



**Land at Broadmore Cottage, Steam Mills Road,
Cinderford, GL14 3HY**

BRE365 INFILTRATION TESTING



Simpson tws

January 2024

P23-306inf

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For and on behalf of Paddock Geo Engineering Limited			

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BRE365 INFILTRATION TESTING

LAND AT BROADMORE COTTAGE, STEAM MILLS ROAD, CINDERFORD, GL14 3HY

Further to instructions received from Simpson tws; the Client, infiltration testing, has been carried out to the BRE365 methodology in relation to assessing the infiltration properties of the underlying ground.

Objectives

This assessment has been carried out to a scope of works as detailed by the Client prior to commencement. The assessment has been designed to assess the infiltration properties of the near surface strata and determine feasibility of soakaways and infiltration rates for SUDs design if applicable.

Scope of Works

The works comprised the forming of 3no. machine excavated trial pit, with infiltration testing within the pits to the BRE365 methodology.

Terms of Reference

The assessment has been carried out generally in accordance with the following guidance.

- BRE Digest 365 – Soakaway Design 2016
- Code of Practice for Site Investigations, British Standards Institution BS5930: 2015

Sitework

The sitework was carried out on the 4th January 2024 and comprised the forming of 3no. machine excavated trial pits to depths of 0.60m, 2.00m and 2.50m (SA1, SA2 and SA3) below ground level (bgl) with infiltration testing undertaken within the trial pits to the BRE365 methodology.

The trial pits were positioned with consideration of the proposed site layouts and in areas currently clear of any obstruction and any buried services following a Cable Avoidance Tool (CAT) and Signal Generator survey and consultation of buried services plans where available. The testing locations are indicated on the enclosed Exploratory Location Plan presented in Appendix B.

The trial pit arisings were logged by a Geotechnical Engineer generally in accordance with BS5930:2015. No samples were recovered from the trial pits.

The infiltration testing was carried out to the BRE365 methodology to the full depth.

The trial pit was reinstated upon completion of testing with compacted arisings.

Encountered Strata

An exploratory Location Plan showing the positions investigated and trial pit logs and are presented in Appendix A and B respectively.

The strata encountered within the trial pits is summarised in the table below. These details are also included on the trial pit logs presented in Appendix B.

Encountered Strata

Encountered Strata – Trial Pit Strata	Exploratory Hole and Basal Depth (m bgl)		
	SA1	SA2	SA3
TOPSOIL Grass onto dark grey brown slightly sandy loamy CLAY	-	0.40	0.40
TOPSOIL/MADE GROUND Grass onto dark grey brown slightly gravelly slightly sandy loamy CLAY. Gravel is fine to medium subangular to subrounded limestone.	0.30	-	-
MADE GROUND Dark grey slightly gravelly slightly sandy silty CLAY with occasional brick and roof tile fragments. Gravel is fine to coarse limestone	0.60	-	-
HEAD Grey blue slightly gravelly silty CLAY with occasional limestone and mudstone fragments fine to medium gravel size.	0.80	-	-
HEAD Yellow brown mottled light grey sandy to very sandy silty CLAY with frequent pockets and laminae of grey silty fine SAND.	-	2.00	2.50
Total Depth (m bgl)	0.80	2.00	2.50

Groundwater Details

No groundwater was encountered in any of the trial pit at full depth of exploration of 2.50m bgl.

It should be noted that groundwater levels may vary seasonally and with other factors. The reviewer should satisfy themselves with the groundwater levels at the time of any construction works.

Laboratory Analysis

Samples were not recovered from the arisings and laboratory analysis was not carried out.

Surface Water Soakaways

Infiltration testing was carried out within the trial pit SA1, SA2 and SA3 to the BRE365 methodology to provide an estimate infiltration factor for the subject site. The trial pits were formed at depth comprised between 0.80m and 2.50m and filled with c. 0.41m and 0.70m of water at its base to limit the amount water used, reduce the likelihood of trial pit instability and target the deeper soil horizons.

The testing was terminated part way through the first cycle within all trial pits due very slow infiltration rate and water level movement over a period comprised between 3 and 4 hours.

The results are presented in Appendix D and are summarised in the table below.

