



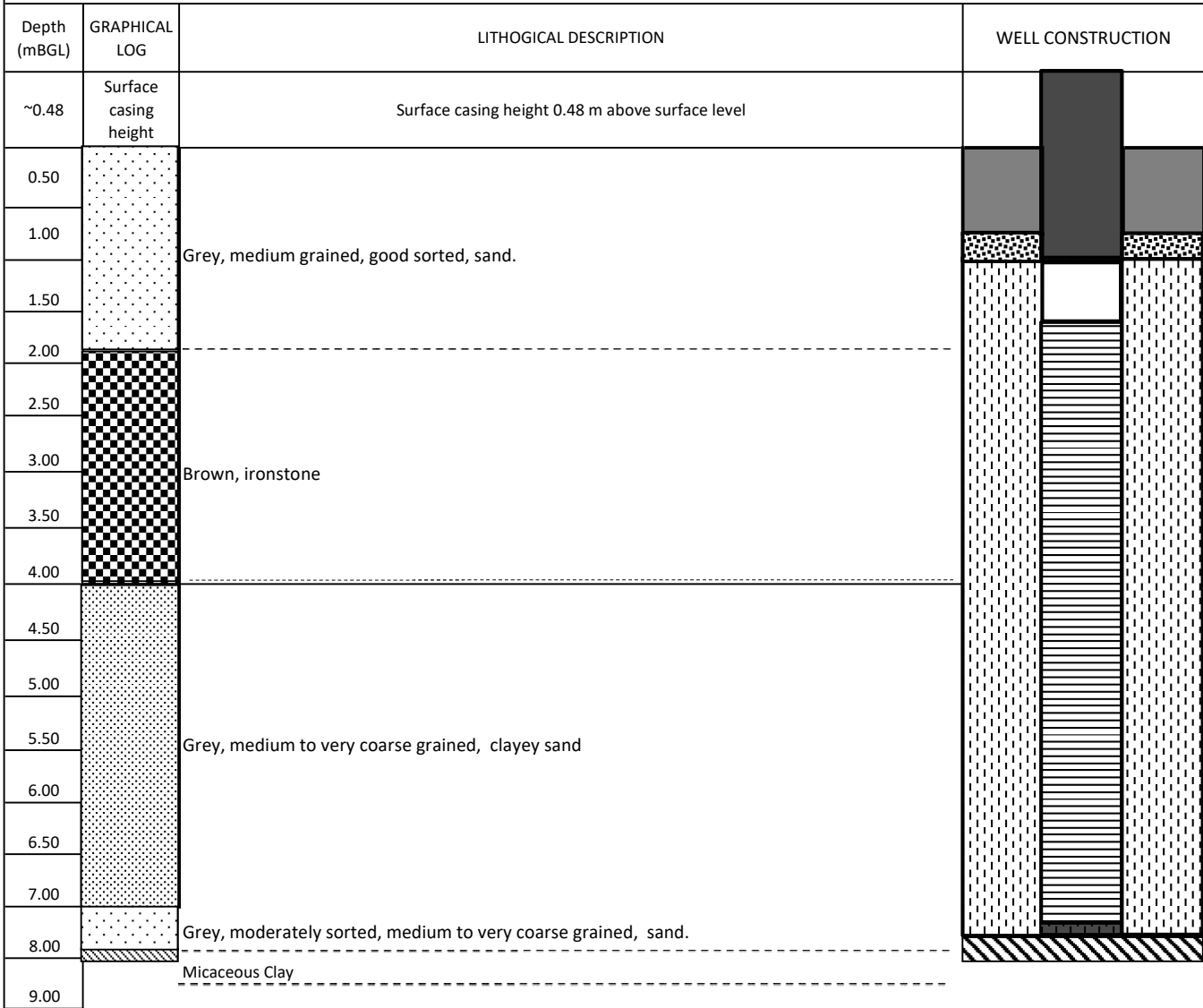
Borehole Log

Borehole No:
YA_MB05S

CLIENT: Doral Mineral Sands
PROJECT: Yalyalup
LOCATION: Yalyalup
JOB NUMBER: 136D

DATE COMMENCED: 31.05.19
DATE COMPLETED: 31.05.19
LOGGED BY: R Olivier
CHECKED BY:

Driller: Aquatech **Drilling Method:** Mud rotary **Surface RL:** 21.8 mAHD **Easting:** 357787
Bore details: Class 18PVC **Weather:** Fine **Datum:** MGA94 **Northing:** 6270960
Static Water Level: **Total Depth of Hole:** 8 m **Top of Casing RL:**





Borehole Log

Borehole No:
YA_MB06S

CLIENT: Doral Mineral Sands
PROJECT: Yalyalup
LOCATION: Yalyalup
JOB NUMBER: 136D

DATE COMMENCED: 31.05.19
DATE COMPLETED: 31.05.19
LOGGED BY: R Olivier
CHECKED BY:

Driller: Aquatech **Drilling Method:** Mud rotary **Surface RL:** 20.52 mAHD **Easting:** 357960
Bore details: Class 18PVC **Weather:** Fine **Datum:** MGA94 **Northing:** 6271720
Static Water Level: **Total Depth of Hole:** 8 m **Top of Casing RL:**

Depth (mBGL)	GRAPHICAL LOG	LITHOLOGICAL DESCRIPTION	WELL CONSTRUCTION
~0.43	Surface casing height	Surface casing height 0.43 m above surface level	
0.50		Grey, medium grained, good sorted, sand.	
1.00			
1.50		Grey, medium to coarse grained, sandy clay	
2.00			
2.50			
3.00			
3.50			
4.00			
4.50		Grey, medium to very coarse grained, clayey sand	
5.00			
5.50			
6.00			
6.50		Micaceous Clay	
7.00			
8.00			



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Borehole Log

Borehole No:
YA_MB075

CLIENT:	Doral Mineral Sands	DATE COMMENCED:	12.12.17
PROJECT:	Yalyalup	DATE COMPLETED:	12.12.17
LOCATION:	Yalyalup	LOGGED BY:	D Bourke
JOB NUMBER:	DMS17-004	CHECKED BY:	G Alexander
Driller:	Wallis	Drilling Method:	RC
Bore details:	Class 18PVC 50mm diameter	Weather:	Fine
		Total Depth of Hole:	8.0m
		Static Water Level:	
Surface RL:	25.04mAHD	Easting:	358606.42
Datum:	MGA94	Northing:	627857.72
Top of Casing RL:			

Depth (mBGL)	GRAPHICAL LOG	LITHOLOGICAL DESCRIPTION	WELL CONSTRUCTION
~0.75	Surface casing height	PVC surface casing height 0.79m above surface level	
0.50		Grey brown, good sorted, medium to coarse grained, sand	
1.00			
1.50		Grey brown, good sorted, medium to coarse grained, clayey sand	
2.00			
2.50		Grey brown, clay	
3.00			
3.50			
4.00		Orange brown, clay, wet at 4m	
4.50			
5.00			
5.50		Grey, good sorted, medium to coarse grained, sandy clay. Wet	
6.00			
6.50		Grey, moderately sorted, medium to very coarse grained, clayey sand. Wet	
7.00			
7.50		Grey brown, moderately sorted, medium to very coarse grained, sand. Wet	
8.00			



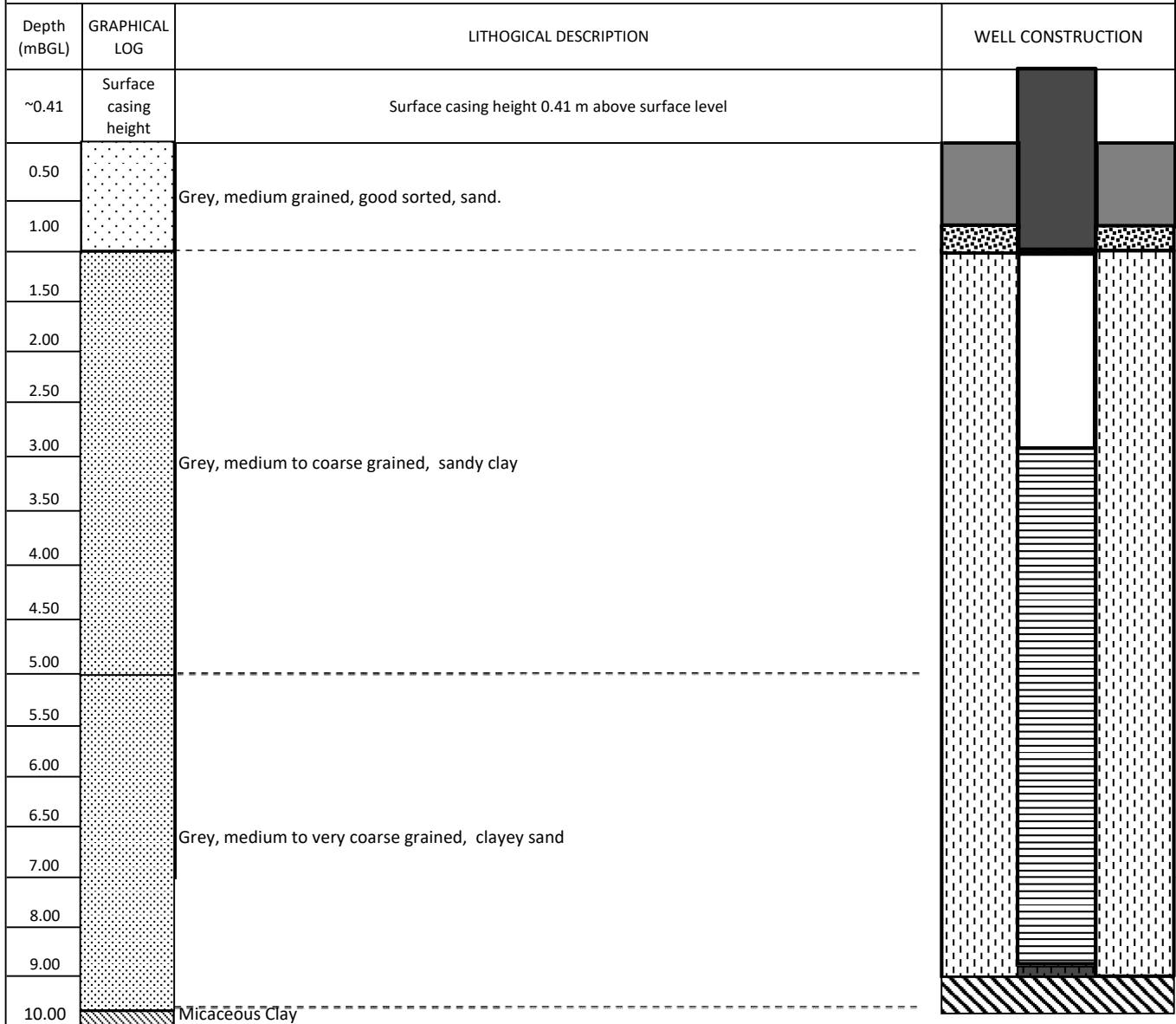
Borehole Log

Borehole No:
YA_MB08S

CLIENT: Doral Mineral Sands
PROJECT: Yalyalup
LOCATION: Yalyalup
JOB NUMBER: 136D

