

**Environmental** Geotechnical **Specialists** 

# **SOAKAWAY** LETTER REPORT

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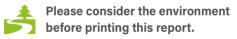
**Rogers Geotechnical Services Ltd** Offices 1 & 2 Barncliffe Business Park, Near Bank, Shelley, Huddersfield, HD8 8LU Company No. 5130864 **\$ 01484 604354** 



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	Report on Soakaway	<b>Testing</b>	
Location:	28 Low Cudworth Green Cudworth, Barnsley, S72 8EF		
For:	Smart Developments (West Yorkshire) Ltd		
Consultants:	Northern Design Partnership		
Report No.	C3124/23/E/5408	Report Date:	May 2023

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

SMA

ng ng

**Steven Hale** BSc Geo-Environmental Technician **Tobias Merry** MSci (Hons), FGS Graduate Geo-environmental Engineer

	Report Summary <sup>1</sup>	
Item	Comments	Section
Geology	No superficial geology overlaying Pennine Middle Coal Measures Formation.	4.
Strata Conditions	Significant thickness of cohesive and granular made ground overlaying silty clay (weathered fraction of the underlying rock).	5.
Groundwater	No groundwater strikes noted during investigation.	5.
Suitability of Soakaways	Not recommended.	7.

<sup>&</sup>lt;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

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 16<sup>th</sup> May 2023 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

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 trial pit 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

Two trial pits were excavated in order to undertake soakaway testing, the positions of which are shown 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 trial pits were logged on site in general accordance with BS5930: 2015 +A1: 2020, and full descriptions are given on the trial pit records which are presented in Appendix 2. Photographs of the trial pits are included within Appendix 3.

Once excavations were completed, the trial pits 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: Geo	logical Data for the	Site	
Strata Type	Strata Name <sup>2</sup>	Previous Name <sup>3</sup>	Description <sup>3</sup>
Superficial Geology	-	-	None indicated beneath the site.
Solid Geology	Pennine Middle Coal Measures Formation	Middle Coal Measures Formation	Interbedded grey mudstone, siltstone, pale grey sandstone and commonly coal seams, with a bed of mudstone containing marine fossils at the base, and several such marine fossil-bearing mudstones in the upper half of the unit.

No superficial geology is noted to underlie the site, and as a result, the on-site soils are considered to consist of the weathered fraction of the bedrock geology.

#### 5. Strata Conditions

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

Table 2: Gen	eralised Strata Profile		
<b>Depth</b> m below ground level to underside of layer	Strata Type	Positions Layer Revealed	Groundwater Strikes m below ground level
0.60	TOPSOIL (Dark brown slightly sandy gravelly clayey SILT with low cobble content).	TP01	None
0.40	TOPSOIL (Dark brown sandy slightly gravelly clayey SILT).	TP02	None
+1.29	Soft to firm brown mottled light grey sandy slightly gravelly silty CLAY.	TP01	None
0.95	Soft to firm brown mottled light grey slightly sandy silty CLAY.	TP02	None
+1.28	Firm light grey mottled brown slightly sandy silty CLAY.	TP02	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.

<sup>&</sup>lt;sup>2</sup> Sources: British Geological Survey (NERC) Map Sheets 87; Barnsley; Solid and Drift Edition, and Geology of Britain Viewer [*online resource from www.bgs.ac.uk*]

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



### 6. Insitu Testing

#### 6.1 Soakaway Test

On reaching the elected soakaway test depth, the pit was 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 4 and are summarised below:

Table 3:	Soakaway T	est Results	5		
Location	Soakage Area Dimensions (average) (m)	Depths of soaked strata (m)	Soil Description (of soaked strata)	Infiltration Rate (m/sec)	Drainage Characteristics
TP01	2.20 x 0.50	0.81 to 1.29	Side – Slightly gravelly, sandy, silty CLAY Base – <i>As above</i>	-	Practically impermeable
TP02	2.10 x 0.40	0.65 to 1.28	Side – Slightly gravelly, sandy, silty CLAY Base – Firm light grey mottled brown slightly sandy silty CLAY.	-	Practically impermeable

During the soakaway tests the water level did not achieve a fall from 75% to 25% of the effective depth of the storage volume in both trial pits. In both tests, there was no measureable movement noted in the water level. On this basis, the tests could not be completed within the scope of the method provided in BRE Digest 365 due to the poor soakage rate of the exposed soils. Due to the negligible water movement it was not possible to extrapolate the results obtained in order to obtain a soil infiltration rate.

#### 7. Discussion

The soils encountered beneath the topsoil were found to be typical of the weathered fraction of the underlying Pennine Middle Coal Measures Formation. The strata conditions and subsequent drainage characteristics appear to be comparable across the site. In this instance, the infiltration testing has revealed that the soils have practically impermeable drainage characteristics. Whilst the topsoil included gravel and cobbles, these soils cannot be recommended as a soakage stratum due to the potential for collapse compression. Therefore, soakaways cannot be recommended at this site and an alternative form of drainage should be adopted.