Infiltration Factors

Trial Pit	Soil Tested	Test Depth	Infiltration Factor (ms ⁻¹)		
			Cycle 1	Cycle 2	Cycle 3
SA1	HD	0.39 – 0.80m	Test failed <10 ⁻⁷	-	-
SA2	HD	1.44 – 2.00m	Test failed <10 ⁻⁷	-	-
SA3	HD	1.80-2.50m	Test failed <10 ⁻⁷	-	-

Note

HD HEAD DEPOSIT

General Notes

This report is produced for the sole use of the Client, and no responsibility of any kind, whether for negligence or otherwise, can be accepted for any Third Party who may rely upon it.

The conclusions and recommendations given in this report are based on our understanding of the future plans for the site and based on a scope of works agreed by the Client and afforded by the agreed budget. No responsibility is accepted for conditions not encountered, which are between exploratory points or outside of the agreed scope of work or if construction is commenced before regulatory approval of designs.

The report has been prepared following the guidelines and principles established in the British Standards, BS 5930, CIRIA Guidance and NHBC Standards. It necessarily relies on the co-operation of other organisations and the free availability of information and total access. No responsibility can, therefore, be accepted for conditions arising from information that was inaccurate or not available to the investigating team as a result of information being withheld or access being denied.

This report may suggest an opinion on a suspected configuration of strata or conditions between exploratory points and below the maximum depth of investigation. However, this is for guidance only and no liability can be accepted for its accuracy. Comments on the groundwater conditions are based on observations made at the time of the investigation unless otherwise stated. It should be noted, however, that groundwater levels might vary due to seasonal or other effects.

APPENDIX A

Trial Pit Location Plan



NORTH



PADDOCK
GEO ENGINEERING

**Exploratory Position
Site Plan**

**Land at Broadmore Cottage,
Steam Mills Road,
Cinderford,
GL14 3HY**

Simpson tws

January 2024






**Infiltration Testing
Locations**

**Not to scale.
All positions are approximate.**

APPENDIX B

Trial Pit Log

Machine : 3 Tonne Excavator Method : Trial Pit	Dimensions 1.10 x 0.30m	Ground Level (mOD)	Client Simpson tws	Job Number P23-306
	Location	Dates 04/01/2024	Engineer PGE	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	Grass onto dark grey brown slightly gravelly slightly sandy loamy CLAY. Gravel is fine to medium subangular to subrounded limestone. (TOPSOIL/MADE GROUND)		
					0.30 (0.30)	Dark grey slightly gravelly slightly sandy silty CLAY with occasional brick and roof tile fragments. Gravel is fine to coarse limestone. (MADE GROUND)		
					0.60 (0.20)	Grey blue slightly gravelly silty CLAY with occasional limestone and mudstone fragments fine to medium gravel size. (HEAD)		
					0.80	Complete at 0.80m		



Remarks

Infiltration test carried out to BRE365 methodology
 Trial pit backfilled with arising
 Trial pit stable upon completion
 No groundwater encountered

Logged in accordance BS5930:2015

Scale (approx) 1:25	Logged By EA	Figure No. P23-306.SA1
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Machine : 3 Tonne Excavator Method : Trial Pit	Dimensions 1.50 x 0.30m	Ground Level (mOD)	Client Simpson tws	Job Number P23-306
	Location	Dates 04/01/2024	Engineer PGE	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					0.40	Grass onto dark grey brown slightly sandy loamy CLAY. (TOPSOIL)		
					0.40	Yellow brown mottled light grey sandy to very sandy silty CLAY with frequent pockets and laminae of grey silty fine SAND. (HEAD)		
					(1.60)	...Becoming slightly gravelly from 1.30m depth. Gravel is fine to coarse subrounded and subangular sanstone.		
					2.00	Complete at 2.00m		



Remarks

No groundwater encountered
 Infiltration test carried out to BRE365 methodology
 Trial pit backfilled with arising
 Trial pit stable upon completion

