Soakaway and Percolation Test Report

Land Adj Orchard Farm, Comberton, Orleton, SY8 4HF

Prepared for;
R. Florence

Sent by e-mail to: [redacted]

Land Adj Orchard Farm
Comberton
Orleton
SY8 4HF

For the attention of R. & R. Florence as well as agent E. Giles (GPS Ltd),

14th February 2025

E-47632– SUDs Tests (BRE 365) and percolation testing (BS 6297) – Land Adj Orchanrd Farm, Comberton, Orleton, SY8 4HF.

Dear Ruby,

1. Introduction

Environmental Management Solutions Limited (EMS) have been commissioned by the client and homeowner R. Florence to undertake infiltration tests and percolation tests for a proposed development at the above site.

This letter report has been produced to summarise the findings of recent BRE 365 Infiltration tests and percolation tests at the site to aid with drainage design and accompany ongoing planning requirements.

2. Site Location and Description

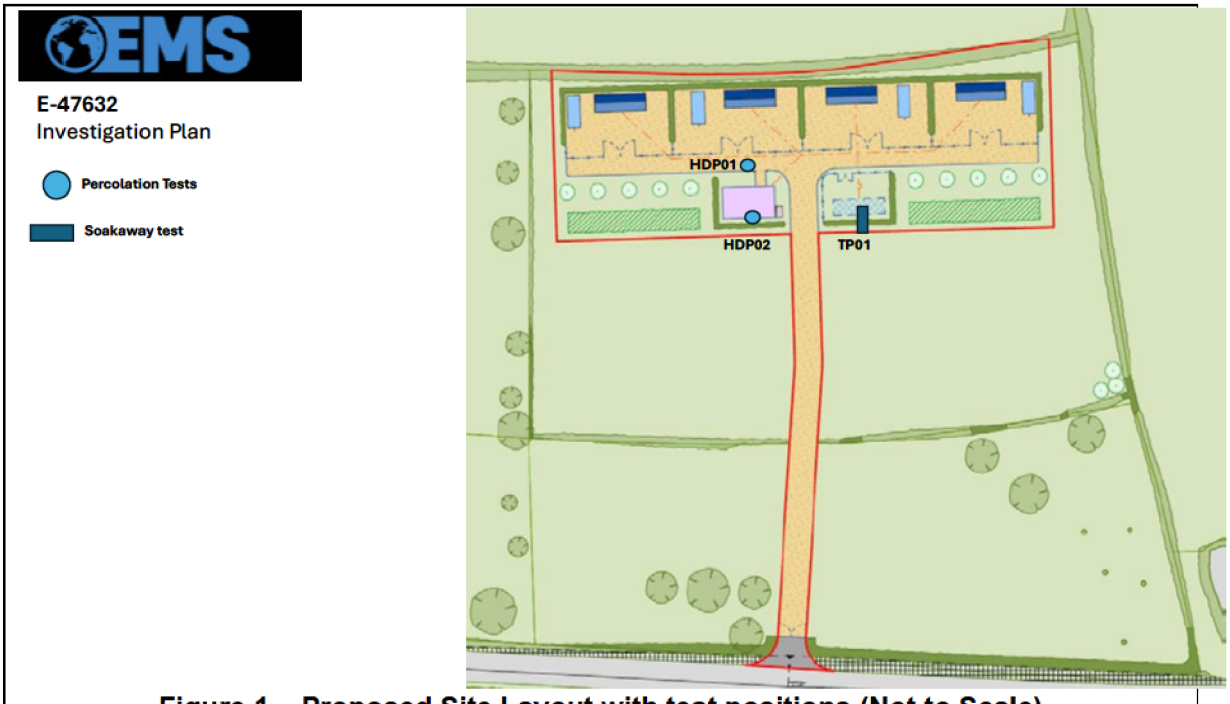

Figure 1 – Proposed Site Layout with test positions (Not to Scale)

The site is located on the West of Orleton, roughly halfway in between Ludlow and Leominster. The site is accessed from a field to the south, from a small access gate adjacent to Pear Tree Cottage.