#### 8. References

- Building Research Establishment (BRE) Digest 365, Soakaway Design, September 1991.
- British Standards Institution (2015 +A1: 2020) BS 5930: Code of practice for ground investigations, B.S.I., London.
- Barnes, G. (2000). Soil Mechanics Principle and Practice. 2nd ed. London: Macmillan Press Ltd, p.47.



Appendix 1 Site Plan



#### Notes:

Investigation positions approximated from site operative's notes.





Appendix 2

**Trial Pit Records** 

								Trialpit I	No
Allin	RGS Environmental Geotechnical Specialists					Tri	al Pit Log	TP0 <sup>4</sup>	
Draia	-4			Projec	t No		Co-ords: -	Sheet 1 o Date	
Projeo Name	E Low Cuc	dworth Gre	een		1/23/E/54		Level:	16/05/20	
Locati	ion <sup>.</sup> 28 l ow (	Cudworth	Green, Cudworth,			-	Dimensions 2.2	Scale	e
		outworth		, Damsicy,			(m): به Depth o	1:50	
Client	t: Smart D	evelopme	ents (West Yorkshi	re) Ltd			1.29	Logge SH	a
er (e	Sample	es and In	Situ Testing	Depth	Level	Lawand			
Water Strike	Depth	Туре	Results	(m)	(m)	Legend	I Stratum Description		
				0.60			TOPSOIL (Dark brown slightly sandy gravelly of SILT with low cobble content. Sand is fine to me gravel is angular to subrounded and fine to coa sandstone and brick. Cobbles are angular to su and less than 200mm of sandstone and brick. Soft to firm brown mottled light grey sandy sligh gravelly slity CLAY. Sand is fine to medium. Gr sub-angular to sub-rounded and fine to medium sandstone. End of pit at 1.29 m	edium. arse of ub-angular / ntly avel is	
									9
Rema Stabil		e			<u> </u>	<u> </u>	1	AC	

								Trialpit I	No
	Environmental Geotechnical Specialists					Tri	al Pit Log	TP02	
				Projec	t No		Co-ords: -	Sheet 1 o Date	
Project Name:	Low Cudwo	orth Green			/23/E/54		Level:	16/05/20	
Location:	· 28 Low Cu	dworth Gre	en, Cudworth, Ba				Dimensions 2.1	Scale	
Location							(m): Depth o	1:50	
Client:	Smart Deve	elopments	(West Yorkshire) I	Ltd			1.28	Logge SH	u
Water Strike		and In Situ ype	<b>I Testing</b> Results	Depth (m)	Level (m)	Legenc	Stratum Description		
Remarks				0.40			TOPSOIL (Dark brown sandy, slightly gravelly, SILT. Sand is fine. Gravel is sub-angular and fir medium sandstone). Soft to firm brown mottled light grey slightly san CLAY. Sand is fine. Firm light grey mottled brown slightly sandy silt Sand is fine. End of pit at 1.28 m	y CLAY.	
Stability:	Stable							AC	S



Appendix 3

**Trial Pit Photographs** 





Photo 1: Image showing TP01.

Site Name:



28 Low Cudworth Green, Cudworth, Barnsley, S72

Job No:

C3124/23/E/5408

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Photo 2: Image showing TP02.





