

**Environmental  
Geotechnical  
Specialists**

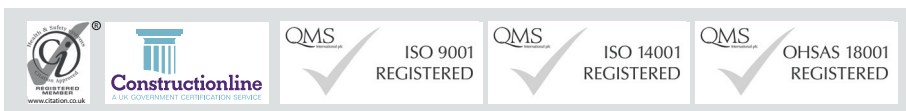


# GEOTECHNICAL REPORT

GEOTECHNICAL  
ENVIRONMENTAL

job number	date
site address	
written by	checked by
issued by	

**Rogers Geotechnical Services Ltd**  
**Telephone** 0843 50 666 87 **Fax** 0843 51 599 30  
**Email** enquiries@rogersgeotech.co.uk  
**www.rogersgeotech.co.uk**  
Offices 1 & 2, Barncliffe Business Park, Near Bank, Shelley,  
Huddersfield, West Yorkshire HD8 8LU.





## Report on Soakaway Testing

Location: 758 New Hey Road  
Outlane, Huddersfield, HD3 3YJ

For: Acumen

Report No. J4332/18/L/S

Report Date: August 2018

For and on behalf of **Rogers Geotechnical Services Ltd**

**Dan Goodwin** EngTech MInstRE  
Geotechnical Engineer

**Steve Rogers** CEng, CGeol, MICE, MCIHT, FGS, ACIEH  
Technical Director

### Report Summary<sup>1</sup>

Item	Comments	Section
Geology	Rossendale Formation.	4.
Strata Conditions	Site dominated by Made Ground with underlying Clay.	5.
Groundwater	None.	5.
Suitability of Soakaways	Yes, with considerations.	7.

<sup>1</sup> This summary should not be relied upon to provide a comprehensive review. All of the information contained in this document should be considered.



## 1. Introduction

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We thank you for your request to undertake percolation testing at the above mentioned site and take pleasure in enclosing the results of this work. The investigation was undertaken on the 9<sup>th</sup> August 2018 in accordance with your instruction to proceed. This report describes the work undertaken, presents the data obtained and discusses the results of the tests.

## 2. Limitations

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The recommendations made and opinions expressed in this report are based on the ground conditions revealed by the site works, together with an assessment of the site. Whilst opinions may be expressed relating to sub-soil conditions in parts of the site not investigated, for example between trialpit positions, these are for guidance only and no liability can be accepted for their accuracy.

This report has been prepared in accordance with our understanding of current best practice. However, new information or legislation, or changes to best practice may necessitate revision of the report after the date of issue.

## 3. Fieldworks

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Three trialpits were excavated in order to undertake soakaway testing, the positions of which are shown on a site plan in Appendix 1. The soakaway tests were undertaken at the base of the pit at depths rational to the construction of soakaways. The soils exposed in the trialpits were logged on site in general accordance with BS5930: 2015, and full descriptions are given on the trialpit records which are presented in Appendix 2.

Once excavations were completed, the trialpits were carefully re-instated with the arisings. Whilst every care was taken during the infilling process, including compacting of the infill at regular intervals with the back acting arm of the excavator, it should be appreciated that some mounding of the surface may have resulted. Moreover, the infilled soils may be subjected to settlement over time, such that a depression in the surface may also occur. Therefore, the locations of any pits undertaken in this investigation should be conveyed to the current site user, as the mounds or depressions associated with the pits may present a risk to current site operations. Furthermore, it must be realised that the infilled pits represent an area of disturbance within the site soils, thus the soils at the pit locations may vary characteristically compared to the undisturbed ground. As such, foundations placed in this disturbed material may not perform as anticipated.



## 4. Geology

The available published geological data for the site has been examined and the following table presents the anticipated geology.

**Table 1: Geological Data for the Site**

Strata Type	Strata Name <sup>2</sup>	Previous Name <sup>3</sup>	Description <sup>3</sup>
Superficial Geology	-	-	None Recorded.
Solid Geology	Rossendale Formation	Rough Rock Grit Group	Fine to very coarse grained feldspathic sandstones, interbedded with grey siltstones and mudstones, with subordinate marine black shales, thin coals and seatearths.