DATE COMMENCED: 31.05.19
DATE COMPLETED: 31.05.19
LOGGED BY: R Olivier
CHECKED BY:

Driller: Aquatech **Drilling Method:** Mud rotary **Surface RL:** 23.24 mAHD **Easting:** 358589
Bore details: Class 18PVC **Weather:** Fine **Datum:** MGA94 **Northing:** 6271310
Static Water Level: **Total Depth of Hole:** 10 m **Top of Casing RL:**





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Borehole Log

Borehole No:
YA_MB09S

CLIENT: Doral Mineral Sands
PROJECT: Yalyalup
LOCATION: Yalyalup
JOB NUMBER: DMS17-004

DATE COMMENCED: 12.12.17
DATE COMPLETED: 12.12.17
LOGGED BY: D Bourke
CHECKED BY: G Alexander

Driller: Wallis **Drilling Method:** Aircore **Surface RL:** 30.58mAHD **Easting:** 359401.33
Bore details: Class 18PVC **Weather:** Fine **Datum:** MGA94 **Northing:** 6270500.97
Static Water Level: **Total Depth of Hole:** 8.0m **Top of Casing RL:**

Depth (mBGL)	GRAPHICAL LOG	LITHOLOGICAL DESCRIPTION	WELL CONSTRUCTION
~0.75	Surface casing height	PVC surface casing height 0.62m above surface level	
0.50	[Dotted pattern]	Cream, clayey sand	[Grey shaded area]
1.00			
1.50	[Dotted pattern]	Grey brown, clayey sand	[Dotted pattern]
2.00			
2.50			
3.00			
3.50			
4.00			
4.50	[Diagonal hatching]	Grey brown, sandy clay	[Horizontal hatching]
5.00			
5.50	[Cross-hatching]	Grey, clay	[Horizontal hatching]
6.00			
6.50	[Dotted pattern]	Grey, clayey sand. Wet at base	[Dotted pattern]
7.00			
7.50			
8.00			



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Borehole Log

Borehole No:
YA_MB10S

CLIENT:	Doral Mineral Sands	DATE COMMENCED:	12.12.17
PROJECT:	Yalyalup	DATE COMPLETED:	12.12.17
LOCATION:	Yalyalup	LOGGED BY:	D Bourke
JOB NUMBER:	DMS17-004	CHECKED BY:	G Alexander
Driller:	Wallis	Drilling Method:	Aircore
Bore details:	Class 18PVC 50mm diameter	Weather:	Fine
		Total Depth of Hole:	7.0m
		Static Water Level:	
Surface RL:	28.51mAHD	Easting:	359305.13
Datum:	MGA94	Northing:	6270895.98
Top of Casing RL:			

Depth (mBGL)	GRAPHICAL LOG	LITHOLOGICAL DESCRIPTION	WELL CONSTRUCTION
0.75	Surface casing height	PVC surface casing height 0.75m above surface level	
0.50	[Dotted pattern]	Orange brown, good sorted, fine to medium grained, clayey sand.	[Grey block]
1.00			
1.50	[Dotted pattern]	Cream, good sorted, medium to coarse grained, clayey sand	[Hatched pattern]
2.00			
2.50	[Dotted pattern]	Brown, moderately sorted, medium to very coarse grained, sand	[Hatched pattern]
3.00			
3.50	[Dotted pattern]	Grey, good sorted, moderate to coarse grained, clayey sand	[Hatched pattern]
4.00			
4.50	[Dotted pattern]	Grey, good sorted, moderate to coarse grained, sand	[Hatched pattern]
5.00			
5.50	[Dotted pattern]	Grey, moderately sorted, moderate to very coarse, sand	[Hatched pattern]
6.00			
6.50	[Dotted pattern]	Grey, moderately sorted, coarse to very coarse sand, wet	[Hatched pattern]
7.00			



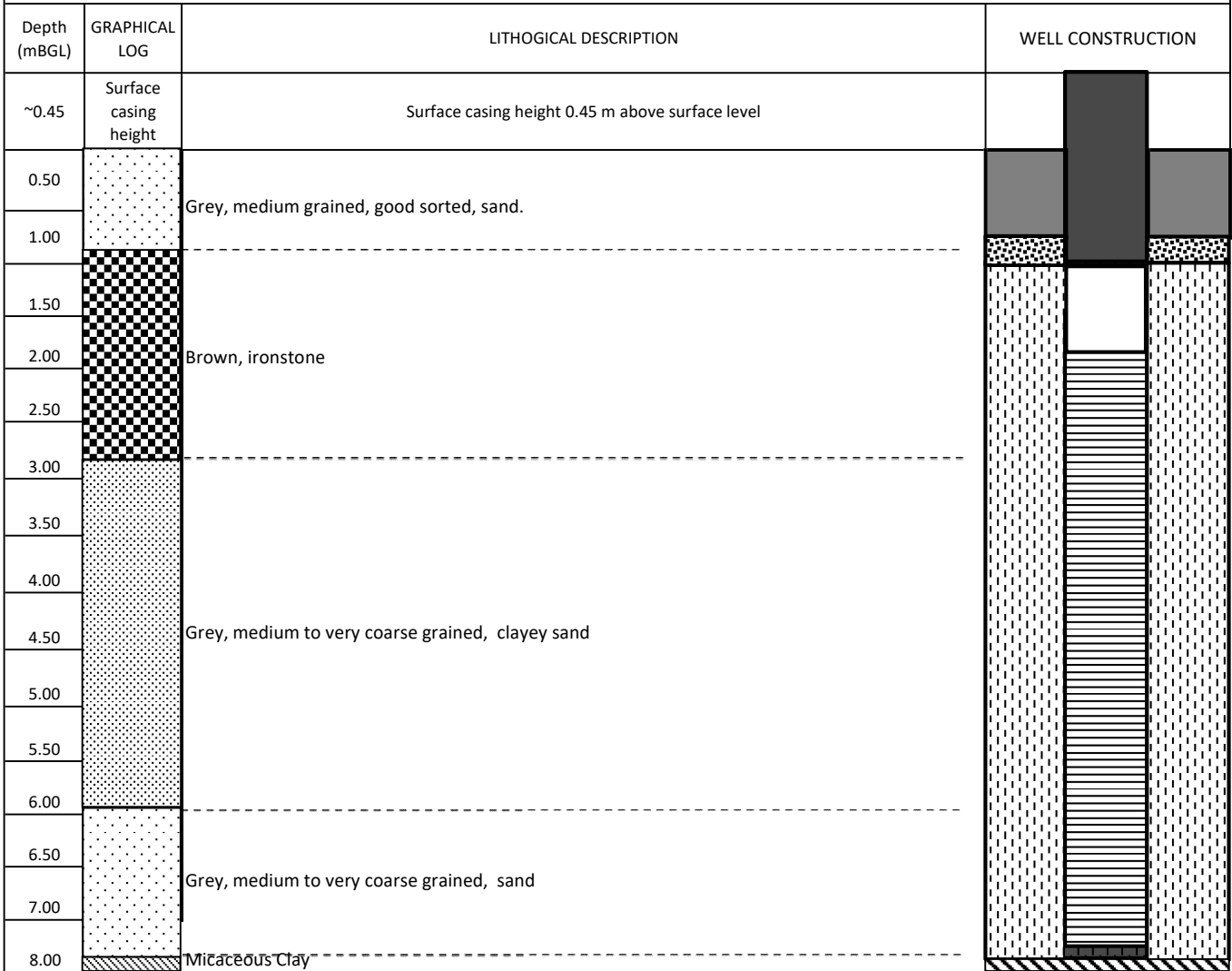
Borehole Log

Borehole No:
YA_MB11S

CLIENT: Doral Mineral Sands
PROJECT: Yalyalup
LOCATION: Yalyalup
JOB NUMBER: 136D

DATE COMMENCED: 31.05.19
DATE COMPLETED: 31.05.19
LOGGED BY: R Olivier
CHECKED BY:

Driller: Aquatech **Drilling Method:** Mud rotary **Surface RL:** 24.69 mAHD **Easting:** 359295
Bore details: Class 18PVC **Weather:** Fine **Datum:** MGA94 **Northing:** 6271545
Static Water Level: **Total Depth of Hole:** 8 m **Top of Casing RL:**





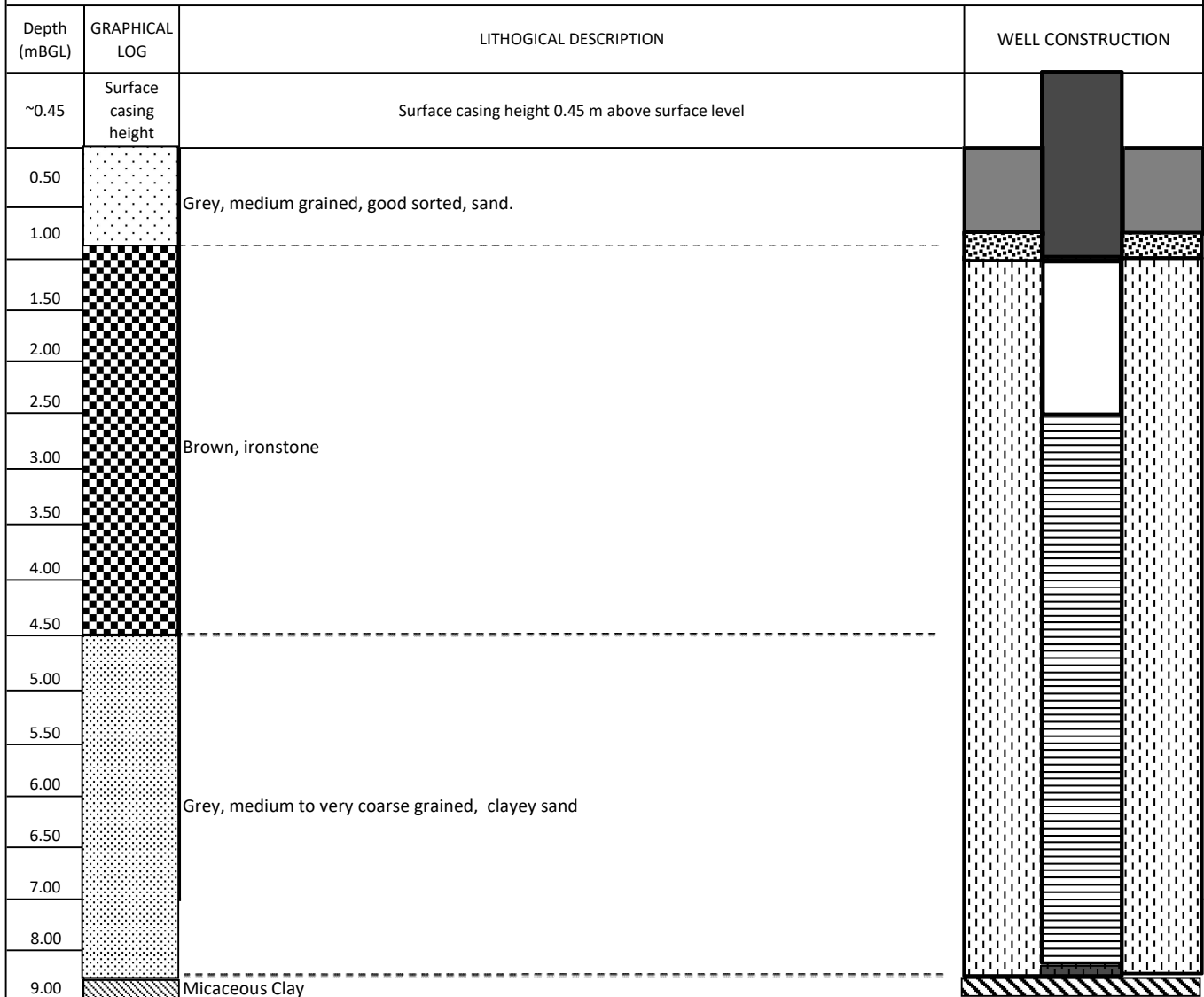
Borehole Log

Borehole No:
YA_MB12S

CLIENT: Doral Mineral Sands
PROJECT: Yalyalup
LOCATION: Yalyalup
JOB NUMBER: 136D

