Appendix B: Well development records

McMILLAN Drilling GROUP

McMillan Drilling (N.I.) Ltd

Log No: 14424

DAILY LOG SHEET

Client: ~~Leeds~~ T+T

Job Ref No: 300645

Day: ER1

Consultant:

Permit No:

Date: 22 (Day) 3 (Month) 19 (Year)

Location: Spring Hill (street address or locality)

Bore Hole No: 1

Bore Size:

or Grid ref: Easting | Northing

Plant #:

Purpose of Bore:

SWL am pm

Start	Finish	Work Details	Bore Log
		BH 1	
		1500 Diver out.	
		Pre developed 34.7	Hole developed with compressor.
		Post developed 31.9	
		1520 Diver in.	
		manual lift to surface.	

Materials Used Eg. Casing, PVC, Screens, Other items etc						Accomodation/Meals - No. of Men	
Cement / Easicrete Bags		Geocloth		Fencing		SPT	
Quick Foam 20 L		1000 L Bulk Waste		Toby	Flush / Upstand	Inclo Tube	
QuickMud Litres		PVC Caps		Track Mats		Packer Test	
Bentonite Powder/Pellets		PVC.	Size	Type	Metres	Push Tube	
Pac-R 25 Kg		Screen	Size	Type	Metres	Vibrating Wire	
Core Boxes Number		Casing	Size	Type	Metres	Hand Auger	
PVC Splits		Gravel / Backfill				Tractor Hire	

Signed		Kms	Hours		Hours		Hours
Client Representative	Transporter/ Drill Rig			Rig Working		Start	
	Support Vehicle			Stand-by		Finish	
Drill Crew	Comments:						
Driller							

Sub-Contractors	Vac Extract	Service Locate	Traffic Control	Water	Earth Moving

McMILLAN Drilling GROUP
McMillan Drilling (N.I.) Ltd

Log No: 14421

DAILY LOG SHEET

Client: ~~Jacobs~~ T+T Job Ref No: 300645 Day: FRI

Consultant: Permit No: Date: 22 / 9 / 19 (Day / Month / Year)

Location: Springhill v (street address or locality) Bore Hole No: 2 Bore Size:

or Grid ref: (Easting / Northing) Plant #:

Purpose of Bore: SWL am pm

Start	Finish	Work Details	Bore Log
		BH 2	
		Diver out 1230	Hole developed with compressor.
		Pre develop 15.5	
		Post develop 30.8	
		Diver in 1300	

Materials Used Eg. Casing, PVC, Screens, Other items etc — **Accomodation/Meals - No. of Men**

Cement / Easicrete	Bags		Geocloth		Fencing		SPT		
Quick Foam	20 L		1000 L Bulk Waste		Toby		Flush / Upstand	Inclo Tube	
QuickMud	Litres		PVC Caps		Track Mats			Packer Test	
Bentonite	Powder/Pellets		PVC .	Size	Type		Metres	Push Tube	
Pac-R	25 Kg		Screen	Size	Type		Metres	Vibrating Wire	
Core Boxes	Number		Casing	Size	Type		Metres	Hand Auger	
PVC Splits			Gravel / Backfill					Tractor Hire	

Signed		Kms	Hours		Hours		Hours
Client Representative	Transporter/ Drill Rig			Rig Working		Start	
	Support Vehicle			Stand-by		Finish	
Drill Crew	Comments:						
Driller							
Sub-Contractors	Vac Extract	Service Locate		Traffic Control		Water	Earth Moving

McMILLAN Drilling GROUP

McMillan Drilling (N.I.) Ltd

Log No: 14422

DAILY LOG SHEET

Client: Jacobs T+T | Job Ref No: 300645 | Day: FRI

Consultant: | Permit No: | Date: 22 (Day) 9 (Month) 19 (Year)

Location: Spring Hill (street address or locality) | Bore Hole No: 3 | Bore Size:

or Grid ref: (Easting) (Northing) | Plant #:

Purpose of Bore: | SWL am pm

Start	Finish	Work Details	Bore Log
		BH-3	
		1310 Diver out	
		Pre develop 22.4	Hole developed with Compressor.
		Post develop 32.1	
		1340 Diver in.	

Materials Used Eg. Casing, PVC, Screens, Other items etc						Accomodation/Meals - No. of Men			
Cement / Easicrete	Bags		Geocloth		Fencing		SPT		
Quick Foam	20 L		1000 L Bulk Waste		Toby	Flush / Upstand	Inclo Tube		
QuickMud	Litres		PVC Caps		Track Mats		Packer Test		
Bentonite	Powder/Pellets		PVC .	Size	Type	Metres	Push Tube		
Pac-R	25 Kg		Screen	Size	Type	Metres	Vibrating Wire		
Core Boxes	Number		Casing	Size	Type	Metres	Hand Auger		
PVC Splits			Gravel / Backfill				Tractor Hire		

Signed		Kms	Hours		Hours		Hours
Client Representative	Transporter/ Drill Rig			Rig Working		Start	
	Support Vehicle			Stand-by		Finish	
Drill Crew	Comments:						
Driller							

Sub-Contractors	Vac Extract	Service Locate	Traffic Control	Water	Earth Moving

McMILLAN Drilling GROUP

McMillan Drilling (N.I.) Ltd

Log No: 14417

DAILY LOG SHEET

Client: Jacobs T+T

Job Ref No: 3 0 0 6 4 5 9

Day: Mon

Consultant:

Permit No:

Date: 25 (Day) 3 (Month) 19 (Year)

Location: Spring Hill (street address or locality)

Bore Hole No: 4

Bore Size:

or Grid ref: (Easting) | (Northing)

Plant #:

Purpose of Bore:

SWL am pm

Start	Finish	Work Details	Bore Log
		BH-4 SWL	
		Pre develop 32.6	Hole developed with compressor.
		Post develop 38.3	
		No logger	

Materials Used Eg. Casing, PVC, Screens, Other items etc						Accomodation/Meals - No. of Men	
Cement / Easicrete Bags		Geocloth		Fencing		SPT	
Quick Foam 20 L		1000 L Bulk Waste		Toby	Flush / Upstand	Inclo Tube	
QuickMud Litres		PVC Caps		Track Mats		Packer Test	
Bentonite Powder/Pellets		PVC.	Size	Type	Metres	Push Tube	
Pac-R 25 Kg		Screen	Size	Type	Metres	Vibrating Wire	
Core Boxes Number		Casing	Size	Type	Metres	Hand Auger	
PVC Splits		Gravel / Backfill				Tractor Hire	

Signed		Kms	Hours		Hours		Hours
Client Representative	Transporter/ Drill Rig			Rig Working		Start	
	Support Vehicle			Stand-by		Finish	
Drill Crew	Comments:						
Driller							

Sub-Contractors	Vac Extract	Service Locate	Traffic Control	Water	Earth Moving

McMILLAN Drilling GROUP

McMillan Drilling (N.I.) Ltd

Log No: 14423

DAILY LOG SHEET

Client: ~~Jacobs~~ T+T Job Ref No: 300645 Day: 221

Consultant: _____ Permit No: _____ Date: 22 (Day) 8 (Month) 19 (Year)

Location: Spring Hill. (Street address or locality) Bore Hole No: 5 Bore Size: _____

or Grid ref: _____ (Easting) _____ (Northing) Plant #: _____

Purpose of Bore: _____ SWL _____ am _____ pm

Start	Finish	Work Details	Bore Log
		BH 5	
		1350 Diver out	
		Pre develop 40.3	Hole developed with compressor.
		Post develop 40.1	
		1410 Diver in	
	-	No water lift to surface.	

Materials Used Eg. Casing, PVC, Screens, Other items etc						Accomodation/Meals - No. of Men	
Cement / Easicrete Bags		Geocloth		Fencing		SPT	
Quick Foam 20 L		1000 L Bulk Waste		Toby	Flush / Upstand	Inclo Tube	
QuickMud Litres		PVC Caps		Track Mats		Packer Test	
Bentonite Powder/Pellets		PVC.	Size	Type	Metres	Push Tube	
Pac-R 25 Kg		Screen	Size	Type	Metres	Vibrating Wire	
Core Boxes Number		Casing	Size	Type	Metres	Hand Auger	
PVC Splits		Gravel / Backfill				Tractor Hire	

Signed		Kms	Hours		Hours		Hours
Client Representative	Transporter/ Drill Rig			Rig Working		Start	
	Support Vehicle			Stand-by		Finish	
Drill Crew	Comments:						
Driller							

Sub-Contractors	Vac Extract	Service Locate	Traffic Control	Water	Earth Moving

McMILLAN Drilling GROUP

McMillan Drilling (N.I.) Ltd

Log No: 14416

DAILY LOG SHEET

Client: ~~Seeds~~ T+T | Job Ref No: 3 0 0 6 4 5 | Day: Mon

Consultant: | Permit No: | Date: 25 (Day) 3 (Month) 19 (Year)

Location: Spring Hill. (street address or locality) | Bore Hole No: 6 | Bore Size:

or Grid ref: (Easting) (Northing) | Plant #:

Purpose of Bore: | SWL am pm

Start	Finish	Work Details	Bore Log
		BH-6 SWL	
		Pre develop 32.6	Hole developed with compressor.
		Post develop 38.3	
		No loggers -	

Materials Used Eg. Casing, PVC, Screens, Other items etc — **Accomodation/Meals - No. of Men**

Cement / Easicrete	Bags		Geocloth		Fencing		SPT		
Quick Foam	20 L		1000 L Bulk Waste		Toby	Flush / Upstand	Inclo Tube		
QuickMud	Litres		PVC Caps		Track Mats		Packer Test		
Bentonite	Powder/Pellets		PVC.	Size	Type	Metres	Push Tube		
Pac-R	25 Kg		Screen	Size	Type	Metres	Vibrating Wire		
Core Boxes	Number		Casing	Size	Type	Metres	Hand Auger		
PVC Splits			Gravel / Backfill				Tractor Hire		

Signed

Client Representative

Drill Crew

Driller

	Kms	Hours		Hours		Hours
Transporter/ Drill Rig			Rig Working		Start	
Support Vehicle			Stand-by		Finish	

Comments: 1 x 50mm cap @ BH 5.

Sub-Contractors	Vac Extract	Service Locate	Traffic Control	Water	Earth Moving

McMILLAN Drilling GROUP
McMillan Drilling (N.I.) Ltd

Log No: 13482

DAILY LOG SHEET

Client: T & T. Job Ref No: 300645 Day: WED

Consultant: Permit No: Date: 27 (Day) 3 (Month) 19 (Year)

Location: Spring Hill Dome Valley. (street address or locality) Bore Hole No: BH 7. Bore Size: 40.

or Grid ref: 1741131 ? (Easting) | 5979273 ? (Northing) Plant #:

Purpose of Bore: SWL am pm

Start	Finish	Work Details	Bore Log
..45		walk into BH 7	
		pull probe 12.00.	Hole developed with Packer
		pre develop SWL 3.27	
		post develop SWL 4.44	clean water.
		12.08 replace probe.	
	12.35.	walk out of BH 7	

Materials Used Eg. Casing, PVC, Screens, Other items etc							Accomodation/Meals - No. of Men	
Cement	Kg.Bags		Diamonds	Size	Type	Metres	SPT	
Easicrete	Kg.Bags		Tricone	Size	Type	% Wear	Inclo Tube	
QuickMud	Litres		PVC	Size	Type	Metres	Packer Test	
Bentonite	Kg.Bags		PVC caps		Type	Number		
Pac-R	Kg		Screen	Size	Type	Metres		
Core Boxes	Number		Casing	Size	Type	Metres		
Quick Foam	Litres							

Signed		Kms	Hours		Hours		Hours
	Transporter/ Drill Rig			Rig Working		Start	
Client representative	Support Vehicle			Stand-by		Finish	
Drill crew James Horn.	Comments:						
Driller Cory Sleeter							

McMILLAN Drilling GROUP

McMillan Drilling (N.I.) Ltd

Log No: 13486

DAILY LOG SHEET

Client: T4T. Job Ref No: 300645 Day: ~~MON~~

Consultant: Permit No: Date: 1 4 19 (Day Month Year)

Location: SPRING HILL DONE VALLEY. (street address or locality) Bore Hole No: BH 8. Bore Size: 90

or Grid ref: Easting | Northing Plant #:

Purpose of Bore: SWL am pm

Start	Finish	Work Details	Bore Log
		Develop BH 8. with Bailer	
		pre develop 42.6m.	clean water.
		post develop 42.9m	

Materials Used Eg. Casing, PVC, Screens, Other Items etc							Accomodation/Meals - No. of Men	
Cement	Kg.Bags		Diamonds	Size	Type	Metres	SPT	
Easicrete	Kg.Bags		Tricone	Size	Type	% Wear	Inclo Tube	
QuickMud	Litres		PVC	Size	Type	Metres	Packer Test	
Bentonite	Kg.Bags		PVC caps		Type	Number		
Pac-R	Kg		Screen	Size	Type	Metres		
Core Boxes	Number		Casing	Size	Type	Metres		
Quick Foam	Litres							

Signed		Kms	Hours		Hours		Hours
	Transporter/ Drill Rig			Rig Working		Start	
Client representative	Support Vehicle			Stand-by		Finish	
Drill crew Greg Blackstock	Comments:						
Driller							

McMILLAN Drilling GROUP

McMillan Drilling (N.I.) Ltd

Log No: 14420

DAILY LOG SHEET

Client: Jacobs T+T Job Ref No: 300645 Day: FRI

Consultant: _____ Permit No: _____ Date: 22/03/19 (Day / Month / Year)

Location: Spring Hill (street address or locality) Bore Hole No: 9 Bore Size: _____

or Grid ref: _____ (Easting) | _____ (Northing) Plant #: _____

Purpose of Bore: _____ SWL _____ am _____ pm

Start	Finish	Work Details	Bore Log
		BH-9	
		loggers out 1420	
		Pre develop 22.9	Hole developed with compressor.
		Post develop 37.3	
		loggers in 1450	

Materials Used Eg. Casing, PVC, Screens, Other items etc — **Accomodation/Meals - No. of Men**

Cement / Easicrete	Bags		Geocloth		Fencing		SPT		
Quick Foam	20 L		1000 L Bulk Waste		Toby	Flush / Upstand	Inclo Tube		
QuickMud	Litres		PVC Caps		Track Mats		Packer Test		
Bentonite	Powder/Pellets		PVC .	Size	Type	Metres	Push Tube		
Pac-R	25 Kg		Screen	Size	Type	Metres	Vibrating Wire		
Core Boxes	Number		Casing	Size	Type	Metres	Hand Auger		
PVC Splits			Gravel / Backfill				Tractor Hire		

Signed		Kms	Hours		Hours		Hours
Client Representative	Transporter/ Drill Rig			Rig Working		Start	
	Support Vehicle			Stand-by		Finish	
Drill Crew	Comments:						
Driller							

Sub-Contractors	Vac Extract	Service Locate	Traffic Control	Water	Earth Moving

McMILLAN Drilling GROUP

McMillan Drilling (N.I.) Ltd

Log No: 14418

DAILY LOG SHEET

Client: ~~Seedos~~ T+T

Job Ref No: 3 0 0 ~~5~~ ~~5~~ ~~9~~ 6 4 5

Day: Mon

Consultant:

Permit No:

Date: 25 (Day) 3 (Month) 19 (Year)

Location: Spring Hill (street address or locality)

Bore Hole No: 10

Bore Size:

or Grid ref: (Easting) | (Northing)

Plant #:

Purpose of Bore:

SWL am pm

Start	Finish	Work Details	Bore Log
		BH 10	
		Diver out - 1300	Hole developed with compressor.
		Pre developed 18m	
		Post developed 39.8m	
		Diver in - 1330.	

Materials Used Eg. Casing, PVC, Screens, Other items etc						Accomodation/Meals - No. of Men	
Cement / Easicrete Bags		Geocloth		Fencing		SPT	
Quick Foam 20 L		1000 L Bulk Waste		Toby	Flush / Upstand	Inclo Tube	
QuickMud Litres		PVC Caps		Track Mats		Packer Test	
Bentonite Powder/Pellets		PVC .	Size	Type	Metres	Push Tube	
Pac-R 25 Kg		Screen	Size	Type	Metres	Vibrating Wire	
Core Boxes Number		Casing	Size	Type	Metres	Hand Auger	
PVC Splits		Gravel / Backfill				Tractor Hire	

Signed		Kms	Hours		Hours		Hours
Client Representative	Transporter/ Drill Rig			Rig Working		Start	
	Support Vehicle			Stand-by		Finish	
Drill Crew	Comments:						
Driller							

Sub-Contractors	Vac Extract	Service Locate	Traffic Control	Water	Earth Moving

McMILLAN Drilling GROUP
McMillan Drilling (N.I.) Ltd

Log No: 13481

DAILY LOG SHEET

Client: T & T | Job Ref No: 300645 | Day: WED

Consultant: | Permit No: | Date: 27 (Day) 3 (Month) 19 (Year)

Location: SPRING HILL DONE VALLEY. (street address or locality) | Bore Hole No: BH 11 | Bore Size: HQ.

or Grid ref: 1741304 ? (Easting) | 5977624 ? (Northing) | Plant #:

Purpose of Bore: | SWL am pm

Start	Finish	Work Details	Bore Log
10-20	11-00	Travel from Te Hora to	
		Done Valley. walk into	Hole developed with Bailer
		Borehole 11	
		SWL 37.44 pre develop.	
		SWL 37.46 post develop.	clean water.
		walk out of Borehole 11	

Materials Used Eg. Casing, PVC, Screens, Other Items etc							Accomodation/Meals - No. of Men	
Cement	Kg.Bags		Diamonds	Size	Type	Metres	SPT	
Easicrete	Kg.Bags		Tricone	Size	Type	% Wear	Inclo Tube	
QuickMud	Litres		PVC	Size	Type	Metres	Packer Test	
Bentonite	Kg.Bags		PVC caps		Type	Number		
Pac-R	Kg		Screen	Size	Type	Metres		
Core Boxes	Number		Casing	Size	Type	Metres		
Quick Foam	Litres							

Signed		Kms	Hours		Hours		Hours
Client representative	Transporter/ Drill Rig			Rig Working		Start	
	Support Vehicle			Stand-by		Finish	
Drill crew James Horn.	Comments:						
Driller Greg Ackerley							

McMILLAN Drilling GROUP

McMillan Drilling (N.I.) Ltd

Log No: 13484

DAILY LOG SHEET

Client: T & T

Job Ref No: 300645

Day: WED

Consultant:

Permit No:

Date: 27 (Day) 3 (Month) 19 (Year)

Location: Spring Hill Dane Valley. (street address or locality)

Bore Hole No: BH 12.

Bore Size: HQ.

or Grid ref: 174 0550 ? (Easting) | 5977 207 . (Northing)

Plant #:

Purpose of Bore:

SWL am pm

Start	Finish	Work Details	Bore Log
		walk into BH 12.	Hole developed with Bailer
		pre develop SWL 18.51	
		poste develop SWL 20.75	clear water
		walk out from site	

Materials Used Eg. Casing, PVC, Screens, Other items etc							Accomodation/Meals - No. of Men	
Cement	Kg.Bags		Diamonds	Size	Type	Metres	SPT	
Easicrete	Kg.Bags		Tricone	Size	Type	% Wear	Inclo Tube	
QuickMud	Litres		PVC	Size	Type	Metres	Packer Test	
Bentonite	Kg.Bags		PVC caps		Type	Number		
Pac-R	Kg		Screen	Size	Type	Metres		
Core Boxes	Number		Casing	Size	Type	Metres		
Quick Foam	Litres							

Signed		Kms	Hours		Hours		Hours
Client representative	Transporter/ Drill Rig			Rig Working		Start	
	Support Vehicle			Stand-by		Finish	
Drill crew James Horn.	Comments:						
Driller Greg Skelton							

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McMILLAN Drilling GROUP
McMillan Drilling (N.I.) Ltd

Log No: 13483

DAILY LOG SHEET

Client: T & T. Job Ref No: 30645 Day: WED

Consultant: _____ Permit No: _____ Date: 27 (Day) 3 (Month) 19 (Year)

Location: Spring Hill Dome valley. (street address or locality) Bore Hole No: BH 13. Bore Size: 4in.

or Grid ref: 1740550 ? (Easting) 5977207 ? (Northing) Plant #: _____

Purpose of Bore: _____ SWL _____ am _____ pm

Start	Finish	Work Details	Bore Log
		walk into BH 13.	Hole developed with bailer
		pre develop SWL 25.8	
		post develop SWL 25.6.	clean water.
		walk onto B 12.	

Materials Used Eg. Casing, PVC, Screens, Other Items etc — **Accomodation/Meals - No. of Men**

Cement	Kg.Bags		Diamonds	Size	Type	Metres	SPT	
Easicrete	Kg.Bags		Tricone	Size	Type	% Wear	Inclo Tube	
QuickMud	Litres		PVC	Size	Type	Metres	Packer Test	
Bentonite	Kg.Bags		PVC caps		Type	Number		
Pac-R	Kg		Screen	Size	Type	Metres		
Core Boxes	Number		Casing	Size	Type	Metres		
Quick Foam	Litres							

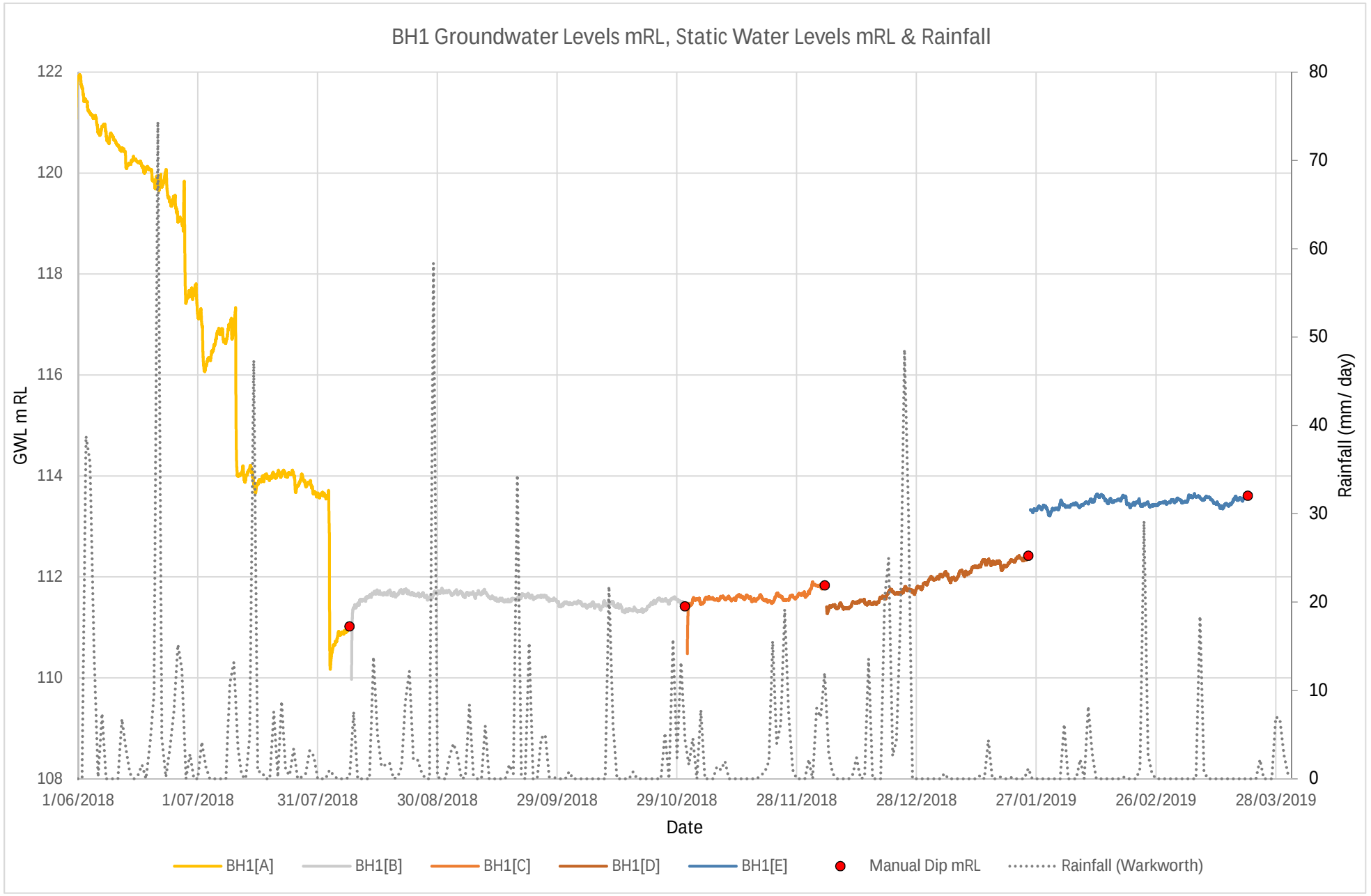
Signed		Kms	Hours		Hours		Hours
Client representative	Transporter/ Drill Rig			Rig Working		Start	
	Support Vehicle			Stand-by		Finish	
Drill crew Greg Quinta	Comments:						
Driller James Horne							

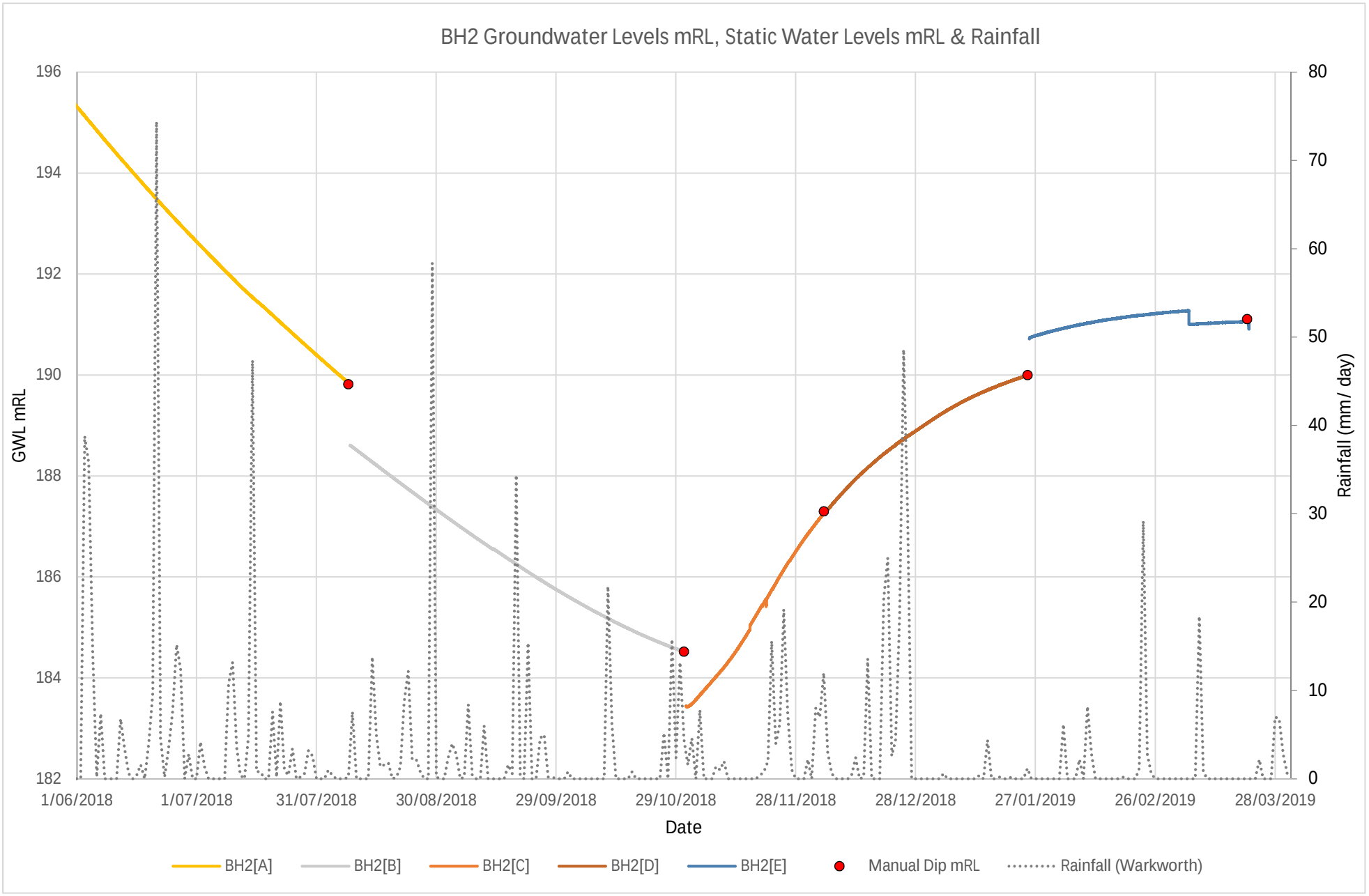
Appendix C: Manual and Electronic Groundwater Level Readings

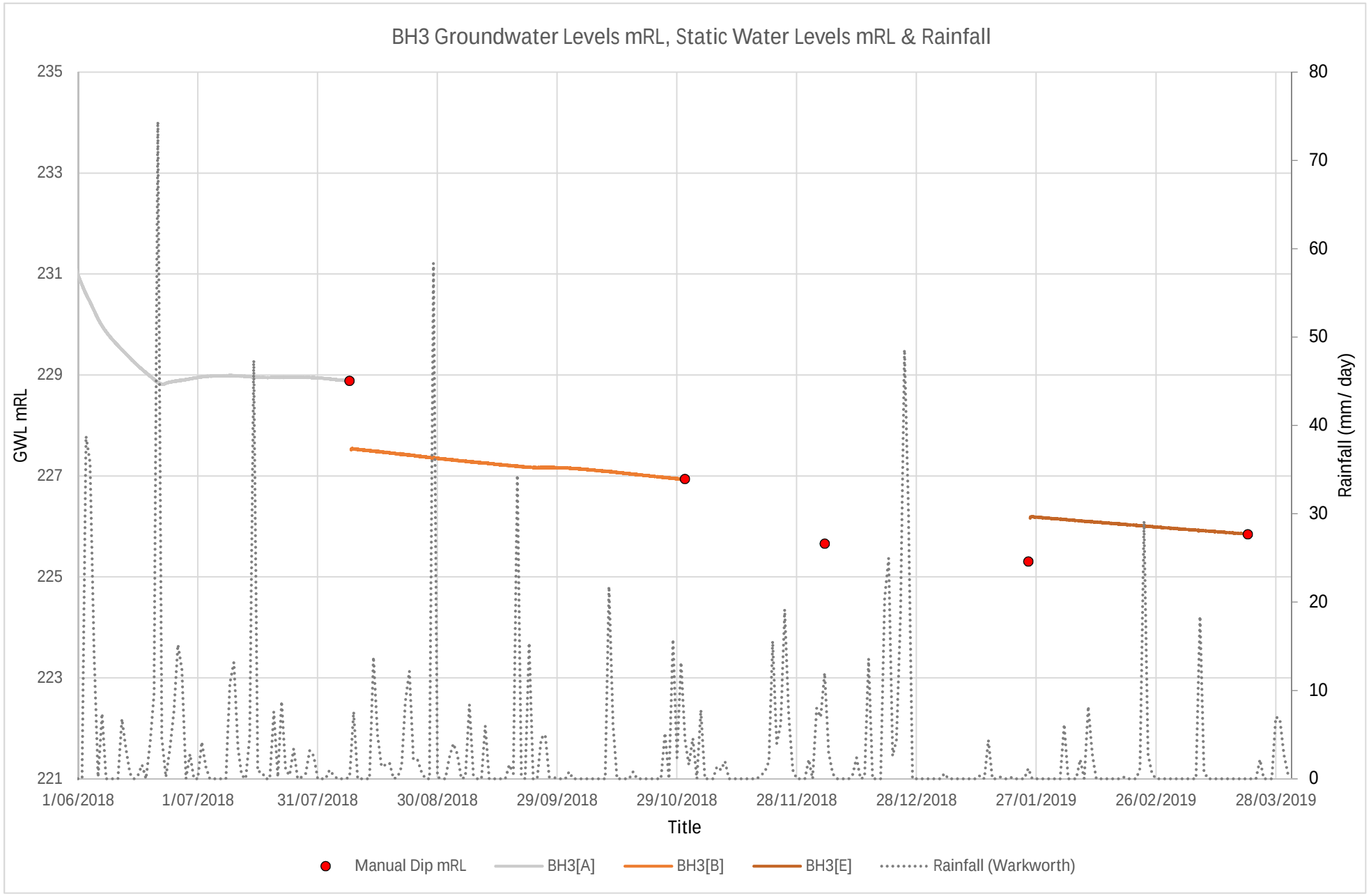
Appendix C Table 1: Summary groundwater levels in the monitoring wells

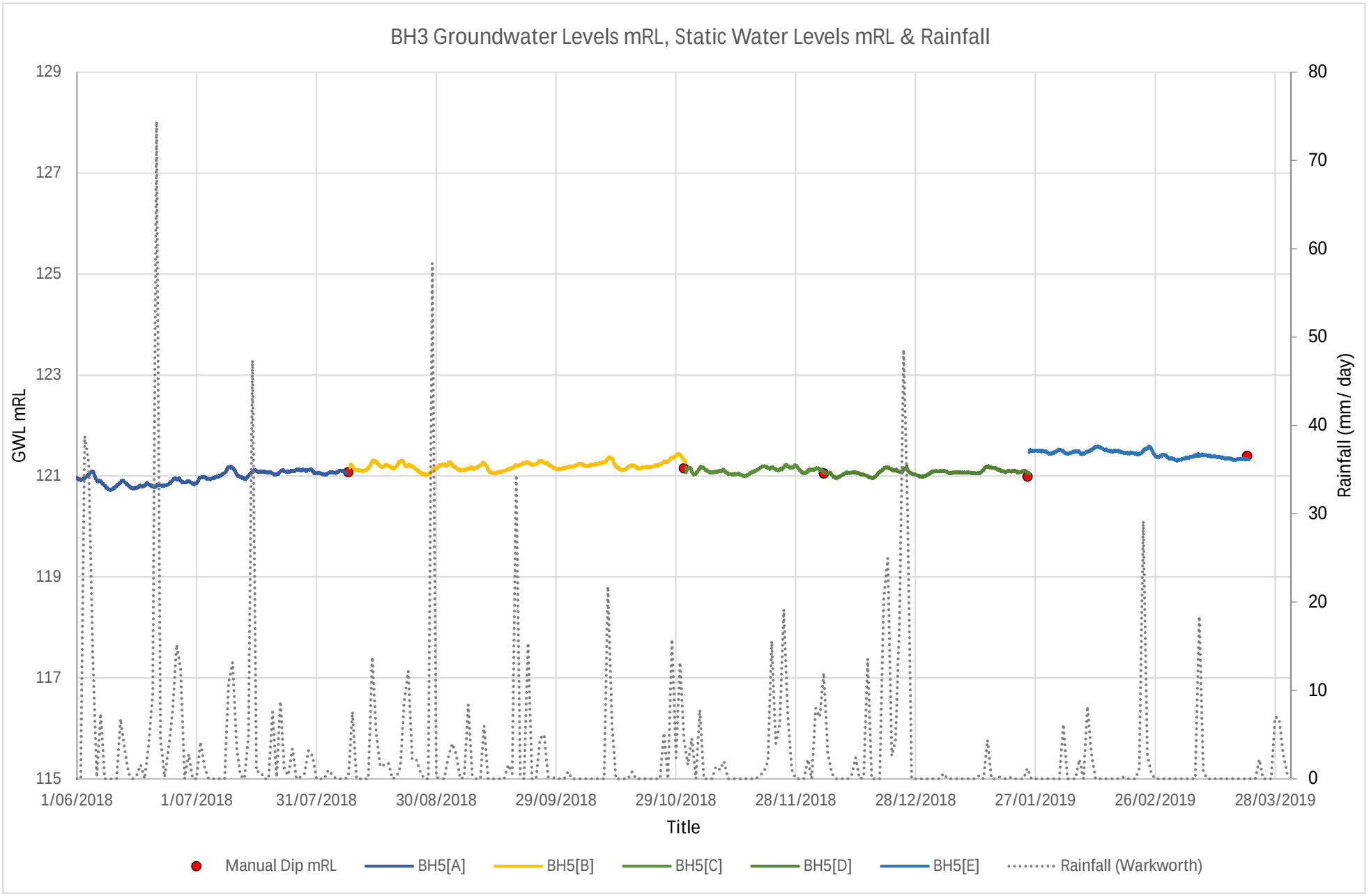
Well ID	Geology at screened interval	Groundwater level range (m bgl)	Comment
BH1	Unweathered siltstone and sandstone. Fractured rock.	Initial reading: 26/04/2018 - 121 mRL. Latest reading: 21/03/2019 - 112 mRL	Following drilling, groundwater levels recovered (declined) until early August 2018. The static water level remained relatively stable around 111 to 112 mRL until late November 2018 when the groundwater levels have risen to around 114 mRL.
BH2	Unweathered siltstone and sandstone. Limited fractures.	Initial reading: 26/04/2018 – 200.6 mRL. Latest reading: 21/03/2019 - 190 mRL	The groundwater level initially fell some 11 m from June 2018 to October 2018. Since then the groundwater levels have risen to around 191 mRL.
BH3	Unweathered siltstone and sandstone. Limited fractures.	Initial reading: 18/05/2018 – 232.8 mRL. Latest reading: 21/03/2019 – 225.5 mRL	The groundwater level in BH3 has slowly fallen around 7 m from the initial reading in May 2018.
BH4	Unweathered siltstone and sandstone. Limited fractures.	Initial reading: 18/05/2018 – 176 mRL. Latest reading: 21/03/2019 - 155 mRL.	By August 2018, groundwater levels following drilling had recovered (declined) rapidly. Since then the static water level has remained relatively stable at or around 155 mRL.
BH5	Unweathered siltstone and sandstone. Fractured.	Initial reading: 18/05/2018 – 123.5 mRL. Latest reading: 21/03/2019 - 120 mRL.	With the exception of the initial reading, groundwater levels have remained consistently between 120 to 121 mRL. The fluctuating groundwater levels could be delayed responses to rainfall.
BH6	Unweathered siltstone and sandstone. Limited fractures.	Initial reading: 18/05/2018 – 107.7 mRL. Latest reading: 21/03/2019 - 95 mRL.	Until December 2018, groundwater levels in BH6 were around 106 mRL. However, by March 2019, the groundwater levels had fallen to around 95 mRL.
BH7	Unweathered sandstone. Limited fractures.	Initial reading: 26/04/2018 – 71.5 mRL. Latest reading: 05/12/2019 – 71.8 mRL.	The water level in BH7 has remained relatively consistent between 70.5 and 71.5 mRL. Sample collection during August 2018 demonstrated recovery of the water level, but not to the pre-sample collection level.
BH8	Unweathered sandstone and conglomerate	Initial reading: 18/05/2018 – 167 mRL. Latest reading: 05/12/2019 – 165 mRL.	Groundwater levels have remained consistently between 165 to 167 mRL.
BH9	Unweathered siltstone and sandstone. Limited fractures.	Initial reading: 26/04/2018 – 218.84 mRL. Latest reading: 21/03/2019 – 217.57 mRL.	Following an initial groundwater level rise, the levels have gradually fallen.