Appendix 4

Soakaway Results

## **Rogers Geotechnical Services L**

#### Soakaway Test

Length (m): 2.200 Datum Height: 0.00 m agl Width (m): 0.50 Granular infill: None Depth (m): 1.29 Porosity of infil: 1 (assumed) Elapsed time (minutes) (m below datum) 0 0.810 (minutes) (m below datum) 1 0.00 (minutes) (m below datum) 1 0.00 (minutes) (m below datum) 1 0 0.810 (minutes) (m below datum) 1 0 0.00 (minutes) (m below datum) 1 0 0.00 (minutes) (m below datum) 1 0 0.01 (minutes) (m below datum) 1 0 0.01 (minutes) (m below datum) 1 0 0.01 (minutes) (m below datum) 1 1 0 20 30 (minutes) (m below datum) 1 1 0 20 30 (minutes) (minutes) (minutes) 1 1 0 20 30 (minutes) (minutes) (minutes) (minutes) 1 1 1 0 20 30 (minutes) (minutes) (minutes) 1 1 1 0 20 30 (minutes) (minutes) (minutes) (minutes) (minutes) 1 1 1 0 20 30 (minutes) (	1 m m m (1 / )	TP01	Test No:	1	Date	
Depth (m):     1.29     Porosity of infili:     1     (assumed)       Elapsed time (minutes)     (m below datum)     Elapsed time (minutes)     Water Depth (minutes)     (m below datum)       0     0.810     (minutes)     (m below datum)     (m below datum)       1     0.810     (minutes)     (m below datum)       2     0.810     (minutes)     (m below datum)       30     0.810     (minutes)     (m below datum)       30     0.810     (minutes)     (m below datum)       0.00     (minutes)     (minutes)     (minutes)       0.01     (minutes)     (minutes)     (minutes)       0.02     (minutes)     (minutes)     (minutes)       0.03     (minutes)     (minutes)     (minutes)       0.04     (minutes)     (minutes)     (minutes)       0.05     (minutes)     (minutes)     (minutes)       1.04     (minutes)     (minutes)     (minutes)       1.05     (minutes)     (minutes)     (minutes)       1.05     (minutes)     (minutes)     (minutes)       1.05     (minutes)     (minutes)<						0 m agl
Elapsed time (minutes)     Water Depth (m below datum)     Water Depth (minutes)     Water Depth (m below datum)       0     0.810     1     0.810     1       2     0.810     1     0.810     1       30     0.810     1     0.810     1       30     0.810     15     0.810     1       30     0.810     1     0     0.810       40     0.810     0     0.810     1       50     0.810     0     0.810     1       60     0.810     0     0.810     0     0.90       1.0     20     30     40     50     60     70     80     90     100       80     0.810     50     60     70     80     90     100       1.0     20     30     40     50     60     70     80     90     100       1.0     20     30     40     50     60     70     80     90     100       1.0     20     30     40     50     60     70     80     <						(assumed)
(minutes)       (m below datum)       (m initites)       (m below datum)         0       0.810       0.810       0.810         1       0.810       0.810       0.810         2       0.810       0.810       0.810         30       0.810       0.810       0.810         30       0.810       0.810       0.810         50       0.810       0.810       0.810         60       0.810       0.810       0.810         0.00       60       0.810       0.810         1.0       20       30       40       50       0.810         1.0       20       30       40       50       60       70       80       90       100         1.0       20       30       40       50       60       70       80       90       100         1.0       20       30       40       50       60       70       80       90       100         1.0       20       30       40       50       60       70       80       90       100	Deptil (III).		Matan Danth	2	1	
1       0.810         2       0.810         4       0.810         15       0.810         30       0.810         40       0.810         50       0.810         60       0.810         70       0.810         80       0.810         90       0.810         10       20         0.00						)
2   0.810     4   0.810     8   0.810     15   0.810     30   0.810     40   0.810     50   0.810     60   0.810     80   0.810     90   0.810     10   0.810     10   0.810     10   0.810     10   0.810     10   0.810     10   0.810     10   0.810     10   0.810     10   0.810     10   0.810     10   0.810     10   0.90     10						
4       0.810         15       0.810         30       0.810         40       0.810         50       0.810         60       0.810         90       0.810         0.00       0.610         0.00       0.810         90       0.810         0.00       0.610         0.00       0.610         0.00       0.610         0.00       0.610         0.00       0.610         0.00       0.610         0.00       0.610         0.00       0.610         0.00       0.60         0.00       0.60         0.00       0.60         0.00       0.60         0.00       0.60         0.00       0.60         0.00       0.60         0.00       0.60         0.00       0.60         0.00       0.60         0.00       0.60         0.00       0.60         0.00       0.60         0.00       0.60         0.00 </th <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>						
8     0.810       15     0.810       30     0.810       40     0.810       50     0.810       80     0.810       90     0.810       90     0.810       90     0.810       90     0.810       90     0.810       90     0.810       90     0.810       90     0.810       90     0.810       90     0.810       90     0.810       90     0.810       90     0.810       100     10       20     30     40       60     70     80     90       100     10     20     30     40       5% effective depth (mbg):     1.05     5% effective depth (mbg):     1.17       5% effective depth (mbg):     1.29     2.40       129     2.40     30     30       129     2.40     30     30       120     1.29     2.40     30       121     2.40     30     30						