DATE COMMENCED: 01.06.19
DATE COMPLETED: 01.06.19
LOGGED BY: R Olivier
CHECKED BY:

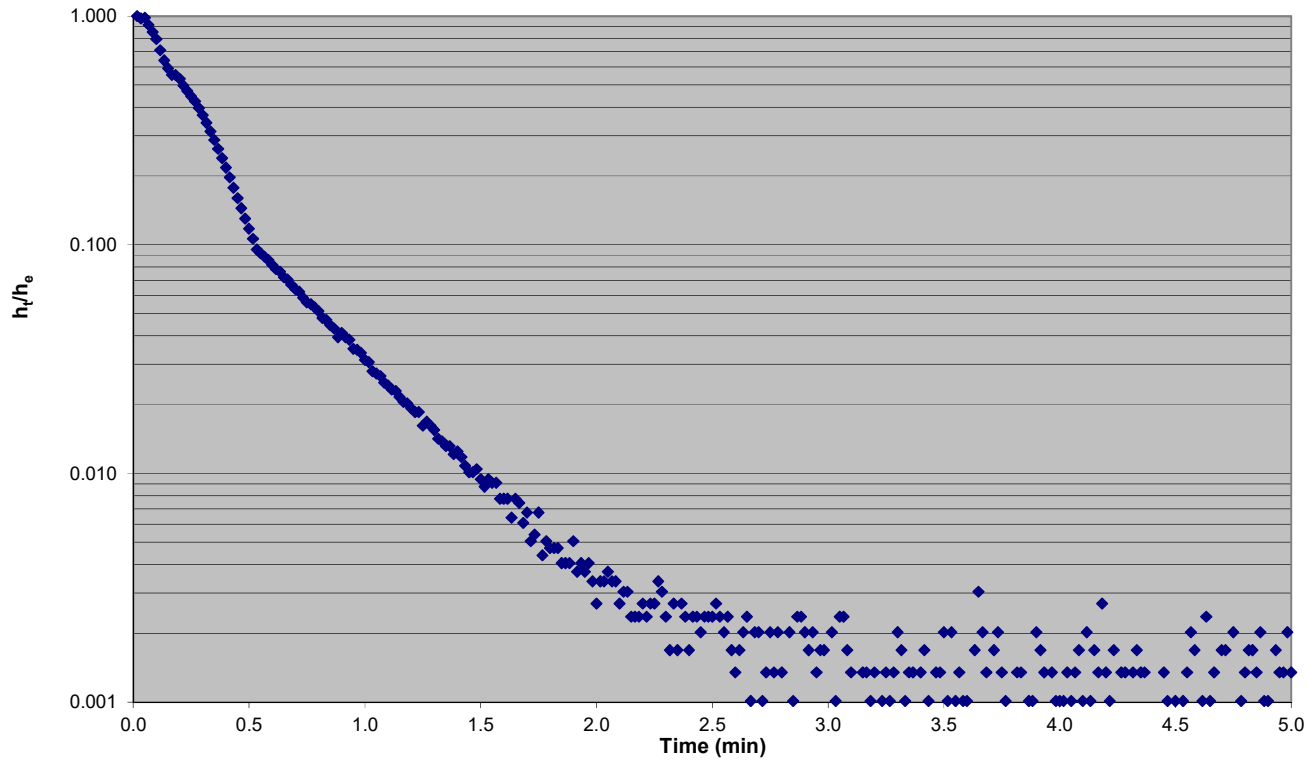
Driller: Aquatech **Drilling Method:** Mud rotary **Surface RL:** 22.79 mAHD **Easting:** 359159
Bore details: Class 18PVC **Weather:** Fine **Datum:** MGA94 **Northing:** 6271808
Static Water Level: **Total Depth of Hole:** 9 m **Top of Casing RL:**



APPENDIX B
RESULTS OF HYDRAULIC TESTS

Bore No:	YA_MB01S	Test No:	0	Job No:	136	Date:	30-Apr-19	Logged by:	BDK
Borehole co-ordinates: Easting:		0		Northing:		0		Collar elevation (m): 0	
Depth to top of test section (m):		2		Length of test section, L (m):		2.13		Radius of borehole, r (m): 0.07	
Depth of static water level, H_w (m):		3.607		Radius of standpipe or casing, r_c (m):		0.025		Excess head, h_e (m): 2.97	

Head - time graph (slope of graph is S)



Calculations:

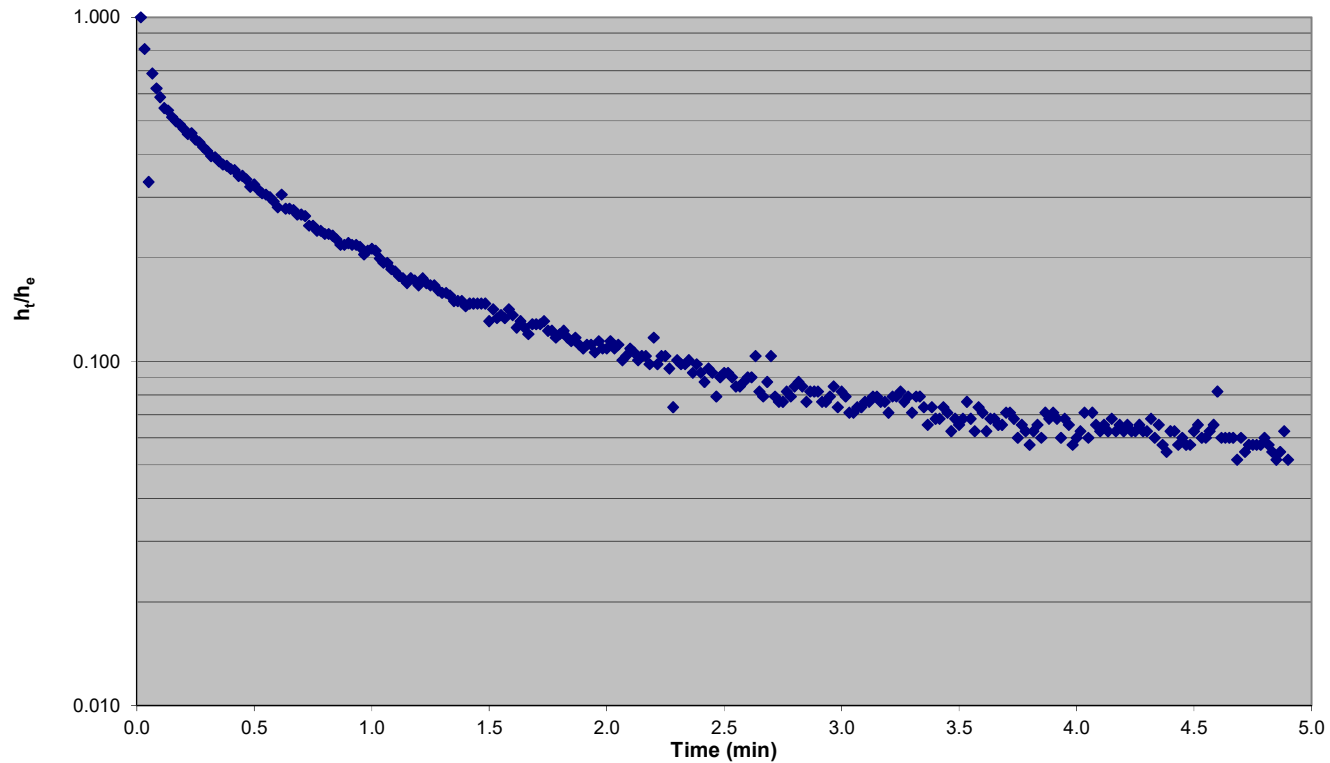
h₁	0.37	0.06
t₁	0.3	0.7
h₂	0.12	0.03
t₂	0.5	1.0
S	2.5E+00	1.0E+00
k	9.68E-05	4.01E-05

m/d **8.37** **3.46**

Permeability, $k = 0.133 \times S \times (rc^2/L)$, (m/sec)
 where $S = (\log (h_1/h_2))/(t_2 - t_1)$,
 (ie slope of plot, t in mins)

Bore No:	YA_MB02S	Test No:	0	Job No:	136	Date:	30-Apr-19	Logged by:	BDK
Borehole co-ordinates: Easting:		0		Northing:		0		Collar elevation (m): 0	
Depth to top of test section (m):		2		Length of test section, L (m):		5.12		Radius of borehole, r (m): 0.07	
Depth of static water level, H_w (m):		2.98		Radius of standpipe or casing, r_c (m):		0.025		Excess head, h_e (m): 0.37	

Head - time graph (slope of graph is S)



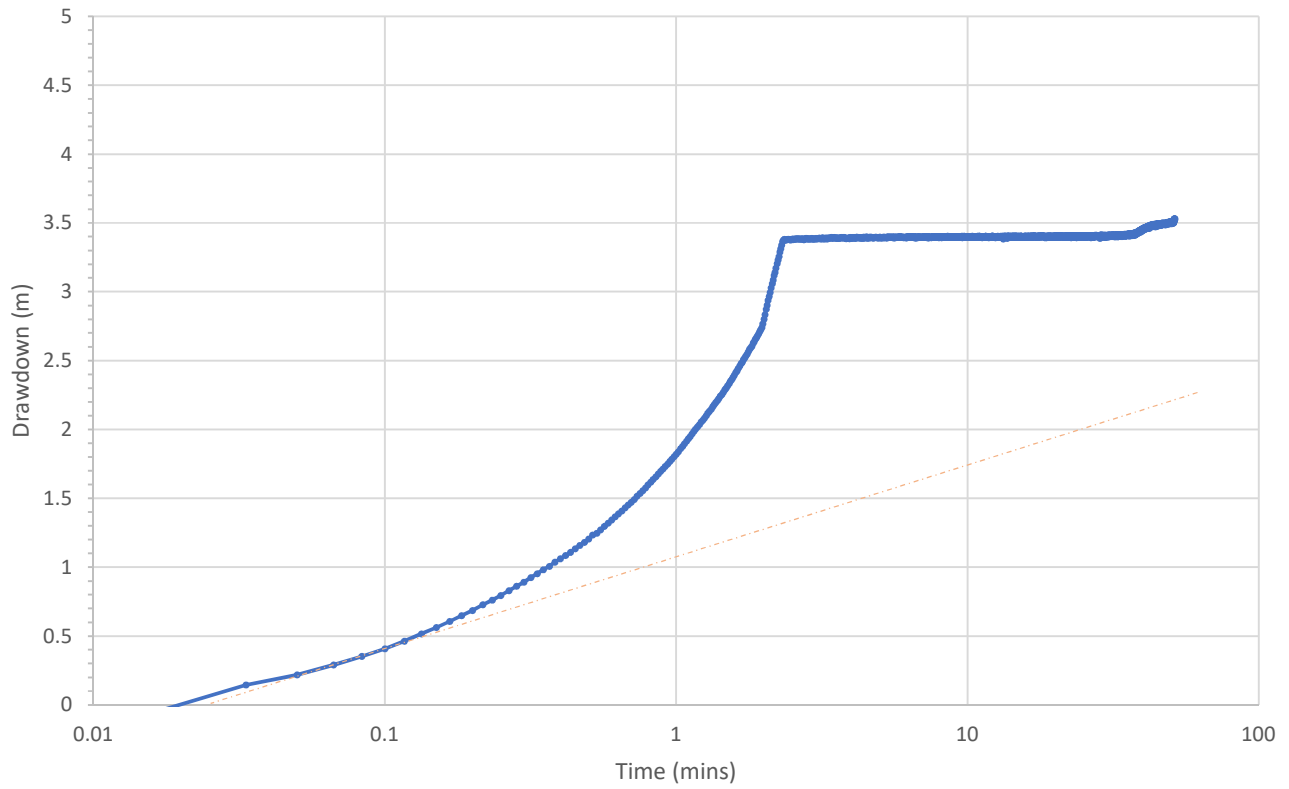
Calculations:

