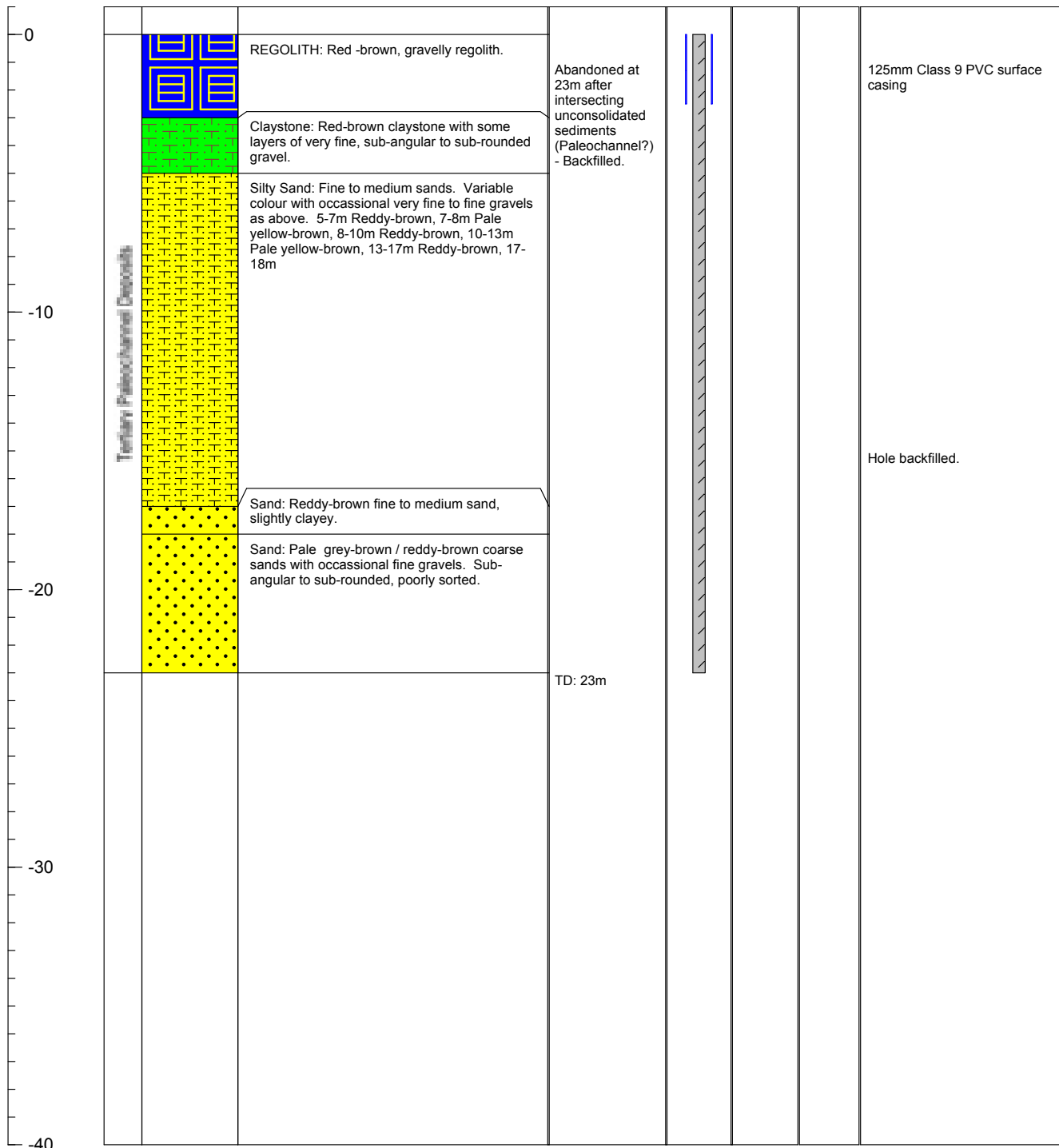
RPS Aquaterra		COMPOSITE WELL LOG			Well No: PZ170 & PZ171	
Suite 4, 125 Melville Parade Como WA 6152 Australia Tel: (+61) (08) 9368 4044 Fax: (+61) (08) 9368 4055		Client: Moolarben Coal Mines Pty		Project: Moolarben Coal Hydrogeology		
		Commenced: 17/03/2008	Method: Tricone	Area: Murrumbidgee Valley		
		Completed: 17/03/2008	Fluid: Air	East: 763925		
		Drilled: Intertech	Bit Record: 5.5" (0-4m)	North: 6424236		
Logged By: NW		3 7/8" (4-31m)		Elevation:		
Static Water Level:		Date:				
Depth (mbgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion	
					Diagram	Notes
0			Sandstone: off-white, pale, pink-brown. High silt content with few fine gravels, sand fine to coarse, gravel subrounded to rounded.	Line 1  Yield: 0.1L/s		50mm PVC End Cap 125mm Class 12 PVC Surface Casing
			Mudstone: off-white-pale grey, rare grey fine gravels, subangular to subrounded of chert. Uniform composition with gravel rich layer 11-12m. 14-15m pale yellow.			PZ171 50mm Class 18 PVC Blank casing Bentonite seal Gravel Pack  50mm Class 18 PVC Screens
			Mudstone: mid grey, becoming harder and darker grey with depth.			
			Mudstone: interbedded, mid-dark grey, friable, moderately hard			PZ170 50mm Class 18 PVC Blank casing  Bentonite seal Gravel Pack
			Sandstone: light-mid grey, medium to coarse sandstone.	PZ170 TD = 31m PZ171 TD = 10m		50mm Class 18 PVC Screens


RPS Aquaterra		COMPOSITE WELL LOG			Well No: PZ172 & PZ173	
Suite 4, 125 Melville Parade Como WA 6152 Australia Tel: (+61) (08) 9368 4044 Fax: (+61) (08) 9368 4055		Client: Moolarben Coal Mines Pty		Project: Moolarben Coal Hydrogeology		
		Commenced: 18/03/2008	Method: Tricone	Area: Murrumbidgee Valley		
		Completed: 18/03/2008	Fluid: Air/Foam	East: 763791		
		Drilled: Intertech	Bit Record: 5.5" (0-5m)	North: 6424260		
Logged By: NW		3 7/8" (5-24m)		Elevation:		
Static Water Level:		Date:				
Depth (mbgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion	
					Diagram	Notes
0			Mudstone: Sandy mudstone, Dark red-brown fine layers of harder dark red-brown mudstone.	Line 1		50mm PVC End Cap
			Mudstone: Mid brown-red brown mudstone. Sand medium to coarse. Soft and highly weathered.	Yield: 0.2L/s		Bentonite seal
			Mudstone: Pale creamy yellow mudstone. 8-9m as above, clayey.			Gravel Pack
10			Gravel: Gravel, multicoloured (dark red brown, light mid-brown, grey, off-white) of mudstone chert. Moderately poorly sorted, angular to subangular.			50mm Class 18 PVC Screens
			Gravel: Generally as above, with increasing % of grey mudstone, becoming clayey. 15-16m Mid grey clay, soft.			PZ172
			Mudstone: Dark-grey/black mudstone, partly carbonaceous, becoming harder with depth.			50mm Class 18 PVC Blank casing
			Mudstone: Mid dark grey mudstone with thinly interbedded sands. Sands medium to coarse.			Bentonite seal Gravel Pack
20				PZ173 TD = 9m PZ172 TD = 24m	50mm Class 18 PVC Screens	
30					Fallback (21-24m)	

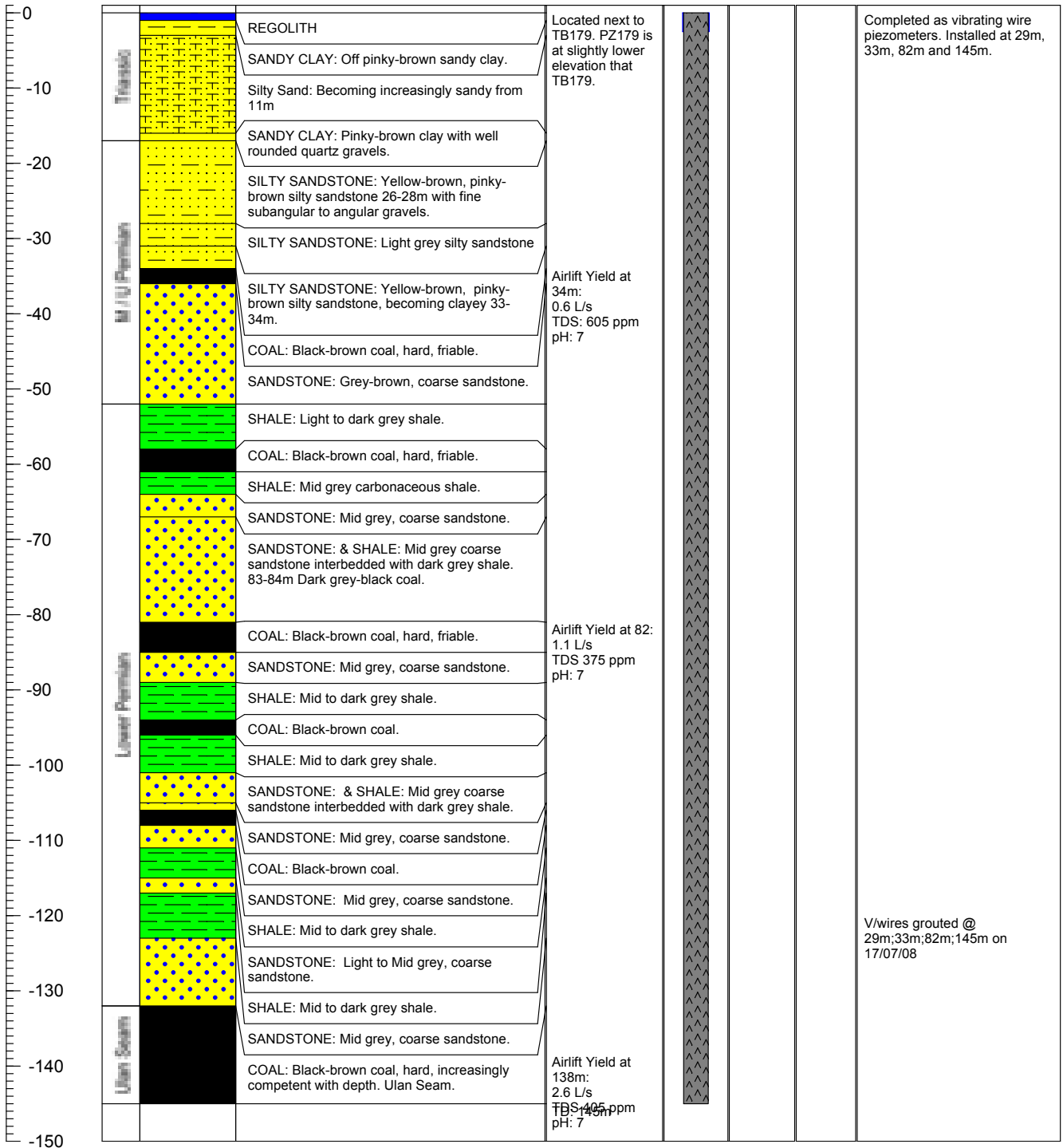
RPS Aquaterra		COMPOSITE WELL LOG			Well No: PZ174 & PZ175	
Suite 4, 125 Melville Parade Como WA 6152 Australia Tel: (+61) (08) 9368 4044 Fax: (+61) (08) 9368 4055		Client: Moolarben Coal Mines Pty		Project: Moolarben Coal Hydrogeology		
		Commenced: 18/03/2008	Method: Tricone	Area: Murrumbidgee Valley		
		Completed: 18/03/2008	Fluid: Air/Foam	East: 763591		
		Drilled: Intertech	Bit Record: 5.5" (0-5.5m)	North: 6424305		
Logged By: NW		3 7/8" (5.5-32m)		Elevation:		
Static Water Level:		Date:				
Depth (mbgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion	
					Diagram	Notes
0			Mudstone: Sandy mudstone. Dark red brown with some dark grey hard mudstone layers. Sand medium to coarse.	Line 1 Yield: 0.4L/s		50mm PVC End Cap 125mm Class 12 PVC Surface Casing  PZ175 50mm Class 18 PVC Blank casing
			Mudstone: Off white-creamy yellow mudstone, soft.			Bentonite seal Gravel Pack 50mm Class 18 PVC Screens
			Mudstone: Tan brown mudstone, soft.			
			Mudstone: Brick red-brown mudstone, soft.			
			CLAY: Mid-brown/red brown/off white with fine gravels. Gravels angular to subangular of dark grey and red brown mudstone.			
			CLAY: off-white - creamy tan and pinky brown, firm.			PZ174 50mm Class 18 PVC Blank casing
			CLAY: off-white, slightly sandy, soft.			
			Mudstone: Dark grey/black mudstone, hard, friable, laminated.			Bentonite seal Gravel Pack 50mm Class 18 PVC Screens
			Mudstone: Dark grey mudstone, interbedded with mid grey fine sandstone. Hard, friable.	PZ175 TD = 12m PZ174 TD = 32m		Fallback (29-32m)

RPS Aquaterra		COMPOSITE WELL LOG			Well No: PZ176 & PZ177	
Suite 4, 125 Melville Parade Como WA 6152 Australia Tel: (+61) (08) 9368 4044 Fax: (+61) (08) 9368 4055		Client: Moolarben Coal Mines Pty		Project: Moolarben Coal Hydrogeology		
		Commenced: 19/03/2008	Method: Tricone	Area: Murrumbidgee Valley		
		Completed: 19/03/2008	Fluid: Mud	East: 763433		
		Drilled: Intertech	Bit Record: 3 7/8" (0-28m)	North: 6424356		
Logged By: NW		Static Water Level:		Date:		
Depth (mbgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion	
					Diagram	Notes
0			Siltstone: Mid grey brown sandy siltstone, sand fine to coarse, highly weathered.	Line 1		50mm PVC End Cap PZ177 50mm Class 18 PVC Blank casing Bentonite seal Gravel Pack 50mm Class 18 PVC Screens
			CLAY: Mid grey stiff clay.	2kg of Chlorine added/agitated to break mud.		
			Siltstone: Mid grey, medium to coarse sand, giving way to sandy siltstone.			
10			Gravel: Light mid grey brown sequence of fine gravel, well sorted, subangular to subrounded, of siltstone and quartz (10-11m) grading into coarse and then fine to medium sand. Moderately well sorted.			
			GRAVEL AND SAND: Light mid grey brown sequence of soft fine gravel/coarse sand with occasional black partly carbonaceous wood/coal. Gravel subangular to subrounded, moderately well sorted. 20-22m, medium to coarse sand.			PZ176 50mm Class 18 PVC Blank casing Bentonite seal Gravel Pack 50mm Class 18 PVC Screens
20			Coal: Very dark brown/black, soft carbonaceous wood/coal. Oil odour and feel (check if drilled with mud)			
			CLAY: Mid dark grey/brown clay with fragments of carbonaceous wood on above, soft.			Fallback (25-28m)
30				PZ177 TD = 7m PZ176 TD = 28m		


 Suite 4, 125 Melville Parade Como WA 6152 Australia Tel: (+61) (08) 9368 4044 Fax: (+61) (08) 9368 4055		<b>COMPOSITE WELL LOG</b>		<b>Well No:</b> PZ178		
		<b>Client:</b> Moolarben Coal Mines Pty		<b>Project:</b> Moolarben Coal Hydrogeology		
<b>Commenced:</b> 01/07/2008		<b>Method:</b> DHH		<b>Area:</b> Murrumbidgee Valley		
<b>Completed:</b> 2/07/2008		<b>Fluid:</b> Air		<b>East:</b> 763717		
<b>Drilled:</b> Intertech		<b>Bit Record:</b> 6.25" (0-5m)		<b>North:</b> 6426880		
<b>Logged By:</b> NW		120mm (5-23m)		<b>Elevation:</b> 443		
<b>Static Water Level:</b> -				<b>Date:</b> -		
Depth (mbgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion	
					Diagram	Notes

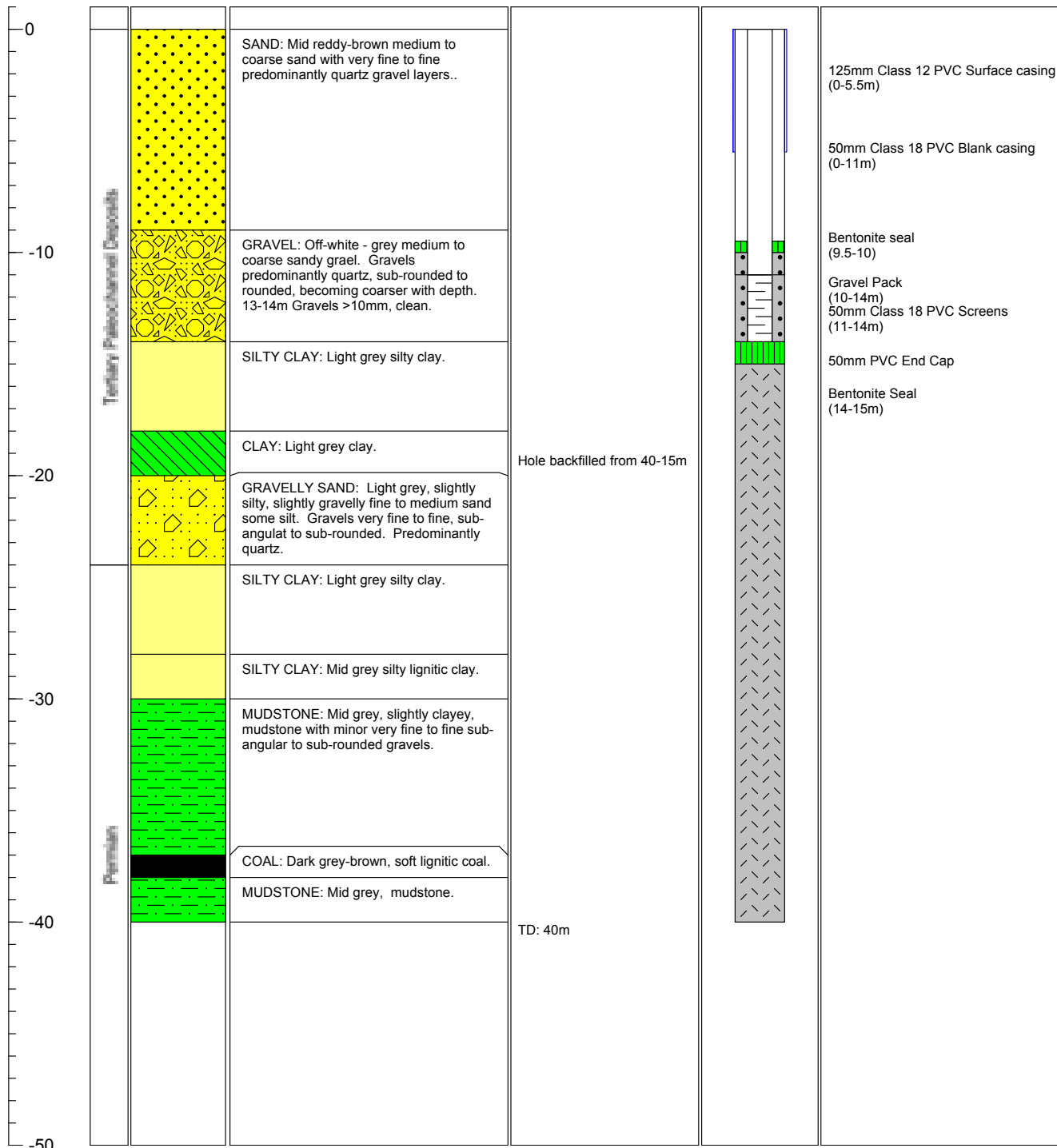



		<b>COMPOSITE WELL LOG</b>		<b>Well No: PZ179</b>		
		<b>Client:</b> Moolarben Coal Mines Pty		<b>Project:</b> Moolarben Coal Hydrogeology		
Suite 4, 125 Melville Parade Como WA 6152 Australia Tel: (+61) (08) 9368 4044 Fax: (+61) (08) 9368 4055		<b>Commenced:</b> 03/07/2008		<b>Method:</b> DHH		
		<b>Completed:</b> 04/07/2008		<b>Fluid:</b> Air		
		<b>Drilled:</b> Intertech		<b>Bit Record:</b> 6.25" (0-4m)		
		<b>Logged By:</b> NW		120mm (10-145m)		
		<b>Static Water Level:</b> 27.18 mbgl (open hole prior to completion)			<b>Date:</b> 09/07/08	
Depth (mbgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion	
					Diagram	Notes

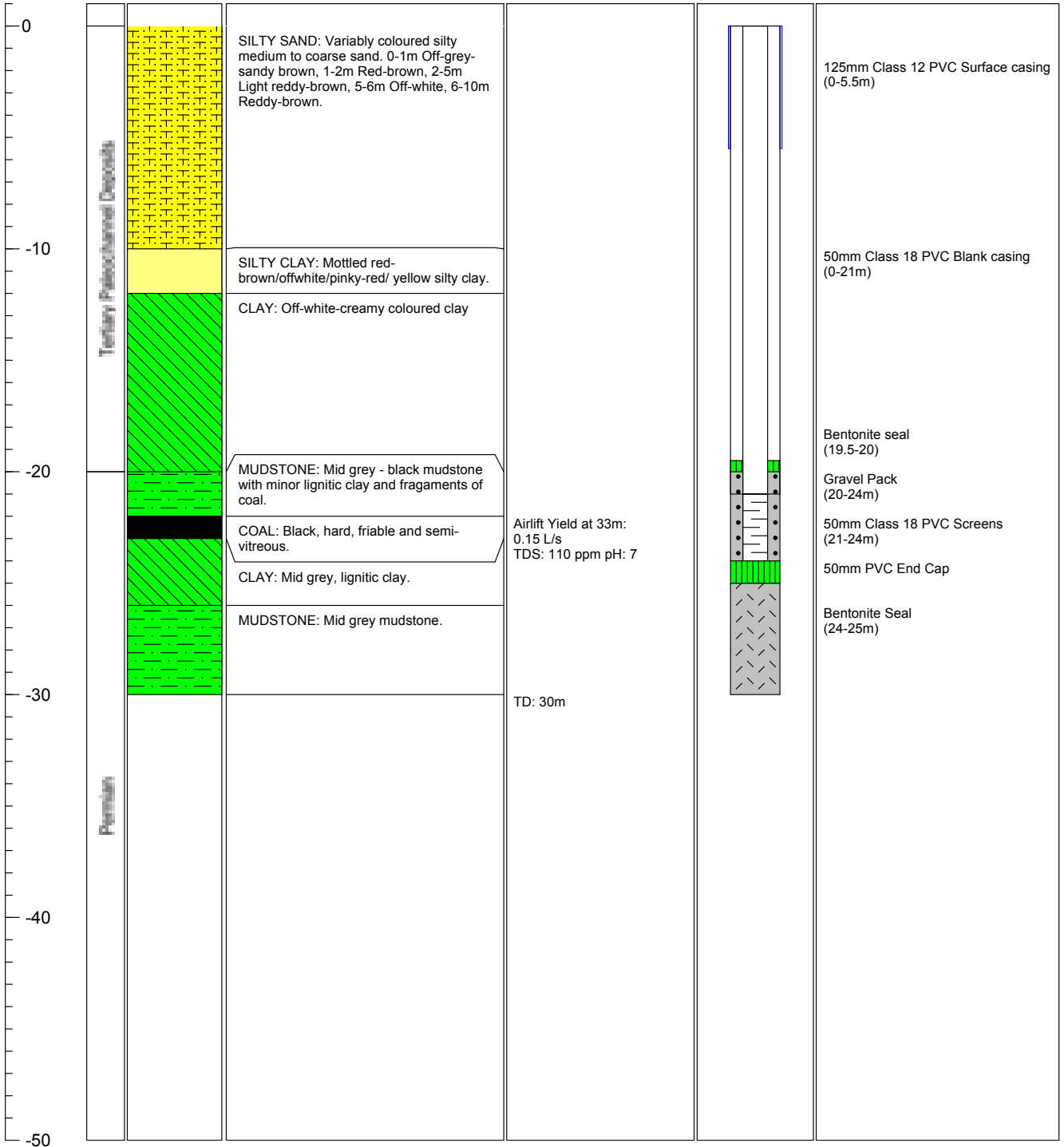





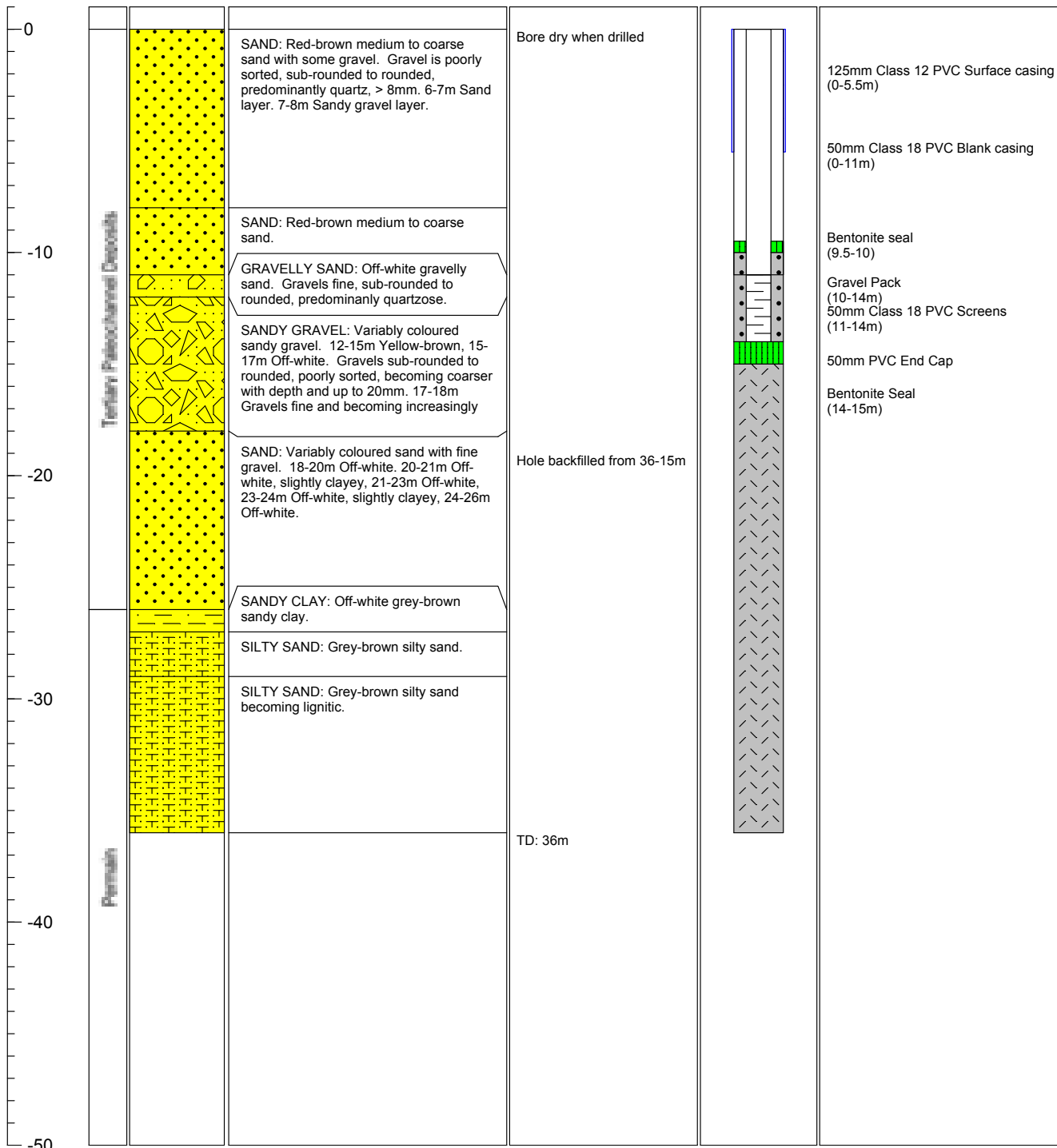
 Suite 4, 125 Melville Parade Como WA 6152 Australia Tel: (+61) (08) 9368 4044 Fax: (+61) (08) 9368 4055		<b>COMPOSITE WELL LOG</b>		<b>Well No: PZ180</b>			
		<b>Client:</b> Moolarben Coal Mines Pty <b>Project:</b> Moolarben Coal Hydrogeology		<b>Commenced:</b> 09/07/2008 <b>Method:</b> DHH <b>Completed:</b> 10/07/2008 <b>Fluid:</b> Air <b>Drilled:</b> Intertech <b>Bit Record:</b> 6.25" (0-5.5m) <b>Logged By:</b> NW      4.25" (5.5-40m)		<b>Area:</b> Murrumbidgee Valley <b>East:</b> 764361 <b>North:</b> 6423759 <b>Elevation:</b> 433.736m	
		<b>Static Water Level:</b> 12.27 mbgl				<b>Date:</b> 15/07/08	
Depth (mbgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion		
					Diagram	Notes	




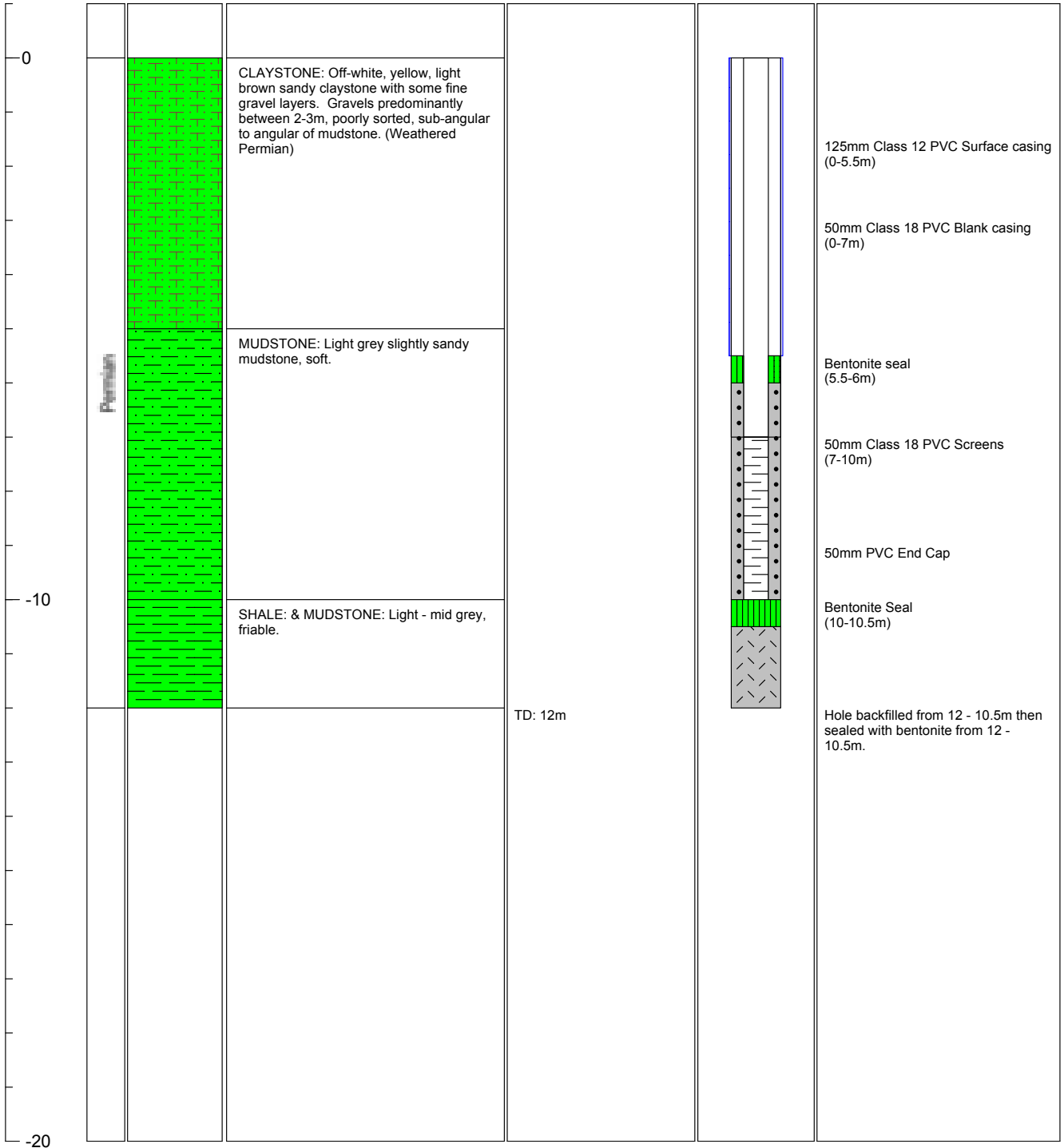
		<b>COMPOSITE WELL LOG</b>		<b>Well No:</b> PZ181			
		<b>Client:</b> Moolarben Coal Mines Pty		<b>Project:</b> Moolarben Coal Hydrogeology			
Suite 4, 125 Melville Parade Como WA 6152 Australia Tel: (+61) (08) 9368 4044 Fax: (+61) (08) 9368 4055		<b>Commenced:</b> 14/07/2008		<b>Method:</b> DHH		<b>Area:</b> Murrumbidgee Valley	
		<b>Completed:</b> 14/07/2008		<b>Fluid:</b> Air		<b>East:</b> 763915	
		<b>Drilled:</b> Intertech		<b>Bit Record:</b> 6.25" (0-5.5m)		<b>North:</b> 6423447	
		<b>Logged By:</b> NW		4.75" (5.5-30m)		<b>Elevation:</b> 435.063m	
		<b>Static Water Level:</b> 9.87 mbgl				<b>Date:</b> 16/07/2008	
Depth (mbgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion		
					Diagram	Notes	




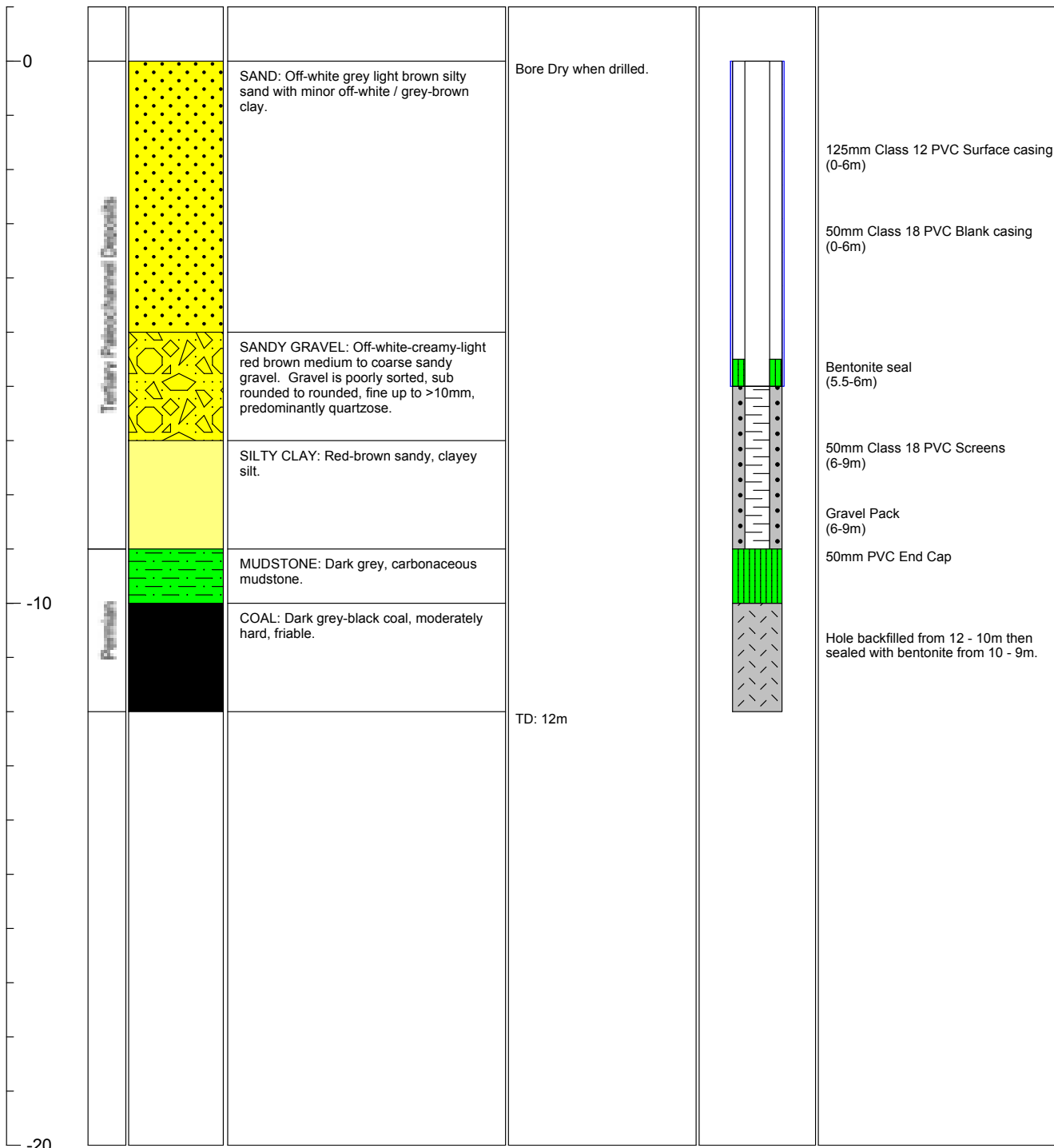
 <p>Suite 4, 125 Melville Parade Como WA 6152 Australia Tel: (+61) (08) 9368 4044 Fax: (+61) (08) 9368 4055</p>		<b>COMPOSITE WELL LOG</b>		<b>Well No: PZ182</b>		
		<b>Client:</b> Moolarben Coal Mines Pty <b>Project:</b> Moolarben Coal Hydrogeology		<b>Area:</b> Murrumbidgee Valley <b>East:</b> 763834 <b>North:</b> 6423173 <b>Elevation:</b> 439.326m		
<b>Commenced:</b> 15/07/2008 <b>Method:</b> DHH <b>Completed:</b> 15/07/2008 <b>Fluid:</b> Air <b>Drilled:</b> Intertech <b>Bit Record:</b> 6.25" (0-5.5m) <b>Logged By:</b> NW      4.75" (5.5-36m)		<b>Static Water Level:</b> Dry		<b>Date:</b> 16/07/2008		
Depth (mbgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion	
					Diagram	Notes



 Suite 4, 125 Melville Parade Como WA 6152 Australia Tel: (+61) (08) 9368 4044 Fax: (+61) (08) 9368 4055		<b>COMPOSITE WELL LOG</b>		<b>Well No: PZ183</b>		
		<b>Client:</b> Moolarben Coal Mines Pty <b>Project:</b> Moolarben Coal Hydrogeology		<b>Commenced:</b> 15/07/2008 <b>Method:</b> DHH <b>Completed:</b> 15/07/2008 <b>Fluid:</b> Air <b>Drilled:</b> Intertech <b>Bit Record:</b> 6.25" (0-5.5m) <b>Logged By:</b> NW      4.75" (5.5-17m)		<b>Area:</b> Murrumbidgee Valley <b>East:</b> 764972 <b>North:</b> 6422157 <b>Elevation:</b> 433.046m
		<b>Static Water Level:</b> 9.46 mbgl <b>Date:</b> 16/07/2008				
Depth (mbgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion	
					Diagram	Notes



 Suite 4, 125 Melville Parade Como WA 6152 Australia Tel: (+61) (08) 9368 4044 Fax: (+61) (08) 9368 4055		<b>COMPOSITE WELL LOG</b>		<b>Well No:</b> PZ184		
		<b>Client:</b> Moolarben Coal Mines Pty		<b>Project:</b> Moolarben Coal Hydrogeology		
<b>Commenced:</b> 15/07/2008		<b>Method:</b> DHH		<b>Area:</b> Murrumbidgee Valley		
<b>Completed:</b> 16/07/2008		<b>Fluid:</b> Air		<b>East:</b> 765411		
<b>Drilled:</b> Intertech		<b>Bit Record:</b> 6.25" (0-6m)		<b>North:</b> 6423142		
<b>Logged By:</b> NW		4.75" (6-12m)		<b>Elevation:</b> 419.399m		
<b>Static Water Level:</b> 6.57 mbgl				<b>Date:</b> 22/07/2008		
Depth (mbgl)	Geology	Graphic Log	Lithological Description	Field Notes	Well Completion	
					Diagram	Notes





## Bore Construction Details - Groundwater Monitoring Piezometers

Piezometer	MGA Coordinates		Top of Casing Elevation (m AHD)	Ground Level / Concrete (m AHD)	Depth Drilled (m)	Aquifer Screened	Screen Interval (m below GL)	Water Quality**		Water Level July 2008 (m AHD)
	Easting	Northing						TDS (mg/L)	pH	
<b>Existing Bores, Springs</b>										
Pinemount Spring (OB01)	762750	6415400	-	-	-	-	-	57	6.6	-
Croydon Bore (OB02)	763817.95	6415647.28	495.046	-	-	-	-	1100	6.9	Flowing*
OB03	762806.33	6417649.19	480.082	479.761	-	-	-	1100	5.8	472.27*
OB04	762300	6418300	-	-	-	-	-	320	4.0	4.99*
Spriggs Bore	756050	6416200	-	-	-	-	-	150	6.0	0.07*
<b>Piezometers (installed 2005 and 2006)</b>										
PZ3	762714.34	6417963.68	474.918	474.592	21.35	Ulan Seam	9-15	780	6.5	4.22*
PZ4	762251.43	6416655.07	517.398	517.087	32.35	Ulan Seam	20-26	1600	6.8	22.64*
PZ17	760774.02	6419352.48		472.154	15	Blackmans Flat Fm (below Ulan Seam)	6-9			Dry
PZ18	760087.77	6422135.90		456.843	15	Ulan Seam and sediments below	6-9	330	6.1	3.18*
PZ30	760007.73	6424852.51	432.928	432.928	30	Marrangaroo Conglomerate (below Ulan Seam)	18-24	460	5.5	23.34*
PZ31A	759547.26	6423722.85	456.794	456.794	30	Marrangaroo Conglomerate (below Ulan Seam)	18-24	-	-	Dry
PZ39	763831.93	6424258.59	428.385	428.101	90.35	Lower Permian	57-60	310	5.6	10.29*
PZ40A	763928.97	6423745.49	-	428.270	45	Lower Permian	38-44			
PZ40B	763928.49	6423743.30	-	428.404	15.7	Lower Permian	9-15	540	5.5	7.90*
PZ41A	763517.56	6423253.59	-	432.595	80.8	Marrangaroo Conglomerate and Sandstone (below Ulan Seam)	77-80	3200	5.4	53.56
PZ41B	763522.98	6423258.22	-	432.773	69.8	Ulan Seam	66-69	4300	6.39	8.75

Piezometer	MGA Coordinates		Top of Casing Elevation (m AHD)	Ground Level / Concrete (m AHD)	Depth Drilled (m)	Aquifer Screened	Screen Interval (m below GL)	Water Quality**		Water Level July 2008	
	Easting	Northing						TDS (mg/L)	pH	(m below TOC)	(m AHD)
PZ43A	760457.77	6417102.24	-	510.408	30	Marrangaroo Conglomerate (below Ulan Seam)	26-29	1700	5.9	20.03*	490.38*
PZ43B	760455.99	6417101.63	-	510.385	19	Shoalhaven Group	15-18	3000	3.7	16.39*	494.00*
PZ44	759906.06	6417069.04	-	491.300	24	Ulan Granite	20-23	2400	6.0	10.62*	480.68*
PZ50A	762532.16	6422847.54	449.758	449.468	70	Ulan Seam	63-69	1400	6.1	65.13	449.76
PZ50B	762531.07	6422847.80	449.871	449.544	45	Lower Permian	38-44	960	7.33	17.69	449.87
PZ50C	762530.08	6422848.31	449.632	449.492	12	Alluvium	8-11	290	7.26	9.81	449.63
PZ52	764832.18	6425912.41	419.560	419.430	39	Tertiary palaeochannel	24-30	110	8.8	1.62*	417.95*
PZ53	761716.53	6425481.29	-	446.915	51	Lower Permian	47-50	510	7.0	46.60*	400.32*
PZ55	758772.97	6423995.29	-	429.464	15.1	Quaternary / Tertiary alluvium	11-14	420	5.6	7.36*	422.11*
PZ58	761616.39	6418359.99	478.083	477.847	12	Tertiary palaeochannel	8-11	8400	4.4	10.46*	467.63*
PZ72A	764661.29	6415236.13	-	509.982	35.9	Upper / Middle Permian	27-33	960	7.32	12.93	509.98
PZ72C	764664.20	6415235.07	-	510.108	14	Quaternary / Tertiary alluvium	10-13	2200	7.32	5.735	510.11
PZ74	762689.04	6415585.83	-	531.221	34.8	Upper / Middle Permian	31-34	3700	6.3	29.705	531.22
PZ101A	762654.82	6431452.03	403.465	402.418	131	Bore abandoned due to casing collapse	(120-129)	-	-	-	-
PZ101B	762645.96	6431445.47	403.28	402.59	60	Lower Permian	54-60	460	7.39	36.86	403.28
PZ101C	762646.00	6431446.00	403.00	402.00	30	Lower Triassic	24-30	370	7.52	22.165	403
PZ102A	761117.86	6429149.82	408.54	408.03	128	Marrangaroo Formation	116-125	1500	6.3	42.45*	355.87*
PZ102B	761116.75	6429146.76	408.23	407.77	86	Ulan Seam	80-86	1800	6.1	41.06*	355.26*
PZ103A	762409.96	6429260.85	425.21	425.12	128	Ulan Seam	118-127	280	6.3	59.06*	366.15*
PZ103B	762397.25	6429264.13	425.00	424.85	87	Lower Permian	81-87	340	7.3	30.98*	394.03*
PZ103C	762397.00	6429264.00	425.00	424.00	30	Lower Triassic	24-30	200	6.6	26.24*	398.77*
PZ104	766831.51	6426451.21	438.92	438.58	160	Ulan Seam	151-160	1800	12.6	57.65*	381.27*
PZ105A	763988.15	6431610.06	388.93	388.49	115	Lower Permian	87.5-96.5	160	7.19	25.31	388.93
PZ105B	763986.59	6431606.57	389.05	388.74	64	Upper / Middle Permian	58-64	160	6.89	11.99	389.05



Piezometer	MGA Coordinates		Top of Casing Elevation (m AHD)	Ground Level / Concrete (m AHD)	Depth Drilled (m)	Aquifer Screened	Screen Interval (m below GL)	Water Quality**		Water Level July 2008 (m AHD)	
	Easting	Northing						TDS (mg/L)	pH		(m below TOC)
PZ105C	763986.00	6431606.00	389.00	388.00	28		22-28	170	6.62	11.07	389
PZ106A	765127.85	6418274.79	510.69	510.49	131.5	Lower Permian	87.5-96.5	490	9.27	72.70	510.69
PZ106B	765124.10	6418279.02	510.91	510.72	41	Upper / Middle Permian	29-35	480	7.34	8.66	510.91
PZ107	762812.57	6419869.06	499.36	499.00	125	Ulan Seam	78-80	380	6.60	66.76	499.361
PZ108R	763133.68	6434792.88	419.46	419.37	227	Ulan Seam	221 – 227	220	5.6	17.93*	401.53*
PZ109	766122.99	6435558.15	437.12	436.98	254	Lower Permian	246-252	620	6.1	54.09*	383.03*
PZ110	762001.82	6427216.37	428.72	728.39	134.5	Ulan Seam floor	100.5 – 103.5	1200	6.0	54.83*	373.89*
						(	108.5 – 111.5				
						(	117.5 – 120.5				
PZ111	767081.93	6423095.51	404.78	404.55	83	Ulan Seam	71 - 77	400	5.8	25.07*	379.71*
						Ulan Seam	84 - 90	1400	6.6	96.88*	388.77*
						Quaternary / Tertiary Alluvium	6 - 12	1500	6.1	5.87*	479.80*
PZ124	763476.37	6426649.03	-	437.51	27	Tertiary Palaeochannel	8.4-20.4	-	-	-	-
PZ125	7761864.01	6426520.60	-	422.488	18	Quaternary / Tertiary Alluvium	5.6 – 11.6	460	5.3	9.72*	412.87*
<b>Piezometers (installed between November 2007 and July 2008)</b>											
PZ126	-	-	-	-	-	Bore not completed – collapsing ground	-	-	-	-	-
PZ127	762799.22	6424948.11	494.55	494.22	154	Completed as multi-level vibrating wire		See Table 3.1a for details			
PZ128	763226.69	6432120.05	409.52	409.18	61	Completed as multi-level vibrating wire		See Table 3.1a for details			
PZ129	763623.75	6432250.61	417.95	417.55	74	Completed as multi-level vibrating wire		See Table 3.1a for details			
PZ130	760940.11	6422437.71	535.07	534.79	111	Completed as multi-level vibrating wire		See Table 3.1a for details			
PZ131	763667.93	6422406.15	454.71	454.42	27	Upper / Middle Permian	21-24	4200	5.61	21.155	454.713
PZ132	763670.89	6422405.45	454.79	454.53	8	Upper / Middle Permian	5-8			Dry	-
PZ133	763467.91	6422444.78	447.61	447.26	74	Completed as multi-level vibrating wire		See Table 3.1a for details			

Piezometer	MGA Coordinates		Top of Casing Elevation (m AHD)	Ground Level / Concrete (m AHD)	Depth Drilled (m)	Aquifer Screened	Screen Interval (m below GL)	Water Quality**		Water Level July 2008	
	Easting	Northing						TDS (mg/L)	pH	(m below TOC)	(m AHD)
PZ134	763467.919	6422444.78	447.56	447.09	26	Upper / Middle Permian	23-26	2100	5.1	16.145	447.56
PZ135	763463.55	6422444.86	439.45	438.99	16	Upper / Middle Permian	13-16	2800	5.62	7.48	439.45
PZ136	763290.49	6422479.67	439.25	438.90	24	Upper / Middle Permian	21-24	2100	5.28	9.185	439.25
PZ137	763286.39	6422480.82	479.01	478.67	30	Upper / Middle Permian	20-23	530	6.67	17.925	479.01
PZ138	764002.34	6420284.92	486.17	485.73	38	Upper / Middle Permian	35-38	1800	5.77	28.245	486.17
PZ139	762603.85	6420386.46	476.20	475.58	66	Ulan Seam	60-66	2100	6.05	64	476.20
PZ140	762941.01	6420370.59	482.45	482.11	30	Lower Permian	13-16; 27-30	-	-	Dry	-
PZ141	762783.15	6420384.89	467.52	467.18	9	Lower Permian	6-9	3000	4.66	5.78	467.52
PZ142	-	-	-	-	120	Backfilled	-	-	-	Dry	-
PZ143	763396.80	6420305.98	464.08	463.75	27	Lower Permian	24-27	1800	5.19	22.58	464.08
PZ144	763768.97	6420209.17	467.37	466.99	28	Lower Permian	25-28	-	-	28.125	467.37
PZ145	763397.60	6420313.58	463.88	463.54	7	Lower Permian	4-7	-	-v	Dry	-
PZ146	762617.22	6420387.02	485.85	485.54	11.5	Upper / Middle Permian	8.5-11.5	-	-	Dry	-
PZ147	762791.67	6420383.02	482.25	481.89	11	Lower Permian	8-11	740	5.79	8.02	482.25
PZ148	762941.12	6420379.91	475.68	475.34	11.5	Lower Permian	8.5-11.5	-	-	Dry	-
PZ149	763994.32	6420281.45	478.23	477.90	11	Upper / Middle Permian	8-11	2600	5.4	8.78	478.23
PZ150	765785.45	6421569.94	452.25	451.75	88.5	Ulan Seam	82.5-88.5	1500	6.2	74.73*	377.28*
PZ151	764825.41	6421712.16	444.97	444.38	71.5	Ulan Seam	65.5-71.5	520	6.6	70.44*	374.57*
PZ152	765788.64	6421562.51	452.78	452.27	13	Upper / Middle Permian	10-13	4400	5.6	9.67*	442.33*
PZ153	763776.05	6420213.41	467.47	466.76	3.5	Regolith / Surficial	0.5-3.5	-	-	Dry	-
PZ154	762612.49	6420379.88	486.23	485.87	7	Upper / Middle Permian	4-7	-	-	Dry	-
PZ155	763474.27	6422443.02	447.87	447.56	10	Upper / Middle Permian	7-10	-	-	9.68	447.87
PZ156	763288.78	6426194.47	456.22	455.73	136	Ulan Seam	130-136	280	6.1	83.54*	372.68*
PZ157	763825.34	6425391.21	446.55	446.05	122	Ulan Seam	116-122	220	7.61	72.04	446.55

Piezometer	MGA Coordinates		Top of Casing Elevation (m AHD)	Ground Level / Concrete (m AHD)	Depth Drilled (m)	Aquifer Screened	Screen Interval (m below GL)	Water Quality**		Water Level July 2008	
	Easting	Northing						TDS (mg/L)	pH	(m below TOC)	(m AHD)
PZ158	763671.32	6422405.31	454.74	454.41	17.5	Regolith / Surficial	11.5-14.5	3800	5.43	13.335	454.74
PZ159	763667.91	6422406.15	454.68	454.39	28	Upper / Middle Permian	22-25	3000	5.05	23.27	454.68
PZ160	763474.25	6422443.01	447.88	447.59	31	Upper / Middle Permian	27-30	1600	5.92	18.485	447.88
PZ161	763467.91	6422444.76	447.59	447.25	10	Regolith / Surficial	6-9	-	-	Dry	-
PZ162	763290.50	6422479.66	439.39	439.02	34	Upper / Middle Permian	29.5-32.5	1000	5.73	11.02	439.39
PZ163	763286.37	6422480.83	439.25	438.80	7	Regolith / Surficial	4-7	-	-	Dry	-
PZ164	762989.83	6422547.58	441.64	441.21	26.5	Upper / Middle Permian	20.5-26.5	5300	3.45	10.095	441.64
PZ165	762992.62	6422546.81	441.68	441.23	5.5	Regolith / Surficial	2.5-5.5	210	-	4.94	441.68
PZ166	762865.30	6422751.48	439.74	439.32	35.5	Regolith / Surficial (Palaeochannel)	10-16	3700	6.39	8.04	439.74
PZ167	762861.69	6422752.24	439.72	439.41	9	Regolith / Surficial (Palaeochannel)	6-9	7200	5.78	8.155	439.72
PZ168	763430.59	6424355.77	451.63	451.17	31	Upper / Middle Permian	27.5-30.5	350	7.03	23.795	451.63
PZ169	763431.89	6424360.04	451.36	450.94	7	Regolith / Surficial	4-7	-	-	Dry	-
PZ170	763590.91	6424306.33	437.49	437.08	31	Upper / Middle Permian	26-29	210	6.71	16.49	437.49
PZ171	763595.02	6424305.57	437.24	436.86	10	Upper / Middle Permian	7-10	-	-	Dry	-
PZ172	763779.19	6424266.34	429.57	429.10	24	Upper / Middle Permian	18-21	4100	6.38	8.175	429.57
PZ173	763782.23	6424265.99	429.38	428.99	9	Regolith / Surficial	6-9	8300	7.23	7.635	429.38
PZ174	763927.13	6424234.76	425.30	424.89	32	Upper / Middle Permian	26-29	2900	6.47	7.195	425.30
PZ175	763931.85	6424234.04	425.03	424.61	12	Regolith / Surficial	9-12	11,000	7.03	5.17	425.03
PZ176	764065.18	6424208.05	419.79	419.47	28	Upper / Middle Permian	19-25	490	7.85	3.155	419.79
PZ177	764067.32	6424211.88	419.66	419.39	7	Regolith / Surficial	4-7	5400	6.74	3.745	419.66
PZ178	-	-	-	-	23	Bore not completed (Backfilled)	-	-	-	-	-
PZ179	764688.37	6426590.89	443.09	442.40	145	Completed as multi-level vibrating wire	-	-	-	-	-
PZ180	764360.86	6423759.11	433.74	433.15	40	Tertiary palaeochannel (backfilled to 15m)	11-14	-a	-a	13.75	419.40

See Table 3.1a for details-

Piezometer	MGA Coordinates		Top of Casing Elevation (m AHD)	Ground Level / Concrete (m AHD)	Depth Drilled (m)	Aquifer Screened	Screen Interval (m below GL)	Water Quality**		Water Level July 2008	
	Easting	Northing						TDS (mg/L)	pH	(m below TOC)	(m AHD)
PZ181	763915.03	6423447.18	435.06	434.55	30	Quaternary / Tertiary alluvium (backfilled to 25m)	21-24	220	5.87	10.25	424.31
PZ182	763833.82	6423173.50	439.33	438.77	36	Tertiary palaeochannel (backfilled to 15m)	11-14	-a	-a	13.48	425.29
PZ183	764972.22	6422157.39	433.05	432.33	12	Upper Permian (backfilled to 10.5m)	7-10	2300	7.53	9.62	422.71
PZ184	765410.56	6423142.32	419.40	418.85	12	Quaternary / Tertiary alluvium / Palaeochannel (backfilled to 10m)	6-9	2300	5.58	6.94	409.21
PZ185	765944.70	6423452.02	421.99	421.36	17	Quaternary / Tertiary alluvium / Palaeochannel (backfilled to 15m)	11-14	-a	-a	-(Dry)	-

## Bore Construction Details - Vibrating Wire Piezometers

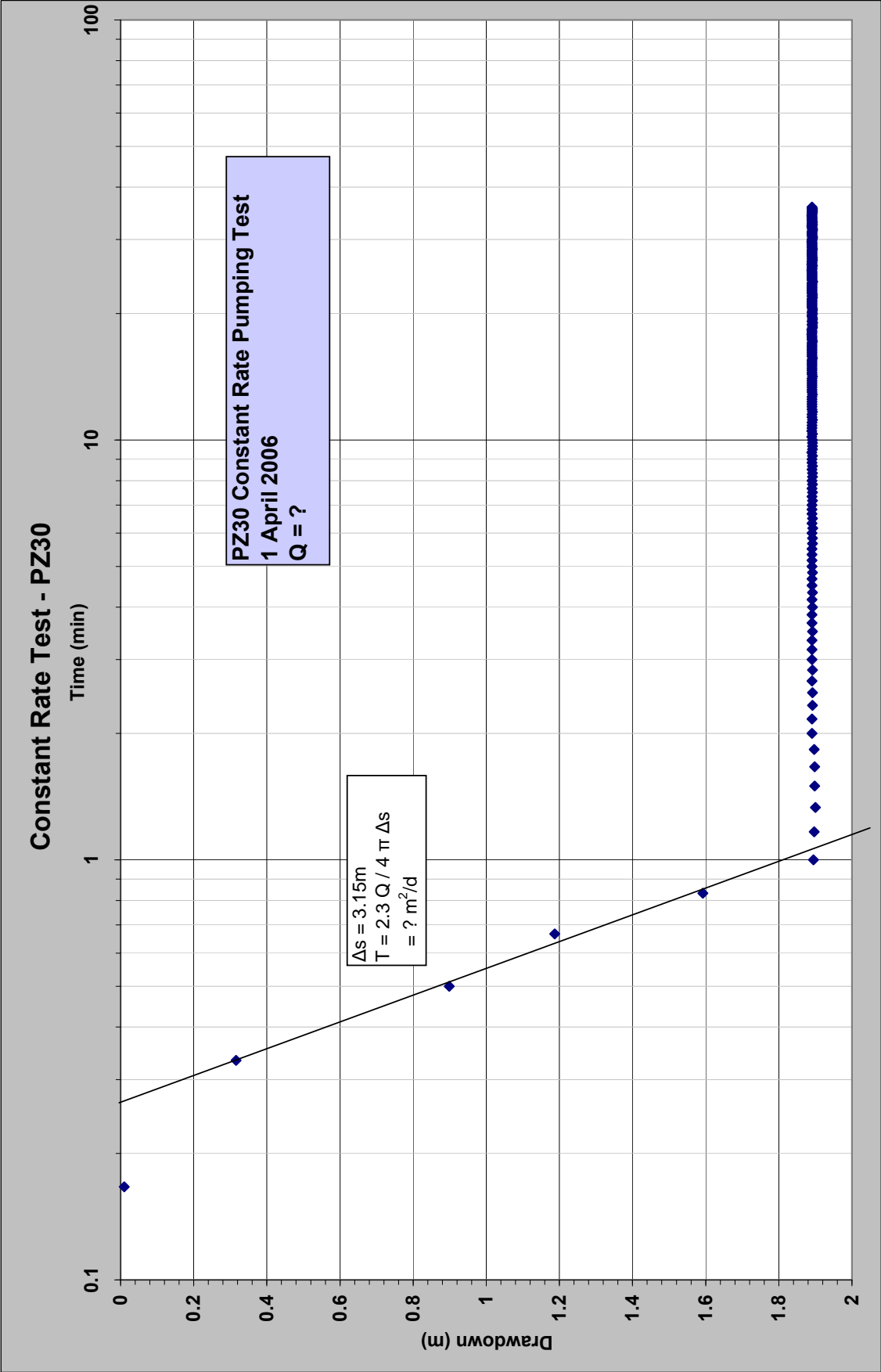
Piezometer	MGA Coordinates		Top of Casing Elevation (m AHD)	Ground Level / Concrete (m AHD)	Depth Drilled (m)	Depth of Vibrating Wire Completions (m below GL)	Target Aquifer of VW (in descending depth order)	Groundwater Level/Pressure July 2008	
	Easting	Northing						(m above VW)	(m AHD)
PZ127 – The Dam	762799.22	6424948.11	494.55	494.22	154	43m	Triassic	0	Dry
						68m	Upper/Middle Permian	21	447.4
						112m	Lower Permian	15	397.3
						141m	Ulan Seam	15	368.5
PZ128 – The Drip west	763226.69	6432120.05	409.52	409.18	61	20m	Triassic	0	Dry
						36m	Upper Permian	7	380.8
						55m	Middle/Lower Permian	22	373.6
PZ129 – The Drip east	763623.75	6432250.61	417.95	417.55	74	35m	Triassic	6	389.2
						53m	Upper/Middle Permian	14	378.5
						74m	Ulan Seam	36	380.6
						38.5m	Lower/Middle Permian (Top of sequence)	0	Dry
PZ130 – The Gap	760940.11	6422437.71	535.07	534.79	111	64m	Lower /Middle Permian (middle of sequence)	6	477.3
						97m	Ulan Seam	11	449.1
						31.5m	Lower/ Middle Permian (Mudstone)	12	428.6
PZ133 – Line 2	763467.91	6422444.78	447.61	447.26	74	43m	Lower/Middle Permian (Shale),	24	428.4
						59m	Ulan Seam	0.5	389.1
						28m	Triassic	3	420.0
						33m	Triassic/Permian boundary	6	418.2
PZ179 – North of UG 1 & South of UG 4	764688.37	6426590.89	443.09	442.40	145	82m	Lower/Middle Permian	57	420.3
						145m	Ulan Seam	76	376.1

## Bore Construction Details - Test Production Bores

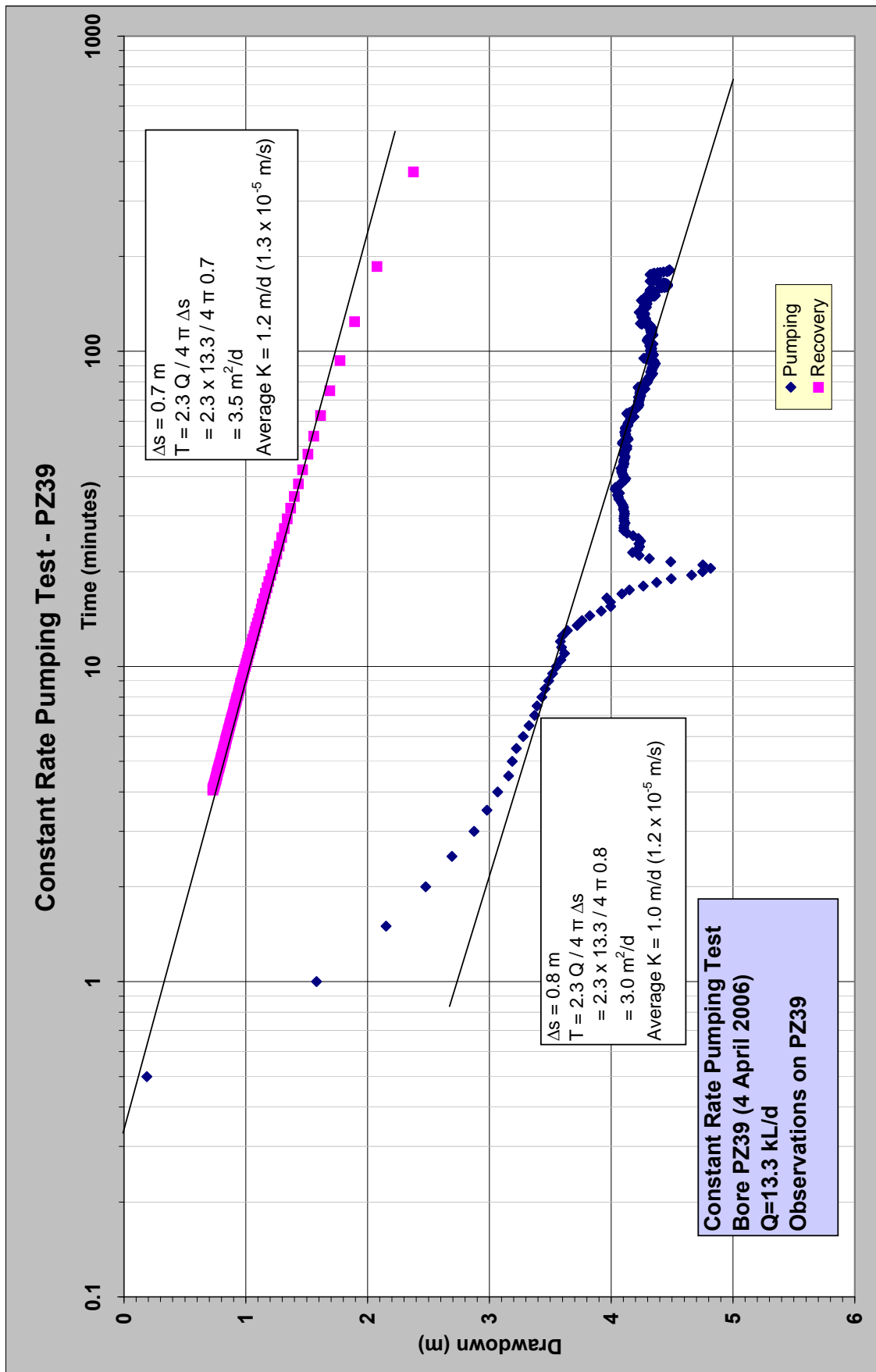
Test Bore	MGA Coordinates		Top of Casing Elevation (m AHD)	Ground Level / Concrete (m AHD)	Depth Drilled (m)	Aquifer Screened	Screen Interval (m below GL)	Water Quality**		Water Level July 2008	
	Easting	Northing						TDS (mg/L)	pH	(m below TOC)	(m AHD)
TB52A	764822.84	6425907.57	419.28	419.23	112	Lower Permian Ulan Seam	47-53 108-114	220	5.8	11.42	407.86
TB52B	764824.88	6425910.63	419.46	419.23	38	Tertiary palaeochannel	31-37	110	5.7	2.62	416.81
TB103	762415.44	6429260.68	425.20	424.93	100	Lower Permian	76-79 82-85 94-97	290	7.3	51.63	373.57
TB105	763980.81	6431610.84	388.78	388.60	133	Lower Permian Ulan Seam	78-84 126-132	500	6.0	25.83	362.96
TB179	764703.43	6426597.68	444.75	444.40	150	Lower Permian	Open hole from 42m	440	6.3	30.20	414.55

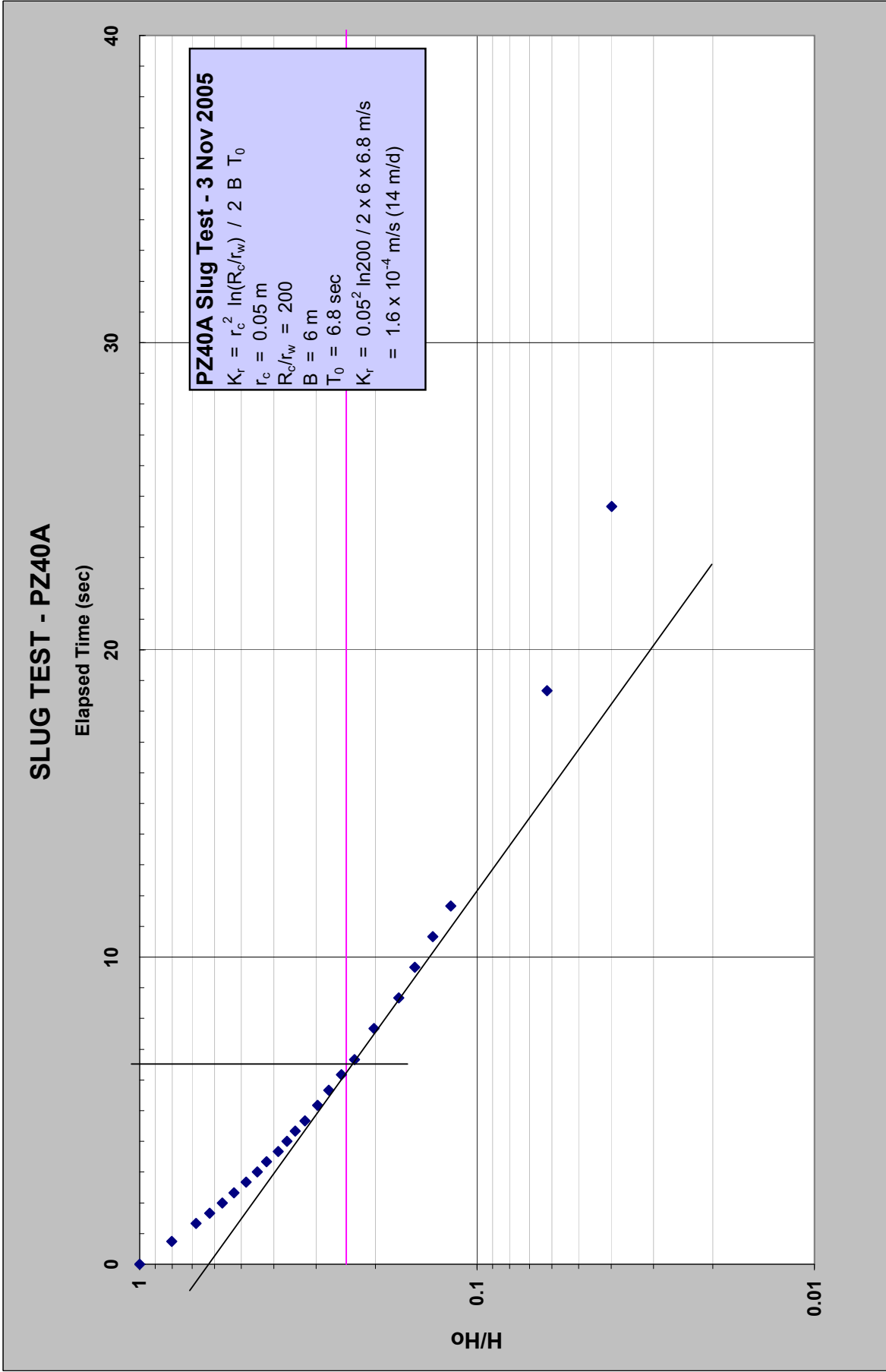
**APPENDIX B:  
HYDRAULIC TEST DATA AND  
ANALYSIS RESULTS**

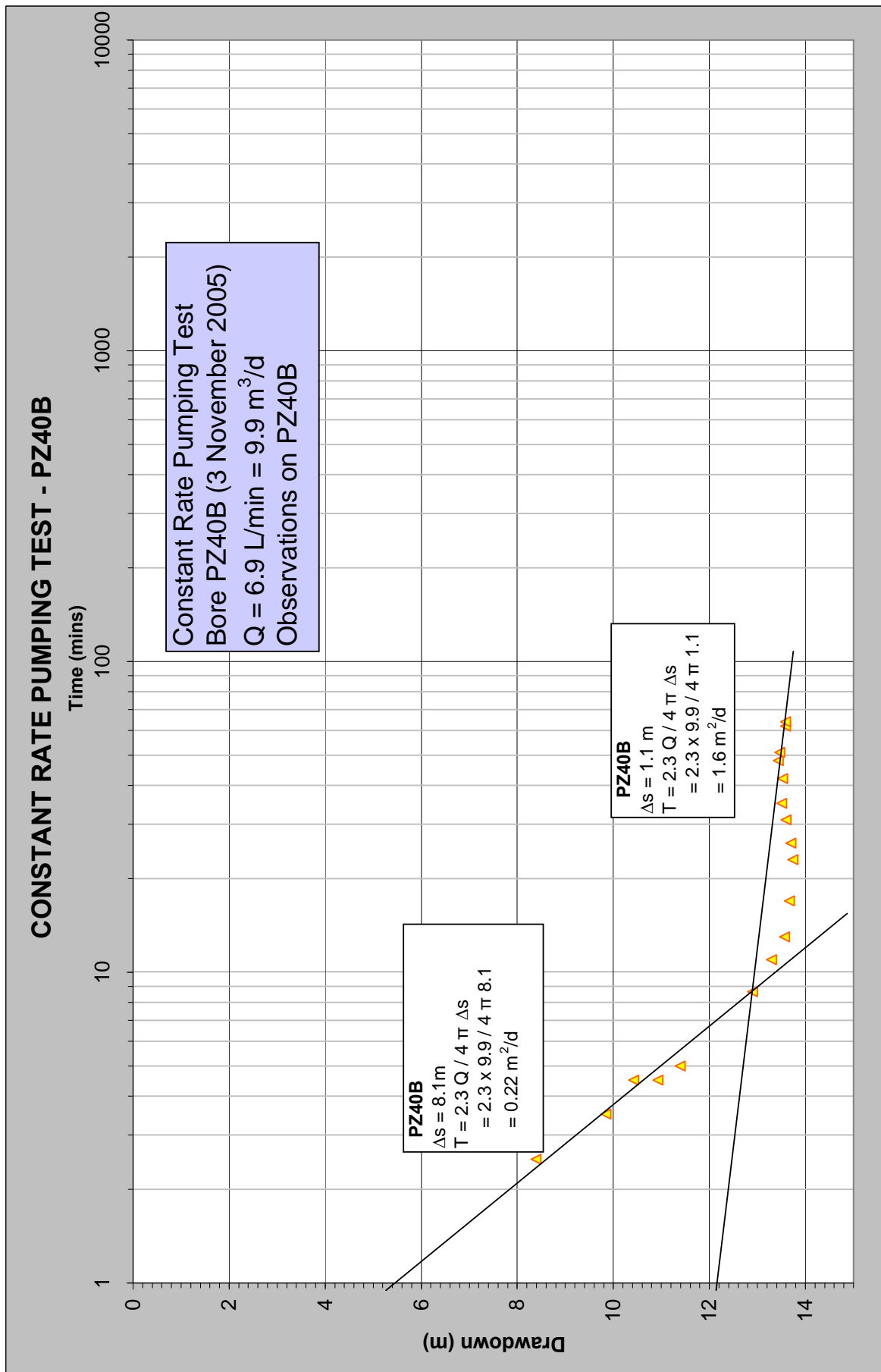
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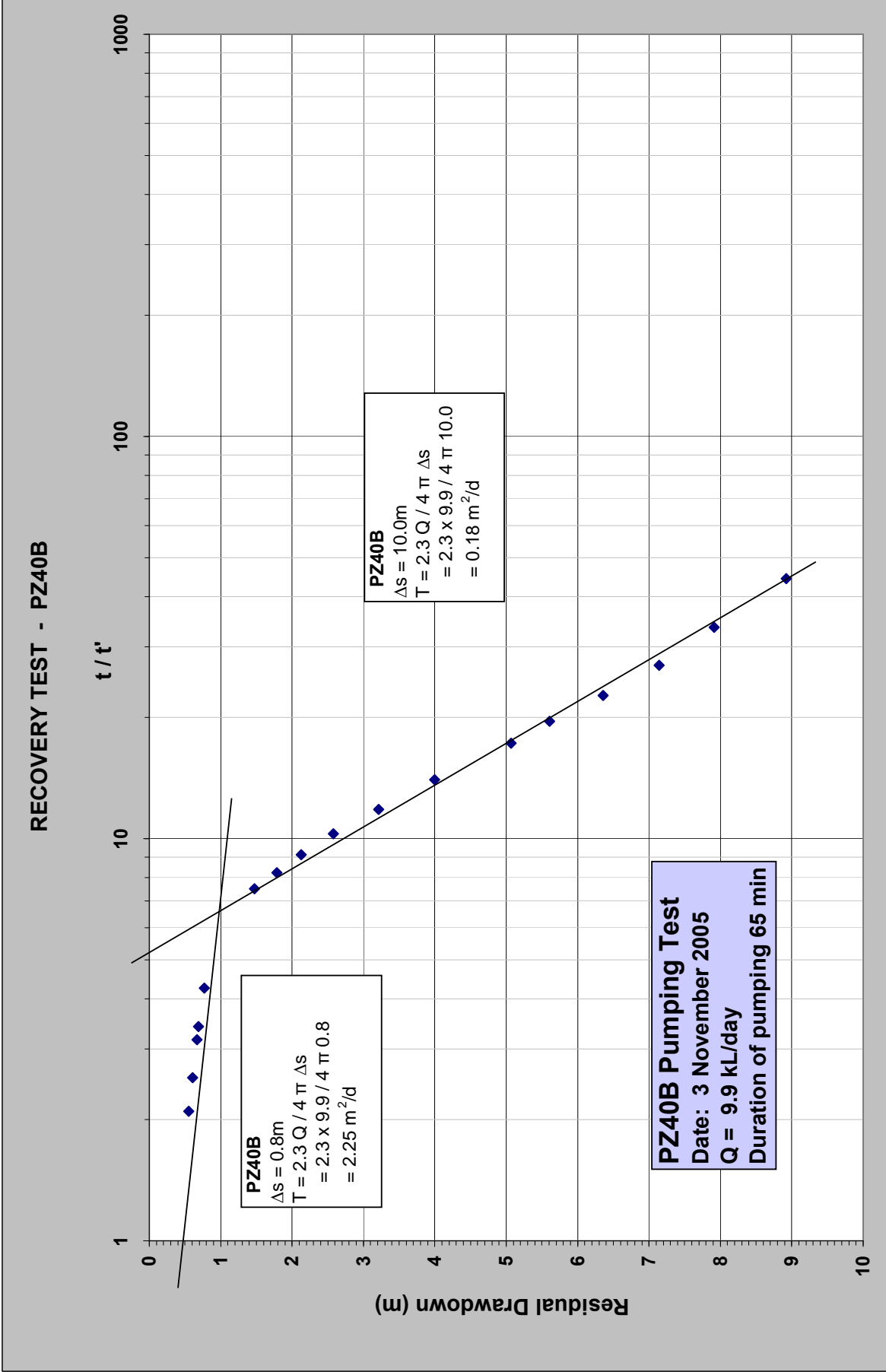