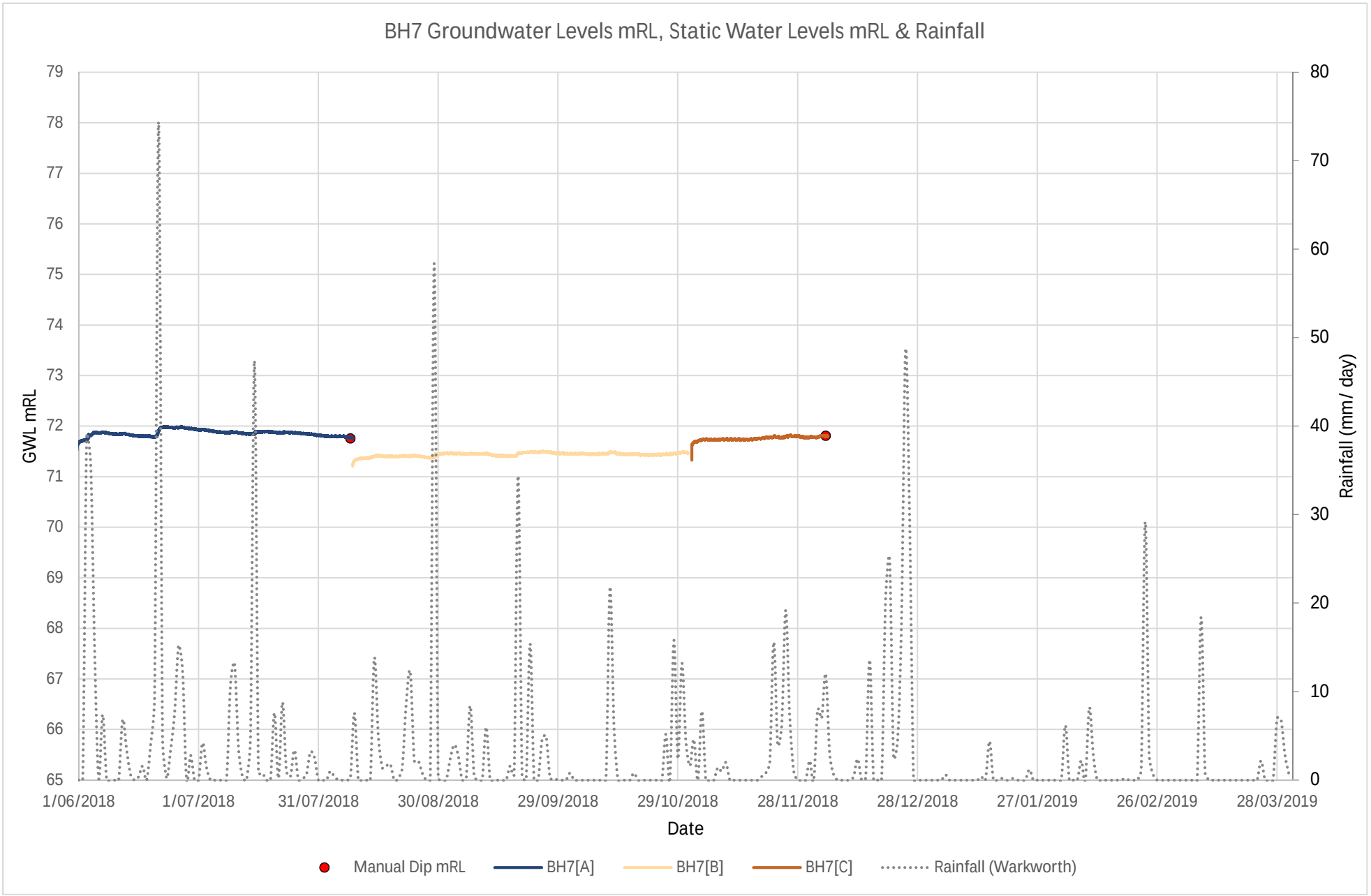
Well ID	Geology at screened interval	Groundwater level range (m bgl)	Comment
BH10	Unweathered sandstone. Limited fractures.	Initial reading: 31/05/2018 – 167.67 mRL. Latest reading: 25/03/2019 – 166 mRL.	The groundwater level in BH10 has remained between approximately 165 to 166 m RL. At the last point of data recovery, the static water level had remained at around 166 m RL.
BH11	Unweathered sandstone. Limited to highly fractured.	Initial reading: 26/04/2018 – 94.16 mRL. Latest reading: 25/03/2019 – 92 mRL.	The groundwater levels have remained relatively consistent based on limited sample data.
BH12	Unweathered sandstone. Fractured.	Initial reading: 26/04/2018 – 88.81 mRL. Latest reading: 25/03/2019 – 88.44 mRL.	The groundwater levels have remained relatively consistent based on limited sample data.
BH13	Unweathered sandstone. Highly fractured.	Initial reading: 26/04/2018 – 34.79 mRL. Latest reading: 25/03/2019 – 34.81 mRL.	The groundwater levels have remained relatively consistent based on limited sample data.
BH14	Unweathered siltstone and sandstone.	Artesian – estimated to be approximately 29.3 mRL	Artesian pressure has prevailed.

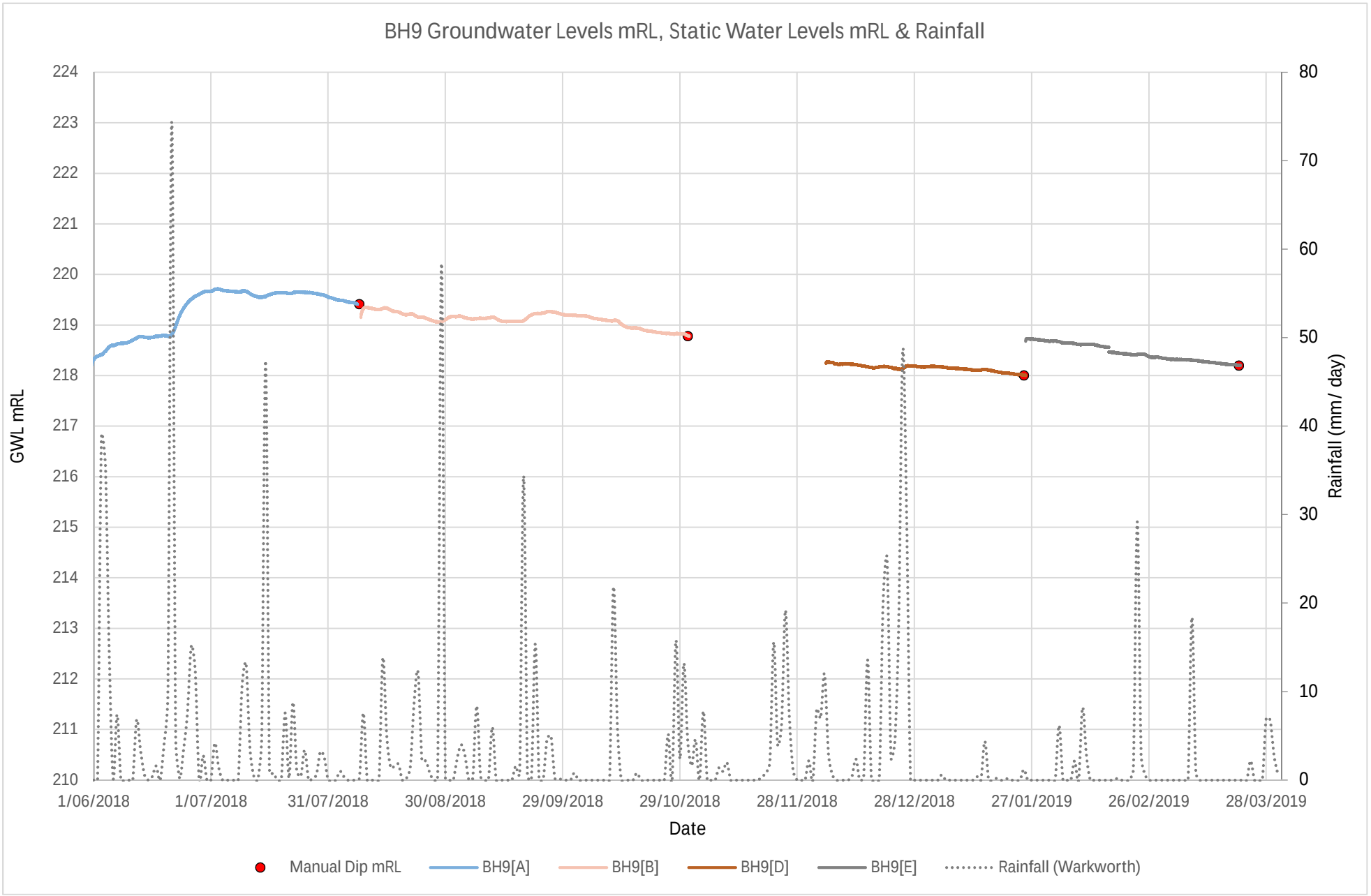

BH1 Groundwater Levels mRL, Static Water Levels mRL & Rainfall
GWL m RL
122
120
118
116
114
112
110
108
Rainfall (mm/ day)
80
70
60
50
40
30
20
10
0
1/06/2018
1/07/2018
31/07/2018
30/08/2018
29/09/2018
29/10/2018
28/11/2018
28/12/2018
27/01/2019
26/02/2019
28/03/2019
Date
BH1[A]
BH1[B]
BH1[C]
BH1[D]
BH1[E]
Manual Dip mRL
Rainfall (Warkworth)

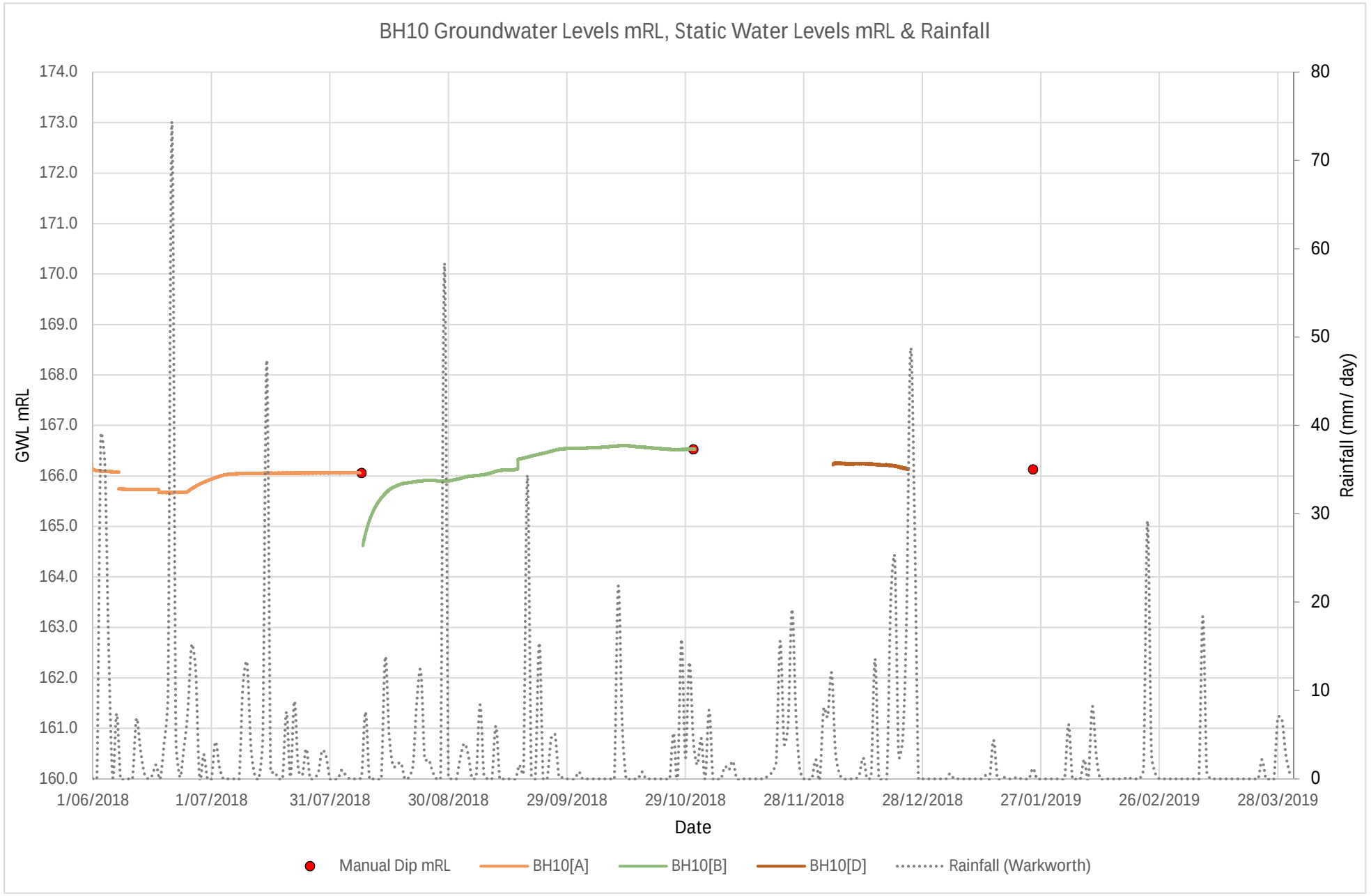

BH2 Groundwater Levels mRL, Static Water Levels mRL & Rainfall
GWL mRL
196
194
192
190
188
186
184
182
Rainfall (mm/ day)
80
70
60
50
40
30
20
10
0
1/06/2018
1/07/2018
31/07/2018
30/08/2018
29/09/2018
29/10/2018
28/11/2018
28/12/2018
27/01/2019
26/02/2019
28/03/2019
Date
BH2[A]
BH2[B]
BH2[C]
BH2[D]
BH2[E]
Manual Dip mRL
Rainfall (Warkworth)


BH3 Groundwater Levels mRL, Static Water Levels mRL & Rainfall
GWL mRL
Rainfall (mm/ day)
235
233
231
229
227
225
223
221
80
70
60
50
40
30
20
10
0
1/06/2018
1/07/2018
31/07/2018
30/08/2018
29/09/2018
29/10/2018
28/11/2018
28/12/2018
27/01/2019
26/02/2019
28/03/2019
Title
Manual Dip mRL
BH3[A]
BH3[B]
BH3[E]
Rainfall (Warkworth)


BH3 Groundwater Levels mRL, Static Water Levels mRL & Rainfall
GWL mRL
Rainfall (mm/ day)
129
127
125
123
121
119
117
115
80
70
60
50
40
30
20
10
0
1/06/2018
1/07/2018
31/07/2018
30/08/2018
29/09/2018
29/10/2018
28/11/2018
28/12/2018
27/01/2019
26/02/2019
28/03/2019
Title
Manual Dip mRL
BH5[A]
BH5[B]
BH5[C]
BH5[D]
BH5[E]
Rainfall (Warkworth)


BH7 Groundwater Levels mRL, Static Water Levels mRL & Rainfall
GWL mRL
Rainfall (mm/ day)
79
78
77
76
75
74
73
72
71
70
69
68
67
66
65
80
70
60
50
40
30
20
10
0
1/06/2018
1/07/2018
31/07/2018
30/08/2018
29/09/2018
29/10/2018
28/11/2018
28/12/2018
27/01/2019
26/02/2019
28/03/2019
Date
Manual Dip mRL
BH7[A]
BH7[B]
BH7[C]
Rainfall (Warkworth)


BH9 Groundwater Levels mRL, Static Water Levels mRL & Rainfall
GWL mRL
224
223
222
221
220
219
218
217
216
215
214
213
212
211
210
Rainfall (mm/ day)
80
70
60
50
40
30
20
10
0
1/06/2018
1/07/2018
31/07/2018
30/08/2018
29/09/2018
29/10/2018
28/11/2018
28/12/2018
27/01/2019
26/02/2019
28/03/2019
Date
Manual Dip mRL
BH9[A]
BH9[B]
BH9[D]
BH9[E]
Rainfall (Warkworth)


BH10 Groundwater Levels mRL, Static Water Levels mRL & Rainfall
GWL mRL
174.0
173.0
172.0
171.0
170.0
169.0
168.0
167.0
166.0
165.0
164.0
163.0
162.0
161.0
160.0
Rainfall (mm/ day)
80
70
60
50
40
30
20
10
0
1/06/2018
1/07/2018
31/07/2018
30/08/2018
29/09/2018
29/10/2018
28/11/2018
28/12/2018
27/01/2019
26/02/2019
28/03/2019
Date
Manual Dip mRL
BH10[A]
BH10[B]
BH10[D]
Rainfall (Warkworth)

Appendix D: Laboratory transcripts

Hill Laboratories
TRIED, TESTED AND TRUSTED

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W www.hill-laboratories.com

Certificate of Analysis

Client:	Tonkin & Taylor	**Lab No:**	1993002	SPv1
Contact:	Leon Pemberton	**Date Received:**	01-Jun-2018	
	C/- Tonkin & Taylor	**Date Reported:**	18-Jun-2018	
	PO Box 5271	**Quote No:**	90687	
	Auckland 1141	**Order No:**	Leon Pemberton	
		Client Reference:		
		Submitted By:	Leon Pemberton	

Sample Type: Aqueous

Sample Name:		BH1 31-May-2018	BH2 31-May-2018	BH3 30-May-2018	BH7 31-May-2018	BH9 30-May-2018
Lab Number:		1993002.1	1993002.2	1993002.3	1993002.4	1993002.5
Individual Tests						
pH	pH Units	7.0	8.5	8.9	8.7	10.2
Total Alkalinity	g/m³ as $CaCO_3$	72	210	210	95	146
Carbonate	g/m³ at 25°C	< 1.0	3.4	9.7	2.3	50
Bicarbonate	g/m³ at 25°C	88	240	240	111	68
Total Hardness	g/m³ as $CaCO_3$	65	53	95	57	83
Electrical Conductivity (EC)	mS/m	22.3	46.7	46.6	31.7	33.2
Total Boron	g/m³	0.029	0.115	0.26	0.116	0.078
Total Calcium	g/m³	12.8	14.9	24	14.8	25
Hexavalent Chromium	g/m³	< 0.0010	< 0.0010	< 0.0010	< 0.0010	0.0020
Total Magnesium	g/m³	8.1	3.9	8.4	4.9	4.9
Total Potassium	g/m³	1.39	1.17	2.8	1.47	2.1
Total Sodium	g/m³	23	107	114	68	64
Chloride	g/m³	23	32	40	35	29
Total Ammoniacal-N	g/m³	< 0.010	< 0.010	0.055	0.032	< 0.010
Nitrite-N	g/m³	0.053	< 0.002	0.011	< 0.002	< 0.002
Nitrate-N	g/m³	0.26	< 0.002	0.025	0.008	< 0.002
Nitrate-N + Nitrite-N	g/m³	0.31	< 0.002	0.036	0.008	< 0.002
Sulphate	g/m³	6.7	7.5	12.6	19.0	10.2
Carbonaceous Biochemical Oxygen Demand ($cBOD_5$)	g O_2/m³	< 2	4	< 2	3	6
Chemical Oxygen Demand (COD)	g O_2/m³	< 6	16	10	19	14
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn						
Dissolved Arsenic	g/m³	< 0.0010	0.0012	0.0022	0.0024	< 0.0010
Dissolved Cadmium	g/m³	< 0.00005	0.00010	< 0.00005	< 0.00005	< 0.00005
Dissolved Chromium	g/m³	< 0.0005	< 0.0005	< 0.0005	0.0012	0.0030
Dissolved Copper	g/m³	< 0.0005	< 0.0005	0.0006	0.0025	0.0018
Dissolved Lead	g/m³	< 0.00010	< 0.00010	< 0.00010	0.00053	0.00012
Dissolved Nickel	g/m³	0.0015	0.0009	< 0.0005	0.0016	< 0.0005
Dissolved Zinc	g/m³	0.0144	0.0019	< 0.0010	0.0067	0.0038
Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq						
Acenaphthene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Acenaphthylene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Anthracene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Benzo[a]anthracene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Benzo[a]pyrene (BAP)	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Benzo[b]fluoranthene + Benzo[j] fluoranthene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Benzo[g,h,i]perylene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010

Sample Type: Aqueous						
Sample Name:		BH1 31-May-2018	BH2 31-May-2018	BH3 30-May-2018	BH7 31-May-2018	BH9 30-May-2018
Lab Number:		1993002.1	1993002.2	1993002.3	1993002.4	1993002.5
Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq						
Benzo[k]fluoranthene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Chrysene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Dibenzo[a,h]anthracene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Fluoranthene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Fluorene	g/m³	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Indeno(1,2,3-c,d)pyrene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Naphthalene	g/m³	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Phenanthrene	g/m³	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004
Pyrene	g/m³	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Total Petroleum Hydrocarbons in Water						
C7 - C9	g/m³	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
C10 - C14	g/m³	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
C15 - C36	g/m³	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Total hydrocarbons (C7 - C36)	g/m³	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7

Sample Name:		BH10 31-May-2018	BH5 31-May-2018			
Lab Number:		1993002.6	1993002.7			
Individual Tests						
pH	pH Units	8.5	7.6	-	-	-
Total Alkalinity	g/m³ as $CaCO_3$	200	240	-	-	-
Carbonate	g/m³ at 25°C	3.7	< 1.0	-	-	-
Bicarbonate	g/m³ at 25°C	240	290	-	-	-
Total Hardness	g/m³ as $CaCO_3$	115	175	-	-	-
Electrical Conductivity (EC)	mS/m	46.9	44.5	-	-	-
Total Boron	g/m³	0.22	0.036	-	-	-
Total Calcium	g/m³	22	53	-	-	-
Hexavalent Chromium	g/m³	< 0.0010	< 0.0010	-	-	-
Total Magnesium	g/m³	14.7	10.7	-	-	-
Total Potassium	g/m³	2.1	2.9	-	-	-
Total Sodium	g/m³	115	51	-	-	-
Chloride	g/m³	41	22	-	-	-
Total Ammoniacal-N	g/m³	< 0.010	< 0.010	-	-	-
Nitrite-N	g/m³	0.002	< 0.002	-	-	-
Nitrate-N	g/m³	0.049	< 0.002	-	-	-
Nitrate-N + Nitrite-N	g/m³	0.052	< 0.002	-	-	-
Sulphate	g/m³	7.3	8.3	-	-	-
Carbonaceous Biochemical Oxygen Demand ($cBOD_5$)	g O_2/m³	< 2 #2	6	-	-	-
Chemical Oxygen Demand (COD)	g O_2/m³	< 12 #1	< 12 #1	-	-	-
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn						
Dissolved Arsenic	g/m³	0.0014	< 0.0010	-	-	-
Dissolved Cadmium	g/m³	< 0.00005	< 0.00005	-	-	-
Dissolved Chromium	g/m³	0.0006	< 0.0005	-	-	-
Dissolved Copper	g/m³	0.0008	< 0.0005	-	-	-
Dissolved Lead	g/m³	0.00076	< 0.00010	-	-	-
Dissolved Nickel	g/m³	< 0.0005	0.0012	-	-	-
Dissolved Zinc	g/m³	0.0148	0.0085	-	-	-
Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq						
Acenaphthene	g/m³	< 0.00010	< 0.00010	-	-	-
Acenaphthylene	g/m³	< 0.00010	< 0.00010	-	-	-
Anthracene	g/m³	< 0.00010	< 0.00010	-	-	-
Benzo[a]anthracene	g/m³	< 0.00010	< 0.00010	-	-	-
Benzo[a]pyrene (BAP)	g/m³	< 0.00010	< 0.00010	-	-	-
Benzo[b]fluoranthene + Benzo[j] fluoranthene	g/m³	< 0.00010	< 0.00010	-	-	-
Benzo[g,h,i]perylene	g/m³	< 0.00010	< 0.00010	-	-	-

Sample Type: Aqueous						
Sample Name:		BH10 31-May-2018	BH5 31-May-2018			
Lab Number:		1993002.6	1993002.7			
Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq						
Benzo[k]fluoranthene	g/m³	< 0.00010	< 0.00010	-	-	-
Chrysene	g/m³	< 0.00010	< 0.00010	-	-	-
Dibenzo[a,h]anthracene	g/m³	< 0.00010	< 0.00010	-	-	-
Fluoranthene	g/m³	< 0.00010	< 0.00010	-	-	-
Fluorene	g/m³	< 0.0002	< 0.0002	-	-	-
Indeno(1,2,3-c,d)pyrene	g/m³	< 0.00010	< 0.00010	-	-	-
Naphthalene	g/m³	< 0.0005	< 0.0005	-	-	-
Phenanthrene	g/m³	< 0.0004	< 0.0004	-	-	-
Pyrene	g/m³	< 0.0002	< 0.0002	-	-	-
Total Petroleum Hydrocarbons in Water						
C7 - C9	g/m³	< 0.06	< 0.06	-	-	-
C10 - C14	g/m³	< 0.2	< 0.2	-	-	-
C15 - C36	g/m³	< 0.4	< 0.4	-	-	-
Total hydrocarbons (C7 - C36)	g/m³	< 0.7	< 0.7	-	-	-

Analyst's Comments

#1 Severe matrix interferences required that a dilution be performed prior to analysis of samples 1993002/6&7, resulting in a detection limit higher than that normally achieved for the Total COD analysis.

#2 Due to workload pressure, we were unable to commence the carbonaceous Biochemical Oxygen Demand (cBOD5) analyses on the day that they arrived at the laboratory. The analyses were performed, as soon as possible, on the frozen samples.

Summary of Methods

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.

Sample Type: Aqueous			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn	0.45µm filtration, ICP-MS, trace level. APHA 3125 B 22nd ed. 2012.	0.00005 - 0.0010 g/m³	1-7
Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq	Liquid / liquid extraction, SPE (if required), GC-MS SIM analysis [KBIs:4736,2695]	0.00010 - 0.0005 g/m³	1-7
Total Petroleum Hydrocarbons in Water	Solvent Hexane extraction, GC-FID analysis, Headspace GC-MS FS analysis US EPA 8015B/MfE Petroleum Industry Guidelines [KBIs:2803,10734;26687,3629]	0.06 - 0.7 g/m³	1-7
Filtration, Unpreserved	Sample filtration through 0.45µm membrane filter.	-	1-7
Total Digestion	Nitric acid digestion. APHA 3030 E 22nd ed. 2012 (modified).	-	1-7
pH	pH meter. APHA 4500-H+ B 22nd ed. 2012. Note: It is not possible to achieve the APHA Maximum Storage Recommendation for this test (15 min) when samples are analysed upon receipt at the laboratory, and not in the field. Samples and Standards are analysed at an equivalent laboratory temperature (typically 18 to 22 °C). Temperature compensation is used.	0.1 pH Units	1-7
Total Alkalinity	Titration to pH 4.5 (M-alkalinity), autotitrator. APHA 2320 B (Modified for alk <20) 22nd ed. 2012.	1.0 g/m³ as $CaCO_3$	1-7
Carbonate	Calculation: from alkalinity and pH, valid where TDS is not >500 mg/L and alkalinity is almost entirely due to hydroxides, carbonates or bicarbonates. APHA 4500-CO_2 D 22nd ed. 2012.	1.0 g/m³ at 25°C	1-7
Bicarbonate	Calculation: from alkalinity and pH, valid where TDS is not >500 mg/L and alkalinity is almost entirely due to hydroxides, carbonates or bicarbonates. APHA 4500-CO_2 D 22nd ed. 2012.	1.0 g/m³ at 25°C	1-7
Total Hardness	Calculation from Calcium and Magnesium. APHA 2340 B 22nd ed. 2012.	1.0 g/m³ as $CaCO_3$	1-7
Electrical Conductivity (EC)	Conductivity meter, 25°C. APHA 2510 B 22nd ed. 2012.	0.1 mS/m	1-7
Filtration for dissolved metals analysis	Sample filtration through 0.45µm membrane filter and preservation with nitric acid. APHA 3030 B 22nd ed. 2012.	-	3, 5
Total Boron	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 22nd ed. 2012.	0.0053 g/m³	1-7
Total Calcium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 22nd ed. 2012.	0.053 g/m³	1-7

Sample Type: Aqueous			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Hexavalent Chromium	Diphenylcarbazide colorimetry. Discrete Analyser. APHA 3500 Cr B (modified from manual analysis) 22nd ed. 2012.	0.0010 g/m³	1-7
Total Magnesium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 22nd ed. 2012.	0.021 g/m³	1-7
Total Potassium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 22nd ed. 2012.	0.053 g/m³	1-7
Total Sodium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 22nd ed. 2012.	0.021 g/m³	1-7
Chloride	Filtered sample. Ion Chromatography. APHA 4110 B (modified) 22nd ed. 2012.	0.5 g/m³	1-7
Total Ammoniacal-N	Phenol/hypochlorite colourimetry. Flow injection analyser. (NH_4-N = NH_4^+-N + NH_3-N). APHA 4500-NH_3 H (modified) 22nd ed. 2012.	0.010 g/m³	1-7
Nitrite-N	Automated Azo dye colorimetry, Flow injection analyser. APHA 4500-NO_3^- I 22nd ed. 2012 (modified).	0.002 g/m³	1-7
Nitrate-N	Calculation: (Nitrate-N + Nitrite-N) - NO2N. In-House.	0.0010 g/m³	1-7
Nitrate-N + Nitrite-N	Total oxidised nitrogen. Automated cadmium reduction, flow injection analyser. APHA 4500-NO_3^- I 22nd ed. 2012 (modified).	0.002 g/m³	1-7
Sulphate	Filtered sample. Ion Chromatography. APHA 4110 B (modified) 22nd ed. 2012.	0.5 g/m³	1-7
Carbonaceous Biochemical Oxygen Demand ($cBOD_5$)	Incubation 5 days, DO meter, nitrification inhibitor added, dilutions, seeded. APHA 5210 B (modified) 22nd ed. 2012.	2 g O_2/m³	1-7
Chemical Oxygen Demand (COD), trace level	Dichromate/sulphuric acid digestion in Hach tubes, colorimetry. Trace Level method. APHA 5220 D 22nd ed. 2012.	6 g O_2/m³	1-7
C7 - C9	Head Space, GCMS analysis.	0.06 g/m³	1-7

These samples were collected by yourselves (or your agent) and analysed as received at the laboratory.

Samples are held at the laboratory after reporting for a length of time depending on the preservation used and the stability of the analytes being tested. Once the storage period is completed the samples are discarded unless otherwise advised by the client.