## 5. Strata Conditions

In accordance with the geology of the area, the succession has been shown to include the following:

**Table 2: Generalised Strata Profile**

Depth m below ground level to underside of layer	Strata Type	Positions Layer Revealed	Groundwater Strikes m below ground level
0 – 1.0 (SA1) 0 – 1.15 (SA2) 0 – 2.0+ (SA3)	Made Ground (Gravelly SAND with cobbles & boulders).	All	None
1.0 – 1.7+ (SA1) 1.15 - 1.8+ (SA2)	CLAY	SA1 & SA2	None

'+' denotes that the strata extended below the termination depth of the investigated positions, thus the extent of the deposit is only proven to the depths indicated.

## 6. Soakaway Testing

On reaching the elected soakaway test depth, the pits were trimmed and squared as much as practicable. Water was then introduced into the pit at a controlled rate to prevent collapse of the sides and the level monitored at time intervals relative to a reference bar at ground level. The results obtained from the soakaway tests are presented at Appendix 3 and are summarised below:

<sup>2</sup> Sources: British Geological Survey (NERC) Map Sheets 88NE; Huddersfield, Dewsbury, Halifax; Solid and Drift Edition, and Geology of Britain Viewer [online resource from [www.bgs.ac.uk](http://www.bgs.ac.uk)]

<sup>3</sup> Sources: British Geological Survey (NERC) Lexicon of Named Rock Units [online resource from [www.bgs.ac.uk](http://www.bgs.ac.uk)]

**Table 3: Soakaway Test Results**

Location	Soakage Area Dimensions (average) (m)	Depths of soaked strata (m)	Soil Description (of soaked strata)	Infiltration Rate (m/sec)	*Drainage Characteristics
SA1	1.5 x 0.4	0.85 to 1.7	Side – Made Ground (Gravelly Sand) Base – CLAY	0	Impervious
SA2	1.4 x 0.5	0.82 to 1.8	Side – Made Ground (Gravelly Sand) Base – CLAY	0	Impervious
SA3	1.5 x 0.4	1.15 to 2.0	Side – Made Ground (Gravelly Sand) Base – Made Ground (Gravelly Sand)	2.7x10 <sup>-4</sup> 1.7x10 <sup>-4</sup> 1.9x10 <sup>-4</sup>	Good

\*Based on the most onerous results for each test.

## 7. Discussion

The soils encountered beneath the made ground were found to be typical of the underlying Rossendale Formation. The strata conditions appear to be comparable across the site although the clay layer was not encountered at SA3. In this instance, the infiltration testing has revealed the soils drainage characteristics to be impervious at the clay layer that was encountered at SA1 & SA2 and Good at the location of SA3 where the clay layer was not encountered. Therefore, soakaways can be recommended at this site in the location of SA3 but not in the other locations across the site as although they still consist of the made ground material, this material rests upon an impermeable layer of clay and bearing in mind that we have endured a prolonged period of dry weather, it is possible that during wet periods the water table could rise, reducing the storage volume within this material. This should also be taken into account with the location SA3, although we didn't encounter the clay layer to a depth of 2.2m this is not to say that the layer is not present at all.

## 8. References

- Building Research Establishment (BRE) Digest 365, *Soakaway Design*, September 1991.
- British Standards Institution (1999) BS5930: *Code of practice for site investigations*, B.S.I., London.
- British Standards Institution (2007), Amendment No 1, BS5930: *Code of practice for site investigations*, B.S.I., London.
- Barnes, G. (2000). *Soil Mechanics Principle and Practice*. 2nd ed. London: Macmillan Press Ltd, p.47.



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## Appendix 1

### Site Plan

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Plan not to scale and investigation positions approximated from site operative's notes.

Title: **Investigation Location Plan**



Rogers **Geotechnical Services** Ltd

Site Name:  
**758 New Hey Road, Outlane**

Job No:  
**J4332/18/L/S**



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## Appendix 2

### Trialpit Records

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# Trial Pit Log

Trialpit No

**SA1**

Sheet 1 of 1

Project Name: 758 New Hey Road

Project No.  
J4332/18/L/SCo-ords: -  
Level:Date  
09/08/2018

Location: Outlane

Dimensions  
(m):

1.5

Scale

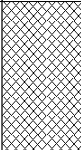
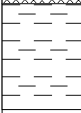
1:50

Client: Acumen

Depth  
1.70

0.4

Logged  
DnG

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				1.00			MADE GROUND (Loose dark brown gravelly SAND with common cobbles of brick and concrete. Gravel is fine to coarse sub-angular concrete, bricks and rubble).
				1.70			Soft dark brown mottled grey CLAY.
							End of pit at 1.70 m