h₁	0.37	0.13
t₁	0.4	1.5
h₂	0.33	0.08
t₂	0.5	3.0
S	4.3E-01	1.4E-01
k	7.01E-06	2.21E-06

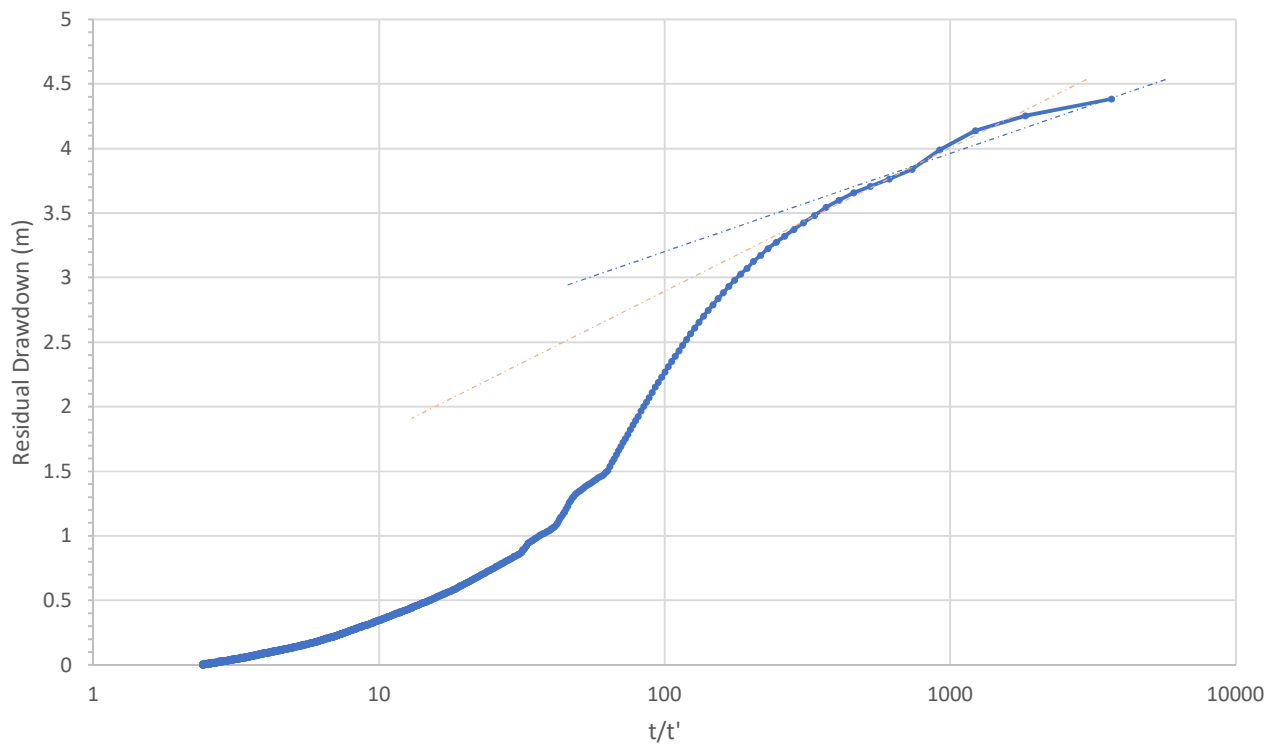
m/d **0.61** **0.19**

Permeability, $k = 0.133 \times S \times (rc^2/L)$, (m/sec)
 where $S = (\log(h_1/h_2))/(t_2 - t_1)$,
 (ie slope of plot, t in mins)

Drawdown Plot

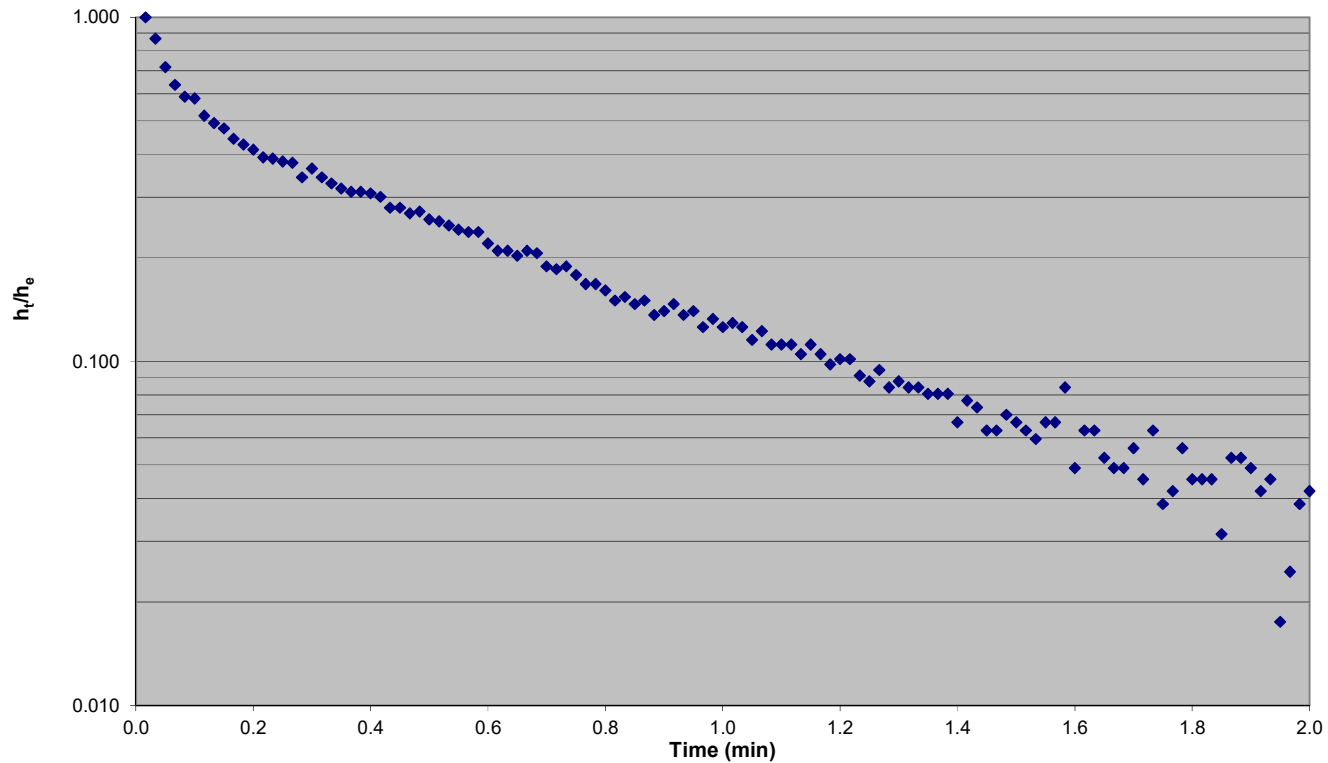


Recovery Plot



Bore No:	YA_MB03S	Test No:	0	Job No:	136	Date:	30-Apr-19	Logged by:	BDK
Borehole co-ordinates: Easting:		0		Northing:		0		Collar elevation (m): 0	
Depth to top of test section (m):		2		Length of test section, L (m):		8.05		Radius of borehole, r (m): 0.13	
Depth of static water level, H_w (m):		1.06		Radius of standpipe or casing, r_c (m):		0.05		Excess head, h_e (m): -0.29	

Head - time graph (slope of graph is S)



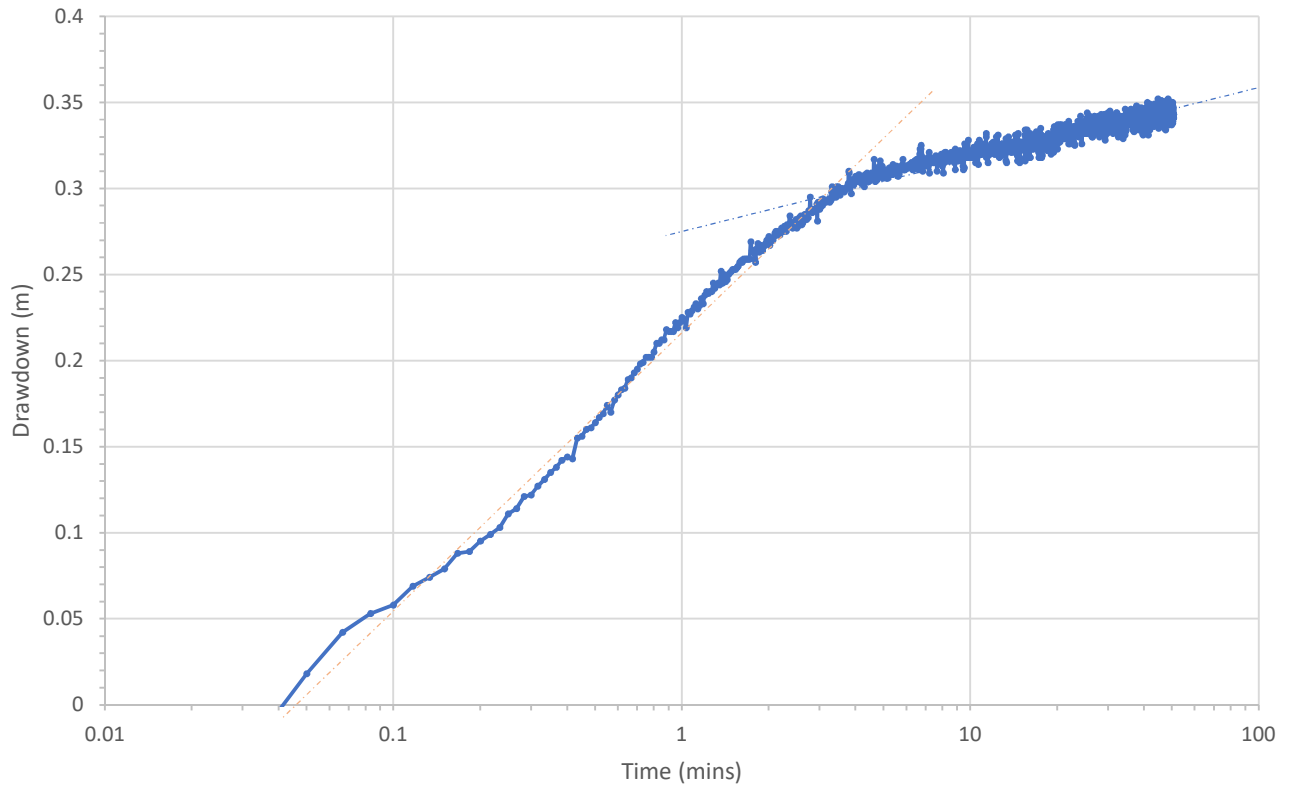
Calculations:

h₁	0.36
t₁	0.3
h₂	0.16
t₂	0.8
S	7.1E-01
k	2.93E-05

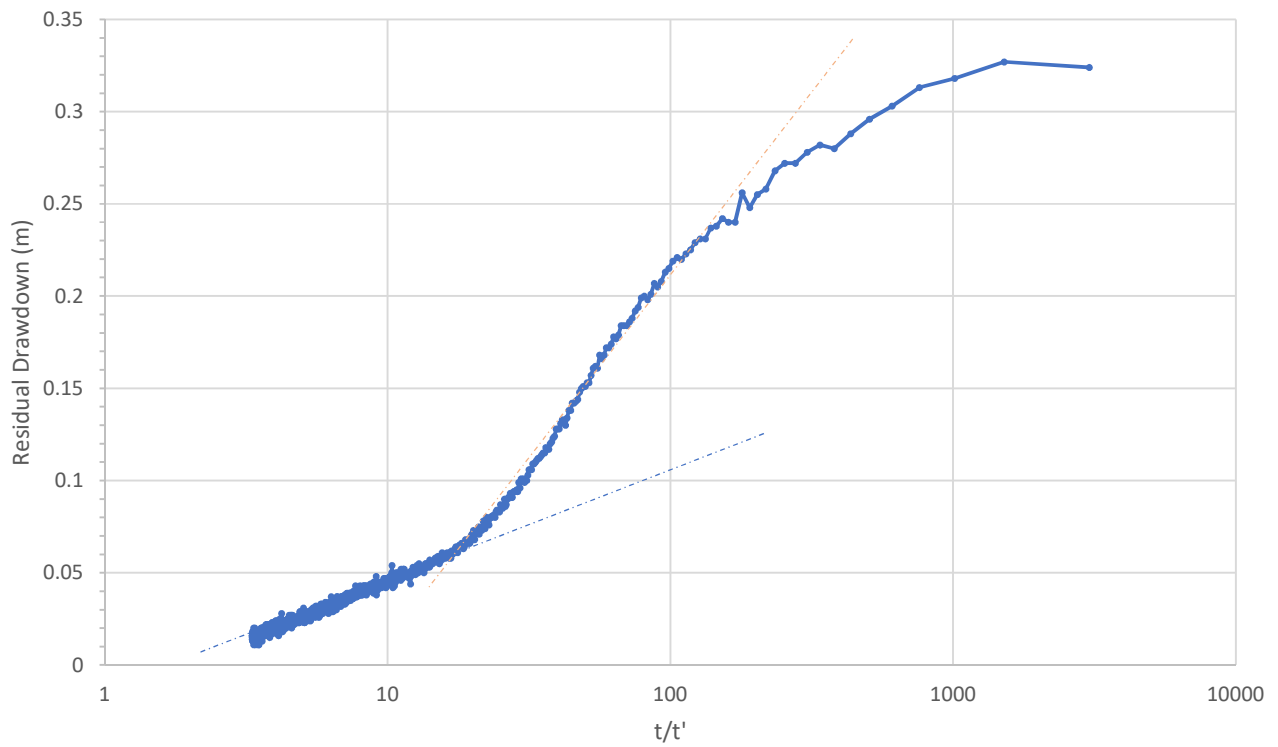
m/d **2.53**

Permeability, $k = 0.133 \times S \times (rc^2/L)$, (m/sec)
 where $S = (\log(h_1/h_2))/(t_2 - t_1)$,
 (ie slope of plot, t in mins)

Drawdown Plot

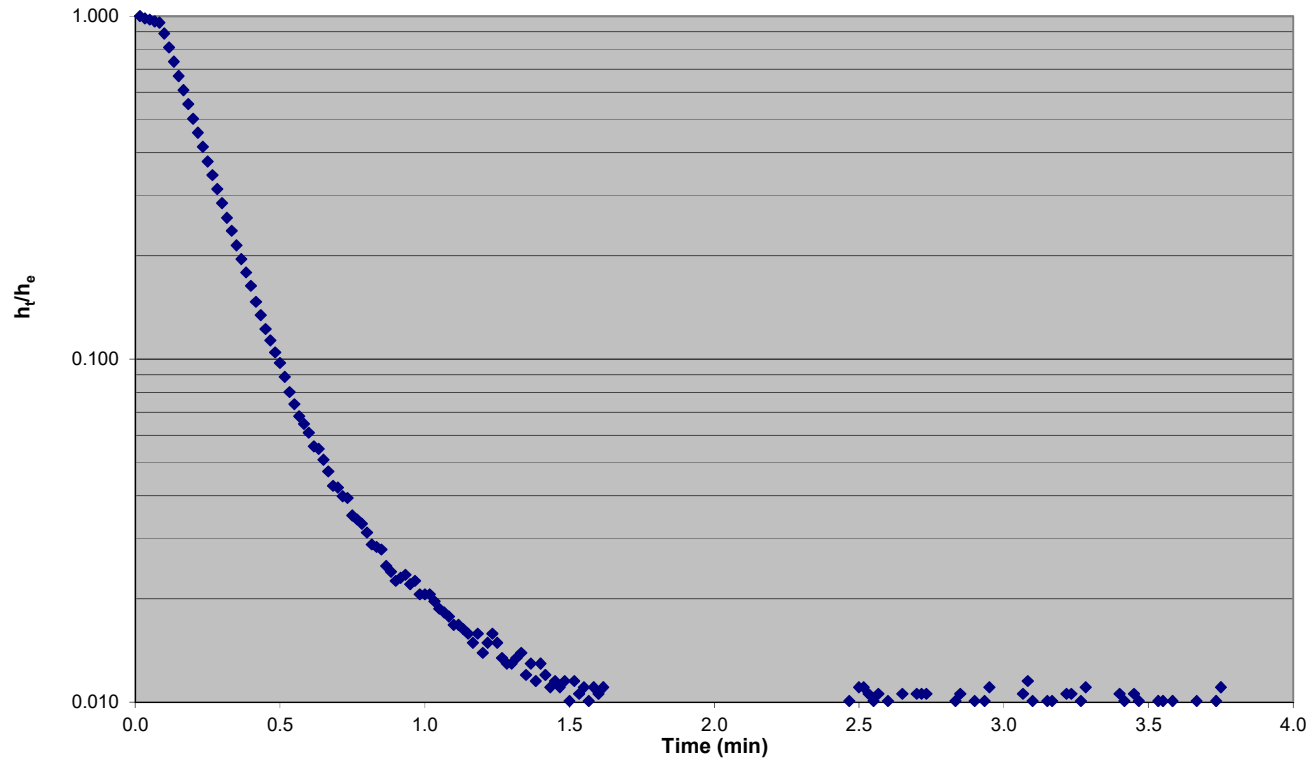


Recovery Plot



Bore No:	YA_MB04S	Test No:	0	Job No:	136	Date:	30-Apr-19	Logged by:	BDK
Borehole co-ordinates: Easting:	0	Northing:	0	Collar elevation (m):	0				
Depth to top of test section (m):	2	Length of test section, L (m):	5.77						
Depth of static water level, H_w (m):	2.51	Radius of borehole, r (m):	0.07						
Excess head, h_e (m):	2.08	Radius of standpipe or casing, r_c (m):	0.025						

Head - time graph (slope of graph is S)



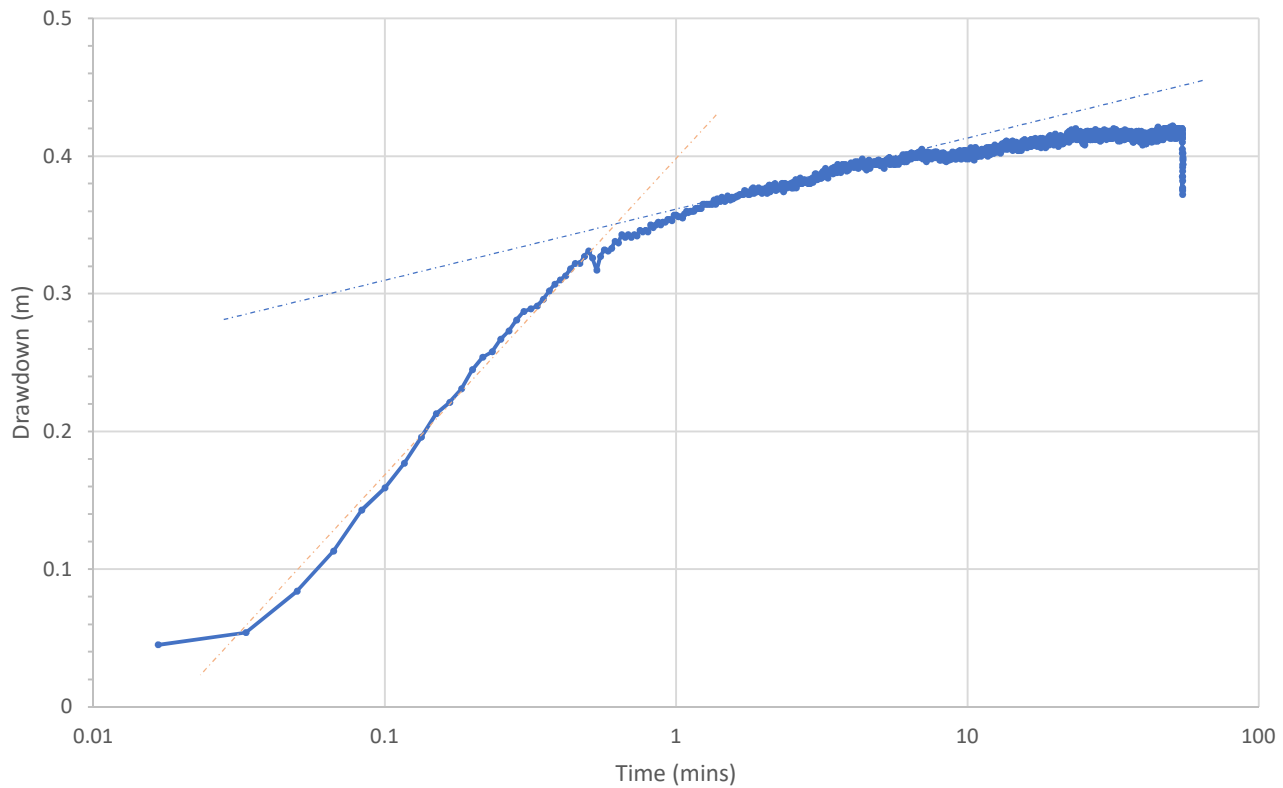
Calculations:

h₁	0.38	0.03
t₁	0.3	0.8
h₂	0.10	0.02
t₂	0.5	1.1
S	2.3E+00	9.0E-01
k	3.38E-05	1.29E-05