30   0.810     40   0.810     50   0.810     60   0.810     70   0.810     90   0.810       0.00     1.00     1.						
40       0.810         50       0.810         60       0.810         80       0.810         90       0.810         90       0.810						
50   0.810     70   0.810     80   0.810     90   0.810     90   0.810       0.00   0.810       0.00   0.810       0.00   0.810       0.00   0.810       0.00   0.810       0.00   0.810       0.00   0.810       0.00   0.810       0.00   0.810       0.00   0.810       1.00   0.90       1.00   0.90       1.00   0.90       1.00   0.90       1.00   0.90       1.00   0.90       1.00   0.90       1.00   0.90       1.00   0.90       1.00   0.90       1.00   0.90       1.00   0.90       1.00   0.90       1.00   0.90       1.00   1.00       1.00   1.00       1.00   1.00       1.00   1.00       1.01   1.02						
60   0.810     80   0.810     90   0.810     0.00   0.810     0.00   0.810     0.00   0.810     0.00   0.810     0.00   0.810     0.00   0.810     0.00   0.810     0.00   0.810     0.00   0.810     0.00   0.810     0.00   0.00     0.00   0.00     0.00   0.00     0.00   0.00     0.00   0.00     0.00   0.00     0.00   0.00     0.00   0.00     1.00   0.00     1.00   0.00     1.00   0.00     1.00   0.00     1.00   0.00     1.00   0.00     1.00   0.00     1.00   0.00     1.00   0.00     1.00   0.00     1.00   0.00     1.00   0.00     1.00   0.00     1.00   0.00     1.00   0.00     1.00   0.00     1.00   0.00     1.00   0.00     0.00   0.00 <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>						
70   0.810     80   0.810     90   0.810     0.00   0.810     0.00   0.810     0.00   0.00     0.00   0.00     0.00   0.00     0.00   0.00     0.00   0.00     0.00   0.00     0.00   0.00     0.00   0.00     0.00   0.00     0.00   0.00     0.00   0.00     0.00   0.00     0.00   0.00     0.00   0.00     1.00   0.00     1.00   20     30   40     50   60     70   80     90   100     Elapsed time (mins):   #N/A     5% effective depth (mbgl):   1.17     Elapsed time (mins):   #N/A     30   0.93     Elapsed time (mins):   #N/A     30   0.93     Elapsed time (mins):   #N/A     30   0.05     5% effective depth (mbgl):   1.17     Elapsed time (mins):   #N/A     iside area at 50% effective depth (mis):   2.40     iside area at 50% effective depth (mis):   2.4						
90   0.810     0.00   0.00     0.00   0.00     0.00   0.00     0.00   0.00     0.00   0.00     0.00   0.00     0.00   0.00     0.00   0.00     0.00   0.00     1.00   0.01     1.00   0.03     Elapsed time (mins):   #N/A     5% effective depth (mbgl):   1.17     Elapsed time (mins):   #N/A     ide area at 50% effective depth (migl):   2.40     ide area at 50% effective depth (migl):   2.40     ide area at 50% effective depth (migl):   2.40						
0.00     0.00						
0.20     0.40       0.40     0.60       0.60     0.60       1.40     0.81       1.40     0.93       1.40     1.40       1.40     1.40       1.40     1.40		90	0.810			
0.20     0.40       0.40     0.60       0.60     0.60       1.40     0.81       1.40     0.93       1.40     1.40       1.40     1.40       1.40     1.40						
0.40     0.60	0.00					
0.60     0.80     0.80     0.80     0.80     0.00     0.80     0.80     0.90     100       1.20     1.00     1.00     20     30     40     50     60     70     80     90     100       Elapsed time (minutes)       tart water depth for analysis (mbgl):     0.81       5% effective depth (mbgl):     1.05     5%     5%     5%     660     70     80     90     100       S% effective depth (mbgl):     0.93     Elapsed time (mins):     #N/A       0% effective depth (mbgl):     1.05     5%     5%     effective depth (mbgl):     1.29       Yolume outflow between 75% and 25% effective depth (m³):       tean as to fow effective depth + base area)     2.40     side area at 50% effective depth + base area)     2.40       ime for outflow between 75% and 25% effective depth (mins):     Test incomplete as 25% effective depth not achieved. Unable to reliably determine soil     infiltration rate.       Results processed following BRE 365 (2007).       No movement in the water - practically impermeable.     Job No:       Smart Developments (West Yorkshire) Ltd     Job No:	0.20 +					
1.00     1.00	0.40 -					
1.00     1.00	<b>E</b> 0.60 +					
1.00     1.00						
1.20     1.40		-	'			
1.40     10     20     30     40     50     60     70     80     90     100       Elapsed time (minutes)       Titart water depth for analysis (mbgl):     0.81       5% effective depth (mbgl):     0.93     Elapsed time (mins):     #N/A       0% effective depth (mbgl):     1.05     5%     5% effective depth (mbgl):     1.17     Elapsed time (mins):     #N/A       0% effective depth (mbgl):     1.17     Elapsed time (mins):     #N/A       1.40     1.29     1.29     1.29     1.24     1.24       Total state area of outflow (m <sup>2</sup> ):     2.40     3.00     2.40     3.00 <td>1.00</td> <td></td> <td></td> <td></td> <td></td> <td>_   </td>	1.00					_