Remarks:

Stability:





# Trial Pit Log

Trialpit No

**SA2**

Sheet 1 of 1

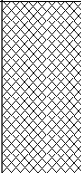

Project Name: 758 New Hey Road

Project No.  
J4332/18/L/SCo-ords: -  
Level:Date  
09/08/2018

Location: Outlane

Dimensions (m):  
Depth 1.80  
1.4  
0.5Scale  
1:50  
Logged  
DnG

Client: Acumen

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				1.15			MADE GROUND (Loose dark brown gravelly SAND with common cobbles and boulders of brick and sandstone. Gravel is fine to coarse sub-angular rubble, bricks and sandstone).
				1.80			Soft dark brown mottled grey CLAY.
							End of pit at 1.80 m



Remarks:

Stability:





# Trial Pit Log

Trialpit No

**SA3**

Sheet 1 of 1

Project Name: 758 New Hey Road

Project No.  
J4332/18/L/SCo-ords: -  
Level:Date  
09/08/2018

Location: Outlane

Dimensions  
(m):

1.5

Scale

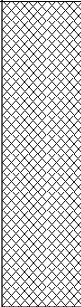
1:50

Client: Acumen

Depth  
2.02

0.4

Logged  
DnG

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				2.02			MADE GROUND (Loose dark brown gravelly SAND with common cobbles of brick and sandstone. Gravel is fine to coarse sub-angular rubble, bricks and sandstone).
							End of pit at 2.02 m

1  
2  
3  
4  
5  
6  
7  
8  
9  
10

Remarks:

Stability:





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## Appendix 3

### Soakaway Results

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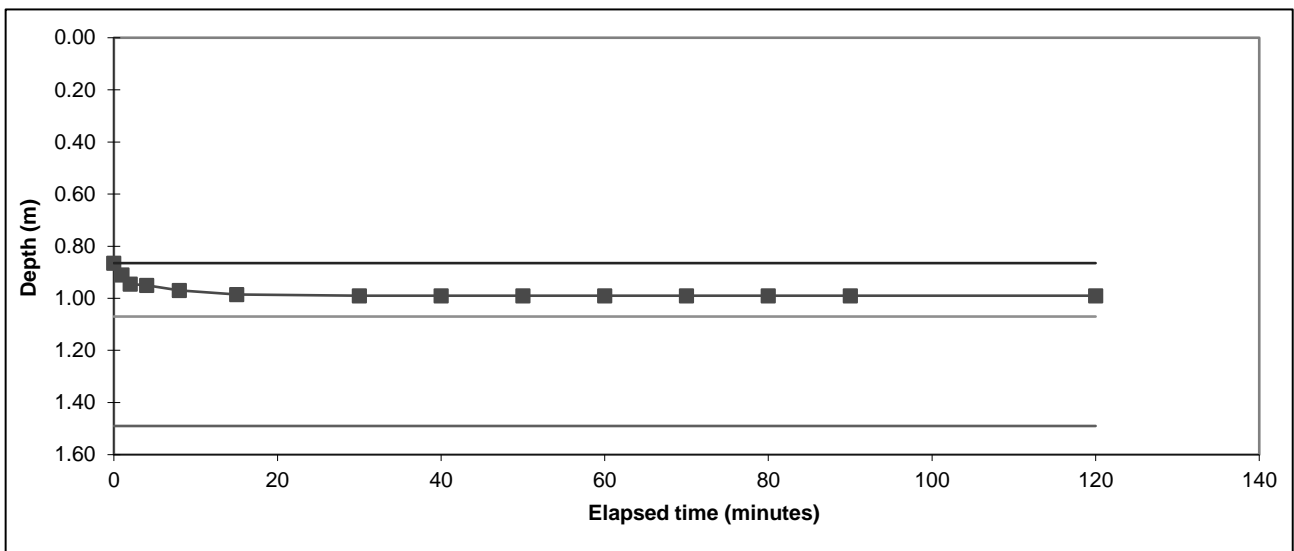
# Rogers Geotechnical Services Ltd

## Soakaway Test

Trial Pit No:	SA1	Test No:	1	Date:	09/08/2018
Length (m):	1.500	Datum Height:			0.00 m agl
Width (m):	0.40	Granular infill:	None		
Depth (m):	1.70	Porosity of infill:	1	(assumed)	

