

Our Ref J3586/16/E
10th August 2016

JPW Yorkshire Ltd.
187 Carlton Road
Barnsley
South Yorkshire
S71 2AW



For the attention of John Wales

Dear Sir,

Ref: Wharnccliffe Silkstone WMC, Worsbrough View, Tankersley, S75 3AH.

We thank you for your request to undertake permeability testing at the above mentioned site and take pleasure in enclosing the results of this work. The investigation was undertaken on the 8th August 2016 in accordance with your instruction to proceed. This letter describes the work undertaken, presents the data obtained and discusses the results of the tests.

Fieldworks

Three trialpits were excavated using the Kobota mini excavator in order to undertake soakaway testing at the positions shown on the attached site plan. The soakage tests were undertaken at the base of the pits at depths rational to proposed soakaways depths. The soils exposed in the trial pits were logged on site in general accordance with BS5930: 2015, and full descriptions are given on the trialpit records which are attached to this letter along with the soakaway test results.

Strata Conditions

At the trialpit locations, the site was found to be capped by made ground comprising brown sandy gravelly clay extending to 0.60m. Below this capping, at trial pit locations TPSA1 and TPSA2 firm dark brown silty sandy slightly gravelly clay and firm orangish yellow sandy gravelly clay was revealed to a depth of 1.20m and 1.40m respectively. Below these deposits, at the same locations, sandy gravelly clay was revealed to the full depths of the trialpits. Below the capping at the location of TPSA3 yellowish brown silty sandy gravelly cobbles were encountered to a depth of 0.90m. Below this orangish brown silty sandy gravel and cobbles were proved to the full depth of this trialpit.

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Soakaway Tests

On reaching the elected soakaway test depth, the pit was trimmed and squared as much as practicable. Water was then pumped into the pit and the level monitored at timed intervals relative to a reference bar at ground level. The results obtained from the soakaway tests are appended to this letter and are summarised below:

Table 1: Soakaway test results

Location	Soakage Area Dimensions (average) (m)	Test Depth (m)	Soil Description		Infiltration Rate (m/sec)	Drainage Characteristics
			Base of Pit	Side of Pit (through test depths)		
TPSA1	1.50 x 0.30	1.74	Slightly gravelly CLAY	Slightly gravelly CLAY	NA	Practically impermeable
TPSA2	1.60 x 0.30	1.83	Sandy gravelly CLAY	Sandy gravelly CLAY.	NA	Practically impermeable
TPSA3	1.50 x 0.30	1.53	Slightly clayey silty sandy GRAVEL and COBBLES	Silty sandy gravelly COBBLES	3.3×10^{-5}	Good.
					2.8×10^{-5}	
					4.1×10^{-5}	

Discussion

The soakage rates at the location of TPSA3 were found to be good. However it should be appreciated that the material found within this trialpit does contain some clay and silt so some siltation is possible within this soakaway, thereby reducing the permeability over time. It is therefore recommended that this is taken into account in the soakaway design, however, it may be appreciated that the calculations given in BRE 365 take into account of such fouling. It is suggested that if soakaway type drainage is to be considered for this site then a targeted approach should be used and soakaways be located in areas displaying sands gravels and cobbles at depths suitable for soakaway drainage. At the locations of TPSA1 and TPSA2, where weathering has reduced the subsoil to clay, the soil is practically impermeable thus should be avoided.

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.

We trust that this information is of interest and should you have any other requirements do not hesitate to contact us.

For and on behalf of
Rogers Geotechnical Services Ltd,

Jim Irving BSc (Hons). UCI
Geotechnical Engineer



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

Title: **Investigation Location Plan**



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Site Name:

Silksytone Warnciliffe WMC

Job No:

J3586/16/E



Trial Pit Log

Trialpit No

TPSA1

Sheet 1 of 1

Project Name: Wharncliffe Silkstone WMC

Project No.
J3586/16/E

Co-ords: -
Level:

Date
08/08/2016

Location: Worksbrough View, Tankersley, S75 3AH

Dimensions
(m):

1.5

Depth
1.74

0.3

Scale
1:50

Logged
JDMI

Client: JPW Yorkshire Ltd

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.00 - 0.60	B					MADE GROUND. (Dark brown mottled orangish brown sandy gravelly CLAY. Gravel is angular fine to coarse of fine grained sandstone and rare concrete).	
	0.60 - 1.20	B		0.60			Firm dark brown silty sandy slightly gravelly CLAY. Gravel is angular fine to medium fine grained sandstone. Occasional carbonaceous inclusions.	1
	1.20 - 1.74	B		1.20			Light grey mottled orange slightly gravelly CLAY with occasional sub-rounded fine grained sandstone cobbles. Gravel is angular to sub-rounded fine to coarse fine grained sandstone.	
				1.74			End of pit at 1.74 m	2
								3
								4
								5
								6
								7
								8
								9
								10