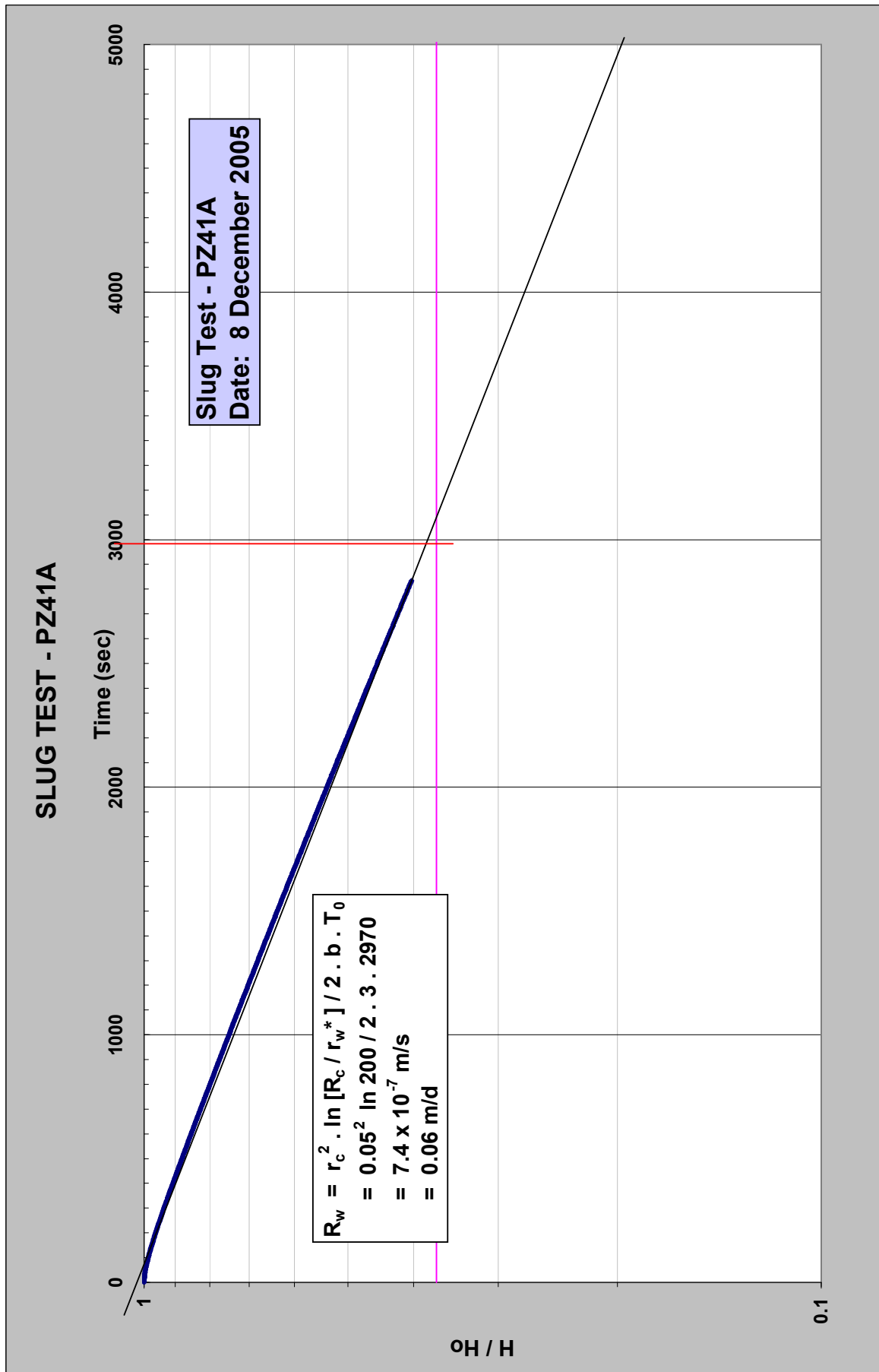


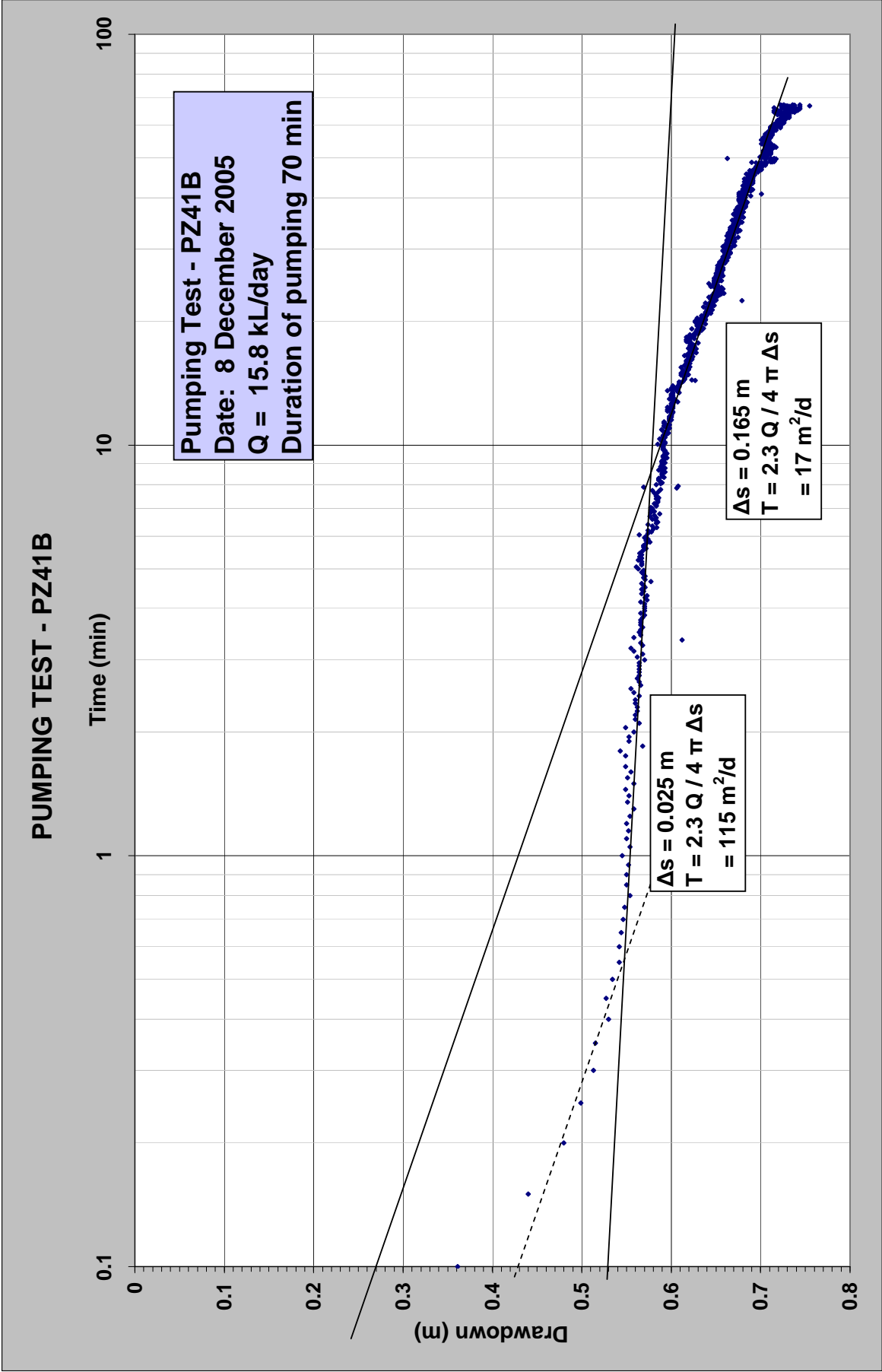


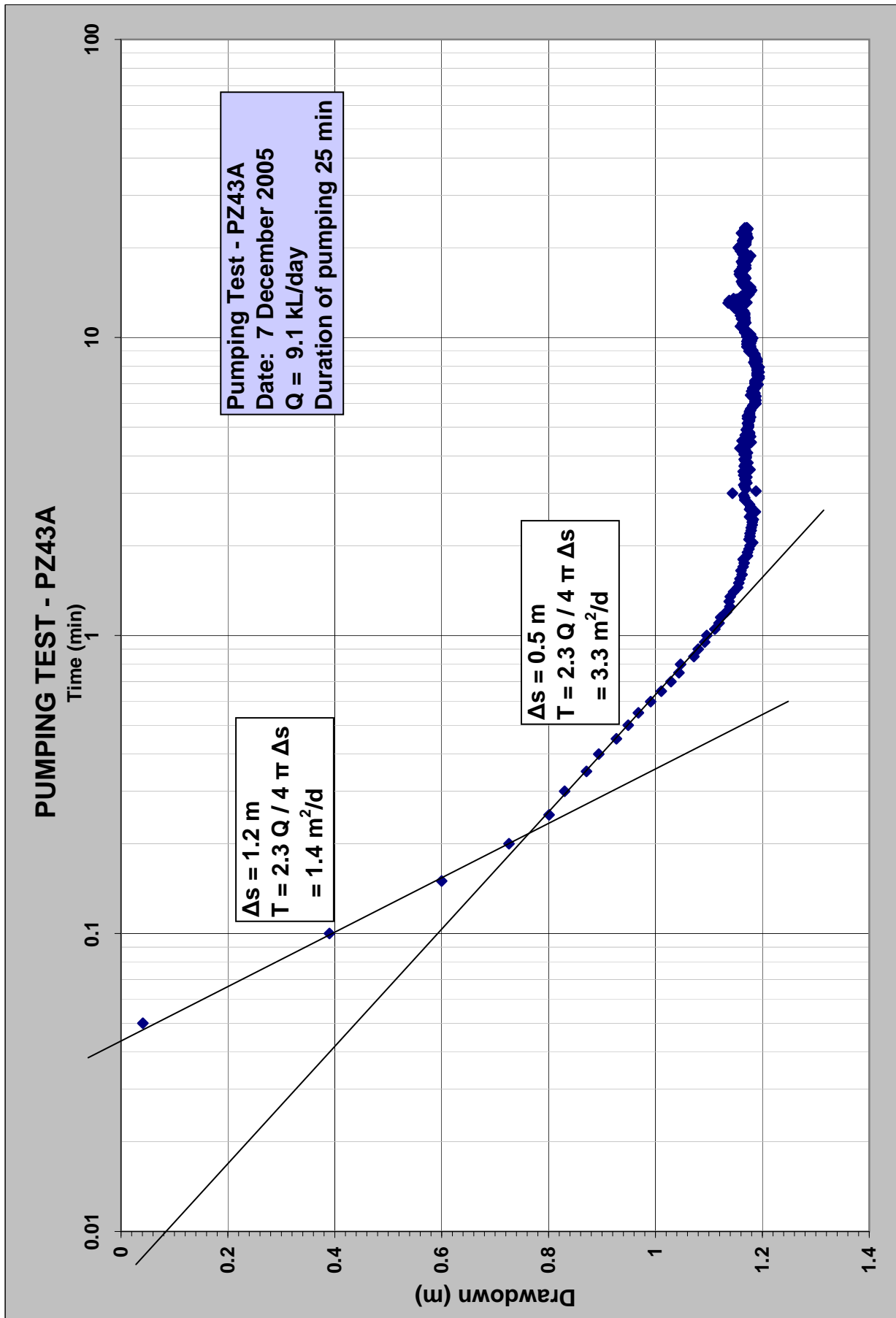


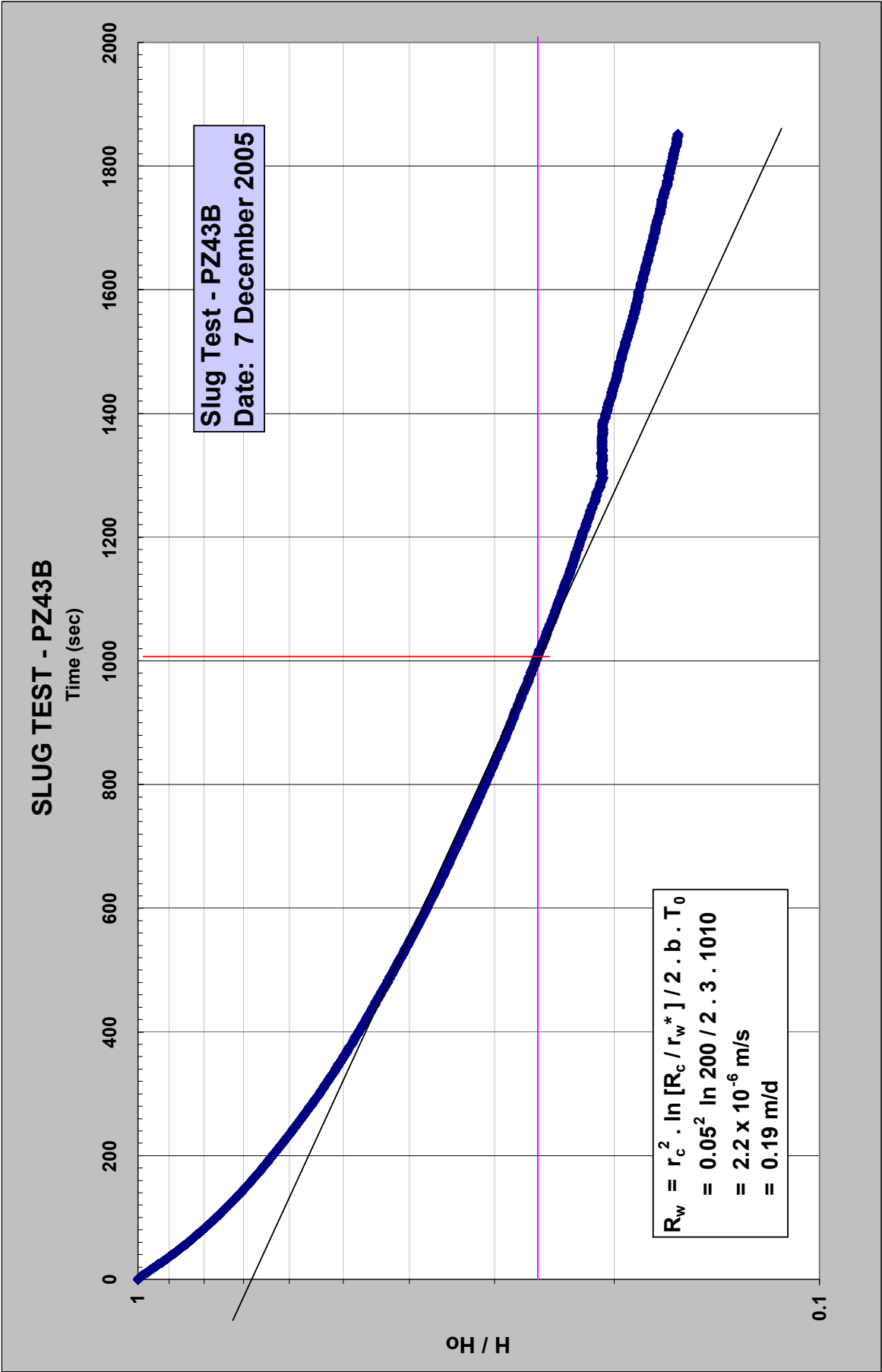




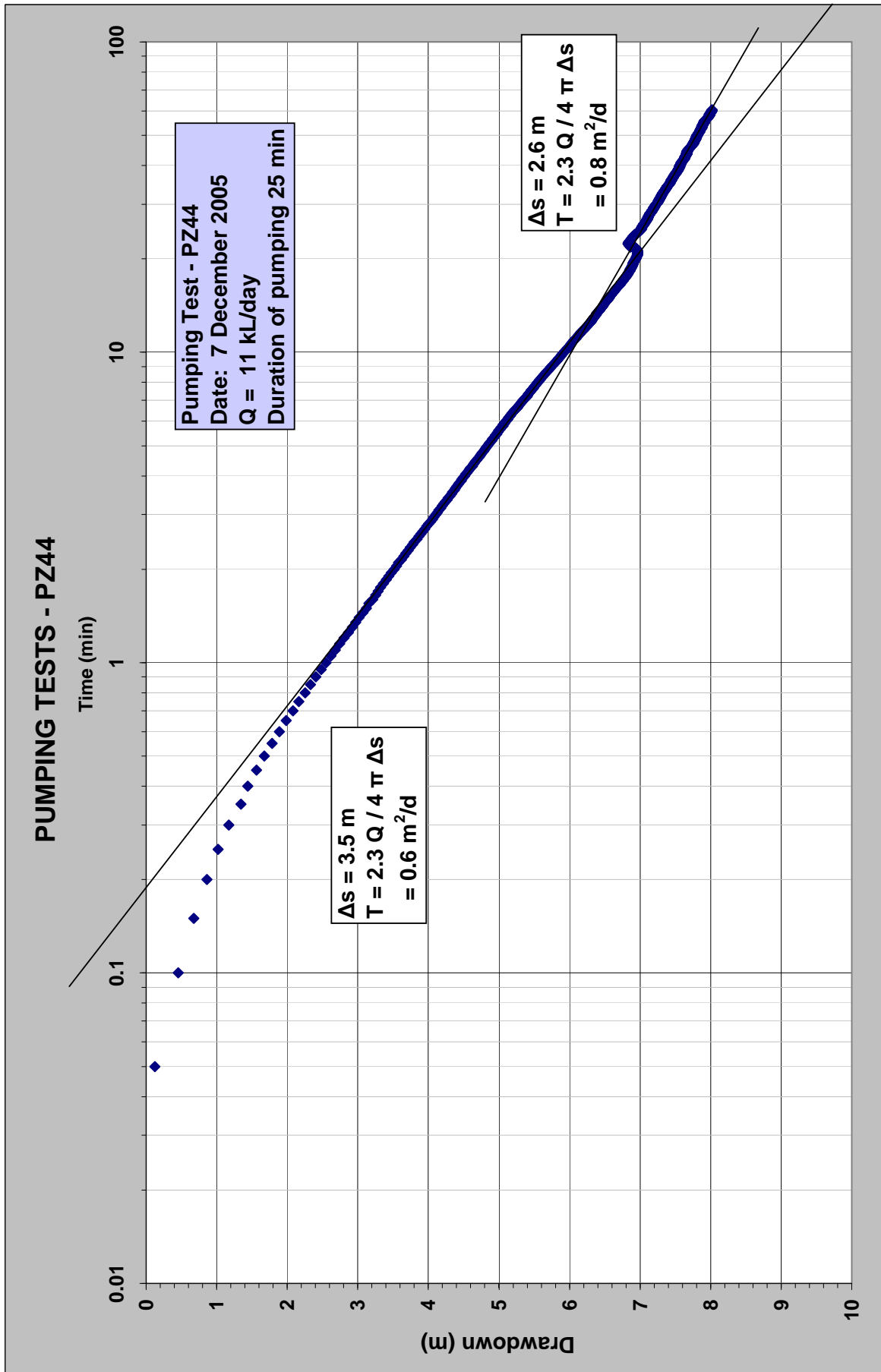


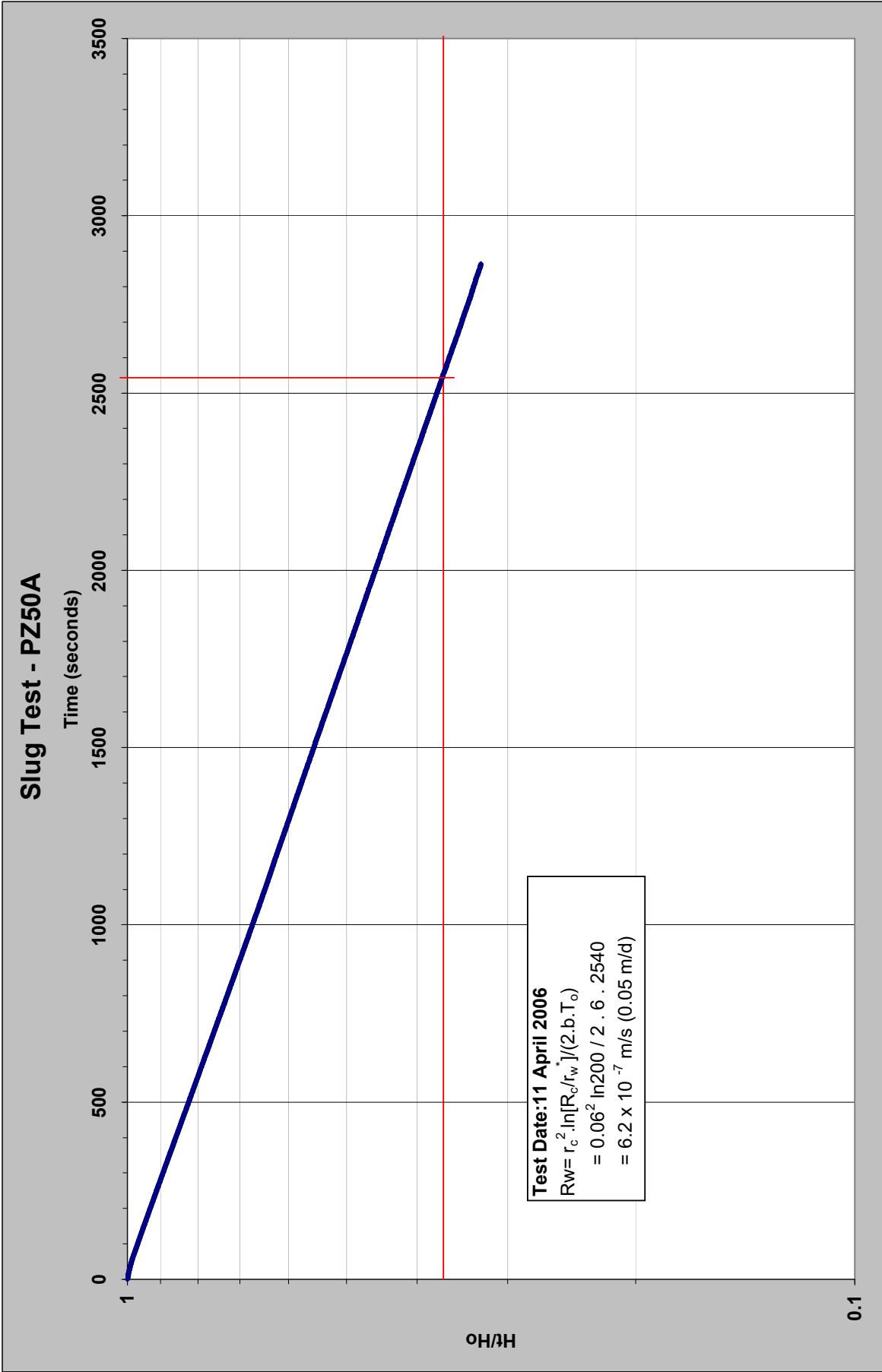


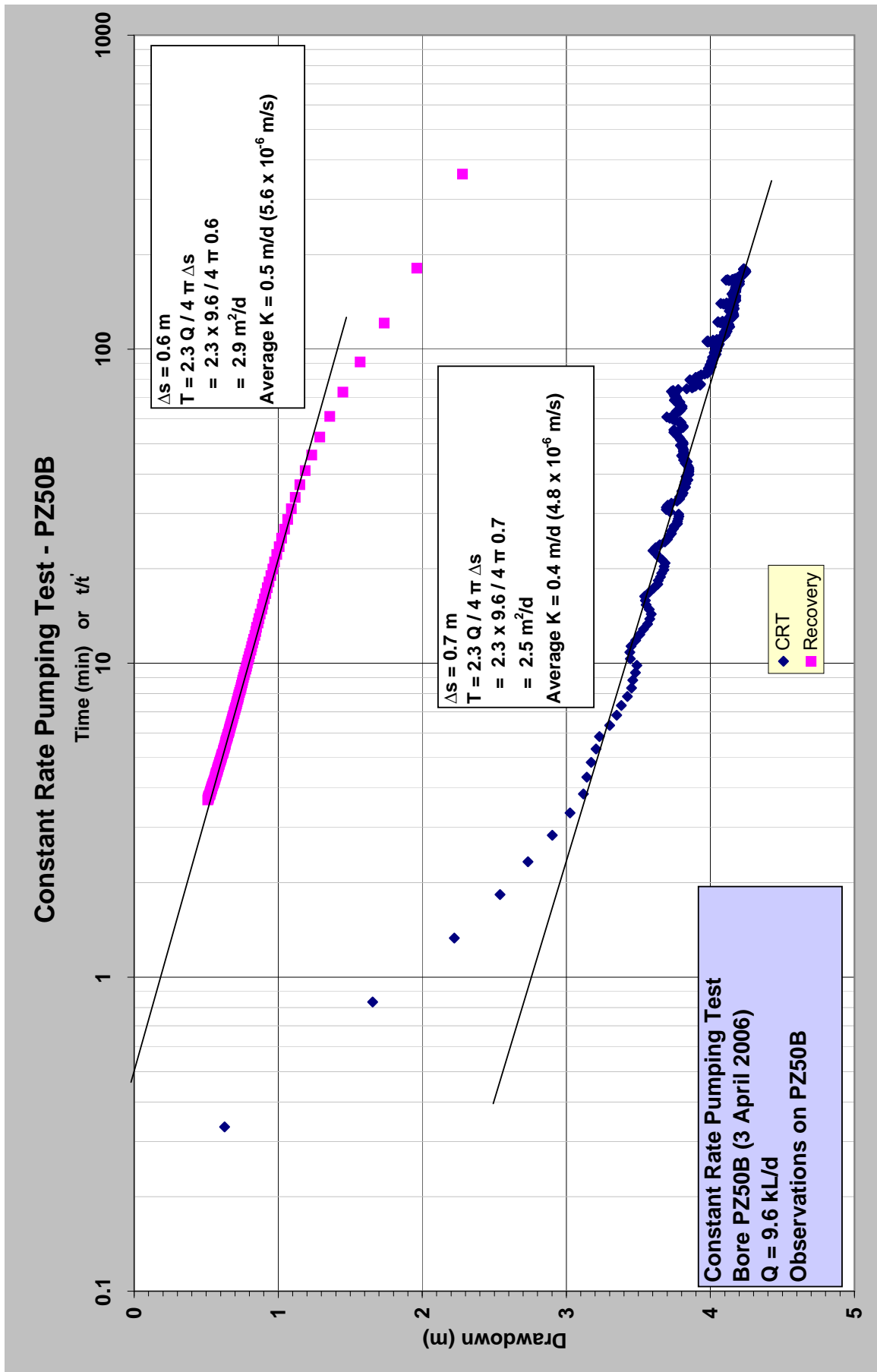


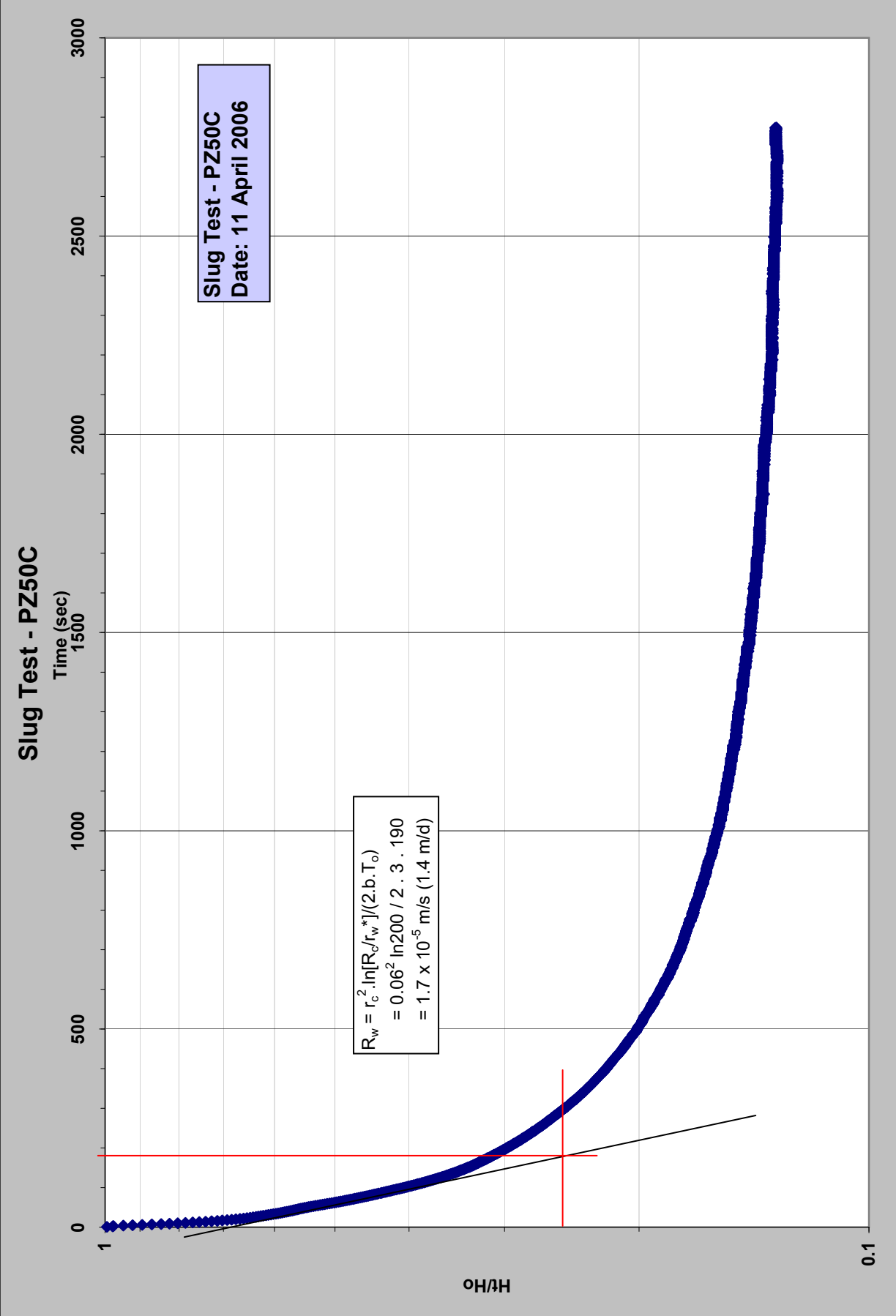


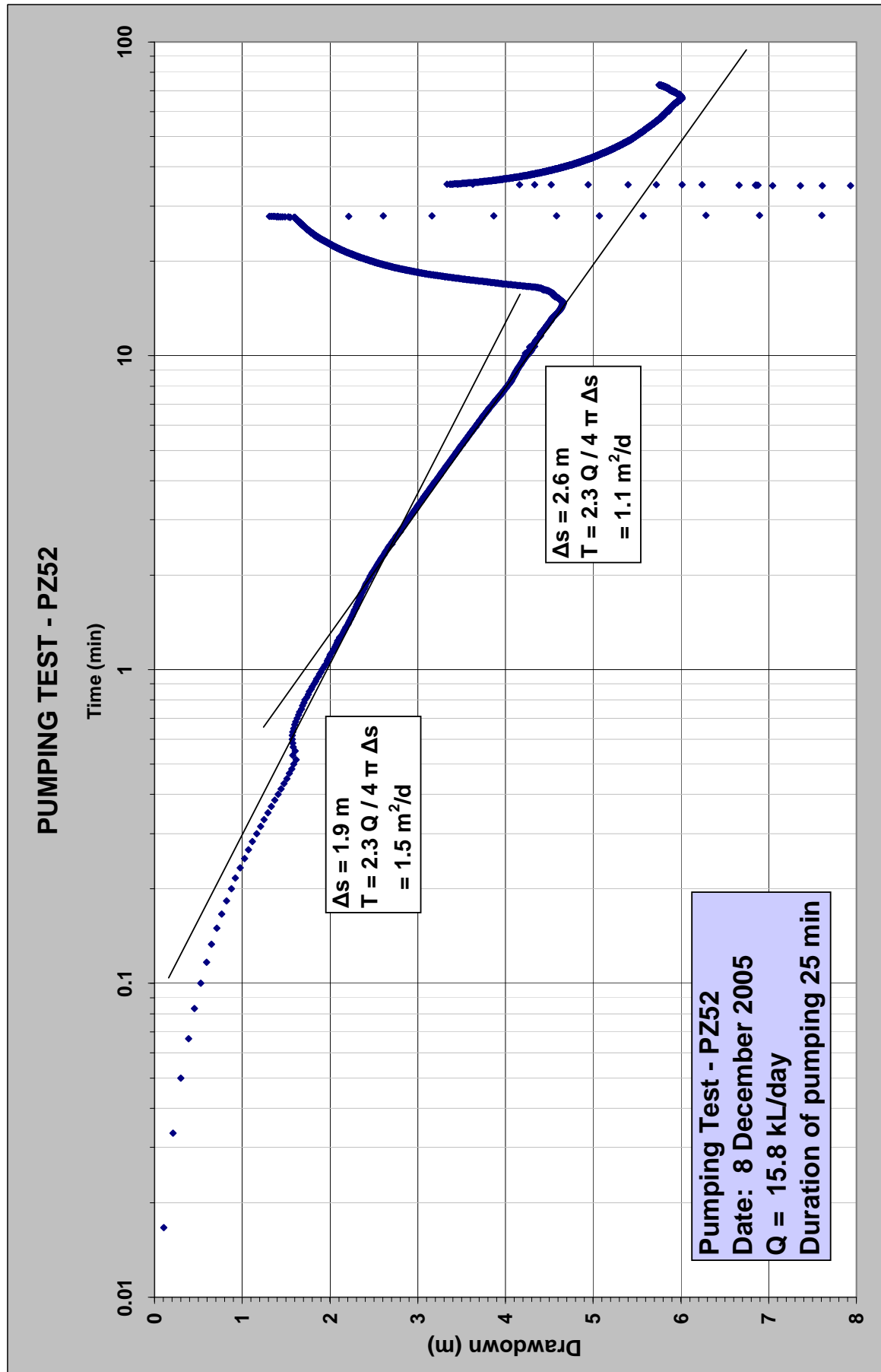


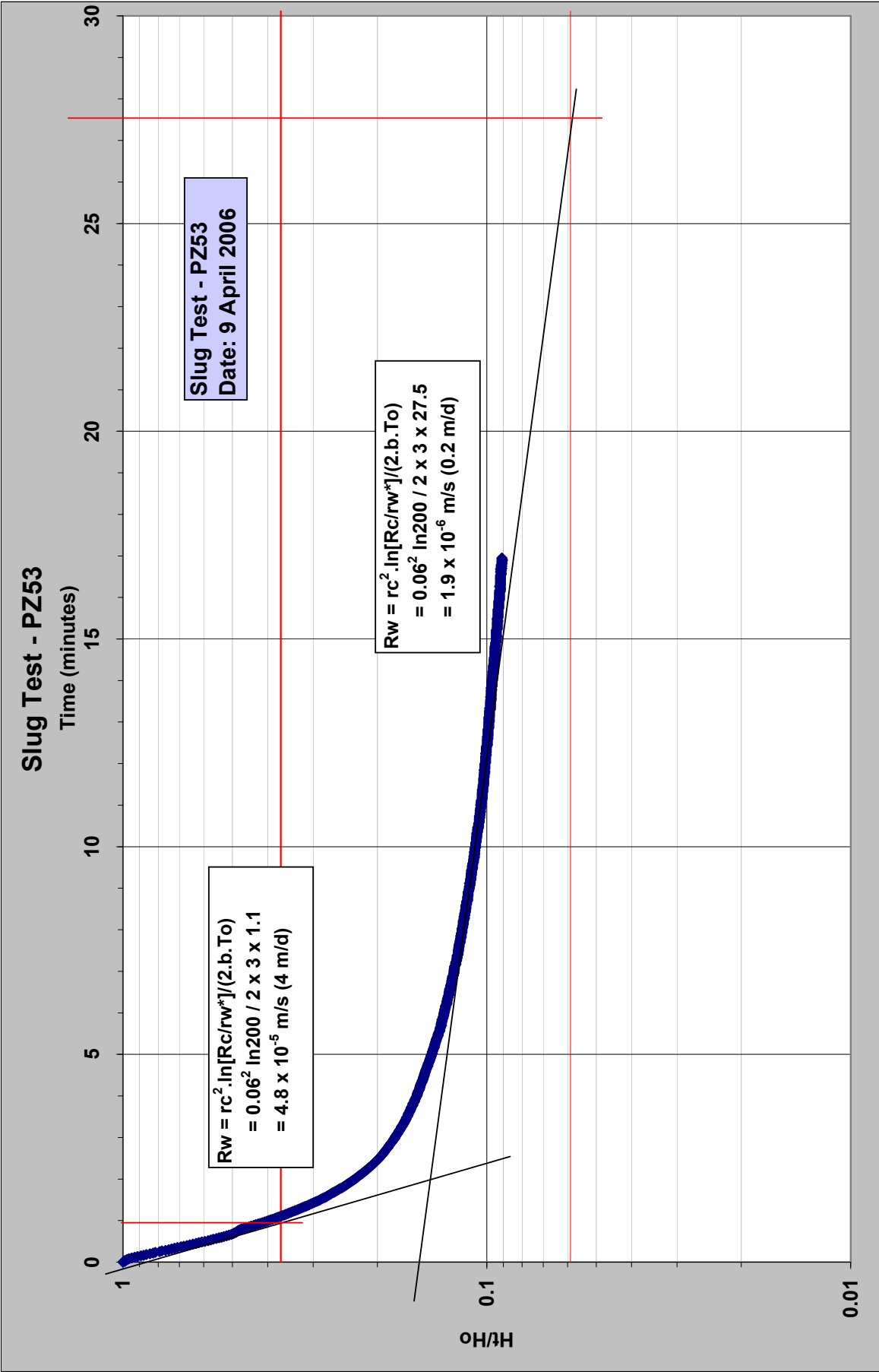


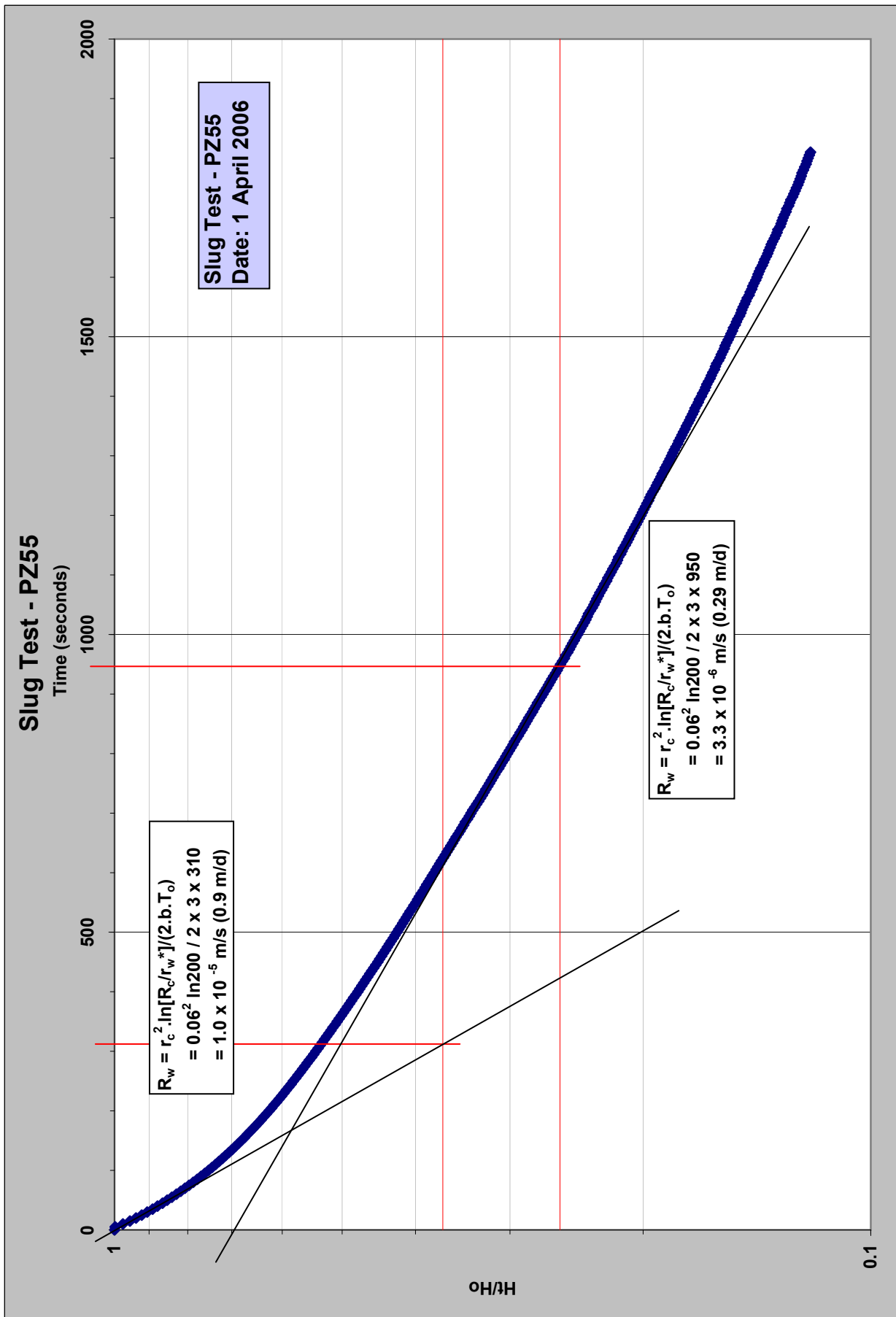


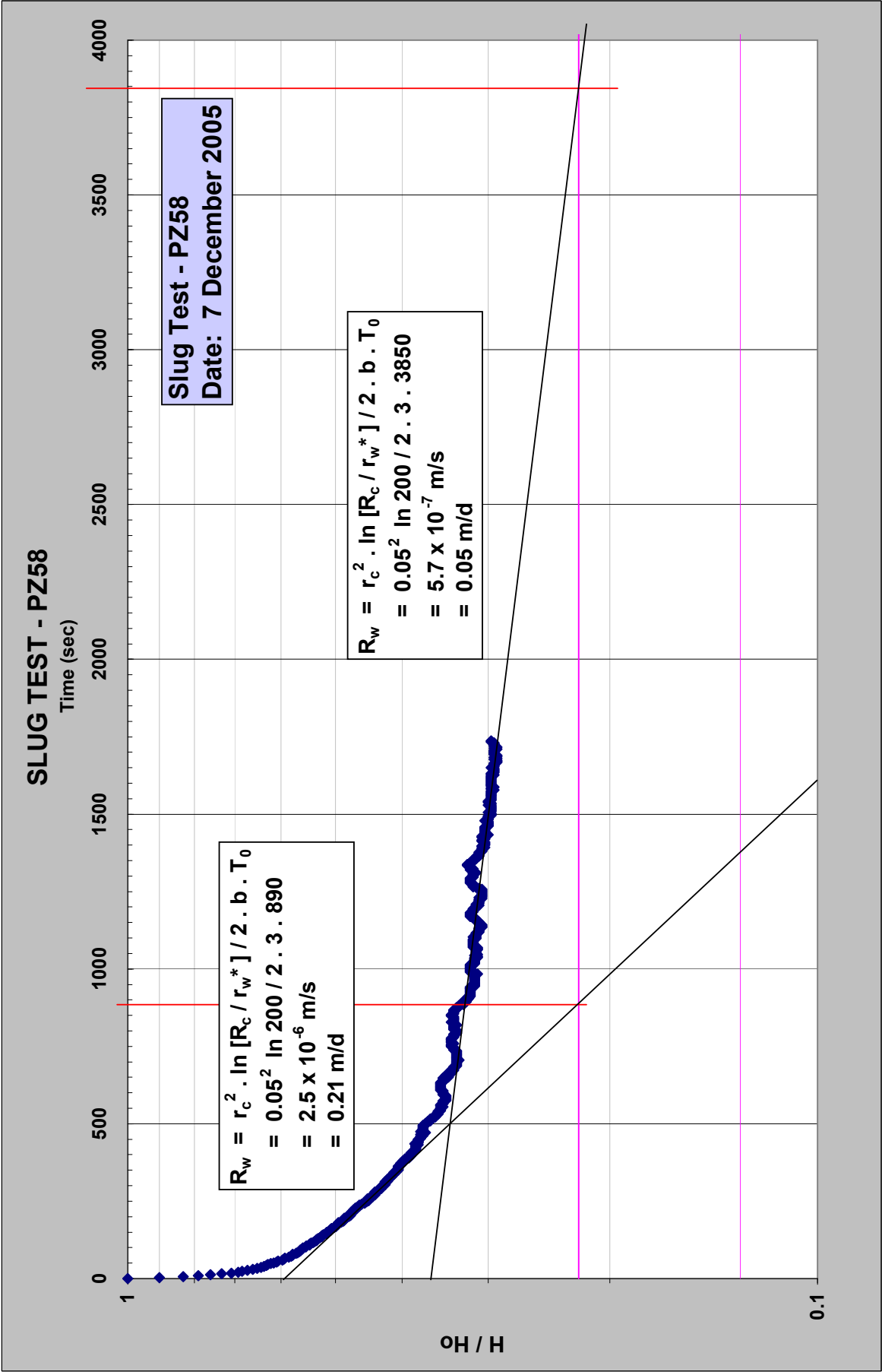




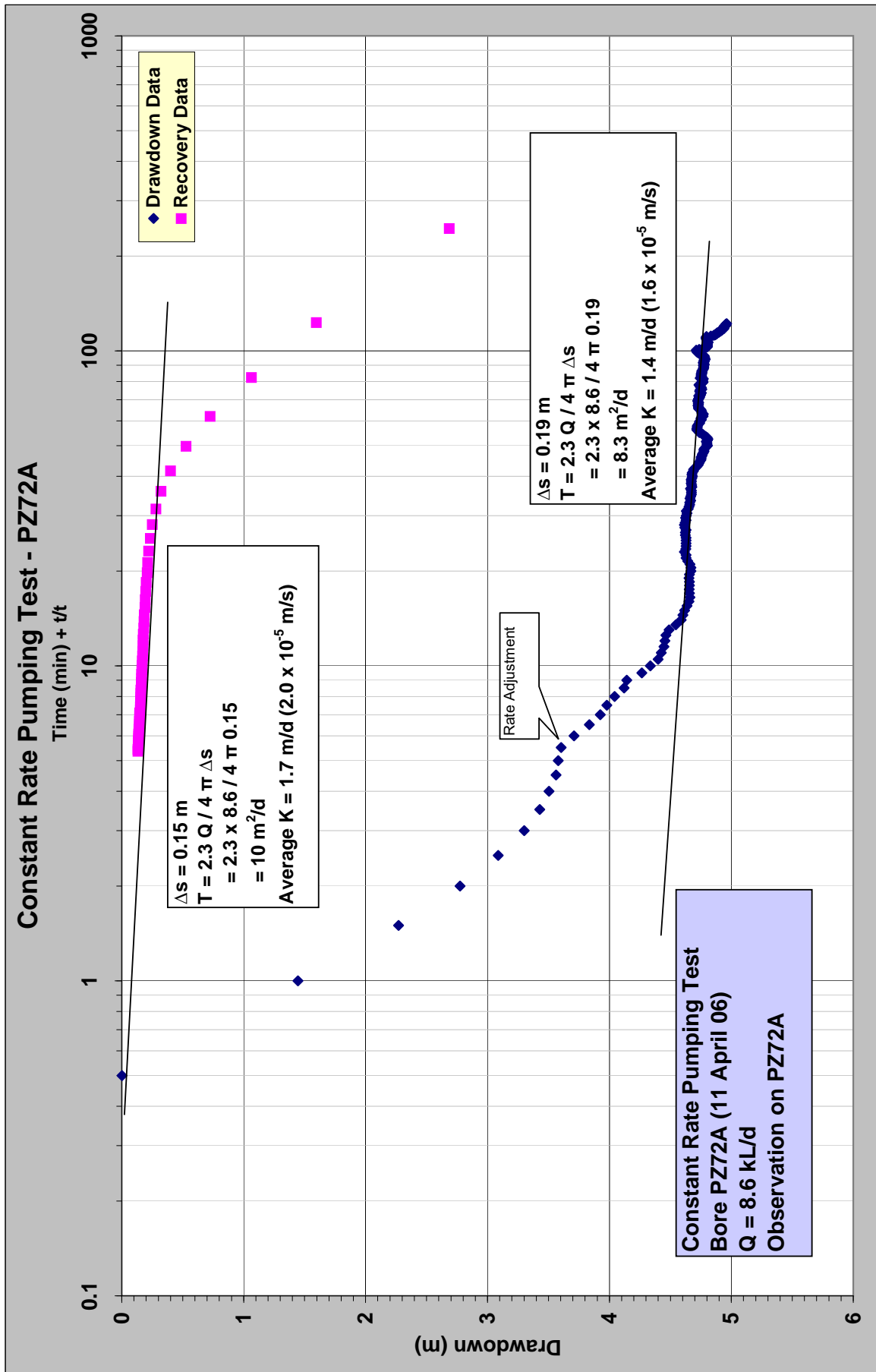


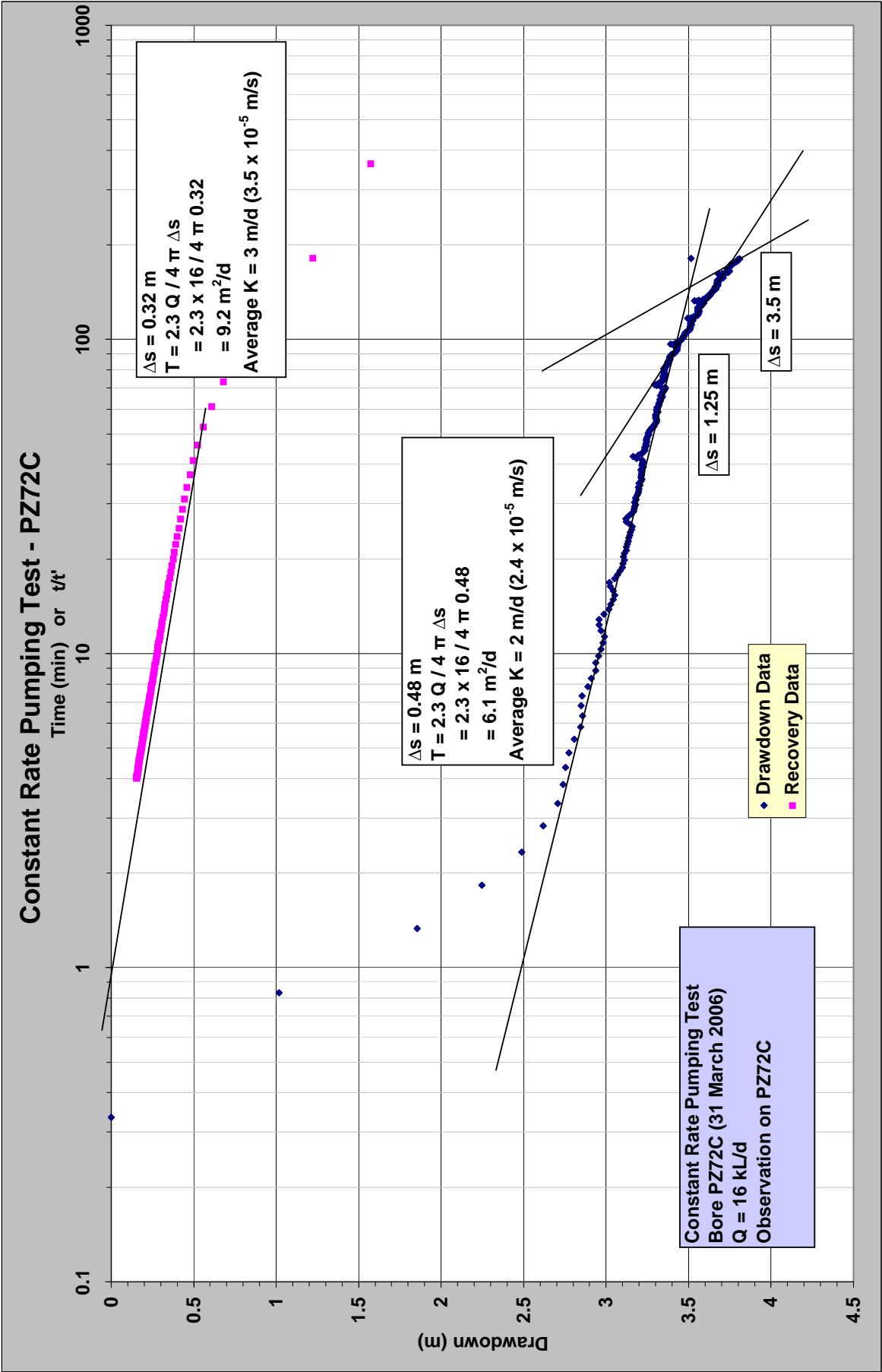


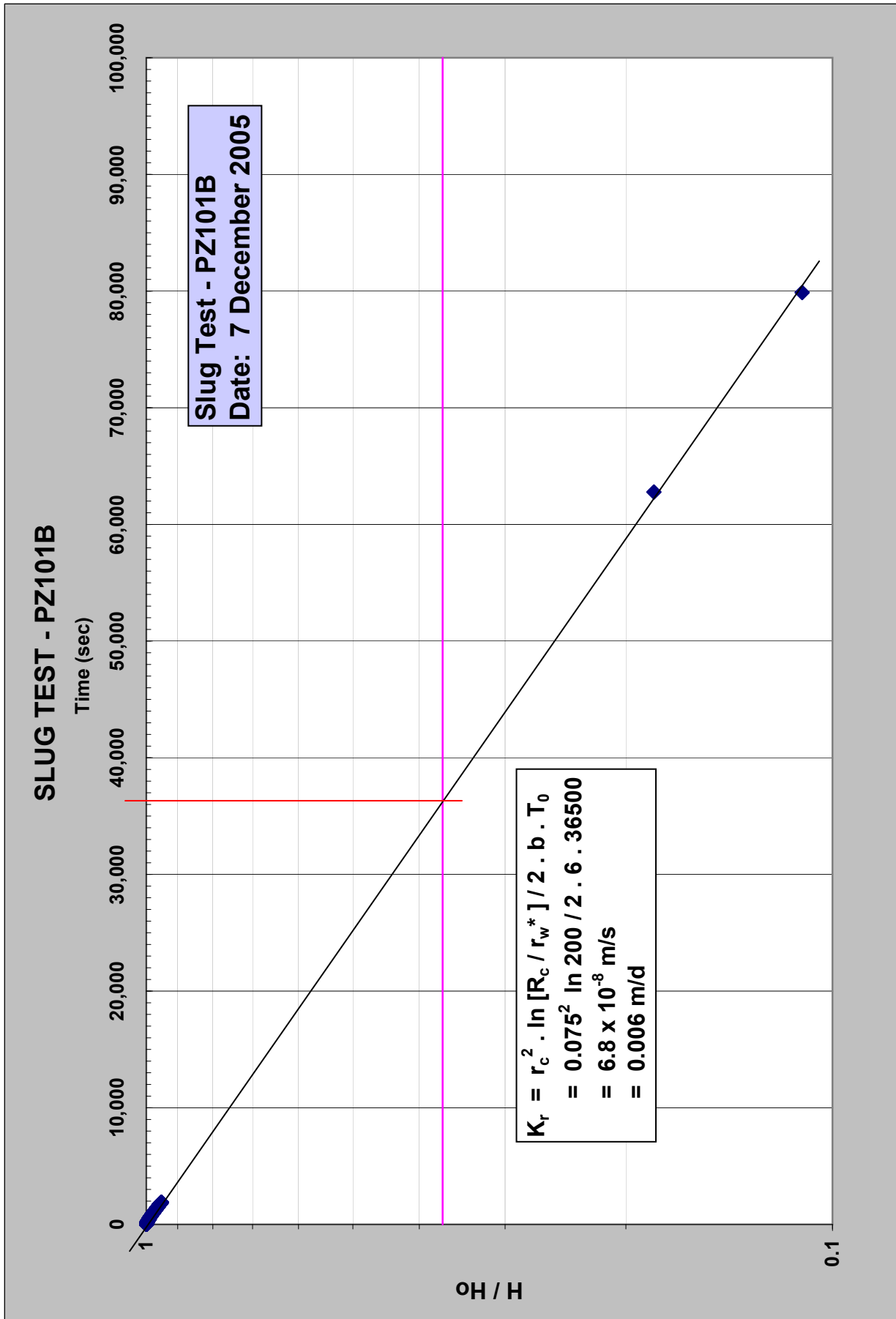


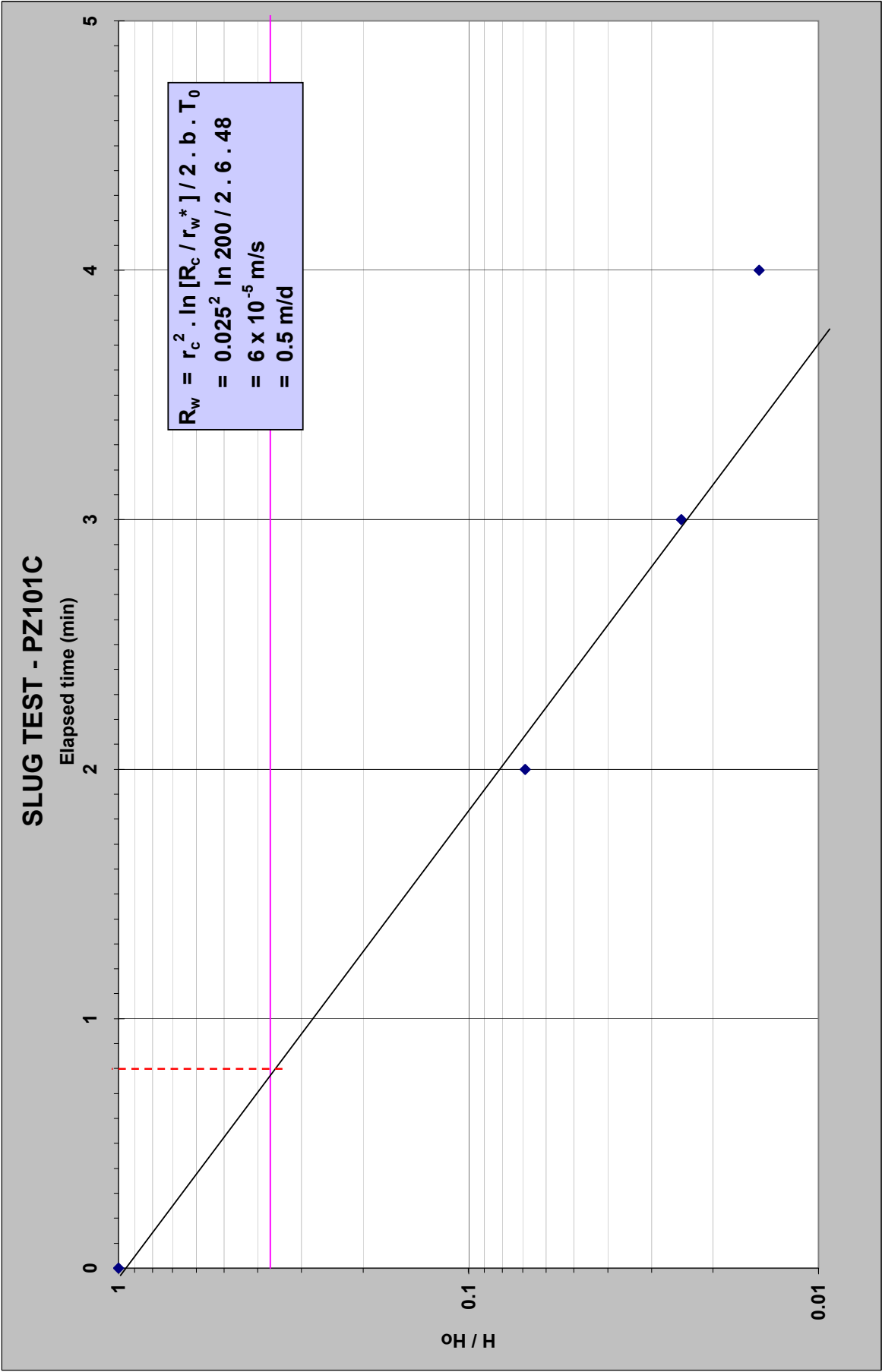


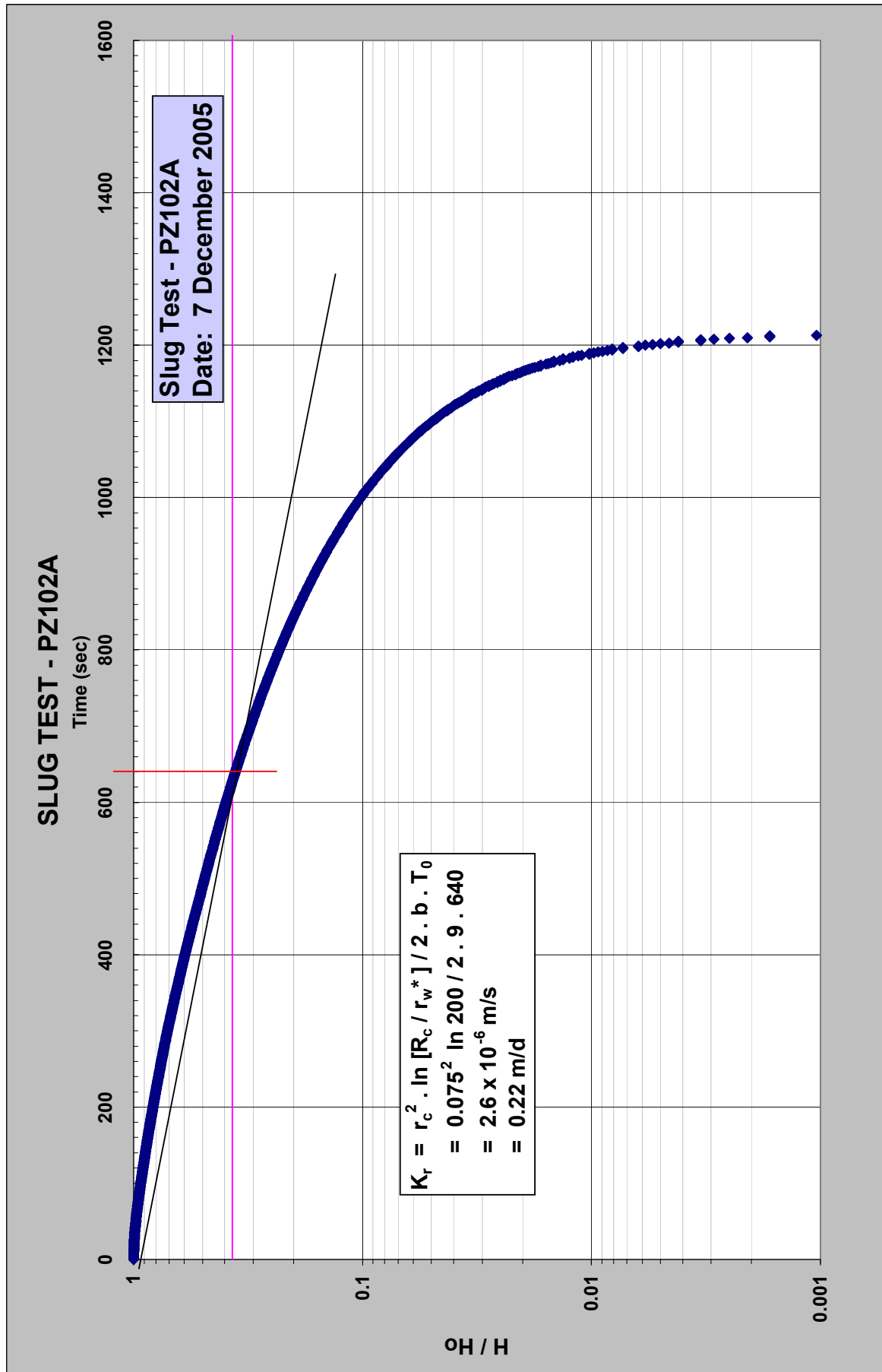


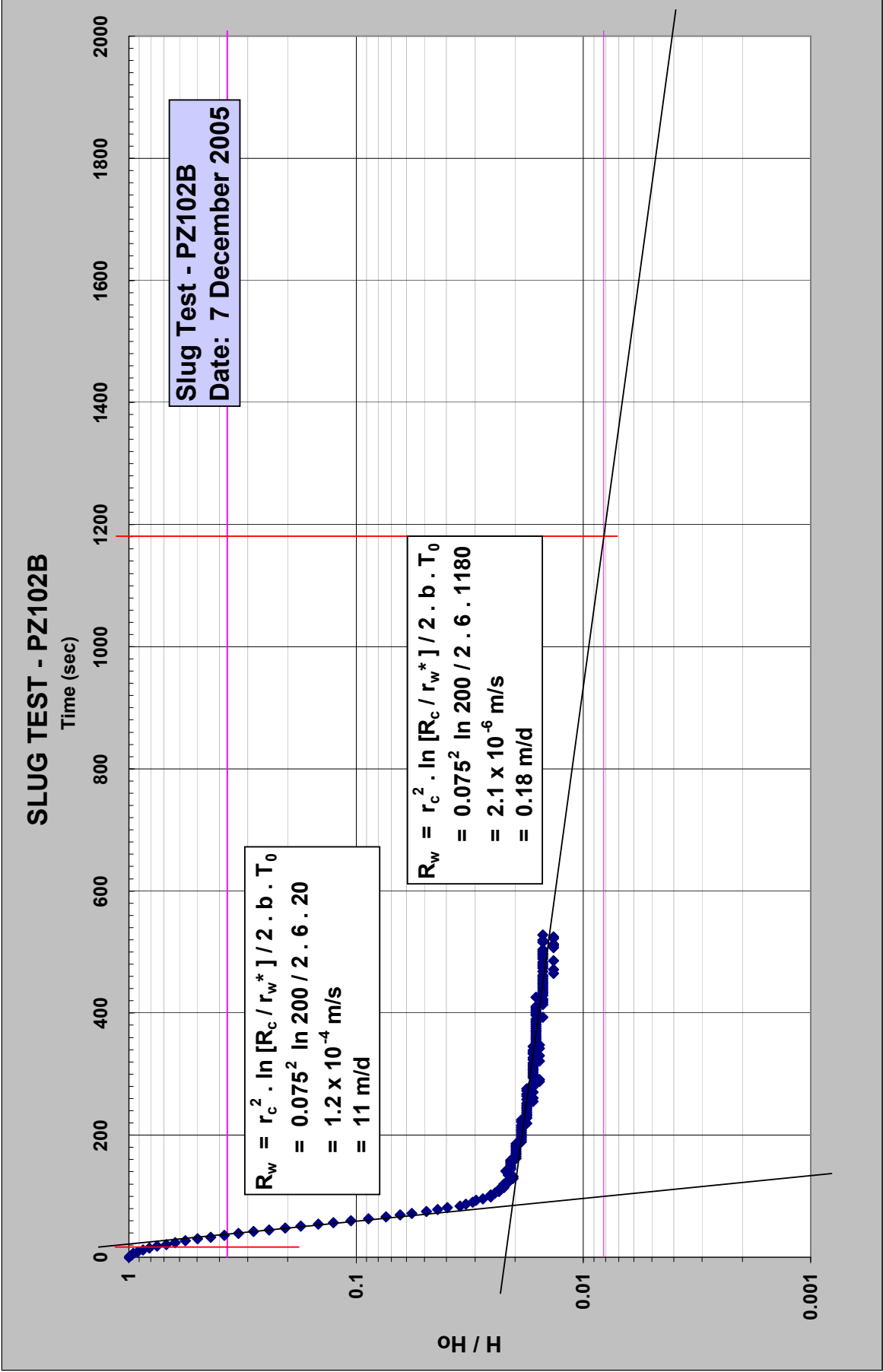


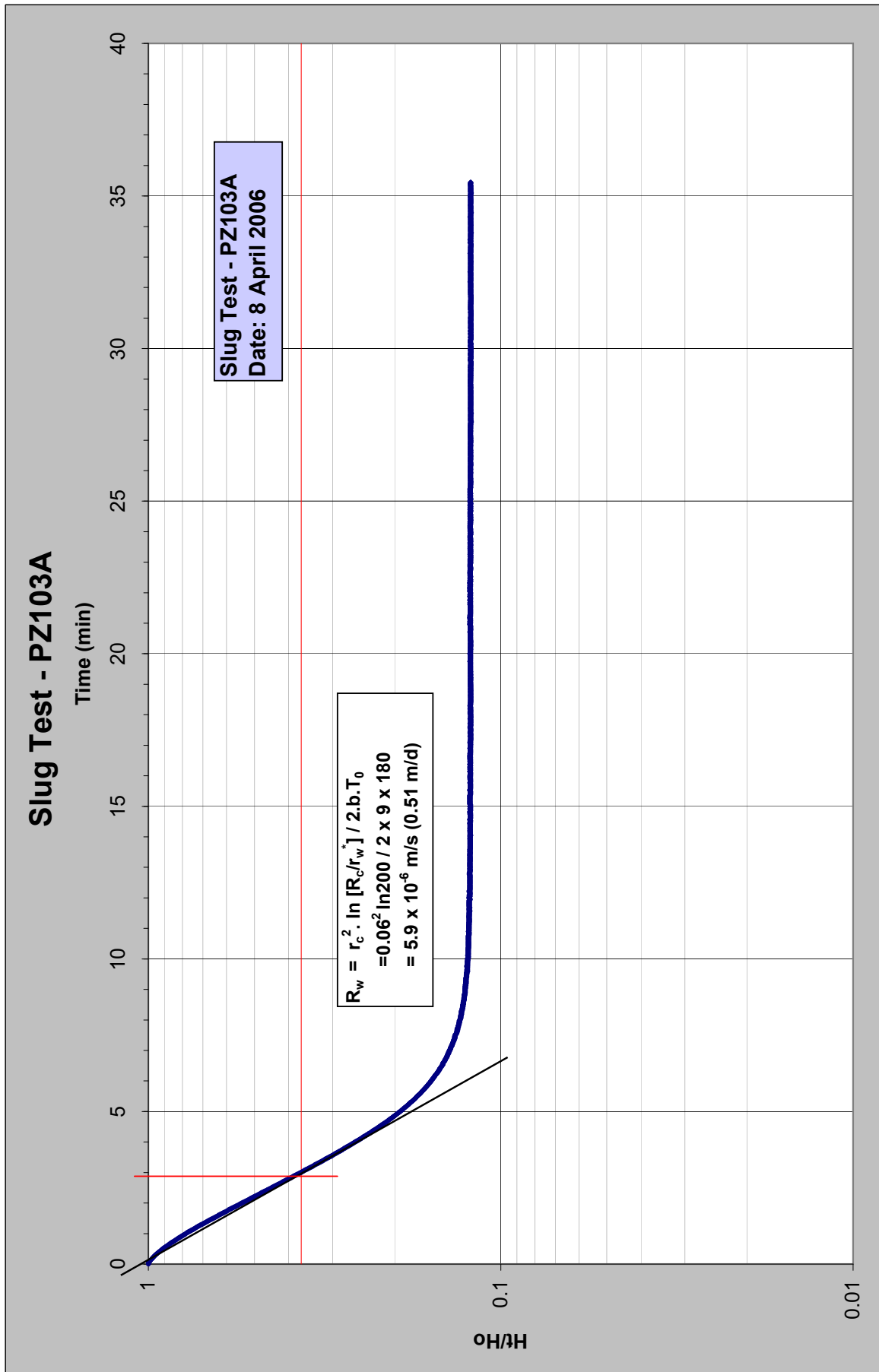


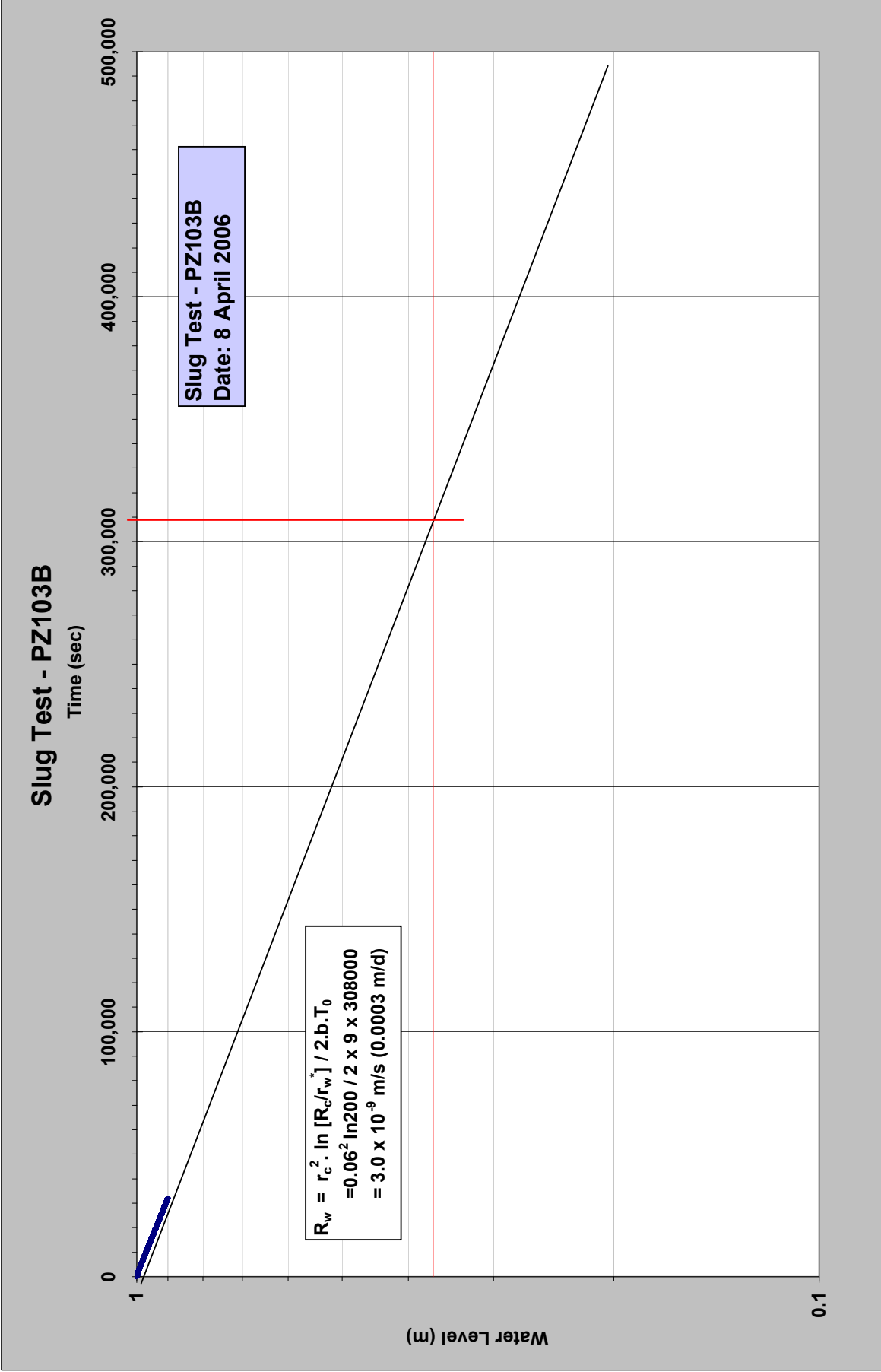




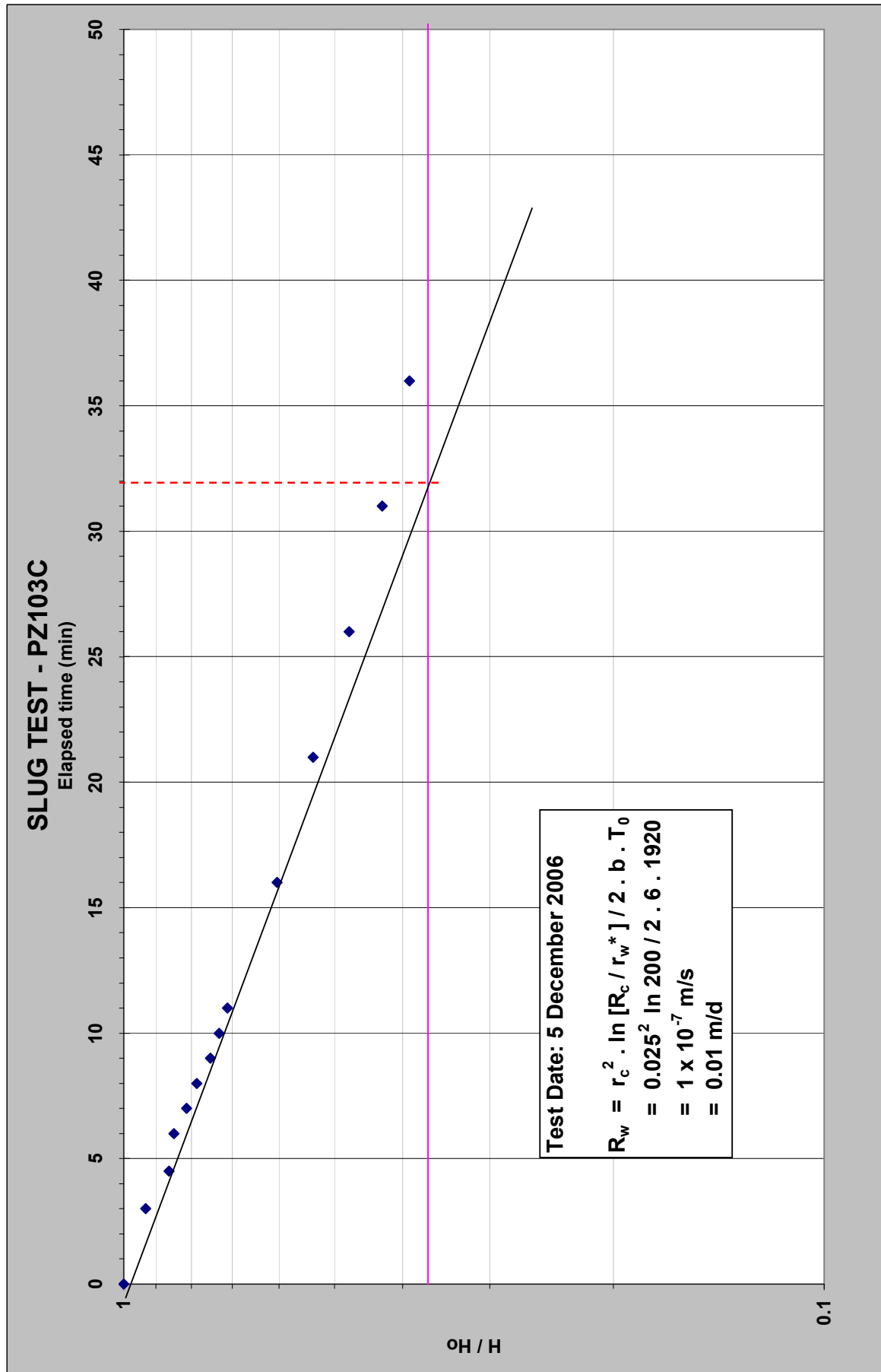


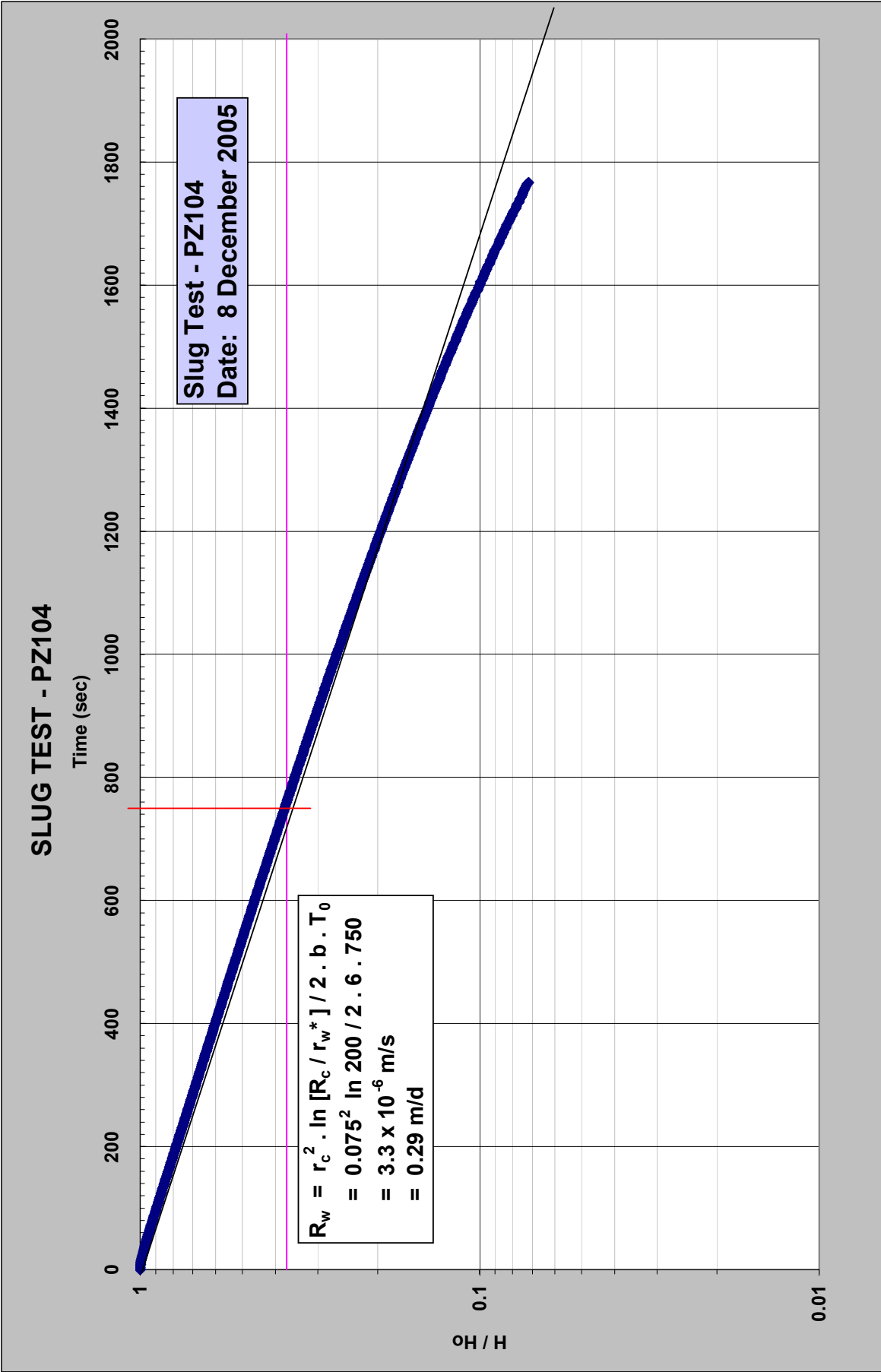


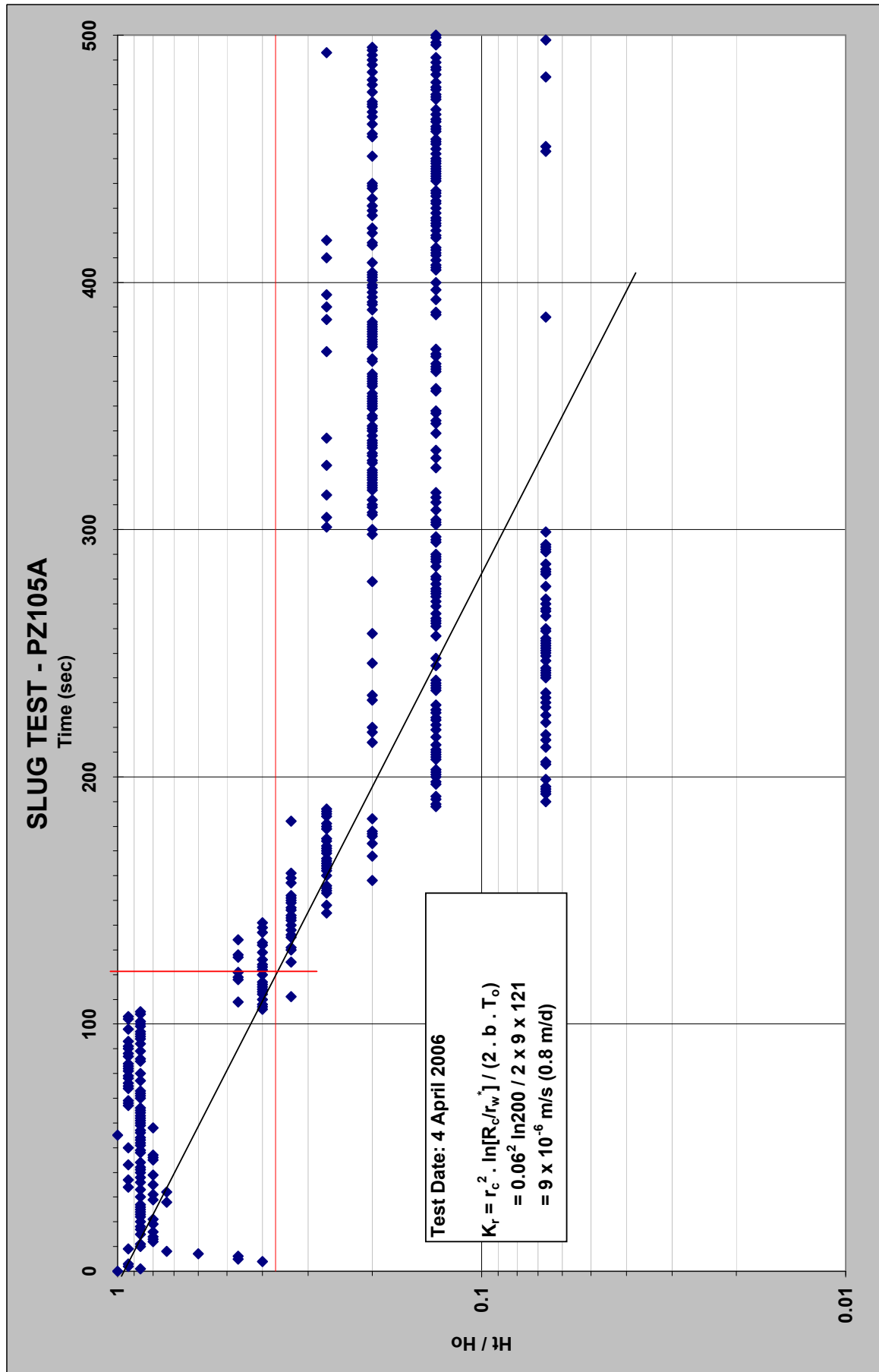


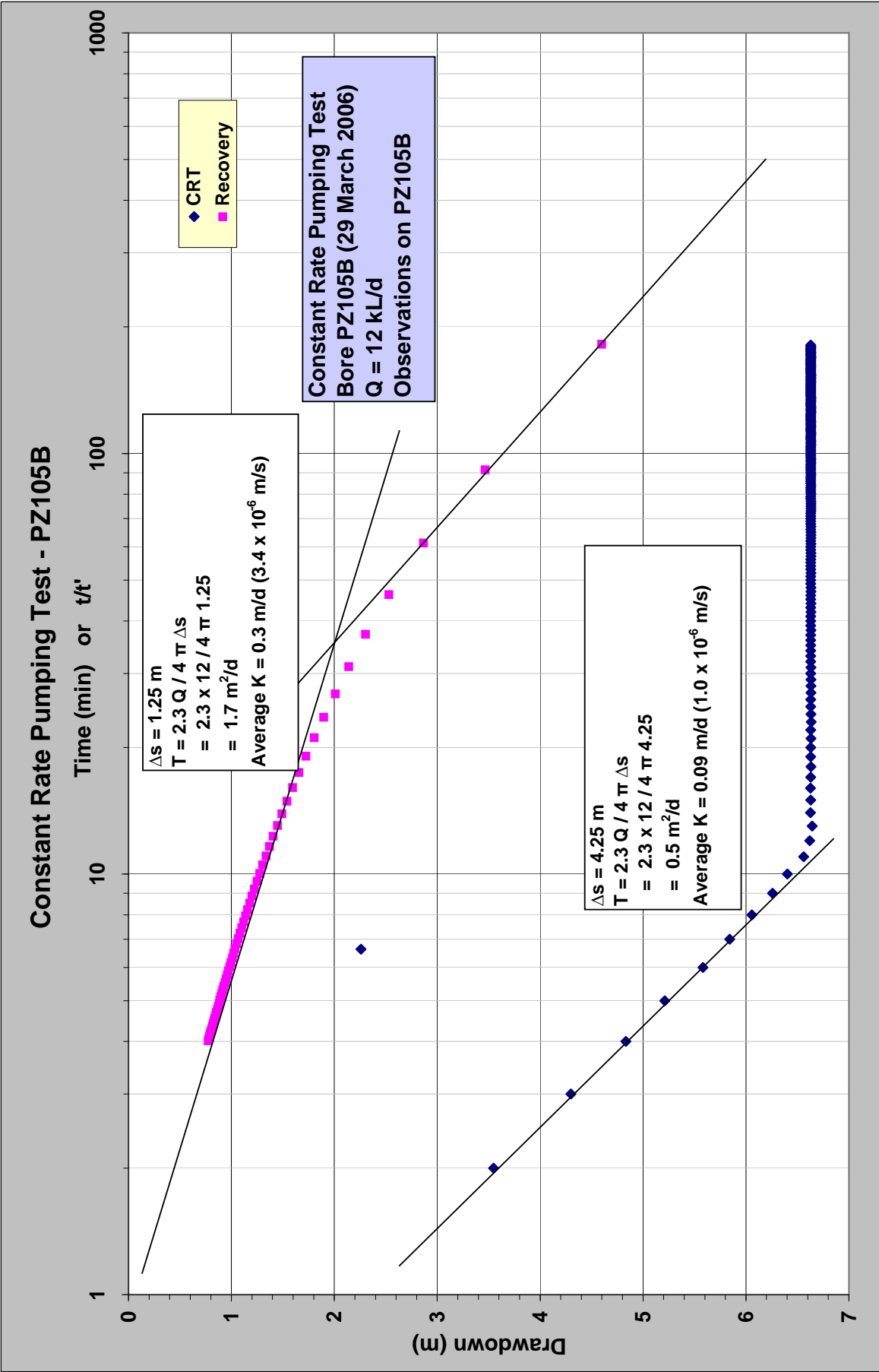


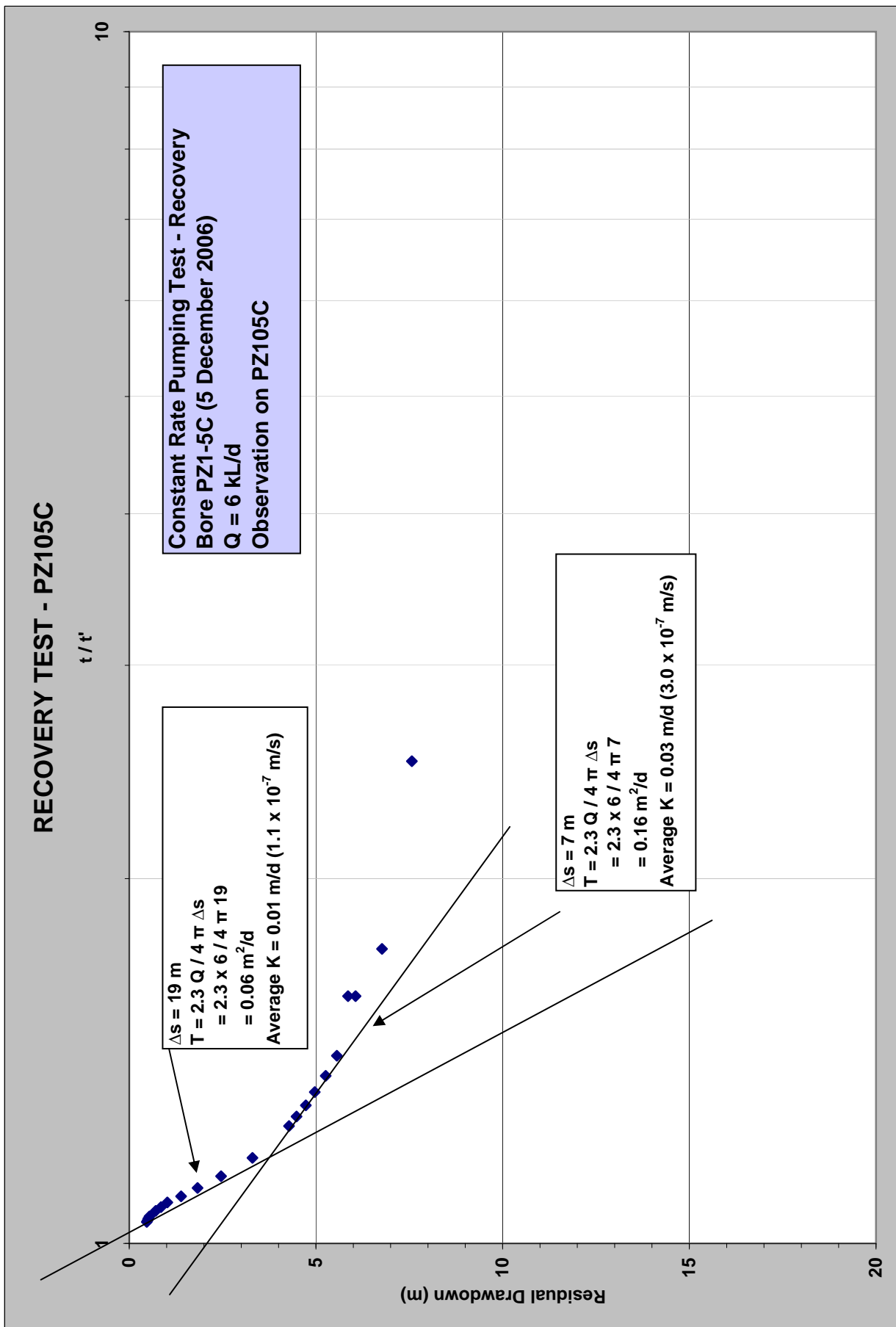


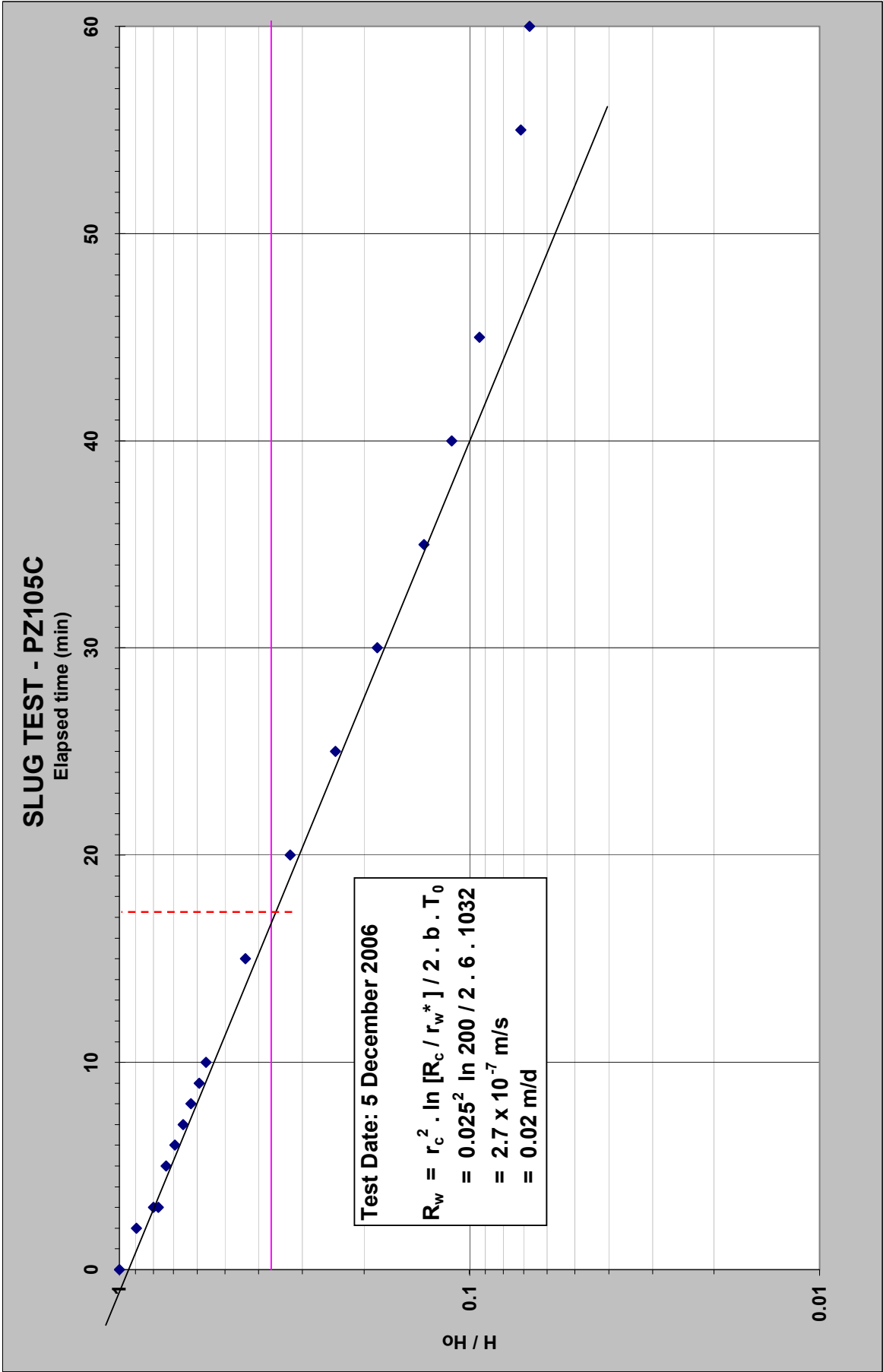


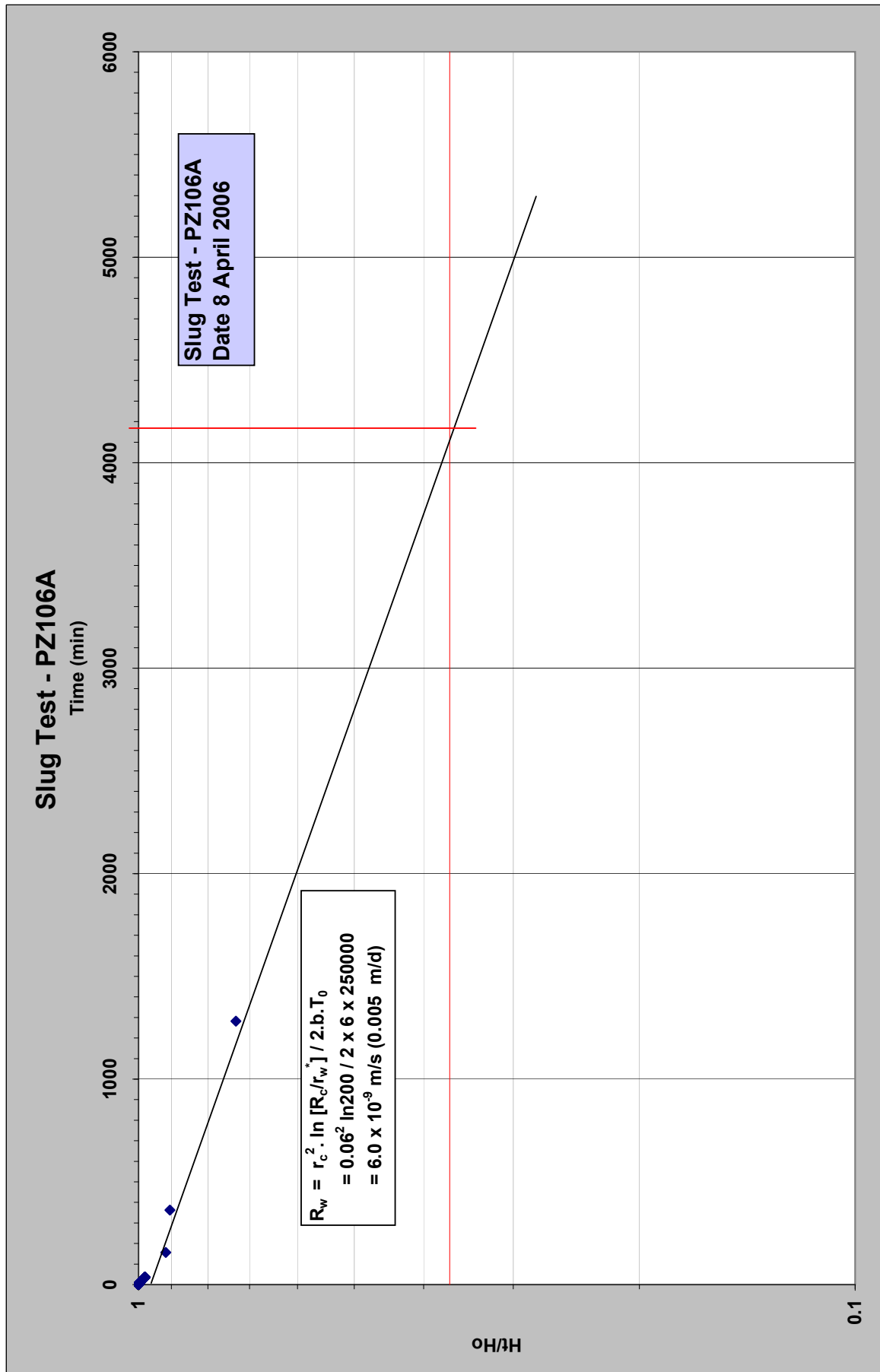


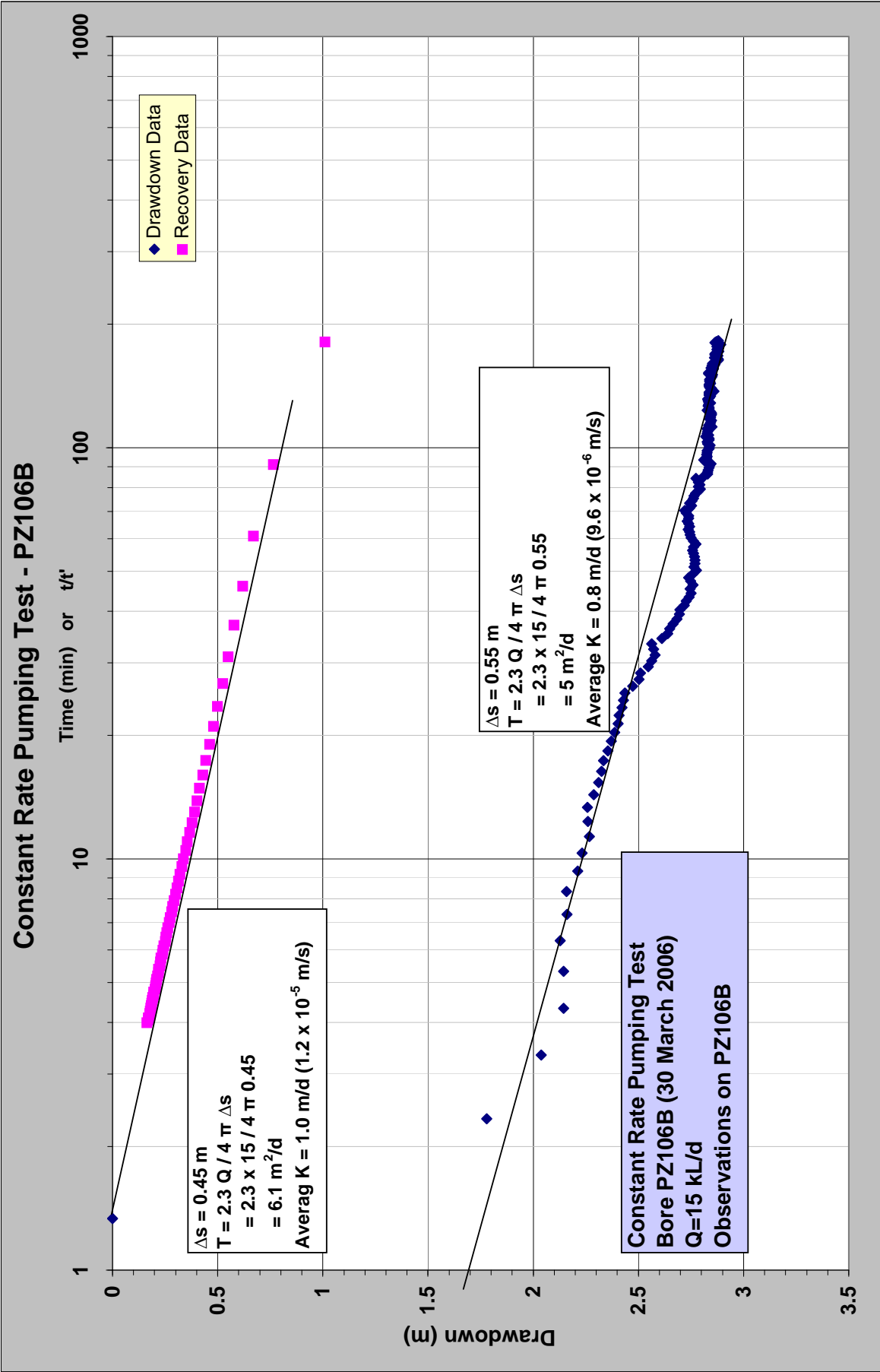




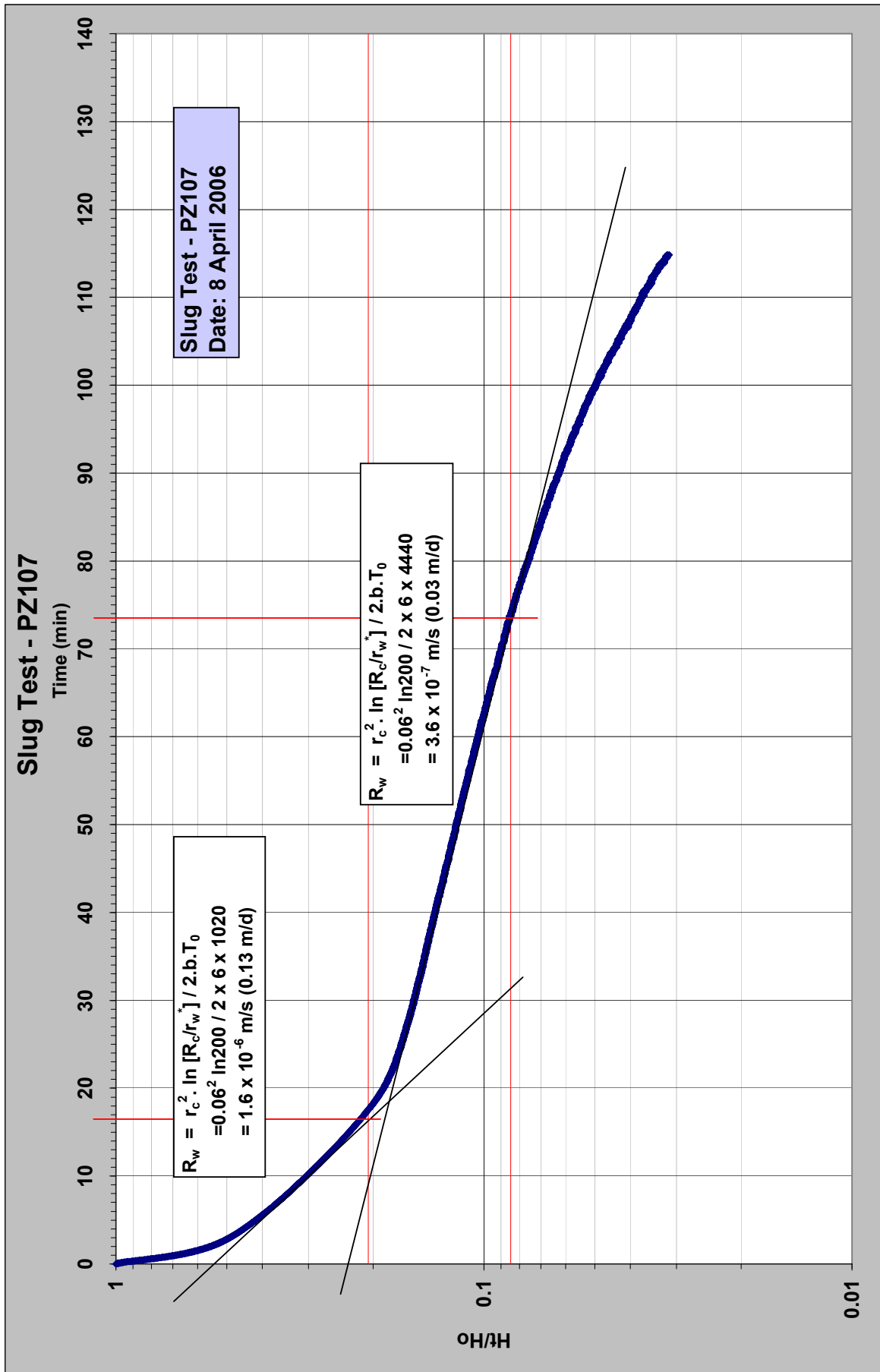


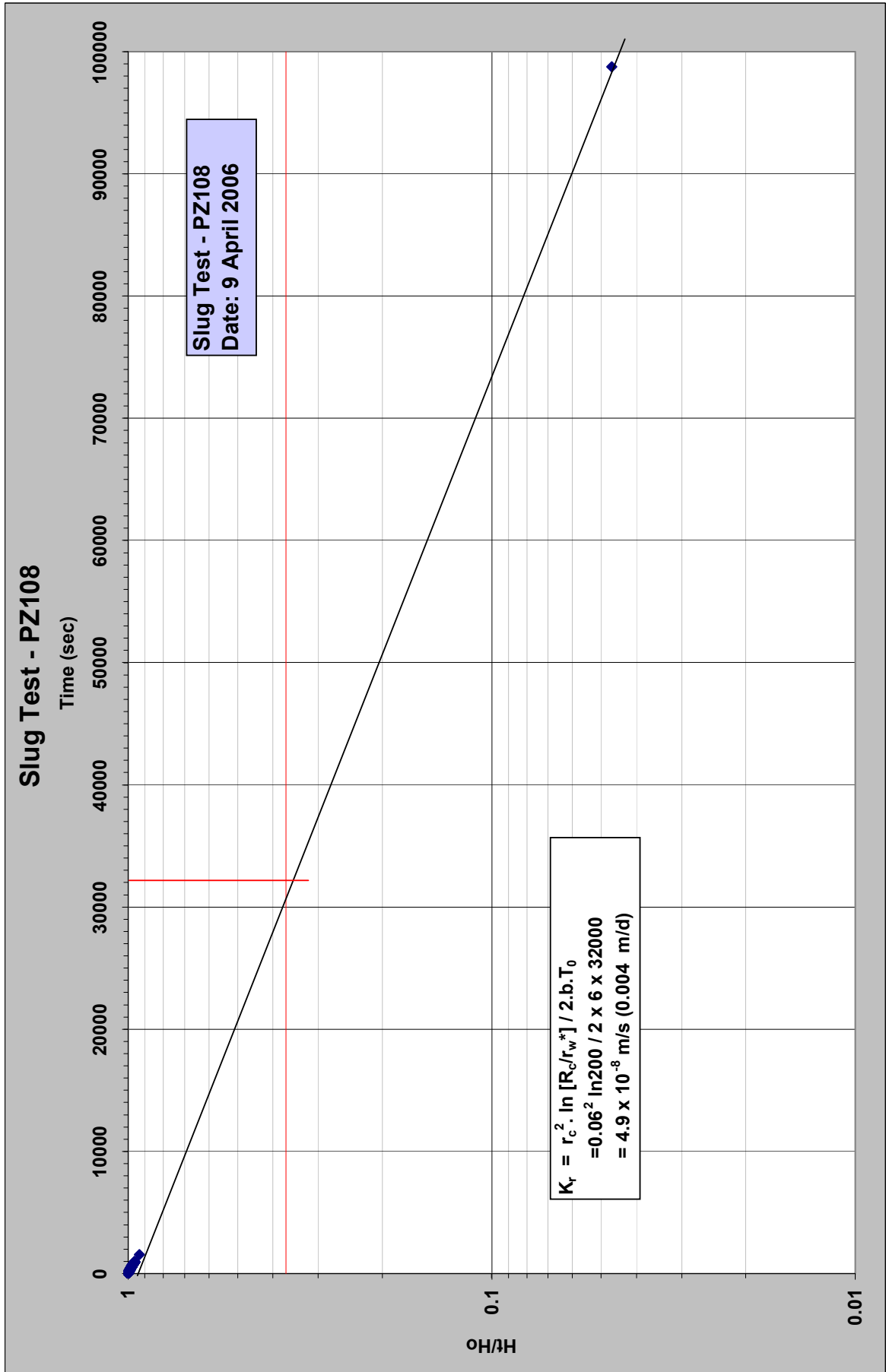


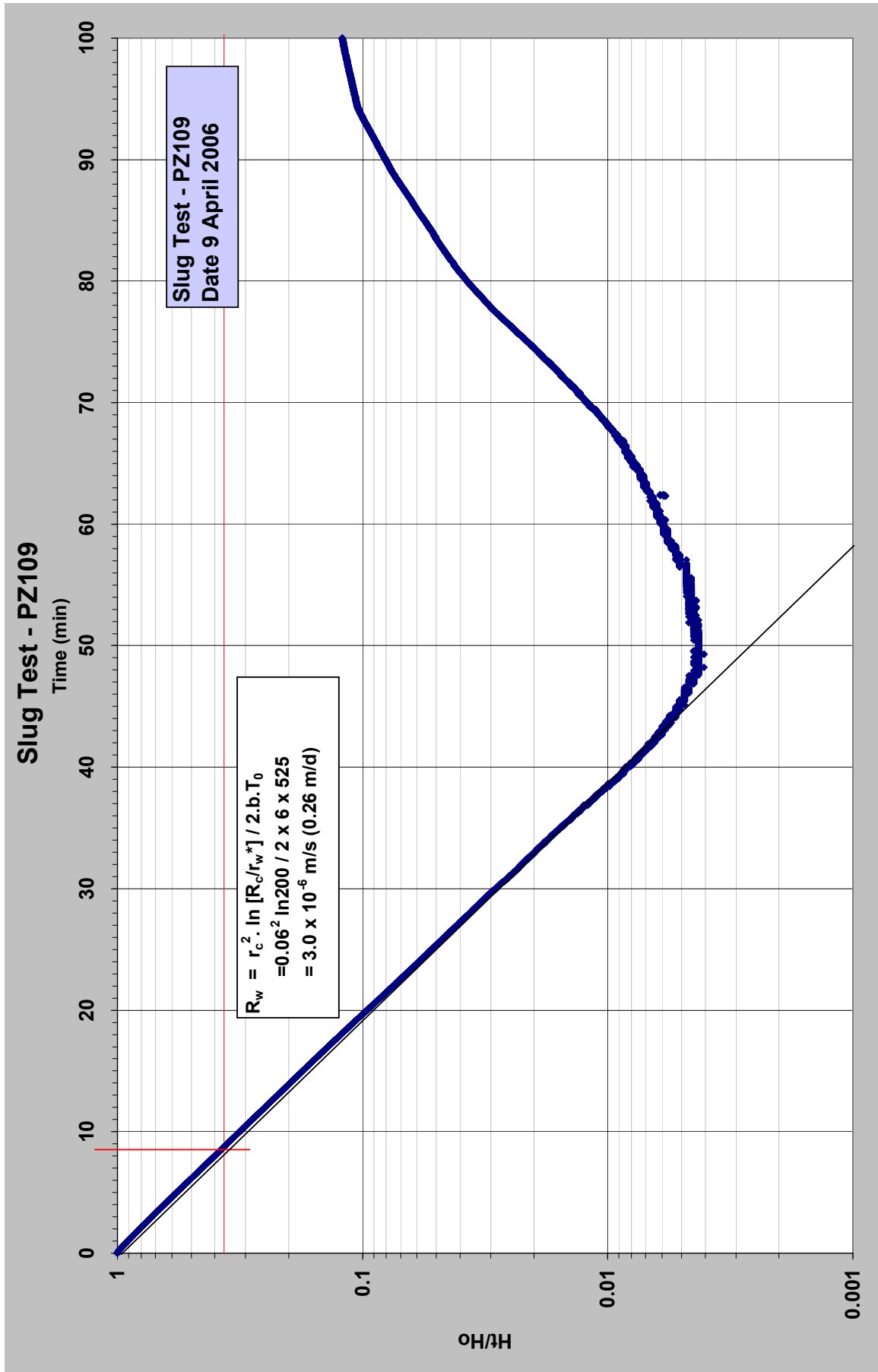


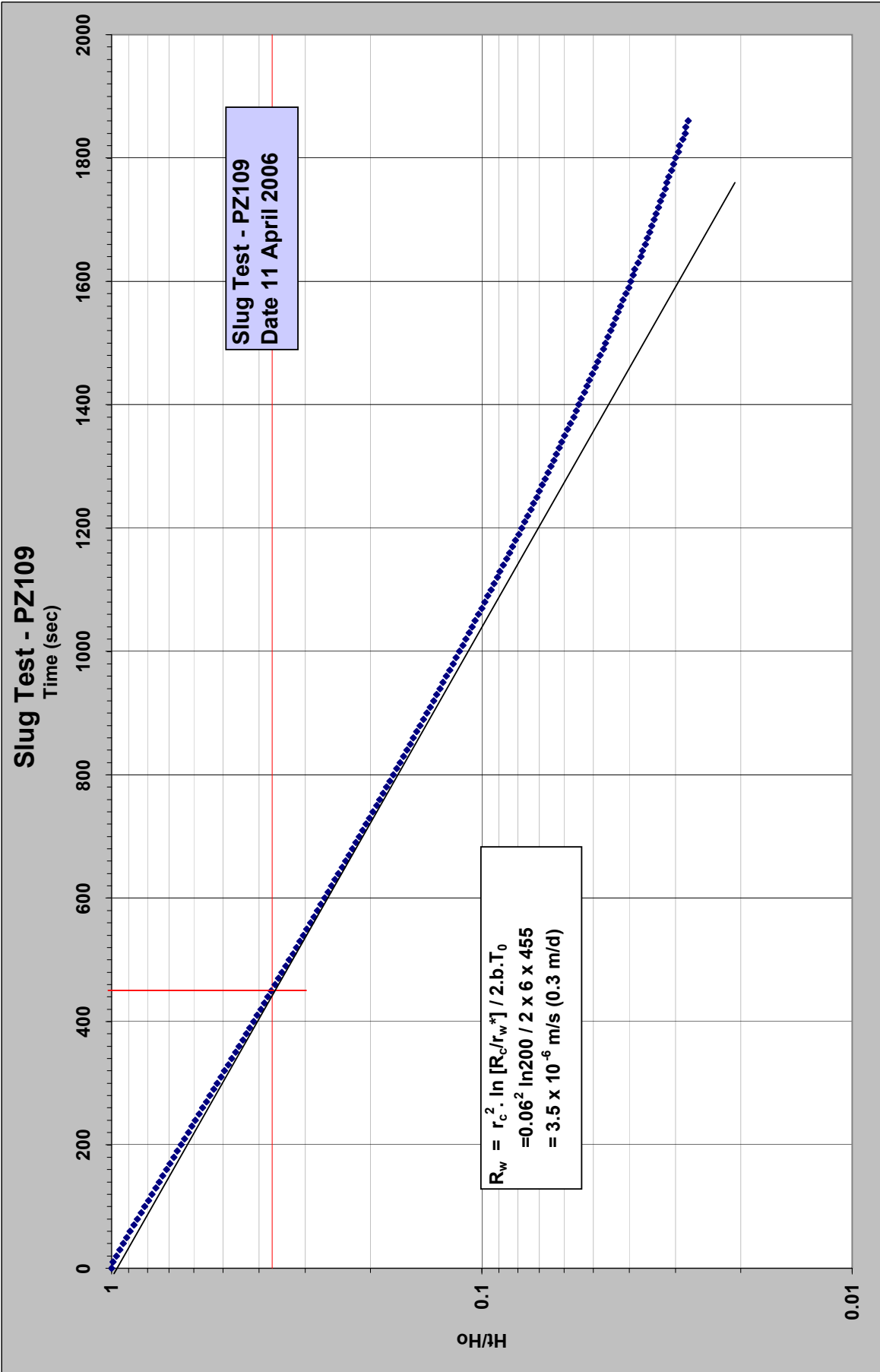


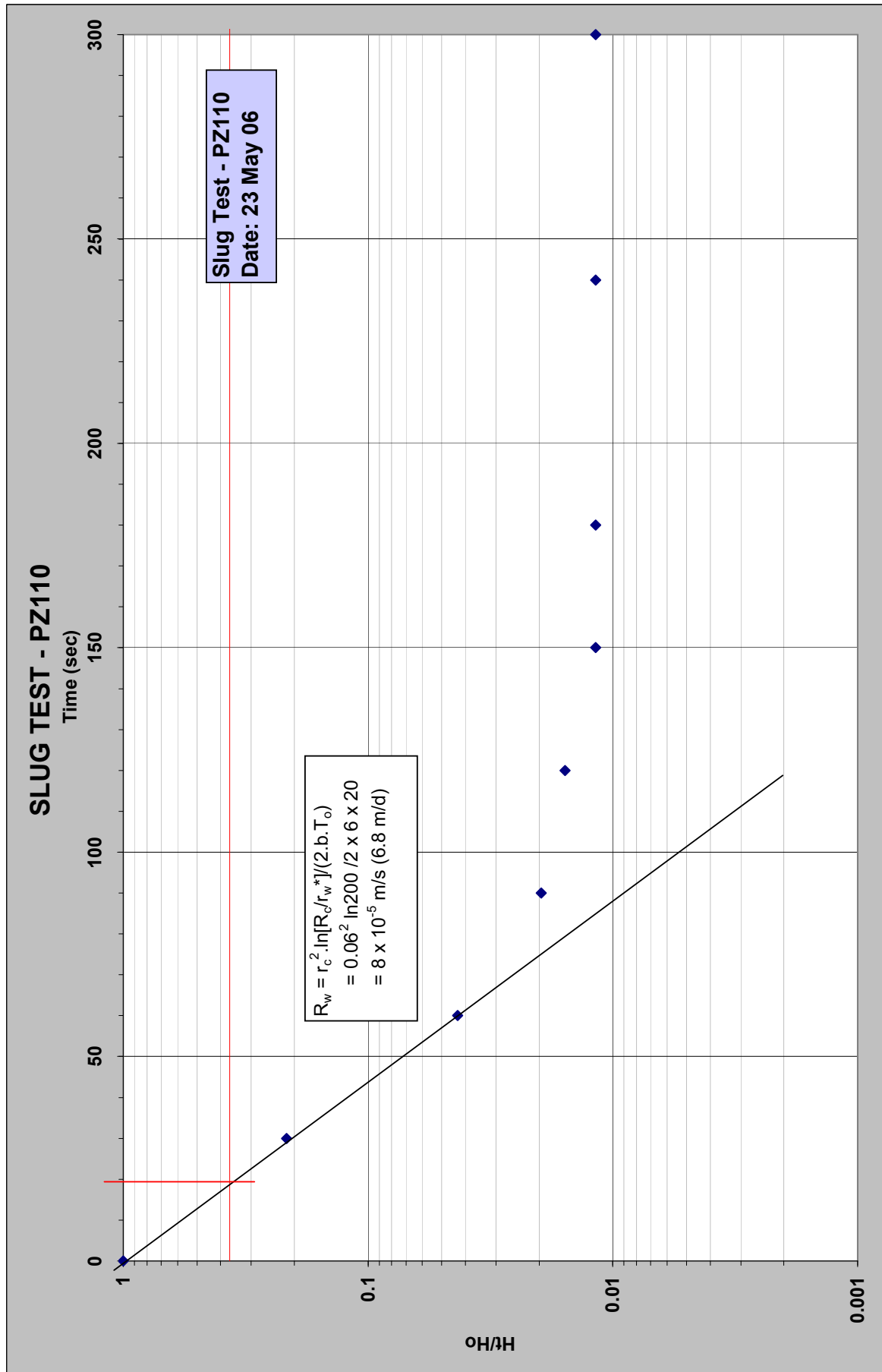


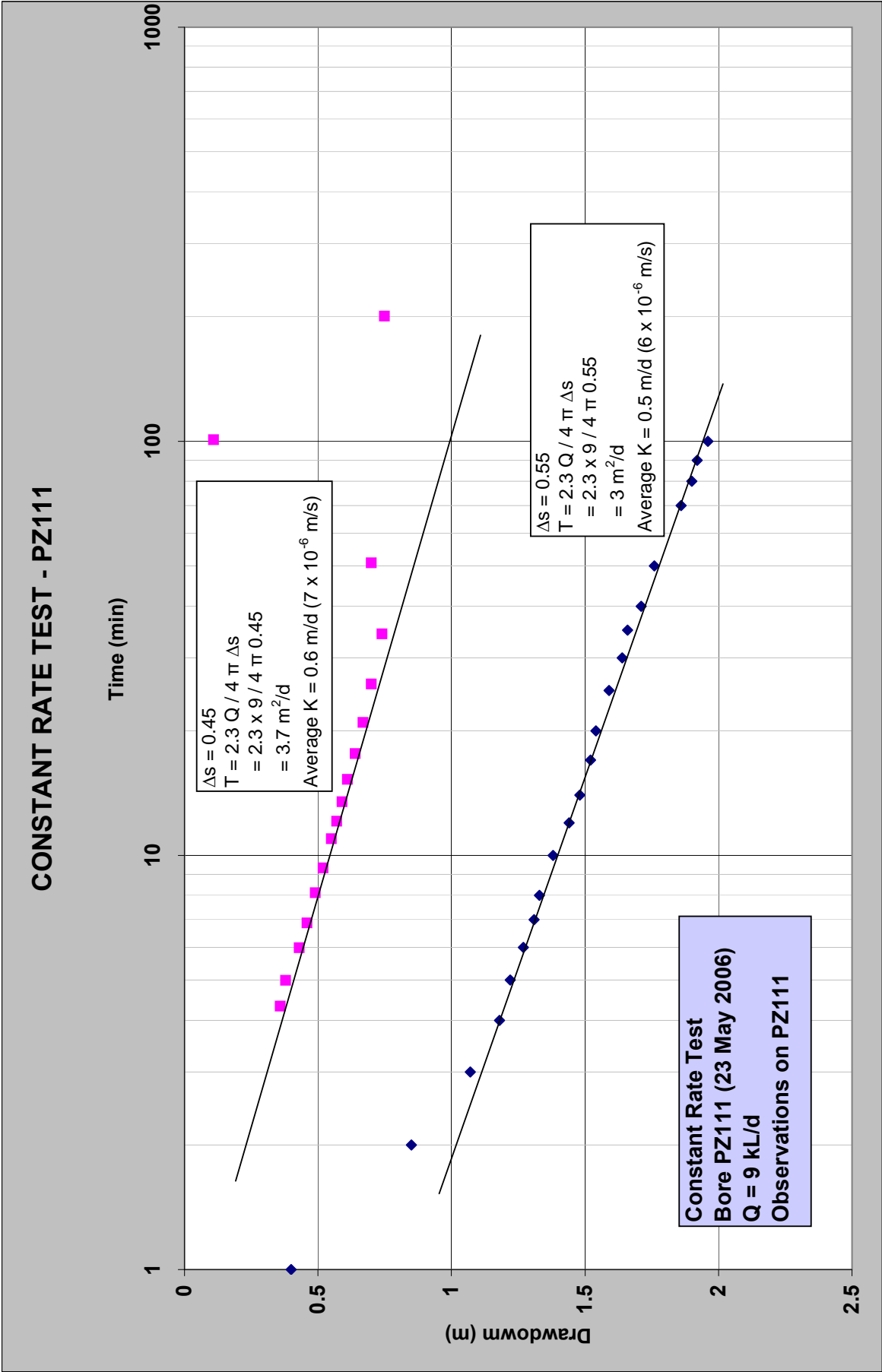


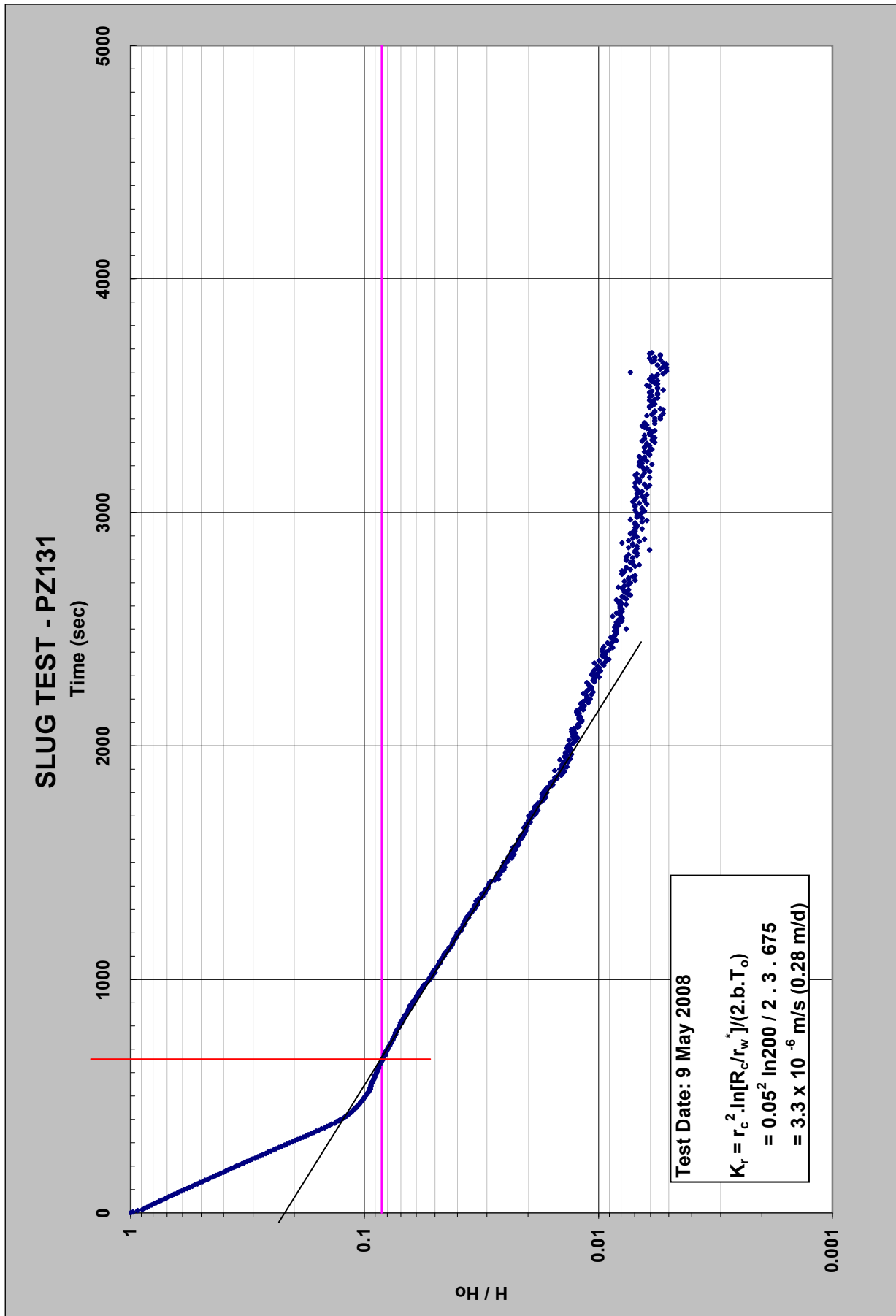


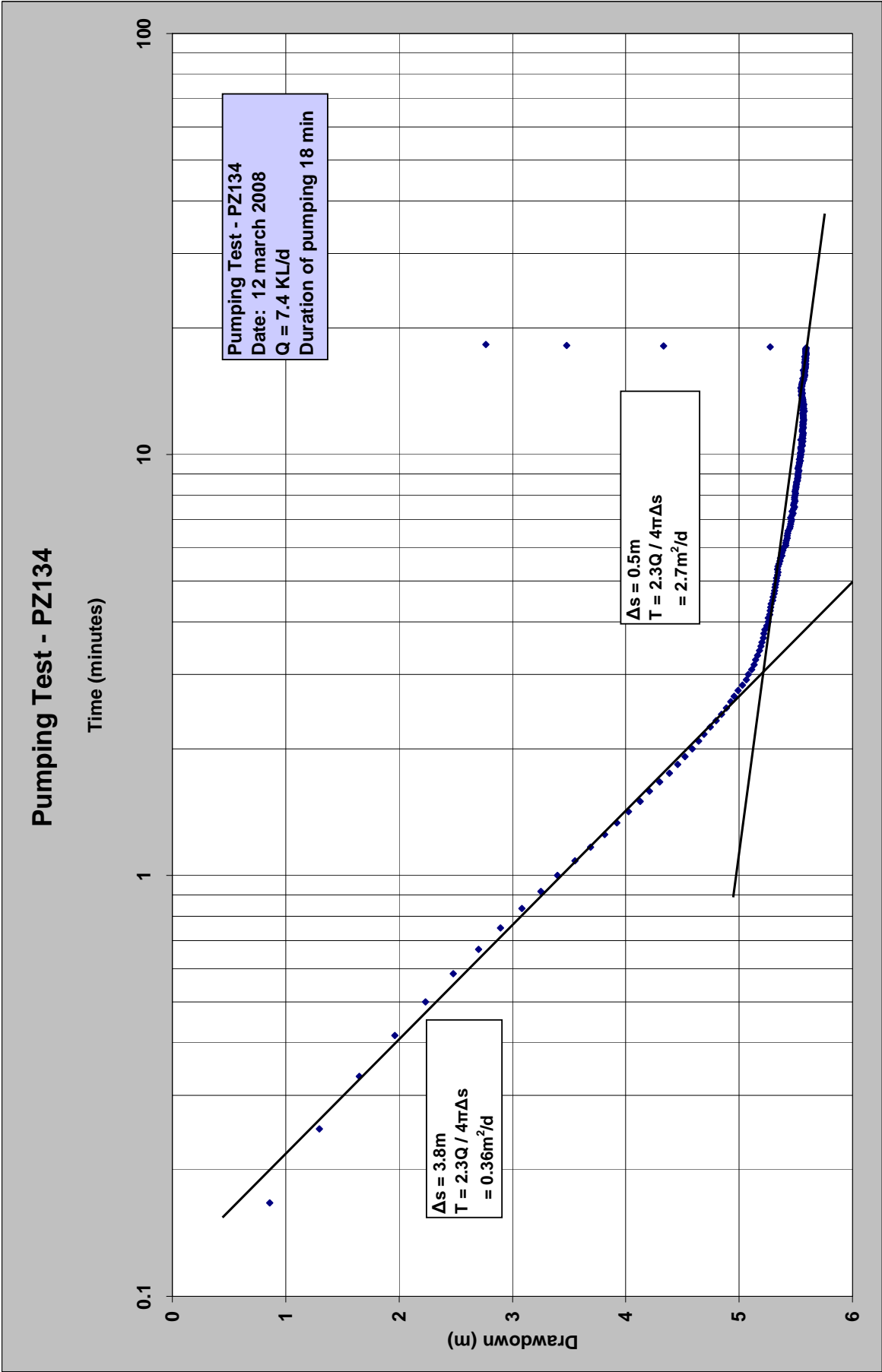




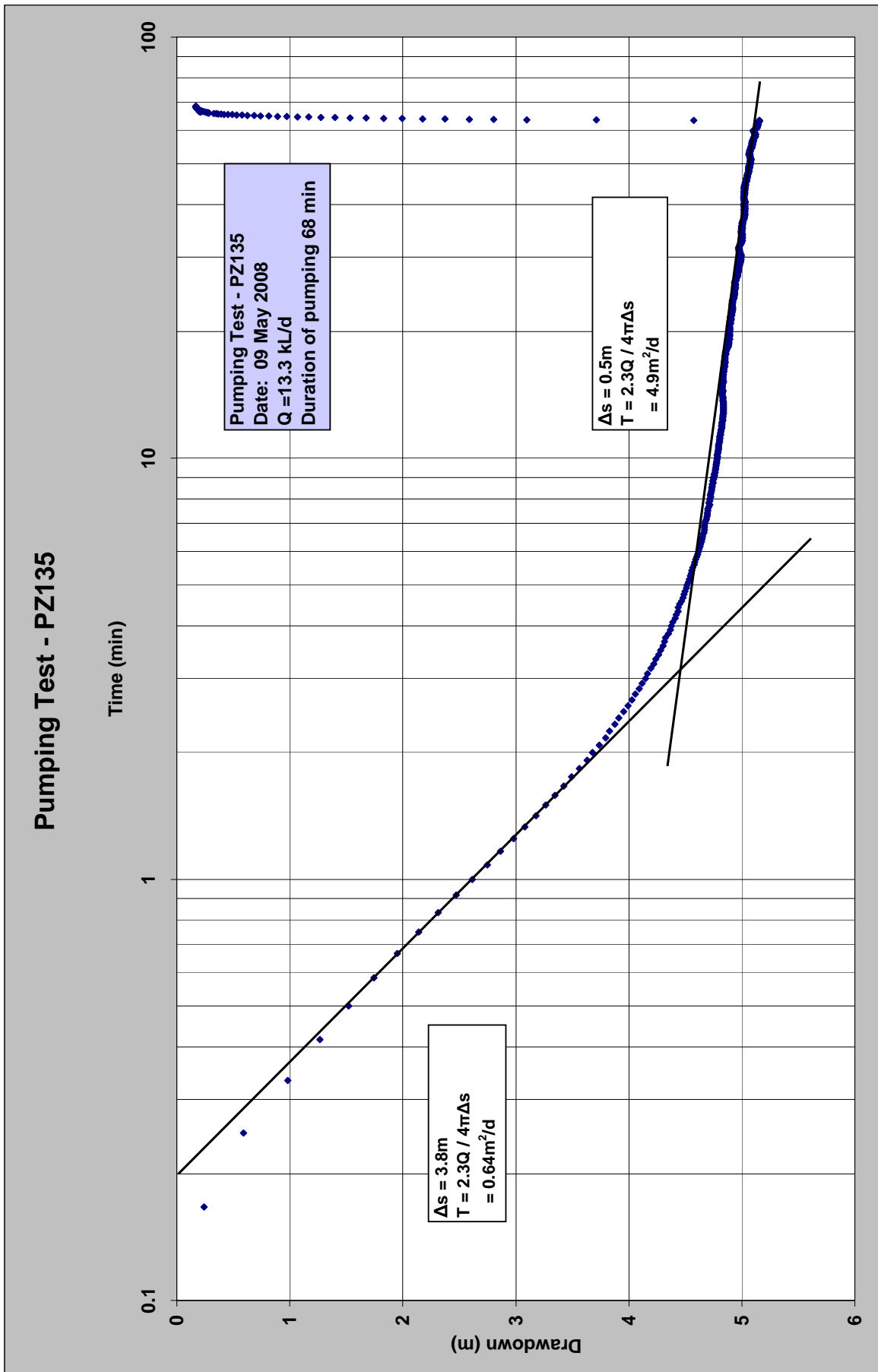


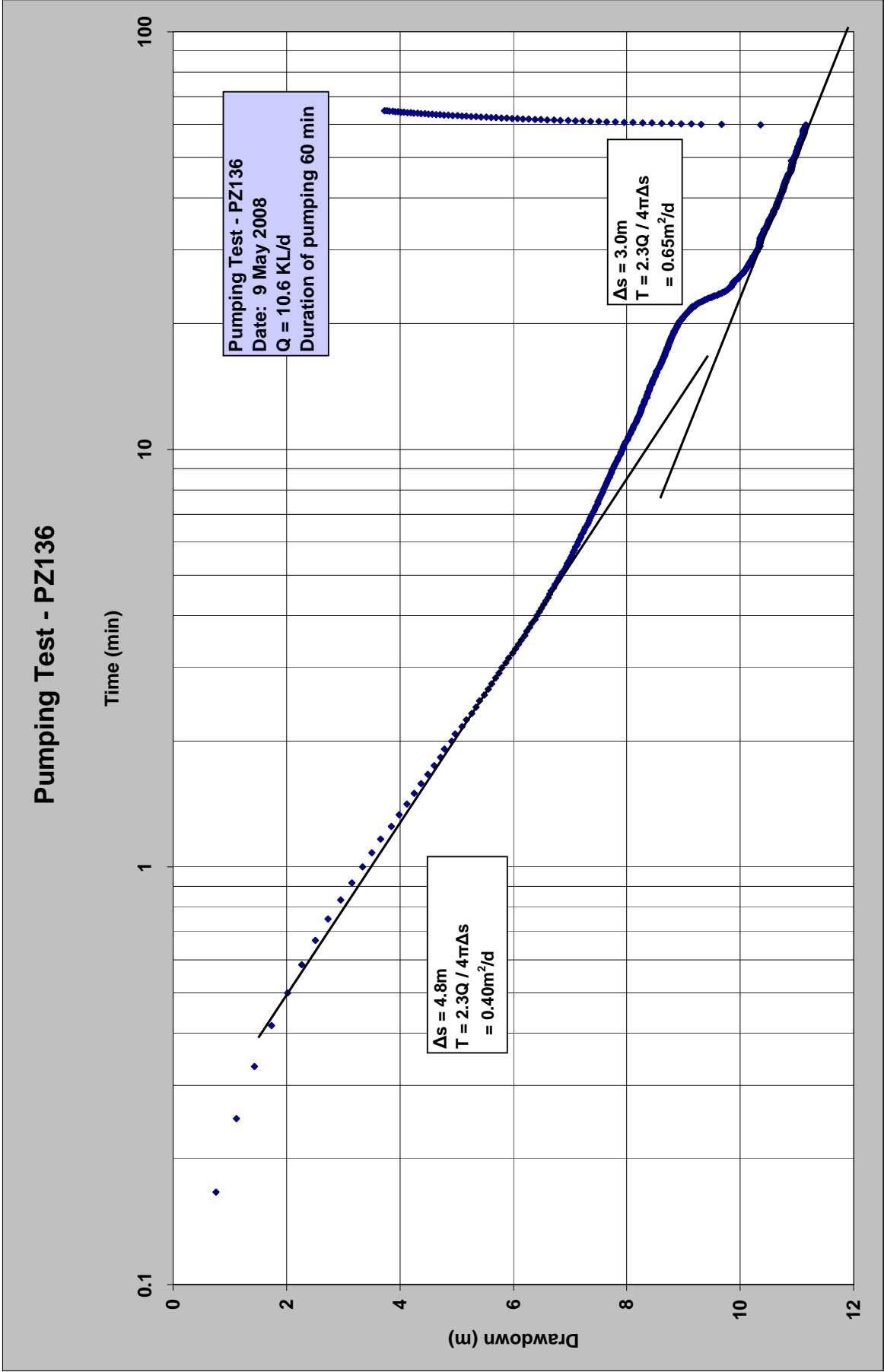


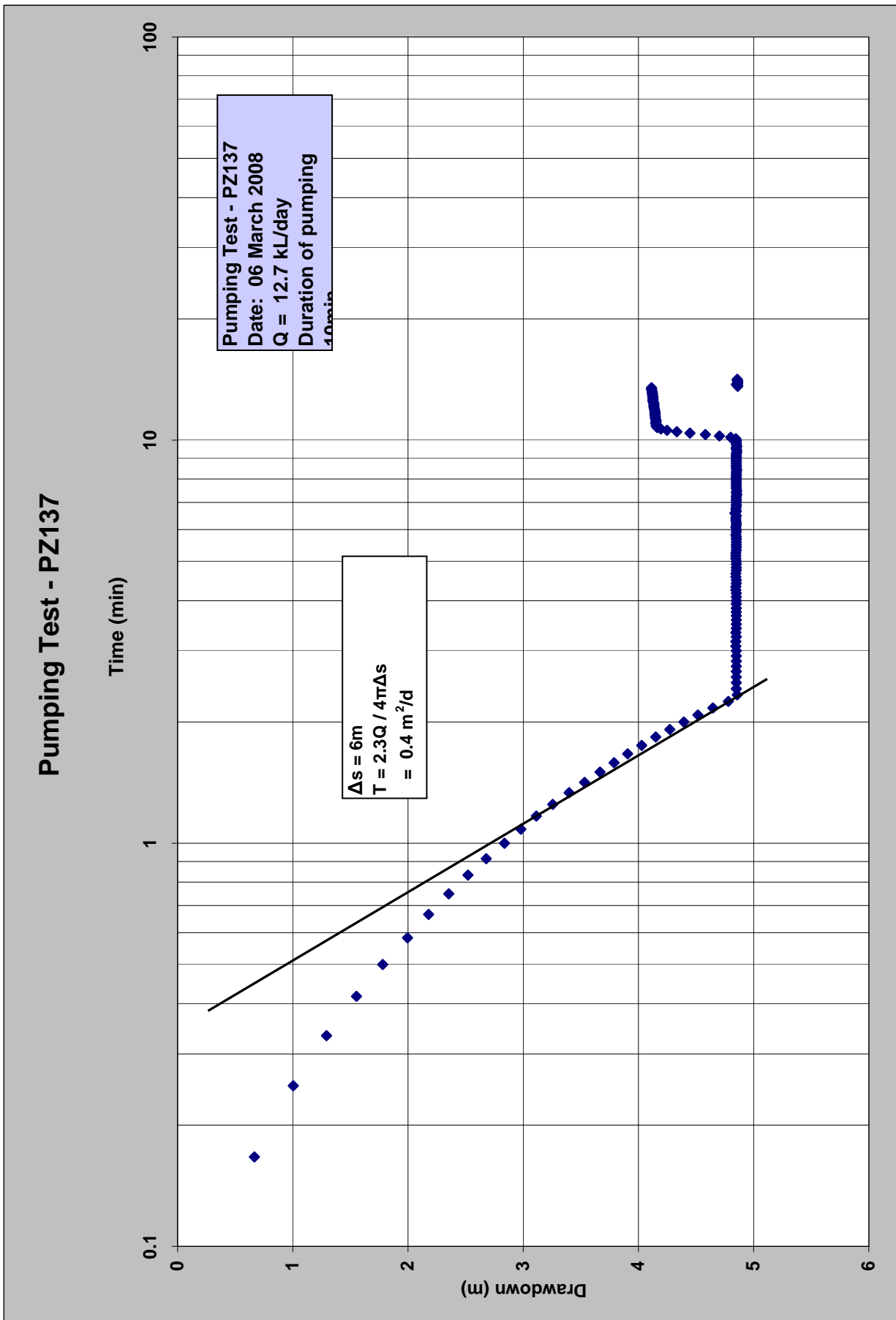


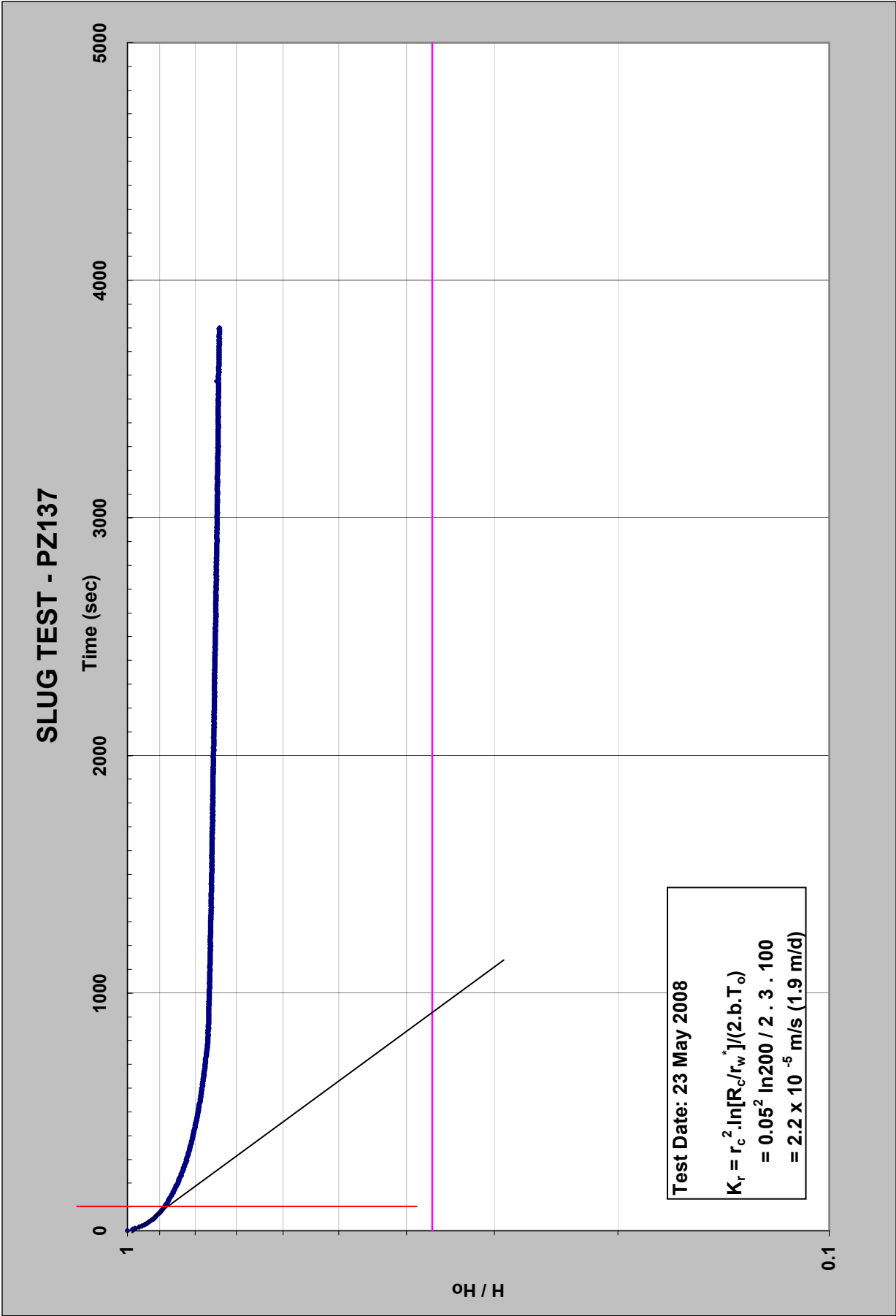


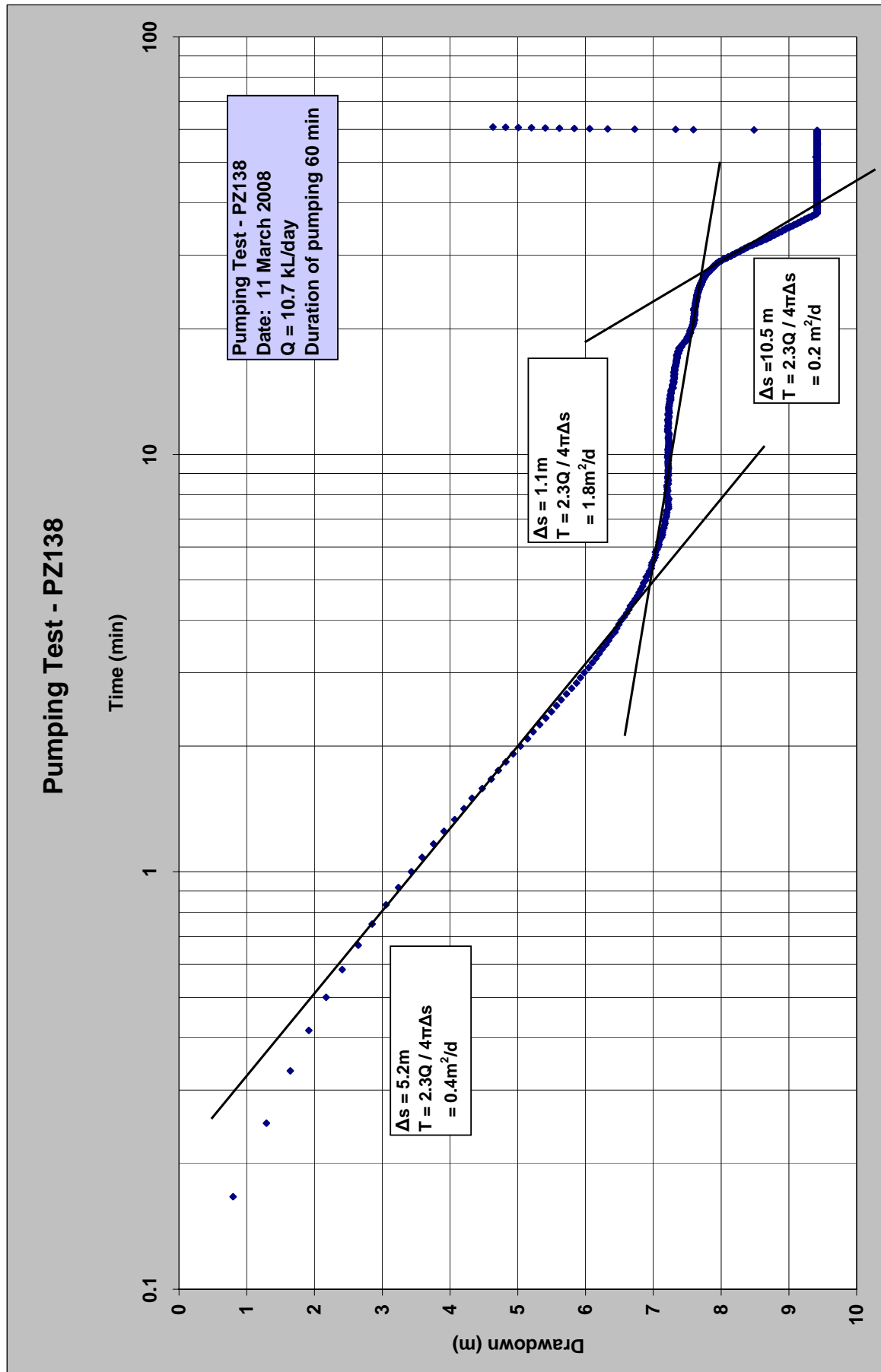


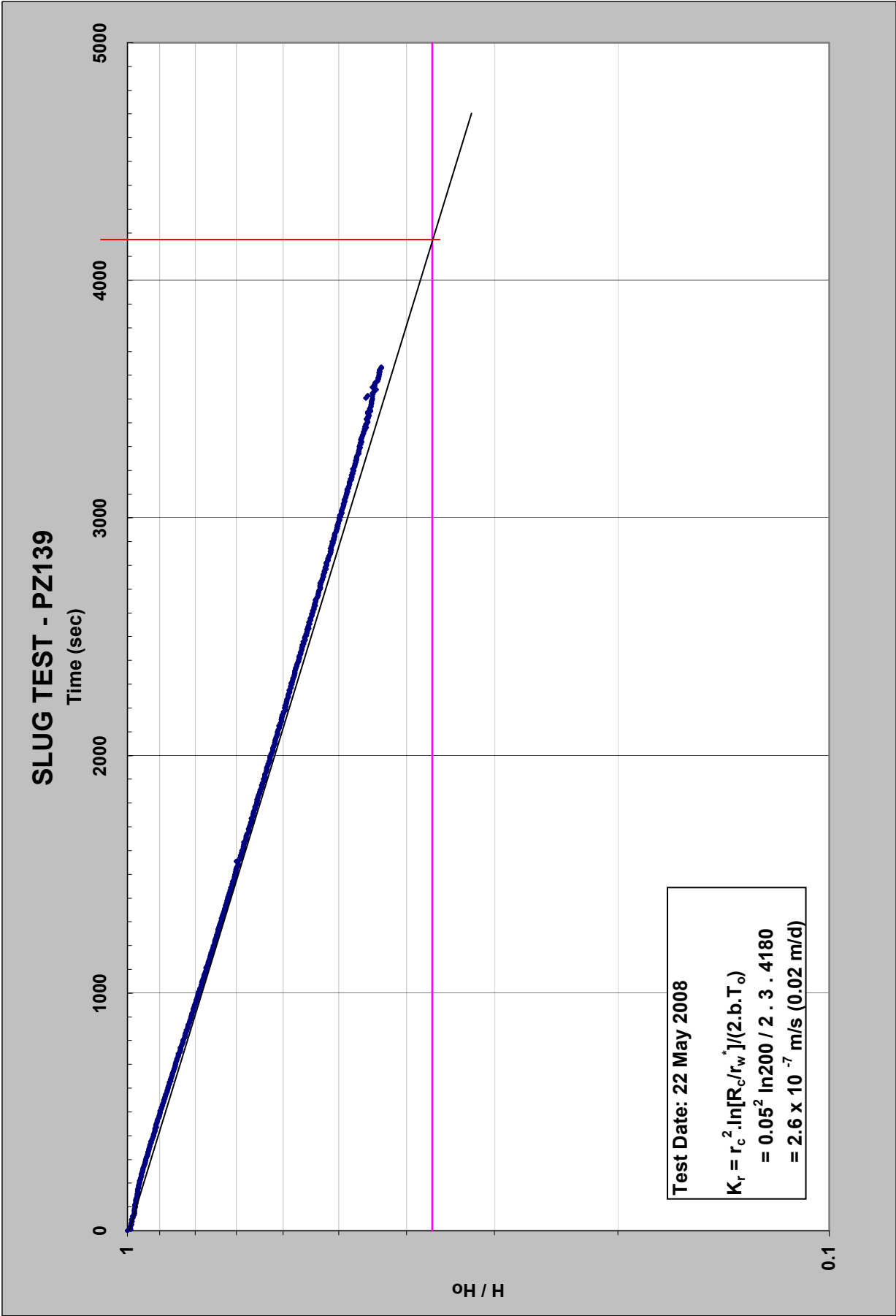


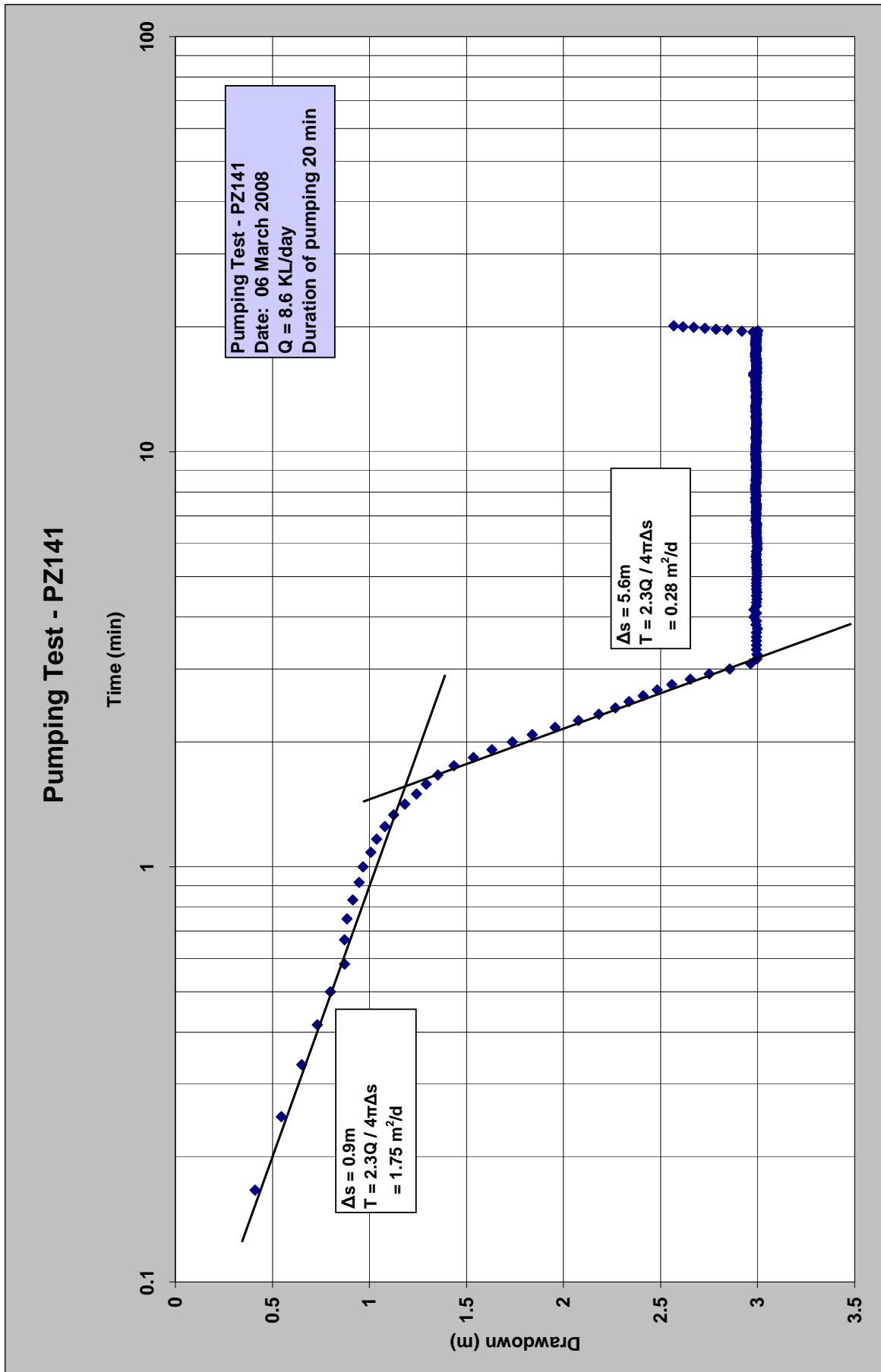


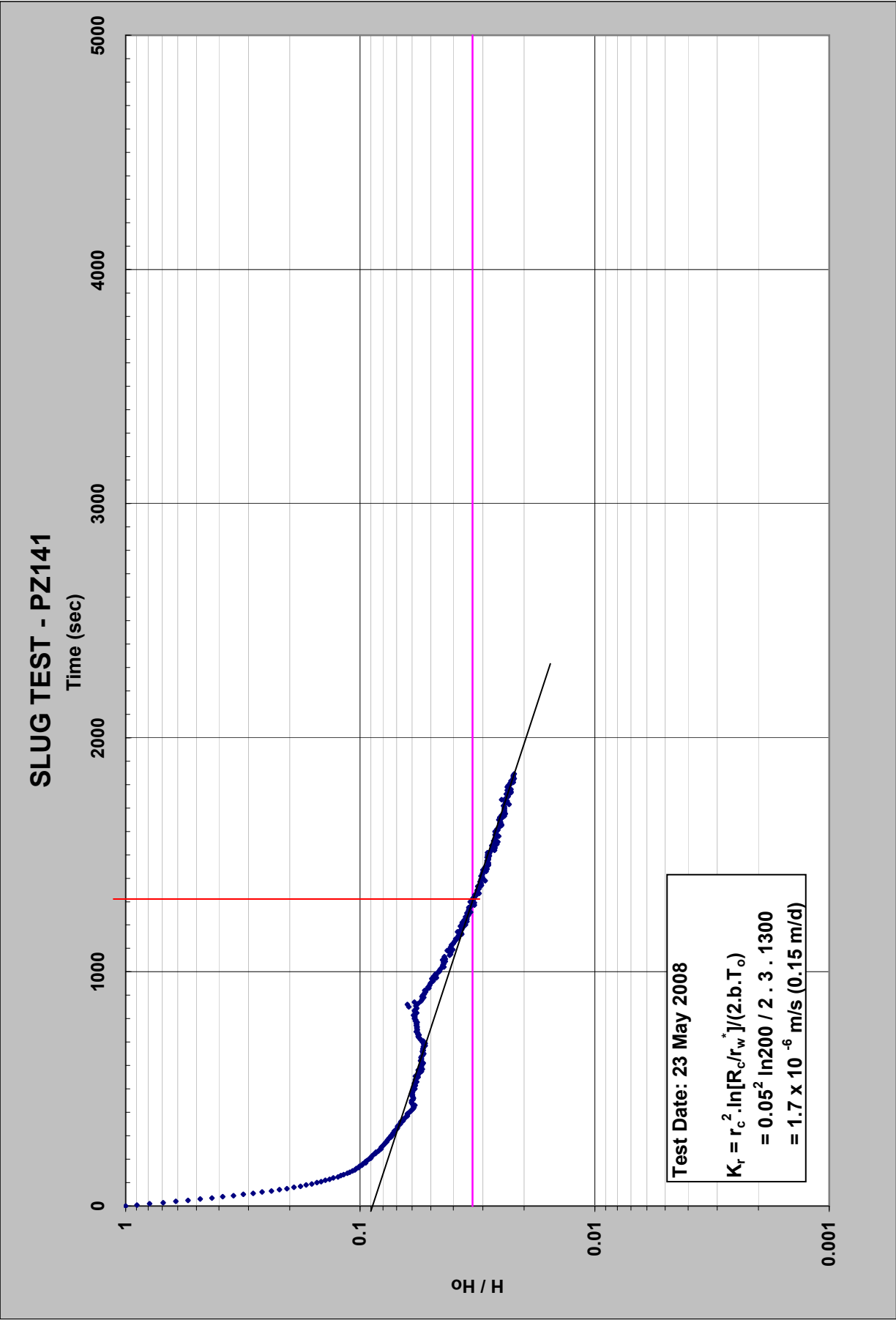




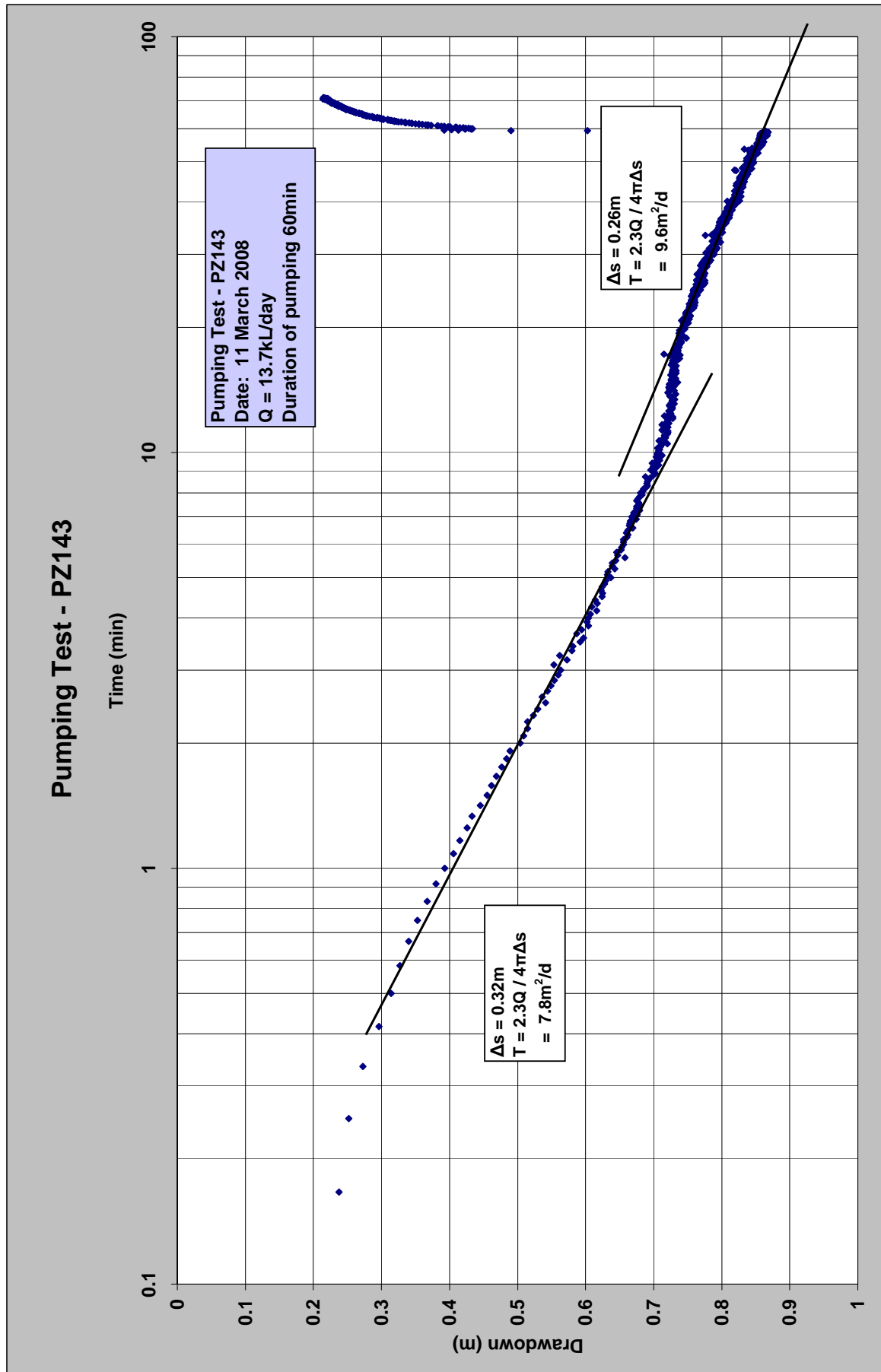


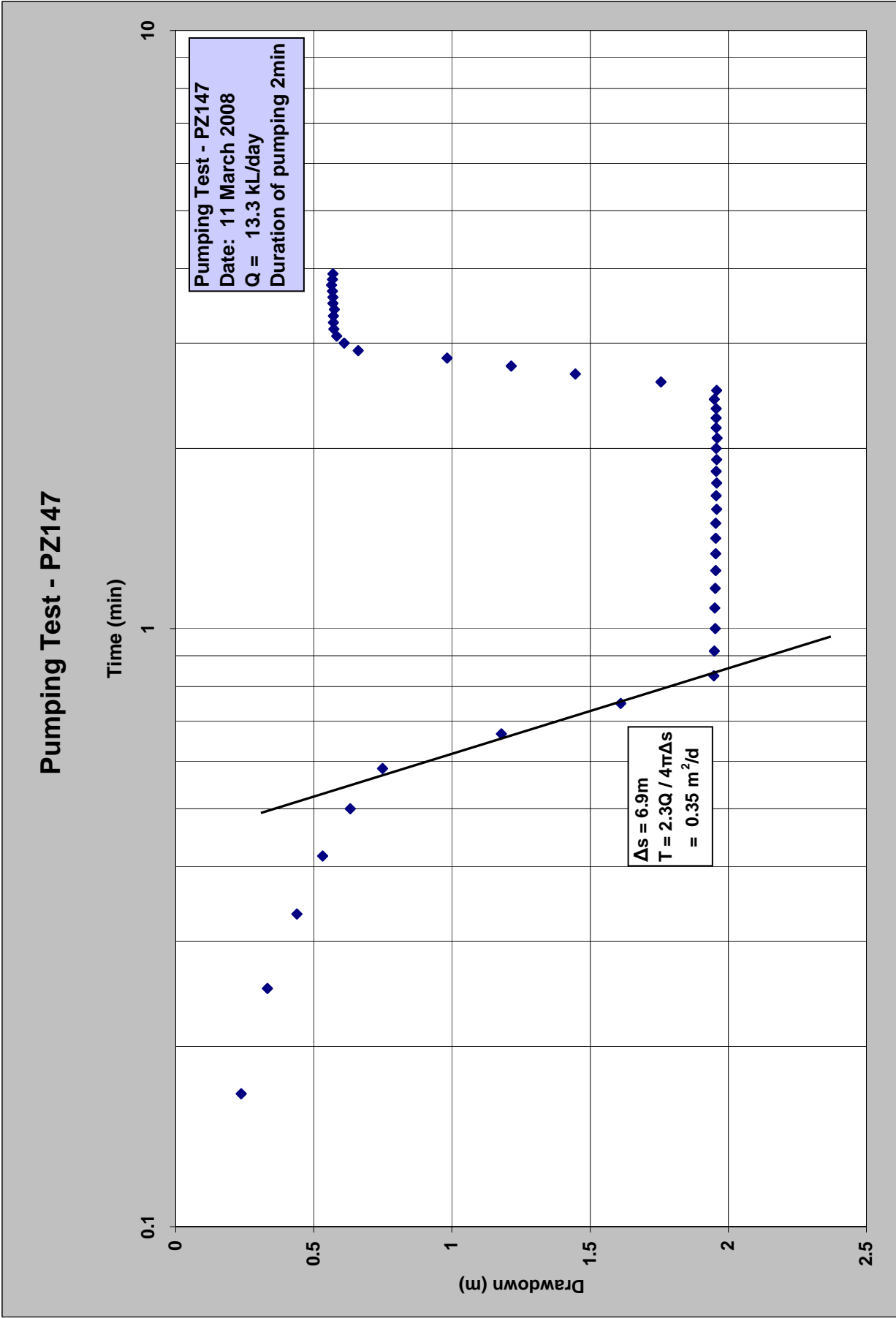


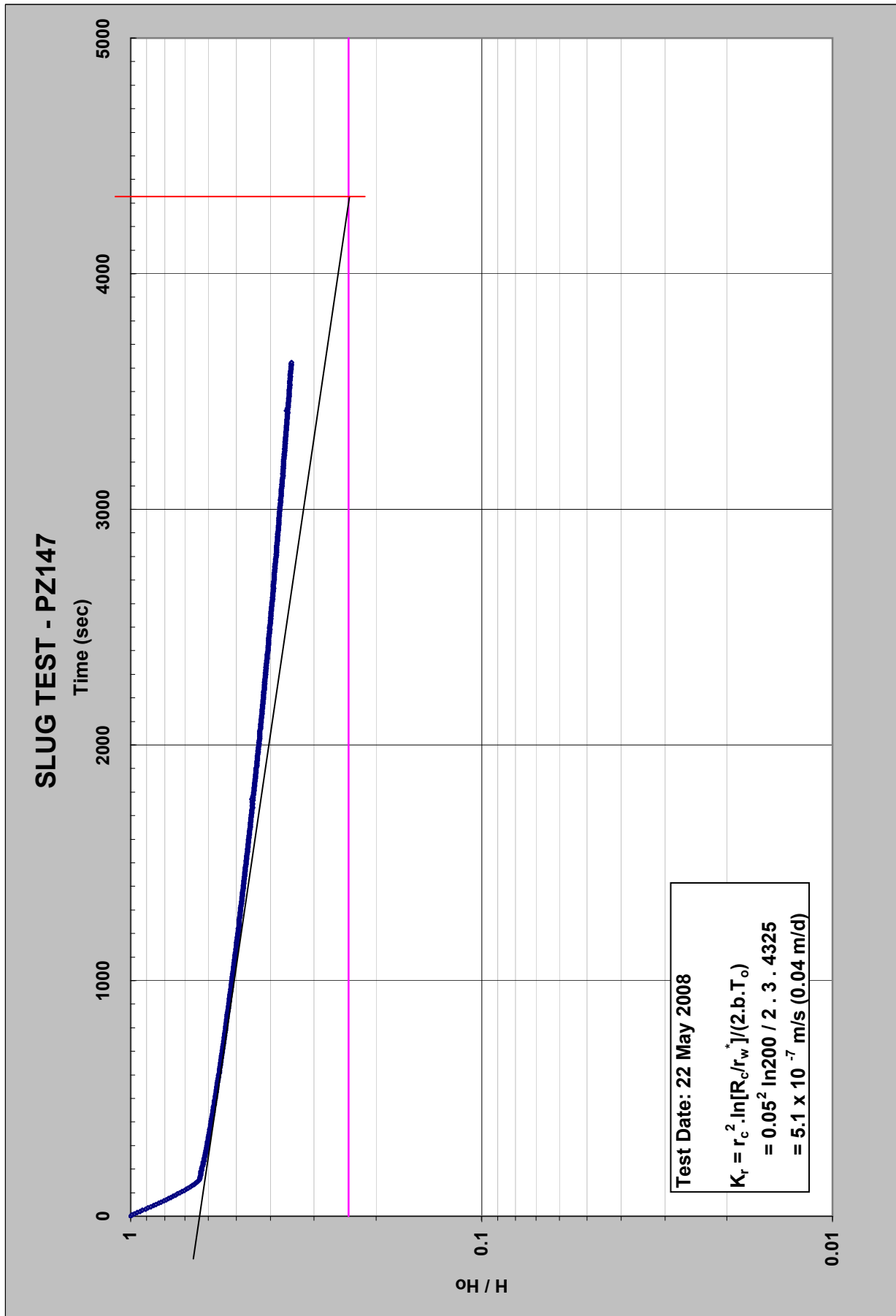


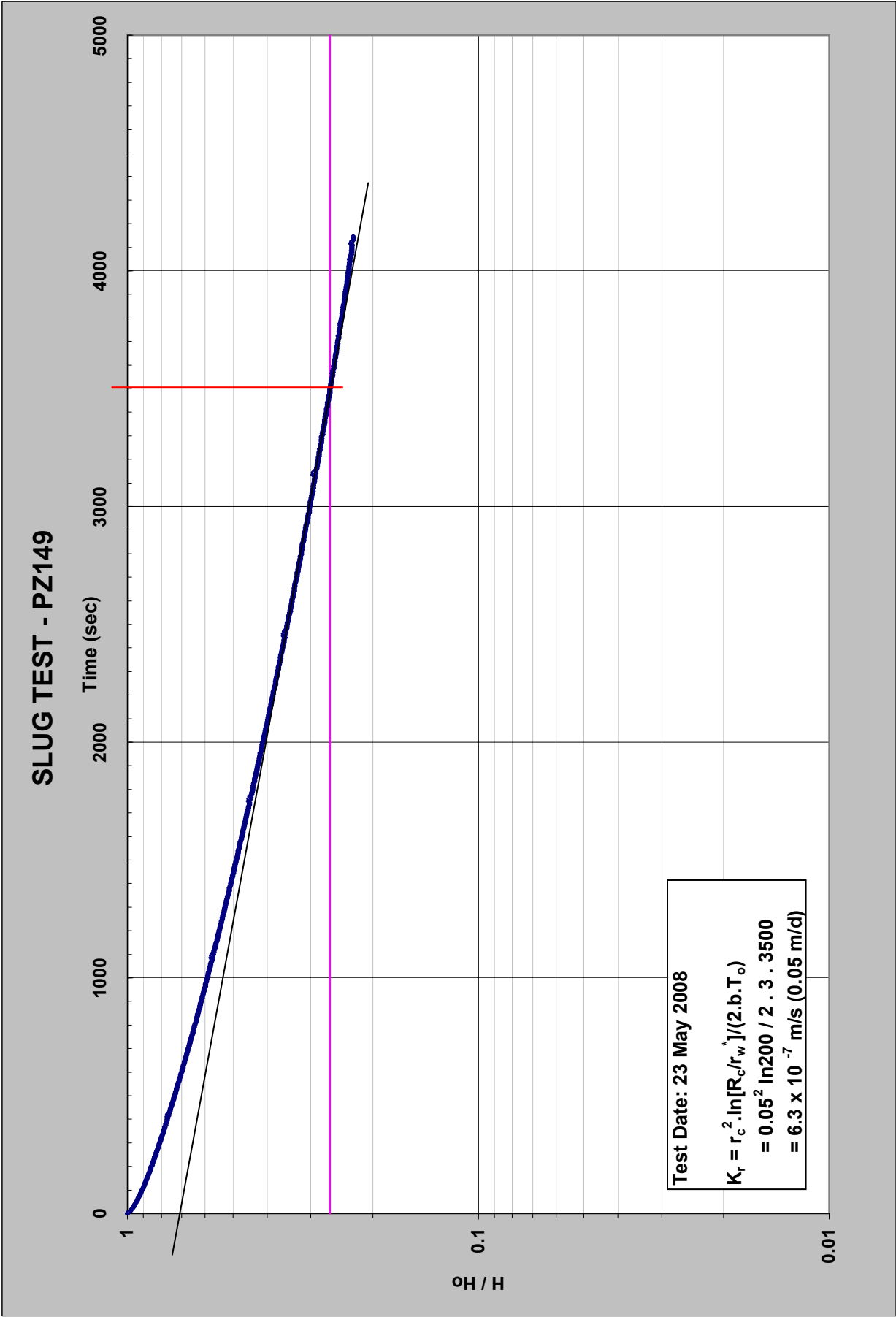


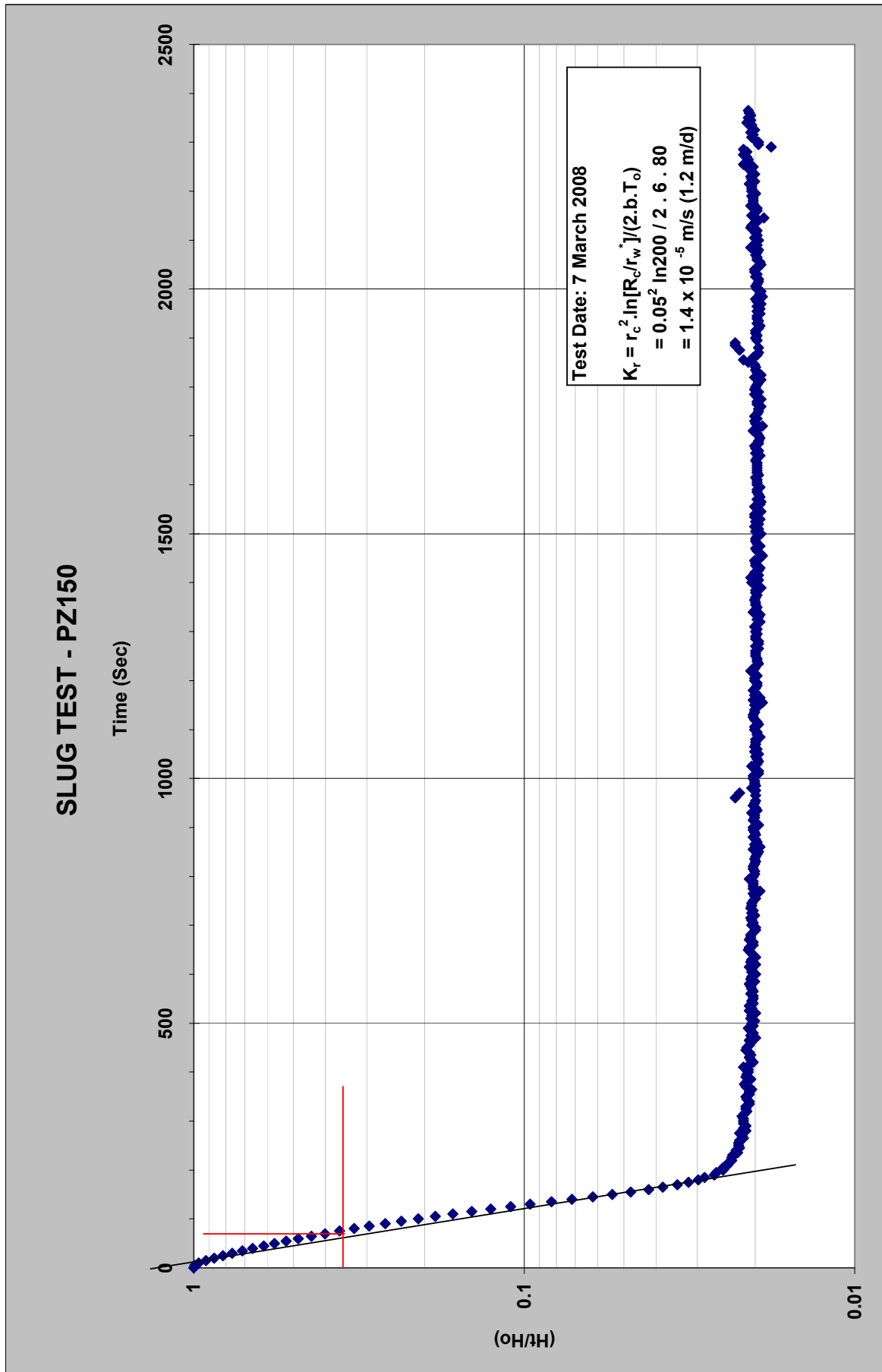


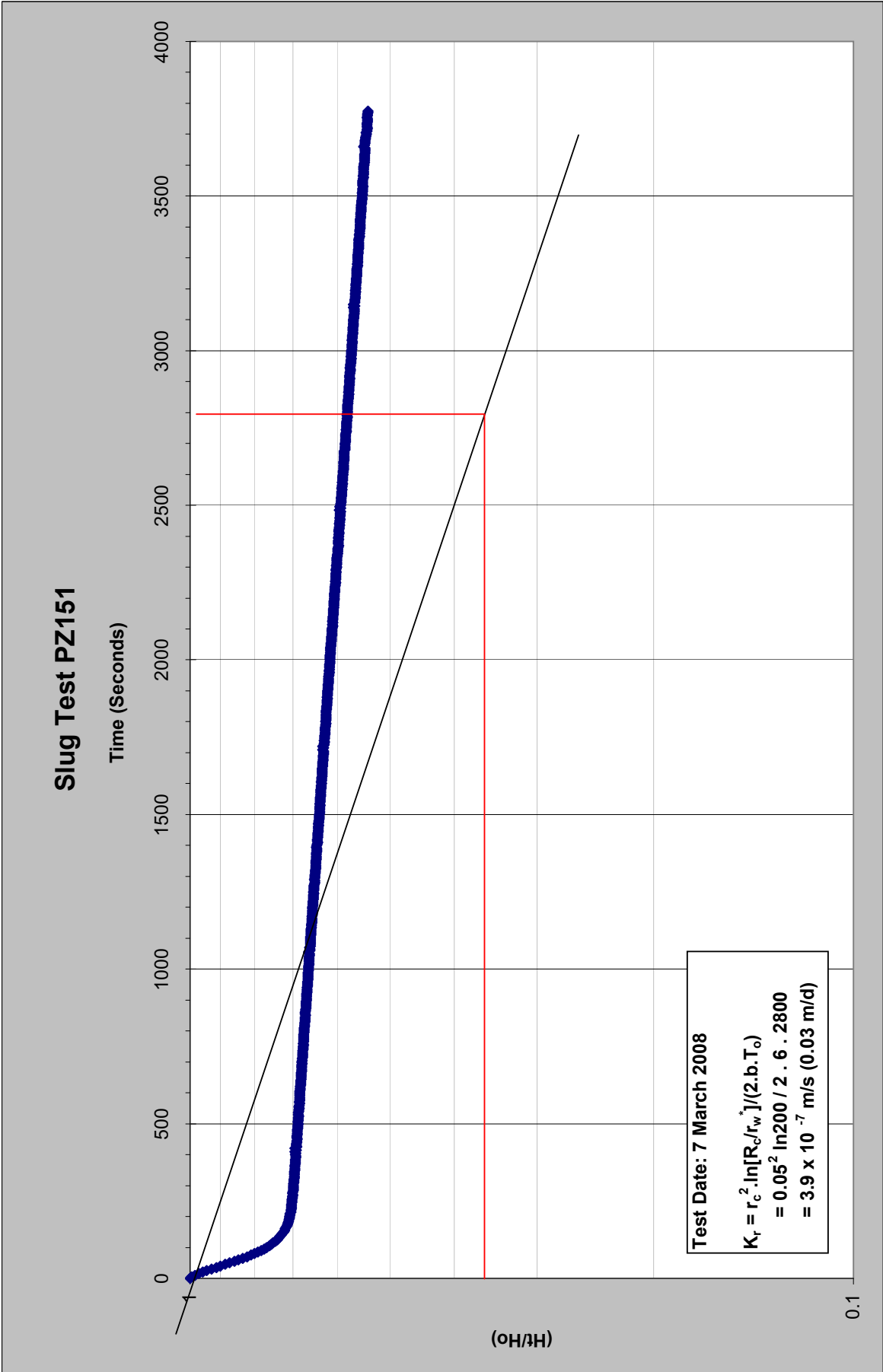


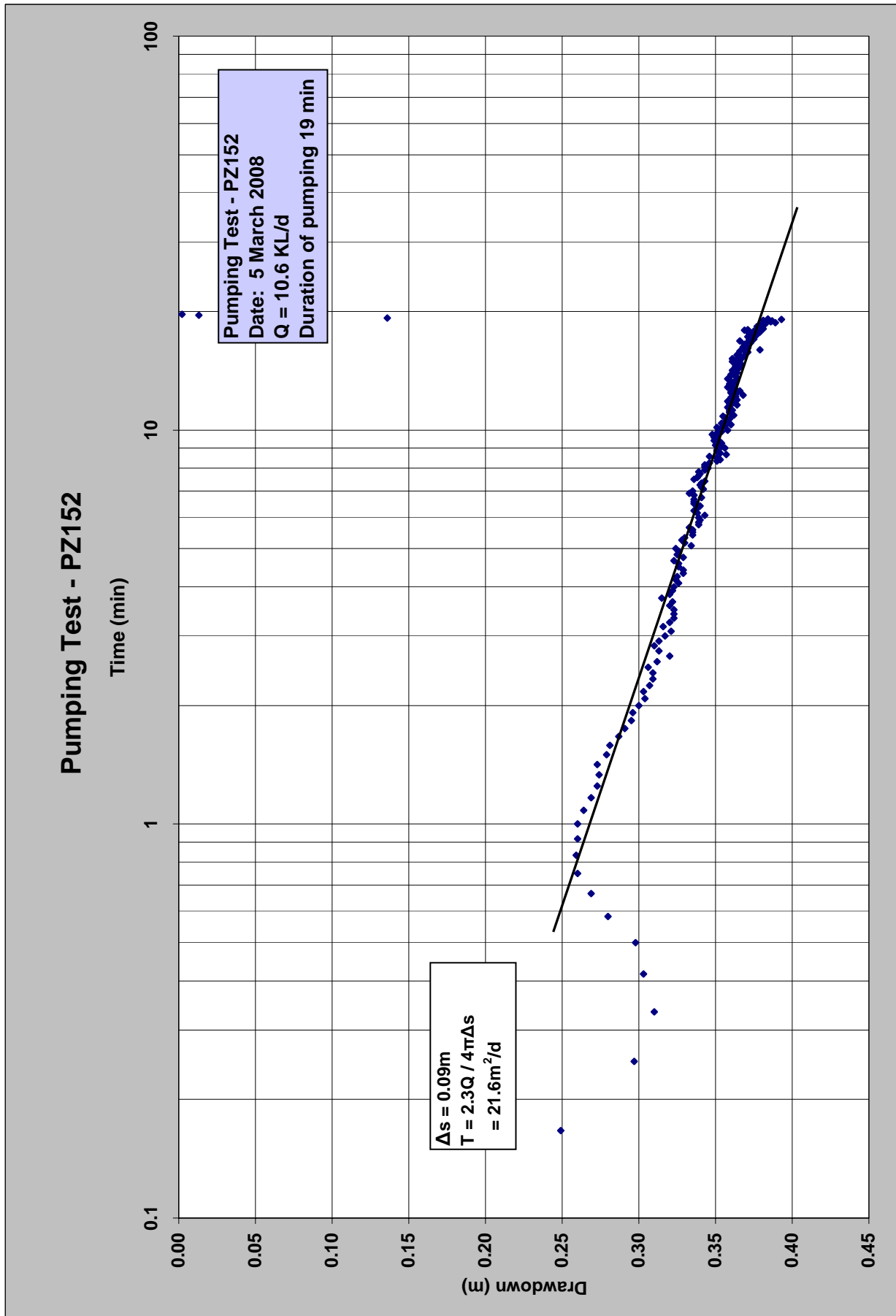


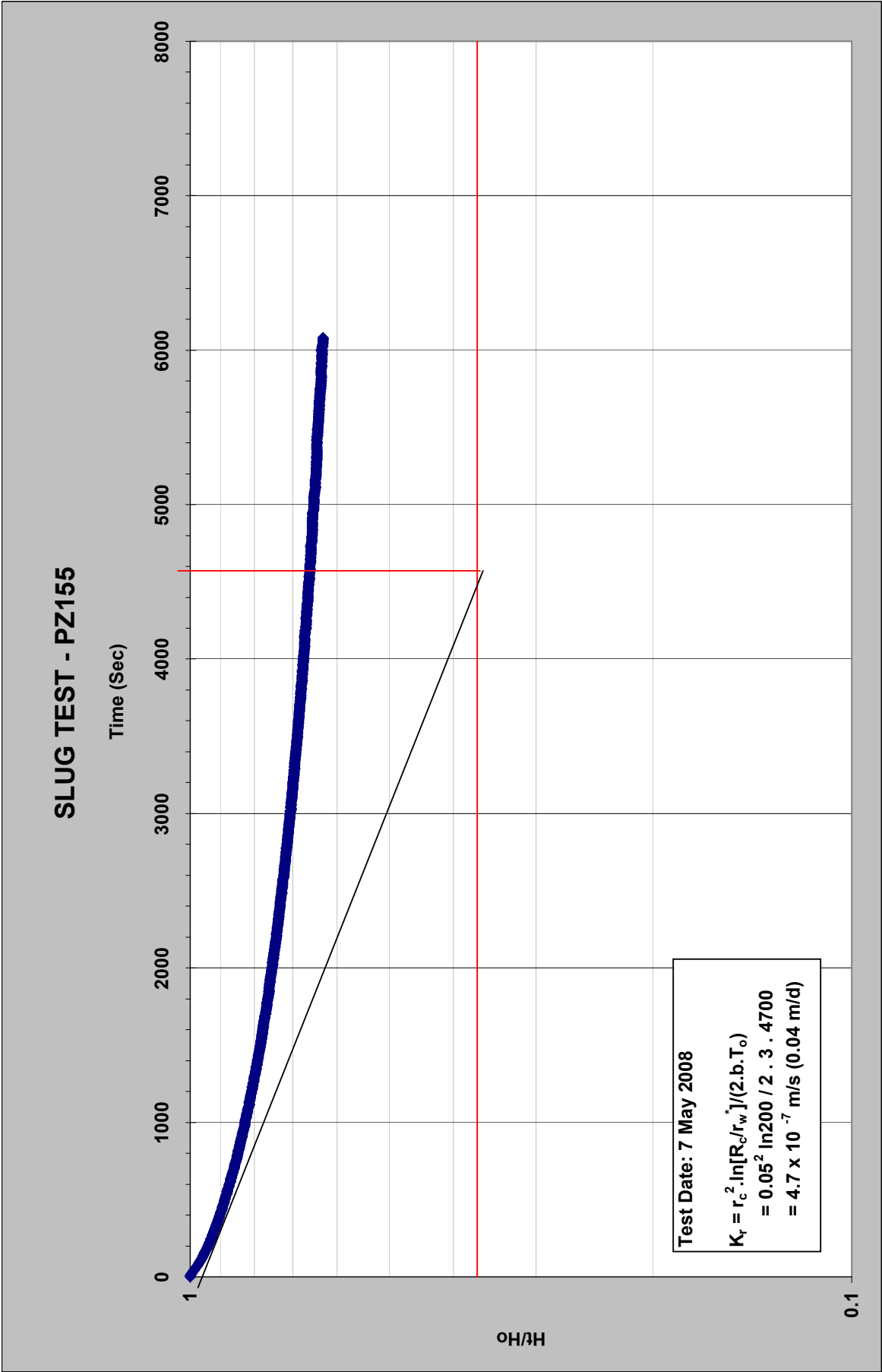






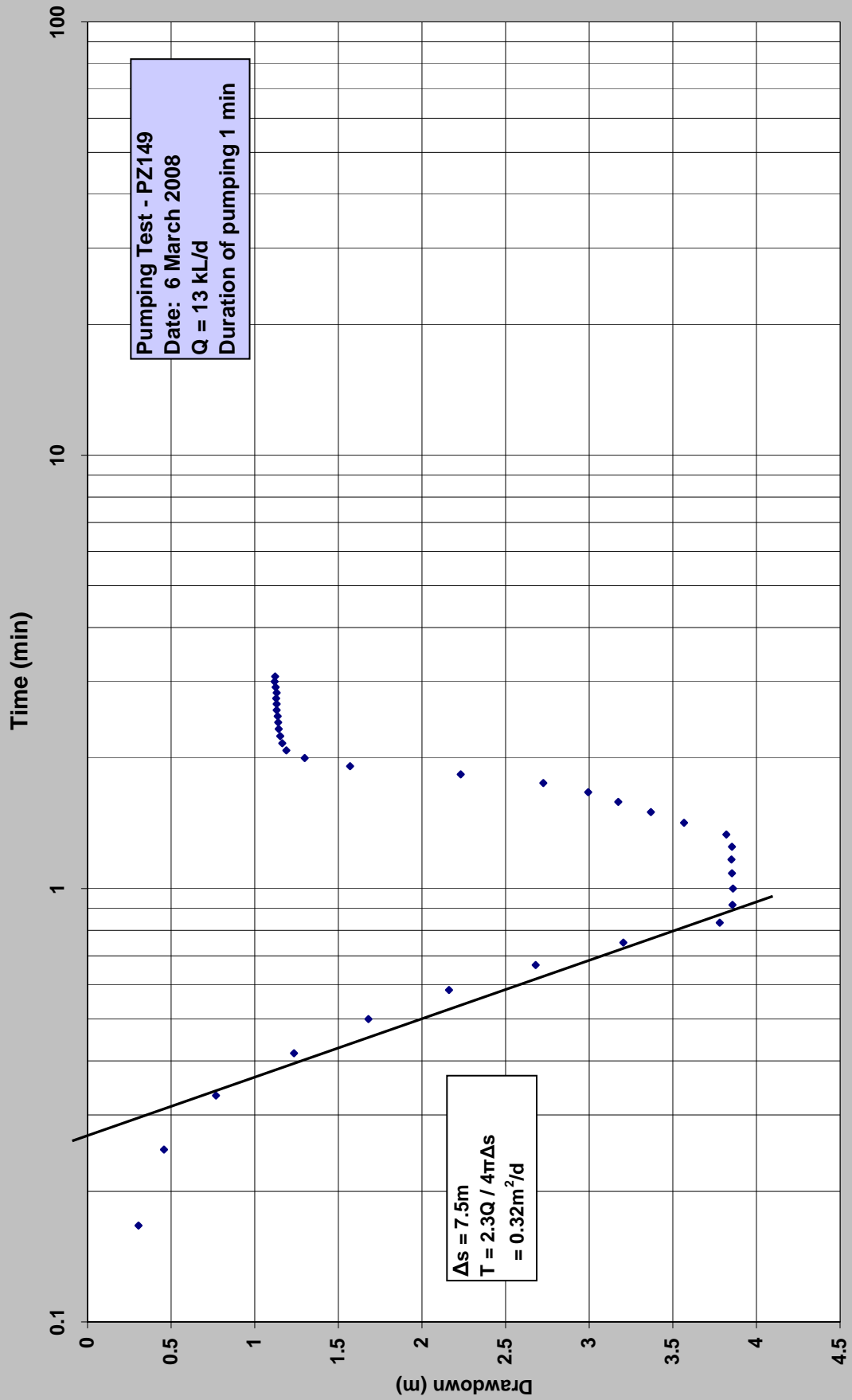


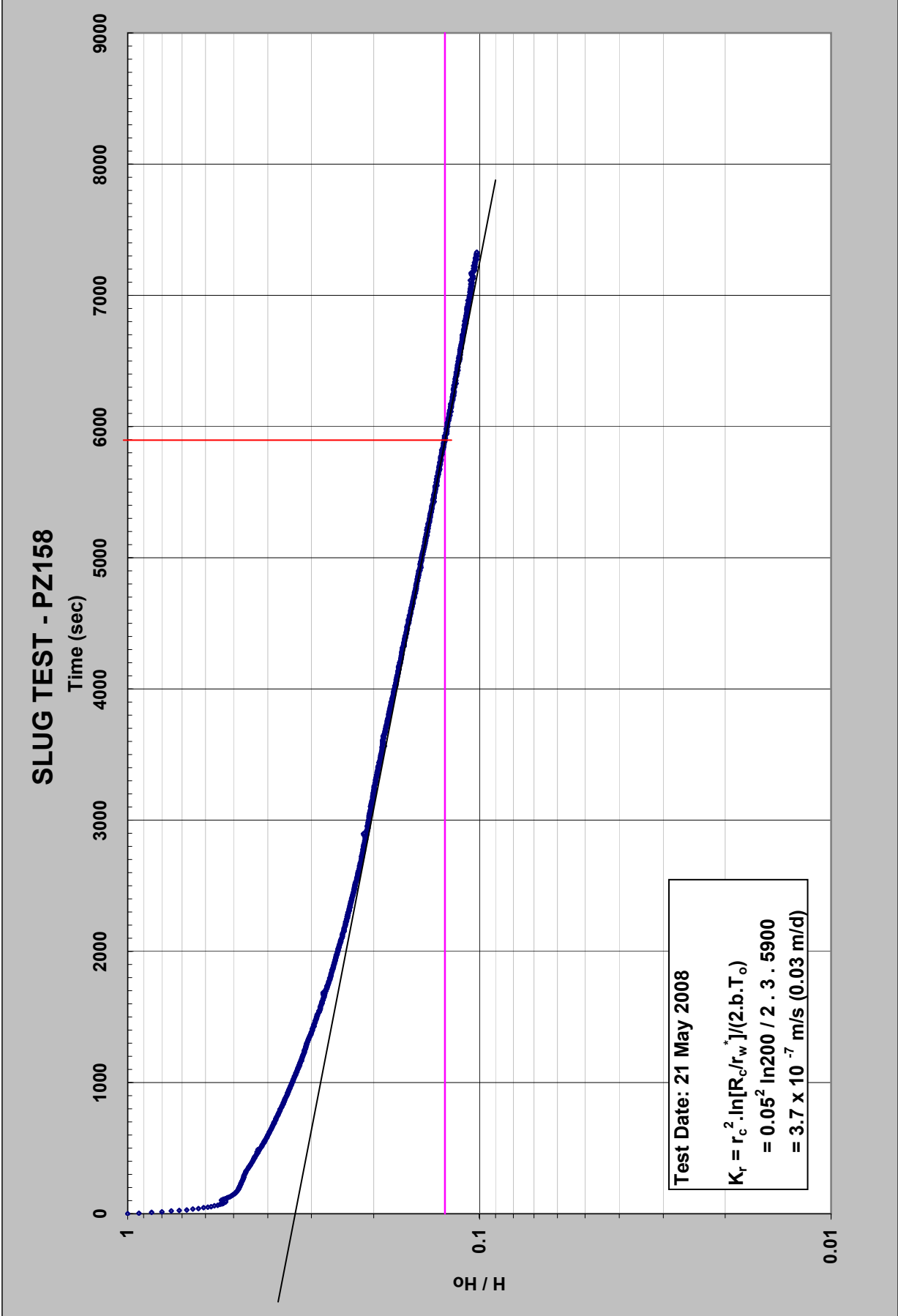


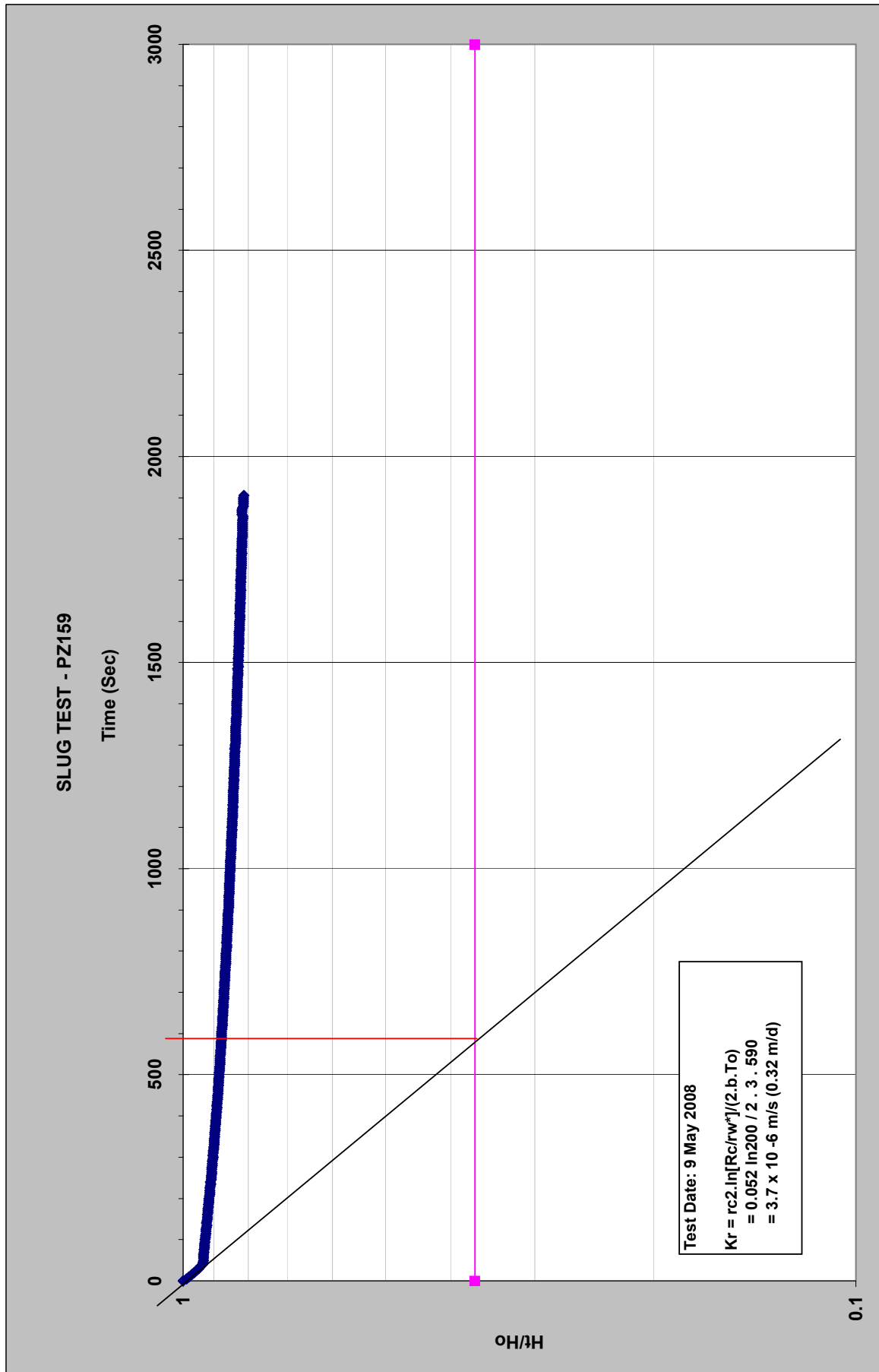




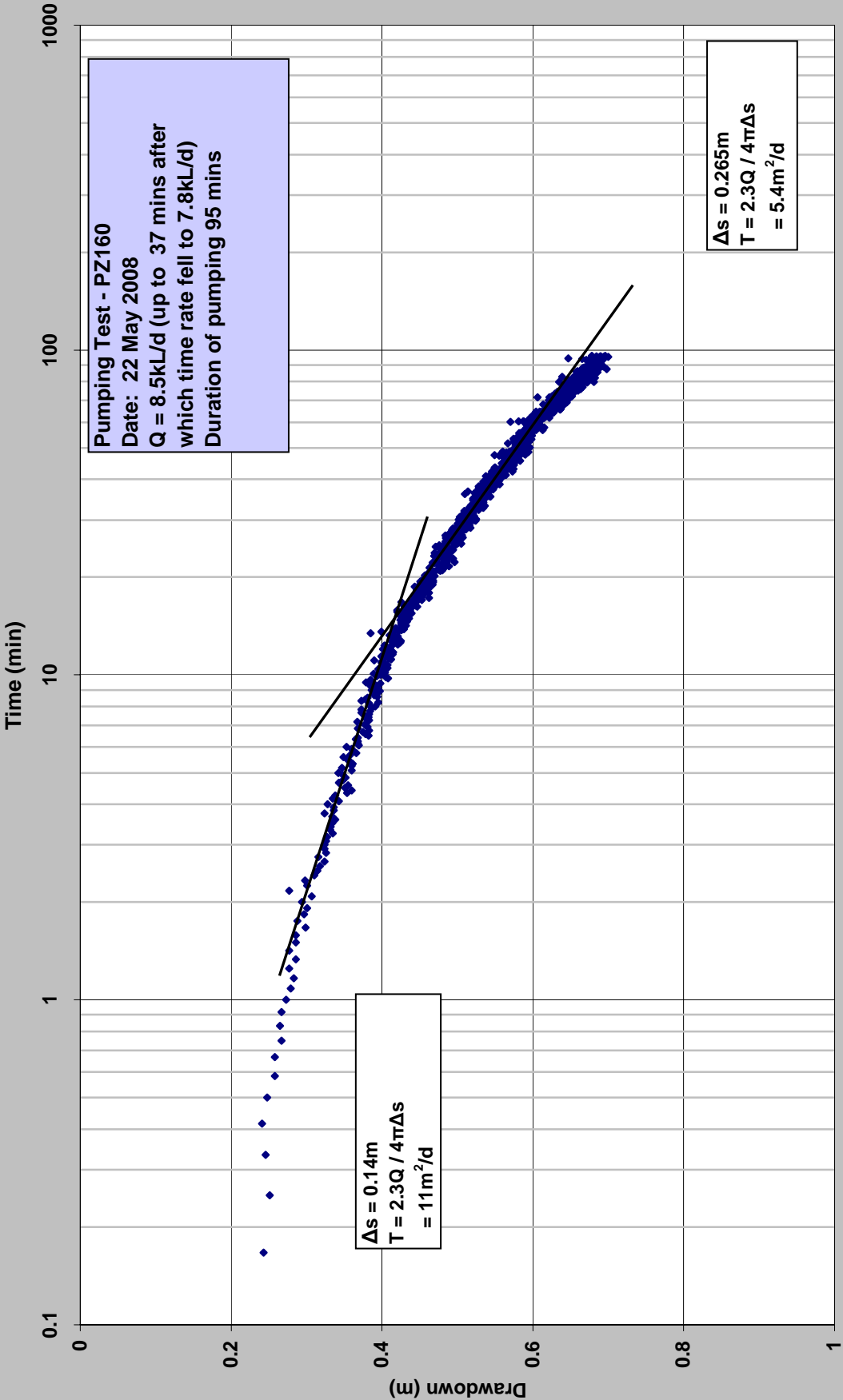
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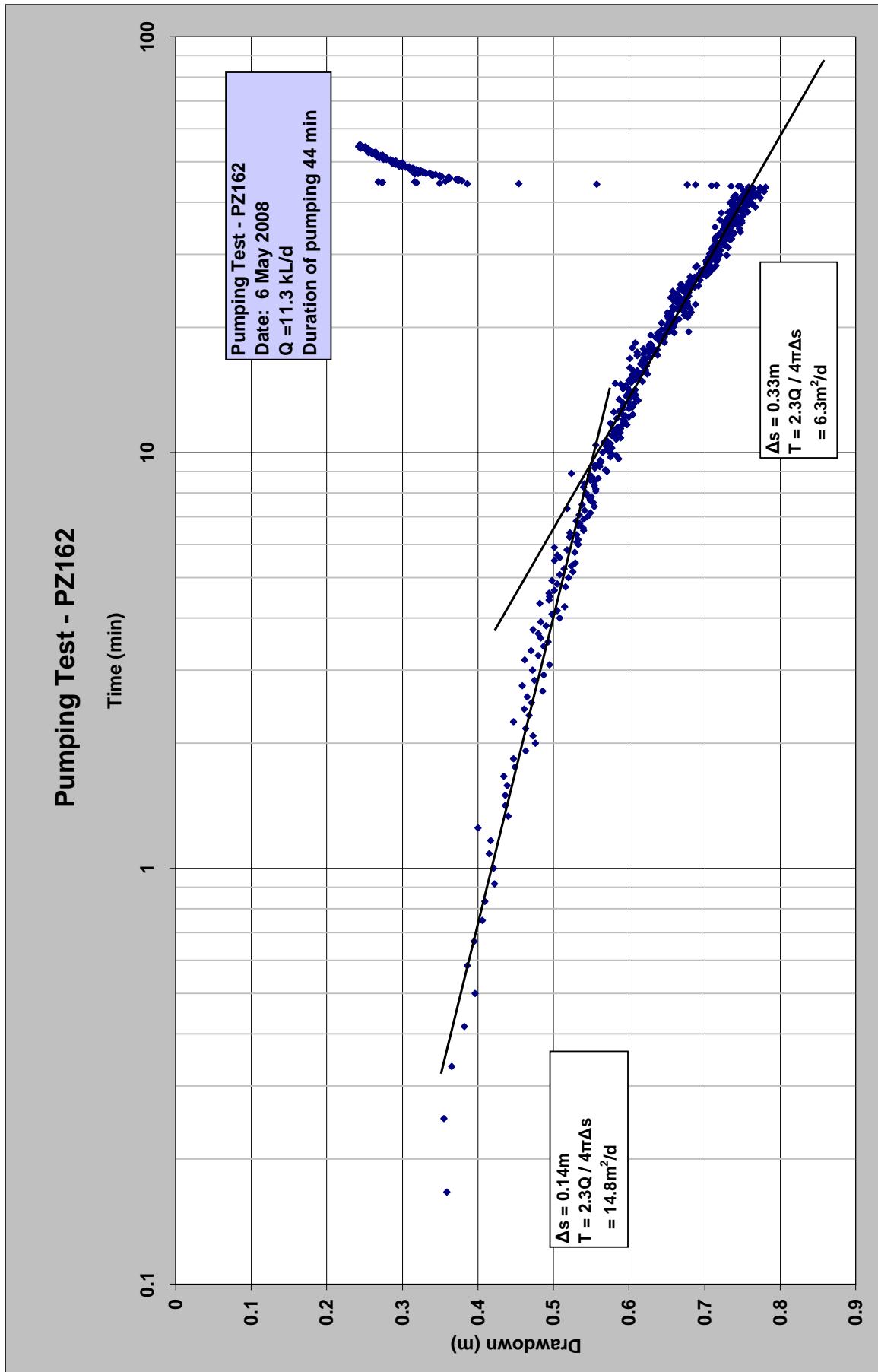




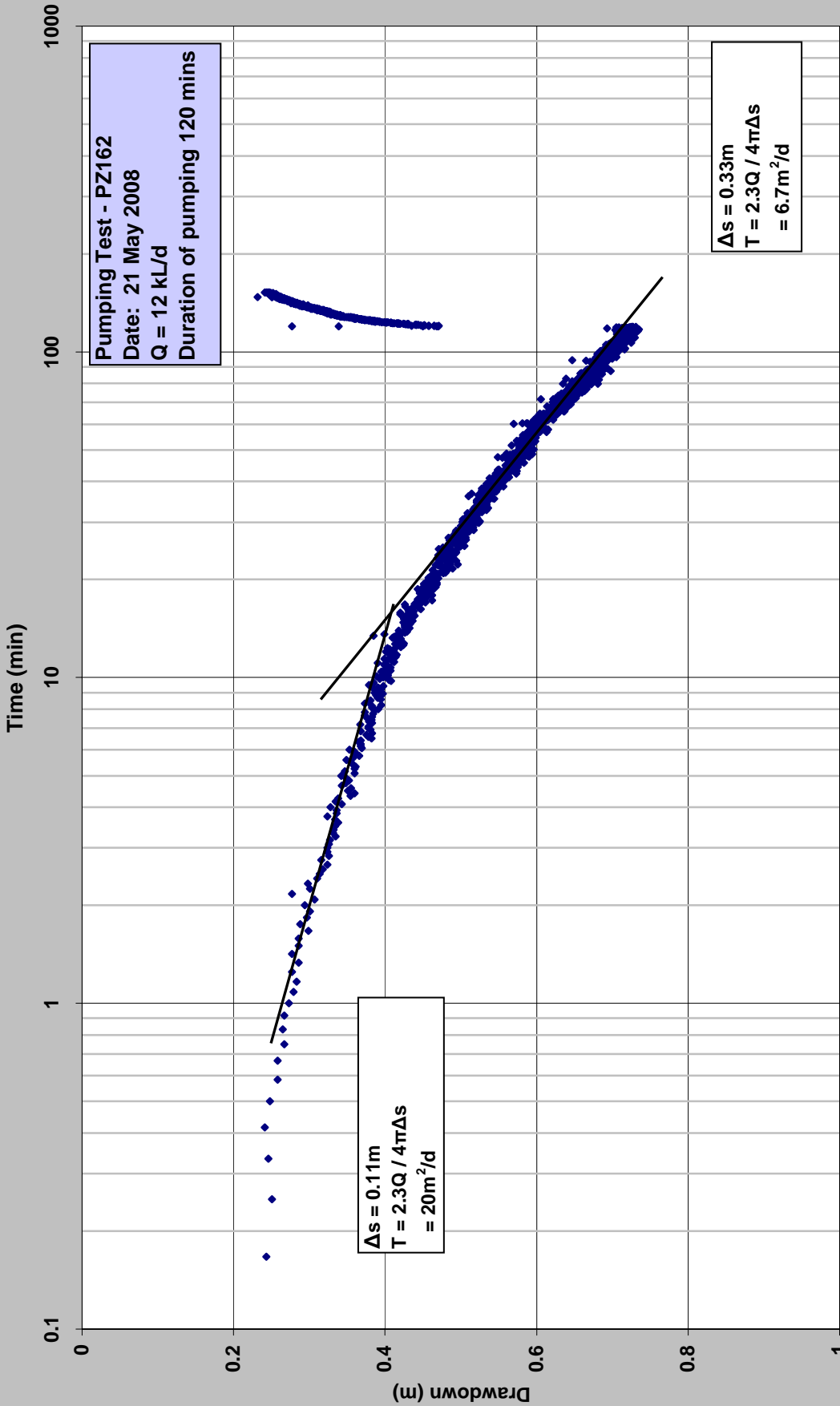


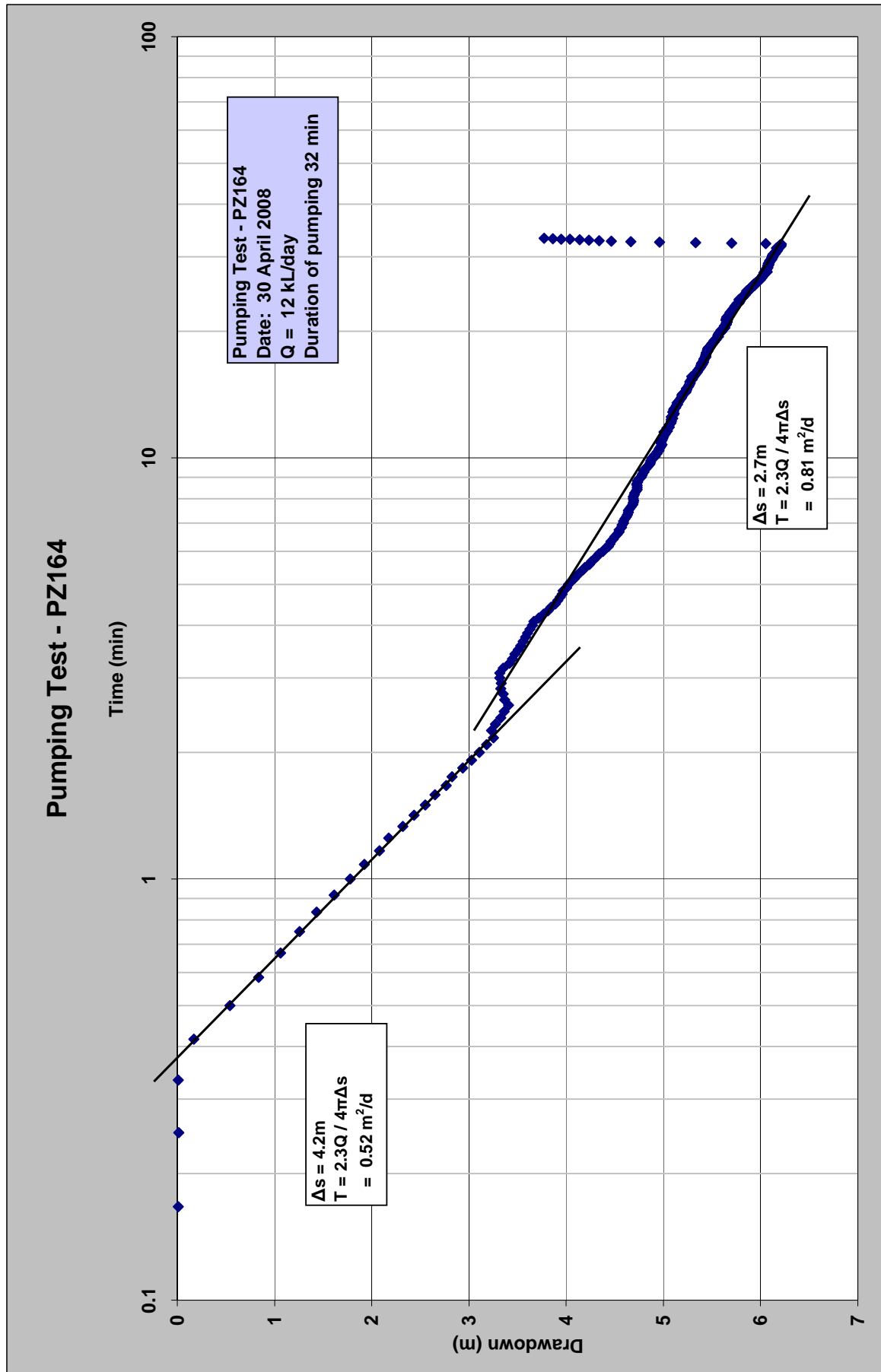
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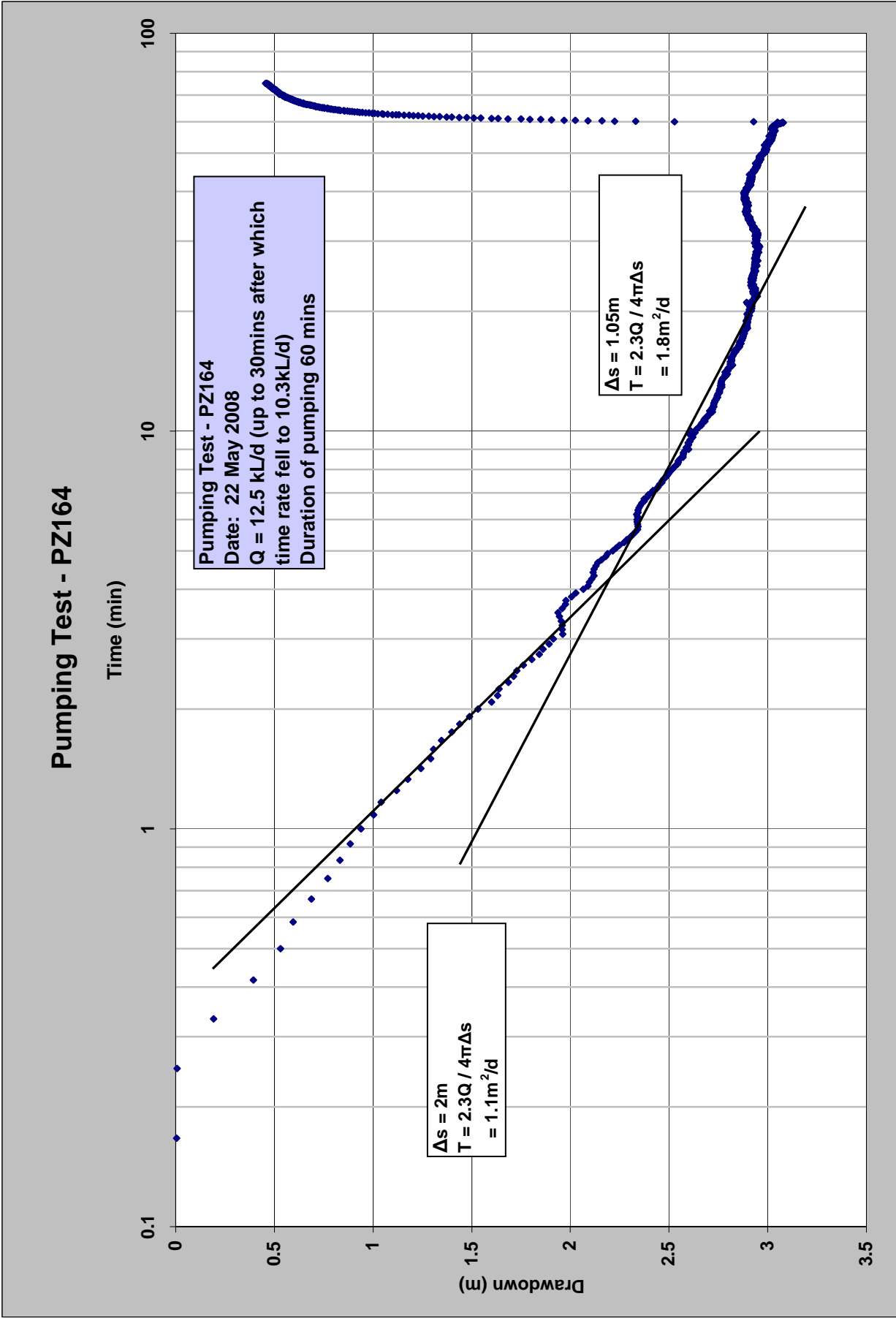




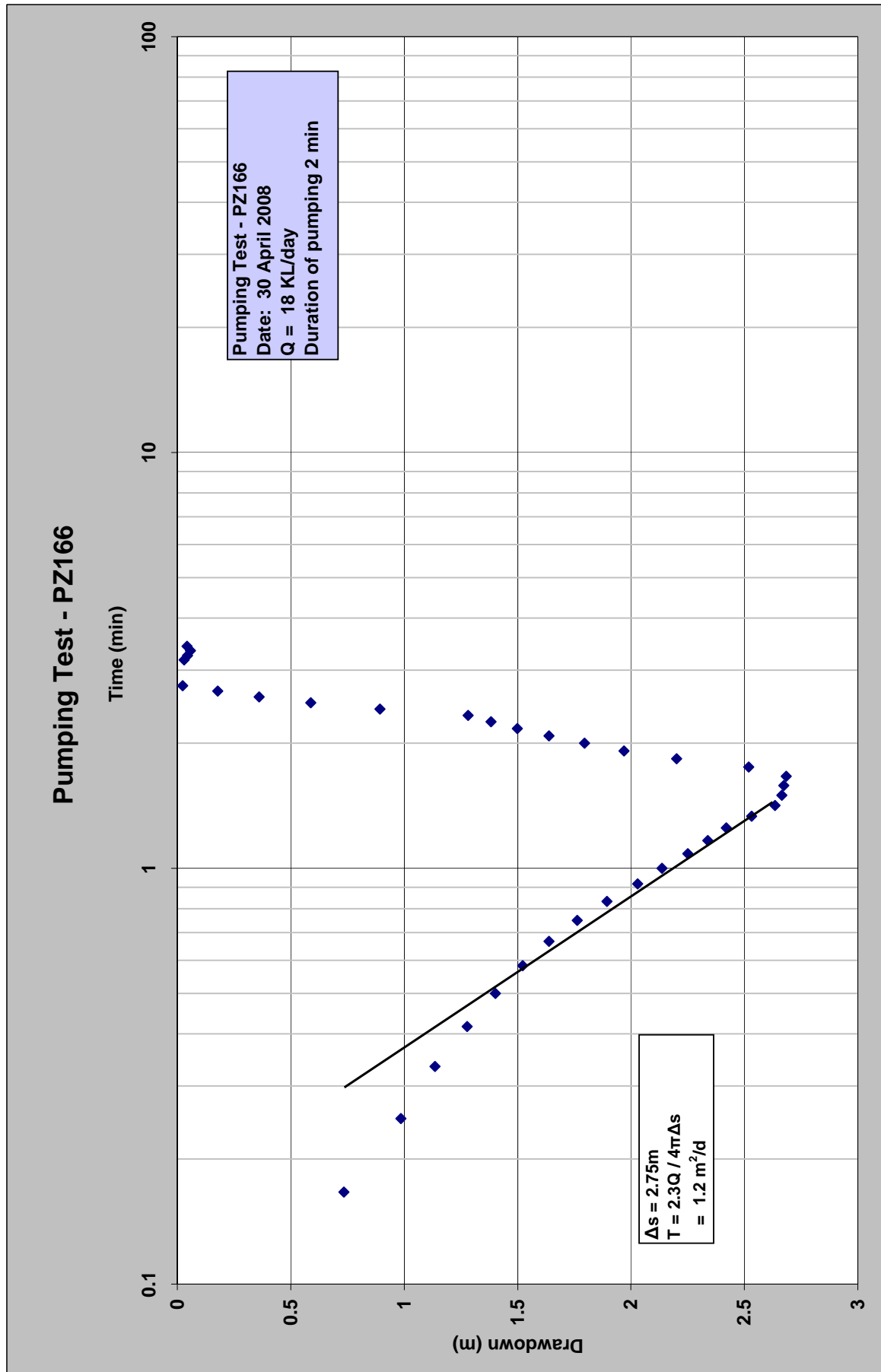
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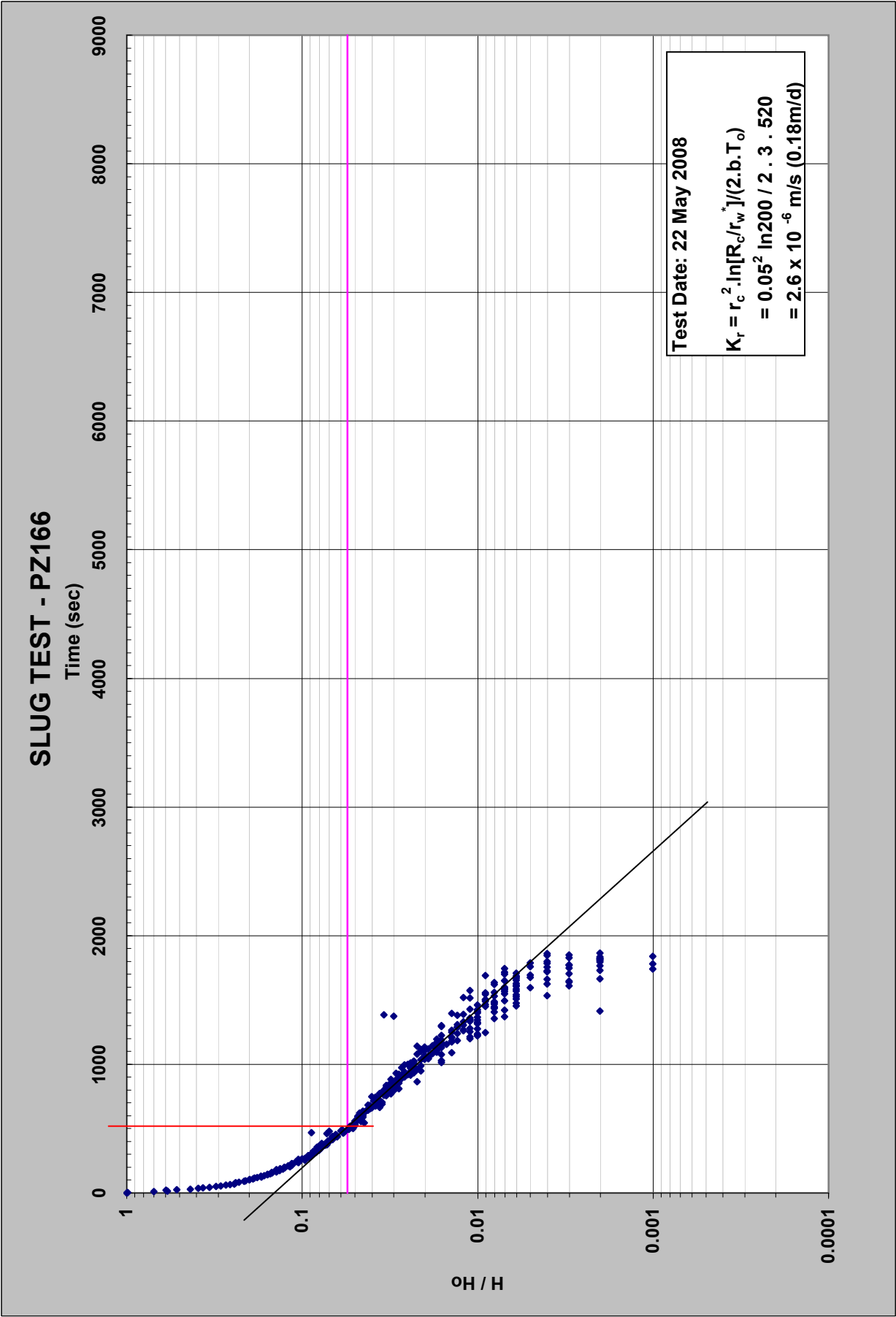