0     10     20     30     40     50     60     70     80     90     100       Elapsed time (minutes)       tart water depth for analysis (mbgl):     0.81       5% effective depth (mbgl):     0.93     Elapsed time (mins):     #N/A       0% effective depth (mbgl):     1.05     5%     #N/A       5% effective depth (mbgl):     1.17     Elapsed time (mins):     #N/A       60 uume outflow between 75% and 25% effective depth (m³):     2.40     #N/A       to sufface area of outflow (m²):       10     2.40     2.40       Soli infiltration rate (m/s):       Test incomplete as 25% effective depth not achieved. Unable to reliably determine soil infiltration rate.       Results processed following BRE 365 (2007).       No movement in the water - practically impermeable.     Job No:       Smart Developments (West Yorkshire) Ltd						
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5% effective depth (mbgl):     0.93     Elapsed time (mins):     #N/A       0% effective depth (mbgl):     1.05     Elapsed time (mins):     #N/A       5% effective depth (mbgl):     1.17     Elapsed time (mins):     #N/A       5% effective depth (mbgl):     1.17     Elapsed time (mins):     #N/A       5% effective depth (mbgl):     1.29     #N/A       70 ume outflow between 75% and 25% effective depth (m³):     2.40       Mean surface area of outflow (m²):     2.40       side area at 50% effective depth + base area)     2.40       ime for outflow between 75% and 25% effective depth (mins):     Test incomplete as 25% effective depth not achieved. Unable to reliably determine soil infiltration rate.       Soil infiltration rate (m/s):     Test incomplete as 25% effective depth not achieved. Unable to reliably determine soil infiltration rate.       Results processed following BRE 365 (2007).     No movement in the water - practically impermeable.       Client:     Smart Developments (West Yorkshire) Ltd     Job No:	1.20	) 20 3	30 40 5	50 60	70 80	90 100
0% effective depth (mbgl):     1.05       5% effective depth (mbgl):     1.17       ase of soakage zone (mbgl):     1.29       olume outflow between 75% and 25% effective depth (m³):     2.40       lean surface area of outflow (m²):     2.40       side area at 50% effective depth + base area)     2.40       ime for outflow between 75% and 25% effective depth (mins):     Test incomplete as 25% effective depth not achieved. Unable to reliably determine soil infiltration rate.       Results processed following BRE 365 (2007).       No movement in the water - practically impermeable.     Job No:	1.20	) 20 3			70 80	90 100
5% effective depth (mbgl):     1.17     Elapsed time (mins):     #N/A       ase of soakage zone (mbgl):     1.29     ************************************	1.20 1.40 0 tart water depth fo	or analysis (mbgl):	Elapsed t	ime (minutes)		
ase of soakage zone (mbgl):     1.29       olume outflow between 75% and 25% effective depth (m³):     2.40       lean surface area of outflow (m²):     2.40       side area at 50% effective depth + base area)     2.40       ime for outflow between 75% and 25% effective depth (mins):     2.40       Soil infiltration rate (m/s):       Test incomplete as 25% effective depth not achieved. Unable to reliably determine soil infiltration rate.       Image: Soil spice seed following BRE 365 (2007).       No movement in the water - practically impermeable.     Job No:	1.20 1.40 0 1.40 0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	or analysis (mbgl): n (mbgl):	Elapsed t 0.81 0.93	ime (minutes)		
lean surface area of outflow (m <sup>2</sup> ):     2.40       side area at 50% effective depth + base area)     ime for outflow between 75% and 25% effective depth (mins):       Test incomplete as 25% effective depth not achieved. Unable to reliably determine soil infiltration rate.       Soil infiltration rate (m/s):       Test incomplete as 25% effective depth not achieved. Unable to reliably determine soil infiltration rate.       emarks       Results processed following BRE 365 (2007).       No movement in the water - practically impermeable.       Stient:       Smart Developments (West Yorkshire) Ltd	1.20 1.40 0 10 tart water depth for 5% effective depth 0% effective depth	or analysis (mbgl): n (mbgl): n (mbgl):	Elapsed t 0.81 0.93 1.05	ime (minutes)	lapsed time (mins	): #N/A
Mean surface area of outflow (m <sup>2</sup> ):     2.40       side area at 50% effective depth + base area)     2.40       ime for outflow between 75% and 25% effective depth (mins):     Test incomplete as 25% effective depth not achieved. Unable to reliably determine soil infiltration rate.       Soil infiltration rate (m/s):     Test incomplete as 25% effective depth not achieved. Unable to reliably determine soil infiltration rate.       Remarks     Results processed following BRE 365 (2007). No movement in the water - practically impermeable.       Client:     Smart Developments (West Yorkshire) Ltd     Job No:	1.20 1.40 0 10 tart water depth for 5% effective depth 0% effective depth 5% effective depth	or analysis (mbgl): n (mbgl): n (mbgl): n (mbgl):	Elapsed t 0.81 0.93 1.05 1.17	ime (minutes)	lapsed time (mins	): #N/A
side area at 50% effective depth + base area)       ime for outflow between 75% and 25% effective depth (mins):       Test incomplete as 25% effective depth not achieved. Unable to reliably determine soil infiltration rate.       Soil infiltration rate (m/s):       Test incomplete as 25% effective depth not achieved. Unable to reliably determine soil infiltration rate.       Results processed following BRE 365 (2007).       No movement in the water - practically impermeable.       Client:       Smart Developments (West Yorkshire) Ltd	1.20 1.40 0 10 5% effective depth 5% effective depth 5% effective depth 5% effective depth base of soakage zo	or analysis (mbgl): n (mbgl): n (mbgl): n (mbgl): n (mbgl): one (mbgl):	Elapsed t 0.81 0.93 1.05 1.17 1.29	ime (minutes) E	lapsed time (mins	): #N/A