Elapsed time (minutes)	Water Depth (m below datum)	Elapsed time (minutes)	Water Depth (m below datum)
0	0.865		
1	0.910		
2	0.945		
4	0.950		
8	0.970		
15	0.985		
30	0.990		
40	0.990		
50	0.990		
60	0.990		
70	0.990		
80	0.990		
90	0.990		
120	0.990		



Start water depth for analysis (mbgl):	0.87	Elapsed time (mins):	#N/A
75% effective depth (mbgl):	1.07	Elapsed time (mins):	#N/A
50% effective depth (mbgl):	1.28	Elapsed time (mins):	#N/A
25% effective depth (mbgl):	1.49	Elapsed time (mins):	#N/A
Base of soakage zone (mbgl):	1.70		
Volume outflow between 75% and 25% effective depth (m <sup>3</sup> ):			
Mean surface area of outflow (m <sup>2</sup> ):		2.20	
(side area at 50% effective depth + base area)			
Time for outflow between 75% and 25% effective depth (mins):			

<b>Soil infiltration rate (m/s):</b>	<b>Test incomplete as 25% effective depth not achieved. Unable to reliably determine soil infiltration rate.</b>
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<b>Remarks</b>	Results processed following BRE 365 (2007). <b>Clay layer at 0.99m found to be impervious.</b>
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<b>Client:</b>	Acumen	<b>Job No:</b>	J4332/18/LS
<b>Site:</b>	758 New Hey Road, Outlane		

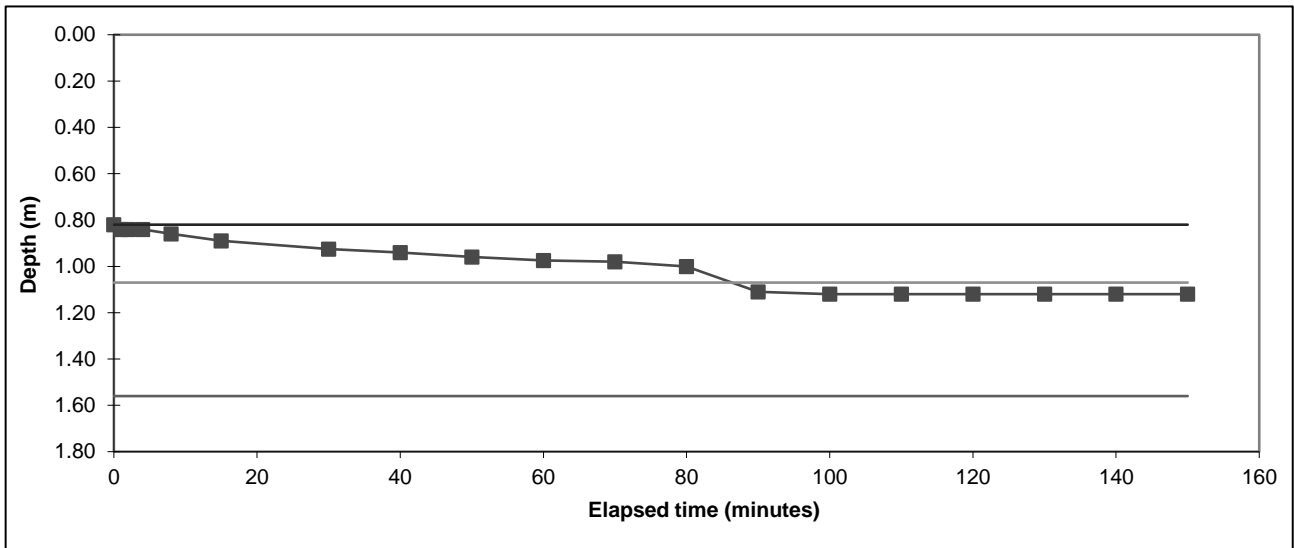
# Rogers Geotechnical Services Ltd

## Soakaway Test

Trial Pit No:	SA2	Test No:	1	Date:	09/08/2018
Length (m):	1.400	Datum Height:			0.00 m agl
Width (m):	0.50	Granular infill:	None		
Depth (m):	1.80	Porosity of infill:	1	(assumed)	