Ara Heron BSc (Tech)
Client Services Manager - Environmental

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Certificate of Analysis

Client:	Tonkin & Taylor	**Lab No:**	2028672	SPv1
Contact:	Leon Pemberton	**Date Received:**	09-Aug-2018	
	C/- Tonkin & Taylor	**Date Reported:**	16-Aug-2018	
	PO Box 5271	**Quote No:**	90687	
	Auckland 1141	**Order No:**	1005069	
		Client Reference:	1005069	
		Submitted By:	Leon Pemberton	

Sample Type: Aqueous

Sample Name:		BH1 08-Aug-2018	BH2 08-Aug-2018	BH3 08-Aug-2018	BH5 08-Aug-2018	BH7 08-Aug-2018
Lab Number:		2028672.1	2028672.2	2028672.3	2028672.4	2028672.5
Individual Tests						
pH	pH Units	7.0	8.6	9.9	7.7	8.1
Total Alkalinity	g/m³ as $CaCO_3$	67	200	167	198	100
Carbonate	g/m³ at 25°C	< 1.0	3.9	41	< 1.0	< 1.0
Bicarbonate	g/m³ at 25°C	82	240	115	240	121
Total Hardness	g/m³ as $CaCO_3$	60	42	44	170	66
Electrical Conductivity (EC)	mS/m	22.3	48.3	45.1	44.2	33.0
Total Boron	g/m³	0.024	0.126	0.30	0.030	0.048
Total Calcium	g/m³	12.1	11.5	14.2	53	19.4
Hexavalent Chromium	g/m³	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
Dissolved Iron	g/m³	< 0.02	0.06	0.28	0.03	0.36
Total Iron	g/m³	0.184	1.46	3.6	1.90	1.32
Total Magnesium	g/m³	7.2	3.2	2.0	9.0	4.2
Dissolved Manganese	g/m³	0.0197	0.021	0.0045	0.154	0.148
Total Manganese	g/m³	0.021	0.046	0.061	0.165	0.148
Total Potassium	g/m³	1.28	1.22	1.08	1.51	0.61
Total Sodium	g/m³	20	97	92	32	42
Chloride	g/m³	22	31	37	21	34
Total Ammoniacal-N	g/m³	< 0.010	< 0.010	0.101	0.027	< 0.010
Nitrite-N	g/m³	< 0.002	< 0.002	0.008	< 0.002	< 0.002
Nitrate-N	g/m³	0.42	< 0.002	0.006	0.004	< 0.002
Nitrate-N + Nitrite-N	g/m³	0.42	< 0.002	0.014	0.004	< 0.002
Sulphate	g/m³	7.0	7.4	12.4	6.1	12.4
Carbonaceous Biochemical Oxygen Demand ($cBOD_5$)	g O_2/m³	< 2	3	< 2	< 2	4
Chemical Oxygen Demand (COD)	g O_2/m³	< 6	< 6	< 6	< 6	13
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn						
Dissolved Arsenic	g/m³	< 0.0010	< 0.0010	0.0018	< 0.0010	< 0.0010
Dissolved Cadmium	g/m³	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Dissolved Chromium	g/m³	0.0008	< 0.0005	0.0008	< 0.0005	< 0.0005
Dissolved Copper	g/m³	< 0.0005	< 0.0005	0.0010	< 0.0005	< 0.0005
Dissolved Lead	g/m³	< 0.00010	< 0.00010	0.00025	< 0.00010	< 0.00010
Dissolved Nickel	g/m³	0.0011	< 0.0005	0.0005	0.0006	< 0.0005
Dissolved Zinc	g/m³	0.0025	0.0018	0.0026	0.0035	0.0023
Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq						
Acenaphthene	g/m³	< 0.00010	< 0.00010	< 0.00010	0.00077	0.00019
Acenaphthylene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Anthracene	g/m³	< 0.00010	< 0.00010	< 0.00010	0.00017	< 0.00010
Benzo[a]anthracene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010

Sample Type: Aqueous						
Sample Name:		BH1 08-Aug-2018	BH2 08-Aug-2018	BH3 08-Aug-2018	BH5 08-Aug-2018	BH7 08-Aug-2018
Lab Number:		2028672.1	2028672.2	2028672.3	2028672.4	2028672.5
Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq						
Benzo[a]pyrene (BAP)	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Benzo[b]fluoranthene + Benzo[j] fluoranthene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Benzo[g,h,i]perylene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Benzo[k]fluoranthene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Chrysene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Dibenzo[a,h]anthracene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Fluoranthene	g/m³	< 0.00010	< 0.00010	< 0.00010	0.00016	< 0.00010
Fluorene	g/m³	< 0.0002	< 0.0002	< 0.0002	0.0006	< 0.0002
Indeno(1,2,3-c,d)pyrene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Naphthalene	g/m³	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Phenanthrene	g/m³	< 0.0004	< 0.0004	< 0.0004	0.0007	< 0.0004
Pyrene	g/m³	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Total Petroleum Hydrocarbons in Water						
C7 - C9	g/m³	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
C10 - C14	g/m³	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
C15 - C36	g/m³	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Total hydrocarbons (C7 - C36)	g/m³	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7

Sample Name:		BH9 08-Aug-2018	BH10 08-Aug-2018			
Lab Number:		2028672.6	2028672.7			
Individual Tests						
pH	pH Units	11.3	8.3	-	-	-
Total Alkalinity	g/m³ as $CaCO_3$	136	188	-	-	-
Carbonate	g/m³ at 25°C	17.9	2.0	-	-	-
Bicarbonate	g/m³ at 25°C	1.9	220	-	-	-
Total Hardness	g/m³ as $CaCO_3$	49	40	-	-	-
Electrical Conductivity (EC)	mS/m	58.4	50.0	-	-	-
Total Boron	g/m³	0.075	0.22	-	-	-
Total Calcium	g/m³	16.9	11.1	-	-	-
Hexavalent Chromium	g/m³	0.0024	< 0.0010	-	-	-
Dissolved Iron	g/m³	< 0.02	0.34	-	-	-
Total Iron	g/m³	2.0	5.8	-	-	-
Total Magnesium	g/m³	1.64	3.1	-	-	-
Dissolved Manganese	g/m³	< 0.0005	0.0056	-	-	-
Total Manganese	g/m³	0.031	0.081	-	-	-
Total Potassium	g/m³	1.91	0.49	-	-	-
Total Sodium	g/m³	65	101	-	-	-
Chloride	g/m³	27	38	-	-	-
Total Ammoniacal-N	g/m³	< 0.010	< 0.010	-	-	-
Nitrite-N	g/m³	< 0.002	< 0.002	-	-	-
Nitrate-N	g/m³	0.003	< 0.002	-	-	-
Nitrate-N + Nitrite-N	g/m³	0.004	< 0.002	-	-	-
Sulphate	g/m³	12.2	10.9	-	-	-
Carbonaceous Biochemical Oxygen Demand ($cBOD_5$)	g O_2/m³	3	< 2	-	-	-
Chemical Oxygen Demand (COD)	g O_2/m³	9	< 6	-	-	-
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn						
Dissolved Arsenic	g/m³	< 0.0010	0.0027	-	-	-
Dissolved Cadmium	g/m³	< 0.00005	< 0.00005	-	-	-
Dissolved Chromium	g/m³	0.0051	< 0.0005	-	-	-
Dissolved Copper	g/m³	0.0009	0.0015	-	-	-
Dissolved Lead	g/m³	< 0.00010	0.00024	-	-	-
Dissolved Nickel	g/m³	< 0.0005	0.0007	-	-	-
Dissolved Zinc	g/m³	0.0015	0.0152	-	-	-

Sample Type: Aqueous						
Sample Name:		BH9 08-Aug-2018	BH10 08-Aug-2018			
Lab Number:		2028672.6	2028672.7			
Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq						
Acenaphthene	g/m³	< 0.00010	< 0.00010	-	-	-
Acenaphthylene	g/m³	< 0.00010	< 0.00010	-	-	-
Anthracene	g/m³	< 0.00010	< 0.00010	-	-	-
Benzo[a]anthracene	g/m³	< 0.00010	< 0.00010	-	-	-
Benzo[a]pyrene (BAP)	g/m³	< 0.00010	< 0.00010	-	-	-
Benzo[b]fluoranthene + Benzo[j] fluoranthene	g/m³	< 0.00010	< 0.00010	-	-	-
Benzo[g,h,i]perylene	g/m³	< 0.00010	< 0.00010	-	-	-
Benzo[k]fluoranthene	g/m³	< 0.00010	< 0.00010	-	-	-
Chrysene	g/m³	< 0.00010	< 0.00010	-	-	-
Dibenzo[a,h]anthracene	g/m³	< 0.00010	< 0.00010	-	-	-
Fluoranthene	g/m³	< 0.00010	< 0.00010	-	-	-
Fluorene	g/m³	< 0.0002	< 0.0002	-	-	-
Indeno(1,2,3-c,d)pyrene	g/m³	< 0.00010	< 0.00010	-	-	-
Naphthalene	g/m³	< 0.0005	< 0.0005	-	-	-
Phenanthrene	g/m³	< 0.0004	< 0.0004	-	-	-
Pyrene	g/m³	< 0.0002	< 0.0002	-	-	-
Total Petroleum Hydrocarbons in Water						
C7 - C9	g/m³	< 0.06	< 0.06	-	-	-
C10 - C14	g/m³	< 0.2	< 0.2	-	-	-
C15 - C36	g/m³	< 0.4	< 0.4	-	-	-
Total hydrocarbons (C7 - C36)	g/m³	< 0.7	< 0.7	-	-	-

Summary of Methods

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.

Sample Type: Aqueous			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn	0.45µm filtration, ICP-MS, trace level. APHA 3125 B 22nd ed. 2012.	0.00005 - 0.0010 g/m³	1-7
Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq	Liquid / liquid extraction, SPE (if required), GC-MS SIM analysis [KBIs:4736,2695]	0.00010 - 0.0005 g/m³	1-7
Total Petroleum Hydrocarbons in Water	Solvent Hexane extraction, GC-FID analysis, Headspace GC-MS FS analysis US EPA 8015B/MfE Petroleum Industry Guidelines [KBIs:2803,10734;26687,3629]	0.06 - 0.7 g/m³	1-7
Filtration, Unpreserved	Sample filtration through 0.45µm membrane filter.	-	1-7
Total Digestion	Nitric acid digestion. APHA 3030 E 22nd ed. 2012 (modified).	-	1-7
pH	pH meter. APHA 4500-H^+ B 22nd ed. 2012. Note: It is not possible to achieve the APHA Maximum Storage Recommendation for this test (15 min) when samples are analysed upon receipt at the laboratory, and not in the field. Samples and Standards are analysed at an equivalent laboratory temperature (typically 18 to 22 °C). Temperature compensation is used.	0.1 pH Units	1-7
Total Alkalinity	Titration to pH 4.5 (M-alkalinity), autotitrator. APHA 2320 B (Modified for alk <20) 22nd ed. 2012.	1.0 g/m³ as $CaCO_3$	1-7
Carbonate	Calculation: from alkalinity and pH, valid where TDS is not >500 mg/L and alkalinity is almost entirely due to hydroxides, carbonates or bicarbonates. APHA 4500-CO_2 D 22nd ed. 2012.	1.0 g/m³ at 25°C	1-7
Bicarbonate	Calculation: from alkalinity and pH, valid where TDS is not >500 mg/L and alkalinity is almost entirely due to hydroxides, carbonates or bicarbonates. APHA 4500-CO_2 D 22nd ed. 2012.	1.0 g/m³ at 25°C	1-7
Total Hardness	Calculation from Calcium and Magnesium. APHA 2340 B 22nd ed. 2012.	1.0 g/m³ as $CaCO_3$	1-7
Electrical Conductivity (EC)	Conductivity meter, 25°C. APHA 2510 B 22nd ed. 2012.	0.1 mS/m	1-7
Total Boron	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 22nd ed. 2012.	0.0053 g/m³	1-7
Total Calcium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 22nd ed. 2012.	0.053 g/m³	1-7

Sample Type: Aqueous			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Hexavalent Chromium	Diphenylcarbazide colorimetry. Discrete Analyser. APHA 3500 Cr B (modified from manual analysis) 22nd ed. 2012.	0.0010 g/m³	1-7
Dissolved Iron	Filtered sample, ICP-MS, trace level. APHA 3125 B 22nd ed. 2012.	0.02 g/m³	1-7
Total Iron	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 22nd ed. 2012.	0.021 g/m³	1-7
Total Magnesium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 22nd ed. 2012.	0.021 g/m³	1-7
Dissolved Manganese	Filtered sample, ICP-MS, trace level. APHA 3125 B 22nd ed. 2012.	0.0005 g/m³	1-7
Total Manganese	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 22nd ed. 2012 / US EPA 200.8.	0.00053 g/m³	1-7
Total Potassium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 22nd ed. 2012.	0.053 g/m³	1-7
Total Sodium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 22nd ed. 2012.	0.021 g/m³	1-7
Chloride	Filtered sample. Ion Chromatography. APHA 4110 B (modified) 22nd ed. 2012.	0.5 g/m³	1-7
Total Ammoniacal-N	Phenol/hypochlorite colourimetry. Flow injection analyser. (NH_4-N = NH_4^+-N + NH_3-N). APHA 4500-NH_3 H (modified) 22nd ed. 2012.	0.010 g/m³	1-7
Nitrite-N	Automated Azo dye colorimetry, Flow injection analyser. APHA 4500-NO_3^- I 22nd ed. 2012 (modified).	0.002 g/m³	1-7
Nitrate-N	Calculation: (Nitrate-N + Nitrite-N) - NO2N. In-House.	0.0010 g/m³	1-7
Nitrate-N + Nitrite-N	Total oxidised nitrogen. Automated cadmium reduction, flow injection analyser. APHA 4500-NO_3^- I 22nd ed. 2012 (modified).	0.002 g/m³	1-7
Sulphate	Filtered sample. Ion Chromatography. APHA 4110 B (modified) 22nd ed. 2012.	0.5 g/m³	1-7
Carbonaceous Biochemical Oxygen Demand ($cBOD_5$)	Incubation 5 days, DO meter, nitrification inhibitor added, dilutions, seeded. APHA 5210 B (modified) 22nd ed. 2012.	2 g O_2/m³	1-7
Chemical Oxygen Demand (COD), trace level	Dichromate/sulphuric acid digestion in Hach tubes, colorimetry. Trace Level method. APHA 5220 D 22nd ed. 2012.	6 g O_2/m³	1-7
C7 - C9	Head Space, GCMS analysis.	0.06 g/m³	1-7

These samples were collected by yourselves (or your agent) and analysed as received at the laboratory.

Samples are held at the laboratory after reporting for a length of time depending on the preservation used and the stability of the analytes being tested. Once the storage period is completed the samples are discarded unless otherwise advised by the client.

Ara Heron BSc (Tech)
Client Services Manager - Environmental

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Certificate of Analysis

Client:	Tonkin & Taylor	**Lab No:**	2074283 SPv1
Contact:	Leon Pemberton C/- Tonkin & Taylor PO Box 5271 Auckland 1141	**Date Received:**	02-Nov-2018
		Date Reported:	09-Nov-2018
		Quote No:	90687
		Order No:	Leon Pemberton
		Client Reference:	
		Submitted By:	Leon Pemberton

Sample Type: Aqueous

Sample Name:		BH1 31-Oct-2018	BH2 31-Oct-2018	BH3 31-Oct-2018	BH5 31-Oct-2018	BH10 31-Oct-2018
Lab Number:		2074283.1	2074283.2	2074283.3	2074283.4	2074283.5
Individual Tests						
pH	pH Units	6.8	9.6	9.5	7.1	8.5
Total Alkalinity	g/m³ as $CaCO_3$	68	200	156	173	187
Carbonate	g/m³ at 25°C	< 1.0	34	21	< 1.0	3.4
Bicarbonate	g/m³ at 25°C	82	178	145	210	220
Total Hardness	g/m³ as $CaCO_3$	54	25	34	130	56
Electrical Conductivity (EC)	mS/m	22.1	47.7	39.5	39.2	48.6
Total Boron	g/m³	0.025	0.124	0.34	0.029	0.23
Total Calcium	g/m³	12.8	5.8	10.4	38	19.2
Hexavalent Chromium	g/m³	0.0074	< 0.0010	< 0.0010	< 0.0010	< 0.0010
Dissolved Iron	g/m³	< 0.02	0.06	0.33	0.11	0.34
Total Iron	g/m³	0.147	1.50	4.0	3.4	4.1
Total Magnesium	g/m³	5.5	2.5	1.87	8.5	2.1
Dissolved Manganese	g/m³	0.0140	0.0011	0.0054	0.150	0.0134
Total Manganese	g/m³	0.0171	0.024	0.063	0.162	0.065
Total Potassium	g/m³	1.64	2.3	0.79	1.10	0.64
Total Sodium	g/m³	25	105	86	28	109
Chloride	g/m³	21	30	37	20	38
Total Ammoniacal-N	g/m³	< 0.010	0.019	0.153	< 0.010	< 0.010
Nitrite-N	g/m³	0.010	< 0.002	0.005	< 0.002	< 0.002
Nitrate-N	g/m³	0.44	0.008	< 0.002	0.041	< 0.002
Nitrate-N + Nitrite-N	g/m³	0.45	0.008	0.005	0.042	< 0.002
Sulphate	g/m³	7.5	7.2	11.2	5.8	12.4
Carbonaceous Biochemical Oxygen Demand ($cBOD_5$)	g O_2/m³	< 2	3	< 2	< 2	< 2
Chemical Oxygen Demand (COD)	g O_2/m³	< 6	8	8	< 6	< 6
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn						
Dissolved Arsenic	g/m³	< 0.0010	< 0.0010	0.0015	< 0.0010	0.0028
Dissolved Cadmium	g/m³	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Dissolved Chromium	g/m³	0.0077	< 0.0005	0.0005	< 0.0005	< 0.0005
Dissolved Copper	g/m³	< 0.0005	< 0.0005	0.0009	< 0.0005	< 0.0005
Dissolved Lead	g/m³	< 0.00010	< 0.00010	0.00034	< 0.00010	0.00019
Dissolved Nickel	g/m³	0.0009	< 0.0005	< 0.0005	< 0.0005	0.0007
Dissolved Zinc	g/m³	0.0014	0.0019	0.0029	0.0020	0.0025
Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq						
Acenaphthene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Acenaphthylene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Anthracene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Benzo[a]anthracene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010

Sample Type: Aqueous						
Sample Name:		BH1 31-Oct-2018	BH2 31-Oct-2018	BH3 31-Oct-2018	BH5 31-Oct-2018	BH10 31-Oct-2018
Lab Number:		2074283.1	2074283.2	2074283.3	2074283.4	2074283.5
Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq						
Benzo[a]pyrene (BAP)	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Benzo[b]fluoranthene + Benzo[j] fluoranthene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Benzo[g,h,i]perylene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Benzo[k]fluoranthene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Chrysene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Dibenzo[a,h]anthracene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Fluoranthene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Fluorene	g/m³	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Indeno(1,2,3-c,d)pyrene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Naphthalene	g/m³	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Phenanthrene	g/m³	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004
Pyrene	g/m³	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Total Petroleum Hydrocarbons in Water						
C7 - C9	g/m³	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
C10 - C14	g/m³	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
C15 - C36	g/m³	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Total hydrocarbons (C7 - C36)	g/m³	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7

Sample Name:		BH9 31-Oct-2018	BH7 01-Nov-2018			
Lab Number:		2074283.6	2074283.7			
Individual Tests						
pH	pH Units	11.7	7.8	-	-	-
Total Alkalinity	g/m³ as $CaCO_3$	164	101	-	-	-
Carbonate	g/m³ at 25°C	< 1.0	< 1.0	-	-	-
Bicarbonate	g/m³ at 25°C	< 1.0	123	-	-	-
Total Hardness	g/m³ as $CaCO_3$	67	63	-	-	-
Electrical Conductivity (EC)	mS/m	68.8	33.2	-	-	-
Total Boron	g/m³	0.082	0.067	-	-	-
Total Calcium	g/m³	25	18.8	-	-	-
Hexavalent Chromium	g/m³	0.0039	< 0.0010	-	-	-
Dissolved Iron	g/m³	< 0.02	0.05	-	-	-
Total Iron	g/m³	0.94	0.72	-	-	-
Total Magnesium	g/m³	0.88	3.8	-	-	-
Dissolved Manganese	g/m³	< 0.0005	0.027	-	-	-
Total Manganese	g/m³	0.0142	0.053	-	-	-
Total Potassium	g/m³	1.84	0.69	-	-	-
Total Sodium	g/m³	72	49	-	-	-
Chloride	g/m³	28	34	-	-	-
Total Ammoniacal-N	g/m³	0.047	< 0.010	-	-	-
Nitrite-N	g/m³	0.004	< 0.002	-	-	-
Nitrate-N	g/m³	0.009	0.005	-	-	-
Nitrate-N + Nitrite-N	g/m³	0.013	0.005	-	-	-
Sulphate	g/m³	12	13.6	-	-	-
Carbonaceous Biochemical Oxygen Demand ($cBOD_5$)	g O_2/m³	< 2	< 2	-	-	-
Chemical Oxygen Demand (COD)	g O_2/m³	10	< 6	-	-	-
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn						
Dissolved Arsenic	g/m³	< 0.0010	< 0.0010	-	-	-
Dissolved Cadmium	g/m³	< 0.00005	< 0.00005	-	-	-
Dissolved Chromium	g/m³	0.0042	< 0.0005	-	-	-
Dissolved Copper	g/m³	0.0008	< 0.0005	-	-	-
Dissolved Lead	g/m³	< 0.00010	< 0.00010	-	-	-
Dissolved Nickel	g/m³	< 0.0005	< 0.0005	-	-	-
Dissolved Zinc	g/m³	< 0.0010	0.0040	-	-	-

Sample Type: Aqueous						
Sample Name:		BH9 31-Oct-2018	BH7 01-Nov-2018			
Lab Number:		2074283.6	2074283.7			
Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq						
Acenaphthene	g/m³	< 0.00010	< 0.00010	-	-	-
Acenaphthylene	g/m³	< 0.00010	< 0.00010	-	-	-
Anthracene	g/m³	< 0.00010	< 0.00010	-	-	-
Benzo[a]anthracene	g/m³	< 0.00010	< 0.00010	-	-	-
Benzo[a]pyrene (BAP)	g/m³	< 0.00010	< 0.00010	-	-	-
Benzo[b]fluoranthene + Benzo[j] fluoranthene	g/m³	< 0.00010	< 0.00010	-	-	-
Benzo[g,h,i]perylene	g/m³	< 0.00010	< 0.00010	-	-	-
Benzo[k]fluoranthene	g/m³	< 0.00010	< 0.00010	-	-	-
Chrysene	g/m³	< 0.00010	< 0.00010	-	-	-
Dibenzo[a,h]anthracene	g/m³	< 0.00010	< 0.00010	-	-	-
Fluoranthene	g/m³	< 0.00010	< 0.00010	-	-	-
Fluorene	g/m³	< 0.0002	< 0.0002	-	-	-
Indeno(1,2,3-c,d)pyrene	g/m³	< 0.00010	< 0.00010	-	-	-
Naphthalene	g/m³	< 0.0005	< 0.0005	-	-	-
Phenanthrene	g/m³	< 0.0004	< 0.0004	-	-	-
Pyrene	g/m³	< 0.0002	< 0.0002	-	-	-
Total Petroleum Hydrocarbons in Water						
C7 - C9	g/m³	< 0.06	< 0.06	-	-	-
C10 - C14	g/m³	< 0.2	< 0.2	-	-	-
C15 - C36	g/m³	< 0.4	< 0.4	-	-	-
Total hydrocarbons (C7 - C36)	g/m³	< 0.7	< 0.7	-	-	-

Summary of Methods

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.
Unless otherwise indicated, analyses were performed at Hill Laboratories, 28 Duke Street, Frankton, Hamilton 3204.

Sample Type: Aqueous			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn	0.45µm filtration, ICP-MS, trace level. APHA 3125 B 22nd ed. 2012.	0.00005 - 0.0010 g/m³	1-7
Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq	Liquid / liquid extraction, SPE (if required), GC-MS SIM analysis [KBIs:4736,2695]	0.00010 - 0.0005 g/m³	1-7
Total Petroleum Hydrocarbons in Water	Solvent Hexane extraction, GC-FID analysis, Headspace GC-MS FS analysis US EPA 8015B/MfE Petroleum Industry Guidelines [KBIs:2803,10734;26687,3629]	0.06 - 0.7 g/m³	1-7
Filtration, Unpreserved	Sample filtration through 0.45µm membrane filter.	-	1-7
Total Digestion	Nitric acid digestion. APHA 3030 E 22nd ed. 2012 (modified).	-	1-7
pH	pH meter. APHA 4500-H^+ B 22nd ed. 2012. Note: It is not possible to achieve the APHA Maximum Storage Recommendation for this test (15 min) when samples are analysed upon receipt at the laboratory, and not in the field. Samples and Standards are analysed at an equivalent laboratory temperature (typically 18 to 22 °C). Temperature compensation is used.	0.1 pH Units	1-7
Total Alkalinity	Titration to pH 4.5 (M-alkalinity), autotitrator. APHA 2320 B (Modified for alk <20) 22nd ed. 2012.	1.0 g/m³ as $CaCO_3$	1-7
Carbonate	Calculation: from alkalinity and pH, valid where TDS is not >500 mg/L and alkalinity is almost entirely due to hydroxides, carbonates or bicarbonates. APHA 4500-CO_2 D 22nd ed. 2012.	1.0 g/m³ at 25°C	1-7
Bicarbonate	Calculation: from alkalinity and pH, valid where TDS is not >500 mg/L and alkalinity is almost entirely due to hydroxides, carbonates or bicarbonates. APHA 4500-CO_2 D 22nd ed. 2012.	1.0 g/m³ at 25°C	1-7
Total Hardness	Calculation from Calcium and Magnesium. APHA 2340 B 22nd ed. 2012.	1.0 g/m³ as $CaCO_3$	1-7
Electrical Conductivity (EC)	Conductivity meter, 25°C. APHA 2510 B 22nd ed. 2012.	0.1 mS/m	1-7
Total Boron	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 22nd ed. 2012.	0.0053 g/m³	1-7
Total Calcium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 22nd ed. 2012.	0.053 g/m³	1-7

Sample Type: Aqueous			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Hexavalent Chromium	Diphenylcarbazide colorimetry. Discrete Analyser. APHA 3500 Cr B (modified from manual analysis) 22nd ed. 2012.	0.0010 g/m³	1-7
Dissolved Iron	Filtered sample, ICP-MS, trace level. APHA 3125 B 22nd ed. 2012.	0.02 g/m³	1-7
Total Iron	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 22nd ed. 2012.	0.021 g/m³	1-7
Total Magnesium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 22nd ed. 2012.	0.021 g/m³	1-7
Dissolved Manganese	Filtered sample, ICP-MS, trace level. APHA 3125 B 22nd ed. 2012.	0.0005 g/m³	1-7
Total Manganese	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 22nd ed. 2012 / US EPA 200.8.	0.00053 g/m³	1-7
Total Potassium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 22nd ed. 2012.	0.053 g/m³	1-7
Total Sodium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 22nd ed. 2012.	0.021 g/m³	1-7
Chloride	Filtered sample. Ion Chromatography. APHA 4110 B (modified) 22nd ed. 2012.	0.5 g/m³	1-7
Total Ammoniacal-N	Phenol/hypochlorite colourimetry. Flow injection analyser. (NH_4-N = NH_4^+-N + NH_3-N). APHA 4500-NH_3 H (modified) 22nd ed. 2012.	0.010 g/m³	1-7
Nitrite-N	Automated Azo dye colorimetry, Flow injection analyser. APHA 4500-NO_3^- I 22nd ed. 2012 (modified).	0.002 g/m³	1-7
Nitrate-N	Calculation: (Nitrate-N + Nitrite-N) - NO2N. In-House.	0.0010 g/m³	1-7
Nitrate-N + Nitrite-N	Total oxidised nitrogen. Automated cadmium reduction, flow injection analyser. APHA 4500-NO_3^- I 22nd ed. 2012 (modified).	0.002 g/m³	1-7
Sulphate	Filtered sample. Ion Chromatography. APHA 4110 B (modified) 22nd ed. 2012.	0.5 g/m³	1-7
Carbonaceous Biochemical Oxygen Demand ($cBOD_5$)	Incubation 5 days, DO meter, nitrification inhibitor added, dilutions, seeded. APHA 5210 B (modified) 22nd ed. 2012.	2 g O_2/m³	1-7
Chemical Oxygen Demand (COD), trace level	Dichromate/sulphuric acid digestion in Hach tubes, colorimetry. Trace Level method. APHA 5220 D 22nd ed. 2012.	6 g O_2/m³	1-7
C7 - C9	Head Space, GCMS analysis.	0.06 g/m³	1-7

These samples were collected by yourselves (or your agent) and analysed as received at the laboratory.

Samples are held at the laboratory after reporting for a length of time depending on the preservation used and the stability of the analytes being tested. Once the storage period is completed the samples are discarded unless otherwise advised by the client.

Ara Heron BSc (Tech)
Client Services Manager - Environmental

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Certificate of Analysis
Laboratory Reference:181123-151

Attention:		*Final Report:*	**312513-0**	*Replaces Report*	**312512-0**
Client:	**MCMILLAN DRILLING (NI) LTD**	*Report Issue Date:*	**08-Apr-2019**		
Address:	**PO Box 1189, Pukekohe, 2340**	*Received Date:*	**23-Nov-2018**		
Client Reference:	**Wayby Valley Bore**	*Sampled By:*	**John Oliver**		
Purchase Order:	**9690**	*Quote Reference :*	**9834**		

Please Note: Amended report - total metals and sample description corrected.
Error generating report

Sample Details		WATERS
Lab Sample ID:		**181123-151-1**
Client Sample ID:		
Sample Date/Time:		23/11/2018
Description:		Wayby Valley Bore
Chemistry Detailed		
Anions by Ion Chromatography (0.45 µm Filtered)		
Chloride	mg/L	28
Nitrate (as N)	mg/L	0.0034
Sulphate	mg/L	10
General Testing		
Ammoniacal Nitrogen (as N)	mg/L	0.059
Bicarbonate Alkalinity (as HCO3)	mg/L	170
Carbonate Alkalinity (as CO3)	mg/L	8.3
Conductivity (at 25 °C)	mS/m	38.5
Dissolved Oxygen	mg/L	2.5
Dissolved Reactive Phosphorus (as P)	mg/L	0.037
Free Carbon Dioxide	mg/L	<1.0 *
Hydroxide Alkalinity (as CaCO3)	mg/L	<1.0
pH (at room temp c. 20 °C)	pH unit	8.4
Total Alkalinity (as CaCO3)	mg/L	160
Total Dissolved Solids	mg/L	300
Turbidity	NTU	13
Metals		
Total Metals by ICP-MS—Trace (Default Digest)		
Calcium (Total)	mg/L	23
Iron (Total)	mg/L	0.93
Magnesium (Total)	mg/L	1.6
Manganese (Total)	mg/L	0.032
Potassium (Total)	mg/L	0.16
Sodium (Total)	mg/L	59
Total Hardness (as CaCO3)	mg/L	63
Microbiology		
Escherichia coli by MPN(Colilert-18)		
Escherichia coli	MPN/100 mL	<1.0
Total Coliforms	MPN/100 mL	37

*Results marked with * are not accredited to International Accreditation New Zealand*

Where samples have been supplied by the client they are tested as received. A dash indicates no test performed.

Reference Methods
The sample(s) referred to in this report were analysed by the following method(s)

Analyte	Method Reference	MDL	Samples	Location
Chemistry Detailed				
Anions by Ion Chromatography (0.45 µm Filtered)				
Chloride	In House based on APHA (online edition) 4110 B and EPA 300.0	0.02 mg/L	All	Auckland

Chemistry Detailed				
Anions by Ion Chromatography (0.45 µm Filtered)				
Nitrate (as N)	In House based on APHA (online edition) 4110 B and EPA 300.0	0.002 mg/L	All	Auckland
Sulphate	In House based on APHA (online edition) 4110 B and EPA 300.0	0.02 mg/L	All	Auckland
General Testing				
Ammoniacal Nitrogen (as N) by Flow Analysis	APHA (online edition) 4500-NH3 H	0.005 mg/L	All	Auckland
Bicarbonate Alkalinity (as HCO3) by Titration	APHA (online edition) 2320 B	1 mg/L	All	Auckland
Carbonate Alkalinity (as CO3) by Titration	APHA (online edition) 2320 B	1 mg/L	All	Auckland
Conductivity (at 25 °C) by Electrode	APHA (online edition) 2510 B	0.5 mS/m	All	Auckland
Dissolved Oxygen by Titration	APHA (online edition) 4500-O C	0.05 mg/L	All	Auckland
Dissolved Reactive Phosphorus (as P) by Colorimetry/ Discrete Analyser	APHA (online edition) 4500-P F	0.002 mg/L	All	Auckland
Free Carbon Dioxide by Titration	APHA (online edition) 4500-CO2 C	1 mg/L	All	Auckland
Hydroxide Alkalinity (as CaCO3) by Titration	APHA (online edition) 2320 B	1 mg/L	All	Auckland
pH (at room temp c. 20 °C) by Electrode	APHA (online edition) 4500-H B (Tested beyond 15 minute APHA holding time)	0.1 pH unit	All	Auckland
Total Alkalinity (as CaCO3) by Titration	APHA (online edition) 2320 B	1 mg/L	All	Auckland
Total Dissolved Solids by Gravimetry	APHA (online edition) 2540 C (Modified: Dried at 103 - 105 ºC)	15 mg/L	All	Auckland
Turbidity by Nephelometry	APHA (online edition) 2130 B (modified)	0.05 NTU	All	Auckland
Metals				
Total Metals by ICP-MS—Trace (Default Digest)				
Calcium (Total)	APHA (online edition) 3125 B by ICPMS	0.010 mg/L	All	Auckland
Iron (Total)	APHA (online edition) 3125 B by ICPMS	0.002 mg/L	All	Auckland
Magnesium (Total)	APHA (online edition) 3125 B by ICPMS	0.001 mg/L	All	Auckland
Manganese (Total)	APHA (online edition) 3125 B by ICPMS	0.0005 mg/L	All	Auckland
Potassium (Total)	APHA (online edition) 3125 B by ICPMS	0.05 mg/L	All	Auckland
Sodium (Total)	APHA (online edition) 3125 B by ICPMS	0.1 mg/L	All	Auckland
Total Hardness (as CaCO3)	APHA (online edition) 3125 B by ICPMS	0.03 mg/L	All	Auckland
Microbiology				
Escherichia coli by MPN(Colilert-18)				
Escherichia coli	APHA (online edition) 9223 B Colilert Quantitray	1 MPN/100 mL	All	Auckland
Total Coliforms	APHA (online edition) 9223 B Colilert Quantitray	1 MPN/100 mL	All	Auckland
Preparations				
Digest for Total Metals in Liquids	APHA (online edition) 3030 E (modified, 4:1 Nitric:Hydrochloric Acid)		All	Auckland
Glass Fibre Filtration (1.2 µm)	APHA (online edition) 2540 C (Filtration)		All	Auckland
Membrane Filtration (0.45 µm)	APHA (online edition) 4500-P B (preliminary filtration)		All	Auckland

The method detection limit (MDL) listed is the limit attainable in a relatively clean matrix. If dilutions are required for analysis the detection limit may be higher. For more information please contact the Operations Manager.