Soil infiltration rate (m/s):     Test incomplete as 25% effective depth not achieved. Unable to reliably determine soil infiltration rate.       remarks     Results processed following BRE 365 (2007). No movement in the water - practically impermeable.       Client:     Smart Developments (West Yorkshire) Ltd	1.20 1.40 0 10 tart water depth for 5% effective depth 0% effective depth 5% effective depth ase of soakage zo folume outflow bet	or analysis (mbgl): n (mbgl): n (mbgl): n (mbgl): one (mbgl): ween 75% and 25	Elapsed t 0.81 0.93 1.05 1.17 1.29	ime (minutes) E	lapsed time (mins lapsed time (mins	): #N/A ): #N/A
Soil infiltration rate (m/s):     achieved. Unable to reliably determine soil infiltration rate.       emarks     Results processed following BRE 365 (2007). No movement in the water - practically impermeable.       Client:     Smart Developments (West Yorkshire) Ltd	1.20 1.40 0 10 tart water depth for 5% effective depth 5% effective depth 5% effective depth ase of soakage zo olume outflow bet lean surface area	or analysis (mbgl): n (mbgl): n (mbgl): n (mbgl): one (mbgl): ween 75% and 25 of outflow (m <sup>2</sup> ):	Elapsed t 0.81 0.93 1.05 1.17 1.29 % effective depth (n	ime (minutes) E	lapsed time (mins lapsed time (mins	): #N/A ): #N/A
infiltration rate.       infiltration rate.       Results processed following BRE 365 (2007).       No movement in the water - practically impermeable.       Client:     Smart Developments (West Yorkshire) Ltd	1.20 1.40 0 10 1.40 0 10 1.40 1.40 0 10 1.40 0 10 1.40 0 10 1.40 0 10 1.40 0 10 1.40 0 10 1.40 0 4 1.40 0 4 1.40 0 4 1.40 0 4 1.40 0 4 1.40	or analysis (mbgl): n (mbgl): n (mbgl): n (mbgl): one (mbgl): ween 75% and 25 of outflow (m <sup>2</sup> ): effective depth + ba	Elapsed t 0.81 0.93 1.05 1.17 1.29 % effective depth (n ase area)	ime (minutes) E n³):	lapsed time (mins lapsed time (mins	): #N/A ): #N/A
No movement in the water - practically impermeable.       Client:     Smart Developments (West Yorkshire) Ltd     Job No:	1.20 1.40 0 10 1.40 0 10 5% effective depth 5% effective depth 5% effective depth 5% effective depth 5% effective depth 5% effective depth 6ase of soakage zo Yolume outflow beth Mean surface area side area at 50% effective beth 1.40 1.4	or analysis (mbgl): n (mbgl): n (mbgl): n (mbgl): one (mbgl): ween 75% and 25 of outflow (m <sup>2</sup> ): effective depth + ba	Elapsed t 0.81 0.93 1.05 1.17 1.29 % effective depth (n ase area) 5% effective depth (n	ime (minutes) E n³): <u>mins):</u> Test incomple	lapsed time (mins lapsed time (mins 2.40 ete as 25% effecti	): #N/A ): #N/A )
Client: Smart Developments (West Yorkshire) Ltd Job No:	1.20 1.40 0 10 1.40 0 4 1.40 0 4 1.40 0 4 1.40 0 4 1.40 0 4 1.40 0 4 1.40 0 4 1.40 0 4 1.40 1.40 0 4 1.40 1.40 0 4 1.40	or analysis (mbgl): n (mbgl): n (mbgl): n (mbgl): one (mbgl): ween 75% and 25 of outflow (m <sup>2</sup> ): effective depth + ba	Elapsed t 0.81 0.93 1.05 1.17 1.29 % effective depth (n ase area) 5% effective depth (n	ime (minutes) E n³): <u>mins):</u> Test incomple	lapsed time (mins lapsed time (mins 2.40 ete as 25% effecti able to reliably de	): #N/A ): #N/A )
	1.20 1.40 0 10 Start water depth for 5% effective depth 5% effective depth 5% effective depth sase of soakage zo Yolume outflow beth Mean surface area side area at 50% effective beth Soil in	or analysis (mbgl): n (mbgl): n (mbgl): one (mbgl): ween 75% and 25 of outflow (m <sup>2</sup> ): effective depth + ba tween 75% and 25 <b>nfiltration rate</b> Results processed	Elapsed t 0.81 0.93 1.05 1.17 1.29 % effective depth (n ase area) 5% effective depth (n (m/s): d following BRE 365	ime (minutes) E n <sup>3</sup> ): <u>Test incomple</u> achieved. Una	lapsed time (mins lapsed time (mins 2.40 ete as 25% effecti able to reliably de	): #N/A ): #N/A )
	1.20 1.40 0 10 tart water depth for 5% effective depth 5% effective depth ase of soakage zo folume outflow beth lean surface area side area at 50% effective beth lean surface area side area at 50% effective beth Soil in	or analysis (mbgl): n (mbgl): n (mbgl): one (mbgl): ween 75% and 25 of outflow (m <sup>2</sup> ): effective depth + ba tween 75% and 25 <b>nfiltration rate</b> Results processed	Elapsed t 0.81 0.93 1.05 1.17 1.29 % effective depth (n ase area) 5% effective depth (n (m/s): d following BRE 365	ime (minutes) E n <sup>3</sup> ): <u>Test incomple</u> achieved. Una	lapsed time (mins lapsed time (mins 2.40 ete as 25% effecti able to reliably de	): #N/A ): #N/A )
	1.20 1.40 0 10 Start water depth for 5% effective depth 5% effective depth 5% effective depth base of soakage zo Yolume outflow beth Aean surface area side area at 50% effective beth Soil in Remarks	or analysis (mbgl): n (mbgl): n (mbgl): n (mbgl): one (mbgl): ween 75% and 25 of outflow (m <sup>2</sup> ): effective depth + ba tween 75% and 25 <b>nfiltration rate</b> Results processed No movement in t	0.81         0.93         1.05         1.17         1.29         % effective depth (nase area)         5% effective depth (nase area)         6% effective depth (nase area)         5% effective depth (nase area)	ime (minutes) E n <sup>3</sup> ): <u>Test incomple</u> achieved. Una i (2007). y impermeable.	lapsed time (mins lapsed time (mins 2.40 ete as 25% effecti able to reliably de	): #N/A ): #N/A ) ive depth not etermine soil