Logged in accordance BS5930:2015

Scale (approx) 1:25	Logged By EA	Figure No. P23-306.SA2
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Machine : 3 Tonne Excavator Method :	Dimensions 1.60 x 0.30m	Ground Level (mOD)	Client Simpson tws	Job Number P23-306
	Location	Dates 04/01/2024	Engineer PGE	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					0.40	Grass onto dark grey brown slightly sandy loamy CLAY. (TOPSOIL)		
					0.40	Yellow brown mottled light grey sandy to very sandy silty CLAY with frequent pockets and laminae of grey silty fine SAND and occasional subrounded sandstone up to medium gravel size. (HEAD)		
					2.10	...Becoming slightly gravelly from 1.20m depth. Gravel is fine to coarse subrounded and subangular sanstone.		
					2.50	Complete at 2.50m		



Remarks

No groundwater encountered
Infiltration test carried out to BRE365 methodology
Trial pit backfilled with arising
Trial pit stable upon completion

Scale (approx) 1:25	Logged By	Figure No. P23-306.SA3
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APPENDIX C

Laboratory Analysis Results – Not Used



APPENDIX D

Infiltration Testing Results

Infiltration Test to BRE365 - SA1 TEST 1

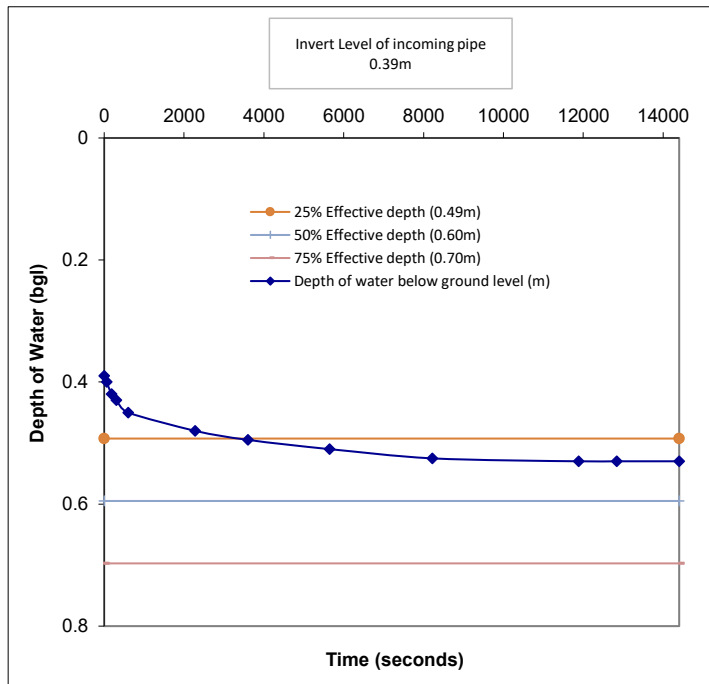
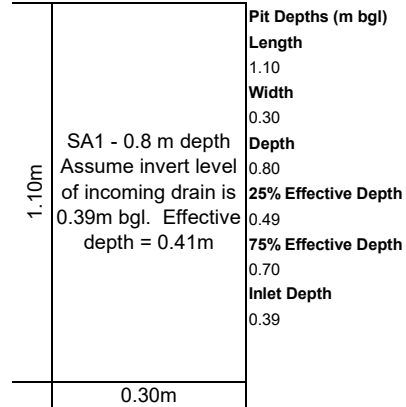
Field Data

Time	Time Elapsed (min)	Time Elapsed (sec)	Depth of Water below GL (m)
	0.0	0	0.39
	1.0	60	0.40
	3.0	180	0.42
	5.0	300	0.43
	10.0	600	0.45
	38.0	2280	0.48
	60.0	3600	0.50
	94.0	5640	0.51
	137.0	8220	0.53
	198.0	11880	0.53
	214.0	12840	0.53
	240.0	14400	0.53

Location: SA1
Weather: Damp
Engineer: EA
Date: 04/01/2024

TEST 1

Strata Tested Head Deposit



CALCULATION:

Soil Infiltration Rate(f) =
 $V_{p75-25} / (ap_{50} \times tp_{75-25})$

Where:
 V_{p75-25} = effective storage volume between 75% and 25% effective depth
 $1.1 \times 0.3 \times (0.6975 - 0.4925)$
 = **0.06765**

ap_{50} = internal area of TP upto 50% effective depth + base of TP
 $2(1.1 \times 0.3) + 2(0.3 \times 0.3) + (1.1 \times 0.3)$
 = **0.904**

tp_{75-25} = the time for water level to fall from 75% - 25% effective depth
 = **N/A** secs

f = **N/A** m/s

Comment

Infiltration test terminated after c.4hrs due to failure to reach 50% in the allowed time