Elapsed time (minutes)	Water Depth (m below datum)	Elapsed time (minutes)	Water Depth (m below datum)
0	0.820	110	1.120
1	0.840	120	1.120
2	0.840	130	1.120
4	0.840	140	1.120
8	0.860	150	1.120
15	0.890		
30	0.925		
40	0.940		
50	0.960		
60	0.975		
70	0.980		
80	1.000		
90	1.110		
100	1.120		



Start water depth for analysis (mbgl):	0.82	Elapsed time (mins):	
75% effective depth (mbgl):	1.07	Elapsed time (mins):	86.4
50% effective depth (mbgl):	1.31	Elapsed time (mins):	#N/A
25% effective depth (mbgl):	1.56	Elapsed time (mins):	#N/A
Base of soakage zone (mbgl):	1.80		
Volume outflow between 75% and 25% effective depth (m <sup>3</sup> ):			
Mean surface area of outflow (m <sup>2</sup> ):			2.56
(side area at 50% effective depth + base area)			
Time for outflow between 75% and 25% effective depth (mins):			

<b>Soil infiltration rate (m/s):</b>	<b>Test incomplete as 25% effective depth not achieved. Unable to reliably determine soil infiltration rate.</b>
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<b>Remarks</b>	Results processed following BRE 365 (2007). <b>Clay layer at 1.1m found to be impervious.</b>
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<b>Client:</b>	Acumen	<b>Job No:</b>	J4332/18/LS
<b>Site:</b>	758 New Hey Road, Outlane		

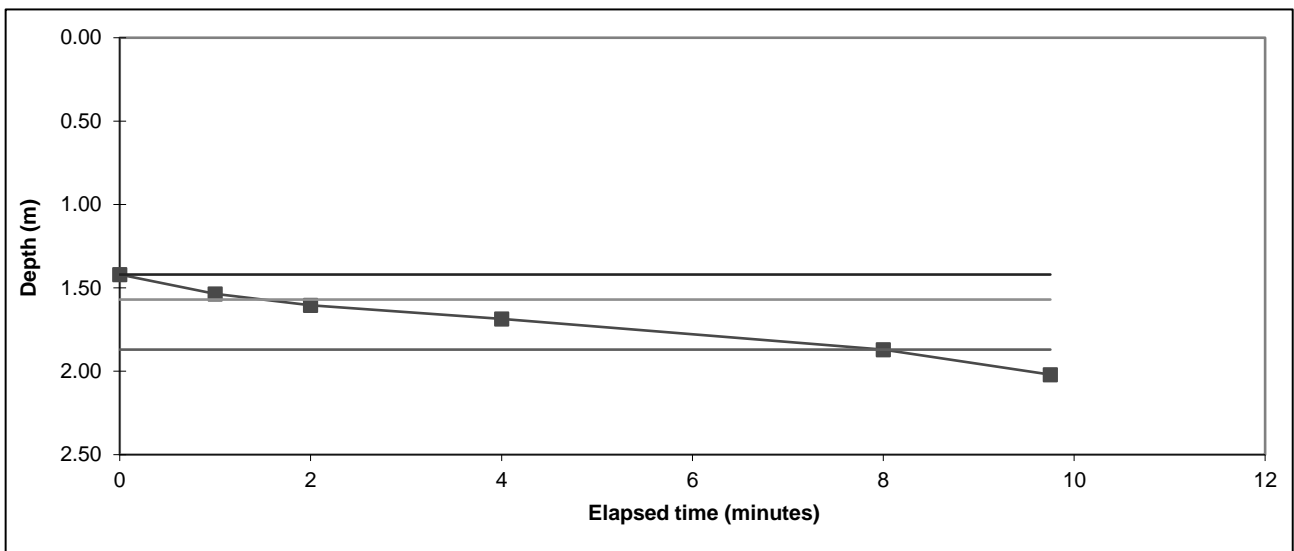
# Rogers Geotechnical Services Ltd

## Soakaway Test

Trial Pit No:	SA3	Test No:	1	Date:	09/08/2018
Length (m):	1.500	Datum Height:			0.00 m agl
Width (m):	0.40	Granular infill:	None		
Depth (m):	2.02	Porosity of infill:	1	(assumed)	

Elapsed time (minutes)	Water Depth (m below datum)	Elapsed time (minutes)	Water Depth (m below datum)
0	1.420		
1	1.535		
2	1.605		
4	1.685		
8	1.870		
9.75	2.020		