### **Rogers Geotechnical Services L**

### Soakaway Test

Trial Pit No:	TP02	Test No:	1		Date:	16/05/2023
Length (m):	2.100		Datum Height		0.00	m agl
Width (m): Depth (m):	0.40 1.28		Granular infill: Porosity of infill:			(assumed)
		Mater Denth				(assumed)
	Elapsed time (minutes)	Water Depth (m below datum)	Elapsed time (minutes)	Water De (m below da		
-	0	0.650	(	(	/	
	1	0.650				
	2 4	0.650 0.650				
	4 8	0.650				
	15	0.650				
	30	0.650				
	40 50	0.650 0.650				
	60	0.650				
0.00						
0.20 +						
0.40 +						
0.60		_	_	_	_	
0.60	• •		•	•		
0.60						
0.80	• •			•	-	
- 1				•	-	
0.80	<b></b>					
0.80 -	10 20		40	50	60	70
0.80	10 20		40 ime (minutes)	50	60	70
0.80		Elapsed ti		50	60	70
0.80 1.00 1.20 0 tart water depth fo	or analysis (mbgl):	Elapsed ti	ime (minutes)			
0.80 1.00 1.20 0 Start water depth fo 5% effective depth	or analysis (mbgl): n (mbgl):	Elapsed ti	ime (minutes)	50 Elapsed time (r		
0.80 1.00 1.20 0 tart water depth fo 5% effective depth 0% effective depth 5% effective depth	or analysis (mbgl): n (mbgl): n (mbgl): n (mbgl):	Elapsed ti 0.65 0.81 0.97 1.12	ime (minutes)		mins):	
0.80 1.00 1.20 0 Start water depth fo 5% effective depth 0% effective depth 5% effective depth	or analysis (mbgl): n (mbgl): n (mbgl): n (mbgl):	Elapsed ti 0.65 0.81 0.97	ime (minutes)	lapsed time (r	mins):	#N/A
0.80 1.00 1.20 0 5% effective depth fo 5% effective depth 5% effective depth 5% effective depth 3ase of soakage zo	or analysis (mbgl): n (mbgl): n (mbgl): n (mbgl): n (mbgl): one (mbgl):	Elapsed ti 0.65 0.81 0.97 1.12 1.28	ime (minutes) E	lapsed time (r	mins):	#N/A
0.80 1.00 1.20 0 Start water depth fo 5% effective depth 60% effective depth 5% effective depth 8ase of soakage zo /olume outflow betw	or analysis (mbgl): n (mbgl): n (mbgl): n (mbgl): one (mbgl): ween 75% and 25%	Elapsed ti 0.65 0.81 0.97 1.12	ime (minutes) E	lapsed time (r	mins):	#N/A
0.80 1.00 1.20 0 Start water depth fo 75% effective depth 50% effective depth 50% effective depth 3ase of soakage zo Yolume outflow betw Aean surface area of side area at 50% effective depth	or analysis (mbgl): n (mbgl): n (mbgl): n (mbgl): one (mbgl): ween 75% and 25 <sup>r</sup> of outflow (m <sup>2</sup> ): iffective depth + ba	Elapsed ti 0.65 0.81 0.97 1.12 1.28 % effective depth (m ase area)	ime (minutes) E n³):	lapsed time (r	nins): nins):	#N/A
0.80 1.00 1.20 0 Start water depth fo 75% effective depth 50% effective depth 50% effective depth 3ase of soakage zo Yolume outflow betw Aean surface area of side area at 50% effective depth	or analysis (mbgl): n (mbgl): n (mbgl): n (mbgl): one (mbgl): ween 75% and 25 <sup>r</sup> of outflow (m <sup>2</sup> ): iffective depth + ba	Elapsed ti 0.65 0.81 0.97 1.12 1.28 % effective depth (m	ime (minutes) E n³):	lapsed time (r	nins): nins):	#N/A
0.80 1.00 1.20 0 Start water depth fo 75% effective depth 50% effective depth 3ase of soakage zo /olume outflow betw Mean surface area of side area at 50% effective betw	or analysis (mbgl): n (mbgl): n (mbgl): n (mbgl): one (mbgl): ween 75% and 25° of outflow (m <sup>2</sup> ): iffective depth + ba tween 75% and 25	Elapsed ti 0.65 0.81 0.97 1.12 1.28 % effective depth (m ase area) 5% effective depth (r	ime (minutes) E n³): <u>mins):</u> <b>Test incompl</b> e	Elapsed time (r Elapsed time (r	nins): nins): 2.39 <b>fective</b>	#N/A #N/A
0.80 1.00 1.20 0 Start water depth fo 75% effective depth 50% effective depth 3ase of soakage zo /olume outflow betw Mean surface area of side area at 50% effective betw	or analysis (mbgl): n (mbgl): n (mbgl): n (mbgl): one (mbgl): ween 75% and 25 <sup>r</sup> of outflow (m <sup>2</sup> ): iffective depth + ba	Elapsed ti 0.65 0.81 0.97 1.12 1.28 % effective depth (m ase area) 5% effective depth (r	ime (minutes) E n³): mins):	Elapsed time (r Elapsed time (r	mins): mins): 2.39 fective	#N/A #N/A