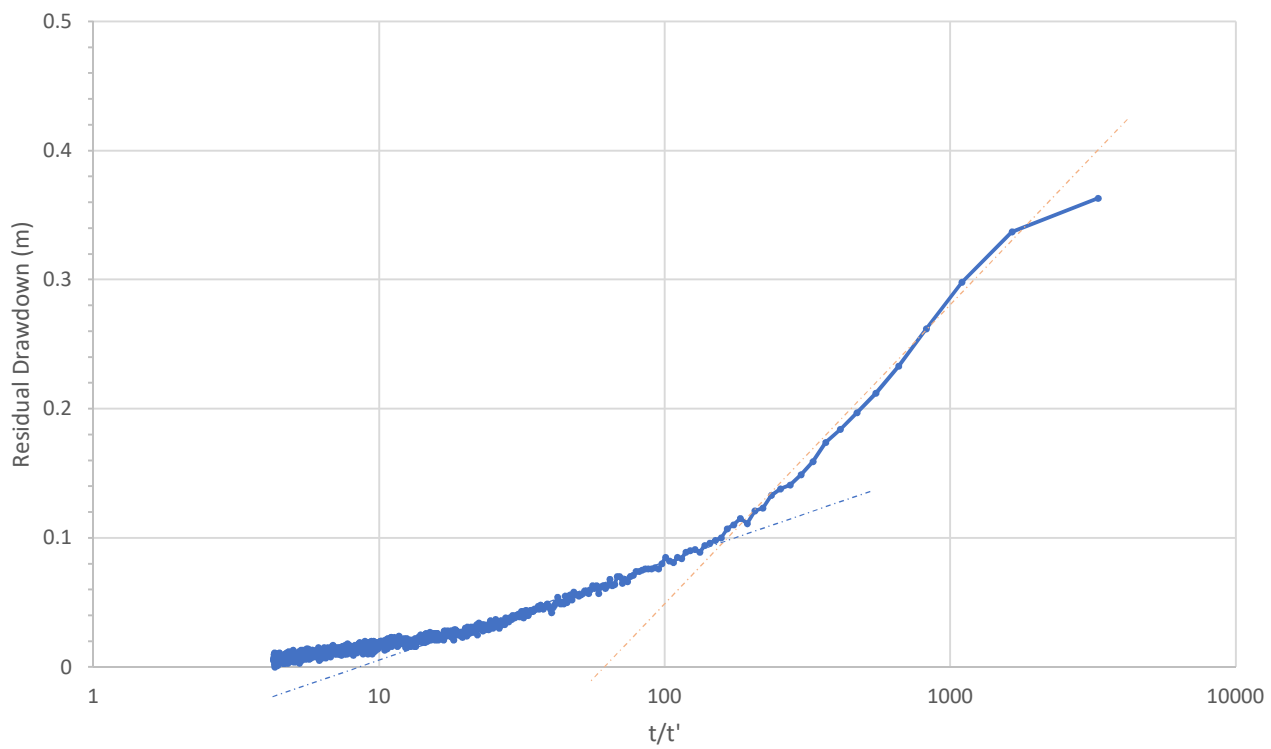
m/d **2.92** **1.12**

Permeability, $k = 0.133 \times S \times (rc^2/L)$, (m/sec)
 where $S = (\log (h_1/h_2))/(t_2 - t_1)$,
 (ie slope of plot, t in mins)

Drawdown Plot

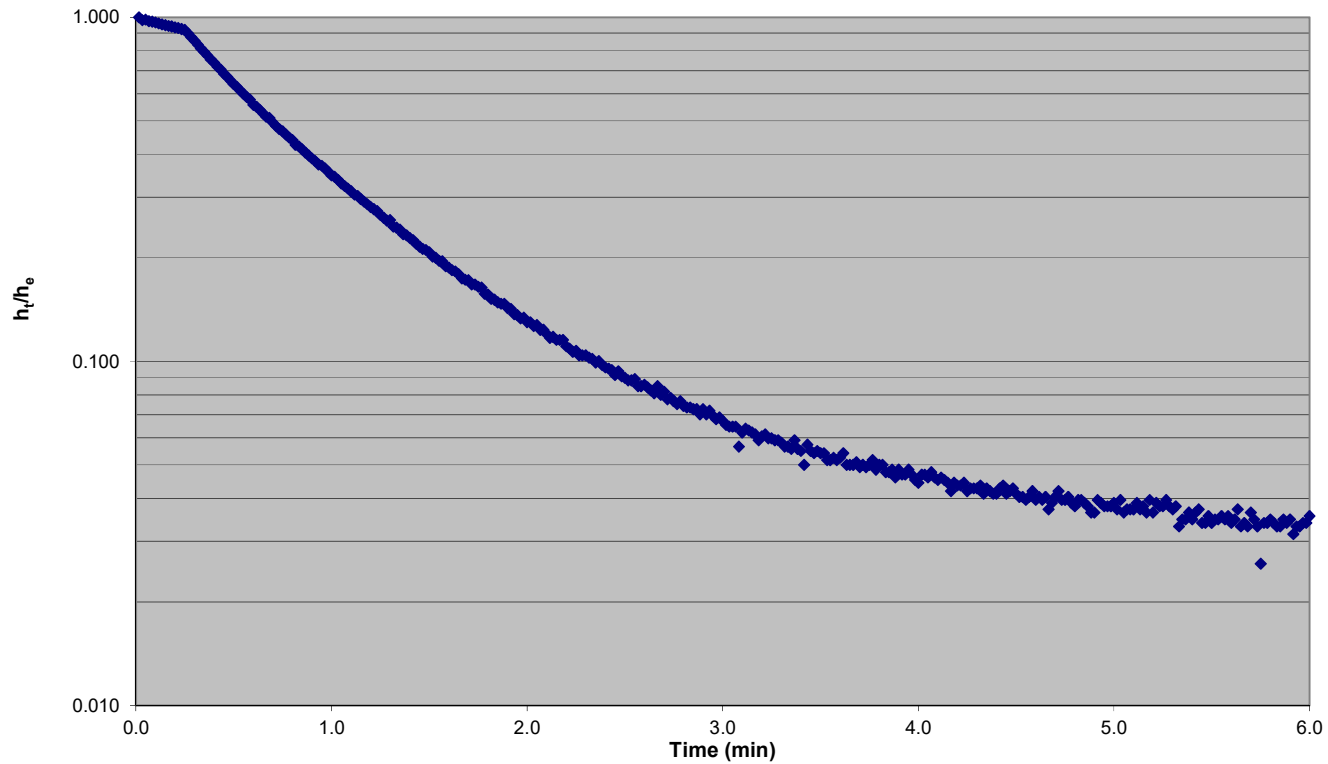


Recovery Plot



Bore No:	YA_MB05S	Test No:	0	Job No:	136	Date:	30-Apr-19	Logged by:	BDK
Borehole co-ordinates: Easting:	0	Northing:	0	Collar elevation (m):	0				
Depth to top of test section (m):	2	Length of test section, L (m):	7.03						
Depth of static water level, H_w (m):	1.16	Radius of borehole, r (m):	0.13						
Excess head, h₀ (m):	1.24	Radius of standpipe or casing, r_c (m):	0.05						

Head - time graph (slope of graph is S)



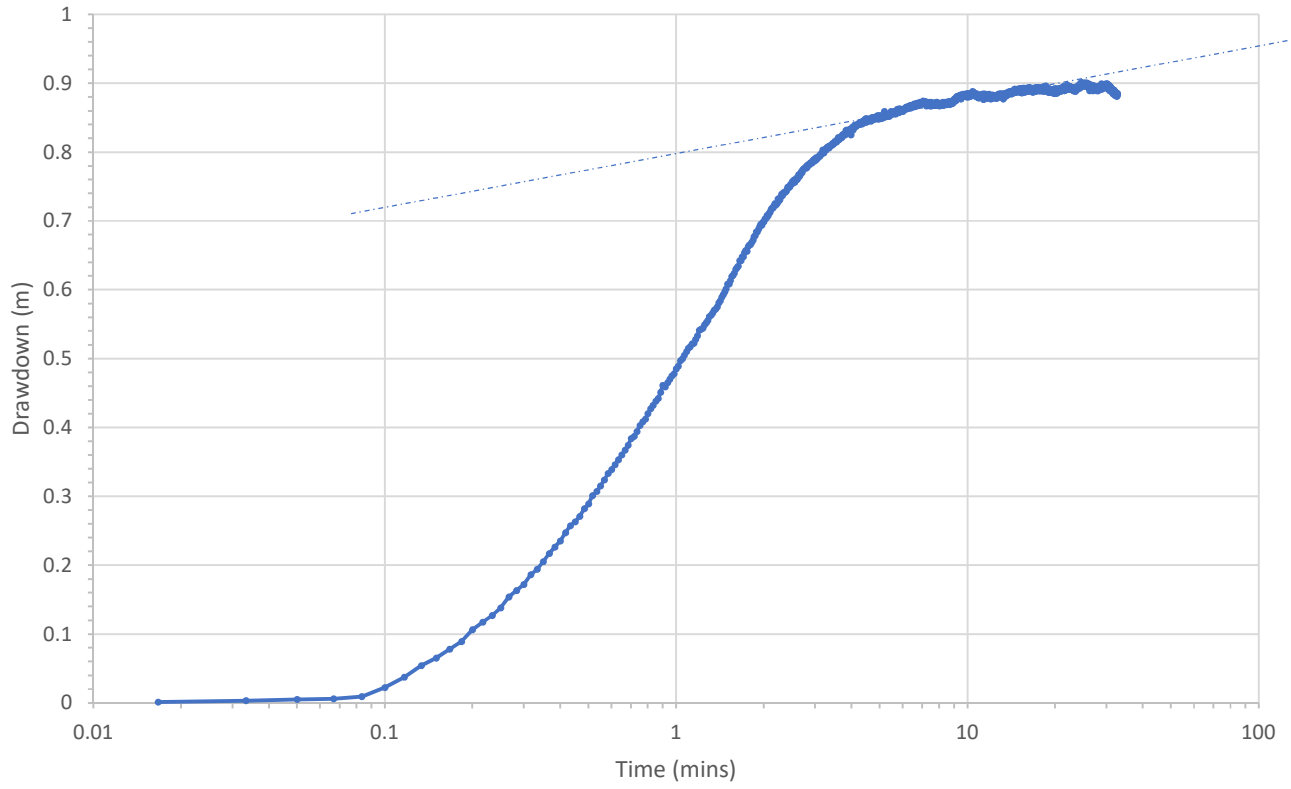
Calculations:

h₁	0.35
t₁	1.0
h₂	0.21
t₂	1.5
S	4.5E-01
k	2.11E-05

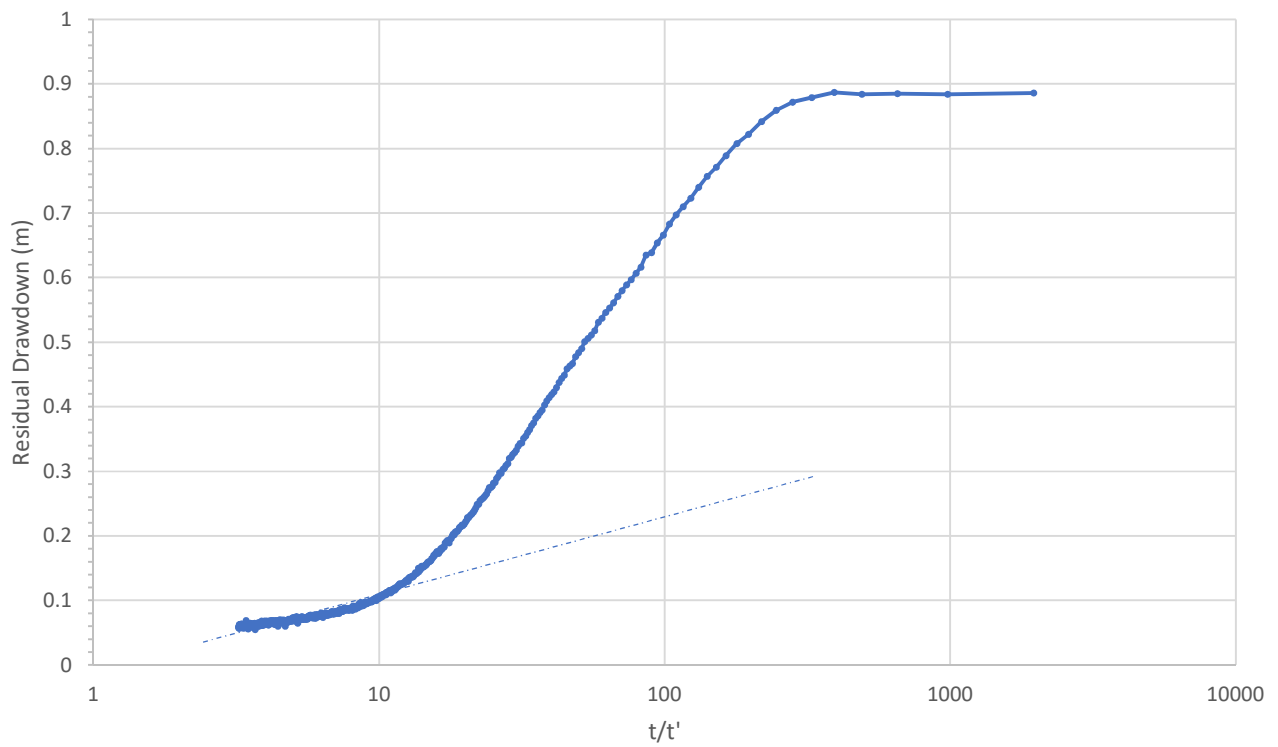
m/d **1.83**

Permeability, $k = 0.133 \times S \times (rc^2/L)$, (m/sec)
 where $S = (\log(h_1/h_2))/(t_2 - t_1)$,
 (ie slope of plot, t in mins)

Drawdown Plot

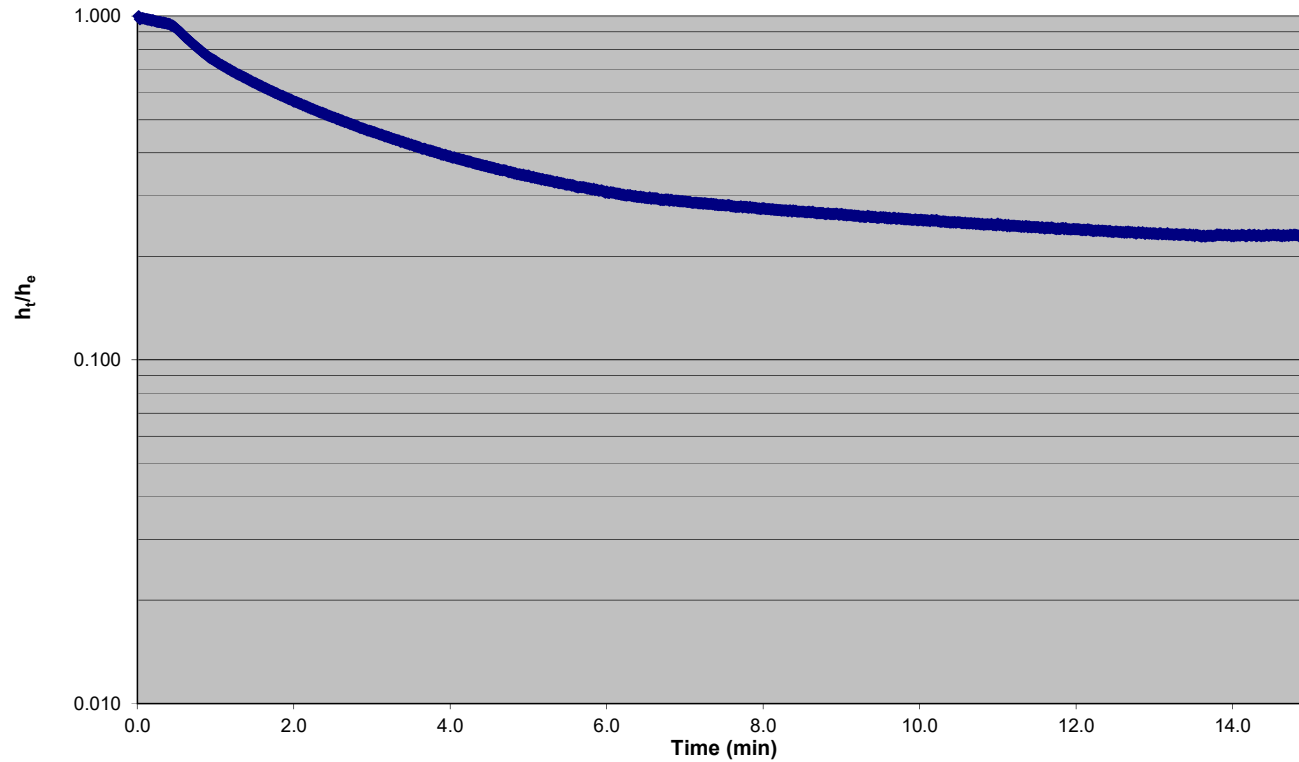


Recovery Plot



Bore No:	YA_MB06S	Test No:	0	Job No:	136	Date:	30-Apr-19	Logged by:	BDK
Borehole co-ordinates: Easting:	0	Northing:	0	Collar elevation (m):	0				
Depth to top of test section (m):	2	Length of test section, L (m):	5.78						
Depth of static water level, H_w (m):	2.9	Radius of borehole, r (m):	0.13						
Excess head, h_e (m):	2.84	Radius of standpipe or casing, r_c (m):	0.05						

Head - time graph (slope of graph is S)



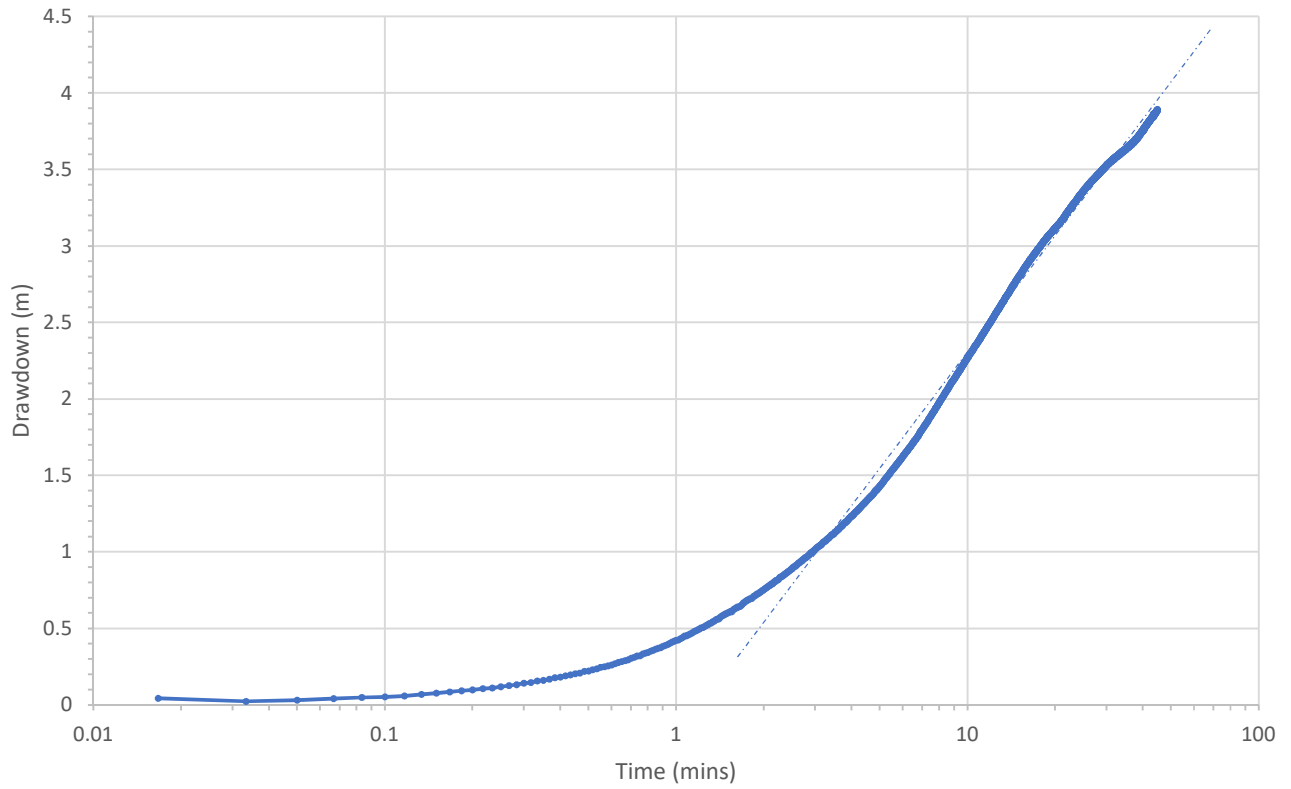
Calculations:

h₁	0.74	0.35
t₁	1.0	4.8
h₂	0.57	0.27
t₂	2.0	9.0
S	1.2E-01	2.9E-02
k	6.70E-06	1.65E-06