Remarks:

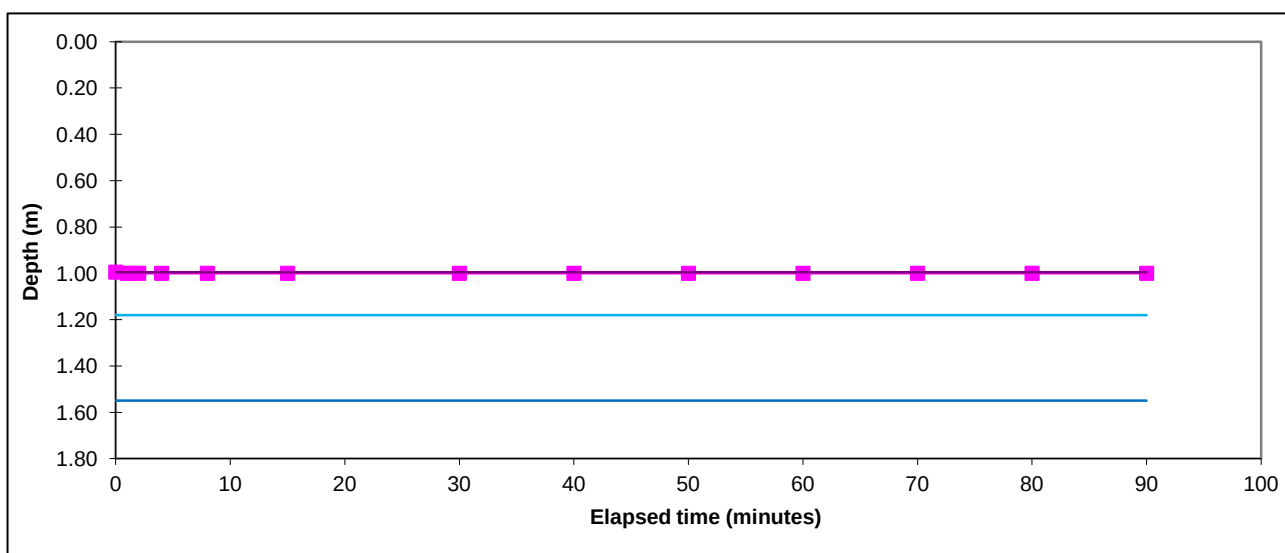
Stability: Good



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Soakaway Test

Trial Pit No:	TP1	Test No:	1	Date:	08.08.2016
Length (m):	1.500	Datum Height:			0.00 m agl
Width (m):	0.30	Granular infill:	None		
Depth (m):	1.74	Porosity of infill:	1	(assumed)	
	Elapsed time (minutes)	Water Depth (m below datum)	Elapsed time (minutes)	Water Depth (m below datum)	
	0	0.995			
	1	1.000			
	2	1.000			
	4	1.000			
	8	1.000			
	15	1.000			
	30	1.000			
	40	1.000			
	50	1.000			
	60	1.000			
	70	1.000			
	80	1.000			
	90	1.000			



Start water depth for analysis (mbgl):	1.00		
75% effective depth (mbgl):	1.18	Elapsed time (mins):	#N/A
50% effective depth (mbgl):	1.37		
25% effective depth (mbgl):	1.55	Elapsed time (mins):	#N/A
Base of soakage zone (mbgl):	1.74		

Volume outflow between 75% and 25% effective depth (m³):

Mean surface area of outflow (m²): 1.78

(side area at 50% effective depth + base area)

Time for outflow between 75% and 25% effective depth (mins):