Samples, with suitable preservation and stability of analytes, will be held by the laboratory for a period of two weeks after results have been reported, unless otherwise advised by the submitter.

Watercare Laboratory Services is a division of Watercare Services Limited .

ACCREDITED LABORATORY

Report Signatory 08/04/2019

Chandra Sharma
KTP Signatory

Hill Laboratories
TRIED, TESTED AND TRUSTED

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Certificate of Analysis

Client:	Tonkin & Taylor	**Lab No:**	2156253 SPv1
Contact:	Leon Pemberton C/- Tonkin & Taylor PO Box 5271 Auckland 1141	**Date Received:**	06-Apr-2019
		Date Reported:	15-Apr-2019
		Quote No:	90687
		Order No:	Kevin Ledwith
		Client Reference:	
		Submitted By:	Kevin Ledwith

Sample Type: Aqueous

		Sample Name:	BH-1 04-Apr-2019	BH-2 04-Apr-2019	BH-3 04-Apr-2019	BH-5 04-Apr-2019	BH-7 04-Apr-2019
		Lab Number:	2156253.1	2156253.2	2156253.3	2156253.4	2156253.5
Individual Tests							
pH	pH Units		7.5	10.8	12.2	7.3	7.8
Total Alkalinity	g/m³ as $CaCO_3$		66	139	380	161	92
Carbonate	g/m³ at 25°C		< 1.0	56	< 1.0	< 1.0	< 1.0
Bicarbonate	g/m³ at 25°C		80	22	< 1.0	196	112
Total Hardness	g/m³ as $CaCO_3$		61	10.5	250	141	40
Electrical Conductivity (EC)	mS/m		21.9	40.1	182.1	38.3	33.1
Total Boron	g/m³		0.023	0.191	0.31	0.032	0.126
Total Calcium	g/m³		12.2	3.1	102	41	12.2
Hexavalent Chromium	g/m³		< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
Dissolved Iron	g/m³		< 0.02	0.33	0.04	0.03	0.09
Total Iron	g/m³		0.104	1.58	0.60	3.4	0.30
Total Magnesium	g/m³		7.5	0.67	0.25	9.6	2.3
Dissolved Manganese	g/m³		0.025	0.0026	< 0.0005	0.143	0.058
Total Manganese	g/m³		0.026	0.023	0.0101	0.22	0.065
Total Potassium	g/m³		1.34	0.66	2.6	1.34	0.48
Total Sodium	g/m³		21	87	82	31	59
Chloride	g/m³		21	23	38	21	32
Total Ammoniacal-N	g/m³		< 0.010	0.70	0.43	< 0.010	0.013
Nitrite-N	g/m³		< 0.002	0.010	0.019	< 0.002	< 0.002
Nitrate-N	g/m³		0.42	0.016	0.040	0.023	0.015
Nitrate-N + Nitrite-N	g/m³		0.42	0.026	0.059	0.023	0.015
Sulphate	g/m³		6.5	11.0	10.8	6.3	15.3
Carbonaceous Biochemical Oxygen Demand ($cBOD_5$)	g O_2/m³		< 2	< 2	< 2	< 2	< 2
Chemical Oxygen Demand (COD)	g O_2/m³		< 6	< 6	16	< 6	10
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn							
Dissolved Arsenic	g/m³		< 0.0010	0.0027	0.0019	< 0.0010	0.0018
Dissolved Cadmium	g/m³		< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Dissolved Chromium	g/m³		0.0009	0.0007	0.0008	0.0006	0.0006
Dissolved Copper	g/m³		< 0.0005	0.0027	0.0015	0.0007	< 0.0005
Dissolved Lead	g/m³		< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Dissolved Nickel	g/m³		0.0013	0.0010	< 0.0005	0.0012	< 0.0005
Dissolved Zinc	g/m³		0.0034	0.0027	0.0027	0.0050	0.0022
Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq							
Acenaphthene	g/m³		< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Acenaphthylene	g/m³		< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Anthracene	g/m³		< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Benzo[a]anthracene	g/m³		< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Benzo[a]pyrene (BAP)	g/m³		< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010

Sample Type: Aqueous						
Sample Name:		BH-1 04-Apr-2019	BH-2 04-Apr-2019	BH-3 04-Apr-2019	BH-5 04-Apr-2019	BH-7 04-Apr-2019
Lab Number:		2156253.1	2156253.2	2156253.3	2156253.4	2156253.5
Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq						
Benzo[b]fluoranthene + Benzo[j] fluoranthene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Benzo[g,h,i]perylene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Benzo[k]fluoranthene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Chrysene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Dibenzo[a,h]anthracene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Fluoranthene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Fluorene	g/m³	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Indeno(1,2,3-c,d)pyrene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Naphthalene	g/m³	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Phenanthrene	g/m³	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004
Pyrene	g/m³	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Total Petroleum Hydrocarbons in Water						
C7 - C9	g/m³	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
C10 - C14	g/m³	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
C15 - C36	g/m³	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Total hydrocarbons (C7 - C36)	g/m³	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7

Sample Name:		BH-9 04-Apr-2019	BH-10 04-Apr-2019			
Lab Number:		2156253.6	2156253.7			
Individual Tests						
pH	pH Units	11.4	8.8	-	-	-
Total Alkalinity	g/m³ as $CaCO_3$	162	109	-	-	-
Carbonate	g/m³ at 25°C	15.8	4.0	-	-	-
Bicarbonate	g/m³ at 25°C	1.3	124	-	-	-
Total Hardness	g/m³ as $CaCO_3$	81	28	-	-	-
Electrical Conductivity (EC)	mS/m	43.4	38.5	-	-	-
Total Boron	g/m³	0.088	0.21	-	-	-
Total Calcium	g/m³	31	8.2	-	-	-
Hexavalent Chromium	g/m³	0.0051	< 0.0010	-	-	-
Dissolved Iron	g/m³	< 0.02	0.14	-	-	-
Total Iron	g/m³	0.99	4.5	-	-	-
Total Magnesium	g/m³	0.71	1.87	-	-	-
Dissolved Manganese	g/m³	< 0.0005	0.0021	-	-	-
Total Manganese	g/m³	0.0154	0.065	-	-	-
Total Potassium	g/m³	1.11	0.41	-	-	-
Total Sodium	g/m³	64	83	-	-	-
Chloride	g/m³	30	39	-	-	-
Total Ammoniacal-N	g/m³	0.091	< 0.010	-	-	-
Nitrite-N	g/m³	0.011	< 0.002	-	-	-
Nitrate-N	g/m³	0.047	0.011	-	-	-
Nitrate-N + Nitrite-N	g/m³	0.058	0.011	-	-	-
Sulphate	g/m³	11.4	12.9	-	-	-
Carbonaceous Biochemical Oxygen Demand ($cBOD_5$)	g O_2/m³	< 2	< 2	-	-	-
Chemical Oxygen Demand (COD)	g O_2/m³	< 6	< 6	-	-	-
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn						
Dissolved Arsenic	g/m³	0.0010	0.0018	-	-	-
Dissolved Cadmium	g/m³	< 0.00005	< 0.00005	-	-	-
Dissolved Chromium	g/m³	0.0072	0.0008	-	-	-
Dissolved Copper	g/m³	0.0016	0.0006	-	-	-
Dissolved Lead	g/m³	< 0.00010	0.00012	-	-	-
Dissolved Nickel	g/m³	< 0.0005	< 0.0005	-	-	-
Dissolved Zinc	g/m³	< 0.0010	0.0029	-	-	-

Sample Type: Aqueous						
Sample Name:		BH-9 04-Apr-2019	BH-10 04-Apr-2019			
Lab Number:		2156253.6	2156253.7			
Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq						
Acenaphthene	g/m³	< 0.00010	< 0.00010	-	-	-
Acenaphthylene	g/m³	< 0.00010	< 0.00010	-	-	-
Anthracene	g/m³	< 0.00010	< 0.00010	-	-	-
Benzo[a]anthracene	g/m³	< 0.00010	< 0.00010	-	-	-
Benzo[a]pyrene (BAP)	g/m³	< 0.00010	< 0.00010	-	-	-
Benzo[b]fluoranthene + Benzo[j] fluoranthene	g/m³	< 0.00010	< 0.00010	-	-	-
Benzo[g,h,i]perylene	g/m³	< 0.00010	< 0.00010	-	-	-
Benzo[k]fluoranthene	g/m³	< 0.00010	< 0.00010	-	-	-
Chrysene	g/m³	< 0.00010	< 0.00010	-	-	-
Dibenzo[a,h]anthracene	g/m³	< 0.00010	< 0.00010	-	-	-
Fluoranthene	g/m³	< 0.00010	< 0.00010	-	-	-
Fluorene	g/m³	< 0.0002	< 0.0002	-	-	-
Indeno(1,2,3-c,d)pyrene	g/m³	< 0.00010	< 0.00010	-	-	-
Naphthalene	g/m³	< 0.0005	< 0.0005	-	-	-
Phenanthrene	g/m³	< 0.0004	< 0.0004	-	-	-
Pyrene	g/m³	< 0.0002	< 0.0002	-	-	-
Total Petroleum Hydrocarbons in Water						
C7 - C9	g/m³	< 0.06	< 0.06	-	-	-
C10 - C14	g/m³	< 0.2	< 0.2	-	-	-
C15 - C36	g/m³	< 0.4	< 0.4	-	-	-
Total hydrocarbons (C7 - C36)	g/m³	< 0.7	< 0.7	-	-	-

Summary of Methods

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.
Unless otherwise indicated, analyses were performed at Hill Laboratories, 28 Duke Street, Frankton, Hamilton 3204.

Sample Type: Aqueous			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn	0.45µm filtration, ICP-MS, trace level. APHA 3125 B 22nd ed. 2012.	0.00005 - 0.0010 g/m³	1-7
Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq	Liquid / liquid extraction, SPE (if required), GC-MS SIM analysis [KBIs:4736,2695]	0.00010 - 0.0005 g/m³	1-7
Total Petroleum Hydrocarbons in Water	Solvent Hexane extraction, GC-FID analysis, Headspace GC-MS FS analysis US EPA 8015B/MfE Petroleum Industry Guidelines [KBIs:2803,10734;26687,3629]	0.06 - 0.7 g/m³	1-7
Filtration, Unpreserved	Sample filtration through 0.45µm membrane filter.	-	1-7
Total Digestion	Nitric acid digestion. APHA 3030 E (modified) 23rd ed. 2017.	-	1-7
pH	pH meter. APHA 4500-H^+ B 23rd ed. 2017. Note: It is not possible to achieve the APHA Maximum Storage Recommendation for this test (15 min) when samples are analysed upon receipt at the laboratory, and not in the field. Samples and Standards are analysed at an equivalent laboratory temperature (typically 18 to 22 °C). Temperature compensation is used.	0.1 pH Units	1-7
Total Alkalinity	Titration to pH 4.5 (M-alkalinity), autotitrator. APHA 2320 B (modified for Alkalinity <20) 23rd ed. 2017.	1.0 g/m³ as $CaCO_3$	1-7
Carbonate	Calculation: from alkalinity and pH, valid where TDS is not >500 mg/L and alkalinity is almost entirely due to hydroxides, carbonates or bicarbonates. APHA 4500-CO_2 D 23rd ed. 2017.	1.0 g/m³ at 25°C	1-7
Bicarbonate	Calculation: from alkalinity and pH, valid where TDS is not >500 mg/L and alkalinity is almost entirely due to hydroxides, carbonates or bicarbonates. APHA 4500-CO_2 D 23rd ed. 2017.	1.0 g/m³ at 25°C	1-7
Total Hardness	Calculation from Calcium and Magnesium. APHA 2340 B 23rd ed. 2017.	1.0 g/m³ as $CaCO_3$	1-7
Electrical Conductivity (EC)	Conductivity meter, 25°C. APHA 2510 B 23rd ed. 2017.	0.1 mS/m	1-7
Total Boron	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.0053 g/m³	1-7
Total Calcium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.053 g/m³	1-7

Sample Type: Aqueous			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Hexavalent Chromium	Diphenylcarbazide colorimetry. Discrete Analyser. APHA 3500 Cr B (modified from manual analysis) 23rd ed. 2017.	0.0010 g/m³	1-7
Dissolved Iron	Filtered sample, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.02 g/m³	1-7
Total Iron	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.021 g/m³	1-7
Total Magnesium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.021 g/m³	1-7
Dissolved Manganese	Filtered sample, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.0005 g/m³	1-7
Total Manganese	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017 / US EPA 200.8.	0.00053 g/m³	1-7
Total Potassium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.053 g/m³	1-7
Total Sodium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.021 g/m³	1-7
Chloride	Filtered sample. Ion Chromatography. APHA 4110 B (modified) 23rd ed. 2017.	0.5 g/m³	1-7
Total Ammoniacal-N	Phenol/hypochlorite colourimetry. Flow injection analyser. (NH_4-N = NH_4^+-N + NH_3-N). APHA 4500-NH_3 H (modified) 23rd ed. 2017.	0.010 g/m³	1-7
Nitrite-N	Automated Azo dye colorimetry, Flow injection analyser. APHA 4500-NO_3^- I (modified) 23rd ed. 2017.	0.002 g/m³	1-7
Nitrate-N	Calculation: (Nitrate-N + Nitrite-N) - NO2N. In-House.	0.0010 g/m³	1-7
Nitrate-N + Nitrite-N	Total oxidised nitrogen. Automated cadmium reduction, flow injection analyser. APHA 4500-NO_3^- I (modified) 23rd ed. 2017.	0.002 g/m³	1-7
Sulphate	Filtered sample. Ion Chromatography. APHA 4110 B (modified) 23rd ed. 2017.	0.5 g/m³	1-7
Carbonaceous Biochemical Oxygen Demand ($cBOD_5$)	Incubation 5 days, DO meter, nitrification inhibitor added, dilutions, seeded. APHA 5210 B (modified) 23rd ed. 2017.	2 g O_2/m³	1-7
Chemical Oxygen Demand (COD), trace level	Dichromate/sulphuric acid digestion in Hach tubes, colorimetry. Trace Level method. APHA 5220 D 23rd ed. 2017.	6 g O_2/m³	1-7
C7 - C9	Head Space, GCMS analysis.	0.06 g/m³	1-7

These samples were collected by yourselves (or your agent) and analysed as received at the laboratory.

Samples are held at the laboratory after reporting for a length of time depending on the preservation used and the stability of the analytes being tested. Once the storage period is completed the samples are discarded unless otherwise advised by the client.

Ara Heron BSc (Tech)
Client Services Manager - Environmental

Appendix E: Tabulated groundwater quality results

Table E1: Tabulated groundwater test results

	Sample Name:	ANZECC 2000 95% trigger values for freshwater	Drinking Water Standards		BH1	BH1	BH1	BH1	BH2	BH2	BH2	BH2	BH3	BH3	BH3	BH3	BH5	BH5	BH5	BH5
	Date:		Maximum acceptable values (MAV)	Guideline values for aesthetics (GV)	31-May-18	8-Aug-18	31-Oct-18	4-Apr-19	31-May-18	8-Aug-18	31-Oct-18	4-Apr-19	30-May-18	8-Aug-18	31-Oct-18	4-Apr-19	31-May-18	8-Aug-18	31-Oct-18	4-Apr-19
	Lab Number:				1993002.1	2028672.1	2074283.1	2156253.1	1993002.2	2028672.2	2074283.2	2156253.2	1993002.3	2028672.3	2074283.3	2156253.3	1993002.7	2028672.4	2074283.4	2156253.4
Individual tests																				
pH	pH Units	-	-	7.0-8.5	7	7	6.8	7.5	8.5	8.6	9.6	10.8	8.9	9.9	9.5	12.2	7.6	7.7	7.1	7.3
Total Alkalinity	g/m3 as CaCO3	-	-	-	72	67	68	66	210	200	200	139	210	167	156	380	240	198	173	161
Carbonate	g/m3 at 25°C	-	-	-	< 1.0	< 1.0	< 1.0	< 1.0	3.4	3.9	34	56	9.7	41	21	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bicarbonate	g/m3 at 25°C	-	-	-	88	82	82	80	240	240	178	22	240	115	145	< 1.0	290	240	210	196
Total Hardness	g/m3 as CaCO3	-	-	200	65	60	54	61	53	42	25	10.5	95	44	34	250	175	170	130	141
Electrical Conductivity (EC)	mS/m	-	-	-	22.3	22.3	22.1	21.9	46.7	48.3	47.7	40.1	46.6	45.1	39.5	182.1	44.5	44.2	39.2	38.3
Total Boron	g/m3	0.37	1.4	-	0.029	0.024	0.025	0.023	0.115	0.126	0.124	0.191	0.26	0.3	0.34	0.31	0.036	0.03	0.029	0.032
Total Calcium	g/m3	-	-	-	12.8	12.1	12.8	12.2	14.9	11.5	5.8	3.1	24	14.2	10.4	102	53	53	38	41
Hexavalent Chromium	g/m3	0.001	-	-	< 0.0010	< 0.0010	0.0074	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
Dissolved Iron	g/m3	-	-	-		< 0.02	< 0.02	< 0.02		0.06	0.06	0.33		0.28	0.33	0.04		0.03	0.11	0.03
Total Iron	g/m3	-	-	0.2	-	0.184	0.147	0.104	-	1.46	1.5	1.58	-	3.6	4	0.6	-	1.9	3.4	3.4
Total Magnesium	g/m3	-	-	-	8.1	7.2	5.5	7.5	3.9	3.2	2.5	0.67	8.4	2	1.87	0.25	10.7	9	8.5	9.6
Dissolved Manganese	g/m3	1.9	-	-	-	0.0197	0.014	0.025	-	0.021	0.0011	0.0026	-	0.0045	0.0054	< 0.0005	-	0.154	0.15	0.143
Total Manganese	g/m3	-		0.4	0.04 (staining) 0.1 (taste)	0.021	0.0171	0.026	-	0.046	0.024	0.023	-	0.061	0.063	0.0101	-	0.165	0.162	0.22
Total Potassium	g/m3	-	-	-	1.39	1.28	1.64	1.34	1.17	1.22	2.3	0.66	2.8	1.08	0.79	2.6	2.9	1.51	1.1	1.34
Total Sodium	g/m3	-	-	200	23	20	25	21	107	97	105	87	114	92	86	82	51	32	28	31
Chloride	g/m3	-	-	250	23	22	21	21	32	31	30	23	40	37	37	38	22	21	20	21
Total Ammoniacal-N	g/m3	-	-	1.5	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.019	0.7	0.055	0.101	0.153	0.43	< 0.010	0.027	< 0.010	< 0.010
Nitrite-N	g/m3	-	0.2	-	0.053	< 0.002	0.01	< 0.002	< 0.002	< 0.002	< 0.002	0.01	0.011	0.008	0.005	0.019	< 0.002	< 0.002	< 0.002	< 0.002
Nitrate-N	g/m3	0.7	50	-	0.26	0.42	0.44	0.42	< 0.002	< 0.002	0.008	0.016	0.025	0.006	< 0.002	0.04	< 0.002	0.004	0.041	0.023
Nitrate-N + Nitrite-N	g/m3	-	-	-	0.31	0.42	0.45	0.42	< 0.002	< 0.002	0.008	0.026	0.036	0.014	0.005	0.059	< 0.002	0.004	0.042	0.023
Sulphate	g/m3	-	-	250	6.7	7	7.5	6.5	7.5	7.4	7.2	11	12.6	12.4	11.2	10.8	8.3	6.1	5.8	6.3
Carbonaceous Biochemical Oxy	g O2/m3	-	-	-	< 2	< 2	< 2	< 2	4	3	3	< 2	< 2	< 2	< 2	< 2	6	< 2	< 2	< 2
Chemical Oxygen Demand (COI	g O2/m3	-	-	-	< 6	< 6	< 6	< 6	16	< 6	8	< 6	10	< 6	8	16	< 12 #1	< 6	< 6	< 6
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn																				
Dissolved Arsenic	g/m3	0.024	0.01	-	< 0.0010	< 0.0010	< 0.0010	< 0.0010	0.0012	< 0.0010	< 0.0010	0.0027	0.0022	0.0018	0.0015	0.0019	< 0.0010	< 0.0010	< 0.0010	< 0.0010
Dissolved Cadmium	g/m3	0.0002	0.004	-	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.0001	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Dissolved Chromium	g/m3	-	0.05	-	< 0.0005	0.0008	0.0077	0.0009	< 0.0005	< 0.0005	< 0.0005	0.0007	< 0.0005	0.0008	0.0005	0.0008	< 0.0005	< 0.0005	< 0.0005	0.0006
Dissolved Copper	g/m3	0.0014	2	1	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.0027	0.0006	0.001	0.0009	0.0015	< 0.0005	< 0.0005	< 0.0005	0.0007
Dissolved Lead	g/m3	0.0034	0.01	-	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	0.00025	0.00034	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Dissolved Nickel	g/m3	0.011	0.08		0.0015	0.0011	0.0009	0.0013	0.0009	< 0.0005	< 0.0005	0.001	< 0.0005	0.0005	< 0.0005	< 0.0005	0.0012	0.0006	< 0.0005	0.0012
Dissolved Zinc	g/m3	0.008	-	1.5	0.0144	0.0025	0.0014	0.0034	0.0019	0.0018	0.0019	0.0027	< 0.0010	0.0026	0.0029	0.0027	0.0085	0.0035	0.002	0.005
Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq																				
Acenaphthene	g/m3				< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	0.00077	< 0.00010	< 0.00010
Acenaphthylene	g/m3				< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Anthracene	g/m3				< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	0.00017	< 0.00010	< 0.00010
Benzo[a]anthracene	g/m3				< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Benzo[a]pyrene (BAP)	g/m3				< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Benzo[b]fluoranthene + Benzo[j]fluoranthene	g/m3				< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Benzo[g,h,i]perylene	g/m3				< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Benzo[k]fluoranthene	g/m3				< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Chrysene	g/m3				< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Dibenzo[a,h]anthracene	g/m3				< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Fluoranthene	g/m3				< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	0.00016	< 0.00010	< 0.00010
Fluorene	g/m3				< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	0.0006	< 0.0002	< 0.0002
Indeno(1,2,3-c,d)pyrene	g/m3				< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Naphthalene	g/m3				< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Phenanthrene	g/m3				< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	0.0007	< 0.0004	< 0.0004
Pyrene	g/m3				< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Total Petroleum Hydrocarbons in Water																				
C7 - C9	g/m3				< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
C10 - C14	g/m3				< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
C15 - C36	g/m3				< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Total hydrocarbons (C7 - C36)	g/m3				< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7

Table E1: Tabulated groundwater test results

	Sample Name:	ANZECC 2000 95% trigger values for freshwater	Drinking Water Standards		BH7	BH7	BH7	BH7	BH9	BH9	BH9	BH9	BH10	BH10	BH10	BH-10
	Date:		Maximum acceptable values (MAV)	Guideline values for aesthetics (GV)	31-May-18	8-Aug-18	1-Nov-18	4-Apr-19	30-May-18	8-Aug-18	31-Oct-18	4-Apr-19	31-May-18	8-Aug-18	31-Oct-18	4-Apr-2019
	Lab Number:				1993002.4	2028672.5	2074283.7	2156253.5	1993002.5	2028673	2074284	2156253.6	1993002.6	2028673	2074284	2156253.7
Individual tests																
pH	pH Units	-	-	7.0-8.5	8.7	8.1	7.8	7.8	10.2	11.3	11.7	11.4	8.5	8.3	8.5	8.8
Total Alkalinity	g/m3 as CaCO3	-	-	-	95	100	101	92	146	136	164	162	200	188	187	109
Carbonate	g/m3 at 25°C	-	-	-	2.3	< 1.0	< 1.0	< 1.0	50	17.9	< 1.0	15.8	3.7	2	3.4	4
Bicarbonate	g/m3 at 25°C	-	-	-	111	121	123	112	68	1.9	< 1.0	1.3	240	220	220	124
Total Hardness	g/m3 as CaCO3	-	-	200	57	66	63	40	83	49	67	81	115	40	56	28
Electrical Conductivity (EC)	mS/m	-	-	-	31.7	33	33.2	33.1	33.2	58.4	68.8	43.4	46.9	50	48.6	38.5
Total Boron	g/m3	0.37	1.4	-	0.116	0.048	0.067	0.126	0.078	0.075	0.082	0.088	0.22	0.22	0.23	0.21
Total Calcium	g/m3	-	-	-	14.8	19.4	18.8	12.2	25	16.9	25	31	22	11.1	19.2	8.2
Hexavalent Chromium	g/m3	0.001	-	-	< 0.0010	< 0.0010	< 0.0010	< 0.0010	0.002	0.0024	0.0039	0.0051	< 0.0010	< 0.0010	< 0.0010	< 0.0010
Dissolved Iron	g/m3	-	-	-		0.36	0.05	0.09		< 0.02	< 0.02	< 0.02		0.34	0.34	0.14
Total Iron	g/m3	-	-	0.2	-	1.32	0.72	0.3	-	2	0.94	0.99	-	5.8	4.1	4.5
Total Magnesium	g/m3	-	-	-	4.9	4.2	3.8	2.3	4.9	1.64	0.88	0.71	14.7	3.1	2.1	1.87
Dissolved Manganese	g/m3	1.9	-	-	-	0.148	0.027	0.058	-	< 0.0005	< 0.0005	< 0.0005	-	0.0056	0.0134	0.0021
Total Manganese	g/m3	-		0.4	0.04 (staining) 0.1 (taste)	0.148	0.053	0.065	-	0.031	0.0142	0.0154	-	0.081	0.065	0.065
Total Potassium	g/m3	-	-	-	1.47	0.61	0.69	0.48	2.1	1.91	1.84	1.11	2.1	0.49	0.64	0.41
Total Sodium	g/m3	-	-	200	68	42	49	59	64	65	72	64	115	101	109	83
Chloride	g/m3	-	-	250	35	34	34	32	29	27	28	30	41	38	38	39
Total Ammoniacal-N	g/m3	-	-	1.5	0.032	< 0.010	< 0.010	0.013	< 0.010	< 0.010	0.047	0.091	< 0.010	< 0.010	< 0.010	< 0.010
Nitrite-N	g/m3	-	0.2	-	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.004	0.011	0.002	< 0.002	< 0.002	< 0.002
Nitrate-N	g/m3	0.7	50	-	0.008	< 0.002	0.005	0.015	< 0.002	0.003	0.009	0.047	0.049	< 0.002	< 0.002	0.011
Nitrate-N + Nitrite-N	g/m3	-	-	-	0.008	< 0.002	0.005	0.015	< 0.002	0.004	0.013	0.058	0.052	< 0.002	< 0.002	0.011
Sulphate	g/m3	-	-	250	19	12.4	13.6	15.3	10.2	12.2	12	11.4	7.3	10.9	12.4	12.9
Carbonaceous Biochemical Oxy	g O2/m3	-	-	-	3	4	< 2	< 2	6	3	< 2	< 2	< 2 #2	< 2	< 2	< 2
Chemical Oxygen Demand (COI	g O2/m3	-	-	-	19	13	< 6	10	14	9	10	< 6	< 12 #1	< 6	< 6	< 6
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn																
Dissolved Arsenic	g/m3	0.024	0.01	-	0.0024	< 0.0010	< 0.0010	0.0018	< 0.0010	< 0.0010	< 0.0010	0.001	0.0014	0.0027	0.0028	0.0018
Dissolved Cadmium	g/m3	0.0002	0.004	-	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Dissolved Chromium	g/m3	-	0.05	-	0.0012	< 0.0005	< 0.0005	0.0006	0.003	0.0051	0.0042	0.0072	0.0006	< 0.0005	< 0.0005	0.0008
Dissolved Copper	g/m3	0.0014	2	1	0.0025	< 0.0005	< 0.0005	< 0.0005	0.0018	0.0009	0.0008	0.0016	0.0008	0.0015	< 0.0005	0.0006
Dissolved Lead	g/m3	0.0034	0.01	-	0.00053	< 0.00010	< 0.00010	< 0.00010	0.00012	< 0.00010	< 0.00010	< 0.00010	0.00076	0.00024	0.00019	0.00012
Dissolved Nickel	g/m3	0.011	0.08		0.0016	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.0007	0.0007	< 0.0005
Dissolved Zinc	g/m3	0.008	-	1.5	0.0067	0.0023	0.004	0.0022	0.0038	0.0015	< 0.0010	< 0.0010	0.0148	0.0152	0.0025	0.0029
Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq																
Acenaphthene	g/m3				< 0.00010	0.00019	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Acenaphthylene	g/m3				< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Anthracene	g/m3				< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Benzo[a]anthracene	g/m3				< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Benzo[a]pyrene (BAP)	g/m3				< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Benzo[b]fluoranthene + Benzo[j]fluoranthene	g/m3				< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Benzo[g,h,i]perylene	g/m3				< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Benzo[k]fluoranthene	g/m3				< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Chrysene	g/m3				< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Dibenzo[a,h]anthracene	g/m3				< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Fluoranthene	g/m3				< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Fluorene	g/m3				< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Indeno(1,2,3-c,d)pyrene	g/m3				< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Naphthalene	g/m3				< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Phenanthrene	g/m3				< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004
Pyrene	g/m3				< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Total Petroleum Hydrocarbons in Water																
C7 - C9	g/m3				< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
C10 - C14	g/m3				< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
C15 - C36	g/m3				< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Total hydrocarbons (C7 - C36)	g/m3				< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7

Appendix F: Rock Mass Permeability: Packer Tests

Dome Project	Date Start:	20/03/2018	Date End:	23/03/2018	Data entered by:	OPRI	Checked by:	ALNA
Borehole:	BH1	RL Collar:	148.0	Angle:	90°	Comments :		

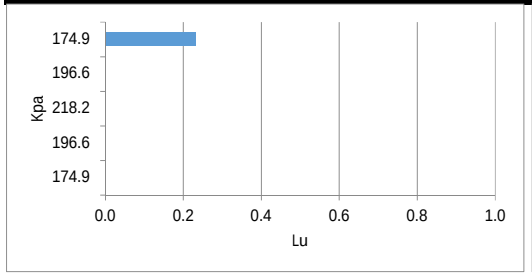
Test Interval				Ground Water Level	Gauge Height
Top:	15	Bottom:	18	12.95	0.5

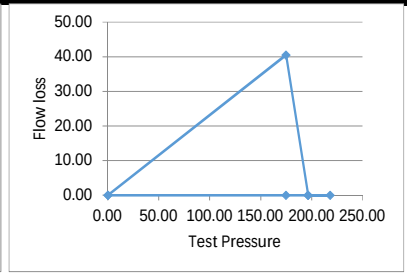
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
43	131.6	174.9	640.7	641.6	0.9	15	0.2
65	131.6	196.6	641.7	641.7	0	15	0.0
87	131.6	218.2	641.8	641.8	0	15	0.0
65	131.6	196.6	641.8	641.8	0	15	0.0
43	131.6	174.9	641.9	641.9	0	15	0.0

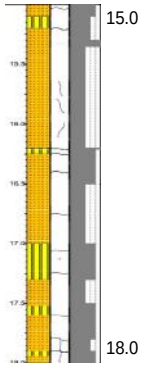
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	321.31	0.68	13.22

From: 15 To: 18 Lu: 0.0

Comments : Void Filling; Data resolution to within 1L







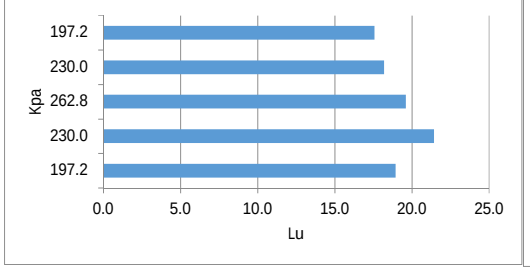
Test Interval				Ground Water Level	Gauge Height
Top:	18	Bottom:	21	12.95	0.5

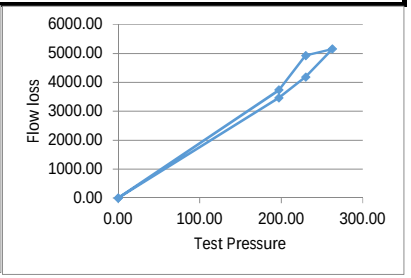
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
66	131.6	197.2	715.0	792.0	77.0	15	17.6
98	131.6	230.0	799.0	892.0	93.0	15	18.2
131	131.6	262.8	910.0	1024.5	114.5	15	19.6
98	131.6	230.0	1039.0	1148.5	109.5	15	21.4
66	131.6	197.2	1158.0	1241.0	83.0	15	18.9

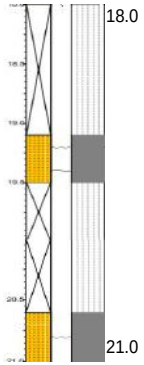
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	356.66	0.74	13.48

From: 18 To: 21 Lu: 19.2

Comments : Laminar Flow; Data resolution to within 1L







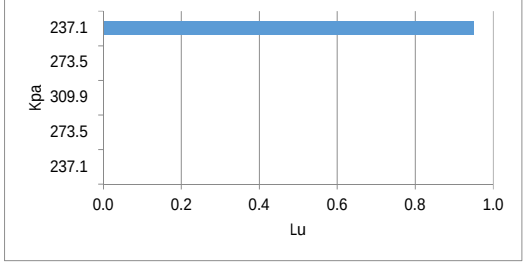
Test Interval				Ground Water Level	Gauge Height
Top:	24	Bottom:	27	16.27	0.5

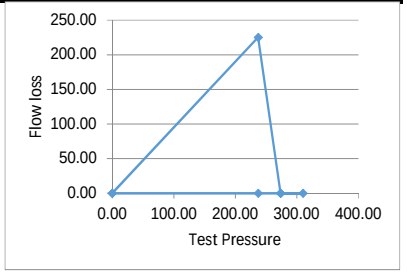
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
73	164.2	237.1	1312.0	1317.0	5.0	15	0.9
109	164.2	273.5	1317.0	1317.0	0.0	15	0.0
146	164.2	309.9	1317.0	1317.0	0.0	15	0.0
109	164.2	273.5	1317.0	1317.0	0.0	15	0.0
73	164.2	237.1	1317.0	1317.0	0.0	15	0.0

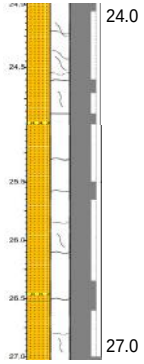
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	459.89	0.67	12.15