0.80 1.00 1.20 0 Start water depth fo 75% effective depth 50% effective depth 50% effective depth 3ase of soakage zo Volume outflow betw Vean surface area iside area at 50% e Time for outflow betw Soil in	or analysis (mbgl): n (mbgl): n (mbgl): one (mbgl): ween 75% and 25° of outflow (m <sup>2</sup> ): of outflow (	Elapsed ti 0.65 0.81 0.97 1.12 1.28 % effective depth (m ase area) 5% effective depth (r	ime (minutes) E n <sup>3</sup> ): <u>mins):</u> Test incomple achieved. Un	Elapsed time (r Elapsed time (r Elapsed time (r ete as 25% ef able to reliab	mins): mins): 2.39 fective	#N/A #N/A
0.80 1.00 1.20 0 Cart water depth fo 5% effective depth 0% effective depth 5% effective depth 5% effective depth 5% effective depth 5% effective depth Colume outflow betw Mean surface area at side area at 50% effective betw Soil in Semarks	or analysis (mbgl): n (mbgl): n (mbgl): one (mbgl): ween 75% and 25° of outflow (m <sup>2</sup> ): of outflow (m <sup>2</sup> ): of outflow (m <sup>2</sup> ): of outflow and 25° of outflow (m <sup>2</sup> ): of outflow and 25° of outflow a	Elapsed ti 0.65 0.81 0.97 1.12 1.28 % effective depth (m ase area) 5% effective depth (r (m/s):	ime (minutes) E n <sup>3</sup> ): <u>Test incomple</u> achieved. Una	Elapsed time (r Elapsed time (r Elapsed time (r ete as 25% ef able to reliab	mins): mins): 2.39 fective	#N/A #N/A
0.80 1.00 1.20 0 Start water depth fo 75% effective depth 60% effective depth 60% effective depth 8ase of soakage zo 70lume outflow betw Aean surface area at side area at 50% e Time for outflow betw Soil in Remarks	or analysis (mbgl): n (mbgl): n (mbgl): one (mbgl): ween 75% and 25° of outflow (m <sup>2</sup> ): of outflow (m <sup>2</sup> ): of outflow (m <sup>2</sup> ): of outflow and 25° of outflow (m <sup>2</sup> ): of outflow and 25° of outflow a	Elapsed ti 0.65 0.81 0.97 1.12 1.28 % effective depth (mase area) 5% effective depth (r (m/s): d following BRE 365	ime (minutes) E n <sup>3</sup> ): <u>Test incomple</u> achieved. Una	Elapsed time (r Elapsed time (r Elapsed time (r ete as 25% ef able to reliab	mins): mins): 2.39 fective	#N/A #N/A
0.80 1.00 1.20 0 Start water depth fo 75% effective depth 60% effective depth 60% effective depth 8ase of soakage zo Volume outflow betw Aean surface area of side area at 50% e Time for outflow betw Soil in Remarks	or analysis (mbgl): n (mbgl): n (mbgl): one (mbgl): ween 75% and 25° of outflow (m <sup>2</sup> ): of outflow (	Elapsed ti 0.65 0.81 0.97 1.12 1.28 % effective depth (mase area) 5% effective depth (r (m/s): d following BRE 365 the water - practically	ime (minutes) E n <sup>3</sup> ): <u>Test incomple</u> achieved. Unit i (2007). y impermeable.	Elapsed time (r Elapsed time (r Elapsed time (r ete as 25% ef able to reliab	mins): mins): 2.39 fective	#N/A #N/A
0.80   1.00   1.20   0   0   Constant water depth for the fort th	or analysis (mbgl): n (mbgl): n (mbgl): n (mbgl): one (mbgl): ween 75% and 25° of outflow (m <sup>2</sup> ): iffective depth + ba tween 75% and 25° <b>nfiltration rate</b> Results processed No movement in t	Elapsed ti 0.65 0.81 0.97 1.12 1.28 % effective depth (mase area) 5% effective depth (r (m/s): d following BRE 365	ime (minutes) E n³): <u>Test incomple</u> achieved. Units 5 (2007). y impermeable.	Elapsed time (r Elapsed time (r ete as 25% ef able to reliab infiltration ra	mins): mins): 2.39 fective	#N/A #N/A