Soil infiltration rate (m/s):	Test incomplete as 25% effective depth not achieved. Unable to reliably determine soil infiltration rate.
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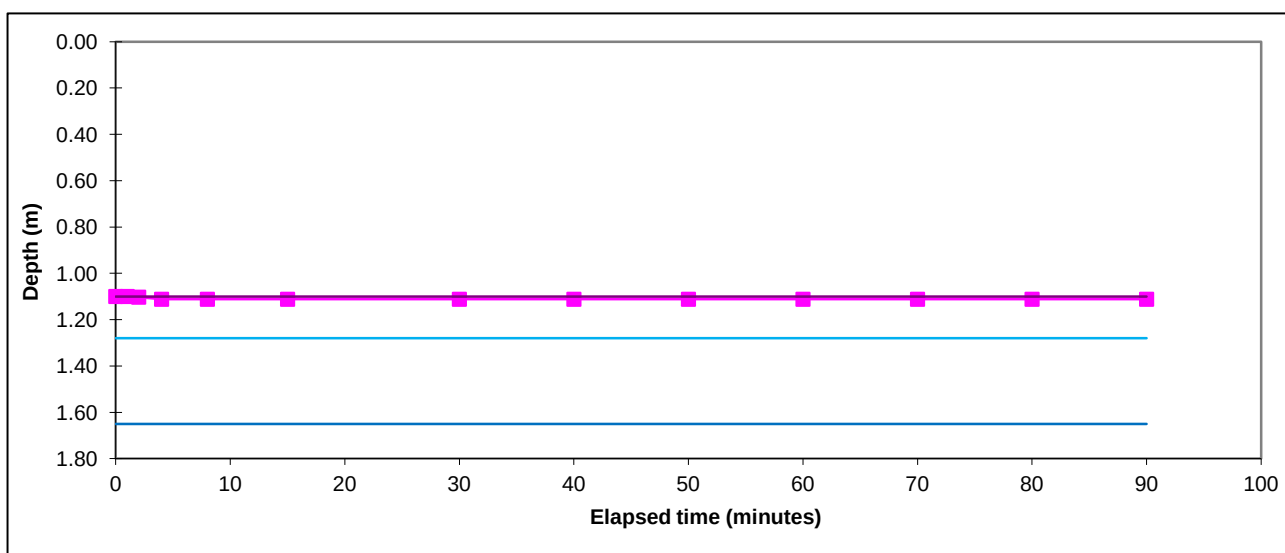
Remarks Results processed following BRE 365 (2007).

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Soakaway Test

Trial Pit No:	TP2	Test No:	1	Date:	08.08.2016
Length (m):	1.600	Datum Height:			0.00 m agl
Width (m):	0.30	Granular infill:	None		
Depth (m):	1.83	Porosity of infill:	1	(assumed)	
	Elapsed time (minutes)	Water Depth (m below datum)	Elapsed time (minutes)	Water Depth (m below datum)	
	0	1.100			
	1	1.100			
	2	1.103			
	4	1.112			
	8	1.112			
	15	1.112			
	30	1.112			
	40	1.112			
	50	1.112			
	60	1.112			
	70	1.112			
	80	1.112			
	90	1.112			



Start water depth for analysis (mbgl):	1.10		
75% effective depth (mbgl):	1.28	Elapsed time (mins):	#N/A
50% effective depth (mbgl):	1.47		
25% effective depth (mbgl):	1.65	Elapsed time (mins):	#N/A
Base of soakage zone (mbgl):	1.83		

Volume outflow between 75% and 25% effective depth (m³):

Mean surface area of outflow (m²): 1.85

(side area at 50% effective depth + base area)

Time for outflow between 75% and 25% effective depth (mins):

Soil infiltration rate (m/s):	Test incomplete as 25% effective depth not achieved. Unable to reliably determine soil infiltration rate.
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Remarks Results processed following BRE 365 (2007).

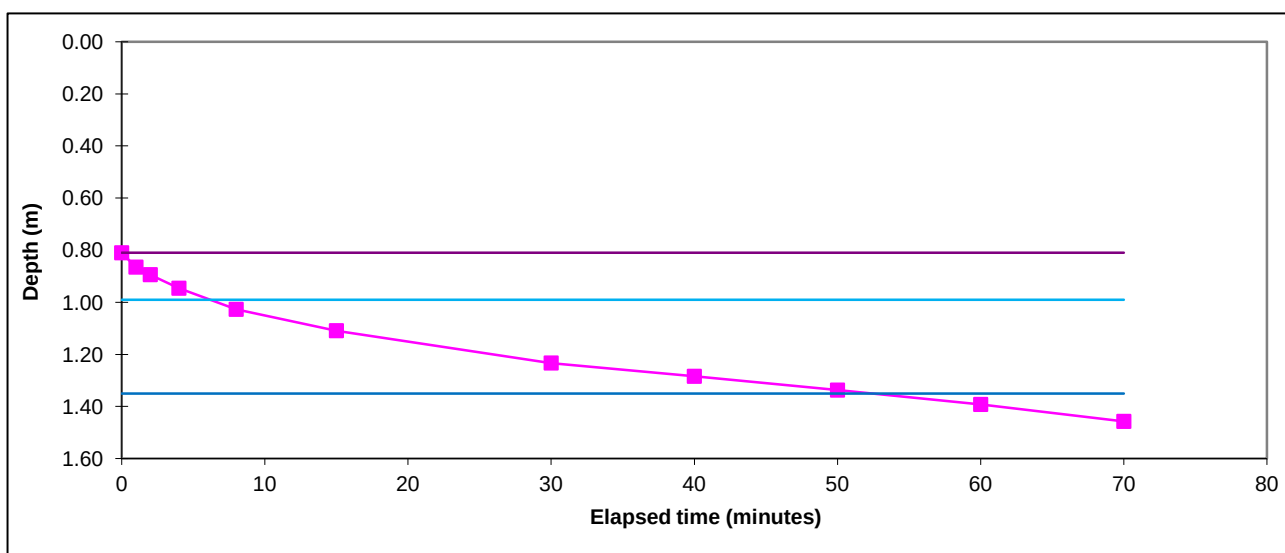
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Soakaway Test