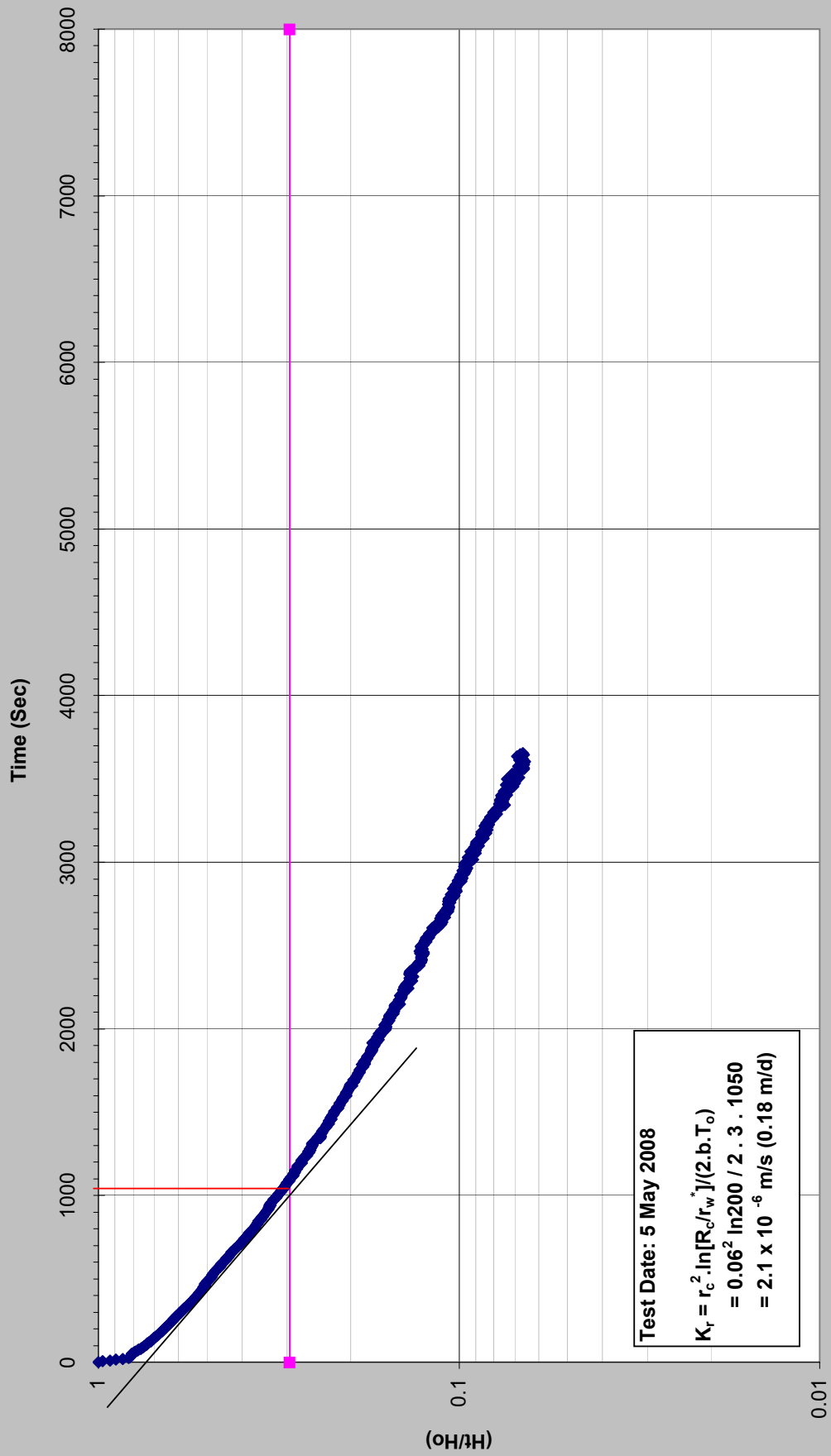


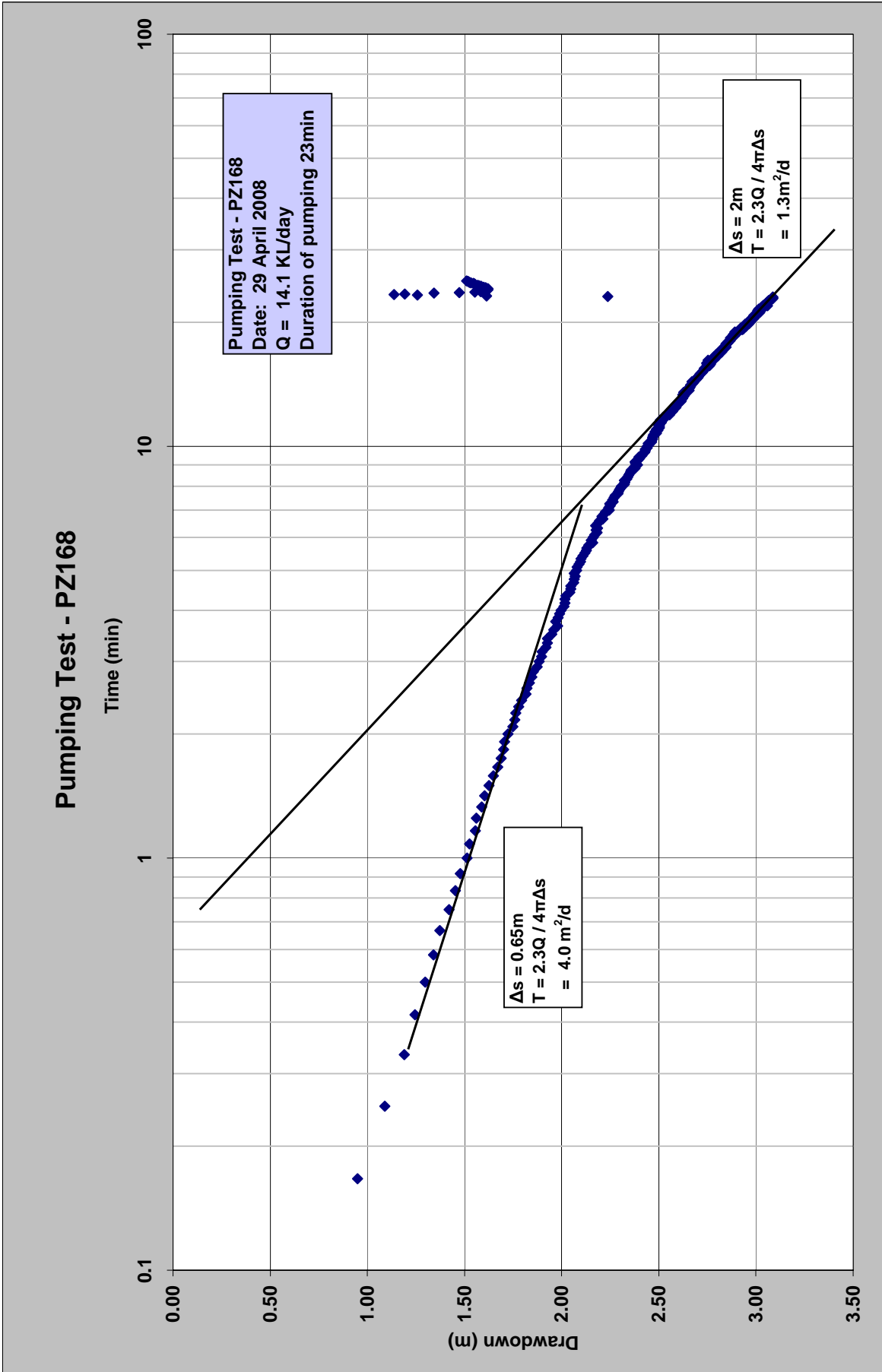


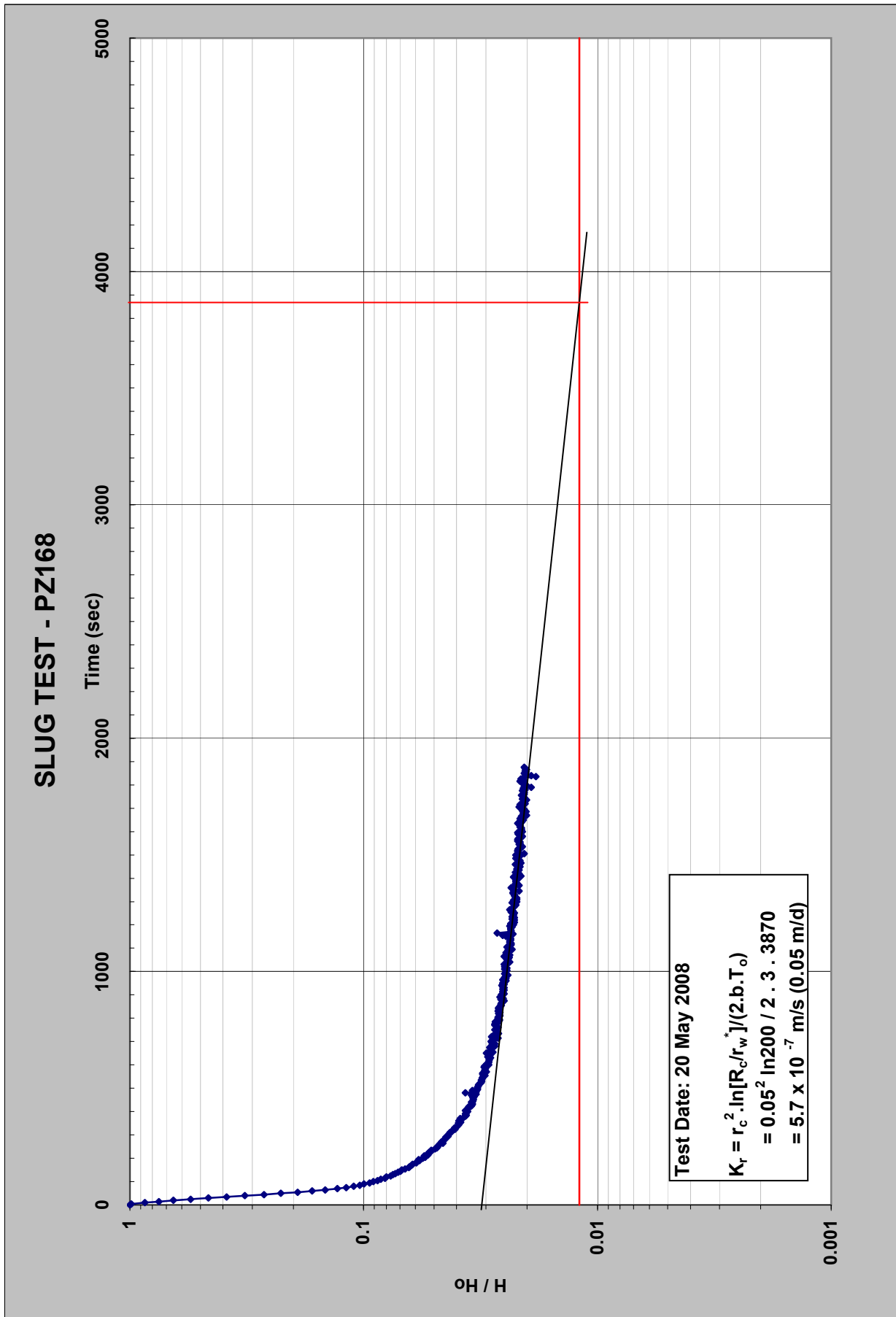


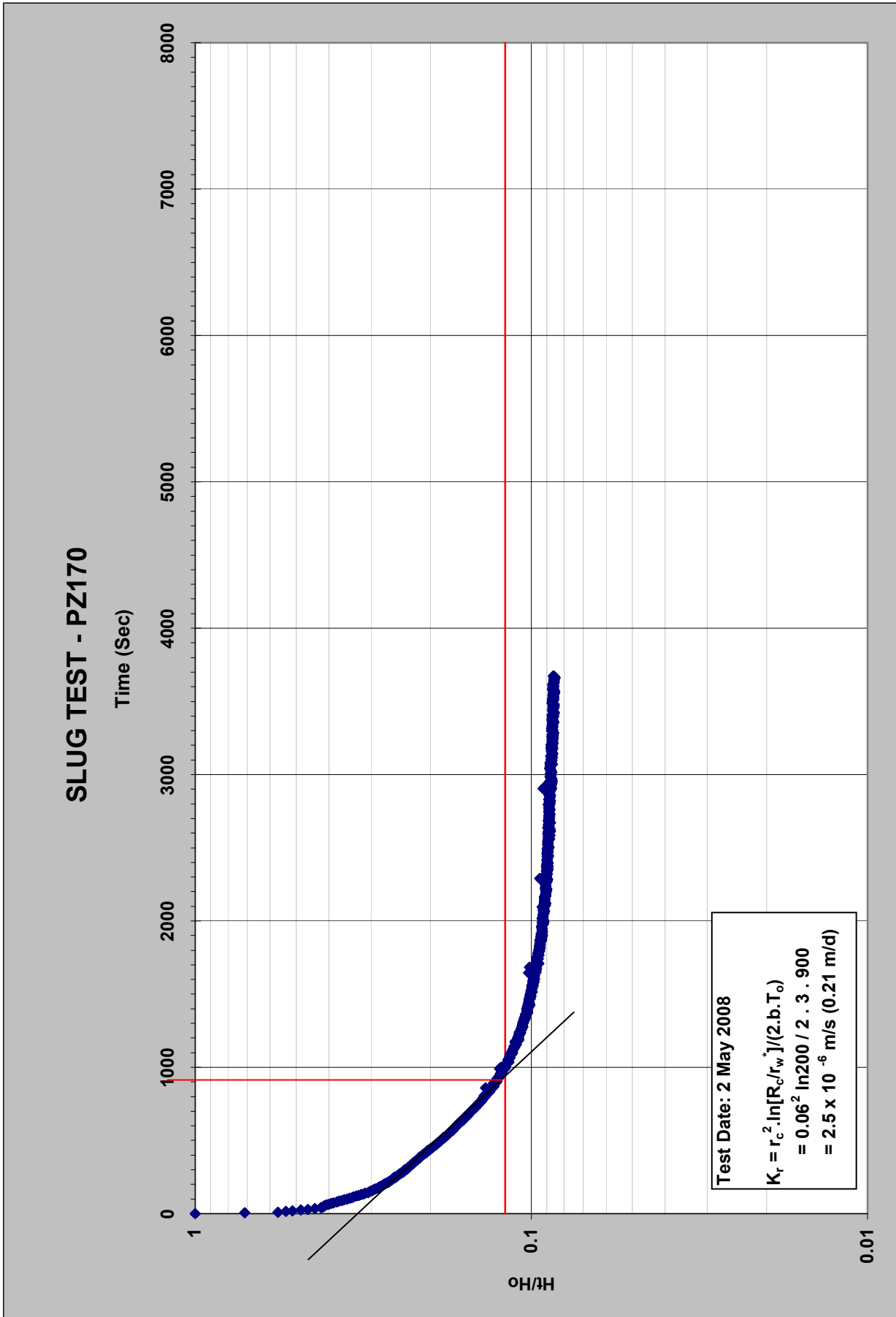


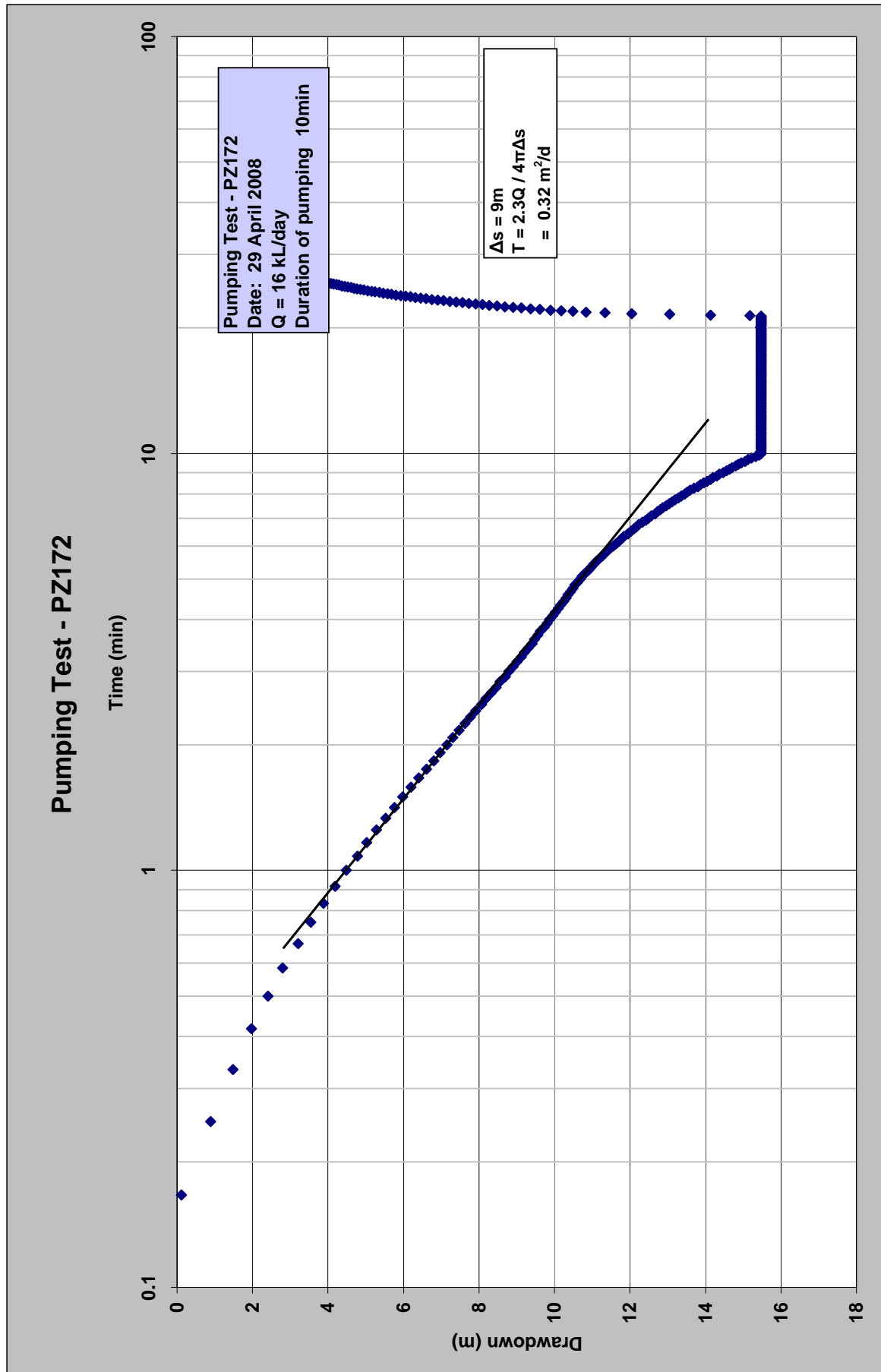
### SLUG TEST - PZ167



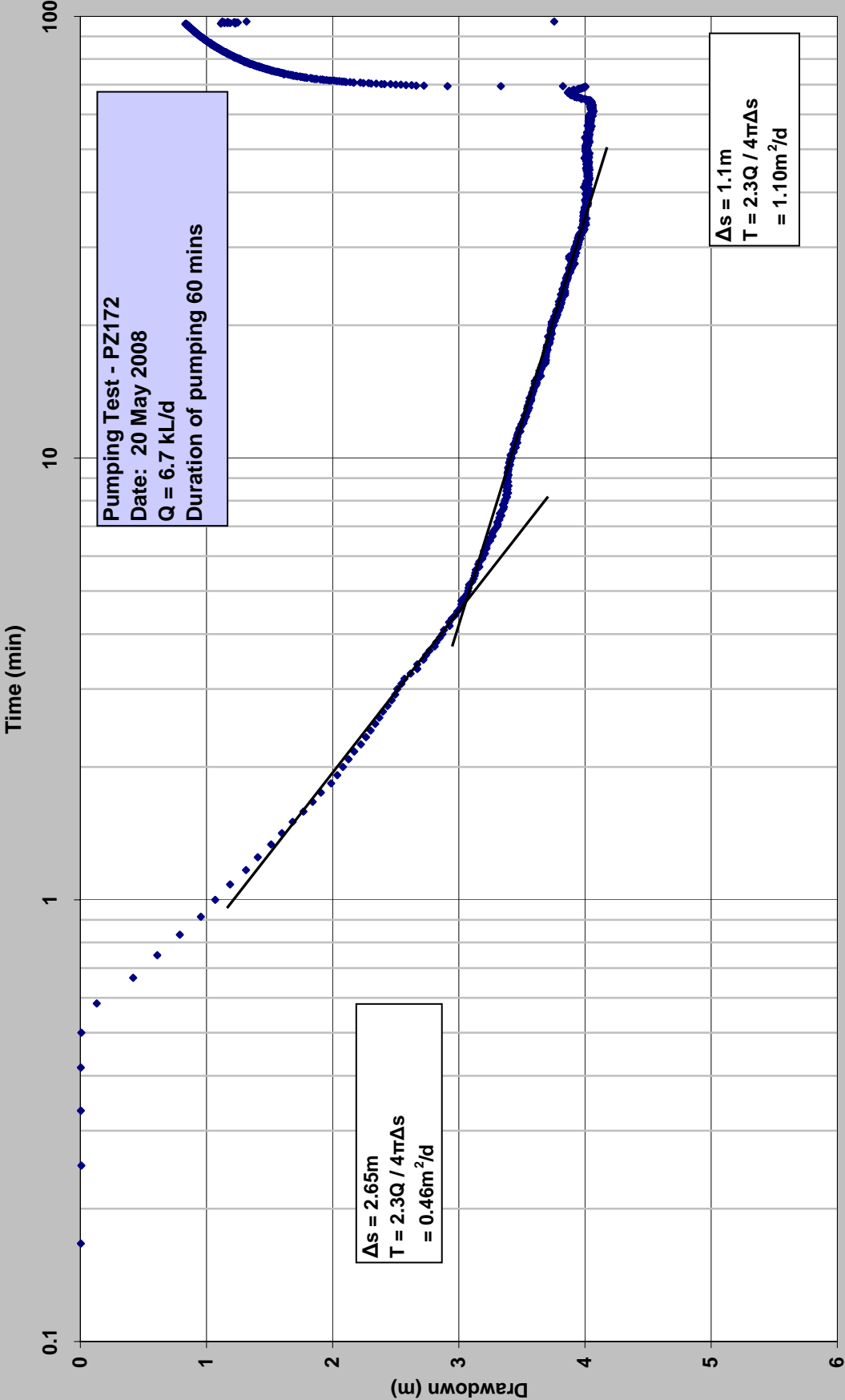




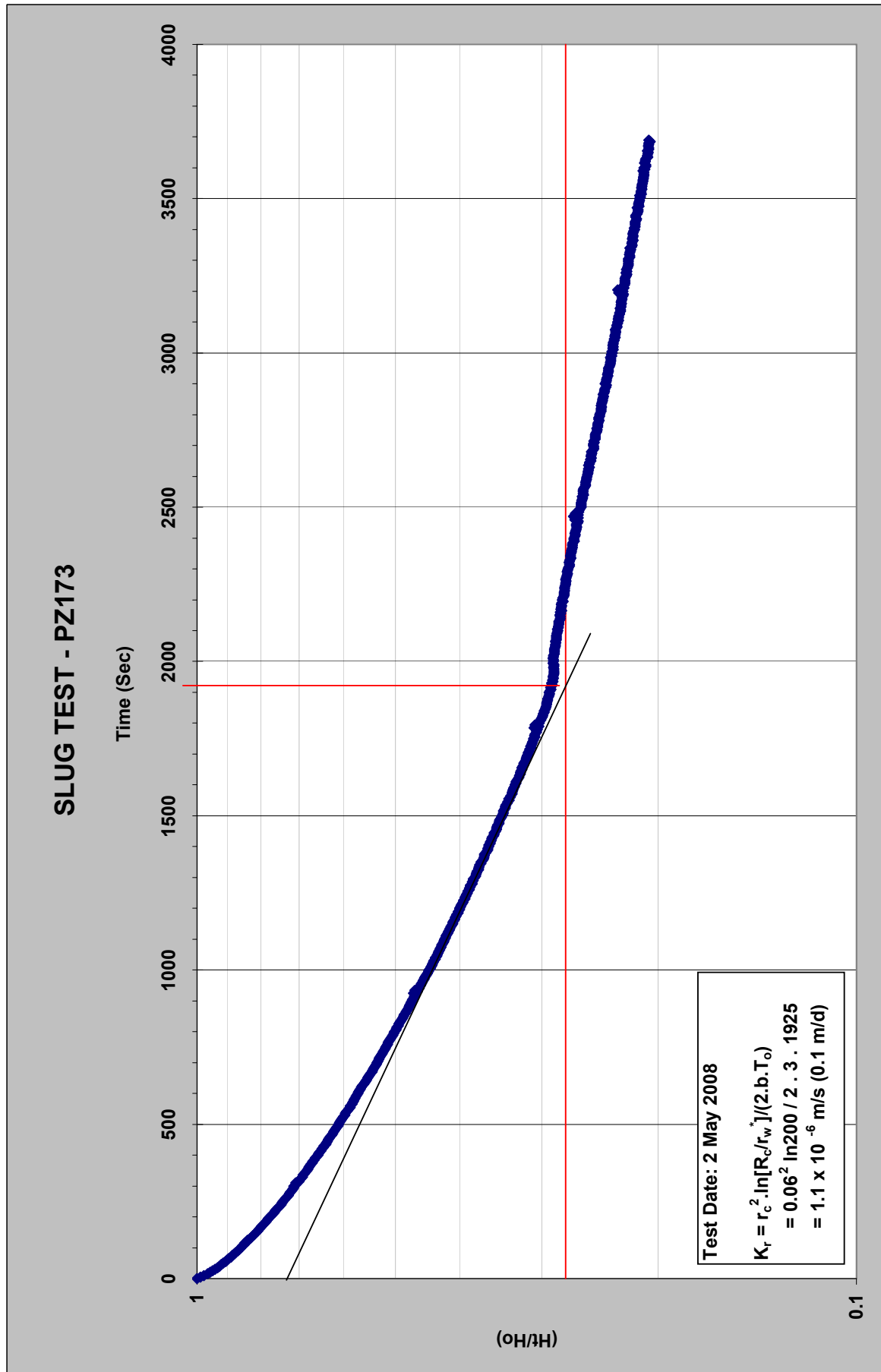


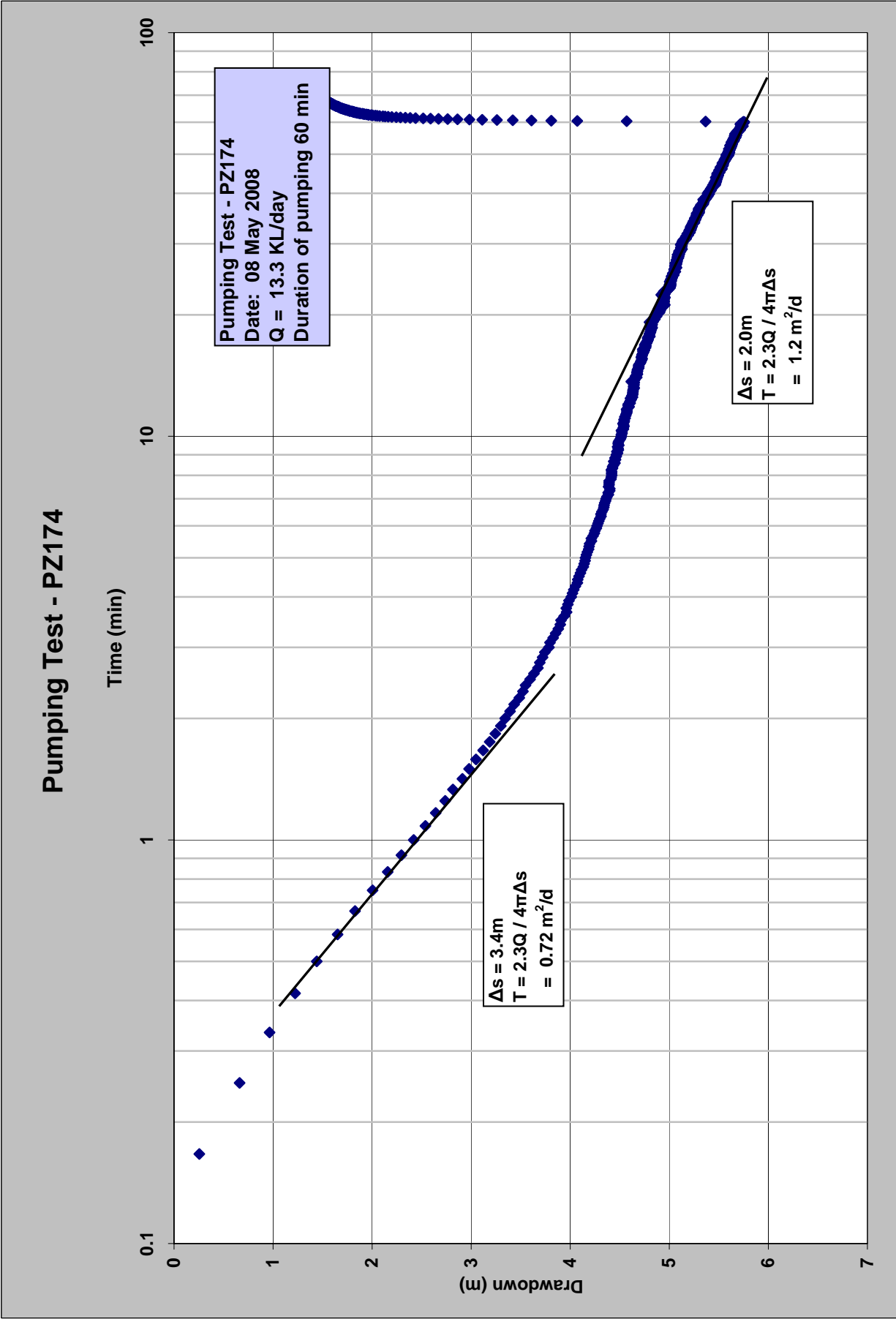


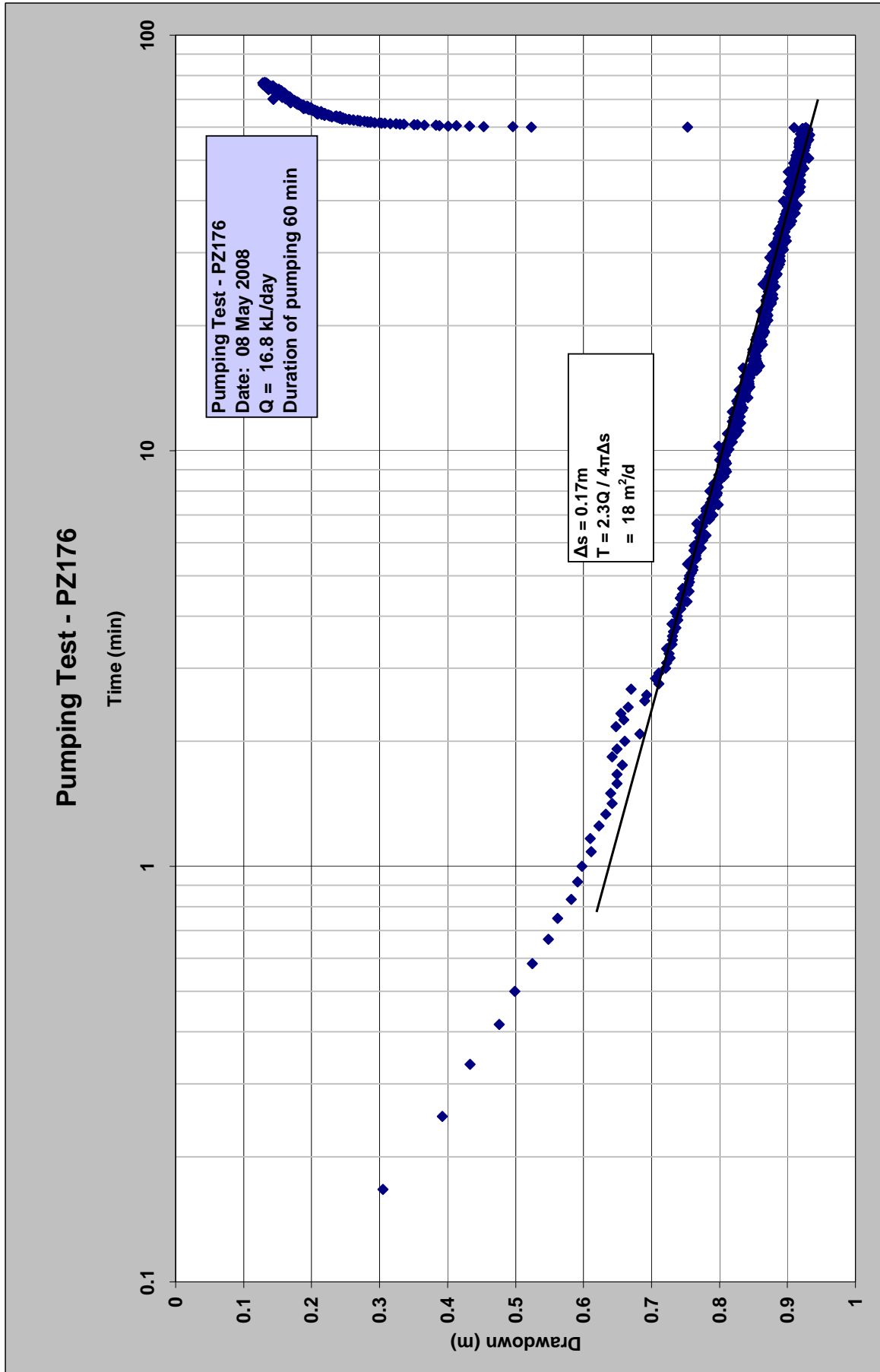
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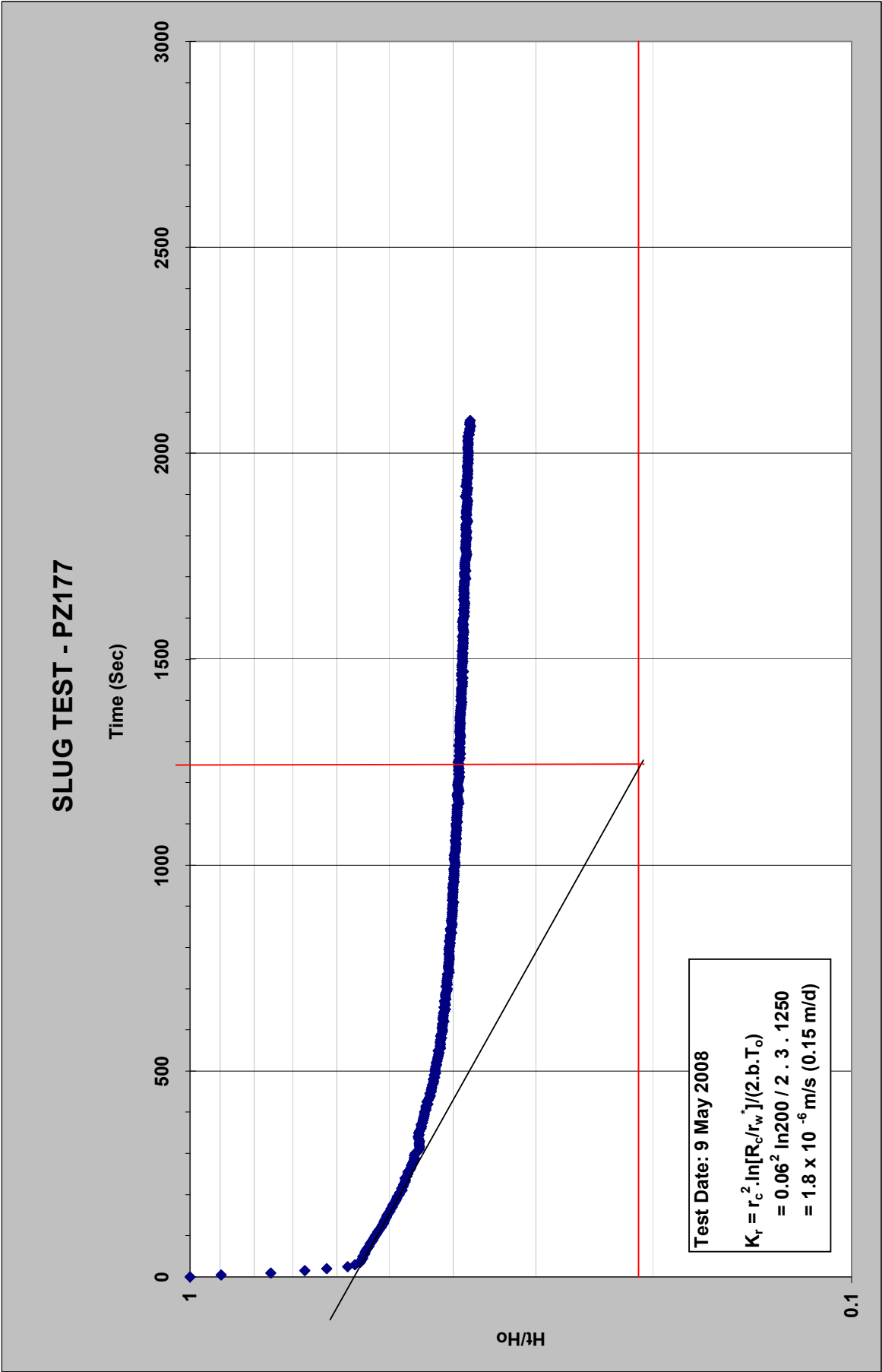




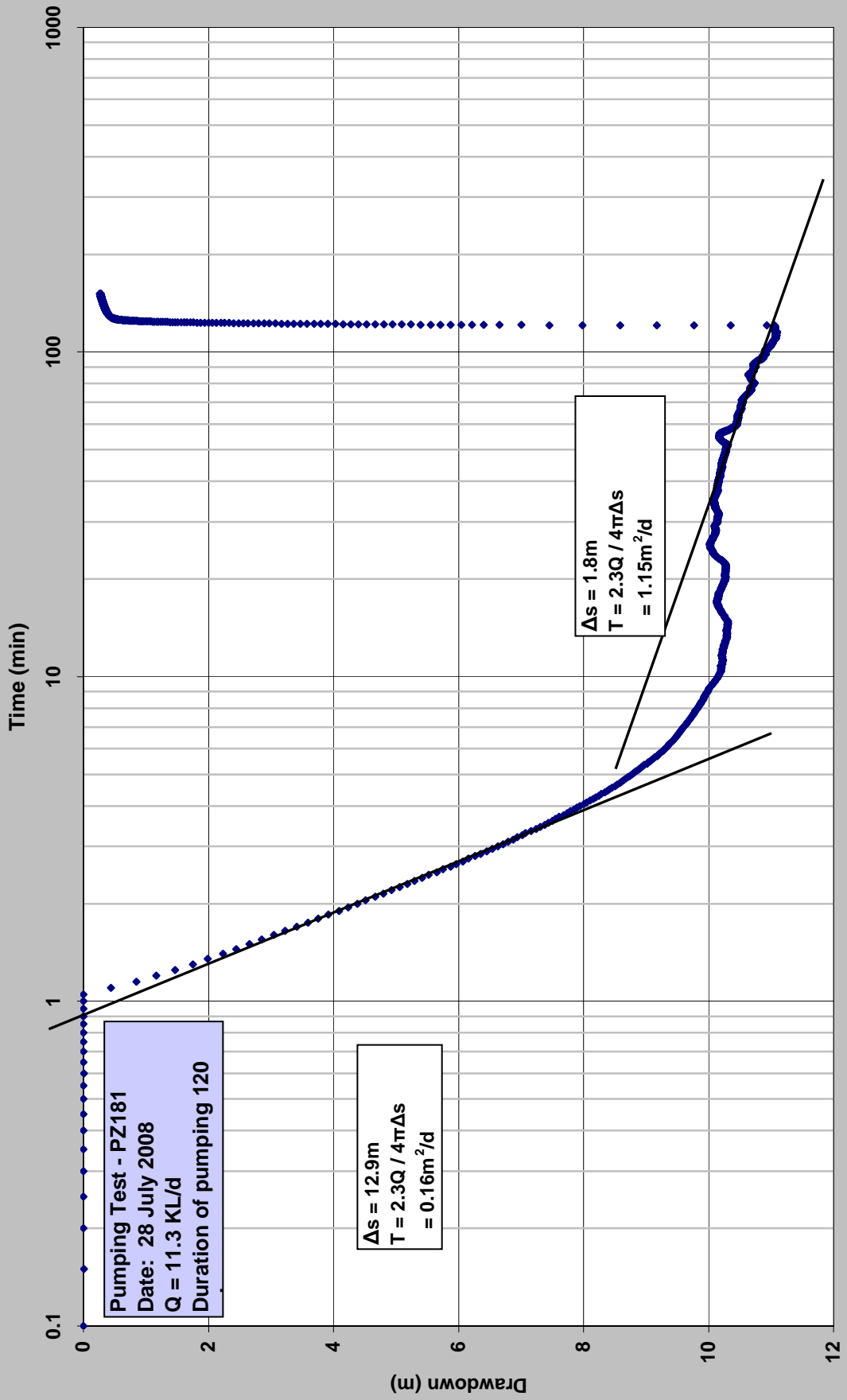


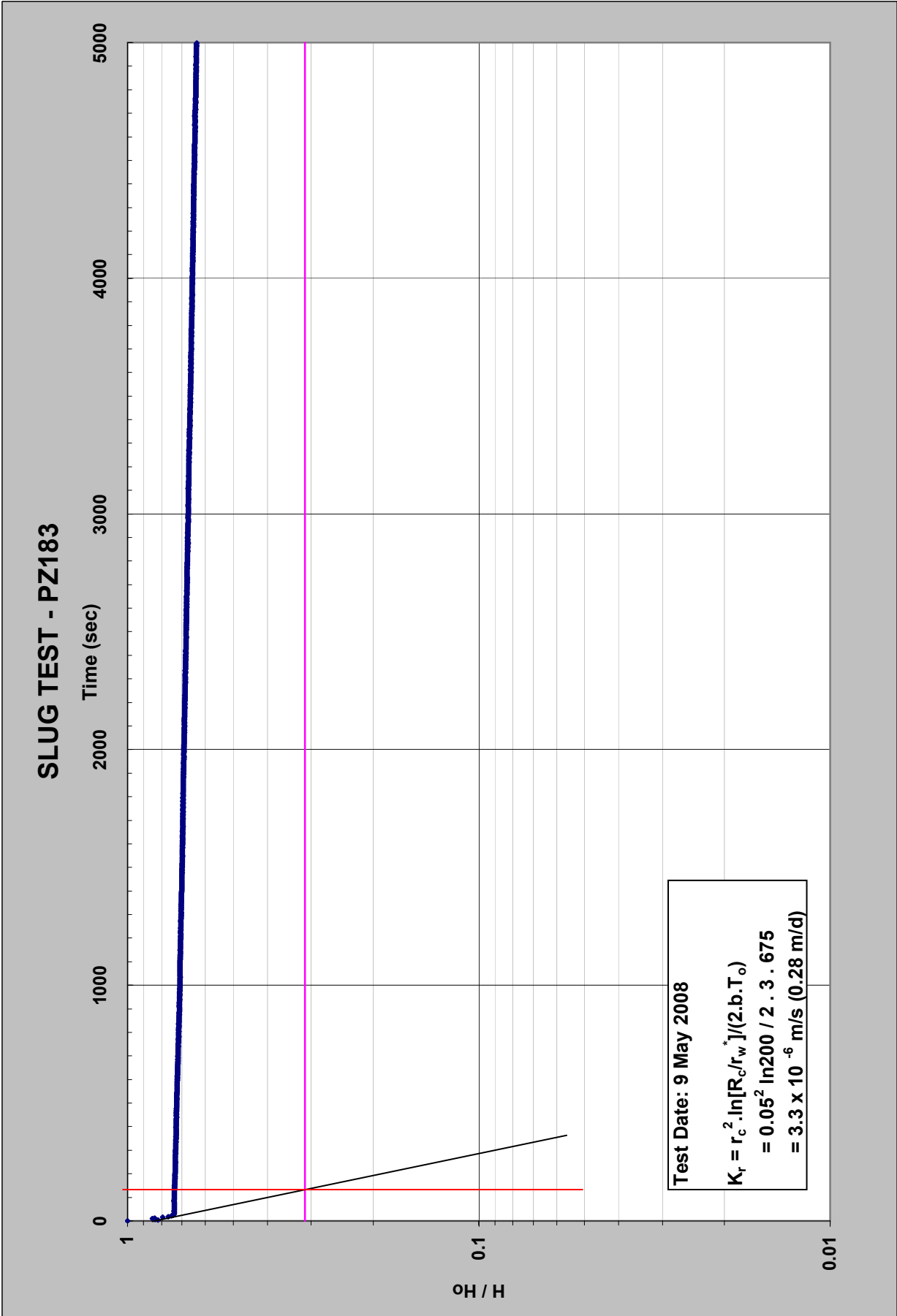


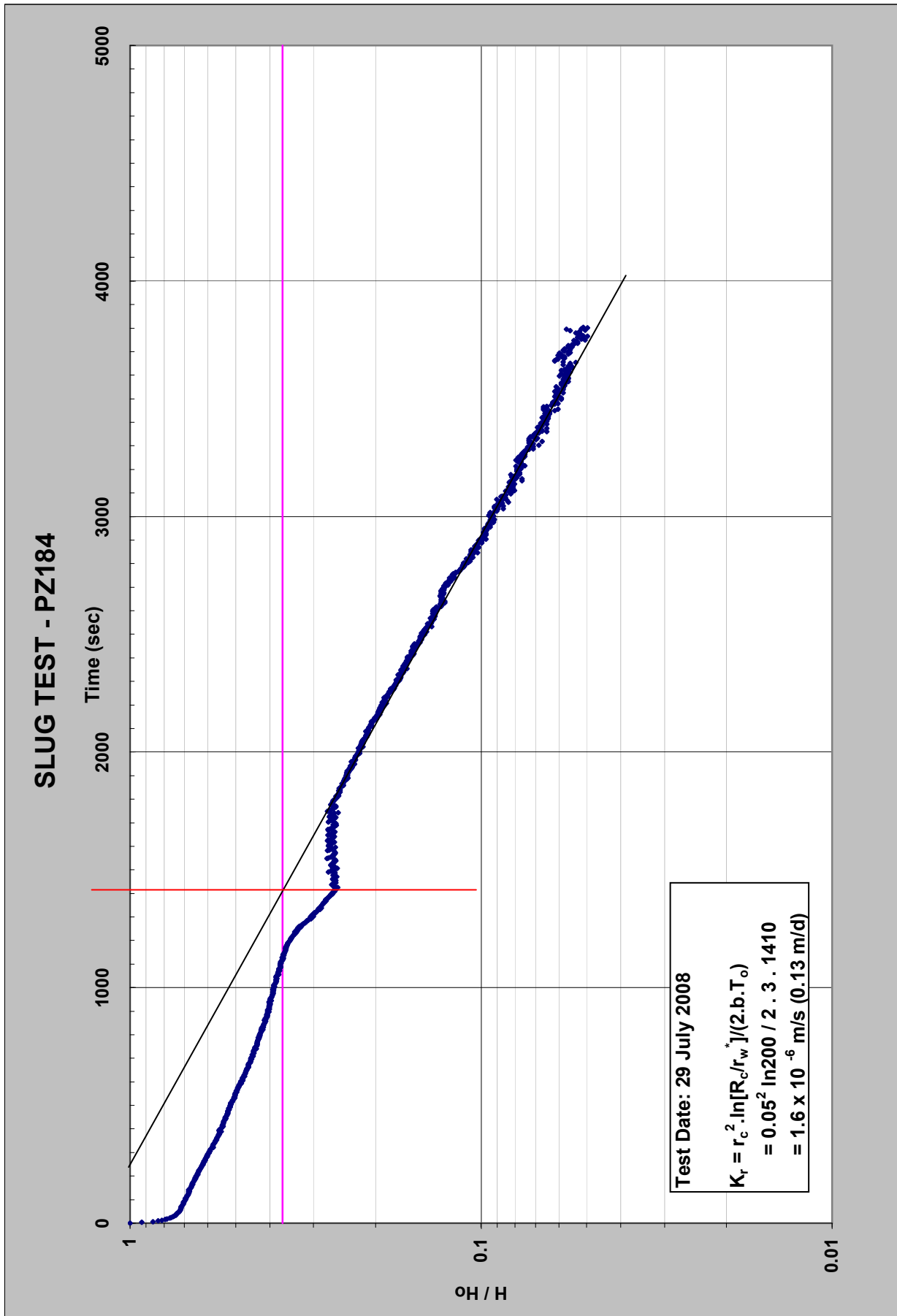


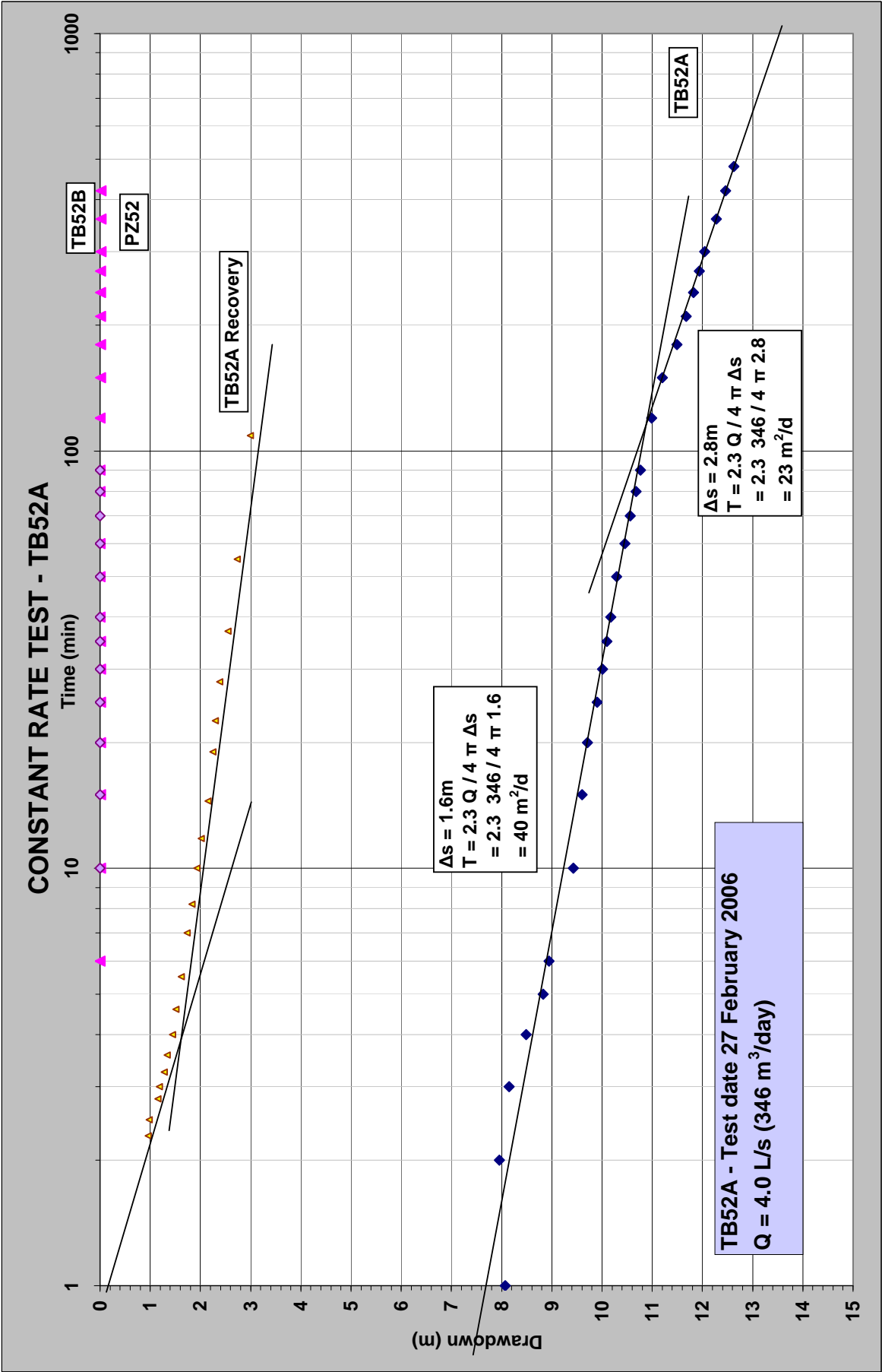


# Pumping Test - PZ181

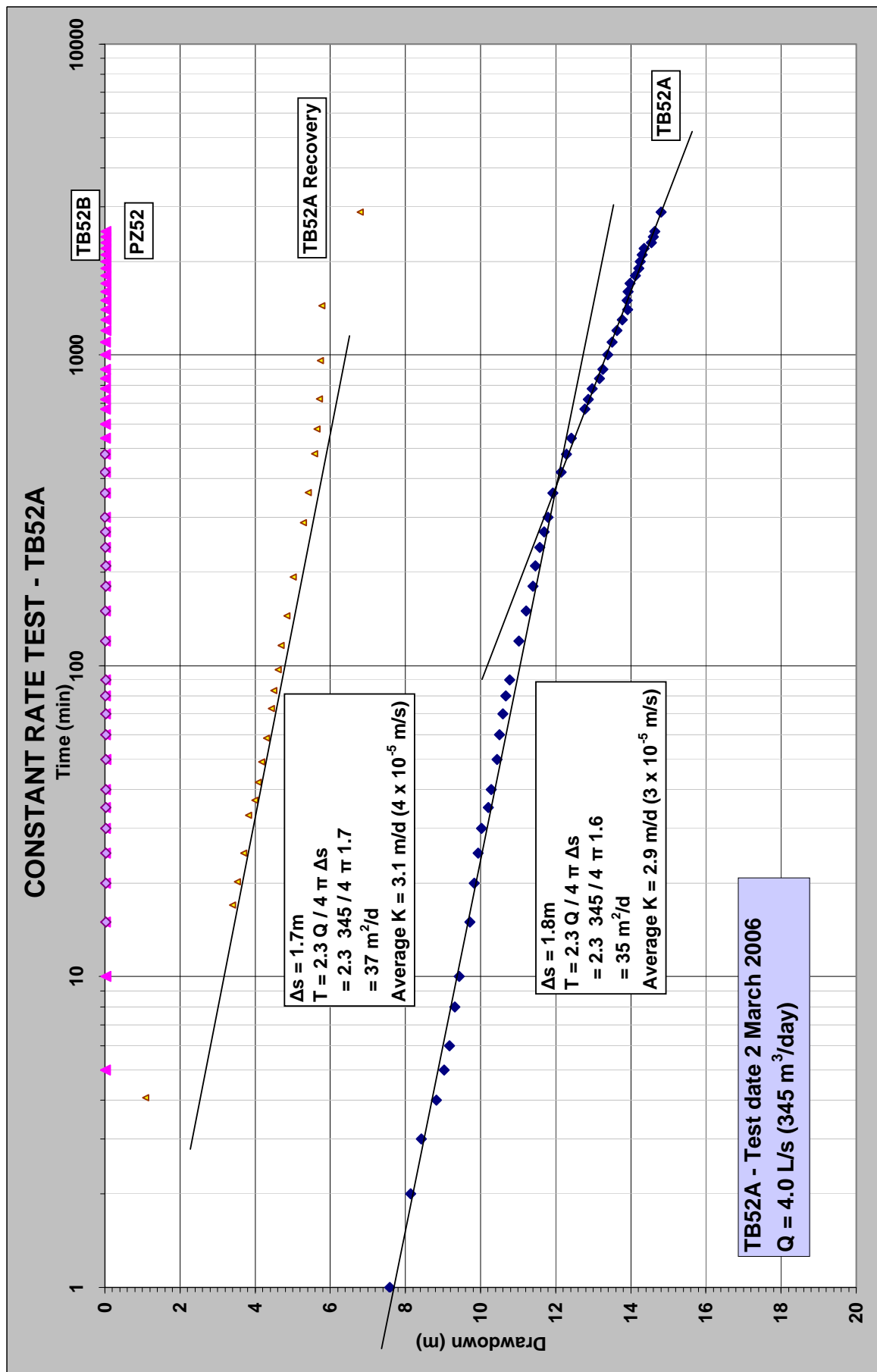


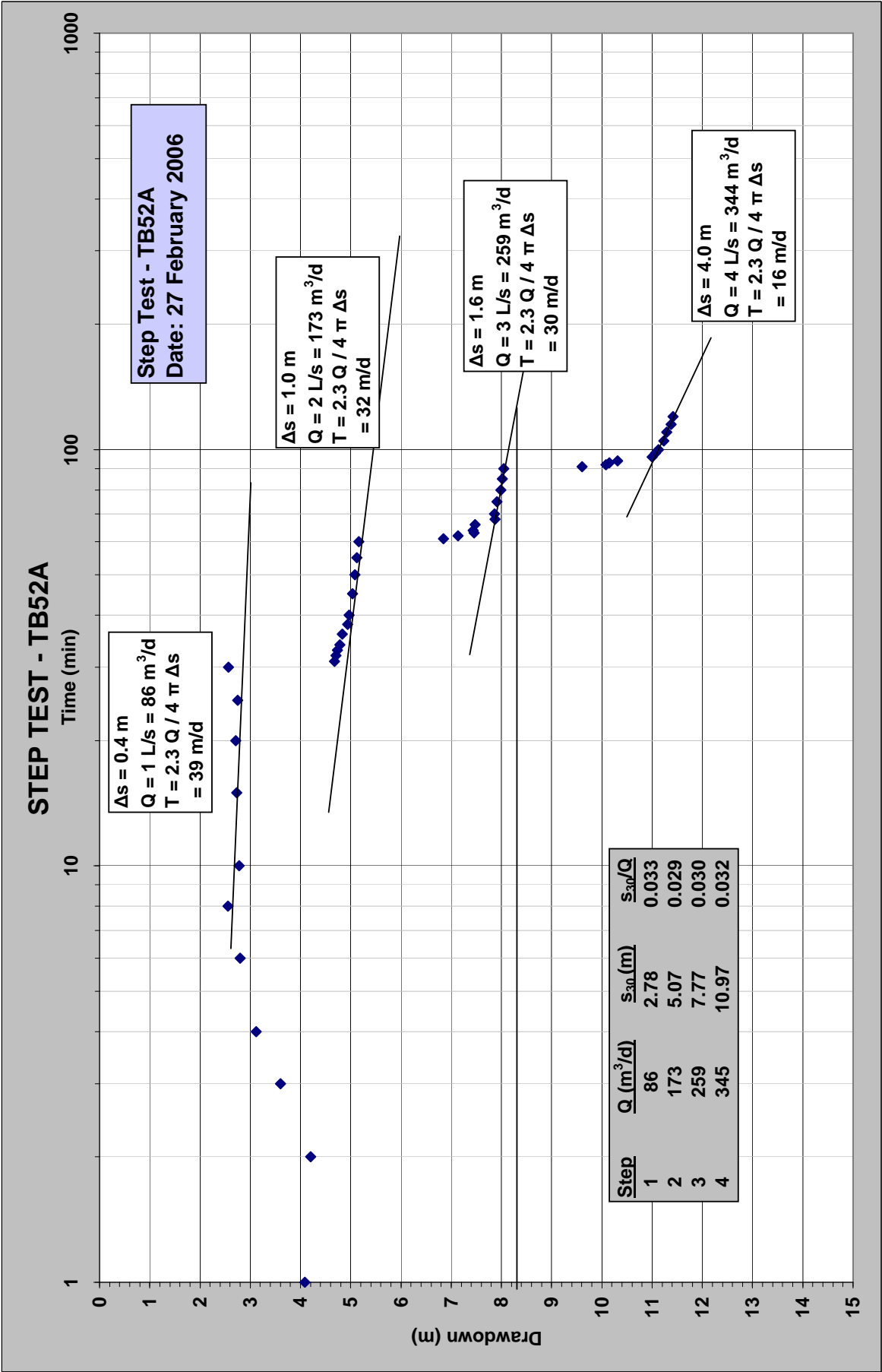


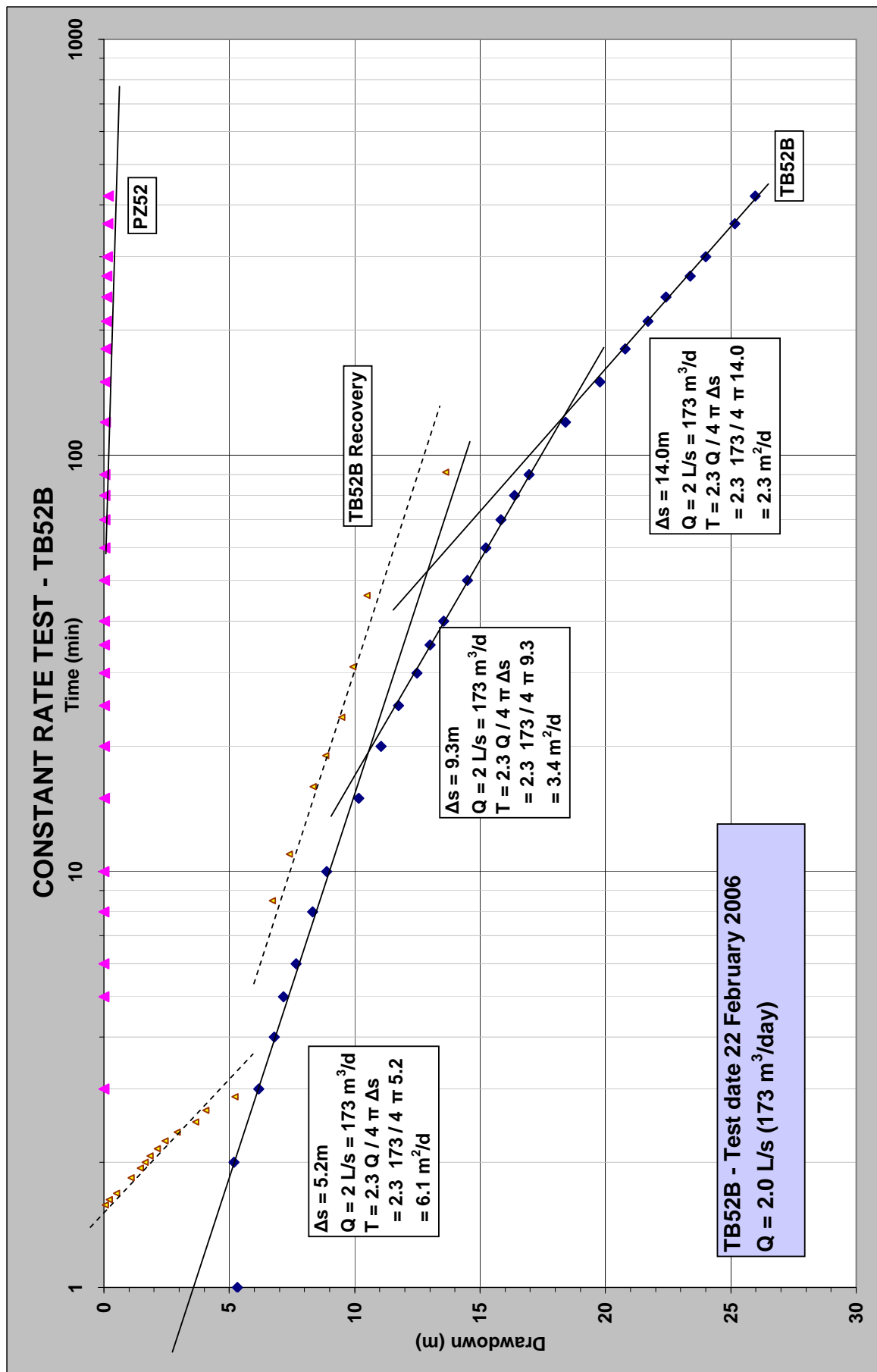


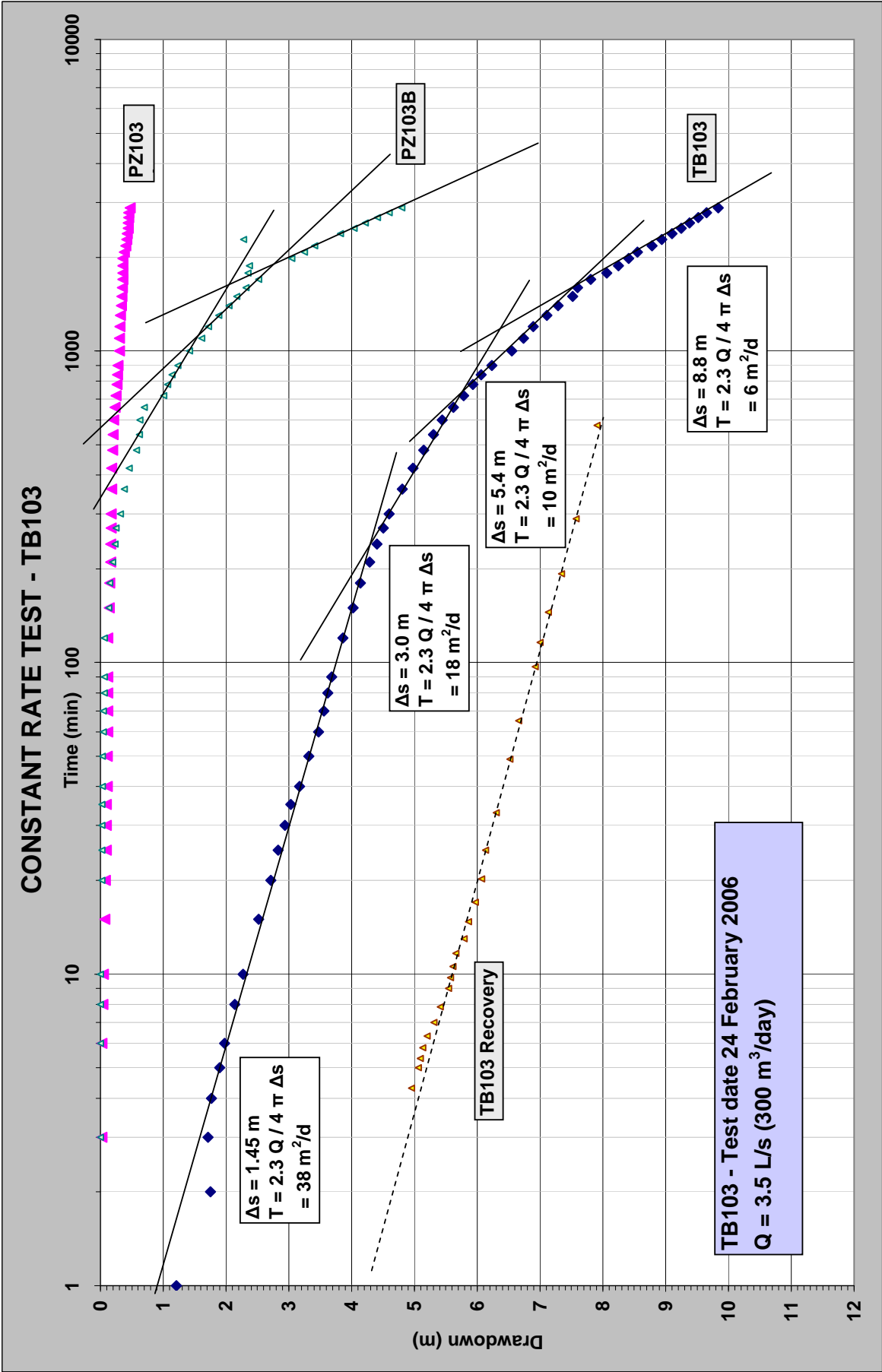


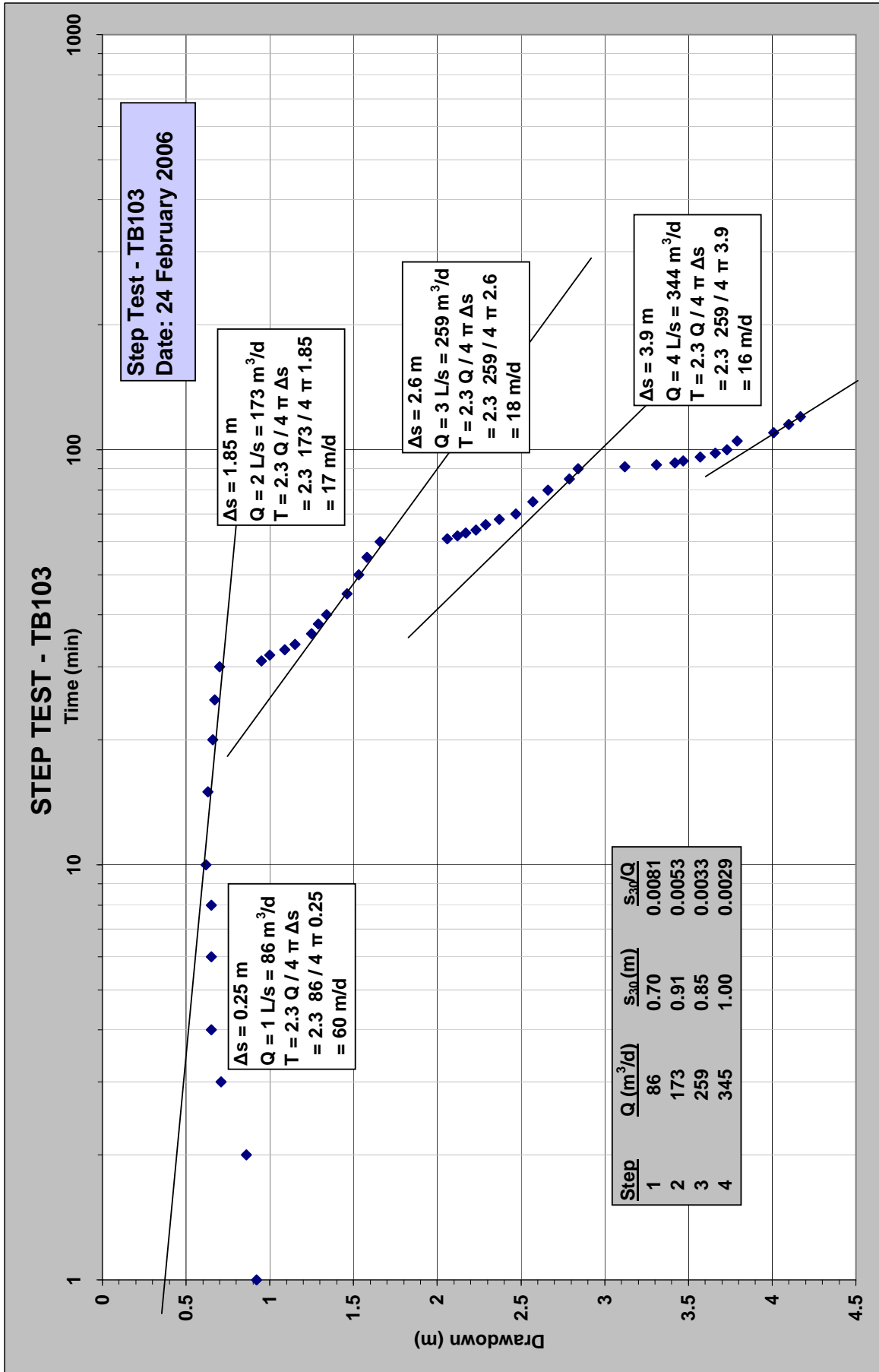


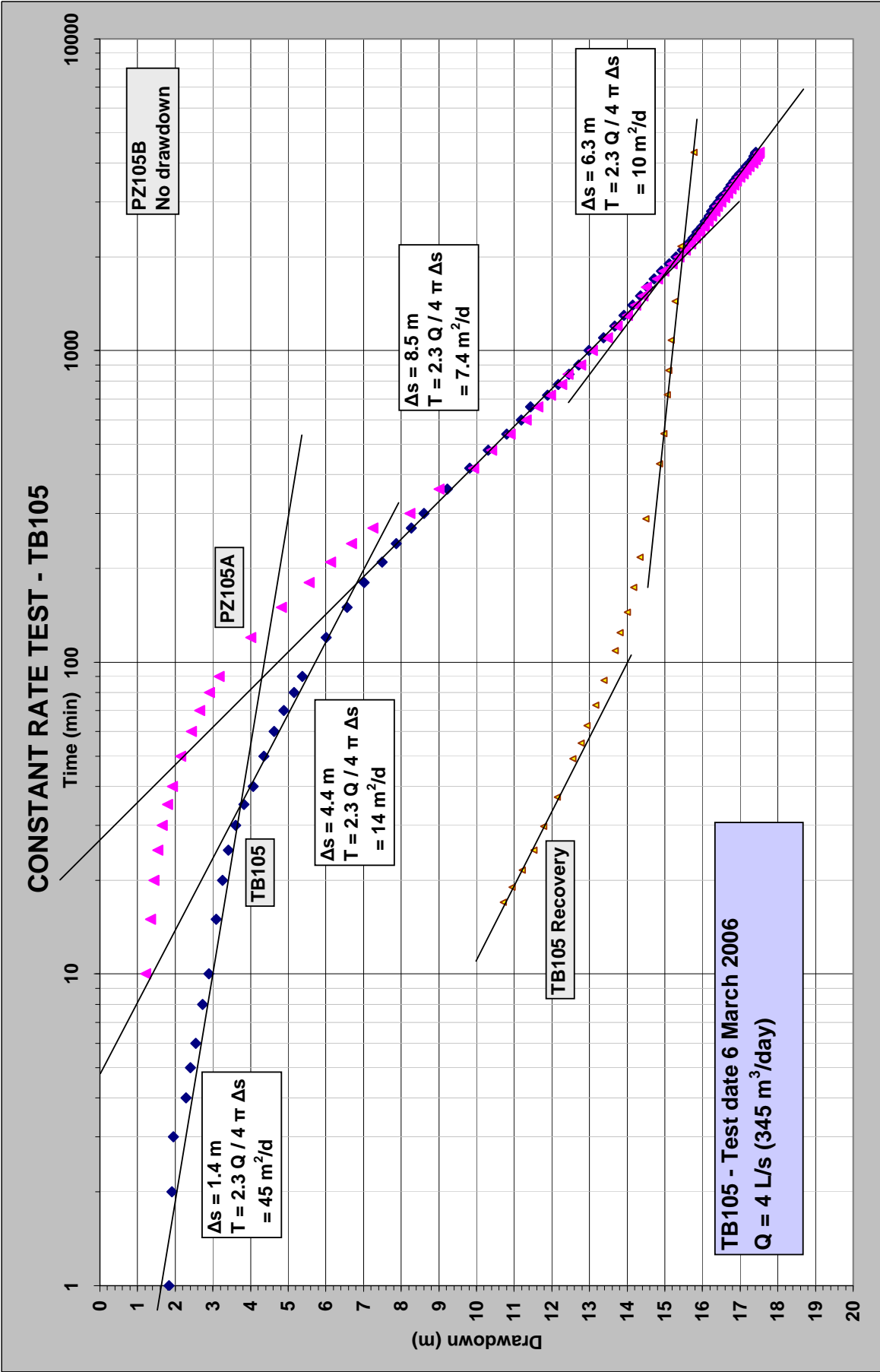


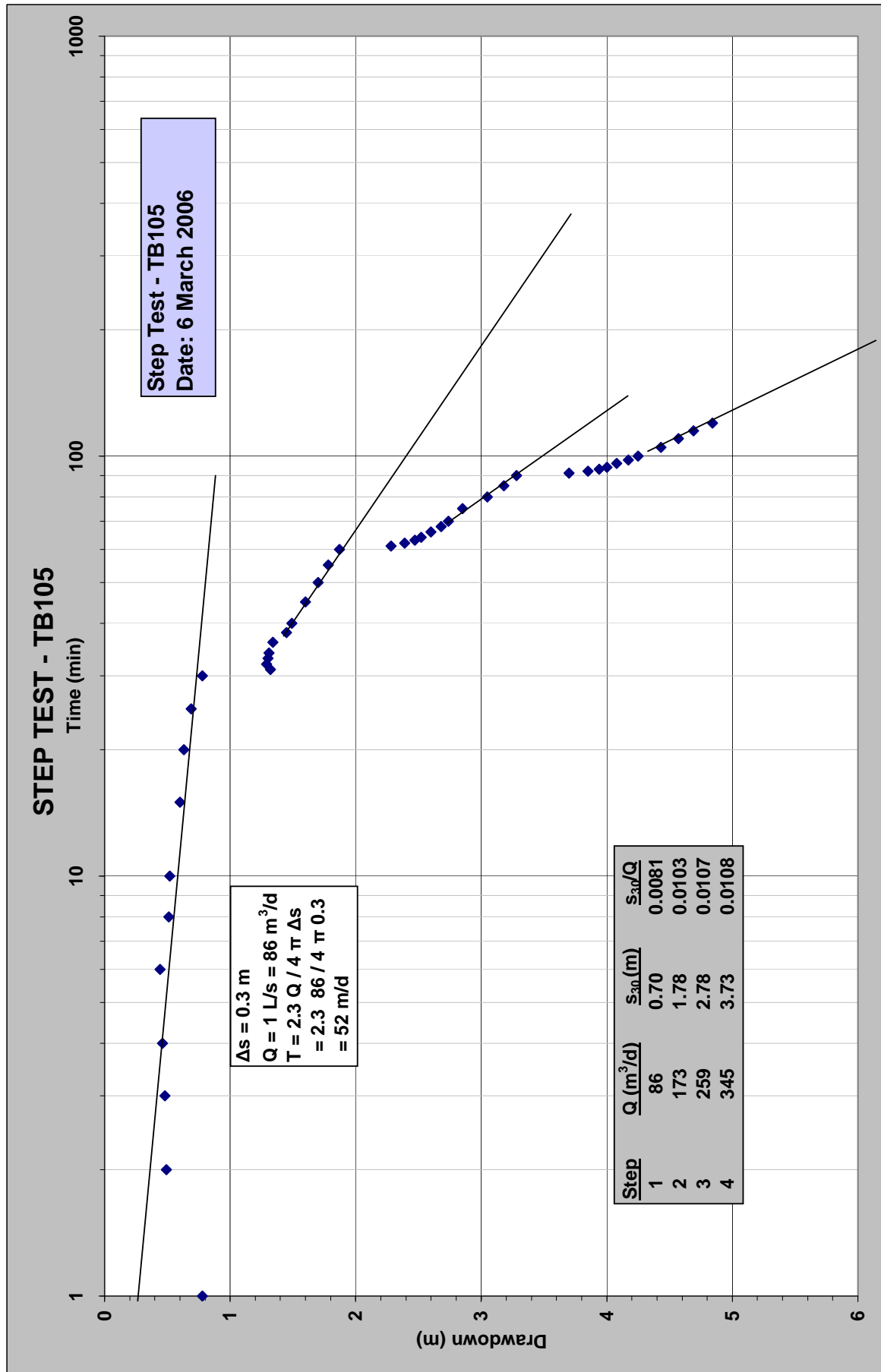


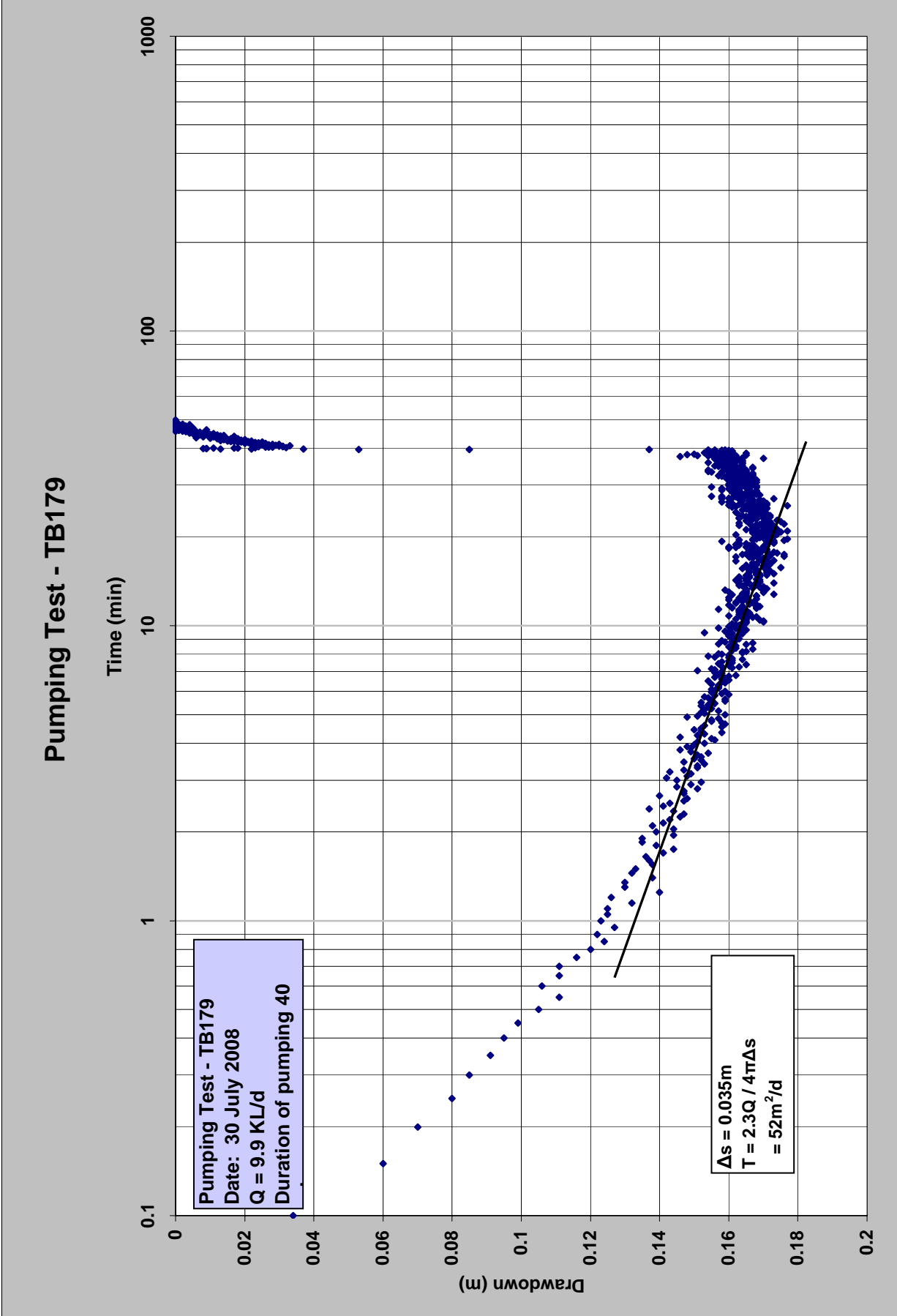














## Hydraulic Testing Schedule and Analysis Results – Piezometers

Piezometer	Screened Interval	Aquifer	Date of Test	Type of Test	Pumping Rate (kL/d)	Duration (mins)	Transmissivity (m <sup>2</sup> /d)	Average Hydraulic Conductivity	Comments
	(mbgl)							(m/d)	
PZ3	9 – 15	Ulan Seam	-	-	-	-	-	-	Inaccessible for testing
PZ4	20 – 26	Ulan Seam	-	-	-	-	-	-	Bore Dry
PZ17	6 – 9	Blackmans Flat Fm	--	-	-	-	-	-	Bore Dry
PZ18	6 – 9	Ulan Seam and sediments below	--	-	-	-	-	-	
PZ30	18 – 24	Marrangaroo Formation	1-Apr-06	Constant Rate	-	-	-	-	
PZ31A	18 – 24	Marrangaroo Formation	--	-	-	-	-	-	Bore Dry
PZ39	57 – 60	Lower Permian	4-Apr-06	Constant Rate	13.3	180	3	1	1.2 x 10 <sup>-5</sup>
				Recovery	-	-	3.5	1.2	1.4 x 10 <sup>-5</sup>
PZ40A	34 – 44	Lower Permian	3-Nov-05	Slug	-	-	-	14	3.5 x 10 <sup>-4</sup>
				Constant Rate	9.9	64	0.2	0.04	4.2 x 10 <sup>-7</sup>
PZ40B	9 – 15	Lower Permian	3-Nov-05	Recovery -	-	-	1.6	0.3	3.1 x 10 <sup>-6</sup>
				Constant Rate	-	-	0.2	0.03	3.5 x 10 <sup>-7</sup>
PZ41A	77 – 80	Marrangaroo Formation	8-Dec-05	Slug	-	-	2.3	0.4	4.3 x 10 <sup>-7</sup>
				Constant Rate	-	-	-	0.06	7.4 x 10 <sup>-7</sup>

Piezometer	Screened Interval	Aquifer	Date of Test	Type of Test	Pumping Rate	Duration (mins)	Transmissivity	Average Hydraulic Conductivity	Average Hydraulic Conductivity	Comments
	(mgl)				(kL/d)		(m <sup>2</sup> /d)	(m/d)	(m/s)	
<b>PZ41B</b>	66 – 69	Ulan Seam	8-Dec-05	Constant Rate	15.8	70	17	5.7	$6.6 \times 10^{-5}$	? Delayed yield effect
<b>PZ43A</b>	26 – 29	Mairangaroo Formation	7-Dec-05	Constant Rate	9.1	30	3.3	1.1	$1.3 \times 10^{-5}$	
<b>PZ43B</b>	15 – 18	Shoalhaven Group	7-Dec-05	Slug	-	-	-	0.19	$2.2 \times 10^{-6}$	
<b>PZ44</b>	20 – 23	Ulan Granite	7-Dec-05	Constant Rate	11	30	0.8	0.3	$3.1 \times 10^{-6}$	
<b>PZ50A</b>	63 – 69	Ulan Seam	11-Apr-06	Slug	-	-	-	0.05	$6.2 \times 10^{-7}$	
<b>PZ50B</b>	38 – 44	Lower Permian	3-Mar-06	Constant Rate	9.6	180	2.5	0.4	$4.9 \times 10^{-6}$	
<b>PZ50C</b>	8 – 11	Alluvium	11-Apr-06	Slug	-	-	-	1.4	$1.7 \times 10^{-5}$	
<b>PZ52</b>	24 – 30	Tertiary palaeochannel	8-Dec-05	Constant Rate	16	30	1.5	0.25	$2.9 \times 10^{-6}$	
<b>PZ53</b>	47 – 50	Lower Permian	9-Apr-06	Slug	-	-	-	4	$4.8 \times 10^{-5}$	
								0.2	$1.9 \times 10^{-6}$	
<b>PZ55</b>	11 – 14	Quaternary / Tertiary alluvium	1-Apr-06 SI	ug	-	-	-	0.9	$1.0 \times 10^{-5}$	
								0.3	$3.3 \times 10^{-6}$	
<b>PZ58</b>	8 – 11	Tertiary Palaeochannel	7-Dec-05 S	lug	-	-	-	0.21	$2.5 \times 10^{-6}$	
								0.05	$5.7 \times 10^{-7}$	

Piezometer	Screened Interval	Aquifer	Date of Test	Type of Test	Pumping Rate (kL/d)	Duration (mins)	Transmissivity (m <sup>2</sup> /d)	Average Hydraulic Conductivity	Comments
	(mbgl)							(m/d)	
<b>PZ72A</b>	27 – 33	Upper / Middle Permian	11-Apr-06	Constant Rate	8.6	120	8.3	1.4	1.6 x 10 <sup>-5</sup>
				Recovery	-	-	10	1.7	2.0 x 10 <sup>-5</sup>
<b>PZ72C</b>	10 – 13	Quaternary / Tertiary alluvium	31-Mar-06	Constant Rate	16	180	6.1	2	2.4 x 10 <sup>-5</sup>
				Recovery	-	-	9.2	3	3.5 x 10 <sup>-5</sup>
<b>PZ74</b>	31 – 34	Upper / Middle Permian	-						
<b>PZ101B</b>	54 – 60	Lower Permian	7-Dec-05	Slug	-	-	-	0.006	6.8 x 10 <sup>-8</sup>
<b>PZ102A</b>	116 – 125	Marrangaroo Formation	7-Dec-05	Slug	-	-	-	0.22	2.6 x 10 <sup>-6</sup>
				Slug	-	-	-	11	1.2 x 10 <sup>-4</sup>
<b>PZ102B</b>	80 – 86	Ulan Seam	7-Dec-05	Slug	-	-	-	0.18	2.1 x 10 <sup>-6</sup>
<b>PZ103A</b>	118 – 127	Ulan Seam	8-Apr-06	Slug	-	-	-	0.5	5.9 x 10 <sup>-6</sup>
<b>PZ103B</b>	81 – 87	Lower Permian	8-Apr-06	Slug	-	-	-	0.0003	3.0 x 10 <sup>-9</sup>
				Slug	-	-	-	0.29	3.3 x 10 <sup>-6</sup>
<b>PZ104</b>	151 – 160	Ulan Seam	8-Dec-05	Slug	-	-	-	-	-
<b>PZ105A</b>	87.5 – 96.5	Lower Permian	4-Apr-06	Slug	-	-	-	-	-
<b>PZ105B</b>	58 – 64	Upper / Middle Permian	29-Mar-06	Constant Rate	12	180 min	0.5	0.09	1.0 x 10 <sup>-6</sup>
				Recovery	-	-	1.7	0.3	3.4 x 10 <sup>-6</sup>
<b>PZ106A</b>	87.5 – 96.5	Lower Permian	8-Apr-06	Slug	-	-	-	0.005	6.0 x 10 <sup>-8</sup>

Piezometer	Screened Interval (mbgl)	Aquifer	Date of Test	Type of Test	Pumping Rate (kL/d)	Duration (mins)	Transmissivity (m <sup>2</sup> /d)	Average Hydraulic Conductivity		Comments
								(m/d)	(m/s)	
<b>PZ106B</b>	29 – 35	Upper / Middle Permian	30-Mar-06	Constant Rate	15	180 min	5	0.8	$9.6 \times 10^{-6}$	
				Recovery			6.1	1	$1.2 \times 10^{-5}$	
<b>PZ107</b>	78 – 80	Ulan Seam	8-Apr-06	Slug	-	-	-	0.13	$1.6 \times 10^{-6}$	
								0.03	$3.6 \times 10^{-7}$	
<b>PZ108R</b>	221 – 227	Ulan Seam	9-Apr-06	Slug	-	-	-	0.004	$4.9 \times 10^{-8}$	
<b>PZ109</b>	246 – 252	Lower Permian	8-Apr-06	Slug	-	-	-	0.26	$3.0 \times 10^{-6}$	
			8-Apr-06	Slug	-	-	-	0.3	$3.5 \times 10^{-6}$	
<b>PZ110</b>	100.5 – 103.5	Ulan Seam Floor	23-May-06	Slug	-	-	-	6.8	$8 \times 10^{-5}$	
	108.5 – 111.5									
	117.5 – 120.5	Shoalhaven Group								
	126.5 – 129.5									
<b>PZ111</b>	71 – 77	Ulan Seam	23-May-06	Constant Rate	9	100 min	3	0.5	$6 \times 10^{-6}$	
				Recovery			3.7	0.6	$7 \times 10^{-6}$	
<b>PZ112A</b>	84 – 90	Ulan Seam	-	-	-	-	-	-	-	Not tested
<b>PZ112B</b>	6 – 12	Quaternary / Tertiary alluvium	--		-	-	-	-	-	Not tested
<b>PZ124</b>	8.4-20.4	Tertiary Palaeochannel	--		-	-	-	-	-	Bore Dry

Piezometer	Screened Interval	Aquifer	Date of Test	Type of Test	Pumping Rate (kL/d)	Duration (mins)	Transmissivity		Average Hydraulic Conductivity		Comments
	(mbgl)						(m <sup>2</sup> /d)	(m/d)	(m/s)		
<b>PZ125</b>	5.6 – 11.6	Quaternary / Tertiary Alluvium	--		-	-	-	-	-	-	Not tested
<b>PZ131</b>	21-24	Upper / Middle Permian	9-May-08	Slug Test	-	-	-	0.28	$3.3 \times 10^{-6}$		
<b>PZ132</b>	5-Aug	Upper / Middle Permian	--		-	-	-	-	-	-	Bore Dry
<b>PZ134</b>	23-26	Upper / Middle Permian	12-Mar-08	Constant Rate	7.4	18	0.36	0.51	$5.9 \times 10^{-6}$	Ea	ry Data
<b>PZ135</b>	13-16	Upper / Middle Permian	9-May-08	Constant Rate	13.3	68	0.64	0.92	$1.1 \times 10^{-5}$	Ea	ry Data
<b>PZ136</b>	21-24	Upper / Middle Permian	9-May-08	Constant Rate	10.6	60	4.9	-	-	-	Late Data
<b>PZ137</b>	20-23	Upper / Middle Permian	6-Mar-08	Constant Rate	12.7	10	0.4	0.18	$2 \times 10^{-6}$	Ea	ry Data
<b>PZ138</b>	35-38	Upper / Middle Permian	11-Mar-08	Constant Rate	10.7	60	0.65	-	-	-	Late Data
<b>PZ139</b>	60-66 Ulan	Seam	22-May-08	Slug	-	-	-	1.9	$1.5 \times 10^{-6}$		
<b>PZ140</b>	13-16 and 27-30	Lower Permian	-	-	-	-	-	0.02	$2.2 \times 10^{-5}$		
									$1.2 \times 10^{-6}$	Ea	ry Data
									-		Late Data
									$2.6 \times 10^{-7}$		
									-		Bore Dry

Piezometer	Screened Interval (mbgl)	Aquifer	Date of Test	Type of Test	Pumping Rate (kL/d)	Duration (mins)	Transmissivity		Average Hydraulic Conductivity		Comments
							(m <sup>2</sup> /d)	(m <sup>2</sup> /d)	(m/d)	(m/s)	
PZ141	6-Sep Lo	wer Permian	6-Mar-08	Constant Rate	8.6	20	1.8	0.34		3.9x10 <sup>-6</sup> E	arly data
									0.28	-	
PZ143	24-27 Lo	wer Permian	11-Mar-08	Constant Rate	13.7	60			0.15	1.7x10 <sup>-6</sup>	
							7.8	2.9		3.4x10 <sup>-5</sup>	
PZ144	25-28 Lo	wer Permian	-	-	-	-					
							9.6	-			
PZ145	4-Jul Lo	wer Permian	-	-	-	-					Bore Dry
PZ146	8.5-11.5	Upper / Middle Permian	--		-	-					Bore Dry
PZ147	8-Nov Lo	wer Permian	11-Mar-08	Constant Rate	13.3	2	2	0.12		1.4x10 <sup>-6</sup>	
									0.35	-	
PZ148	8.5-11.5 Lo	wer Permian	-	-	-	-					Bore Dry
PZ149	8-Nov	Upper / Middle Permian	6-Mar-08 S	lug	-	-			0.05	6.3x10 <sup>-7</sup>	
PZ150	82.5-88.5	Ulan Seam	7-Mar-08	Slug Test	-	-			0.29	3.4 x 10 <sup>-6</sup>	
PZ151	65.5-71.5	Ulan Seam	7-Mar-08	Slug Test	-	-			0.03	3.9 x 10 <sup>-7</sup>	
PZ152	Oct-13	Upper / Middle Permian	5-Mar-08	Constant Rate	10.6	19			7.2	8.3x10 <sup>-5</sup> S	uspect Data
PZ153	0.5-3.5	Regolith / Surficial	-	-	-	-					Bore Dry

Piezometer	Screened Interval (mbgl)	Aquifer	Date of Test	Type of Test	Pumping Rate (kL/d)	Duration (mins)	Transmissivity (m <sup>2</sup> /d)	Average Hydraulic Conductivity		Comments
								(m/d)	(m/s)	
<b>PZ154</b>	4-Jul	Upper / Middle Permian	--		-	-	-	-	-	Bore Dry
<b>PZ155</b>	7-Oct	Upper / Middle Permian	7-May-08	Slug Test	-	-	-	0.04	$4.7 \times 10^{-7}$	Limited saturated thickness
<b>PZ158</b>	11.5-14.5	Regolith / Surficial		Slug Test	-	-	-0.03		$3.7 \times 10^{-7}$	
<b>PZ159</b>	22-25	Upper / Middle Permian	1-May-08	Slug Test	-	-	-	0.32	$3.7 \times 10^{-6}$	Limited saturated thickness
<b>PZ160</b>	27-30	Upper / Middle Permian	1-May-08	Constant Rate	14.4	15	8.5	2.8	$3.3 \times 10^{-5}$ P	oor data
			22-May-08	Constant Rate	8.5 9.5 7.8 -		11	3.7	$4.2 \times 10^{-5}$ E	arly data
<b>PZ161</b>	6-Sep	Regolith / Surficial	-	-	-	-	-	-	-	Bore Dry
			6-May-08	Constant Rate	11.3	44	15 3.5 6.3 -		$4.1 \times 10^{-5}$ E	arly data
<b>PZ162</b>	29.5-32.5	Upper / Middle Permian	21-May-08	Constant Rate	12	120	20 4.5 6.7 -		$5.2 \times 10^{-5}$ E	arly data
<b>PZ163</b>	4-Jul	Regolith / Surficial	-	-	-	-	-	-	-	Bore Dry
<b>PZ164</b>	20.5-26.5	Upper / Middle Permian	30-Apr-08	Constant Rate	12	32	0.52 0.11 0.81 -		$1.3 \times 10^{-6}$ E	arly data
			22-May-08	Constant Rate	12.5	60	1.1	0.24	$2.8 \times 10^{-6}$ S	Late data

Piezometer	Screened Interval (mbgl)	Aquifer	Date of Test	Type of Test	Pumping Rate (kL/d)	Duration (mins)	Transmissivity (m <sup>2</sup> /d)	Average Hydraulic Conductivity	Average Hydraulic Conductivity	Comments
								(m/d)	(m/s)	
<b>PZ165</b>	2.5-5.5	Regolith / Surficial	22-May-08	Slug Test	10.3 1.8	-	-	0.01	1.0x10 <sup>-7</sup>	Coal Seam
<b>PZ166</b>	Oct-16	Regolith / Surficial	30-Apr-08	Constant Rate Slug Test	18 -	2 -	1.2 -	-	-	oor data
<b>PZ167</b>	6-Sep	Regolith / Surficial	5-May-08	Slug Test	-	-	-	0.18	2.1 x 10 <sup>-6</sup>	Limited saturated thickness
<b>PZ168</b>	27.5-30.5	Upper / Middle Permian	29-Apr-08 20-May-08 S	Constant Rate slug Test	14.1 -	23 -	4 -	0.88 0.05	1.0x10 <sup>-5</sup> 5.7x10 <sup>-7</sup>	
<b>PZ169</b>	4-Jul	Regolith / Surficial	29-Apr-08	-	-	-	-	-	-	Bore Dry
<b>PZ170</b>	26-29	Upper / Middle Permian	30-Apr-08	Slug Test	-	-	-	0.21	2.5 x 10 <sup>-6</sup>	
<b>PZ171</b>	7-Oct	Upper / Middle Permian	--		-	-	-	-	-	Bore Dry
<b>PZ172</b>	18-21	Upper / Middle Permian	29-Apr-08 20-May-08	Constant Rate Constant Rate	16 6.7	21 60	0.32 0.46 0.26 1.1 -	0.1	1.2x10 <sup>-6</sup> 3.0x 0 <sup>-6</sup> E -	arly data Late data
<b>PZ173</b>	6-Sep	Regolith / Surficial	29-Apr-08	Slug Test	-	-	-	0.1	1.1 x 10 <sup>-6</sup>	Limited saturated thickness





**APPENDIX C:  
NOW REGISTERED GROUNDWATER SITES  
SUMMARY INFORMATION**

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Reg No	Licence	Type	Owner	Completed	Depth	Drilled depth	County	Parish	SWL	Salinity	Comment	Yield	Comment	Easting MGA	Northing MGA	Lat	Long
GW007093	80BL001807	Bore open thru rock	Private	1/07/1945	54.8	54.9	BLIGH	UARBRY		(Unknown)				750611	6444642	32.10676	149.6559
GW011258	20BL004326	Bore	Private	1/09/1955	99.8	99.8	PHILLIP	WOLLAR		Brackish				777037	6414094	32.37556	149.9444
GW021748		Bore	Private		89.9		BLIGH	TOMIBILL		Fresh				778315	6442564	32.11899	149.9498
GW023208	80BL015694	Well	Private		6.0		PHILLIP	COOYAL		(Unknown)				756284	6410749	32.41083	149.725
GW023209	80BL015695	Well	Private		10.3	10.7	PHILLIP	COOYAL		(Unknown)				756061	6410269	32.41528	149.7208
GW026341	80BL019050	Well	Private	1/04/1966	42.6	42.7	PHILLIP	COOYAL		(Unknown)				749388	6410056	32.41871	149.652
GW026446	80BL019402	(Unknown)	Private	1/02/1967	56.3	56.4	PHILLIP	COOYAL		501-1000 ppm				758887	6406770	32.44611	149.7536
GW026904	80BL019895	Bore open thru rock	Private	1/04/1966	39.6	39.6	PHILLIP	COOYAL		(Unknown)				756190	6409330	32.42361	149.7244
GW026959	80BL018522	Bore	Private	1/05/1966	48.7	48.8	PHILLIP	BAYL		(Unknown)				760004	6406006	32.45278	149.7658
GW028799	80BL022787	Well	Private	1/04/1968	2.4	2.4	PHILLIP	WIALDRA		(Unknown)				749393	6415512	32.36954	149.6506
GW029043	80BL022325	Bore	Private		73.1	73.2	PHILLIP	BAYL		Good				760547	6405400	32.45806	149.7719
GW029543	20BL023549	Bore	Private	1/02/1968	11.8	18.0	PHILLIP	FITZGERALD		(Unknown)				777212	6405589	32.45222	149.9489
GW031201	80BL022177	Bore	Private	1/01/1968	50.2	50.3	PHILLIP	BAYL		Good				759418	6405093	32.46111	149.76
GW031301	70BL024287	Bore	Private	1/03/1968	24.6	24.7	PHILLIP	WIALDRA		(Unknown)				749025	6419683	32.33204	149.6456
GW033070	80BL025910	Excavation	Private		3.9		BLIGH	MUNMURRA		Stock				776430	6434872	32.18861	149.9319
GW033071	80BL025912	Well	Private		3.6		BLIGH	MUNMURRA		0-500 ppm				776369	6435007	32.1875	149.9314
GW033072	80BL025911	Well	Private		6.0		BLIGH	MUNMURRA		1001-3000 ppm				776553	6435062	32.18694	149.9333
GW037617	80BL031019	Bore	Private	1/05/1974	34.7	34.7	PHILLIP	BAYL		Good				758812	6405008	32.46194	149.7536
GW042766	80BL101929	Bore open thru rock	Private	1/05/1976	33.5	33.5	PHILLIP	BAYL		1001-3000 ppm				758390	6405130	32.46083	149.7489
GW043914	80BL100507	Bore	Private	1/08/1974	25.6	25.6	BLIGH	BUNGABA		(Unknown)				749038	6436142	32.18371	149.6414
GW043929	80BL101945	Bore open thru rock	Private	1/03/1975	45.7	45.7	PHILLIP	COOYAL	8.5	501-1000 ppm				755664	6408960	32.42706	149.7199
GW045626	80BL104997	Bore	Private	1/12/1976	22.5	23.0	PHILLIP	COOYAL		(Unknown)				759304	6406609	32.4475	149.7583
GW047036	80BL104861	Bore	Private	1/12/1977	40.0	40.0	PHILLIP	COOYAL		(Unknown)				759844	6406717	32.44639	149.7639
GW047685	80BL111647	Bore open thru rock	Private	1/07/1980	61.0	61.0	BLIGH	COPE		Good				749030	6423073	32.30149	149.6448
GW047685	80BL111647	Bore open thru rock	Private	1/07/1980	61.0	61.0	BLIGH	COPE		Good				749030	6423073	32.30149	149.6448
GW048581	80BL108387	Bore	Private	1/05/1978	18.0	18.0	PHILLIP	COOYAL		(Unknown)				757286	6407997	32.43528	149.7364
GW048604	80BL108824	Bore	Private	1/09/1978	25.0	25.0	BLIGH	BUNGABA		(Unknown)				750087	6436425	32.18093	149.6523
GW051150	20BL113573	Bore open thru rock	Private	1/07/1980	31.3	31.3	PHILLIP	WOLLAR		Fresh				778750	6416130	32.35694	149.9622
GW051252	20BL113924	Bore open thru rock	Private	1/06/1980	33.5	33.5	PHILLIP	WOLLAR		Fresh				777355	6415774	32.36056	149.9475
GW051582	20BL111698	Bore	Private	1/03/1980	38.1	38.1	PHILLIP	WOLLAR		Poor				777481	6415887	32.35944	149.9486
GW051694	80BL113019	Bore open thru rock	Private	1/07/1980	74.7	74.7	PHILLIP	COOYAL		Good				756990	6407180	32.44278	149.7336
GW051718	80BL106359	Bore	Private	1/05/1977	48.0	48.0	PHILLIP	COOYAL		(Unknown)				757050	6407850	32.43667	149.7339
GW052150	80BL113300	Bore	Private	1/01/1981	20.9	20.9	PHILLIP	BAYL		Fresh				758510	6405680	32.45583	149.75
GW052937	20BL112342	Bore open thru rock	Private	1/04/1980	42.7	42.7	PHILLIP	WOLLAR		Fresh				777610	6416668	32.35194	149.9706
GW053260	20BL119252	Well	Private		6.8		PHILLIP	FITZGERALD		(Unknown)				779950	6406780	32.44083	149.9775
GW053265	20BL119251	Well	Private		5.2		PHILLIP	FITZGERALD		(Unknown)				779880	6406800	32.44083	149.9769
GW053687	80BL134207	Bore open thru rock	Private	1/02/1983	62.0	62.0	PHILLIP	WIALDRA		Fresh				749311	6419583	32.33288	149.6487
GW054176	80BL113777	Bore	Private	1/02/1983	35.7		PHILLIP	WIALDRA		Fresh				749311	6419583	32.33288	149.6487
GW054254	20BL114935	Bore	Private	1/06/1980	35.1	35.1	PHILLIP	COOYAL		(Unknown)				760015	6409400	32.42222	149.765
GW054498	20BL116298	Bore	Private	1/09/1981	18.3	18.3	PHILLIP	FITZGERALD		Good				777320	6405740	32.45083	149.95
GW054519	80BL116356	Bore open thru rock	Private	1/03/1981	46.3	46.3	PHILLIP	PRICE		Good				767950	6405200	32.45806	149.8506
GW054759	80BL117670	Bore	Private	1/06/1981	42.7	42.7	PHILLIP	BAYL		Good				757575	6405460	32.45806	149.7403
GW055472	20BL120565	Bore open thru rock	Private	1/09/1981	91.5	91.5	BLIGH	BOBADEEN		Good				767090	6440738	32.13815	149.8314
GW055515	80BL120656	Bore open thru rock	Private	1/07/1981	61.0	61.0	PHILLIP	COOYAL		Fresh				755300	6406950	32.44528	149.7156
GW057032	80BL124602	Bore	Private	1/02/1981	54.6	54.6	PHILLIP	WOLLAR		(Unknown)				778350	6414110	32.37528	149.9583
GW057528	80BL125783	Bore	Private	1/05/1983	18.2	18.2	PHILLIP	COOYAL		(Unknown)				757180	6406100	32.4525	149.7358
GW059029	80BL116773	Bore	Private	1/06/1983	42.6	42.6	PHILLIP	COOYAL		Potable				756310	6406440	32.44972	149.7264
GW059030	80BL116773	Bore	Private	1/01/1981	44.0	44.0	PHILLIP	COOYAL		(Unknown)				759615	6406700	32.44639	149.7617
GW059559	20BL131333	Bore	Private	1/07/1984	45.8	45.8	PHILLIP	COOYAL		(Unknown)				759650	6406875	32.445	149.7619
GW060802		Bore	Private	1/07/1984	36.6		PHILLIP	WOLLAR		3001-7000 ppm				777561	6415829	32.36	149.9494
GW060803		Bore	Private	1/04/1985		45.7	PHILLIP	COOYAL		(Unknown)				755150	6406775	32.44694	149.7142
GW060804	80BL132260	Bore	Private	1/04/1985	45.7	45.7	PHILLIP	COOYAL		(Unknown)				755180	6406860	32.44611	149.7144
GW061459	80BL133682	Bore	Private	1/01/1986	23.1	23.1	PHILLIP	COOYAL		(Unknown)				755250	6406820	32.44639	149.715
GW061480	80BL133931	Bore	Private	1/02/1986	18.5	18.5	PHILLIP	BAYL		Fresh				757500	6406300	32.45972	149.7394
GW061514	80BL134032	Bore	Private	1/01/1980	51.8		PHILLIP	COOYAL		(Unknown)				755845	6406325	32.45083	149.7217

Reg No	Licence	Type	Owner	Completed	Depth	Drilled depth	County	Parish	SWL	Salinity	Comment	Yield	Comment	Easting MGA	Northing MGA	Lat	Long
GW062319	80BL137662	Bore	Private	1/06/1988	46.2	46.2	PHILLIP	BAYLY		710.4	Fresh			758690	6405440	32.45806	149.7519
GW062319	80BL137662	Bore	Private	1/06/1988	46.2	46.2	PHILLIP	BAYLY		710.4	Fresh			758690	6405440	32.45806	149.7519
GW062806	80BL137662	Bore	Private	1/06/1986	67.0	67.0	PHILLIP	WALDRA			(Unknown)			749260	6415423	32.37038	149.6492
GW065222	20BL143078	Bore	Private	24/08/1989	36.5		BLIGH	UARBRA			Good			758737	6444376	32.10732	149.742
GW066420	20BL143078	Bore	Private				PHILLIP	WOLLAR						779320	6416330	32.355	149.9681
GW066711	20BL143246	Bore	Private				BLIGH	BOBADEEN						765593	6440654	32.13926	149.8156
GW070892	80BL152297	Bore	Private	12/05/1993	47.2	47.2	PHILLIP	BAYLY			Good			761877	6405412	32.4575	149.7858
GW070937	80BL152298	Bore	Private	16/05/1993	57.0	57.0	PHILLIP	BAYLY			Good			761100	6405600	32.45607	149.7786
GW078130		Well	Private		4.0		PHILLIP	CUMBO						770535	6411152	32.40389	149.8764
GW078159		Well	Private		5.0		PHILLIP	CUMBO						770125	6409988	32.41444	149.8722
GW078162		Well	Private		6.0		PHILLIP	CUMBO						769880	6409095	32.4225	149.87
GW078189		Well	Private				PHILLIP	WOLLAR						777764	6416596	32.35506	149.9514
GW078206		Bore	Private				PHILLIP	CUMBO						777385	6415858	32.35972	149.9478
GW078212		Well	Private				PHILLIP	WOLLAR						777707	6416655	32.35245	149.9509
GW078225		Bore	Private				PHILLIP	WOLLAR						777604	6416506	32.35382	149.9498
GW078231		Well	Private				PHILLIP	FITZGERALD						778828	6408978	32.42134	149.965
GW078542	20BL166952	Bore	Private	16/09/1997	72.0	72.0	BLIGH	DURRIGERE						775529	6433668	32.19972	149.9219
GW080105		Bore	Private	1/02/1993	4.5		BLIGH	MUNMURRA	1.1	5875.0				776530	6436724	32.17194	149.9317
GW080106		Bore	Private	1/02/1993	4.5		BLIGH	MUNMURRA	1.0	2368.0				776633	6436629	32.17278	149.9328
GW080107		Bore	Private	1/02/1993	7.5		BLIGH	DURRIGERE	2.3	12672.0				776070	6436809	32.17128	149.9276
GW080108		Bore	Private	1/02/1993	4.5		BLIGH	DURRIGERE	2.5	7462.0				775756	6436283	32.17611	149.9236
GW080109		Bore	Private	1/02/1993	3.0		BLIGH	DURRIGERE	1.4	7840.0				775758	6436283	32.17611	149.9236
GW080110		Bore	Private	1/02/1993	5.5		BLIGH	DURRIGERE						775855	6436002	32.17861	149.9247
GW080113		Bore	Private	1/02/1993	4.5		BLIGH	DURRIGERE	2.3	2580.0				775155	6435343	32.18472	149.9175
GW080114		Bore	Private	1/02/1993	4.0		PHILLIP	DURRIGERE	2.4	2675.0				775155	6435343	32.18472	149.9175
GW080120		Well	Private				PHILLIP	CUMBO						770880	6410781	32.40705	149.8801
GW080121		Bore	Private				PHILLIP	WOLLAR						777903	6418897	32.33221	149.9523
GW080122		Well	Private				PHILLIP	WOLLAR						778054	6418653	32.33437	149.954
GW080123		Well	Private				PHILLIP	WOLLAR						778115	6418310	32.33744	149.9547
GW080125		Well	Private				PHILLIP	WOLLAR						777521	6414383	32.37297	149.9496
GW080127		Well	Private				PHILLIP	WOLLAR						777810	6415503	32.36281	149.9523
GW080128		Well	Private				NORTHUMBERLAND	ROTHBURY						771830	6416072	32.35926	149.8687
GW080135		Bore	Private		20.0		BLIGH	BOBADEEN						677004	6440831	32.13734	149.8305
GW080412		Bore	Landcare Group	9/01/2003	6.0	6.0	PHILLIP	CUMBO						778116	6417714	32.34281	149.9549
GW080413		Bore	Landcare Group	9/01/2003	8.5	8.5	PHILLIP	CUMBO	5.6	1300.0				778096	6417643	32.34346	149.9547
GW200575	20BL168100	Bore	Mines	4/03/2003	2.5	2.5	BLIGH	BOBADEEN						756363	6439535	32.15149	149.7182
GW200576	20BL168100	Bore	Mines	4/03/2003	4.0	4.0	BLIGH	BOBADEEN						756113	6439185	32.1547	149.7156
GW200577	20BL168100	Bore	Mines	4/03/2003	7.3	7.3	BLIGH	BOBADEEN						756713	6440085	32.14646	149.7217
GW200578	20BL168100	Bore	Mines	4/03/2003	2.6	2.6	BLIGH	BOBADEEN						757213	6439385	32.15265	149.7272
GW200579	20BL168100	Bore	Mines	5/03/2003	11.5	11.5	BLIGH	BOBADEEN						758663	6438085	32.16399	149.745
GW200580	20BL168100	Bore	Mines	4/03/2003	7.5	7.5	BLIGH	BOBADEEN	5.8					757663	6437635	32.16832	149.7324
GW200581	20BL168100	Bore	Mines	5/03/2003	3.5	3.5	BLIGH	BOBADEEN						758113	6437885	32.16596	149.7371
GW200582	20BL168100	Bore	Mines	5/03/2003	1.0	1.0	BLIGH	BOBADEEN						760013	6434785	32.19346	149.7581
GW200583	20BL168100	Bore	Mines	4/03/2003	2.7	2.7	BLIGH	BOBADEEN						759063	6435485	32.16188	149.7479
GW200657	20BL167090	Bore	Private	31/12/1987	30.0		PHILLIP	MOOLARBEN				15.0		763775	6415996	32.36188	149.8032
GW800067	80BL144679	Bore	Private	30/11/1991	90.0	90.0	PHILLIP	WALDRA			Good			749125	6419495	32.33371	149.6467
GW800069	80BL144784	Bore	Private	30/11/1991	43.0	43.0	PHILLIP	WALDRA			Good			749201	6419370	32.33482	149.6476
GW800273	80BL236739	Bore	Private	5/12/1995	48.7	48.7	PHILLIP	PRICE			Good			764100	6405850	32.45506	149.8094
GW800714	80BL236792	Bore	Private	11/09/1995	63.0	63.0	BLIGH	BUNGABA						749638	6430634	32.23322	149.6492
GW800759	80BL236221	Bore	Private	21/10/1994	52.5	52.5	PHILLIP	COYAL			Good			759700	6406800	32.44559	149.7624
GW801199	80BL236002	Bore	Private	1/01/1994			PHILLIP	BAYLY						756846	6405418	32.45861	149.7325
GW801199	80BL236002	Bore	Private	1/01/1994			PHILLIP	BAYLY						756846	6405418	32.45861	149.7325
GW801611	80BL239681	Bore	Private	1/08/2002	24.0	24.0	PHILLIP	COYAL						759905	6407240	32.44157	149.7645
GW801625	80BL237200	Bore	Private	1/08/2002	24.0	24.0	PHILLIP	COYAL						759905	6407240	32.44157	149.7645
GW801903	80BL238245	Bore	Private	24/08/1998	70.0	70.0	PHILLIP	BLIGH	6.0		(Unknown)	3.8	Cumulative	758906	6405720	32.45561	149.7543
GW802173	80BL237593	Bore	Private	31/7/1997	61.0	61.0	PHILLIP	COYAL	9.1		Good	25.2		758875	6406760	32.44614	149.7537
GW802243	80BL242395	Bore	Private	28/09/2004	64.0	64.0	PHILLIP	WALDRA						749433	6419694	32.33185	149.6499
GW802400	80BL140043	Bore	Private	22/08/1989	46.3	46.3	PHILLIP	BAYLY	21.9		Fresh	6.3		758835	6405005	32.44196	149.7537

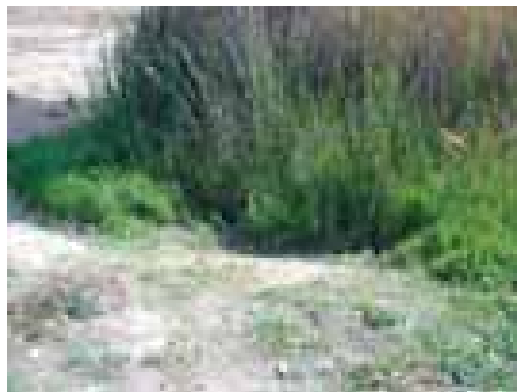
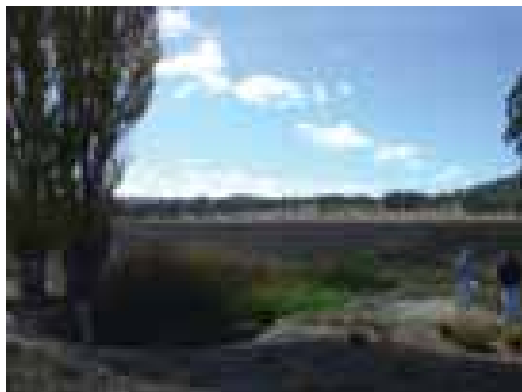
Reg No	Licence	Type	Owner	Completed	Depth	Drilled depth	County	Parish	SWL	Salinity	Comment	Yield	Comment	Easting MGA	Northing MGA	Lat	Long
GW802481	80BL239880	Bore	Private	27/08/2002	48.0	48.0	PHILLIP	BAYLY	15.0		(Unknown)	0.1		760566	6406206	32.45976	149.7713
GW802987	80BL238658	Bore	Private	30/07/1995	64.0	64.0	PHILLIP	PRICE	21.3		S.Brackish	0.2		768298	6405445	32.45587	149.8542
GW803062	80BL243230	Bore	Private	27/02/2006	21.0	21.0	BLIGH	UARBRY	9.0			1.5	Cumulative	750973	6443455	32.11738	149.66
GW803063	80BL243231	Bore	Private	23/02/2006	15.0	15.0	BLIGH	UARBRY	8.5			0.5		751673	6443295	32.11867	149.6875
GW803064	80BL243232	Bore	Private	21/02/2006	25.0	25.0	BLIGH	NANDOURA						754593	6444900	32.10934	149.6928
GW803065	80BL243233	Bore	Private	22/02/2006	14.0	14.0	BLIGH	NANDOURA						754088	6444270	32.10934	149.6928
GW803072	80BL243297	Well	Private	16/06/1961	5.0	10.0	PHILLIP	EURUNDURY	3.0					750023	6406300	32.45242	149.6597
GW803074	80BL243298	Well	Private	16/03/1837	10.0	10.0	PHILLIP	WALDRA	4.0					750403	6406555	32.45004	149.6637
GW803076	80BL243299	Well	Private	30/03/1961	10.0	10.0	PHILLIP	WALDRA	4.0					750528	6406250	32.45276	149.6651
GW803147	80BL243472	Bore	Private	9/08/2006	73.0		PHILLIP	WALDRA						750189	6417455	32.35186	149.6585
GW803209	80BL243227	Bore	Private	7/06/2006	43.0	43.0	PHILLIP	COOVAL	19.0			0.8		753719	6410619	32.41266	149.6979
GW803230	80BL241941	Bore	Private	10/12/2003	40.0	40.0	PHILLIP	WALDRA	16.0			0.1	Cumulative	751046	6417957	32.34714	149.6875
GW803350	80BL243672	Bore	Private	23/12/2006	90.0	90.0	PHILLIP	COOVAL	7.0			1.0	Cumulative	751423	6406455	32.44933	149.7383
GW803438	80BL244260	Bore	Private	30/04/2007	57.0	57.0	PHILLIP	WALDRA	28.0			0.1		752997	6418758	32.33948	149.688

**APPENDIX D:  
CENSUS SITE DATA**

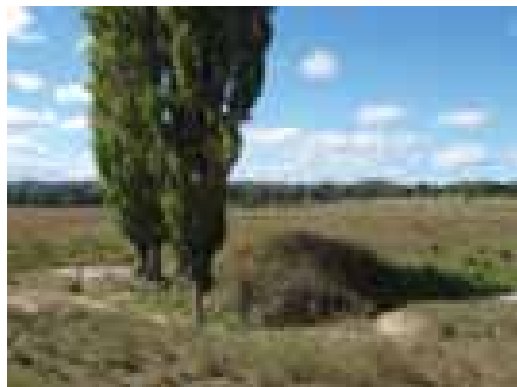
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**Site No:** 001  
**Name:** Poplars  
**Property:** Rayner  
**Description:** Spring / soak on Lagoon Creek  
**MGA Coordinates:** 6417079.983 N 759268.111 E  
**Elevation:** 476.658 m AHD

**Date inspected:** 3 May 2005      **Water Quality (field):** pH 6.28    EC 0.93 mS      T 16.1 °C



**Date inspected:** 21 April 2009      **Water Quality (field):** pH 6.95    EC 0.286 mS      T 17.7 °C



Laboratory Analysis Results				
Analyte	Units	LOR	3 May 2005	21 April 2009
TSS	mg/L @ 105°C	1	64	358
TDS	mg/L @ 180°C	1	230	188
pH		0.1	6.6	6.5
EC	µS/cm	1	375	270
Potassium	mg/L	0.1	4.9	2.9
Sodium	mg/L	1	37	26
Calcium	mg/L	1	20	16
Magnesium	mg/L	0.1	9.4	9.7
Cation sum	meq/L	0.01	3.51	2.8
Chloride	mg/L	1	37	21
Sulphate	mg/L	1	56	65
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	46	40
Anion sum	meq/L	0.01	3.13	2.74
Ionic difference	%		5.7%	
Allowable difference	%		2.0%	
Aluminium				<0.02
Arsenic				<0.001
Boron				0.01
Cadmium				<0.00005
Chromium				<0.002
Cobalt				0.0002
Copper				0.0011
Iron				0.18
Lead				0.00014
Manganese				0.042
Mercury				<0.0001
Nickel				<0.001
Selenium				<0.001
Silver				<0.001
Zinc				<0.005
Phosphorous(Reactive)				0.02
Phosphorous (Total)				0.67
Flouride				0.4
Nitrogen (Total)				13
Ammonial Nitrogen				0.49
Nitrates				0.02

Minor metals and nutrients not analysed during initial survey.

**Site No:** 002  
**Name:** Reedy Lagoon  
**Property:** Rainer  
**Description:** Spring / soak (waterhole on Lagoon Creek)  
**MGA Coordinates:** 6417425.633 N 759486.562 E  
**Elevation:** 470.794 m AHD

**Date inspected:** 3 May 2005      **Water Quality (field):** pH 7.0      EC 5.4 mS      T ? °C



**Date inspected:** 21 April 2009      **Water Quality (field):** pH 7.47      EC 3.58 mS      T 19.9 °C



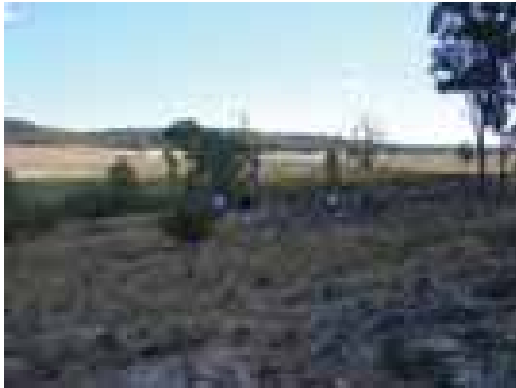
Laboratory Analysis Results				
Analyte	Units	LOR	3 May 2005	21 April 2009
TSS	mg/L @ 105°C	1	6	3
TDS	mg/L @ 180°C	1	3400	2288
pH		0.1	7.0	7.2
EC	µS/cm	1	5040	3380
Potassium	mg/L	0.1	12	12
Sodium	mg/L	1	570	420
Calcium	mg/L	1	230	162
Magnesium	mg/L	0.1	200	126
Cation sum	meq/L	0.01	53.0	37
Chloride	mg/L	1	1100	780
Sulphate	mg/L	1	480	392
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	411	310
Anion sum	meq/L	0.01	49.2	36.4
Ionic difference	%		3.7%	
Allowable difference	%		5.0%	
Aluminium				0.02
Arsenic				<0.001
Boron				0.03
Cadmium				<0.00005
Chromium				<0.002
Cobalt				0.0004
Copper				0.0027
Iron				0.08
Lead				0.00015
Manganese				0.14
Mercury				<0.0001
Nickel				0.003
Selenium				<0.001
Silver				<0.001
Zinc				<0.005
Phosphorous(Reactive)				0.03
Phosphorous (Total)				0.03
Flouride				0.9
Nitrogen (Total)				0.46
Ammonial Nitrogen				0.02
Nitrates				<0.01

Minor metals and nutrients not analysed during initial survey.

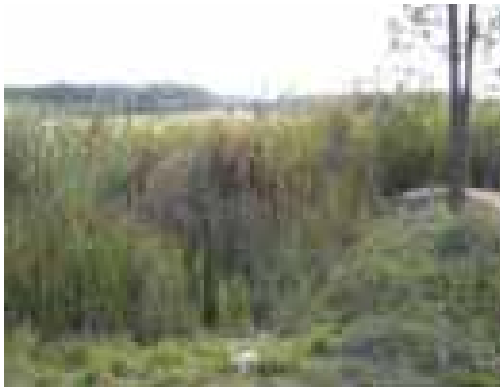


**Site No:** 003  
**Name:** Schoolyard paddock  
**Property:** Rayner  
**Description:** Spring - on Lagoon Creek...  
**MGA Coordinates:** 6417909.792 N 759621.965 E  
**Elevation:** 464.5 m AHD

**Date inspected:** 3 May 2005      **Water Quality (field):** pH 7.5      EC 4.5 mS/cm



**Date inspected:** 21 April 2009      **Water Quality (field):** pH 7.88      EC 5.47 mS/cm      T 20.1 °C



Laboratory Analysis Results				
Analyte	Units	LOR	3 May 2005	21 April 2009
TSS	mg/L @ 105°C	1	4	3
TDS	mg/L @ 180°C	1	3100	3731
pH		0.1	7.5	7.6
EC	µS/cm	1	4490	5300
Potassium	mg/L	0.1	9.5	11
Sodium	mg/L	1	430	532
Calcium	mg/L	1	280	336
Magnesium	mg/L	0.1	170	205
Cation sum	meq/L	0.01	46.9	57.1
Chloride	mg/L	1	1300	1400
Sulphate	mg/L	1	710	761
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	244	300
Anion sum	meq/L	0.01	56.3	61.3
Ionic difference	%		9.1%	
Allowable difference	%		2.0%	
Aluminium				0.02
Arsenic				<0.001
Boron				0.01
Cadmium				<0.00005
Chromium				<0.002
Cobalt				0.0005
Copper				0.003
Iron				0.01
Lead				0.00015
Manganese				0.008
Mercury				<0.0001
Nickel				0.005
Selenium				<0.001
Silver				<0.001
Zinc				<0.005
Phosphorous(Reactive)				0.03
Phosphorous (Total)				0.02
Flouride				0.7
Nitrogen (Total)				1.2
Ammonial Nitrogen				0.03
Nitrates				<0.01

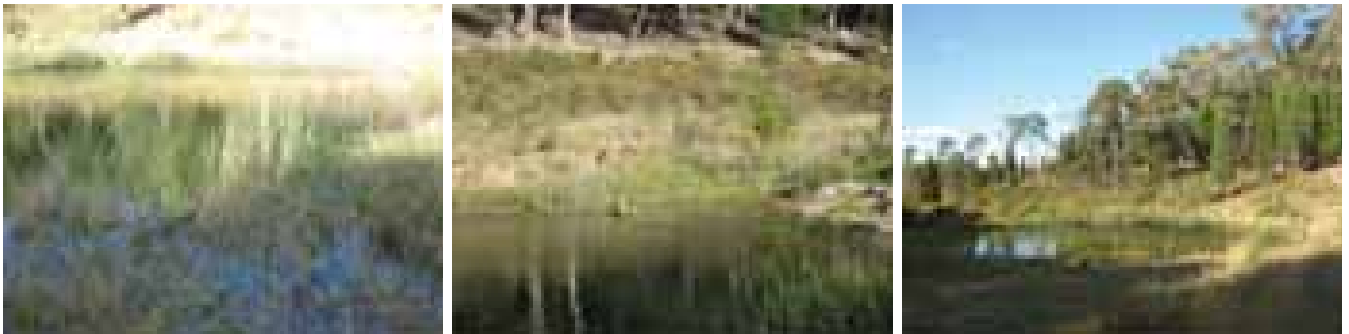
Minor metals and nutrients not analysed during initial survey.

**Site No:** 004  
**Name:** Browns Gully...  
**Property:** Rainer  
**Description:** Dam fed by seepage  
**MGA Coordinates:** 6417051.932 N 761489.352 E  
**Elevation:** 522.062 m AHD

**Date inspected:** 3 May 2005      **Water Quality (field):** pH 7.1      EC 0.26 Ms/cm      T ? °C



**Date inspected:** 21 April 2009      **Water Quality (field):** pH 8.48      EC 0.247 mS/cm      T 20.8 °C



Laboratory Analysis Results				
Analyte	Units	LOR	3 May 2005	21 April 2009
TSS	mg/L @ 105°C	1	14	7
TDS	mg/L @ 180°C	1	150	123.5
pH		0.1	7.1	8.5
EC	µS/cm	1	265	190
Potassium	mg/L	0.1	4.4	6.4
Sodium	mg/L	1	41	22
Calcium	mg/L	1	2.9	6
Magnesium	mg/L	0.1	5.9	7.2
Cation sum	meq/L	0.01	2.53	2.01
Chloride	mg/L	1	38	25
Sulphate	mg/L	1	1.2	<2
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	67	45
Anion sum	meq/L	0.01	2.44	1.6
Ionic difference	%		1.8%	
Allowable difference	%		2.0%	
Aluminium				0.03
Arsenic				<0.001
Boron				0.04
Cadmium				<0.00005
Chromium				<0.002
Cobalt				<0.0002
Copper				<0.0005
Iron				0.22
Lead				0.00018
Manganese				0.014
Mercury				<0.0001
Nickel				<0.001
Selenium				<0.001
Silver				<0.001
Zinc				<0.005
Phosphorous(Reactive)				0.02
Phosphorous (Total)				0.03
Flouride				0.2
Nitrogen (Total)				0.77
Ammonial Nitrogen				0.03
Nitrates				<0.01

Minor metals and nutrients not analysed during initial survey.

**Site No:** 005  
**Name:** Emu Paddock dam  
**Property:** Rayner  
**Description:** Spring fed dam  
**MGA Coordinates:** 6418308.351 N 761435.356 E  
**Elevation:** 475.938 m AHD

**Date inspected:** 3 May 2005      **Water Quality (field):** pH 6.83    EC 0.34 mS/cm    T 17.4 °C



**Date inspected:** 21 April 2009      **Water Quality (field):** pH 8.66    EC 0.1219 mS/cm    T 21.1 °C



Laboratory Analysis Results				
Analyte	Units	LOR	3 May 2005	21 April 2009
TSS	mg/L @ 105°C	1	7.2	7
TDS	mg/L @ 180°C	1	295	94.5
pH		0.1	12	8.5
EC	µS/cm	1	170	100
Potassium	mg/L	0.1	<1	4
Sodium	mg/L	1	94	12
Calcium	mg/L	1	28	5
Magnesium	mg/L	0.1	4.2	5.9
Cation sum	meq/L	0.01	1.4	1.36
Chloride	mg/L	1	8.5	7
Sulphate	mg/L	1	47	<2
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	2.3	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	2.87	36
Anion sum	meq/L	0.01	2.76	0.92
Ionic difference	%		2.1%	
Allowable difference	%		2.0%	
Aluminium				0.64
Arsenic				0.001
Boron				0.03
Cadmium				<0.00005
Chromium				<0.002
Cobalt				<0.0002
Copper				0.0013
Iron				1.2
Lead				0.00058
Manganese				0.005
Mercury				<0.0001
Nickel				0.002
Selenium				<0.001
Silver				<0.001
Zinc				<0.005
Phosphorous(Reactive)				0.02
Phosphorous (Total)				0.03
Flouride				0.2
Nitrogen (Total)				0.72
Ammonial Nitrogen				0.03
Nitrates				<0.01

Minor metals and nutrients not analysed during initial survey.

**Site No:** 006  
**Name:** Hillside House Dam.  
**Property:** Rayner  
**Description:** Spring fed dam  
**MGA Coordinates:** 6416803.907 N 760339.504 E  
**Elevation:** 512.262 m AHD

**Date inspected:** 3 May 2005      **Water Quality (field):** pH 6.80    EC 0.28 mS/cm    T 18.7 °C

NO PHOTO

**Date inspected:** 21 April 2009      **Water Quality (field):** pH 8.66    EC 0.1219 mS/cm    T 21.1 °C



Laboratory Analysis Results				
Analyte	Units	LOR	3 May 2005	21 April 2009
TSS	mg/L @ 105°C	1	42	5
TDS	mg/L @ 180°C	1	950	122
pH		0.1	7.5	7.9
EC	µS/cm	1	195	160
Potassium	mg/L	0.1	8.0	7.8
Sodium	mg/L	1	19	14
Calcium	mg/L	1	4.8	10
Magnesium	mg/L	0.1	9.1	10
Cation sum	meq/L	0.01	2.02	2.13
Chloride	mg/L	1	9.8	7
Sulphate	mg/L	1	9.0	<2
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	71	71
Anion sum	meq/L	0.01	1.88	1.62
Ionic difference	%		3.5%	
Allowable difference	%		2.0%	
Aluminium				0.14
Arsenic				0.002
Boron				0.03
Cadmium				<0.00005
Chromium				<0.002
Cobalt				0.0004
Copper				0.0021
Iron				0.15
Lead				0.00038
Manganese				0.04
Mercury				<0.0001
Nickel				0.002
Selenium				<0.001
Silver				<0.001
Zinc				<0.005
Phosphorous(Reactive)				0.02
Phosphorous (Total)				0.05
Flouride				0.7
Nitrogen (Total)				1.4
Ammonial Nitrogen				0.3
Nitrates				<0.01

Minor metals and nutrients not analysed during initial survey.

**Site No:** 007  
**Name:** Croydon House bore  
**Property:** Mayberry  
**Description:** Bore  
**MGA Coordinates:** 6415647.277 N 763817.945 E  
**Elevation:** 495.046 m AHD

**Date inspected:** 3 May 2005      **Water Quality (field):** pH 7.9      EC 1.6 mS/cm      T



**Date inspected:** 21 April 2009      **Water Quality (field):** pH 7.02      EC 1.823 mS/cm      T 14.2 °C



**Laboratory Analysis Results**

Analyte	Units	LOR	3 May 2005	21 April 2009
TSS	mg/L @ 105°C	1	300	<2
TDS	mg/L @ 180°C	1	1100	1197
pH		0.1	7.9	7.2
EC	µS/cm	1	1590	1960
Potassium	mg/L	0.1	79	18
Sodium	mg/L	1	160	170
Calcium	mg/L	1	36	105
Magnesium	mg/L	0.1	47	77
Cation sum	meq/L	0.01	14.6	19.4
Chloride	mg/L	1	310	347
Sulphate	mg/L	1	34	150
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	188	356
Anion sum	meq/L	0.01	2.76	20
Ionic difference	%		5.1%	
Allowable difference	%		5.0%	
Aluminium				<0.02
Arsenic				<0.001
Boron				0.02
Cadmium				<0.00005
Chromium				<0.001
Cobalt				<0.0002
Copper				0.0012
Iron				0.02
Lead				<0.00005
Manganese				0.025
Mercury				<0.0001
Nickel				0.002
Selenium				<0.001
Silver				<0.001
Zinc				<0.005
Phosphorous(Reactive)				0.02
Phosphorous (Total)				<0.01
Flouride				0.6
Nitrogen (Total)				0.35
Ammonial Nitrogen				0.02
Nitrates				0.3

Minor metals and nutrients not analysed during initial survey.

**Site No:** 008  
**Name:** Lower Pig Trap Dam  
**Property:** Mayberry  
**Description:** Spring fed dam  
**MGA Coordinates:** 6417524.566 N 763776.91 E  
**Elevation:** 491.97 m AHD

**Date inspected:** 3 May 2005      **Water Quality (field):** pH 8.35    EC 2.26 mS/cm    T 16.9 °C



**Date inspected:** 21 April 2009      **Water Quality (field):** pH DRY    EC DRY    T DRY



Laboratory Analysis Results				
Analyte	Units	LOR	3 May 2005	21 April 2009
TSS	mg/L @ 105°C	1	9300	Dam Dry
TDS	mg/L @ 180°C	1	2200	
pH		0.1	8.0	
EC	µS/cm	1	2120	
Potassium	mg/L	0.1	440	
Sodium	mg/L	1	22	
Calcium	mg/L	1	28	
Magnesium	mg/L	0.1	46	
Cation sum	meq/L	0.01	17.4	
Chloride	mg/L	1	170	
Sulphate	mg/L	1	<1.0	
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	678	
Anion sum	meq/L	0.01	18.4	
Ionic difference	%		2.7%	
Allowable difference	%		5.0%	
Aluminium				
Arsenic				
Boron				
Cadmium				
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Manganese				
Mercury				
Nickel				
Selenium				
Silver				
Zinc				
Phosphorous(Reactive)				
Phosphorous (Total)				
Flouride				
Nitrogen (Total)				
Ammonial Nitrogen				
Nitrates				

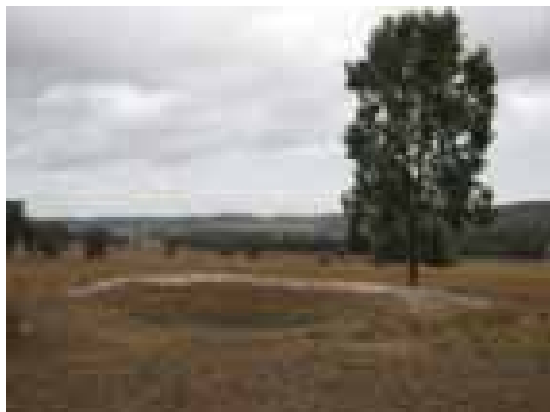
Minor metals and nutrients not analysed during initial survey.

**Site No:** 009  
**Name:** Upper Pig trap Dam  
**Property:** Mayberry  
**Description:** Not sampled  
**MGA Coordinates:** 6417794.196 N 763813.483 E  
**Elevation:** 502.711 m AHD

**Date inspected:** 3 May 2005      **Water Quality (field):** Site dry

NO PHOTO

**Date inspected:** 21 April 2009      **Water Quality (field):** Site dry



**Site No:** 012-013  
**Name:** Fernmount House Bore  
**Property:** Mayberry  
**Description:** Bore  
**MGA Coordinates:** 6415475.664 N 761122.977 E  
**Elevation:** 507.825 m AHD (top of casing)

**Date inspected:** 3 May 2005      **Water Quality (field):** pH 6.37    EC 1.84 mS/cm    T 18.6 °C



**Date inspected:** 21 May 2009      **Water Quality (field):** Site Inaccessible



Laboratory Analysis Results				
Analyte	Units	LOR	3 May 2005	21 May 2009
TSS	mg/L @ 105°C	1	8	No Sample Site Inaccessible
TDS	mg/L @ 180°C	1	940	
pH		0.1	6.8	
EC	µS/cm	1	1610	
Potassium	mg/L	0.1	11	
Sodium	mg/L	1	140	
Calcium	mg/L	1	89	
Magnesium	mg/L	0.1	64	
Cation sum	meq/L	0.01	16.1	
Chloride	mg/L	1	240	
Sulphate	mg/L	1	110	
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	335	
Anion sum	meq/L	0.01	15.8	
Ionic difference	%		1.0%	
Allowable difference	%		5.0%	
Aluminium				
Arsenic				
Boron				
Cadmium				
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Manganese				
Mercury				
Nickel				
Selenium				
Silver				
Zinc				
Phosphorous(Reactive)				
Phosphorous (Total)				
Flouride				
Nitrogen (Total)				
Ammonial Nitrogen				
Nitrates				

Minor metals and nutrients not analysed during initial survey.



Appendix E | Groundwater Impact Assessment

**Site No:** 014  
**Name:** Flat Dam (foreground)  
**Property:** Mayberry  
**Description:** Spring fed dam  
**MGA Coordinates:** 6415310.07 N 761172.576 E  
**Elevation:** 509.337 m AHD

**Date inspected:** 3 May 2005      **Water Quality (field):** Not sampled, as dam has been topped up with bore water.



**Date inspected:** 21 May 2009      **Water Quality (field):** Not sampled, as dam has been topped up with bore water.



**Site No:** 015  
**Name:** Cattleyard Dam (background)  
**Property:** Mayberry  
**Description:** Spring fed dam  
**MGA Coordinates:** 6415168.539 N 761222.239 E  
**Elevation:** 512.400 m AHD

**Date inspected:** 3 May 2005      **Water Quality (field):** Not sampled, as dam has been topped up with bore water.

NO PHOTO

**Date inspected:** 21 May 2009      **Water Quality (field):** Not sampled, as dam has been topped up with bore water.



**Site No:** 016  
**Name:** Shearing Shed dam  
**Property:** Mayberry  
**Description:** Spring fed dam  
**MGA Coordinates:** 6415294.550 N 760973.441 E  
**Elevation:** 510.195 m AHD

**Date inspected:** 3 May 2005      **Water Quality (field):** pH 6.92    EC 0.95 mS/cm    T 18.2 °C



**Date inspected:** 21 May 2009      **Water Quality (field):** pH 7.94    EC 0.47mS/cm    T 15.8 °C



Laboratory Analysis Results				
Analyte	Units	LOR	3 May 2005	21 May 2009
TSS	mg/L @ 105°C	1	36	54
TDS	mg/L @ 180°C	1	510	322
pH		0.1	7.1	7.8
EC	µS/cm	1	865	500
Potassium	mg/L	0.1	27	28
Sodium	mg/L	1	100	60
Calcium	mg/L	1	8.1	3.8
Magnesium	mg/L	0.1	22	11
Cation sum	meq/L	0.01	7.26	4.42
Chloride	mg/L	1	170	96
Sulphate	mg/L	1	76	19
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	48	60
Anion sum	meq/L	0.01	7.34	4.3
Ionic difference	%		0.6%	
Allowable difference	%		2.0%	
Aluminium				0.1
Arsenic				0.004
Boron				0.08
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0015
Copper				0.0017
Iron				0.89
Lead				0.0011
Manganese				0.011
Mercury				<0.0001
Nickel				0.005
Selenium				<0.001
Silver				<0.001
Zinc				0.041
Phosphorous(Reactive)				0.02
Phosphorous (Total)				0.38
Flouride				0.5
Nitrogen (Total)				4.3
Ammonial Nitrogen				0.02
Nitrates				<0.1

Minor metals and nutrients not analysed during initial survey.

**Site No:** 017  
**Name:** Old Killer Dam  
**Property:** Mayberry  
**Description:** Spring fed dam  
**MGA Coordinates:** 6415530 N 761485 E  
**Elevation:** 542 m AHD

**Date inspected:** 19 May 2005      **Water Quality (field):** No Field Measurements Taken

NO PHOTO

**Date inspected:** 21 May 2009      **Water Quality (field):** pH 8.08    EC 0.854mS/cm    T 14.7 °C



Laboratory Analysis Results				
Analyte	Units	LOR	19 May 2005	21 May 2009
TSS	mg/L @ 105°C	1	340	56
TDS	mg/L @ 180°C	1	1400	638
pH		0.1	7.8	7.8
EC	µS/cm	1	1970	890
Potassium	mg/L	0.1	110	68
Sodium	mg/L	1	230	92
Calcium	mg/L	1	28	13
Magnesium	mg/L	0.1	61	27
Cation sum	meq/L	0.01	19.23	8.61
Chloride	mg/L	1	350	135
Sulphate	mg/L	1	13	15
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	478	208
Anion sum	meq/L	0.01	19.70	8.28
Ionic difference	%		1.2%	
Allowable difference	%		5.0%	
Aluminium				0.16
Arsenic				0.006
Boron				0.08
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0058
Copper				0.0017
Iron				1.2
Lead				0.0016
Manganese				0.43
Mercury				<0.0001
Nickel				0.007
Selenium				<0.001
Silver				<0.001
Zinc				0.043
Phosphorous(Reactive)				0.23
Phosphorous (Total)				1.2
Flouride				0.5
Nitrogen (Total)				9.1
Ammonial Nitrogen				1.4
Nitrates				<0.1

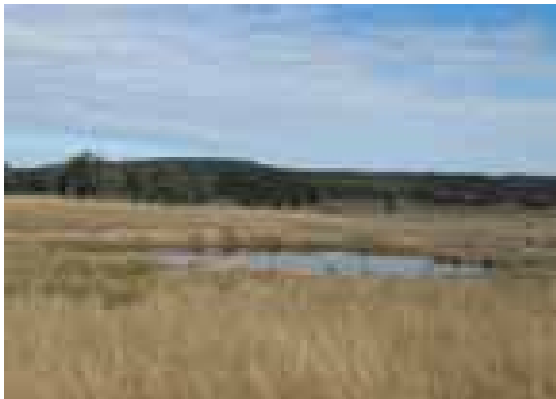
Minor metals and nutrients not analysed during initial survey.

**Site No:** 018  
**Name:** Boiling Dam  
**Property:** Swords  
**Description:** Spring fed dam  
**MGA Coordinates:** 6421881.771 N 760047.637 E  
**Elevation:** 451.312 m AHD

**Date inspected:** 28 July 2005      **Water Quality (field):** pH 6.43    EC 1.08 mS/cm    T 10.3 °C



**Date inspected:** 15 June 2009      **Water Quality (field):** pH 5.70    EC 0.927mS/cm    T 12.3 °C



### Laboratory Analysis Results

Analyte	Units	LOR	28 July 2005	15 June 2009
TSS	mg/L @ 105°C	1	10	2
TDS	mg/L @ 180°C	1	570	528
pH		0.1	7.3	6.9
EC	µS/cm	1	925	900
Potassium	mg/L	0.1	20	9.1
Sodium	mg/L	1	98	118
Calcium	mg/L	1	12	11
Magnesium	mg/L	0.1	31	27
Cation sum	meq/L	0.01	7.93	8.14
Chloride	mg/L	1	190	227
Sulphate	mg/L	1	83	64
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	64	48
Anion sum	meq/L	0.01	8.37	8.69
Ionic difference	%		2.7%	
Allowable difference	%		2.0%	
Aluminium				<0.02
Arsenic				0.001
Boron				0.04
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0002
Copper				0.0006
Iron				0.15
Lead				<0.00005
Manganese				0.015
Mercury				<0.0001
Nickel				0.004
Selenium				<0.001
Silver				<0.001
Zinc				<0.005
Phosphorous(Reactive)				0.02
Phosphorous (Total)				0.02
Flouride				0.1
Nitrogen (Total)				0.71
Ammonial Nitrogen				0.02
Nitrates				0.01

Minor metals and nutrients not analysed during initial survey.

**Site No:** 019  
**Name:** Swords (2) seep  
**Property:** Swords  
**Description:** Seepage  
**MGA Coordinates:** 6421886.390 N 759789.768 E  
**Elevation:** 442.683 m AHD

**Date inspected:** 28 July 2005      **Water Quality (field):** pH 3.41    EC 2.9 mS/cm    T 10.6 °C



**Date inspected:** 15 June 2009      **Water Quality (field):** pH 3.78    EC 3.33 mS/cm    T 12.3 °C

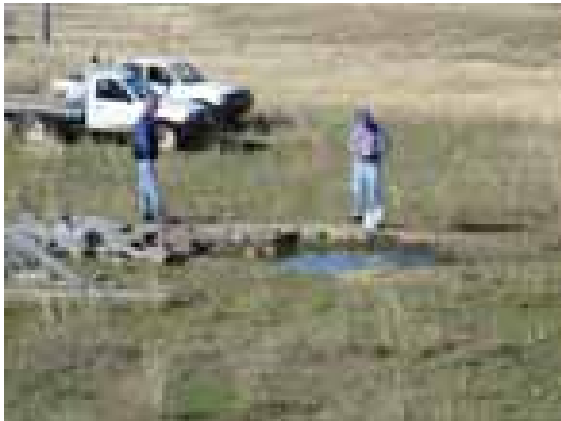


Laboratory Analysis Results				
Analyte	Units	LOR	28 July 2005	15 June 2009
TSS	mg/L @ 105°C	1	590	88
TDS	mg/L @ 180°C	1	1600	2207
pH		0.1	3.7	3.8
EC	µS/cm	1	2760	3370
Potassium	mg/L	0.1	27	34
Sodium	mg/L	1	300	460
Calcium	mg/L	1	39	54
Magnesium	mg/L	0.1	58	84
Cation sum	meq/L	0.01	23.4	30.5
Chloride	mg/L	1	610	869
Sulphate	mg/L	1	420	473
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
Anion sum	meq/L	0.01	25.9	34.4
Ionic difference	%		11.9%	
Allowable difference	%		5.0%	
Aluminium				35
Arsenic				0.003
Boron				0.02
Cadmium				0.0015
Chromium				0.001
Cobalt				0.18
Copper				0.018
Iron				2.7
Lead				0.0012
Manganese				2.9
Mercury				<0.0001
Nickel				0.23
Selenium				<0.001
Silver				<0.001
Zinc				0.87
Phosphorous(Reactive)				0.02
Phosphorous (Total)				0.05
Flouride				2.4
Nitrogen (Total)				0.82
Ammonial Nitrogen				0.04
Nitrates				<0.01

Minor metals and nutrients not analysed during initial survey.

**Site No:** 020  
**Name:** Swords 3  
**Property:** Swords  
**Description:** Former well, not very reliable supply, especially in summer  
**MGA Coordinates:** 6420738 N 760909 E  
**Elevation:** 491.947 m AHD

**Date inspected:** 28 July 2005      **Water Quality (field):** pH 5.50    EC 0.205 mS/cm    T 10.6 °C



**Date inspected:** 15 June 2009      **Water Quality (field):** Site Dry



Laboratory Analysis Results				
Analyte	Units	LOR	28 July 2005	15 June 2009
TSS	mg/L @ 105°C	1	4	Site Dry
TDS	mg/L @ 180°C	1	140	
pH		0.1	5.5	
EC	µS/cm	1	205	
Potassium	mg/L	0.1	2.8	
Sodium	mg/L	1	25	
Calcium	mg/L	1	0.3	
Magnesium	mg/L	0.1	4.7	
Cation sum	meq/L	0.01	1.56	
Chloride	mg/L	1	30	
Sulphate	mg/L	1	5.7	
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	1	
Anion sum	meq/L	0.01	1.68	
Ionic difference	%		7.1%	
Allowable difference	%		2.0%	
Aluminium				
Arsenic				
Boron				
Cadmium				
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Manganese				
Mercury				
Nickel				
Selenium				
Silver				
Zinc				
Phosphorous(Reactive)				
Phosphorous (Total)				
Flouride				
Nitrogen (Total)				
Ammonial Nitrogen				
Nitrates				

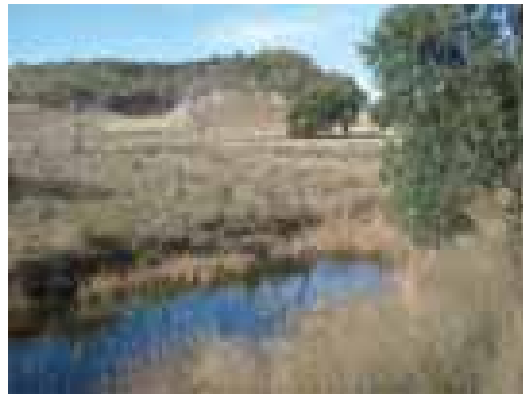
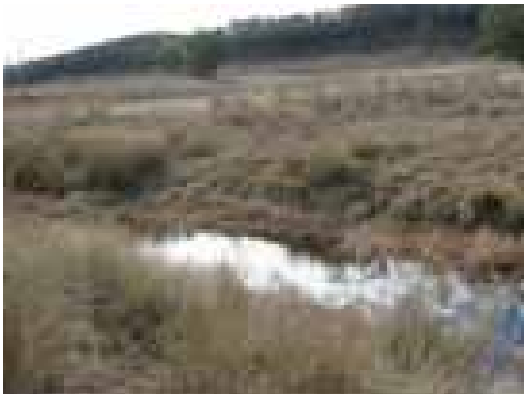
Minor metals and nutrients not analysed during initial survey.