The site is flat and laid to grass. The site is bound by hedgerow. There is a small 'temporary' structure in the south-east corner of the field.

The site plan including test positions can be seen in figure 1.

3. Proposed Development

The proposed site plan includes the construction of 4 'chalet' style residential buildings, with a relatively small footprint and surrounded by loose bound permeable hardstanding.

Wildflower meadows and native tree planting have also been proposed on site. A drainage strategy has been written which includes foul water and surface water.

4. Geology

The BGS map (Sheets 181 'Ludlow', 1:50,000 scale), indicates the site to be underlain by the Raglan Mudstone Formation which broadly consists of interbedded siltstones and mudstones. The superficial geology recorded on site is shown as glaciofluvial sheet deposits consisting mainly of sand and gravels.

There are no recorded BGS boreholes within 250m of the site boundary.

5. Hydrogeology

The Raglan Mudstone Formation is designated as a Secondary A aquifer. Secondary A aquifers comprise permeable layers that can support local water supplies, and may form an important source of base flow to rivers

The superficial geology is classed an unconfined aquifer.

The site is not located within a Groundwater Source Protection Zone.

The site does lie within a Nitrate Vulnerable Zone.

Groundwater vulnerability is given as medium-high for this site.

6. Hydrology and Flood Risk

The closes surface water features to the site are two east-west running brooks approximately 300m north and one 300m south of site.

The site is situated within flood zone 1, therefore there is a low probability of flooding from rivers and the sea.

There is a negligible chance for surface water flooding as shown in the flood risk map for planning provided by the UK Government.

The flood map for planning service provided by Gov.UK (https://flood-map-for-planning.service.gov.uk/location)

7. Previous Investigation Works

EMS is not aware of any previous investigations being conducted at the site.

8. Site Works

Site works were undertaken between the 28-30th January 2025 and included excavating 1 trial hole via mechanical excavation and a further two hand dug trial pits and performing and observing soakaway testing in accordance with BRE 365, as well as percolation testing to BS 6297.

- TP01 was located in the area on the proposed plans where a soakaway is intended to be installed. (Soakaway test)
- HDP01 and HDP02 were within the vicinity of the package treatment plant on the proposed drawings (Percolation tests).

9. Encountered Ground Conditions

The encountered ground conditions showed a sandy clayey SILT, followed by a very gravelly sandy CLAY. The gravel content increased with depth.

No groundwater was encountered within any of the trial pits although it is anticipated to be <2 mbgl.

A photographic record of the trial pits and testing are presented in Attachment A. Detailed Trial Pit logs are presented in Attachment B.

10. Soil Infiltration Rates

A summary of soakaway testing is presented in Table 1.

Table 1: Summary of Soakaway Test Results

Test Pit	Strata Tested	Elapsed Time	Measured Outflow	Infiltration Rate (m/s)
TP01 Test 1 28/01/25	0.34 mbgl – 1.00 mbgl	6 hours and 46 minutes	100%	8.43×10^{-6} m/s
TP01 Test 2 29/01/25	0.31 mbgl – 1.00 mbgl	11 hours and 0 minutes (overnight infiltration)	100%	5.50×10^{-6} m/s
TP01 Test 3 30/01/25	0.30 mbgl – 0.97 mbgl	16 hours and 40 minutes (overnight infiltration)	96.25%	**3.47×10^{-6} m/s** *(Infiltration rate to BRE 365 after 3 fills)*

The one test location proved slow, but managed to infiltrate fully three times during the course of the testing.

11. Soakaway Advice

Two infiltration tests undertaken within the SAND managed to infiltrate 3 full fills and an infiltration rate could be established for TP01.

TP01 achieved an infiltration rate of $3.47x10^{-6}$ m/s between 0.30 and 0.97 mbgl after three fills.