Trial Pit No:	TP3	Test No:	1	Date:	08.08.2016
Length (m):	1.500	Datum Height:			0.00 m agl
Width (m):	0.30	Granular infill:	None		
Depth (m):	1.53	Porosity of infill:	1	(assumed)	

Elapsed time (minutes)	Water Depth (m below datum)	Elapsed time (minutes)	Water Depth (m below datum)
0	0.810		
1	0.865		
2	0.894		
4	0.946		
8	1.027		
15	1.109		
30	1.233		
40	1.284		
50	1.337		
60	1.392		
70	1.457		



Start water depth for analysis (mbgl):	0.81		
75% effective depth (mbgl):	0.99	Elapsed time (mins):	6.2
50% effective depth (mbgl):	1.17		
25% effective depth (mbgl):	1.35	Elapsed time (mins):	52.4
Base of soakage zone (mbgl):	1.53		
Volume outflow between 75% and 25% effective depth (m ³):			0.162
Mean surface area of outflow (m ²):			1.75
(side area at 50% effective depth + base area)			
Time for outflow between 75% and 25% effective depth (mins):			46.2

Soil infiltration rate (m/s):	3.3E-5
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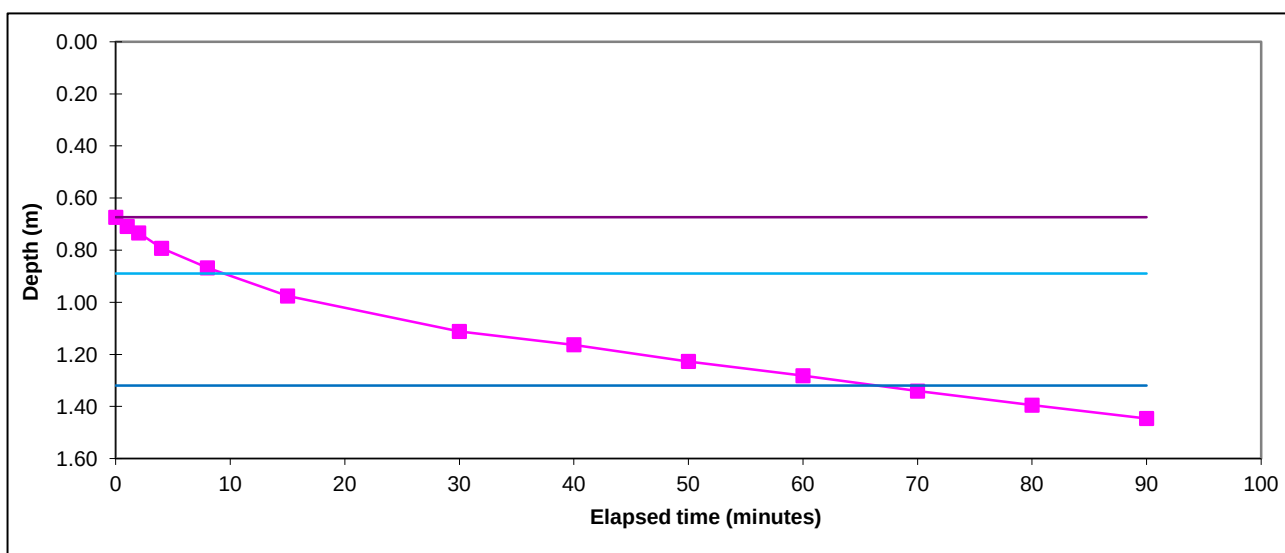
Remarks	Results processed following BRE 365 (2007).
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Soakaway Test