**Site No:** 021  
**Name:** Swords 4  
**Property:** Swords  
**Description:** Permanent waterhole in Moolarben Creek. Sand/sandstone bottom.  
**MGA Coordinates:** 6419753.683 N 760513.853 E  
**Elevation:** 451.986 m AHD

**Date inspected:** 28 July 2005      **Water Quality (field):** pH 6.87    EC 3.37 mS/cm    T 12.1 °C



**Date inspected:** 15 June 2009      **Water Quality (field):** pH 6.40    EC 3.2 mS/cm    T 9.5 °C



Laboratory Analysis Results				
Analyte	Units	LOR	28 July 2005	15 June 2009
TSS	mg/L @ 105°C	1	3	6
TDS	mg/L @ 180°C	1	2000	2251
pH		0.1	7.1	2
EC	µS/cm	1	3290	3450
Potassium	mg/L	0.1	26	19
Sodium	mg/L	1	370	500
Calcium	mg/L	1	110	93
Magnesium	mg/L	0.1	110	115
Cation sum	meq/L	0.01	31.3	36.3
Chloride	mg/L	1	640	833
Sulphate	mg/L	1	480	384
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	145	261
Anion sum	meq/L	0.01	30.9	36.7
Ionic difference	%		0.5%	
Allowable difference	%		5.0%	
Aluminium				0.04
Arsenic				<0.001
Boron				0.02
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0005
Copper				0.0016
Iron				0.03
Lead				<0.00005
Manganese				0.029
Mercury				<0.0001
Nickel				0.005
Selenium				<0.001
Silver				<0.001
Zinc				<0.005
Phosphorous(Reactive)				0.02
Phosphorous (Total)				0.01
Flouride				0.9
Nitrogen (Total)				0.58
Ammonial Nitrogen				0.01
Nitrates				<0.01

Minor metals and nutrients not analysed during initial survey.

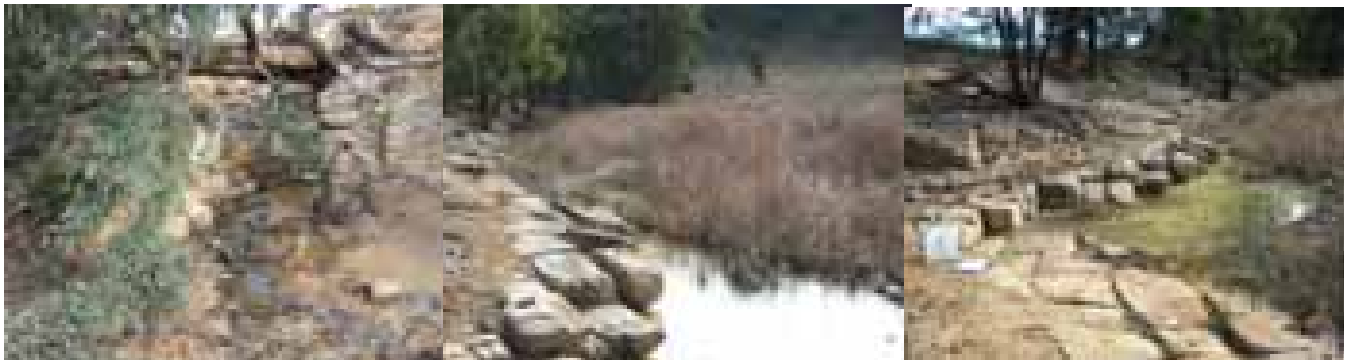


**Site No:** 022  
**Name:** Swords 5  
**Property:** Swords  
**Description:** Small seepage on west bank of Moolarben Creek. Flow slow but visible.  
**MGA Coordinates:** 6418963 N 761339 E  
**Elevation:** 492 m AHD

**Date inspected:** 28 July 2005      **Water Quality (field):** pH 5.39    EC 3.79 mS/cm    T 14.3 °C

NO PHOTO

**Date inspected:** 15 June 2009      **Water Quality (field):** pH 4.35    EC 5.25 mS/cm    T 15 °C



Laboratory Analysis Results				
Analyte	Units	LOR	28 July 2005	15 June 2009
TSS	mg/L @ 105°C	1	28	57
TDS	mg/L @ 180°C	1	2300	3662
pH		0.1	5.5	4.5
EC	µS/cm	1	4000	5170
Potassium	mg/L	0.1	63	27
Sodium	mg/L	1	490	793
Calcium	mg/L	1	48	59
Magnesium	mg/L	0.1	120	156
Cation sum	meq/L	0.01	35.2	51
Chloride	mg/L	1	930	1260
Sulphate	mg/L	1	470	1040
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	13	<2
Anion sum	meq/L	0.01	36.3	57.2
Ionic difference	%		0.5%	
Allowable difference	%		5.0%	
Aluminium				110
Arsenic				<0.001
Boron				<0.01
Cadmium				0.0054
Chromium				0.005
Cobalt				0.54
Copper				0.21
Iron				2.3
Lead				0.0025
Manganese				5.1
Mercury				0.0003
Nickel				0.41
Selenium				<0.001
Silver				<0.001
Zinc				1.4
Phosphorous(Reactive)				0.03
Phosphorous (Total)				0.02
Flouride				2.9
Nitrogen (Total)				1.7
Ammonial Nitrogen				0.07
Nitrates				0.77

Minor metals and nutrients not analysed during initial survey.

**Site No:** 023  
**Name:** Swords 6  
**Property:** Swords  
**Description:** Permanent waterhole in Moolarben Creek.  
 Apparent seepage from coal measures outcropping in bank of creek.  
**MGA Coordinates:** 6418879 N 761905 E  
**Elevation:** 495 m AHD

**Date inspected:** 28 July 2005      **Water Quality (field):** pH 5.28    EC 3.10 mS/cm    T 8.7 °C



**Date inspected:** 15 June 2009      **Water Quality (field):** pH 5.75    EC 2.02 mS/cm    T 6.8 °C



Laboratory Analysis Results				
Analyte	Units	LOR	28 July 2005	15 June 2009
TSS	mg/L @ 105°C	1	10	316
TDS	mg/L @ 180°C	1	1700	1307
pH		0.1	5.1	6.4
EC	µS/cm	1	2940	2210
Potassium	mg/L	0.1	26	24
Sodium	mg/L	1	310	367
Calcium	mg/L	1	51	35
Magnesium	mg/L	0.1	90	63
Cation sum	meq/L	0.01	24.1	23.5
Chloride	mg/L	1	710	532
Sulphate	mg/L	1	300	225
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	1	141
Anion sum	meq/L	0.01	26.3	22.5
Ionic difference	%		1.5%	
Allowable difference	%		5.0%	
Aluminium				0.26
Arsenic				<0.001
Boron				0.07
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0016
Copper				0.0014
Iron				0.14
Lead				<0.00005
Manganese				0.081
Mercury				<0.0001
Nickel				0.004
Selenium				<0.001
Silver				<0.001
Zinc				0.006
Phosphorous(Reactive)				0.02
Phosphorous (Total)				0.19
Flouride				0.5
Nitrogen (Total)				2.7
Ammonial Nitrogen				0.02
Nitrates				<0.01

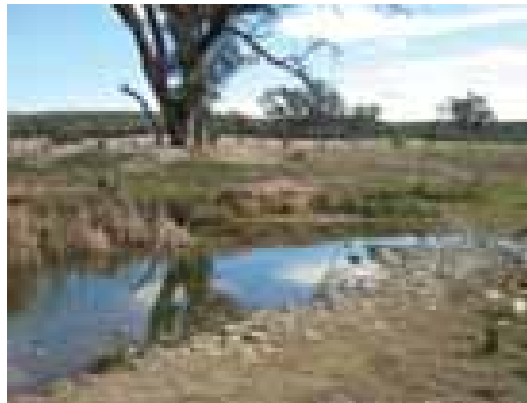
Minor metals and nutrients not analysed during initial survey.

**Site No:** 024  
**Name:** Swords 7  
**Property:** Swords  
**Description:** Permanent waterhole in Lagoon Creek.  
**MGA Coordinates:** 6418791.752 N 759948.276 E  
**Elevation:** 453.057 m AHD

**Date inspected:** 28 July 2005      **Water Quality (field):** pH 7.31    EC 3.41 mS/cm    T 12.3 °C



**Date inspected:** 15 June 2009      **Water Quality (field):** pH 6.67    EC 3.23 mS/cm    T 10.9 °C



Laboratory Analysis Results				
Analyte	Units	LOR	28 July 2005	15 June 2009
TSS	mg/L @ 105°C	1	8	35
TDS	mg/L @ 180°C	1	2000	2379
pH		0.1	7.7	6.8
EC	µS/cm	1	3340	3240
Potassium	mg/L	0.1	20	17
Sodium	mg/L	1	320	437
Calcium	mg/L	1	170	204
Magnesium	mg/L	0.1	100	102
Cation sum	meq/L	0.01	31.1	38
Chloride	mg/L	1	670	780
Sulphate	mg/L	1	430	431
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	221	227
Anion sum	meq/L	0.01	32.3	35.5
Ionic difference	%		1.8%	
Allowable difference	%		5.0%	
Aluminium				0.02
Arsenic				<0.001
Boron				0.01
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0004
Copper				0.0017
Iron				0.03
Lead				<0.00005
Manganese				0.021
Mercury				<0.0001
Nickel				0.005
Selenium				<0.001
Silver				<0.001
Zinc				<0.005
Phosphorous(Reactive)				0.02
Phosphorous (Total)				0.07
Flouride				0.6
Nitrogen (Total)				0.8
Ammonial Nitrogen				0.03
Nitrates				<0.01

Minor metals and nutrients not analysed during initial survey.

**Site No:** 025  
**Name:** Swords 8  
**Property:** Swords  
**Description:** Spring fed dam in paddock just west of Lagoon Creek.  
**MGA Coordinates:** 6418905.347 N 759689.490 E  
**Elevation:** 453.272 m AHD

**Date inspected:** 28 July 2005      **Water Quality (field):** pH 7.49    EC 0.46 mS/cm    T 12.2 °C



**Date inspected:** 15 June 2009      **Water Quality (field):** pH 6.75    EC 0.27 mS/cm    T 12.2 °C



Laboratory Analysis Results				
Analyte	Units	LOR	28 July 2005	15 June 2009
TSS	mg/L @ 105°C	1	49	136
TDS	mg/L @ 180°C	1	1700	191
pH		0.1	6.9	7.2
EC	µS/cm	1	340	260
Potassium	mg/L	0.1	8.9	8.9
Sodium	mg/L	1	49	39
Calcium	mg/L	1	2.9	13
Magnesium	mg/L	0.1	3.9	5.7
Cation sum	meq/L	0.01	2.83	3.04
Chloride	mg/L	1	73	57
Sulphate	mg/L	1	8.3	11
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	39	36
Anion sum	meq/L	0.01	3.01	2.56
Ionic difference	%		3.2%	
Allowable difference	%		2.0%	
Aluminium				0.04
Arsenic				0.001
Boron				0.02
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.001
Copper				<0.0005
Iron				0.14
Lead				0.00032
Manganese				0.16
Mercury				<0.0001
Nickel				0.001
Selenium				<0.001
Silver				<0.001
Zinc				0.005
Phosphorous(Reactive)				0.02
Phosphorous (Total)				0.09
Flouride				0.4
Nitrogen (Total)				1.7
Ammonial Nitrogen				0.11
Nitrates				0.43

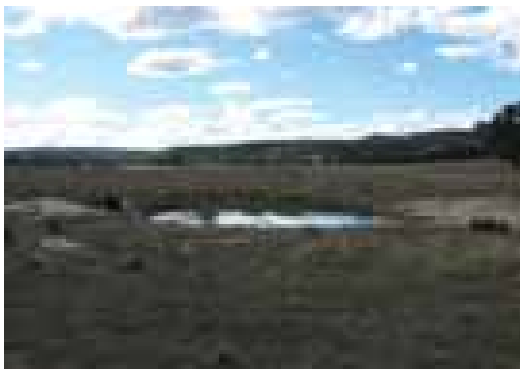
Minor metals and nutrients not analysed during initial survey.

**Site No:** 026  
**Name:** Swords 9  
**Property:** Swords  
**Description:** Spring fed dam in paddock just west of Lagoon Creek.  
**MGA Coordinates:** 6419038.279 N 759698.236 E  
**Elevation:** 451.063 m AHD

**Date inspected:** 28 July 2005      **Water Quality (field):** pH 6.97    EC 0.30 mS/cm    T 12.5 °C



**Date inspected:** 15 June 2009      **Water Quality (field):** pH 6.83    EC 0.1685 mS/cm    T 11.8 °C



Laboratory Analysis Results				
Analyte	Units	LOR	28 July 2005	15 June 2009
TSS	mg/L @ 105°C	1	170	75
TDS	mg/L @ 180°C	1	490	142
pH		0.1	6.7	6.9
EC	µS/cm	1	225	190
Potassium	mg/L	0.1	12	7.3
Sodium	mg/L	1	24	20
Calcium	mg/L	1	1.5	0.87
Magnesium	mg/L	0.1	5.2	5.6
Cation sum	meq/L	0.01	1.85	1.56
Chloride	mg/L	1	36	39
Sulphate	mg/L	1	8.1	7
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	30	18
Anion sum	meq/L	0.01	1.78	1.61
Ionic difference	%		1.9%	
Allowable difference	%		2.0%	
Aluminium				0.08
Arsenic				<0.001
Boron				0.02
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0023
Copper				<0.0005
Iron				0.07
Lead				0.00023
Manganese				0.098
Mercury				<0.0001
Nickel				0.001
Selenium				<0.001
Silver				<0.001
Zinc				0.005
Phosphorous(Reactive)				0.02
Phosphorous (Total)				0.04
Flouride				<0.1
Nitrogen (Total)				4.9
Ammonial Nitrogen				0.3
Nitrates				4.2

Minor metals and nutrients not analysed during initial survey.

**Site No:** 027  
**Name:** Swords 10  
**Property:** Swords  
**Description:** Soak in paddock west of Lagoon Creek. Water virtually at surface. Poor yield, dries up in dry periods.  
**MGA Coordinates:** 6419105.326 N 759560.851 E  
**Elevation:** 452.358 m AHD

**Date inspected:** 28 July 2005      **Water Quality (field):** pH 5.55    EC 0.74 mS/cm    T 13.4 °C



**Date inspected:** 15 June 2009      **Water Quality (field):** pH 5.75    EC 0.309 mS/cm    T 12.7 °C

NO PHOTO

Laboratory Analysis Results				
Analyte	Units	LOR	28 July 2005	15 June 2009
TSS	mg/L @ 105°C	1	<2	10
TDS	mg/L @ 180°C	1	380	252
pH		0.1	5.5	6.5
EC	µS/cm	1	630	330
Potassium	mg/L	0.1	13	11
Sodium	mg/L	1	38	22
Calcium	mg/L	1	2.1	1.8
Magnesium	mg/L	0.1	38	18
Cation sum	meq/L	0.01	5.22	2.81
Chloride	mg/L	1	32	35
Sulphate	mg/L	1	3.7	7
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	2	7
Anion sum	meq/L	0.01	5.72	1.27
Ionic difference	%		4.6%	
Allowable difference	%		2.0%	
Aluminium				<0.02
Arsenic				<0.001
Boron				0.02
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0003
Copper				<0.0005
Iron				0.02
Lead				0.00007
Manganese				0.013
Mercury				<0.0001
Nickel				<0.001
Selenium				<0.001
Silver				<0.001
Zinc				0.008
Phosphorous(Reactive)				0.02
Phosphorous (Total)				0.02
Flouride				<0.1
Nitrogen (Total)				26
Ammonial Nitrogen				0.02
Nitrates				26

Minor metals and nutrients not analysed during initial survey.

**Site No:** 028  
**Name:** Swords 11  
**Property:** Swords  
**Description:** Water supply well for old Cobb & Co Hotel. Water 1.58m below surface.  
**MGA Coordinates:** 6419929.134 N 759517.980 E  
**Elevation:** 446.624 m AHD

**Date inspected:** 28 July 2005      **Water Quality (field):** No Field Measurements Taken



**Date inspected:** 15 June 2009      **Water Quality (field):** pH 6.38      EC 2.43 mS/cm      T 15.4 °C

NO PHOTO

Laboratory Analysis Results				
Analyte	Units	LOR	28 July 2005	15 June 2009
TSS	mg/L @ 105°C	1	15	5
TDS	mg/L @ 180°C	1	1400	1689
pH		0.1	7.3	6.8
EC	µS/cm	1	2420	2600
Potassium	mg/L	0.1	15	15
Sodium	mg/L	1	230	321
Calcium	mg/L	1	96	127
Magnesium	mg/L	0.1	64	78
Cation sum	meq/L	0.01	24.39	27.1
Chloride	mg/L	1	530	470
Sulphate	mg/L	1	200	296
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	264	273
Anion sum	meq/L	0.01	20.44	24.9
Ionic difference	%		8.8%	
Allowable difference	%		5.0%	
Aluminium				0.03
Arsenic				<0.001
Boron				0.02
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0004
Copper				0.0011
Iron				0.13
Lead				<0.00005
Manganese				0.96
Mercury				<0.0001
Nickel				0.004
Selenium				<0.001
Silver				<0.001
Zinc				<0.005
Phosphorous(Reactive)				0.5
Phosphorous (Total)				0.7
Flouride				0.3
Nitrogen (Total)				2.3
Ammonial Nitrogen				1.6
Nitrates				0.05

Minor metals and nutrients not analysed during initial survey.

**Site No:** 029  
**Name:** Swords 12  
**Property:** Swords  
**Description:** Permanent waterhole in Lagoon Creek.  
**MGA Coordinates:** 6420605.745 N 759247.958 E  
**Elevation:** 441.571 m AHD

**Date inspected:** 28 July 2005      **Water Quality (field):** pH 6.91    EC 2.45 mS/cm    T 15.2 °C



**Date inspected:** 15 June 2009      **Water Quality (field):** pH 6.48    EC 3.02 mS/cm    T 10.8 °C



Laboratory Analysis Results				
Analyte	Units	LOR	28 July 2005	15 June 2009
TSS	mg/L @ 105°C	1	8	112
TDS	mg/L @ 180°C	1	1500	2208
pH		0.1	7.3	6.7
EC	µS/cm	1	2460	3280
Potassium	mg/L	0.1	16	29
Sodium	mg/L	1	220	380
Calcium	mg/L	1	120	156
Magnesium	mg/L	0.1	73	100
Cation sum	meq/L	0.01	22.0	33.3
Chloride	mg/L	1	480	798
Sulphate	mg/L	1	320	392
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	124	173
Anion sum	meq/L	0.01	22.7	34.1
Ionic difference	%		1.6%	
Allowable difference	%		5.0%	
Aluminium				0.03
Arsenic				<0.001
Boron				0.02
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0024
Copper				0.0015
Iron				0.14
Lead				<0.00005
Manganese				3.4
Mercury				<0.0001
Nickel				0.006
Selenium				<0.001
Silver				<0.001
Zinc				<0.005
Phosphorous(Reactive)				0.04
Phosphorous (Total)				0.21
Flouride				0.3
Nitrogen (Total)				1.4
Ammonial Nitrogen				0.02
Nitrates				<0.01

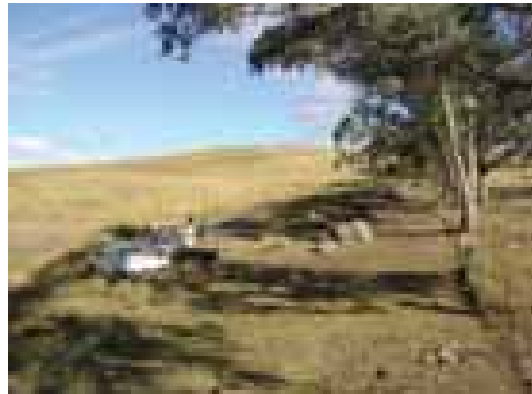
Minor metals and nutrients not analysed during initial survey.



Appendix E | Groundwater Impact Assessment

**Site No:** 030  
**Name:** Birchills North  
**Property:** Cox  
**Description:** Spring-fed dam in granite.  
**MGA Coordinates:** 6416779.159 N 757511.938 E  
**Elevation:** 441.571 m AHD

**Date inspected:** 3 May 2005      **Water Quality (field):** pH 5.9      EC 0.59 mS/cm      T 15.4 °C



**Date inspected:** 23 June 2009      **Water Quality (field):** pH 6.72      EC 0.1427 mS/cm      T 13.8 °C



Laboratory Analysis Results				
Analyte	Units	LOR	3 May 2005	23 June 2009
TSS	mg/L @ 105°C	1	47	235
TDS	mg/L @ 180°C	1	360	265
pH		0.1	7.1	6.5
EC	µS/cm	1	485	155
Potassium	mg/L	0.1	60	20
Sodium	mg/L	1	18	7
Calcium	mg/L	1	15	4.3
Magnesium	mg/L	0.1	13	3.8
Cation sum	meq/L	0.01	4.14	1.34
Chloride	mg/L	1	39	14
Sulphate	mg/L	1	<1	6
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	165	37
Anion sum	meq/L	0.01	4.40	1.26
Ionic difference	%		1.6%	
Allowable difference	%		5.0%	
Aluminium				<0.02
Arsenic				<0.001
Boron				0.05
Cadmium				<0.00005
Chromium				<0.001
Cobalt				<0.0002
Copper				0.0007
Iron				0.13
Lead				0.00025
Manganese				0.003
Mercury				<0.0001
Nickel				<0.001
Selenium				<0.001
Silver				<0.001
Zinc				0.021
Phosphorous(Reactive)				<0.01
Phosphorous (Total)				0.55
Flouride				0.2
Nitrogen (Total)				4.2
Ammonial Nitrogen				0.09
Nitrates				0.03

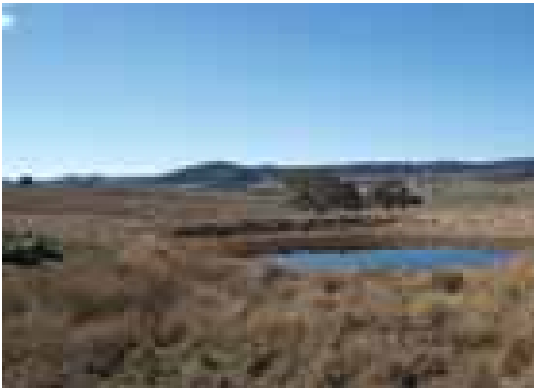
Minor metals and nutrients not analysed during initial survey.

**Site No:** 031  
**Name:** Birchills Central  
**Property:** Cox  
**Description:** Granite spring fed dam.  
**MGA Coordinates:** 6416426.944 N 757409.616E  
**Elevation:** 535.942 m AHD

**Date inspected:** 3 May 2005      **Water Quality (field):** pH 7.66    EC 0.61 mS/cm    T 15.9 °C



**Date inspected:** 23 June 2009      **Water Quality (field):** pH 6.76    EC 0.1784 mS/cm    T 13.5 °C



Laboratory Analysis Results				
Analyte	Units	LOR	3 May 2005	23 June 2009
TSS	mg/L @ 105°C	1	35	<2
TDS	mg/L @ 180°C	1	380	134
pH		0.1	8.0	7.4
EC	µS/cm	1	505	195
Potassium	mg/L	0.1	34	8.7
Sodium	mg/L	1	30	24
Calcium	mg/L	1	23	6.2
Magnesium	mg/L	0.1	15	5.2
Cation sum	meq/L	0.01	4.56	2
Chloride	mg/L	1	21	11
Sulphate	mg/L	1	2.9	35
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	217	43
Anion sum	meq/L	0.01	4.99	1.9
Ionic difference	%		3.3%	
Allowable difference	%		2.0%	
Aluminium				0.02
Arsenic				<0.001
Boron				0.02
Cadmium				<0.00005
Chromium				<0.001
Cobalt				<0.0002
Copper				0.0009
Iron				0.28
Lead				0.00047
Manganese				0.01
Mercury				<0.0001
Nickel				<0.001
Selenium				<0.001
Silver				<0.001
Zinc				0.005
Phosphorous(Reactive)				<0.01
Phosphorous (Total)				0.05
Flouride				1.2
Nitrogen (Total)				1.7
Ammonial Nitrogen				0.06
Nitrates				0.05

Minor metals and nutrients not analysed during initial survey.

**Site No:** 032  
**Name:** SW7 West  
**Property:** Cox  
**Description:** Large waterhole overflowing to main Lagoon Creek, near School Paddock  
**MGA Coordinates:** 6418031.363 N 759472.782 E  
**Elevation:** 464.494 m AHD

**Date inspected:** 3 May 2005      **Water Quality (field):** pH 7.11      EC 2.23 mS/cm      T 16.7 °C



**Date inspected:** 23 June 2009      **Water Quality (field):** pH 6.66      EC 1.57 mS/cm      T 15.1 °C



Laboratory Analysis Results				
Analyte	Units	LOR	3 May 2005	23 June 2009
TSS	mg/L @ 105°C	1	47	3
TDS	mg/L @ 180°C	1	1300	1116
pH		0.1	7.7	6.9
EC	µS/cm	1	1960	1700
Potassium	mg/L	0.1	10	12
Sodium	mg/L	1	200	156
Calcium	mg/L	1	120	131
Magnesium	mg/L	0.1	55	44
Cation sum	meq/L	0.01	19.5	17.2
Chloride	mg/L	1	330	333
Sulphate	mg/L	1	220	219
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	229	180
Anion sum	meq/L	0.01	18.5	17.5
Ionic difference	%		2.6%	
Allowable difference	%		5.0%	
Aluminium				3
Arsenic				1116
Boron				6.9
Cadmium				1700
Chromium				12
Cobalt				156
Copper				131
Iron				44
Lead				17.2
Manganese				333
Mercury				219
Nickel				<2
Selenium				180
Silver				17.5
Zinc				<0.005
Phosphorous(Reactive)				0.01
Phosphorous (Total)				0.03
Flouride				0.9
Nitrogen (Total)				0.63
Ammonial Nitrogen				0.03
Nitrates				<0.01

Minor metals and nutrients not analysed during initial survey.

**Site No:** 033  
**Name:** Ram shed bore...  
**Property:** Cox  
**Description:** Bore, problems with iron deposit clogging pumps.  
**MGA Coordinates:** 6416637.676 N 758378.869E  
**Elevation:** 496.263 m AHD

**Date inspected:** 3 May 2005

**Water Quality (field):** No Field Measurements Taken



**Date inspected:** 23 June 2009

**Water Quality (field):** pH 6.62 EC 0.459 mS/cm T 17.9 °C



Laboratory Analysis Results				
Analyte	Units	LOR	3 May 2005	23 June 2009
TSS	mg/L @ 105°C	1	57	100
TDS	mg/L @ 180°C	1	300	203
pH		0.1	6.5	6.6
EC	µS/cm	1	530	445
Potassium	mg/L	0.1	5.3	9.9
Sodium	mg/L	1	79	49
Calcium	mg/L	1	18	13
Magnesium	mg/L	0.1	24	3.4
Cation sum	meq/L	0.01	6.44	3.31
Chloride	mg/L	1	170	53
Sulphate	mg/L	1	9.8	<2
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	85	74
Anion sum	meq/L	0.01	6.70	2.97
Ionic difference	%		1.9%	
Allowable difference	%		2.0%	
Aluminium				<0.02
Arsenic				<0.001
Boron				<0.01
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0002
Copper				0.0005
Iron				0.37
Lead				<0.00005
Manganese				3.2
Mercury				<0.0001
Nickel				0.001
Selenium				<0.001
Silver				<0.001
Zinc				0.015
Phosphorous(Reactive)				<0.01
Phosphorous (Total)				0.04
Flouride				24
Nitrogen (Total)				8.7
Ammonial Nitrogen				7.5
Nitrates				<0.01

Minor metals and nutrients not analysed during initial survey.

**Site No:** 034  
**Name:** Silo Paddock Dam  
**Property:** Cox  
**Description:** Spring fed dam, no catchment for surface runoff.  
**MGA Coordinates:** 6415907.023 N 758959.568 E  
**Elevation:** 499.634 m AHD

**Date inspected:** 3 May 2005      **Water Quality (field):** pH 7.75    EC 4.4mS/cm    T 18.3 °C



**Date inspected:** 23 June 2009      **Water Quality (field):** pH 6.55    EC 1.905 mS/cm    T 16.2 °C

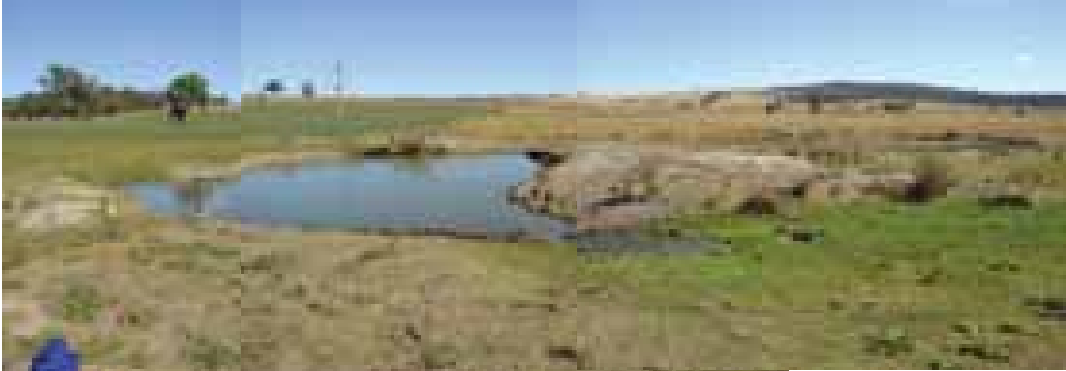


Laboratory Analysis Results				
Analyte	Units	LOR	3 May 2005	23 June 2009
TSS	mg/L @ 105°C	1	64	35
TDS	mg/L @ 180°C	1	2400	1274
pH		0.1	8.0	6.7
EC	µS/cm	1	3850	1990
Potassium	mg/L	0.1	57	48
Sodium	mg/L	1	530	279
Calcium	mg/L	1	46	32
Magnesium	mg/L	0.1	120	61
Cation sum	meq/L	0.01	36.7	20
Chloride	mg/L	1	710	397
Sulphate	mg/L	1	370	332
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	263	93
Anion sum	meq/L	0.01	33.0	20
Ionic difference	%		5.3%	
Allowable difference	%		5.0%	
Aluminium				<0.02
Arsenic				0.001
Boron				0.04
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0008
Copper				0.0018
Iron				<0.01
Lead				<0.00005
Manganese				0.03
Mercury				<0.0001
Nickel				0.007
Selenium				<0.001
Silver				<0.001
Zinc				<0.005
Phosphorous(Reactive)				<0.01
Phosphorous (Total)				0.04
Flouride				1
Nitrogen (Total)				2.3
Ammonial Nitrogen				0.18
Nitrates				0.21

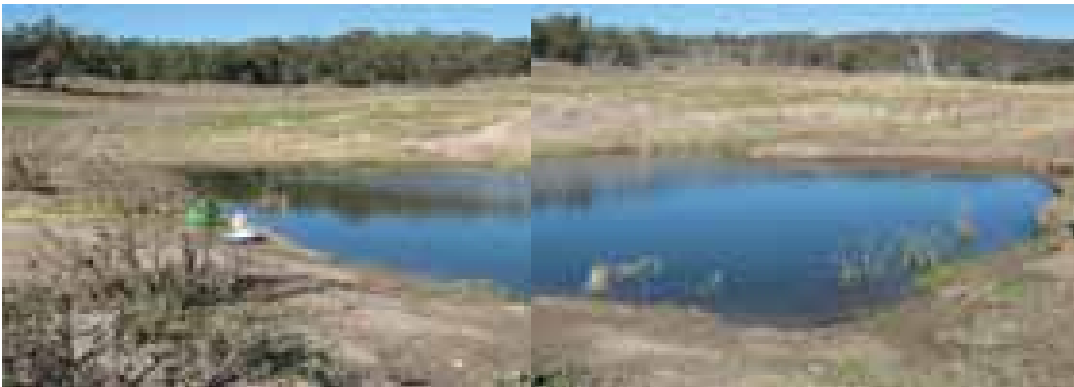
Minor metals and nutrients not analysed during initial survey.

**Site No:** 035  
**Name:** Ewe Shed Paddock Dam  
**Property:** Cox  
**Description:** Spring fed dam. Slow water make. Runoff diverted around to a small dam below.  
**MGA Coordinates:** 6415615.756 N 759098.525 E  
**Elevation:** 506.17 m AHD

**Date inspected:** 3 May 2005      **Water Quality (field):** pH 7.65    EC 7.67mS/cm    T 17.1 °C



**Date inspected:** 23 June 2009      **Water Quality (field):** pH 7.15    EC 3.80 mS/cm    T 15.2 °C



Laboratory Analysis Results				
Analyte	Units	LOR	3 May 2005	23 June 2009
TSS	mg/L @ 105°C	1	99	5
TDS	mg/L @ 180°C	1	5100	2744
pH		0.1	7.8	7
EC	µS/cm	1	6790	3960
Potassium	mg/L	0.1	43	29
Sodium	mg/L	1	870	524
Calcium	mg/L	1	200	101
Magnesium	mg/L	0.1	340	185
Cation sum	meq/L	0.01	76.9	43.8
Chloride	mg/L	1	1600	830
Sulphate	mg/L	1	1400	959
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	137	56
Anion sum	meq/L	0.01	77.0	44.5
Ionic difference	%		0.1%	
Allowable difference	%		2.0%	
Aluminium				0.03
Arsenic				0.001
Boron				0.05
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0005
Copper				0.0032
Iron				0.04
Lead				0.00007
Manganese				0.06
Mercury				<0.0001
Nickel				0.012
Selenium				<0.001
Silver				<0.001
Zinc				<0.005
Phosphorous(Reactive)				<0.01
Phosphorous (Total)				0.03
Flouride				0.9
Nitrogen (Total)				0.87
Ammonial Nitrogen				0.01
Nitrates				<0.01

Minor metals and nutrients not analysed during initial survey.

**Site No:** 036  
**Name:** Twin Springs Low  
**Property:** Cox  
**Description:** Spring fed dam. Water level about 1m lower than adjacent dam across fence  
**MGA Coordinates:** 6414796.141 N 760216.009E  
**Elevation:** 518.937m AHD

**Date inspected:** 3 May 2005      **Water Quality (field):** pH 8.48    EC 2.85 mS/cm    T 18.1 °C



**Date inspected:** 23 June 2009      **Water Quality (field):** pH 8.35    EC 4.72 mS/cm    T 18.4 °C



Laboratory Analysis Results				
Analyte	Units	LOR	3 May 2005	23 June 2009
TSS	mg/L @ 105°C	1	360	57
TDS	mg/L @ 180°C	1	1600	3352
pH		0.1	7.8	8.1
EC	µS/cm	1	2700	5050
Potassium	mg/L	0.1	40	42
Sodium	mg/L	1	340	748
Calcium	mg/L	1	19	27
Magnesium	mg/L	0.1	100	208
Cation sum	meq/L	0.01	25.0	52.1
Chloride	mg/L	1	610	1190
Sulphate	mg/L	1	54	951
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	90	133
Anion sum	meq/L	0.01	20.1	56
Ionic difference	%		10.8%	
Allowable difference	%		5.0%	
Aluminium				<0.02
Arsenic				0.003
Boron				0.07
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0061
Copper				0.0021
Iron				0.28
Lead				0.00008
Manganese				2.6
Mercury				<0.0001
Nickel				0.008
Selenium				<0.001
Silver				<0.001
Zinc				0.009
Phosphorous(Reactive)				<0.01
Phosphorous (Total)				0.27
Flouride				0.7
Nitrogen (Total)				3.8
Ammonial Nitrogen				<0.01
Nitrates				<0.01

Minor metals and nutrients not analysed during initial survey.

**Site No:** 037  
**Name:** Twin Springs High  
**Property:** Cox  
**Description:** Spring fed dam, water elevation about 1m higher than adjacent dam across fence  
**MGA Coordinates:** 6414788.032 N 760220.235E  
**Elevation:** 519.957m AHD

**Date inspected:** 3 May 2005      **Water Quality (field):** pH 8.84    EC 6.75 mS/cm    T 16.6 °C



**Date inspected:** 23 June 2009      **Water Quality (field):** pH 7.98    EC 4.16 mS/cm    T 16.5 °C



Laboratory Analysis Results				
Analyte	Units	LOR	3 May 2005	23 June 2009
TSS	mg/L @ 105°C	1	260	6
TDS	mg/L @ 180°C	1	4000	2775
pH		0.1	8.8	8.4
EC	µS/cm	1	6150	4320
Potassium	mg/L	0.1	120	29
Sodium	mg/L	1	820	639
Calcium	mg/L	1	34	177
Magnesium	mg/L	0.1	280	182
Cation sum	meq/L	0.01	63.4	52.3
Chloride	mg/L	1	1400	1010
Sulphate	mg/L	1	280	808
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	61	3
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	650	112
Anion sum	meq/L	0.01	59.5	53.6
Ionic difference	%		3.2%	
Allowable difference	%		2.0%	
Aluminium				<0.02
Arsenic				0.002
Boron				0.06
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0015
Copper				0.0022
Iron				0.04
Lead				<0.00005
Manganese				0.1
Mercury				<0.0001
Nickel				0.005
Selenium				<0.001
Silver				<0.001
Zinc				0.012
Phosphorous(Reactive)				<0.01
Phosphorous (Total)				0.03
Flouride				0.6
Nitrogen (Total)				1.2
Ammonial Nitrogen				0.03
Nitrates				<0.01

Minor metals and nutrients not analysed during initial survey.

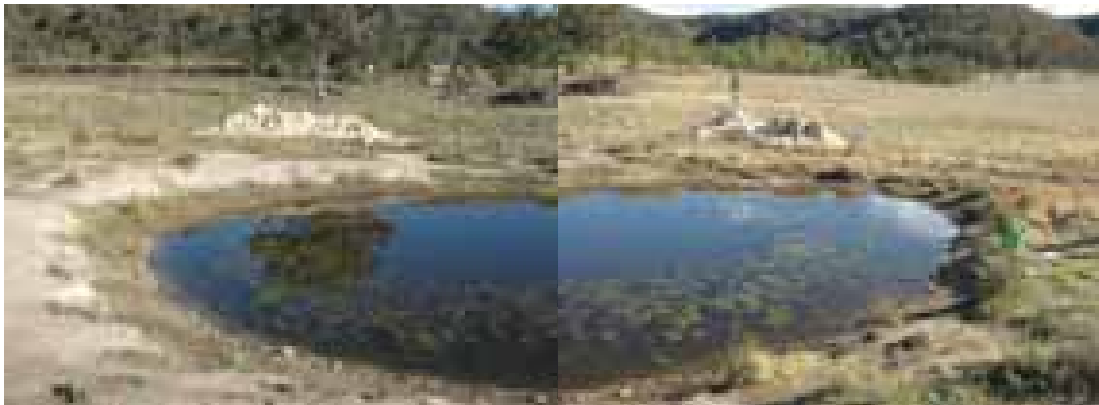


**Site No:** 038  
**Name:** Hay Shed South...  
**Property:** Cox  
**Description:** Newly excavated dam  
**MGA Coordinates:** 6413980.043 N 760393.138E  
**Elevation:** 541.551m AHD

**Date inspected:** 3 May 2005      **Water Quality (field):** pH 8.01    EC 0.71 mS/cm    T 18.1 °C



**Date inspected:** 23 June 2009      **Water Quality (field):** pH 7.69    EC 0.466 mS/cm    T 17.2 °C



Laboratory Analysis Results				
Analyte	Units	LOR	3 May 2005	23 June 2009
TSS	mg/L @ 105°C	1	160	16
TDS	mg/L @ 180°C	1	430	287
pH		0.1	7.5	8.2
EC	µS/cm	1	585	465
Potassium	mg/L	0.1	55	24
Sodium	mg/L	1	52	43
Calcium	mg/L	1	10	5.5
Magnesium	mg/L	0.1	24	20
Cation sum	meq/L	0.01	6.14	52.3
Chloride	mg/L	1	56	71
Sulphate	mg/L	1	1.4	8
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	192	121
Anion sum	meq/L	0.01	5.45	53.6
Ionic difference	%		6.0%	
Allowable difference	%		2.0%	
Aluminium				0.05
Arsenic				0.001
Boron				0.09
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0006
Copper				0.0011
Iron				0.32
Lead				0.00019
Manganese				0.027
Mercury				<0.0001
Nickel				0.003
Selenium				<0.001
Silver				<0.001
Zinc				0.041
Phosphorous(Reactive)				<0.01
Phosphorous (Total)				0.1
Flouride				0.7
Nitrogen (Total)				1.8
Ammonial Nitrogen				0.05
Nitrates				<0.01

Minor metals and nutrients not analysed during initial survey.

**Site No:** 039-40  
**Name:** Hay Shed Bore  
**Property:** Cox  
**Description:** Bore Pumped To Dam, Dam Sampled.  
**MGA Coordinates:** 6414547.881 N 760584.502 E  
**Elevation:** 526.984 m AHD (top of casing)

**Date inspected:** 3 May 2005      **Water Quality (field):** Unable to obtain sample – Grundfos submersible pump installed



**Date inspected:** 23 June 2009      **Water Quality (field):** pH 6.91      EC 0.984 mS/cm      T 16.8 °C



Laboratory Analysis Results				
Analyte	Units	LOR	3 May 2005	23 June 2009
TSS	mg/L @ 105°C	1	No Sample Taken, Large Pump In Bore	296
TDS	mg/L @ 180°C	1		608
pH		0.1		7.5
EC	µS/cm	1		1020
Potassium	mg/L	0.1		33
Sodium	mg/L	1		99
Calcium	mg/L	1		20
Magnesium	mg/L	0.1		32
Cation sum	meq/L	0.01		8.78
Chloride	mg/L	1		203
Sulphate	mg/L	1		37
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1		<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1		165
Anion sum	meq/L	0.01		9.79
Ionic difference	%			
Allowable difference	%			
Aluminium			Minor metals and nutrients not analysed during initial survey.	0.17
Arsenic				0.007
Boron				0.05
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0036
Copper				0.0008
Iron				1.1
Lead				0.0012
Manganese				0.78
Mercury				<0.0001
Nickel				0.011
Selenium				0.001
Silver				<0.001
Zinc				0.05
Phosphorous(Reactive)				0.12
Phosphorous (Total)			1.2	
Flouride			0.3	
Nitrogen (Total)			11	
Ammonial Nitrogen			6.5	
Nitrates			0.03	

**Site No:** 041  
**Name:** Hay Shed North Dam  
**Property:** Cox  
**Description:** Spring fed dam. Water arises from a narrow "pipe"-like opening in the base.  
**MGA Coordinates:** 6414671.132 N 760643.138 E  
**Elevation:** 521.992 m AHD

**Date inspected:** 3 May 2005      **Water Quality (field):** pH 7.18    EC 6.75mS      T 18.4 °C



**Date inspected:** 23 June 2009      **Water Quality (field):** pH 8.13    EC 5.59 mS/cm      T 15.4 °C



Laboratory Analysis Results				
Analyte	Units	LOR	3 May 2005	23 June 2009
TSS	mg/L @ 105°C	1	16	60
TDS	mg/L @ 180°C	1	370	3403
pH		0.1	7.6	8.7
EC	µS/cm	1	6060	5920
Potassium	mg/L	0.1	18	37
Sodium	mg/L	1	760	812
Calcium	mg/L	1	37	32
Magnesium	mg/L	0.1	290	288
Cation sum	meq/L	0.01	59.2	61.6
Chloride	mg/L	1	1900	1790
Sulphate	mg/L	1	290	212
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	20
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	132	260
Anion sum	meq/L	0.01	62.3	60.5
Ionic difference	%		2.5%	
Allowable difference	%		5.0%	
Aluminium				<0.02
Arsenic				0.004
Boron				0.03
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0053
Copper				0.0017
Iron				0.25
Lead				0.00009
Manganese				0.99
Mercury				<0.0001
Nickel				0.009
Selenium				0.002
Silver				<0.001
Zinc				0.009
Phosphorous(Reactive)				0.01
Phosphorous (Total)				0.5
Flouride				0.9
Nitrogen (Total)				4.6
Ammonial Nitrogen				0.03
Nitrates				<0.01

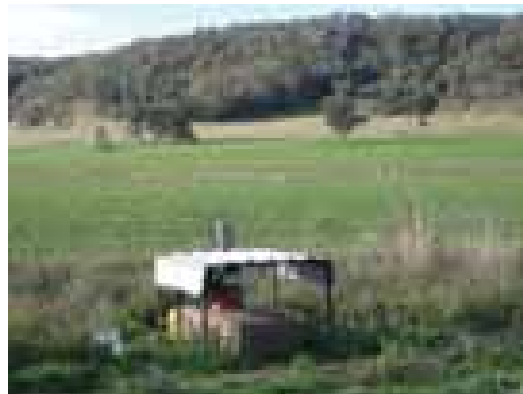
Minor metals and nutrients not analysed during initial survey.

**Site No:** 042-043  
**Name:** Clarkes Gully Bore  
**Property:** Cox  
**Description:** Bore – unable to sample. Sample collected from tank, which had been filled from bore about a week previously. There is an old well near bore, which has dried up.  
**MGA Coordinates:** 6414996.871 N 761334.184 E  
**Elevation:** 516.347m AHD (top of casing)

**Date inspected:** 3 May 2005      **Water Quality (field):** pH 7.36    EC 1.99mS/cm    T 17.6 °C



**Date inspected:** 23 June 2009      **Water Quality (field):** pH 8.45    EC 1.42 mS/cm    T 15.9 °C



Laboratory Analysis Results				
Analyte	Units	LOR	3 May 2005	23 June 2009
TSS	mg/L @ 105°C	1	10	5
TDS	mg/L @ 180°C	1	1000	848
pH		0.1	7.4	8.8
EC	µS/cm	1	1780	1450
Potassium	mg/L	0.1	10	15
Sodium	mg/L	1	200	162
Calcium	mg/L	1	58	34
Magnesium	mg/L	0.1	67	60
Cation sum	meq/L	0.01	17.4	14.1
Chloride	mg/L	1	320	287
Sulphate	mg/L	1	120	112
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	15
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	288	211
Anion sum	meq/L	0.01	17.3	14.9
Ionic difference	%		0.2%	
Allowable difference	%		5.0%	
Aluminium				<0.02
Arsenic				<0.001
Boron				<0.01
Cadmium				<0.00005
Chromium				<0.001
Cobalt				<0.0002
Copper				0.0009
Iron				0.05
Lead				<0.00005
Manganese				0.002
Mercury				<0.0001
Nickel				0.001
Selenium				<0.001
Silver				<0.001
Zinc				<0.005
Phosphorous(Reactive)				0.01
Phosphorous (Total)				0.02
Flouride				0.4
Nitrogen (Total)				0.77
Ammonial Nitrogen				0.09
Nitrates				<0.01

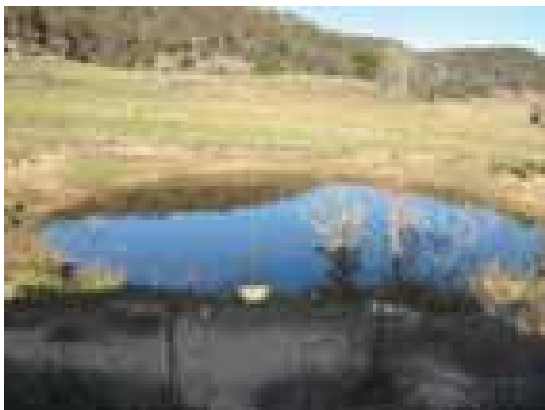
Minor metals and nutrients not analysed during initial survey.

**Site No:** 044  
**Name:** Corner Paddock Dam  
**Property:** Cox  
**Description:** Spring fed dam. Basalt outcrop nearby.  
**MGA Coordinates:** 6416324.300 N 761163.645 E  
**Elevation:** 531.513m AHD

**Date inspected:** 3 May 2005      **Water Quality (field):** pH 7.49    EC 0.46 mS/cm    T 21.4 °C



**Date inspected:** 23 June 2009      **Water Quality (field):** pH 7.93    EC 0.2 mS/cm    T 14.4 °C



Laboratory Analysis Results				
Analyte	Units	LOR	3 May 2005	23 June 2009
TSS	mg/L @ 105°C	1	41	13
TDS	mg/L @ 180°C	1	1100	136.5
pH		0.1	8.0	8.2
EC	µS/cm	1	400	210
Potassium	mg/L	0.1	15	8.8
Sodium	mg/L	1	42	19
Calcium	mg/L	1	8.2	2.5
Magnesium	mg/L	0.1	19	8.5
Cation sum	meq/L	0.01	4.18	1.88
Chloride	mg/L	1	38	25
Sulphate	mg/L	1	1.8	4
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	133	56
Anion sum	meq/L	0.01	3.77	1.91
Ionic difference	%		5.2%	
Allowable difference	%		2.0%	
Aluminium				0.06
Arsenic				<0.001
Boron				0.04
Cadmium				<0.00005
Chromium				<0.001
Cobalt				<0.0002
Copper				0.0008
Iron				0.08
Lead				0.00006
Manganese				0.001
Mercury				<0.0001
Nickel				0.002
Selenium				<0.001
Silver				<0.001
Zinc				<0.005
Phosphorous(Reactive)				<0.01
Phosphorous (Total)				0.05
Flouride				0.3
Nitrogen (Total)				0.97
Ammonial Nitrogen				0.05
Nitrates				<0.01

Minor metals and nutrients not analysed during initial survey.

**Site No:** 045  
**Name:** Hill Paddock Dam  
**Property:** Cox  
**Description:** Two spring fed dams, about 300m apart.  
 Reported yield 1300 L/hr from one dam and 900 L/hr from the other.  
**MGA Coordinates:** 6415854.779 N 760703.495 E  
**Elevation:** 494.121m AHD

**Date inspected:** 3 May 2005      **Water Quality (field):** pH 7.00    EC 1.88mS      T 19.5 °C



**Date inspected:** 23 June 2009      **Water Quality (field):** pH 6.65    EC 1.79 mS/cm      T 14.2 °C



Laboratory Analysis Results				
Analyte	Units	LOR	3 May 2005	23 June 2009
TSS	mg/L @ 105°C	1	6	17
TDS	mg/L @ 180°C	1	940	1130
pH		0.1	7.3	7.2
EC	µS/cm	1	1700	1920
Potassium	mg/L	0.1	5.1	6.8
Sodium	mg/L	1	190	255
Calcium	mg/L	1	52	56
Magnesium	mg/L	0.1	61	66
Cation sum	meq/L	0.01	16.0	19.5
Chloride	mg/L	1	330	411
Sulphate	mg/L	1	95	165
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	234	220
Anion sum	meq/L	0.01	16.0	19.4
Ionic difference	%		0.1%	
Allowable difference	%		5.0%	
Aluminium				<0.02
Arsenic				0.001
Boron				0.04
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0046
Copper				0.0007
Iron				0.03
Lead				<0.00005
Manganese				1.4
Mercury				<0.0001
Nickel				0.008
Selenium				<0.001
Silver				<0.001
Zinc				<0.005
Phosphorous(Reactive)				0.01
Phosphorous (Total)				0.07
Flouride				0.3
Nitrogen (Total)				0.48
Ammonial Nitrogen				0.03
Nitrates				<0.01

Minor metals and nutrients not analysed during initial survey.

**Site No:** 046  
**Name:** Wort paddock Dam  
**Property:** Cox  
**Description:** Turkey's nest dam, accepts seepage only. Water level reported to rise to about 1m below crest.  
**MGA Coordinates:** 6415930.224 N 759614.32 E  
**Elevation:** 494.401 m AHD

**Date inspected:** 3 May 2005      **Water Quality (field):** pH 9.10    EC 1.78 mS/cm    T 19.1 °C



**Date inspected:** 25 June 2009      **Water Quality (field):** pH 7.24    EC 0.959 mS/cm    T 12.5 °C



Laboratory Analysis Results				
Analyte	Units	LOR	3 May 2005	25 June 2009
TSS	mg/L @ 105°C	1	14	30
TDS	mg/L @ 180°C	1	890	554
pH		0.1	9.3	7.3
EC	µS/cm	1	1600	990
Potassium	mg/L	0.1	27	30
Sodium	mg/L	1	200	95
Calcium	mg/L	1	25	40
Magnesium	mg/L	0.1	38	26
Cation sum	meq/L	0.01	13.8	9.03
Chloride	mg/L	1	410	156
Sulphate	mg/L	1	43	16
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	22	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	70	199
Anion sum	meq/L	0.01	14.3	8.71
Ionic difference	%		0.4%	
Allowable difference	%		5.0%	
Aluminium				<0.02
Arsenic				3
Boron				0.02
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0004
Copper				<0.0005
Iron				0.02
Lead				<0.00005
Manganese				0.028
Mercury				<0.0001
Nickel				0.002
Selenium				<0.001
Silver				<0.001
Zinc				<0.005
Phosphorous(Reactive)				<0.01
Phosphorous (Total)				0.04
Flouride				0.7
Nitrogen (Total)				4.1
Ammonial Nitrogen				2.4
Nitrates				0.04

Minor metals and nutrients not analysed during initial survey.

**Site No:** 047-048  
**Name:** House Bore  
**Property:** Cox  
**Description:** Bore, 45m deep. Yield 2 L/s initially, less than 0.3 L/s now. Water from fractures in granite.  
**MGA Coordinates:** 6416275.353 N 758165.842E  
**Elevation:** 501.597 m AHD (top of casing)

**Date inspected:** 3 May 2005

**Water Quality (field):** No Field Measurements Taken

NO PHOTO

**Date inspected:** 23 June 2009

**Water Quality (field):** pH 6.01 EC 0.818 mS/cm T 15.8 °C



Laboratory Analysis Results				
Analyte	Units	LOR	3 May 2005	23 June 2009
TSS	mg/L @ 105°C	1	65	45
TDS	mg/L @ 180°C	1	580	516
pH		0.1	6.3	6.8
EC	µS/cm	1	840	810
Potassium	mg/L	0.1	8.8	9.2
Sodium	mg/L	1	65	56
Calcium	mg/L	1	82	83
Magnesium	mg/L	0.1	16	14
Cation sum	meq/L	0.01	8.46	7.96
Chloride	mg/L	1	48	25
Sulphate	mg/L	1	240	236
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	110	153
Anion sum	meq/L	0.01	8.55	8.68
Ionic difference	%		0.5%	
Allowable difference	%		2.0%	
Aluminium				0.14
Arsenic				<0.001
Boron				0.02
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0032
Copper				0.0007
Iron				17
Lead				<0.00005
Manganese				5.2
Mercury				<0.0001
Nickel				0.006
Selenium				<0.001
Silver				<0.001
Zinc				0.25
Phosphorous(Reactive)				0.03
Phosphorous (Total)				0.02
Flouride				9.6
Nitrogen (Total)				0.5
Ammonial Nitrogen				0.26
Nitrates				0.05

Minor metals and nutrients not analysed during initial survey.

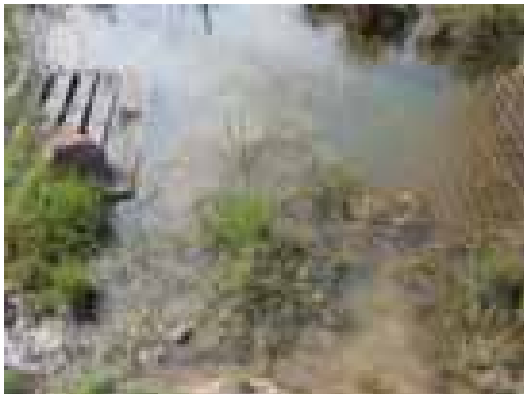


**Site No:** 050  
**Name:** The Well  
**Property:** Moolarben Coal Operations  
**Description:** Seep near house, has been excavated out.  
**MGA Coordinates:** 6421268 N 763347E  
**Elevation:** 476m AHD

**Date inspected:** 3 May 2005      **Water Quality (field):** pH 5.78    EC 0.40mS/cm    T 12.9 °C



**Date inspected:** 22 April 2009      **Water Quality (field):** pH 7.09    EC 0.246mS/cm    T 19 °C



Laboratory Analysis Results				
Analyte	Units	LOR	3 May 2005	22 April 2009
TSS	mg/L @ 105°C	1	7	8
TDS	mg/L @ 180°C	1	170	123.5
pH		0.1	6.0	7
EC	µS/cm	1	265	200
Potassium	mg/L	0.1	4	3.1
Sodium	mg/L	1	32	28
Calcium	mg/L	1	4.5	7.5
Magnesium	mg/L	0.1	5.9	6.7
Cation sum	meq/L	0.01	2.34	2.22
Chloride	mg/L	1	7	39
Sulphate	mg/L	1	170	<2
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	60	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	6.3	28
Anion sum	meq/L	0.01	2.21	1.66
Ionic difference	%		3.1%	
Allowable difference	%		2.0%	
Aluminium				0.02
Arsenic				<0.001
Boron				0.03
Cadmium				<0.00005
Chromium				<0.002
Cobalt				0.0006
Copper				<0.0005
Iron				0.09
Lead				0.00005
Manganese				0.056
Mercury				<0.0001
Nickel				<0.001
Selenium				<0.001
Silver				<0.001
Zinc				<0.005
Phosphorous(Reactive)				0.02
Phosphorous (Total)				0.02
Flouride				<0.1
Nitrogen (Total)				0.24
Ammonial Nitrogen				0.03
Nitrates				<0.01

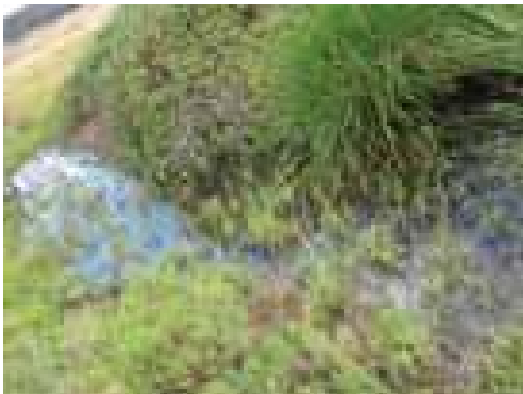
Minor metals and nutrients not analysed during initial survey.

**Site No:** 051  
**Name:** Soak No 2  
**Property:** Moolarben Coal Operations  
**Description:** Permanent spring with reeds  
**MGA Coordinates:** 6421831 N 762981 E  
**Elevation:** 477m AHD

**Date inspected:** 26 July 2005      **Water Quality (field):** pH 6.29    EC 0.37 mS/cm    T 12.7 °C



**Date inspected:** 22 April 2009      **Water Quality (field):** pH 7.33    EC 0.288mS/cm    T 18.7 °C



Laboratory Analysis Results				
Analyte	Units	LOR	26 July 2005	22 April 2009
TSS	mg/L @ 105°C	1	54	12
TDS	mg/L @ 180°C	1	140	173.5
pH		0.1	6.4	6.9
EC	µS/cm	1	220	250
Potassium	mg/L	0.1	4.5	2.1
Sodium	mg/L	1	27	32
Calcium	mg/L	1	2.8	8.9
Magnesium	mg/L	0.1	5.3	9.9
Cation sum	meq/L	0.01	2.09	2.7
Chloride	mg/L	1	40	50
Sulphate	mg/L	1	5.9	<2
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	42	37
Anion sum	meq/L	0.01	1.87	2.15
Ionic difference	%		5.7%	
Allowable difference	%		2.0%	
Aluminium				<0.02
Arsenic				<0.001
Boron				0.05
Cadmium				<0.0005
Chromium				<0.002
Cobalt				0.0004
Copper				<0.0005
Iron				0.47
Lead				0.00007
Manganese				0.046
Mercury				<0.0001
Nickel				<0.001
Selenium				<0.001
Silver				<0.001
Zinc				<0.005
Phosphorous(Reactive)				0.02
Phosphorous (Total)				0.08
Flouride				0.2
Nitrogen (Total)				0.95
Ammonial Nitrogen				0.03
Nitrates				<0.01

Minor metals and nutrients not analysed during initial survey.

**Site No:** 052  
**Name:** Soak No 3  
**Property:** Moolarben Coal Operations  
**Description:** Groundwater fed dam.  
**MGA Coordinates:** 6422004 N 762988 E  
**Elevation:** 477m AHD

**Date inspected:** 26 July 2005      **Water Quality (field):** pH 6.55    EC 0.12 mS/cm    T 12.4 °C



**Date inspected:** 22 April 2009      **Water Quality (field):** pH 7.96    EC 0.075mS/cm    T 19.6 °C



Laboratory Analysis Results				
Analyte	Units	LOR	26 July 2005	22 April 2009
TSS	mg/L @ 105°C	1	15	9
TDS	mg/L @ 180°C	1	71	73.5
pH		0.1	6.8	7.2
EC	µS/cm	1	80	70
Potassium	mg/L	0.1	6.7	-
Sodium	mg/L	1	6.5	-
Calcium	mg/L	1	0.8	-
Magnesium	mg/L	0.1	1.8	-
Cation sum	meq/L	0.01	0.64	-
Chloride	mg/L	1	8.2	7
Sulphate	mg/L	1	<1	-
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	25	20
Anion sum	meq/L	0.01	0.75	-
Ionic difference	%		7.9%	
Allowable difference	%		2.0%	
Aluminium				0.19
Arsenic				<0.001
Boron				0.02
Cadmium				<0.00005
Chromium				<0.002
Cobalt				0.0005
Copper				0.0009
Iron				0.74
Lead				0.00027
Manganese				0.011
Mercury				<0.0001
Nickel				<0.001
Selenium				<0.001
Silver				<0.001
Zinc				<0.005
Phosphorous(Reactive)				0.03
Phosphorous (Total)				0.07
Flouride				0.1
Nitrogen (Total)				2
Ammonial Nitrogen				0.09
Nitrates				<0.01

Minor metals and nutrients not analysed during initial survey.

**Site No:** 053  
**Name:** Soak No 4  
**Property:** Moolarben Coal Operations  
**Description:** Spring fed dam  
**MGA Coordinates:** 6422573 N 762023 E  
**Elevation:** 496m AHD

**Date inspected:** 26 July 2005      **Water Quality (field):** pH 6.70    EC 0.25 mS/cm    T 12.8 °C



**Date inspected:** 22 April 2009      **Water Quality (field):** pH 7.43    EC 0.294mS/cm    T 17.8 °C



Laboratory Analysis Results				
Analyte	Units	LOR	26 July 2005	22 April 2009
TSS	mg/L @ 105°C	1	6	19
TDS	mg/L @ 180°C	1	140	155
pH		0.1	6.8	7
EC	µS/cm	1	165	185
Potassium	mg/L	0.1	4.6	-
Sodium	mg/L	1	22	-
Calcium	mg/L	1	2.4	-
Magnesium	mg/L	0.1	3.8	-
Cation sum	meq/L	0.01	1.51	-
Chloride	mg/L	1	24	25
Sulphate	mg/L	1	4.3	-
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	41	51
Anion sum	meq/L	0.01	1.59	-
Ionic difference	%		2.5%	
Allowable difference	%		2.0%	
Aluminium				0.09
Arsenic				0.002
Boron				0.06
Cadmium				<0.00005
Chromium				<0.002
Cobalt				0.0005
Copper				0.0012
Iron				3.5
Lead				0.00068
Manganese				0.049
Mercury				<0.0001
Nickel				0.002
Selenium				<0.001
Silver				<0.001
Zinc				<0.005
Phosphorous(Reactive)				0.03
Phosphorous (Total)				0.09
Flouride				0.2
Nitrogen (Total)				1.9
Ammonial Nitrogen				0.04
Nitrates				<0.01

Minor metals and nutrients not analysed during initial survey.

Appendix E | Groundwater Impact Assessment

**Site No:** 054  
**Name:** Soak No 5  
**Property:** Moolarben Coal Operations  
**Description:** Soak / spring fed dam  
**MGA Coordinates:** 6422672 N 762546 E  
**Elevation:** 480m AHD

**Date inspected:** 26 July 2005      **Water Quality (field):** pH 5.54    EC 0.28 mS/cm    T 13.2 °C



**Date inspected:** 22 April 2009      **Water Quality (field):** pH 6.65    EC 0.168mS/cm    T 17.7 °C



Laboratory Analysis Results				
Analyte	Units	LOR	26 July 2005	22 April 2009
TSS	mg/L @ 105°C	1	25	19
TDS	mg/L @ 180°C	1	190	118.5
pH		0.1	6.1	6.7
EC	µS/cm	1	195	160
Potassium	mg/L	0.1	20	
Sodium	mg/L	1	16	
Calcium	mg/L	1	2.2	
Magnesium	mg/L	0.1	3.1	
Cation sum	meq/L	0.01	1.57	
Chloride	mg/L	1	36	21
Sulphate	mg/L	1	18	
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	15	30
Anion sum	meq/L	0.01	1.69	
Ionic difference	%		3.6%	
Allowable difference	%		2.0%	
Aluminium				0.11
Arsenic				0.001
Boron				0.06
Cadmium				<0.00005
Chromium				<0.002
Cobalt				0.0012
Copper				0.0012
Iron				1.8
Lead				0.0004
Manganese				0.13
Mercury				<0.0001
Nickel				0.001
Selenium				<0.001
Silver				<0.001
Zinc				<0.005
Phosphorous(Reactive)				0.02
Phosphorous (Total)				0.08
Flouride				<0.1
Nitrogen (Total)				1.8
Ammonial Nitrogen				0.04
Nitrates				<0.01

Minor metals and nutrients not analysed during initial survey.

**Site No:** 055  
**Name:** Soak No 6  
**Property:** Moolarben Coal Operations  
**Description:** Soak / spring fed dam  
**MGA Coordinates:** 6422722 N 762616 E  
**Elevation:** 474m AHD

**Date inspected:** 26 July 2005      **Water Quality (field):** pH 6.12    EC 0.17 mS/cm    T 13.1 °C



**Date inspected:** 22 April 2009      **Water Quality (field):** pH 6.94    EC 0.165mS/cm    T 17.3 °C

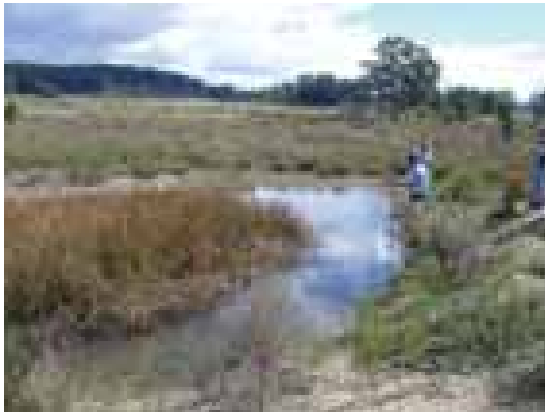


Laboratory Analysis Results				
Analyte	Units	LOR	26 July 2005	22 April 2009
TSS	mg/L @ 105°C	1	18	2
TDS	mg/L @ 180°C	1	130	91.5
pH		0.1	6.9	6.7
EC	µS/cm	1	175	160
Potassium	mg/L	0.1	4.3	
Sodium	mg/L	1	13	
Calcium	mg/L	1	15	
Magnesium	mg/L	0.1	2.5	
Cation sum	meq/L	0.01	1.63	
Chloride	mg/L	1	20	21
Sulphate	mg/L	1	4.7	
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	55	41
Anion sum	meq/L	0.01	1.76	
Ionic difference	%		3.9%	
Allowable difference	%		2.0%	
Aluminium				0.04
Arsenic				<0.001
Boron				0.04
Cadmium				<0.00005
Chromium				<0.002
Cobalt				<0.0002
Copper				<0.0005
Iron				0.36
Lead				0.00006
Manganese				0.005
Mercury				<0.0001
Nickel				<0.001
Selenium				<0.001
Silver				<0.001
Zinc				<0.005
Phosphorous(Reactive)				0.02
Phosphorous (Total)				0.02
Flouride				<0.1
Nitrogen (Total)				0.42
Ammonial Nitrogen				0.05
Nitrates				<0.01

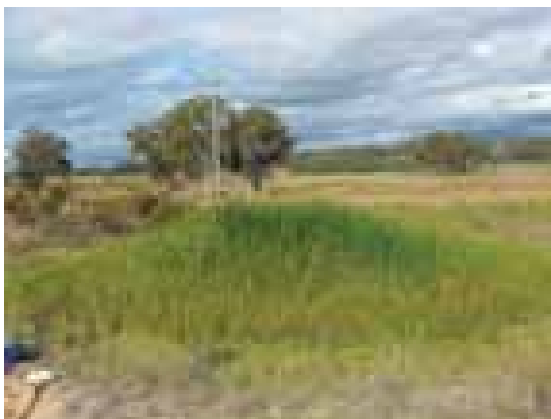
Minor metals and nutrients not analysed during initial survey.

**Site No:** 056  
**Name:** Soak No 7  
**Property:** Moolarben Coal Operations  
**Description:** Small soak south of No 6.  
**MGA Coordinates:** 6422687 N 762639 E  
**Elevation:** 475m AHD

**Date inspected:** 26 July 2005      **Water Quality (field):** pH 6.33    EC 0.27 mS/cm    T 16.1 °C



**Date inspected:** 22 April 2009      **Water Quality (field):** pH 6.45    EC 0.204mS/cm    T 16.9 °C



Laboratory Analysis Results				
Analyte	Units	LOR	26 July 2005	22 April 2009
TSS	mg/L @ 105°C	1	3	35
TDS	mg/L @ 180°C	1	130	121
pH		0.1	6.6	6.3
EC	µS/cm	1	205	220
Potassium	mg/L	0.1	0.7	
Sodium	mg/L	1	33	
Calcium	mg/L	1	0.6	
Magnesium	mg/L	0.1	4.7	
Cation sum	meq/L	0.01	1.87	
Chloride	mg/L	1	29	25
Sulphate	mg/L	1	4.2	
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	56	55
Anion sum	meq/L	0.01	2.02	
Ionic difference	%		4.0%	
Allowable difference	%		2.0%	
Aluminium				<0.02
Arsenic				<0.001
Boron				0.05
Cadmium				<0.00005
Chromium				<0.002
Cobalt				0.0005
Copper				<0.0005
Iron				0.15
Lead				0.00008
Manganese				0.092
Mercury				<0.0001
Nickel				<0.001
Selenium				<0.001
Silver				<0.001
Zinc				<0.005
Phosphorous(Reactive)				0.02
Phosphorous (Total)				0.03
Flouride				0.1
Nitrogen (Total)				0.59
Ammonial Nitrogen				0.01
Nitrates				<0.01

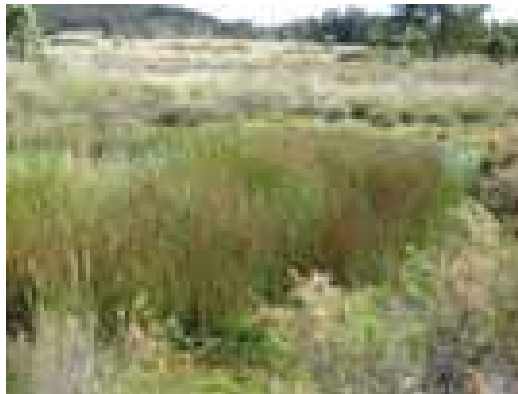
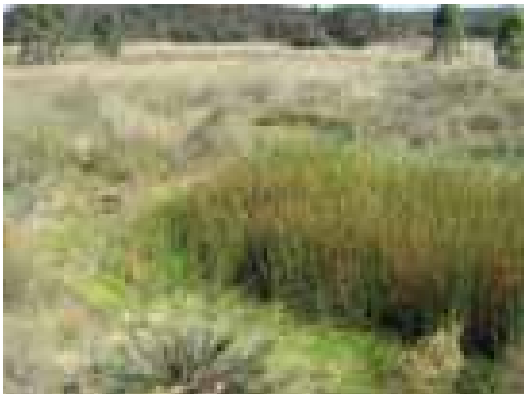
Minor metals and nutrients not analysed during initial survey.

**Site No:** 057  
**Name:** Soak No 8  
**Property:** Moolarben Coal Operations  
**Description:** Small soak / dam. Negligible surface catchment  
**MGA Coordinates:** 6420815 N 763173 E  
**Elevation:** 489m AHD

**Date inspected:** 26 July 2005      **Water Quality (field):** pH 6.49    EC 0.34 mS/cm    T 15.1 °C



**Date inspected:** 23 April 2009      **Water Quality (field):** pH 7.50    EC 0.16mS/cm    T 18.4 °C



Laboratory Analysis Results				
Analyte	Units	LOR	26 July 2005	23 April 2009
TSS	mg/L @ 105°C	1	3	<2
TDS	mg/L @ 180°C	1	110	104.4
pH		0.1	6.8	6.5
EC	µS/cm	1	165	160
Potassium	mg/L	0.1	3.9	
Sodium	mg/L	1	20	
Calcium	mg/L	1	0.8	
Magnesium	mg/L	0.1	6.1	
Cation sum	meq/L	0.01	1.51	
Chloride	mg/L	1	24	18
Sulphate	mg/L	1	5.3	13
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	39	33
Anion sum	meq/L	0.01	1.57	
Ionic difference	%		1.8%	
Allowable difference	%		2.0%	
Aluminium				0.04
Arsenic				<0.001
Boron				0.04
Cadmium				<0.00005
Chromium				<0.001
Cobalt				<0.0002
Copper				0.0008
Iron				0.16
Lead				0.0001
Manganese				0.01
Mercury				<0.0001
Nickel				<0.001
Selenium				<0.001
Silver				<0.001
Zinc				0.005
Phosphorous(Reactive)				0.02
Phosphorous (Total)				0.01
Flouride				0.2
Nitrogen (Total)				0.46
Ammonial Nitrogen				0.03
Nitrates				0.06

Minor metals and nutrients not analysed during initial survey.



**Site No:** 058  
**Name:** Soak No 1  
**Property:** Moolarben Coal Operations  
**Description:** Broad swampy area in centre of valley.  
 Previously was a deep hole, now has become filled with water couch.  
**MGA Coordinates:** 6420061 N 764034 E  
**Elevation:** 498m AHD

**Date inspected:** 26 July 2005      **Water Quality (field):** pH 4.49      EC 1.47 mS/cm      T 13.5 °C



**Date inspected:** 29 April 2009      **Water Quality (field):** pH 6.95      EC 1.398 mS/cm      T 14 °C



Laboratory Analysis Results				
Analyte	Units	LOR	26 July 2005	29 April 2009
TSS	mg/L @ 105°C	1	15	31
TDS	mg/L @ 180°C	1	730	786
pH		0.1	5.6	6.3
EC	µS/cm	1	1220	1395
Potassium	mg/L	0.1	16	
Sodium	mg/L	1	120	
Calcium	mg/L	1	23	
Magnesium	mg/L	0.1	40	
Cation sum	meq/L	0.01	10.07	
Chloride	mg/L	1	370	
Sulphate	mg/L	1	2.5	
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	5	
Anion sum	meq/L	0.01	10.59	
Ionic difference	%		2.5%	
Allowable difference	%		5.0%	
Aluminium				0.02
Arsenic				<0.001
Boron				0.06
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.02
Copper				0.0006
Iron				0.62
Lead				<0.00005
Manganese				3.8
Mercury				<0.0001
Nickel				0.003
Selenium				<0.001
Silver				<0.001
Zinc				0.005
Phosphorous(Reactive)				0.02
Phosphorous (Total)				0.08
Flouride				<0.1
Nitrogen (Total)				1.2
Ammonial Nitrogen				0.03
Nitrates				0.02

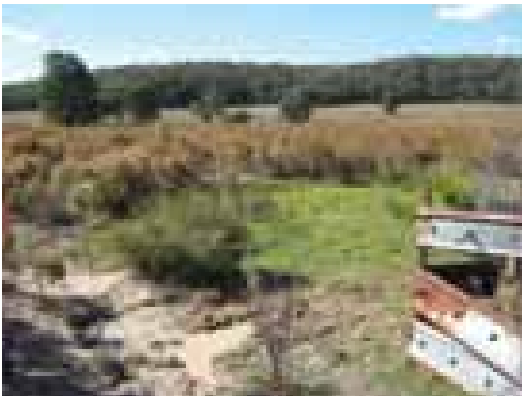
Minor metals and nutrients not analysed during initial survey.

**Site No:** 059  
**Name:** Soak No.2  
**Property:** Moolarben Coal Operations  
**Description:** Small seepage in middle of paddock.  
**MGA Coordinates:** 6419456 N 764087 E  
**Elevation:** 517m AHD

**Date inspected:** 26 July 2005      **Water Quality (field):** pH 5.95    EC 0.27 mS/cm    T 16.6 °C



**Date inspected:** 23 April 2009      **Water Quality (field):** pH 6.06    EC 1.555 mS/cm    T 24.1 °C



Laboratory Analysis Results				
Analyte	Units	LOR	26 July 2005	23 April 2009
TSS	mg/L @ 105°C	1	19	1220
TDS	mg/L @ 180°C	1	190	893
pH		0.1	6.1	5.8
EC	µS/cm	1	235	160
Potassium	mg/L	0.1	1.8	
Sodium	mg/L	1	33	
Calcium	mg/L	1	0.2	
Magnesium	mg/L	0.1	4.7	
Cation sum	meq/L	0.01	1.88	
Chloride	mg/L	1	40	21
Sulphate	mg/L	1	4.3	24
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	12	10
Anion sum	meq/L	0.01	1.46	
Ionic difference	%		12.6%	
Allowable difference	%		2.0%	
Aluminium				1.2
Arsenic				<0.001
Boron				0.05
Cadmium				<0.00005
Chromium				0.002
Cobalt				0.0006
Copper				0.0015
Iron				0.52
Lead				0.0003
Manganese				0.01
Mercury				<0.0001
Nickel				<0.001
Selenium				<0.001
Silver				<0.001
Zinc				0.014
Phosphorous(Reactive)				0.03
Phosphorous (Total)				0.36
Flouride				<0.1
Nitrogen (Total)				3.4
Ammonial Nitrogen				0.12
Nitrates				1

Minor metals and nutrients not analysed during initial survey.

**Site No:** 060  
**Name:** National Park No 1  
**Property:** Moolarben Coal Operations  
**Description:** Shallow well, just inside the National Park. Chips of coal in spoil.  
**MGA Coordinates:** 6417706 N 765442 E  
**Elevation:** 560m AHD

**Date inspected:** 26 July 2005      **Water Quality (field):** pH 5.31    EC 0.21 mS/cm    T 14.6 °C



**Date inspected:** 23 April 2009      **Water Quality (field):** pH 5.81    EC 0.157 mS/cm    T 18.3 °C



Laboratory Analysis Results				
Analyte	Units	LOR	26 July 2005	23 April 2009
TSS	mg/L @ 105°C	1	13	3
TDS	mg/L @ 180°C	1	170	116.5
pH		0.1	5.3	5.5
EC	µS/cm	1	140	150
Potassium	mg/L	0.1	4.5	2.3
Sodium	mg/L	1	15	20
Calcium	mg/L	1	1.3	6.9
Magnesium	mg/L	0.1	2.2	4.30
Cation sum	meq/L	0.01	1.01	1.63
Chloride	mg/L	1	31	32
Sulphate	mg/L	1	<1	<2
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	8	7
Anion sum	meq/L	0.01	1.06	1.04
Ionic difference	%		2.0%	
Allowable difference	%		2.0%	
Aluminium				0.29
Arsenic				0.001
Boron				0.01
Cadmium				<0.00005
Chromium				0.001
Cobalt				0.0091
Copper				0.0012
Iron				0.36
Lead				0.00032
Manganese				0.08
Mercury				<0.0001
Nickel				0.023
Selenium				<0.001
Silver				<0.001
Zinc				0.008
Phosphorous(Reactive)				0.06
Phosphorous (Total)				0.11
Flouride				<0.1
Nitrogen (Total)				2.2
Ammonial Nitrogen				1.3
Nitrates				<0.01

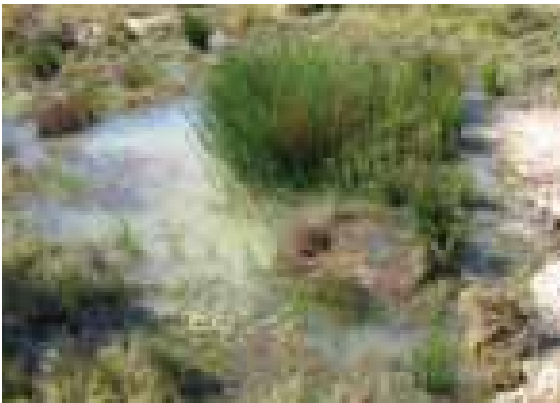
Minor metals and nutrients not analysed during initial survey.

**Site No:** 061  
**Name:** Warwick Lodge  
**Property:** Moolarben Coal Operations  
**Description:** Soak / spring fed dam. There are one or two disused old wells nearby.  
**MGA Coordinates:** 6420894 N 763023 E  
**Elevation:** 492m AHD

**Date inspected:** 26 July 2005      **Water Quality (field):** pH 6.55    EC 0.14 mS/cm    T 15.4 °C



**Date inspected:** 23 April 2009      **Water Quality (field):** pH 6.80    EC 0.18 mS/cm    T 20.6 °C



Laboratory Analysis Results				
Analyte	Units	LOR	26 July 2005	23 April 2009
TSS	mg/L @ 105°C	1	22	4
TDS	mg/L @ 180°C	1	150	92.5
pH		0.1	6.7	6.4
EC	µS/cm	1	110	170
Potassium	mg/L	0.1	2.3	
Sodium	mg/L	1	15	
Calcium	mg/L	1	0.6	
Magnesium	mg/L	0.1	3.3	
Cation sum	meq/L	0.01	1.01	
Chloride	mg/L	1	14	21
Sulphate	mg/L	1	12	15
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	22	37
Anion sum	meq/L	0.01	1.08	
Ionic difference	%		3.4%	
Allowable difference	%		2.0%	
Aluminium				0.24
Arsenic				<0.001
Boron				0.04
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0004
Copper				0.0006
Iron				0.22
Lead				0.00012
Manganese				0.05
Mercury				<0.0001
Nickel				<0.001
Selenium				<0.001
Silver				<0.001
Zinc				<0.005
Phosphorous(Reactive)				0.02
Phosphorous (Total)				0.03
Flouride				0.1
Nitrogen (Total)				0.71
Ammonial Nitrogen				0.02
Nitrates				0.07

Minor metals and nutrients not analysed during initial survey.

**Site No:** 062  
**Name:** Soak No.1  
**Property:** Moolarben Coal Operations  
**Description:** Soak  
**MGA Coordinates:** 6423238 N 763043 E  
**Elevation:** 464m AHD

**Date inspected:** 26 July 2005      **Water Quality (field):** pH 6.42    EC 0.24 mS/cm    T 14.5 °C



**Date inspected:** 29 April 2009      **Water Quality (field):** pH 8.15    EC 0.226 mS/cm    T 15.9 °C



Laboratory Analysis Results				
Analyte	Units	LOR	26 July 2005	29 April 2009
TSS	mg/L @ 105°C	1	240	562
TDS	mg/L @ 180°C	1	280	456
pH		0.1	6.3	7.2
EC	µS/cm	1	140	230
Potassium	mg/L	0.1	1.4	
Sodium	mg/L	1	25	
Calcium	mg/L	1	0.5	
Magnesium	mg/L	0.1	1.3	
Cation sum	meq/L	0.01	1.26	
Chloride	mg/L	1	37	
Sulphate	mg/L	1	7.8	
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	8	
Anion sum	meq/L	0.01	1.37	
Ionic difference	%		4.23	
Allowable difference	%		2.0%	
Aluminium				2.5
Arsenic				0.002
Boron				0.16
Cadmium				<0.00005
Chromium				0.004
Cobalt				0.0006
Copper				0.0028
Iron				1.7
Lead				0.0013
Manganese				0.01
Mercury				<0.0001
Nickel				0.002
Selenium				<0.001
Silver				<0.001
Zinc				0.015
Phosphorous(Reactive)				0.02
Phosphorous (Total)				12
Flouride				0.4
Nitrogen (Total)				4.6
Ammonial Nitrogen				<0.01
Nitrates				0.04

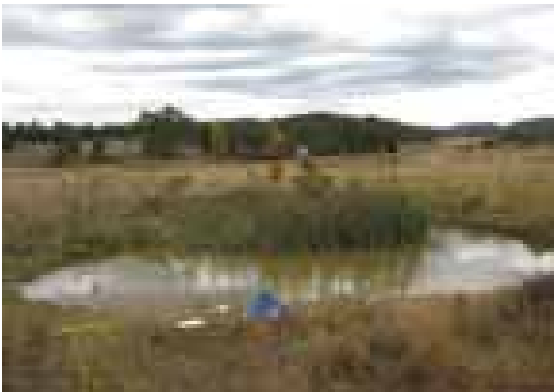
Minor metals and nutrients not analysed during initial survey.

**Site No:** 063  
**Name:** Soak No 2  
**Property:** Moolarben Coal Operations  
**Description:** Soak, about 100m SE from Soak 1.  
**MGA Coordinates:** 6423185 N 763078 E  
**Elevation:** 462m AHD

**Date inspected:** 26 July 2005      **Water Quality (field):** pH 6.50    EC 0.34 mS/cm    T 14.7 °C



**Date inspected:** 29 April 2009      **Water Quality (field):** pH 8.19    EC 0.298 mS/cm    T 15.5 °C



Laboratory Analysis Results				
Analyte	Units	LOR	26 July 2005	29 April 2009
TSS	mg/L @ 105°C	1	41	141
TDS	mg/L @ 180°C	1	280	274
pH		0.1	6.5	7.3
EC	µS/cm	1	245	295
Potassium	mg/L	0.1	4.8	11
Sodium	mg/L	1	31	36
Calcium	mg/L	1	1.3	4
Magnesium	mg/L	0.1	5.6	8.1
Cation sum	meq/L	0.01	2.00	2.71
Chloride	mg/L	1	58	60
Sulphate	mg/L	1	6.5	<2
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	18	39
Anion sum	meq/L	0.01	2.13	2.47
Ionic difference	%		3.3%	
Allowable difference	%		2.0%	
Aluminium				1.1
Arsenic				0.001
Boron				0.12
Cadmium				<0.00005
Chromium				0.002
Cobalt				0.0006
Copper				0.0022
Iron				1.3
Lead				0.0012
Manganese				0.012
Mercury				<0.0001
Nickel				0.001
Selenium				<0.001
Silver				<0.001
Zinc				0.019
Phosphorous(Reactive)				0.02
Phosphorous (Total)				0.21
Flouride				0.2
Nitrogen (Total)				4.1
Ammonial Nitrogen				<0.01
Nitrates				0.02

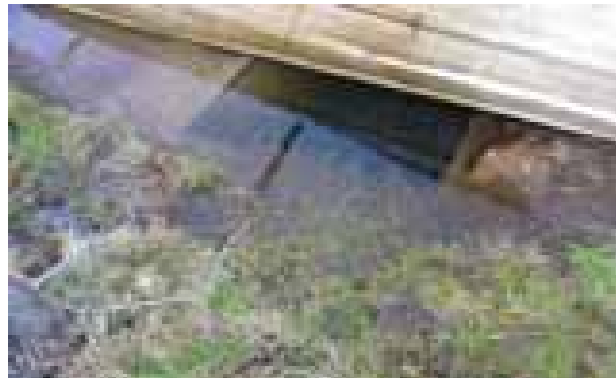
Minor metals and nutrients not analysed during initial survey.

**Site No:** 064  
**Name:** Davies 3  
**Property:** Moolarben Coal Operations  
**Description:** Soak, formerly equipped with windmill.  
**MGA Coordinates:** 6423288 N 762994 E  
**Elevation:** 465m AHD

**Date inspected:** 26 July 2005      **Water Quality (field):** pH 4.85    EC 0.27 mS/cm    T 15.2 °C



**Date inspected:** 29 April 2009      **Water Quality (field):** pH 6.45    EC 0.1776 mS/cm    T 16.9 °C



Laboratory Analysis Results				
Analyte	Units	LOR	26 July 2005	29 April 2009
TSS	mg/L @ 105°C	1	<2	88
TDS	mg/L @ 180°C	1	78	120.2
pH		0.1	5.2	6.1
EC	µS/cm	1	135	145
Potassium	mg/L	0.1	1.5	
Sodium	mg/L	1	16	
Calcium	mg/L	1	0.1	
Magnesium	mg/L	0.1	3.3	
Cation sum	meq/L	0.01	1.01	
Chloride	mg/L	1	29	
Sulphate	mg/L	1	3.2	
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	2	
Anion sum	meq/L	0.01	0.92	
Ionic difference	%		4.45%	
Allowable difference	%		2.0%	
Aluminium				<0.02
Arsenic				<0.001
Boron				0.03
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0004
Copper				<0.0005
Iron				0.17
Lead				<0.00005
Manganese				0.012
Mercury				<0.0001
Nickel				<0.001
Selenium				<0.001
Silver				<0.001
Zinc				<0.005
Phosphorous(Reactive)				0.02
Phosphorous (Total)				0.62
Flouride				<0.1
Nitrogen (Total)				10
Ammonial Nitrogen				<0.01
Nitrates				0.03

Minor metals and nutrients not analysed during initial survey.

**Site No:** 065  
**Name:** House Bore  
**Property:** Moolarben Coal Operations  
**Description:** Bore (in pump-house). Pump inlet set at 21m.  
**MGA Coordinates:** 6416414.567 N 759265.632 E  
**Elevation:** 487.089m AHD

**Date inspected:** 26 July 2005      **Water Quality (field):** pH 6.40    EC 4.12 mS/cm    T 16.5 °C



**Date inspected:** 14 May 2009      **Water Quality (field):** pH 6.98    EC 0.582 mS/cm    T 17.5 °C



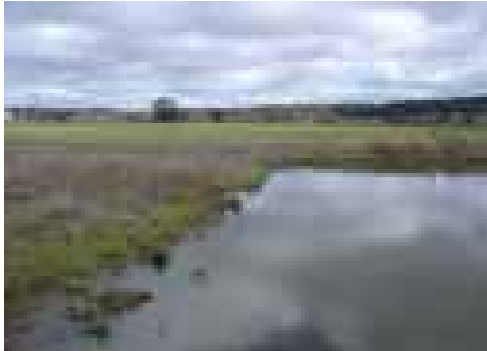
Laboratory Analysis Results				
Analyte	Units	LOR	26 July 2005	14 May 2009
TSS	mg/L @ 105°C	1	7	379
TDS	mg/L @ 180°C	1	2400	57
pH		0.1	6.5	6.9
EC	µS/cm	1	3860	590
Potassium	mg/L	0.1	38	18
Sodium	mg/L	1	410	67
Calcium	mg/L	1	130	15
Magnesium	mg/L	0.1	120	13
Cation sum	meq/L	0.01	35.16	5.19
Chloride	mg/L	1	1000	99
Sulphate	mg/L	1	240	50
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	131	51
Anion sum	meq/L	0.01	35.82	4.85
Ionic difference	%		0.9%	
Allowable difference	%		5.0%	
Aluminium				0.47
Arsenic				0.001
Boron				0.03
Cadmium				0.00016
Chromium				<0.001
Cobalt				0.0008
Copper				1.2
Iron				0.26
Lead				0.013
Manganese				0.055
Mercury				<0.0001
Nickel				0.014
Selenium				<0.001
Silver				<0.001
Zinc				0.29
Phosphorous(Reactive)				0.04
Phosphorous (Total)				0.1
Flouride				0.3
Nitrogen (Total)				5.4
Ammonial Nitrogen				<0.01
Nitrates				4.1

Minor metals and nutrients not analysed during initial survey.

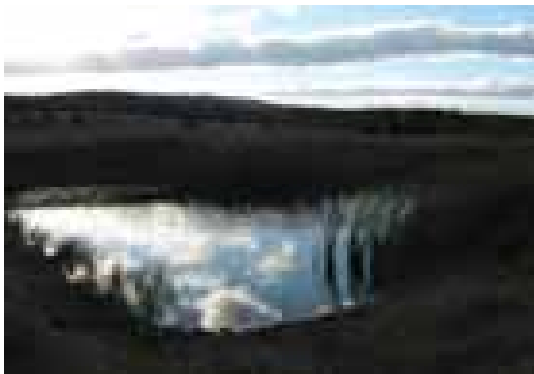


**Site No:** 066  
**Name:** Soak No.1  
**Property:** Moolarben Coal Operations  
**Description:** Spring fed dam. Water reportedly bubbles up through floor when cleaned out.  
**MGA Coordinates:** 6416275.724 N 759014.704 E  
**Elevation:** 490.895m AHD

**Date inspected:** 26 July 2005      **Water Quality (field):** pH 7.30    EC 0.42mS      T 13.0 °C



**Date inspected:** 14 May 2009      **Water Quality (field):** pH 7.74    EC 0.429 mS/cm      T 14.5 °C



Laboratory Analysis Results				
Analyte	Units	LOR	26 July 2005	14 May 2009
TSS	mg/L @ 105°C	1	9	293
TDS	mg/L @ 180°C	1	260	12
pH		0.1	7.0	7.6
EC	µS/cm	1	345	465
Potassium	mg/L	0.1	24	63
Sodium	mg/L	1	29	43
Calcium	mg/L	1	5.2	10
Magnesium	mg/L	0.1	7.8	14
Cation sum	meq/L	0.01	2.78	5.13
Chloride	mg/L	1	61	50
Sulphate	mg/L	1	25	<2
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	37	140
Anion sum	meq/L	0.01	2.98	4.21
Ionic difference	%		3.5%	
Allowable difference	%		2.0%	
Aluminium				<0.02
Arsenic				0.002
Boron				0.04
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0005
Copper				0.0009
Iron				0.31
Lead				0.00036
Manganese				0.054
Mercury				<0.0001
Nickel				0.002
Selenium				<0.001
Silver				<0.001
Zinc				<0.005
Phosphorous(Reactive)				0.01
Phosphorous (Total)				0.04
Flouride				0.4
Nitrogen (Total)				2
Ammonial Nitrogen				0.02
Nitrates				<0.01

Minor metals and nutrients not analysed during initial survey.

**Site No:** 067  
**Name:** Soak No 2  
**Property:** Moolarben Coal Operations  
**Description:** Spring fed dam.  
**MGA Coordinates:** 6416285.674 N 759034.211 E  
**Elevation:** 490.464m AHD

**Date inspected:** 26 July 2005      **Water Quality (field):** pH 7.20    EC 0.56 mS/cm    T 12.6 °C



**Date inspected:** 14 May 2009      **Water Quality (field):** pH 7.71    EC 1.242 mS/cm    T 14.8 °C



Laboratory Analysis Results				
Analyte	Units	LOR	26 July 2005	14 May 2009
TSS	mg/L @ 105°C	1	6	827
TDS	mg/L @ 180°C	1	310	86
pH		0.1	7.0	7.8
EC	µS/cm	1	455	1260
Potassium	mg/L	0.1	27	100
Sodium	mg/L	1	42	125
Calcium	mg/L	1	8.8	21
Magnesium	mg/L	0.1	11	30
Cation sum	meq/L	0.01	3.86	11.5
Chloride	mg/L	1	82	213
Sulphate	mg/L	1	38	<2
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	44	246
Anion sum	meq/L	0.01	3.98	10.9
Ionic difference	%		1.6%	
Allowable difference	%		2.0%	
Aluminium				<0.02
Arsenic				0.006
Boron				0.05
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0046
Copper				0.0058
Iron				0.63
Lead				0.00064
Manganese				3.2
Mercury				<0.0001
Nickel				0.006
Selenium				<0.001
Silver				<0.001
Zinc				0.005
Phosphorous(Reactive)				0.02
Phosphorous (Total)				0.48
Flouride				0.8
Nitrogen (Total)				16
Ammonial Nitrogen				6.2
Nitrates				0.01

Minor metals and nutrients not analysed during initial survey.

**Site No:** 068  
**Name:** Soak No.3  
**Property:** Moolarben Coal Operations  
**Description:** Spring fed dam.  
**MGA Coordinates:** 6416252.815 N 759549.142 E  
**Elevation:** 486.968m AHD

**Date inspected:** 26 July 2005      **Water Quality (field):** pH 8.34    EC 0.88 mS/cm    T 12.5 °C



**Date inspected:** 14 May 2009      **Water Quality (field):** pH 7.66    EC 0.451 mS/cm    T 15.7 °C



Laboratory Analysis Results				
Analyte	Units	LOR	26 July 2005	14 May 2009
TSS	mg/L @ 105°C	1	140	326
TDS	mg/L @ 180°C	1	570	40
pH		0.1	7.3	8
EC	µS/cm	1	725	480
Potassium	mg/L	0.1	19	37
Sodium	mg/L	1	89	41
Calcium	mg/L	1	15	18
Magnesium	mg/L	0.1	15	14
Cation sum	meq/L	0.01	6.34	4.78
Chloride	mg/L	1	140	42
Sulphate	mg/L	1	80	6
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	69	155
Anion sum	meq/L	0.01	6.99	4.41
Ionic difference	%		4.9%	
Allowable difference	%		2.0%	
Aluminium				<0.02
Arsenic				0.002
Boron				0.08
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0004
Copper				0.0018
Iron				0.02
Lead				0.00006
Manganese				0.023
Mercury				<0.0001
Nickel				0.002
Selenium				<0.001
Silver				<0.001
Zinc				0.039
Phosphorous(Reactive)				0.01
Phosphorous (Total)				0.1
Flouride				0.5
Nitrogen (Total)				2
Ammonial Nitrogen				0.25
Nitrates				0.03

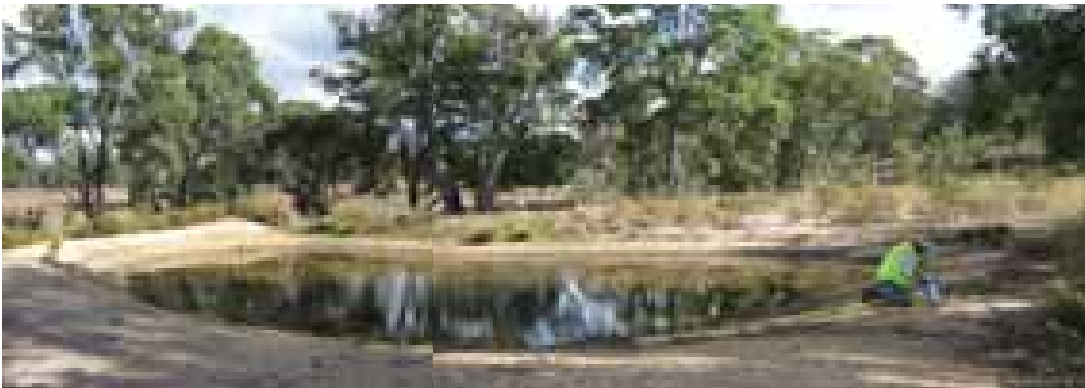
Minor metals and nutrients not analysed during initial survey.

**Site No:** 069  
**Name:** Soak No 1  
**Property:** Moolarben Coal Operations  
**Description:** Spring fed dam.  
**MGA Coordinates:** 6425092.651 N 763703.904 E  
**Elevation:** 439.32m AHD

**Date inspected:** 26 July 2005      **Water Quality (field):** pH 7.35    EC 0.22 mS/cm    T 12.1 °C



**Date inspected:** 30 April 2009      **Water Quality (field):** pH 8.34    EC 0.1631 mS/cm    T 14.9 °C



Laboratory Analysis Results				
Analyte	Units	LOR	26 July 2005	30 April 2009
TSS	mg/L @ 105°C	1	140	74
TDS	mg/L @ 180°C	1	570	134.1
pH		0.1	7.1	7.2
EC	µS/cm	1	205	180
Potassium	mg/L	0.1	10	7.4
Sodium	mg/L	1	21	26
Calcium	mg/L	1	2.3	5.6
Magnesium	mg/L	0.1	5	4.6
Cation sum	meq/L	0.01	1.70	1.98
Chloride	mg/L	1	21	32
Sulphate	mg/L	1	2.6	<2
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	63	30
Anion sum	meq/L	0.01	1.91	1.5
Ionic difference	%		5.8%	
Allowable difference	%		2.0%	
Aluminium				0.38
Arsenic				0.001
Boron				0.05
Cadmium				<0.00005
Chromium				0.001
Cobalt				0.0002
Copper				0.0007
Iron				1.3
Lead				0.00043
Manganese				0.006
Mercury				<0.0001
Nickel				0.001
Selenium				<0.001
Silver				<0.001
Zinc				<0.005
Phosphorous(Reactive)				0.01
Phosphorous (Total)				0.12
Flouride				0.1
Nitrogen (Total)				1.7
Ammonial Nitrogen				0.02
Nitrates				0.01

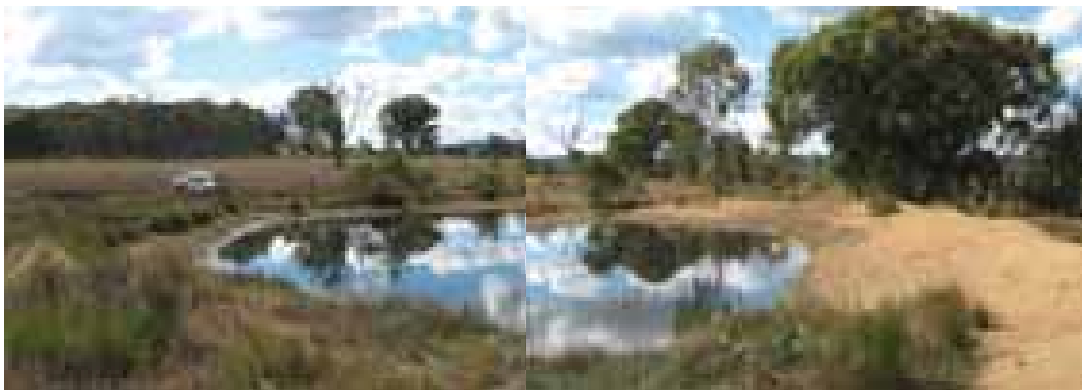
Minor metals and nutrients not analysed during initial survey.

**Site No:** 071  
**Name:** Soak No.3  
**Property:** Moolarben Coal Operations  
**Description:** Spring fed dam.  
**MGA Coordinates:** 6425191.245 N 763843.981 E  
**Elevation:** 437.69m AHD

**Date inspected:** 26 July 2005      **Water Quality (field):** pH 7.27    EC 0.19 mS/cm    T 13.6 °C



**Date inspected:** 30 April 2009      **Water Quality (field):** pH 8.73    EC 0.1708 mS/cm    T 19.8 °C



Laboratory Analysis Results				
Analyte	Units	LOR	26 July 2005	30 April 2009
TSS	mg/L @ 105°C	1	9	<2
TDS	mg/L @ 180°C	1	82	135.5
pH		0.1	7.5	8.2
EC	µS/cm	1	135	180
Potassium	mg/L	0.1	8.4	8.7
Sodium	mg/L	1	11	21
Calcium	mg/L	1	2.8	8.9
Magnesium	mg/L	0.1	3.5	5.9
Cation sum	meq/L	0.01	1.12	2.06
Chloride	mg/L	1	11	21
Sulphate	mg/L	1	1.6	<2
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	45	47
Anion sum	meq/L	0.01	1.24	1.53
Ionic difference	%		5.2%	
Allowable difference	%		2.0%	
Aluminium				0.03
Arsenic				<0.001
Boron				0.04
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0004
Copper				<0.0005
Iron				1.2
Lead				0.0001
Manganese				0.018
Mercury				<0.0001
Nickel				<0.001
Selenium				<0.001
Silver				<0.001
Zinc				<0.005
Phosphorous(Reactive)				0.01
Phosphorous (Total)				0.05
Flouride				0.2
Nitrogen (Total)				2
Ammonial Nitrogen				0.01
Nitrates				0.02

Minor metals and nutrients not analysed during initial survey.

**Site No:** 072  
**Name:** Soak No.4  
**Property:** Moolarben Coal Operations  
**Description:** Spring fed dam.  
**MGA Coordinates:** 6424915.638 N 762741.068 E  
**Elevation:** 492.459m AHD

**Date inspected:** 26 July 2005      **Water Quality (field):** pH 6.96    EC 0.29 mS/cm    T 14.3 °C



**Date inspected:** 30 April 2009      **Water Quality (field):** pH 8.3    EC 0.1937 mS/cm    T 18.5 °C



Laboratory Analysis Results				
Analyte	Units	LOR	26 July 2005	30 April 2009
TSS	mg/L @ 105°C	1	67	8
TDS	mg/L @ 180°C	1	260	133
pH		0.1	7.1	8
EC	µS/cm	1	225	180
Potassium	mg/L	0.1	16	7
Sodium	mg/L	1	15	21
Calcium	mg/L	1	5.8	7.9
Magnesium	mg/L	0.1	5.9	6.3
Cation sum	meq/L	0.01	1.84	2
Chloride	mg/L	1	31	28
Sulphate	mg/L	1	<1	<2
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	53	38
Anion sum	meq/L	0.01	1.95	1.55
Ionic difference	%		0.12%	
Allowable difference	%		2.0%	
Aluminium				0.09
Arsenic				<0.001
Boron				0.06
Cadmium				<0.00005
Chromium				<0.001
Cobalt				<0.0002
Copper				<0.0005
Iron				1.1
Lead				0.00009
Manganese				0.01
Mercury				<0.0001
Nickel				0.001
Selenium				<0.001
Silver				<0.001
Zinc				<0.005
Phosphorous(Reactive)				0.01
Phosphorous (Total)				0.05
Flouride				0.2
Nitrogen (Total)				1.3
Ammonial Nitrogen				0.02
Nitrates				0.01

Minor metals and nutrients not analysed during initial survey.

**Site No:** 073  
**Name:** Soak No 5  
**Property:** Moolarben Coal Operations  
**Description:** Small spring, has been dug out and enlarged.  
**MGA Coordinates:** 6424278.841 N 763707.773 E  
**Elevation:** 432.349m AHD

**Date inspected:** 26 July 2005      **Water Quality (field):** pH 6.96    EC 0.29 mS/cm    T 14.3 °C



**Date inspected:** 30 April 2009      **Water Quality (field):** Site Dry No Sample



Laboratory Analysis Results				
Analyte	Units	LOR	26 July 2005	30 April 2009
TSS	mg/L @ 105°C	1	56	Site Dry No Sample
TDS	mg/L @ 180°C	1	180	
pH		0.1	6.8	
EC	µS/cm	1	135	
Potassium	mg/L	0.1	11	
Sodium	mg/L	1	11	
Calcium	mg/L	1	1.3	
Magnesium	mg/L	0.1	3.7	
Cation sum	meq/L	0.01	1.13	
Chloride	mg/L	1	21	
Sulphate	mg/L	1	7.2	
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	25	
Anion sum	meq/L	0.01	1.24	
Ionic difference	%		4.8%	
Allowable difference	%		2.0%	
Aluminium				
Arsenic				
Boron				
Cadmium				
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Manganese				
Mercury				
Nickel				
Selenium				
Silver				
Zinc				
Phosphorous(Reactive)				
Phosphorous (Total)				
Flouride				
Nitrogen (Total)				
Ammonial Nitrogen				
Nitrates				

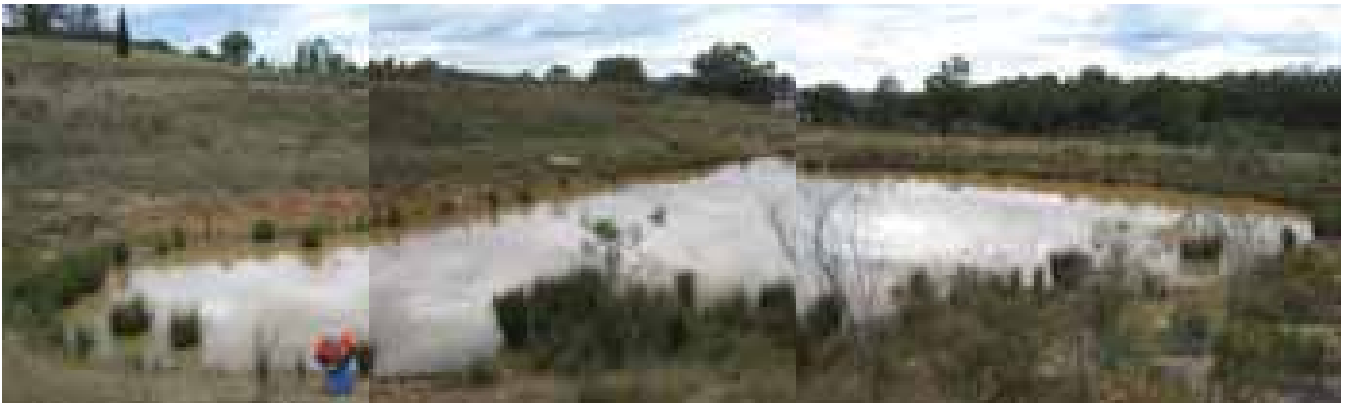
Minor metals and nutrients not analysed during initial survey.

**Site No:** 074  
**Name:** Dam No 1  
**Property:** Moolarben Coal Operations  
**Description:** Dam – no visible evidence of groundwater inflow.  
**MGA Coordinates:** 6422350.504 N 761386.887 E  
**Elevation:** 487.478m AHD

**Date inspected:** 26 July 2005      **Water Quality (field):** pH 6.57    EC 0.16 mS/cm    T 13.4 °C



**Date inspected:** 29 April 2009      **Water Quality (field):** pH 8.14    EC 0.1491 mS/cm    T 16.2 °C



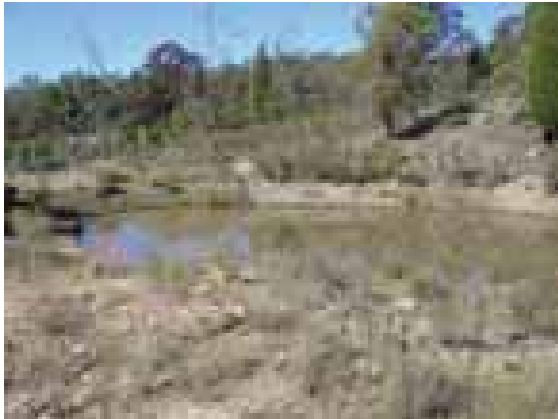
Laboratory Analysis Results				
Analyte	Units	LOR	26 July 2005	29 April 2009
TSS	mg/L @ 105°C	1	100	212
TDS	mg/L @ 180°C	1	680	201
pH		0.1	6.9	7.5
EC	µS/cm	1	105	150
Potassium	mg/L	0.1	1.7	
Sodium	mg/L	1	12	
Calcium	mg/L	1	2	
Magnesium	mg/L	0.1	4	
Cation sum	meq/L	0.01	0.99	
Chloride	mg/L	1	14	
Sulphate	mg/L	1	3.4	
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	26	
Anion sum	meq/L	0.01	0.99	
Ionic difference	%		0.5%	
Allowable difference	%		2.0%	
Aluminium				0.29
Arsenic				<0.001
Boron				0.05
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0021
Copper				0.0022
Iron				0.25
Lead				0.00017
Manganese				0.05
Mercury				<0.0001
Nickel				0.003
Selenium				<0.001
Silver				<0.001
Zinc				0.01
Phosphorous(Reactive)				0.01
Phosphorous (Total)				0.12
Flouride				0.5
Nitrogen (Total)				1.8
Ammonial Nitrogen				0.19
Nitrates				0.06

Minor metals and nutrients not analysed during initial survey.

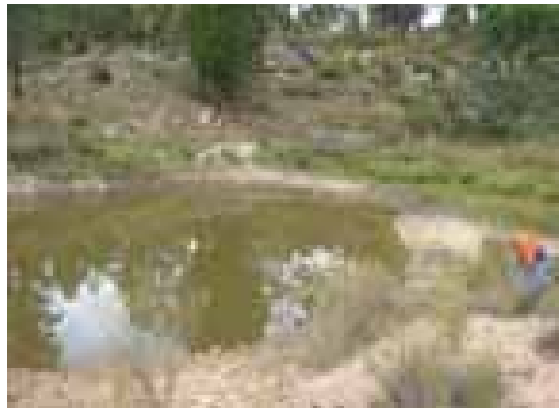


**Site No:** 075  
**Name:** Dam No 2  
**Property:** Moolarben Coal Operations  
**Description:** Dam – no visible evidence of groundwater inflow.  
**MGA Coordinates:** 6422157.743 N 761397.373 E  
**Elevation:** 484.565m AHD

**Date inspected:** 26 July 2005      **Water Quality (field):** pH 6.64    EC 0.20 mS/cm    T 16.7 °C



**Date inspected:** 29 April 2009      **Water Quality (field):** pH 8.17    EC 0.1242 mS/cm    T 15.5 °C



Laboratory Analysis Results					
Analyte	Units	LOR	26 July 2005	29 April 2009	
TSS	mg/L @ 105°C	1	25	54	
TDS	mg/L @ 180°C	1	180	112	
pH		0.1	6.8	7.3	
EC	µS/cm	1	195	135	
Potassium	mg/L	0.1	4.7	Analysis Not Required	
Sodium	mg/L	1	23		
Calcium	mg/L	1	1.5		
Magnesium	mg/L	0.1	3.2		
Cation sum	meq/L	0.01	1.46		
Chloride	mg/L	1	35		
Sulphate	mg/L	1	8		
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1		
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	18		
Anion sum	meq/L	0.01	1.51		
Ionic difference	%		1.9%		
Allowable difference	%		2.0%		
Aluminium					0.25
Arsenic					0.001
Boron					0.06
Cadmium				<0.00005	
Chromium				<0.001	
Cobalt				<0.0002	
Copper				0.0024	
Iron				0.3	
Lead				0.0007	
Manganese				0.003	
Mercury				<0.0001	
Nickel				0.002	
Selenium				<0.001	
Silver				<0.001	
Zinc				0.019	
Phosphorous(Reactive)				0.01	
Phosphorous (Total)				0.14	
Flouride				0.2	
Nitrogen (Total)				2.1	
Ammonial Nitrogen				<0.01	
Nitrates				0.02	

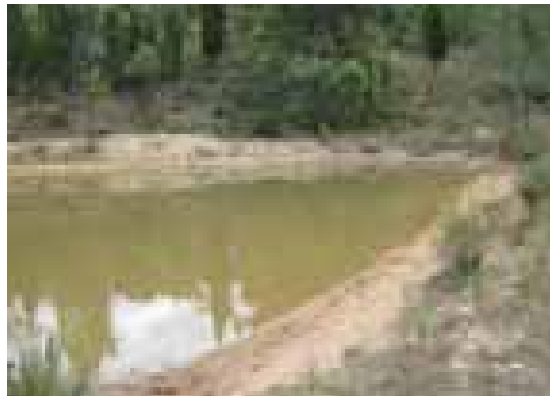
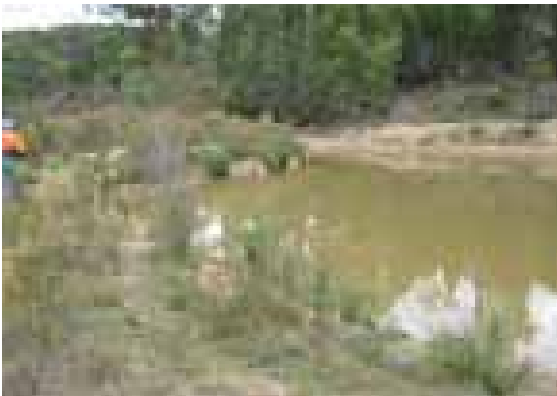
Minor metals and nutrients not analysed during initial survey.

**Site No:** 076  
**Name:** Dam No 3  
**Property:** Moolarben Coal Operations  
**Description:** Dam – no visible evidence of groundwater inflow.  
**MGA Coordinates:** 6422238.357 N 761293.734 E  
**Elevation:** 493.965m AHD

**Date inspected:** 26 July 2005      **Water Quality (field):** pH 6.91    EC 0.19 mS/cm    T 15.4 °C



**Date inspected:** 29 April 2009      **Water Quality (field):** pH 8.06    EC 0.1378 mS/cm    T 16 °C



Laboratory Analysis Results					
Analyte	Units	LOR	26 July 2005	29 April 2009	
TSS	mg/L @ 105°C	1	65	128	
TDS	mg/L @ 180°C	1	170	163.5	
pH		0.1	6.7	7.2	
EC	µS/cm	1	165	140	
Potassium	mg/L	0.1	4.4	Analysis Not Required	
Sodium	mg/L	1	21		
Calcium	mg/L	1	0.7		
Magnesium	mg/L	0.1	3.8		
Cation sum	meq/L	0.01	1.37		
Chloride	mg/L	1	36		
Sulphate	mg/L	1	4.2		
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1		
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	18		
Anion sum	meq/L	0.01	1.46		
Ionic difference	%		3.1%		
Allowable difference	%		2.0%		
Aluminium					1.2
Arsenic					0.001
Boron					0.03
Cadmium				<0.00005	
Chromium				<0.001	
Cobalt				0.0005	
Copper				0.0024	
Iron				1.3	
Lead				0.00083	
Manganese				0.011	
Mercury				<0.0001	
Nickel				0.003	
Selenium				<0.001	
Silver				<0.001	
Zinc				<0.005	
Phosphorous(Reactive)				0.02	
Phosphorous (Total)				0.1	
Flouride				0.4	
Nitrogen (Total)				1.9	
Ammonial Nitrogen				0.02	
Nitrates				0.03	

Minor metals and nutrients not analysed during initial survey.

**Site No:** 077  
**Name:** UCML No.1  
**Property:** Ulan Coal (Leased by Sword)  
**Description:** Spring / soak.  
**MGA Coordinates:** 6422203.613 N 759943.973 E  
**Elevation:** 451.196m AHD

**Date inspected:** 26 July 2005      **Water Quality (field):** pH 4.87    EC 0.60 mS/cm    T 12.6 °C



**Date inspected:** 15 June 2009      **Water Quality (field):** pH 5.46    EC 0.375 mS/cm    T 12.3 °C

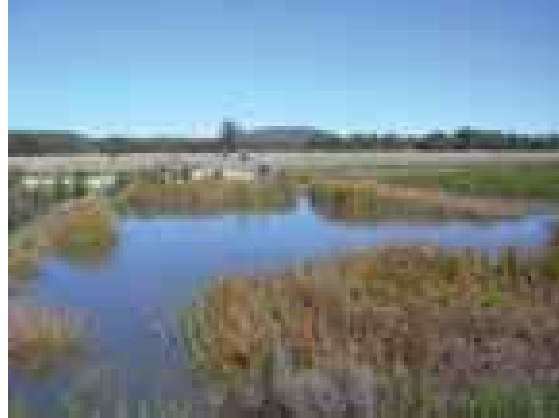


Laboratory Analysis Results				
Analyte	Units	LOR	26 July 2005	15 June 2009
TSS	mg/L @ 105°C	1	6	20
TDS	mg/L @ 180°C	1	390	323
pH		0.1	5.1	6.7
EC	µS/cm	1	510	380
Potassium	mg/L	0.1	2.8	4.5
Sodium	mg/L	1	74	60
Calcium	mg/L	1	0.3	7
Magnesium	mg/L	0.1	9	7.2
Cation sum	meq/L	0.01	4.05	3.67
Chloride	mg/L	1	130	96
Sulphate	mg/L	1	40	51
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	7	11
Anion sum	meq/L	0.01	4.64	3.98
Ionic difference	%		6.8%	
Allowable difference	%		2.0%	
Aluminium				0.41
Arsenic				0.001
Boron				0.03
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0007
Copper				0.0006
Iron				0.29
Lead				0.00051
Manganese				0.036
Mercury				<0.0001
Nickel				0.003
Selenium				<0.001
Silver				<0.001
Zinc				0.011
Phosphorous(Reactive)				0.02
Phosphorous (Total)				0.2
Flouride				<0.1
Nitrogen (Total)				1.6
Ammonial Nitrogen				0.02
Nitrates				<0.01

Minor metals and nutrients not analysed during initial survey.

**Site No:** 078  
**Name:** UCML No 2  
**Property:** Ulan Coal (Leased by Sword)  
**Description:** Spring fed dam.  
**MGA Coordinates:** 6422254.835 N 757921.576 E  
**Elevation:** 451.936m AHD

**Date inspected:** 26 July 2005      **Water Quality (field):** pH 6.76    EC 0.16 mS/cm    T 13.7 °C



**Date inspected:** 20 May 2009      **Water Quality (field):** pH 6.48    EC 0.139 mS/cm    T 13.6 °C

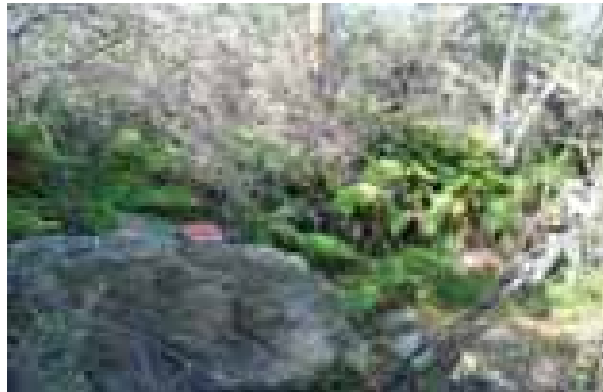
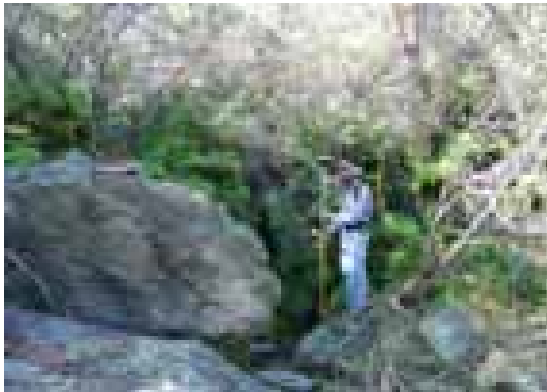


Laboratory Analysis Results				
Analyte	Units	LOR	26 July 2005	20 May 2009
TSS	mg/L @ 105°C	1	10	5
TDS	mg/L @ 180°C	1	180	285
pH		0.1	5.8	6.4
EC	µS/cm	1	115	160
Potassium	mg/L	0.1	2.3	3.1
Sodium	mg/L	1	20	30
Calcium	mg/L	1	0.2	0.1
Magnesium	mg/L	0.1	0.81	0.17
Cation sum	meq/L	0.01	1.01	1.4
Chloride	mg/L	1	17	28
Sulphate	mg/L	1	10	<2
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	16	26
Anion sum	meq/L	0.01	1.01	1.31
Ionic difference	%		0.1%	
Allowable difference	%		2.0%	
Aluminium				0.34
Arsenic				<0.001
Boron				0.1
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0003
Copper				0.0013
Iron				0.7
Lead				0.0012
Manganese				0.011
Mercury				<0.0001
Nickel				<0.001
Selenium				<0.001
Silver				<0.001
Zinc				0.13
Phosphorous(Reactive)				0.02
Phosphorous (Total)				0.05
Flouride				0.3
Nitrogen (Total)				1.6
Ammonial Nitrogen				0.07
Nitrates				<0.1

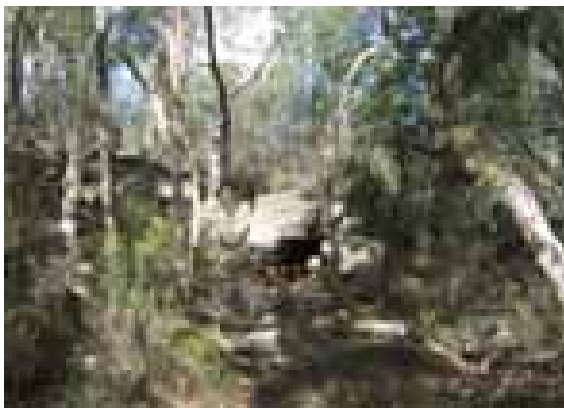
Minor metals and nutrients not analysed during initial survey.

**Site No:** 080  
**Name:** Spring - WW1  
**Property:** Moolarben Coal Operations  
**Description:** Spring.  
**MGA Coordinates:** 6431196 N 763656 E  
**Elevation:** 412.7 mAHD

**Date inspected:** 1 February 2006 **Water Quality (field):** Dry at time of inspection. No sample



**Date inspected:** 14 May 2009 **Water Quality (field):** pH 5.63 EC 0.262 mS/cm T 13.9 °C



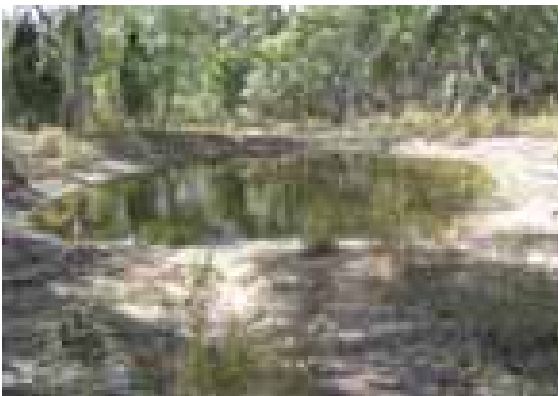
Laboratory Analysis Results				
Analyte	Units	LOR	1 February 2006	14 May 2009
TSS	mg/L @ 105°C	1	Dry at time of inspection. No sample	215
TDS	mg/L @ 180°C	1		1800
pH		0.1		4.6
EC	µS/cm	1		300
Potassium	mg/L	0.1		3.5
Sodium	mg/L	1		36
Calcium	mg/L	1		0.68
Magnesium	mg/L	0.1		6.4
Cation sum	meq/L	0.01		2.22
Chloride	mg/L	1		78
Sulphate	mg/L	1		<2
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1		<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1		<2
Anion sum	meq/L	0.01		2.2
Ionic difference	%			
Allowable difference	%			
Aluminium			Minor metals and nutrients not analysed during initial survey.	0.28
Arsenic				<0.001
Boron				0.21
Cadmium				<0.00005
Chromium				0.001
Cobalt				0.0038
Copper				0.0023
Iron				0.72
Lead				0.00054
Manganese				0.022
Mercury				<0.0001
Nickel				0.004
Selenium				<0.001
Silver				<0.001
Zinc				0.16
Phosphorous(Reactive)				0.01
Phosphorous (Total)				0.33
Flouride			0.2	
Nitrogen (Total)			4.6	
Ammonial Nitrogen			0.29	
Nitrates			0.01	

**Site No:** 082  
**Name:** Dam 3  
**Property:** Moolarben Coal Operations  
**Description:** Spring fed dam, reportedly always holds water.  
**MGA Coordinates:** 6430503 N 761869 E  
**Elevation:** 396 mAHD

**Date inspected:** 1 February 2006    **Water Quality (field):** pH 5.83    EC 0.11 mS/cm    T 28.9 °C



**Date inspected:** 14 May 2009    **Water Quality (field):** pH 8.27    EC 0.0723 mS/cm    T 16.1 °C

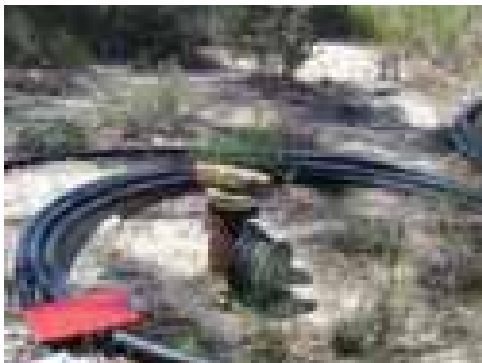


Laboratory Analysis Results				
Analyte	Units	LOR	1 February 2006	14 May 2009
TSS	mg/L @ 105°C	1	19	80
TDS	mg/L @ 180°C	1	88	70
pH		0.1	5.80	7.1
EC	µS/cm	1	110	80
Potassium	mg/L	0.1	5.1	6.5
Sodium	mg/L	1	5.8	6.1
Calcium	mg/L	1	1.3	1.3
Magnesium	mg/L	0.1	1.5	1.5
Cation sum	meq/L	0.01	0.57	0.62
Chloride	mg/L	1	9.4	14
Sulphate	mg/L	1	<1	<2
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	16	5
Anion sum	meq/L	0.01	0.59	0.49
Ionic difference	%		27.32%	
Allowable difference	%		2.00%	
Aluminium				0.05
Arsenic				<0.001
Boron				0.03
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0005
Copper				0.0008
Iron				0.18
Lead				<0.00005
Manganese				0.009
Mercury				<0.0001
Nickel				0.003
Selenium				<0.001
Silver				<0.001
Zinc				<0.005
Phosphorous(Reactive)				0.01
Phosphorous (Total)				0.04
Flouride				<0.1
Nitrogen (Total)				1.3
Ammonial Nitrogen				<0.01
Nitrates				<0.01

Minor metals and nutrients not analysed during initial survey.

**Site No:** 083  
**Name:** House Bore - Elward 1  
**Property:** Elward  
**Description:** Bore. Open hole, dry to at least 91 m. Drilled by Watermin - 320 ft deep.  
**Coordinates:** 6434758.11 N 762564.268 E  
**Elevation:** 443.179 mAHD

**Date inspected:** 1 February 2006      **Water Quality (field):** DRY/NO SAMPLE



**Date inspected:** 14 May 2009      **Water Quality (field):** DRY/NO SAMPLE



**Site No:** 084  
**Name:** Bore with Pump - Elward 2  
**Property:** Elward  
**Description:** Bore. Fitted with Onga pump. Pumps to tank at house – garden use. Drilled to 420 ft. Water level 38.85m below ground level.  
**MGA Coordinates:** 6435320.5 N 762683.034 E  
**Elevation:** 441.5 mAHD  
**Date inspected:** 1 February 2006 **Water Quality (field):** No Field Measurements Taken



**Date inspected:** 14 May 2009 **Water Quality (field):** pH 8.04 EC 0.0485 mS/cm T 27.8 °C



Laboratory Analysis Results				
Analyte	Units	LOR	1 February 2006	14 May 2009
TSS	mg/L @ 105°C	1	10	259
TDS	mg/L @ 180°C	1	140	2
pH		0.1	6.4	7.9
EC	µS/cm	1	320	445
Potassium	mg/L	0.1	1.2	6.9
Sodium	mg/L	1	24	28
Calcium	mg/L	1	4.3	50
Magnesium	mg/L	0.1	8.4	6.3
Cation sum	meq/L	0.01	1.98	4.41
Chloride	mg/L	1	47	42
Sulphate	mg/L	1	1	<2
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	55	145
Anion sum	meq/L	0.01	2.45	4.08
Ionic difference	%		17.63%	
Allowable difference	%		2.0%	
Aluminium				<0.02
Arsenic				<0.001
Boron				<0.01
Cadmium				<0.00005
Chromium				<0.001
Cobalt				<0.0002
Copper				0.0067
Iron				0.02
Lead				0.00029
Manganese				0.009
Mercury				<0.0001
Nickel				0.001
Selenium				<0.001
Silver				<0.001
Zinc				0.018
Phosphorous(Reactive)				0.08
Phosphorous (Total)				0.13
Flouride				<0.1
Nitrogen (Total)				2
Ammonial Nitrogen				0.03
Nitrates				1.7

Minor metals and nutrients not analysed during initial survey.



**Site No:** 085  
**Name:** Dam - Redhill 2  
**Property:** Moolarben Coal Operations  
**Description:** Dam – possibly seepage fed.  
**MGA Coordinates:** 6426537.851 N 766226.098 E  
**Elevation:** 431.22 mAHD

**Date inspected:** 1 February 2006    **Water Quality (field):** pH 5.76    EC 0.73 mS/cm    T 32.8 °C



**Date inspected:** 1 May 2009    **Water Quality (field):** pH 6.33    EC 0.0635 mS/cm    T 14.7 °C



Laboratory Analysis Results				
Analyte	Units	LOR	1 February 2006	1 May 2009
TSS	mg/L @ 105°C	1	29	23
TDS	mg/L @ 180°C	1	82	47.3
pH		0.1	9.30	5.9
EC	µS/cm	1	80	56
Potassium	mg/L	0.1	4.5	2.7
Sodium	mg/L	1	6.9	4.9
Calcium	mg/L	1	0.7	4.7
Magnesium	mg/L	0.1	0.67	2.5
Cation sum	meq/L	0.01	0.51	0.72
Chloride	mg/L	1	3.4	<3
Sulphate	mg/L	1	<1	<2
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2	20
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	25	<2
Anion sum	meq/L	0.01	0.60	0.4
Ionic difference	%		52.66%	
Allowable difference	%		2.0%	
Aluminium				0.03
Arsenic				<0.001
Boron				0.04
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0006
Copper				<0.0005
Iron				0.36
Lead				<0.00005
Manganese				0.087
Mercury				<0.0001
Nickel				<0.001
Selenium				<0.001
Silver				<0.001
Zinc				<0.005
Phosphorous(Reactive)				<0.01
Phosphorous (Total)				0.06
Flouride				<0.1
Nitrogen (Total)				1.2
Ammonial Nitrogen				<0.01
Nitrates				0.01

Minor metals and nutrients not analysed during initial survey.

**Site No:** 086  
**Name:** Dam - Redhill 2  
**Property:** Moolarben Coal Operations  
**Description:** Dam – possibly seepage fed.  
**MGA Coordinates:** 6425945.318 N 764843.153 E  
**Elevation:** 418.718 mAHD

**Date inspected:** 1 February 2006    **Water Quality (field):** pH 9.29    EC 0.08 mS/cm    T 38.6 °C



**Date inspected:** 1 May 2009    **Water Quality (field):** pH 7.95    EC 0.066 mS/cm    T 20.4 °C



Laboratory Analysis Results				
Analyte	Units	LOR	1 February 2006	1 May 2009
TSS	mg/L @ 105°C	1	1100	26
TDS	mg/L @ 180°C	1	430	54
pH		0.1	5.8	6.4
EC	µS/cm	1	730	50
Potassium	mg/L	0.1	40	2.5
Sodium	mg/L	1	38	4.8
Calcium	mg/L	1	18	4.5
Magnesium	mg/L	0.1	13	2.3
Cation sum	meq/L	0.01	4.65	0.69
Chloride	mg/L	1	54	7
Sulphate	mg/L	1	18	<2
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2	11
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	170	<2
Anion sum	meq/L	0.01	5.30	0.42
Ionic difference	%		41.11%	
Allowable difference	%		2.0%	
Aluminium				0.2
Arsenic				<0.001
Boron				0.03
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0013
Copper				0.0013
Iron				1.5
Lead				0.00052
Manganese				0.035
Mercury				<0.0001
Nickel				0.003
Selenium				<0.001
Silver				<0.001
Zinc				<0.005
Phosphorous(Reactive)				0.01
Phosphorous (Total)				0.15
Flouride				<0.1
Nitrogen (Total)				2.4
Ammonial Nitrogen				0.06
Nitrates				0.02

Minor metals and nutrients not analysed during initial survey.

**Site No:** 087  
**Name:** Dam - Transport 1  
**Property:** Moolarben Coal Operations  
**Description:** Dam, possibly spring fed. Very slimy green-yellow colour.  
**MGA Coordinates:** 6426320.896 N 763685.437 E  
**Elevation:** 440.15 mAHD

**Date inspected:** 1 February 2006    **Water Quality (field):** pH 8.43    EC 0.27 mS/cm    T 36.7 °C



**Date inspected:** 30 April 2009    **Water Quality (field):** pH 7.57    EC 0.217 mS/cm    T 11.5 °C



Laboratory Analysis Results				
Analyte	Units	LOR	1 February 2006	30 April 2009
TSS	mg/L @ 105°C	1	1000	16
TDS	mg/L @ 180°C	1	2300	380
pH		0.1	8.40	7.2
EC	µS/cm	1	270	230
Potassium	mg/L	0.1	5	6.6
Sodium	mg/L	1	46	37
Calcium	mg/L	1	1.9	6.7
Magnesium	mg/L	0.1	4	6.3
Cation sum	meq/L	0.01	2.55	2.37
Chloride	mg/L	1	21	14
Sulphate	mg/L	1	13	4
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	95	88
Anion sum	meq/L	0.01	2.76	2.24
Ionic difference	%		47.74%	
Allowable difference	%		2.0%	
Aluminium				0.69
Arsenic				0.002
Boron				0.09
Cadmium				<0.00005
Chromium				0.001
Cobalt				0.0017
Copper				0.0014
Iron				4.5
Lead				0.0016
Manganese				0.24
Mercury				<0.0001
Nickel				0.002
Selenium				<0.001
Silver				<0.001
Zinc				0.034
Phosphorous(Reactive)				0.04
Phosphorous (Total)				0.35
Flouride				0.7
Nitrogen (Total)				6.9
Ammonial Nitrogen				2.6
Nitrates				0.01

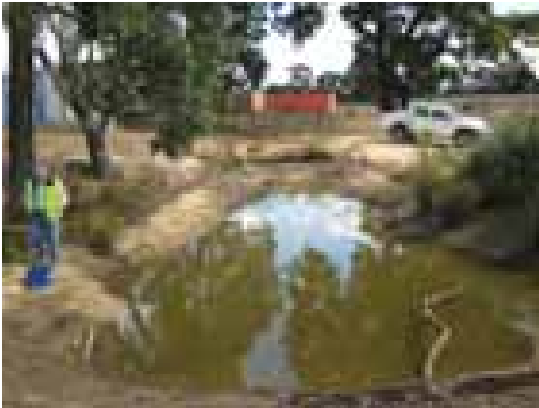
Minor metals and nutrients not analysed during initial survey.

**Site No:** 088  
**Name:** Dam - Transport 2  
**Property:** Moolarben Coal Operations  
**Description:** Dam, possibly spring fed. Muddy around edges.  
**MGA Coordinates:** 6426259.145 N 763760.49 E  
**Elevation:** 439.9 m AHD

**Date inspected:** 1 February 2006    **Water Quality (field):** pH 7.45    EC 0.22 mS/cm    T 34.0 °C

NO PHOTO

**Date inspected:** 30 April 2009    **Water Quality (field):** pH 8.12    EC 0.1188 mS/cm    T 17.7 °C



Laboratory Analysis Results				
Analyte	Units	LOR	1 February 2006	30 April 2009
TSS	mg/L @ 105°C	1	61	47
TDS	mg/L @ 180°C	1	1100	96.5
pH		0.1	7.4	7.2
EC	µS/cm	1	220	130
Potassium	mg/L	0.1	8.3	13
Sodium	mg/L	1	30	9.7
Calcium	mg/L	1	4.9	7
Magnesium	mg/L	0.1	5.3	5
Cation sum	meq/L	0.01	2.20	1.51
Chloride	mg/L	1	16	14
Sulphate	mg/L	1	21	<2
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	72	37
Anion sum	meq/L	0.01	2.33	1.13
Ionic difference	%		40.60%	
Allowable difference	%		2.0%	
Aluminium				0.08
Arsenic				<0.001
Boron				0.04
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0004
Copper				0.001
Iron				0.38
Lead				0.00014
Manganese				0.023
Mercury				<0.0001
Nickel				<0.001
Selenium				<0.001
Silver				<0.001
Zinc				<0.005
Phosphorous(Reactive)				0.01
Phosphorous (Total)				0.3
Flouride				0.2
Nitrogen (Total)				3
Ammonial Nitrogen				<0.01
Nitrates				0.01

Minor metals and nutrients not analysed during initial survey.

**Site No:** 089  
**Name:** Dam - Transport 3  
**Property:** Moolarben Coal Operations  
**Description:** Dam  
**MGA Coordinates:** 6426361.38 N 763770.115 E  
**Elevation:** 437.47 mAHD

**Date inspected:** 1 February 2006    **Water Quality (field):** pH 9.27    EC 0.24 mS/cm    T 35.8 °C



**Date inspected:** 30 April 2009    **Water Quality (field):** pH 8.22    EC 0.1808 mS/cm    T 14.4 °C



Laboratory Analysis Results				
Analyte	Units	LOR	1 February 2006	30 April 2009
TSS	mg/L @ 105°C	1	740	172
TDS	mg/L @ 180°C	1	2400	202
pH		0.1	9.3	7.3
EC	µS/cm	1	240	150
Potassium	mg/L	0.1	2.3	3.7
Sodium	mg/L	1	56	24
Calcium	mg/L	1	4.1	4
Magnesium	mg/L	0.1	3.1	3.5
Cation sum	meq/L	0.01	2.96	1.63
Chloride	mg/L	1	19	7
Sulphate	mg/L	1	55	<2
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	10	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	82	49
Anion sum	meq/L	0.01	3.52	1.18
Ionic difference	%		5.82%	
Allowable difference	%		2.0%	
Aluminium				0.58
Arsenic				<0.001
Boron				0.11
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0004
Copper				0.0017
Iron				0.98
Lead				0.00079
Manganese				0.005
Mercury				<0.0001
Nickel				0.001
Selenium				<0.001
Silver				<0.001
Zinc				0.058
Phosphorous(Reactive)				0.02
Phosphorous (Total)				0.48
Flouride				0.6
Nitrogen (Total)				7.2
Ammonial Nitrogen				0.02
Nitrates				0.02

Minor metals and nutrients not analysed during initial survey.

**Site No:** 090  
**Name:** Dam - Transport 4  
**Property:** Moolarben Coal Operations  
**Description:** Dam/soak (in gully)  
**MGA Coordinates:** 6426486.706 N 764040.996 E  
**Elevation:** 428.57 mAHD

**Date inspected:** 1 February 2006    **Water Quality (field):** pH 8.53    EC 0.16 mS/cm    T 37.3 °C



**Date inspected:** 30 April 2009    **Water Quality (field):** DRY/NO SAMPLE



Laboratory Analysis Results				
Analyte	Units	LOR	1 February 2006	30 April 2009
TSS	mg/L @ 105°C	1	160	SITE DRY/NO SAMPLE
TDS	mg/L @ 180°C	1	430	
pH		0.1	8.5	
EC	µS/cm	1	160	
Potassium	mg/L	0.1	3.1	
Sodium	mg/L	1	22	
Calcium	mg/L	1	1	
Magnesium	mg/L	0.1	3.1	
Cation sum	meq/L	0.01	1.34	
Chloride	mg/L	1	19	
Sulphate	mg/L	1	<2	
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2	
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	32	
Anion sum	meq/L	0.01	1.18	
Ionic difference	%		54.68%	
Allowable difference	%		2.0%	
Aluminium				
Arsenic				
Boron				
Cadmium				
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Manganese				
Mercury				
Nickel				
Selenium				
Silver				
Zinc				
Phosphorous(Reactive)				
Phosphorous (Total)				
Flouride				
Nitrogen (Total)				
Ammonial Nitrogen				
Nitrates				

Minor metals and nutrients not analysed during initial survey.

**Site No:** 091  
**Name:** Dam - Transport 5  
**Property:** Moolarben Coal Operations  
**Description:** Dam  
**MGA Coordinates:** 6426657.318 N 763513.862 E  
**Elevation:** 436.73 mAHD

**Date inspected:** 1 February 2006    **Water Quality (field):** pH 8.18    EC 0.38 mS/cm    T 36.5 °C



**Date inspected:** 30 April 2009    **Water Quality (field):** pH 8.01    EC 0.522 mS/cm    T 14.5 °C



Laboratory Analysis Results				
Analyte	Units	LOR	1 February 2006	30 April 2009
TSS	mg/L @ 105°C	1		49
TDS	mg/L @ 180°C	1	680	361
pH		0.1	8.2	7.7
EC	µS/cm	1	380	545
Potassium	mg/L	0.1	8.8	21
Sodium	mg/L	1	56	77
Calcium	mg/L	1	2.6	6
Magnesium	mg/L	0.1	4.5	14
Cation sum	meq/L	0.01	3.16	5.34
Chloride	mg/L	1	41	64
Sulphate	mg/L	1	2	<2
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	91	166
Anion sum	meq/L	0.01	3.02	5.12
Ionic difference	%		43.71%	
Allowable difference	%		2.0%	
Aluminium				0.05
Arsenic				0.002
Boron				0.11
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.001
Copper				0.0006
Iron				1.2
Lead				0.00005
Manganese				0.085
Mercury				<0.0001
Nickel				0.001
Selenium				<0.001
Silver				<0.001
Zinc				0.026
Phosphorous(Reactive)				0.01
Phosphorous (Total)				0.38
Flouride				0.5
Nitrogen (Total)				6.3
Ammonial Nitrogen				0.09
Nitrates				0.02

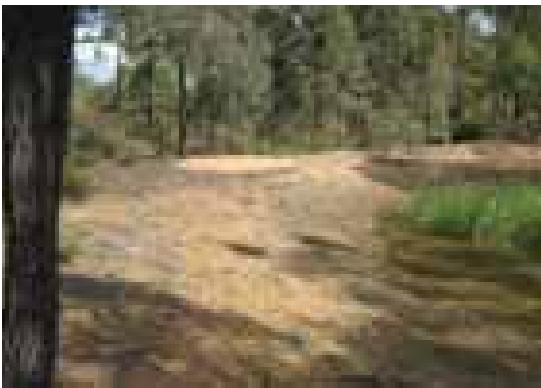
Minor metals and nutrients not analysed during initial survey.

**Site No:** 092  
**Name:** Dam - Transport 6  
**Property:** Moolarben Coal Operations  
**Description:** Dam with reeds.  
**MGA Coordinates:** 6426907.745 N 763865.978 E  
**Elevation:** 442.8 mAHD

**Date inspected:** 1 February 2006    **Water Quality (field):** pH 7.32    EC 0.15 mS/cm    T 35.7 °C



**Date inspected:** 30 April 2009    **Water Quality (field):** pH 7.01    EC 0.082 mS/cm    T 13.4 °C



Laboratory Analysis Results				
Analyte	Units	LOR	1 February 2006	30 April 2009
TSS	mg/L @ 105°C	1	38	93
TDS	mg/L @ 180°C	1	100	40.7
pH		0.1	7.3	6.4
EC	µS/cm	1	150	80
Potassium	mg/L	0.1	10	1.7
Sodium	mg/L	1	14	16
Calcium	mg/L	1	1.8	3.8
Magnesium	mg/L	0.1	1.7	2.9
Cation sum	meq/L	0.01	1.10	1.17
Chloride	mg/L	1	17	3
Sulphate	mg/L	1	<1	<2
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	24	33
Anion sum	meq/L	0.01	0.96	0.74
Ionic difference	%		33.89%	
Allowable difference	%		2.0%	
Aluminium				0.11
Arsenic				<0.001
Boron				0.09
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0005
Copper				<0.0005
Iron				2.3
Lead				0.00032
Manganese				0.054
Mercury				<0.0001
Nickel				<0.001
Selenium				<0.001
Silver				<0.001
Zinc				0.051
Phosphorous(Reactive)				0.01
Phosphorous (Total)				0.14
Flouride				0.1
Nitrogen (Total)				2.1
Ammonial Nitrogen				<0.01
Nitrates				<0.01

Minor metals and nutrients not analysed during initial survey.



**Site No:** 111  
**Name:** Old hand dug well  
**Property:** UCML – Leased by Mitchell  
**Description:** Old hand dug well.  
**MGA Coordinates:** 6423333 N 763364 E  
**Elevation:** 435 m AHD

**Date inspected:** 29 October 2007 **Water Quality (field):** pH 7.20 EC 1.313mS/cm T 18.2 °C



**Date inspected:** 18 May 2009 **Water Quality (field):** pH 6.95 EC 0.571 mS/cm T 17.6 °C



Laboratory Analysis Results				
Analyte	Units	LOR	29 October 2007	18 May 2009
TSS	mg/L @ 105°C	1	64	29
TDS	mg/L @ 180°C	1	780	266
pH		0.1	7.20	6.6
EC	µS/cm	1	1313	620
Potassium	mg/L	0.1	9	8.8
Sodium	mg/L	1	92	63
Calcium	mg/L	1	19	11
Magnesium	mg/L	0.1	44	21
Cation sum	meq/L	0.01	8.83	5.24
Chloride	mg/L	1	280	145
Sulphate	mg/L	1	32	3
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	54	44
Anion sum	meq/L	0.01	9.68	5.03
Ionic difference	%		4.58%	
Allowable difference	%		5.00%	
Aluminium				0.08
Arsenic				0.003
Boron				0.03
Cadmium				<0.00005
Chromium				0.001
Cobalt				0.003
Copper				0.0018
Iron				2.7
Lead				0.0011
Manganese				0.34
Mercury				<0.0001
Nickel				0.004
Selenium				<0.001
Silver				<0.001
Zinc				0.006
Phosphorous(Reactive)				0.02
Phosphorous (Total)				0.24
Flouride				0.2
Nitrogen (Total)				1.3
Ammonial Nitrogen				0.05
Nitrates				0.19

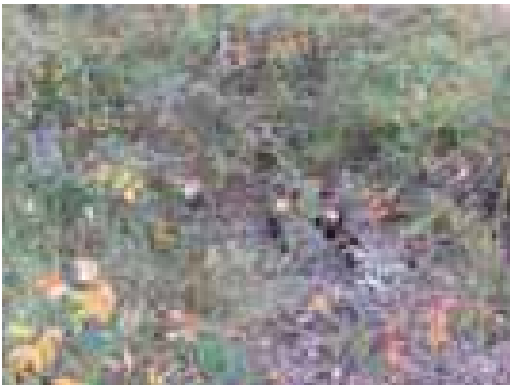
Minor metals and nutrients not analysed during initial survey.

**Site No:** 115  
**Name:** Old well under tree  
**Property:** UCML – Leased by Mitchell  
**Description:** Old well under tree.  
**MGA Coordinates:** 6423659 N 763546 E  
**Elevation:** 431 m AHD

**Date inspected:** 29 October 2007    **Water Quality (field):** pH 6.00    EC 0.337 mS/cm    T 18.3 °C



**Date inspected:** 20 May 2009    **Water Quality (field):** pH 6.20    EC 0.123 mS/cm    T 16.1 °C



Laboratory Analysis Results				
Analyte	Units	LOR	29 October 2007	20 May 2009
TSS	mg/L @ 105°C	1	10	11
TDS	mg/L @ 180°C	1	190	84.3
pH		0.1	6.00	6.1
EC	µS/cm	1	337	135
Potassium	mg/L	0.1	1.8	1.3
Sodium	mg/L	1	17	13
Calcium	mg/L	1	1.9	2.7
Magnesium	mg/L	0.1	5.6	4.4
Cation sum	meq/L	0.01	1.40	1.1
Chloride	mg/L	1	39	21
Sulphate	mg/L	1	1.5	6
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	7	21
Anion sum	meq/L	0.01	1.37	1.14
Ionic difference	%		2.67%	
Allowable difference	%		5.00%	
Aluminium				0.03
Arsenic				<0.001
Boron				0.03
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0017
Copper				<0.0005
Iron				1.5
Lead				<0.00005
Manganese				0.076
Mercury				<0.0001
Nickel				<0.001
Selenium				<0.001
Silver				<0.001
Zinc				<0.005
Phosphorous(Reactive)				0.02
Phosphorous (Total)				0.18
Flouride				<0.1
Nitrogen (Total)				0.68
Ammonial Nitrogen				0.23
Nitrates				<0.1

Minor metals and nutrients not analysed during initial survey.

**Site No:** 117  
**Name:** Dam - near shed  
**Property:** UCML – Leased by Mitchell  
**MGA Coordinates:** 6423901 N 763771 E  
**Elevation:** 423 m AHD

**Date inspected:** 29 October 2007 **Water Quality (field):** pH 7.20 EC 0.250 mS/cm T 24.9 °C



**Date inspected:** 20 May 2009 **Water Quality (field):** pH 7.53 EC 0.229 mS/cm T 16.4 °C

NO PHOTO

Laboratory Analysis Results				
Analyte	Units	LOR	29 October 2007	20 May 2009
TSS	mg/L @ 105°C	1	70	209
TDS	mg/L @ 180°C	1	120	269
pH		0.1	7.20	6.2
EC	µS/cm	1	250	260
Potassium	mg/L	0.1	11	27
Sodium	mg/L	1	6.5	16
Calcium	mg/L	1	3.3	4.9
Magnesium	mg/L	0.1	2.5	3.3
Cation sum	meq/L	0.01	1.03	1.9
Chloride	mg/L	1	9.3	60
Sulphate	mg/L	1	2.1	<2
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	32	4
Anion sum	meq/L	0.01	0.95	1.77
Ionic difference	%		0.60%	
Allowable difference	%		5.00%	
Aluminium				1.2
Arsenic				0.001
Boron				0.15
Cadmium				<0.00005
Chromium				0.001
Cobalt				0.0052
Copper				0.0026
Iron				1.4
Lead				0.001
Manganese				0.4
Mercury				<0.0001
Nickel				0.003
Selenium				<0.001
Silver				<0.001
Zinc				0.027
Phosphorous(Reactive)				0.02
Phosphorous (Total)				1.2
Flouride				0.1
Nitrogen (Total)				15
Ammonial Nitrogen				1.5
Nitrates				<0.1

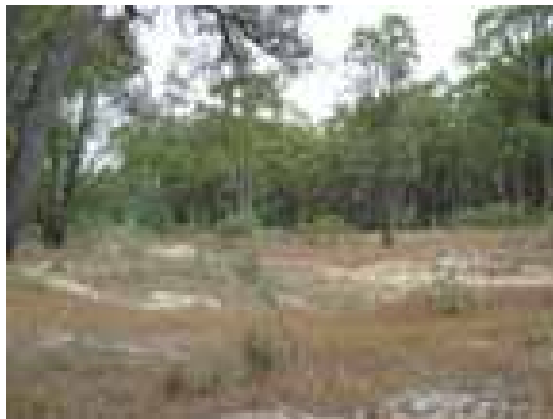
Minor metals and nutrients not analysed during initial survey.

**Site No:** 120  
**Name:** Sand 'borrow pits' - Dry  
**Property:** UCML – Leased by Mitchell  
**Description:** Dry  
**MGA Coordinates:** 6423972 N 764244 E  
**Elevation:** 424 m AHD

**Date inspected:** 29 October 2007    **Water Quality (field):** SITE DRY / NO SAMPLE



**Date inspected:** 19 May 2009    **Water Quality (field):** SITE DRY / NO SAMPLE



**Site No:** 121  
**Name:** Soak near windmill  
**Property:** UCML – Leased by Mitchell  
**MGA Coordinates:** 6424037 N 764203 E  
**Elevation:** 424 m AHD

**Date inspected:** 29 October 2007    **Water Quality (field):** pH 7.06    EC 0.228 mS/cm    T 28.3 °C



**Date inspected:** 19 May 2009    **Water Quality (field):** SITE DRY / NO SAMPLE



Laboratory Analysis Results				
Analyte	Units	LOR	29 October 2007	19 May 2009
TSS	mg/L @ 105°C	1	29	SITE DRY / NO SAMPLE
TDS	mg/L @ 180°C	1	200	
pH		0.1	7.10	
EC	µS/cm	1	228	
Potassium	mg/L	0.1	7.2	
Sodium	mg/L	1	9.2	
Calcium	mg/L	1	2.9	
Magnesium	mg/L	0.1	2.8	
Cation sum	meq/L	0.01	1.12	
Chloride	mg/L	1	8.7	
Sulphate	mg/L	1	2.7	
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2	
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	24	
Anion sum	meq/L	0.01	0.80	
Ionic difference	%		10.23%	
Allowable difference	%		5.00%	
Aluminium				
Arsenic				
Boron				
Cadmium				
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Manganese				
Mercury				
Nickel				
Selenium				
Silver				
Zinc				
Phosphorous(Reactive)				
Phosphorous (Total)				
Flouride				
Nitrogen (Total)				
Ammonial Nitrogen				
Nitrates				

Minor metals and nutrients not analysed during initial survey.