Table 4 – Summary of Soakaway Assessment	
Ground model	The subsoil characteristics include, clay, gravel and sand in various combinations and quite densely packed. Providing slow infiltration.
SA test locations	TP01 (Shown in Figure 1)
Traditional soakaways should be located at least 5m away from any foundations. Infiltration devices that do not lead to concentrated water inflows, such as permeable pavements, can be located closer than this offset distance subject to careful design and construction.	
Soils tested	Soft, gravelly sandy CLAY.
Proposed SuDS likely to be clear of groundwater	Unknown.
Geotechnical Risk Potential? (Dissolution, running sands)	Unlikely.
Potential for shrinkage/heave in clays	Unlikely.
Acceptable Risk of shrinkage/heave in clays	Unlikely.
Slope stability issues	No
Contaminated land issues	No visual or olfactory evidence of contamination was identified.
Source Protection Zone	No
F calculated	TP01 – 3.47×10^{-6} m/s

As stated in the National Planning Practice Guidance, the aim should be to discharge surface water run-off as high up the drainage hierarchy, as reasonably practicable:

- into the ground (infiltration).
- to a surface water body.
- to a surface water sewer, highway drain, or another drainage system.
- to a combined sewer.

We recommend considering a combination of drainage system (SuDS) components. Options include:

- Source control
- Swales & conveyance channels
- Filtration
- Infiltration
- Retention & detention
- Wetlands
- Inlets, outlets & control structures

A successful SuDS scheme may use a combination of these processes and components. We recommend providing our information to a drainage designer experienced with SuDS to consider the best approach.

12. Percolation Testing

Percolation testing was also conducted on site, in two locations near the proposed foul water percolation zone (shown in figure 1), at a depth of 0.3-0.6 mbgl in both pits (HDP01 & HDP02). The following table shows the Vp values of the percolation tests performed.

Location:	HDP01	HDP02
Vp Value:	91	95

EMS thank you for your business.

Yours sincerely,

For and on behalf of Environmental Management Solutions Limited

[redacted]

Joshua Greenland-Pigott (Head of Geotech)

Attachments

Attachment A: Photographic record
Attachment B: Trial Pit Logs
Attachment C: Soakaway data

Attachment A – Photographic Record

The Old Surgery, 22a King Street, Hereford HR4 9DA
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Registered Office: The Old Surgery, 22a King Street, Hereford HR4 9DA

Photo 01	Photo 02
	
28th January 2025 – Land Adj Orchard Farm	**28th January 2025 – Land Adj Orchard Farm**
TP01 during soakaway test 01	Upper soils in TP01 showing a sandy clay/clayey sand.

Photo 03	Photo 04
	
28th January 2025 – Land Adj Orchard Farm	**28th January 2025 – Land Adj Orchard Farm**
TP01 during soakaway test 02	Percolation test pit (PT01)

Photo 05	Photo 06
	
28th January 2025 – Land Adj Orchard Farm	**28th January 2025 – Land Adj Orchard Farm**
Percolation test pit (PT01).	Percolation test in PT01

Photo 07	Photo 08
	
28th January 2025 – Land Adj Orchard Farm	**28th January 2025 – Land Adj Orchard Farm**
Soakaway test pit TP01 during soakaway test	Infiltration proved slow in TP01.

Attachment B – Trial Pit Logs

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Trial Pit

TP01

Sheet 1 of 1

Hole Type	Easting	Northing	Ground Level (m)	Scale
TP	349308.00	267805.00		1:25

Project Name	Project No.	Start Date	End Date
Land Adj Orchard Farm	E-47632	2025-01-28	2025-01-28

Client
R. & A. Florence.

Contractor
Nathan Davies Contracting

Consultant
EMS- GEOTECH

Inst/ Backfill	Water Levels	Samples and Tests: Depth (m)	Samples and Tests: Type/ Ref	Samples and Tests: Results	Level (m)	Depth (thickness) (m)	Strata: Legend	Strata: Description
						(0.30) 0.30		Soft brown sandy clayey SILT. Roots and rootlets.
						(0.70) 1.00		Soft reddish brown very gravelly sandy CLAY. Increasing gravels with depth. Gravels are well rounded and fine to course sized.
								End of Trial Pit at 1.00m