From: 24 To: 27 Lu: 0.0

Comments : Void Filling; Data resolution to within 1L







Dome Project	Date Start:	20/03/2018	Date End:	23/03/2018	Data entered by:	OPRI	Checked by:	ALNA
Borehole:	BH1	RL Collar:	148.0	Angle:	90°	Comments :		

Test Interval				Ground Water Level	Gauge Height
Top:	30	Bottom:	33	16.27	0.5

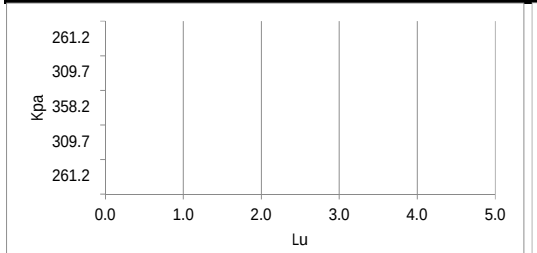
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
97	164.2	261.2	1340.0	1340.0	0.0	15	0.0
146	164.2	309.7	1340.0	1340.0	0.0	15	0.0
194	164.2	358.2	1340.0	1340.0	0.0	15	0.0
146	164.2	309.7	1340.0	1340.0	0.0	15	0.0
97	164.2	261.2	1340.0	1340.0	0.0	15	0.0

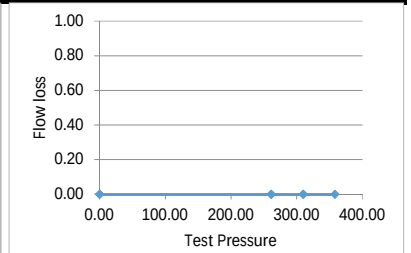
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	530.58	0.68	11.37

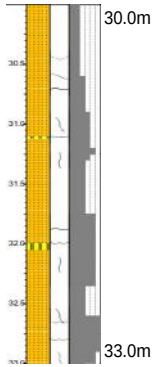
From: 30.0 To: 33.0 Comments : No water take

Data resolution to within 1L

Lu: 0.0







Test Interval				Ground Water Level	Gauge Height
Top:	36	Bottom:	39	17.5	0.5

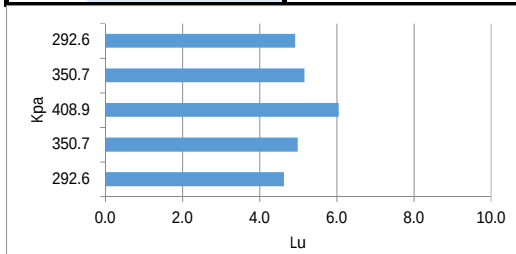
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
116	176.2	292.6	1387.5	1419.5	32.0	15	4.9
175	176.2	350.7	1423.5	1463.7	40.2	15	5.2
233	176.2	408.9	1471.3	1526.3	55.0	15	6.1
175	176.2	350.7	1528.1	1567.0	38.9	15	5.0
116	176.2	292.6	1567.0	1597.1	30.1	15	4.6

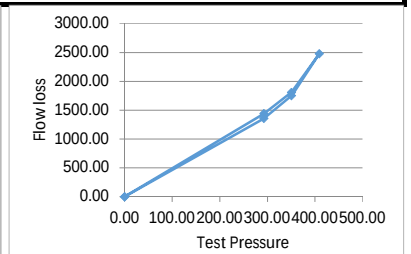
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	613.33	0.67	10.90

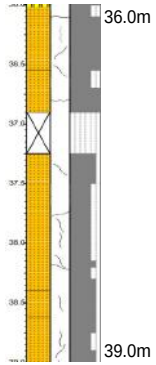
From: 36.0 To: 39.0 Comments : Dilatant

Data resolution to within 1L

Lu: 4.9







Test Interval				Ground Water Level	Gauge Height
Top:	39	Bottom:	43.5	17.5	0.5

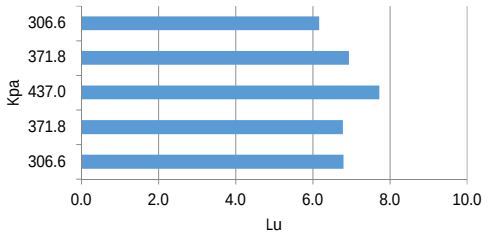
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
130	176.2	306.6	1637.5	1679.5	42.0	15	6.2
196	176.2	371.8	1685.2	1742.5	57.3	15	6.9
261	176.2	437.0	1746.9	1821.9	75.0	15	7.7
196	176.2	371.8	1826.8	1882.8	56.0	15	6.8
130	176.2	306.6	1885.6	1931.9	46.3	15	6.8

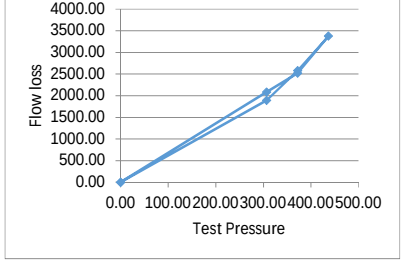
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	657.51	0.66	10.59

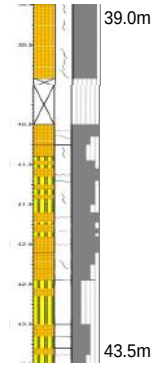
From: 39.0 To: 43.5 Comments : Dilatant

Note: 4.5m Test Length (39.0m-43.5m). Data resolution to within 1L

Lu: 6.7







Dome Project	Date Start:	20/03/2018	Date End:	23/03/2018	Data entered by:	OPRI	Checked by:	ALNA
Borehole:	BH1	RL Collar:	148.0	Angle:	90°	Comments :		

Test Interval				Ground Water Level	Gauge Height
Top:	47	Bottom:	50	21.25	0.5

Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
153	213.0	365.9	2415.0	2875.0	460	15	56.6
229	213.0	442.3	2935.0	3475.0	540	15	55.0
306	213.0	518.8	3560.0	4226.0	666	15	57.8
229	213.0	442.3	4270.0	4820.0	550	15	56.0
153	213.0	365.9	4860.0	5331.0	471	15	58.0

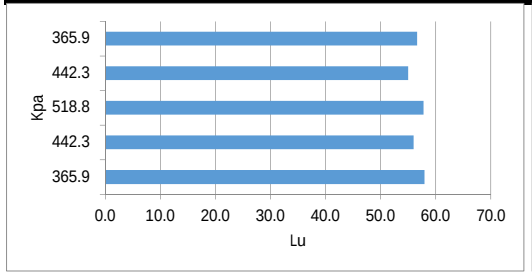
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	779.68	0.67	10.70

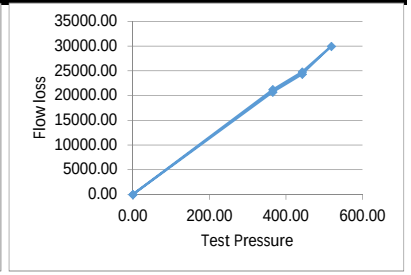
From: 47.0 To: 50.0

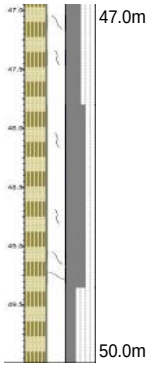
Lu: 56.7

Comments : Laminar Flow

Data resolution to within 1L







Dome Project Date Start: 12/04/2018 Date End: 16/04/2018 Data entered by: DSA Checked by: ALNA

Borehole: BH2 RL Collar: 204.3 Angle: 90° Comments :

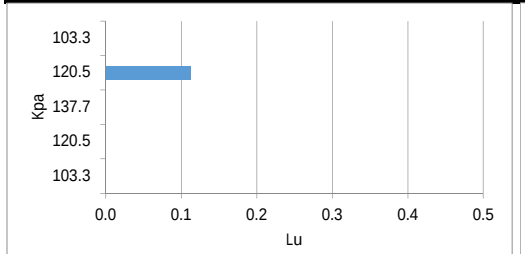
Test Interval				Ground Water Level	Gauge Height
Top:	10.5	Bottom:	13.5	6.54	0.5

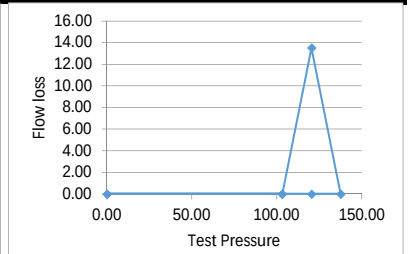
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
35	68.8	103.3	16311.8	16311.8	0.0	10	0.0
52	68.8	120.5	16312.7	16312.9	0.2	10	0.1
69	68.8	137.7	16312.9	16312.9	0.0	10	0.0
52	68.8	120.5	16312.9	16312.9	0.0	10	0.0
35	68.8	103.3	16312.9	16312.9	0.0	10	0.0

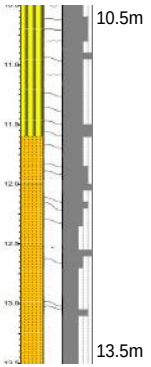
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	205.48	0.67	11.47

From: 10.5 To: 13.5 Comments : Void Filling

Lu: 0.0 Data resolution to within 1L







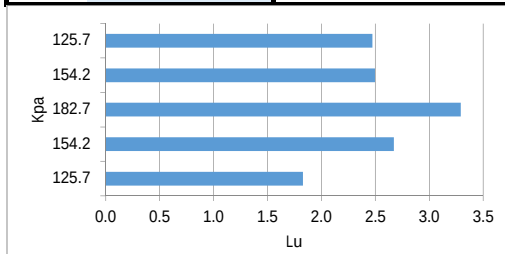
Test Interval				Ground Water Level	Gauge Height
Top:	16.5	Bottom:	19.5	6.54	0.5

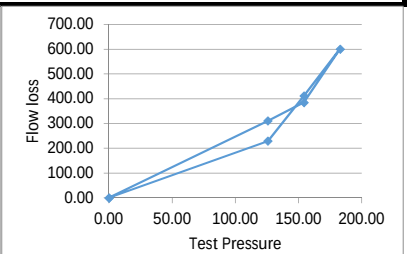
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
57	68.8	125.7	16350.8	16355.4	4.6	10	2.5
85	68.8	154.2	16356.2	16361.9	5.7	10	2.5
114	68.8	182.7	16362.8	16371.7	8.9	10	3.3
85	68.8	154.2	16372.1	16378.2	6.1	10	2.7
57	68.8	125.7	16378.7	16382.1	3.4	10	1.8

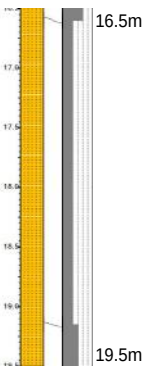
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	276.17	0.66	10.15

From: 16.5 To: 19.5 Comments : Dilatant

Lu: 2.4 Data resolution to within 1L







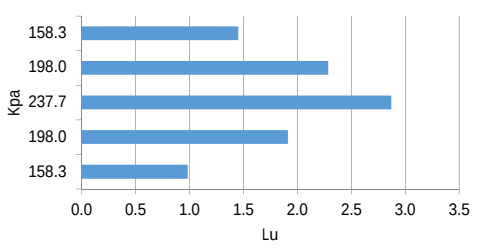
Test Interval				Ground Water Level	Gauge Height
Top:	22.5	Bottom:	25.5	6.54	1.5

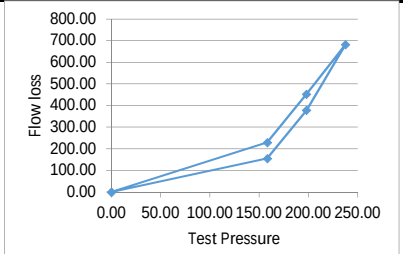
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
80	78.8	158.3	16410.7	16414.1	3.4	10	1.5
119	78.8	198.0	16415.6	16422.3	6.7	10	2.3
159	78.8	237.7	16424.1	16434.2	10.1	10	2.9
119	78.8	198.0	16434.4	16440.0	5.6	10	1.9
80	78.8	158.3	16440.2	16442.5	2.3	10	1.0

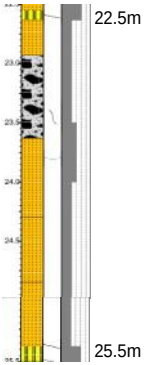
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	346.86	0.69	9.90

From: 22.5 To: 25.5 Comments : Dilatant

Lu: 1.7 Data resolution to within 1L







Dome Project Date Start: 12/04/2018 Date End: 16/04/2018 Data entered by: DSA Checked by: ALNA

Borehole: BH2 RL Collar: 204.3 Angle: 90° Comments :

Test Interval				Ground Water Level	Gauge Height
Top:	28.5	Bottom:	31.5	14.05	0.5

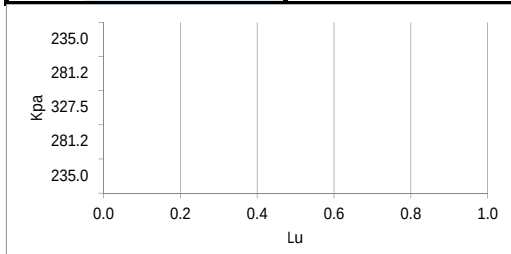
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
93	142.4	235.0	16467.7	16467.7	0.0	10	0.0
139	142.4	281.2	16467.7	16467.7	0.0	10	0.0
185	142.4	327.5	16467.7	16467.7	0.0	10	0.0
139	142.4	281.2	16467.7	16467.7	0.0	10	0.0
93	142.4	235.0	16467.7	16467.7	0.0	10	0.0

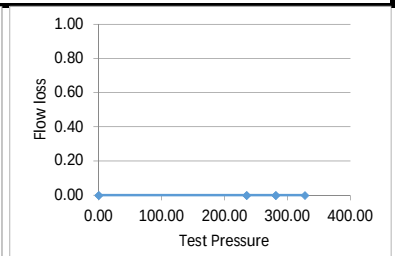
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	491.15	0.67	10.92

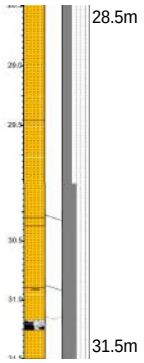
From: 28.5 To: 31.5 Comments : No water take

Data resolution to within 1L

Lu: 0.0







Test Interval				Ground Water Level	Gauge Height
Top:	34.5	Bottom:	37.5	14.05	0.5

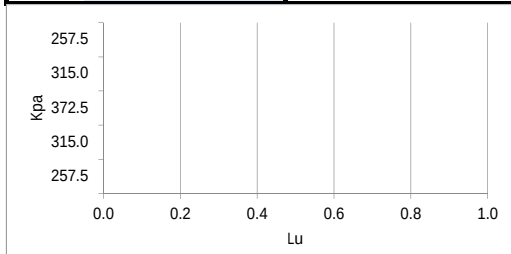
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
115	142.4	257.5	16494.1	16494.1	0.0	10	0.0
173	142.4	315.0	16494.1	16494.1	0.0	10	0.0
230	142.4	372.5	16494.1	16494.1	0.0	10	0.0
173	142.4	315.0	16494.2	16494.2	0.0	10	0.0
115	142.4	257.5	16494.2	16494.2	0.0	10	0.0

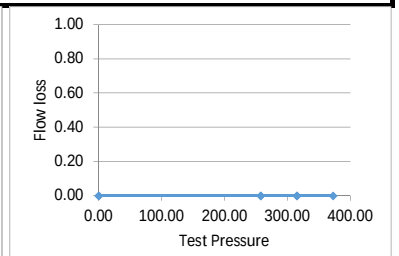
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	561.84	0.66	10.35

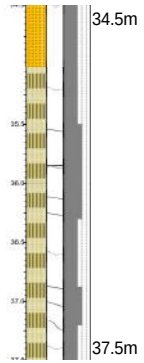
From: 34.5 To: 37.5 Comments : No water take

Data resolution to within 1L

Lu: 0.0







Test Interval				Ground Water Level	Gauge Height
Top:	40.5	Bottom:	43.5	14.05	0.5

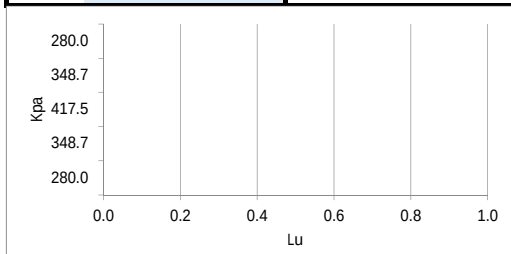
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
138	142.4	280.0	16512.2	16512.2	0.0	10	0.0
206	142.4	348.7	16512.2	16512.2	0.0	10	0.0
275	142.4	417.5	16512.2	16512.2	0.0	10	0.0
206	142.4	348.7	16512.2	16512.2	0.0	10	0.0
138	142.4	280.0	16512.3	16512.3	0.0	10	0.0

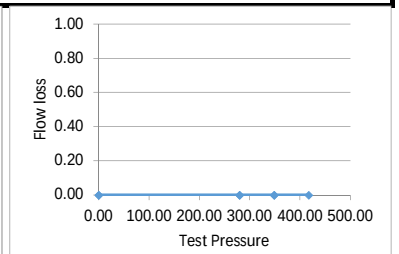
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	632.53	0.66	9.94

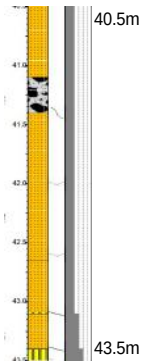
From: 40.5 To: 43.5 Comments : No water take

Data resolution to within 1L

Lu: 0.0







Dome Project Date Start: 12/04/2018 Date End: 16/04/2018 Data entered by: DSA Checked by: ALNA

Borehole: BH2 RL Collar: 204.3 Angle: 90° Comments :

Test Interval				Ground Water Level	Gauge Height
Top:	46.5	Bottom:	49.5	16.7	0.5

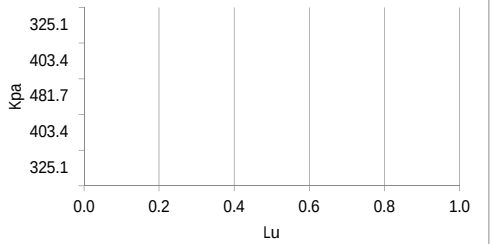
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
157	168.4	325.1	16555.7	16555.7	0.0	10	0.0
235	168.4	403.4	16555.7	16555.7	0.0	10	0.0
313	168.4	481.7	16555.7	16555.7	0.0	10	0.0
235	168.4	403.4	16555.7	16555.7	0.0	10	0.0
157	168.4	325.1	16555.7	16555.7	0.0	10	0.0

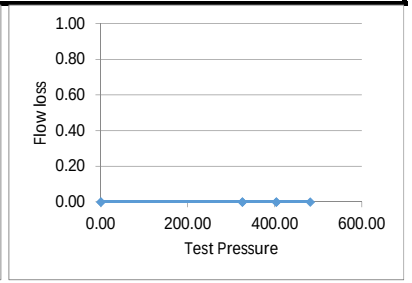
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	729.20	0.66	10.03

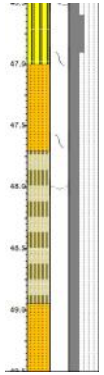
From: 46.5 To: 49.5 Comments : No water take

Data resolution to within 1L

Lu: 0.0







Dome Project Date Start: 26/04/2018 Date End: 30/04/2018 Data entered by: OPRI Checked by: ALNA

Borehole: BH3 RL Collar: 245.5 Angle: 90° Comments :

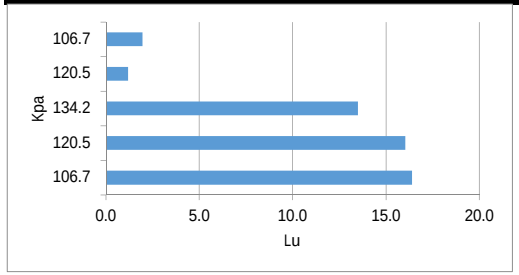
Test Interval				Ground Water Level	Gauge Height
Top:	9	Bottom:	12	7.6	0.5

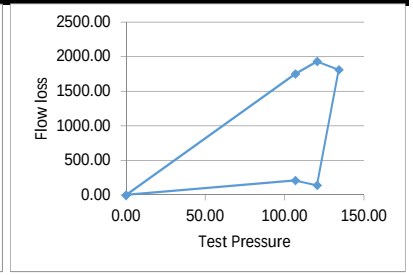
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
28	79.2	106.7	16626.6	16629.7	3.1	10	2.0
41	79.2	120.5	16630.9	16633.0	2.1	10	1.2
55	79.2	134.2	16633.4	16660.2	26.8	10	13.5
41	79.2	120.5	16662.7	16691.3	28.6	10	16.0
28	79.2	106.7	16693.4	16719.3	25.9	10	16.4

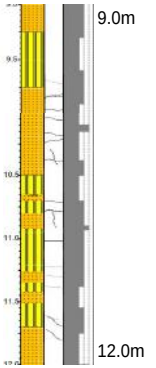
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	198.19	0.68	12.78

From: 9.0 To: 12.0 Comments : Wash-out

Lu: 16.4 Data resolution to within 1L







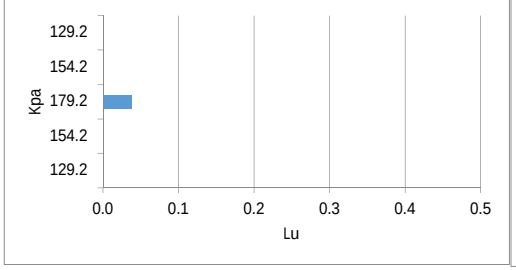
Test Interval				Ground Water Level	Gauge Height
Top:	15	Bottom:	18	7.6	0.5

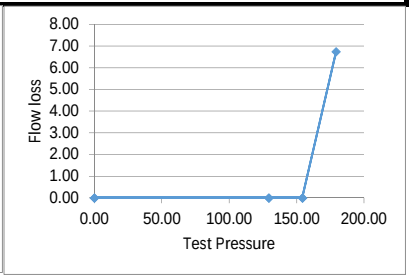
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
50	79.2	129.2	16784.9	16784.9	0.0	10	0.0
75	79.2	154.2	16784.9	16784.9	0.0	10	0.0
100	79.2	179.2	16784.9	16785.0	0.1	10	0.0
75	79.2	154.2	16785.0	16785.0	0.0	10	0.0
50	79.2	129.2	16785.0	16785.0	0.0	10	0.0

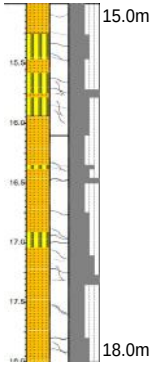
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	268.88	0.67	10.86

From: 15.0 To: 18.0 Comments : Void Filling

Lu: 0.0 Data resolution to within 1L







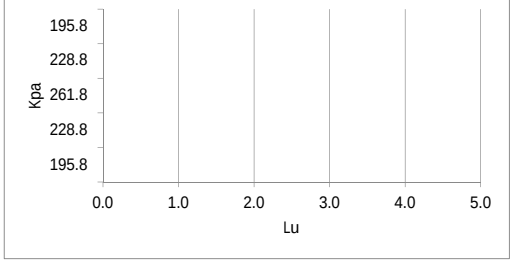
Test Interval				Ground Water Level	Gauge Height
Top:	21	Bottom:	24	12.75	0.5

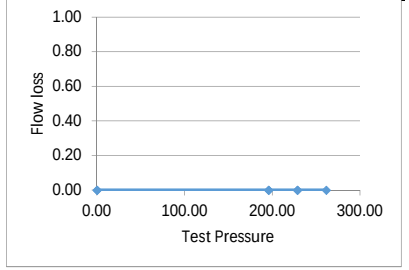
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
66	129.7	195.8	16861.4	16861.4	0.0	10	0.0
99	129.7	228.8	16861.4	16861.4	0.0	10	0.0
132	129.7	261.8	16861.4	16861.4	0.0	10	0.0
99	129.7	228.8	16861.4	16861.4	0.0	10	0.0
66	129.7	195.8	16861.4	16861.4	0.0	10	0.0

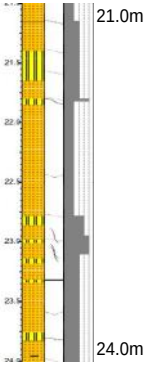
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	390.05	0.67	11.63

From: 21.0 To: 24.0 Comments : No water take

Lu: 0.0 Data resolution to within 1L







Dome Project	Date Start:	26/04/2018	Date End:	30/04/2018	Data entered by:	OPRI	Checked by:	ALNA
Borehole:	BH3	RL Collar:	245.5	Angle:	90°	Comments :		

Test Interval				Ground Water Level	Gauge Height
Top:	27	Bottom:	30	12.75	0.5

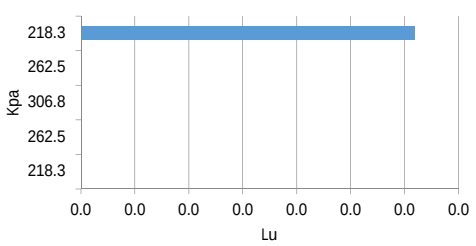
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
89	129.7	218.3	16944.0	16944.1	0.1	10	0.0
133	129.7	262.5	16944.1	16944.1	0.0	10	0.0
177	129.7	306.8	16944.1	16944.1	0.0	10	0.0
133	129.7	262.5	16944.1	16944.1	0.0	10	0.0
89	129.7	218.3	16944.1	16944.1	0.0	10	0.0

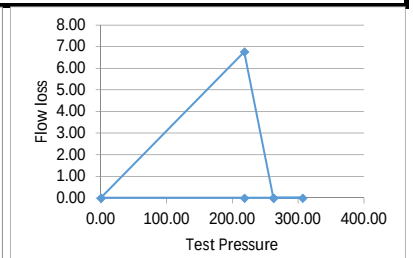
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	460.74	0.67	10.76

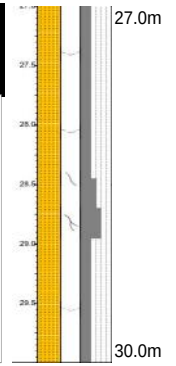
From: 27.0 To: 30.0 Comments : Void Filling

Data resolution to within 1L

Lu: 0.0







Test Interval				Ground Water Level	Gauge Height
Top:	33	Bottom:	36	12.75	0.5

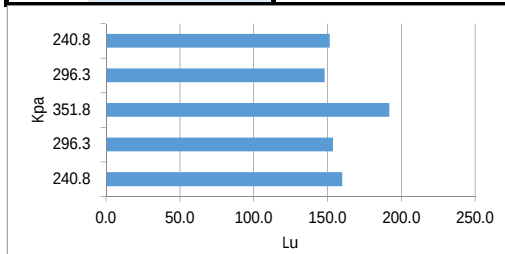
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
111	129.7	240.8	17236.0	17776.0	540	10	151.5
167	129.7	296.3	17834.0	18484.0	650	10	148.2
222	129.7	351.8	18572.0	19571.0	999	10	191.8
167	129.7	296.3	19640.0	20314.0	674	10	153.6
111	129.7	240.8	20367.0	20937.0	570	10	159.9

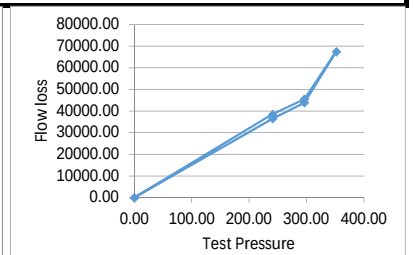
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	531.43	0.66	10.20

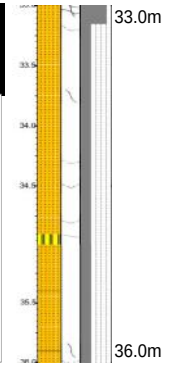
From: 33.0 To: 36.0 Comments : Dilatant

Data resolution to within 1L

Lu: 153.3







Test Interval				Ground Water Level	Gauge Height
Top:	39	Bottom:	42	26.5	0.5

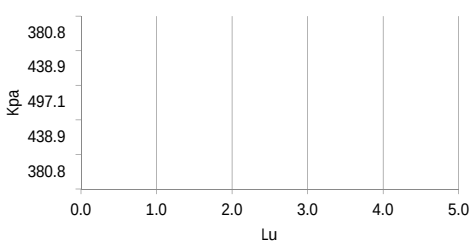
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
116	264.4	380.8	21028.6	21028.6	0.0	10	0.0
175	264.4	438.9	21028.6	21028.6	0.0	10	0.0
233	264.4	497.1	21028.6	21028.6	0.0	10	0.0
175	264.4	438.9	21028.6	21028.6	0.0	10	0.0
116	264.4	380.8	21028.6	21028.6	0.0	10	0.0

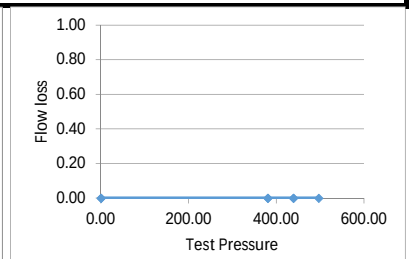
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	736.87	0.67	12.27

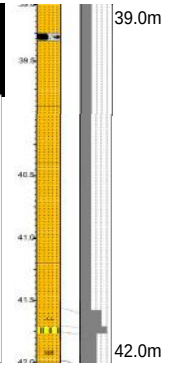
From: 39.0 To: 42.0 Comments : No water take

Data resolution to within 1L

Lu: 0.0







Dome Project Date Start: 26/04/2018 Date End: 30/04/2018 Data entered by: OPRI Checked by: ALNA

Borehole: BH3 RL Collar: 245.5 Angle: 90° Comments :

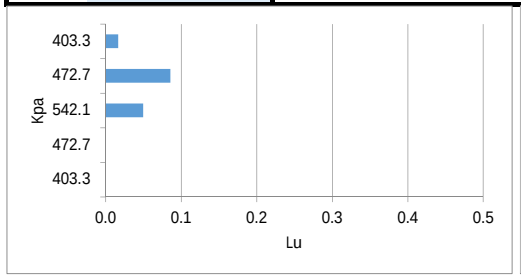
Test Interval				Ground Water Level	Gauge Height
Top:	45	Bottom:	48	26.5	0.5

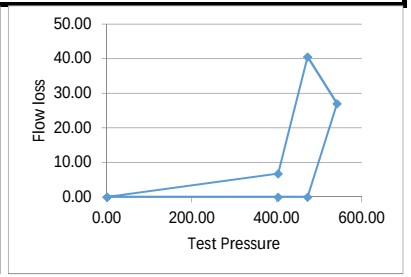
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
139	264.4	403.3	21158.0	21158.1	0.1	10	0.0
208	264.4	472.7	21158.1	21158.7	0.6	10	0.1
278	264.4	542.1	21158.8	21159.2	0.4	10	0.0
208	264.4	472.7	21159.2	21159.2	0.0	10	0.0
139	264.4	403.3	21159.2	21159.2	0.0	10	0.0

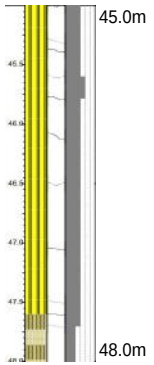
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	807.56	0.67	11.66

From: 45.0 To: 48.0 Comments : Void Filling

Lu: 0.0 Data resolution to within 1L







Dome Project Date Start: 10/05/2018 Date End: 14/05/2018 Data entered by: ALNA Checked by: ALNA

Borehole: BH4 RL Collar: 193.7 Angle: 90° Comments :

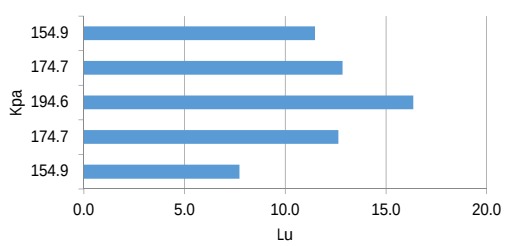
Test Interval				Ground Water Level	Gauge Height
Top:	13.5	Bottom:	16.5	11.25	0.5

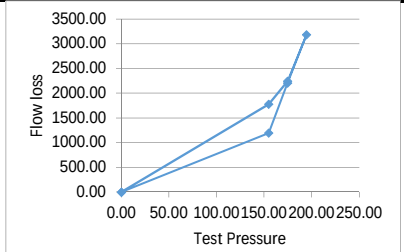
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
40	115.2	154.9	11072.3	11098.6	26.3	10	11.5
60	115.2	174.7	11108.0	11141.2	33.2	10	12.8
79	115.2	194.6	11149.7	11196.8	47.1	10	16.3
60	115.2	174.7	11198.6	11231.3	32.7	10	12.6
40	115.2	154.9	11231.5	11249.2	17.7	10	7.7

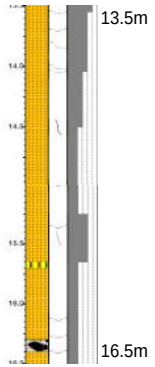
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	286.98	0.68	12.97

From: 13.5 To: 16.5 Comments : Dilatant

Lu: 12.2 Data resolution to within 1L







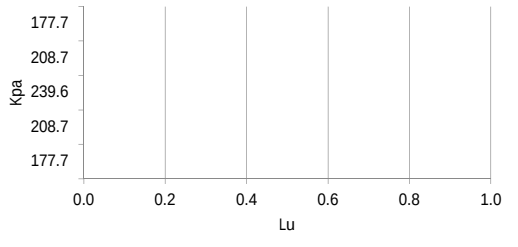
Test Interval				Ground Water Level	Gauge Height
Top:	19.5	Bottom:	22.5	11.25	0.5

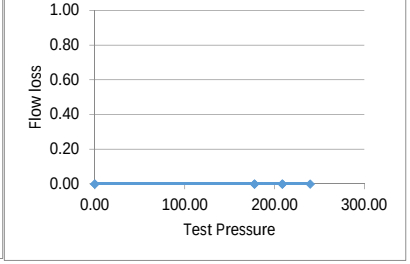
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
63	115.2	177.7	11252.5	11252.5	0.0	10	0.0
94	115.2	208.7	11252.9	11252.9	0.0	10	0.0
124	115.2	239.6	11252.9	11252.9	0.0	10	0.0
94	115.2	208.7	11252.9	11252.9	0.0	10	0.0
63	115.2	177.7	11252.9	11252.9	0.0	10	0.0

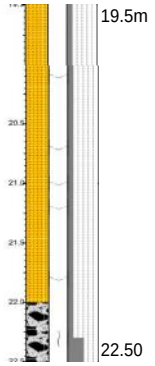
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	357.67	0.67	11.41