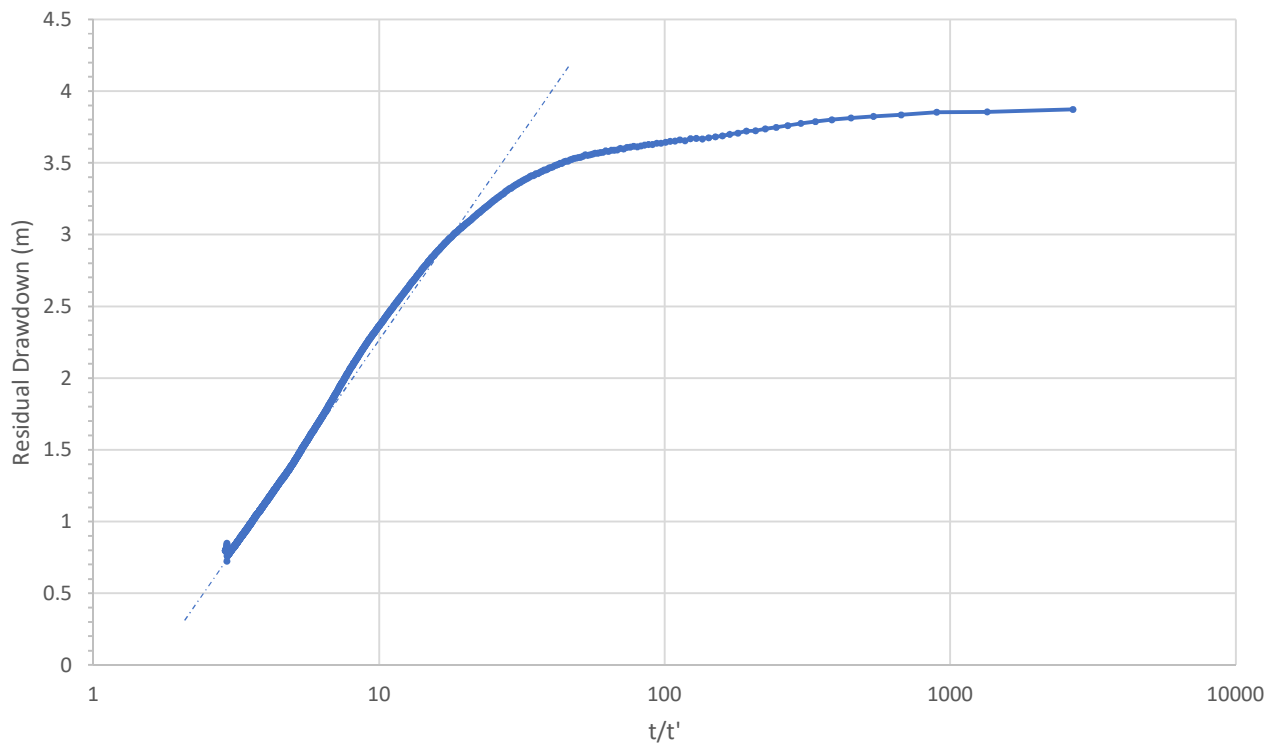
m/d **0.58** **0.14**

Permeability, $k = 0.133 \times S \times (rc^2/L)$, (m/sec)
 where $S = (\log (h_1/h_2))/(t_2 - t_1)$,
 (ie slope of plot, t in mins)

Drawdown Plot

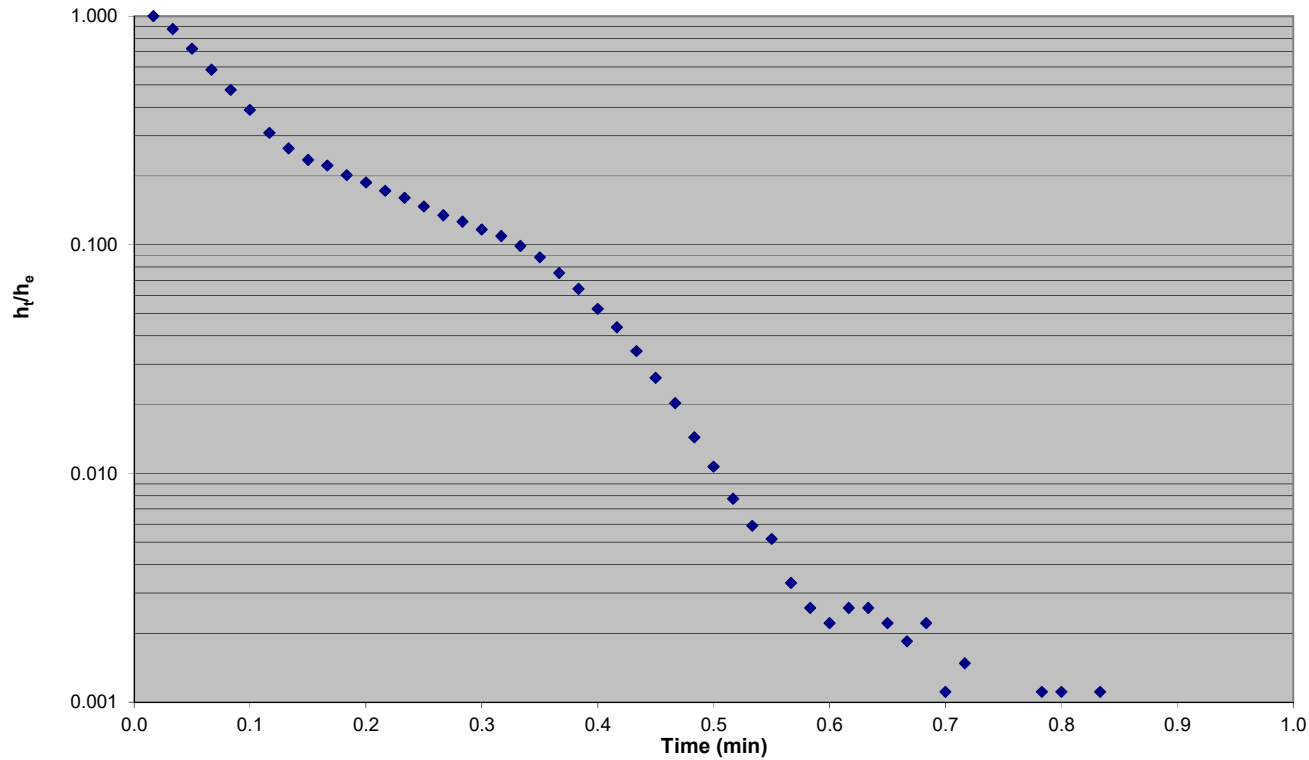


Recovery Plot



Bore No:	YA_MB07S	Test No:	0	Job No:	136	Date:	30-Apr-19	Logged by:	BDK
Borehole co-ordinates: Easting:	0	Northing:	0	Collar elevation (m):	0				
Depth to top of test section (m):	2	Length of test section, L (m):	4.2						
Depth of static water level, H_w (m):	3.84	Radius of borehole, r (m):	0.07						
Excess head, h_e (m):	2.71	Radius of standpipe or casing, r_c (m):	0.025						

Head - time graph (slope of graph is S)



Calculations:

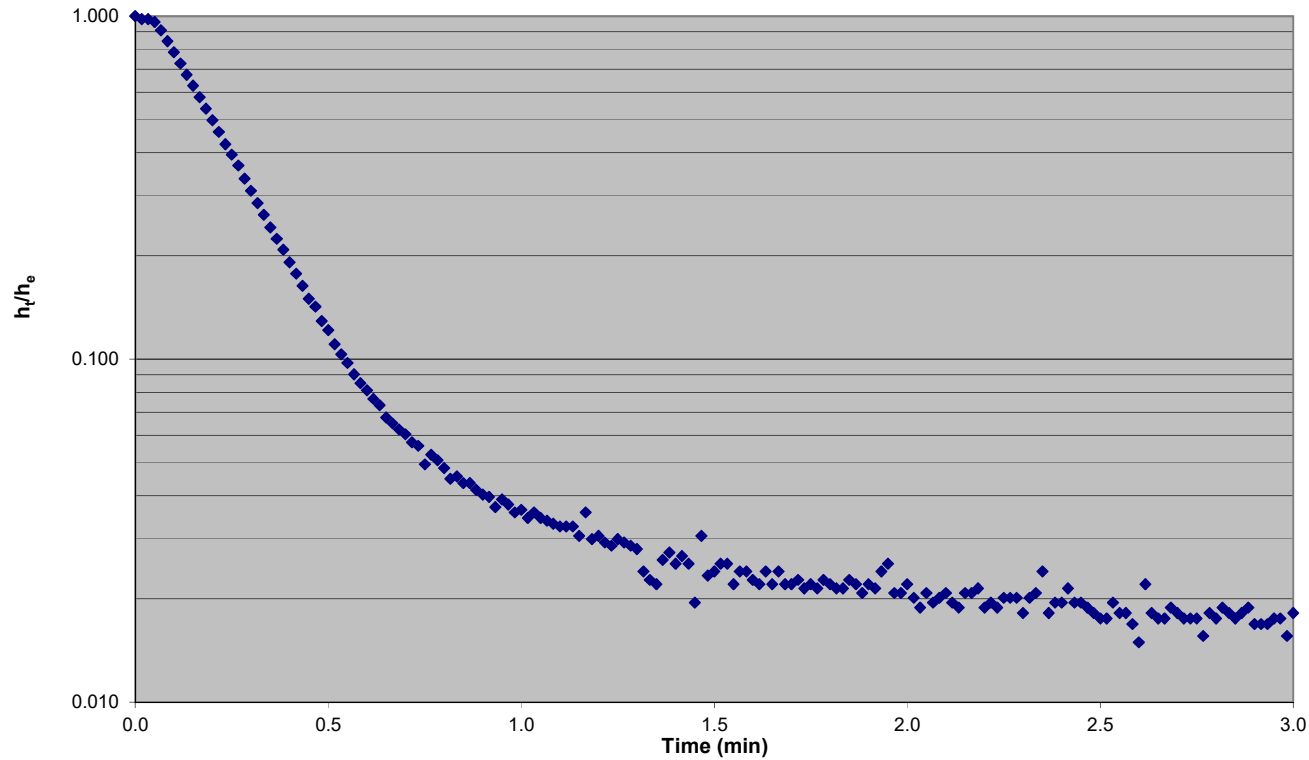
h₁	0.72	0.05
t₁	0.05	0.4
h₂	0.39	0.01
t₂	0.10	0.5
S	5.4E+00	6.9E+00
k	1.06E-04	1.37E-04

m/d **9.16** **11.80**

Permeability, $k = 0.133 \times S \times (rc^2/L)$, (m/sec)
 where $S = (\log(h_1/h_2))/(t_2 - t_1)$,
 (ie slope of plot, t in mins)

Bore No:	YA_MB08S	Test No:	0	Job No:	136	Date:	30-Apr-19	Logged by:	BDK
Borehole co-ordinates: Easting:	0	Northing:	0	Collar elevation (m):	0				
Depth to top of test section (m):	2	Length of test section, L (m):	8.15						
Depth of static water level, H_w (m):	1.69	Radius of borehole, r (m):	0.13						
Excess head, h_e (m):	1.54	Radius of standpipe or casing, r_c (m):	0.05						

Head - time graph (slope of graph is S)



Calculations:

h₁	0.34
t₁	0.3
h₂	0.19
t₂	0.4
S	2.1E+00
k	8.52E-05

m/d **7.36**

Permeability, $k = 0.133 \times S \times (rc^2/L)$, (m/sec)
 where $S = (\log(h_1/h_2))/(t_2 - t_1)$,
 (ie slope of plot, t in mins)