Client: Simpson tws
Project No: P23-306
Project: Land at Broadmore Cottage, Steam Mills Road, Cinderford, GL14 3HY

Infiltration Test to BRE365 - SA2 TEST 1

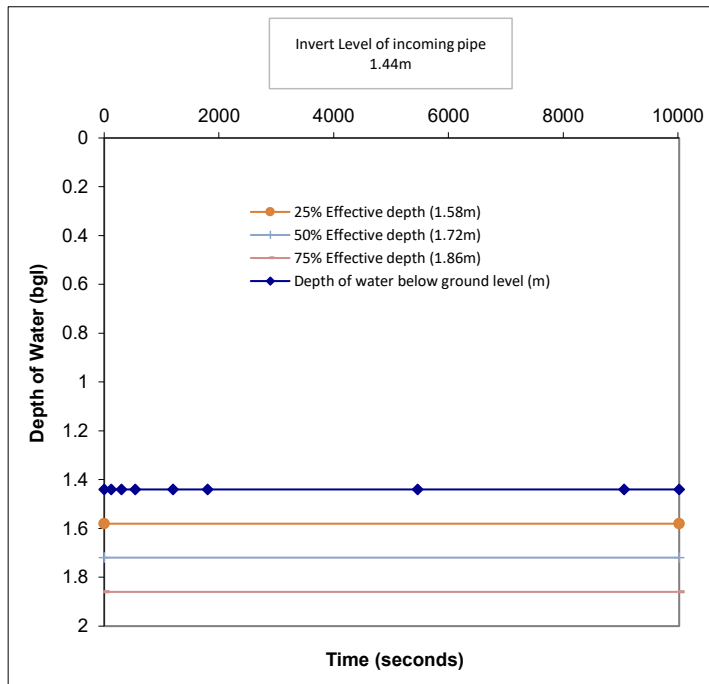
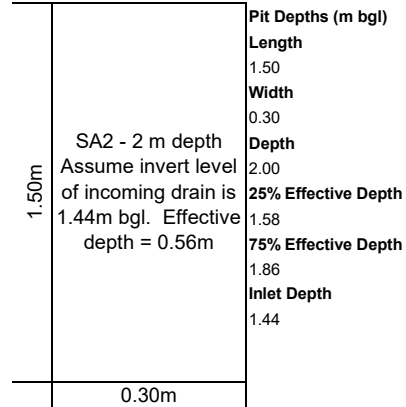
Field Data

Time	Time Elapsed (min)	Time Elapsed (sec)	Depth of Water below GL (m)
	0.0	0	1.44
	2.0	120	1.44
	5.0	300	1.44
	9.0	540	1.44
	20.0	1200	1.44
	30.0	1800	1.44
	91.0	5460	1.44
	151.0	9060	1.44
	167.0	10020	1.44

Location: SA2
Weather: Damp
Engineer: EA
Date: 04/01/2024

TEST 1

Strata Tested Head Deposit



CALCULATION:

Soil Infiltration Rate(f) =
 $V_{p75-25} / (ap_{50} \times tp_{75-25})$

Where:
 V_{p75-25} = effective storage volume between 75% and 25% effective depth
 $1.5 \times 0.3 \times (1.86 - 1.58)$
 = **0.126**

ap_{50} = internal area of TP upto 50% effective depth + base of TP
 $2(1.5 \times 0.3) + 2(0.3 \times 0.3) + (1.5 \times 0.3)$
 = **1.458**

tp_{75-25} = the time for water level to fall from 75% - 25% effective depth
 = **N/A** secs

f = **N/A** m/s

Comment

Infiltration test terminated after c.3hrs due to failure to reach 25% in the allowed time



Client: Simpson tws
Project No: P23-306
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Infiltration Test to BRE365 - SA3 TEST 1