From: 19.5 To: 22.5 Comments : No water take

Lu: 0.0 Data resolution to within 1L







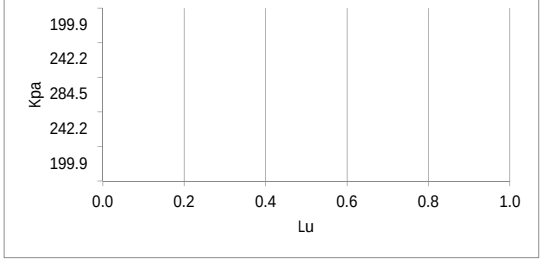
Test Interval				Ground Water Level	Gauge Height
Top:	25.5	Bottom:	28.5	11.25	0.5

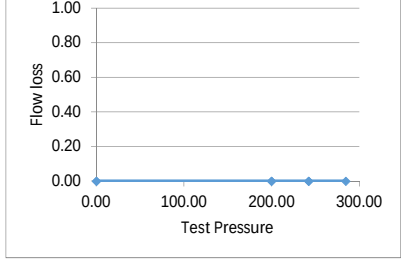
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
85	115.2	199.9	11253	11253	0.0	10	0.0
127	115.2	242.2	11253	11253	0.0	10	0.0
169	115.2	284.5	11253	11253	0.0	10	0.0
127	115.2	242.2	11253	11253	0.0	10	0.0
85	115.2	199.9	11253	11253	0.0	10	0.0

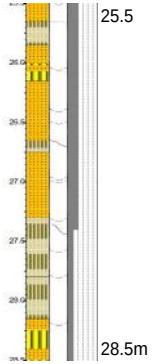
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	428.36	0.66	10.54

From: 25.5 To: 28.5 Comments : No water take

Lu: 0.0 Data resolution to within 1L







Dome Project Date Start: 10/05/2018 Date End: 14/05/2018 Data entered by: ALNA Checked by: ALNA

Borehole: BH4 RL Collar: 193.7 Angle: Comments :

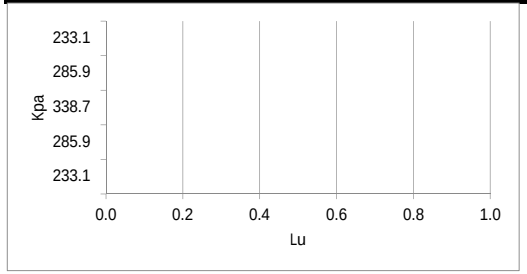
Test Interval				Ground Water Level	Gauge Height
Top:	31.5	Bottom:	34.5	12.5	0.5

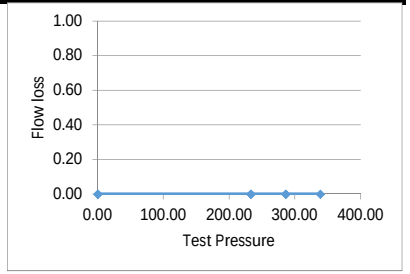
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
106	127.4	233.1	11254	11254.3	0.0	15	0.0
159	127.4	285.9	11254	11254.3	0.0	15	0.0
211	127.4	338.7	11254	11254.3	0.0	15	0.0
159	127.4	285.9	11254	11254.3	0.0	15	0.0
106	127.4	233.1	11254	11254.3	0.0	15	0.0

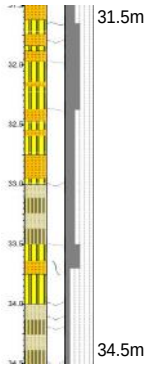
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	511.31	0.66	10.26

From: 31.5 To: 34.5 Comments : No water take; Data resolution to within 1L

Lu: 0.0







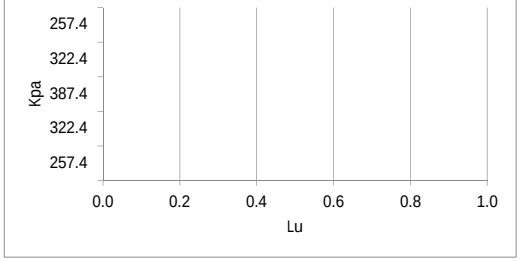
Test Interval				Ground Water Level	Gauge Height
Top:	37.5	Bottom:	40.5	12.5	0.5

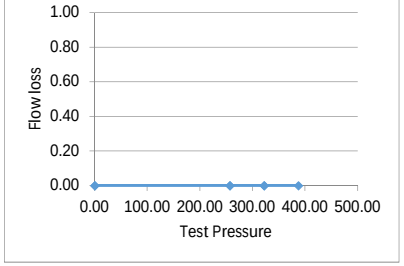
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
130	127.4	257.4	11254.8	11254.8	0.0	10	0.0
195	127.4	322.4	11254.8	11254.8	0.0	10	0.0
260	127.4	387.4	11254.8	11254.8	0.0	10	0.0
195	127.4	322.4	11254.8	11254.8	0.0	10	0.0
130	127.4	257.4	11254.8	11254.8	0.0	10	0.0

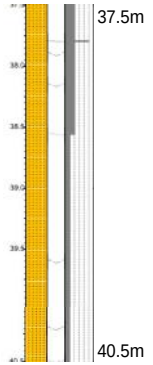
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	582.00	0.67	9.93

From: 37.5 To: 40.5 Comments : No water take; Data resolution to within 1L

Lu: 0.0







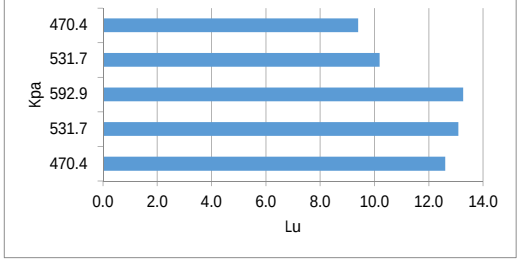
Test Interval				Ground Water Level	Gauge Height
Top:	43.5	Bottom:	46.5	35	0.5

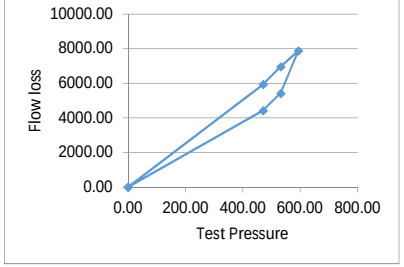
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
123	347.9	470.4	11268.0	11333.5	65.5	10	9.4
184	347.9	531.7	11345.4	11425.6	80.2	10	10.2
245	347.9	592.9	11439.0	11555.5	116.5	10	13.3
184	347.9	531.7	11575.0	11678.0	103.0	10	13.1
123	347.9	470.4	11694.0	11781.8	87.8	10	12.6

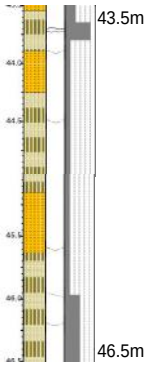
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	873.19	0.68	13.18

From: 43.5 To: 46.5 Comments : Laminar; Data resolution to within 1L

Lu: 11.7







Dome Project Date Start: 16/05/2018 Date End: 17/05/2018 Data entered by: DSA Checked by: ALNA

Borehole: BH5 RL Collar: 161.2 Angle: 90° Comments :

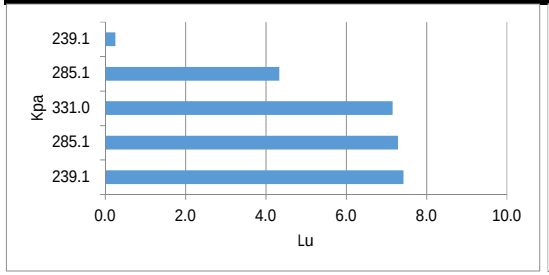
Test Interval				Ground Water Level	Gauge Height
Top:	28.5	Bottom:	31.5	14.54	0.5

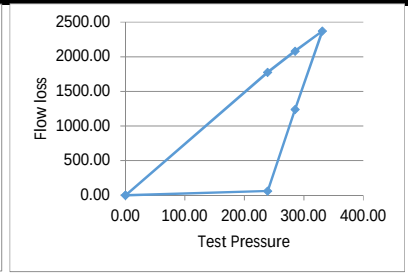
From: 28.5 To: 31.5 Comments : Wash-out becoming Laminar from Step 3 to Step 5

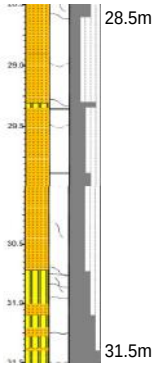
Lu: 7.3 Data resolution to within 1L

Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
92	147.2	239.1	23001.7	23002.6	0.9	10	0.3
138	147.2	285.1	23003.6	23021.9	18.3	10	4.3
184	147.2	331.0	23025.0	23060.1	35.1	10	7.2
138	147.2	285.1	23063.0	23093.8	30.8	10	7.3
92	147.2	239.1	23096.0	23122.3	26.3	10	7.4

Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	495.95	0.67	11.03







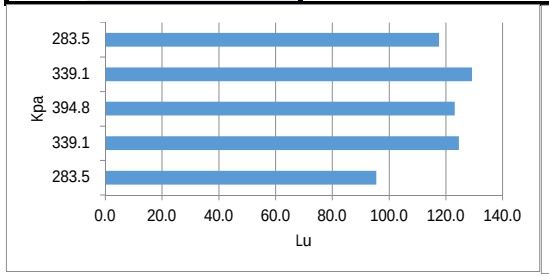
Test Interval				Ground Water Level	Gauge Height
Top:	34.5	Bottom:	37.5	17.1	0.5

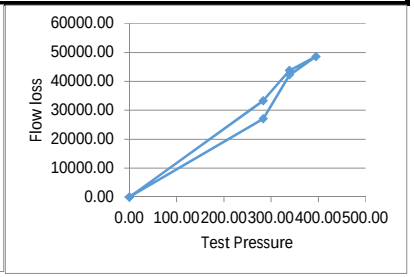
From: 34.5 To: 37.5 Comments : Laminar

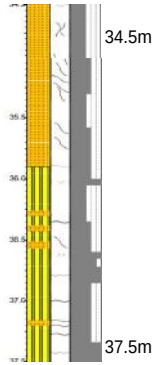
Lu: 118.1 Data resolution to within 1L

Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
111	172.3	283.5	23455	23949	494	10	117.7
167	172.3	339.1	24020	24669	649	10	129.3
223	172.3	394.8	24710	25430	720	10	123.2
167	172.3	339.1	25480	26106	626	10	124.7
111	172.3	283.5	26300	26701	401	10	95.5

Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	591.73	0.67	10.97







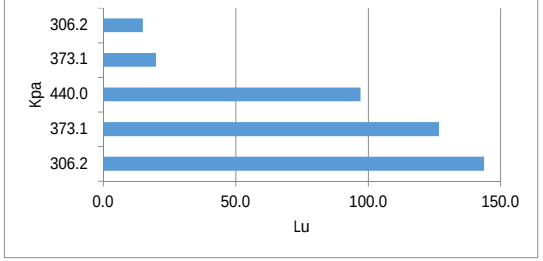
Test Interval				Ground Water Level	Gauge Height
Top:	40.5	Bottom:	43.5	17.1	0.5

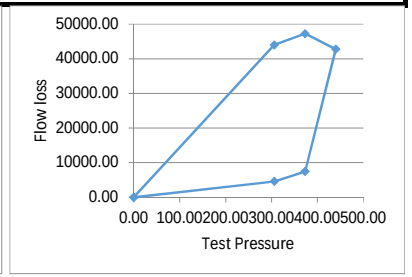
From: 40.5 To: 43.5 Comments : Wash-out

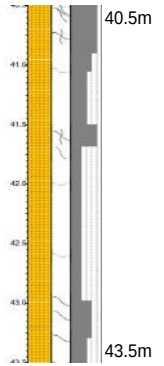
Lu: 143.8 Data resolution to within 1L

Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
134	172.5	306.2	26985	27052.8	68	10	15.0
201	172.5	373.1	27059	27169.2	110	10	19.9
268	172.5	440.0	27210	27843	633	10	97.2
201	172.5	373.1	27890	28590	700	10	126.7
134	172.5	306.2	28620	29272	652	10	143.8

Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	662.42	0.66	10.48







Dome Project Date Start: 16/05/2018 Date End: 17/05/2018 Data entered by: DSA Checked by: ALNA

Borehole: BH5 RL Collar: 161.2 Angle: 90° Comments :

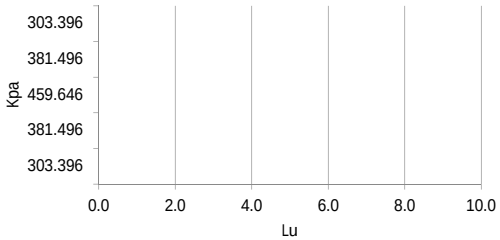
Test Interval				Ground Water Level	Gauge Height
Top:	46.5	Bottom:	49.5	14.54	0.5

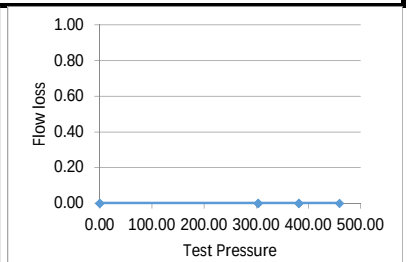
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
156	147.2	303.396	N/A	N/A	N/A	10	N/A
234	147.2	381.496	N/A	N/A	N/A	10	N/A
312	147.2	459.646	N/A	N/A	N/A	10	N/A
234	147.2	381.496	N/A	N/A	N/A	10	N/A
156	147.2	303.396	N/A	N/A	N/A	10	N/A

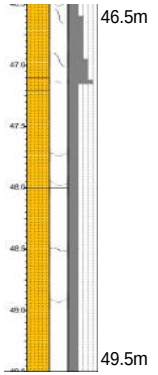
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	708.03	0.65	9.58

From: 46.5 To: 49.5 Lu:

Comments : Unable to fill rod string with pump on full (due to water loss)







Dome Project	Date Start:	8/05/2018	Date End:	10/05/2018	Data entered by:	DSA	Checked by:	ALNA
Borehole:	BH6	RL Collar:	128.0	Angle:	90°	Comments :		

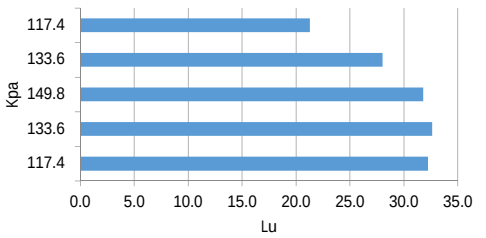
Test Interval				Ground Water Level	Gauge Height
Top:	10.5	Bottom:	13.5	8.2	0.5

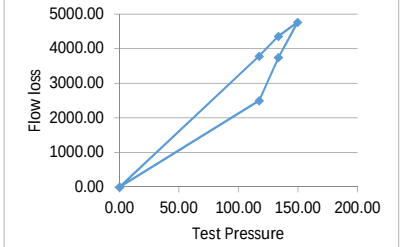
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
32	85.1	117.4	21224.5	21261.5	37.0	10	21.3
49	85.1	133.6	21267.0	21322.4	55.4	10	28.0
65	85.1	149.8	21328.0	21398.5	70.5	10	31.8
49	85.1	133.6	21404.0	21468.5	64.5	10	32.6
32	85.1	117.4	21475.0	21531.0	56.0	10	32.2

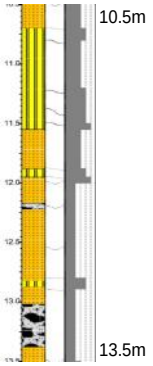
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	221.74	0.68	12.48

From: 10.5 To: 13.5 Comments : Wash-out becoming laminar from Step 3 to Step 5

Lu: 32.2 Data resolution to within 1L







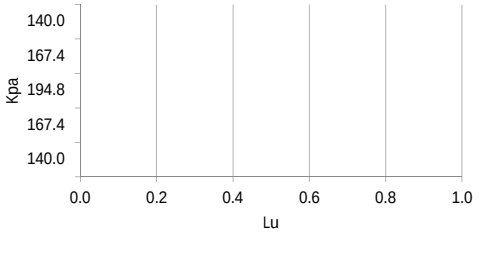
Test Interval				Ground Water Level	Gauge Height
Top:	16.5	Bottom:	19.5	8.2	0.5

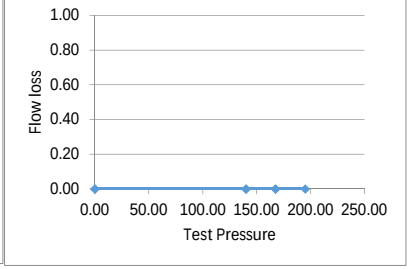
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
55	85.1	140.0	21561.3	21561.3	0.0	10	0.0
82	85.1	167.4	21561.3	21561.3	0.0	10	0.0
110	85.1	194.8	21561.3	21561.3	0.0	10	0.0
82	85.1	167.4	21561.3	21561.3	0.0	10	0.0
55	85.1	140.0	21561.3	21561.3	0.0	10	0.0

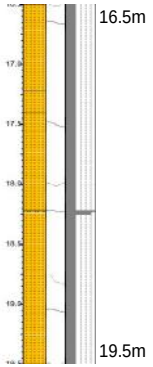
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	292.44	0.67	10.82

From: 16.5 To: 19.5 Comments : No water take

Lu: 0.0 Data resolution to within 1L







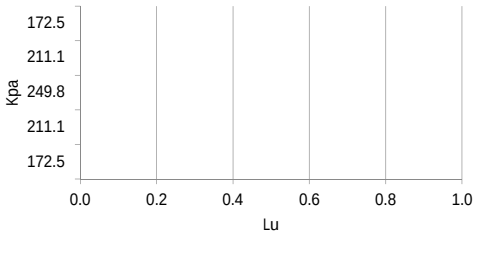
Test Interval				Ground Water Level	Gauge Height
Top:	22.5	Bottom:	25.5	8.2	1.5

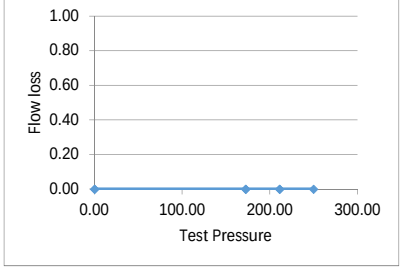
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
77	95.1	172.5	21603.1	21603.1	0.0	10	0.0
116	95.1	211.1	21603.1	21603.1	0.0	10	0.0
155	95.1	249.8	21603.1	21603.1	0.0	10	0.0
116	95.1	211.1	21603.1	21603.1	0.0	10	0.0
77	95.1	172.5	21603.1	21603.1	0.0	10	0.0

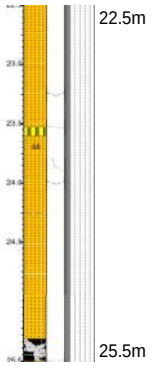
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	363.13	0.69	10.41

From: 22.5 To: 25.5 Comments : No water take

Lu: 0.0 Data resolution to within 1L







Dome Project	Date Start:	8/05/2018	Date End:	10/05/2018	Data entered by:	DSA	Checked by:	ALNA
Borehole:	BH6	RL Collar:	128.0	Angle:	90°	Comments :		

Test Interval				Ground Water Level	Gauge Height
Top:	28.5	Bottom:	31.5	20.95	0.5

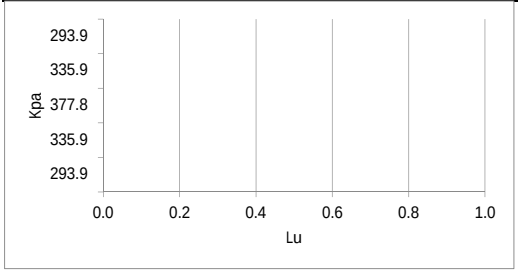
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
84	210.0	293.9	21625.2	21625.2	0.0	10	0.0
126	210.0	335.9	21625.2	21625.2	0.0	10	0.0
168	210.0	377.8	21625.2	21625.2	0.0	10	0.0
126	210.0	335.9	21625.2	21625.2	0.0	10	0.0
84	210.0	293.9	21625.2	21625.2	0.0	10	0.0

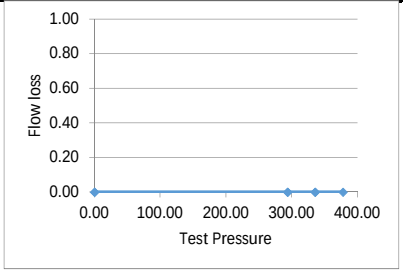
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	558.77	0.68	12.59

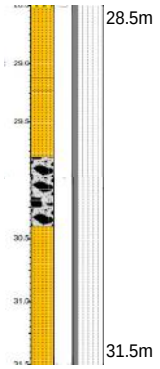
From: 28.5 To: 31.5 Comments : No water take

Data resolution to within 1L

Lu: 0.0







Test Interval				Ground Water Level	Gauge Height
Top:	34.5	Bottom:	37.5	20.95	0.5

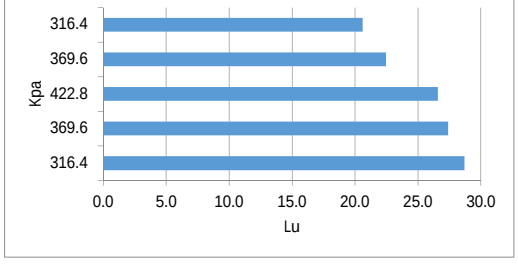
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
106	210.0	316.4	21757.0	21853.5	96.5	10	20.6
160	210.0	369.6	21864.0	21987.0	123.0	10	22.5
213	210.0	422.8	22001.0	22167.5	166.5	10	26.6
160	210.0	369.6	22182.0	22332.0	150.0	10	27.4
106	210.0	316.4	22346.0	22480.5	134.5	10	28.7

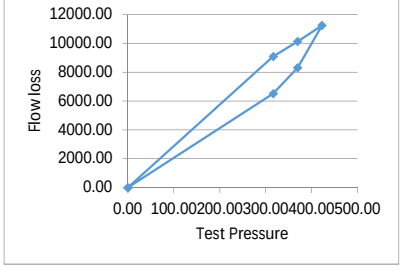
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	629.46	0.67	11.74

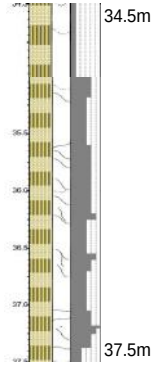
From: 34.5 To: 37.5 Comments : Wash-out

Data resolution to within 1L

Lu: 28.7







Test Interval				Ground Water Level	Gauge Height
Top:	40.5	Bottom:	43.5	20.95	0.5

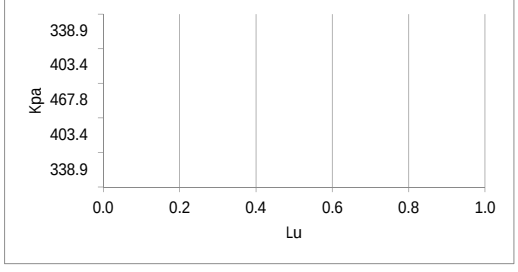
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
129	210.0	338.9	22639.6	22639.6	0.0	10	0.0
193	210.0	403.4	22639.6	22639.6	0.0	10	0.0
258	210.0	467.8	22639.6	22639.6	0.0	10	0.0
193	210.0	403.4	22639.6	22639.6	0.0	10	0.0
129	210.0	338.9	22639.6	22639.6	0.0	10	0.0

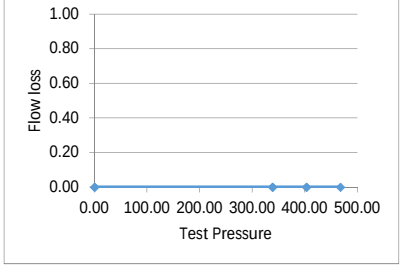
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	700.15	0.67	11.14

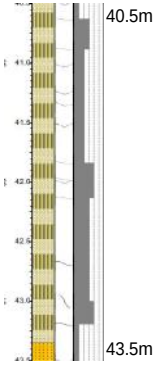
From: 40.5 To: 43.5 Comments : No water take

Data resolution to within 1L

Lu: 0.0







Dome Project Date Start: 8/05/2018 Date End: 10/05/2018 Data entered by: DSA Checked by: ALNA

Borehole: BH6 RL Collar: 128.0 Angle: 90° Comments :

Test Interval				Ground Water Level	Gauge Height
Top:	46.5	Bottom:	49.5	25.14	0.5

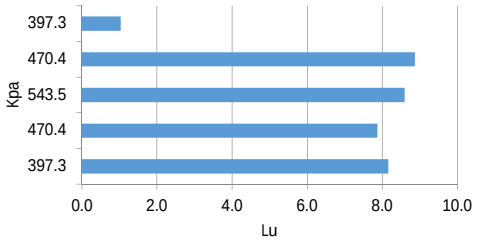
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
146	251.1	397.3	22724.7	22730.8	6.1	10	1.0
219	251.1	470.4	22733.8	22795.6	61.8	10	8.9
292	251.1	543.5	22801.0	22870.2	69.2	10	8.6
219	251.1	470.4	22877.0	22931.8	54.8	10	7.9
146	251.1	397.3	22938.0	22986.0	48.0	10	8.2

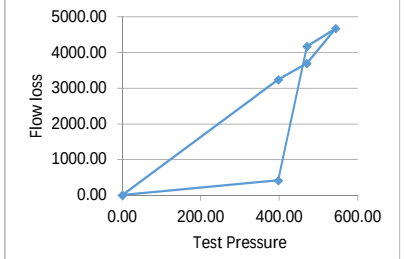
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	811.91	0.67	11.32

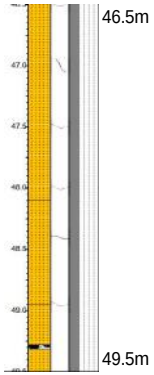
From: 46.5 To: 49.5 Lu: 8.4

Comments : Wash-out becoming laminar from Step 2 to Step 5

Data resolution to within 1L







Dome Project	Date Start:	26/03/2018	Date End:	29/03/2018	Data entered by:	ALNA	Checked by:	ALNA
Borehole:	BH7	RL Collar:	TBC	Angle:	90°	Comments :		

Test Interval				Ground Water Level	Gauge Height
Top:	7.5	Bottom:	10.5	4.9	1.5

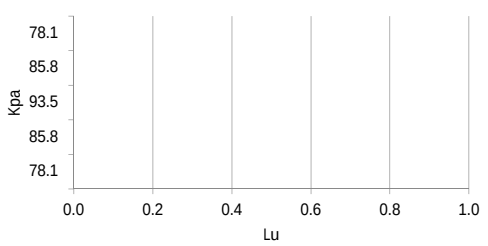
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
15	62.7	78.1	7406.4	7406.4	0.0	15	0.0
23	62.7	85.8	7406.4	7406.4	0.0	15	0.0
31	62.7	93.5	7406.4	7406.4	0.0	15	0.0
23	62.7	85.8	7406.4	7406.4	0.0	15	0.0
15	62.7	78.1	7406.4	7406.4	0.0	15	0.0

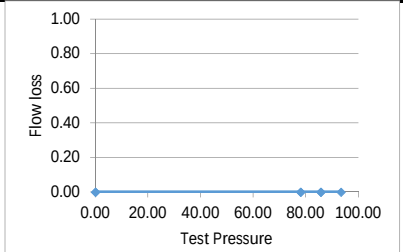
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	154.06	0.61	10.39

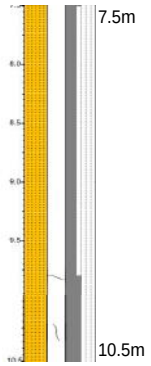
From: 7.5 To: 10.5 Comments : No water take

Data resolution to within 1L

Lu: 0.0







Test Interval				Ground Water Level	Gauge Height
Top:	10.5	Bottom:	13.5	4.9	1.5

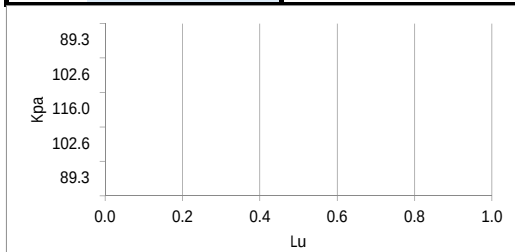
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
27	62.7	89.3	7408.7	7408.7	0.0	15	0.0
40	62.7	102.6	7408.7	7408.7	0.0	15	0.0
53	62.7	116.0	7408.7	7408.7	0.0	15	0.0
40	62.7	102.6	7408.7	7408.7	0.0	15	0.0
27	62.7	89.3	7408.7	7408.7	0.0	15	0.0

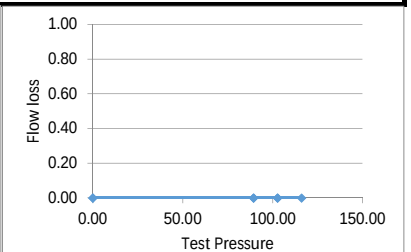
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	189.40	0.61	9.66

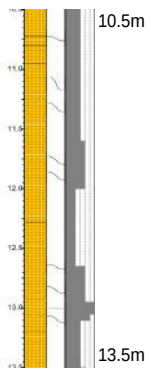
From: 10.5 To: 13.5 Comments : No water take

Data resolution to within 1L

Lu: 0.0







Test Interval				Ground Water Level	Gauge Height
Top:	13.5	Bottom:	16.5	3.34	1.5

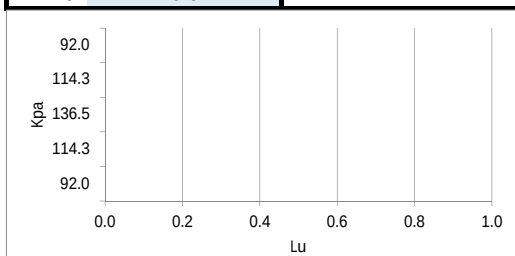
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
45	47.4	92.0	7408.7	7408.7	0.0	15	0.0
67	47.4	114.3	7408.7	7408.7	0.0	15	0.0
89	47.4	136.5	7408.7	7408.7	0.0	15	0.0
67	47.4	114.3	7408.7	7408.7	0.0	15	0.0
45	47.4	92.0	7408.7	7408.7	0.0	15	0.0

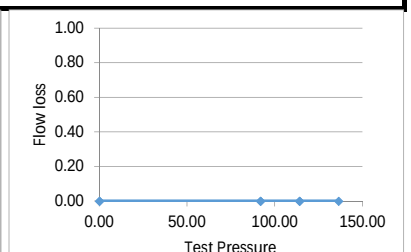
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	209.46	0.65	9.10

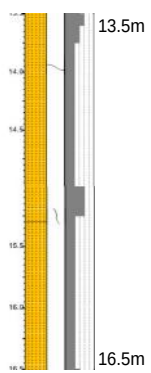
From: 13.5 To: 16.5 Comments : No water take

Data resolution to within 1L

Lu: 0.0







Dome Project Date Start: 26/03/2018 Date End: 29/03/2018 Data entered by: ALNA Checked by: ALNA

Borehole: BH7 RL Collar: TBC Angle: 90° Comments :

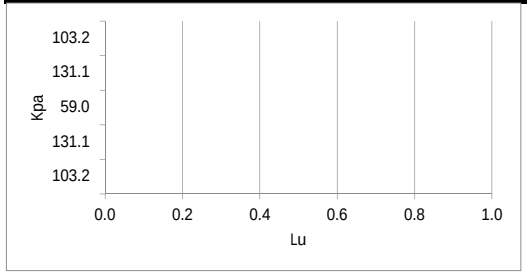
Test Interval				Ground Water Level	Gauge Height
Top:	16.5	Bottom:	19.5	3.34	1.5

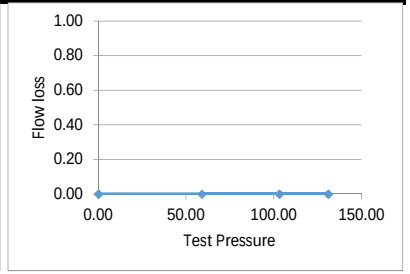
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
56	47.4	103.2	7408.7	7408.7	0.0	15	0.0
84	47.4	131.1	7408.7	7408.7	0.0	15	0.0
12	47.4	59.0	7408.7	7408.7	0.0	15	0.0
84	47.4	131.1	7408.7	7408.7	0.0	15	0.0
56	47.4	103.2	7408.7	7408.7	0.0	15	0.0

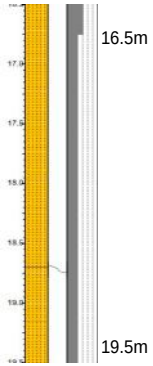
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	244.81	0.24	3.28

From: 16.5 To: 19.5 Comments : No water take; Data resolution to within 1L

Lu: 0.0







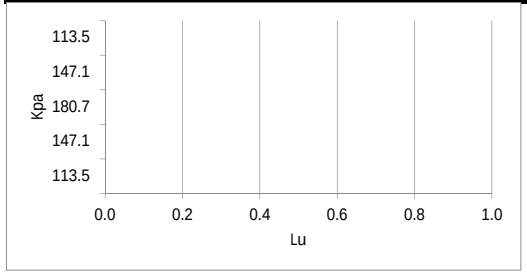
Test Interval				Ground Water Level	Gauge Height
Top:	19.5	Bottom:	22.5	3.23	1.5

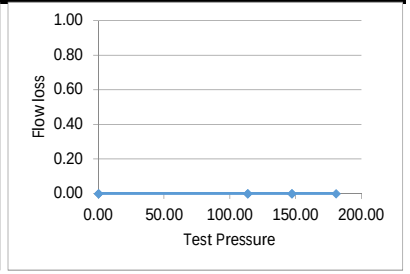
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
67	46.4	113.5	7411.6	7411.6	0.0	15	0.0
101	46.4	147.1	7411.6	7411.6	0.0	15	0.0
134	46.4	180.7	7411.6	7411.6	0.0	15	0.0
101	46.4	147.1	7411.6	7411.6	0.0	15	0.0
67	46.4	113.5	7411.6	7411.6	0.0	15	0.0

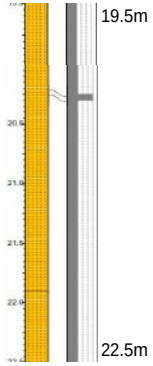
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	279.08	0.65	8.61

From: 19.5 To: 22.5 Comments : No water take; Data resolution to within 1L

Lu: 0.0







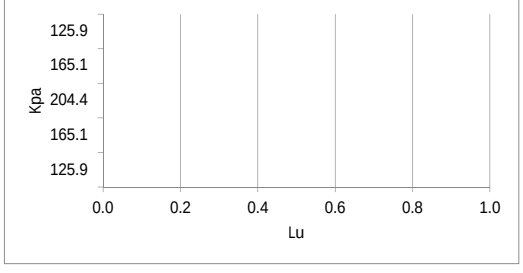
Test Interval				Ground Water Level	Gauge Height
Top:	22.5	Bottom:	25.5	3.34	1.5