Start water depth for analysis (mbgl):	1.42		
75% effective depth (mbgl):	1.57	Elapsed time (mins):	1.5
50% effective depth (mbgl):	1.72		
25% effective depth (mbgl):	1.87	Elapsed time (mins):	8.0
Base of soakage zone (mbgl):	2.02		
Volume outflow between 75% and 25% effective depth (m <sup>3</sup> ):			0.180
Mean surface area of outflow (m <sup>2</sup> ):			1.74
(side area at 50% effective depth + base area)			
Time for outflow between 75% and 25% effective depth (mins):			6.5

<b>Soil infiltration rate (m/s):</b>	<b>2.7E-4</b>
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**Remarks** Results processed following BRE 365 (2007).  
Run 1 1000Ltrs used

<b>Client:</b>	Acumen	<b>Job No:</b>	J4332/18/LS
<b>Site:</b>	758 New Hey Road, Outlane		

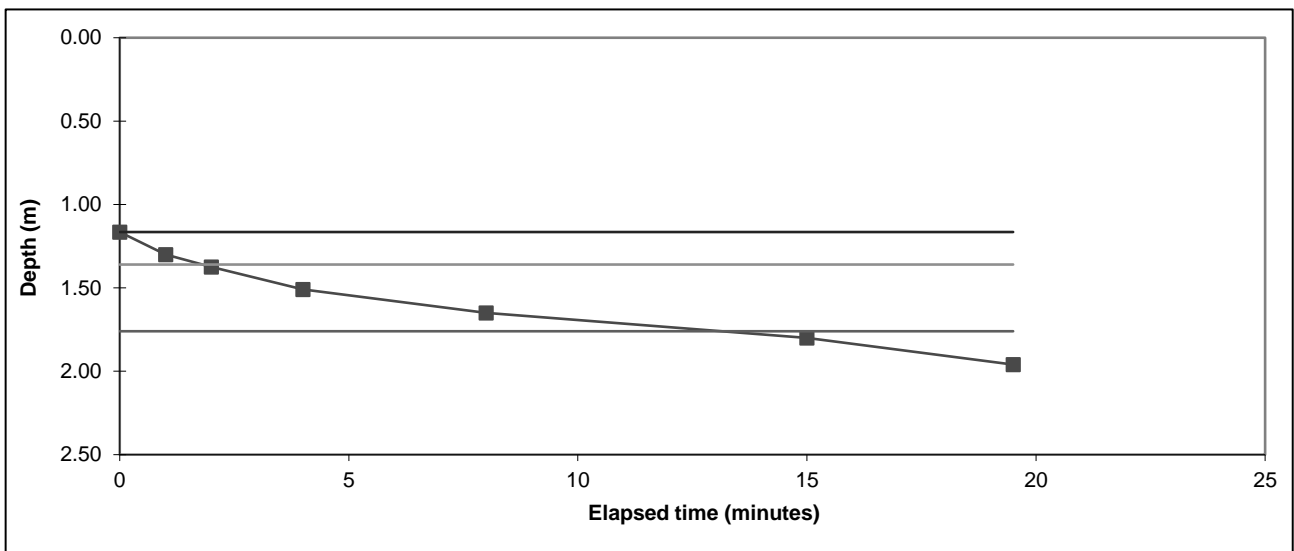
# Rogers Geotechnical Services Ltd

## Soakaway Test

Trial Pit No:	SA3	Test No:	2	Date:	09/08/2018
Length (m):	1.500	Datum Height:			0.00 m agl
Width (m):	0.40	Granular infill:	None		
Depth (m):	1.96	Porosity of infill:	1		(assumed)

Elapsed time (minutes)	Water Depth (m below datum)	Elapsed time (minutes)	Water Depth (m below datum)
0	1.165		
1	1.300		
2	1.375		
4	1.510		
8	1.650		
15	1.800		
19.5	1.960		



Start water depth for analysis (mbgl):	1.17		
75% effective depth (mbgl):	1.36	Elapsed time (mins):	1.8
50% effective depth (mbgl):	1.56		
25% effective depth (mbgl):	1.76	Elapsed time (mins):	13.1
Base of soakage zone (mbgl):	1.96		
Volume outflow between 75% and 25% effective depth (m <sup>3</sup> ):			0.240
Mean surface area of outflow (m <sup>2</sup> ):			2.12
(side area at 50% effective depth + base area)			
Time for outflow between 75% and 25% effective depth (mins):			11.3