**Site No:** 122  
**Name:** Windmill waterhole  
**Property:** UCML – Leased by Mitchell  
**MGA Coordinates:** 6424054 N 764220 E  
**Elevation:** 424 m AHD

**Date inspected:** 29 October 2007    **Water Quality (field):** pH 7.00    EC 0.486 mS/cm    T 26.2 °C



**Date inspected:** 19 May 2009    **Water Quality (field):** SITE DRY / NO SAMPLE



Laboratory Analysis Results				
Analyte	Units	LOR	29 October 2007	19 May 2009
TSS	mg/L @ 105°C	1	5	SITE DRY / NO SAMPLE
TDS	mg/L @ 180°C	1	240	
pH		0.1	7.00	
EC	µS/cm	1	486	
Potassium	mg/L	0.1	3	
Sodium	mg/L	1	45	
Calcium	mg/L	1	14	
Magnesium	mg/L	0.1	3.2	
Cation sum	meq/L	0.01	3.17	
Chloride	mg/L	1	70	
Sulphate	mg/L	1	4.8	
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2	
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	30	
Anion sum	meq/L	0.01	2.69	
Ionic difference	%		5.68%	
Allowable difference	%		5.00%	
Aluminium			Minor metals and nutrients not analysed during initial survey.	
Arsenic				
Boron				
Cadmium				
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Manganese				
Mercury				
Nickel				
Selenium				
Silver				
Zinc				
Phosphorous(Reactive)				
Phosphorous (Total)				
Flouride				
Nitrogen (Total)				
Ammonial Nitrogen				
Nitrates				

**Site No:** 123  
**Name:** Red mud hole  
**Property:** UCML – Leased by Mitchell  
**MGA Coordinates:** 6423621 N 763945 E  
**Elevation:** 435 m AHD

**Date inspected:** 29 October 2007    **Water Quality (field):** pH 6.30    EC 0.771 mS/cm    T 29.8 °C



**Date inspected:** 19 May 2009    **Water Quality (field):** SITE DRY / NO SAMPLE



Laboratory Analysis Results				
Analyte	Units	LOR	29 October 2006	19 May 2009
TSS	mg/L @ 105°C	1	130	SITE DRY / NO SAMPLE
TDS	mg/L @ 180°C	1	600	
pH		0.1	6.30	
EC	µS/cm	1	771	
Potassium	mg/L	0.1	15	
Sodium	mg/L	1	74	
Calcium	mg/L	1	6.3	
Magnesium	mg/L	0.1	15	
Cation sum	meq/L	0.01	5.35	
Chloride	mg/L	1	170	
Sulphate	mg/L	1	7.7	
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2	
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	11	
Anion sum	meq/L	0.01	5.19	
Ionic difference	%		0.24%	
Allowable difference	%		5.00%	
Aluminium				
Arsenic				
Boron				
Cadmium				
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Manganese				
Mercury				
Nickel				
Selenium				
Silver				
Zinc				
Phosphorous(Reactive)				
Phosphorous (Total)				
Flouride				
Nitrogen (Total)				
Ammonial Nitrogen				
Nitrates				

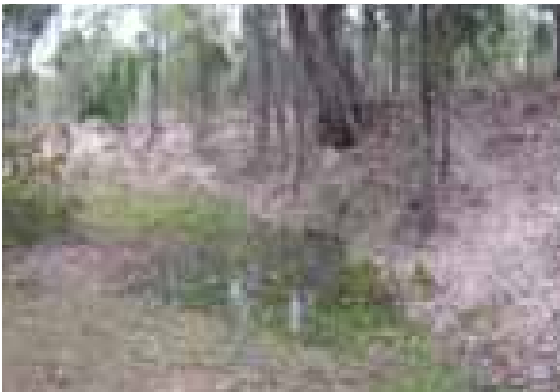
Minor metals and nutrients not analysed during initial survey.

**Site No:** 124  
**Name:** Waterhole – Eastern creek  
**Property:** UCML – Leased by Mitchell  
**MGA Coordinates:** 6423619 N 763941 E  
**Elevation:** 434 m AHD

**Date inspected:** 29 October 2007 **Water Quality (field):** pH 8.43 EC 0.27 mS/cm T 36.7 °C



**Date inspected:** 19 May 2009 **Water Quality (field):** pH 6.76 EC 0.231 mS/cm T 14.2 °C



Laboratory Analysis Results				
Analyte	Units	LOR	29 October 2007	19 May 2009
TSS	mg/L @ 105°C	1	770	4
TDS	mg/L @ 180°C	1	500	161
pH		0.1	6.80	6.5
EC	µS/cm	1	390	245
Potassium	mg/L	0.1	4.3	1.6
Sodium	mg/L	1	95	34
Calcium	mg/L	1	14	3.5
Magnesium	mg/L	0.1	17	3.4
Cation sum	meq/L	0.01	6.39	1.97
Chloride	mg/L	1	140	60
Sulphate	mg/L	1	91	<2
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	19	10
Anion sum	meq/L	0.01	6.38	1.89
Ionic difference	%		0.92%	
Allowable difference	%		5.00%	
Aluminium				0.09
Arsenic				<0.001
Boron				<0.01
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0008
Copper				<0.0005
Iron				0.46
Lead				<0.00005
Manganese				0.042
Mercury				<0.0001
Nickel				0.002
Selenium				<0.001
Silver				<0.001
Zinc				<0.005
Phosphorous(Reactive)				0.01
Phosphorous (Total)				0.02
Flouride				<0.1
Nitrogen (Total)				0.21
Ammonial Nitrogen				<0.01
Nitrates				<0.01

Minor metals and nutrients not analysed during initial survey.



**Site No:** 125  
**Name:** Eagle Dam  
**Property:** UCML – Leased by Mitchell  
**MGA Coordinates:** 6423352 N 765195 E  
**Elevation:** 434 m AHD

**Date inspected:** 29 October 2007    **Water Quality (field):** pH 6.45    EC 0.412 mS/cm    T 21.4 °C



**Date inspected:** 19 May 2009    **Water Quality (field):** SITE DRY / NO SAMPLE



Laboratory Analysis Results				
Analyte	Units	LOR	29 October 2007	19 May 2009
TSS	mg/L @ 105°C	1	83	SITE DRY / NO SAMPLE
TDS	mg/L @ 180°C	1	230	
pH		0.1	6.40	
EC	µS/cm	1	412	
Potassium	mg/L	0.1	4.2	
Sodium	mg/L	1	32	
Calcium	mg/L	1	4.9	
Magnesium	mg/L	0.1	4.8	
Cation sum	meq/L	0.01	2.24	
Chloride	mg/L	1	49	
Sulphate	mg/L	1	2.3	
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2	
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	18	
Anion sum	meq/L	0.01	1.89	
Ionic difference	%		8.88%	
Allowable difference	%		5.00%	
Aluminium			Minor metals and nutrients not analysed during initial survey.	
Arsenic				
Boron				
Cadmium				
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Manganese				
Mercury				
Nickel				
Selenium				
Silver				
Zinc				
Phosphorous(Reactive)				
Phosphorous (Total)				
Flouride				
Nitrogen (Total)				
Ammonial Nitrogen				
Nitrates				

**Site No:** 126b  
**Name:** Tractor dig  
**Property:** UCML – Leased by Mitchell  
**MGA Coordinates:** 6423336 N 765185 E  
**Elevation:** 411 m AHD

**Date inspected:** 29 October 2007    **Water Quality (field):** pH 6.64    EC 0.335 mS/cm    T 24 °C



**Date inspected:** 19 May 2009    **Water Quality (field):** pH 5.92    EC 1.302 mS/cm    T 24 °C



Laboratory Analysis Results				
Analyte	Units	LOR	29 October 2007	19 May 2009
TSS	mg/L @ 105°C	1	260	36
TDS	mg/L @ 180°C	1	370	653
pH		0.1	6.64	4.4
EC	µS/cm	1	335	1245
Potassium	mg/L	0.1	2.7	7.6
Sodium	mg/L	1	31	149
Calcium	mg/L	1	2.8	11
Magnesium	mg/L	0.1	3.8	27
Cation sum	meq/L	0.01	2.20	9.45
Chloride	mg/L	1	38	340
Sulphate	mg/L	1	6	<2
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	16	<2
Anion sum	meq/L	0.01	1.54	9.59
Ionic difference	%		10.43%	
Allowable difference	%		5.00%	
Aluminium				<0.02
Arsenic				0.001
Boron				0.08
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.12
Copper				0.0005
Iron				0.68
Lead				<0.00005
Manganese				1.6
Mercury				<0.0001
Nickel				0.071
Selenium				<0.001
Silver				<0.001
Zinc				0.24
Phosphorous(Reactive)				<0.01
Phosphorous (Total)				0.04
Flouride				0.1
Nitrogen (Total)				0.8
Ammonial Nitrogen				0.06
Nitrates				<0.01

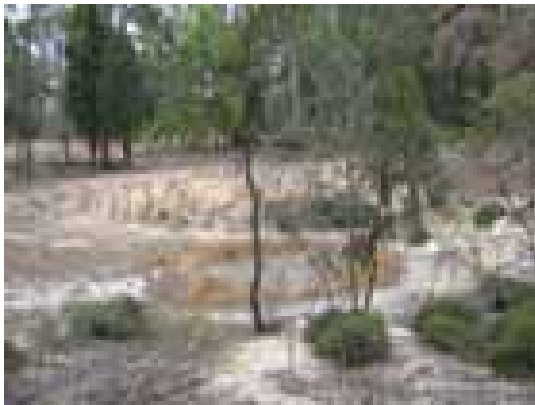
Minor metals and nutrients not analysed during initial survey.

**Site No:** 128  
**Name:** Waterholes – old quarry  
**Property:** UCML – Leased by Mitchell  
**Description:** Near Davies property  
**MGA Coordinates:** 6422349 N 763662 E  
**Elevation:** 436 m AHD

**Date inspected:** 29 October 2007    **Water Quality (field):** pH 5.98    EC 0.269 mS/cm    T 27.4 °C



**Date inspected:** 19 May 2009    **Water Quality (field):** SITE DRY / NO SAMPLE



Laboratory Analysis Results				
Analyte	Units	LOR	29 October 2007	19 May 2009
TSS	mg/L @ 105°C	1	30	SITE DRY / NO SAMPLE
TDS	mg/L @ 180°C	1	140	
pH		0.1	5.98	
EC	µS/cm	1	269	
Potassium	mg/L	0.1	3.3	
Sodium	mg/L	1	17	
Calcium	mg/L	1	1.4	
Magnesium	mg/L	0.1	3.1	
Cation sum	meq/L	0.01	1.25	
Chloride	mg/L	1	28	
Sulphate	mg/L	1	3.2	
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2	
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	5	
Anion sum	meq/L	0.01	1.02	
Ionic difference	%		9.14%	
Allowable difference	%		5.00%	
Aluminium				
Arsenic				
Boron				
Cadmium				
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Manganese				
Mercury				
Nickel				
Selenium				
Silver				
Zinc				
Phosphorous(Reactive)				
Phosphorous (Total)				
Flouride				
Nitrogen (Total)				
Ammonial Nitrogen				
Nitrates				

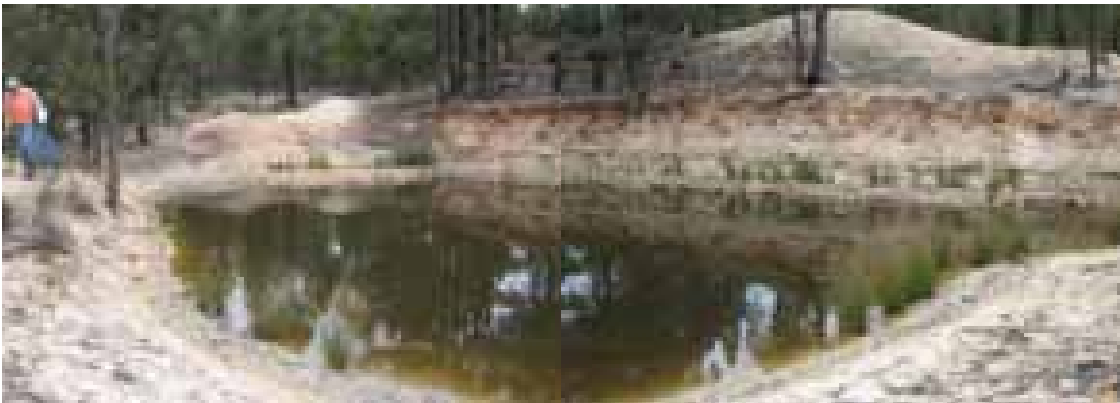
Minor metals and nutrients not analysed during initial survey.

**Site No:** 129  
**Name:** Waterhole – old quarry, #2  
**Property:** UCML – Leased by Mitchell  
**Description:** Near Davies property  
**MGA Coordinates:** 6422297 N 763636 E  
**Elevation:** 443 m AHD

**Date inspected:** 29 October 2007    **Water Quality (field):** pH 6.09    EC 0.194 mS/cm    T 25.5 °C



**Date inspected:** 19 May 2009    **Water Quality (field):** pH 7.41    EC 0.0876 mS/cm    T 13.8 °C



Laboratory Analysis Results				
Analyte	Units	LOR	29 October 2007	19 May 2009
TSS	mg/L @ 105°C	1	200	29
TDS	mg/L @ 180°C	1	230	101
pH		0.1	7.41	6.6
EC	µS/cm	1	87.6	105
Potassium	mg/L	0.1	2.7	5.6
Sodium	mg/L	1	13	7.8
Calcium	mg/L	1	0.8	0.71
Magnesium	mg/L	0.1	0.78	1.3
Cation sum	meq/L	0.01	1.14	0.62
Chloride	mg/L	1	8.2	18
Sulphate	mg/L	1	3.5	<2
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	6	4
Anion sum	meq/L	0.01	0.46	0.59
Ionic difference	%		27.05%	
Allowable difference	%		5.00%	
Aluminium				0.18
Arsenic				<0.001
Boron				0.05
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0009
Copper				0.0016
Iron				0.29
Lead				0.00028
Manganese				0.028
Mercury				<0.0001
Nickel				0.001
Selenium				<0.001
Silver				<0.001
Zinc				0.008
Phosphorous(Reactive)				<0.01
Phosphorous (Total)				0.12
Flouride				0.3
Nitrogen (Total)				2.2
Ammonial Nitrogen				0.03
Nitrates				<0.01

Minor metals and nutrients not analysed during initial survey.

**Site No:** 130  
**Name:** Stock Dam #2  
**Property:** UCML – Leased by Mitchell  
**MGA Coordinates:** 6421604 N 764785 E  
**Elevation:** 447 m AHD

**Date inspected:** 29 October 2007 **Water Quality (field):** pH 6.70 EC 0.225 mS/cm T 24.9 °C



**Date inspected:** 19 May 2009 **Water Quality (field):** pH 6.83 EC 0.188 mS/cm T 14.4 °C



### Laboratory Analysis Results

Analyte	Units	LOR	29 October 2007	19 May 2009
TSS	mg/L @ 105°C	1	40	24
TDS	mg/L @ 180°C	1	220	181
pH		0.1	6.70	6.9
EC	µS/cm	1	225	190
Potassium	mg/L	0.1	7.3	20
Sodium	mg/L	1	5.9	10
Calcium	mg/L	1	3	4.3
Magnesium	mg/L	0.1	2.5	4.2
Cation sum	meq/L	0.01	1.55	1.51
Chloride	mg/L	1	7.3	25
Sulphate	mg/L	1	1.9	<2
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	27	36
Anion sum	meq/L	0.01	0.79	1.42
Ionic difference	%		0.86%	
Allowable difference	%		5.00%	
Aluminium				0.13
Arsenic				0.002
Boron				0.08
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.001
Copper				0.0022
Iron				1.1
Lead				0.0011
Manganese				0.12
Mercury				<0.0001
Nickel				0.003
Selenium				<0.001
Silver				<0.001
Zinc				0.008
Phosphorous(Reactive)				0.01
Phosphorous (Total)				0.29
Flouride				0.1
Nitrogen (Total)				5.8
Ammonial Nitrogen				2.4
Nitrates				0.01

Minor metals and nutrients  
not analysed during initial  
survey.

**Site No:** 137  
**Name:** Spring Fed Dam #1  
**Property:** Moolarben Coal Operations  
**MGA Coordinates:** 6420106 N 765976 E  
**Elevation:** 462 m AHD

**Date inspected:** 30 October 2007    **Water Quality (field):** pH 7.00    EC 1.42 mS/cm    T 22 °C



**Date inspected:** 19 May 2009    **Water Quality (field):** pH 8.65    EC 0.175 mS/cm    T 15.6 °C

NO PHOTO

Laboratory Analysis Results				
Analyte	Units	LOR	30 October 2007	19 May 2009
TSS	mg/L @ 105°C	1	100	32
TDS	mg/L @ 180°C	1	930	186
pH		0.1	7.00	8.7
EC	µS/cm	1	1420	195
Potassium	mg/L	0.1	14	17
Sodium	mg/L	1	220	18
Calcium	mg/L	1	11	2.7
Magnesium	mg/L	0.1	34	5.1
Cation sum	meq/L	0.01	13.30	1.77
Chloride	mg/L	1	470	18
Sulphate	mg/L	1	20	<2
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2	3
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	37	54
Anion sum	meq/L	0.01	14.40	1.65
Ionic difference	%		4.12%	
Allowable difference	%		5.00%	
Aluminium				0.6
Arsenic				0.004
Boron				0.1
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0003
Copper				0.0019
Iron				0.89
Lead				0.00081
Manganese				0.007
Mercury				<0.0001
Nickel				0.001
Selenium				<0.001
Silver				<0.001
Zinc				0.007
Phosphorous(Reactive)				0.01
Phosphorous (Total)				0.07
Flouride				0.3
Nitrogen (Total)				2.1
Ammonial Nitrogen				0.05
Nitrates				<0.01

Minor metals and nutrients  
not analysed during initial  
survey.

**Site No:** 138  
**Name:** Bore near Spring Fed Dam  
**Property:** Moolarben Coal Operations  
**Description:** SWL = 14.220m  
**MGA Coordinates:** 6420107 N 765975 E  
**Elevation:** 463 m AHD

**Date inspected:** 30 October 2007 **Water Quality (field):** pH 7.00 EC 1.42 mS/cm T 22 °C



**Date inspected:** 19 May 2009 **Water Quality (field):** pH 8.65 EC 0.175 mS/cm T 15.6 °C

NO PHOTO

Laboratory Analysis Results				
Analyte	Units	LOR	30 October 2007	19 May 2009
TSS	mg/L @ 105°C	1	1400	84
TDS	mg/L @ 180°C	1	4100	3748
pH		0.1	5.30	5.5
EC	µS/cm	1	6220	6570
Potassium	mg/L	0.1	36	43
Sodium	mg/L	1	630	724
Calcium	mg/L	1	75	81
Magnesium	mg/L	0.1	220	235
Cation sum	meq/L	0.01	58.00	56
Chloride	mg/L	1	2300	2050
Sulphate	mg/L	1	130	135
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	11	45
Anion sum	meq/L	0.01	67.60	61.5
Ionic difference	%		14.96%	
Allowable difference	%		5.00%	
Aluminium				<0.02
Arsenic				<0.001
Boron				0.17
Cadmium				0.00009
Chromium				0.004
Cobalt				0.6
Copper				0.0014
Iron				130
Lead				0.00006
Manganese				18
Mercury				<0.0001
Nickel				1.5
Selenium				<0.001
Silver				<0.001
Zinc				2.9
Phosphorous(Reactive)				0.02
Phosphorous (Total)				<0.01
Flouride				0.1
Nitrogen (Total)				0.86
Ammonial Nitrogen				0.49
Nitrates				<0.01

Minor metals and nutrients  
not analysed during initial  
survey.

**Site No:** 139  
**Name:** Natural Dam #1  
**Property:** Moolarben Coal Operations  
**MGA Coordinates:** 6419882 N 766147 E  
**Elevation:** 468 m AHD

**Date inspected:** 30 October 2007    **Water Quality (field):** pH 7.20    EC 0.317 mS/cm    T 20.6 °C

NO PHOTO

**Date inspected:** 19 May 2009    **Water Quality (field):** pH 6.74    EC 0.1309 mS/cm    T 14.5 °C



Laboratory Analysis Results				
Analyte	Units	LOR	30 October 2007	19 May 2009
TSS	mg/L @ 105°C	1	650	29
TDS	mg/L @ 180°C	1	200	126
pH		0.1	7.20	7.2
EC	µS/cm	1	317	150
Potassium	mg/L	0.1	7.4	16
Sodium	mg/L	1	20	6.5
Calcium	mg/L	1	2.4	5.5
Magnesium	mg/L	0.1	4.1	4.5
Cation sum	meq/L	0.01	1.83	1.34
Chloride	mg/L	1	21	7
Sulphate	mg/L	1	11	<2
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	33	52
Anion sum	meq/L	0.01	1.50	1.24
Ionic difference	%		1.18%	
Allowable difference	%		5.00%	
Aluminium				0.06
Arsenic				<0.001
Boron				0.1
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0005
Copper				0.0016
Iron				0.92
Lead				0.0002
Manganese				0.021
Mercury				<0.0001
Nickel				0.003
Selenium				<0.001
Silver				<0.001
Zinc				0.06
Phosphorous(Reactive)				0.01
Phosphorous (Total)				0.07
Flouride				0.3
Nitrogen (Total)				2.3
Ammonial Nitrogen				<0.01
Nitrates				<0.01

Minor metals and nutrients not analysed during initial survey.



**Site No:** 141  
**Name:** Original Spring  
**Property:** Moolarben Coal Operations  
**Description:** Flowing into troughs cut out of tree trunks  
**MGA Coordinates:** 6419606 N 766203 E  
**Elevation:** 476 m AHD

**Date inspected:** 30 October 2007 **Water Quality (field):** pH 4.64 EC 0.248 mS/cm T 22.4 °C



**Date inspected:** 19 May 2009 **Water Quality (field):** pH 4.49 EC 0.1448 mS/cm T 18.8 °C

NO PHOTO

Laboratory Analysis Results				
Analyte	Units	LOR	30 October 2007	19 May 2009
TSS	mg/L @ 105°C	1	3	<2
TDS	mg/L @ 180°C	1	100	80.1
pH		0.1	4.60	4.6
EC	µS/cm	1	248	145
Potassium	mg/L	0.1	1.6	1.9
Sodium	mg/L	1	15	15
Calcium	mg/L	1	1.1	1.5
Magnesium	mg/L	0.1	2.2	2.2
Cation sum	meq/L	0.01	0.96	0.96
Chloride	mg/L	1	27	28
Sulphate	mg/L	1	6.7	4
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	0	<2
Anion sum	meq/L	0.01	1.02	0.87
Ionic difference	%		1.54%	
Allowable difference	%		5.00%	
Aluminium				0.11
Arsenic				0.002
Boron				0.01
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0045
Copper				0.0016
Iron				0.36
Lead				0.00018
Manganese				0.017
Mercury				<0.0001
Nickel				0.024
Selenium				<0.001
Silver				<0.001
Zinc				0.022
Phosphorous(Reactive)				<0.01
Phosphorous (Total)				<0.01
Flouride				<0.1
Nitrogen (Total)				0.06
Ammonial Nitrogen				0.04
Nitrates				<0.01

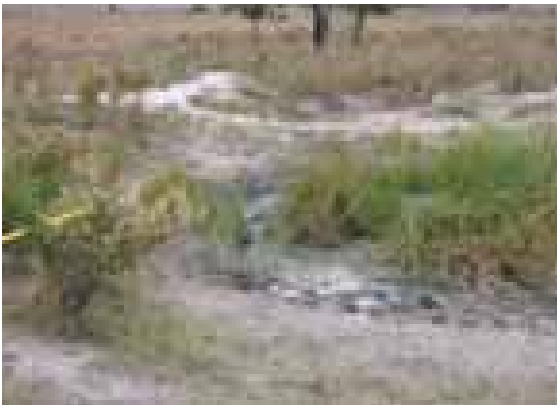
Minor metals and nutrients  
not analysed during initial  
survey.

**Site No:** 142  
**Name:** Spring Fed Dam At House  
**Property:** Moolarben Coal Operations  
**Description:** Near house  
**MGA Coordinates:** 6419450 N 765767 E  
**Elevation:** 489 m AHD

**Date inspected:** 30 October 2007    **Water Quality (field):** pH 7.20    EC 0.311 mS/cm    T 24 °C



**Date inspected:** 19 May 2009    **Water Quality (field):** pH 6.93    EC 0.257 mS/cm    T 14.7 °C



Laboratory Analysis Results				
Analyte	Units	LOR	30 October 2007	19 May 2009
TSS	mg/L @ 105°C	1	840	38
TDS	mg/L @ 180°C	1	350	256
pH		0.1	7.20	6.8
EC	µS/cm	1	311	285
Potassium	mg/L	0.1	9.1	20
Sodium	mg/L	1	26	31
Calcium	mg/L	1	0.8	2.5
Magnesium	mg/L	0.1	5.4	5.2
Cation sum	meq/L	0.01	2.92	2.41
Chloride	mg/L	1	28	42
Sulphate	mg/L	1	8.3	6
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	40	50
Anion sum	meq/L	0.01	1.80	2.31
Ionic difference	%		2.38%	
Allowable difference	%		5.00%	
Aluminium				0.71
Arsenic				0.002
Boron				0.15
Cadmium				<0.00005
Chromium				0.002
Cobalt				0.0004
Copper				0.0017
Iron				0.45
Lead				0.00029
Manganese				0.023
Mercury				<0.0001
Nickel				0.001
Selenium				<0.001
Silver				<0.001
Zinc				0.05
Phosphorous(Reactive)				0.01
Phosphorous (Total)				0.07
Flouride				0.2
Nitrogen (Total)				1.5
Ammonial Nitrogen				<0.01
Nitrates				<0.01

Minor metals and nutrients not analysed during initial survey.

**Site No:** 144  
**Name:** Silted up Dam/Eastern Creek  
**Property:** UCML – Leased by Mitchell  
**MGA Coordinates:** 6421707 N 765307 E  
**Elevation:** 456 m AHD

**Date inspected:** 30 October 2007 **Water Quality (field):** pH 3.50 EC 2.81 mS/cm T 27 °C



**Date inspected:** 20 May 2009 **Water Quality (field):** Site Dry No Sample Taken



Laboratory Analysis Results				
Analyte	Units	LOR	30 October 2007	20 May 2009
TSS	mg/L @ 105°C	1	1000	Site Dry No Sample Taken
TDS	mg/L @ 180°C	1	1900	
pH		0.1	3.50	
EC	µS/cm	1	2810	
Potassium	mg/L	0.1	12	
Sodium	mg/L	1	340	
Calcium	mg/L	1	76	
Magnesium	mg/L	0.1	93	
Cation sum	meq/L	0.01	27.20	
Chloride	mg/L	1	880	
Sulphate	mg/L	1	260	
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2	
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	0	
Anion sum	meq/L	0.01	30.20	
Ionic difference	%		6.51%	
Allowable difference	%		5.00%	
Aluminium				
Arsenic				
Boron				
Cadmium				
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Manganese				
Mercury				
Nickel				
Selenium				
Silver				
Zinc				
Phosphorous(Reactive)				
Phosphorous (Total)				
Flouride				
Nitrogen (Total)				
Ammonial Nitrogen				
Nitrates				

Minor metals and nutrients not analysed during initial survey.

**Site No:** 145  
**Name:** Eastern Ck Channel – Wollar Rd end  
**Property:** UCML – Leased by Mitchell  
**MGA Coordinates:** 6421806 N 765314 E  
**Elevation:** 444 m AHD

**Date inspected:** 30 October 2007 **Water Quality (field):** pH 6.07 EC 0.99 mS/cm T 27.5 °C



**Date inspected:** 20 May 2009 **Water Quality (field):** Site Dry No Sample Taken



Laboratory Analysis Results				
Analyte	Units	LOR	30 October 2007	20 May 2009
TSS	mg/L @ 105°C	1	720	Site Dry No Sample Taken
TDS	mg/L @ 180°C	1	620	
pH		0.1	6.10	
EC	µS/cm	1	990	
Potassium	mg/L	0.1	5.2	
Sodium	mg/L	1	96	
Calcium	mg/L	1	15	
Magnesium	mg/L	0.1	26	
Cation sum	meq/L	0.01	7.22	
Chloride	mg/L	1	240	
Sulphate	mg/L	1	49	
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2	
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	7	
Anion sum	meq/L	0.01	7.95	
Ionic difference	%		4.85%	
Allowable difference	%		5.00%	
Aluminium				
Arsenic				
Boron				
Cadmium				
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Manganese				
Mercury				
Nickel				
Selenium				
Silver				
Zinc				
Phosphorous(Reactive)				
Phosphorous (Total)				
Flouride				
Nitrogen (Total)				
Ammonial Nitrogen				
Nitrates				

Minor metals and nutrients not analysed during initial survey.

**Site No:** 146  
**Name:** Bore near pumpjack shed  
**Property:** UCML – Leased by Mitchell  
**MGA Coordinates:** 6422170 N 765091 E  
**Elevation:** 438 m AHD

**Date inspected:** 30 October 2007    **Water Quality (field):** pH 5.50    EC 4.22 mS/cm    T 22.5 °C



**Date inspected:** 19 May 2009    **Water Quality (field):** pH 5.66    EC 5.18 mS/cm    T 18.5 °C



Laboratory Analysis Results				
Analyte	Units	LOR	30 October 2007	19 May 2009
TSS	mg/L @ 105°C	1	150	39
TDS	mg/L @ 180°C	1	3000	2856
pH		0.1	5.50	5.7
EC	µS/cm	1	4220	5110
Potassium	mg/L	0.1	25	32
Sodium	mg/L	1	480	580
Calcium	mg/L	1	130	118
Magnesium	mg/L	0.1	170	181
Cation sum	meq/L	0.01	44.70	46.8
Chloride	mg/L	1	1700	1530
Sulphate	mg/L	1	180	162
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	34	33
Anion sum	meq/L	0.01	52.30	47.2
Ionic difference	%		11.01%	
Allowable difference	%		5.00%	
Aluminium				<0.02
Arsenic				<0.001
Boron				0.07
Cadmium				0.00005
Chromium				0.001
Cobalt				0.74
Copper				0.0018
Iron				50
Lead				0.00035
Manganese				6.3
Mercury				<0.0001
Nickel				1.1
Selenium				<0.001
Silver				<0.001
Zinc				1.5
Phosphorous(Reactive)				0.01
Phosphorous (Total)				0.02
Flouride				0.2
Nitrogen (Total)				1.3
Ammonial Nitrogen				0.88
Nitrates				0.13

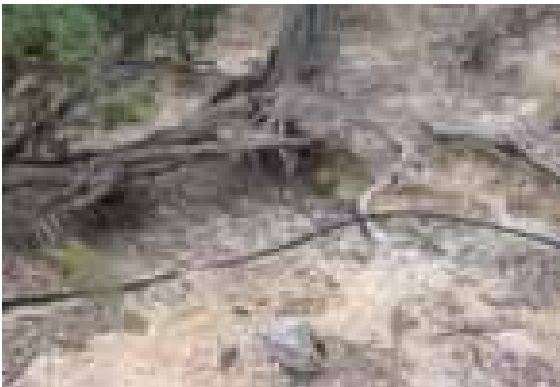
Minor metals and nutrients not analysed during initial survey.

**Site No:** 147  
**Name:** Gully/Creek near pump jack shed  
**Property:** UCML – Leased by Mitchell  
**MGA Coordinates:** 6422171 N 765081 E  
**Elevation:** 438 m AHD

**Date inspected:** 30 October 2007    **Water Quality (field):** pH 5.70    EC 0.570 mS/cm    T 22.8 °C



**Date inspected:** 19 May 2009    **Water Quality (field):** Site Dry No Sample Taken



Laboratory Analysis Results				
Analyte	Units	LOR	30 October 2007	19 May 2009
TSS	mg/L @ 105°C	1	1400	Site Dry No Sample Taken
TDS	mg/L @ 180°C	1	510	
pH		0.1	5.70	
EC	µS/cm	1	570	
Potassium	mg/L	0.1	7.4	
Sodium	mg/L	1	52	
Calcium	mg/L	1	5	
Magnesium	mg/L	0.1	9.9	
Cation sum	meq/L	0.01	3.78	
Chloride	mg/L	1	97	
Sulphate	mg/L	1	15	
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2	
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	22	
Anion sum	meq/L	0.01	3.55	
Ionic difference	%		0.38%	
Allowable difference	%		5.00%	
Aluminium			Minor metals and nutrients not analysed during initial survey.	
Arsenic				
Boron				
Cadmium				
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Manganese				
Mercury				
Nickel				
Selenium				
Silver				
Zinc				
Phosphorous(Reactive)				
Phosphorous (Total)				
Flouride				
Nitrogen (Total)				
Ammonial Nitrogen				
Nitrates				

**Site No:** 148  
**Name:** Quarry – North of Wollar rd  
**Property:** UCML – Leased by Mitchell  
**Description:** Between road and railway line  
**MGA Coordinates:** 6423041 N 766645 E  
**Elevation:** 414 m AHD

**Date inspected:** 30 October 2007 **Water Quality (field):** pH 5.70 EC 0.570 mS/cm T 22.8 °C



**Date inspected:** 20 May 2009 **Water Quality (field):** pH 6.26 EC 0.1103 mS/cm T 14.9 °C



Laboratory Analysis Results				
Analyte	Units	LOR	30 October 2007	20 May 2009
TSS	mg/L @ 105°C	1	240	118
TDS	mg/L @ 180°C	1	480	343
pH		0.1	7.30	6.3
EC	µS/cm	1	202	110
Potassium	mg/L	0.1	2.2	9.3
Sodium	mg/L	1	15	14
Calcium	mg/L	1	2.6	3
Magnesium	mg/L	0.1	2.1	2.5
Cation sum	meq/L	0.01	1.45	1.2
Chloride	mg/L	1	6.2	11
Sulphate	mg/L	1	21	41
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	21	5
Anion sum	meq/L	0.01	1.11	1.26
Ionic difference	%		1.00%	
Allowable difference	%		5.00%	
Aluminium				0.82
Arsenic				<0.001
Boron				0.15
Cadmium				<0.00005
Chromium				0.001
Cobalt				0.0018
Copper				0.0016
Iron				0.85
Lead				0.00083
Manganese				0.04
Mercury				<0.0001
Nickel				0.006
Selenium				<0.001
Silver				<0.001
Zinc				0.027
Phosphorous(Reactive)				0.04
Phosphorous (Total)				0.19
Flouride				0.2
Nitrogen (Total)				3.7
Ammonial Nitrogen				0.96
Nitrates				<0.1

Minor metals and nutrients  
not analysed during initial  
survey.

**Site No:** 149  
**Name:** Dam 1 – near grid on Murragamba Rd  
**Property:** Moolarben Coal Operations  
**Description:** Between road and railway line  
**MGA Coordinates:** 6424126 N 763717 E  
**Elevation:** 429 m AHD

**Date inspected:** 30 October 2007 **Water Quality (field):** pH 7.20 EC 0.236 mS/cm T 25.8 °C



**Date inspected:** 30 April 2009 **Water Quality (field):** pH 8.81 EC 0.1578 mS/cm T 20.4 °C



Laboratory Analysis Results				
Analyte	Units	LOR	30 October 2007	30 April 2009
TSS	mg/L @ 105°C	1	230	128
TDS	mg/L @ 180°C	1	460	167.3
pH		0.1	7.20	7.4
EC	µS/cm	1	236	150
Potassium	mg/L	0.1	7.3	9.7
Sodium	mg/L	1	14	14
Calcium	mg/L	1	3.2	7.1
Magnesium	mg/L	0.1	4.4	6.8
Cation sum	meq/L	0.01	1.66	1.77
Chloride	mg/L	1	16	14
Sulphate	mg/L	1	5	<2
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	34	44
Anion sum	meq/L	0.01	1.26	1.27
Ionic difference	%		3.23%	
Allowable difference	%		5.00%	
Aluminium				0.35
Arsenic				<0.001
Boron				0.09
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0007
Copper				0.002
Iron				0.42
Lead				0.00016
Manganese				0.012
Mercury				<0.0001
Nickel				0.002
Selenium				<0.001
Silver				<0.001
Zinc				0.005
Phosphorous(Reactive)				0.06
Phosphorous (Total)				0.47
Flouride				0.3
Nitrogen (Total)				6.5
Ammonial Nitrogen				0.13
Nitrates				0.02

Minor metals and nutrients  
not analysed during initial  
survey.



**Site No:** 150  
**Name:** Shearing Shed Dam  
**Property:** Moolarben Coal Operations  
**MGA Coordinates:** 6424531 N 763952 E  
**Elevation:** 424 m AHD

**Date inspected:** 30 October 2007 **Water Quality (field):** pH 7.00 EC 0.153 mS/cm T 26.5 °C



**Date inspected:** 1 May 2009 **Water Quality (field):** Site Dry No sample



Laboratory Analysis Results				
Analyte	Units	LOR	30 October 2007	1 May 2009
TSS	mg/L @ 105°C	1	52	Site Dry No Sample
TDS	mg/L @ 180°C	1	60	
pH		0.1	7.00	
EC	µS/cm	1	153	
Potassium	mg/L	0.1	4.7	
Sodium	mg/L	1	3.9	
Calcium	mg/L	1	1.8	
Magnesium	mg/L	0.1	1.2	
Cation sum	meq/L	0.01	0.56	
Chloride	mg/L	1	2.7	
Sulphate	mg/L	1	18	
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2	
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	27	
Anion sum	meq/L	0.01	0.81	
Ionic difference	%		34.86%	
Allowable difference	%		5.00%	
Aluminium				
Arsenic				
Boron				
Cadmium				
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Manganese				
Mercury				
Nickel				
Selenium				
Silver				
Zinc				
Phosphorous(Reactive)				
Phosphorous (Total)				
Flouride				
Nitrogen (Total)				
Ammonial Nitrogen				
Nitrates				

Minor metals and nutrients not analysed during initial survey.

**Site No:** 151  
**Name:** Dam 2 near Shearing Shed  
**Property:** Moolarben Coal Operations  
**MGA Coordinates:** 6424455 N 763914 E  
**Elevation:** 429 m AHD

**Date inspected:** 30 October 2007 **Water Quality (field):** pH 8.67 EC 0.235 mS/cm T 25.8 °C



**Date inspected:** 1 May 2009 **Water Quality (field):** pH 8.69 EC 0.1573 mS/cm T 24.2 °C



Laboratory Analysis Results				
Analyte	Units	LOR	30 October 2007	1 May 2009
TSS	mg/L @ 105°C	1	130	27
TDS	mg/L @ 180°C	1	200	134
pH		0.1	8.70	8.3
EC	µS/cm	1	235	165
Potassium	mg/L	0.1	7.3	8.2
Sodium	mg/L	1	14	15
Calcium	mg/L	1	2.3	7.6
Magnesium	mg/L	0.1	4	7.4
Cation sum	meq/L	0.01	1.92	1.85
Chloride	mg/L	1	13	14
Sulphate	mg/L	1	4.6	<2
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2	57
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	40	<2
Anion sum	meq/L	0.01	1.26	1.53
Ionic difference	%		0.89%	
Allowable difference	%		5.00%	
Aluminium				0.07
Arsenic				<0.001
Boron				0.05
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0006
Copper				0.0009
Iron				2
Lead				0.00013
Manganese				0.011
Mercury				<0.0001
Nickel				0.002
Selenium				<0.001
Silver				<0.001
Zinc				<0.005
Phosphorous(Reactive)				0.01
Phosphorous (Total)				0.17
Flouride				0.3
Nitrogen (Total)				2.5
Ammonial Nitrogen				<0.01
Nitrates				0.02

Minor metals and nutrients  
not analysed during initial  
survey.

**Site No:** 152  
**Name:** Dam Near Creek - Below Shearing Shed  
**Property:** Moolarben Coal Operations  
**MGA Coordinates:** 642403 N 764191 E  
**Elevation:** 432 m AHD

**Date inspected:** 30 October 2007    **Water Quality (field):** pH 6.82    EC 0.190 mS/cm    T 24.5 °C



**Date inspected:** 14 May 2009    **Water Quality (field):** pH 8.24    EC 0.1584 mS/cm    T 12 °C



Laboratory Analysis Results				
Analyte	Units	LOR	30 October 2007	14 May 2009
TSS	mg/L @ 105°C	1	490	143
TDS	mg/L @ 180°C	1	120	24
pH		0.1	6.80	7.7
EC	µS/cm	1	190	160
Potassium	mg/L	0.1	2.2	6.7
Sodium	mg/L	1	7.6	10
Calcium	mg/L	1	2.7	7.4
Magnesium	mg/L	0.1	2.1	5.8
Cation sum	meq/L	0.01	0.90	1.45
Chloride	mg/L	1	7.6	10
Sulphate	mg/L	1	2.2	3
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	24	47
Anion sum	meq/L	0.01	0.76	1.28
Ionic difference	%		3.17%	
Allowable difference	%		5.00%	
Aluminium				0.13
Arsenic				<0.001
Boron				0.07
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0007
Copper				0.0013
Iron				0.13
Lead				0.00008
Manganese				0.004
Mercury				<0.0001
Nickel				0.002
Selenium				<0.001
Silver				<0.001
Zinc				0.024
Phosphorous(Reactive)				0.01
Phosphorous (Total)				0.1
Flouride				0.1
Nitrogen (Total)				2.2
Ammonial Nitrogen				0.05
Nitrates				<0.01

Minor metals and nutrients not analysed during initial survey.

**Site No:** 152  
**Name:** Dam Near Creek - Below Shearing Shed  
**Property:** Salter & Little  
**MGA Coordinates:** 642403 N 764191 E  
**Elevation:** 432 m AHD

**Date inspected:** 30 October 2007 **Water Quality (field):** pH 6.82 EC 0.190 mS/cm T 24.5 °C



**Date inspected:** 14 May 2009 **Water Quality (field):** pH 8.24 EC 0.1584 mS/cm T 12 °C



Laboratory Analysis Results				
Analyte	Units	LOR	30 October 2007	14 May 2009
TSS	mg/L @ 105°C	1	490	143
TDS	mg/L @ 180°C	1	120	24
pH		0.1	6.80	7.7
EC	µS/cm	1	190	160
Potassium	mg/L	0.1	2.2	6.7
Sodium	mg/L	1	7.6	10
Calcium	mg/L	1	2.7	7.4
Magnesium	mg/L	0.1	2.1	5.8
Cation sum	meq/L	0.01	0.90	1.45
Chloride	mg/L	1	7.6	10
Sulphate	mg/L	1	2.2	3
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	24	47
Anion sum	meq/L	0.01	0.76	1.28
Ionic difference	%		3.17%	
Allowable difference	%		5.00%	
Aluminium				0.13
Arsenic				<0.001
Boron				0.07
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0007
Copper				0.0013
Iron				0.13
Lead				0.00008
Manganese				0.004
Mercury				<0.0001
Nickel				0.002
Selenium				<0.001
Silver				<0.001
Zinc				0.024
Phosphorous(Reactive)				0.01
Phosphorous (Total)				0.1
Flouride				0.1
Nitrogen (Total)				2.2
Ammonial Nitrogen				0.05
Nitrates				<0.01

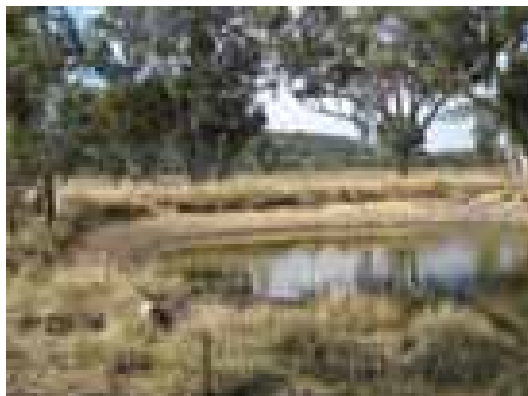
Minor metals and nutrients not analysed during initial survey.

**Site No:** 154  
**Name:** Dam – Near cow shed  
**Property:** Moolarben Coal Operations  
**MGA Coordinates:** 6424754 N 764150 E  
**Elevation:** 431 m AHD

**Date inspected:** 30 October 2007 **Water Quality (field):** pH 6.95 EC 0.208 mS/cm T 24.3 °C



**Date inspected:** 14 May 2009 **Water Quality (field):** pH 7.88 EC 0.1844 mS/cm T 13.1 °C



Laboratory Analysis Results				
Analyte	Units	LOR	30 October 2007	14 May 2009
TSS	mg/L @ 105°C	1	420	166
TDS	mg/L @ 180°C	1	150	61
pH		0.1	6.90	7.3
EC	µS/cm	1	208	200
Potassium	mg/L	0.1	5.1	21
Sodium	mg/L	1	8.5	14
Calcium	mg/L	1	3.4	4.7
Magnesium	mg/L	0.1	2.4	4
Cation sum	meq/L	0.01	1.28	1.71
Chloride	mg/L	1	11	25
Sulphate	mg/L	1	3.1	<2
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	31	39
Anion sum	meq/L	0.01	1	1.48
Ionic difference	%		6.83%	
Allowable difference	%		5.00%	
Aluminium				0.04
Arsenic				<0.001
Boron				0.11
Cadmium				<0.00005
Chromium				<0.001
Cobalt				0.0009
Copper				0.0011
Iron				0.32
Lead				0.00012
Manganese				0.053
Mercury				<0.0001
Nickel				0.003
Selenium				<0.001
Silver				<0.001
Zinc				0.067
Phosphorous(Reactive)				0.02
Phosphorous (Total)				0.44
Flouride				<0.1
Nitrogen (Total)				4.5
Ammonial Nitrogen				0.02
Nitrates				<0.01

Minor metals and nutrients not analysed during initial survey.

**Site No:** 157  
**Name:** Dam - Closest to Wollar Rd  
**Property:** Moolarben Coal Operations  
**MGA Coordinates:** 6424926 N 764022 E  
**Elevation:** 430 m AHD

**Date inspected:** 30 October 2007    **Water Quality (field):** pH 8.70    EC 1.04 mS/cm    T 26.7 °C



**Date inspected:** 1 May 2009    **Water Quality (field):** pH 9.29    EC 0.562 mS/cm    T 20.4 °C



Laboratory Analysis Results					
Analyte	Units	LOR	30 October 2007	1 May 2009	
TSS	mg/L @ 105°C	1	50	11	
TDS	mg/L @ 180°C	1	610	397	
pH		0.1	8.70	9.4	
EC	µS/cm	1	1040	585	
Potassium	mg/L	0.1	24	Analysis Not Required	
Sodium	mg/L	1	110		
Calcium	mg/L	1	30		
Magnesium	mg/L	0.1	28		
Cation sum	meq/L	0.01	9.29		
Chloride	mg/L	1	63		
Sulphate	mg/L	1	220		
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2	Analysis Not Required	
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	140		
Anion sum	meq/L	0.01	8.95		
Ionic difference	%		0.24%		
Allowable difference	%		5.00%		
Aluminium					0.07
Arsenic					0.002
Boron				0.05	
Cadmium				<0.00005	
Chromium				<0.001	
Cobalt				0.0006	
Copper				0.0006	
Iron				0.56	
Lead				0.00017	
Manganese				0.033	
Mercury				<0.0001	
Nickel				0.002	
Selenium				<0.001	
Silver				<0.001	
Zinc				<0.005	
Phosphorous(Reactive)				0.01	
Phosphorous (Total)				0.07	
Flouride				0.5	
Nitrogen (Total)				3.2	
Ammonial Nitrogen				<0.01	
Nitrates				<0.01	

Minor metals and nutrients not analysed during initial survey.

**Site No:** 158  
**Name:** Dam #1  
**Property:** Moolarben Coal Operations  
**Description:** Below the house  
**MGA Coordinates:** 6425859 N 763813 E  
**Elevation:** 438 m AHD

**Date inspected:** 30 October 2007 **Water Quality (field):** pH 8.60 EC 0.226 mS/cm T 28.2 °C



**Date inspected:** 24 April 2009 **Water Quality (field):** pH 7.70 EC 0.226 mS/cm T 17.8 °C



### Laboratory Analysis Results

Analyte	Units	LOR	30 October 2007	24 April 2009	
TSS	mg/L @ 105°C	1	280	13	
TDS	mg/L @ 180°C	1	140	118	
pH		0.1	8.60	6.3	
EC	µS/cm	1	226	115	
Potassium	mg/L	0.1	6.8	Analysis Not Required	
Sodium	mg/L	1	9.8		
Calcium	mg/L	1	3.2		
Magnesium	mg/L	0.1	2.9		
Cation sum	meq/L	0.01	1.57		
Chloride	mg/L	1	24		21
Sulphate	mg/L	1	13		<2
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2	<2	
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	37	14	
Anion sum	meq/L	0.01	1.67	Analysis Not Required	
Ionic difference	%		25.64%		
Allowable difference	%		5.00%		
Aluminium				0.06	
Arsenic				<0.001	
Boron				0.06	
Cadmium				<0.00005	
Chromium				<0.0001	
Cobalt				0.0006	
Copper				0.0017	
Iron				2.6	
Lead				0.00076	
Manganese				0.04	
Mercury				<0.0001	
Nickel				0.001	
Selenium				<0.001	
Silver				<0.001	
Zinc				<0.005	
Phosphorous(Reactive)				0.02	
Phosphorous (Total)				0.13	
Flouride				0.1	
Nitrogen (Total)				2.4	
Ammonial Nitrogen				0.09	
Nitrates				<0.01	

Minor metals and nutrients not analysed during initial survey.

**Site No:** 159  
**Name:** Dam #2  
**Property:** Moolarben Coal Operations  
**Description:** Closest to railway line  
**MGA Coordinates:** 6425962 N 763858 E  
**Elevation:** 436 m AHD

**Date inspected:** 30 October 2007    **Water Quality (field):** pH 8.10    EC 0.294 mS/cm    T 24.8 °C



**Date inspected:** 24 April 2009    **Water Quality (field):** pH 8.25    EC 0.238 mS/cm    T 19.8 °C



Laboratory Analysis Results					
Analyte	Units	LOR	30 October 2007	24 April 2009	
TSS	mg/L @ 105°C	1	100	387	
TDS	mg/L @ 180°C	1	1600	482	
pH		0.1	8.1	7.7	
EC	µS/cm	1	294	245	
Potassium	mg/L	0.1	1.8	Analysis Not Required	
Sodium	mg/L	1	35		
Calcium	mg/L	1	2		
Magnesium	mg/L	0.1	4.1		
Cation sum	meq/L	0.01	2.78		
Chloride	mg/L	1	12.00		18
Sulphate	mg/L	1	2.5		5
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2		<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	61		91
Anion sum	meq/L	0.01	1.59		Analysis Not Required
Ionic difference	%		10.96%		
Allowable difference	%		5.00%		
Aluminium				0.73	
Arsenic				0.001	
Boron				0.06	
Cadmium				<0.00005	
Chromium				<0.001	
Cobalt				0.0014	
Copper				0.0026	
Iron				0.65	
Lead				0.0006	
Manganese				0.01	
Mercury				<0.0001	
Nickel				0.002	
Selenium				<0.001	
Silver				<0.001	
Zinc				0.01	
Phosphorous(Reactive)				0.02	
Phosphorous (Total)				0.47	
Flouride				0.5	
Nitrogen (Total)				5.5	
Ammonial Nitrogen				0.15	
Nitrates				<0.01	

Minor metals and nutrients not analysed during initial survey.



**Site No:** 160  
**Name:** Dam #3  
**Property:** Moolarben Coal Operations  
**Description:** Tractor Scoop  
**MGA Coordinates:** 6426873 N 763791 E  
**Elevation:** 444m AHD

**Date inspected:** 30 October 2007 **Water Quality (field):** pH 8.60 EC 0.275 mS/cm T 25.9 °C



**Date inspected:** 24 April 2009 **Water Quality (field):** pH 7.74 EC 0.253 mS/cm T 20.3 °C

NO PHOTO

Laboratory Analysis Results					
Analyte	Units	LOR	30 October 2007	24 April 2009	
TSS	mg/L @ 105°C	1	1500	1460	
TDS	mg/L @ 180°C	1	2300	896	
pH		0.1	8.60	7.2	
EC	µS/cm	1	275	225	
Potassium	mg/L	0.1	1.3	Analysis Not Required	
Sodium	mg/L	1	38		
Calcium	mg/L	1	1.3		
Magnesium	mg/L	0.1	1.8		
Cation sum	meq/L	0.01	2.85		
Chloride	mg/L	1	17		35
Sulphate	mg/L	1	9.6		<2
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2	<2	
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	51	51	
Anion sum	meq/L	0.01	1.56	Analysis Not Required	
Ionic difference	%		5.58%		
Allowable difference	%		5.00%		
Aluminium				34	
Arsenic				0.003	
Boron				0.08	
Cadmium				<0.00005	
Chromium				0.03	
Cobalt				0.0072	
Copper				0.0060	
Iron				11	
Lead				0.0037	
Manganese				0.03	
Mercury				<0.0001	
Nickel				0.016	
Selenium				<0.001	
Silver				<0.001	
Zinc				0.031	
Phosphorous(Reactive)				0.02	
Phosphorous (Total)				0.69	
Flouride				1.2	
Nitrogen (Total)				11	
Ammonial Nitrogen				0.06	
Nitrates				<0.01	

Minor metals and nutrients not analysed during initial survey.

**Site No:** 161  
**Name:** Willow Tree  
**Property:** Rayner  
**Description:** Soak Under Tree  
**MGA Coordinates:** 6417070 N 759191 E  
**Elevation:** 476m AHD

**Date inspected:** 24 April 2009      **Water Quality (field):** Not Sampled



Laboratory Analysis Results			
Analyte	Units	LOR	24 April 2009
TSS	mg/L @ 105°C	1	Not Sampled
TDS	mg/L @ 180°C	1	
pH		0.1	
EC	µS/cm	1	
Potassium	mg/L	0.1	
Sodium	mg/L	1	
Calcium	mg/L	1	
Magnesium	mg/L	0.1	
Cation sum	meq/L	0.01	
Chloride	mg/L	1	
Sulphate	mg/L	1	
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	
Anion sum	meq/L	0.01	
Ionic difference	%		
Allowable difference	%		
Aluminium			
Arsenic			
Boron			
Cadmium			
Chromium			
Cobalt			
Copper			
Iron			
Lead			
Manganese			
Mercury			
Nickel			
Selenium			
Silver			
Zinc			
Phosphorous(Reactive)			
Phosphorous (Total)			
Flouride			
Nitrogen (Total)			
Ammonial Nitrogen			
Nitrates			

**Site No:** 162  
**Name:** Cattle Paddock Spring  
**Property:** Rayner  
**Description:** Soak Under Tree  
**MGA Coordinates:** 6417736 N 759632 E  
**Elevation:** 468m AHD

**Date inspected:** 21 April 2009      **Water Quality (field):** pH 7.79    EC 4.52 mS/cm    T 19 °C



Laboratory Analysis Results			
Analyte	Units	LOR	21 April 2009
TSS	mg/L @ 105°C	1	16
TDS	mg/L @ 180°C	1	2972
pH		0.1	7.6
EC	µS/cm	1	4410
Potassium	mg/L	0.1	18
Sodium	mg/L	1	430
Calcium	mg/L	1	362
Magnesium	mg/L	0.1	147
Cation sum	meq/L	0.01	49.3
Chloride	mg/L	1	1120
Sulphate	mg/L	1	450
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	280
Anion sum	meq/L	0.01	46.6
Ionic difference	%		
Allowable difference	%		
Aluminium			<0.02
Arsenic			0.001
Boron			0.02
Cadmium			<0.00005
Chromium			<0.002
Cobalt			0.0005
Copper			0.0022
Iron			0.19
Lead			0.00022
Manganese			0.085
Mercury			<0.0001
Nickel			0.004
Selenium			<0.001
Silver			<0.001
Zinc			<0.005
Phosphorous(Reactive)			0.03
Phosphorous (Total)			0.03
Flouride			0.7
Nitrogen (Total)			0.74
Ammonial Nitrogen			0.02
Nitrates			<0.01

**Site No:** 163  
**Name:** Sheep Dip Dam  
**Property:** Rayner  
**Description:** Spring Fed Dam  
**MGA Coordinates:** 6417288 N 759923 E  
**Elevation:** 491m AHD

**Date inspected:** 21 April 2009      **Water Quality (field):** pH 8.77    EC 0.1235 mS/cm    T 21.1 °C

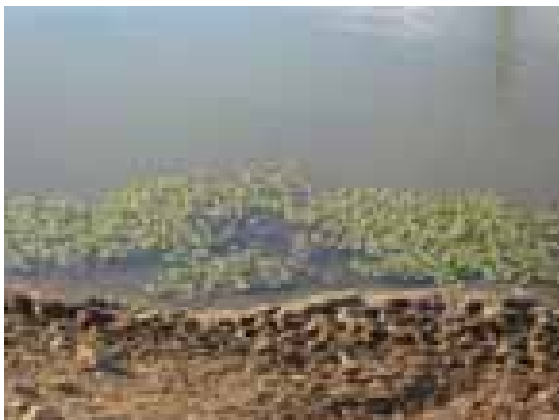


Laboratory Analysis Results			
Analyte	Units	LOR	21 April 2009
TSS	mg/L @ 105°C	1	20
TDS	mg/L @ 180°C	1	75
pH		0.1	8.5
EC	µS/cm	1	50
Potassium	mg/L	0.1	3.4
Sodium	mg/L	1	3.4
Calcium	mg/L	1	5.2
Magnesium	mg/L	0.1	2.4
Cation sum	meq/L	0.01	0.69
Chloride	mg/L	1	7
Sulphate	mg/L	1	8
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	7
Anion sum	meq/L	0.01	0.5
Ionic difference	%		
Allowable difference	%		
Aluminium			0.62
Arsenic			0.003
Boron			0.02
Cadmium			<0.00005
Chromium			<0.002
Cobalt			<0.0002
Copper			0.0011
Iron			0.47
Lead			0.00037
Manganese			0.017
Mercury			<0.0001
Nickel			<0.001
Selenium			<0.001
Silver			<0.001
Zinc			<0.005
Phosphorous(Reactive)			0.02
Phosphorous (Total)			0.09
Flouride			0.1
Nitrogen (Total)			1.5
Ammonial Nitrogen			0.18
Nitrates			<0.01

Appendix E | Groundwater Impact Assessment

**Site No:** 164  
**Name:** Soak / Dam  
**Property:** Rayner  
**Description:** Spring Fed Dam  
**MGA Coordinates:** 6416955 N 760138 E  
**Elevation:** 503m AHD

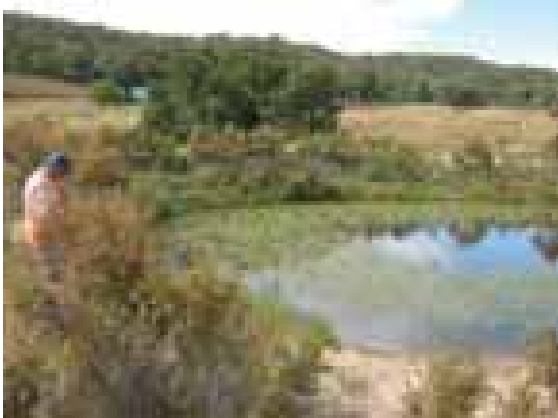
**Date inspected:** 21 April 2009      **Water Quality (field):** pH 8.61    EC 0.209 mS/cm    T 21.5 °C



Laboratory Analysis Results			
Analyte	Units	LOR	21 April 2009
TSS	mg/L @ 105°C	1	32
TDS	mg/L @ 180°C	1	147.5
pH		0.1	8.3
EC	µS/cm	1	175
Potassium	mg/L	0.1	8.4
Sodium	mg/L	1	19
Calcium	mg/L	1	6.7
Magnesium	mg/L	0.1	8.9
Cation sum	meq/L	0.01	2.11
Chloride	mg/L	1	18
Sulphate	mg/L	1	6
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	50
Anion sum	meq/L	0.01	1.51
Ionic difference	%		
Allowable difference	%		
Aluminium			0.01
Arsenic			0.002
Boron			0.02
Cadmium			<0.00005
Chromium			<0.002
Cobalt			0.0002
Copper			0.0009
Iron			0.07
Lead			0.00006
Manganese			0.008
Mercury			<0.0001
Nickel			<0.001
Selenium			<0.001
Silver			<0.001
Zinc			<0.005
Phosphorous(Reactive)			0.02
Phosphorous (Total)			0.09
Flouride			0.3
Nitrogen (Total)			2.2
Ammonial Nitrogen			0.03
Nitrates			<0.01

**Site No:** 165  
**Name:** Lilly Pond Dam  
**Property:** Moolarben Coal Operations  
**Description:** Spring Fed Dam (20m from well)  
**MGA Coordinates:** 6421236 N 763311 E  
**Elevation:** 455m AHD

**Date inspected:** 22 April 2009      **Water Quality (field):** pH 7.50    EC 0.1381 mS/cm    T 20.3 °C



Laboratory Analysis Results			
Analyte	Units	LOR	22 April 2009
TSS	mg/L @ 105°C	1	14
TDS	mg/L @ 180°C	1	142.5
pH		0.1	7.1
EC	µS/cm	1	130
Potassium	mg/L	0.1	6.3
Sodium	mg/L	1	18
Calcium	mg/L	1	6.7
Magnesium	mg/L	0.1	5.3
Cation sum	meq/L	0.01	1.71
Chloride	mg/L	1	14
Sulphate	mg/L	1	<2
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	36
Anion sum	meq/L	0.01	1.11
Ionic difference	%		
Allowable difference	%		
Aluminium			0.1
Arsenic			0.001
Boron			0.05
Cadmium			<0.00005
Chromium			<0.002
Cobalt			0.0005
Copper			0.0008
Iron			1.5
Lead			0.00045
Manganese			0.058
Mercury			<0.0001
Nickel			<0.001
Selenium			<0.001
Silver			<0.001
Zinc			<0.005
Phosphorous(Reactive)			0.02
Phosphorous (Total)			0.08
Flouride			0.2
Nitrogen (Total)			1.7
Ammonial Nitrogen			0.03
Nitrates			<0.01

**Site No:** 166  
**Name:** Slate Quarry  
**Property:** Moolarben Coal Operations  
**Description:** Near PZ131-132  
**MGA Coordinates:** 6422193 N 763612 E  
**Elevation:** 464m AHD

**Date inspected:** 23 April 2009      **Water Quality (field):** pH 7.50 EC 0.308 mS/cm      T 17.6 °C



Laboratory Analysis Results			
Analyte	Units	LOR	23 April 2009
TSS	mg/L @ 105°C	1	17
TDS	mg/L @ 180°C	1	204
pH		0.1	6.6
EC	µS/cm	1	220
Potassium	mg/L	0.1	5.4
Sodium	mg/L	1	39
Calcium	mg/L	1	5.7
Magnesium	mg/L	0.1	2.60
Cation sum	meq/L	0.01	2.33
Chloride	mg/L	1	50
Sulphate	mg/L	1	<2
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	12
Anion sum	meq/L	0.01	1.65
Ionic difference	%		
Allowable difference	%		
Aluminium			0.22
Arsenic			0.009
Boron			0.06
Cadmium			<0.00005
Chromium			<0.001
Cobalt			0.0005
Copper			0.0019
Iron			0.17
Lead			0.00059
Manganese			0.01
Mercury			<0.0001
Nickel			0.001
Selenium			<0.001
Silver			<0.001
Zinc			<0.005
Phosphorous(Reactive)			0.02
Phosphorous (Total)			0.23
Flouride			0.4
Nitrogen (Total)			4.2
Ammonial Nitrogen			0.03
Nitrates			<0.01

**Site No:** 167  
**Name:** Pig Feed Dam  
**Property:** Sword  
**Description:** Spring Fed Dam  
**MGA Coordinates:** 6421823 N 759176 E  
**Elevation:** 438m AHD

**Date inspected:** 15 June 2009      **Water Quality (field):** pH 7.40    EC 4.19 mS/cm    T 10.3 °C

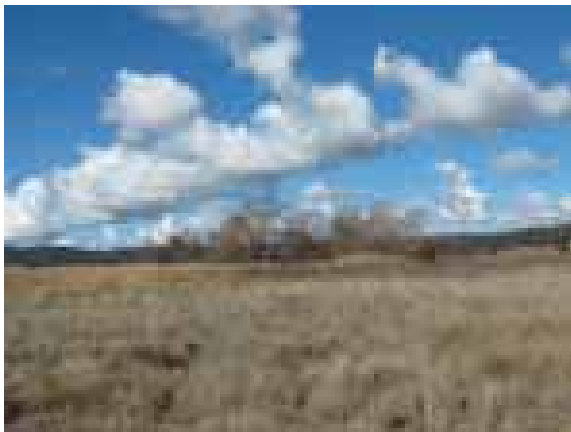
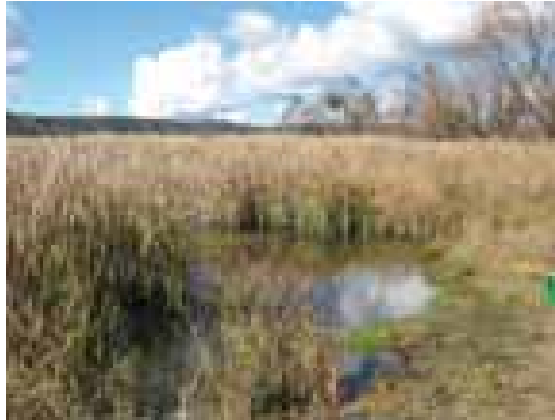
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<b>Laboratory Analysis Results</b>			
<b>Analyte</b>	<b>Units</b>	<b>LOR</b>	<b>15 June 2009</b>
TSS	mg/L @ 105°C	1	43
TDS	mg/L @ 180°C	1	2665
pH		0.1	6.8
EC	µS/cm	1	4140
Potassium	mg/L	0.1	33
Sodium	mg/L	1	547
Calcium	mg/L	1	154
Magnesium	mg/L	0.1	121
Cation sum	meq/L	0.01	42.3
Chloride	mg/L	1	1130
Sulphate	mg/L	1	367
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	225
Anion sum	meq/L	0.01	44
Ionic difference	%		
Allowable difference	%		
Aluminium			0.02
Arsenic			0.002
Boron			0.04
Cadmium			<0.00005
Chromium			<0.001
Cobalt			0.0026
Copper			0.0022
Iron			0.02
Lead			<0.00005
Manganese			1.8
Mercury			<0.0001
Nickel			0.011
Selenium			<0.001
Silver			<0.001
Zinc			<0.005
Phosphorous(Reactive)			0.02
Phosphorous (Total)			0.08
Flouride			0.8
Nitrogen (Total)			3
Ammonial Nitrogen			0.83
Nitrates			0.04



**Site No:** 168  
**Name:** Double Iron Gates Dam  
**Property:** Cox  
**Description:** Spring Fed Dam  
**MGA Coordinates:** 6416950 N 758870 E  
**Elevation:** 484.632m AHD

**Date inspected:** 23 June 2009      **Water Quality (field):** pH 6.52    EC 0.291 mS/cm    T 11.6 °C



Laboratory Analysis Results			
Analyte	Units	LOR	23 June 2009
TSS	mg/L @ 105°C	1	43
TDS	mg/L @ 180°C	1	2665
pH		0.1	6.8
EC	µS/cm	1	4140
Potassium	mg/L	0.1	33
Sodium	mg/L	1	547
Calcium	mg/L	1	154
Magnesium	mg/L	0.1	121
Cation sum	meq/L	0.01	42.3
Chloride	mg/L	1	1130
Sulphate	mg/L	1	367
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	225
Anion sum	meq/L	0.01	44
Ionic difference	%		
Allowable difference	%		
Aluminium			0.02
Arsenic			0.002
Boron			0.04
Cadmium			<0.00005
Chromium			<0.001
Cobalt			0.0026
Copper			0.0022
Iron			0.02
Lead			<0.00005
Manganese			1.8
Mercury			<0.0001
Nickel			0.011
Selenium			<0.001
Silver			<0.001
Zinc			<0.005
Phosphorous(Reactive)			0.02
Phosphorous (Total)			0.08
Flouride			0.8
Nitrogen (Total)			3
Ammonial Nitrogen			0.83
Nitrates			0.04

**Site No:** 169  
**Name:** Mill Paddock Bore  
**Property:** Cox  
**Description:** SWL=6.74m  
**MGA Coordinates:** 6416599 N 758586 E  
**Elevation:** 496.824 m AHD

**Date inspected:** 23 June 2009      **Water Quality (field):** pH 6.93    EC 0.169 mS/cm    T 18.1 °C



Laboratory Analysis Results			
Analyte	Units	LOR	23 June 2009
TSS	mg/L @ 105°C	1	<2
TDS	mg/L @ 180°C	1	212
pH		0.1	7.1
EC	µS/cm	1	320
Potassium	mg/L	0.1	12
Sodium	mg/L	1	25
Calcium	mg/L	1	14
Magnesium	mg/L	0.1	9.5
Cation sum	meq/L	0.01	2.87
Chloride	mg/L	1	42
Sulphate	mg/L	1	54
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	43
Anion sum	meq/L	0.01	3.17
Ionic difference	%		
Allowable difference	%		
Aluminium			<0.02
Arsenic			<0.001
Boron			0.01
Cadmium			<0.00005
Chromium			<0.001
Cobalt			0.0003
Copper			<0.0005
Iron			0.21
Lead			0.00008
Manganese			0.14
Mercury			<0.0001
Nickel			<0.001
Selenium			<0.001
Silver			<0.001
Zinc			<0.005
Phosphorous(Reactive)			0.01
Phosphorous (Total)			0.02
Flouride			0.7
Nitrogen (Total)			0.5
Ammonial Nitrogen			<0.01
Nitrates			<0.01

**Site No:** 170  
**Name:** Mill Paddock Spring  
**Property:** Cox  
**Description:** Seep which has been dug out with excavator.  
**MGA Coordinates:** 6416857 N 758874 E  
**Elevation:** 484.0224 m AHD

**Date inspected:** 23 June 2009      **Water Quality (field):** pH 6.03    EC 0.217 mS/cm    T 17.3 °C



Laboratory Analysis Results			
Analyte	Units	LOR	23 June 2009
TSS	mg/L @ 105°C	1	53
TDS	mg/L @ 180°C	1	96.5
pH		0.1	7.3
EC	µS/cm	1	175
Potassium	mg/L	0.1	2.4
Sodium	mg/L	1	14
Calcium	mg/L	1	10
Magnesium	mg/L	0.1	2.8
Cation sum	meq/L	0.01	1.4
Chloride	mg/L	1	28
Sulphate	mg/L	1	<2
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	31
Anion sum	meq/L	0.01	1.41
Ionic difference	%		
Allowable difference	%		
Aluminium			<0.02
Arsenic			<0.001
Boron			<0.01
Cadmium			<0.00005
Chromium			<0.001
Cobalt			<0.0002
Copper			<0.0005
Iron			0.04
Lead			<0.00005
Manganese			0.067
Mercury			<0.0001
Nickel			<0.001
Selenium			<0.001
Silver			<0.001
Zinc			<0.005
Phosphorous(Reactive)			<0.01
Phosphorous (Total)			0.02
Flouride			2.3
Nitrogen (Total)			0.56
Ammonial Nitrogen			0.33
Nitrates			<0.01

**Site No:** 171  
**Name:** Joes Well  
**Property:** Cox  
**Description:** 2 wells & windmill, sampled from well with bricks.  
**MGA Coordinates:** 6416908 N 759123 E  
**Elevation:** 484.3272 m AHD

**Date inspected:** 23 June 2009      **Water Quality (field):** pH 5.73    EC 0.246 mS/cm    T 17.1 °C



Laboratory Analysis Results			
Analyte	Units	LOR	23 June 2009
TSS	mg/L @ 105°C	1	8
TDS	mg/L @ 180°C	1	157
pH		0.1	6.9
EC	µS/cm	1	245
Potassium	mg/L	0.1	5.6
Sodium	mg/L	1	17
Calcium	mg/L	1	11
Magnesium	mg/L	0.1	6.8
Cation sum	meq/L	0.01	1.99
Chloride	mg/L	1	18
Sulphate	mg/L	1	46
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	23
Anion sum	meq/L	0.01	1.92
Ionic difference	%		
Allowable difference	%		
Aluminium			<0.02
Arsenic			<0.001
Boron			0.01
Cadmium			<0.00005
Chromium			<0.001
Cobalt			<0.0002
Copper			<0.0005
Iron			0.03
Lead			<0.00005
Manganese			0.04
Mercury			<0.0001
Nickel			<0.001
Selenium			<0.001
Silver			<0.001
Zinc			0.005
Phosphorous(Reactive)			<0.01
Phosphorous (Total)			0.01
Flouride			0.8
Nitrogen (Total)			3.4
Ammonial Nitrogen			0.11
Nitrates			2.8

**Site No:** 172  
**Name:** Ewe Shed Paddock Dam  
**Property:** Cox  
**Description:** Spring fed dam.  
**MGA Coordinates:** 6415648 N 759087 E  
**Elevation:** 505.968 m AHD

**Date inspected:** 23 June 2009      **Water Quality (field):** pH 8.43      EC 4.6 mS/cm      T 16.5 °C



Laboratory Analysis Results			
Analyte	Units	LOR	23 June 2009
TSS	mg/L @ 105°C	1	60
TDS	mg/L @ 180°C	1	174.4
pH		0.1	6.2
EC	µS/cm	1	255
Potassium	mg/L	0.1	4.1
Sodium	mg/L	1	20
Calcium	mg/L	1	13
Magnesium	mg/L	0.1	7
Cation sum	meq/L	0.01	2.2
Chloride	mg/L	1	14
Sulphate	mg/L	1	58
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	24
Anion sum	meq/L	0.01	2.08
Ionic difference	%		
Allowable difference	%		
Aluminium			<0.02
Arsenic			<0.001
Boron			0.01
Cadmium			<0.00005
Chromium			<0.001
Cobalt			<0.0002
Copper			0.0007
Iron			<0.01
Lead			0.00016
Manganese			0.003
Mercury			<0.0001
Nickel			<0.001
Selenium			<0.001
Silver			<0.001
Zinc			0.01
Phosphorous(Reactive)			<0.01
Phosphorous (Total)			0.02
Flouride			0.5
Nitrogen (Total)			4.2
Ammonial Nitrogen			0.04
Nitrates			3.5

**Site No:** 173  
**Name:** Old Corner Paddock Dam  
**Property:** Cox  
**Description:** Spring fed dam.  
**MGA Coordinates:** 6416181 N 761486 E  
**Elevation:** 536.1432 m AHD

**Date inspected:** 23 June 2009      **Water Quality (field):** pH 7.97    EC 0.445 mS/cm    T 16.9 °C



Laboratory Analysis Results			
Analyte	Units	LOR	23 June 2009
TSS	mg/L @ 105°C	1	122
TDS	mg/L @ 180°C	1	3338
pH		0.1	9
EC	µS/cm	1	4790
Potassium	mg/L	0.1	82
Sodium	mg/L	1	635
Calcium	mg/L	1	120
Magnesium	mg/L	0.1	205
Cation sum	meq/L	0.01	52.6
Chloride	mg/L	1	1130
Sulphate	mg/L	1	869
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	37
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	238
Anion sum	meq/L	0.01	55.5
Ionic difference	%		
Allowable difference	%		
Aluminium			<0.02
Arsenic			0.01
Boron			0.1
Cadmium			<0.00005
Chromium			0.001
Cobalt			0.0051
Copper			0.0027
Iron			0.06
Lead			0.00018
Manganese			6.8
Mercury			<0.0001
Nickel			0.014
Selenium			0.003
Silver			<0.001
Zinc			0.005
Phosphorous(Reactive)			0.02
Phosphorous (Total)			0.85
Flouride			0.7
Nitrogen (Total)			5.8
Ammonial Nitrogen			0.07
Nitrates			0.02

**Site No:** 174  
**Name:** Hill Paddock Rock Dam  
**Property:** Cox  
**Description:** Spring fed dam.  
**MGA Coordinates:** 6415680 N 760948 E  
**Elevation:** 501.0912 m AHD

**Date inspected:** 23 June 2009      **Water Quality (field):** pH 8.95    EC 0.58 mS/cm    T 17.1 °C



Laboratory Analysis Results			
Analyte	Units	LOR	23 June 2009
TSS	mg/L @ 105°C	1	313
TDS	mg/L @ 180°C	1	279
pH		0.1	8.1
EC	µS/cm	1	445
Potassium	mg/L	0.1	71
Sodium	mg/L	1	14
Calcium	mg/L	1	13
Magnesium	mg/L	0.1	13
Cation sum	meq/L	0.01	4.14
Chloride	mg/L	1	46
Sulphate	mg/L	1	<2
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	142
Anion sum	meq/L	0.01	4.14
Ionic difference	%		
Allowable difference	%		
Aluminium			<0.02
Arsenic			0.003
Boron			0.04
Cadmium			<0.00005
Chromium			<0.001
Cobalt			0.0009
Copper			0.0022
Iron			0.43
Lead			0.00032
Manganese			0.065
Mercury			<0.0001
Nickel			0.003
Selenium			<0.001
Silver			<0.001
Zinc			<0.005
Phosphorous(Reactive)			0.01
Phosphorous (Total)			0.65
Flouride			0.3
Nitrogen (Total)			8.2
Ammonial Nitrogen			2.1
Nitrates			0.02

**Site No:** 175  
**Name:** 2<sup>nd</sup> Dam From SP045  
**Property:** Cox  
**Description:** Spring fed dam.  
**MGA Coordinates:** 6416043 N 760591 E  
**Elevation:** 494.9952 m AHD

**Date inspected:** 23 June 2009      **Water Quality (field):** pH 7.88    EC 2.22 mS/cm    T 14.6 °C



Laboratory Analysis Results			
Analyte	Units	LOR	23 June 2009
TSS	mg/L @ 105°C	1	5
TDS	mg/L @ 180°C	1	403
pH		0.1	9.3
EC	µS/cm	1	605
Potassium	mg/L	0.1	11
Sodium	mg/L	1	45
Calcium	mg/L	1	24
Magnesium	mg/L	0.1	37
Cation sum	meq/L	0.01	6.48
Chloride	mg/L	1	71
Sulphate	mg/L	1	44
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	29
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	149
Anion sum	meq/L	0.01	6.48
Ionic difference	%		
Allowable difference	%		
Aluminium			<0.02
Arsenic			0.002
Boron			0.03
Cadmium			<0.00005
Chromium			<0.001
Cobalt			0.0007
Copper			0.0019
Iron			0.03
Lead			<0.00005
Manganese			0.009
Mercury			<0.0001
Nickel			0.008
Selenium			<0.001
Silver			<0.001
Zinc			<0.005
Phosphorous(Reactive)			<0.01
Phosphorous (Total)			0.04
Flouride			0.7
Nitrogen (Total)			1.9
Ammonial Nitrogen			0.02
Nitrates			<0.01



**Site No:** 176  
**Name:** Wheat Paddock East  
**Property:** Cox  
**Description:** Spring fed dam.  
**MGA Coordinates:** 6416006 N 760548 E  
**Elevation:** 493.1664 m AHD

**Date inspected:** 23 June 2009      **Water Quality (field):** pH 7.86    EC 2.54 mS/cm    T 12.7 °C



Laboratory Analysis Results			
Analyte	Units	LOR	23 June 2009
TSS	mg/L @ 105°C	1	266
TDS	mg/L @ 180°C	1	1485
pH		0.1	8.3
EC	µS/cm	1	2340
Potassium	mg/L	0.1	13
Sodium	mg/L	1	337
Calcium	mg/L	1	64
Magnesium	mg/L	0.1	74
Cation sum	meq/L	0.01	24.3
Chloride	mg/L	1	468
Sulphate	mg/L	1	301
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	238
Anion sum	meq/L	0.01	24.2
Ionic difference	%		
Allowable difference	%		
Aluminium			<0.02
Arsenic			<0.001
Boron			0.05
Cadmium			<0.00005
Chromium			<0.001
Cobalt			0.0005
Copper			0.023
Iron			<0.01
Lead			0.0019
Manganese			0.001
Mercury			<0.0001
Nickel			0.004
Selenium			<0.001
Silver			<0.001
Zinc			0.037
Phosphorous(Reactive)			0.01
Phosphorous (Total)			0.19
Flouride			0.4
Nitrogen (Total)			3.3
Ammonial Nitrogen			0.04
Nitrates			1.3

**Site No:** 177  
**Name:** Windmill Bore  
**Property:** Cox  
**Description:** Southern Cross Windmill installed so unable to sample.  
**MGA Coordinates:** 6416083 N 759838 E  
**Elevation:** 494.9952 m AHD

**Date inspected:** 25 June 2009      **Water Quality (field):**    pH   EC      mS/cm      T    °C



Laboratory Analysis Results			
Analyte	Units	LOR	25 June 2009
TSS	mg/L @ 105°C	1	Not Sampled
TDS	mg/L @ 180°C	1	
pH		0.1	
EC	µS/cm	1	
Potassium	mg/L	0.1	
Sodium	mg/L	1	
Calcium	mg/L	1	
Magnesium	mg/L	0.1	
Cation sum	meq/L	0.01	
Chloride	mg/L	1	
Sulphate	mg/L	1	
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	
Anion sum	meq/L	0.01	
Ionic difference	%		
Allowable difference	%		
Aluminium			
Arsenic			
Boron			
Cadmium			
Chromium			
Cobalt			
Copper			
Iron			
Lead			
Manganese			
Mercury			
Nickel			
Selenium			
Silver			
Zinc			
Phosphorous(Reactive)			
Phosphorous (Total)			
Flouride			
Nitrogen (Total)			
Ammonial Nitrogen			
Nitrates			

**Site No:** 178  
**Name:** Wort Paddock east  
**Property:** Cox  
**Description:** Dam near windmill – Groundwater seep which has been dug out..  
**MGA Coordinates:** 6415914 N 760020 E  
**Elevation:** 500.7864 m AHD

**Date inspected:** 25 June 2009      **Water Quality (field):** pH 7.14    EC 0.1145 mS/cm    T 10.8 °C



Laboratory Analysis Results			
Analyte	Units	LOR	25 June 2009
TSS	mg/L @ 105°C	1	37
TDS	mg/L @ 180°C	1	296
pH		0.1	7.7
EC	µS/cm	1	125
Potassium	mg/L	0.1	12
Sodium	mg/L	1	7.5
Calcium	mg/L	1	2.6
Magnesium	mg/L	0.1	3
Cation sum	meq/L	0.01	1.01
Chloride	mg/L	1	18
Sulphate	mg/L	1	6
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	20
Anion sum	meq/L	0.01	1.03
Ionic difference	%		
Allowable difference	%		
Aluminium			1.9
Arsenic			4
Boron			0.08
Cadmium			<0.00005
Chromium			0.001
Cobalt			0.0006
Copper			0.0026
Iron			11.7
Lead			0.003
Manganese			0.048
Mercury			<0.0001
Nickel			0.002
Selenium			<0.001
Silver			<0.001
Zinc			0.045
Phosphorous(Reactive)			0.02
Phosphorous (Total)			0.11
Flouride			0.2
Nitrogen (Total)			2
Ammonial Nitrogen			0.37
Nitrates			0.02

**Site No:** 179  
**Name:** 200m From Wort Paddock east  
**Property:** Cox  
**Description:** Dam over fence  
**MGA Coordinates:** 6415838 N 760072 E  
**Elevation:** 505.0536 m AHD

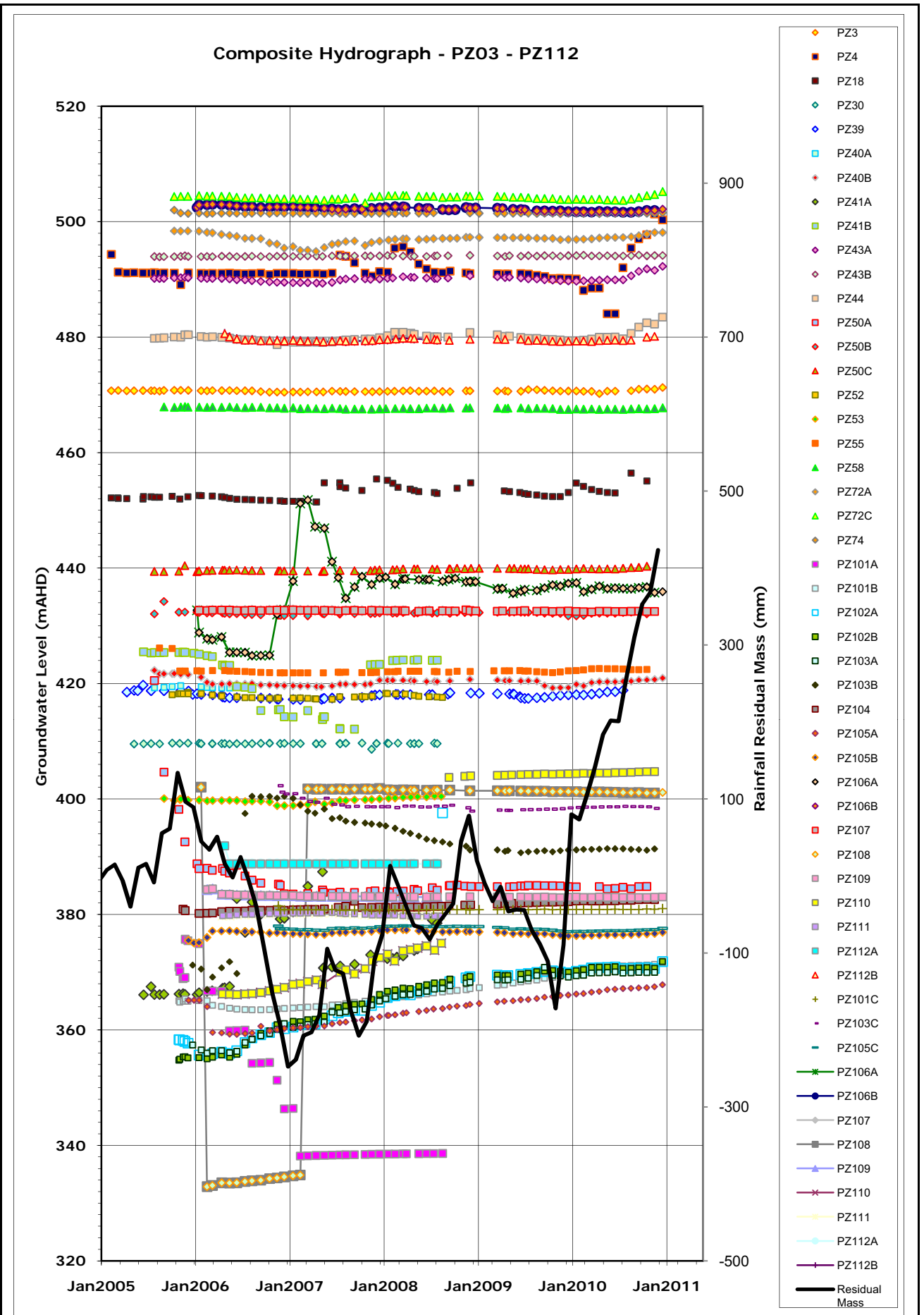
**Date inspected:** 25 June 2009      **Water Quality (field):** pH 6.81    EC 0.289 mS/cm    T 11.5 °C

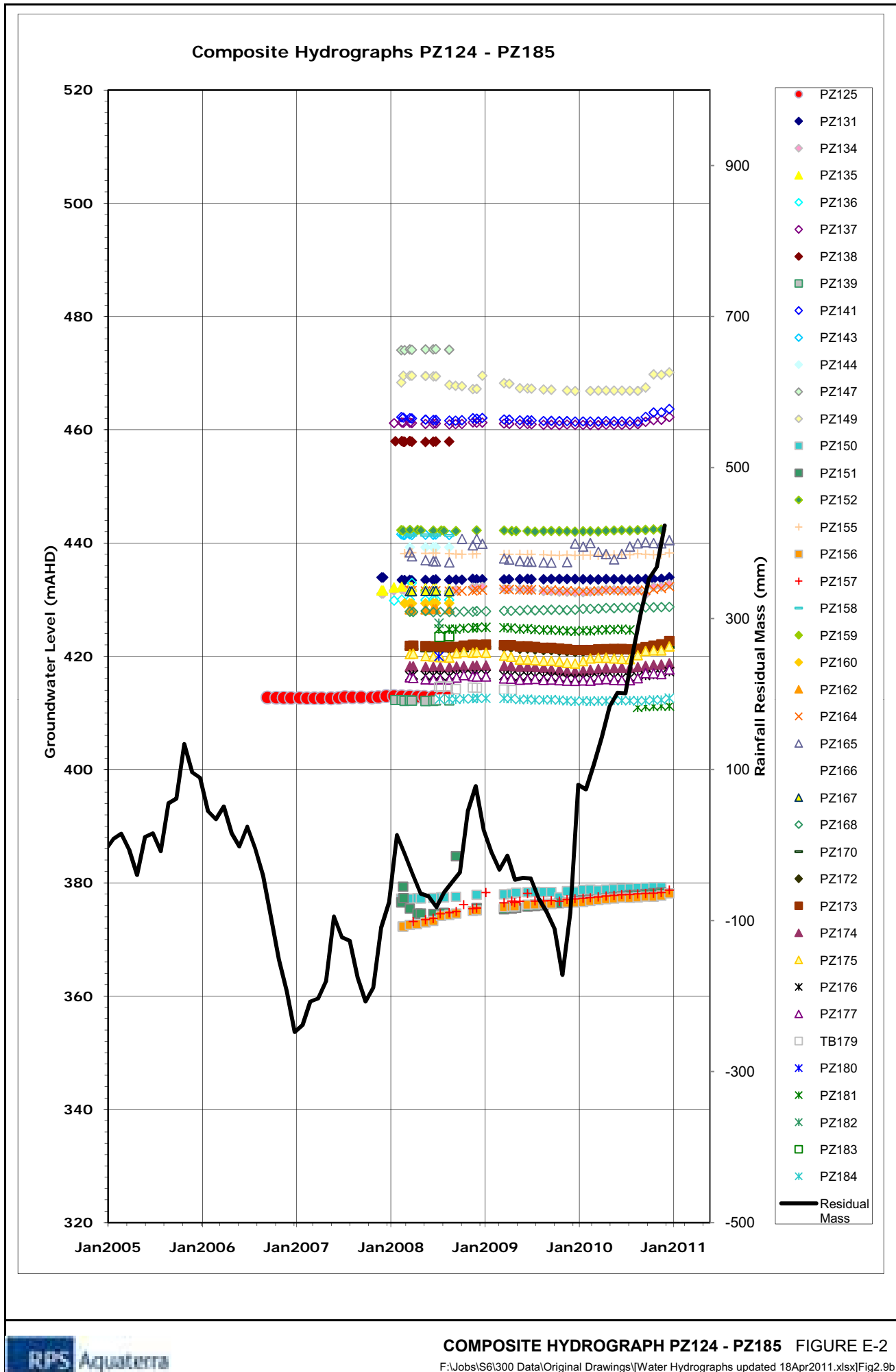


Laboratory Analysis Results			
Analyte	Units	LOR	25 June 2009
TSS	mg/L @ 105°C	1	3
TDS	mg/L @ 180°C	1	206
pH		0.1	7.3
EC	µS/cm	1	315
Potassium	mg/L	0.1	12
Sodium	mg/L	1	33
Calcium	mg/L	1	7
Magnesium	mg/L	0.1	6
Cation sum	meq/L	0.01	2.58
Chloride	mg/L	1	57
Sulphate	mg/L	1	<2
CO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	<2
HCO <sub>3</sub> alkalinity	mg/L CaCO <sub>3</sub>	1	49
Anion sum	meq/L	0.01	2.59
Ionic difference	%		
Allowable difference	%		
Aluminium			<0.02
Arsenic			3
Boron			0.04
Cadmium			<0.00005
Chromium			<0.001
Cobalt			0.0015
Copper			<0.0005
Iron			0.91
Lead			0.00039
Manganese			0.35
Mercury			<0.0001
Nickel			0.002
Selenium			<0.001
Silver			<0.001
Zinc			<0.005
Phosphorous(Reactive)			<0.01
Phosphorous (Total)			0.08
Flouride			0.2
Nitrogen (Total)			2.2
Ammonial Nitrogen			0.02
Nitrates			<0.01

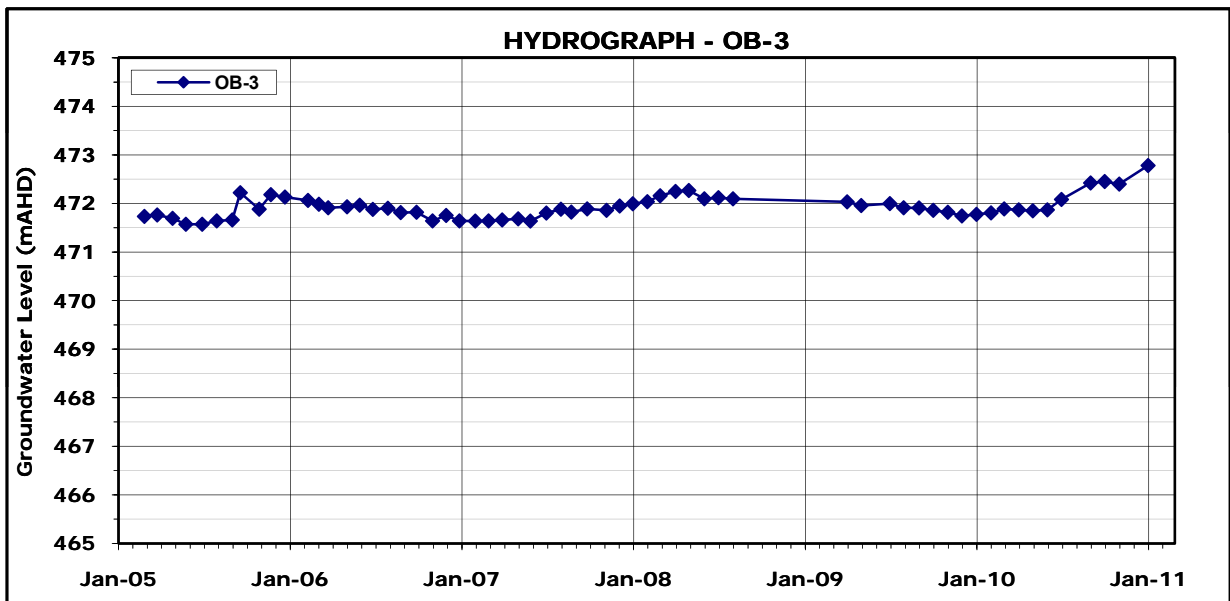
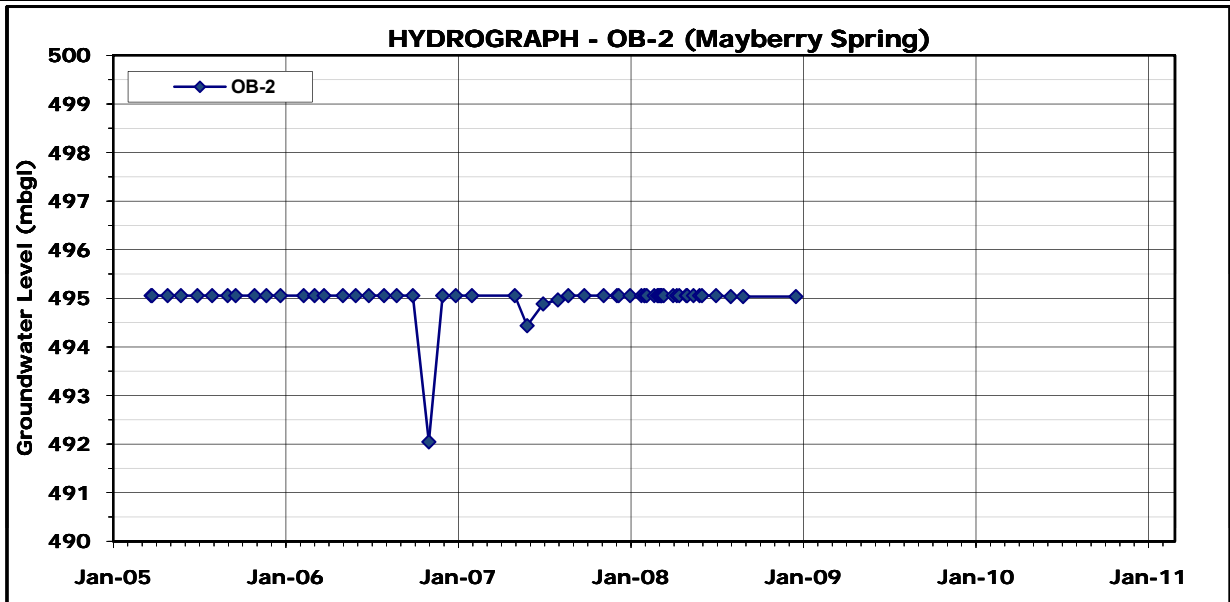
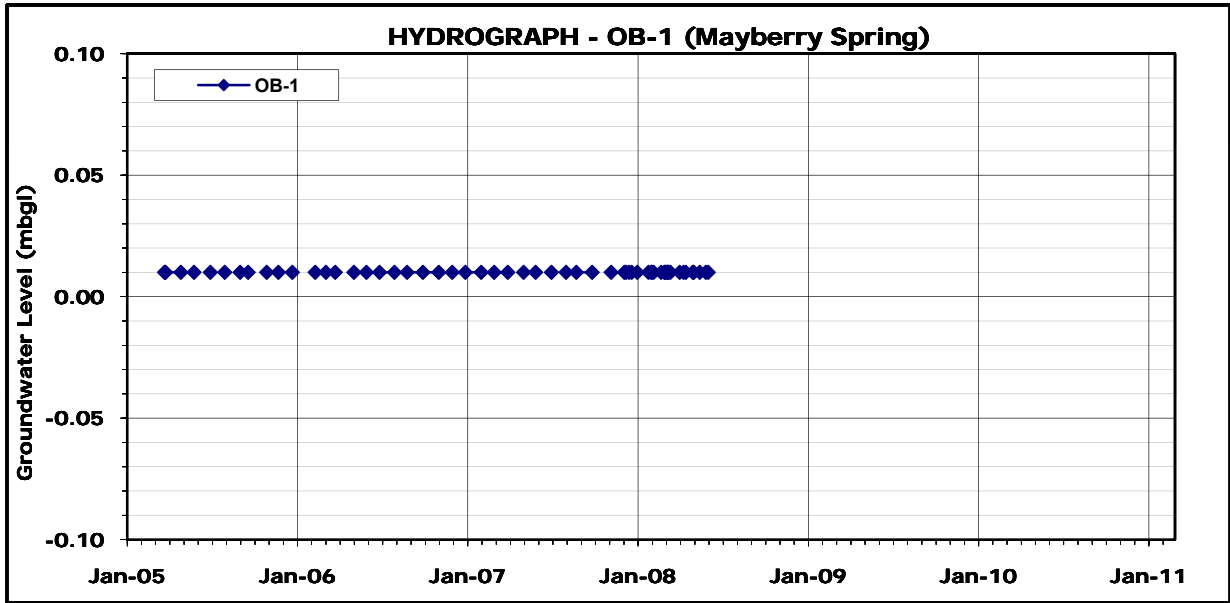
## **APPENDIX E: WATER LEVEL HYDROGRAPHS**

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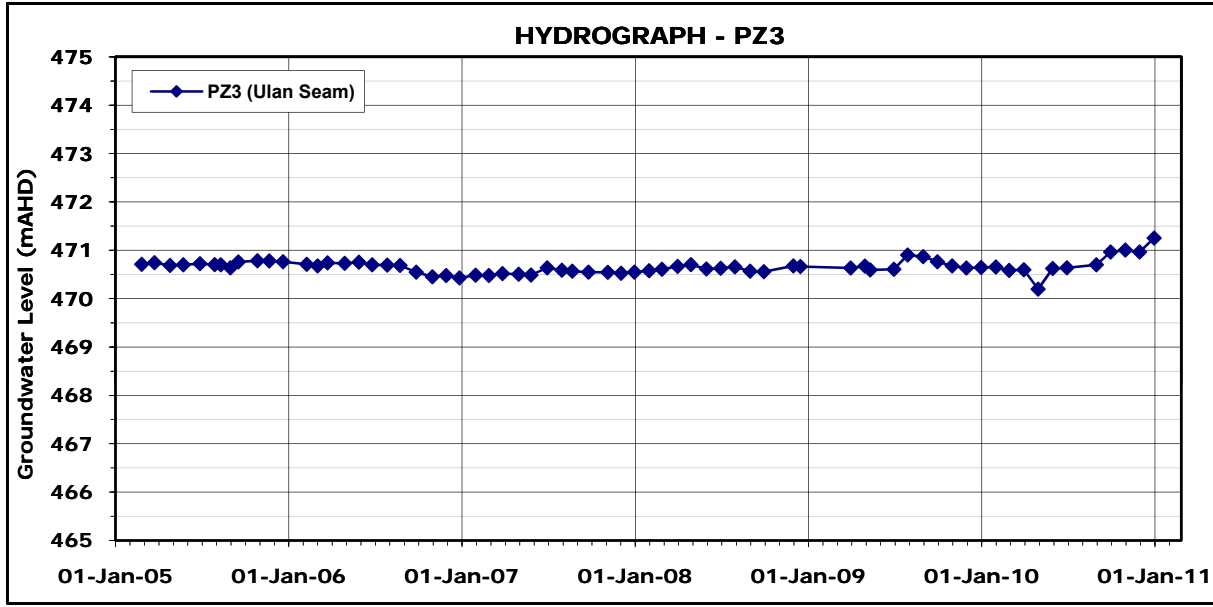
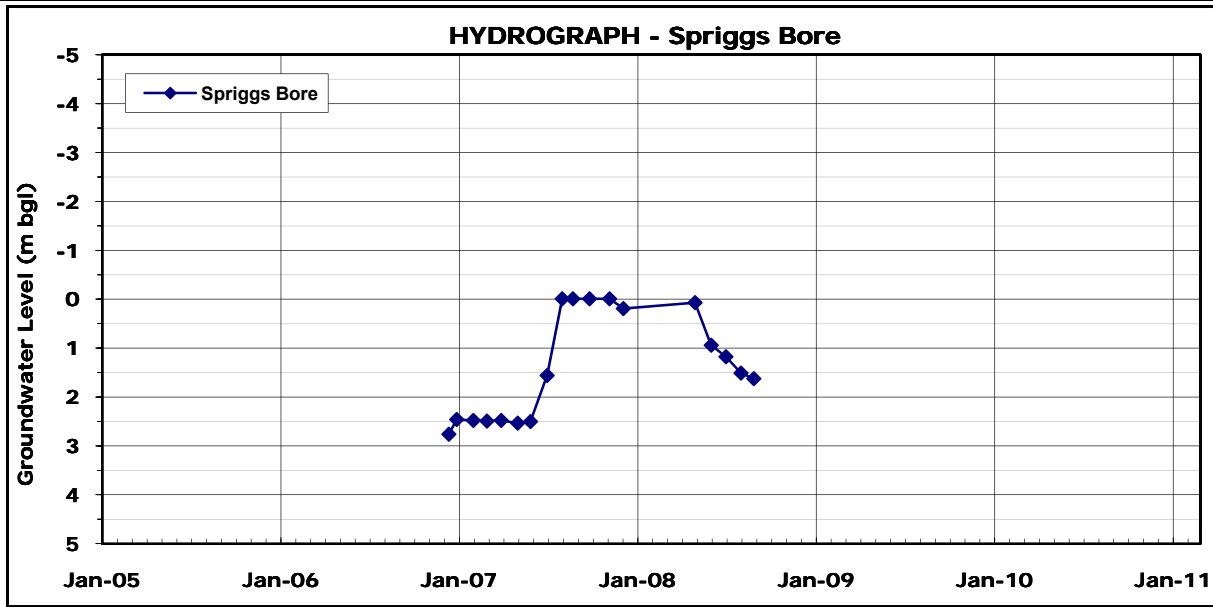
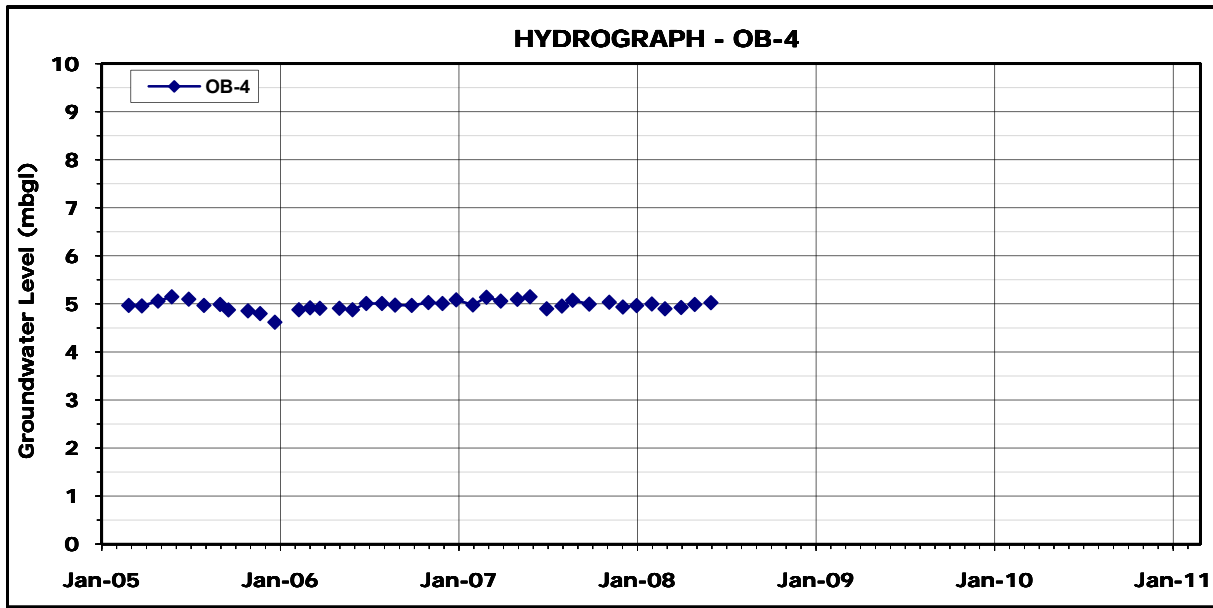




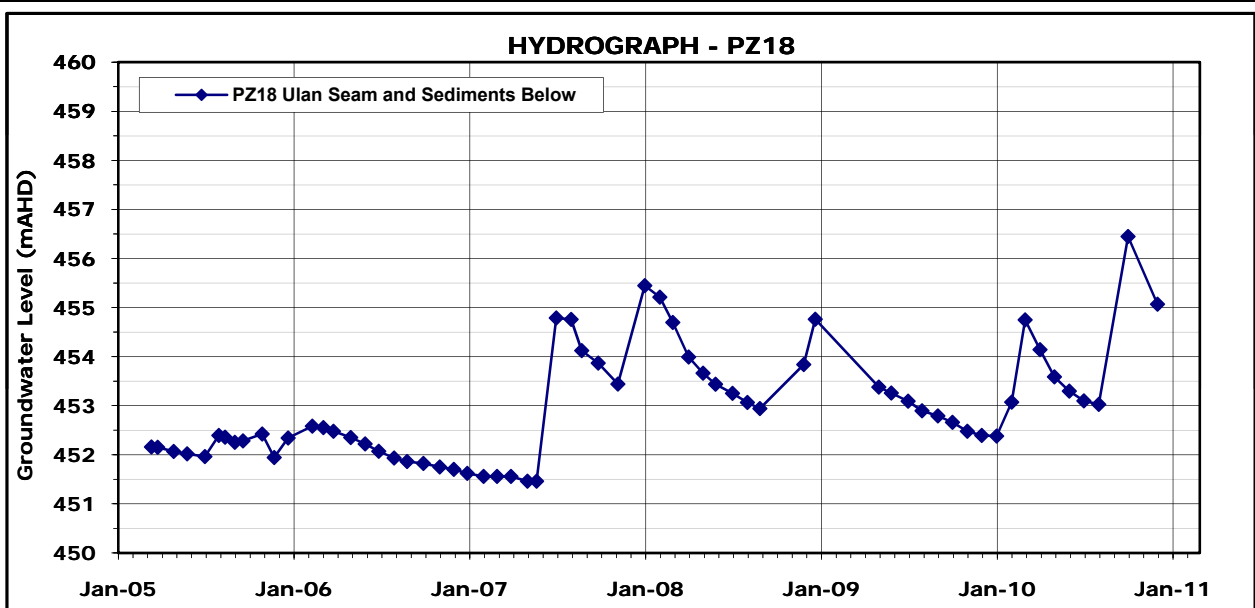
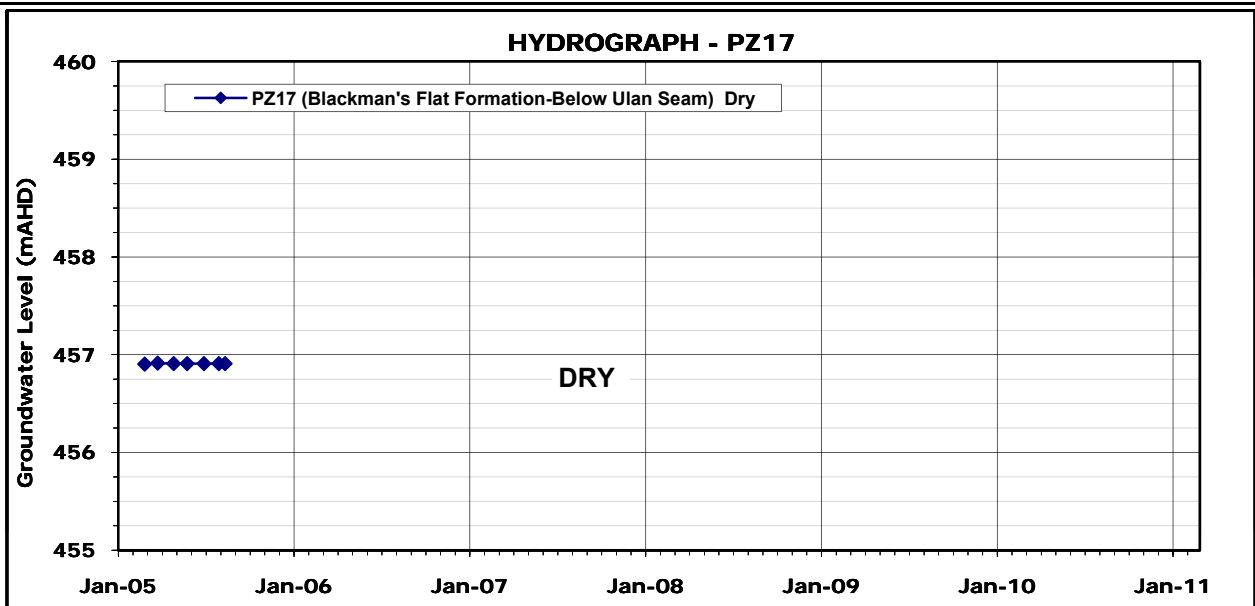
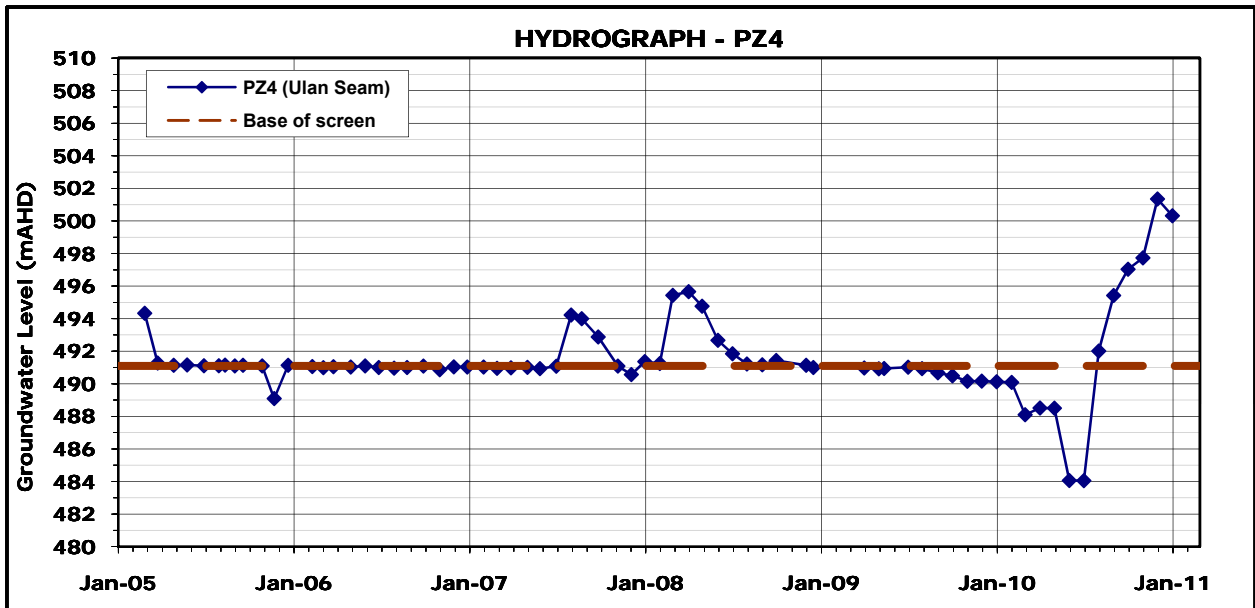
COMPOSITE HYDROGRAPH PZ124 - PZ185 FIGURE E-2

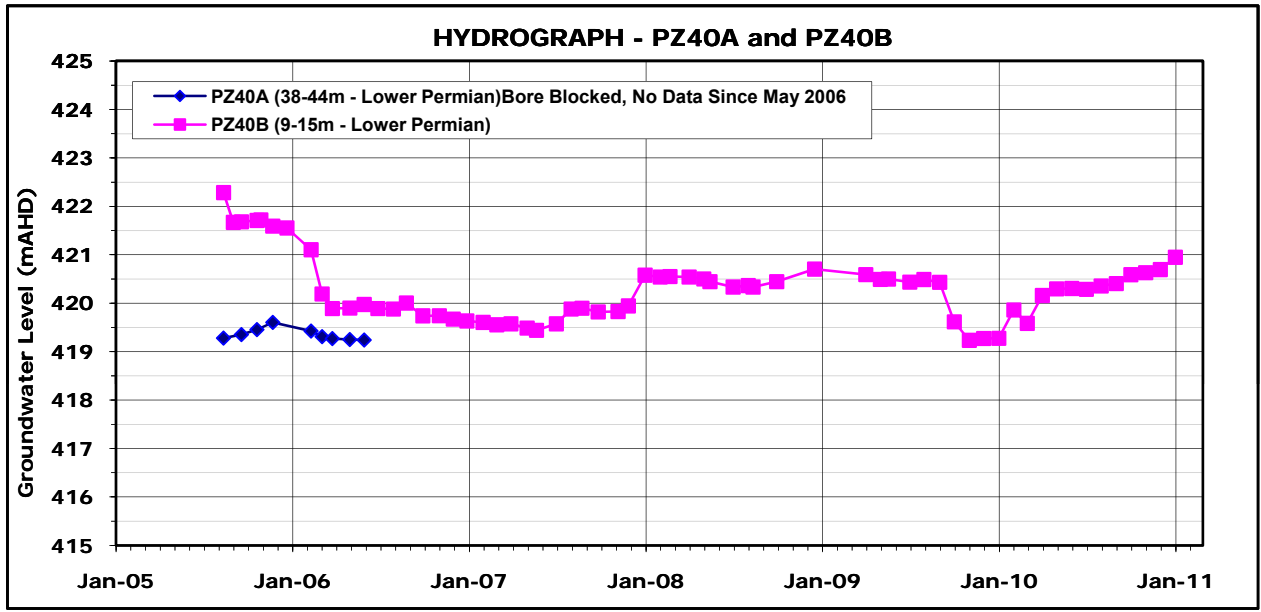
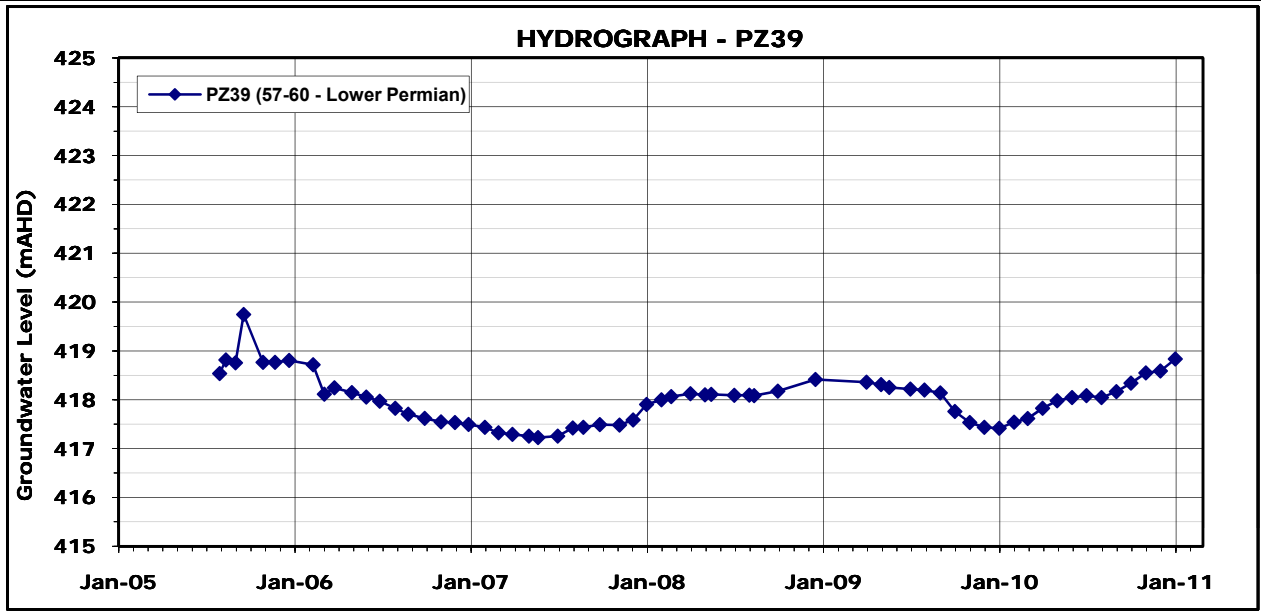
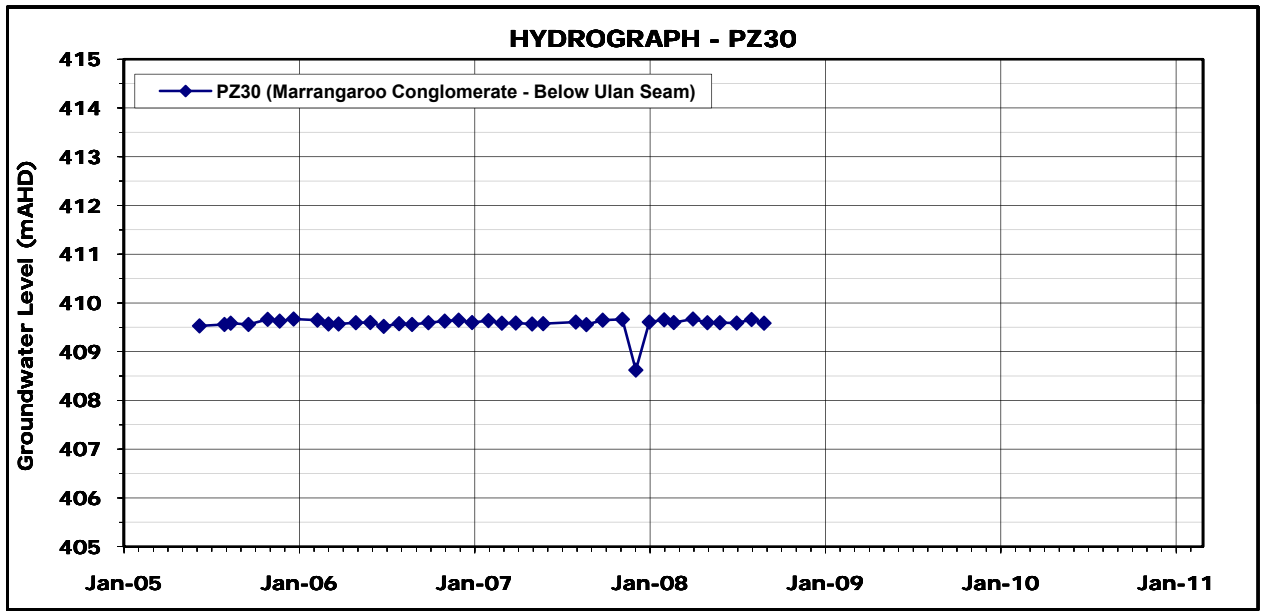




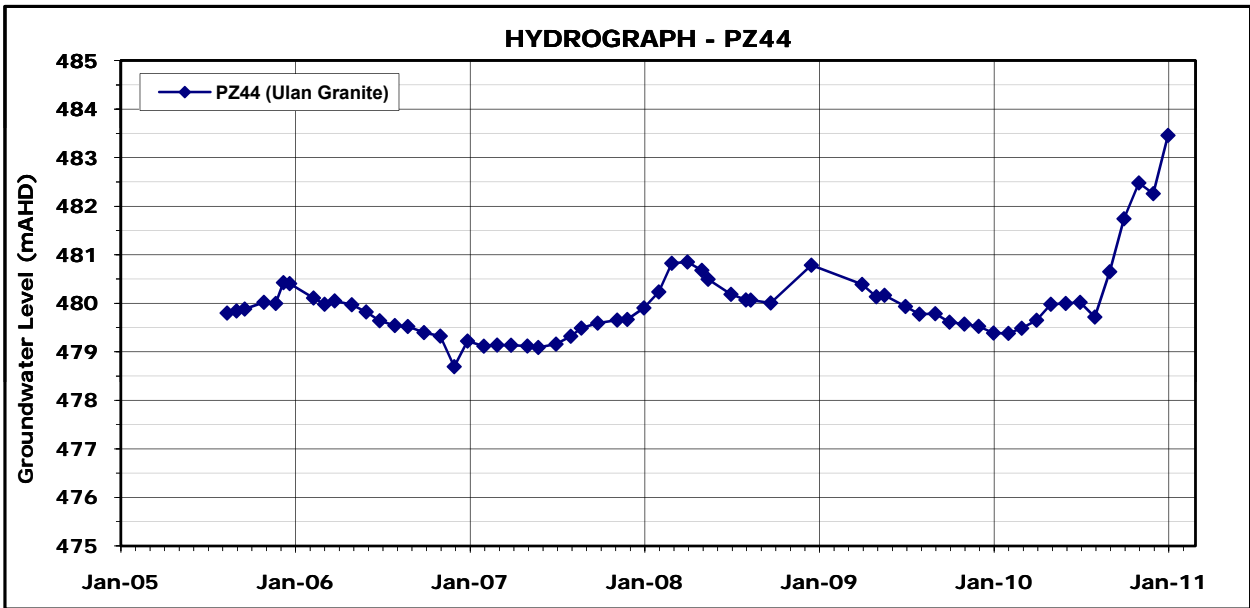
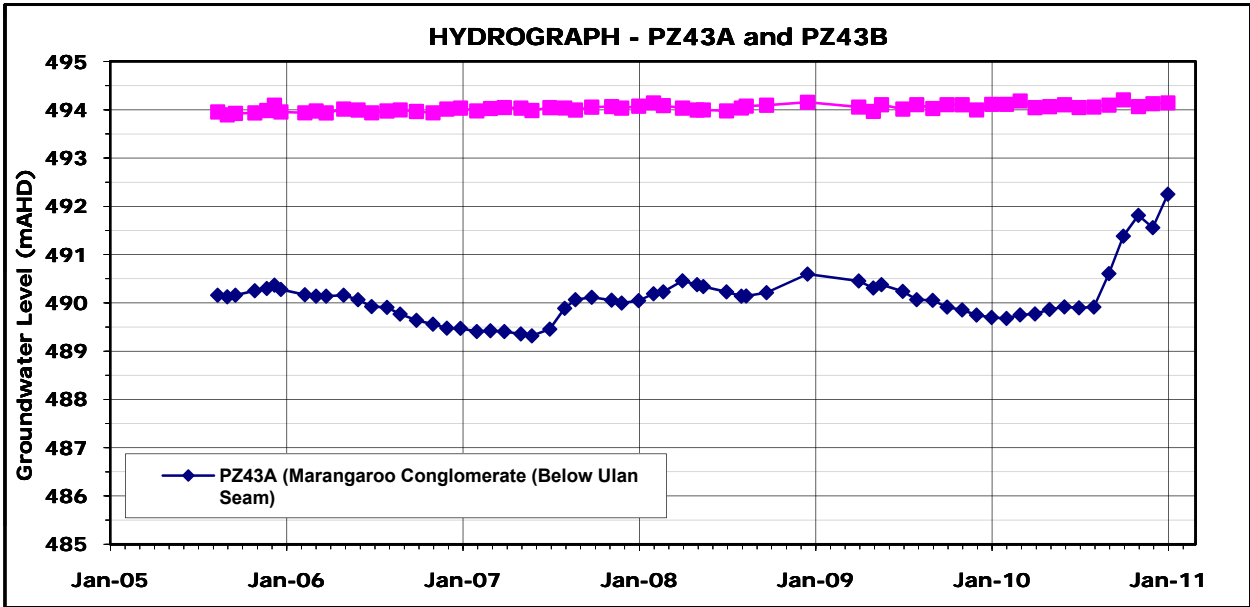
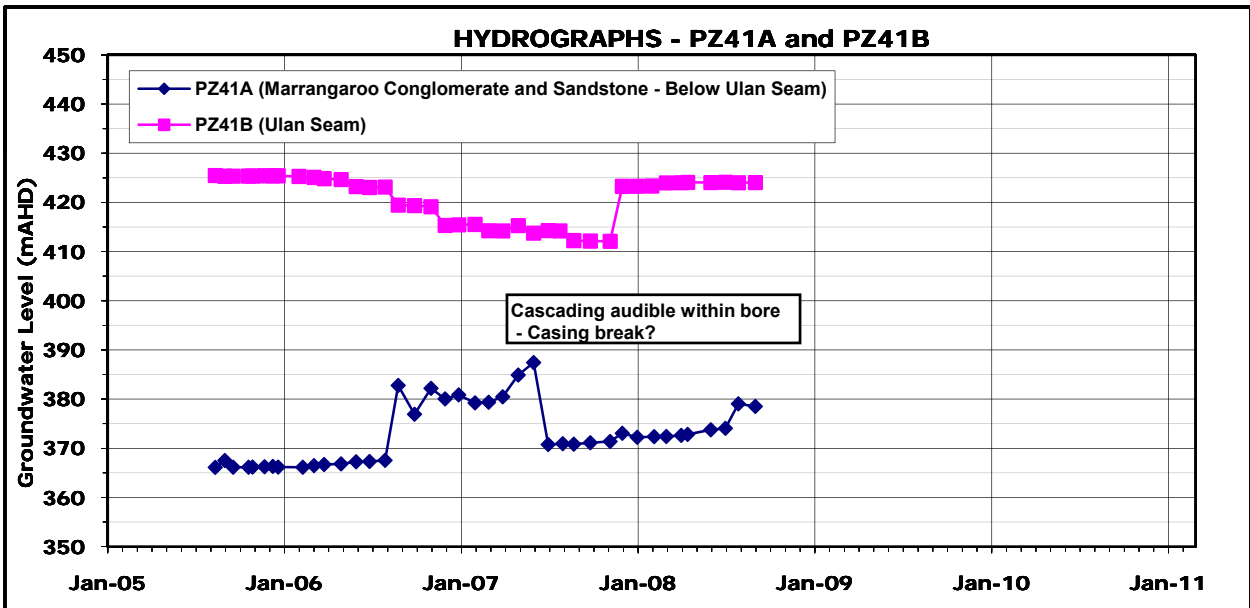


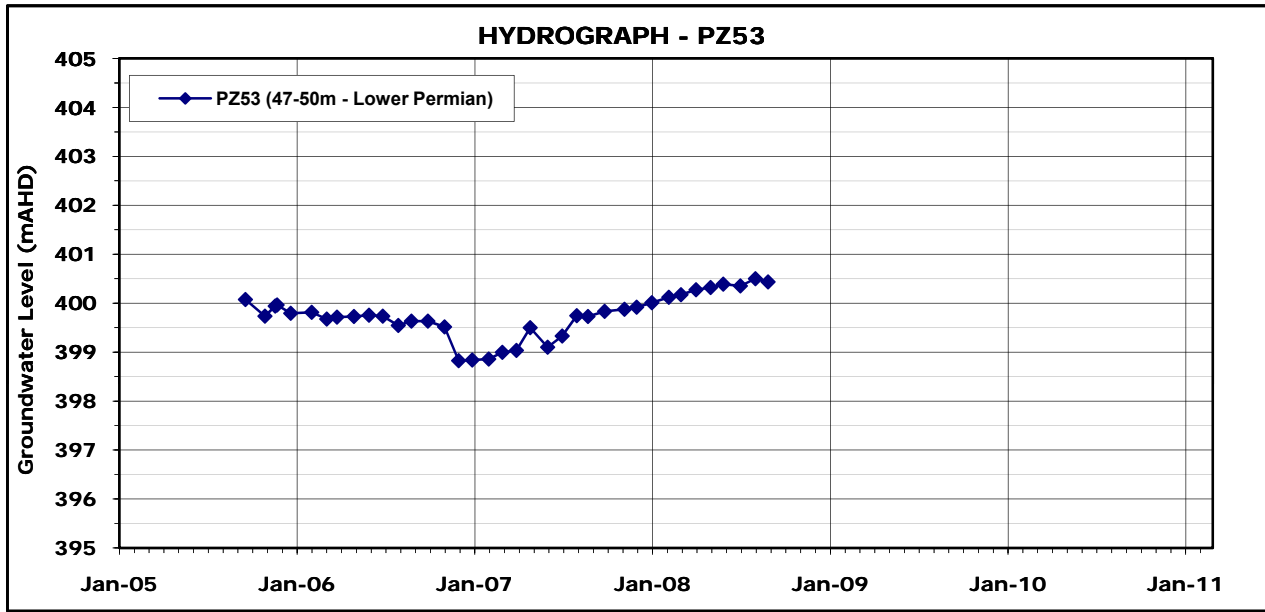
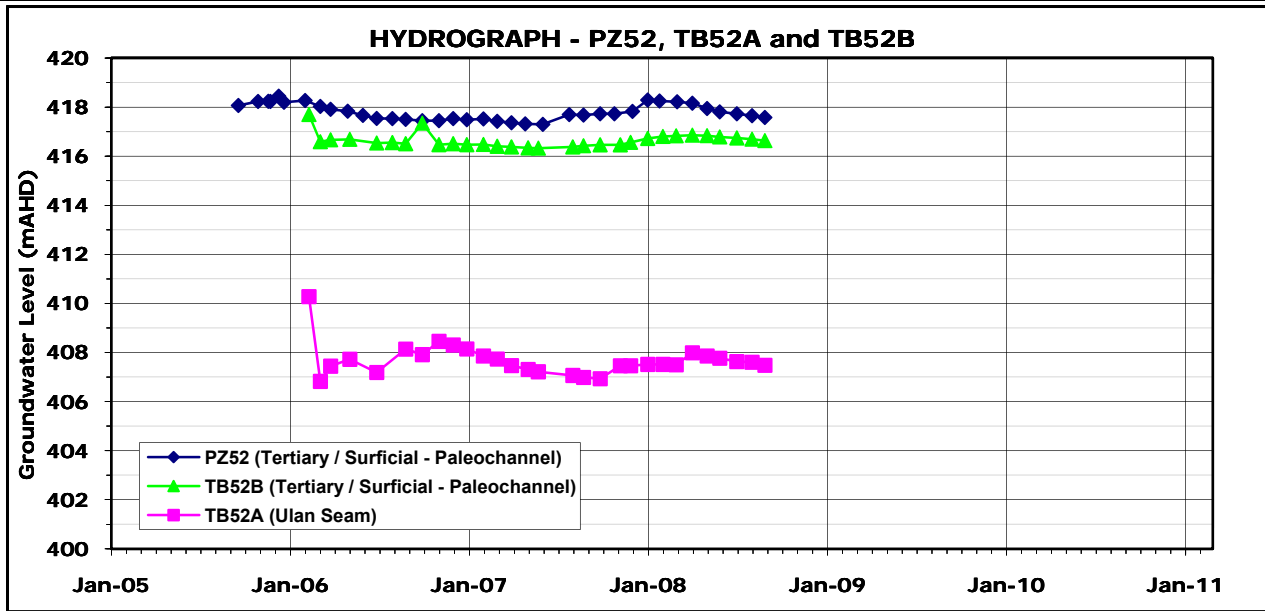
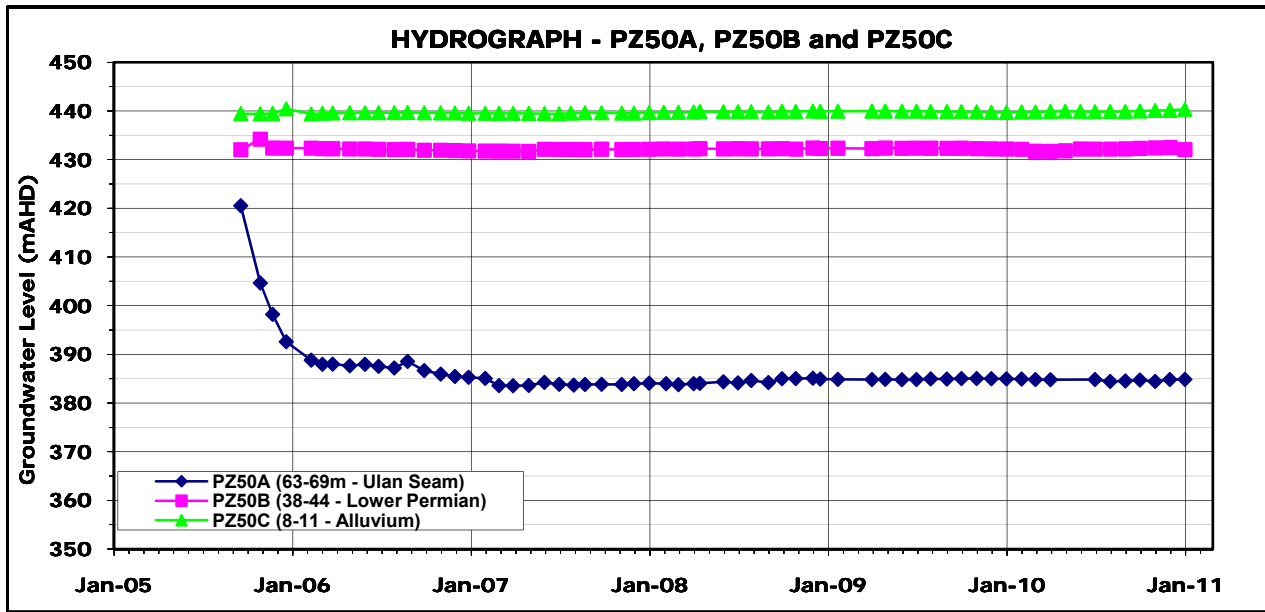
PIEZOMETER HYDROGRAPHS - OB4, SPRIGGS BORE, PZ3 FIGURE E-4



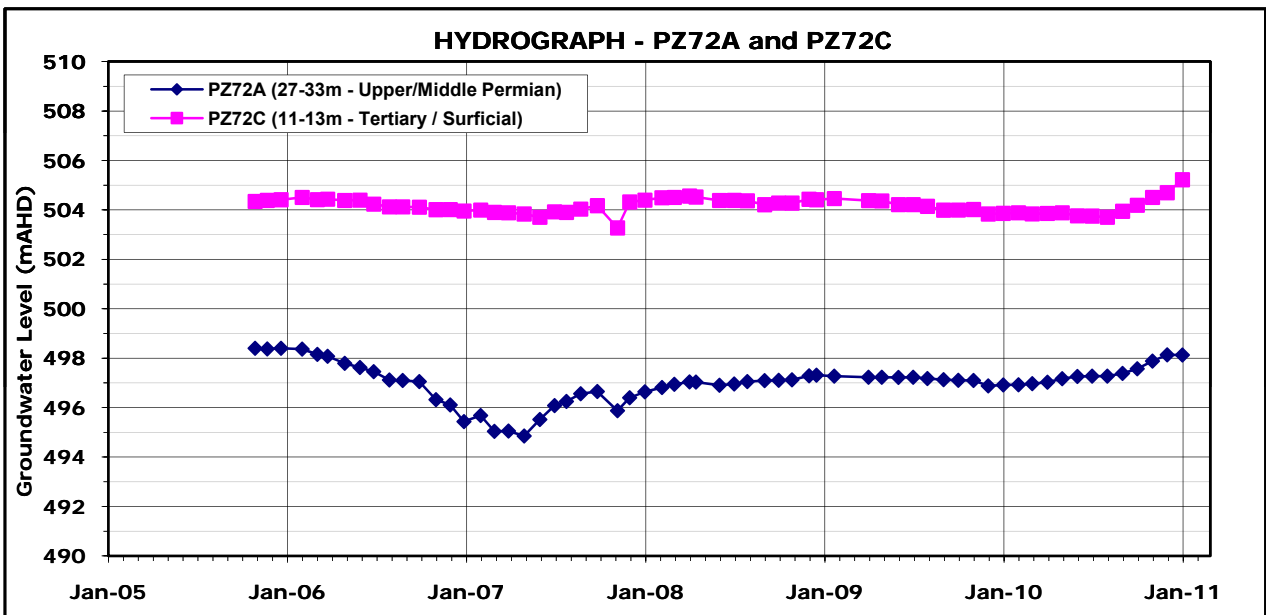
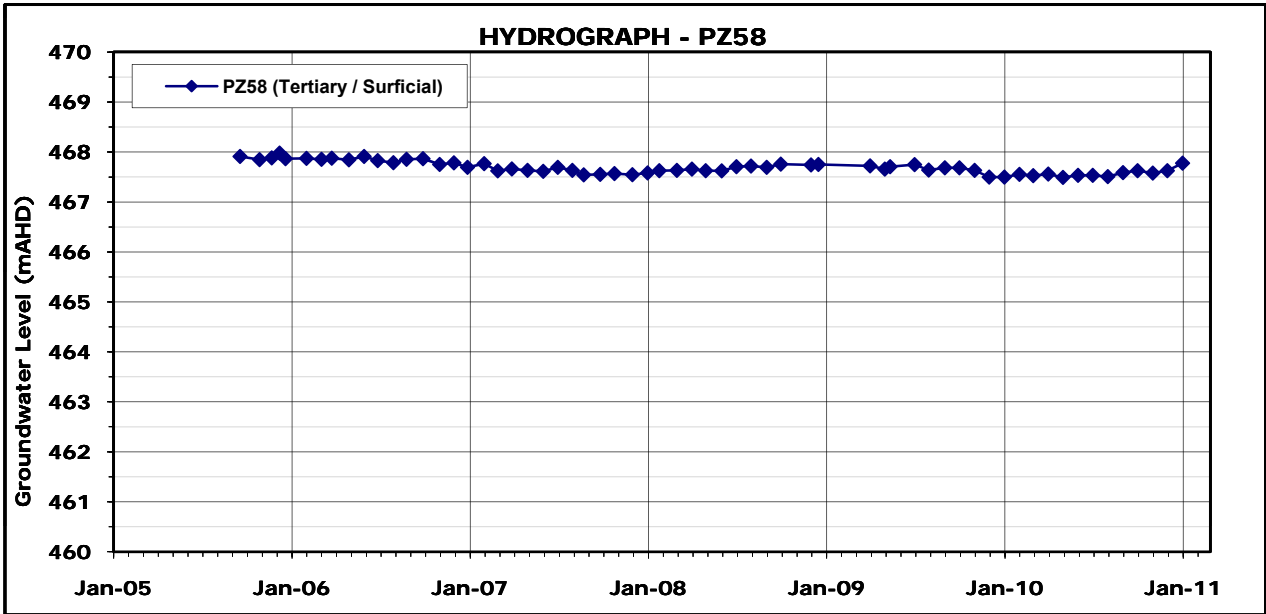
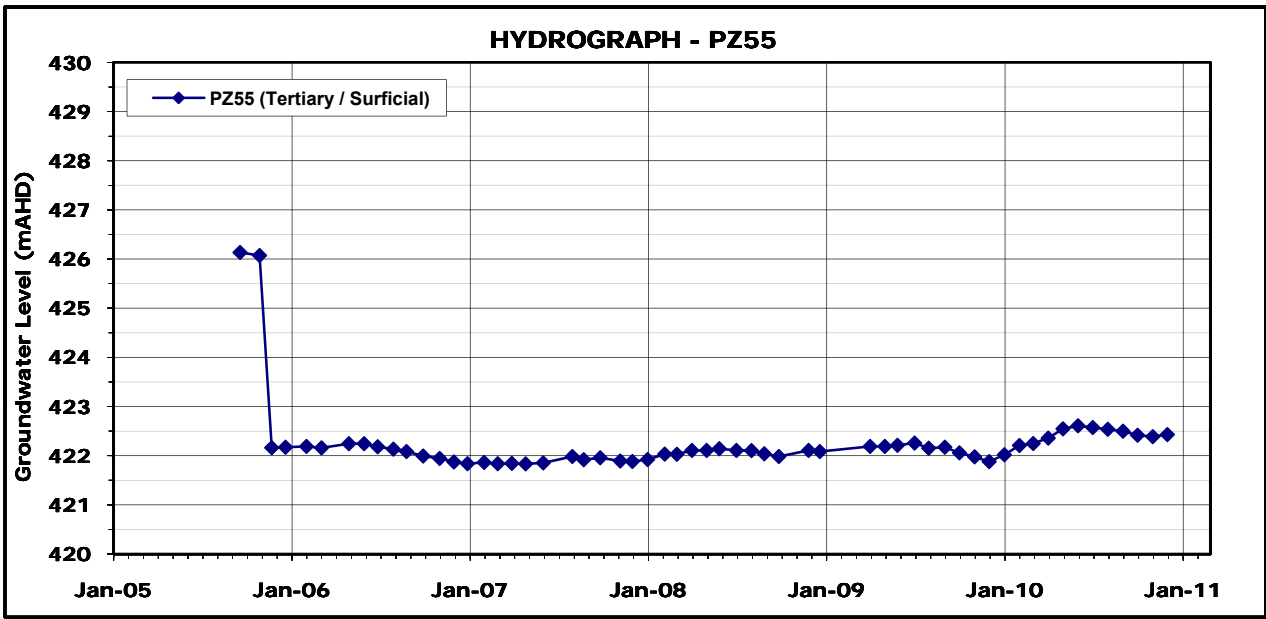


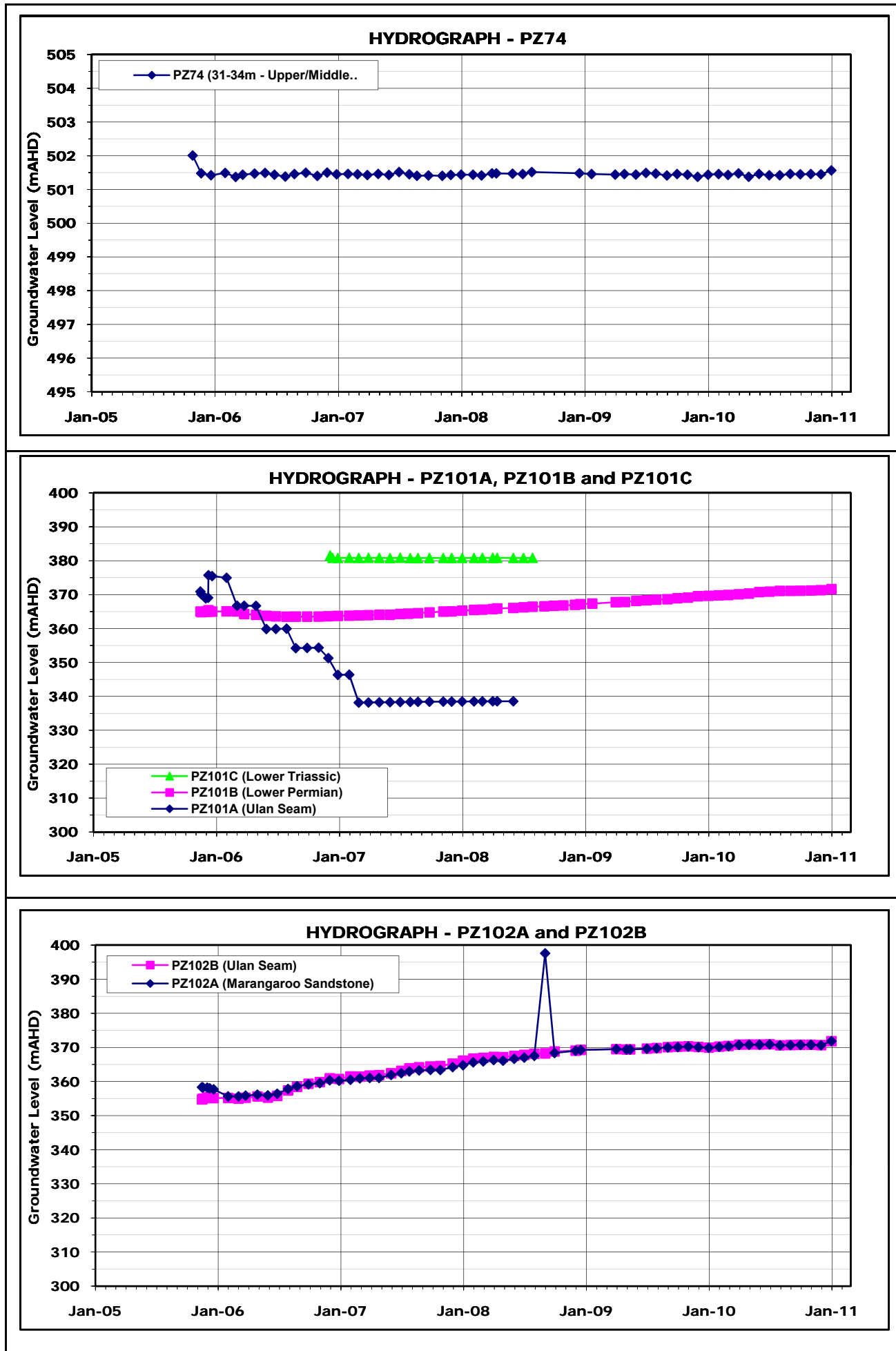
PIEZOMETER HYDROGRAPHS - PZ30, PZ39, PZ40A-B FIGURE E-6



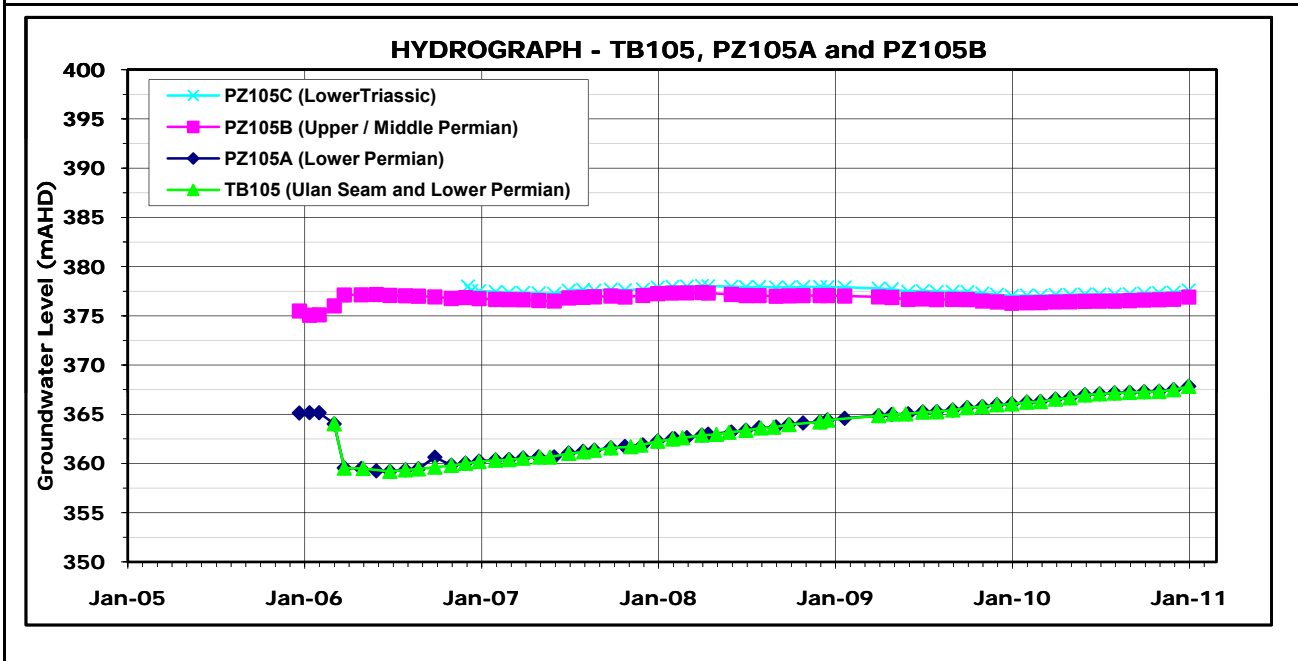
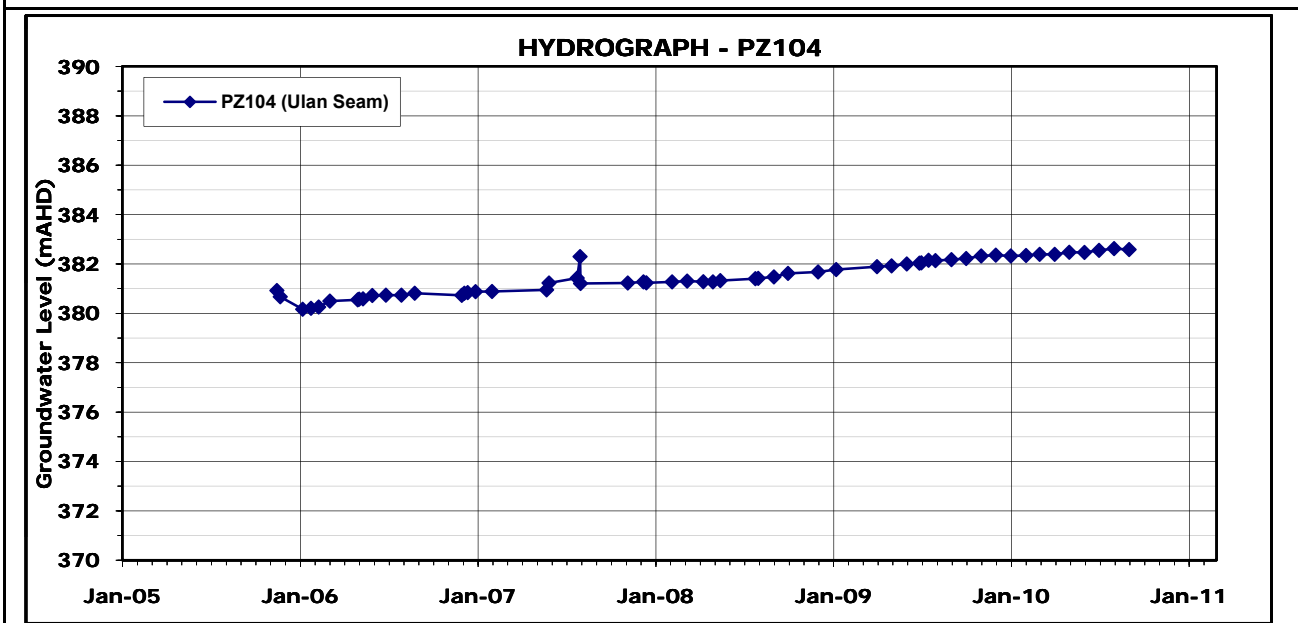
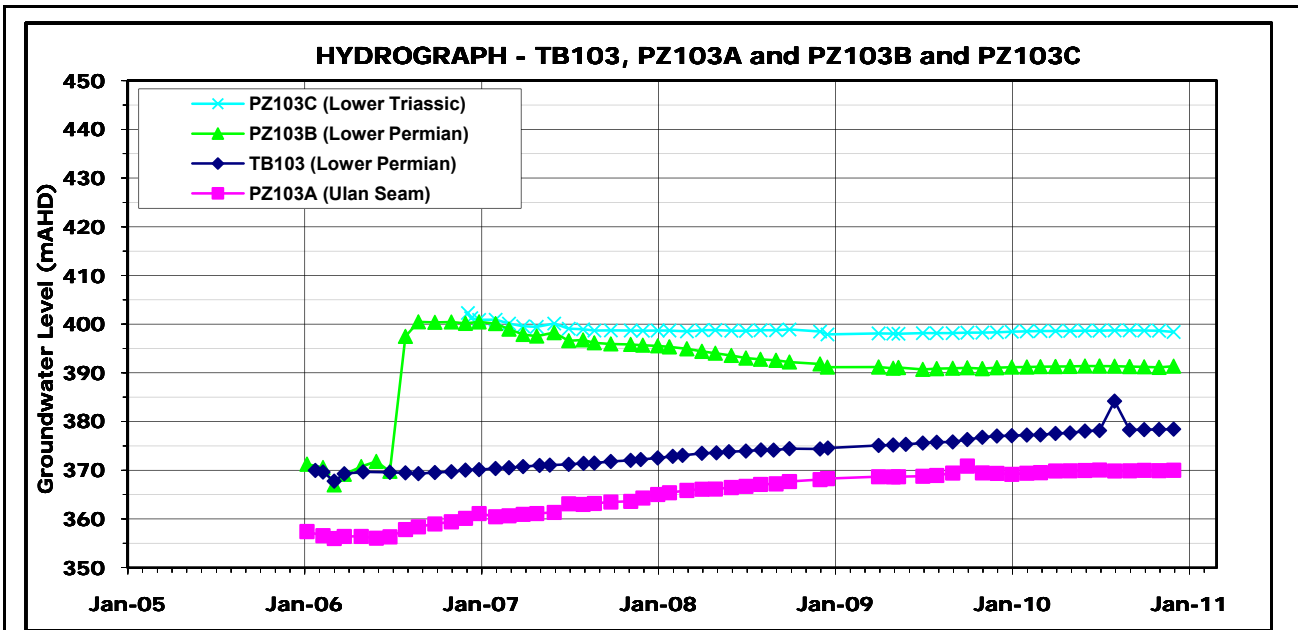