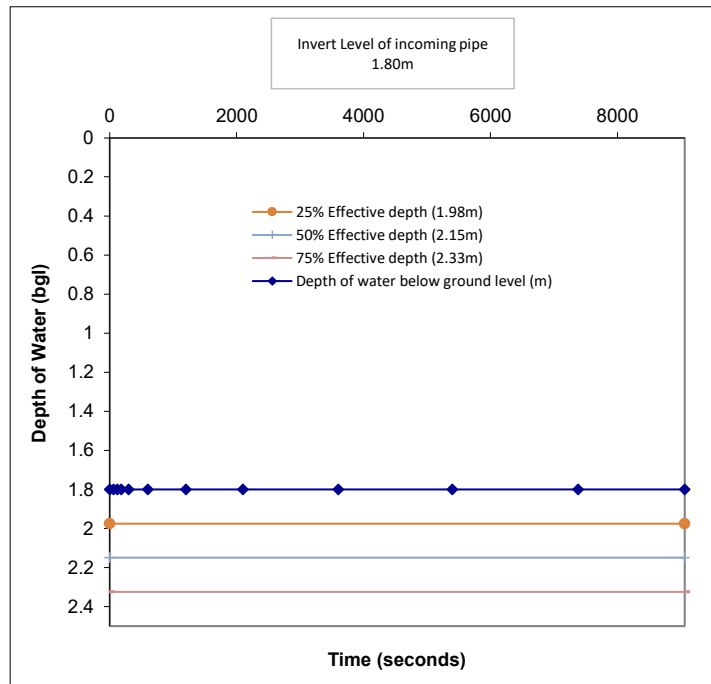
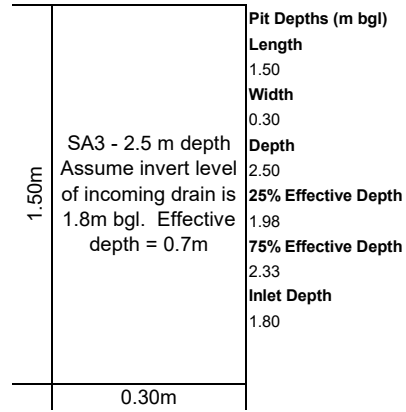
Field Data

Time	Time Elapsed (min)	Time Elapsed (sec)	Depth of Water below GL (m)
	0.0	0	1.80
	1.0	60	1.80
	2.0	120	1.80
	3.0	180	1.80
	5.0	300	1.80
	10.0	600	1.80
	20.0	1200	1.80
	35.0	2100	1.80
	60.0	3600	1.80
	90.0	5400	1.80
	123.0	7380	1.80
	151.0	9060	1.80

Location: SA3
Weather: Damp
Engineer: EA
Date: 04/01/2024

TEST 1

Strata Tested Head Deposit



CALCULATION:

Soil Infiltration Rate(f) =
 $V_{p75-25} / (ap_{50} \times tp_{75-25})$

Where:
 V_{p75-25} = effective storage volume between 75% and 25% effective depth
 $1.5 \times 0.3 \times (2.325 - 1.975)$
 = **0.1575**

ap_{50} = internal area of TP upto 50% effective depth + base of TP
 $2(1.5 \times 0.3) + 2(0.3 \times 0.3) + (1.5 \times 0.3)$
 = **1.71**

tp_{75-25} = the time for water level to fall from 75% - 25% effective depth
 = **N/A** secs

$f =$ **N/A** m/s

Comment

Infiltration test terminated after c.2.5hrs due to failure to reach 25% in the allowed time



Client: Simpson tws
Project No: P23-306
Project: Land at Broadmore Cottage, Steam Mills Road, Cinderford, GL14 3HY

APPENDIX E

Site Photographs



Photo of the area (Facing north-west)



Photo of the area (Facing south-west)



Client: Simpson tws

Project No: P23-306
Project Title: Land at Broadmore Cot tage, Steam Mills Road, Cinderford, GL14 3HY

Date: 04/01/2024



Photo of the area (Facing south)



Photo of the rear of the property



Client:	Simpson tws
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Date:	04/01/2024



Soil profile of trial pit SA1



Soil arisings of trial pit SA1



Soil profile of trial pit SA2



Soil arisings of trial pit SA2



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Date:	04/01/2024



Soil profile of trial pit SA3



Soil arisings of trial pit SA3