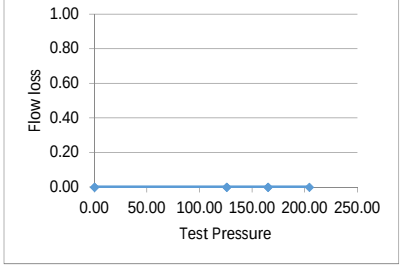
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
78	47.4	125.9	7411.8	7411.8	0.0	15	0.0
118	47.4	165.1	7411.8	7411.8	0.0	15	0.0
157	47.4	204.4	7411.8	7411.8	0.0	15	0.0
118	47.4	165.1	7411.8	7411.8	0.0	15	0.0
78	47.4	125.9	7411.8	7411.8	0.0	15	0.0

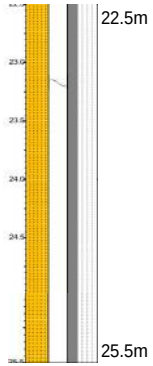
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	315.50	0.65	8.51

From: 22.5 To: 25.5 Comments : No water take; Data resolution to within 1L

Lu: 0.0







Dome Project Date Start: 26/04/2018 Date End: 30/04/2018 Data entered by: OPRI Checked by: ALNA

Borehole: BH8 RL Collar: 208.2 Angle: 90° Comments :

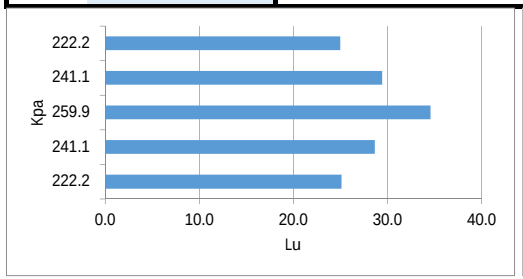
Test Interval				Ground Water Level	Gauge Height
Top:	18.0	Bottom:	19.5	17.15	1.7

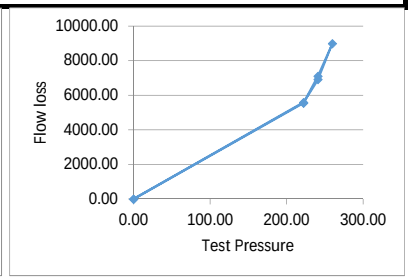
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
38	184.7	222.2	8786.2	8868.4	82.2	10	25.0
56	184.7	241.1	8875.6	8980.7	105.1	10	29.4
75	184.7	259.9	8990.8	9123.9	133.1	10	34.6
56	184.7	241.1	9128.5	9230.8	102.3	10	28.7
38	184.7	222.2	9236	9318.7	82.7	10	25.1

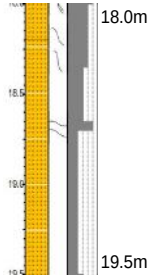
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	388.98	0.67	13.86

From: 18.0 To: 19.5 Comments : Dilatant

Lu: 27.1 Data resolution to within 1L







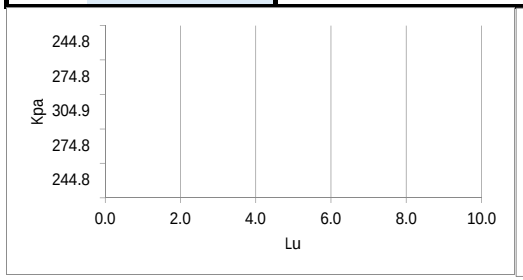
Test Interval				Ground Water Level	Gauge Height
Top:	24.0	Bottom:	25.5	17.15	1.7

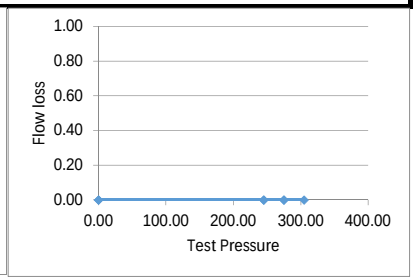
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
60	184.7	244.8	9321.8	9321.8	0.0	10	0.0
90	184.7	274.8	9321.8	9321.8	0.0	10	0.0
120	184.7	304.9	9321.8	9321.8	0.0	10	0.0
90	184.7	274.8	9321.8	9321.8	0.0	10	0.0
60	184.7	244.8	9321.8	9321.8	0.0	10	0.0

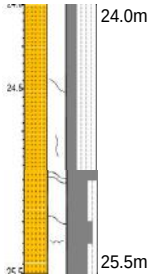
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	459.67	0.66	12.32

From: 24.0 To: 25.5 Comments : No water take

Lu: 0.0 Data resolution to within 1L







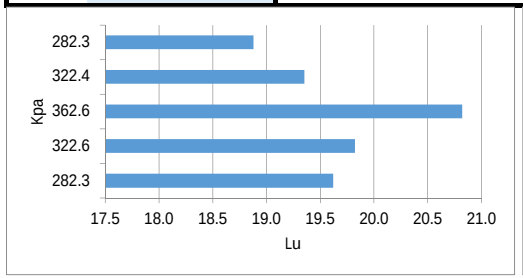
Test Interval				Ground Water Level	Gauge Height
Top:	30.0	Bottom:	31.5	18.9	1.7

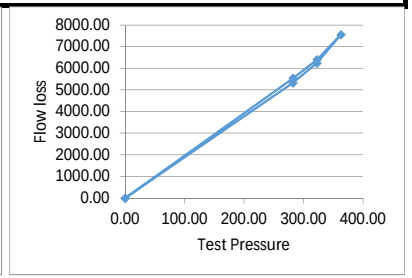
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
80	201.9	282.3	9336.3	9415.2	78.9	10	18.9
121	201.9	322.4	9427.4	9519.8	92.4	10	19.4
161	201.9	362.6	9532.5	9644.3	111.8	10	20.8
121	201.9	322.6	9652.1	9746.8	94.7	10	19.8
80	201.9	282.3	9749.2	9831.2	82.0	10	19.6

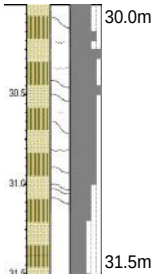
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	547.52	0.66	11.79

From: 30.0 To: 31.5 Comments : Dilatant

Lu: 19.4 Data resolution to within 1L







Dome Project Date Start: 26/04/2018 Date End: 30/04/2018 Data entered by: OPRI Checked by: ALNA

Borehole: BH8 RL Collar: 208.2 Angle: 90° Comments :

Test Interval				Ground Water Level	Gauge Height
Top:	36.0	Bottom:	37.5	18.9	1.7

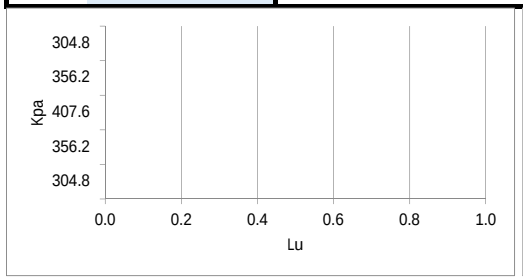
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
103	201.9	304.8	9833.6	9833.6	0.0	10	0.0
154	201.9	356.2	9833.6	9833.6	0.0	10	0.0
206	201.9	407.6	9833.6	9833.6	0.0	10	0.0
154	201.9	356.2	9833.6	9833.6	0.0	10	0.0
103	201.9	304.8	9833.6	9833.6	0.0	10	0.0

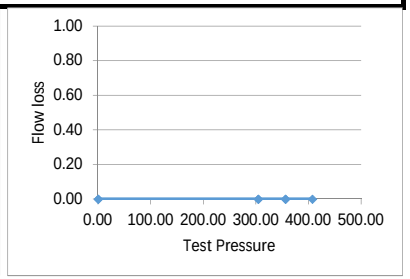
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	618.21	0.66	11.09

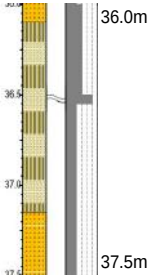
From: 36.0 To: 37.5 Comments : No water take

Data resolution to within 1L

Lu: 0.0







Test Interval				Ground Water Level	Gauge Height
Top:	42.0	Bottom:	43.5	20.8	1.7

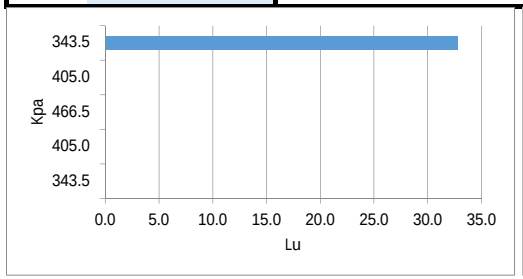
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
123	220.5	343.5	9877.1	10043.8	166.7	10	32.8
185	220.5	405.0					
246	220.5	466.5					
185	220.5	405.0					
123	220.5	343.5					

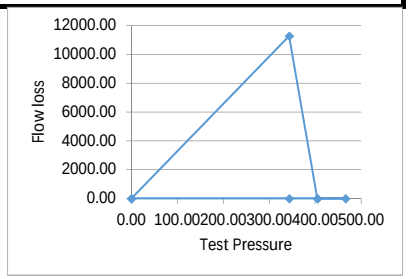
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	707.52	0.66	10.91

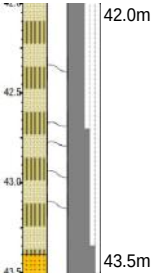
From: 42.0 To: 43.5 Comments : Unable to increase pressure beyond 123 Kpa (pump at maximum)

Data resolution to within 1L

Lu: 32.8







Test Interval				Ground Water Level	Gauge Height
Top:	45.0	Bottom:	46.5	20.8	1.7

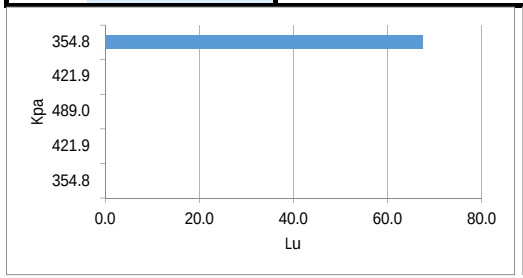
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
134	220.5	354.8	10471.4	10826.3	354.9	10	67.6
201	220.5	421.9					
269	220.5	489.0					
201	220.5	421.9					
134	220.5	354.8					

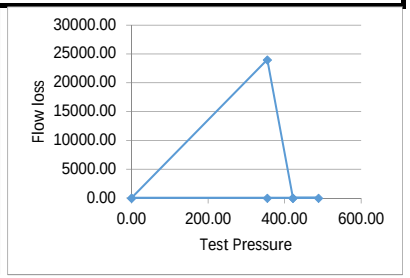
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	742.87	0.66	10.69

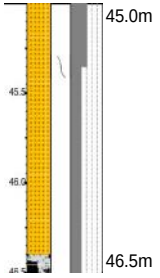
From: 45.0 To: 46.5 Comments : Unable to increase pressure beyond 134 Kpa (pump at maximum)

Data resolution to within 1L

Lu: 67.6







Dome Project Date Start: 26/04/2018 Date End: 30/04/2018 Data entered by: OPRI Checked by: ALNA

Borehole: BH8 RL Collar: 208.2 Angle: 90° Comments :

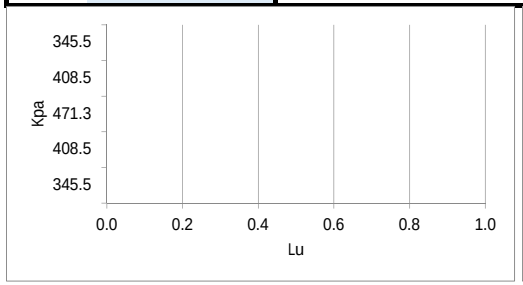
Test Interval				Ground Water Level	Gauge Height
Top:	48.0	Bottom:	49.5	20.8	1.7

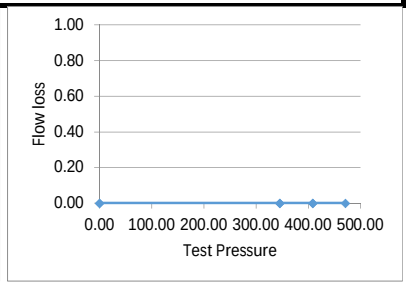
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
125	220.5	345.5	11063.7	11063.7	0.0	10	0.0
188	220.5	408.5	11063.7	11063.7	0.0	10	0.0
251	220.5	471.3	11063.7	11063.7	0.0	10	0.0
188	220.5	408.5	11063.7	11063.7	0.0	10	0.0
125	220.5	345.5	11063.7	11063.7	0.0	10	0.0

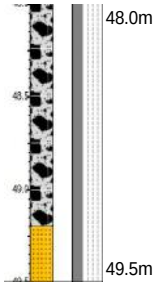
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	778.21	0.61	9.67

From: 48.0 To: 49.5 Comments : No water take

Lu: 0.0 Data resolution to within 1L







Dome Project Date Start: 13/04/2018 Date End: 20/04/2018 Data entered by: OPRI Checked by: ALNA

Borehole: BH9 RL Collar: 240.5 Angle: 90° Comments :

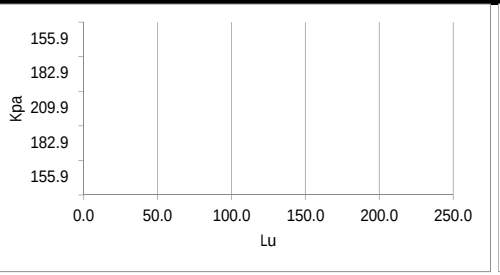
Test Interval				Ground Water Level	Gauge Height
Top:	12.0	Bottom:	13.5	9.3	1.1

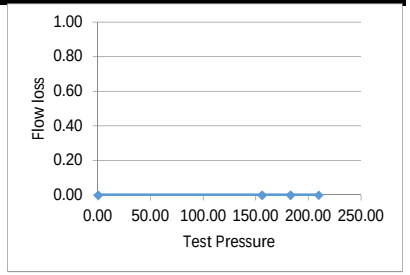
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
54	101.9	155.9	N/A	N/A	0	10	N/A
81	101.9	182.9	N/A	N/A	0	10	N/A
108	101.9	209.9	N/A	N/A	0	10	N/A
81	101.9	182.9	N/A	N/A	0	10	N/A
54	101.9	155.9	N/A	N/A	0	10	N/A

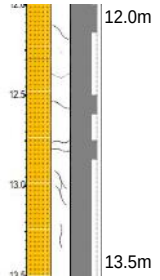
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	241.36	0.87	16.46

From: 12.0 To: 13.5 Comments : Water bypassing packer -Test abandoned

Lu:







Test Interval				Ground Water Level	Gauge Height
Top:	15.0	Bottom:	16.5	9.3	1.1

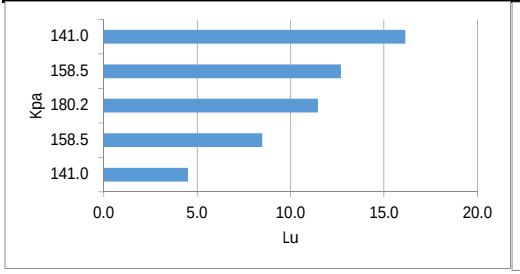
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
39	101.9	141.0	7598.7	7632.4	33.7	10	16.1
57	101.9	158.5	7632.4	7662.2	29.8	10	12.7
78	101.9	180.2	7670.4	7701	30.6	10	11.5
57	101.9	158.5	7703.8	7723.7	19.9	10	8.5
39	101.9	141.0	7724	7733.4	9.4	10	4.5

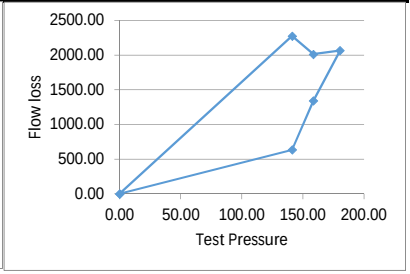
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	276.71	0.65	11.44

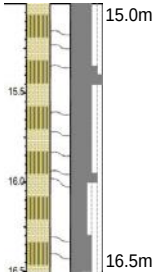
From: 15.0 To: 16.5 Comments : Void Filling

Data resolution to within 1L

Lu: 4.5







Test Interval				Ground Water Level	Gauge Height
Top:	21.0	Bottom:	22.5	9.3	1.1

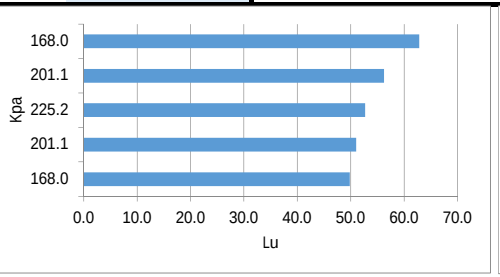
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
66	101.9	168.0	7780.2	7936.6	156.4	10	62.9
99	101.9	201.1	7954.5	8122	167.5	10	56.2
123	101.9	225.2	8136.6	8312.3	175.7	10	52.7
99	101.9	201.1	8325.4	8477.4	152.0	10	51.0
66	101.9	168.0	8485	8609	124.0	10	49.8

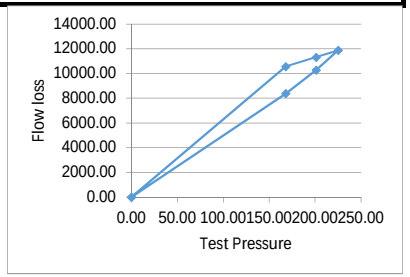
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	347.40	0.65	10.35

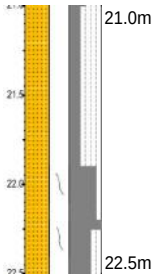
From: 21.0 To: 22.5 Comments : Void Filling becoming progressively Laminar

Data resolution to within 1L

Lu: 49.8







Dome Project	Date Start:	13/04/2018	Date End:	20/04/2018	Data entered by:	OPRI	Checked by:	ALNA
Borehole:	BH9	RL Collar:	240.5	Angle:	90°	Comments :		

Test Interval				Ground Water Level	Gauge Height
Top:	27.0	Bottom:	28.5	18.4	1.1

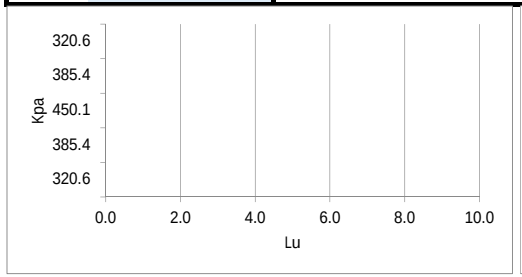
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
130	191.1	320.6	8668.5	8668.5	0.0	10	0.0
194	191.1	385.4	8668.5	8668.5	0.0	10	0.0
259	191.1	450.1	8668.5	8668.5	0.0	10	0.0
194	191.1	385.4	8668.5	8668.5	0.0	10	0.0
130	191.1	320.6	8668.5	8668.5	0.0	10	0.0

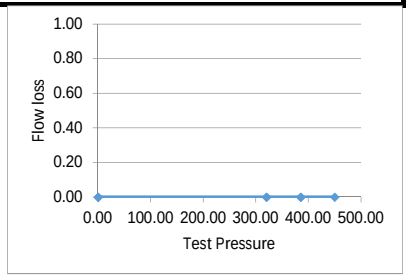
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	507.27	0.89	16.22

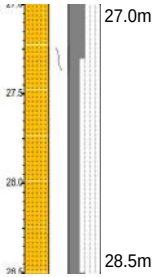
From: 27.0 To: 28.5 Lu: 0.0

Comments : No water take

Data resolution to within 1L







Test Interval				Ground Water Level	Gauge Height
Top:	33.0	Bottom:	34.5	18.4	1.1

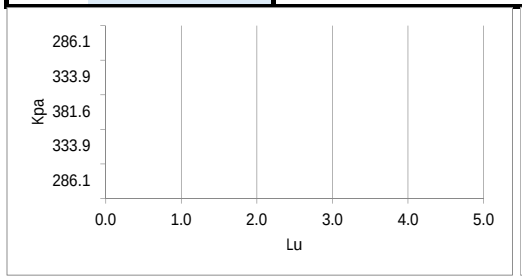
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
95	191.1	286.1	8668.4	8668.4	0.0	10	0.0
143	191.1	333.9	8668.4	8668.4	0.0	10	0.0
191	191.1	381.6	8668.4	8668.4	0.0	10	0.0
143	191.1	333.9	8668.4	8668.4	0.0	10	0.0
95	191.1	286.1	8668.4	8668.4	0.0	10	0.0

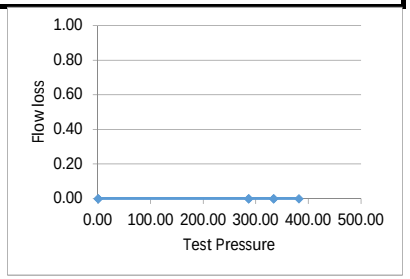
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	577.96	0.66	11.31

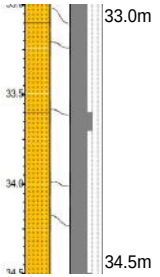
From: 33.0 To: 34.5 Lu: 0.0

Comments : No water take

Data resolution to within 1L







Test Interval				Ground Water Level	Gauge Height
Top:	39	Bottom:	40.5	10.4	1.1

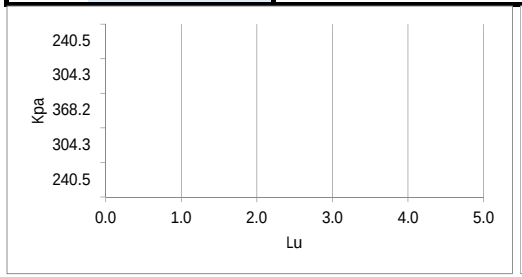
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
128	112.7	240.5	8683.1	8683.1	0.0	10	0.0
192	112.7	304.3	8683.1	8683.1	0.0	10	0.0
256	112.7	368.2	8683.1	8683.1	0.0	10	0.0
192	112.7	304.3	8683.1	8683.1	0.0	10	0.0
128	112.7	240.5	8683.1	8683.1	0.0	10	0.0

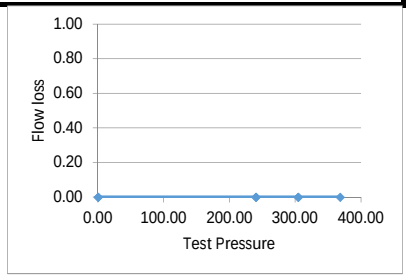
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	570.25	0.65	9.26

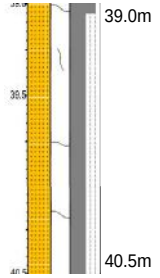
From: 39.0 To: 40.5 Lu: 0.0

Comments : No water take

Data resolution to within 1L







Dome Project Date Start: 13/04/2018 Date End: 20/04/2018 Data entered by: OPRI Checked by: ALNA

Borehole: BH9 RL Collar: 240.5 Angle: 90° Comments :

Test Interval				Ground Water Level	Gauge Height
Top:	45.0	Bottom:	46.5	9.4	1.1

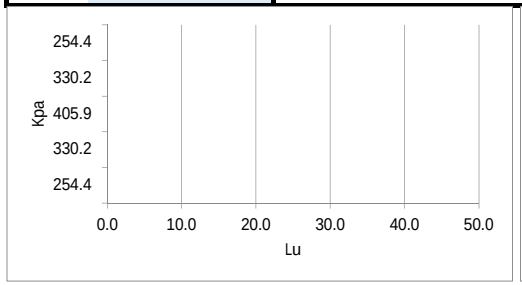
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
152	102.9	254.4	8683.3	8683.3	0.0	10	0.0
227	102.9	330.2	8683.3	8683.3	0.0	10	0.0
303	102.9	405.9	8716.1	8716.1	0.0	10	0.0
227	102.9	330.2	8716.1	8716.1	0.0	10	0.0
152	102.9	254.4	8716.1	8716.1	0.0	10	0.0

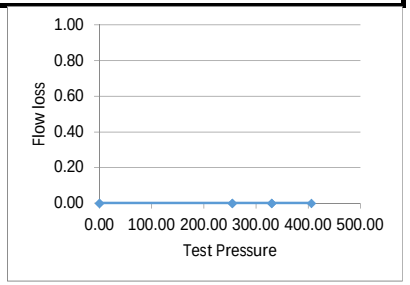
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	631.15	0.64	8.87

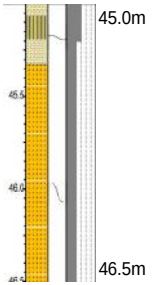
From: 45.0 To: 46.5 Comments : No water take

Data resolution to within 1L

Lu: 0.0







Dome Project Date Start: 22/05/2018 Date End: 24/05/2018 Data entered by: DSA Checked by: ALNA

Borehole: BH10 RL Collar: 183.5 Angle: 90° Comments :

Test Interval				Ground Water Level	Gauge Height
Top:	12.0	Bottom:	15	3.1	0.5

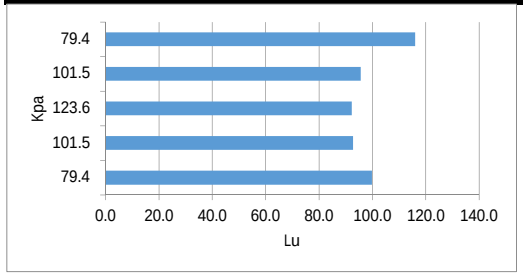
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
44	35.084	79.4	11833.0	11969.4	136.4	10	116.0
66	35.084	101.5	11984.5	12128.1	143.6	10	95.6
89	35.084	123.6	12144.2	12313.0	168.8	10	92.2
66	35.084	101.5	12329.1	12468.4	139.3	10	92.7
44	35.084	79.4	12480.9	12598.2	117.3	10	99.8

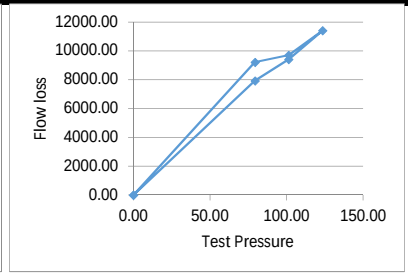
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	189.44	0.65	9.15

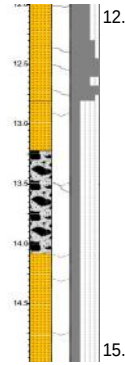
From: 12.0 To: 15.0 Comments : Turbulent

Data resolution to within 1L

Lu: 92.2







Test Interval				Ground Water Level	Gauge Height
Top:	18.0	Bottom:	21	4.05	0.5

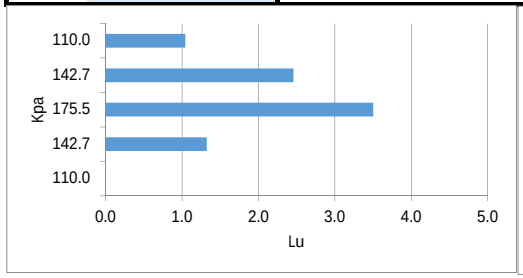
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
66	44.4	110.0	12612.5	12614.2	1.7	10	1.0
98	44.4	142.7	12616.6	12621.8	5.2	10	2.5
131	44.4	175.5	12624.6	12633.7	9.1	10	3.5
98	44.4	142.7	12634.3	12637.1	2.8	10	1.3
66	44.4	110.0	12637.2	12637.2	0.0	10	0.0

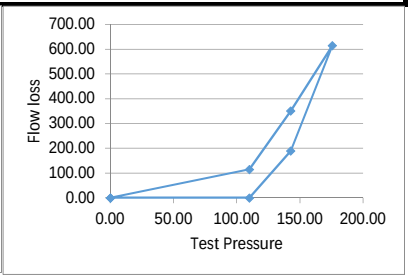
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	269.44	0.65	9.00

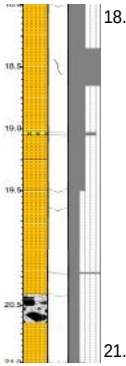
From: 18.0 To: 21.0 Comments : Dilatant

Data resolution to within 1L

Lu: 1.2







Test Interval				Ground Water Level	Gauge Height
Top:	24.0	Bottom:	27	14.05	1.5

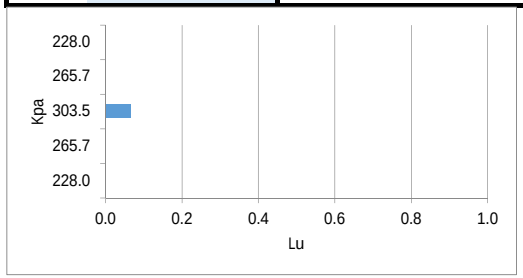
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
76	152.4	228.0	12636.9	12636.9	0.0	10	0.0
113	152.4	265.7	12637.1	12637.1	0.0	10	0.0
151	152.4	303.5	12637.4	12637.7	0.3	10	0.1
113	152.4	265.7	12637.7	12637.7	0.0	10	0.0
76	152.4	228.0	12637.7	12637.7	0.0	10	0.0

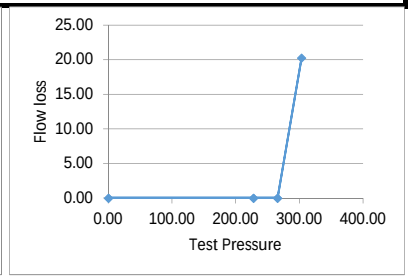
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	438.13	0.69	11.90

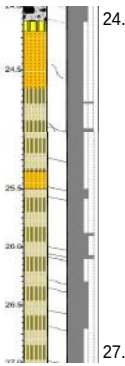
From: 24.0 To: 27.0 Comments : Void Filling

Data resolution to within 1L

Lu: 0.0







Dome Project

Date Start: 22/05/2018 Date End: 24/05/2018 Data entered by: DSA Checked by: ALNA

Borehole: BH10 RL Collar: 183.5 Angle: 90° Comments :

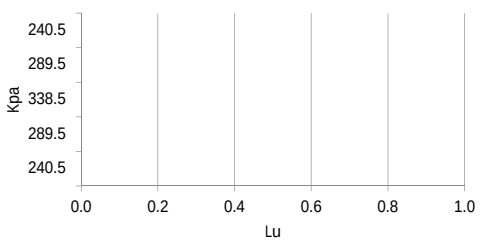
Test Interval				Ground Water Level	Gauge Height
Top:	30.0	Bottom:	33.0	14.05	0.5

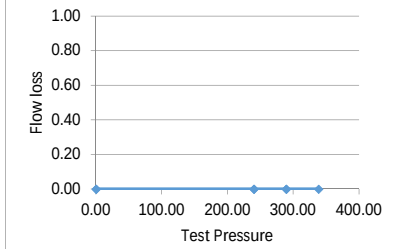
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
98	142.4	240.5	12638	12638.1	0.0	10	0.0
147	142.4	289.5	12638	12638.1	0.0	10	0.0
196	142.4	338.5	12638	12638.1	0.0	10	0.0
147	142.4	289.5	12638	12638.1	0.0	10	0.0
98	142.4	240.5	12638	12638.1	0.0	10	0.0

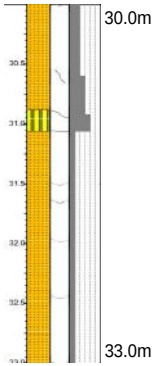
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	508.82	0.67	10.75

From: 30.0 To: 33.0 Comments : No water take

Lu: 0.0 Data resolution to within 1L







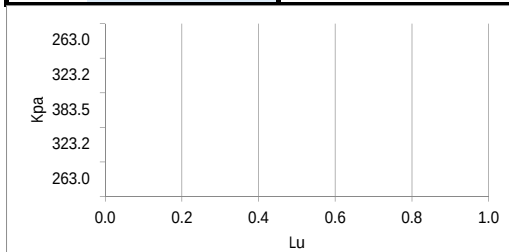
Test Interval				Ground Water Level	Gauge Height
Top:	36.0	Bottom:	39.0	14.05	0.5

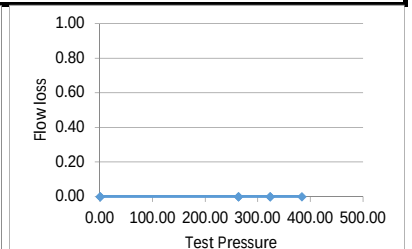
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
121	142.4	263.0	12638	12637.9	0.0	10	0.0
181	142.4	323.2	12638	12637.9	0.0	10	0.0
241	142.4	383.5	12638	12637.9	0.0	10	0.0
181	142.4	323.2	12638	12637.9	0.0	10	0.0
121	142.4	263.0	12638	12637.9	0.0	10	0.0

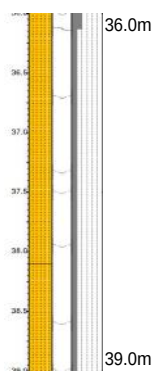
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	579.52	0.66	10.23

From: 36.0 To: 39.0 Comments : No water take

Lu: 0.0 Data resolution to within 1L







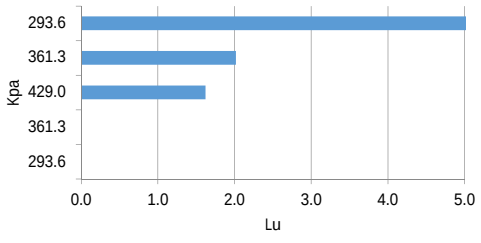
Test Interval				Ground Water Level	Gauge Height
Top:	40.5	Bottom:	43.5	15.65	0.5

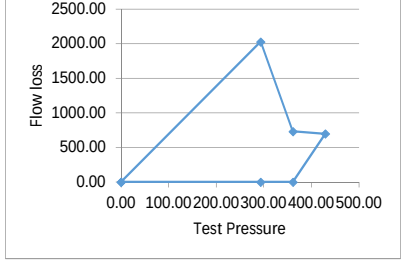
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
136	158.1	293.6	12647	12677	30.0	10	6.9
203	158.1	361.3	12682	12692.5	10.8	10	2.0
271	158.1	429.0	12695	12704.8	10.3	10	1.6
203	158.1	361.3	12705	12704.9	0.0	10	0.0
136	158.1	293.6	12705	12704.9	0.0	10	0.0

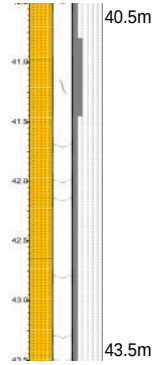
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	648.21	0.66	10.21

From: 40.5 To: 43.5 Comments : Void Filling

Lu: 0.0 Data resolution to within 1L







Dome Project Date Start: 22/05/2018 Date End: 24/05/2018 Data entered by: DSA Checked by: ALNA

Borehole: BH10 RL Collar: 183.5 Angle: 90° Comments :

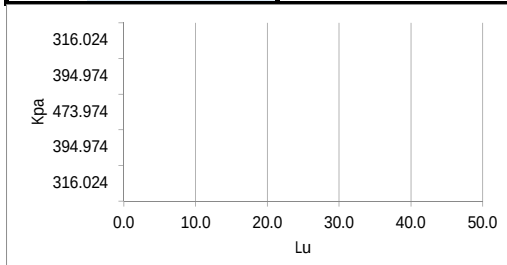
Test Interval				Ground Water Level	Gauge Height
Top:	46.5	Bottom:	49.5	15.65	0.5

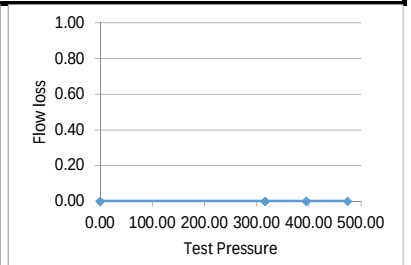
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
158	158.07	316.024	N/A	N/A	N/A	10	N/A
237	158.07	394.974	N/A	N/A	N/A	10	N/A
316	158.07	473.974	N/A	N/A	N/A	10	N/A
237	158.07	394.974	N/A	N/A	N/A	10	N/A
158	158.07	316.024	N/A	N/A	N/A	10	N/A

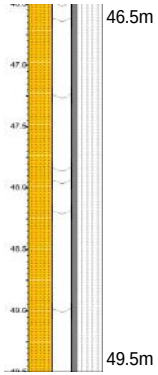
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	718.91	0.66	9.87

From: 46.5 To: 49.5 Lu:

Comments : Packer not sealing. Test abandoned.