PIEZOMETER HYDROGRAPHS - PZ50A-C, TB52A-B, PZ52, PZ53 FIGURE E-8

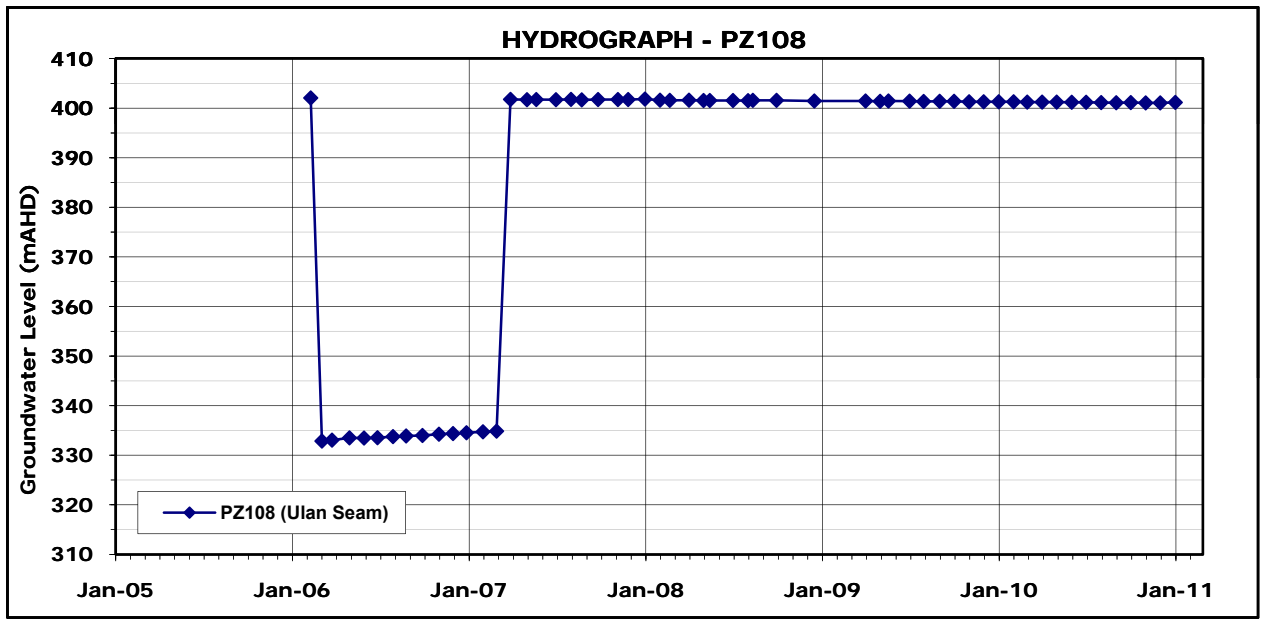
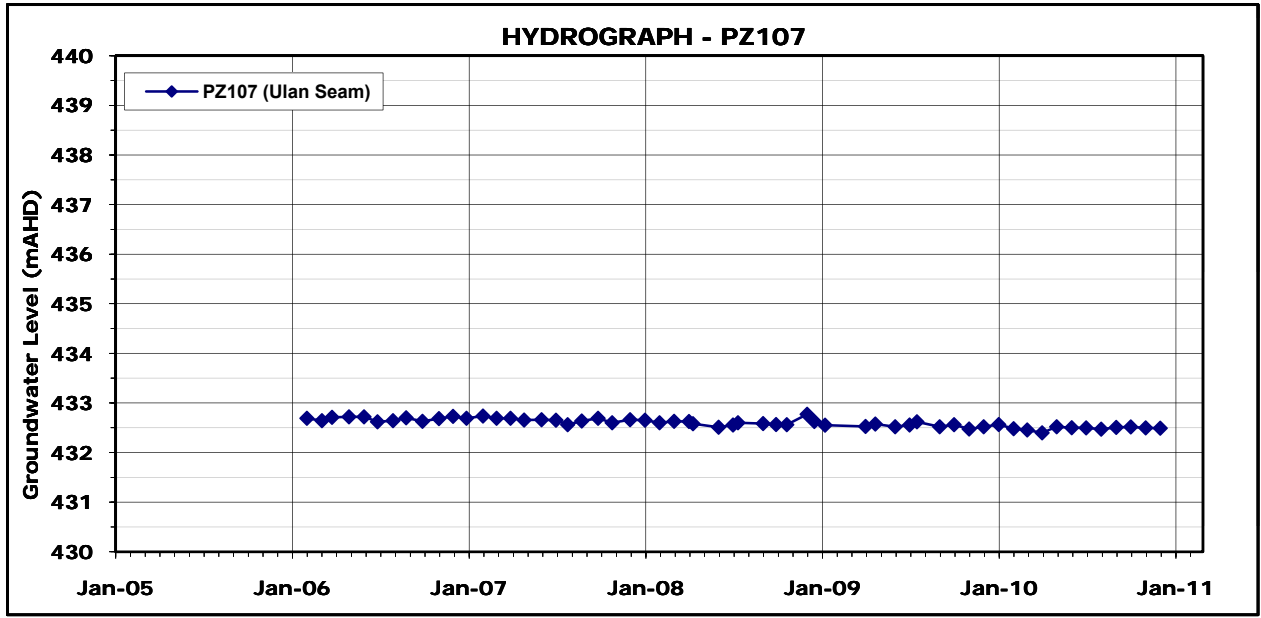
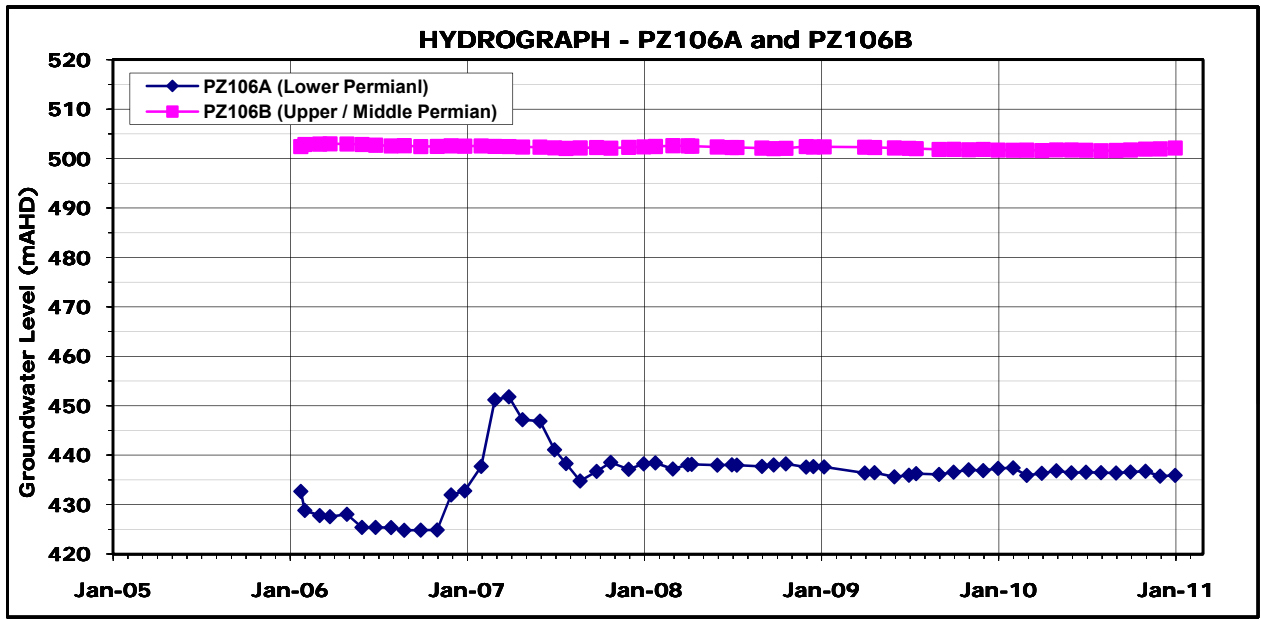




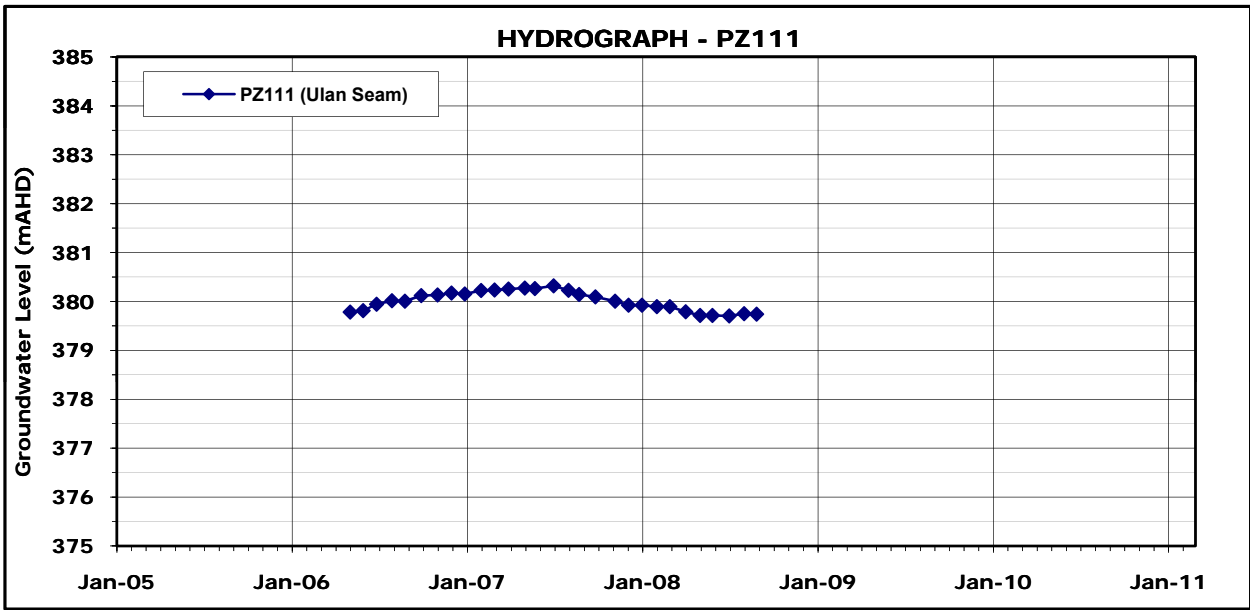
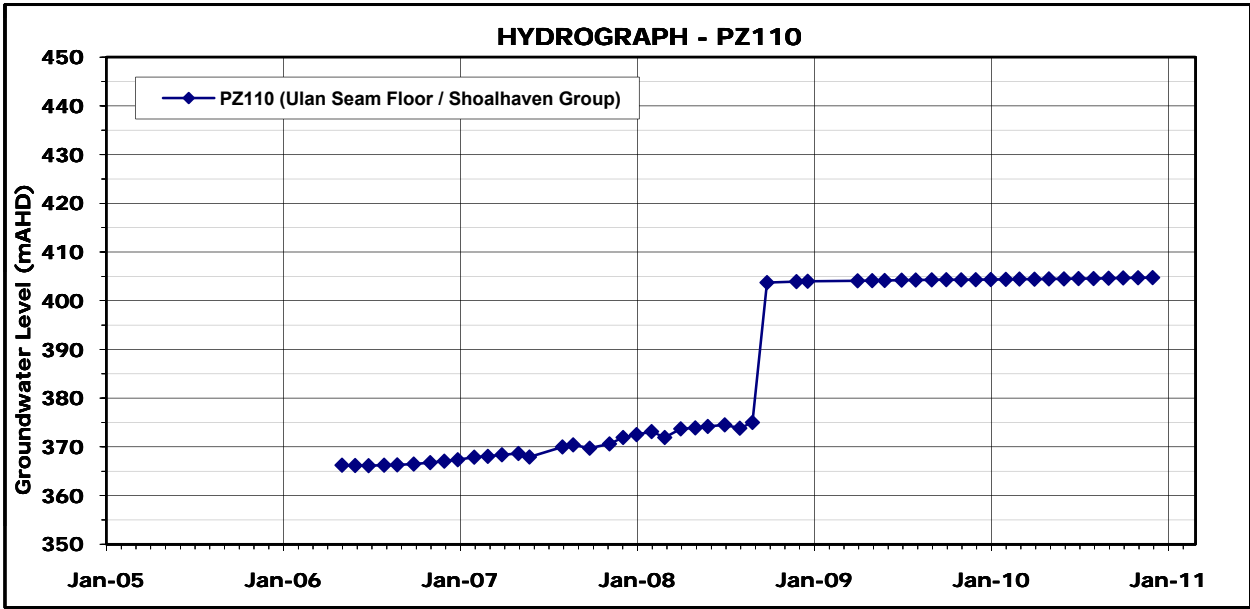
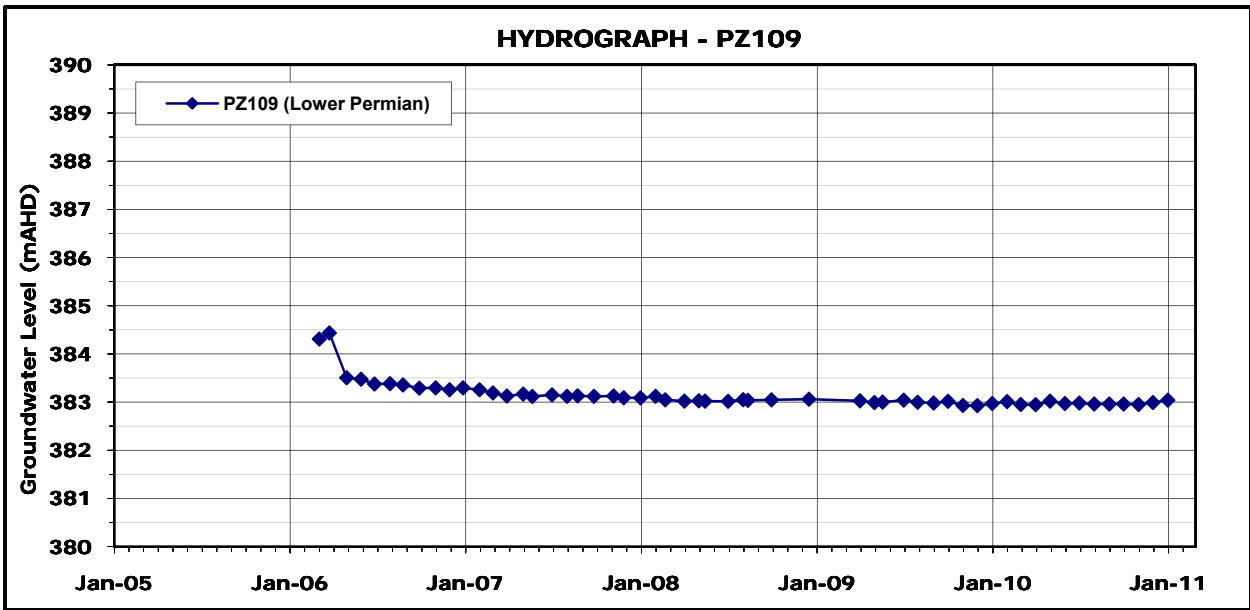
PIEZOMETER HYDROGRAPHS - PZ74, PZ101B-C, PZ102A-B FIGURE E-10

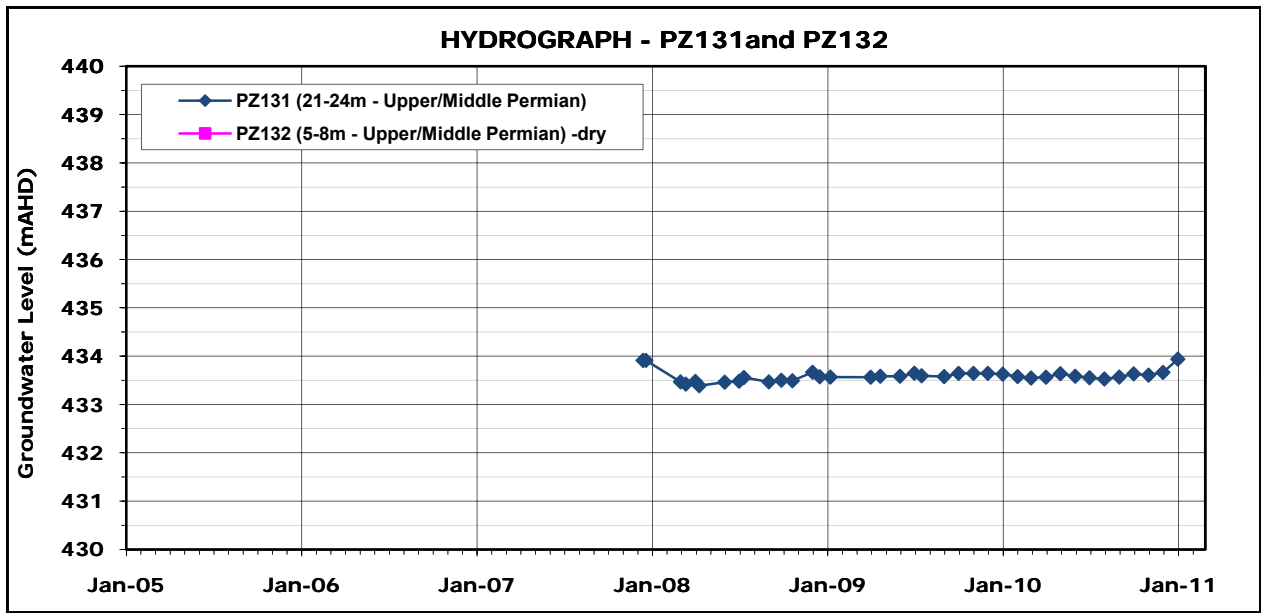
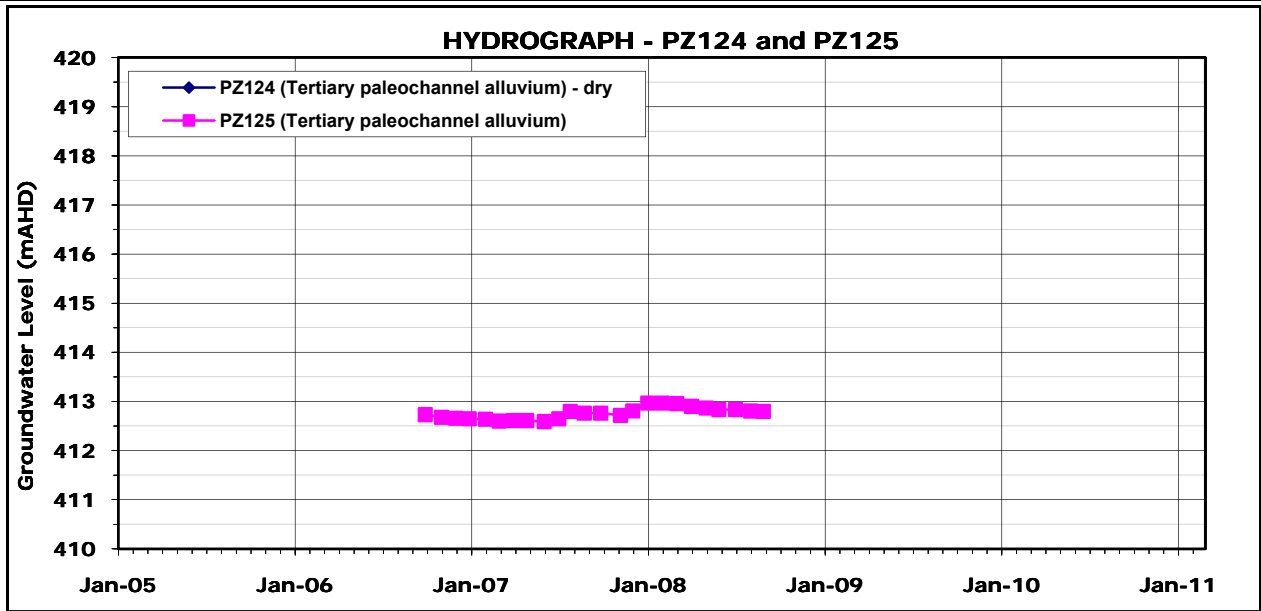
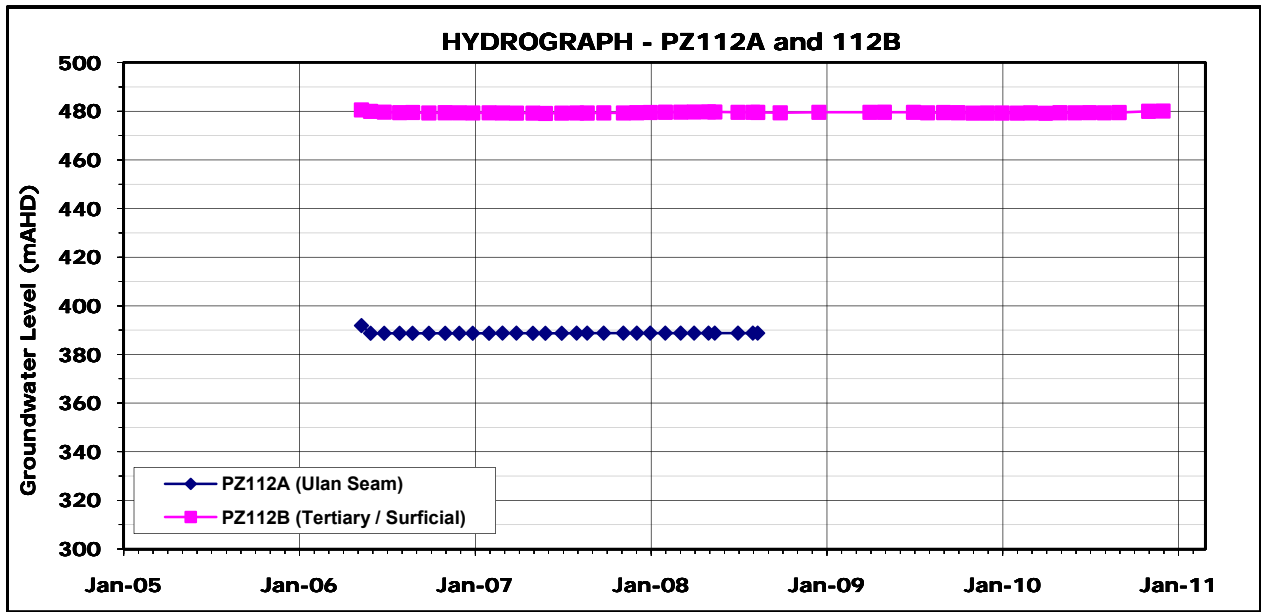


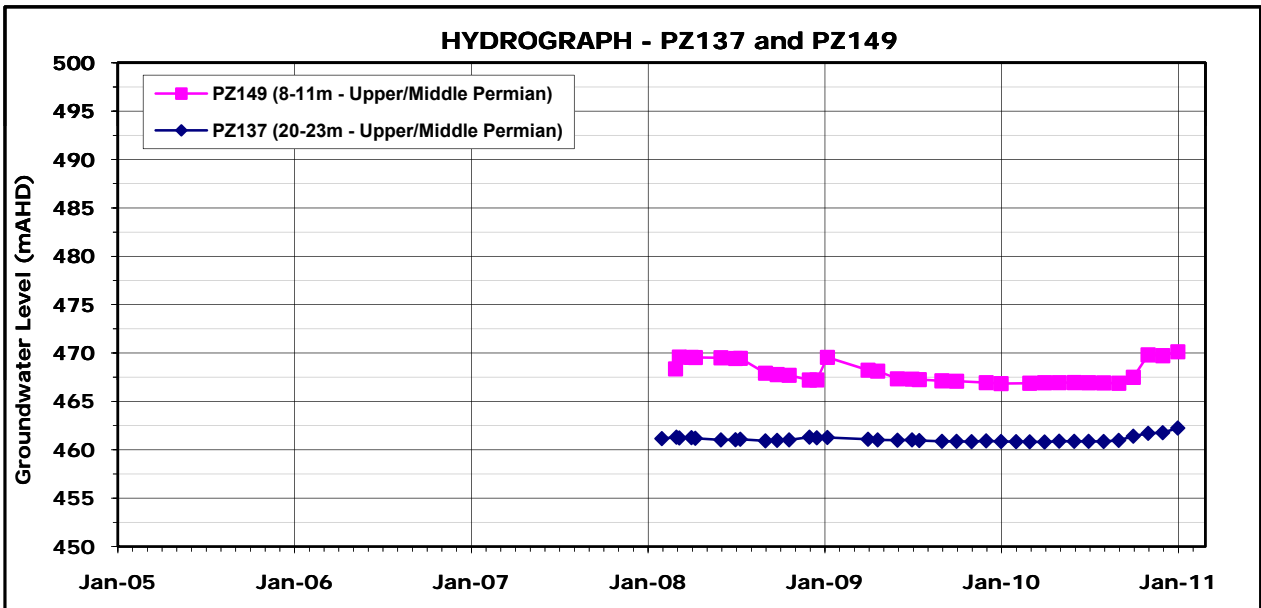
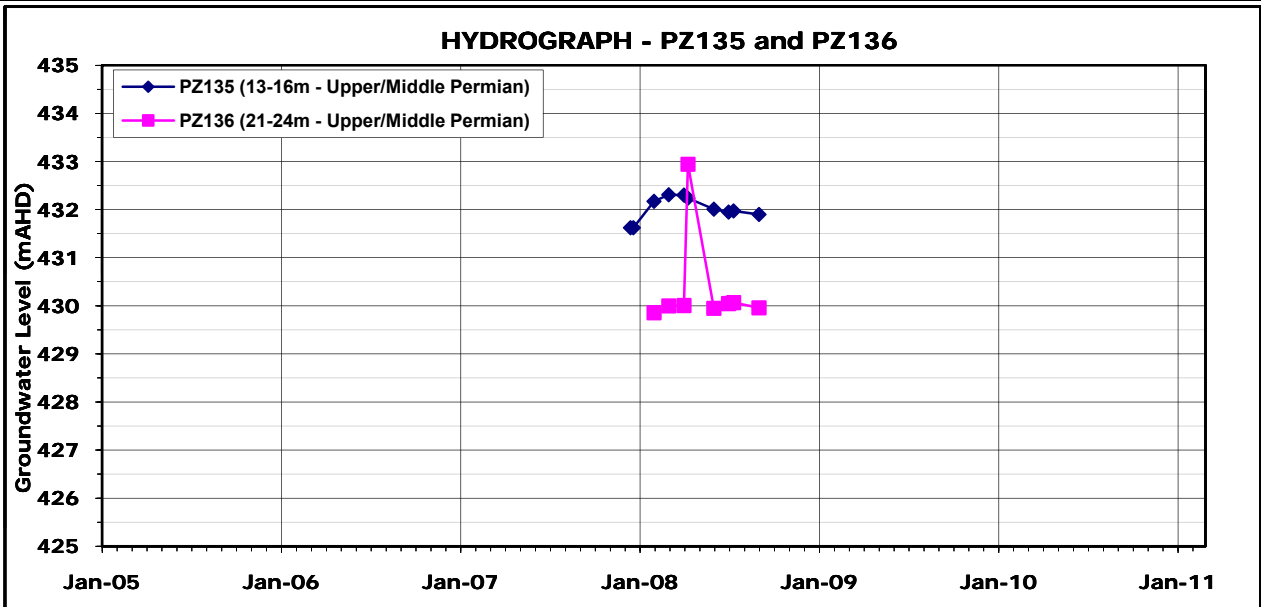
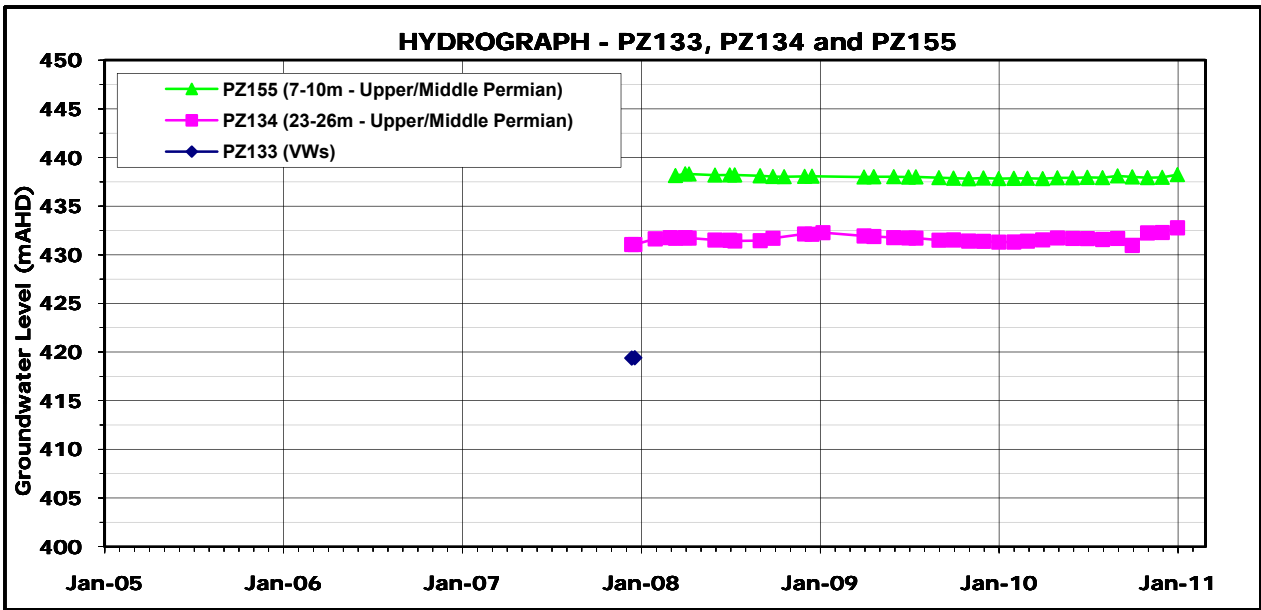


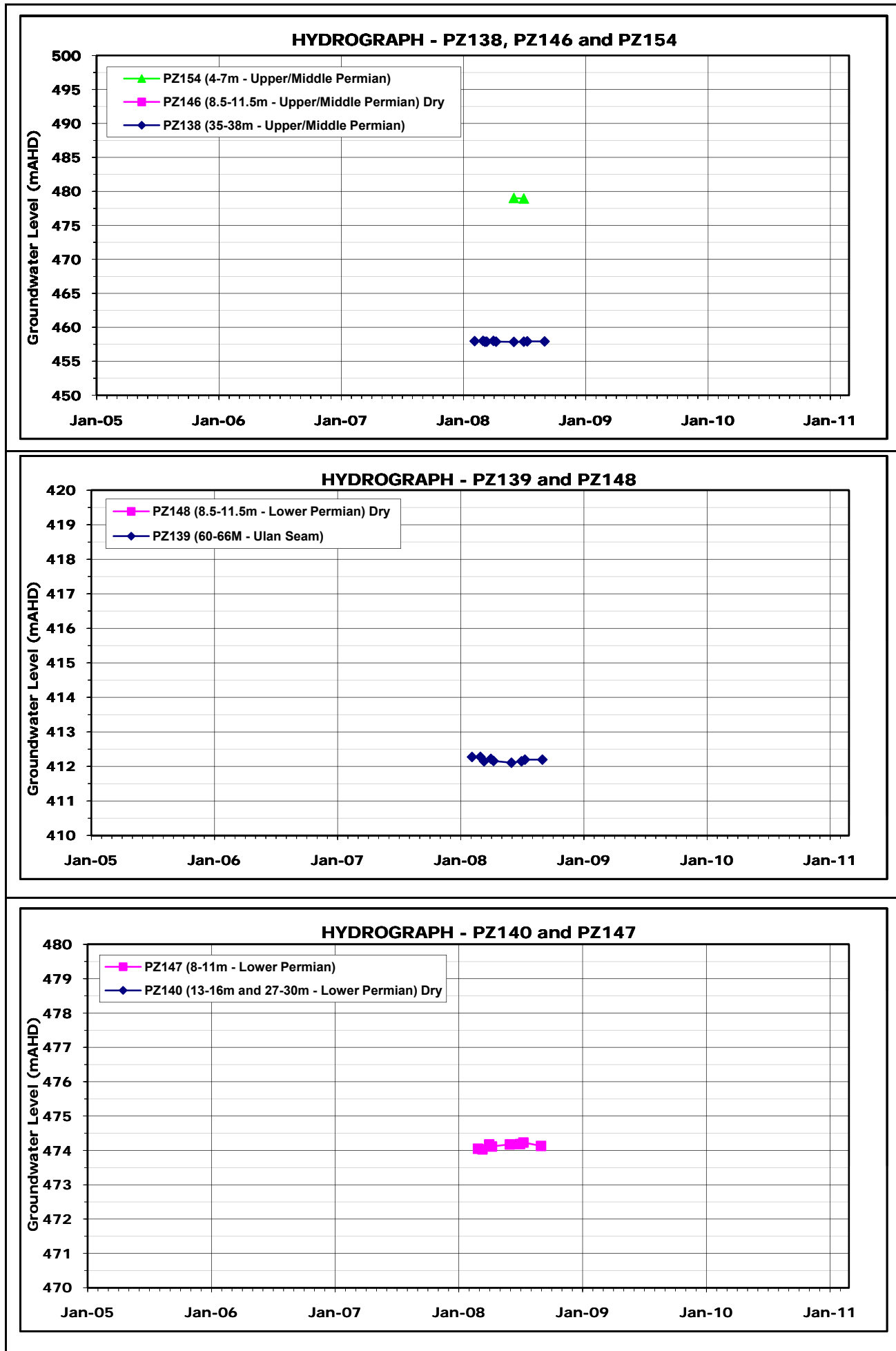


PIEZOMETER HYDROGRAPHS - PZ106A-B, PZ107, PZ108 FIGURE E-12

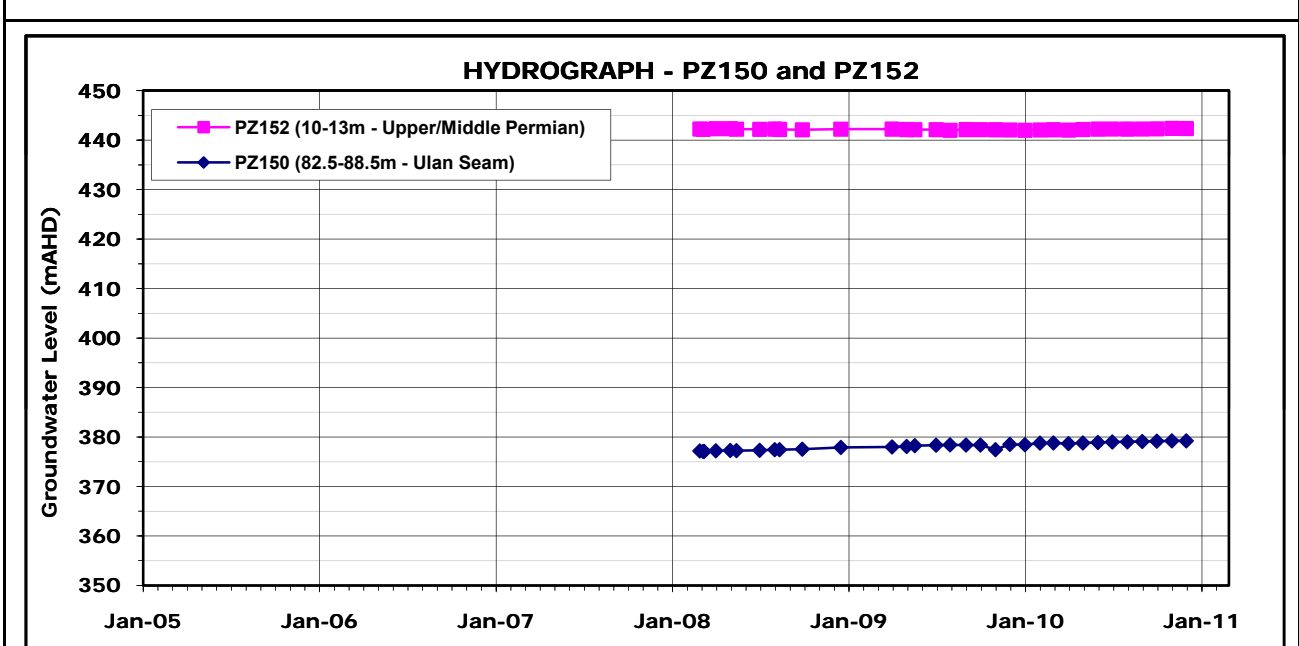
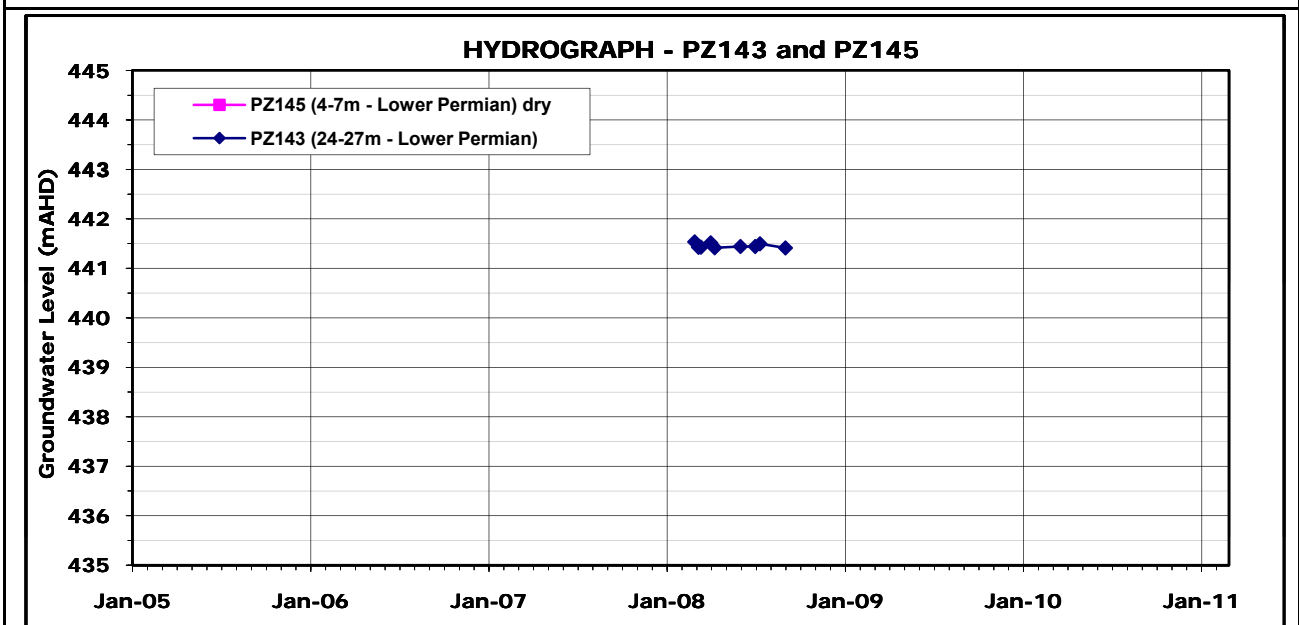
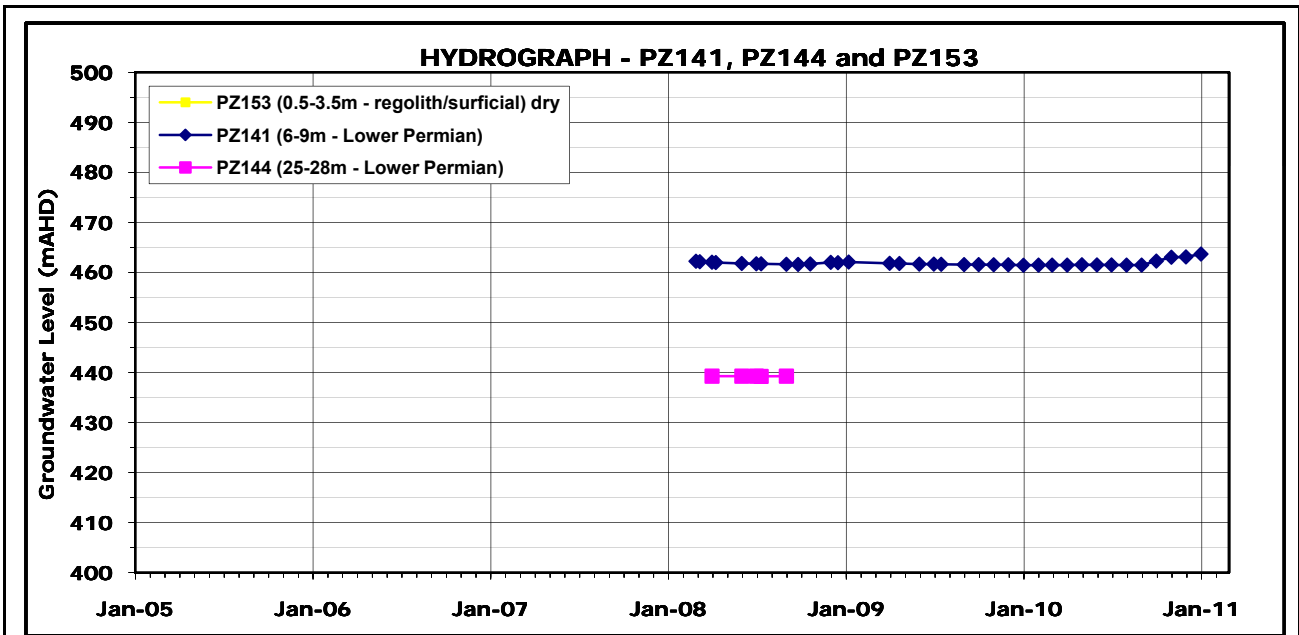


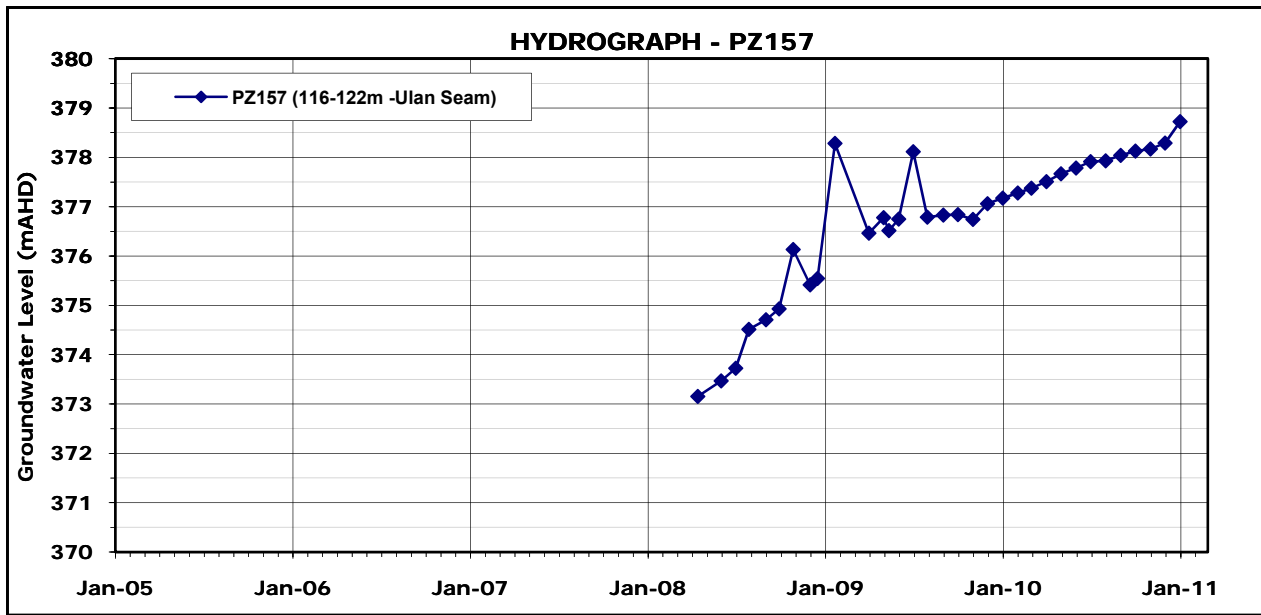
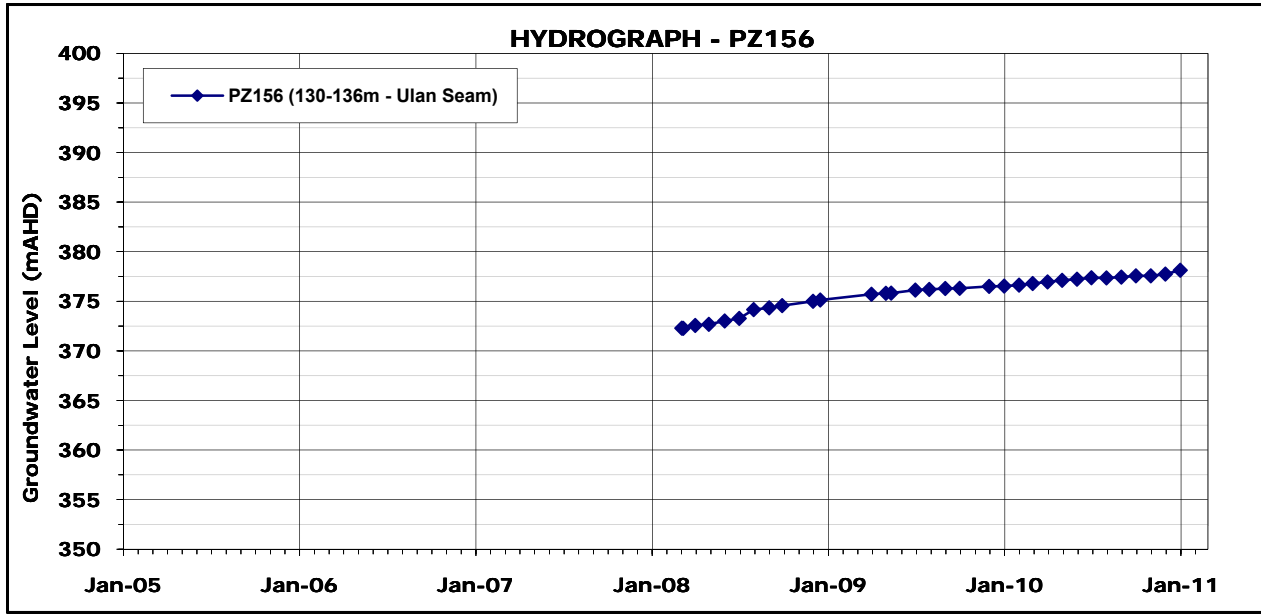
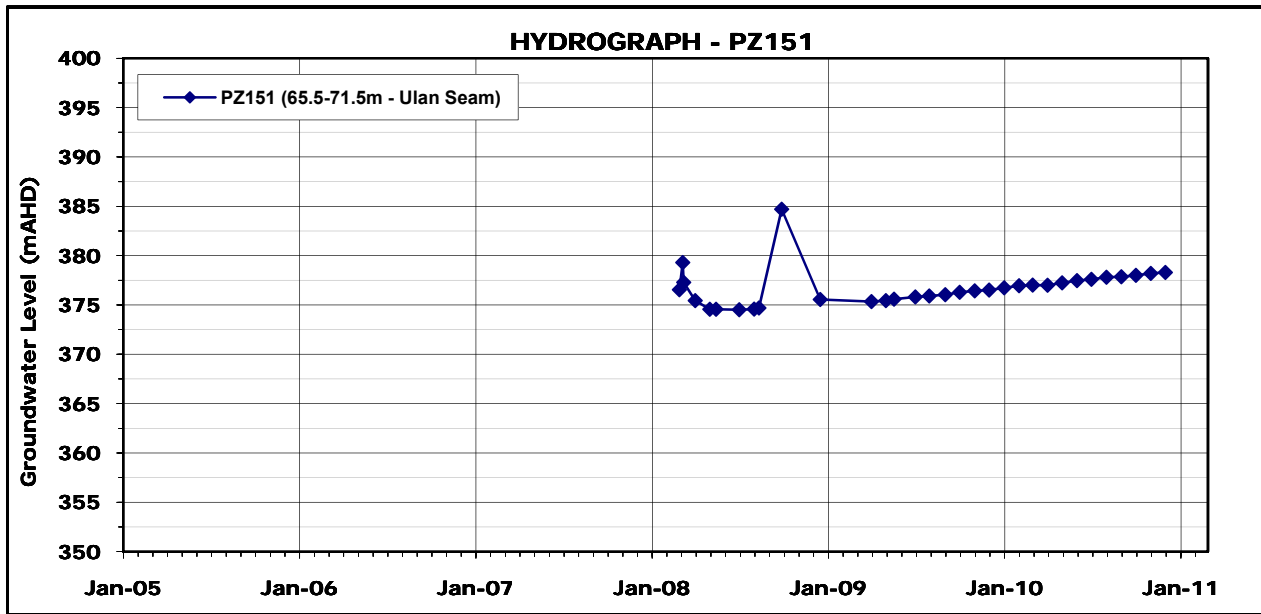




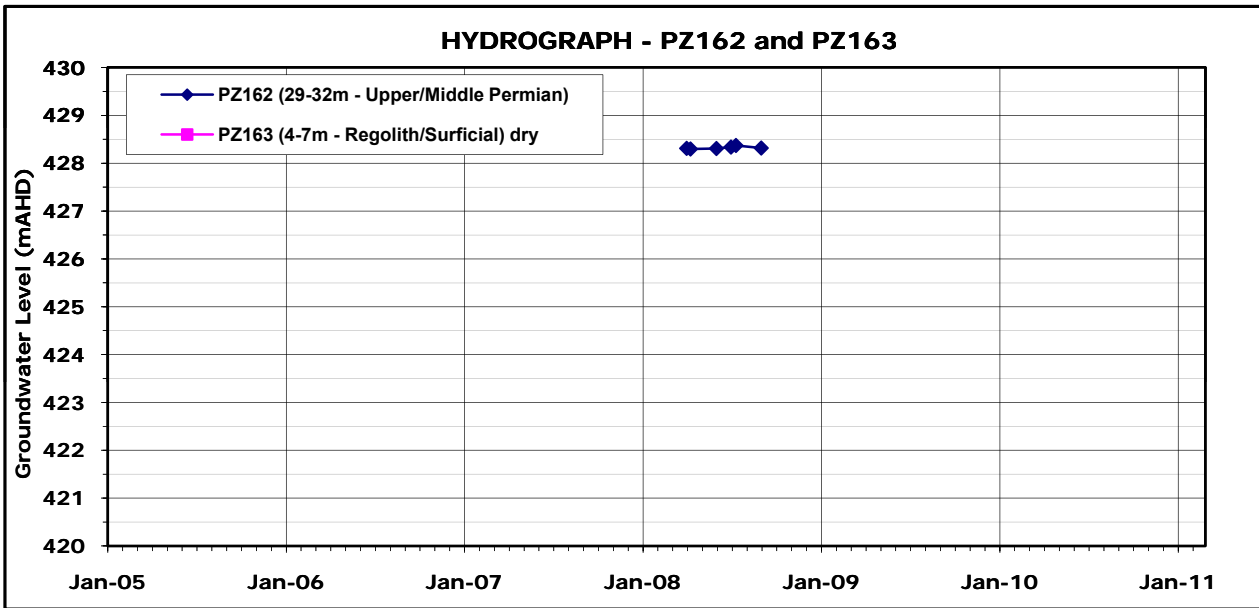
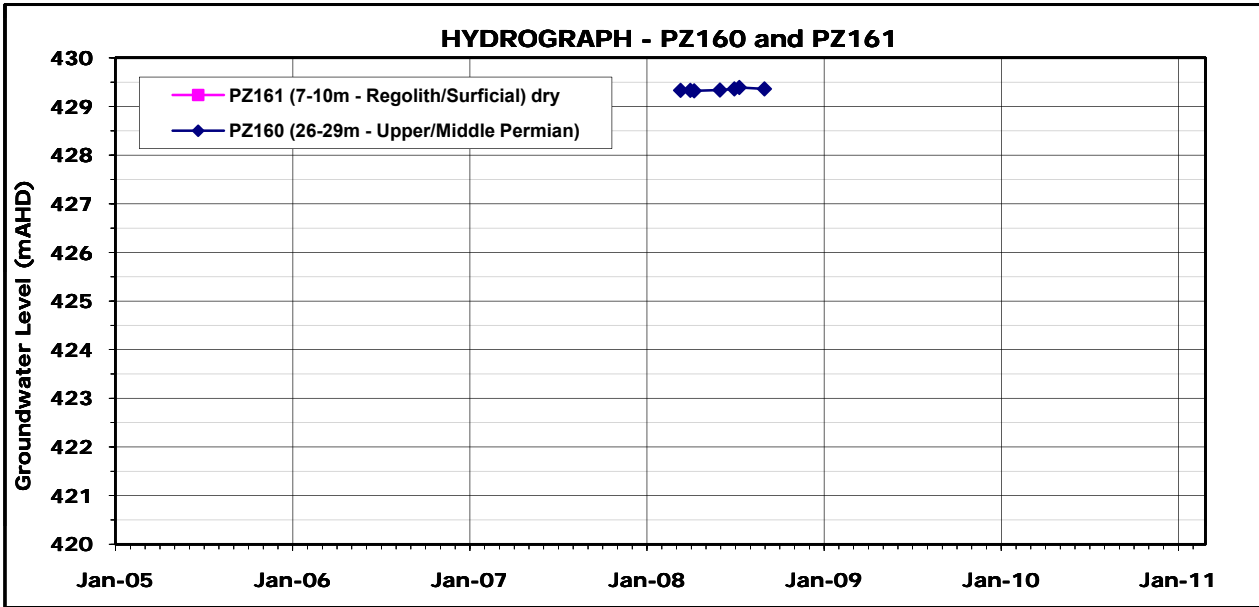
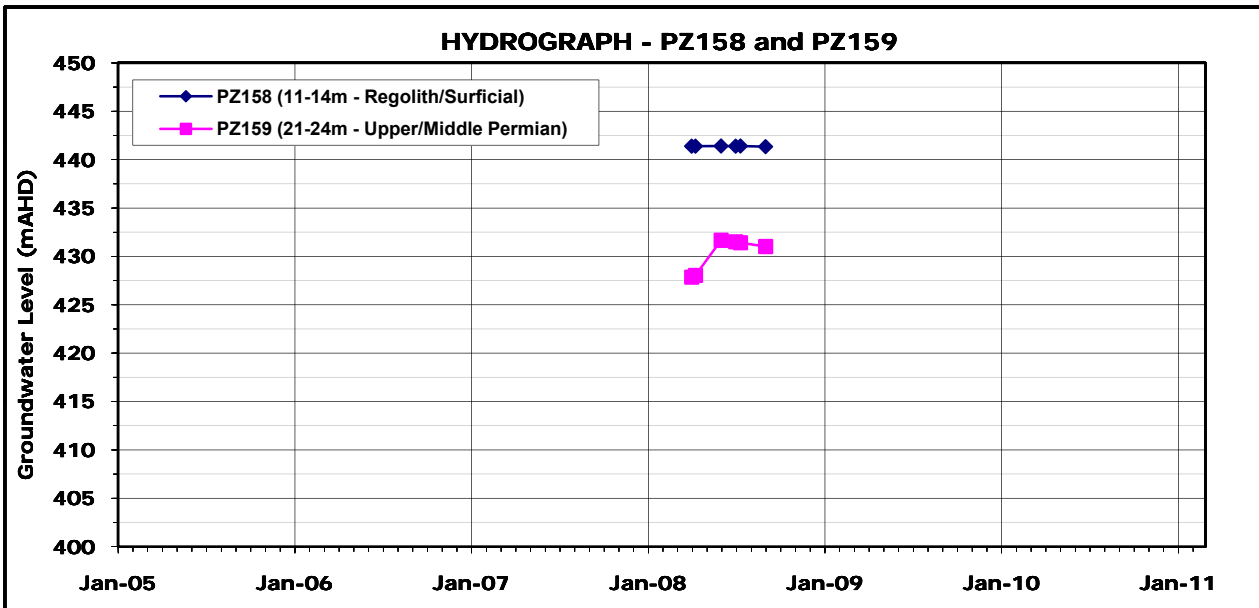


HYDROGRAPHS - PZ138, PZ146, PZ154, PZ139, PZ148, PZ140, PZ147 FIGURE E-16

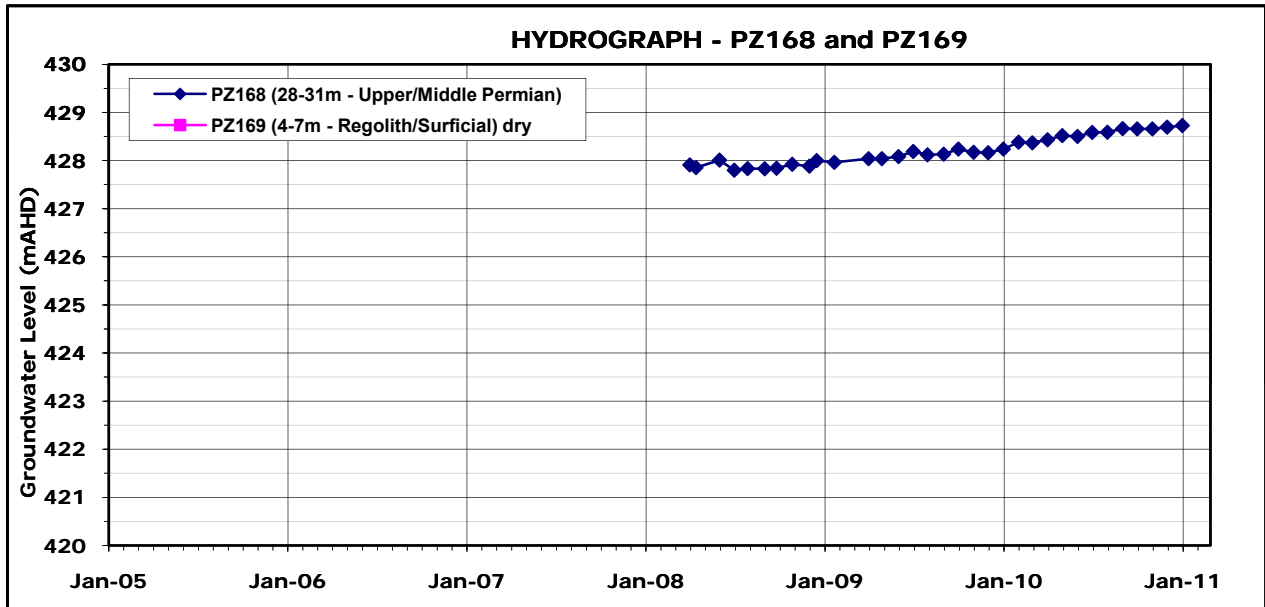
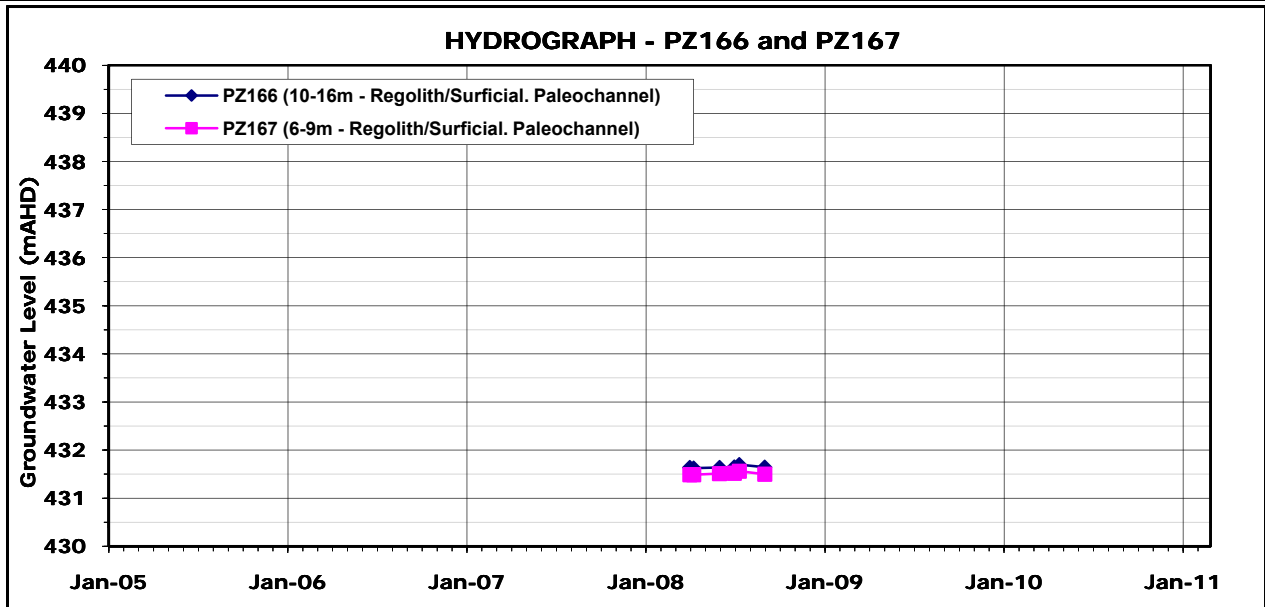
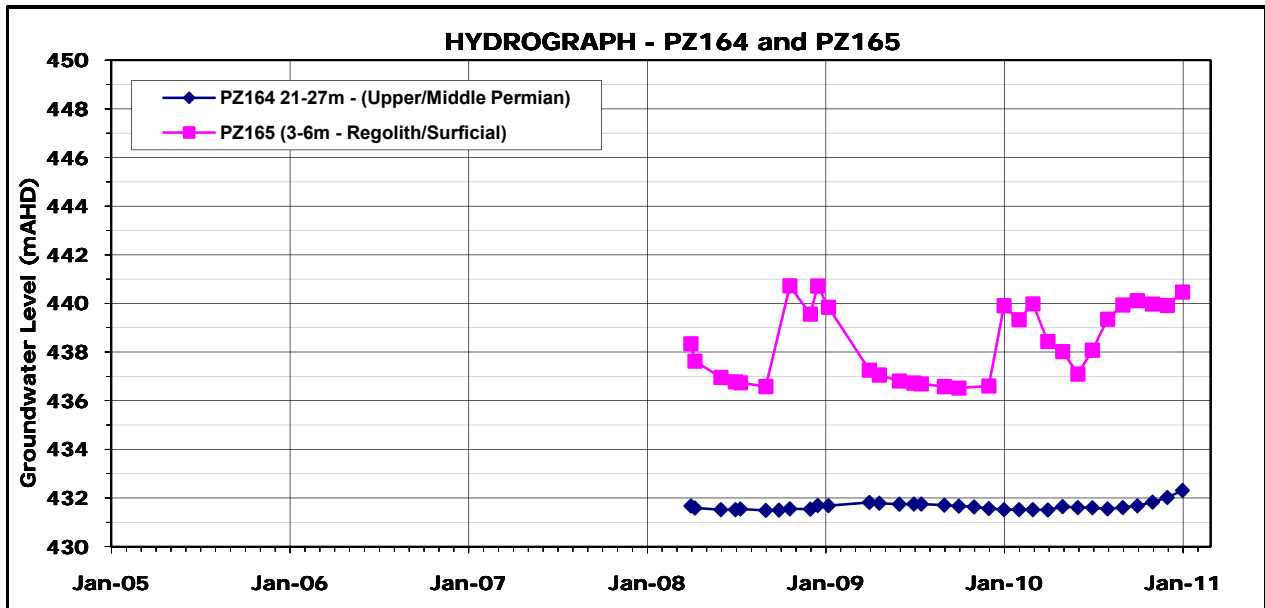


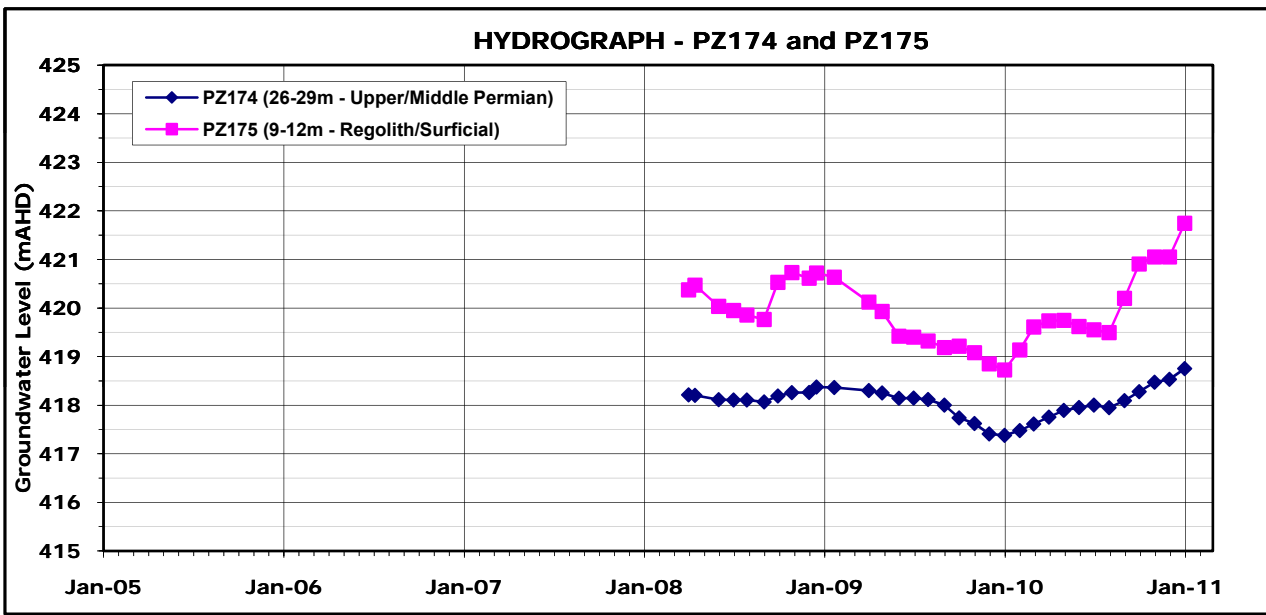
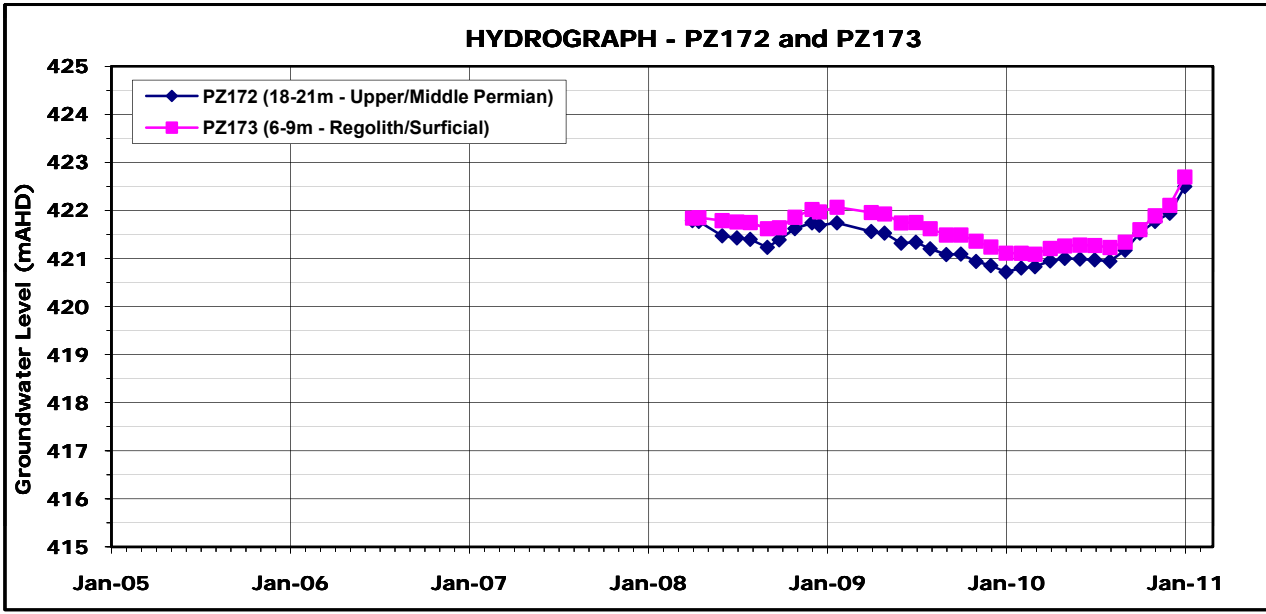
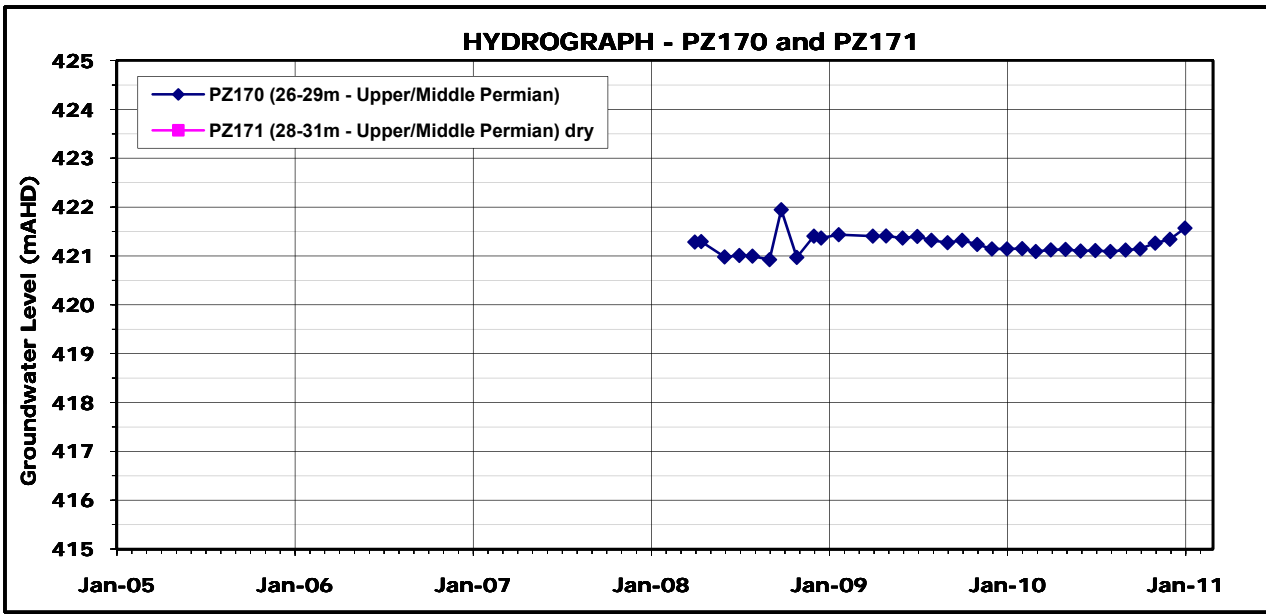


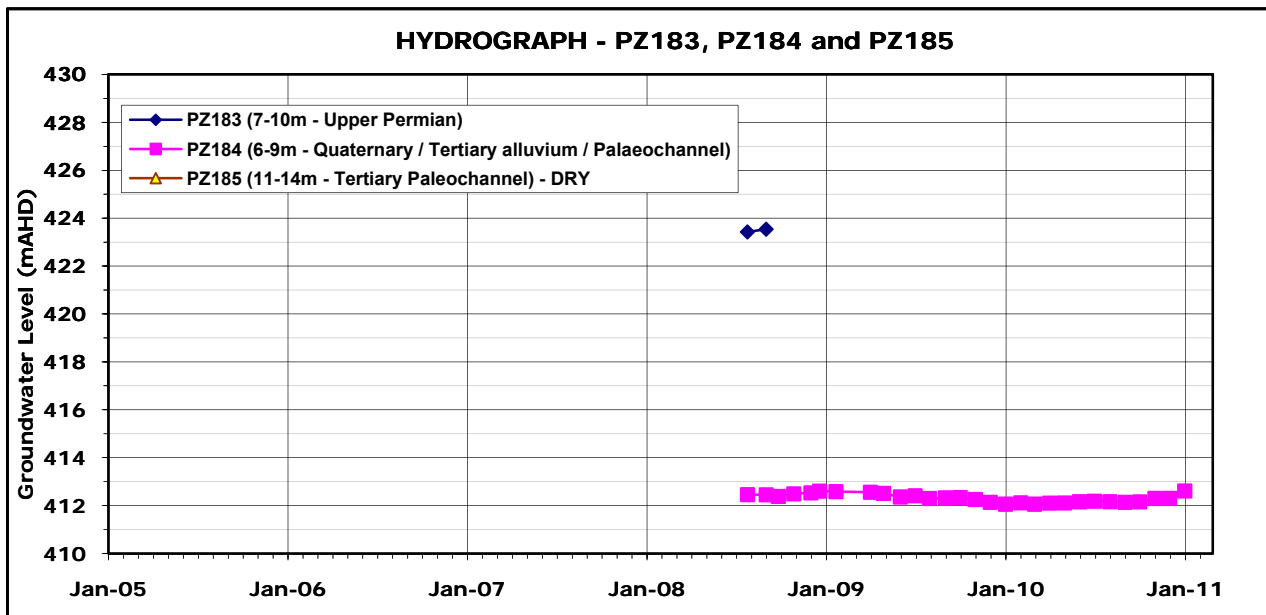
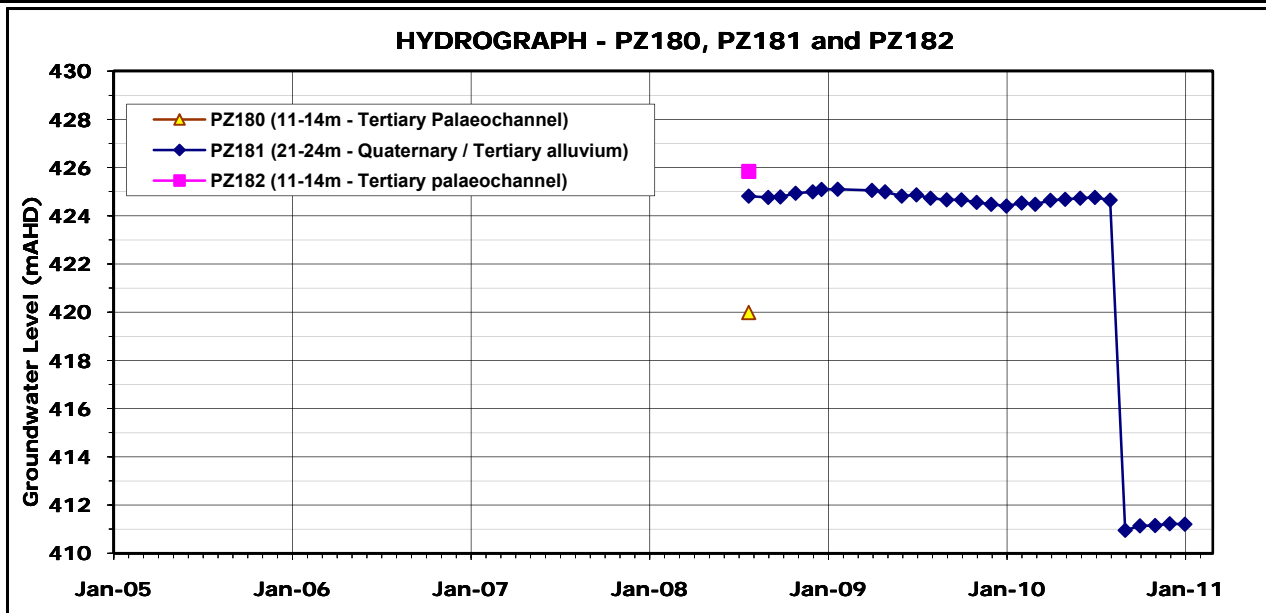
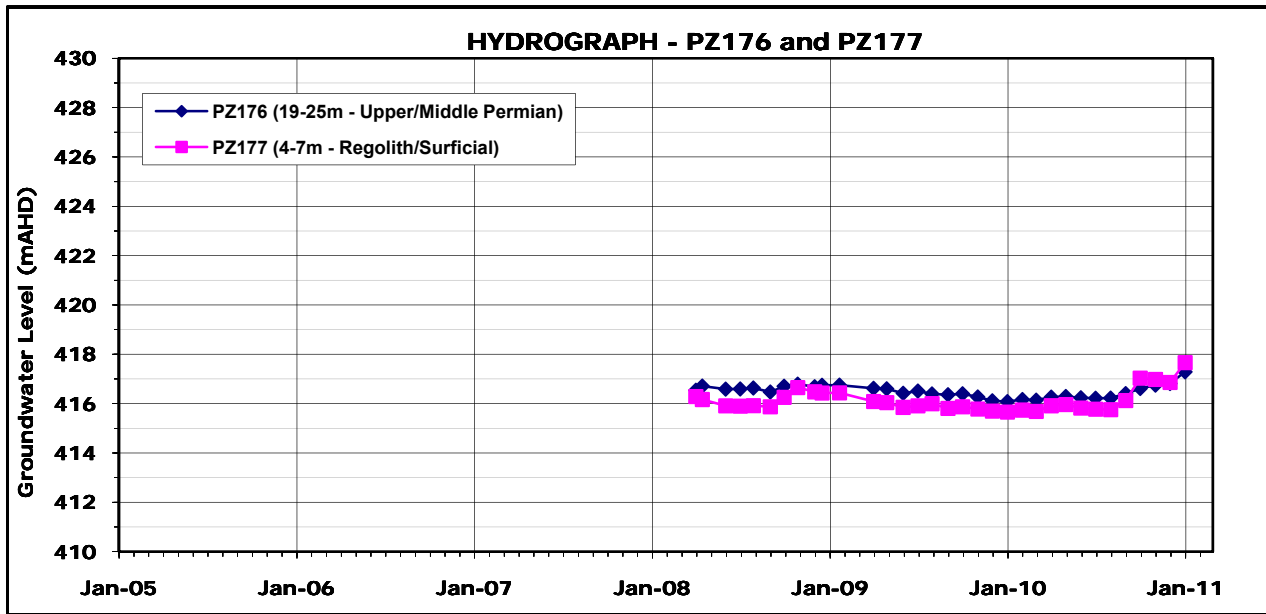
PIEZOMETER HYDROGRAPHS - PZ151, PZ156, PZ157 FIGURE E-18











**APPENDIX F:  
WATER QUALITY – SUMMARY OF  
LABORATORY RESULTS**

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Bore / Well / Spring / Soak		OB01			OB02			OB03			OB04			Spriggs Bore		
Lithological Unit		Min	Average	Max	Min	Average	Max	Min	Average	Max	Min	Average	Max	Min	Average	Max
Parameter	Units	ANZECC (2000) Guideline Value for Freshwater Ecosystem Protection														
	LOR															
pH Value (field)	0.01	4.70	5.64	6.70	5.50	6.58	7.90	5.70	6.24	7.70	3.10	3.87	4.80	6.00	6.00	6.00
pH Value (lab)																
Conductivity (field)	0	80	134	300	1530	2000	2280	1800	2102	2260	410	481	530	260	260	260
Conductivity @ 25°C	1	90	99	110	1800	1950	2000	1800	2115	2900	400	465	490	180	180	180
Total Suspended Solids (TSS)	2	2	3	4	3	4	8	4	24	69	2	5	20	2	2	2
Total Dissolved Solids (TDS)	1	50	64	100	1100	1157	1300	880	1090	1300	320	333	350	150	150	150
Calcium	1	0	1	5	85	106	120	32	37	40	2	3	5	13	13	13
Magnesium	1	1	2	2	65	76	85	47	58	66	4	4	7	5	5	5
Sodium	1	9	11	12	140	160	180	180	259	310	42	47	54	13	13	13
Potassium	1	1	1	3	15	19	24	15	19	21	6	6	7	2	2	2
Hydroxide as CaCO3	1															
Carbonate as CaCO3	1															
Bicarbonate as CaCO3	1															
Chloride	1															
Sulphate	1															
Fluoride	0.1	0.04	0.07	0.12	0.53	0.60	0.65	0.19	0.32	0.43	0.11	0.19	0.62	0.31	0.31	0.31
Cyanide	0.01															
Aluminium - Filtered	0.005	0.02	0.08	0.11	0.05	0.05	0.05	0.01	0.03	0.06	1.90	2.10	2.20	0.04	0.04	0.04
Arsenic - Filtered	0.001				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Boron - Filtered	0.01	0.02	0.02	0.02	0.01	0.02	0.03	0.01	0.02	0.04	0.06	0.73	8.00	0.00	0.00	0.00
Cadmium - Filtered	0.00005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chromium - Filtered	0.002				0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cobalt - Filtered	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.00
Copper - Filtered	0.0005	0.00	0.02	0.04	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.00	0.00	0.00
Iron - Filtered	0.01	0.01	0.04	0.11	0.01	0.17	0.69	0.04	5.09	13.00	0.64	0.87	1.20	0.20	0.20	0.20
Lead - Filtered	0.00005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.13	0.00	0.00	0.00
Manganese - Filtered	1.9	0.01	0.01	0.02	0.00	0.08	0.52	0.20	0.33	0.40	0.07	0.10	0.11	0.02	0.02	0.02
Mercury - Filtered	0.0001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nickel - Filtered	0.001	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.01	0.02	0.01	0.02	0.03	0.00	0.00	0.00
Selenium - Filtered	0.001	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.01	0.02	0.00	0.00	0.00	0.00	0.00	0.00
Silver - Filtered	0.00005				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Zinc - Filtered	0.005	0.01	0.03	0.07	0.01	0.02	0.03	0.01	0.17	0.58	0.08	0.10	0.13	0.02	0.02	0.02
Ammonia as N	0.01	0.01	0.03	0.04	0.01	0.04	0.12	0.18	3.15	25.00	0.01	0.22	1.70	0.01	0.01	0.01
Nitrate as N	0.01	0.10	0.12	0.13	0.16	0.29	0.40	0.31	0.98	2.10	5.00	6.66	7.30	0.30	0.30	0.30
Total Nitrogen as N	0.01	0.14	0.17	0.24	0.31	0.37	0.55	0.75	7.01	36.00	7.10	7.68	8.00	0.42	0.42	0.42
Reactive Phosphorus as P	0.01	0.01	0.02	0.03	0.01	0.02	0.03	0.01	0.40	2.10	0.10	0.12	0.14	0.02	0.02	0.02
Total Phosphorus as P	0.01	0.01	0.01	0.02	0.01	0.02	0.02	0.04	0.77	3.90	0.11	0.17	0.20	0.03	0.03	0.03

Zero values within shading indicate where analysis results are less than laboratory detection

Parameter	Units	LOR	ANZECC (2000) Guideline Value for Freshwater Ecosystem Protection	Bore / Well / Spring / Soak Lithological Unit			PZ03 Ulan Seam			PZ04 Ulan Seam			PZ18 Ulan Seam and sediments			PZ30 Marrangaroo Conglomerate			PZ39 Lower Permian		
				Min	Average	Max	Min	Average	Max	Min	Average	Max	Min	Average	Max	Min	Average	Max	Min	Average	Max
				pH Value (field)		0.01		5.70	6.31	7.20	6.00	6.69	8.00	3.90	4.71	6.10	5.40	6.03	6.30	5.46	5.93
Conductivity (lab)	µS/cm	0		680	1307	1930	1970	3859	4670	440	692	1060	740	871	1110	480	826	2190			
Conductivity @ 25°C	µS/cm	1		620	1292	1700	2300	3857	4400	390	638	960	740	771	800	510	763	2100			
Total Suspended Solids (TSS)	mg/L	2		9	17	36	4	70	240	15	220	700	9	93	170	8	25	57			
Total Dissolved Solids (TDS)	mg/L	1		320	694	1000	1300	2407	2900	330	499	600	420	454	470	280	438	1300			
Calcium	mg/L	1		3	28	57	43	137	180	0	1	1	47	53	58	19	29	82			
Magnesium	mg/L	1		16	45	70	98	189	230	4	10	15	10	11	12	11	22	90			
Sodium	mg/L	1		82	145	210	290	416	510	54	88	130	59	67	71	42	60	160			
Potassium	mg/L	1		5	10	16	37	58	72	2	3	4	16	18	19	7	9	13			
Hydroxide as CaCO3	mg/L	1																			
Carbonate as CaCO3	mg/L	1																			
Bicarbonate as CaCO3	mg/L	1		82	216	366	320	762	878	0	10	32	160	176	190	39	62	144			
Chloride	mg/L	1		120	234	330	290	671	890	74	143	210	81	93	98	120	186	560			
Sulphate	mg/L	1		23	77	130	230	428	500	28	60	100	56	65	74	3	12	35			
Fluoride	mg/L	0.1		0.19	0.36	0.58	0.65	0.80	0.99	0.06	0.16	0.24	0.66	0.76	0.86	0.07	0.14	0.34			
Cyanide	mg/L	0.01	0.007	0.04	0.04	0.04	0.07	0.07	0.07												
Aluminium - Filtered	mg/L	0.005	0.055	0.04	0.04	0.04	0.01	0.06	0.31	0.11	0.91	4.60	0.02	0.02	0.02	0.02	0.07	0.11			
Arsenic - Filtered	mg/L	0.001	0.013	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.02	0.00	0.00	0.00	0.00	0.00	0.00			
Boron - Filtered	mg/L	0.01	0.37	0.01	0.02	0.03	0.03	0.05	0.08	0.03	0.06	0.16	0.02	0.02	0.04	0.01	0.02	0.03			
Cadmium - Filtered	mg/L	0.00005	0.0002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Chromium - Filtered	mg/L	0.002	ID	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Cobalt - Filtered	mg/L	0.001		0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.04	0.01	0.04	0.06	0.00	0.02	0.18			
Copper - Filtered	mg/L	0.0005	0.0014	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01			
Iron - Filtered	mg/L	0.01	ID	0.40	6.38	15.00	0.02	0.40	1.20	0.06	2.38	6.00	0.09	4.05	16.00	1.60	6.00	11.00			
Lead - Filtered	mg/L	0.00005	0.0034	0.00	0.00	0.00	0.00	0.01	0.05	0.00	0.01	0.02	0.00	0.00	0.01	0.00	0.00	0.01			
Manganese - Filtered	mg/L	0.001	1.9	0.19	0.35	0.76	0.03	0.44	0.77	0.00	0.01	0.02	1.30	1.79	2.20	0.17	0.66	3.80			
Mercury - Filtered	mg/L	0.0001	0.00006	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.06	0.08	0.00	0.00	0.00			
Nickel - Filtered	mg/L	0.001	0.011	0.00	0.00	0.00	0.00	0.01	0.02	0.00	0.03	0.08	0.05	0.06	0.08	0.00	0.01	0.07			
Selenium - Filtered	mg/L	0.001	0.005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Silver - Filtered	mg/L	0.001	0.00005	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00			
Zinc - Filtered	mg/L	0.005	0.008	0.01	0.01	0.02	0.01	0.04	0.12	0.01	0.19	0.55	0.02	0.06	0.12	0.01	0.09	0.65			
Ammonia as N	mg/L	0.01	0.9	0.13	0.19	0.27	0.01	0.13	0.51	0.03	0.40	0.65	0.04	0.25	0.39	0.05	0.20	0.36			
Nitrate as N	mg/L	0.01	0.7	0.01	0.02	0.04	0.01	0.61	3.80	0.02	0.36	1.30	0.01	0.08	0.23	0.01	0.02	0.05			
Total Nitrogen as N	mg/L	0.01		0.10	0.21	0.42	0.29	1.19	4.70	0.72	1.39	3.90	0.21	0.38	0.51	0.13	0.23	0.37			
Reactive Phosphorus as P	mg/L	0.01		0.01	0.03	0.05	0.02	0.02	0.03	0.01	0.03	0.06	0.02	0.02	0.03	0.01	0.02	0.03			
Total Phosphorus as P	mg/L	0.01		0.02	0.04	0.07	0.01	0.06	0.10	0.04	0.23	0.96	0.03	0.09	0.22	0.01	0.02	0.05			

Zero values within shading indicate where analysis results are less than laboratory detection

Parameter	Units	LOR	ANZECC (2000) Guideline Value for Freshwater Ecosystem Protection	PZ40A Lower Permian			PZ40B Lower Permian			PZ41A Marrangaroo Conglomerate			PZ41B Ulan Seam			PZ43A Marrangaroo Conglomerate		
				Min	Average	Max	Min	Average	Max	Min	Average	Max	Min	Average	Max	Min	Average	Max
				Lithological Unit			Lithological Unit			Lithological Unit			Lithological Unit			Lithological Unit		
pH Value (field)		0.01		5.70	5.70	5.70	5.50	6.11	7.10	5.53	6.30	5.19	6.03	7.10	5.90	6.41	6.70	
pH Value (lab)																		
Conductivity (field)	µS/cm	0		1450	1450	1450	590	755	1140	6049	6590	3070	5009	6810	2190	2650	2900	
Conductivity @ 25°C	µS/cm	1					500	676	980	5829	6100	2800	5033	6300	2500	2500	2500	
Total Suspended Solids (TSS)	mg/L	2					6	35	130	22	218	36	89	380	15	87	220	
Total Dissolved Solids (TDS)	mg/L	1					250	356	540	3429	3700	1600	2975	4300	1500	1655	1800	
Calcium	mg/L	1					10	18	29	86	150	46	76	93	130	142	160	
Magnesium	mg/L	1					8	14	24	180	196	78	167	230	170	186	210	
Sodium	mg/L	1					53	68	85	150	720	310	548	740	96	110	120	
Potassium	mg/L	1					5	12	15	37	42	22	40	51	32	37	40	
Hydroxide as CaCO3	mg/L	1																
Carbonate as CaCO3	mg/L	1					23	84	110	82	140	0	41	76	602	650	660	
Bicarbonate as CaCO3	mg/L	1					90	147	250	1857	2000	810	1576	2000	340	370	510	
Chloride	mg/L	1					9	17	26	134	170	64	191	290	260	287	420	
Sulphate	mg/L	1					0.07	0.12	0.17	0.17	0.56	0.05	0.17	0.36	0.79	0.89	1.10	
Fluoride	mg/L	0.1																
Cyanide	mg/L	0.01	0.007									0.02	0.02	0.02				
Aluminium - Filtered	mg/L	0.005	0.055				0.00	0.00	0.00	0.02	0.04	0.02	0.14	0.68	0.02	0.05	0.12	
Arsenic - Filtered	mg/L	0.001	0.013				0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.00	0.02	0.06	
Boron - Filtered	mg/L	0.01	0.37				0.02	0.03	0.04	0.05	0.07	0.04	0.11	0.19	0.01	0.02	0.03	
Cadmium - Filtered	mg/L	0.00005	0.0002				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Chromium - Filtered	mg/L	0.002	ID				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Cobalt - Filtered	mg/L	0.001					0.00	0.00	0.01	0.01	0.15	0.01	0.08	0.14	0.00	0.00	0.02	
Copper - Filtered	mg/L	0.0005	0.0014				0.00	0.00	0.00	0.00	0.23	0.01	0.00	0.00	0.00	0.00	0.00	
Iron - Filtered	mg/L	0.01	ID				0.48	15.99	33.00	9.20	49.89	27.00	104.17	150.00	0.01	1.05	3.60	
Lead - Filtered	mg/L	0.00005	0.0034				0.00	0.01	0.04	0.00	0.01	0.00	0.00	0.03	0.00	0.00	0.01	
Manganese - Filtered	mg/L	0.001	1.9				0.12	0.20	0.32	2.80	3.21	2.10	3.62	4.60	0.15	0.31	0.71	
Mercury - Filtered	mg/L	0.0001	0.00006				0.00	0.00	0.01	0.03	0.22	0.01	0.13	0.22	0.00	0.00	0.00	
Nickel - Filtered	mg/L	0.001	0.011				0.00	0.00	0.01	0.03	0.35	0.01	0.13	0.22	0.00	0.01	0.04	
Selenium - Filtered	mg/L	0.001	0.005				0.00	0.00	0.01	0.03	0.35	0.01	0.13	0.22	0.00	0.01	0.04	
Silver - Filtered	mg/L	0.001	0.00005				0.00	0.00	0.01	0.03	0.35	0.01	0.13	0.22	0.00	0.01	0.04	
Zinc - Filtered	mg/L	0.005	0.008				0.01	0.02	0.04	0.02	0.39	0.03	0.22	0.77	0.01	0.03	0.10	
Ammonia as N	mg/L	0.01	0.9				0.07	0.13	0.23	0.16	1.25	0.85	1.42	1.90	0.13	0.30	0.38	
Nitrate as N	mg/L	0.01	0.7				0.01	0.02	0.04	0.02	0.03	0.03	0.03	0.03	0.01	0.03	0.07	
Total Nitrogen as N	mg/L	0.01					0.08	0.12	0.20	0.42	1.63	0.62	1.40	2.60	0.36	0.65	1.10	
Reactive Phosphorus as P	mg/L	0.01					0.01	0.03	0.09	0.01	0.02	0.01	0.04	0.14	0.01	0.02	0.04	
Total Phosphorus as P	mg/L	0.01					0.01	0.06	0.17	0.04	0.31	0.02	0.08	0.15	0.02	0.15	0.82	

Zero values within shading indicate where analysis results are less than laboratory detection

Parameter	Units	LOR	ANZECC (2000) Guideline Value for Freshwater Ecosystem Protection	PZ43B Shoalhaven Group			PZ44 Ulan Granite			PZ50A Ulan Seam			PZ50B Lower Permian			PZ50C Alluvium		
				Min	Average	Max	Min	Average	Max	Min	Average	Max	Min	Average	Max	Min	Average	Max
				Bore / Well / Spring / Soak Lithological Unit			Bore / Well / Spring / Soak Lithological Unit			Bore / Well / Spring / Soak Lithological Unit			Bore / Well / Spring / Soak Lithological Unit			Bore / Well / Spring / Soak Lithological Unit		
pH Value (field)		0.01		3.40	4.24	5.40	5.60	6.33	7.50	6.00	6.31	7.60	5.48	6.14	7.50	5.50	6.71	12.50
Conductivity (lab)	µS/cm	0		3590	4465	5090	2530	3057	3200	1340	2280	2580	1250	1703	2210	380	1135	5810
Conductivity @ 25°C	µS/cm	1		4000	4473	5100	2800	2945	3000	1300	2186	2500	1300	1655	2200	400	793	2500
Total Suspended Solids (TSS)	mg/L	2		44	252	480	11	33	91	180	1604	9800	10	54	210	31	194	800
Total Dissolved Solids (TDS)	mg/L	1		2600	3018	3600	2200	2364	2500	820	1246	1400	670	955	1300	220	432	1400
Calcium	mg/L	1		12	25	52	420	473	530	36	64	75	25	44	67	2	38	420
Magnesium	mg/L	1		100	135	190	75	85	90	42	98	120	40	65	100	0	14	19
Sodium	mg/L	1		460	641	720	95	107	120	100	181	220	110	145	170	41	80	110
Potassium	mg/L	1		64	74	82	41	45	49	12	14	15	12	14	15	3	6	31
Hydroxide as CaCO3	mg/L	1																
Carbonate as CaCO3	mg/L	1																
Bicarbonate as CaCO3	mg/L	1																
Chloride	mg/L	1		3	6	9	410	431	450	110	340	390	33	177	350	27	35	58
Sulphate	mg/L	1		770	826	880	230	271	300	270	491	580	250	390	490	78	139	200
Fluoride	mg/L	0.1		950	1105	1500	900	1073	1200	56	68	80	2	62	110	17	44	76
Cyanide	mg/L	0.01	0.007	0.52	0.72	1.10	0.22	0.28	0.35	0.36	0.48	0.60	0.09	0.29	0.38	0.07	0.15	0.28
Aluminium - Filtered	mg/L	0.005	0.065	5.20	9.82	16.00	0.02	0.03	0.06	0.03	0.03	0.03	0.03	0.03	0.03	0.09	0.09	0.09
Arsenic - Filtered	mg/L	0.001	0.013	0.00	0.01	0.03	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Boron - Filtered	mg/L	0.01	0.37	0.05	0.06	0.07	0.01	0.02	0.02	0.01	0.04	0.12	0.01	0.02	0.03	0.00	0.00	0.00
Cadmium - Filtered	mg/L	0.00005	0.0002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chromium - Filtered	mg/L	0.002	ID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cobalt - Filtered	mg/L	0.001		0.17	0.38	0.59	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.01
Copper - Filtered	mg/L	0.0005	0.0014	0.01	0.02	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Iron - Filtered	mg/L	0.01	ID	0.29	4.58	12.00	0.01	3.37	10.00	0.03	2.65	7.40	0.14	7.99	19.00	0.01	0.22	1.20
Lead - Filtered	mg/L	0.00005	0.0034	0.01	0.11	0.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19
Manganese - Filtered	mg/L	0.001	1.9	0.20	0.35	0.70	0.47	0.62	1.10	0.15	0.24	0.47	0.21	0.32	0.47	0.03	1.23	13.00
Mercury - Filtered	mg/L	0.0001	0.00006	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nickel - Filtered	mg/L	0.001	0.011	0.24	0.54	0.87	0.00	0.01	0.03	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.00	0.02
Selenium - Filtered	mg/L	0.001	0.005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.00	0.00
Silver - Filtered	mg/L	0.001	0.00005															
Zinc - Filtered	mg/L	0.005	0.008	1.50	2.73	3.50	0.01	0.02	0.03	0.02	0.11	0.29	0.02	0.07	0.19	0.01	0.04	0.07
Ammonia as N	mg/L	0.01	0.9	0.03	0.10	0.23	0.14	0.51	3.00	0.05	0.15	0.40	0.11	0.27	0.41	0.01	1.90	15.00
Nitrate as N	mg/L	0.01	0.7	0.65	1.00	1.20	0.01	0.02	0.02	0.01	0.03	0.09	0.01	0.03	0.06	0.21	2.27	3.40
Total Nitrogen as N	mg/L			1.70	2.34	2.70	0.37	0.47	0.58	0.22	1.25	3.70	0.36	0.97	1.70	1.50	3.94	16.00
Reactive Phosphorus as P	mg/L	0.01		0.01	0.03	0.04	0.01	0.02	0.03	0.01	0.02	0.03	0.01	0.02	0.03	0.01	0.02	0.03
Total Phosphorus as P	mg/L	0.01		0.04	0.27	0.47	0.05	0.08	0.13	0.17	0.61	2.70	0.02	0.07	0.26	0.03	0.23	0.85

Zero values within shading indicate where analysis results are less than laboratory detection



Parameter	Units	LOR	ANZECC (2000) Guideline Value for Freshwater Ecosystem Protection	TB52A			TB52B			PZ52			PZ53			PZ55		
				Tertiary / Surficial			Tertiary / Surficial			Tertiary / Surficial			Lower Permian			Tertiary / Surficial		
				Min	Average	Max	Min	Average	Max	Min	Average	Max	Min	Average	Max	Min	Average	Max
pH Value (field)		0.01		5.76	6.29	6.80	5.66	6.21	7.10	5.20	6.93	8.75	5.90	6.53	7.50	5.30	6.01	6.70
pH Value (lab)	µS/cm	0		380	416	440	150	186	240	150	235	350	930	991	1070	240	360	520
Conductivity (field)	µS/cm	1		350	383	400	140	173	200	130	179	300	870	896	910	190	272	410
Conductivity @ 25°C	mg/L	2		4	8	16	6	26	120	14	1288	10000	28	127	390	120	2194	6000
Total Suspended Solids (TSS)	mg/L	1		180	214	250	57	104	160	86	263	15000	470	494	530	220	341	500
Calcium	mg/L	1		21	24	26	1	5	6	2	4	12	56	61	63	0	4	23
Magnesium	mg/L	1		10	12	13	1	3	4	2	2	6	30	33	34	0	2	3
Sodium	mg/L	1		19	21	23	7	18	22	17	22	49	49	53	56	26	41	61
Potassium	mg/L	1		8	10	11	1	2	2	1	2	5	21	23	25	1	2	3
Hydroxide as CaCO3	mg/L	1		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Carbonate as CaCO3	mg/L	1		110	117	120	25	48	60	32	38	49	260	273	320	13	50	200
Bicarbonate as CaCO3	mg/L	1		7	38	46	19	21	24	18	28	61	110	113	130	29	46	80
Chloride	mg/L	1		1	1	1	0	1	3	0	7	28	27	31	33	13	25	58
Sulphate	mg/L	1		0.17	0.22	0.31	0.05	0.11	0.21	0.05	0.21	0.71	0.19	0.24	0.27	0.10	0.27	0.48
Fluoride	mg/L	0.1																
Cyanide	mg/L	0.01	0.007															
Aluminium - Filtered	mg/L	0.005	0.055				0.02	0.11	0.37	0.02	0.11	0.55	0.00	0.00	0.02	0.03	0.08	0.35
Arsenic - Filtered	mg/L	0.001	0.013				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Boron - Filtered	mg/L	0.01	0.37				0.01	0.02	0.04	0.01	0.05	0.13	0.01	0.01	0.01	0.01	0.02	0.02
Cadmium - Filtered	mg/L	0.00005	0.0002				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chromium - Filtered	mg/L	0.001	ID				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cobalt - Filtered	mg/L	0.0005	0.0014				0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Copper - Filtered	mg/L	0.01	ID				0.06	1.69	4.10	0.03	0.65	0.99	0.02	0.02	0.02	0.02	0.24	0.59
Iron - Filtered	mg/L	0.00005	0.0034				0.00	0.02	0.13	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Lead - Filtered	mg/L	0.00001	1.9				0.12	0.14	0.20	0.01	0.00	0.04	0.03	0.05	0.06	0.01	0.21	0.42
Manganese - Filtered	mg/L	0.0001	0.00006				0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mercury - Filtered	mg/L	0.0001	0.011				0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Nickel - Filtered	mg/L	0.001	0.005				0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.02	0.00	0.00	0.01
Selenium - Filtered	mg/L	0.001	0.00005				0.01	0.01	0.03	0.01	0.03	0.08	0.01	0.03	0.10	0.01	0.06	0.32
Silver - Filtered	mg/L	0.005	0.008				0.01	0.01	0.03	0.01	0.03	0.08	0.01	0.03	0.10	0.01	0.06	0.32
Zinc - Filtered	mg/L	0.005	0.008				0.01	0.01	0.03	0.01	0.03	0.08	0.01	0.03	0.10	0.01	0.06	0.32
Ammonia as N	mg/L	0.01	0.9				0.07	0.15	0.18	0.01	0.07	0.12	0.04	0.15	0.30	0.01	0.04	0.07
Nitrate as N	mg/L	0.01	0.7				0.01	0.04	0.08	0.01	0.02	0.03	0.01	0.01	0.02	0.01	0.03	0.07
Total Nitrogen as N	mg/L	0.01					0.06	0.19	0.36	0.11	1.97	8.00	0.19	0.37	0.53	0.42	0.72	1.00
Reactive Phosphorus as P	mg/L	0.01					0.01	0.02	0.03	0.01	0.02	0.04	0.01	0.02	0.03	0.01	0.04	0.09
Total Phosphorus as P	mg/L	0.01					0.04	0.08	0.13	0.02	0.46	2.30	0.07	1.44	3.70	0.12	0.72	2.70

Zero values within shading indicate where analysis results are less than laboratory detection

Bore / Well / Spring / Soak Lithological Unit		PZ58			PZ72A			PZ72C			PZ74				
		Tertiary / Surficial			Upper / Middle Permian			Tertiary / Surficial			Upper / Middle Permian				
		Min	Average	Max	Min	Average	Max	Min	Average	Max	Min	Average	Max		
<b>Parameter</b>	<b>Units</b>	<b>LOR</b>	<b>ANZECC (2000) Guideline Value for Freshwater Ecosystem Protection</b>												
pH Value (field)		0.01		2.50	3.61	4.90	6.20	6.74	7.90	6.20	6.78	7.90	5.70	6.45	7.60
pH Value (lab)				8120	11150	16580	1440	1733	1950	2850	3388	3710	3860	4860	5170
Conductivity (field)	µS/cm	0		7600	11509	16000	1500	1645	1700	3200	3445	3500	4700	4836	5000
Conductivity @ 25°C	µS/cm	1		5	2520	15000	4	25	140	4	160	540	9	220	450
Total Suspended Solids (TSS)	mg/L	2		5900	9236	14000	840	952	1300	1800	1991	2200	3200	3436	3700
Total Dissolved Solids (TDS)	mg/L	1													
Calcium	mg/L	1		44	72	100	54	78	86	67	71	75	320	353	380
Magnesium	mg/L	1		230	398	580	54	58	62	140	156	170	190	205	220
Sodium	mg/L	1		940	1513	2300	130	150	170	370	418	470	340	405	460
Potassium	mg/L	1		1	6	23	14	17	19	9	11	13	48	63	69
Hydroxide as CaCO3	mg/L	1													
Carbonate as CaCO3	mg/L	1		2	2	2	55	364	410	540	616	650	450	710	750
Bicarbonate as CaCO3	mg/L	1		1600	2509	3600	240	273	340	620	691	770	820	903	960
Chloride	mg/L	1		2100	3545	5100	71	79	86	200	219	240	670	728	780
Sulphate	mg/L	1		1.40	10.22	25.00	0.65	0.77	0.87	1.00	1.14	1.30	0.14	0.21	0.34
Fluoride	mg/L	0.1													
Cyanide	mg/L	0.01	0.007												
Aluminium - Filtered	mg/L	0.005	0.055	97.00	193.36	280.00	0.02	0.11	0.51	0.03	0.13	0.28	0.02	0.30	1.50
Arsenic - Filtered	mg/L	0.001	0.013	0.00	0.00	0.00	0.00	0.01	0.02	0.02	0.02	0.02	0.00	0.00	0.00
Boron - Filtered	mg/L	0.01	0.37	0.00	0.06	0.14	0.01	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.03
Cadmium - Filtered	mg/L	0.00005	0.0002	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chromium - Filtered	mg/L	0.002	ID	0.02	0.03	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
Cobalt - Filtered	mg/L	0.001		0.42	0.92	1.50	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Copper - Filtered	mg/L	0.0005	0.0014	0.11	0.31	0.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Iron - Filtered	mg/L	0.01	ID	0.32	3.00	14.00	0.16	0.92	1.90	0.01	0.04	0.20	0.01	2.13	7.00
Lead - Filtered	mg/L	0.00005	0.0034	0.20	0.32	0.53	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.01	0.11
Manganese - Filtered	mg/L	0.001	1.9	0.94	1.61	2.40	0.01	0.07	0.09	0.03	0.04	0.05	0.08	0.11	0.17
Mercury - Filtered	mg/L	0.0001	0.00006	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nickel - Filtered	mg/L	0.001	0.011	0.54	1.21	2.00	0.00	0.00	0.01	0.00	0.01	0.01	0.00	0.01	0.02
Selenium - Filtered	mg/L	0.001	0.005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Silver - Filtered	mg/L	0.001	0.00005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Zinc - Filtered	mg/L	0.005	0.008	4.40	6.95	8.90	0.01	0.04	0.09	0.01	0.03	0.08	0.01	0.05	0.12
Ammonia as N	mg/L	0.01	0.9	0.01	0.06	0.19	0.16	0.33	0.39	0.01	0.03	0.07	0.37	0.44	0.50
Nitrate as N	mg/L	0.01	0.7	0.01	0.03	0.12	0.02	0.02	0.02	0.50	0.90	1.10	0.02	0.12	0.50
Total Nitrogen as N	mg/L	0.01		0.55	1.11	1.70	0.28	0.44	0.62	0.57	1.01	1.40	0.48	0.94	2.10
Reactive Phosphorus as P	mg/L	0.01		0.02	0.02	0.04	0.01	0.02	0.04	0.01	0.02	0.05	0.01	0.02	0.03
Total Phosphorus as P	mg/L	0.01		0.04	0.53	1.30	0.02	0.05	0.14	0.01	0.17	0.44	0.01	0.20	0.62

Zero values within shading indicate where analysis results are less than laboratory detection

Bore / Well / Spring / Soak		Lithological Unit			PZ101A			PZ101C			PZ102A			PZ102B			TB103		
Parameter	Units	LOR	ANZECC (2000) Guideline Value for Freshwater Ecosystem Protection	Ulan Seam			Triassic			Marrangaroo Sandstone			Ulan Seam			Lower Permian			
				Min	Average	Max	Min	Average	Max	Min	Average	Max	Min	Average	Max	Min	Average	Max	
pH Value (field)		0.01		6.70	7.23	8.50	5.90	7.07	11.90	6.20	6.70	8.30	5.90	6.56	7.90	7.30	7.30	7.30	
pH Value (lab)																			
Conductivity (field)	µS/cm	0		1060	1227	1330	560	1134	3980	620	1297	1910	1170	1485	2300	740	740	740	
Conductivity @ 25°C	µS/cm	1		860	1143	1200	620	1064	3600	550	1285	2300	1100	1500	2500	560	560	560	
Total Suspended Solids (TSS)	mg/L	2		25	63	120	17	292	1300	7	34	84	3	43	130	270	270	270	
Total Dissolved Solids (TDS)	mg/L	1		500	670	730	360	410	530	370	787	1500	570	925	1800	290	290	290	
Calcium	mg/L	1		60	102	110	33	66	240	26	77	150	54	85	160	37	37	37	
Magnesium	mg/L	1		21	25	26	0	18	24	3	20	52	24	36	66	16	16	16	
Sodium	mg/L	1		65	70	73	34	69	140	74	132	260	96	158	300	65	65	65	
Potassium	mg/L	1		20	34	42	8	31	180	14	38	71	18	24	39	15	15	15	
Hydroxide as CaCO3	mg/L	1																	
Carbonate as CaCO3	mg/L	1																	
Bicarbonate as CaCO3	mg/L	1		290	368	420	150	150	150	86	243	370	230	258	300	160	160	160	
Chloride	mg/L	1		100	120	130	60	89	160	42	160	210	160	186	220	89	89	89	
Sulphate	mg/L	1		5	54	180	5	60	410	15	192	630	3	249	890	10	10	10	
Fluoride	mg/L	0.1		0.69	0.77	0.90	0.38	0.59	0.95	1.30	1.61	2.20	1.30	1.43	1.60	1.30	1.30	1.30	
Cyanide	mg/L	0.01	0.007																
Aluminium - Filtered	mg/L	0.005	0.055	0.03	0.13	0.59	0.03	0.06	0.09	0.02	0.04	0.10	0.02	0.03	0.07				
Arsenic - Filtered	mg/L	0.001	0.013	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00				
Boron - Filtered	mg/L	0.01	0.37	0.02	0.03	0.04	0.01	0.02	0.03	0.01	0.02	0.03	0.03	0.03	0.04	0.03	0.03	0.03	
Cadmium - Filtered	mg/L	0.00005	0.0002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Chromium - Filtered	mg/L	0.002	ID	0.00	0.01	0.04	0.18	0.18	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Cobalt - Filtered	mg/L	0.001		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Copper - Filtered	mg/L	0.0005	0.0014	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Iron - Filtered	mg/L	0.01	ID	0.05	0.43	1.60	0.04	0.43	2.20	0.01	0.08	0.40	0.02	0.44	1.50				
Lead - Filtered	mg/L	0.00005	0.0034	0.00	0.02	0.11	0.00	0.00	0.01	0.00	0.00	0.02	0.00	0.00	0.00	0.04	0.04	0.04	
Manganese - Filtered	mg/L	0.001	1.9	0.12	0.14	0.16	0.19	0.47	0.69	0.00	0.07	0.29	0.09	0.17	0.38	0.00	0.00	0.00	
Mercury - Filtered	mg/L	0.0001	0.00006							0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Nickel - Filtered	mg/L	0.001	0.011	0.00	0.01	0.01	0.00	0.00	0.01	0.00	0.00	0.02	0.00	0.00	0.01	0.00	0.00	0.00	
Selenium - Filtered	mg/L	0.001	0.005							0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Silver - Filtered	mg/L	0.001	0.00005							0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Zinc - Filtered	mg/L	0.005	0.008	0.01	0.04	0.10	0.01	0.01	0.01	0.01	0.02	0.05	0.01	0.03	0.10	0.00	0.00	0.00	
Ammonia as N	mg/L	0.01	0.9	0.18	0.55	0.86	0.14	0.27	0.39	0.03	0.26	0.72	0.09	0.38	0.76	0.36	0.36	0.36	
Nitrate as N	mg/L	0.01	0.7	0.02	0.04	0.05	0.01	0.02	0.02	0.01	0.02	0.02	0.01	0.07	0.40	0.47	0.47	0.47	
Total Nitrogen as N	mg/L	0.01		1.90	2.35	3.30	0.33	0.46	0.55	0.70	1.24	3.80	0.69	0.89	1.00	0.47	0.47	0.47	
Reactive Phosphorus as P	mg/L	0.01		0.02	0.12	0.32	0.01	0.02	0.03	0.01	0.02	0.03	0.01	0.01	0.02	0.03	0.03	0.03	
Total Phosphorus as P	mg/L	0.01		0.32	0.39	0.50	0.03	0.27	1.50	0.02	0.05	0.09	0.01	0.06	0.21	0.03	0.03	0.03	

Zero values within shading indicate where analysis results are less than laboratory detection

Bore / Well / Spring / Soak		TB103R			PZ103A			PZ103B			PZ103C			PZ104		
Lithological Unit		Lower Permian			Ulan Seam			Lower Permian			Lower Permian			Ulan Seam		
Parameter	Units	LOR	ANZECC (2000) Guideline Value for Freshwater Ecosystem Protection	Min	Average	Max	Min	Average	Max	Min	Average	Max	Min	Average	Max	
pH Value (field)		0.01		5.71	6.39	6.80	5.40	6.43	8.10	5.10	6.72	9.50	5.20	7.55	13.10	
pH Value (lab)															13.10	
Conductivity (field)	µS/cm	0		570	633	730	380	514	730	300	575	710	310	2744	13020	
Conductivity @ 25°C	µS/cm	1		520	559	600	370	437	560	340	510	630	340	2079	13000	
Total Suspended Solids (TSS)	mg/L	2		5	32	75	2	58	130	14	76	140	44	764	3300	
Total Dissolved Solids (TDS)	mg/L	1		270	305	350	120	244	300	210	298	370	180	621	3300	
Calcium	mg/L	1		33	37	45	12	21	36	10	42	57	5	91	540	
Magnesium	mg/L	1		16	17	18	5	11	17	1	6	9	0	7	12	
Sodium	mg/L	1		30	36	41	32	34	40	31	32	34	31	44	87	
Potassium	mg/L	1		9	11	17	7	11	24	5	16	66	5	104	870	
Hydroxide as CaCO3	mg/L	1														
Carbonate as CaCO3	mg/L	1		130	165	260	58	110	190	81	81	81	230	575	920	
Bicarbonate as CaCO3	mg/L	1		73	75	81	51	70	80	24	93	200	27	55	150	
Chloride	mg/L	1		5	7	10	4	9	20	9	21	32	3	18	90	
Sulphate	mg/L	1		0.33	0.40	0.53	0.06	0.26	0.56	0.03	0.13	0.23	0.05	0.21	0.65	
Fluoride	mg/L	0.1														
Cyanide	mg/L	0.01	0.007													
Aluminium - Filtered	mg/L	0.005	0.055	0.00	0.00	0.00	0.02	0.02	0.02	0.02	0.11	0.28	0.23	0.40	0.57	
Arsenic - Filtered	mg/L	0.001	0.013	0.01	0.02	0.04	0.01	0.02	0.03	0.01	0.02	0.02	0.01	0.01	0.02	
Boron - Filtered	mg/L	0.01	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Cadmium - Filtered	mg/L	0.00005	0.0002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Chromium - Filtered	mg/L	0.002	ID	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Cobalt - Filtered	mg/L	0.001		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Copper - Filtered	mg/L	0.0005	0.0014	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Iron - Filtered	mg/L	0.01	ID	0.01	2.30	6.90	0.12	5.91	17.00	0.01	2.44	8.10	0.00	5.15	13.00	
Lead - Filtered	mg/L	0.00005	0.0034	0.00	0.00	0.00	0.00	0.00	0.01	0.10	0.17	0.26	0.00	0.83	1.30	
Manganese - Filtered	mg/L	0.001	1.9	0.11	0.16	0.20	0.02	0.24	0.39	0.00	0.02	0.03	0.00	0.00	0.00	
Mercury - Filtered	mg/L	0.0001	0.00006													
Nickel - Filtered	mg/L	0.001	0.011	0.01	0.01	0.01	0.00	0.01	0.03	0.00	0.02	0.03	0.01	0.08	0.14	
Selenium - Filtered	mg/L	0.001	0.005													
Silver - Filtered	mg/L	0.001	0.00005													
Zinc - Filtered	mg/L	0.005	0.008	0.01	0.06	0.16	0.01	0.07	0.36	0.01	0.02	0.05	0.01	0.04	0.07	
Ammonia as N	mg/L	0.01	0.9	0.14	0.18	0.25	0.02	0.14	0.26	0.02	0.06	0.09	0.01	0.10	0.30	
Nitrate as N	mg/L	0.01	0.7	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.05	0.10	0.01	0.06	0.14	
Total Nitrogen as N	mg/L	0.01		0.12	0.74	3.20	0.51	1.27	2.70	0.15	0.30	0.45	0.08	2.02	3.80	
Reactive Phosphorus as P	mg/L	0.01		0.01	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.01	0.02	0.02	
Total Phosphorus as P	mg/L	0.01		0.02	0.04	0.06	0.01	0.07	0.12	0.01	0.04	0.09	0.03	0.67	2.90	

Zero values within shading indicate where analysis results are less than laboratory detection

Bore / Well / Spring / Soak		TB105		PZ105A		PZ105B		PZ105C		PZ106A		
Lithological Unit		Lower Permian		Lower Permian		Upper / Middle Permian		Triassic		Lower Permian		
Parameter	Units	LOR	ANZECC (2000) Guideline Value for Freshwater Ecosystem Protection	Min	Average	Max	Min	Average	Max	Min	Average	Max
pH Value (field)		0.01		6.04	6.74	7.80	5.29	6.37	7.80	5.10	5.97	6.80
pH Value (lab)												
Conductivity (field)	µS/cm	0		540	705	800	240	370	500	280	344	470
Conductivity @ 25°C	µS/cm	1		500	646	710	250	315	500	290	303	320
Total Suspended Solids (TSS)	mg/L	2		2	8	23	11	72	410	7	79	430
Total Dissolved Solids (TDS)	mg/L	1		270	360	500	120	185	280	160	174	190
Calcium	mg/L	1		22	35	42	3	10	24	8	9	11
Magnesium	mg/L	1		10	14	16	4	6	9	5	6	6
Sodium	mg/L	1		52	66	71	27	35	53	31	34	37
Potassium	mg/L	1		10	16	19	2	4	9	3	3	3
Hydroxide as CaCO3	mg/L	1										
Carbonate as CaCO3	mg/L	1										
Bicarbonate as CaCO3	mg/L	1		150	253	310	12	48	150	25	37	49
Chloride	mg/L	1		44	54	69	54	60	71	57	61	65
Sulphate	mg/L	1		0	1	3	3	8	28	1	6	12
Fluoride	mg/L	0.1		0.86	1.46	1.70	0.06	0.27	0.87	0.06	0.07	0.07
Cyanide	mg/L	0.01	0.007									
Aluminium - Filtered	mg/L	0.005	0.055	0.02	0.04	0.07	0.02	0.03	0.04	0.03	0.03	0.03
Arsenic - Filtered	mg/L	0.001	0.013	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.02
Boron - Filtered	mg/L	0.01	0.37	0.05	0.06	0.09	0.01	0.02	0.03	0.01	0.01	0.01
Cadmium - Filtered	mg/L	0.00005	0.0002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chromium - Filtered	mg/L	0.002	ID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cobalt - Filtered	mg/L	0.001		0.00	0.00	0.01	0.00	0.01	0.02	0.01	0.02	0.02
Copper - Filtered	mg/L	0.0005	0.0014	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Iron - Filtered	mg/L	0.01	ID	0.05	1.23	3.30	0.26	2.36	7.40	0.39	1.29	2.10
Lead - Filtered	mg/L	0.00005	0.0034	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.03	0.08
Manganese - Filtered	mg/L	0.001	1.9	0.03	0.08	0.13	0.09	0.22	0.28	0.11	0.58	1.10
Mercury - Filtered	mg/L	0.0001	0.00006									
Nickel - Filtered	mg/L	0.001	0.011	0.00	0.01	0.04	0.01	0.08	0.14	0.04	0.06	0.09
Selenium - Filtered	mg/L	0.001	0.005									
Silver - Filtered	mg/L	0.001	0.00005									
Zinc - Filtered	mg/L	0.005	0.008	0.01	0.01	0.02	0.03	0.09	0.29	0.01	0.03	0.07
Ammonia as N	mg/L	0.01	0.9	0.28	0.52	0.67	0.02	0.13	0.43	0.05	0.10	0.20
Nitrate as N	mg/L	0.01	0.7	0.01	0.01	0.01	0.02	0.07	0.18	0.01	0.01	0.01
Total Nitrogen as N	mg/L			0.47	0.59	0.86	0.30	1.11	2.10	0.17	0.45	0.94
Reactive Phosphorus as P	mg/L	0.01		0.02	0.02	0.03	0.01	0.02	0.02	0.01	0.01	0.01
Total Phosphorus as P	mg/L	0.01		0.01	0.03	0.07	0.01	0.09	0.26	0.01	0.09	0.37

Zero values within shading indicate where analysis results are less than laboratory detection

Bore / Well / Spring / Soak		PZ106B			PZ107			PZ108R			PZ108R			PZ109				
Lithological Unit		Upper / Middle Permian			Ulan Seam			Ulan Seam			Ulan Seam			Lower Permian				
Parameter	Units	LOR	ANZECC (2000) Guideline Value for Freshwater Ecosystem Protection	Min	Average	Max	Min	Average	Max	Min	Average	Max	Min	Average	Max			
pH Value (field)		0.01		4.88	6.39	8.20	4.70	6.13	7.10	6.40	6.90	7.40	5.60	6.24	6.80	6.10	7.87	12.30
pH Value (lab)																		
Conductivity (field)	µS/cm	0		660	1144	1810	600	908	2190	660	715	770	280	401	560	690	914	1680
Conductivity @ 25°C	µS/cm	1		750	1053	1600	610	838	2000	570	615	660	240	359	530	650	820	1500
Total Suspended Solids (TSS)	mg/L	2		14	29	47	31	99	300	15	17	18	11	39	85	21	55	140
Total Dissolved Solids (TDS)	mg/L	1		440	603	960	360	470	1100	350	355	360	150	206	320	330	439	620
Calcium	mg/L	1		8	14	23	26	40	110	29	35	40	9	11	15	7	22	110
Magnesium	mg/L	1		15	23	38	12	23	66	14	22	29	5	12	18	0	8	13
Sodium	mg/L	1		96	128	200	54	77	140	41	50	59	21	32	49	65	93	180
Potassium	mg/L	1		5	6	9	8	13	30	3	5	7	1	9	47	26	34	39
Hydroxide as CaCO3	mg/L	1																
Carbonate as CaCO3	mg/L	1		14	40	160	100	163	250	100	155	210	69	101	200	12	63	200
Bicarbonate as CaCO3	mg/L	1		200	291	460	84	132	410	60	72	84	28	45	57	44	151	480
Chloride	mg/L	1		29	31	34	12	57	170	10	50	90	1	5	7	7	54	91
Sulphate	mg/L	1		0.05	0.08	0.12	0.14	0.19	0.23	0.26	0.26	0.26	0.13	0.16	0.21	0.46	0.74	1.80
Fluoride	mg/L	0.1																
Cyanide	mg/L	0.01	0.007															
Aluminium - Filtered	mg/L	0.005	0.055	0.02	0.07	0.17	0.04	0.11	0.25	0.02	0.02	0.02	0.02	0.03	0.06	0.02	0.08	0.39
Arsenic - Filtered	mg/L	0.001	0.013	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00
Boron - Filtered	mg/L	0.01	0.37	0.02	0.02	0.02	0.02	0.03	0.04	0.01	0.02	0.02	0.06	0.06	0.06	0.01	0.02	0.07
Cadmium - Filtered	mg/L	0.00005	0.0002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chromium - Filtered	mg/L	0.002	ID	0.00	0.00	0.01	0.00	0.01	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cobalt - Filtered	mg/L	0.001	0.0014	0.01	0.02	0.03	0.00	0.01	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Copper - Filtered	mg/L	0.00005	0.0014	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Iron - Filtered	mg/L	0.01	ID	0.36	3.12	4.80	0.61	3.16	6.10	4.00	4.00	4.00	0.04	1.99	5.20	0.03	0.06	0.24
Lead - Filtered	mg/L	0.00005	0.0034	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.01	0.04	0.00	0.00	0.01
Manganese - Filtered	mg/L	0.001	1.9	0.44	0.62	0.88	0.14	0.30	0.83	0.08	0.12	0.16	0.01	0.05	0.12	0.00	0.01	0.03
Mercury - Filtered	mg/L	0.0001	0.00006															
Nickel - Filtered	mg/L	0.001	0.011	0.02	0.03	0.05	0.01	0.02	0.08	0.01	0.02	0.03	0.00	0.01	0.01	0.00	0.00	0.00
Selenium - Filtered	mg/L	0.001	0.005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Silver - Filtered	mg/L	0.001	0.00005															
Zinc - Filtered	mg/L	0.005	0.008	0.01	0.05	0.13	0.01	0.06	0.29	0.01	0.16	0.30	0.02	0.03	0.06	0.01	0.01	0.03
Ammonia as N	mg/L	0.01	0.9	0.02	0.06	0.12	0.11	0.22	0.43	0.01	0.81	1.60	0.01	0.37	1.40	0.27	0.65	1.20
Nitrate as N	mg/L	0.01	0.7	0.01	0.02	0.02	0.01	0.02	0.04	0.02	0.03	0.03	0.02	0.15	0.22	0.01	0.02	0.03
Total Nitrogen as N	mg/L	0.01		0.13	0.57	1.70	0.21	1.31	3.60	0.09	1.25	2.40	0.21	1.64	2.80	1.30	1.54	2.00
Reactive Phosphorus as P	mg/L	0.01		0.01	0.03	0.07	0.01	0.02	0.03	0.01	0.02	0.02	0.01	0.02	0.03	0.02	0.03	0.04
Total Phosphorus as P	mg/L	0.01		0.02	0.06	0.15	0.06	0.11	0.24	0.02	0.03	0.03	0.02	0.07	0.22	0.04	0.09	0.19

Zero values within shading indicate where analysis results are less than laboratory detection

Bore / Well / Spring / Soak		PZ110			PZ111			PZ112A			PZ112B			PZ114 / PZ125					
		Ulan Seam floor			Ulan Seam			Ulan Seam			Tertiary / Surficial			Upper / Middle Permian					
Parameter	Units	LOR	ANZECC (2000) Guideline Value for Freshwater Ecosystem Protection	Min	Average	Max	Min	Average	Max	Min	Average	Max	Min	Average	Max				
				pH Value (field)		0.01		6.00	6.36	6.70	5.80	6.27	7.00	6.60	6.60	6.60	5.02	5.70	6.70
pH Value (lab)																			
Conductivity (field)	µS/cm	0		1040	1810	5470	640	1060	1730	2200	2200	2200	2200	5952	8240	700	1177	1580	
Conductivity @ 25°C	µS/cm	1		860	1111	1800	720	989	1200	2170	2170	2170	2500	6070	8100	800	1115	1400	
Total Suspended Solids (TSS)	mg/L	2		9	68	200	3	21	48	2700	2700	2700	12	762	2000	33	1926	6000	
Total Dissolved Solids (TDS)	mg/L	1		480	639	1200	370	562	720	1400	1400	1400	1500	3622	5000	460	627	760	
Calcium	mg/L	1		39	45	60	25	59	89	120	120	120	6	41	93	1	9	31	
Magnesium	mg/L	1		21	30	64	21	30	39	61	61	61	30	123	190	12	19	22	
Sodium	mg/L	1		60	97	140	45	71	130	210	210	210	450	997	1300	110	152	170	
Potassium	mg/L	1		11	26	39	8	17	22	30	30	30	10	28	39	1	2	5	
Hydroxide as CaCO3	mg/L	1																	
Carbonate as CaCO3	mg/L	1																	
Bicarbonate as CaCO3	mg/L	1																	
Chloride	mg/L	1		53	195	310	82	192	350	150	150	150	10	26	58	0	5	16	
Sulphate	mg/L	1		170	237	520	150	190	300	570	570	570	590	1666	2500	240	313	360	
Fluoride	mg/L	0.1		2	12	25	10	27	51	64	64	64	250	407	480	7	27	74	
Cyanide	mg/L	0.01	0.007	0.20	1.07	2.00	0.11	0.71	2.80	0.27	0.27	0.27	0.10	0.20	0.36	0.14	0.22	0.25	
Aluminium - Filtered	mg/L	0.005	0.055	0.03	0.03	0.03	0.03	0.03	0.03	0.01	0.01	0.01	0.02	0.07	0.19	0.06	0.19	0.34	
Arsenic - Filtered	mg/L	0.001	0.013	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.01	0.01	0.04	0.06	
Boron - Filtered	mg/L	0.01	0.37	0.02	0.04	0.11	0.01	0.02	0.04	0.09	0.09	0.09	0.02	0.05	0.12	0.01	0.04	0.06	
Cadmium - Filtered	mg/L	0.00005	0.0002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Chromium - Filtered	mg/L	0.002	ID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Cobalt - Filtered	mg/L	0.001		0.00	0.03	0.13	0.00	0.01	0.03	0.01	0.01	0.01	0.00	0.09	0.18	0.01	0.02	0.02	
Copper - Filtered	mg/L	0.0005	0.0014	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	
Iron - Filtered	mg/L	0.01	ID	0.07	3.44	7.30	0.07	3.12	13.00	0.01	0.01	0.01	0.01	2.80	7.10	0.02	0.05	0.08	
Lead - Filtered	mg/L	0.00005	0.0034	0.00	0.00	0.01	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.02	0.07	
Manganese - Filtered	mg/L	0.001	1.9	0.39	0.92	2.50	0.09	0.57	1.00	0.53	0.53	0.53	0.18	1.90	4.40	0.06	0.15	0.38	
Mercury - Filtered	mg/L	0.0001	0.00006	0.00	0.09	0.41	0.00	0.02	0.06	0.04	0.04	0.04	0.04	0.19	0.35	0.05	20.06	120.00	
Nickel - Filtered	mg/L	0.001	0.011																
Selenium - Filtered	mg/L	0.001	0.005																
Silver - Filtered	mg/L	0.001	0.00005																
Zinc - Filtered	mg/L	0.005	0.008	0.01	0.30	0.74	0.01	0.05	0.21	0.41	0.41	0.41	0.05	0.20	0.31	0.05	0.18	0.53	
Ammonia as N	mg/L	0.01	0.9	0.10	0.74	1.70	0.17	0.24	0.32	0.30	0.30	0.30	0.04	0.15	0.29	0.02	0.03	0.05	
Nitrate as N	mg/L	0.01	0.7	0.01	0.06	0.18	0.01	0.15	0.29	0.07	0.07	0.07	0.04	0.82	2.70	0.24	0.34	0.43	
Total Nitrogen as N	mg/L			0.31	1.44	2.40	0.17	0.45	0.89	3.10	3.10	3.10	1.00	2.00	4.60	0.47	1.11	1.70	
Reactive Phosphorus as P	mg/L	0.01		0.01	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.04	0.01	0.03	0.04	
Total Phosphorus as P	mg/L	0.01		0.02	0.04	0.05	0.02	0.03	0.04	4.30	4.30	4.30	0.02	0.49	1.50	0.06	0.49	1.20	

Zero values within shading indicate where analysis results are less than laboratory detection

Bore / Well / Spring / Soak		PZ131			PZ132			PZ134			PZ135			PZ136		
Parameter	Units	LOR	ANZECC (2000) Guideline Value for Freshwater Ecosystem Protection	Upper / Middle Permian			Upper / Middle Permian			Upper / Middle Permian			Upper / Middle Permian			
				Min	Average	Max	Min	Average	Max	Min	Average	Max	Min	Average	Max	
pH Value (field)		0.01		5.80	6.42	7.20										
pH Value (lab)																
Conductivity (field)	µS/cm	0		4420	4677	5110										
Conductivity @ 25°C	µS/cm	1		5800	5850	5900										
Total Suspended Solids (TSS)	mg/L	2		34	87	140										
Total Dissolved Solids (TDS)	mg/L	1		4200	4200	4200										
Calcium	mg/L	1		340	345	350										
Magnesium	mg/L	1		310	315	320										
Sodium	mg/L	1		440	460	480										
Potassium	mg/L	1		89	89	89										
Hydroxide as CaCO3	mg/L	1														
Carbonate as CaCO3	mg/L	1		390	460	530										
Bicarbonate as CaCO3	mg/L	1		1300	1300	1300										
Chloride	mg/L	1		850	925	1000										
Sulphate	mg/L	1		0.19	0.20	0.20										
Fluoride	mg/L	0.1														
Cyanide	mg/L	0.01	0.007													
Aluminium - Filtered	mg/L	0.005	0.055	0.02	0.03	0.03										
Arsenic - Filtered	mg/L	0.001	0.013	0.01	0.01	0.02										
Boron - Filtered	mg/L	0.01	0.37	0.02	0.02	0.02										
Cadmium - Filtered	mg/L	0.00005	0.0002													
Chromium - Filtered	mg/L	0.002	ID													
Cobalt - Filtered	mg/L	0.001														
Copper - Filtered	mg/L	0.0005	0.0014	0.00	0.00	0.01										
Iron - Filtered	mg/L	0.01	ID	1.40	3.50	5.60										
Lead - Filtered	mg/L	0.00005	0.0034													
Manganese - Filtered	mg/L	0.001	1.9	0.34	0.38	0.42										
Mercury - Filtered	mg/L	0.0001	0.00006													
Nickel - Filtered	mg/L	0.001	0.011	0.01	0.02	0.04										
Selenium - Filtered	mg/L	0.001	0.005													
Silver - Filtered	mg/L	0.001	0.00005													
Zinc - Filtered	mg/L	0.005	0.008	0.01	0.01	0.01										
Ammonia as N	mg/L	0.01	0.9	0.46	0.58	0.69										
Nitrate as N	mg/L	0.01	0.7	0.02	0.03	0.03										
Total Nitrogen as N	mg/L			0.63	1.17	1.70										
Reactive Phosphorus as P	mg/L	0.01		0.01	0.01	0.01										
Total Phosphorus as P	mg/L	0.01		0.02	0.09	0.15										

Zero values within shading indicate where analysis results are less than laboratory detection



Bore / Well / Spring / Soak		PZ137			PZ138			PZ139			PZ140			PZ141		
Lithological Unit		Upper / Middle Permian		Upper / Middle Permian		Ulian Seam		Lower Permian		Lower Permian		Lower Permian				
Parameter	Units	LOR	ANZECC (2000) Guideline Value for Freshwater Ecosystem Protection	Min	Average	Max	Min	Average	Max	Min	Average	Max	Min	Average	Max	
pH Value (field)		0.01		5.10	5.62	6.35	5.70	6.06	6.46	5.60	5.64	5.68	4.20	4.76	5.40	
pH Value (lab)				6.40	6.40	6.40							5.00	5.00	5.00	
Conductivity (field)	µS/cm	0		780	867	1021	2620	2723	2820	1100	1860	2620	4060	4593	5110	
Conductivity @ 25°C	µS/cm	1		420	733	890	3200	3250	3300	1200	2250	3300	4490	4897	5200	
Total Suspended Solids (TSS)	mg/L	2		67	759	1800	29	33	36	9	12	15	15	954	2800	
Total Dissolved Solids (TDS)	mg/L	1		530	533	540	1800	2000	2200	650	1375	2100	2700	2900	3000	
Calcium	mg/L	1		26	28	29	110	110	110	55	93	130	19	21	22	
Magnesium	mg/L	1		22	23	23	120	120	120	37	64	91	94	96	99	
Sodium	mg/L	1		76	79	84	350	360	370	120	255	390	780	803	820	
Potassium	mg/L	1		24	25	26	48	49	50	20	39	57	40	42	44	
Hydroxide as CaCO3	mg/L	1														
Carbonate as CaCO3	mg/L	1														
Bicarbonate as CaCO3	mg/L	1		29	70	130	390	400	410	160	185	210	1500	1600	1700	
Chloride	mg/L	1		210	227	240	730	745	760	240	540	840	140	143	150	
Sulphate	mg/L	1		26	30	35	200	215	230	47	164	280	0.35	0.40	0.45	
Fluoride	mg/L	0.1		0.05	0.07	0.08	0.21	0.24	0.26	0.16	0.16	0.16				
Cyanide	mg/L	0.01	0.007				0.01	0.01	0.01	0.01	0.01	0.01				
Aluminium - Filtered	mg/L	0.005	0.055	0.02	0.02	0.02	0.00	0.00	0.01	0.00	0.01	0.01	0.86	1.15	1.40	
Arsenic - Filtered	mg/L	0.001	0.013	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.01	0.01	0.00	0.01	0.01	
Boron - Filtered	mg/L	0.01	0.37	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	
Cadmium - Filtered	mg/L	0.00005	0.0002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Chromium - Filtered	mg/L	0.002	ID				0.00	0.00	0.00	0.00	0.00	0.00				
Cobalt - Filtered	mg/L	0.001		0.01	0.01	0.02	0.03	0.03	0.04	0.00	0.01	0.02	0.09	0.10	0.10	
Copper - Filtered	mg/L	0.0005	0.0014	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	
Iron - Filtered	mg/L	0.01	ID	0.18	2.69	6.00	5.50	10.75	16.00	0.22	0.58	0.94	3.60	36.17	99.40	
Lead - Filtered	mg/L	0.00005	0.0034	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.51	0.79	0.00	0.00	0.00	
Manganese - Filtered	mg/L	0.001	1.9	0.58	0.67	0.76	0.45	0.47	0.49	0.22	0.51	0.79	0.77	0.80	0.83	
Mercury - Filtered	mg/L	0.0001	0.00006													
Nickel - Filtered	mg/L	0.001	0.011	0.03	0.03	0.04	0.12	0.15	0.17	0.01	0.04	0.08	0.21	0.22	0.22	
Selenium - Filtered	mg/L	0.001	0.005				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Silver - Filtered	mg/L	0.001	0.00005													
Zinc - Filtered	mg/L	0.005	0.008	0.01	0.07	0.13	0.01	0.07	0.13	0.04	0.04	0.04	0.48	0.55	0.60	
Ammonia as N	mg/L	0.01	0.9	0.17	0.28	0.33	0.11	0.14	0.16	0.10	0.31	0.51	0.47	0.49	0.52	
Nitrate as N	mg/L	0.01	0.7	0.02	0.03	0.04	0.02	0.03	0.04	0.01	0.03	0.05	0.01	0.01	0.01	
Total Nitrogen as N	mg/L			0.75	0.75	0.75				0.83	0.83	0.83	2.70	2.70	2.70	
Reactive Phosphorus as P	mg/L	0.01		0.03	0.03	0.03	0.01	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.03	
Total Phosphorus as P	mg/L	0.01		0.05	0.24	0.59	0.02	0.03	0.04	0.02	0.02	0.02	0.01	0.85	2.50	

Zero values within shading indicate where analysis results are less than laboratory detection

Bore / Well / Spring / Soak		PZ143		PZ149		PZ150		PZ151		PZ152		
Lithological Unit		Lower Permian		Upper / Middle Permian		Ulan Seam		Ulan Seam		Upper / Middle Permian		
Parameter	Units	LOR	ANZECC (2000) Guideline Value for Freshwater Ecosystem Protection	Min	Average	Max	Min	Average	Max	Min	Average	Max
pH Value (field)		0.01		5.10	5.77	6.70	5.10	5.66	6.22	6.40	6.51	6.62
pH Value (lab)				6.00	6.20	6.20	6.40	6.40	6.40	6.00	6.40	6.00
Conductivity (field)	µS/cm	0		2180	2493	2780	5030	5065	5100	483	577	670
Conductivity @ 25°C	µS/cm	1		2500	2533	2600	4730	5715	6700	420	580	740
Total Suspended Solids (TSS)	mg/L	2		61	281	720	73	127	180	10	210	410
Total Dissolved Solids (TDS)	mg/L	1		1500	1633	1800	3700	4000	4300	250	325	400
Calcium	mg/L	1		100	100	100	180	195	210	18	26	33
Magnesium	mg/L	1		78	82	87	160	190	220	10	15	20
Sodium	mg/L	1		230	257	300	590	630	670	33	47	60
Potassium	mg/L	1		43	46	49	68	75	82	19	20	20
Hydroxide as CaCO3	mg/L	1										
Carbonate as CaCO3	mg/L	1		50	83	120	32	71	110	78	94	110
Bicarbonate as CaCO3	mg/L	1		660	697	730	1600	1850	2100	66	103	140
Chloride	mg/L	1		210	220	230	130	140	150	20	27	34
Sulphate	mg/L	1		0.08	0.16	0.26	0.08	0.64	1.20	0.14	0.14	0.14
Fluoride	mg/L	0.1										
Cyanide	mg/L	0.01	0.007									
Aluminium - Filtered	mg/L	0.005	0.055	0.03	0.04	0.05	0.02	0.05	0.08	0.01	0.01	0.01
Arsenic - Filtered	mg/L	0.001	0.013	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.02
Boron - Filtered	mg/L	0.01	0.37	0.06	0.06	0.07	0.08	0.09	0.10	0.01	0.02	0.02
Cadmium - Filtered	mg/L	0.00005	0.0002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chromium - Filtered	mg/L	0.002	ID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cobalt - Filtered	mg/L	0.001		0.01	0.01	0.02	0.21	0.30	0.38	0.00	0.01	0.01
Copper - Filtered	mg/L	0.0005	0.0014	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Iron - Filtered	mg/L	0.01	ID	3.90	15.63	23.00	44.00	56.00	68.00	0.33	1.22	2.10
Lead - Filtered	mg/L	0.00005	0.0034	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manganese - Filtered	mg/L	0.001	1.9	1.10	1.17	1.20	14.00	16.50	19.00	0.10	0.14	0.18
Mercury - Filtered	mg/L	0.0001	0.00006	0.05	0.07	0.08	0.00	0.00	0.00	0.01	0.03	0.05
Nickel - Filtered	mg/L	0.001	0.011	0.00	0.02	0.03	0.79	1.20	1.60	0.01	0.03	0.05
Selenium - Filtered	mg/L	0.001	0.005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Silver - Filtered	mg/L	0.001	0.00005									
Zinc - Filtered	mg/L	0.005	0.008	0.03	0.19	0.50	0.87	1.24	1.60	0.01	0.07	0.13
Ammonia as N	mg/L	0.01	0.9	0.38	0.44	0.48	0.24	0.33	0.41	0.14	0.15	0.16
Nitrate as N	mg/L	0.01	0.7	0.01	0.01	0.01	0.10	0.10	0.10	0.10	0.10	0.10
Total Nitrogen as N	mg/L			0.89	1.23	1.60						
Reactive Phosphorus as P	mg/L	0.01		0.04	0.05	0.05	0.02	0.06	0.10	0.02	0.03	0.03
Total Phosphorus as P	mg/L	0.01		0.01	0.14	0.33	0.13	0.13	0.13	0.01	0.10	0.18

Zero values within shading indicate where analysis results are less than laboratory detection

Bore / Well / Spring / Soak		PZ153			PZ154			PZ155			PZ156			PZ157		
Lithological Unit		Regolith / Surficial			Upper / Middle Permian			Upper / Middle Permian			Ulan Seam			Ulan Seam		
Parameter	Units	LOR	ANZECC (2000) Guideline Value for Freshwater Ecosystem Protection	Min	Average	Max	Min	Average	Max	Min	Average	Max	Min	Average	Max	
pH Value (field)		0.01														
pH Value (lab)																
Conductivity (field)	µS/cm	0														
Conductivity @ 25°C	µS/cm	1														
Total Suspended Solids (TSS)	mg/L	2														
Total Dissolved Solids (TDS)	mg/L	1														
Calcium	mg/L	1														
Magnesium	mg/L	1														
Sodium	mg/L	1														
Potassium	mg/L	1														
Hydroxide as CaCO3	mg/L	1														
Carbonate as CaCO3	mg/L	1														
Bicarbonate as CaCO3	mg/L	1														
Chloride	mg/L	1														
Sulphate	mg/L	1														
Fluoride	mg/L	0.1														
Cyanide	mg/L	0.01	0.007													
Aluminium - Filtered	mg/L	0.005	0.055	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.02	
Arsenic - Filtered	mg/L	0.001	0.013	0.04	0.04	0.04	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	
Boron - Filtered	mg/L	0.01	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Cadmium - Filtered	mg/L	0.00005	0.0002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Chromium - Filtered	mg/L	0.002	ID	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
Cobalt - Filtered	mg/L	0.001	0.0014	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Copper - Filtered	mg/L	0.0005	ID	0.02	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Iron - Filtered	mg/L	0.01	ID	0.02	0.02	0.02	8.40	8.70	9.00	8.40	8.70	9.00	0.98	0.98	0.98	
Lead - Filtered	mg/L	0.00005	0.0034	0.18	0.18	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	
Manganese - Filtered	mg/L	0.001	1.9	0.02	0.02	0.02	0.49	0.58	0.67	0.49	0.58	0.67	0.21	0.21	0.21	
Mercury - Filtered	mg/L	0.0001	0.00006	0.02	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	
Nickel - Filtered	mg/L	0.001	0.011	0.02	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	
Selenium - Filtered	mg/L	0.001	0.005	0.02	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	
Silver - Filtered	mg/L	0.001	0.00005	0.07	0.07	0.07	0.04	0.05	0.05	0.04	0.05	0.05	0.01	0.01	0.01	
Zinc - Filtered	mg/L	0.005	0.008	0.06	0.06	0.06	0.02	0.25	0.49	0.02	0.25	0.49	0.10	0.10	0.10	
Ammonia as N	mg/L	0.01	0.9	0.06	0.06	0.06	0.04	0.08	0.12	0.04	0.08	0.12	0.14	0.14	0.14	
Nitrate as N	mg/L	0.01	0.7	0.03	0.03	0.03	0.33	0.33	0.33	0.33	0.33	0.33	2.00	2.00	2.00	
Total Nitrogen as N	mg/L	0.01		0.05	0.05	0.05	1.20	2.35	3.50	0.03	0.03	0.03	0.06	0.06	0.06	
Reactive Phosphorus as P	mg/L	0.01		0.05	0.05	0.05	0.03	0.03	0.03	0.03	0.03	0.03	0.06	0.06	0.06	
Total Phosphorus as P	mg/L	0.01		0.05	0.05	0.05	0.05	0.23	0.41	0.05	0.23	0.41	0.06	0.06	0.06	

Zero values within shading indicate where analysis results are less than laboratory detection

Bore / Well / Spring / Soak		PZ158			PZ159			PZ160			PZ161			PZ162		
Lithological Unit		Regolith / Surficial			Upper / Middle Permian			Upper / Middle Permian			Regolith / Surficial			Upper / Middle Permian		
Parameter	Units	LOR	ANZECC (2000) Guideline Value for Freshwater Ecosystem Protection	Min	Average	Max	Min	Average	Max	Min	Average	Max	Min	Average	Max	
pH Value (field)		0.01		5.70	5.70	5.70							6.10	6.10	6.10	
pH Value (lab)				4460	4460	4460							2170	2170	2170	
Conductivity (field)	µS/cm	0		5900	5900	5900							2600	2600	2600	
Conductivity @ 25°C	µS/cm	1		11	11	11							47	47	47	
Total Suspended Solids (TSS)	mg/L	2		3300	3300	3300							1400	1400	1400	
Total Dissolved Solids (TDS)	mg/L	1					6.30	6.30	6.30	6.10	6.10	6.10				
Calcium	mg/L	1		160	160	160	120.00	120.00	120.00	79	79	79	61	61	61	
Magnesium	mg/L	1		270	270	270	230.00	230.00	230.00	140	140	140	84	84	84	
Sodium	mg/L	1		640	640	640	520.00	520.00	520.00	260	260	260	150	150	150	
Potassium	mg/L	1		45	45	45	30.00	30.00	30.00	14	14	14	21	21	21	
Hydroxide as CaCO3	mg/L	1														
Carbonate as CaCO3	mg/L	1		130	130	130	98.00	98.00	98.00	410	410	410	300	300	300	
Bicarbonate as CaCO3	mg/L	1		1900	1900	1900	1500.00	1500.00	1500.00	610	610	610	370	370	370	
Chloride	mg/L	1		300	300	300	300.00	300.00	300.00	83	83	83	60	60	60	
Sulphate	mg/L	1		0.22	0.22	0.22	0.15	0.15	0.15	0.52	0.52	0.52	0.27	0.27	0.27	
Fluoride	mg/L	0.1														
Cyanide	mg/L	0.01	0.007													
Aluminium - Filtered	mg/L	0.005	0.055				0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	
Arsenic - Filtered	mg/L	0.001	0.013				0.04	0.04	0.04	0.01	0.01	0.01	0.02	0.02	0.02	
Boron - Filtered	mg/L	0.01	0.37	0.01	0.01	0.01										
Cadmium - Filtered	mg/L	0.00005	0.0002	0.00	0.00	0.00										
Chromium - Filtered	mg/L	0.002	ID													
Cobalt - Filtered	mg/L	0.001	0.0014	0.01	0.01	0.01	0.08	0.08	0.08	0.00	0.00	0.00	0.01	0.01	0.01	
Copper - Filtered	mg/L	0.0005	0.0014	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	
Iron - Filtered	mg/L	0.01	ID	0.00	0.00	0.00	7.70	7.70	7.70	0.00	0.00	0.00	0.55	0.55	0.55	
Lead - Filtered	mg/L	0.00005	0.0034	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.21	0.21	
Manganese - Filtered	mg/L	0.001	1.9	0.09	0.09	0.09	0.80	0.80	0.80	0.00	0.00	0.00	0.03	0.03	0.03	
Mercury - Filtered	mg/L	0.0001	0.00006													
Nickel - Filtered	mg/L	0.001	0.011	0.04	0.04	0.04	0.11	0.11	0.11	0.02	0.02	0.02	0.03	0.03	0.03	
Selenium - Filtered	mg/L	0.001	0.005	0.00	0.00	0.00										
Silver - Filtered	mg/L	0.001	0.00005													
Zinc - Filtered	mg/L	0.005	0.008	0.07	0.07	0.07	0.04	0.04	0.04	0.01	0.01	0.01	0.14	0.14	0.14	
Ammonia as N	mg/L	0.01	0.9	0.07	0.07	0.07	0.03	0.03	0.03	0.72	0.72	0.72	0.19	0.19	0.19	
Nitrate as N	mg/L	0.01	0.7	0.24	0.24	0.24							0.01	0.01	0.01	
Total Nitrogen as N	mg/L	0.01					0.01	0.01	0.01	0.71	0.71	0.71	0.02	0.02	0.02	
Reactive Phosphorus as P	mg/L	0.01		0.02	0.02	0.02	0.17	0.17	0.17	0.05	0.05	0.05	0.02	0.02	0.02	
Total Phosphorus as P	mg/L	0.01					0.17	0.17	0.17	0.08	0.08	0.08	0.02	0.02	0.02	

Zero values within shading indicate where analysis results are less than laboratory detection

Bore / Well / Spring / Soak		PZ163			PZ164			PZ165			PZ166			PZ167		
Parameter	Units	LOR	ANZECC (2000) Guideline Value for Freshwater Ecosystem Protection	Regolith / Surficial			Upper / Middle Permian			Regolith / Surficial			Regolith / Surficial (Palaeochannel)			
				Min	Average	Max	Min	Average	Max	Min	Average	Max	Min	Average	Max	
pH Value (field)		0.01														
pH Value (lab)																
Conductivity (field)	µS/cm	0														
Conductivity @ 25°C	µS/cm	1														
Total Suspended Solids (TSS)	mg/L	2														
Total Dissolved Solids (TDS)	mg/L	1														
Calcium	mg/L	1														
Magnesium	mg/L	1														
Sodium	mg/L	1														
Potassium	mg/L	1														
Hydroxide as CaCO3	mg/L	1														
Carbonate as CaCO3	mg/L	1														
Bicarbonate as CaCO3	mg/L	1														
Chloride	mg/L	1														
Sulphate	mg/L	1														
Fluoride	mg/L	0.1														
Cyanide	mg/L	0.01	0.007													
Aluminium - Filtered	mg/L	0.005	0.055	6.70	7.75	8.80	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	
Arsenic - Filtered	mg/L	0.001	0.013	0.04	0.05	0.05	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	
Boron - Filtered	mg/L	0.01	0.37	0.15	0.19	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Cadmium - Filtered	mg/L	0.00005	0.0002	0.02	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Chromium - Filtered	mg/L	0.002	ID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Cobalt - Filtered	mg/L	0.001		1.30	1.35	1.40	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
Copper - Filtered	mg/L	0.0005	0.0014	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Iron - Filtered	mg/L	0.01	ID	88.00	104.00	120.00	0.21	0.37	0.52	0.02	0.03	0.04	0.02	0.02	0.02	
Lead - Filtered	mg/L	0.00005	0.0034	0.04	0.08	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Manganese - Filtered	mg/L	0.001	1.9	2.80	2.80	2.80	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	
Mercury - Filtered	mg/L	0.0001	0.00006													
Nickel - Filtered	mg/L	0.001	0.011	1.60	1.70	1.80	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
Selenium - Filtered	mg/L	0.001	0.005				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Silver - Filtered	mg/L	0.001	0.00005													
Zinc - Filtered	mg/L	0.005	0.008	6.30	6.80	7.30	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	
Ammonia as N	mg/L	0.01	0.9													
Nitrate as N	mg/L	0.01	0.7	5.70	6.05	6.40	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	
Total Nitrogen as N	mg/L			2.60	2.95	3.30	2.30	2.80	3.30	3.40	3.90	4.40	1.10	2.15	3.20	
Reactive Phosphorus as P	mg/L	0.01		0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.03	
Total Phosphorus as P	mg/L	0.01		0.14	0.25	0.36	0.22	0.42	0.62	0.22	0.42	0.62	0.03	0.41	0.78	

Zero values within shading indicate where analysis results are less than laboratory detection