Trial Pit No:	TP3	Test No:	2	Date:	08.08.2016
Length (m):	1.500	Datum Height:			0.00 m agl
Width (m):	0.30	Granular infill:	None		
Depth (m):	1.53	Porosity of infill:	1	(assumed)	
	Elapsed time (minutes)	Water Depth (m below datum)	Elapsed time (minutes)	Water Depth (m below datum)	
	0	0.674			
	1	0.709			
	2	0.734			
	4	0.793			
	8	0.868			
	15	0.976			
	30	1.112			
	40	1.163			
	50	1.227			
	60	1.282			
	70	1.341			
	80	1.395			
	90	1.446			



Start water depth for analysis (mbgl):	0.67		
75% effective depth (mbgl):	0.89	Elapsed time (mins):	9.4
50% effective depth (mbgl):	1.10		
25% effective depth (mbgl):	1.32	Elapsed time (mins):	66.4
Base of soakage zone (mbgl):	1.53		
Volume outflow between 75% and 25% effective depth (m ³):			0.194
Mean surface area of outflow (m ²):			2.00
(side area at 50% effective depth + base area)			
Time for outflow between 75% and 25% effective depth (mins):			57.0

Soil infiltration rate (m/s):	2.8E-5
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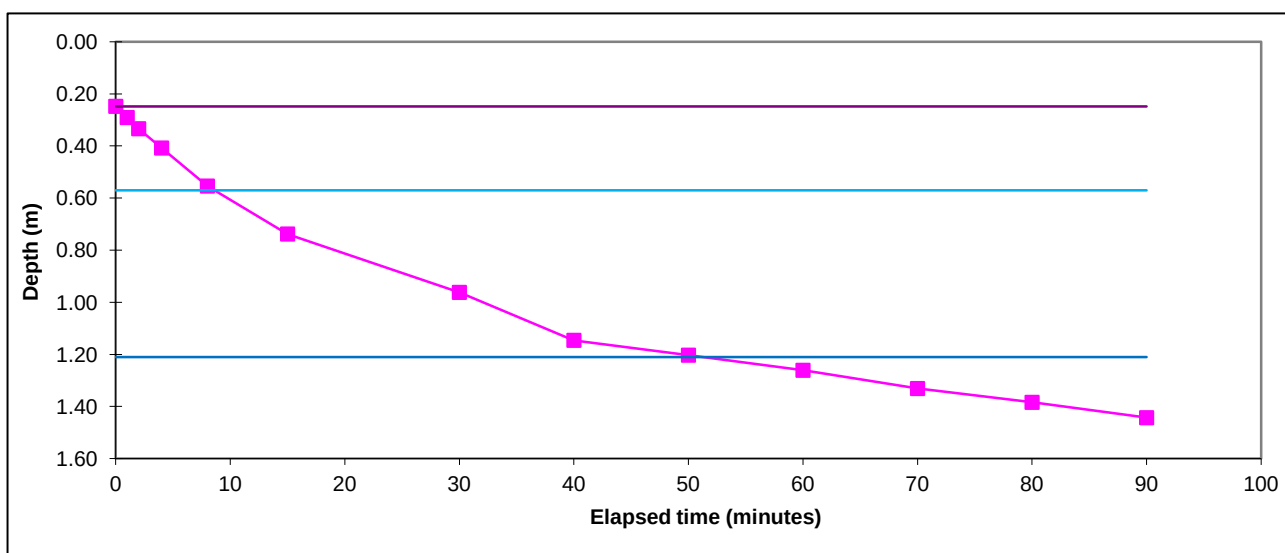
Remarks Results processed following BRE 365 (2007).

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Soakaway Test

Trial Pit No:	TP3	Test No:	3	Date:	08.08.2016
Length (m):	1.500	Datum Height:			0.00 m agl
Width (m):	0.30	Granular infill:	None		
Depth (m):	1.53	Porosity of infill:	1	(assumed)	
	Elapsed time (minutes)	Water Depth (m below datum)	Elapsed time (minutes)	Water Depth (m below datum)	
	0	0.248			
	1	0.291			
	2	0.334			
	4	0.408			
	8	0.554			
	15	0.738			
	30	0.962			
	40	1.146			
	50	1.203			
	60	1.261			
	70	1.331			
	80	1.384			
	90	1.443			



Start water depth for analysis (mbgl):	0.25		
75% effective depth (mbgl):	0.57	Elapsed time (mins):	8.6
50% effective depth (mbgl):	0.89		
25% effective depth (mbgl):	1.21	Elapsed time (mins):	51.2
Base of soakage zone (mbgl):	1.53		

Volume outflow between 75% and 25% effective depth (m ³):	0.288
Mean surface area of outflow (m ²):	2.75
(side area at 50% effective depth + base area)	
Time for outflow between 75% and 25% effective depth (mins):	42.6

Soil infiltration rate (m/s):	4.1E-5
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Remarks Results processed following BRE 365 (2007).

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