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0

Remarks

Method, Plant, Stability, Dimensions

Logger

Checked By: JGP **Approved By:** JGP

Attachment C – Soakaway Data

The Old Surgery, 22a King Street, Hereford HR4 9DA
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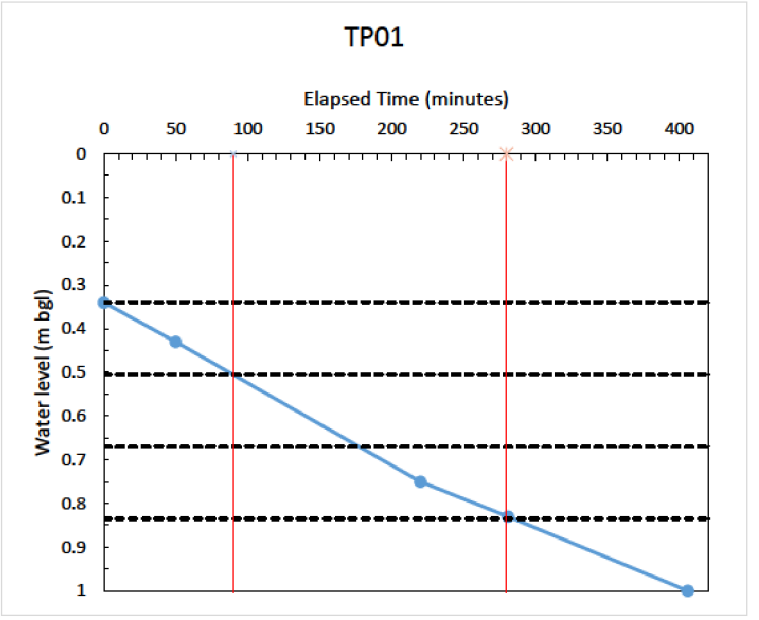
Soakaway Test Result Sheet

Project Name:	Land Adj Orchard Farm
Project Number:	E-47632
Date of Test:	28/01/2025
Test Location:	TP01 Test 1

The test pit was backfilled by client

Depth of pit (m):	1.00
Effective depth (m):	0.66
Width of pit (m):	0.35
Length of pit (m):	1.20

Time elapsed (mins)	Water level (m below ground level)
0	0.34
50	0.43
220	0.75
281	0.83
406	1.00
0	0.00
0	0.00
0	0.00
0	0.00
0	0.00
0	0.00
0	0.00



V_{p75-25} = 0.14 m^3, Storage volume from 75% to 25% depth

a_{s50} = 1.44 m^2 wetted area of pit 50% full;

t_{p75-25} = 190 minutes, time to fall from 75% depth to 25% depth

***f* (soil infiltration rate) =** **8.43E-06** m/s

(If above is blank/black an infiltration rate has not been established)

$$f = \frac{Vp75\text{-}25}{as50 \times tp75\text{-}25 \times 60}$$

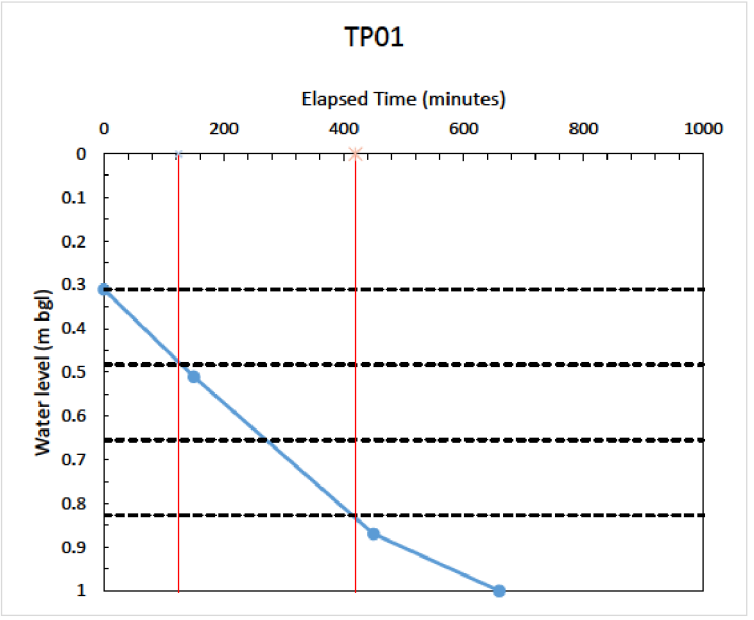
Soakaway Test Result Sheet

Project Name:	Land Adj Orchard Farm
Project Number:	E-47632
Date of Test:	29/01/2025
Test Location:	TP01 Test 2