Bore / Well / Spring / Soak		PZ168			PZ169			PZ170			PZ171			PZ172		
Parameter	Units	LOR	ANZECC (2000) Guideline Value for Freshwater Ecosystem Protection	Upper / Middle Permian			Regolith / Surficial			Upper / Middle Permian			Upper / Middle Permian			
				Min	Average	Max	Min	Average	Max	Min	Average	Max	Min	Average	Max	
pH Value (field)		0.01		5.80	5.80	5.80			5.40	5.40	5.40			5.70	5.70	5.70
pH Value (lab)																
Conductivity (field)	µS/cm	0		600	600	600			2200	2200	2200			5130	5130	5130
Conductivity @ 25°C	µS/cm	1		640	645	650			2500	2850	3200			7000	7000	7000
Total Suspended Solids (TSS)	mg/L	2		16	39	62			14	1007	2000			35	55	74
Total Dissolved Solids (TDS)	mg/L	1		350	355	360			1700	1900	2100			4100	4350	4600
Calcium	mg/L	1		37	37	37			130	155	180			120	125	130
Magnesium	mg/L	1		32	32	32			110	115	120			370	375	380
Sodium	mg/L	1		35	36	37			200	210	220			740	750	760
Potassium	mg/L	1		10	11	11			24	27	29			3	3	3
Hydroxide as CaCO3	mg/L	1														
Carbonate as CaCO3	mg/L	1														
Bicarbonate as CaCO3	mg/L	1		210	210	210			240	245	250			380	405	430
Chloride	mg/L	1		81	82	83			730	825	920			2200	2250	2300
Sulphate	mg/L	1		7	7	7			19	23	26			140	145	150
Fluoride	mg/L	0.1							0.14	0.14	0.14			0.28	0.28	0.28
Cyanide	mg/L	0.01	0.007													
Aluminium - Filtered	mg/L	0.005	0.055						0.03	0.03	0.03			0.02	0.02	0.02
Arsenic - Filtered	mg/L	0.001	0.013	0.00	0.00	0.00			0.00	0.00	0.00			0.00	0.00	0.00
Boron - Filtered	mg/L	0.01	0.37	0.01	0.01	0.01			0.02	0.05	0.07			0.01	0.01	0.01
Cadmium - Filtered	mg/L	0.00005	0.0002						0.00	0.00	0.00			0.00	0.00	0.00
Chromium - Filtered	mg/L	0.002	ID													
Cobalt - Filtered	mg/L	0.001							0.01	0.01	0.02			0.03	0.03	0.04
Copper - Filtered	mg/L	0.0005	0.0014						0.00	0.00	0.00			0.00	0.00	0.00
Iron - Filtered	mg/L	0.01	ID	1.70	2.60	3.50			0.03	0.03	0.03			0.03	0.04	0.04
Lead - Filtered	mg/L	0.00005	0.0034	0.00	0.00	0.00			0.00	0.00	0.00			0.00	0.00	0.00
Manganese - Filtered	mg/L	0.001	1.9	0.12	0.13	0.14			0.20	0.21	0.21			0.42	0.45	0.47
Mercury - Filtered	mg/L	0.0001	0.00006											0.00	0.00	0.00
Nickel - Filtered	mg/L	0.001	0.011	0.00	0.00	0.00			0.08	0.08	0.08			0.27	0.29	0.31
Selenium - Filtered	mg/L	0.001	0.005													
Silver - Filtered	mg/L	0.001	0.00005													
Zinc - Filtered	mg/L	0.005	0.008	0.01	0.02	0.04			0.26	0.27	0.27			0.55	0.57	0.58
Ammonia as N	mg/L	0.01	0.9	0.13	0.14	0.15			0.10	0.11	0.11			0.03	0.04	0.05
Nitrate as N	mg/L	0.01	0.7											0.20	0.25	0.30
Total Nitrogen as N	mg/L	0.01														
Reactive Phosphorus as P	mg/L	0.01		0.02	0.02	0.02			0.02	0.02	0.02			0.02	0.02	0.02
Total Phosphorus as P	mg/L	0.01		0.01	0.02	0.02			0.30	0.30	0.30			0.01	0.02	0.02

Zero values within shading indicate where analysis results are less than laboratory detection

Bore / Well / Spring / Soak		PZ173			PZ174			PZ175			PZ176			PZ177		
		Regolith / Surficial			Upper / Middle Permian			Regolith / Surficial			Upper / Middle Permian			Regolith / Surficial		
Parameter	Units	LOR	ANZECC (2000) Guideline Value for Freshwater Ecosystem Protection	Min	Average	Max	Min	Average	Max	Min	Average	Max	Min	Average	Max	
				pH Value (field)		0.01		6.30	6.30	6.30	5.40	5.40	5.40	5.30	5.30	5.30
pH Value (lab)																
Conductivity (field)	µS/cm	0		9180	9180	9180	1960	1960	1960	8100	8100	8100	1090	1090	1090	
Conductivity @ 25°C	µS/cm	1		14000	14000	14000	2400	2400	2400	13000	13000	13000	840	840	840	
Total Suspended Solids (TSS)	mg/L	2		17	10009	20000	52	52	52	23	23	23	39	39	39	
Total Dissolved Solids (TDS)	mg/L	1		8300	8450	8600	1200	1200	1200	7800	7800	7800	960	960	960	
Calcium	mg/L	1		33	34	34	50	50	50	150	150	150	27	27	27	
Magnesium	mg/L	1		590	595	600	110	110	110	630	630	630	19	19	19	
Sodium	mg/L	1		2200	2250	2300	230	230	230	1600	1600	1600	110	110	110	
Potassium	mg/L	1		8	10	11	10	10	10	13	13	13	4	4	4	
Hydroxide as CaCO3	mg/L	1														
Carbonate as CaCO3	mg/L	1		1300	1350	1400	96	96	96	440	440	440	110	110	110	
Bicarbonate as CaCO3	mg/L	1		4400	4450	4500	880	880	880	4100	4100	4100	170	170	170	
Chloride	mg/L	1		160	165	170	69	69	69	480	480	480	9	9	9	
Sulphate	mg/L	1		2.10	2.30	2.50	0.21	0.21	0.21	0.73	0.73	0.73	0.13	0.13	0.13	
Fluoride	mg/L	0.1														
Cyanide	mg/L	0.01	0.007													
Aluminium - Filtered	mg/L	0.005	0.055	0.03	0.03	0.03	0.00	0.00	0.00	0.03	0.03	0.03	0.22	0.22	0.22	
Arsenic - Filtered	mg/L	0.001	0.013				0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	
Boron - Filtered	mg/L	0.01	0.37	0.05	0.08	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	
Cadmium - Filtered	mg/L	0.00005	0.0002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Chromium - Filtered	mg/L	0.002	ID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Cobalt - Filtered	mg/L	0.001		0.01	0.01	0.01	0.02	0.02	0.02	0.04	0.04	0.04	0.02	0.02	0.02	
Copper - Filtered	mg/L	0.0005	0.0014	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Iron - Filtered	mg/L	0.01	ID	0.01	0.02	0.02	0.21	0.21	0.21	0.00	0.00	0.00	25.00	25.00	25.00	
Lead - Filtered	mg/L	0.00005	0.0034	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	
Manganese - Filtered	mg/L	0.001	1.9	1.30	1.60	1.90	0.21	0.21	0.21	0.35	0.35	0.35	0.28	0.28	0.28	
Mercury - Filtered	mg/L	0.0001	0.00006	0.00	0.00	0.00	0.14	0.14	0.14	0.03	0.03	0.03	0.04	0.04	0.04	
Nickel - Filtered	mg/L	0.001	0.011	0.01	0.02	0.02										
Selenium - Filtered	mg/L	0.001	0.005													
Silver - Filtered	mg/L	0.001	0.00005													
Zinc - Filtered	mg/L	0.005	0.008	0.01	0.06	0.10	0.30	0.30	0.30	0.17	0.17	0.17	0.05	0.05	0.05	
Ammonia as N	mg/L	0.01	0.9	0.04	0.05	0.06	0.70	0.70	0.70	0.22	0.22	0.22	0.06	0.06	0.06	
Nitrate as N	mg/L	0.01	0.7	1.00	1.00	1.00	1.10	1.10	1.10	0.62	0.62	0.62	6.40	6.40	6.40	
Total Nitrogen as N	mg/L			0.99	1.45	1.90	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	
Reactive Phosphorus as P	mg/L	0.01		0.03	0.03	0.03	0.01	0.01	0.01	0.01	0.01	0.01	0.12	0.12	0.12	
Total Phosphorus as P	mg/L	0.01		0.02	0.27	0.51	0.02	0.02	0.02	0.01	0.01	0.01	0.03	0.03	0.03	

Zero values within shading indicate where analysis results are less than laboratory detection

Bore / Well / Spring / Soak		TB179			PZ180			PZ181			PZ182			PZ183		
Lithological Unit		Ulan Seam			Tertiary / Surficial			Tertiary / Surficial			Tertiary / Surficial			Tertiary / Surficial		
Parameter	Units	LOR	ANZECC (2000) Guideline Value for Freshwater Ecosystem Protection	Min	Average	Max	Min	Average	Max	Min	Average	Max	Min	Average	Max	
pH Value (field)		0.01		6.30	6.30	6.30										
pH Value (lab)				890	890	890										
Conductivity (field)	µS/cm	0		890	890	890										
Conductivity @ 25°C	µS/cm	1		20	20	20										
Total Suspended Solids (TSS)	mg/L	2		440	440	440										
Total Dissolved Solids (TDS)	mg/L	1														
Calcium	mg/L	1		15	15	15										
Magnesium	mg/L	1		25	25	25										
Sodium	mg/L	1		78	78	78										
Potassium	mg/L	1		8	8	8										
Hydroxide as CaCO3	mg/L	1														
Carbonate as CaCO3	mg/L	1		26	26	26										
Bicarbonate as CaCO3	mg/L	1		240	240	240										
Chloride	mg/L	1		9	9	9										
Sulphate	mg/L	1														
Fluoride	mg/L	0.1														
Cyanide	mg/L	0.01	0.007													
Aluminium - Filtered	mg/L	0.005	0.055													
Arsenic - Filtered	mg/L	0.001	0.013													
Boron - Filtered	mg/L	0.01	0.37													
Cadmium - Filtered	mg/L	0.00005	0.0002	0.00	0.00	0.00										
Chromium - Filtered	mg/L	0.002	ID													
Cobalt - Filtered	mg/L	0.001	0.0014	0.04	0.04	0.04										
Copper - Filtered	mg/L	0.0005	ID													
Iron - Filtered	mg/L	0.01	0.0034	1.20	1.20	1.20										
Lead - Filtered	mg/L	0.00005	0.00006	0.73	0.73	0.73										
Manganese - Filtered	mg/L	0.001	1.9													
Mercury - Filtered	mg/L	0.0001	0.00006	0.38	0.38	0.38										
Nickel - Filtered	mg/L	0.001	0.011													
Selenium - Filtered	mg/L	0.001	0.005													
Silver - Filtered	mg/L	0.001	0.00005													
Zinc - Filtered	mg/L	0.005	0.008	0.17	0.17	0.17										
Ammonia as N	mg/L	0.01	0.9	0.02	0.02	0.02										
Nitrate as N	mg/L	0.01	0.7													
Total Nitrogen as N	mg/L	0.01														
Reactive Phosphorus as P	mg/L	0.01		0.02	0.02	0.02										
Total Phosphorus as P	mg/L	0.01														

Zero values within shading indicate where analysis results are less than laboratory detection



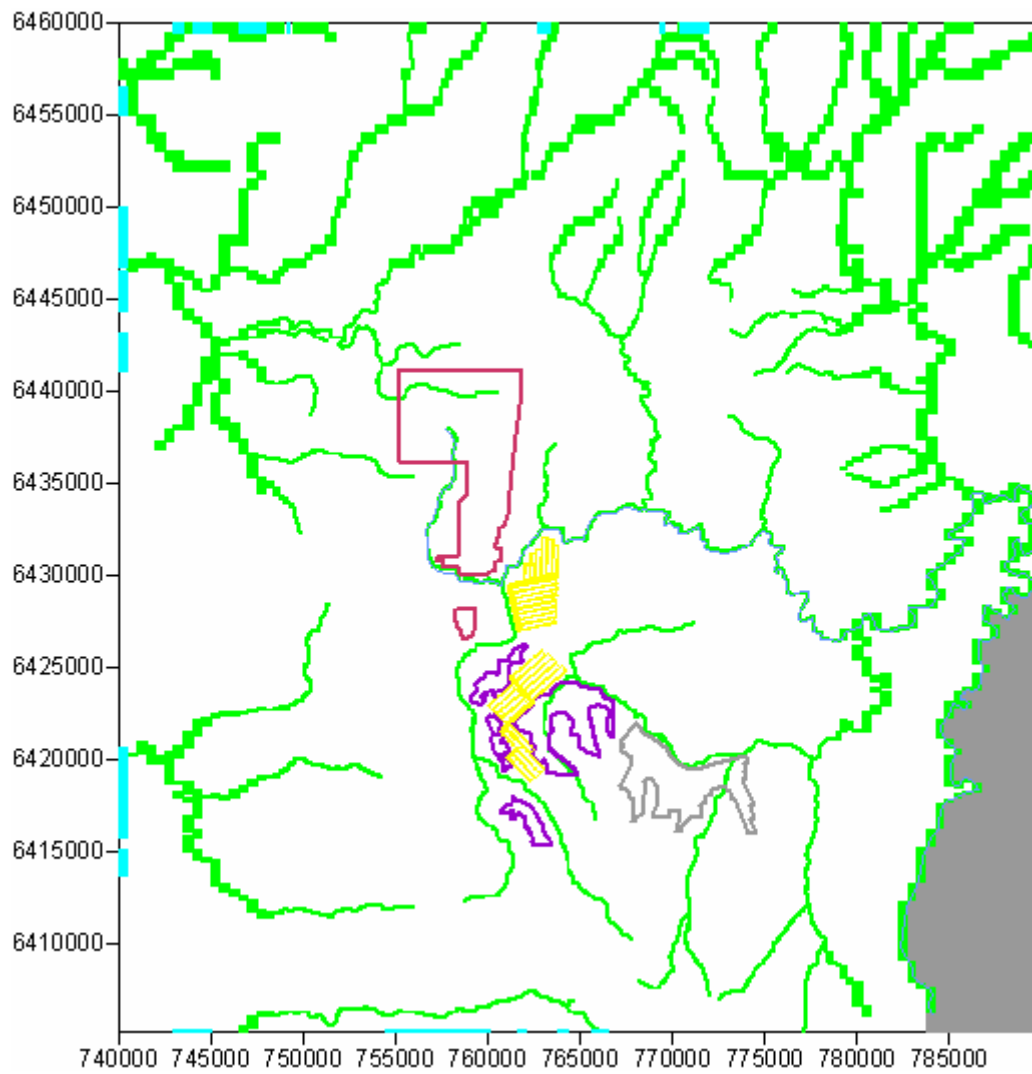
Bore / Well / Spring / Soak		PZ184		PZ185		
Lithological Unit		Upper / Middle Permian		Tertiary / Surficial		
Parameter	Units	LOR	ANZECC (2000) Guideline Value for Freshwater Ecosystem Protection	Min	Average	Max
pH Value (field)		0.01		5.60	5.60	5.60
pH Value (lab)						
Conductivity (field)	µS/cm	0		4170	4170	4170
Conductivity @ 25°C	µS/cm	1		3900	3900	3900
Total Suspended Solids (TSS)	mg/L	2		300	300	300
Total Dissolved Solids (TDS)	mg/L	1		2300	2300	2300
Calcium	mg/L	1		44	44	44
Magnesium	mg/L	1		57	57	57
Sodium	mg/L	1		620	620	620
Potassium	mg/L	1		9	9	9
Hydroxide as CaCO3	mg/L	1				
Carbonate as CaCO3	mg/L	1		4	4	4
Bicarbonate as CaCO3	mg/L	1		960	960	960
Chloride	mg/L	1		340	340	340
Sulphate	mg/L	1		0.40	0.40	0.40
Fluoride	mg/L	0.1				
Cyanide	mg/L	0.01	0.007			
Aluminium - Filtered	mg/L	0.005	0.055	1.70	1.70	1.70
Arsenic - Filtered	mg/L	0.001	0.013	0.00	0.00	0.00
Boron - Filtered	mg/L	0.01	0.37	0.04	0.04	0.04
Cadmium - Filtered	mg/L	0.00005	0.0002	0.00	0.00	0.00
Chromium - Filtered	mg/L	0.002	ID	0.00	0.00	0.00
Cobalt - Filtered	mg/L	0.001		0.12	0.12	0.12
Copper - Filtered	mg/L	0.0005	0.0014	0.00	0.00	0.00
Iron - Filtered	mg/L	0.01	ID	21.00	21.00	21.00
Lead - Filtered	mg/L	0.00005	0.0034	0.00	0.00	0.00
Manganese - Filtered	mg/L	0.001	1.9	0.87	0.87	0.87
Mercury - Filtered	mg/L	0.0001	0.00006	0.00	0.00	0.00
Nickel - Filtered	mg/L	0.001	0.011	0.18	0.18	0.18
Selenium - Filtered	mg/L	0.001	0.005			
Silver - Filtered	mg/L	0.001	0.00005			
Zinc - Filtered	mg/L	0.005	0.008	0.23	0.23	0.23
Ammonia as N	mg/L	0.01	0.9	0.86	0.86	0.86
Nitrate as N	mg/L	0.01	0.7			
Total Nitrogen as N	mg/L			0.59	0.59	0.59
Reactive Phosphorus as P	mg/L	0.01		0.01	0.01	0.01
Total Phosphorus as P	mg/L	0.01		0.03	0.03	0.03

Zero values within shading indicate where analysis results are less than laboratory detection

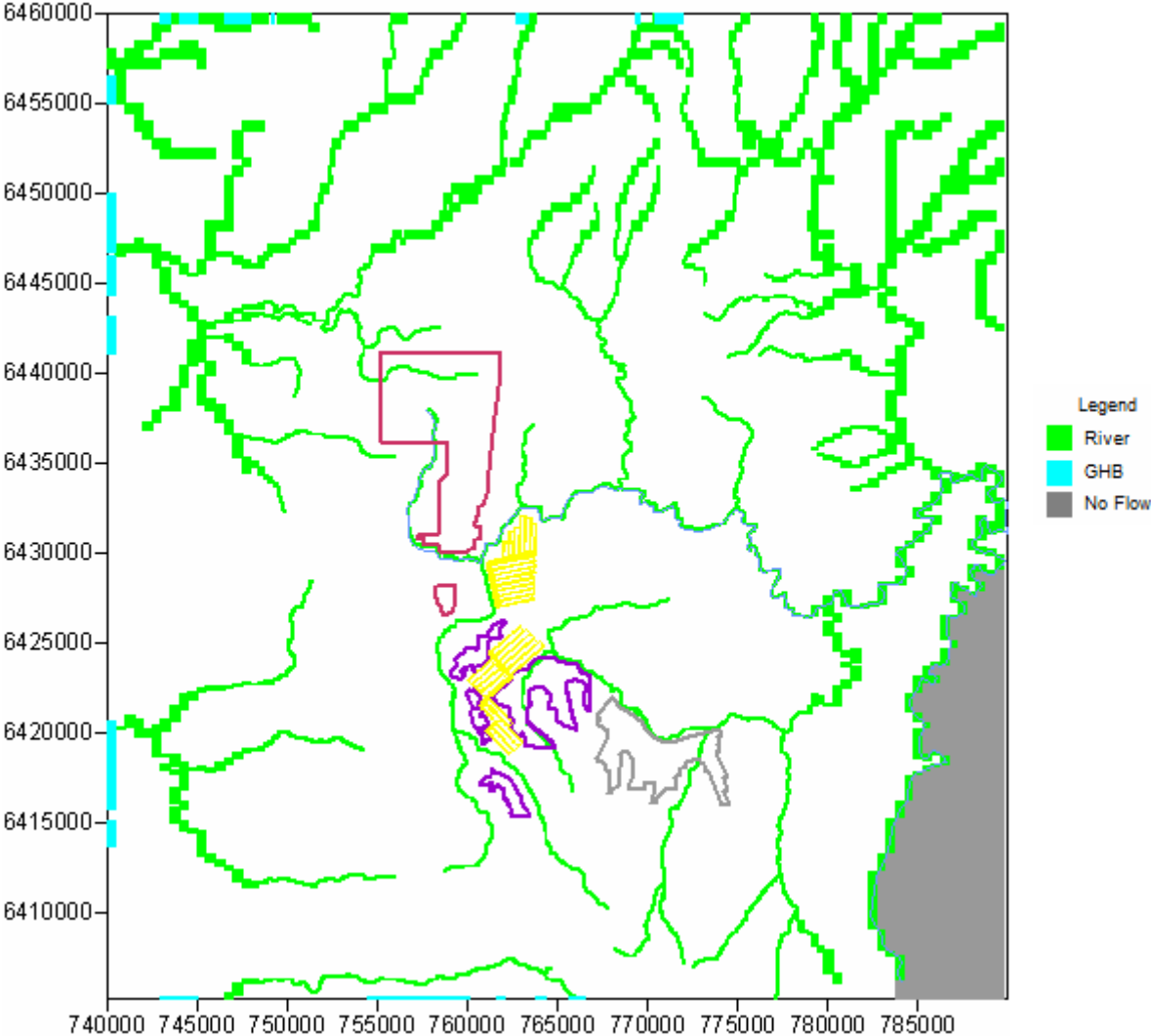
**APPENDIX G:  
MC2.2 MODEL DOMAIN AND LAYER  
BOUNDARY CONDITIONS**

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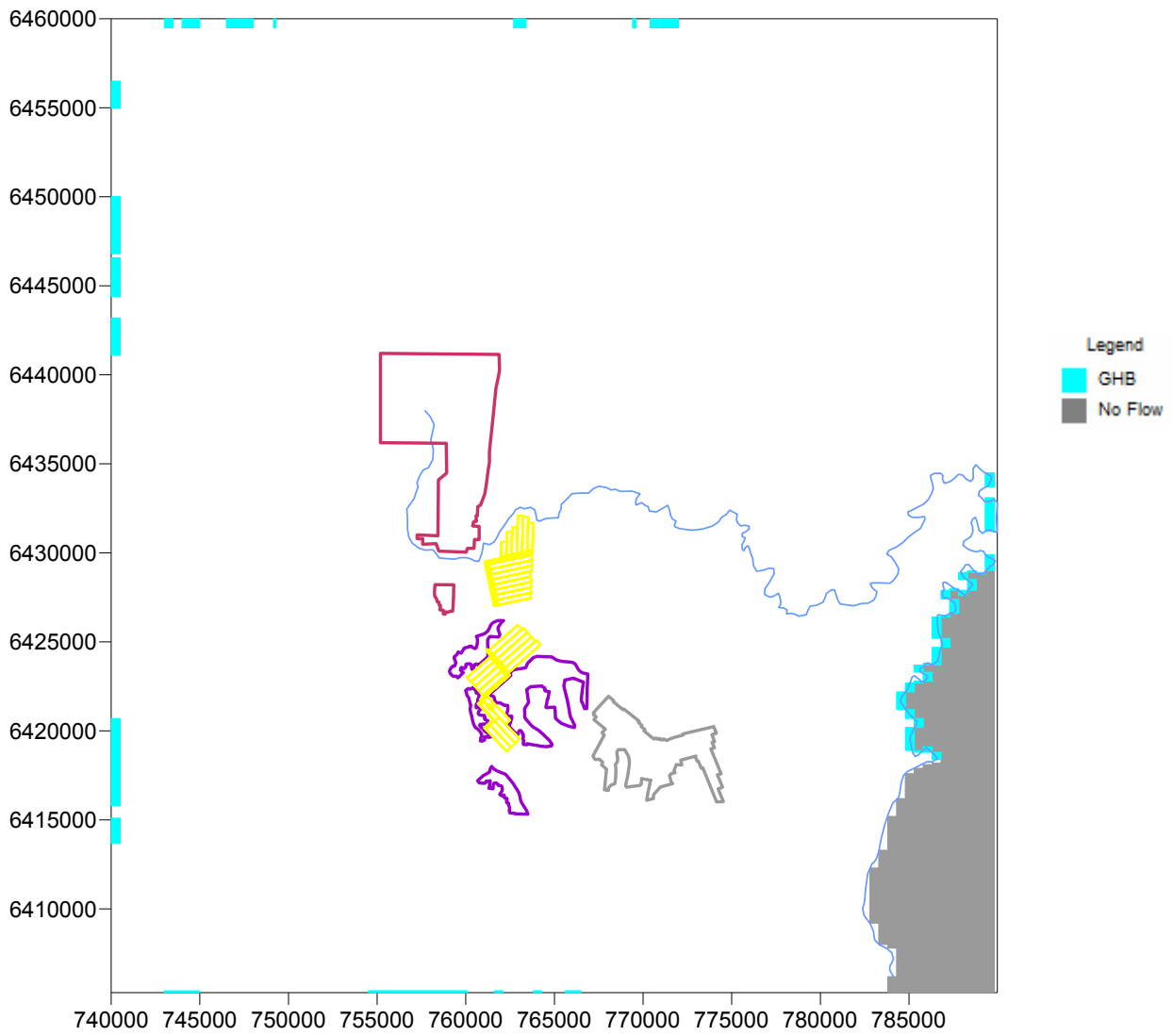
### MC2.2 Model Domain



Boundary Condition for Layer 1



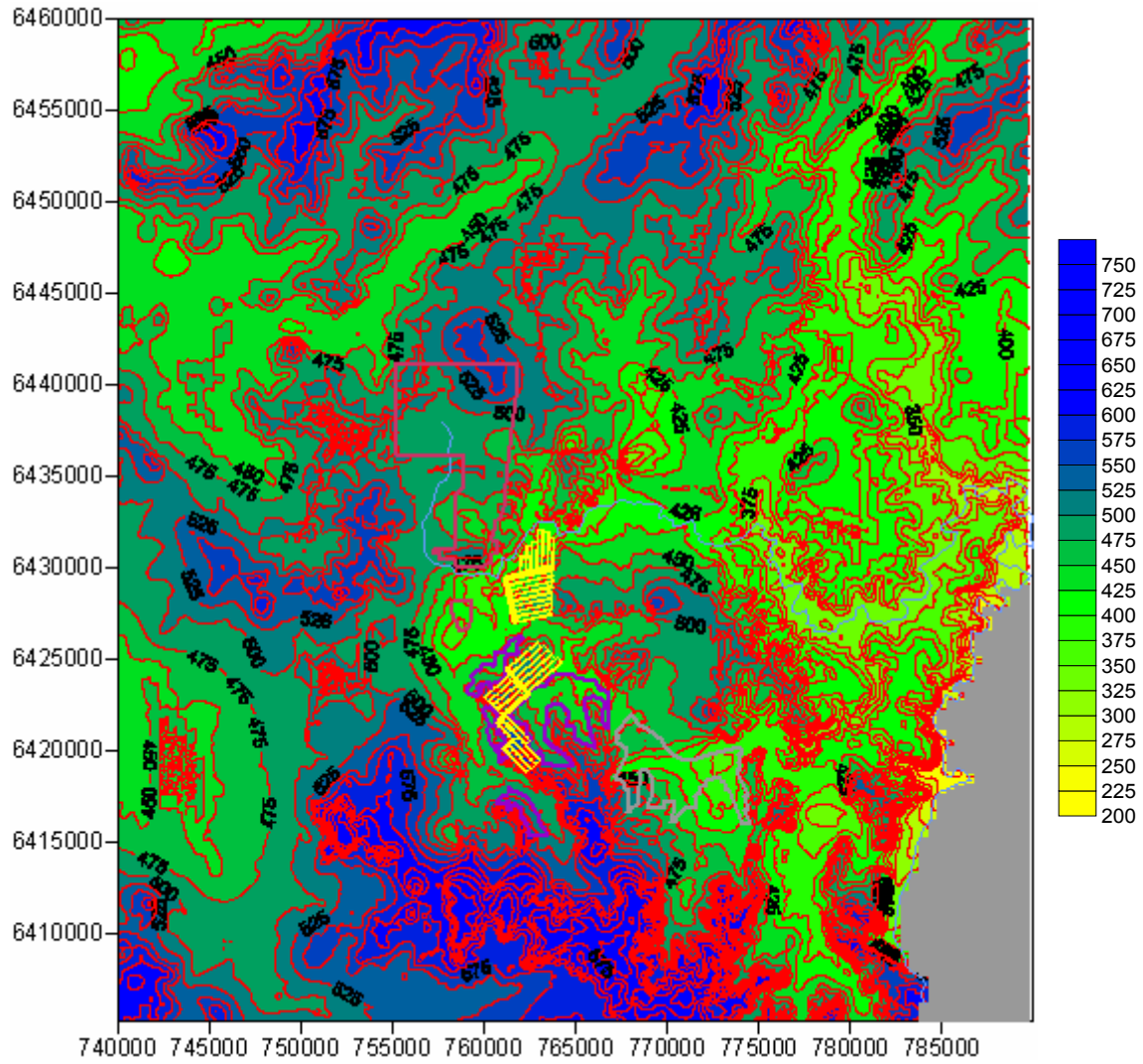
### Boundary Condition for Layers 2 to 8



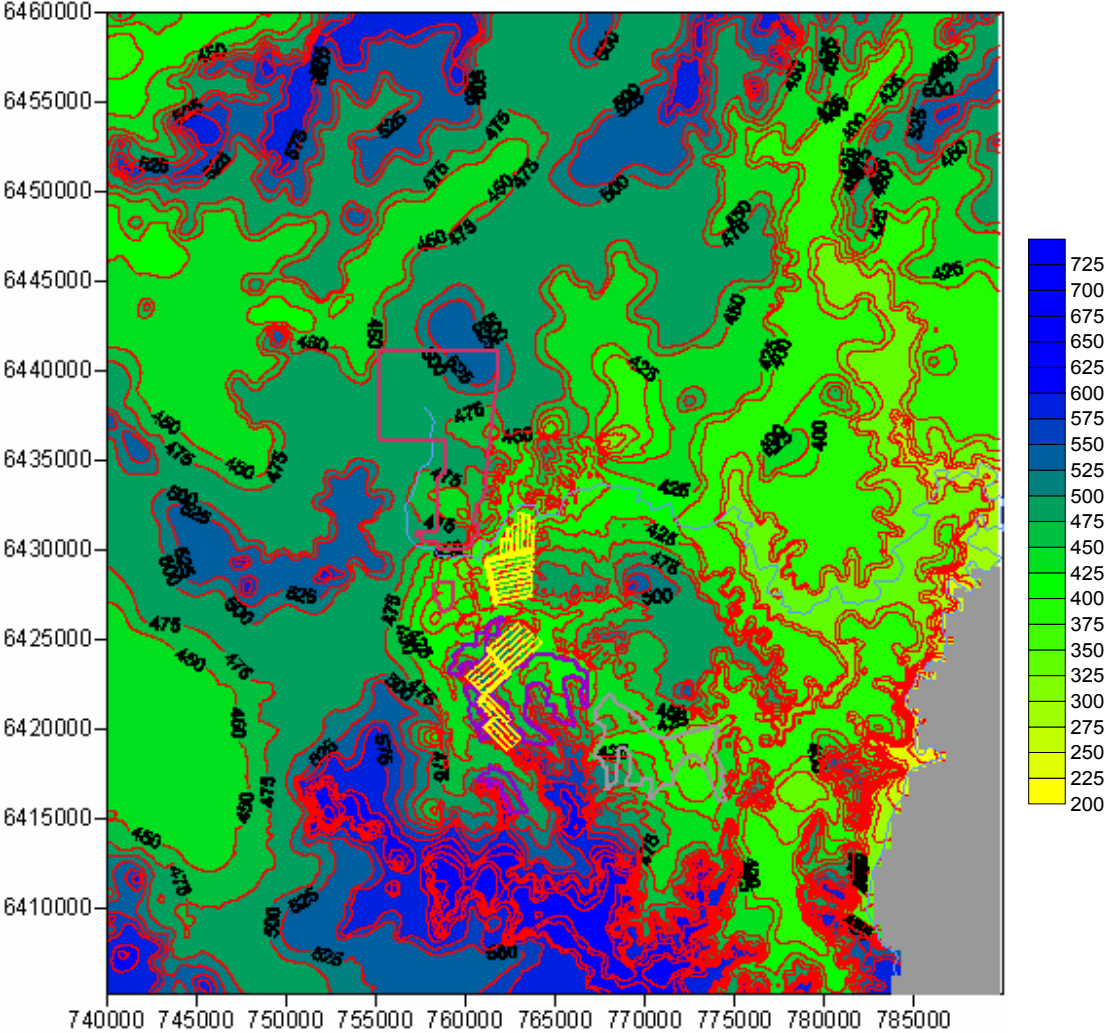
**APPENDIX H:  
MC2.2 MODEL LAYER ELEVATIONS**

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### Top Elevation for Layer 1 (mAHD)

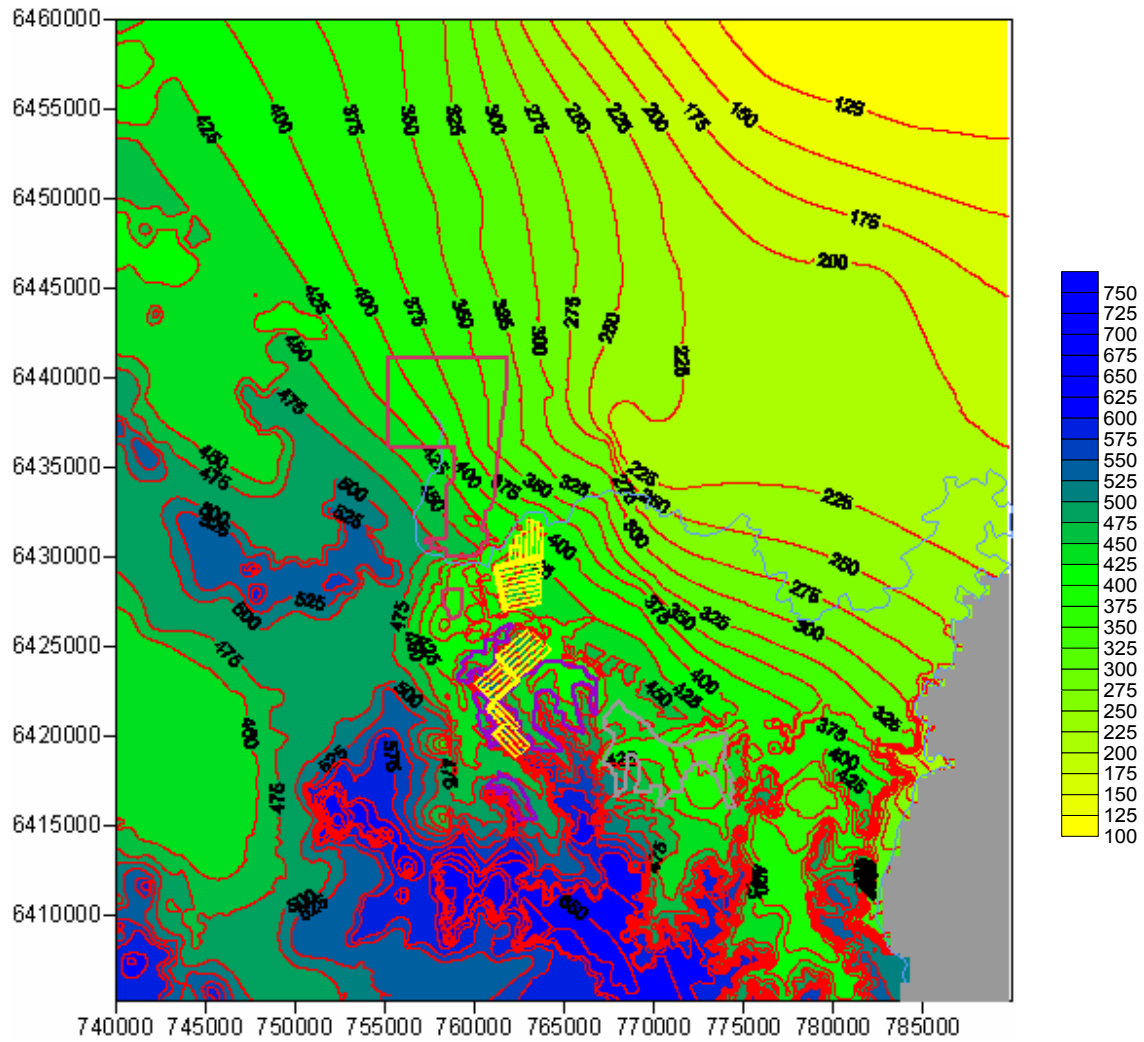


Top Elevation for Layer 2 (mAHD)

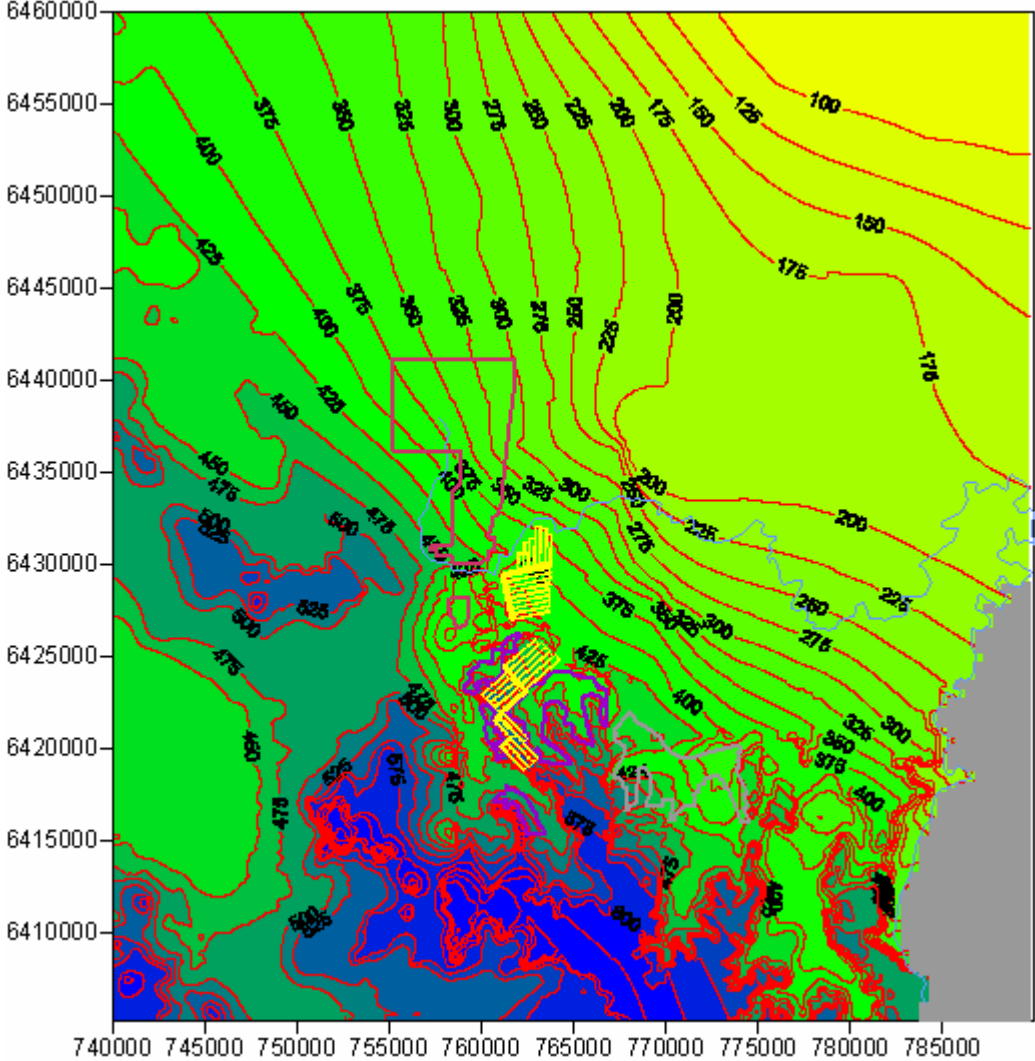




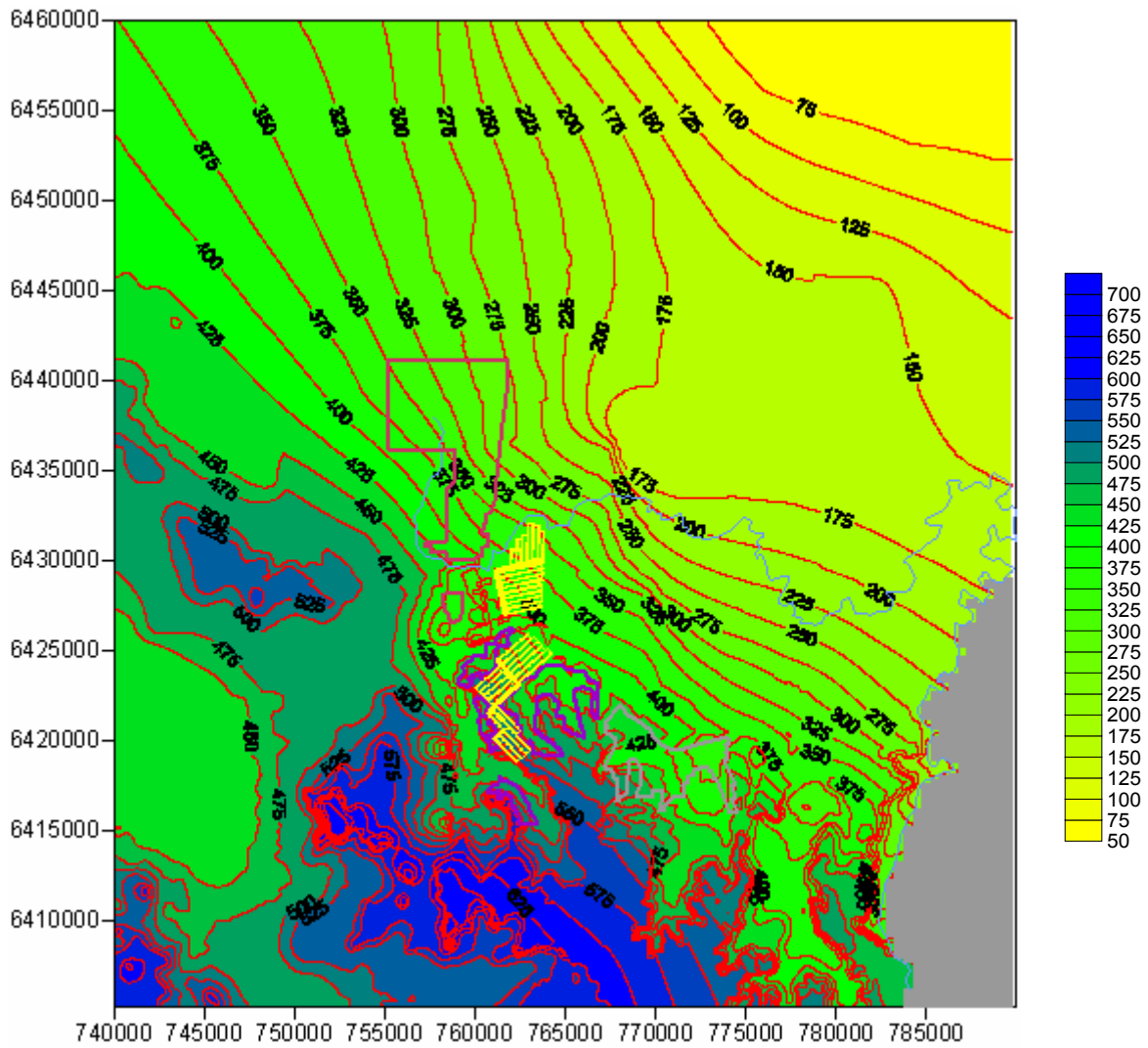
### Top Elevation for Layer 3 (mAHD)



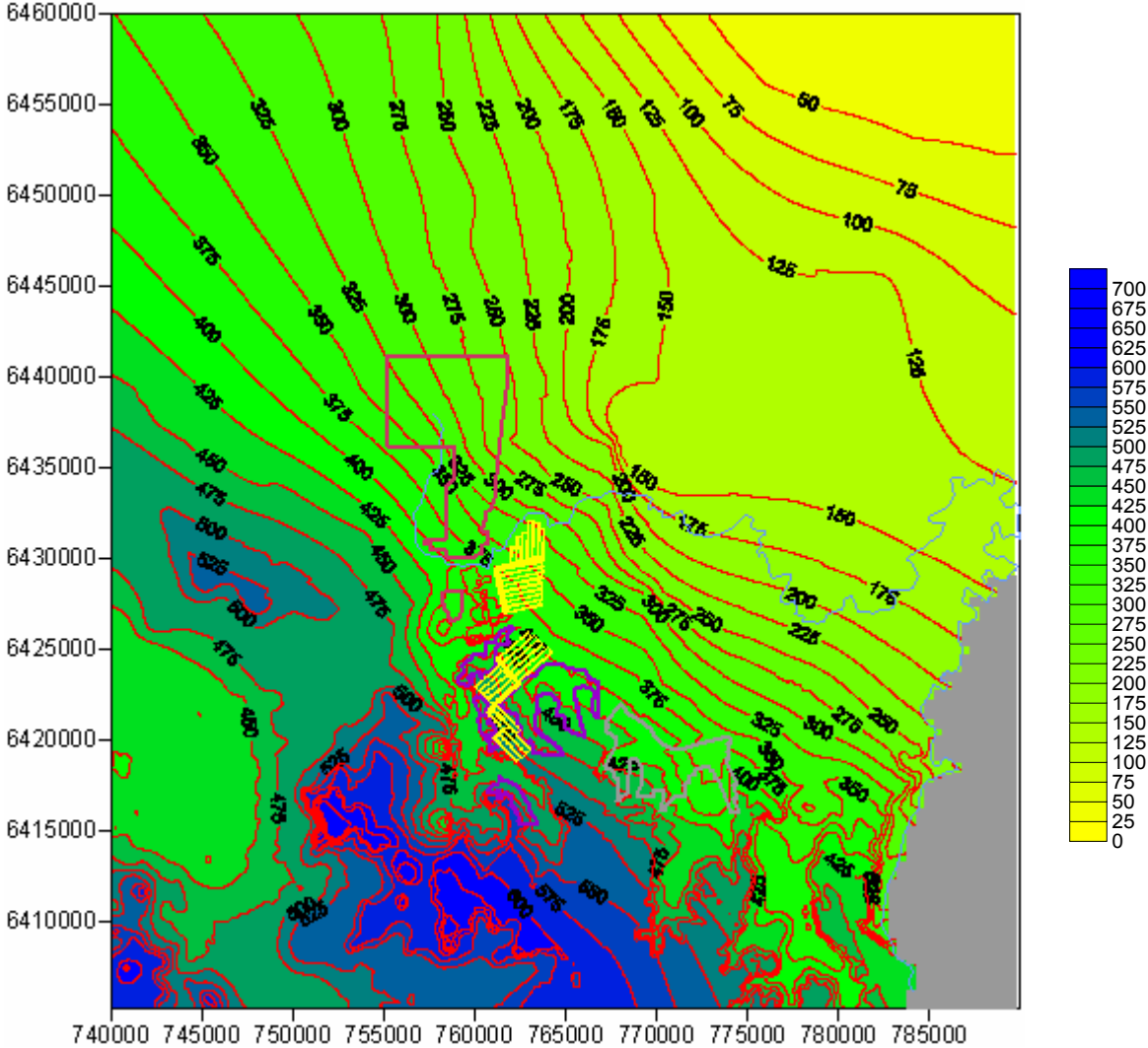
Top Elevation for Layer 4 (mAHD)



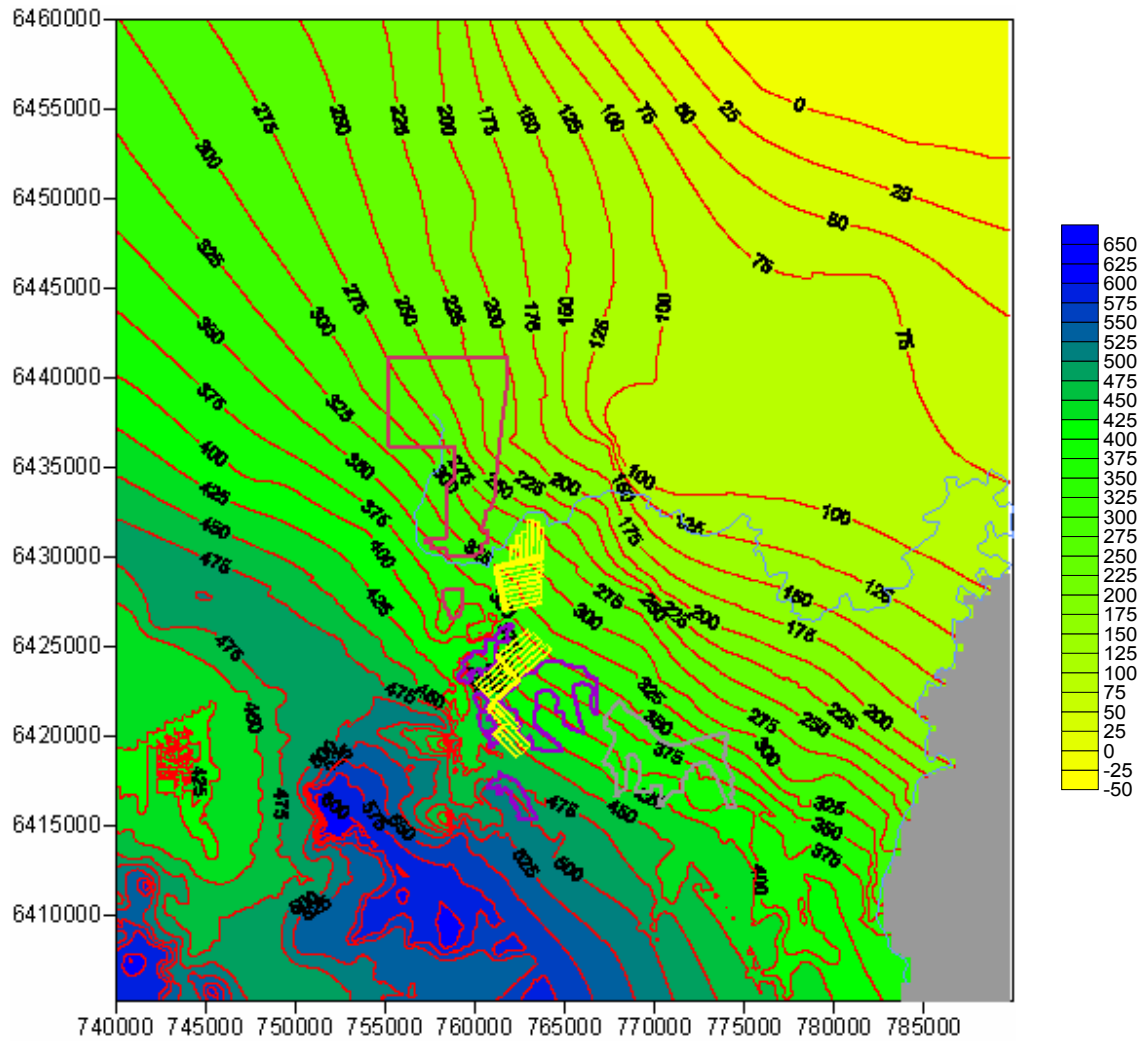
### Top Elevation for Layer 5 (mAHD)



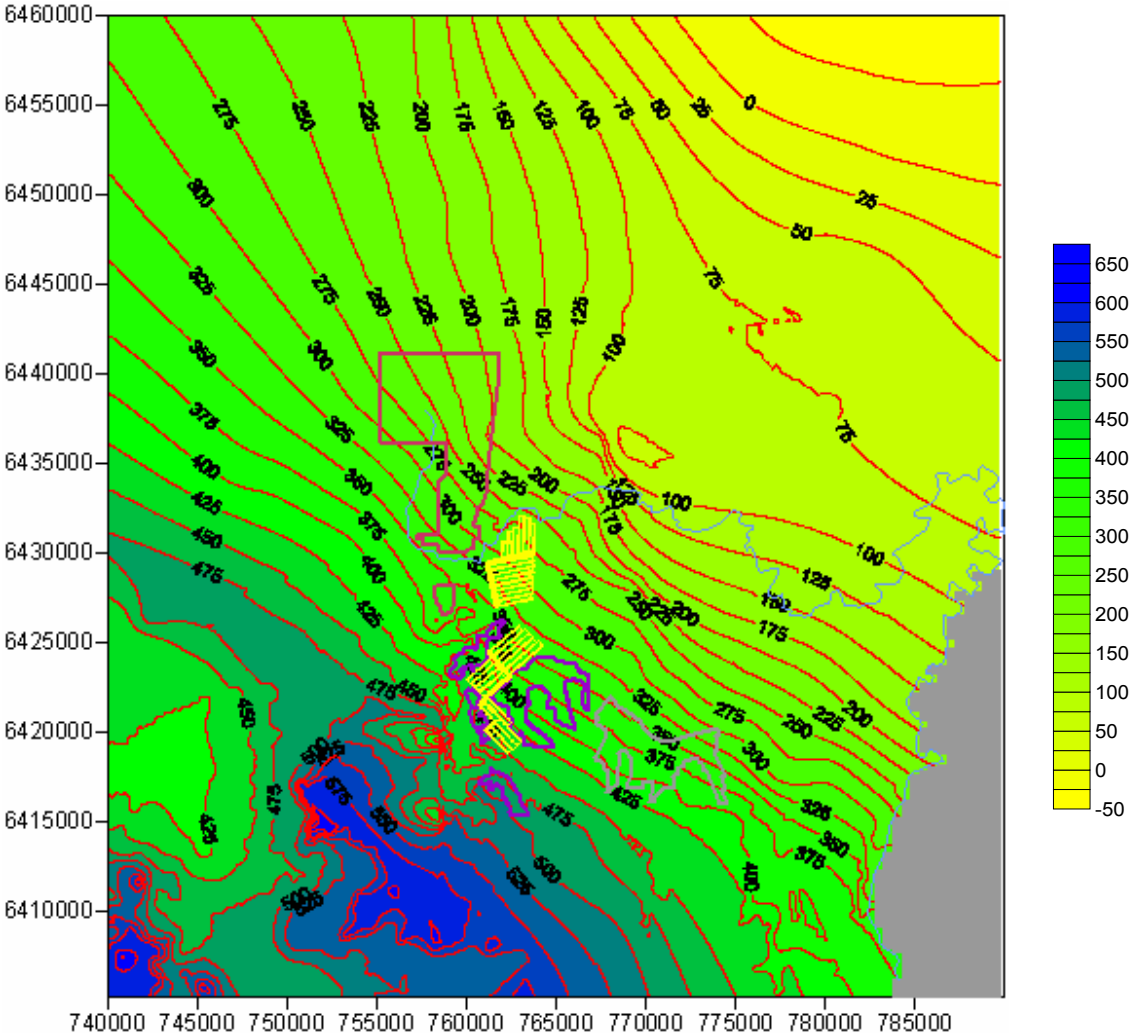
Top Elevation for Layer 6 (mAHD)



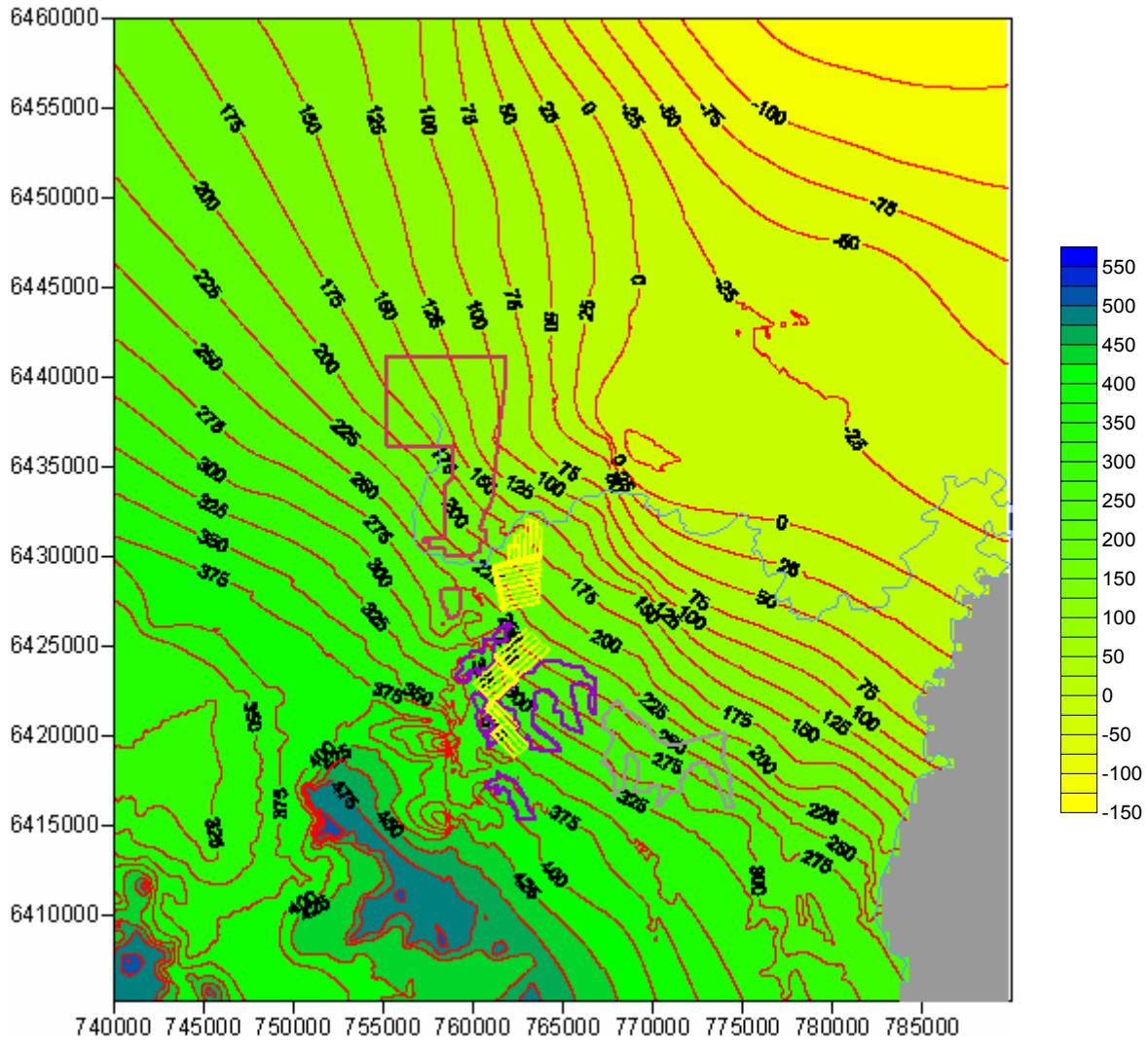
### Top Elevation for Layer 7 (mAHD)



Top Elevation for Layer 8 (mAHD)



### Bottom Elevation for Layer 8 (mAHD)

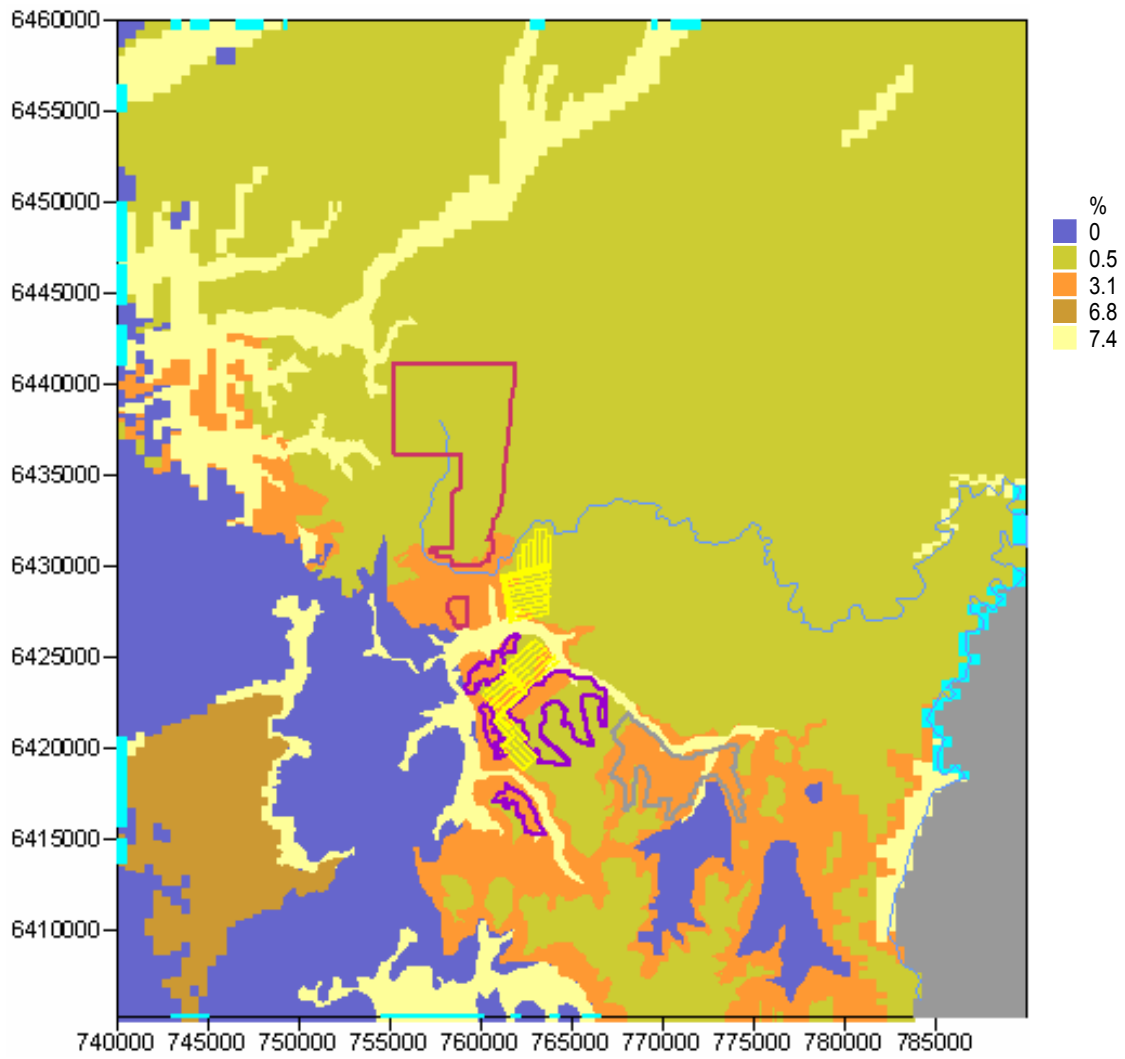


**APPENDIX I:  
MC2.2 CALIBRATED PARAMETERS**

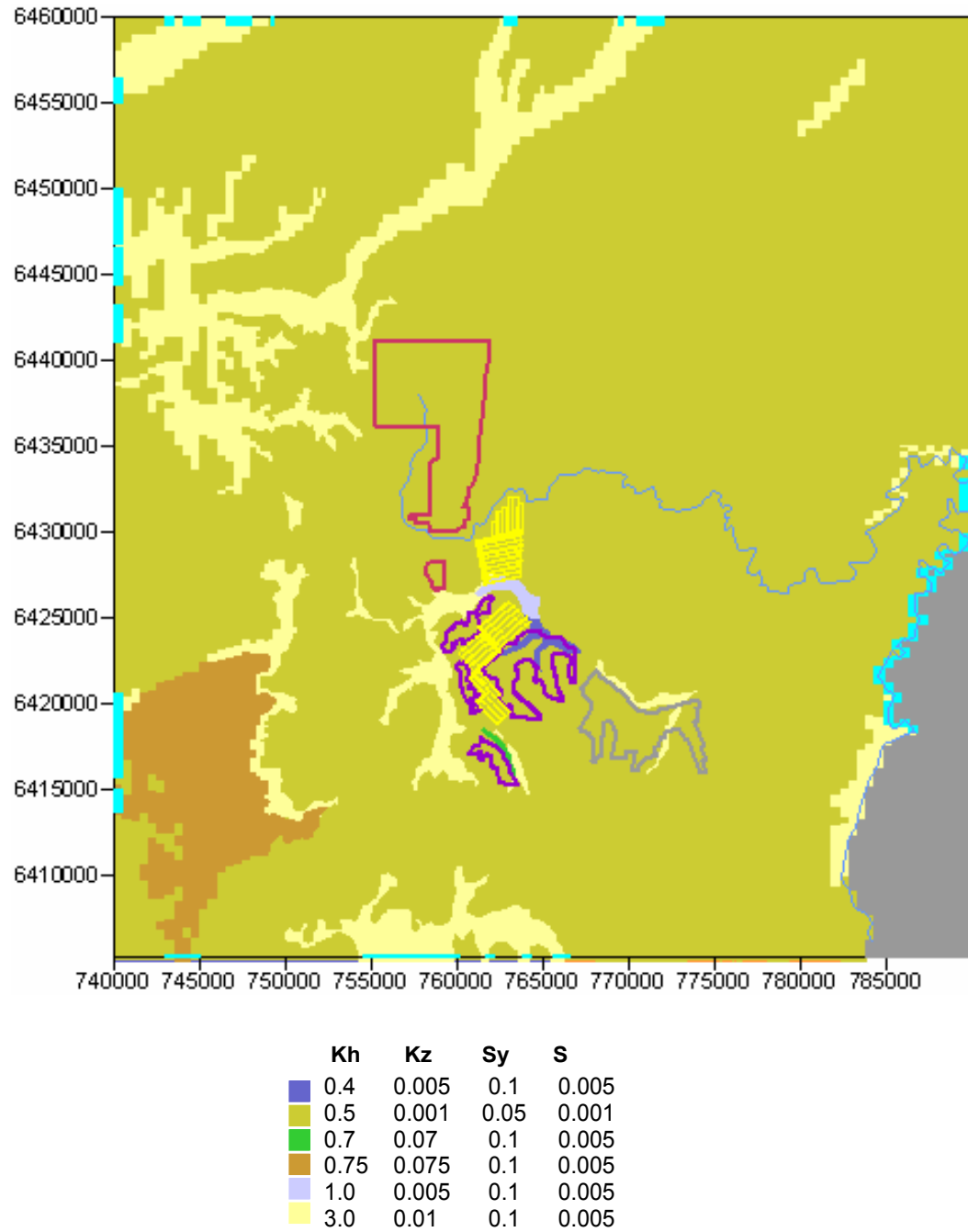
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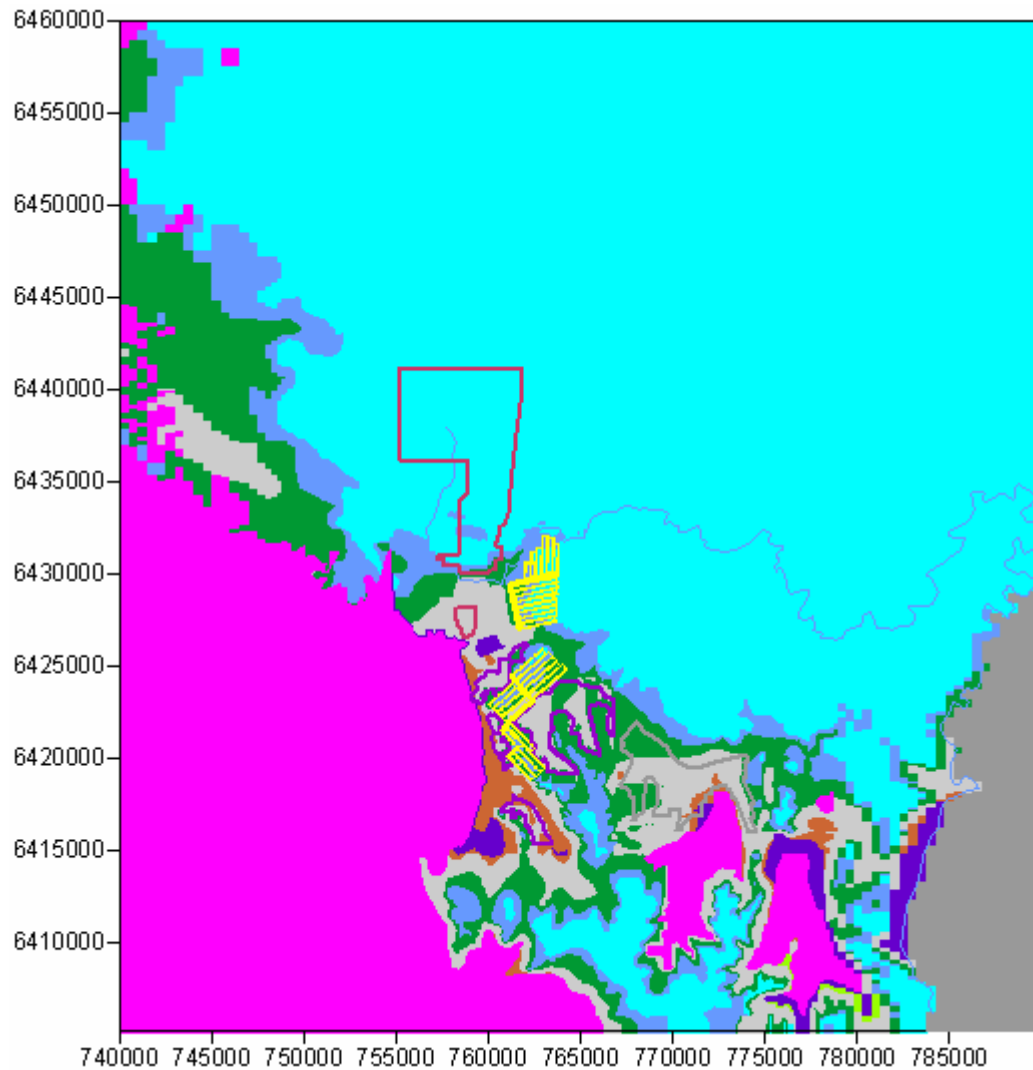
Percent of Rainfall Recharge Rate (Applied to highest active layer)



### Hydraulic Parameters for Layer 1

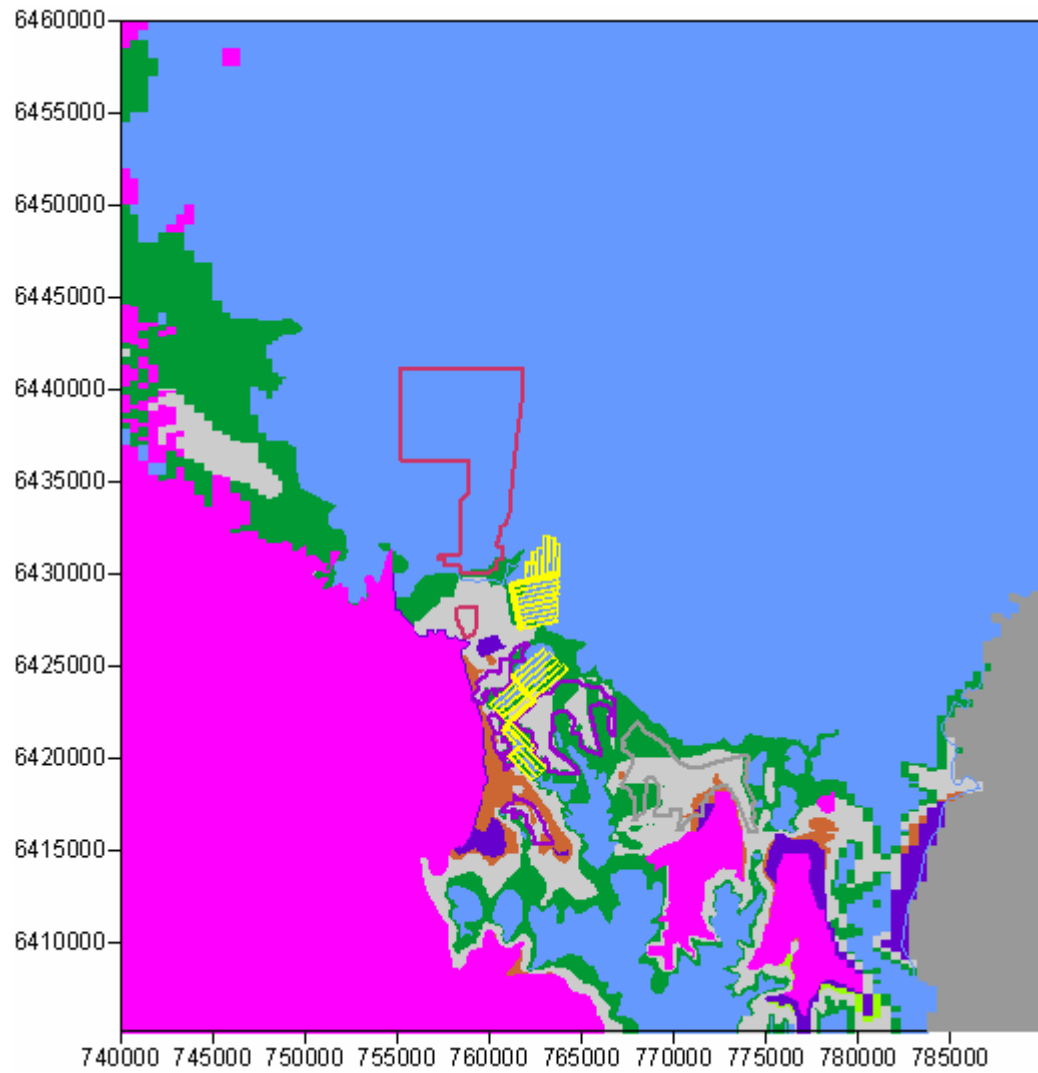


### Hydraulic Parameters for Layer 2



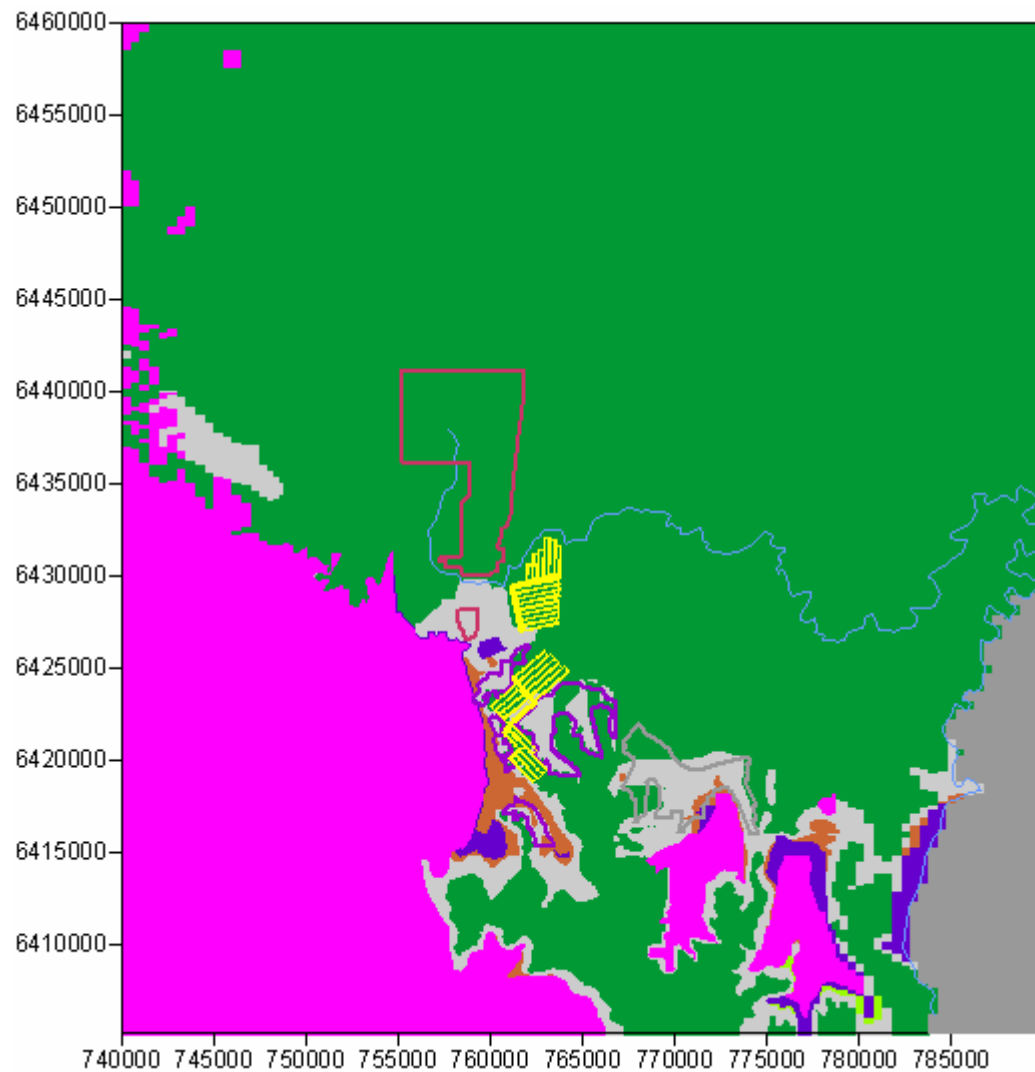
	<b>Kh</b>	<b>Kz</b>	<b>Sy</b>	<b>S</b>
<span style="color: magenta;">■</span>	0.0005	0.00001	0.005	0.00001
<span style="color: grey;">■</span>	0.05	0.00001	0.01	0.00005
<span style="color: lime;">■</span>	0.05	0.005	0.01	0.00005
<span style="color: green;">■</span>	0.1	0.000025	0.01	0.00005
<span style="color: blue;">■</span>	0.1	0.00001	0.01	0.00001
<span style="color: cyan;">■</span>	0.2	0.00005	0.02	0.00005
<span style="color: magenta;">■</span>	0.5	0.00001	0.02	0.00005
<span style="color: brown;">■</span>	1.0	0.0005	0.02	0.00005

### Hydraulic Parameters for Layer 3



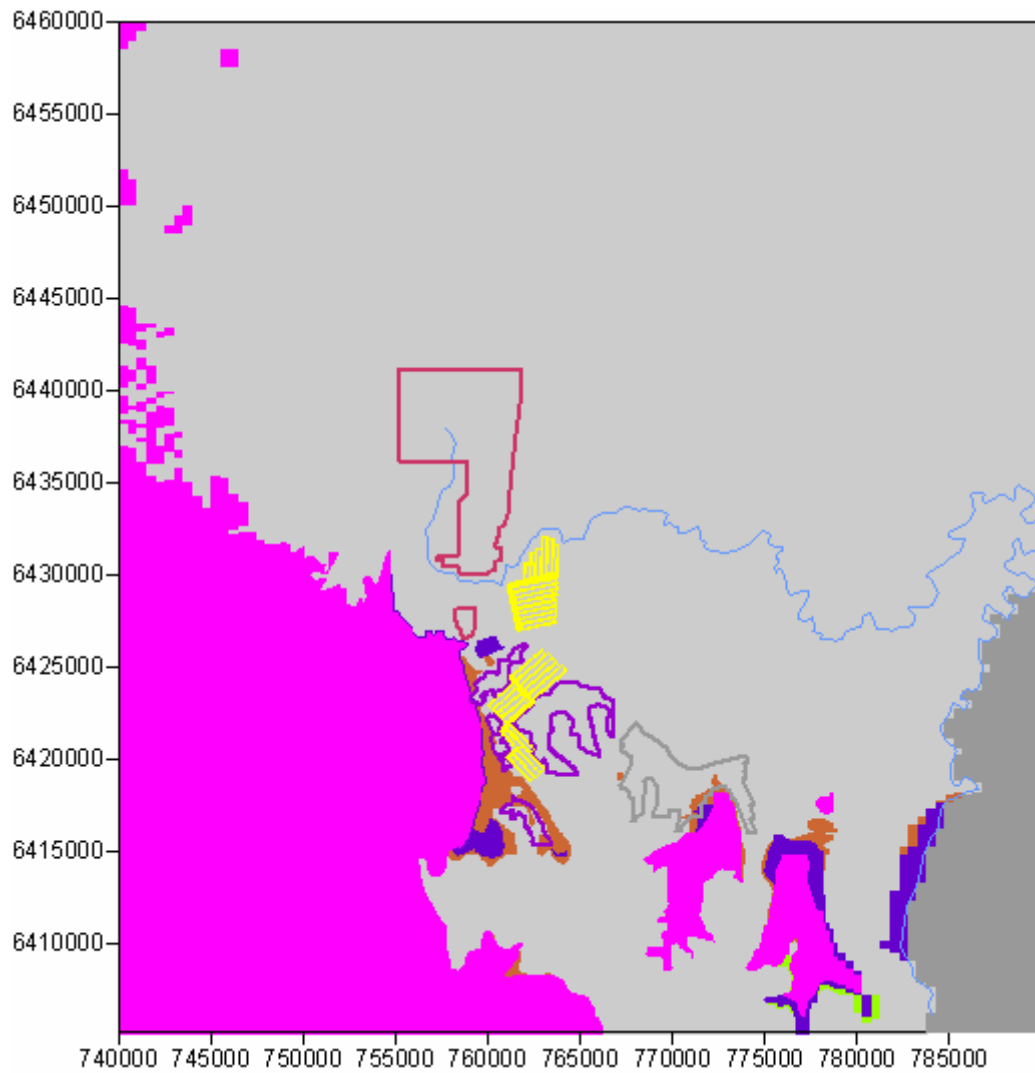
	<b>Kh</b>	<b>Kz</b>	<b>Sy</b>	<b>S</b>
<span style="color: magenta;">■</span>	0.0005	0.00001	0.005	0.00001
<span style="color: grey;">■</span>	0.05	0.00001	0.01	0.00005
<span style="color: lime;">■</span>	0.05	0.005	0.01	0.00005
<span style="color: green;">■</span>	0.1	0.000025	0.01	0.00005
<span style="color: purple;">■</span>	0.1	0.00001	0.01	0.00001
<span style="color: blue;">■</span>	0.2	0.00005	0.02	0.00005
<span style="color: brown;">■</span>	1.0	0.0005	0.02	0.00005

### Hydraulic Parameters for Layers 4 and 5



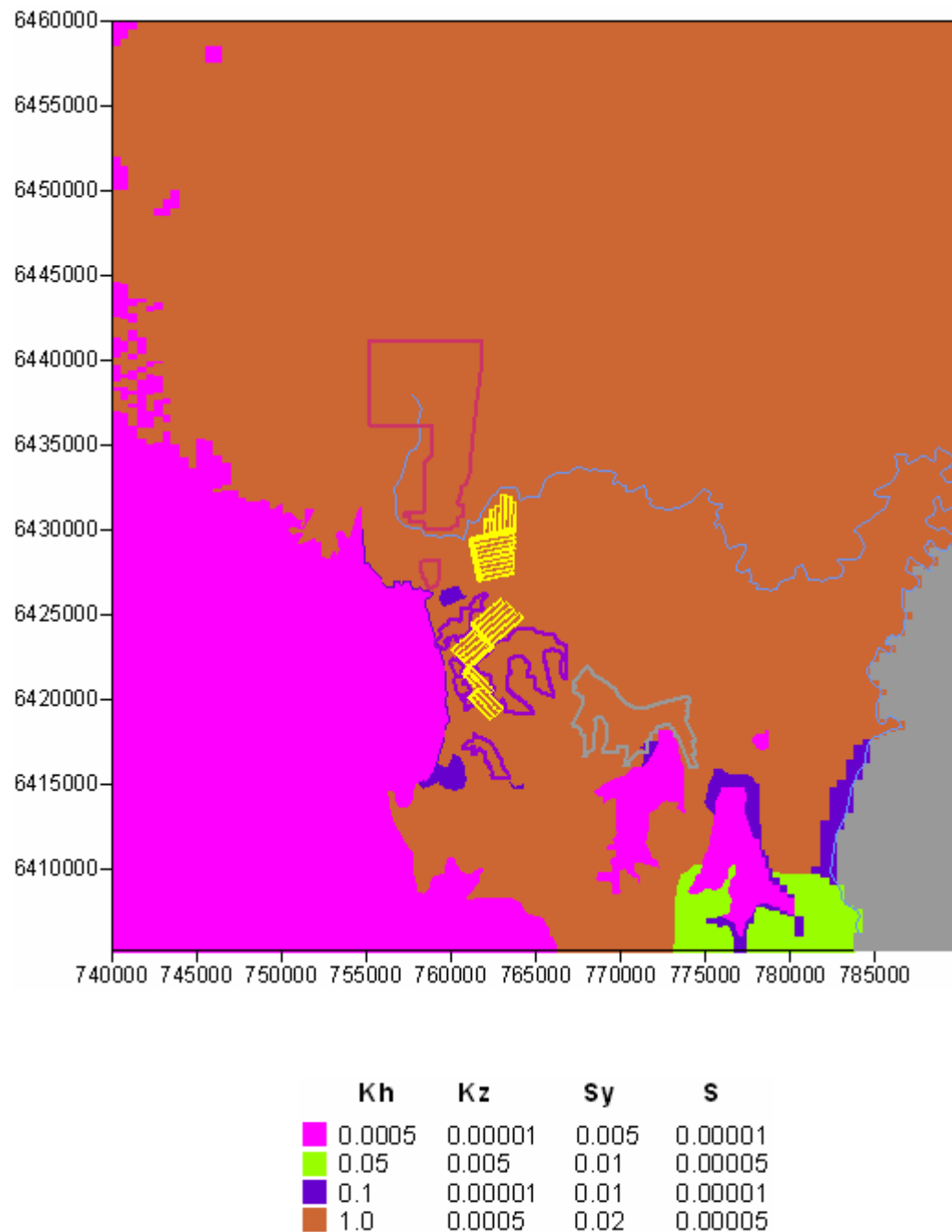
	<b>Kh</b>	<b>Kz</b>	<b>Sy</b>	<b>S</b>
<span style="color: magenta;">■</span>	0.0005	0.00001	0.005	0.00001
<span style="color: grey;">■</span>	0.05	0.00001	0.01	0.00005
<span style="color: yellow;">■</span>	0.05	0.005	0.01	0.00005
<span style="color: green;">■</span>	0.1	0.000025	0.01	0.00005
<span style="color: blue;">■</span>	0.1	0.00001	0.01	0.00001
<span style="color: brown;">■</span>	1.0	0.0005	0.02	0.00005

### Hydraulic Parameters for Layer 6

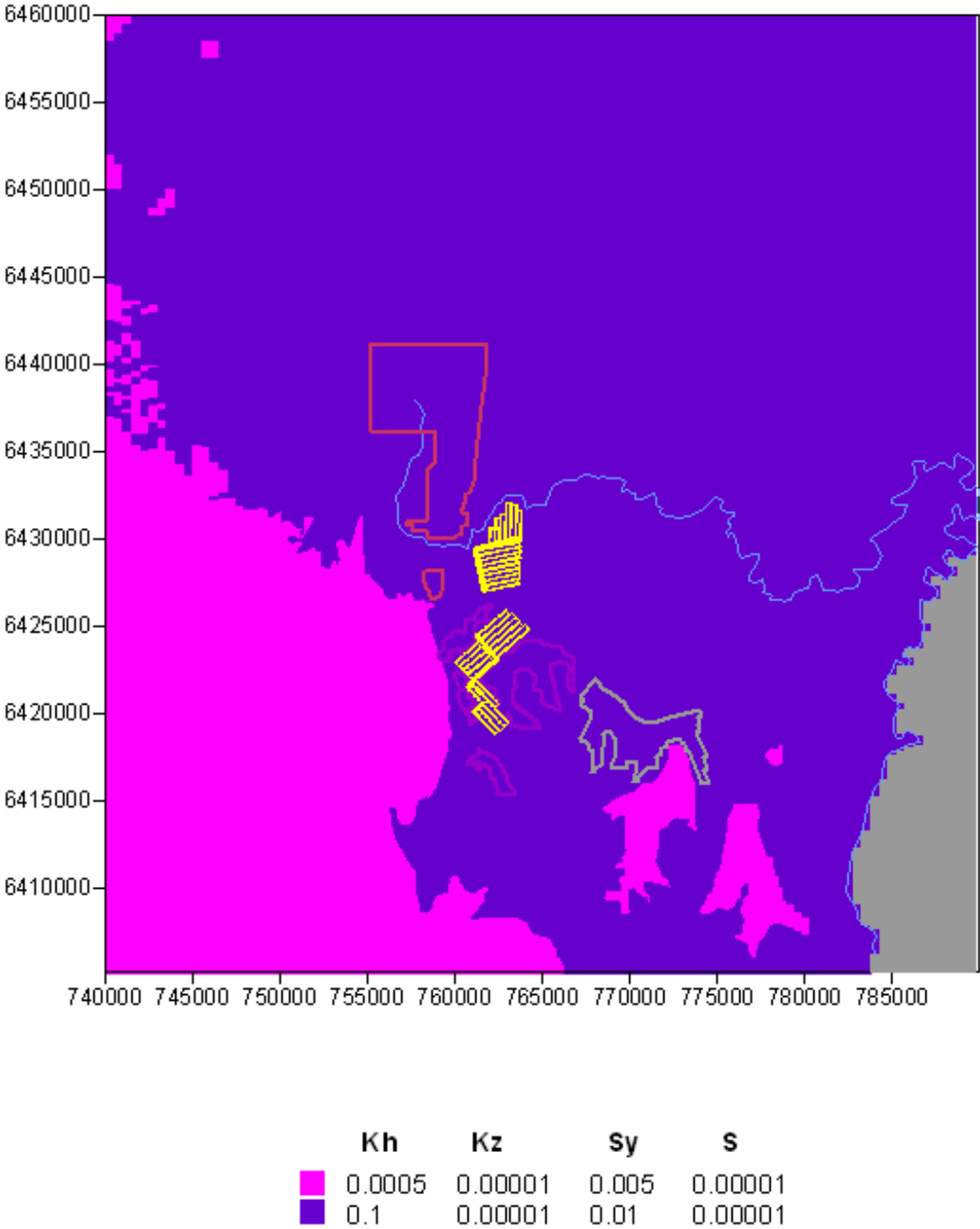


	<b>Kh</b>	<b>Kz</b>	<b>Sy</b>	<b>S</b>
<span style="color: magenta;">■</span>	0.0005	0.00001	0.005	0.00001
<span style="color: grey;">■</span>	0.05	0.00001	0.01	0.00005
<span style="color: yellow;">■</span>	0.05	0.005	0.01	0.00005
<span style="color: blue;">■</span>	0.1	0.00001	0.01	0.00001
<span style="color: brown;">■</span>	1.0	0.0005	0.02	0.00005

### Hydraulic Parameters for Layer 7



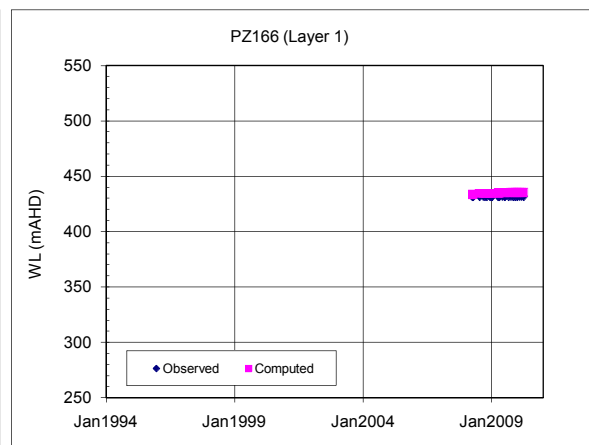
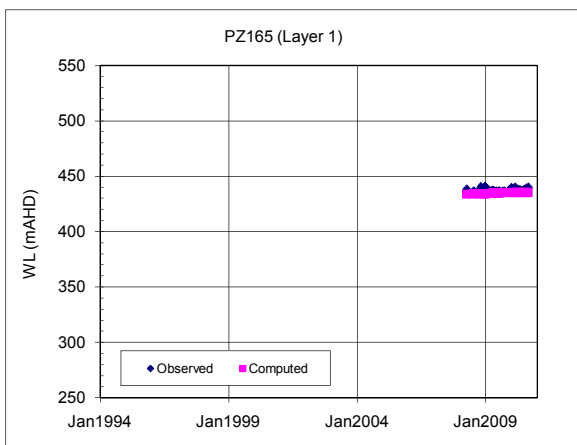
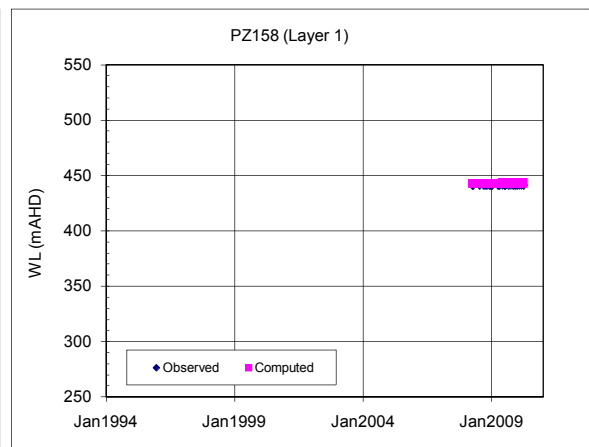
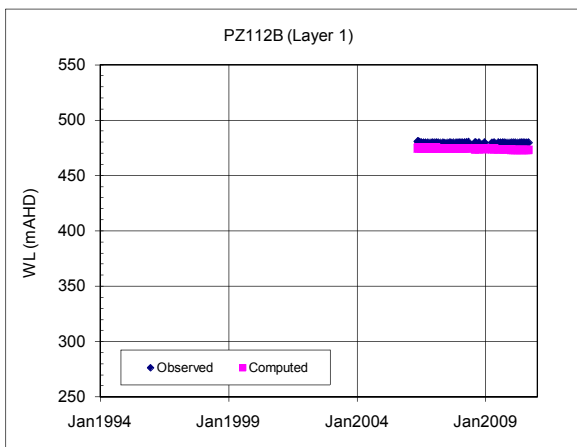
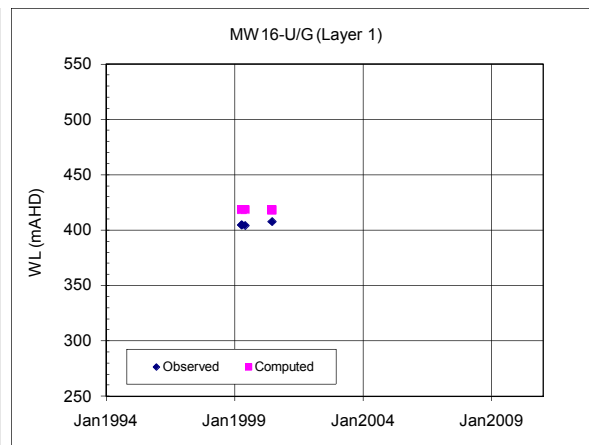
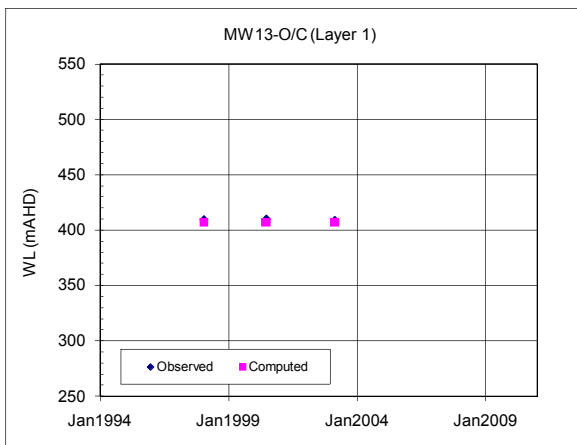
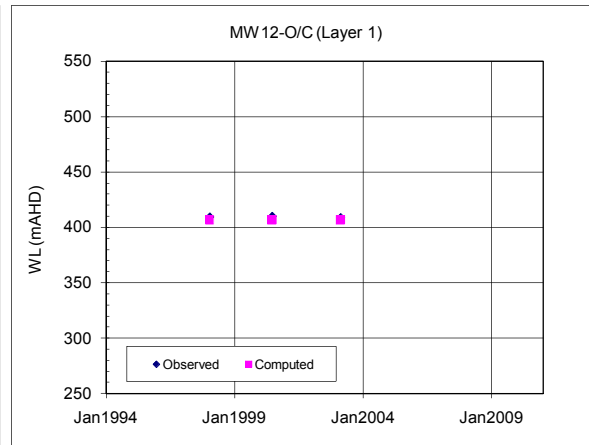
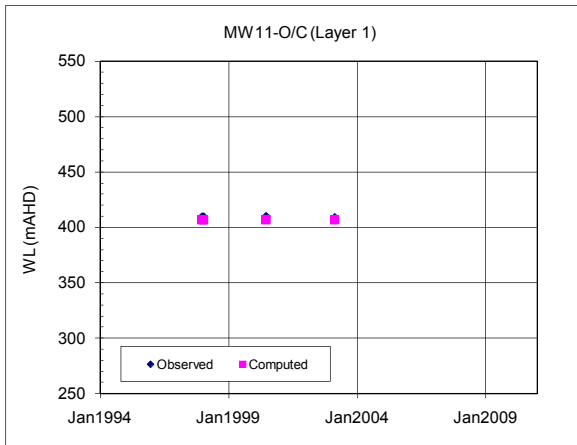
Hydraulic Parameters for Layer 8

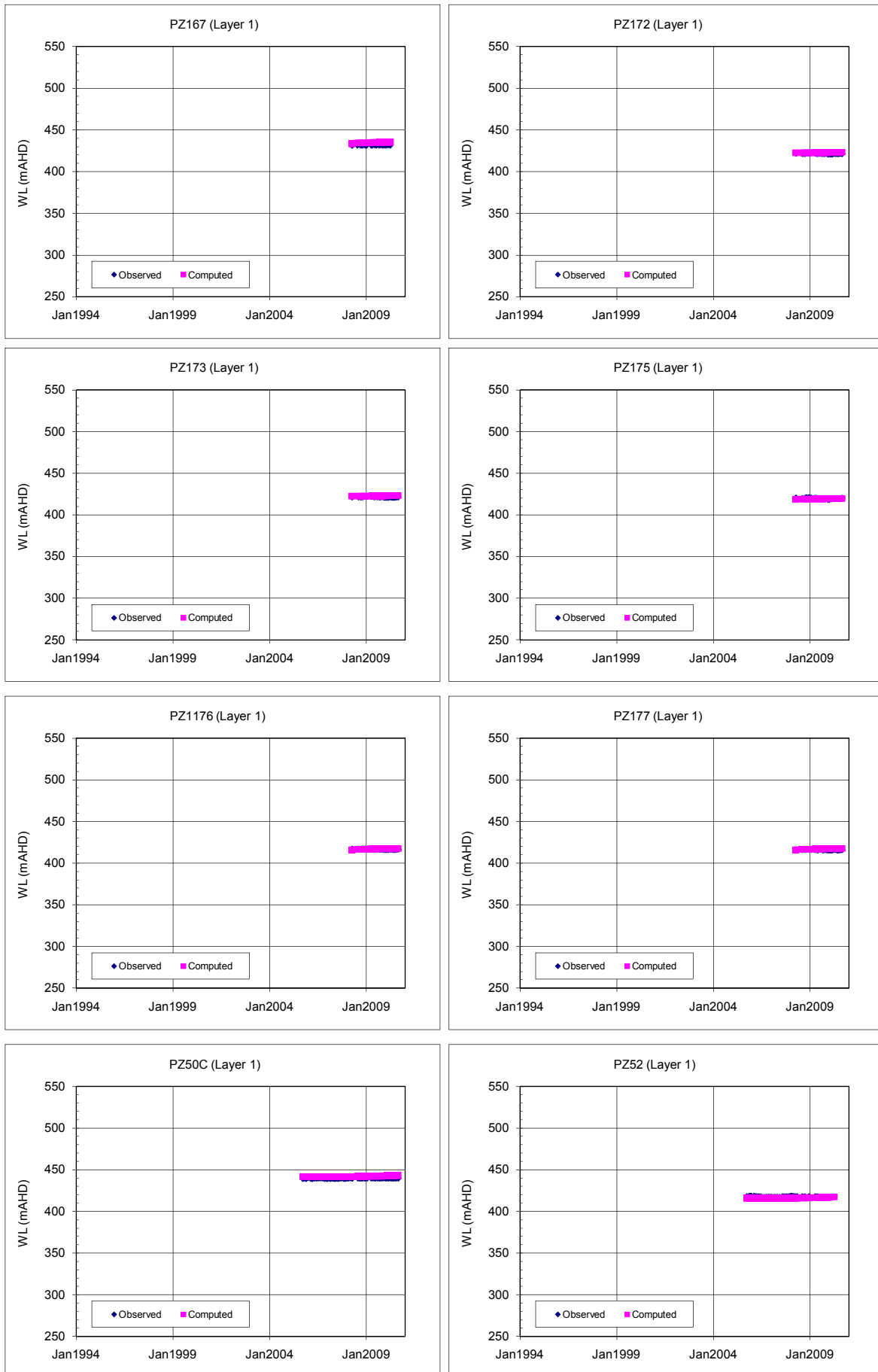


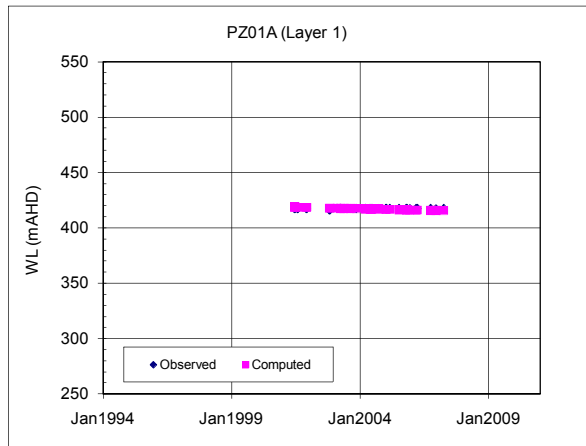
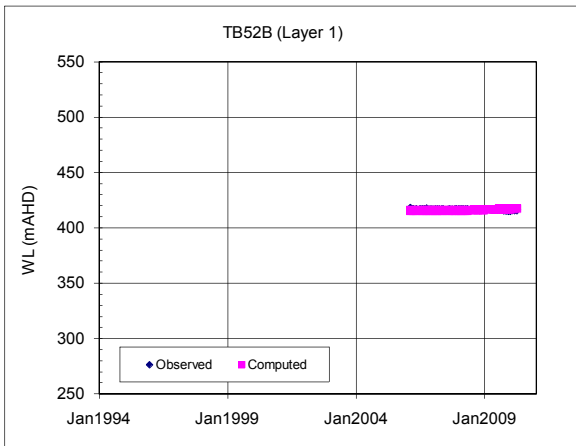
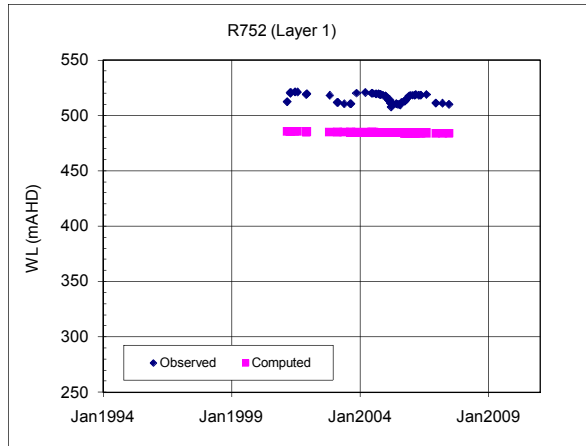
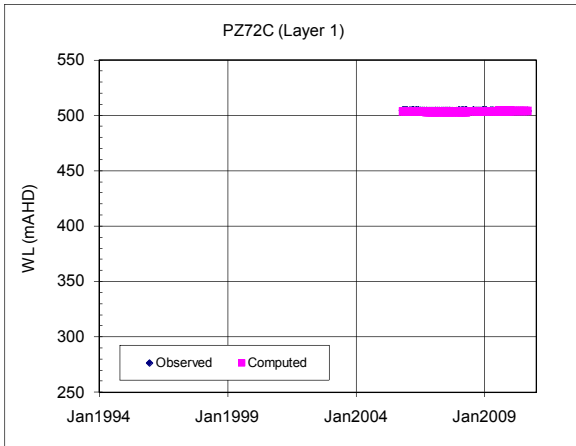
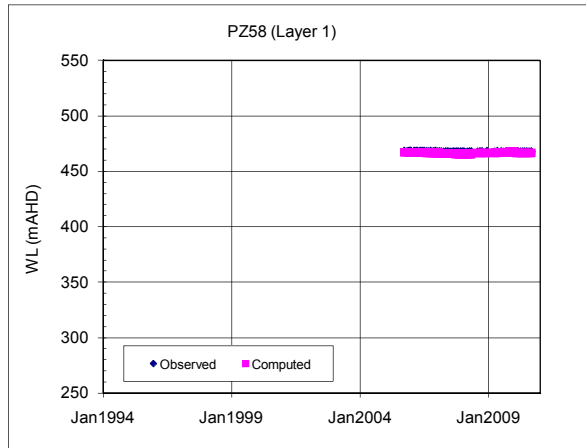
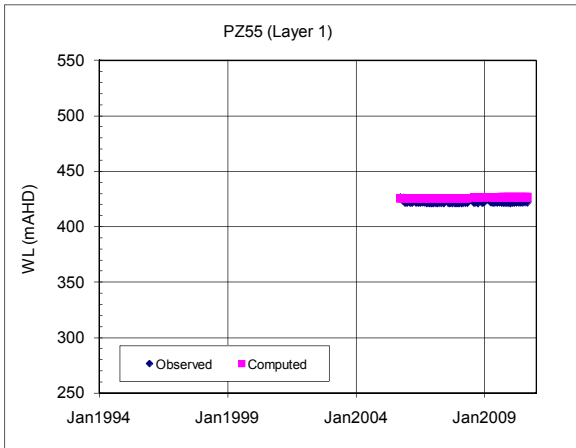


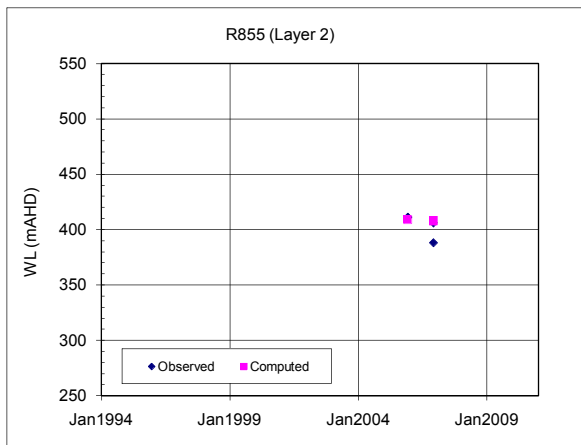
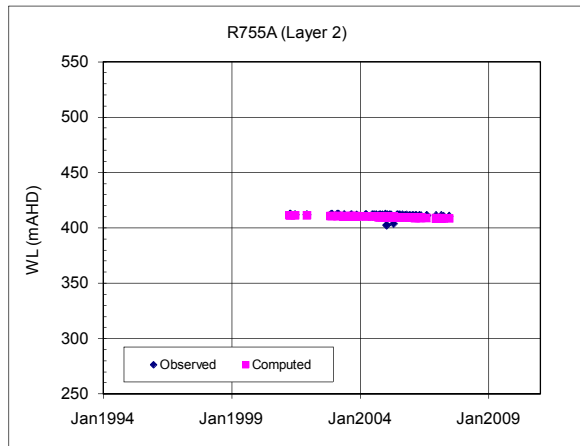
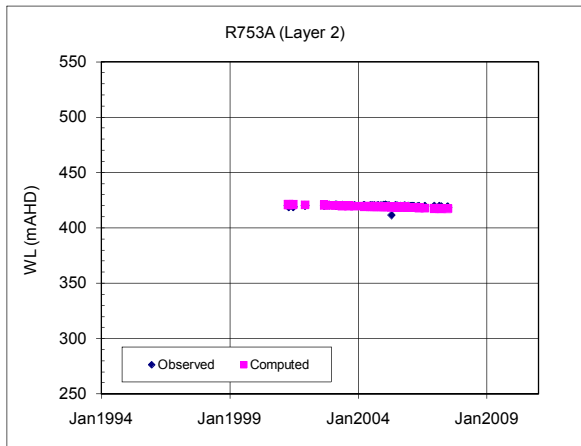
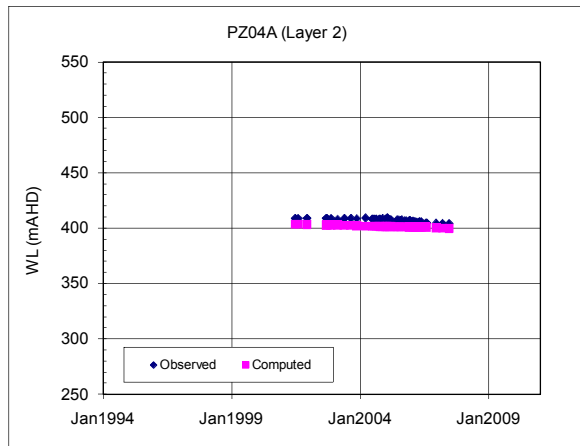
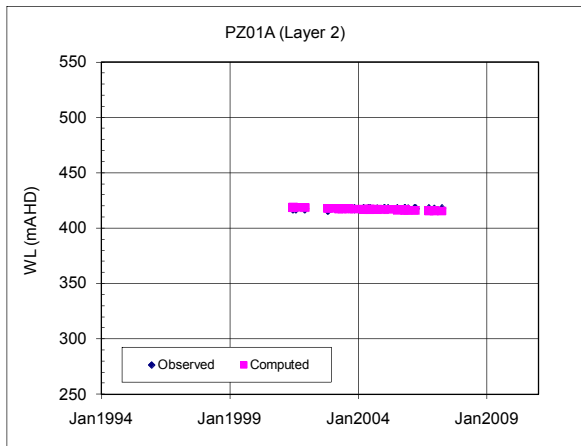
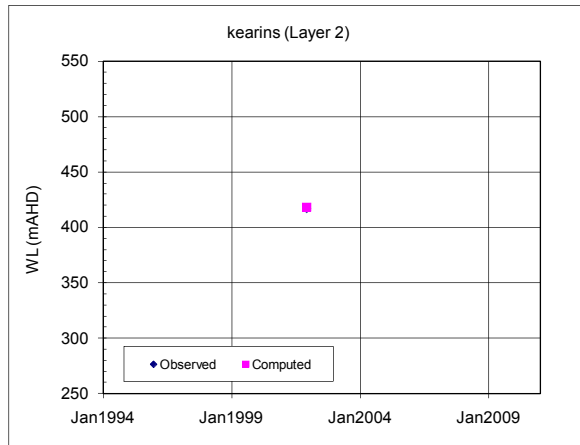
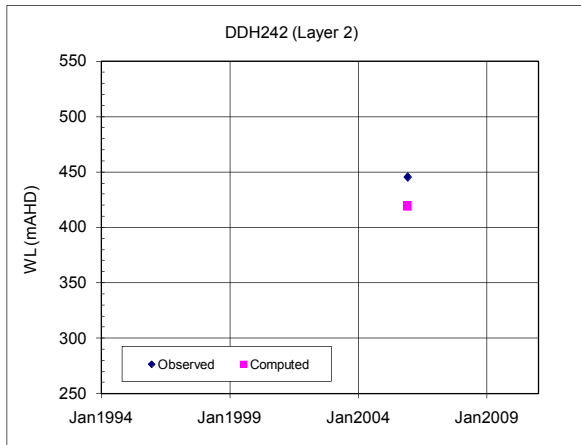
**APPENDIX J:  
MC2.2 TRANSIENT CALIBRATION  
HYDROGRAPHS (SIMULATED V OBSERVED  
WATER LEVELS)**

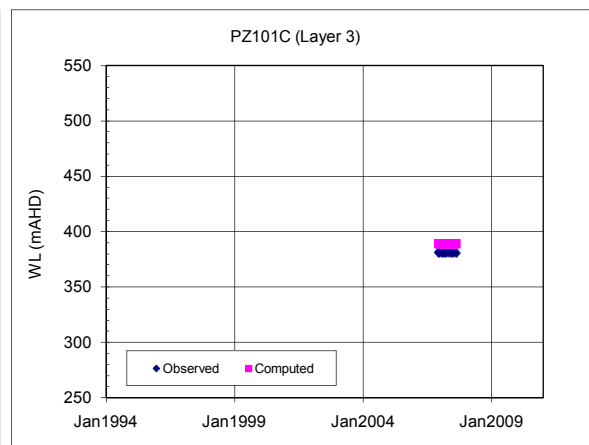
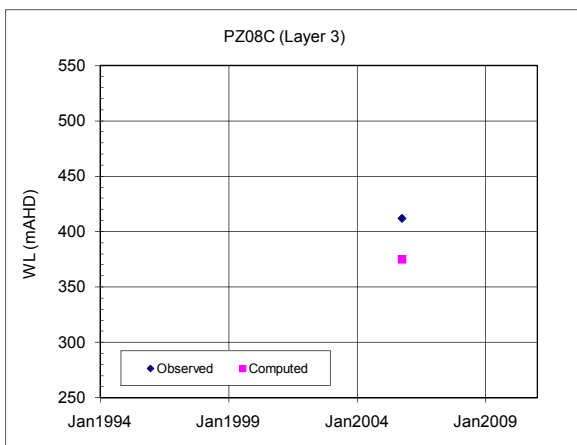
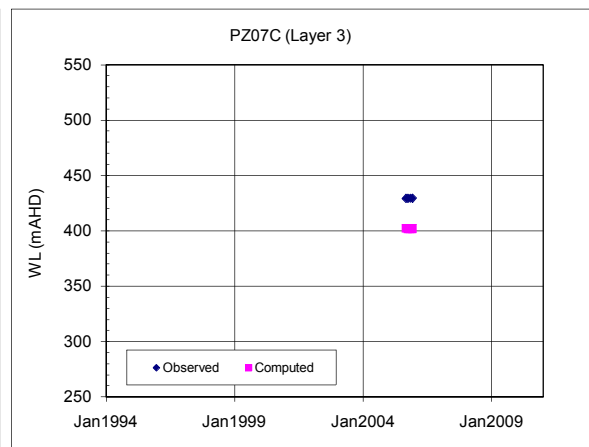
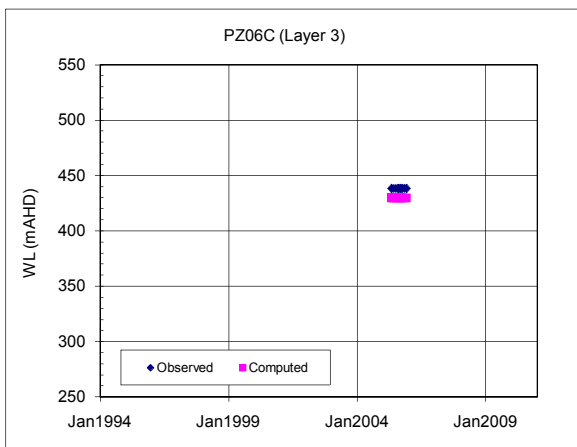
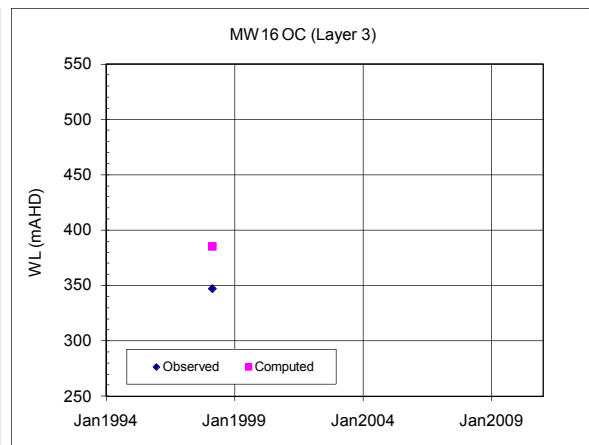
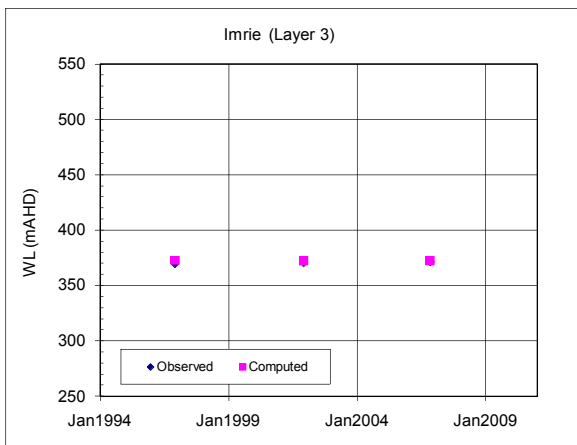
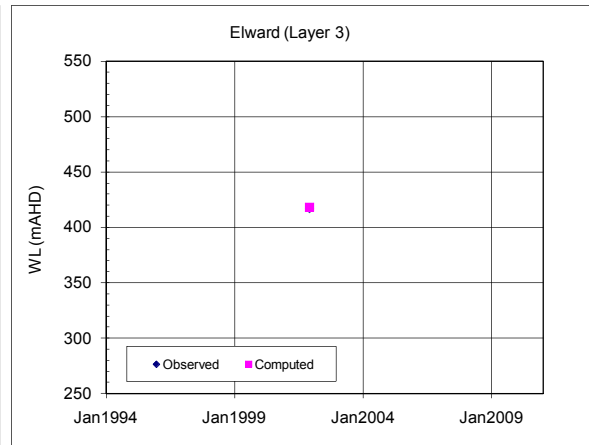
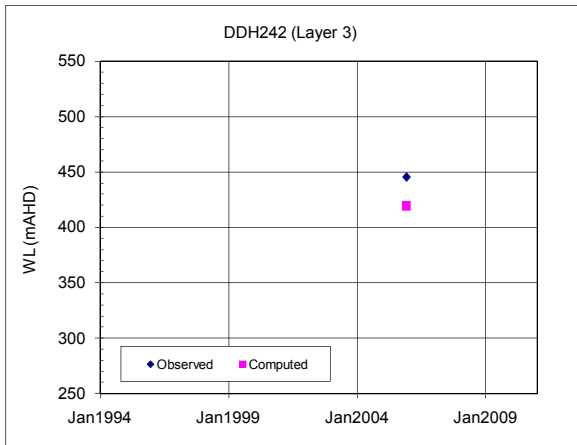
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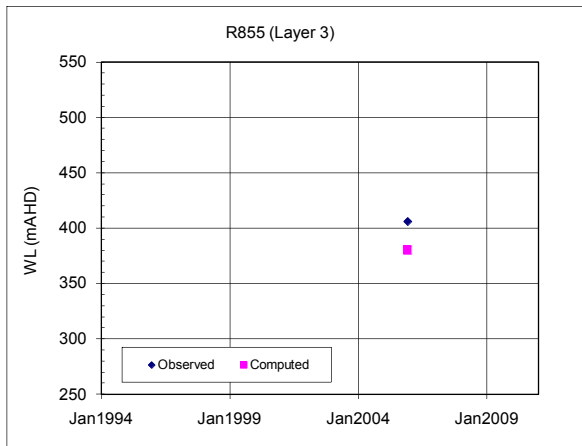
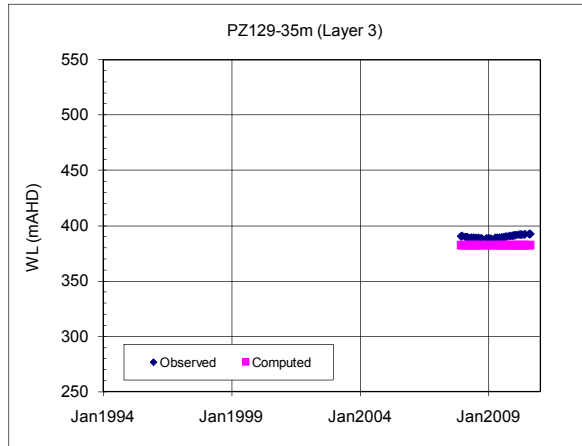
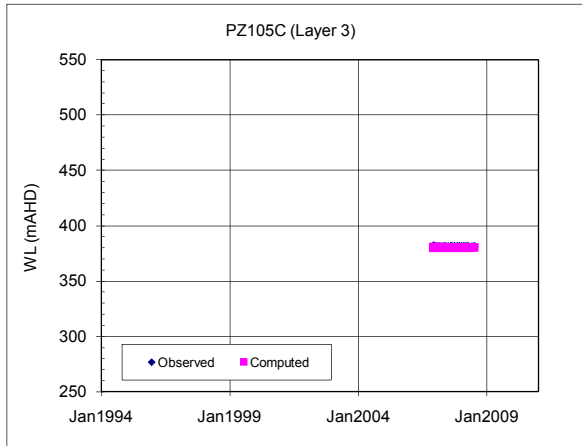


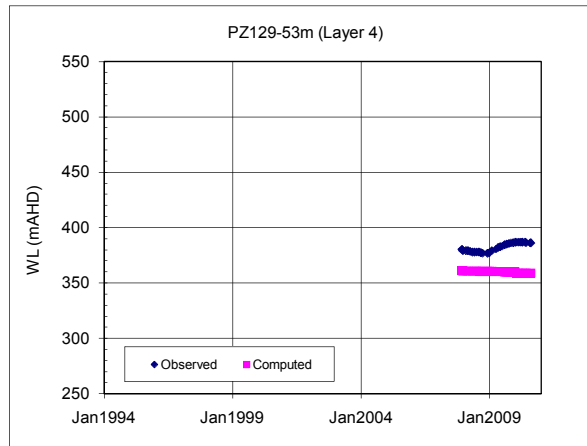
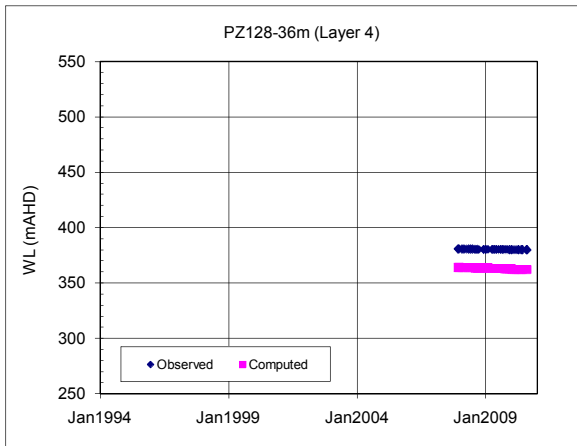
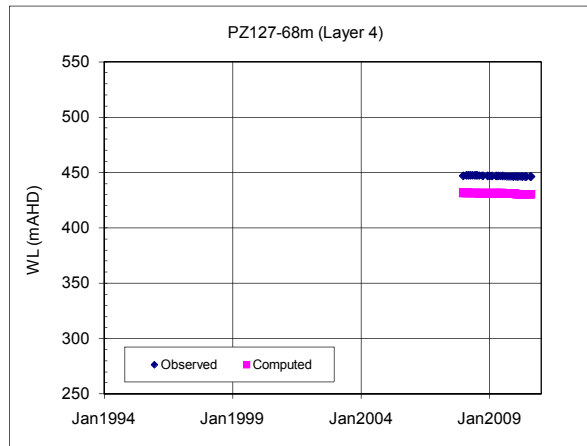
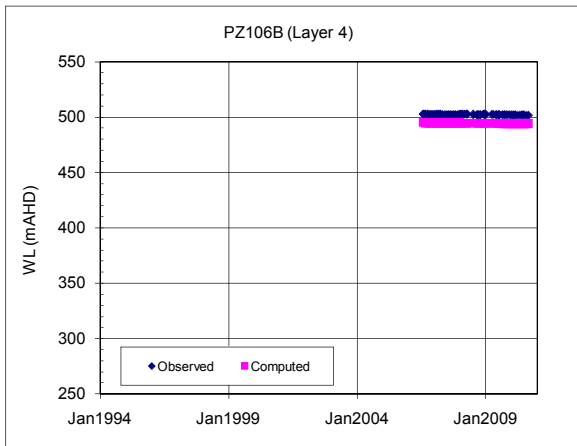
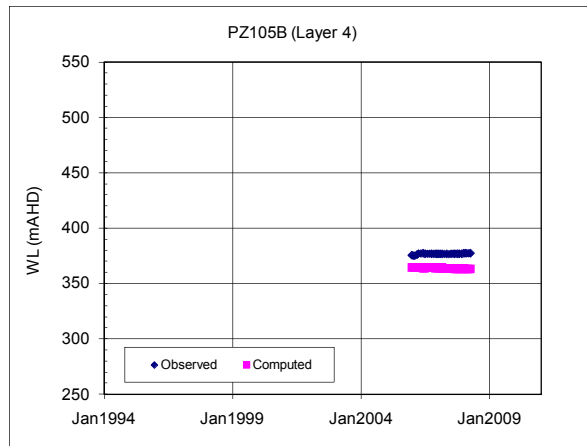
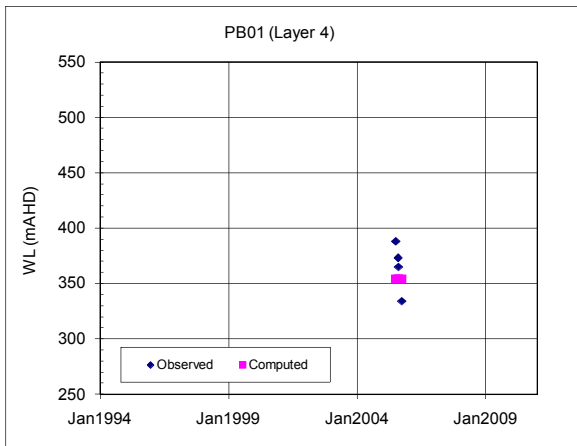
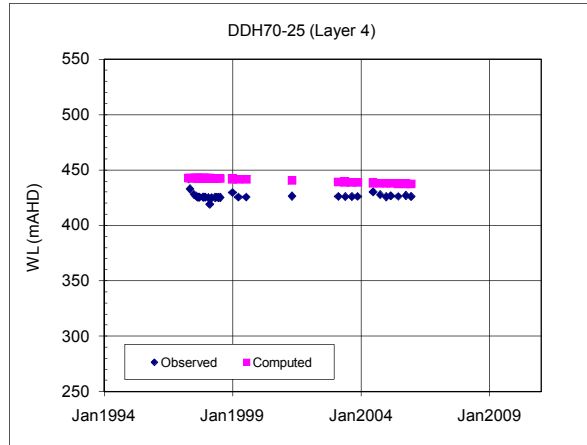
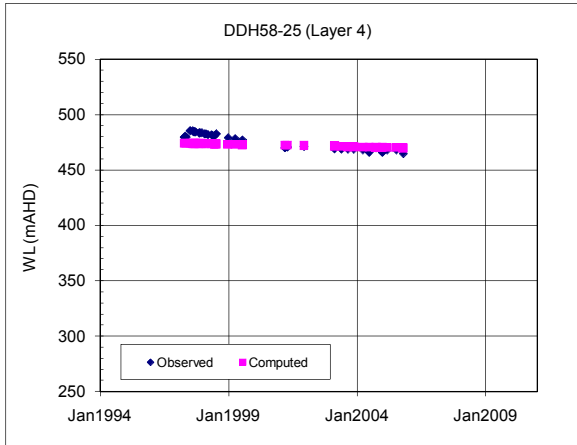




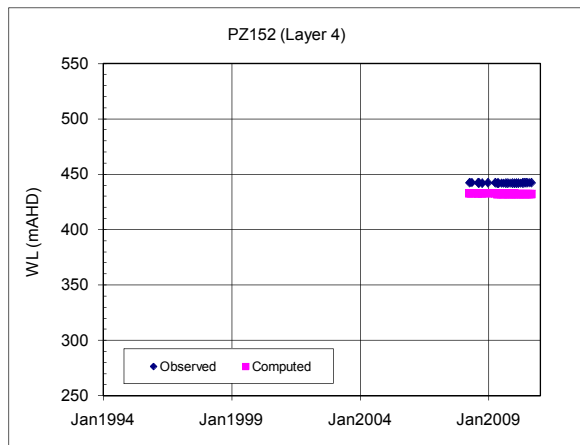
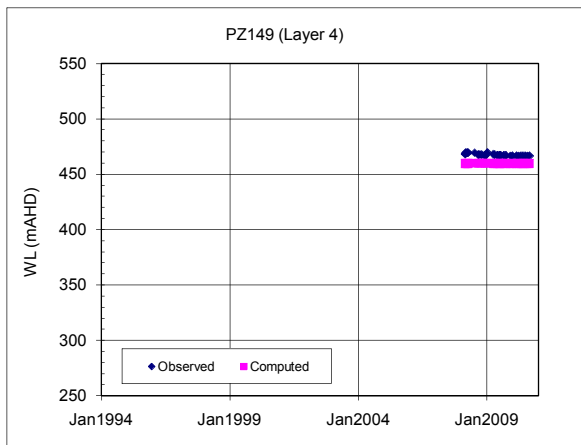
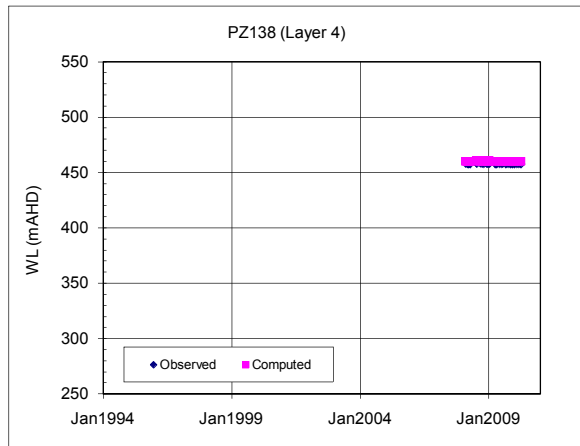
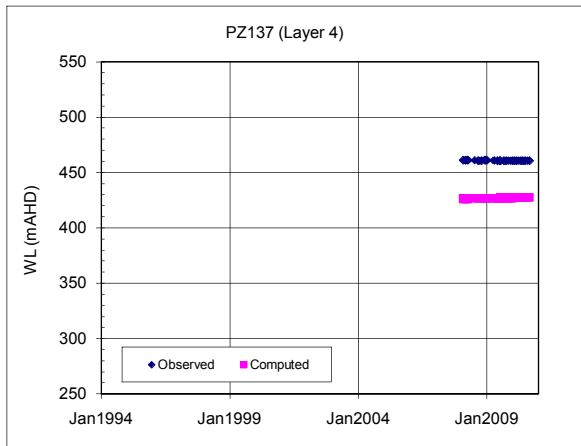
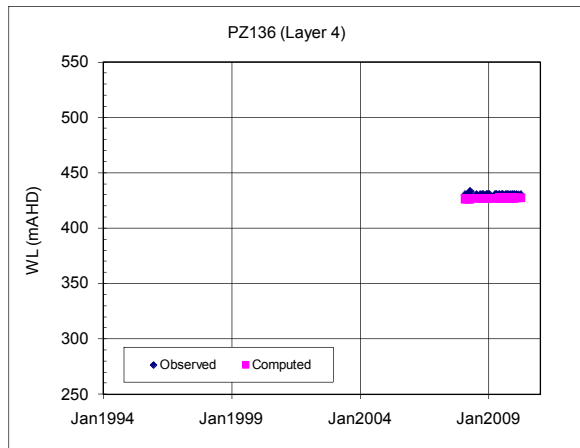
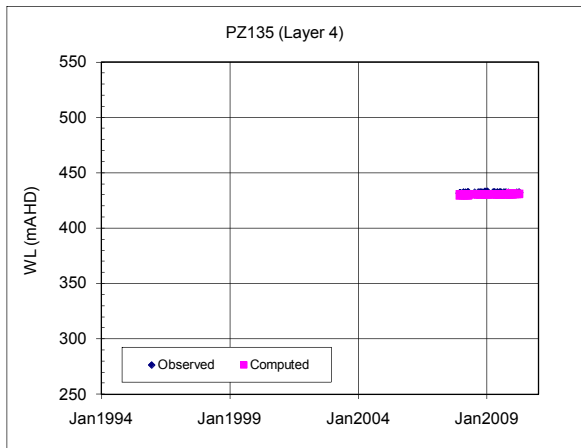
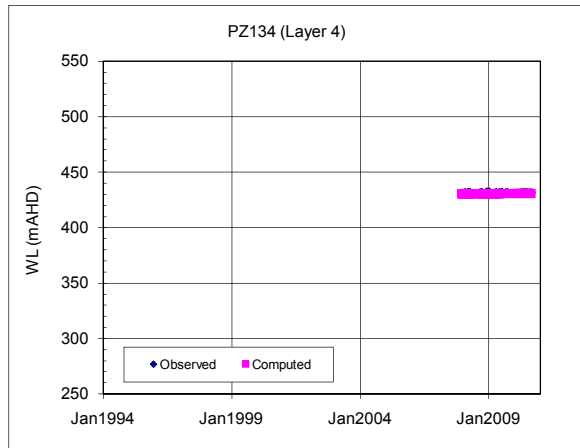
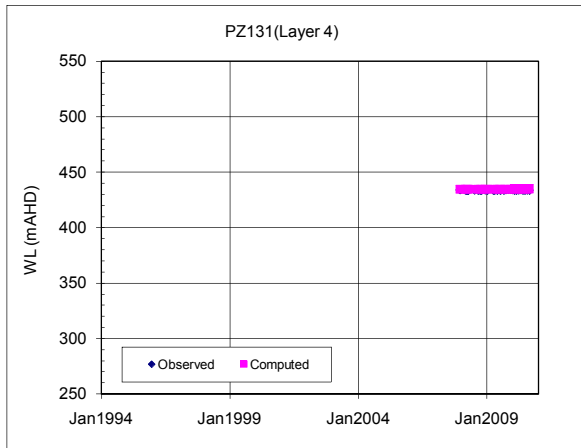


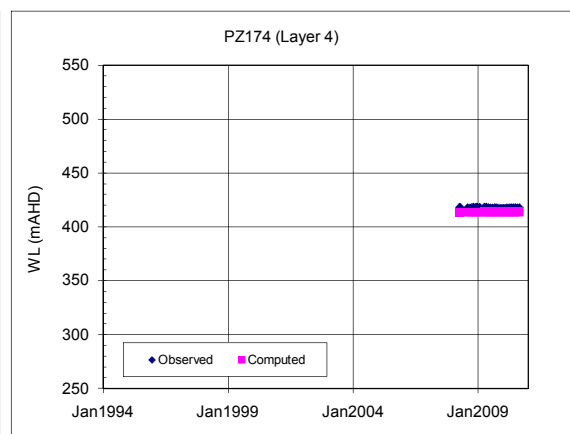
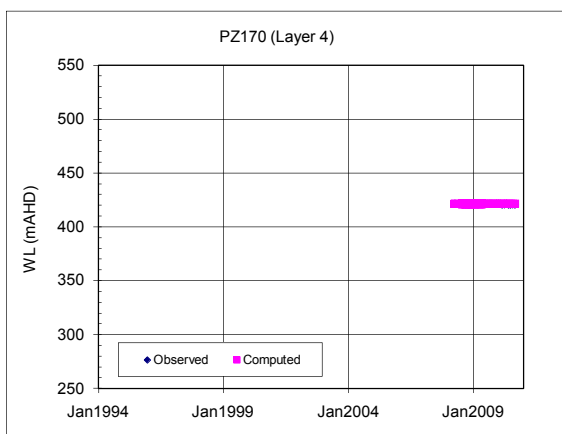
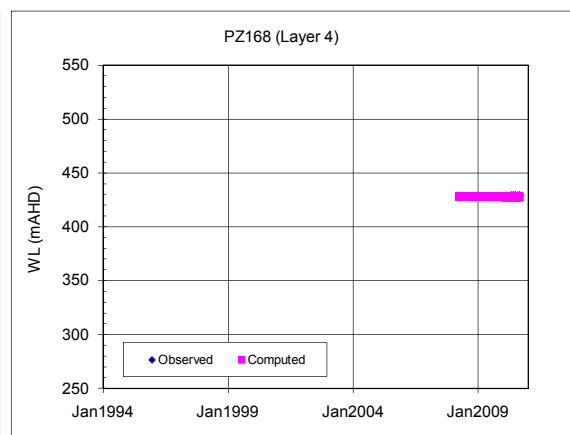
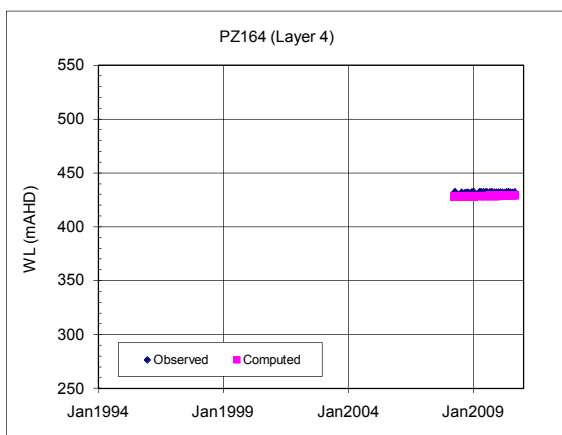
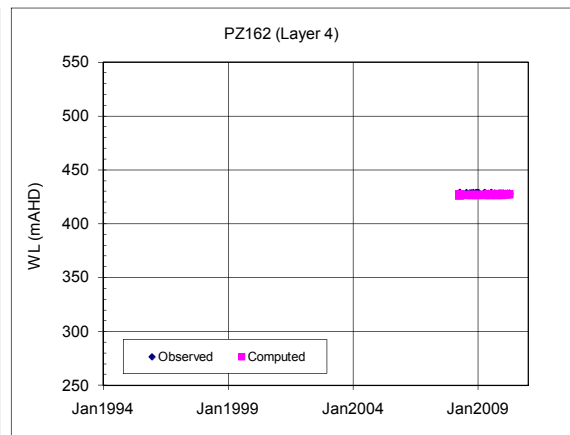
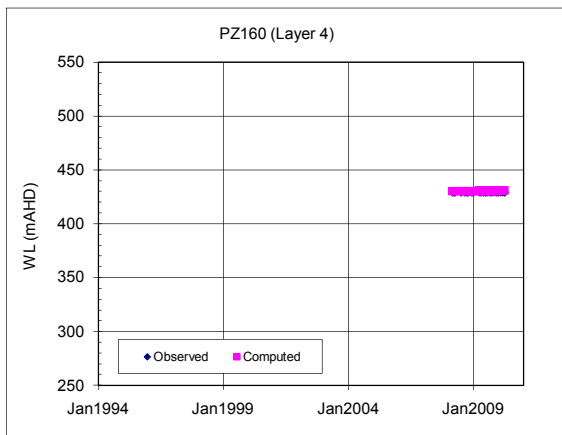
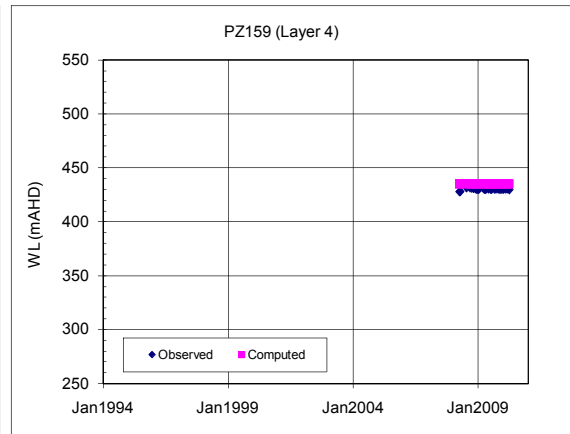
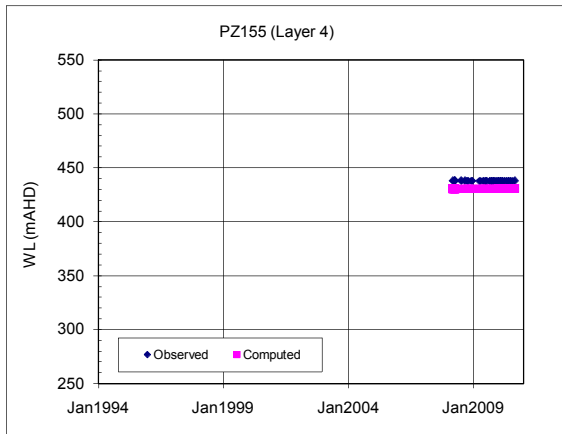


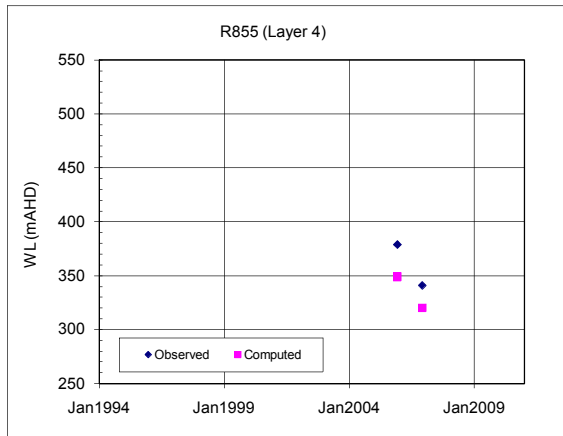
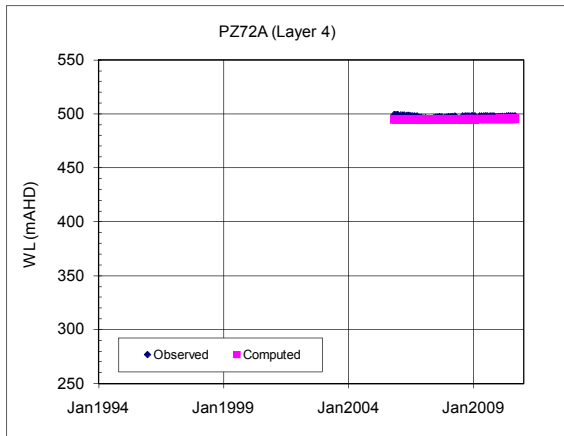


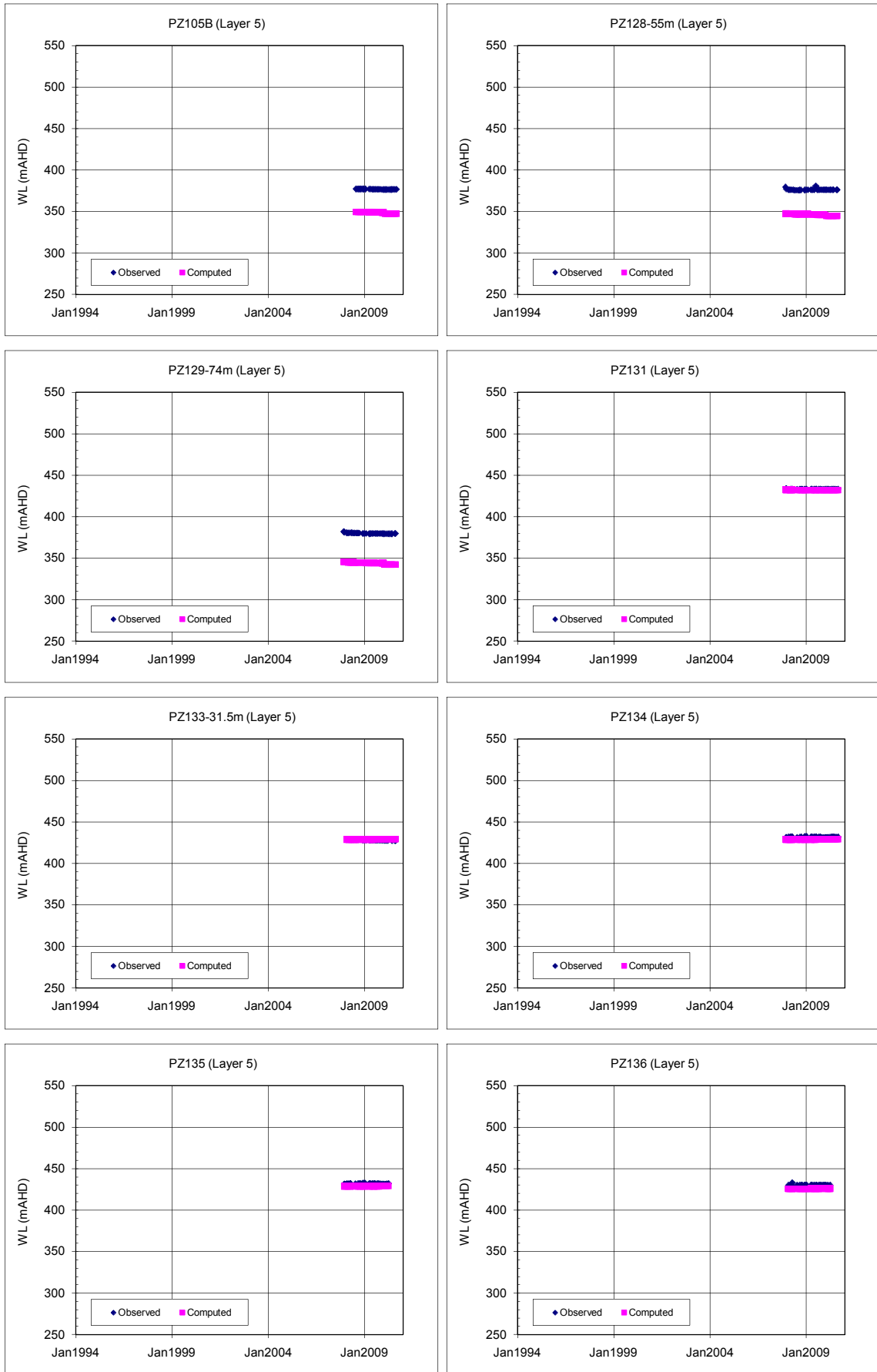


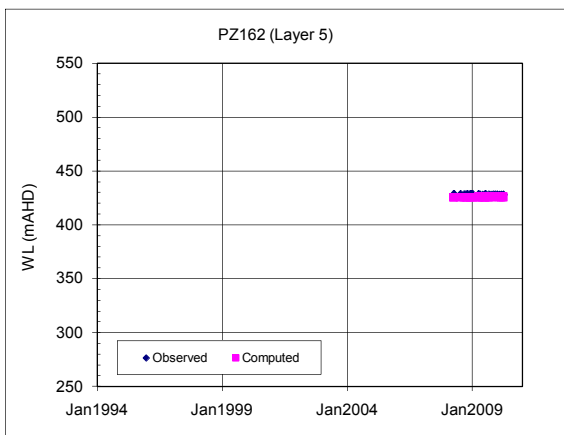
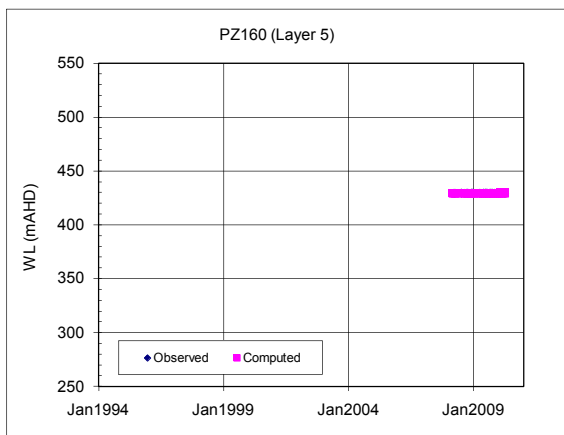
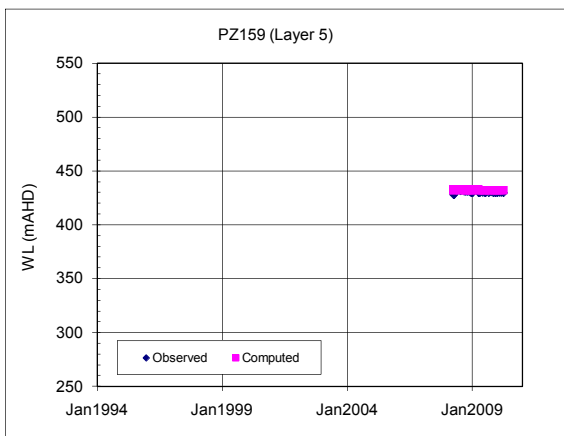
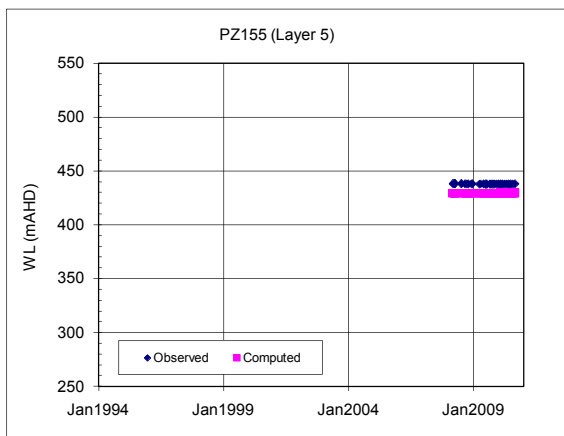
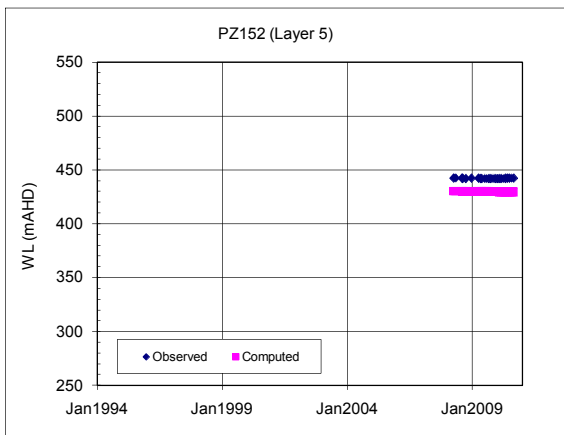
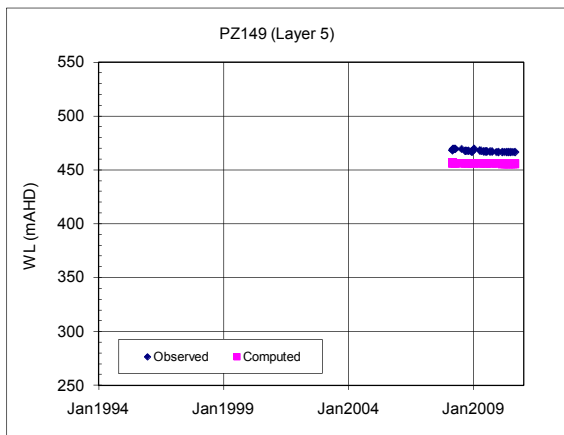
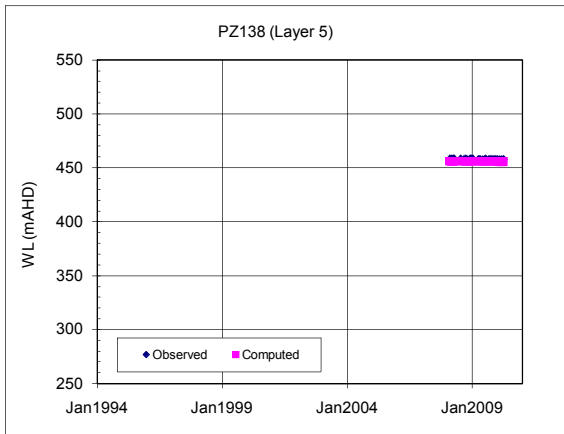
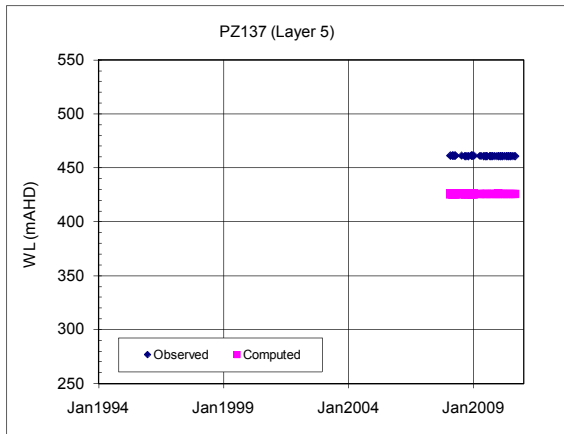