Dome Project Date Start: 28/03/2018 Date End: 4/04/2018 Data entered by: OPRI Checked by: ALNA

Borehole: BH11 RL Collar: TBC Angle: 90° Comments :

Test Interval				Ground Water Level	Gauge Height
Top:	15.0	Bottom:	18.0	10.8	0.5

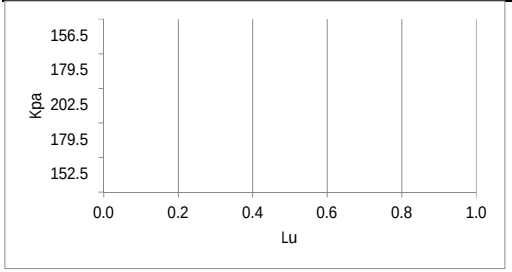
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
46	110.5	156.5	5386.0	5386.0	0.0	15	0.0
69	110.5	179.5	5386.0	5386.0	0.0	15	0.0
92	110.5	202.5	5386.0	5386.0	0.0	15	0.0
69	110.5	179.5	5386.0	5386.0	0.0	15	0.0
42	110.5	152.5	5386.0	5386.0	0.0	15	0.0

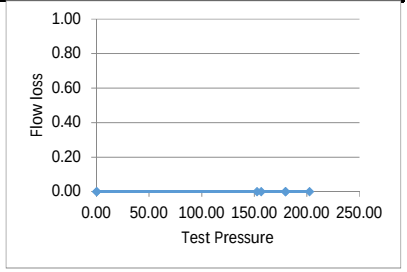
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	300.24	0.67	12.28

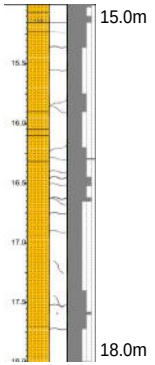
From: 15.0 To: 18.0 Comments : No water take

Data resolution to within 1L

Lu: 0.0







Test Interval				Ground Water Level	Gauge Height
Top:	21.0	Bottom:	24.0	11.4	0.5

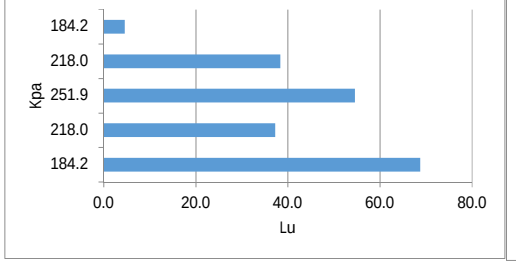
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
68	116.4	184.2	5420.5	5439.3	18.8	15	4.6
102	116.4	218.0	5449.4	5635.4	186.0	15	38.4
136	116.4	251.9	5650.3	5955.7	305.4	15	54.6
102	116.4	218.0	5969.4	6150.0	180.6	15	37.3
68	116.4	184.2	6170.1	6451.4	281.3	15	68.7

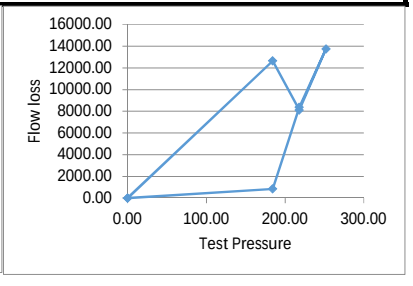
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	376.82	0.67	11.20

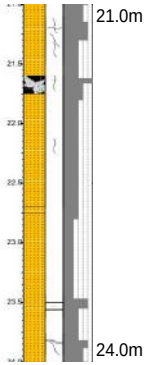
From: 21.0 To: 24.0 Comments : Wash-out

Data resolution to within 1L

Lu: 68.7







Test Interval				Ground Water Level	Gauge Height
Top:	27.0	Bottom:	30.0	11.4	0.5

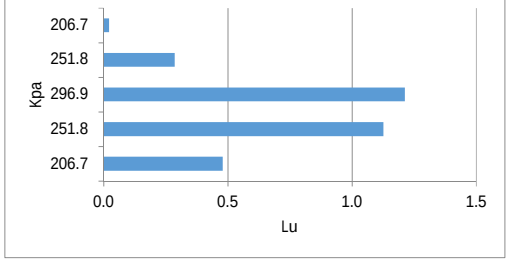
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
90	116.4	206.7	6482.6	6482.7	0.1	15	0.0
135	116.4	251.8	6483.7	6485.3	1.6	15	0.3
181	116.4	296.9	6486.0	6494.0	8.0	15	1.2
135	116.4	251.8	6495.3	6501.6	6.3	15	1.1
90	116.4	206.7	6501.7	6503.9	2.2	15	0.5

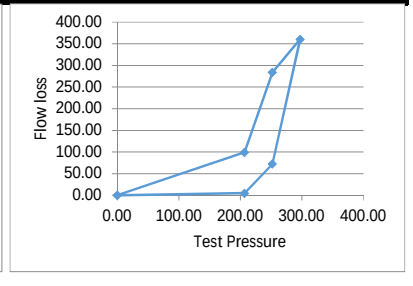
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	447.51	0.66	10.42

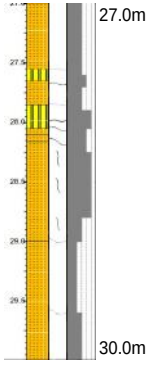
From: 27.0 To: 30.0 Comments : Dilatant

Data resolution to within 1L

Lu: 0.5







Dome Project Date Start: 28/03/2018 Date End: 4/04/2018 Data entered by: OPRI Checked by: ALNA

Borehole: BH11 RL Collar: TBC Angle: 90° Comments :

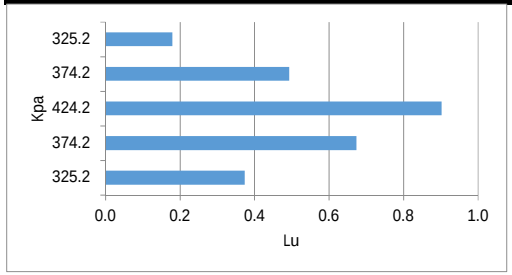
Test Interval				Ground Water Level	Gauge Height
Top:	33.0	Bottom:	36.0	22.6	0.5

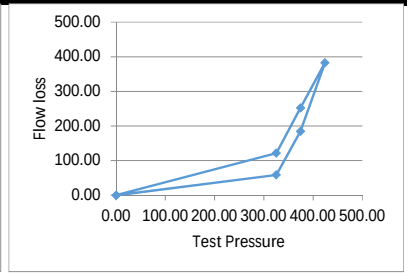
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
99	226.2	325.2	6610.7	6612.0	1.3	15	0.2
148	226.2	374.2	6612.3	6616.4	4.1	15	0.5
198	226.2	424.2	6617.0	6625.5	8.5	15	0.9
148	226.2	374.2	6626.1	6631.7	5.6	15	0.7
99	226.2	325.2	6632.0	6634.7	2.7	15	0.4

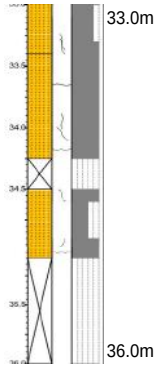
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	627.96	0.68	12.30

From: 33.0 To: 36.0 Comments : Dilatant

Lu: 0.4 Data resolution to within 1L







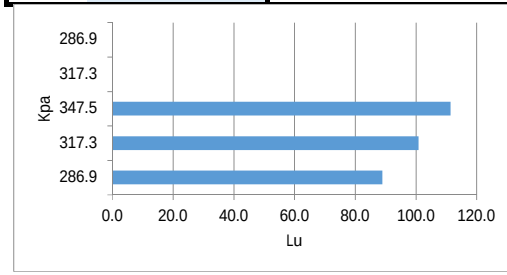
Test Interval				Ground Water Level	Gauge Height
Top:	36.0	Bottom:	39.0	22.6	0.5

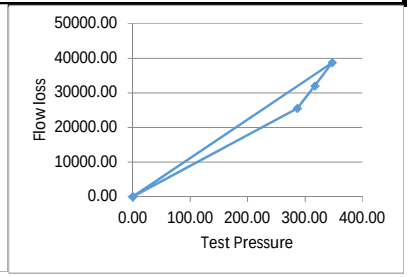
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
61	226.2	286.9				15	
91	226.2	317.3				15	
121	226.2	347.5	7180.0	8040.0	860.0	15	111.4
91	226.2	317.3	8090.0	8801.0	711.0	15	100.9
61	226.2	286.9	8830.0	9208.0	378.0	10	89.0

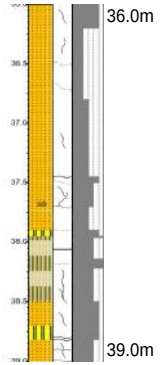
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	663.31	0.52	9.27

From: 36.0 To: 39.0 Comments : Likely Dilatant. Only Steps 3 to Step 5 completed. Step 5 test only run for 10 minutes due to running out of water.

Lu: 94.9 Data resolution to within 1L







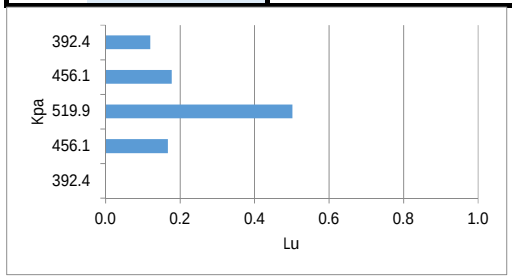
Test Interval				Ground Water Level	Gauge Height
Top:	42.0	Bottom:	45.0	26.54	0.5

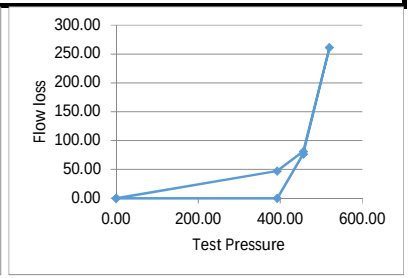
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
128	264.8	392.4	9367.0	9368.0	1.0	15	0.1
191	264.8	456.1	9368.1	9369.9	1.8	15	0.2
255	264.8	519.9	9370.3	9376.1	5.8	15	0.5
191	264.8	456.1	9376.2	9377.9	1.7	15	0.2
128	264.8	392.4	9377.9	9377.9	0.0	15	0.0

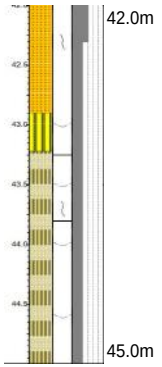
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	772.61	0.67	11.95

From: 42.0 To: 45.0 Comments : Dilatant

Lu: 0.1 Data resolution to within 1L







Dome Project Date Start: 28/03/2018 Date End: 4/04/2018 Data entered by: OPRI Checked by: ALNA

Borehole: BH11 RL Collar: TBC Angle: 90° Comments :

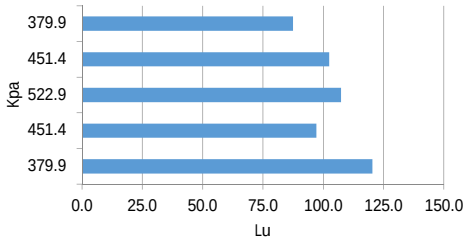
Test Interval				Ground Water Level	Gauge Height
Top:	46.5	Bottom:	49.5	22.37	1.8

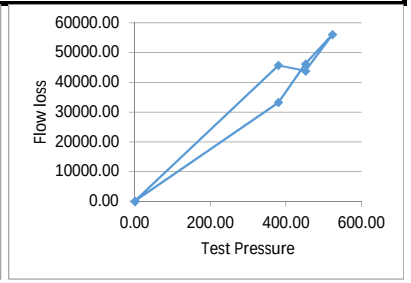
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
143	236.9	379.9	9960.0	10698.0	738	15	87.5
215	236.9	451.4	11524.0	12414.0	890	13	102.4
286	236.9	522.9	13069.0	13651.0	582	7	107.4
215	236.9	451.4	14490.0	14977.0	487	7.5	97.2
143	236.9	379.9	15577.0	16254.0	677	10	120.4

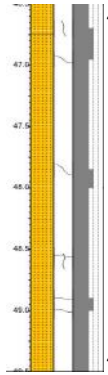
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	784.76	0.67	10.89

From: 46.5 To: 49.5 Comments : Laminar

Lu: 103.0 Data resolution to within 1L







Dome Project Date Start: 16/03/2018 Date End: 20/03/2018 Data entered by: OPRI Checked by: ALNA

Borehole: BH12 RL Collar: TBC Angle: 90° Comments :

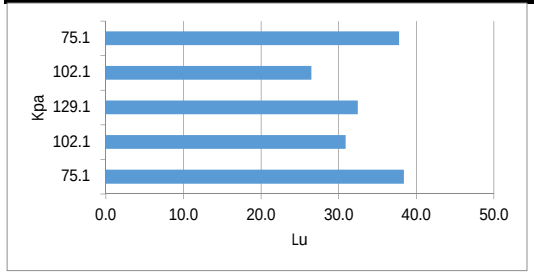
Test Interval				Ground Water Level	Gauge Height
Top:	12.0	Bottom:	15.0	1.75	0.4

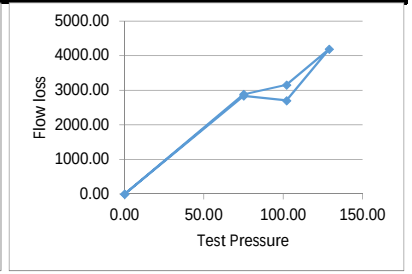
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
54	21.1	75.1	6941.0	7004.0	63.0	15	37.8
81	21.1	102.1	7008.0	7068.0	60.0	15	26.5
108	21.1	129.1	7164.0	7257.0	93.0	15	32.4
81	21.1	102.1	7260.0	7330.0	70.0	15	30.9
54	21.1	75.1	7332.0	7396.0	64.0	15	38.4

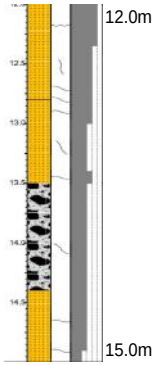
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	176.21	0.73	9.56

From: 12.0 To: 15.0 Comments : Turbulent

Lu: 32.4 Data resolution to within 1L







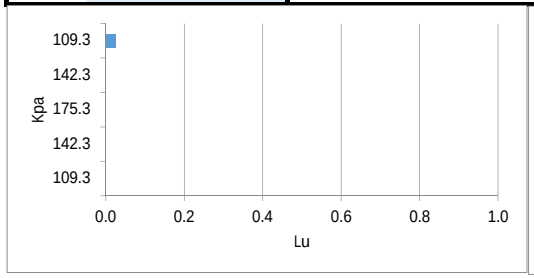
Test Interval				Ground Water Level	Gauge Height
Top:	18.0	Bottom:	21.0	4.02	0.4

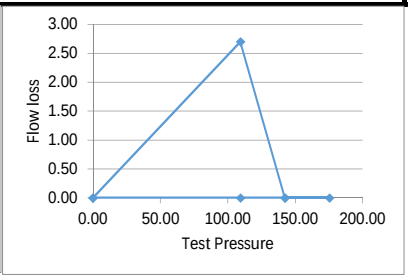
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
66	43.3	109.3	7399.2	7399.3	0.1	15	0.0
99	43.3	142.3	7399.3	7399.3	0.0	15	0.0
132	43.3	175.3	7399.3	7399.3	0.0	15	0.0
99	43.3	142.3	7399.3	7399.3	0.0	15	0.0
66	43.3	109.3	7399.3	7399.3	0.0	15	0.0

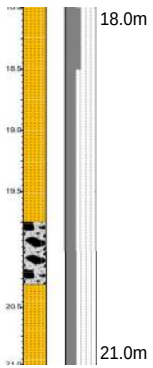
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	269.15	0.65	8.99

From: 18.0 To: 21.0 Comments : Void Filling

Lu: 0.0 Data resolution to within 1L







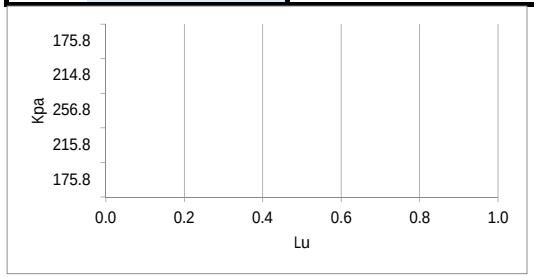
Test Interval				Ground Water Level	Gauge Height
Top:	24.0	Bottom:	27.0	8.97	0.4

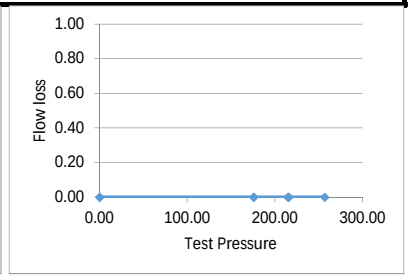
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
84	91.8	175.8	7402.2	7402.2	0.0	15	0.0
123	91.8	214.8	7402.2	7402.2	0.0	15	0.0
165	91.8	256.8	7402.2	7402.2	0.0	15	0.0
124	91.8	215.8	7402.2	7402.2	0.0	15	0.0
84	91.8	175.8	7402.2	7402.2	0.0	15	0.0

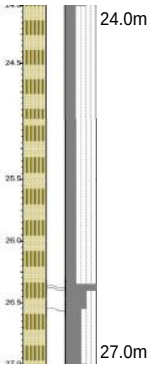
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	388.35	0.66	10.07

From: 24.0 To: 27.0 Comments : No water take

Lu: 0.0 Data resolution to within 1L







Dome Project Date Start: 16/03/2018 Date End: 20/03/2018 Data entered by: OPRI Checked by: ALNA

Borehole: BH12 RL Collar: TBC Angle: 90° Comments :

Test Interval				Ground Water Level	Gauge Height
Top:	30.0	Bottom:	33.0	8.97	0.4

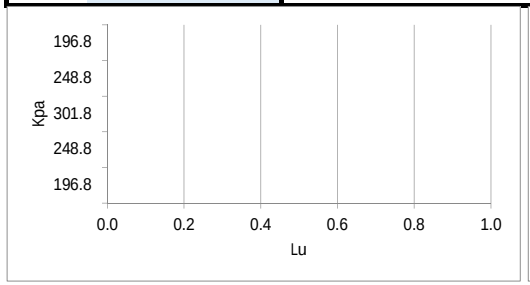
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
105	91.8	196.8	7402.5	7402.5	0.0	15	0.0
157	91.8	248.8	7402.5	7402.5	0.0	15	0.0
210	91.8	301.8	7402.5	7402.5	0.0	15	0.0
157	91.8	248.8	7402.5	7402.5	0.0	15	0.0
105	91.8	196.8	7402.5	7402.5	0.0	15	0.0

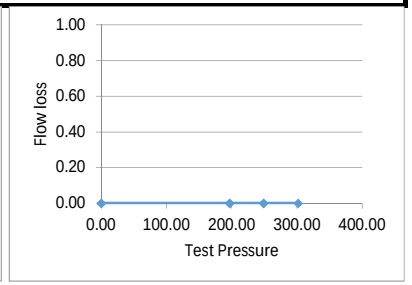
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	459.04	0.66	9.58

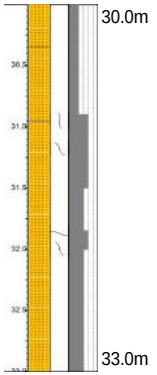
From: 30.0 To: 33.0 Comments : No water take

Data resolution to within 1L

Lu: 0.0







Dome Project	Date Start:	1/03/2018	Date End:	7/03/2018	Data entered by:	OPRI	Checked by:	ALNA
Borehole:	BH13	RL Collar:	TBC	Angle:	90°	Comments :		

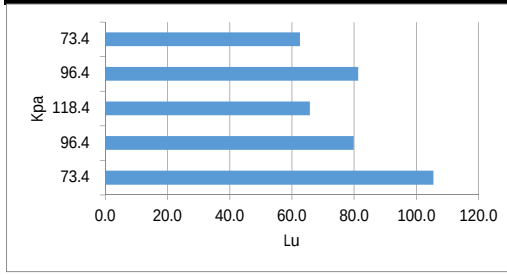
Test Interval				Ground Water Level	Gauge Height
Top:	12.0	Bottom:	15.0	2.5	0.4

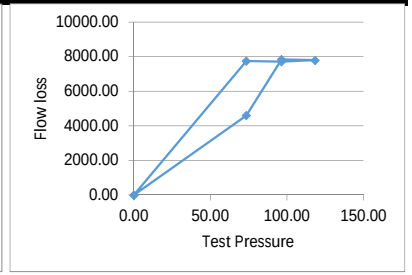
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
45	28.4	73.4	401.0	503.0	102	15	62.5
68	28.4	96.4	527.0	701.0	174	15	81.2
90	28.4	118.4	732.0	905.0	173	15	65.8
68	28.4	96.4	937.0	1108.0	171	15	79.8
45	28.4	73.4	1128.0	1300.0	172	15	105.5

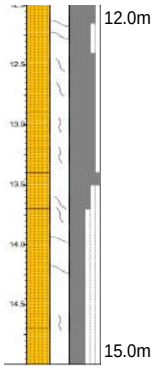
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	183.56	0.65	8.77

From: 12.0 To: 15.0 Comments : Wash-out

Lu: 105.5 Data resolution to within 1L







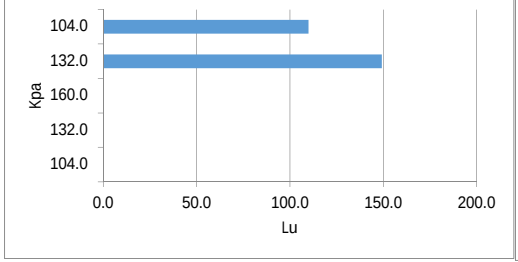
Test Interval				Ground Water Level	Gauge Height
Top:	15.0	Bottom:	18.0	4.5	0.4

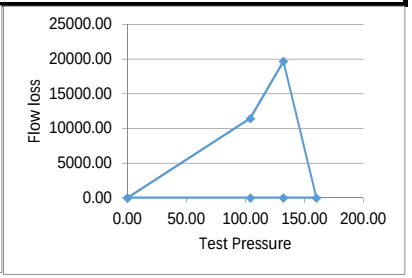
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
56	48.0	104.0	1457.0	1711.0	254	15	109.9
84	48.0	132.0	1714.0	1889.0	175	6	149.2
112	48.0	160.0					
84	48.0	132.0					
56	48.0	104.0					

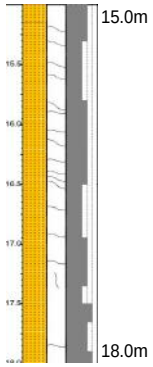
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	238.50	0.67	9.70

From: 15.0 To: 18.0 Comments : Unable to get up to full pressure (water bypassing packer)

Lu: 129.6 Data resolution to within 1L







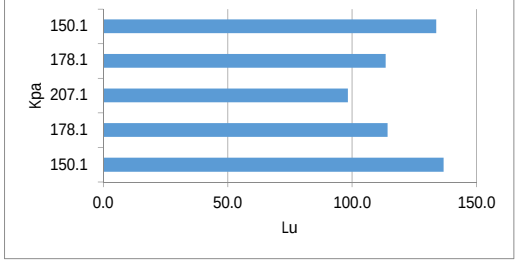
Test Interval				Ground Water Level	Gauge Height
Top:	18.0	Bottom:	21.0	9.0	0.4

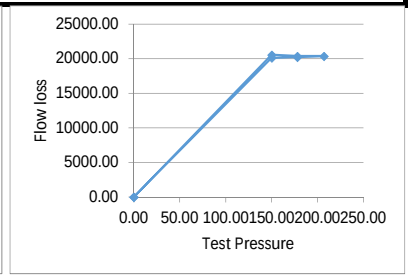
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
58	92.1	150.1	2207.0	2653.0	446	15	133.8
86	92.1	178.1	2686.0	3135.0	449	15	113.5
115	92.1	207.1	3204.0	3656.0	452	15	98.3
86	92.1	178.1	3692.0	4144.0	452	15	114.2
58	92.1	150.1	4173.0	4629.0	456	15	136.8

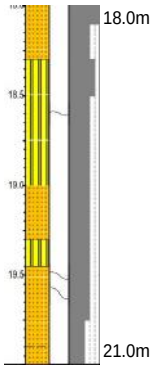
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	317.95	0.65	10.62

From: 18.0 To: 21.0 Comments : Turbulent

Lu: 98.3 Data resolution to within 1L







Dome Project	Date Start:	1/03/2018	Date End:	7/03/2018	Data entered by:	OPRI	Checked by:	ALNA
Borehole:	BH13	RL Collar:	TBC	Angle:	90°	Comments :		

Test Interval				Ground Water Level	Gauge Height
Top:	21.0	Bottom:	24.0	23.34	0.4

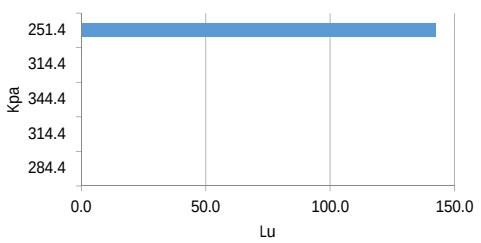
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
27	224.4	251.4	4775.0	5571.0	796	15	142.5
90	224.4	314.4					
120	224.4	344.4					
90	224.4	314.4					
60	224.4	284.4					

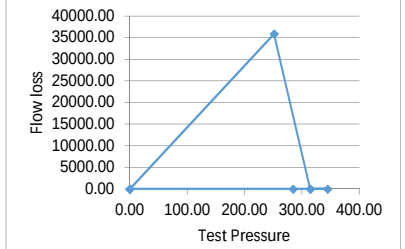
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	493.83	0.70	15.31

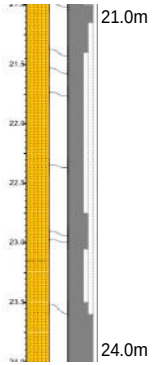
From: 21.0 To: 24.0 Comments : Unable to get up to full pressure

Data resolution to within 1L

Lu: 142.5







Test Interval				Ground Water Level	Gauge Height
Top:	27.0	Bottom:	30.0	23.6	0.4

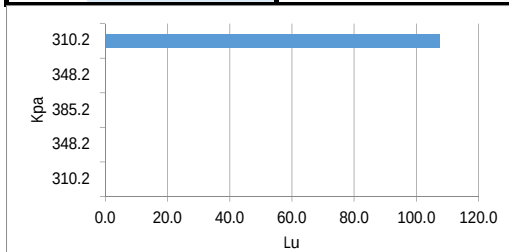
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
75	235.2	310.2	5800.0	6096.0	296	6	107.4
113	235.2	348.2					
150	235.2	385.2					
113	235.2	348.2					
75	235.2	310.2					

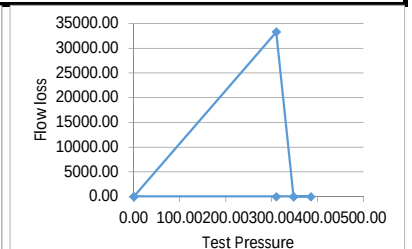
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	567.07	0.68	13.52

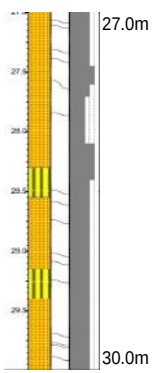
From: 27.0 To: 30.0 Comments : Unable to get up to full pressure

Data resolution to within 1L

Lu: 107.4







Test Interval				Ground Water Level	Gauge Height
Top:	32.0	Bottom:	35.0	25.2	0.4

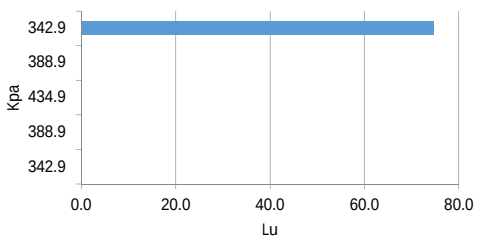
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
92	250.9	342.9	6282.0	6851.0	569	15	74.7
138	250.9	388.9					
184	250.9	434.9					
138	250.9	388.9					
92	250.9	342.9					

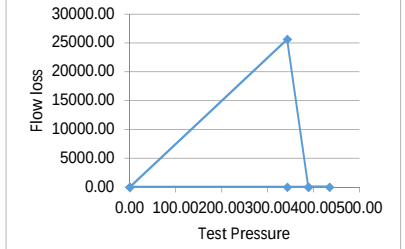
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	641.66	0.68	12.98

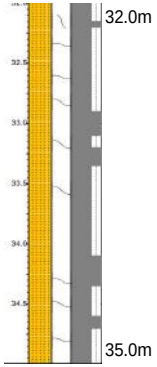
From: 32.0 To: 35.0 Comments : Unable to get up to full pressure

Data resolution to within 1L

Lu: 74.7







Dome Project Date Start: 30/05/2018 Date End: 30/05/2018 Data entered by: DSA Checked by: ALNA

Borehole: BH14 RL Collar: 28.0 Angle: 90° Comments :

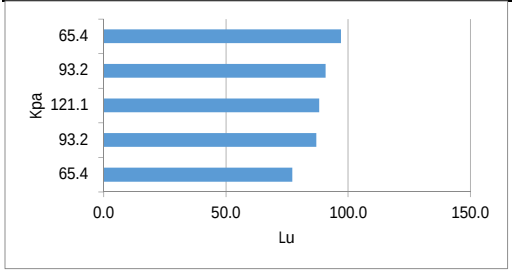
Test Interval				Ground Water Level	Gauge Height
Top:	13.5	Bottom:	16.5	0.0	1.0

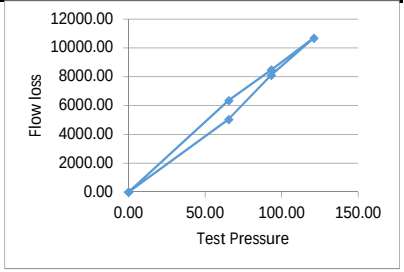
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
56	9.8	65.4	12752.0	12893.0	141	15	97.1
83	9.8	93.2	12903.0	13091.0	188	15	90.8
111	9.8	121.1	13108.0	13345.0	237	15	88.1
83	9.8	93.2	13356.0	13536.0	180	15	87.0
56	9.8	65.4	13551.0	13663.0	112	15	77.1

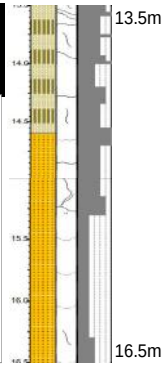
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	176.73	0.68	8.07

From: 13.5 To: 16.5 Comments : Void Filling

Lu: 77.1 Data resolution to within 1L







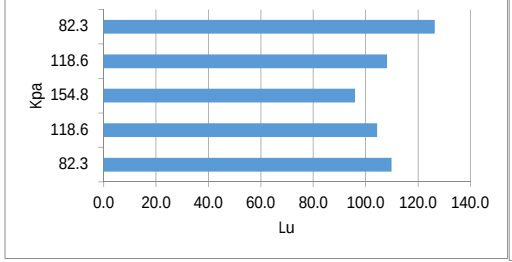
Test Interval				Ground Water Level	Gauge Height
Top:	18.0	Bottom:	21.0	0.0	1.0

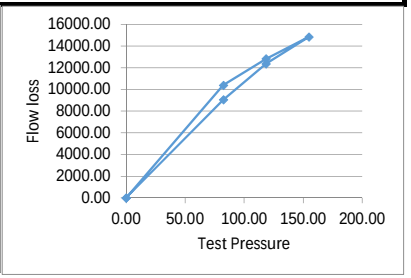
Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
73	9.8	82.3	13690.0	13921.0	231	15	126.4
109	9.8	118.6	13942.0	14227.0	285	15	108.2
145	9.8	154.8	14245.0	14575.0	330	15	96.0
109	9.8	118.6	14584.0	14859.0	275	15	104.4
73	9.8	82.3	14873.0	15074.0	201	15	110.0

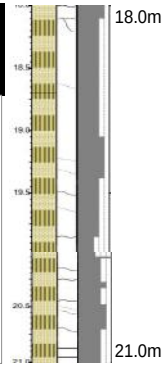
Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	229.75	0.67	7.94

From: 18.0 To: 21.0 Comments : Turbulent Flow

Lu: 96.0 Data resolution to within 1L







Test Interval				Ground Water Level	Gauge Height
Top:	22.5	Bottom:	25.5	0.0	1.0

Gauge Pressure	Static head	Test Pressure	Start litres	Finish litres	Flow	time	Lu
89	9.8	99.2	15097.0	15379.0	282	15	128.0
134	9.8	143.8	15418.0	15736.0	318	15	99.6
169	9.8	178.6	15762.0	16126.0	364	15	91.8
134	9.8	143.8	16150.0	16422.0	272	15	85.2
89	9.8	99.2	16432.0	16630.0	198	15	89.9

Pressure Checks	Overburden Pressure	Test Pressure / Overburden	Max Test Pressure /metre
	282.77	0.63	7.44

From: 22.5 To: 25.5 Comments : Void filling becoming laminar from Step 3 to Step 5.

Lu: 88.9 Data resolution to within 1L