The test pit was backfilled by client

Depth of pit (m):	1.00
Effective depth (m):	0.69
Width of pit (m):	0.35
Length of pit (m):	1.20

Time elapsed (mins)	Water level (m below ground level)
0	0.31
150	0.51
450	0.87
660	1.00
0	0.00
0	0.00
0	0.00
0	0.00
0	0.00
0	0.00
0	0.00
0	0.00



V_{p75-25} = 0.14 m^3, Storage volume from 75% to 25% depth

a_{s50} = 1.49 m^2 wetted area of pit 50% full;

t_{p75-25} = 295 minutes, time to fall from 75% depth to 25% depth

***f* (soil infiltration rate) =** **5.50E-06** m/s

(If above is blank/black an infiltration rate has not been established)

$$f = \frac{Vp75\text{-}25}{as50 \times tp75\text{-}25 \times 60}$$

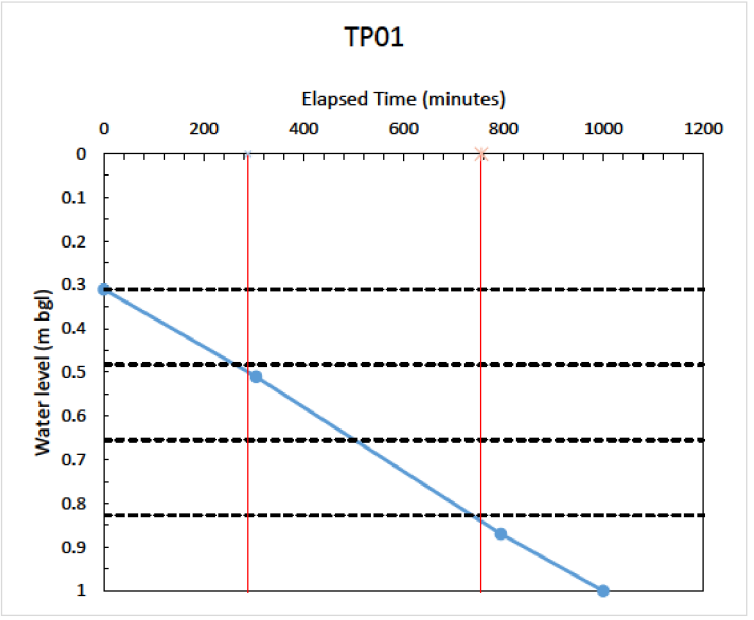
Soakaway Test Result Sheet

Project Name:	Land Adj Orchard Farm
Project Number:	E-47632
Date of Test:	30/01/2025
Test Location:	TP01 Test 3

The test pit was backfilled by client

Depth of pit (m):	1.00
Effective depth (m):	0.69
Width of pit (m):	0.35
Length of pit (m):	1.20

Time elapsed (mins)	Water level (m below ground level)
0	0.31
305	0.51
795	0.87
1000	1.00
0	0.00
0	0.00
0	0.00
0	0.00
0	0.00
0	0.00
0	0.00
0	0.00



V_{p75-25} = 0.14 m^3, Storage volume from 75% to 25% depth

a_{s50} = 1.49 m^2 wetted area of pit 50% full;

t_{p75-25} = 467 minutes, time to fall from 75% depth to 25% depth

***f* (soil infiltration rate) =** **3.47E-06** m/s

(If above is blank/black an infiltration rate has not been established)

$$f = \frac{Vp75\text{-}25}{as50 \times tp75\text{-}25 \times 60}$$