<b>Soil infiltration rate (m/s):</b>	<b>1.7E-4</b>
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**Remarks** Results processed following BRE 365 (2007).  
Run 2 1000Ltrs used

<b>Client:</b>	Acumen	<b>Job No:</b>	J4332/18/LS
<b>Site:</b>	758 New Hey Road, Outlane		

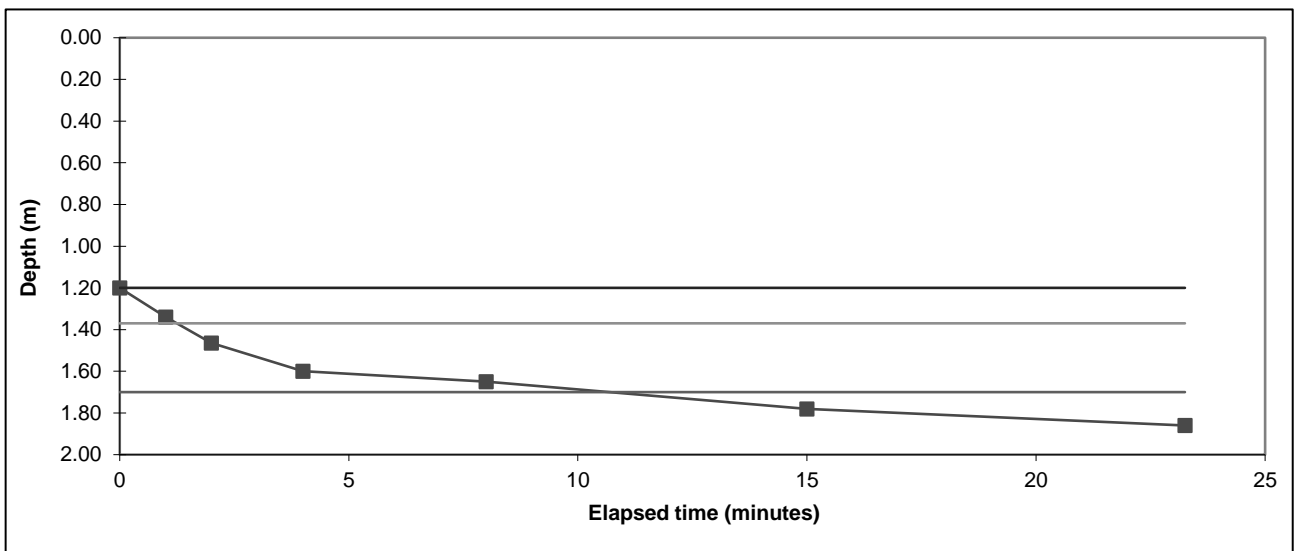
# Rogers Geotechnical Services Ltd

## Soakaway Test

Trial Pit No:	SA3	Test No:	3	Date:	09/08/2018
Length (m):	1.500	Datum Height:		0.00 m agl	
Width (m):	0.40	Granular infill:	None		
Depth (m):	1.86	Porosity of infill:	1	(assumed)	

Elapsed time (minutes)	Water Depth (m below datum)	Elapsed time (minutes)	Water Depth (m below datum)
0	1.200		
1	1.340		
2	1.465		
4	1.600		
8	1.650		
15	1.780		
23.25	1.860		



Start water depth for analysis (mbgl):	1.20	Elapsed time (mins):	
75% effective depth (mbgl):	1.37	Elapsed time (mins):	1.2
50% effective depth (mbgl):	1.53	Elapsed time (mins):	
25% effective depth (mbgl):	1.70	Elapsed time (mins):	10.7
Base of soakage zone (mbgl):	1.86		
Volume outflow between 75% and 25% effective depth (m <sup>3</sup> ):			0.198
Mean surface area of outflow (m <sup>2</sup> ):			1.85
(side area at 50% effective depth + base area)			
Time for outflow between 75% and 25% effective depth (mins):			9.5

<b>Soil infiltration rate (m/s):</b>	<b>1.9E-4</b>
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**Remarks** Results processed following BRE 365 (2007).  
Run 3 1000Ltrs used

<b>Client:</b>	Acumen	<b>Job No:</b>	J4332/18/LS
<b>Site:</b>	758 New Hey Road, Outlane		