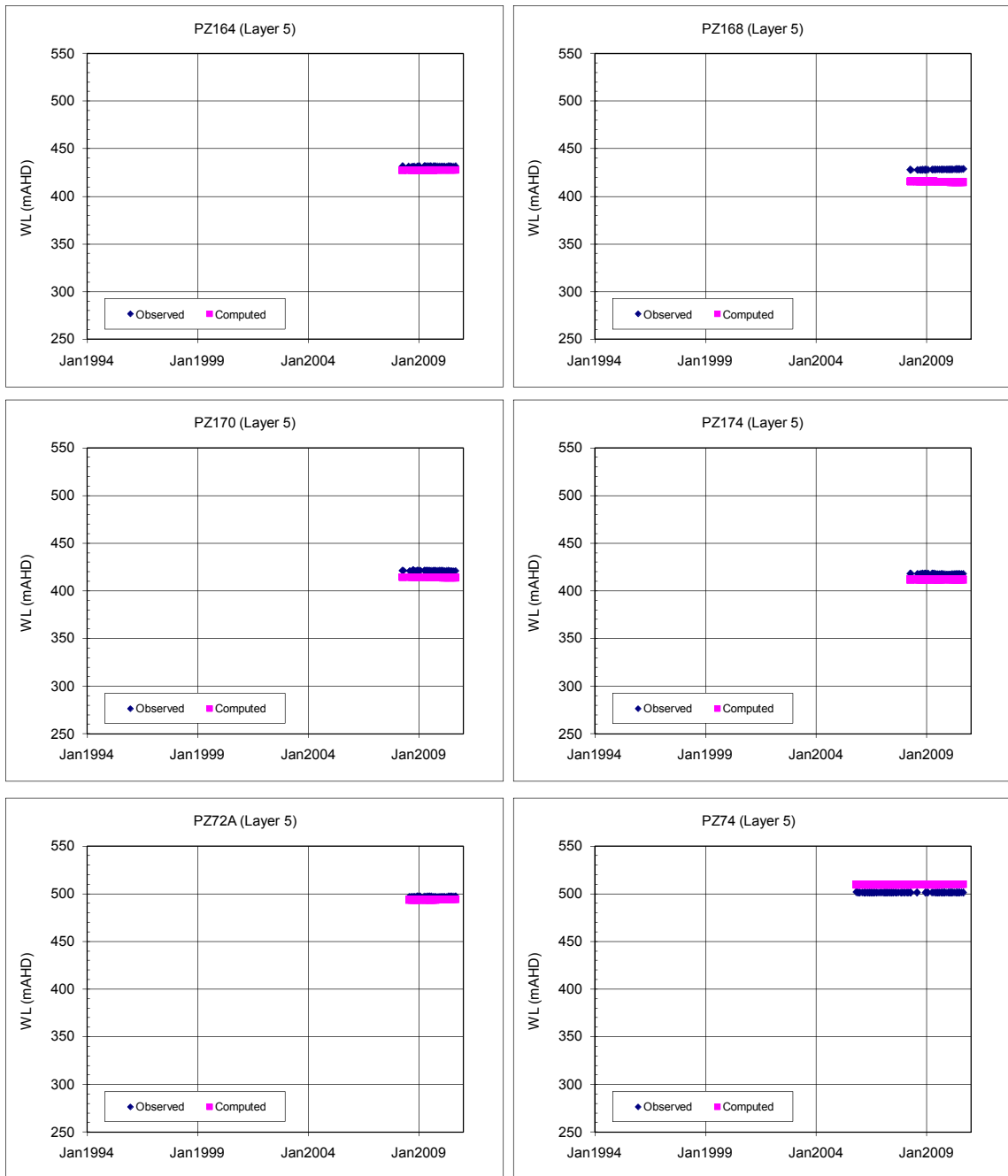


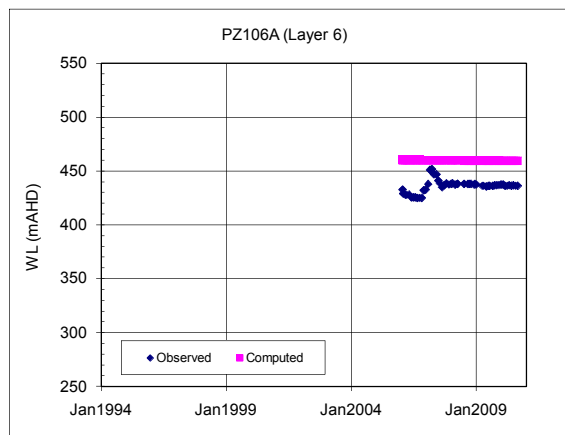
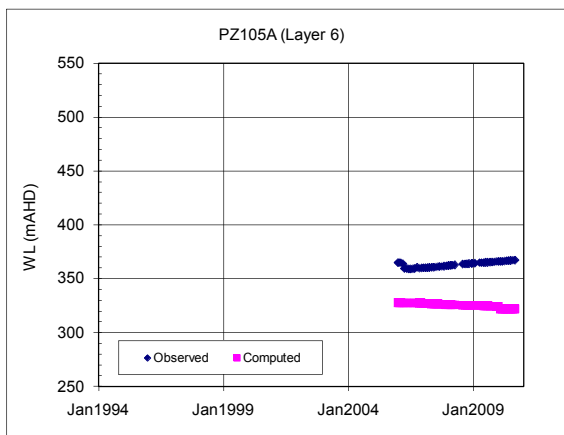
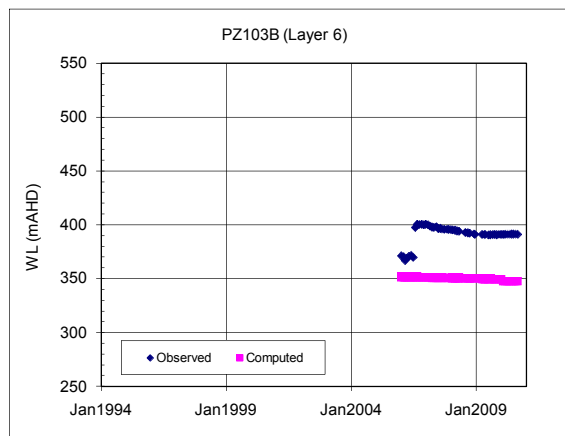
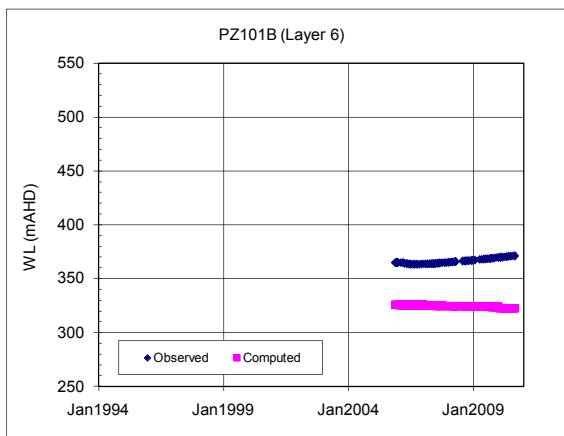
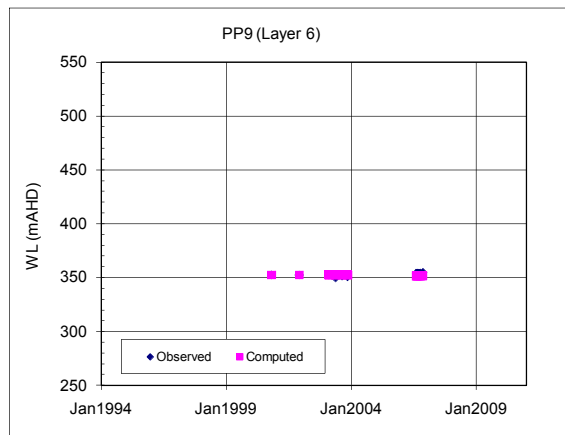
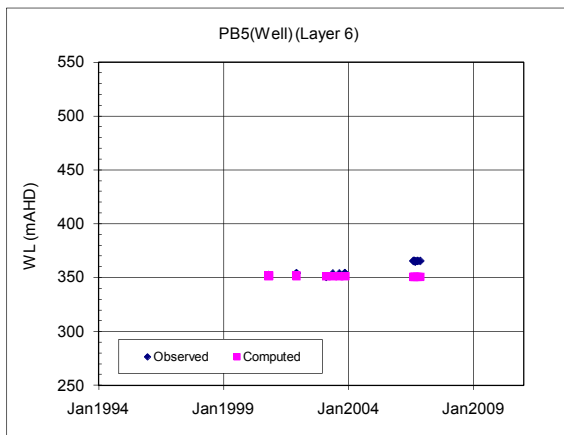
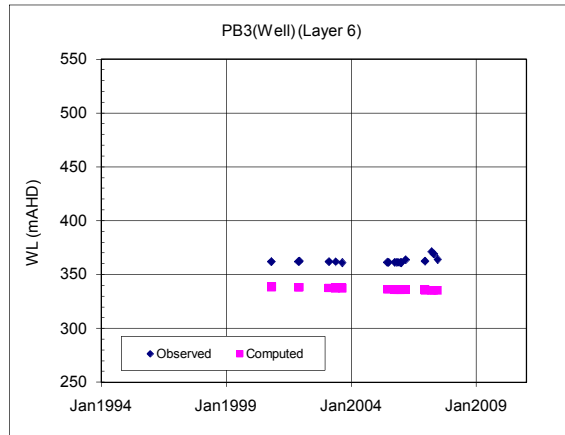
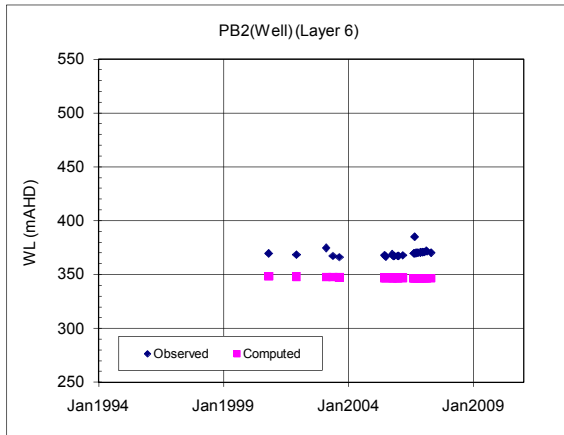


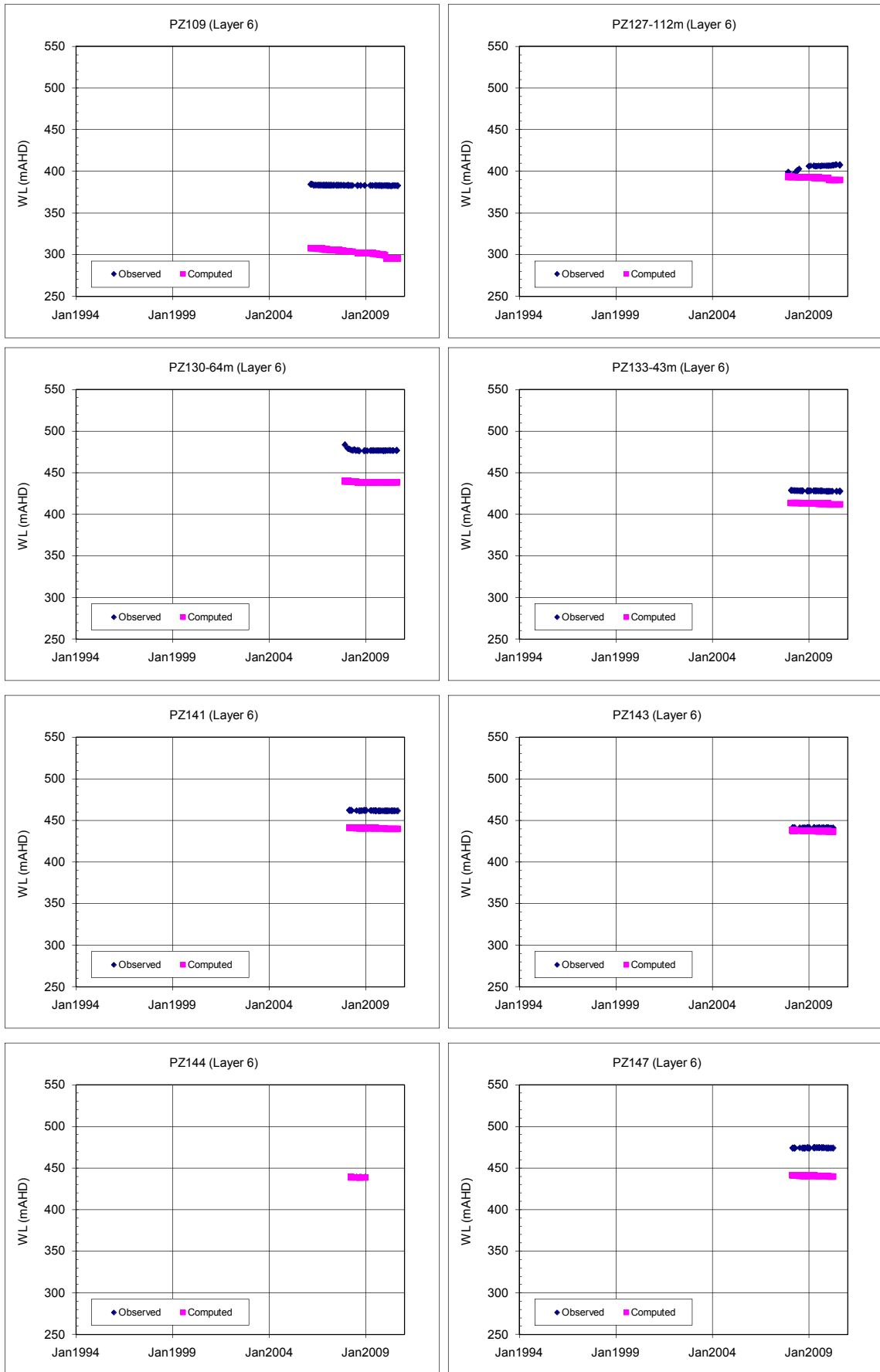




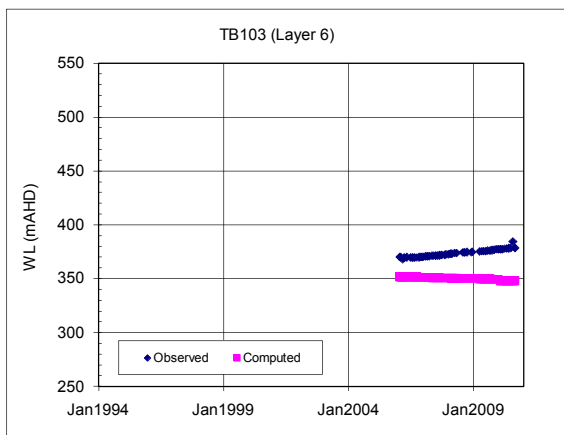
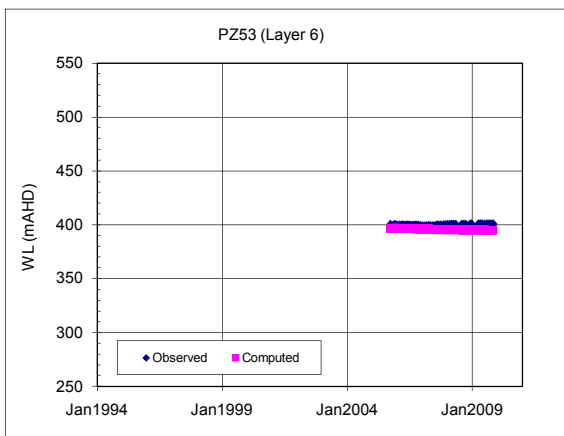
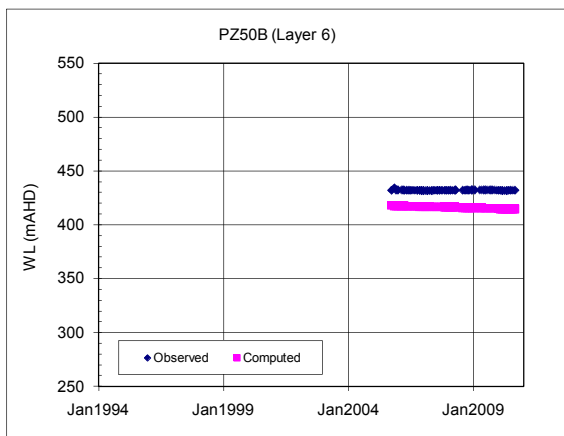
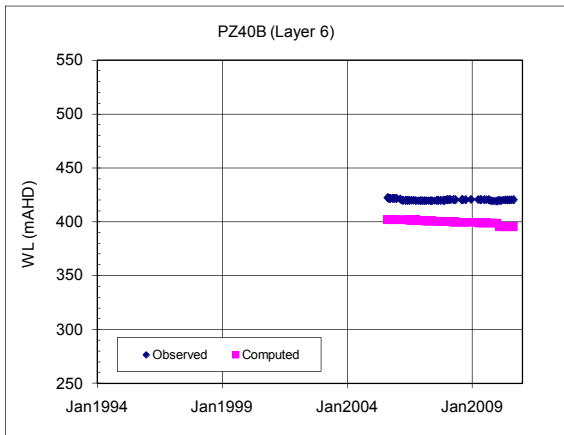
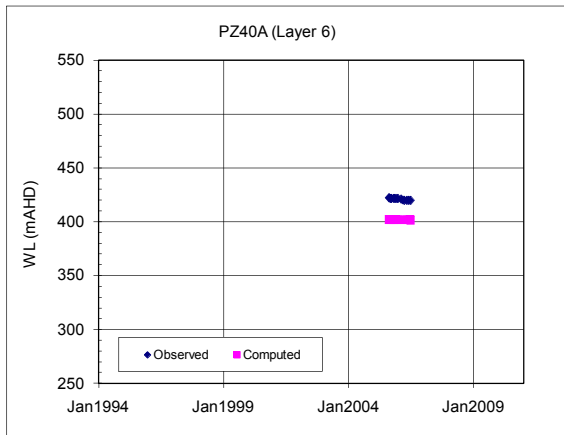
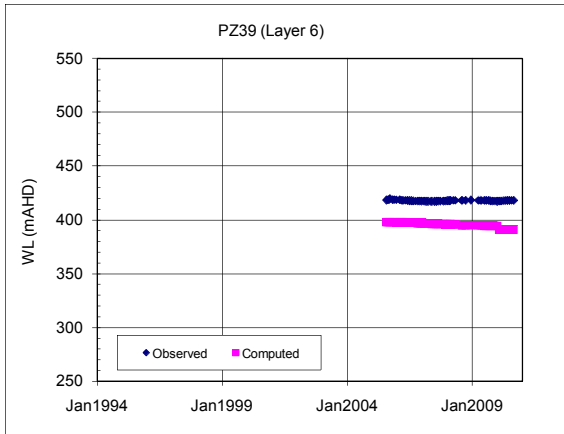
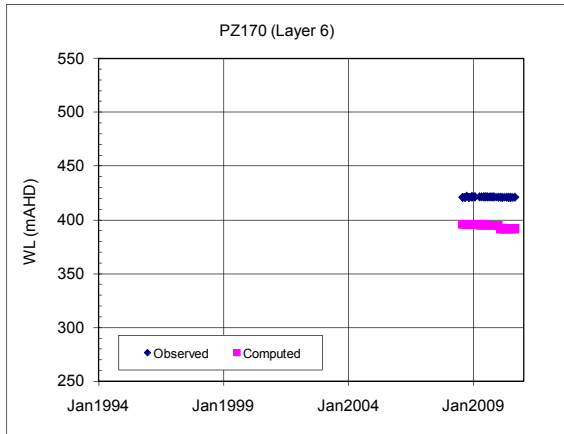


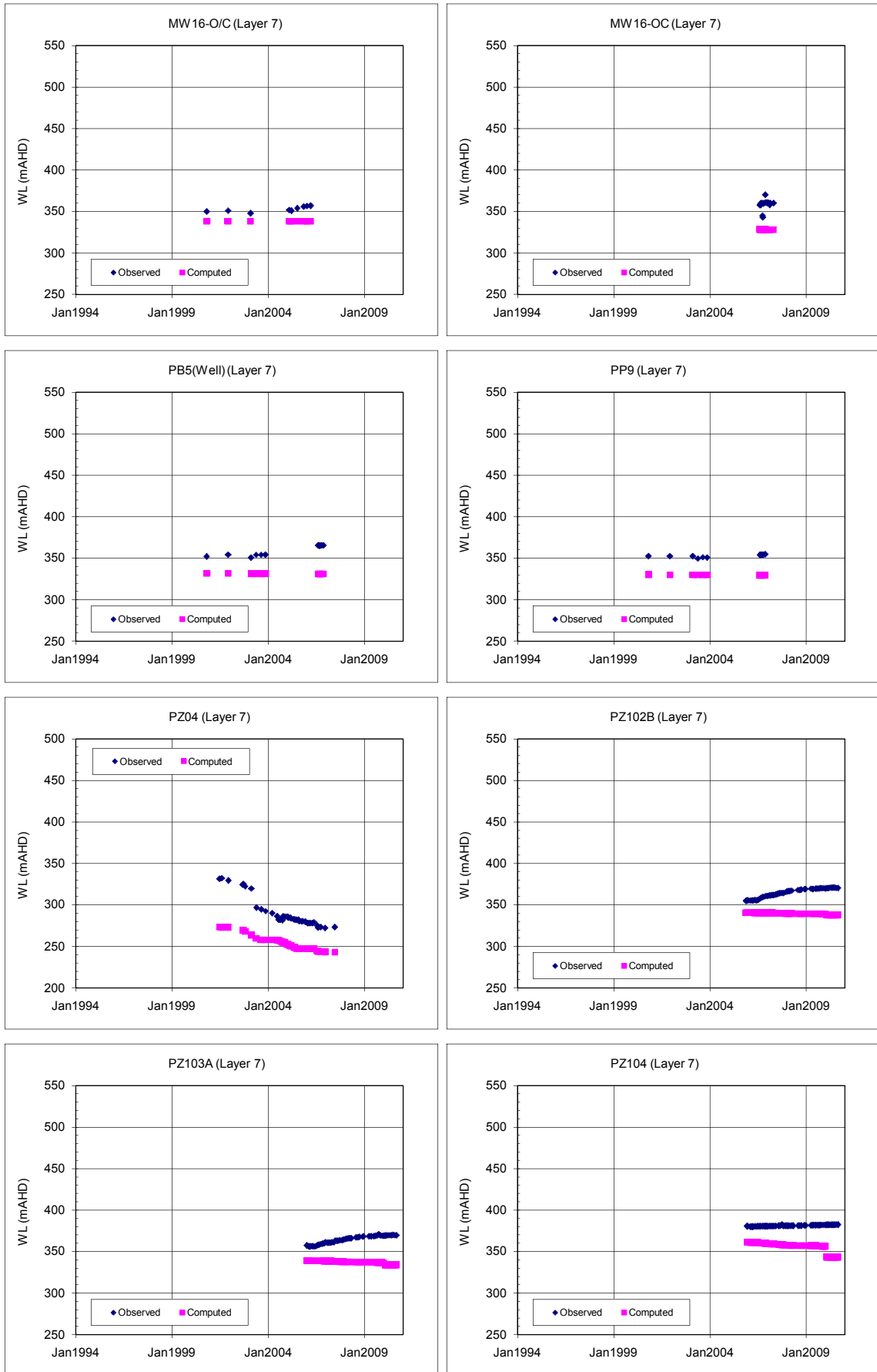


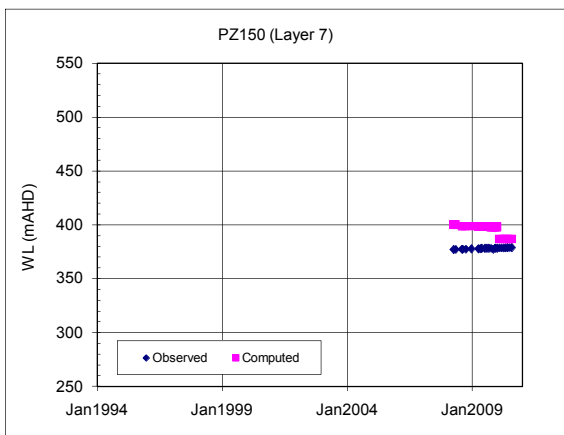
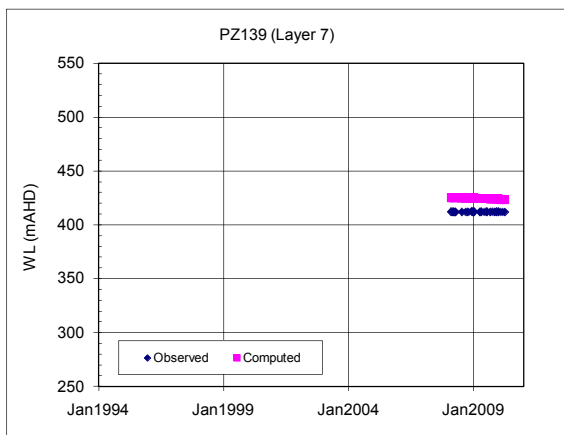
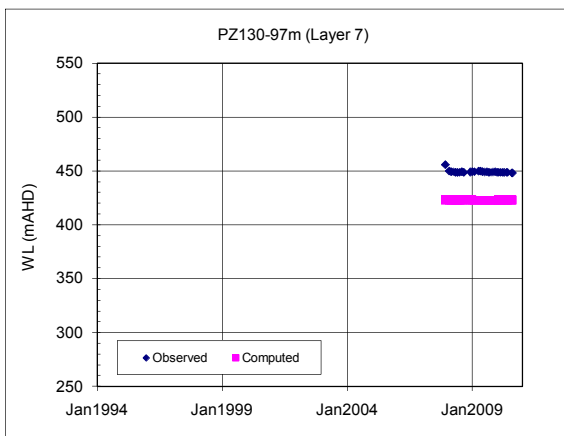
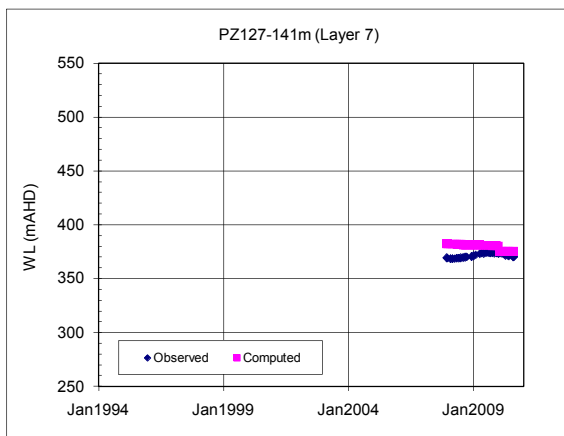
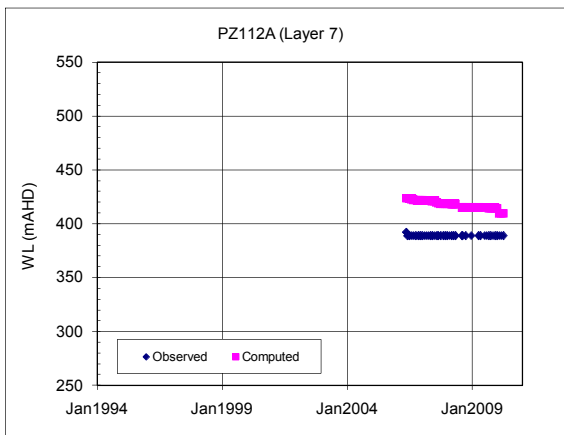
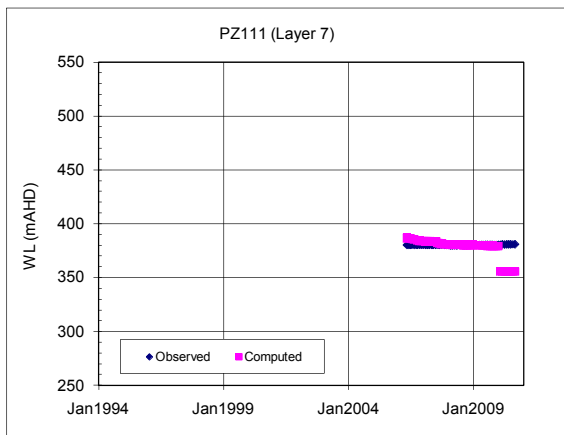
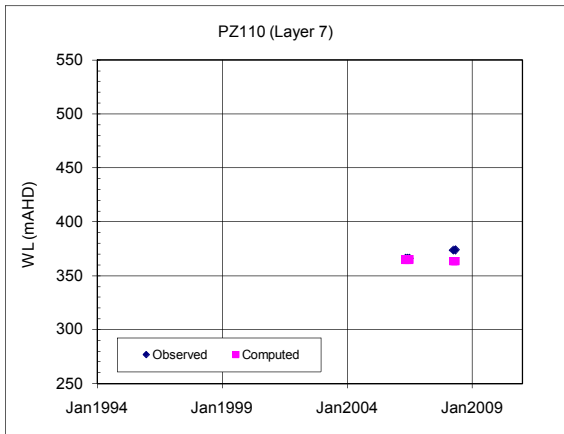
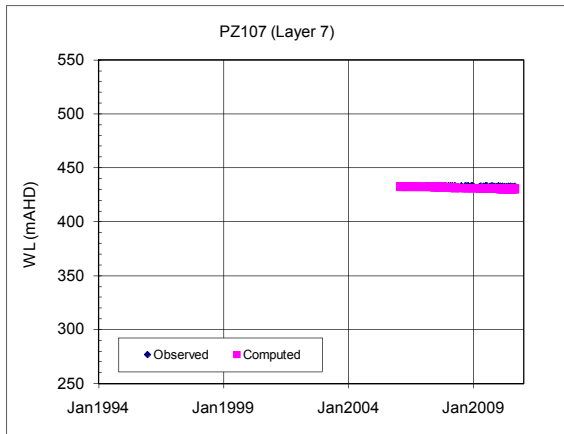


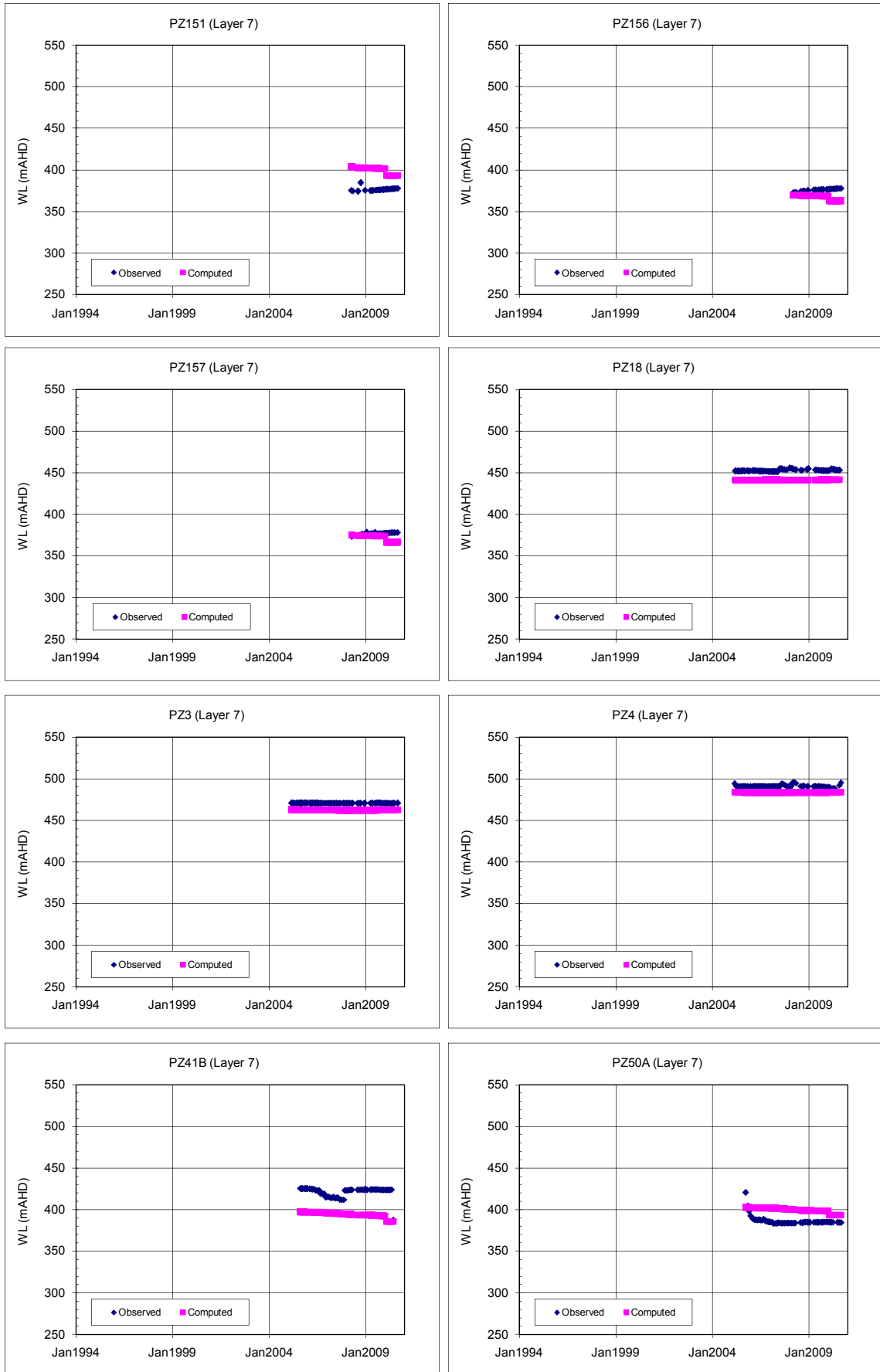


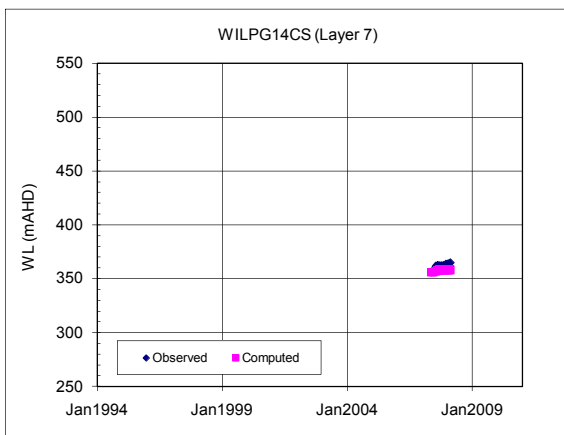
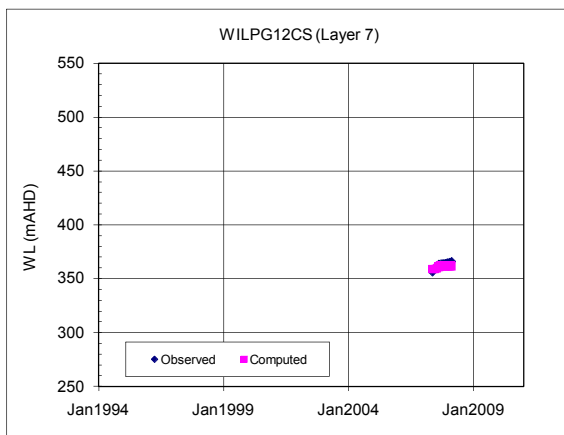
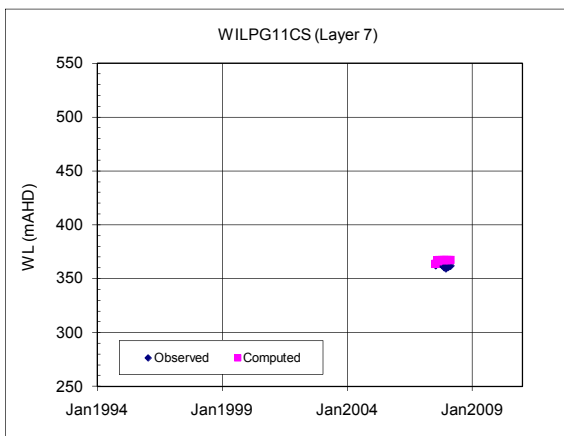
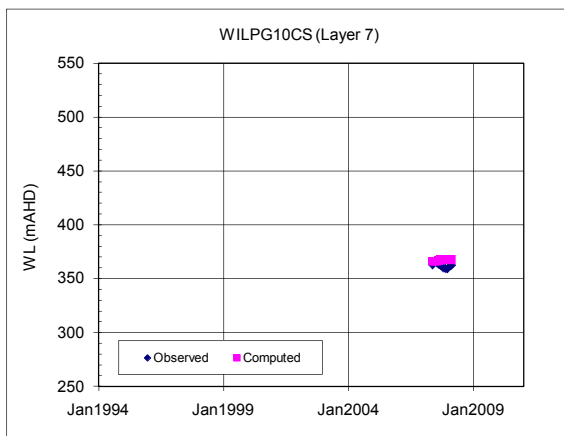
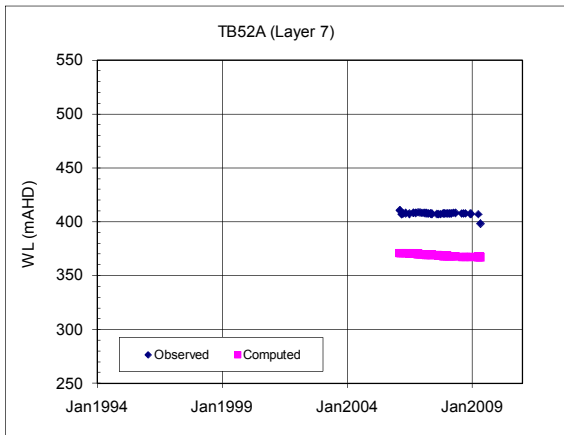
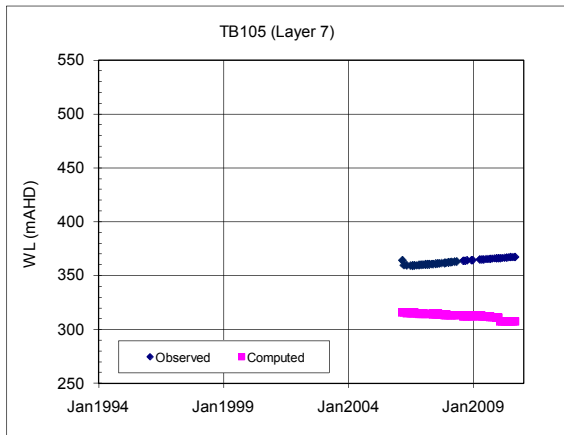
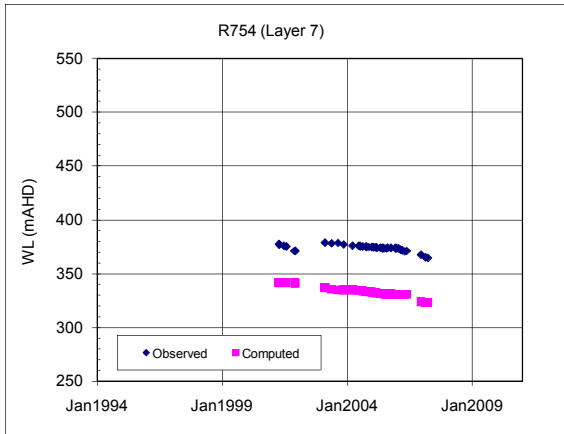
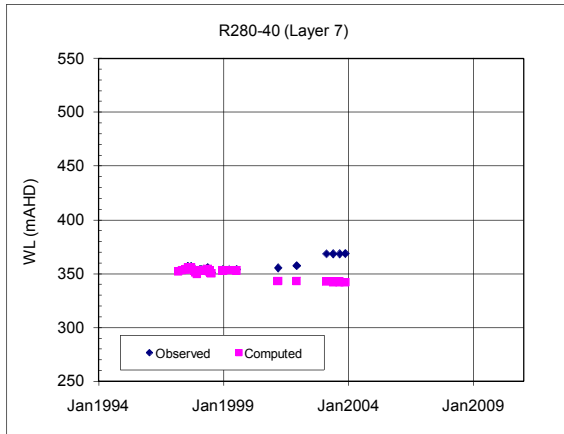


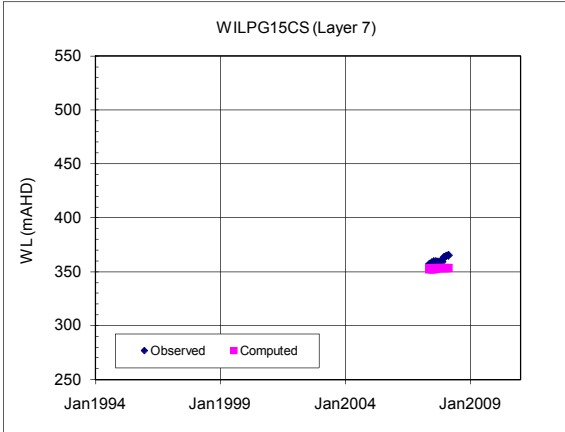


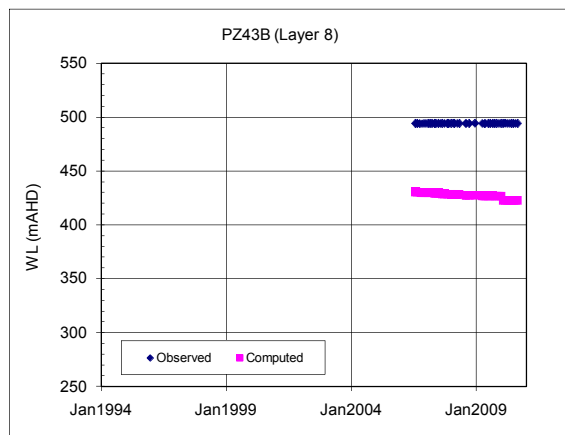
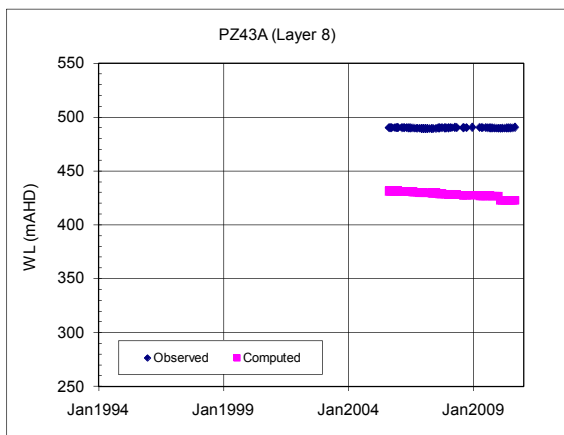
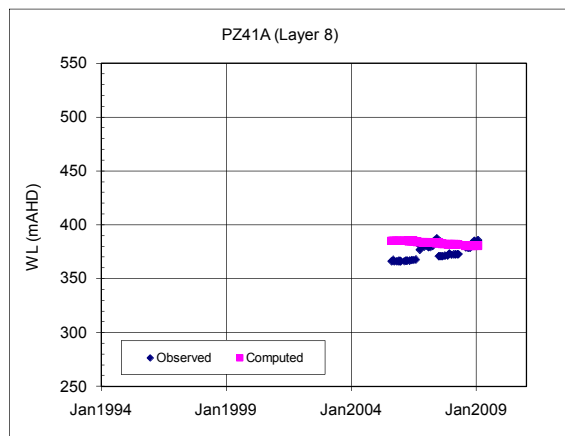
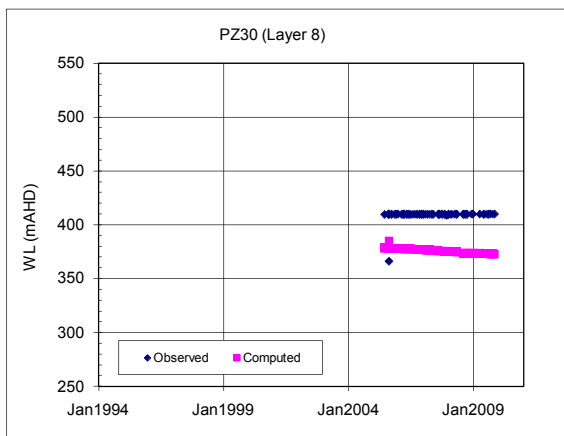
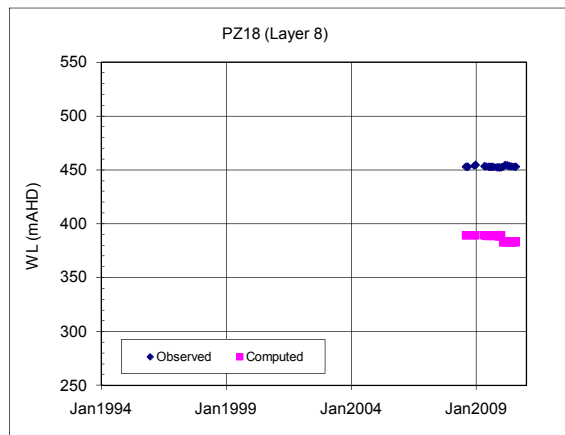
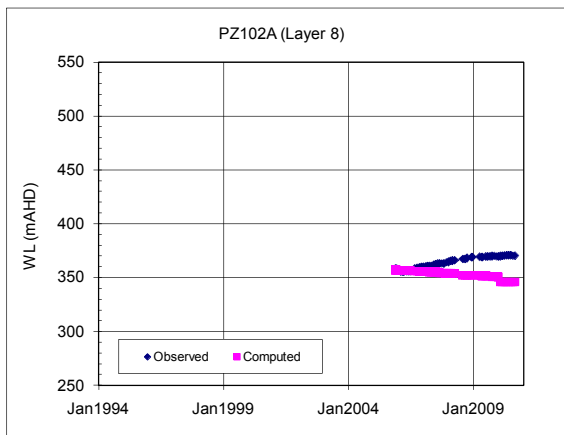
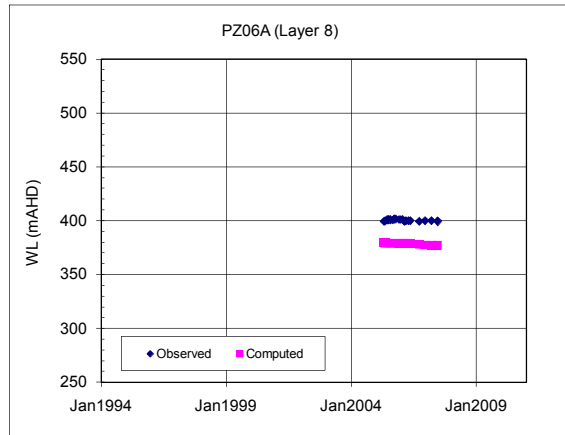
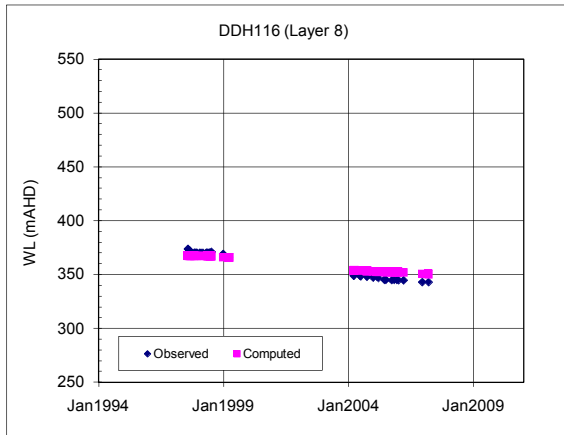


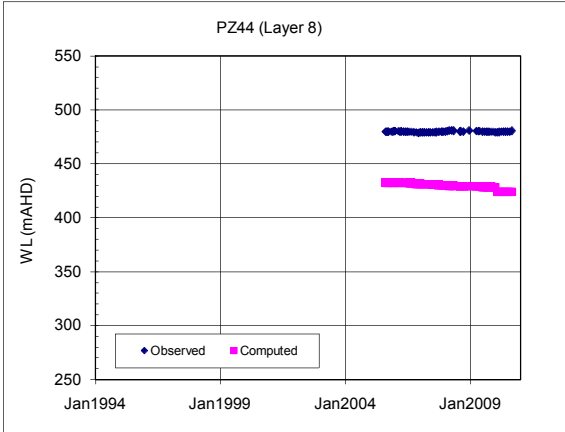








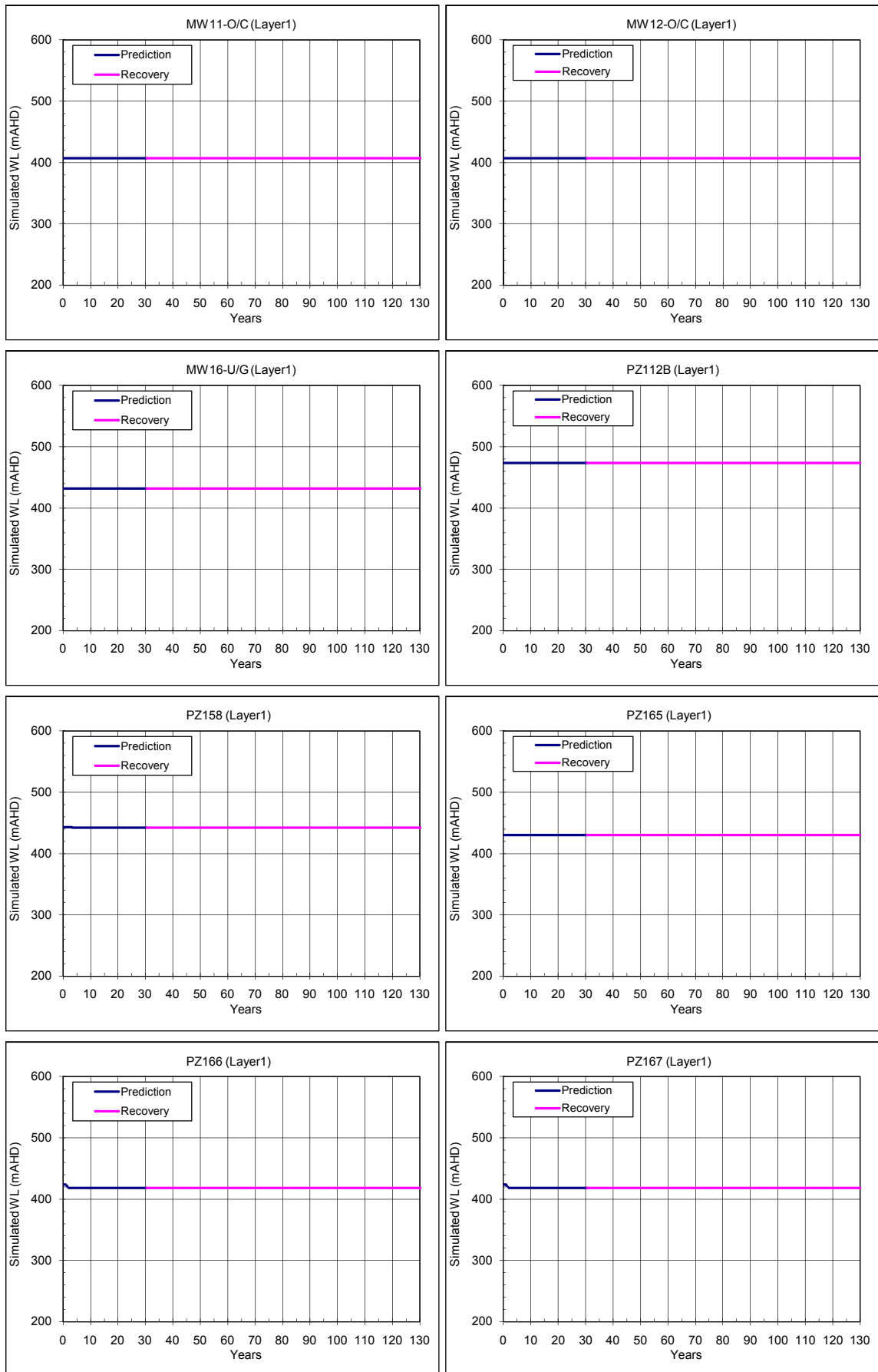


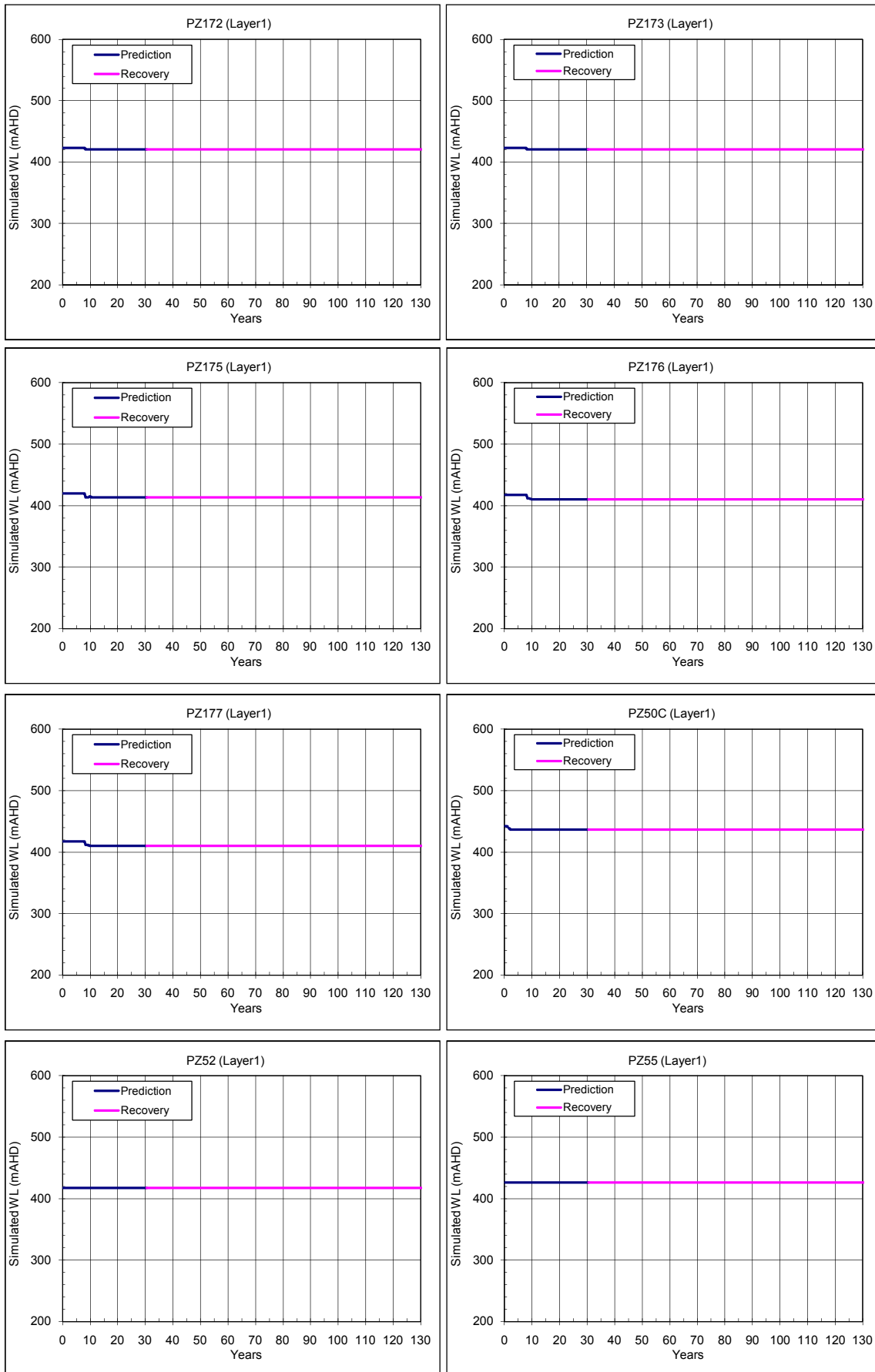


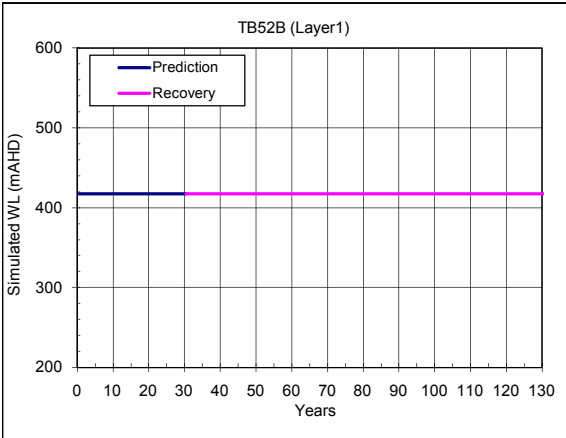
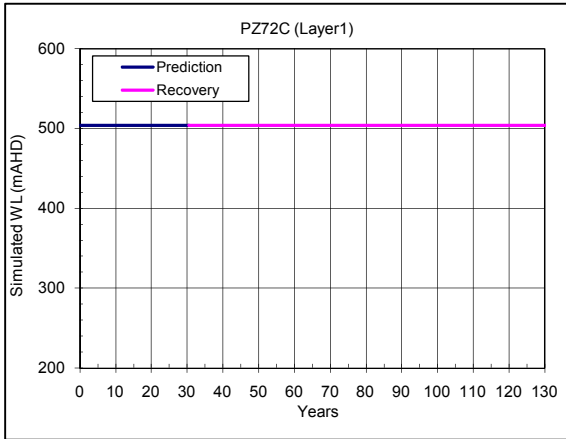
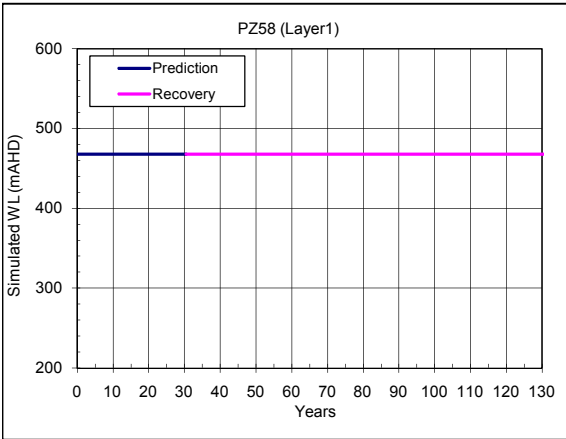


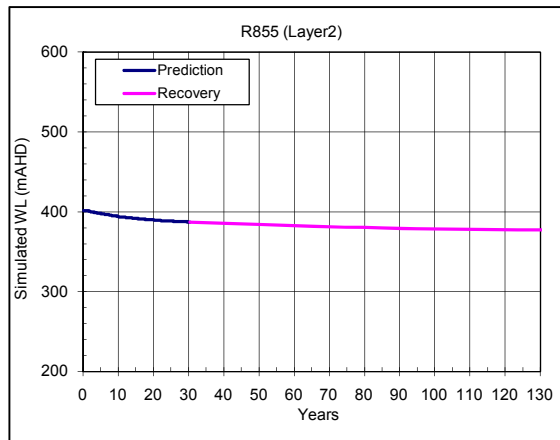
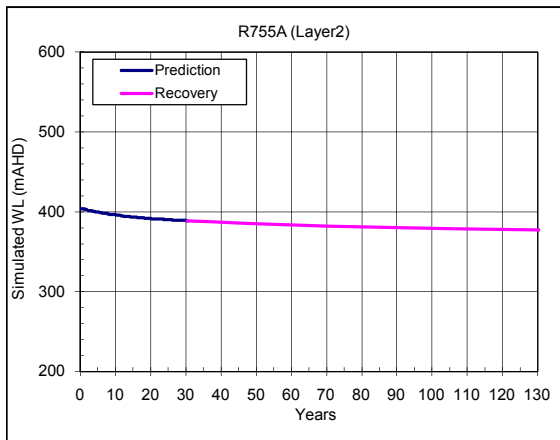
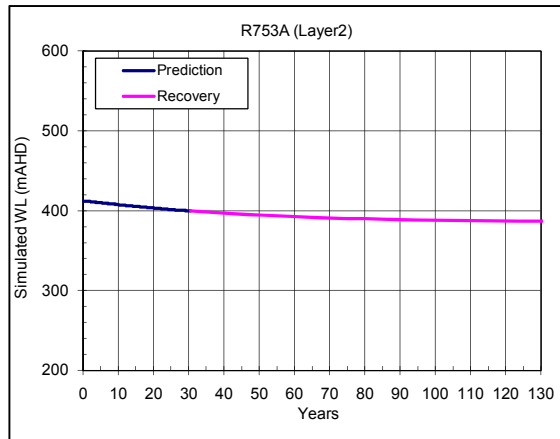
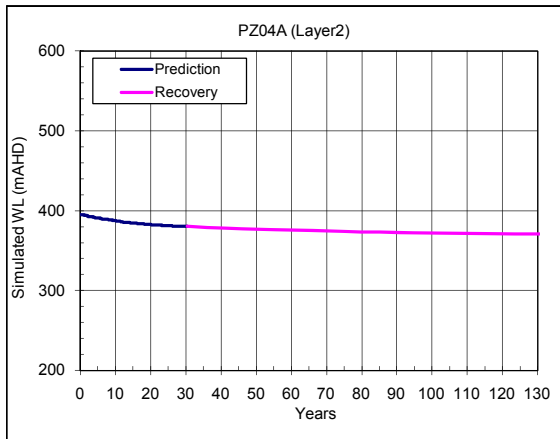
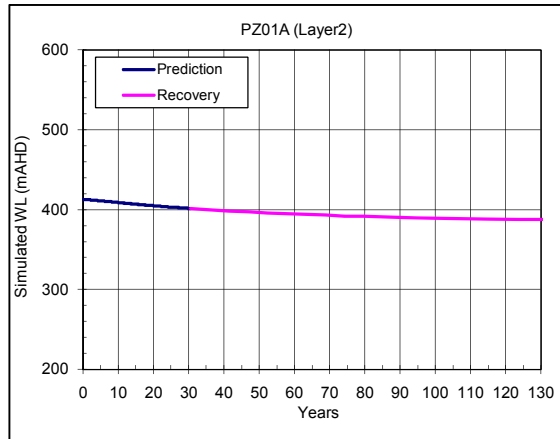
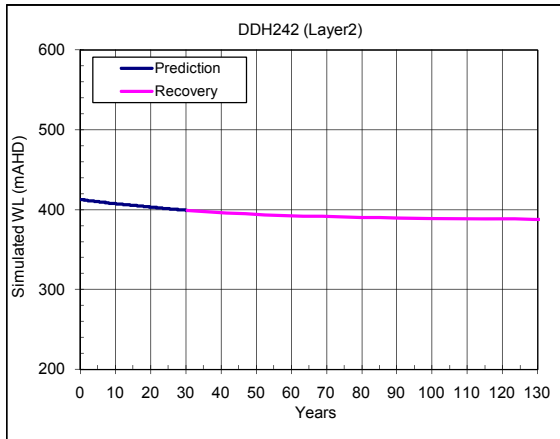
**APPENDIX K:  
MC2.2 PREDICTED RECOVERY  
HYDROGRAPHS**

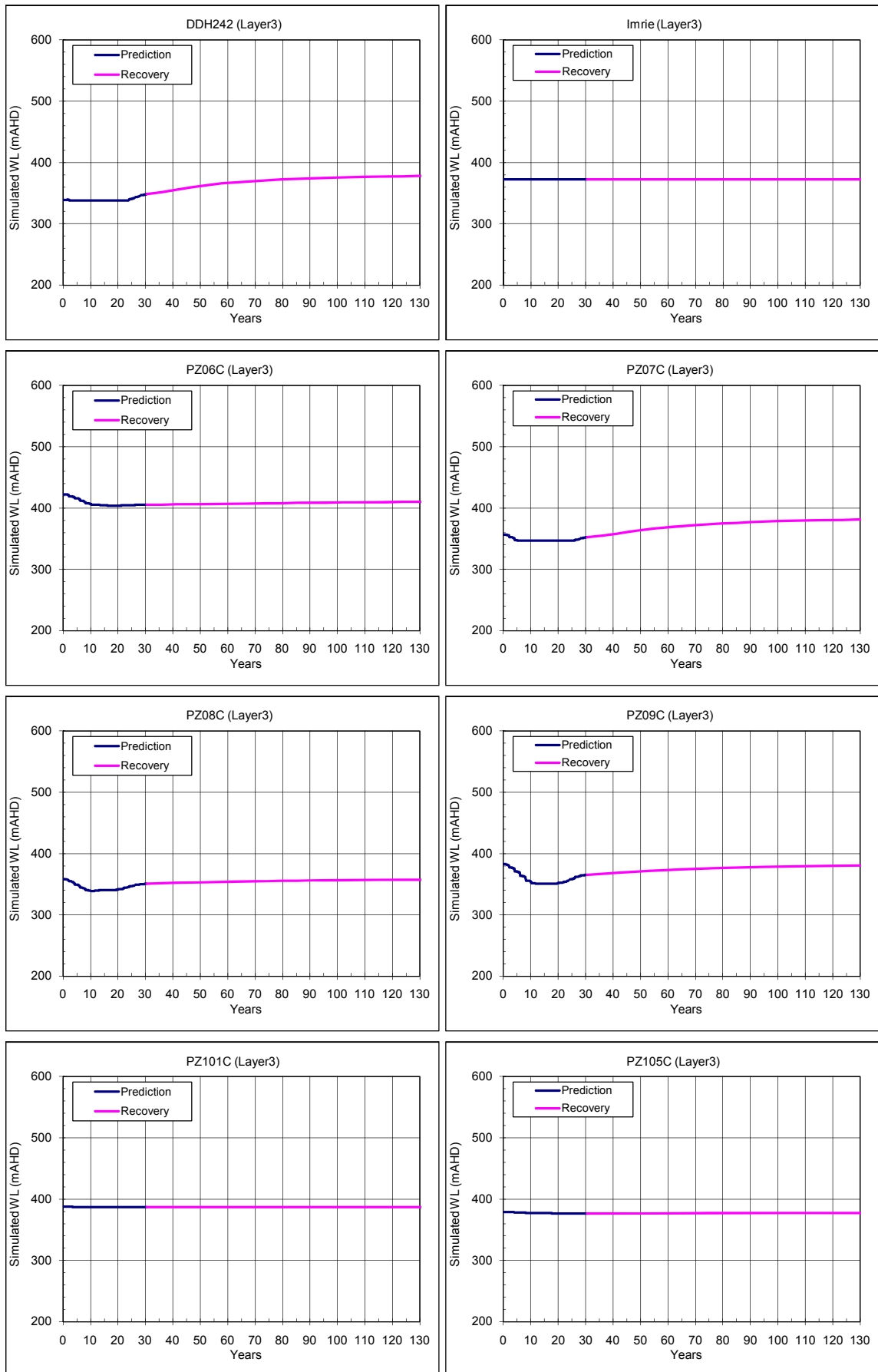
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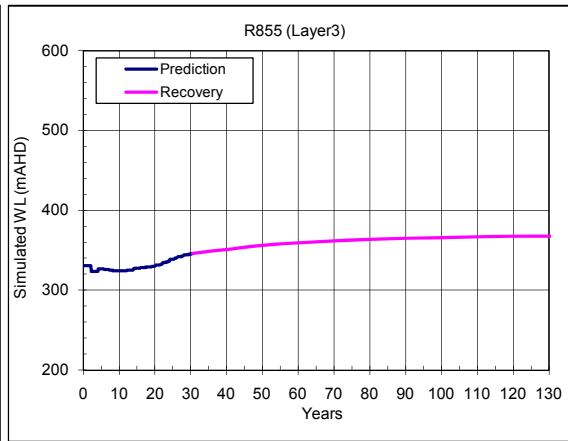
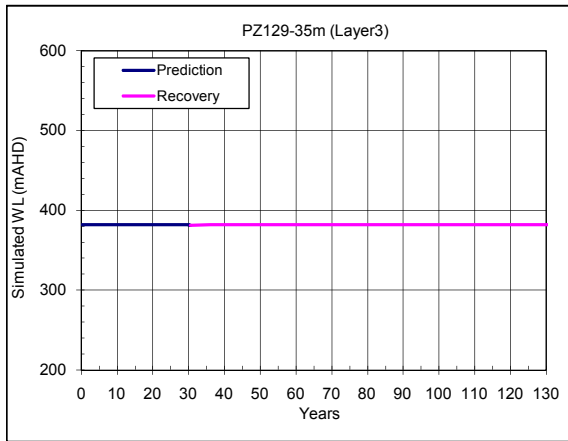


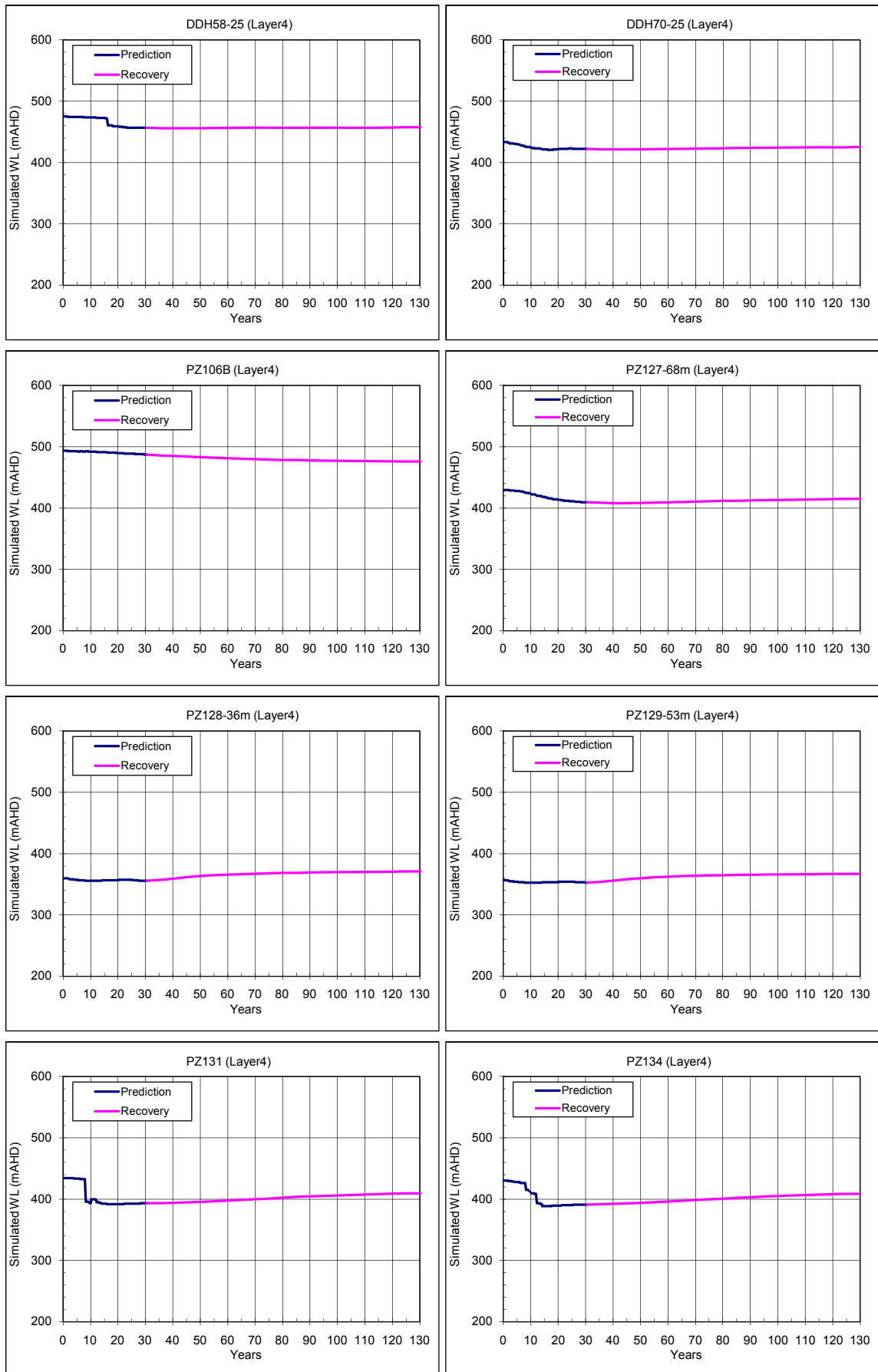




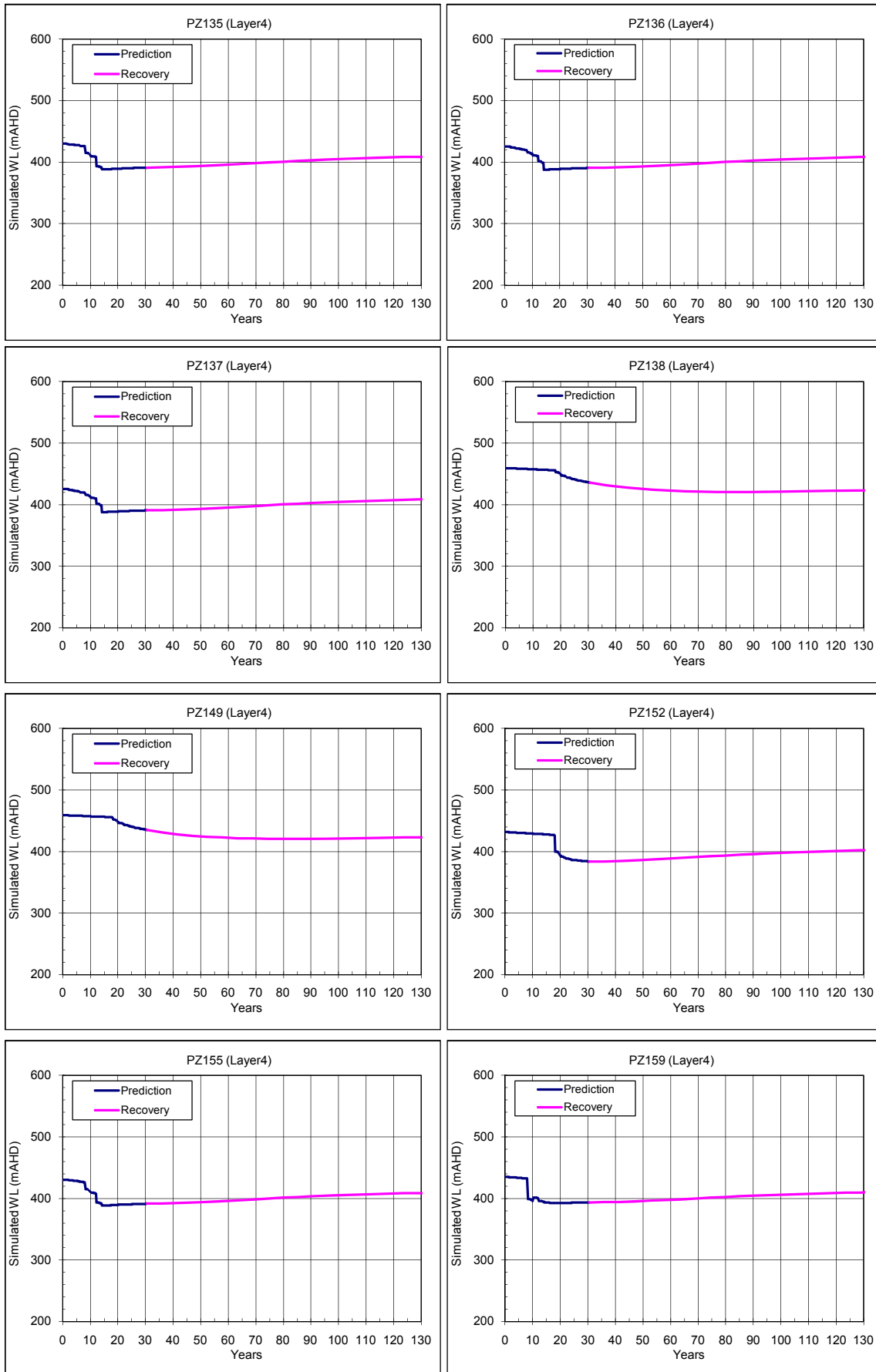


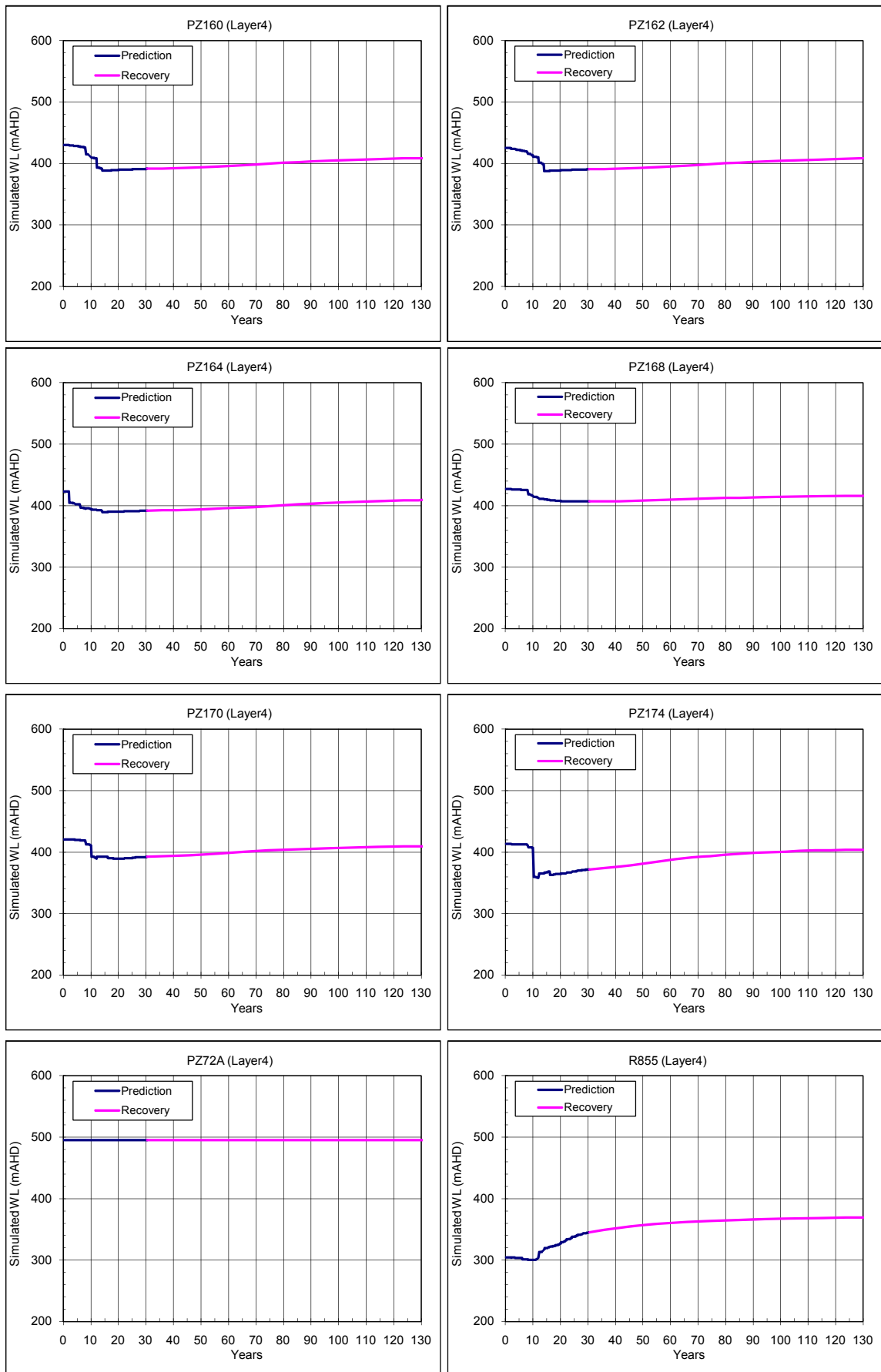


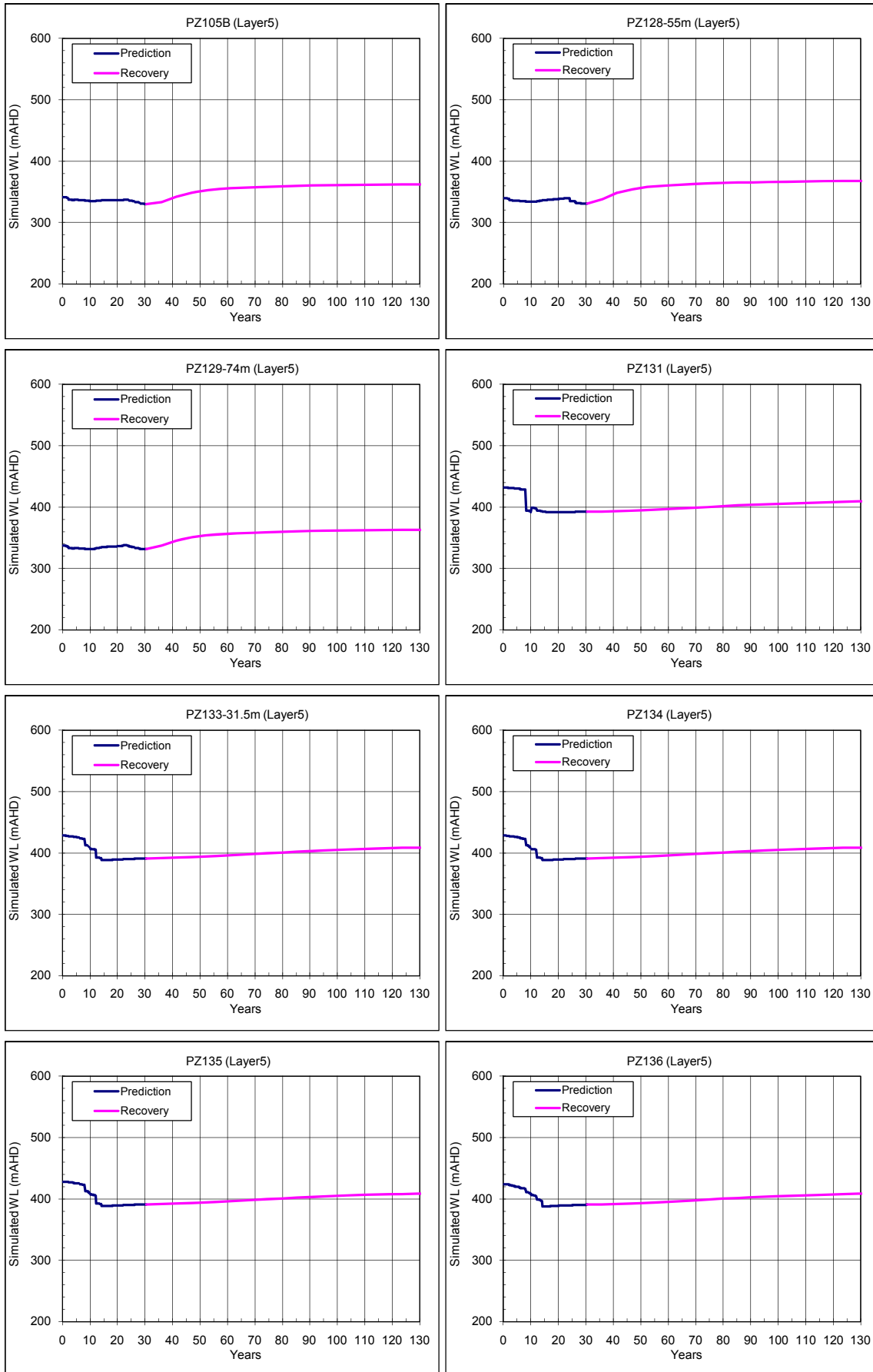


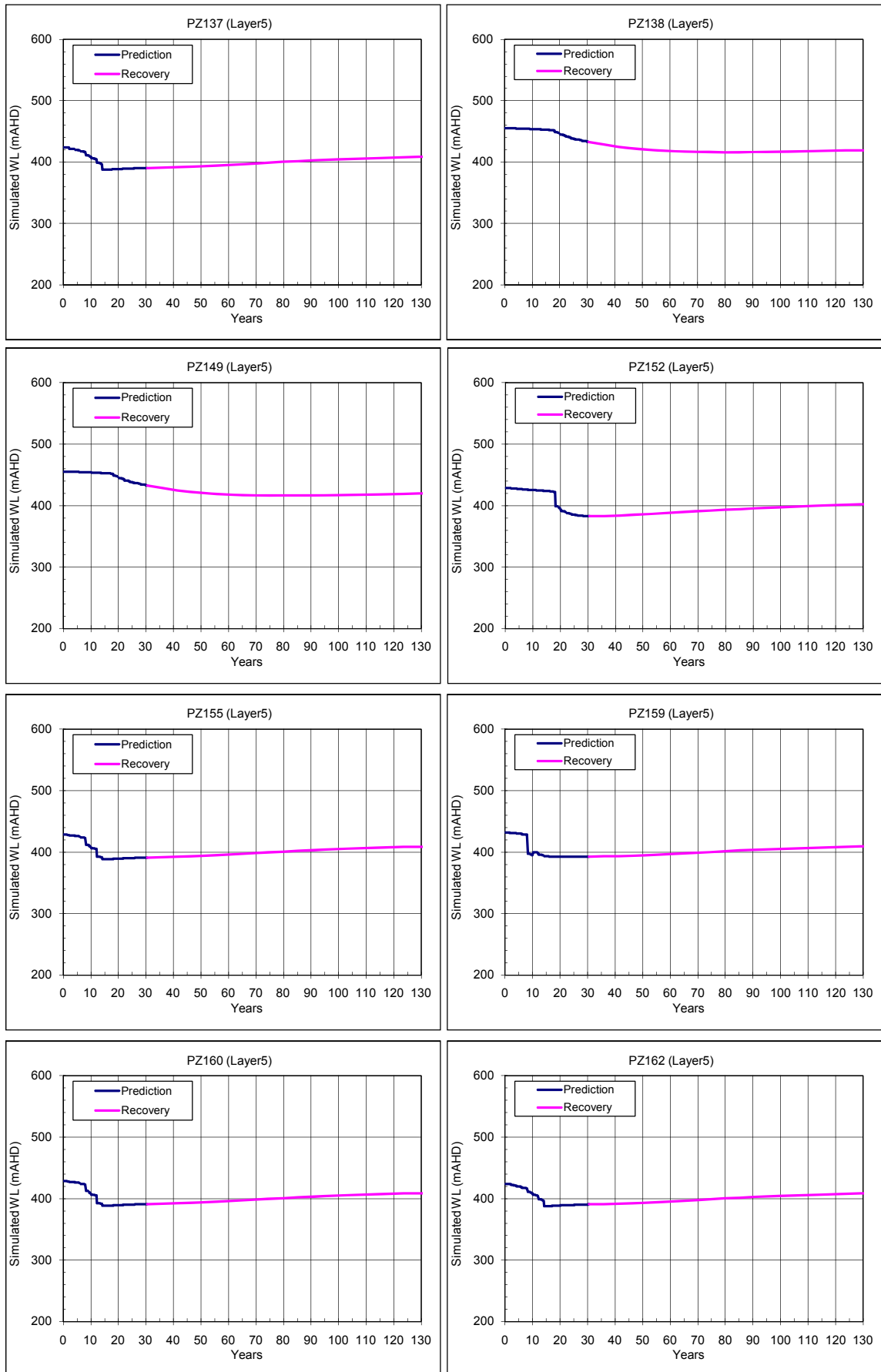


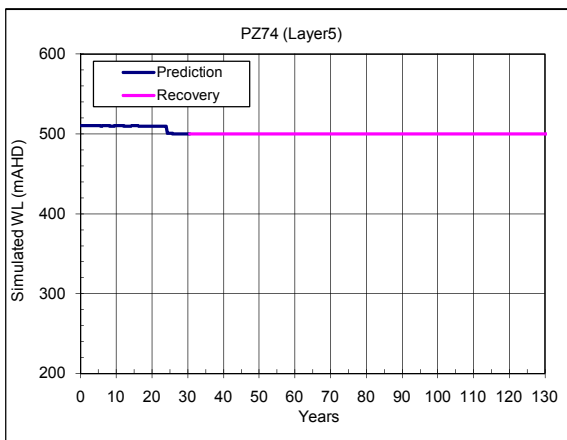
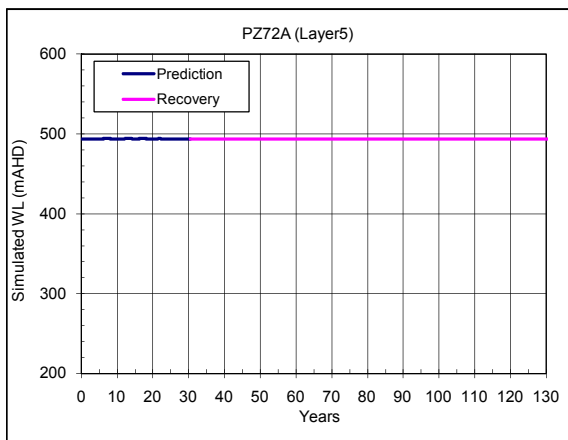
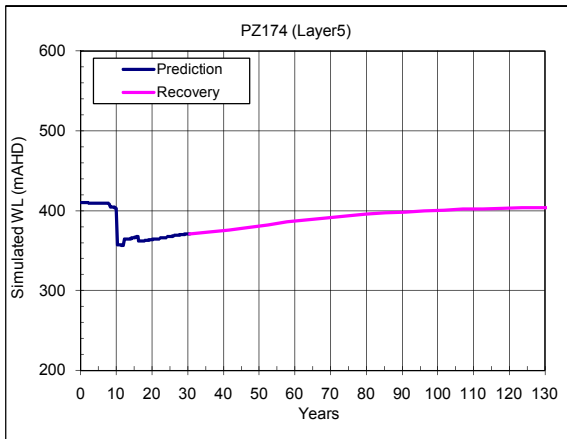
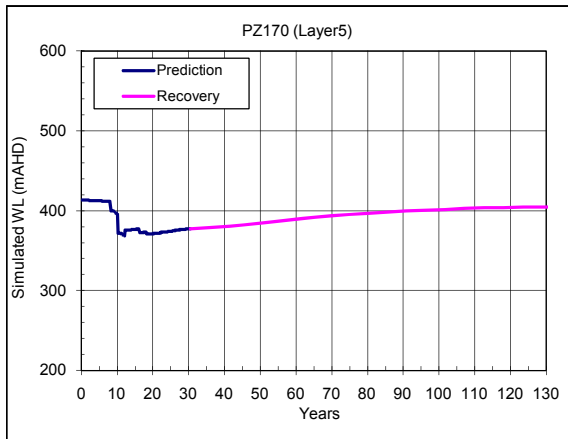
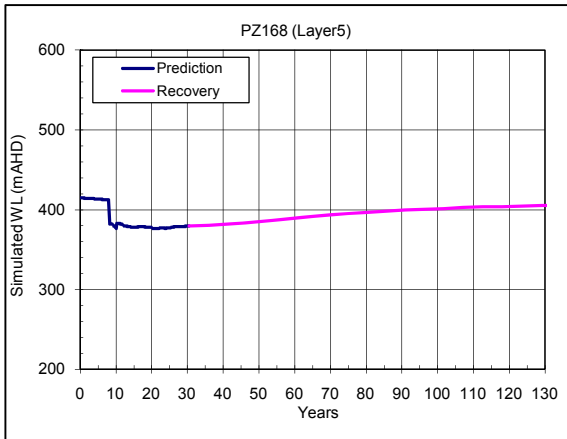
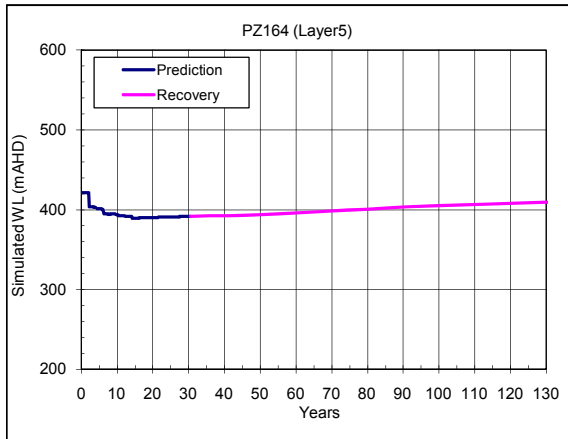


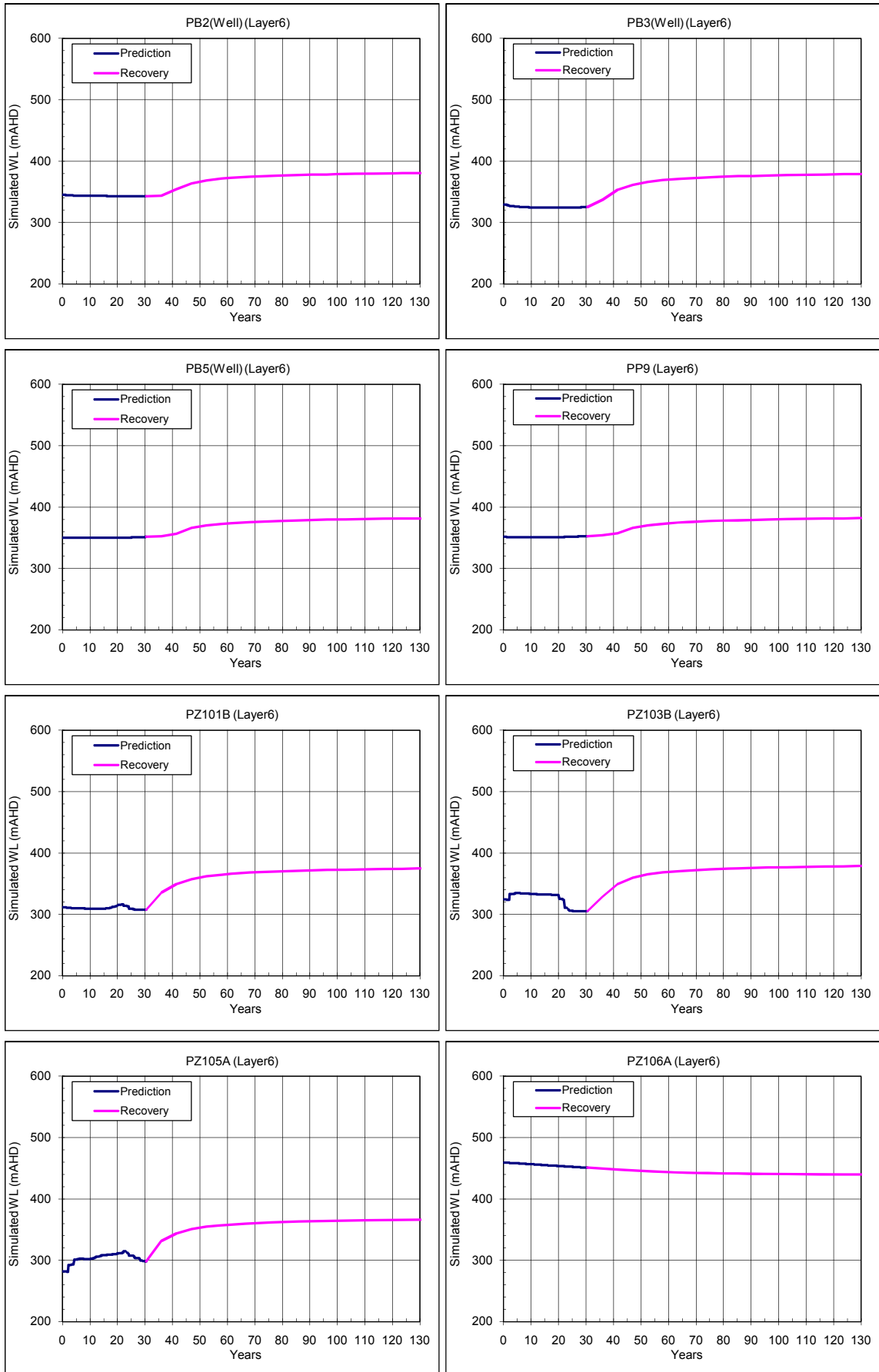


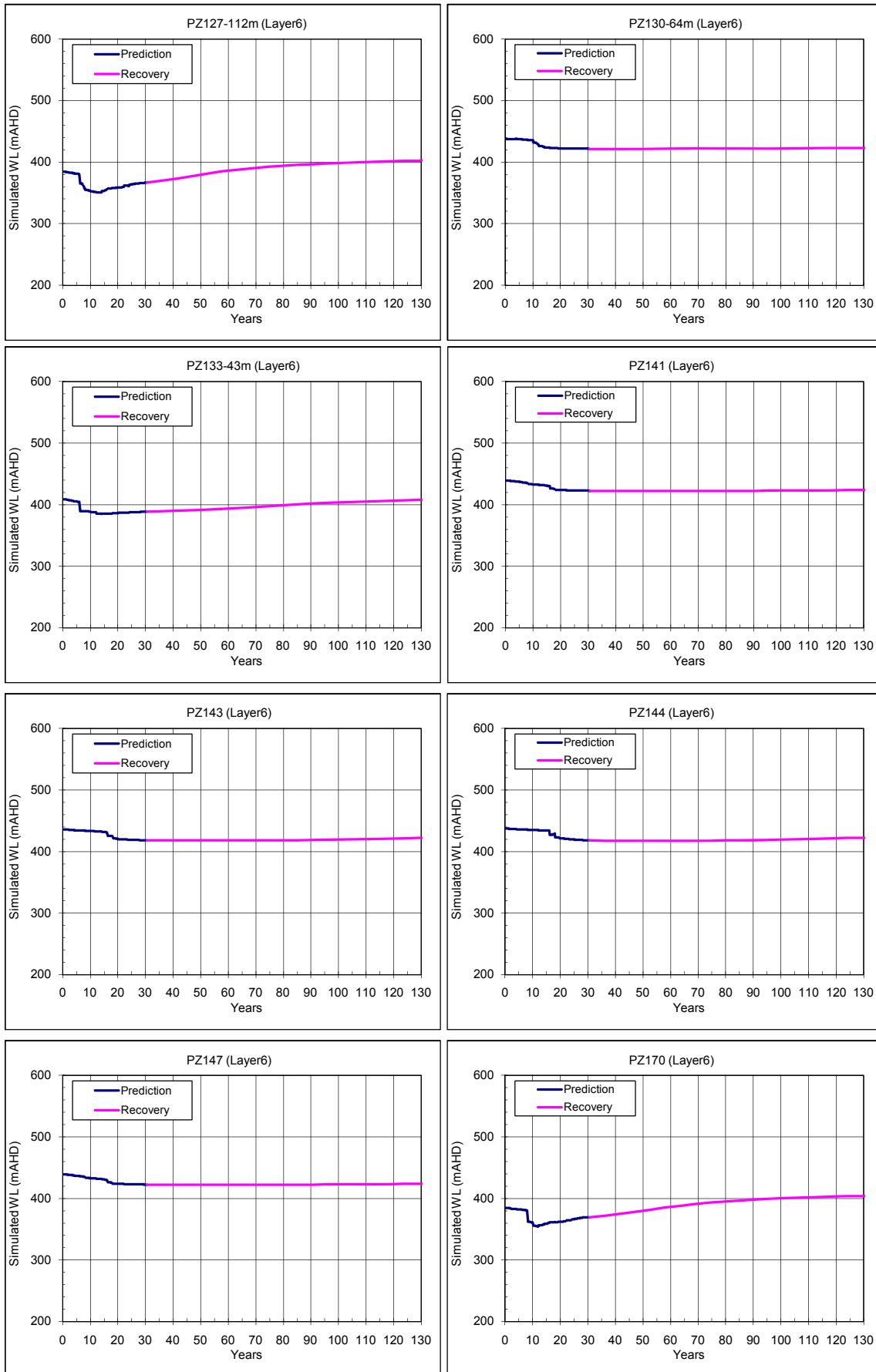


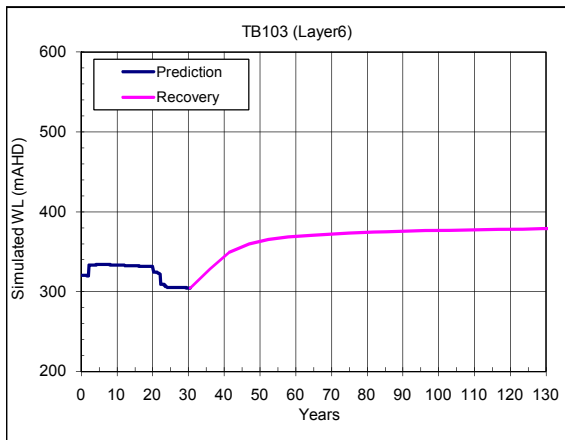
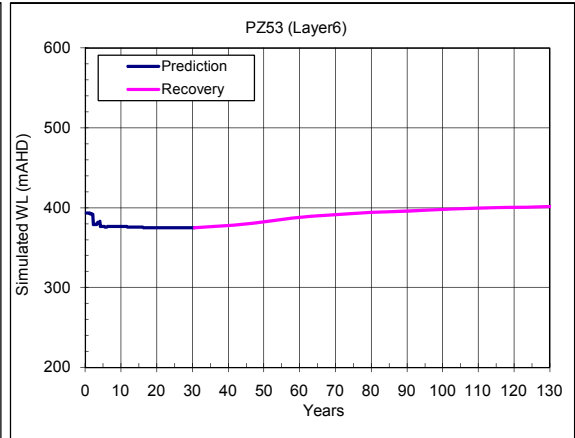
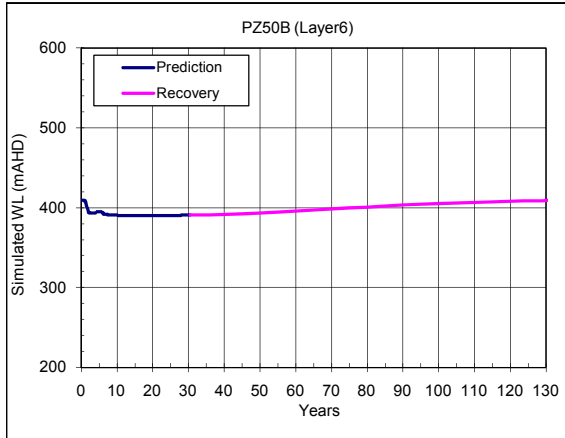
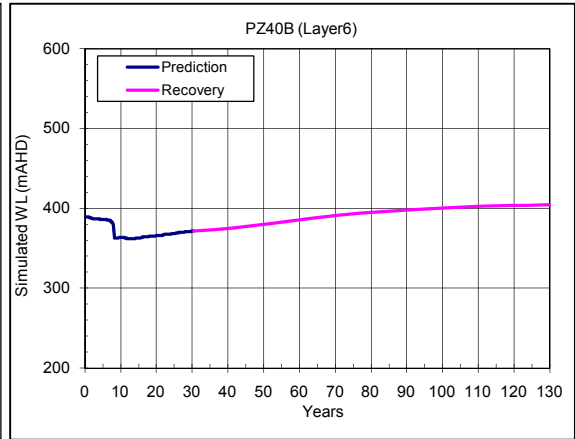
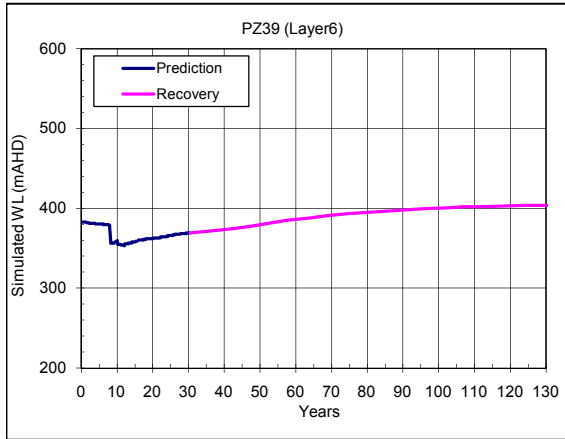




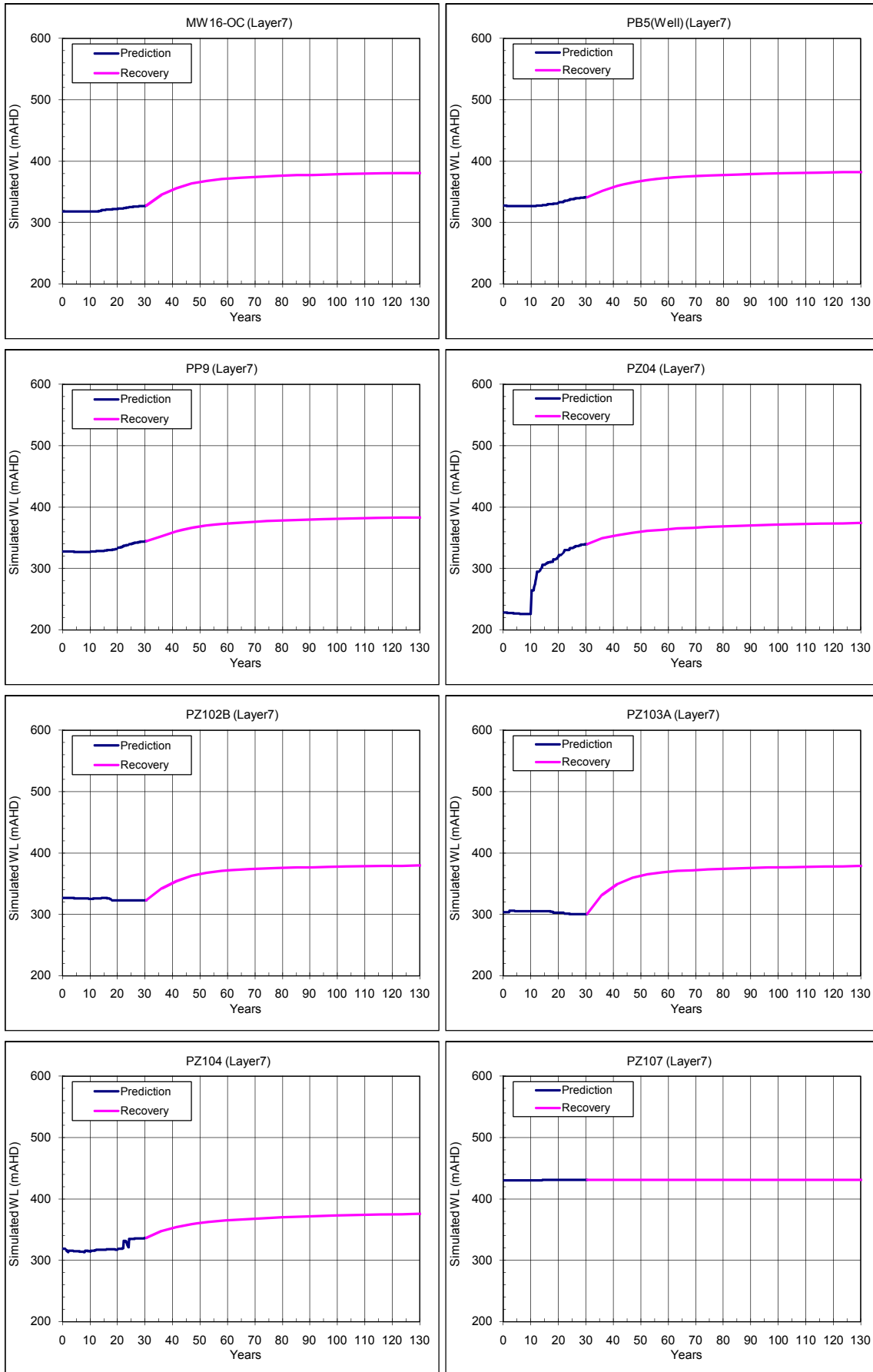


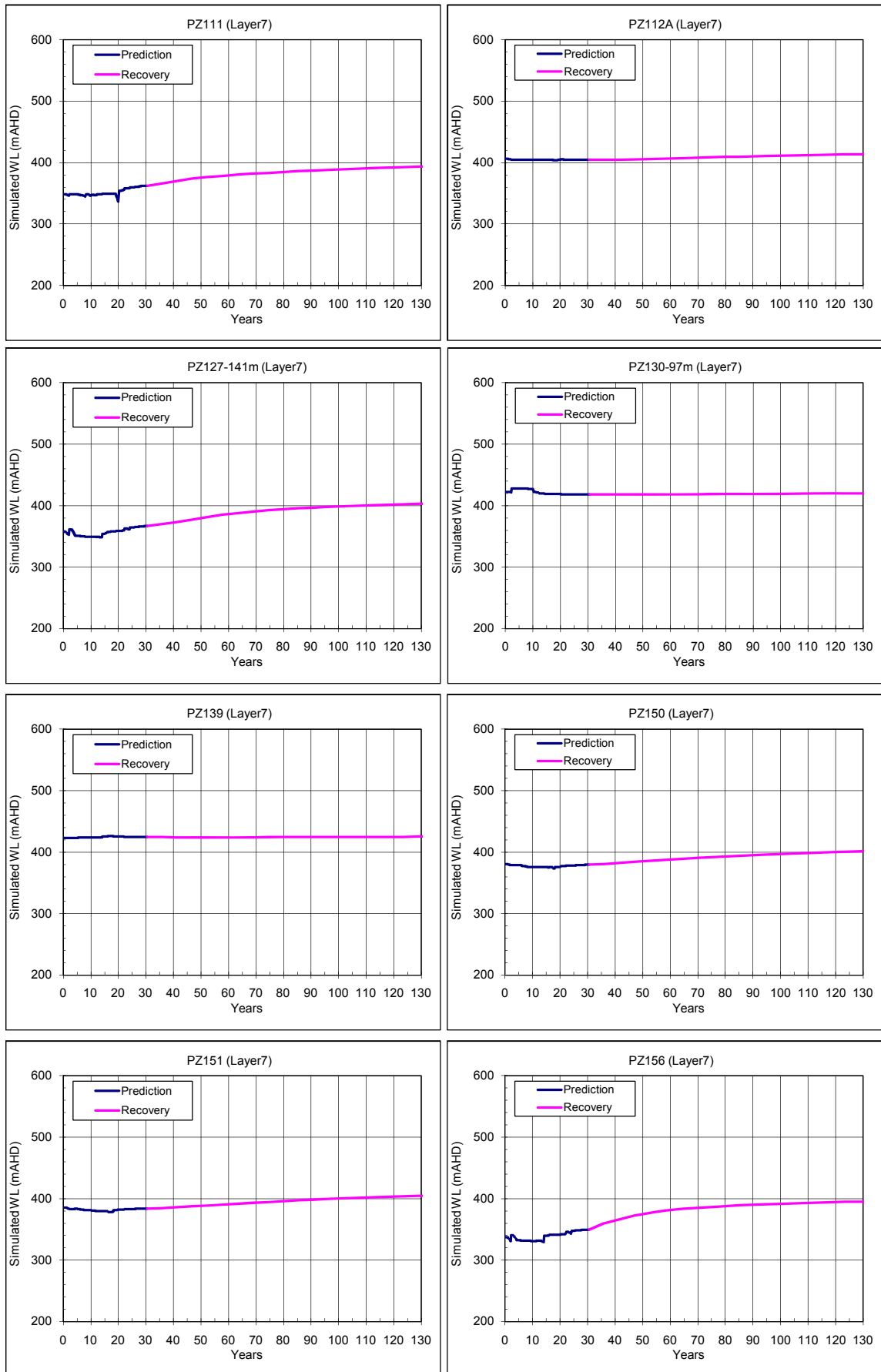


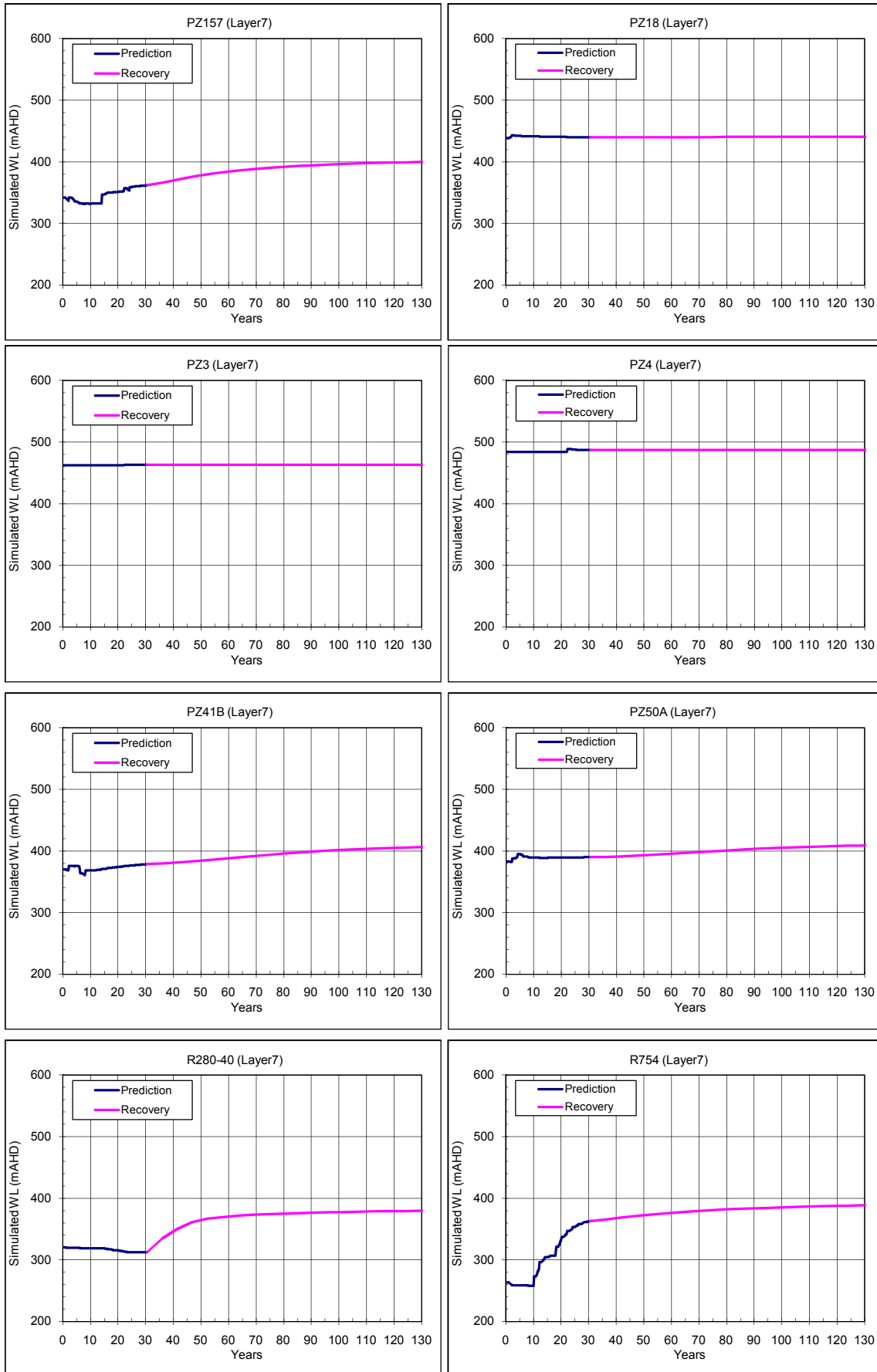


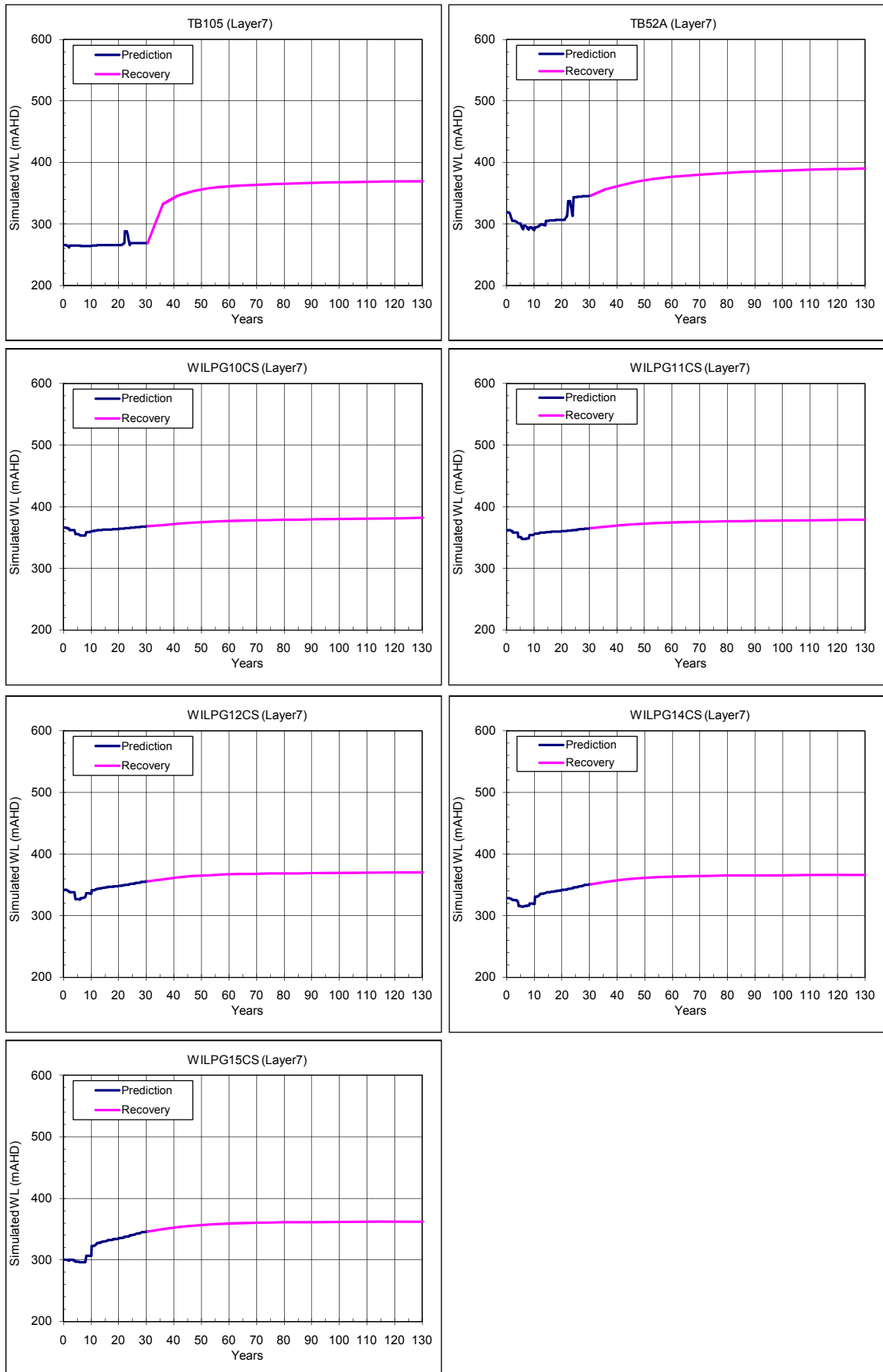


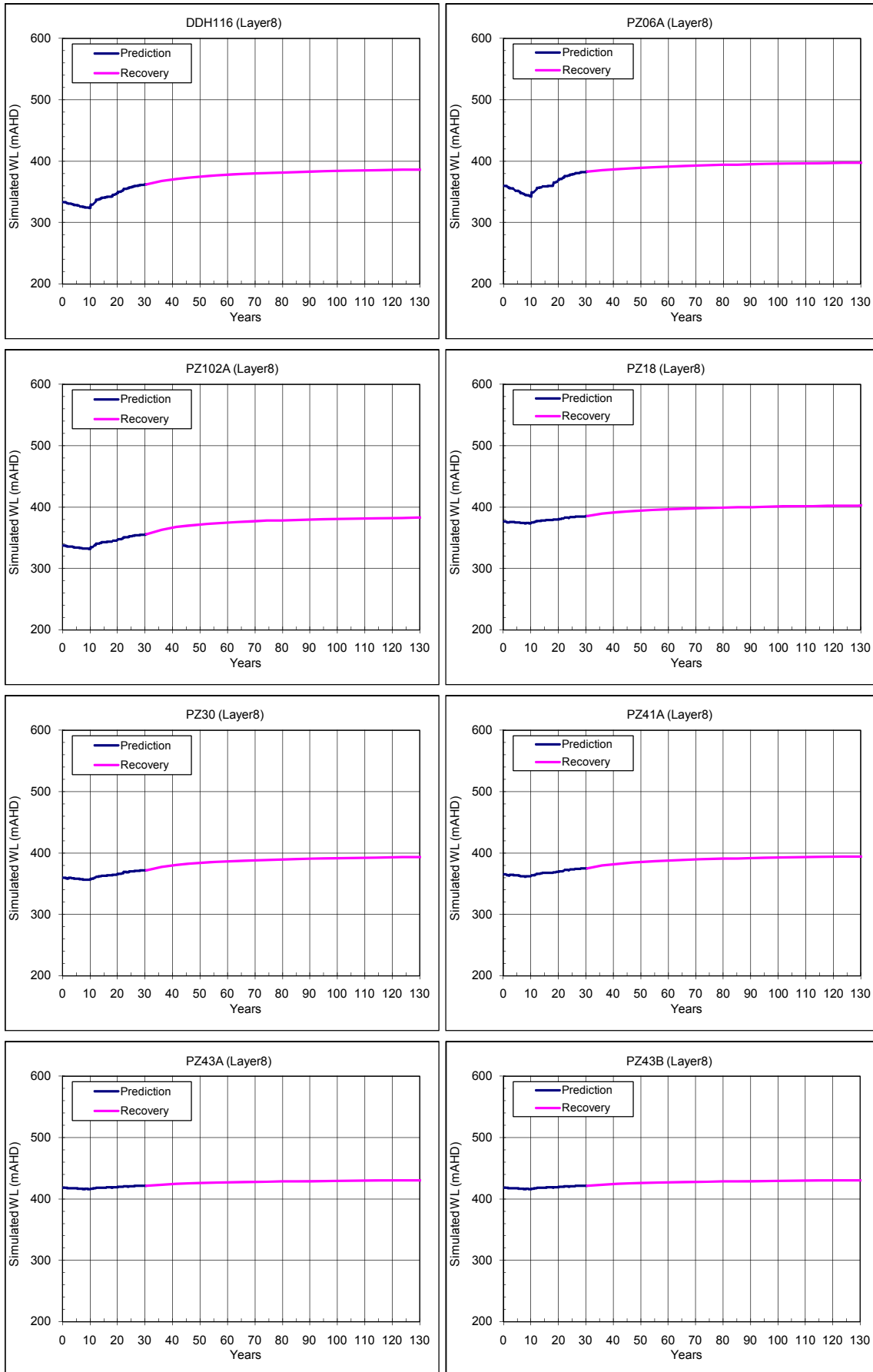


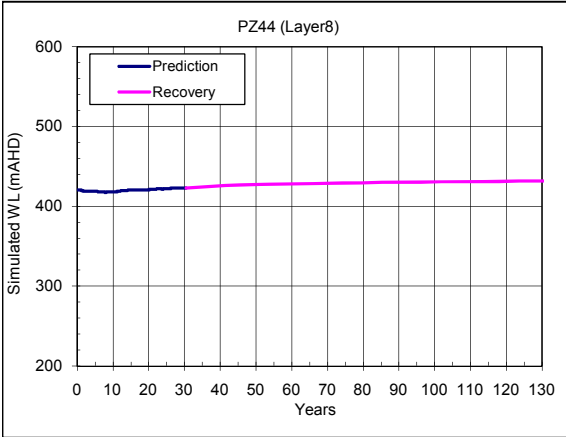












**APPENDIX L:  
PREDICTED IMPACTS OF MCC ON EXISTING  
BORES, WELLS, SPRINGS, GROUNDWATER-  
FED DAMS AND SOAKS**

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Registered No	Licence No	Census No	MGA Coordinates		Landholder	Site Description	Authorised Purpose	Depth (m)	Aquifer	Predicted Drawdown Impact (m)	
			E	N						End of Mining (2042)	100 years After Closure (2143)
GW047111	20BL107324	-	756435	6419900	P Ban	Bore	Stock / domestic	12	Granite	No impact	No impact
GW047172	20BL107323	-	756065	6419786	P Ban	Bore	Stock / domestic	15	Granite	No impact	No impact
GW073038	20BL166333	-	767380	6414181	G C & E M Batty	Bore	Stock / domestic	42	Permian Coal Measures	0	0
-	-	SP58	764034	6420061	B W & H J Best	Soak	Stock	-	Permian Coal Measures	Mined Out OC4	
-	-	SP59	764087	6419456	B W & H J Best	Seep	Stock	-	Permian Coal Measures	Mined Out OC4	
-	-	SP50	763347	6421268	S M Birt & K M Hayes	Soak	Stock	-	Permian Coal Measures	Mined Out OC4	
-	-	SP51	762981	6421831	S M Birt & K M Hayes	Dam/soak	Stock	-	Permian Coal Measures	Mined Out OC4	
-	-	SP52	762988	642004	S M Birt & K M Hayes	Dam/soak	Stock	-	Permian Coal Measures	Mined Out OC4	
-	-	SP53	762023	6422573	S M Birt & K M Hayes	Dam/soak	Stock	-	Permian Coal Measures	Mined Out OC4	
-	-	SP54	762546	6422672	S M Birt & K M Hayes	Dam/soak	Stock	-	Permian Coal Measures	Mined Out OC4	
-	-	SP55	762616	6422722	S M Birt & K M Hayes	Dam/soak	Stock	-	Permian Coal Measures	Mined Out OC4	
-	-	SP56	762639	6422687	S M Birt & K M Hayes	Dam/soak	Stock	-	Permian Coal Measures	Mined Out OC4	
-	-	SP57	763173	6420815	S M Birt & K M Hayes	Dam/soak	Stock	-	Permian Coal Measures	Mined Out OC4	



Registered No	Licence No	Census No	MGA Coordinates		Landholder	Site Description	Authorised Purpose	Depth (m)	Aquifer	Predicted Drawdown Impact (m)	
			E	N						End of Mining (2042)	100 years After Closure (2143)
GW013368	20BL005420	-	761169	6413589	K O Bishop	Bore	Stock / domestic	19	Alluvium?	No impact	No impact
GW023203	20BL015692	-	757410	6414170	W D & M S Bryant	Well	Stock	8	Alluvium	No impact	No impact
GW023216	20BL015693		757001	6414081	W D & M S Bryant	Well	Stock	11	Alluvium	No impact	No impact
-	-	SP61	763023	6420894	M Carlisle	Dam/soak	Stock	-	Permian Coal Meas	Mined Out OC4	
GW052583	20BL113120	SP65	759314	6416285	D Chinner	Bore	Stock	33	Granite	No impact	No impact
-	-	SP66	759014	6416275	D Chinner	Dam/soak	Stock	-	Quaternary alluvium	No impact	No impact
-	-	SP67	759034	6416285	D Chinner	Dam/soak	Stock	-	Quaternary alluvium	No impact	No impact
-	-	SP68	759549	6416252	D Chinner	Dam/soak	Stock	-	Quaternary alluvium	No impact	No impact
GW059766	20BL130632	-	755914	6418905	K J & B J Condran	Bore	Domestic	31	Granite	No impact	No impact
GW070856	20BL150485	-	759834	6416078	M Cox	Bore	Stock / domestic	55	Granite?	No impact. Abandoned bore.	
GW078082	20BL166624	-	757681	6416385	R Cox	Bore	Stock / domestic	23	Granite	No impact	No impact
-	-	SP30	757511	6416779	R Cox	Dam	Stock	-	Granite	No impact	No impact
-	-	SP31	757409	6416426	R Cox	Dam	Stock	-	Granite	No impact	No impact
-	-	SP32	759472	6418031	R Cox	Soak	Stock	-	Quaternary alluvium	No impact	No impact

Registered No	Licence No	Census No	MGA Coordinates		Landholder	Site Description	Authorised Purpose	Depth (m)	Aquifer	Predicted Drawdown Impact (m)	
			E	N						End of Mining (2042)	100 years After Closure (2143)
GW050592	20BL113124	SP33	758378	6416637	R Cox	Bore	Stock/domestic	-	Granite	No impact.	Abandoned bore.
-	-	SP34	758959	6415907	R Cox	Dam/soak	Stock	-	Quaternary alluvium	No impact	
-	-	SP35	759098	6415615	R Cox	Dam/soak	Stock	-	Quaternary alluvium	No impact	
-	-	SP36	760216	6414796	R Cox	Dam/soak	Stock	-	Permian Coal Measures	0	0
-	-	SP37	760220	6414788	R Cox	Dam/soak	Stock	-	Permian Coal Measures	0	0
-	-	SP38	760393	6413980	R Cox	Dam/soak	Stock	-	Permian Coal Measures	0	0
-	-	SP39	760584	6414547	R Cox	Bore	Stock	-	Permian Coal Measures	0	0
-	-	SP41	760643	6414671	R Cox	Dam/soak	Stock	-	Permian Coal Measures	0	0
-	-	SP42	761334	6414996	R Cox	Bore	Stock	-	Permian Coal Measures	0	0
-	-	SP44	761163	6416324	R Cox	Dam/soak	Stock	-	Permian Coal Measures	No Impact	0
-	-	SP45	760703	6415854	R Cox	Dam/soak	Stock	-	Quaternary alluvium	No impact	
-	-	SP46	759614	6415930	R Cox	Dam/soak	Stock	-	Quaternary alluvium	No impact	
GW070638		SP47	758165	6416275	R Cox	Bore	Domestic	45	Granite	No impact	
GW064580	20BL137225	-	764114	6438510	M J Cundy	Bore	Stock /	70	Triassic	0.2	0

Registered No	Licence No	Census No	MGA Coordinates		Landholder	Site Description	Authorised Purpose	Depth (m)	Aquifer	Predicted Drawdown Impact (m)	
			E	N						End of Mining (2042)	100 years After Closure (2143)
-	-	SP62	763043	6423288	C & H Davies	Dam/soak	Stock	-	Permian Coal Measures	Mined Out	OC4
-	-	SP63	763078	6423185	C & H Davies	Dam/soak	Stock	-	Permian Coal Measures	Mined Out	OC4
GW043432	20BL102183	SP64	762994	6423288	C & H Davies	Soak/well	Stock / domestic	-	Permian Coal Measures	Mined Out	OC4
GW047195	20BL107487	SP83	762564	6434758	E H Elward	Bore (dry)	Stock/domestic	107	Permian Coal Measures	already dewatered	already dewatered
GW047495	20BL107537	SP84	762683	6425945	E H Elward	Bore	Domestic	149	Triassic	No Impact	0
GW073376	-	-	756069	6417363	H M Graham	Bore		36	Granite	No impact	
GW059683	20BL122034	-	757764	6423645	L K Hoare	Bore	Stock / domestic	62	Granite	No impact	
GW078174	20BL152584	-	757585	6423655	L K Hoare	Bore		84	Granite	No impact	
GW053215	20BL118263	-	756054	6417895	B J & K Howe	Bore	Domestic, irrigation, stock	23	Granite	No impact	
GW059514	20BL131263	-	755934	6419485	B G Jackson	Bore	Stock / domestic	20	Granite	No impact	
GW067674	-	-			B G Jackson	Bore	Stock / domestic	30	Granite	No impact	
GW078314	20BL166146	-	767956	6435662	G R & R A King	Bore		99	Granite	No impact	
GW025262	20BL0224743	-	756198	6415670	P Libertis	Bore	Domestic, irrigation	126	Granite	No impact	

Registered No	Licence No	Census No	MGA Coordinates		Landholder	Site Description	Authorised Purpose	Depth (m)	Aquifer	Predicted Drawdown Impact (m)	
			E	N						End of Mining (2042)	100 years After Closure (2143)
-	-	SP79	762473	6412035	C Mayberry	Spring	-	Triassic	0	0	
-	-	SP7	763817	6415947	E Mayberry	Bore	Stock	Permian Coal Measures	May dry up	0	
-	-	SP12	761122	6415475	E Mayberry	Bore	Stock/Domestic	Permian Coal Measures	0	0	
-	-	SP14	761172	6415310	E Mayberry	Dam	Stock	Permian Coal Measures	0	0	
-	-	SP15	761222	6415168	E Mayberry	Dam	Stock	Permian Coal Measures	0	0	
-	-	SP16	760973	6415294	E Mayberry	Dam	Stock	Permian Coal Measures	0	0	
-	-	SP17	761485	6415530	E Mayberry	Dam	Stock	Permian Coal Measures	0	0	
-	-	SP98	-	-	E Mayberry	Spring	-	Triassic	0	0	
-	-	SP99	-	-	E Mayberry	Dam	Stock	Permian Coal Measures?	0	0	
-	-	SP100	-	-	E Mayberry	Dam	Stock	Permian Coal Measures?	0	0	
-	-	SP8	763776	6417524	K & R Mayberry	Dam/soak	Stock	Permian Coal Measures	No Impact	0	
-	-	SP9	763813	6417794	K & R Mayberry	Soak	-	Permian Coal Measures	No Impact	0	
-	-	SP10	763166	6417592	K & R Mayberry	Soak	-	Quaternary alluvium	Will be mined out		
-	-	SP11	763451	6417178	K & R Mayberry	Soak	-	Quaternary alluvium	Will be mined out		

Registered No	Licence No	Census No	MGA Coordinates		Landholder	Site Description	Authorised Purpose	Depth (m)	Aquifer	Predicted Drawdown Impact (m)	
			E	N						End of Mining (2042)	100 years After Closure (2143)
GW051741	20BL113001		756724	6418366	R C Menchin	Bore	Stock / domestic	27	Granite	No impact	
GW800279	80BL236762	SP49	765214	6431985	J Mullins & C Imrie	Bore	Domestic	24	Triassic	0	0
-	-	SP81	764094	6432635	J Mullins & C Imrie	Spring	-	-	Triassic	No Impact	
-	-	SP93	765557	6431343	J Mullins & C Imrie	Goulburn R	-	-	Surface water	No impact	
-	-	SP95	764474	6431648	J Mullins & C Imrie	Spring/seep	-	-	Triassic	No Impact	
-	-	SP96	764227	6431823	J Mullins & C Imrie	Goulburn R	-	-	Surface water	No impact	
GW059519	20BL125780	-	756034	6419085	P T J & S E Nagle	Bore	Stock / domestic	24	? Granite	No impact	
GW046670	20BL105865	-	755884	6418679	M & E Petrovics	Bore	Stock / domestic	19	Granite	No impact	
GW057084	20BL124673	-	756329	6418750	B D & D M Rayner	Bore	Domestic	42	Granite	No impact	
-	-	SP1	759268	6417079	D & Y Rayner	Dam	Stock	-	Quaternary alluvium	No impact	
-	-	SP2	759486	6417425	D & Y Rayner	Soak	-	-	Quaternary alluvium	No impact	
-	-	SP3	759621	6417909	D & Y Rayner	Soak	-	-	Quaternary alluvium	No impact	
-	-	SP4	761489	6417051	D & Y Rayner	Dam	Stock	-	Permian Coal Measures	Will be mined out OC3	

Registered No	Licence No	Census No	MGA Coordinates		Landholder	Site Description	Authorised Purpose	Depth (m)	Aquifer	Predicted Drawdown Impact (m)	
			E	N						End of Mining (2042)	100 years After Closure (2143)
-	-	SP5	761435	6418308	D & Y Rayner	Dam	Stock	-	Quaternary alluvium	0	0
-	-	SP6	760339	6416803	D & Y Rayner	Dam	Stock/Domestic	-	Marrangaroo conglomerate	No impact	No impact
GW023210	20BL015691	-	757818	6414855	C & L Schmidt	Well	Stock	8	Alluvium/Granite	No impact	No impact
GW802260	80BL242378	-	758094	6415817	C & L Schmidt	Bore	Supply Obtained	42	Granite	No impact	No impact
GW070657	80BL152122	-	755940	6419842	J E Simpson	Bore	-	32	Granite	No impact	No impact
-	-	SP69	763692	6425140	T R & N C Simpson	Dam	Stock	-	Permian Coal Measures	No Impact	0
-	-	SP70	763692	6425140	T R & N C Simpson	Well (dry)	-	-	Permian Coal Measures	No Impact	0
-	-	SP71	763843	6425191	T R & N C Simpson	Dam	Stock	-	Permian Coal Measures	No Impact	0
-	-	SP72	762741	6424915	T R & N C Simpson	Dam	Stock	-	Triassic Narrabeen Gp	No Impact	0
-	-	SP73	763707	6424278	T R & N C Simpson	Spring/seep	-	-	Permian Coal Measures	Will be mined out OC4	
-	-	SP85	764843	6425945	Spitters Hollow Pty Ltd	Dam/soak	Stock	-	Tertiary alluvium?	0	0
-	-	SP86	766226	6426537	Spitters Hollow Pty Ltd	Dam/soak	Stock	-	Permian Coal Measures	May dry up	May dry up
GW055488	20BL113009	-	756284	6415385	R & D Sprigg	Bore	Stock	11	Granite	No impact	No impact

Registered No	Licence No	Census No	MGA Coordinates		Landholder	Site Description	Authorised Purpose	Depth (m)	Aquifer	Predicted Drawdown Impact (m)	
			E	N						End of Mining (2042)	100 years After Closure (2143)
GW063717	20BL135331	-	763650	6412985	D & J Stokes	Well	Stock / domestic	3.4	?	No impact	
-	-	SP18	760047	6421881	M & P Swords	Dam	Stock	-	Marrangaroo conglomerate	Will be mined out OC2	
-	-	SP19	759789	6421886	M & P Swords	Seep	Stock	-	Permian Coal Measures	May dry up	May dry up
-	-	SP20	760911	6420739	M & P Swords	Spring/well	Stock	-	Permian Coal Measures	Will be mined out OC2	
-	-	SP21	760513	6419753	M & P Swords	Soak	Stock	-	Marrangaroo conglomerate	No impact	
-	-	SP22	761339	6418879	M & P Swords	Seep	Stock	-	Permian Coal Measures	0	0
-	-	SP23	761905	6418879	M & P Swords	Seep	Stock	-	Permian Coal Measures	No Impact	0
-	-	SP24	759948	6418791	M & P Swords	Soak	Stock	-	Quaternary alluvium	No impact	
-	-	SP25	759689	6418905	M & P Swords	Dam/soak	Stock	-	Quaternary alluvium	No impact	
-	-	SP26	759698	6419038	M & P Swords	Dam/soak	Stock	-	Quaternary alluvium	No impact	
-	-	SP27	759560	419105	M & P Swords	Seep/well	Stock	-	Quaternary alluvium	No impact	
-	-	SP28	759517	6419929	M & P Swords	Well	-	-	Quaternary alluvium	No impact	
-	-	SP29	759247	6420605	M & P Swords	Soak	Stock	-	Quaternary alluvium	No impact	

Registered No	Licence No	Census No	MGA Coordinates		Landholder	Site Description	Authorised Purpose	Depth (m)	Aquifer	Predicted Drawdown Impact (m)	
			E	N						End of Mining (2042)	100 years After Closure (2143)
GW043930	20BL102022		756232	6417099	J Szymkarczuk	Bore	-	35	Granite	No impact	No impact
-	-	SP87	763685	6426320	M & J Transport	Dam	Stock	-	Surface water	No impact	No impact
-	-	SP88	763760	6426259	M & J Transport	Dam	Stock	-	Surface water	No impact	No impact
-	-	SP89	763770	6426361	M & J Transport	Dam	Stock	-	Surface water	No impact	No impact
-	-	SP90	764040	6426486	M & J Transport	Dam/soak	Stock	-	Surficial	0	0
-	-	SP91	763513	6426657	M & J Transport	Dam	Stock	-	Surface water	No impact	No impact
-	-	SP92	763865	6426907	M & J Transport	Dam/soak	Stock	-	Surficial	0	0
-	-	SP74	761386	6422350	B J & M R Wallis	Dam	Stock	-	Permian Coal Measures	Will be mined out OC4	
-	-	SP75	761397	6422157	B J & M R Wallis	Dam	Stock	-	Permian Coal Measures	Will be mined out OC4	
-	-	SP76	761293	6422238	B J & M R Wallis	Dam	Stock	-	Permian Coal Measures	Will be mined out OC4	
-	-	SP80	763656	6431196	J Westwood	Spring (dry)	-	-	Triassic Narrabeen Gp	No Impact	0
-	-	SP82	761869	6430503	J Westwood	Dam/soak	Stock	-	Permian Coal Measures	May dry up	0
GW079745	-	-	763189	6435869	J Williams	Bore		34	Triassic	0	0
GW078317	-	-	764390	6436463	J Williams	Bore	Domestic	?	Triassic	0.6	0.4



Registered No	Licence No	Census No	MGA Coordinates		Landholder	Site Description	Authorised Purpose	Depth (m)	Aquifer	Predicted Drawdown Impact (m)	
			E	N						End of Mining (2042)	100 years After Closure (2143)
GW078371	20BL167677	-	760914	6430335	UCML	Bore	-	6	Alluvium	No impact	No impact
GW078372	20BL167677	-	760764	6430435	UCML	Bore	-	2	Alluvium	No impact	No impact
GW078373	20BL167677	-	760782	6429634	UCML	Bore	-	4.8	Alluvium	No impact	No impact
GW078374	20BL167677	-	761109	6430535	UCML	Bore	-	2.2	Alluvium	No impact	No impact
GW012015	-	-	759793	6429114	UCML	Bore	Coal exploration	76	Permian Coal Measures	Backfilled	
GW012016	-	-	760198	6429108	UCML	Bore	Coal exploration	76	Permian Coal Measures	16.4	0
GW024774	-	-	765415	6423890	UCML	Bore	Coal exploration	91	Permian Coal Measures	Will be mined out – OC4	
GW034640	20BL027911	-	765173	6422294	UCML	Bore	Stock / domestic	70	Permian Coal Measures	Will be mined out – OC4	
GW038112	20BL102747	-	759958	6429118	UCML	Bore	Irrigation	81	Permian Coal Measures	Collapsed	
GW057326	20BL124955	-	760644	6429565	UCML	Bore	Test / monitoring	73	Permian Coal Measures	Abandoned bore	
GW057327	20BL124956	-	760046	6429771	UCML	Bore	Test / monitoring	62	Permian Coal Measures	18.2	0
GW057329	20BL124958	-	761171	6429878	UCML	Bore	Test / monitoring	93	Permian Coal Measures	30.7	0
GW059037	20BL121131	-	760254	6429710	UCML	Bore	Industrial	70	Permian Coal Measures	19.9	0
GW059038	20BL121129	-	760664	6429475	UCML	Bore	Industrial	73	Permian Coal Measures	20.8	0

Registered No	Licence No	Census No	MGA Coordinates		Landholder	Site Description	Authorised Purpose	Depth (m)	Aquifer	Predicted Drawdown Impact (m)	
			E	N						End of Mining (2042)	100 years After Closure (2143)
GW065949	-	-	760854	6427185	UCML	Bore	-	57	Permian Coal Measures	Mined out – Ulan OC	
GW065950	-	-	759204	6425693	UCML	Bore	-	81	Granite	No impact	
GW200094	20BL167677	-	758717	6426606	UCML	Bore	-	-	Permian Coal Measures	3.2	0
-	-	SP77	759943	6422203	UCML	Dam	Stock	-	Permian Coal Measures	May dry up	May dry up
-	-	SP78	757921	6422254	UCML	Dam	Stock	-	Granite	No impact	
GW010013	-	-	760602	6428295	Crown Land	Bore	Coal exploration	61	Permian Coal Measures	Mined out – Ulan OC	
GW024773	-	-	762645	6439500	Crown Land	Bore	Coal exploration	126	Permian Coal Measures	9.6	0
GW057328	20BL124957	-	761894	6430860	Crown Land	Bore	Test / monitoring	115	Permian Coal Measures	Abandoned bore	
GW059034	20BL121127	-	760934	6429235	Crown Land	Bore	Industrial	72	Permian Coal Measures	20.5	0
GW059035	20BL121128	-	761039	6429765	Crown Land	Bore	Industrial	80	Permian Coal Measures	27.7	0
GW059036	20BL121130	-	761634	6430395	Crown Land	Bore	Industrial	109	Permian Coal Measures	41.9	0
GW065948	-	-	760864	6428910	Crown Land	Bore	-	95	Permian Coal Measures	17.7	0
GW065995	-	-	760934	6428773	Crown Land	Bore	-	105	Permian Coal Measures	16.7	0
GW049542	20BL110252	-	758106	6425092	? Ulan Village	Bore	Domestic	31	Granite	No impact	

Registered No	Licence No	Census No	MGA Coordinates		Landholder	Site Description	Authorised Purpose	Depth (m)	Aquifer	Predicted Drawdown Impact (m)	
			E	N						End of Mining (2042)	100 years After Closure (2143)
GW080350	20BL168215	-	758378	6425115	? Ulan Village	Bore	-	Granite	No impact	No impact	
GW060608	20BL131820	-	769534	6436675	DP250311 / 3	Bore	Stock / domestic	Basalt	No impact	No impact	
GW053778	20BL117431	-	768304	6437705	DP250311 / 18	Bore	Domestic, irrigation, stock	Triassic	0.1	0.1	0.1
GW073549	20BL166215	-	756471	6424018	DP592376 / 1	Bore	Test / monitoring	Granite	No impact	No impact	
GW073550	-	-			DP40917 / 279	Bore	Test / monitoring	Granite	No impact	No impact	
GW030626	-	-	762554	6438985	DP750736 / 61	Bore	Stock / domestic	Permian Coal Measures	Hole backfilled		0
GW030631	20BL027210	-	762458	6438996	DP750736 / 61	Bore	Stock / domestic	Triassic	0.2	0.2	0
GW034454	20BL027654	-	763695	6438051	DP750736 / 61	Bore	Stock	Triassic	0.2	0.2	0
GW052802	20BL113133	-	756364	6423610	DP809642 / 1	Bore	Irrigation	Granite	No impact	No impact	
-	-	SP60	765442	6417706	Munghorn Gap N R	Well	-	Permian Coal Measures	No Impact	No impact	0
-	-	SP94	764674	6431991	Goulburn River N P	Goulburn R	-	Surface water	No impact	No impact	
-	-	SP97	764257	6431667	Goulburn River N P	Spring/seep	-	Triassic	No Impact	No impact	0
GW803438	80BL244260		752997	6418758	Wialdra	Bore	-	Granite	No impact	No impact	
GW080120	-	-	770880	6410781	Cumbo	Well	-	Permian Coal	0	0	0

Registered No	Licence No	Census No	MGA Coordinates		Landholder	Site Description	Authorised Purpose	Depth (m)	Aquifer	Predicted Drawdown Impact (m)	
			E	N						End of Mining (2042)	100 years After Closure (2143)
									Measures		
GW055472	20BL120585	-	767090	6440738	Bobadeen	Bore	-	91.5	Triassic	0.1	0
GW065222	-	-	758737	6444376	Uarbry	Bore	-	36.5	Triassic	0	0
GW066711	20BL143246	-	765593	6440654	Bobadeen	-	-	-	Triassic	0	0
GW080128	-	-	771830	6416072	Rothbury	Well	-	-	Permian Coal Measures	0	0
GW080135	-	-	767004	6440831	Bobadeen	Bore	-	20	Triassic	0.1	0
GW200575	20BL168100	-	756363	6439535	Bobadeen	Bore	-	2.5	Triassic	0.2	0
GW200576	20BL168100	-	756113	6439185	Bobadeen	Bore	-	4	Triassic	0	0
GW200577	20BL168100	-	756713	6440085	Bobadeen	Bore	-	7.3	Triassic	0.2	0.2
GW200578	20BL168100	-	757213	6439385	Bobadeen	Bore	-	2.6	Triassic	0.3	0.1
GW200579	20BL168100	-	758863	6438085	Bobadeen	Bore	-	11.5	Triassic	0.4	0.2
GW200580	20BL168100	-	757663	6437635	Bobadeen	Bore	-	7.5	Triassic	0.2	0
GW200581	20BL168100	-	758113	6437885	Bobadeen	Bore	-	3.5	Triassic	0.2	0
GW200582	20BL168100	-	760013	6434785	Bobadeen	Bore	-	1	Triassic	0.1	0
GW200583	20BL168100	-	759063	6435485	Bobadeen	Bore	-	2.7	Triassic	0	No Impact
GW200657	20BL167090	-	763775	6415996	Moolarben	Bore	-	30	Permian Coal Measures	0	0
-	-	SP101	7638813	64285859	Renshaw	Dam	Stock	-	Alluvium	May dry out	0

Registered No	Licence No	Census No	MGA Coordinates		Landholder	Site Description	Authorised Purpose	Depth (m)	Aquifer	Predicted Drawdown Impact (m)	
			E	N						End of Mining (2042)	100 years After Closure (2143)
-	-	SP102	763858	6425962	Renshaw	Dam	Stock	-	Alluvium	May dry out	0
-	-	SP103	763791	6426873	Renshaw	Dam	Stock	-	Alluvium	May dry out	0
-	-	SP104	762818	6423302	Mitchell	Dam	Stock	-	Alluvium	Mined Out OC4	
-	-	SP105	762818	6423363	Mitchell	Dam	Stock	-	Surface Water (Quarry)	Mined Out OC4	
-	-	SP106	762615	6423247	Mitchell	Dam	Stock	-	Alluvium	Mined Out OC4	
-	-	SP107	762592	6423243	Mitchell	Dam	Stock	-	Alluvium	Mined Out OC4	
-	-	SP108	763332	6423264	Mitchell	Drainage channel	Stock	-	Surface Water	Mined Out OC4	
-	-	SP109	763378	6423196	Mitchell	Dam	Stock	-	Alluvium	Mined Out OC4	
-	-	SP110	763310	6423348	Mitchell	Dam	Stock	-	Alluvium	Mined Out OC4	
-	-	SP111	763364	6423333	Mitchell	Well	Stock	-	Alluvium	Mined Out OC4	
-	-	SP112	763493	6423399	Mitchell	Creek	Stock	-	Surface Water	Mined Out OC4	
-	-	SP113	763492	6423627	Mitchell	Soak	Stock	-	Alluvium	Mined Out OC4	
-	-	SP114	763533	6423650	Mitchell	Soak	Stock	-	Alluvium	Mined Out OC4	
-	-	SP115	763546	6423659	Mitchell	Well	Stock/Domestic	-	Alluvium	Mined Out OC4	
-	-	SP116	763617	6423972	Mitchell	Tank/stand & borehole(dry)	Stock /Domestic (abandoned)	-	Alluvium	Mined Out OC4	
-	-	SP117	763771	6423901	Mitchell	Dam	Stock	-	Alluvium	Mined Out OC4	
-	-	SP118	763808	6423750	Mitchell	Causeway	Stock	-	Surface Water	Mined Out OC4	

Registered No	Licence No	Census No	MGA Coordinates		Landholder	Site Description	Authorised Purpose	Depth (m)	Aquifer	Predicted Drawdown Impact (m)	
			E	N						End of Mining (2042)	100 years After Closure (2143)
-	-	SP119	763655	6423864	Mitchell	Soak	Stock	-	Alluvium	Mined Out	OC4
-	-	SP120	764244	6423972	Mitchell	Pit (dry)	Stock	-	Tertiary Palaeochannel	Mined Out	OC4
-	-	SP121	764203	6424037	Mitchell	Soak	Stock	-	Alluvium	Mined Out	OC4
-	-	SP122	764220	6424054	Mitchell	Waterhole	Stock	-	Alluvium	Mined Out	OC4
-	-	SP123	763945	6423621	Mitchell	Mud hole	Stock	-	Surface Water	Mined Out	OC4
-	-	SP124	763941	6423619	Mitchell	Waterhole	Stock	-	Surface Water	Mined Out	OC4
-	-	SP125	765195	6423352	Mitchell	Dam	Stock	-	Alluvium	Mined Out	OC4
-	-	SP126b	765185	6423336	Mitchell	Dig/Waterhole	Stock	-	Alluvium	Mined Out	OC4
-	-	SP127	765147	6423277	Mitchell	Creek	Stock	-	Surface Water	Mined Out	OC4
-	-	SP128	763662	6422349	Mitchell	Waterhole	Stock	-	Surface Water (Quarry)	May dry out	0
-	-	SP129	763636	6422297	Mitchell	Waterhole	Stock	-	Surface Water (Quarry)	May dry out	0
-	-	SP130	764785	6421604	Mitchell	Dam	Stock	-	Alluvium	Mined Out	OC4
-	-	SP131	765316	6421536	Helm	Scald	Stock	-	Alluvium / Surface Water	Mined Out	OC4
-	-	SP132	765392	6421260	Helm	Waterhole	Stock	-	Permian Coal Measures	Mined Out	OC4
-	-	SP133	765465	6421006	Helm	Dam	Stock	-	Permian Coal Measures	Mined Out	OC4
-	-	SP134	765424	6421006	Helm	Dam	Stock	-	Permian Coal	Mined Out	OC4

Registered No	Licence No	Census No	MGA Coordinates		Landholder	Site Description	Authorised Purpose	Depth (m)	Aquifer	Predicted Drawdown Impact (m)	
			E	N						End of Mining (2042)	100 years After Closure (2143)
-	-	SP135	765453	6420815	Helm	Soak	Stock	-	Permian Coal Measures	Mined Out OC4	
-	-	SP136	765812	6420359	Powers	Pool	Stock	-	Permian Coal Measures	Mined Out OC4	
-	-	SP137	765976	6420106	Powers	Dam	Stock	-	Permian Coal Measures	No Impact	0
-	-	SP138	765975	6420107	Powers	Bore	Stock/Domestic	-	Permian Coal Measures	Mined Out OC4	
-	-	SP139	766147	6419882	Powers	Dam	Stock	-	Permian Coal Measures	No Impact	0
-	-	SP140	766201	6419605	Powers	Dam	Stock	-	Permian Coal Measures	No Impact	0
-	-	SP141	766203	6419606	Powers	Spring	Stock	-	Permian Coal Measures	No Impact	0
-	-	SP142	765767	6419450	Powers	Dam	Stock	-	Permian Coal Measures	No Impact	0
-	-	SP143	765870	6419734	Powers	Dam	Stock	-	Permian Coal Measures	Mined Out OC4	
-	-	SP144	765307	6421707	Mitchell	Dam	Stock	-	Permian Coal Measures	Mined Out OC4	
-	-	SP145	765314	6421806	Mitchell	Channel	Stock	-	Permian Coal Measures	Mined Out OC4	
-	-	SP146	765091	6422170	Mitchell	Bore	Stock/Domestic	-	Permian Coal Measures	Mined Out OC4	
-	-	SP147	765081	6422171	Mitchell	Gully/Creek	Stock	-	Surface Water	Mined Out OC4	

Registered No	Licence No	Census No	MGA Coordinates		Landholder	Site Description	Authorised Purpose	Depth (m)	Aquifer	Predicted Drawdown Impact (m)	
			E	N						End of Mining (2042)	100 years After Closure (2143)
-	-	SP148	766645	6423041	Mitchell	Quarry	Stock	-	Surface Water	Mined Out OC4	
-	-	SP149	763717	6424126	Salter & Little	Dam	Stock	-	Colluvium over Permian	May dry out	0
-	-	SP150	763952	6424531	Salter & Little	Dam	Stock	-	Colluvium over Permian	May dry out	0
-	-	SP151	763914	6424455	Salter & Little	Dam	Stock	-	Colluvium over Permian	May dry out	0
-	-	SP152	764191	642403	Salter & Little	Dam	Stock	-	Colluvium over Permian	May dry out	0
-	-	SP153	764055	6424471	Salter & Little	Dam	Stock	-	Colluvium over Permian	May dry out	0
-	-	SP154	764150	6424754	Salter & Little	Dam	Stock	-	Colluvium over Permian	May dry out	0
-	-	SP155	764056	6424788	Salter & Little	Dam	Stock	-	Colluvium over Permian	May dry out	0
-	-	SP156	763533	6423650	Mitchell	Dip/Waterhole	Stock	-	Alluvium	May dry out	0
-	-	SP157	764022	6424926	Salter & Little	Dam	Stock	-	Permian Coal Measures	No Impact	0
-	-	SP158	763813	6425859	Renshaw	Dam	Stock	-	Alluvium	May dry out	0
-	-	SP159	763858	6425962	Renshaw	Dam	Stock	-	Alluvium	May dry out	0
-	-	SP160	763791	6426873	Renshaw	Dam	Stock	-	Alluvium	May dry out	0



**APPENDIX M:  
INDEPENDENT PEER REVIEW OF MOOLARBEN STAGE 2 PPR MODEL**

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**(by Associate Professor Noel Merrick on 30 June 2011)**



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30 June 2011

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**Re: Peer Review of Moolarben Stage 2 PPR Model**

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Dear Belinda,

This letter reports on an incremental review of the groundwater assessment performed by RPS Aquaterra for the Moolarben Stage 2 Project, based on a report dated 6 June 2011: "Moolarben Stage 2 – PPR May 2011 Groundwater Assessment".

The underlying groundwater model was reviewed by Heritage Computing in October 2006 (Moolarben Stage 1) and November 2008 (Moolarben Stage 2). At the time of the second review the model was termed MC2.1. The review findings at that time as to the construction, development and performance of the model still stand. The main findings were that the model had been developed competently and was suitable for cumulative impact assessment.

The reviewer has also read the correspondence between Aquaterra (Peter Dundon) and Kalf and Associates (Frans Kalf) between the dates 13 July 2009 and 14 November 2009. Dr Kalf conducted an independent review of the Stage 2 groundwater assessment for the NSW Department of Planning.

The current review focuses on the application of the model for a modified mine plan (for the Preferred Project Report, PPR) rather than revisiting the underlying structure of the model.

It is understood that minor recalibration was undertaken and reported in November 2009 due to revised mine plans and more information from the adjacent Ulan mine. This model, termed MC2.2, has been used in the current assessment.

Detailed comments, mostly of an editorial nature, were provided separately on 24 May 2011 and 16 June 2011.

There were some inconsistencies in technical reporting in earlier drafts, and they have now been resolved to my satisfaction. I am of the view that there is nothing of substance in the revised RPS Aquaterra report that needs to be rectified.

Substantive comments in the Kalf review have been addressed satisfactorily in the latest RPS Aquaterra report.

In conclusion, the current model application has been performed competently in my opinion, and all matters previously raised by me have been addressed satisfactorily,

Yours sincerely,

A handwritten signature in black ink, appearing to read "N. Merrick", written in a cursive style.

Dr Noel Merrick