

**SOAKAGE TESTING AND GROUNDWATER MONITORING**

**AT**

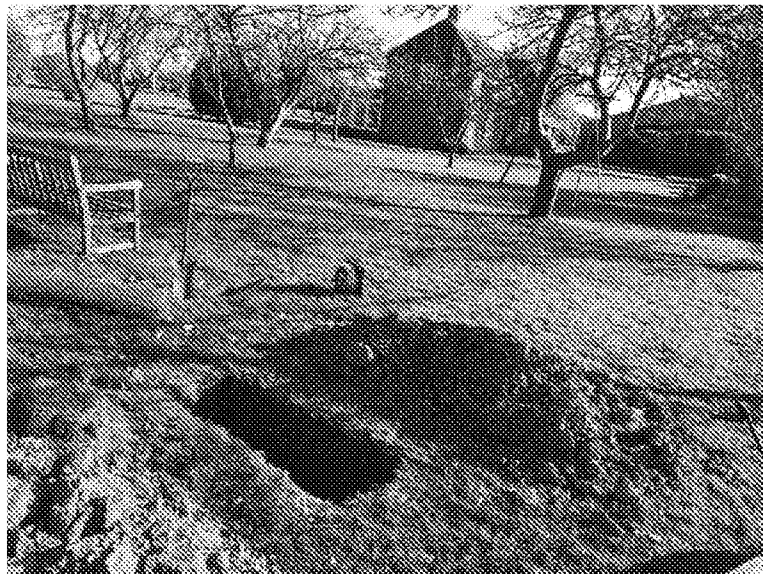
**TILE BARN FARM, HILL LANE, BARNHAM**

**FOR**

**MATTHEW LONSDALE**

**G6445**

**31 March 2021**



**Ground Management Ltd**  
Civil and Geotechnical Engineering Services

**DOCUMENT CONTROL**

Report Title: Soakage Testing and Groundwater Monitoring  
Tile Barn Farm, Hill Lane, Barnham

Report No./ Issue: G6445-01/1

Report Status: Issued for Client Comment

Distribution: Matthew Lonsdale PDF copy 31 March 2021

Prepared by: Alistair Tyler BSc MSc DIC CEng MICE

Signed:

Ground Management Ltd Robin Hill Farm Clay Lane Fishbourne Chichester West Sussex PO18 8AB



## **CONTENTS**

- 1.0 Introduction
- 2.0 Proposed Development
- 3.0 General Description of Site and Surrounding Area
- 4.0 Geology
- 5.0 Details of the Ground Investigation
- 6.0 Ground and Groundwater Conditions
- 7.0 Discussion and Recommendations

- Figure 1: Site Location Plan
- Figure 2: Existing Site Layout
- Figure 3: Proposed Development
- Figure 4: Exploratory Hole Location Plan

Exploratory Hole Logs: Borehole BH1  
Trial Pit TP1

Infiltration Test Results

## **1.0 INTRODUCTION**

- 1.1 Ground Management Ltd have carried out a preliminary ground investigation at Tile Barn Farm, Hill Lane, Barnham to collect information on ground conditions relevant to drainage of a proposed new house.
- 1.2 The work included a brief desk study, site visit for borehole excavation and standpipe installation followed by large scale soakage testing.
- 1.3 The exploratory holes allowed assessment of ground conditions and collection of samples. The standpipe will enable ongoing monitoring of groundwater level.
- 1.4 This report provides a record of the investigation and its findings together with brief discussion and recommendations to assist drainage design.
- 1.5 Recommendations are based on the conditions revealed by the investigation. Should the proposed development change or ground conditions be found to vary from those previously revealed they should be reported to a geotechnical engineer to consider the significance.
- 1.6 A contamination assessment has not been requested or carried out.
- 1.7 The work was carried out on behalf of Matthew Lonsdale and nothing in this report confers or purports to confer on any third party, any benefit or any right to enforce any term of this report pursuant to the Contract (Rights of Third Parties) Act 1999.

## **2.0 PROPOSED DEVELOPMENT**

- 2.1 The proposed development comprises a new house and ancillary works including a driveway with a new access onto Hill Lane as indicated on plans prepared by Pullen Architecture, an extract of which is presented on the attached Figure 3.

---

### **3.0 GENERAL DESCRIPTION OF SITE AND SURROUNDING AREA**

- 3.1 The site is located to the north of the existing farm yard and house on the east side of Hill Lane as indicated on Figure 1. The National Grid Reference for the site is SU 96443 03798 approximately and the nearest postcode is PO22 0BL.
- 3.2 The site comprises part of the garden to the existing house as indicated on the attached Figure 2.
- 3.3 As shown on the site plan the site is currently a lawn area occupied by a number of trees and some shrubs. There is a hedge along the west boundary with Hill Lane beyond, slightly below the level of the site.
- 3.4 Open field, currently grass, extends to the east of the site. Ground levels are not indicated on the plans but the 1:25,000 Ordnance Survey mapping shows the site to be just above the 5m contour and indicates the general area has a slight slope towards the south.
- 3.5 The nearest open watercourse is an open ditch on the west side of Hill Lane that flows south across the fields and connects into Lidsey Rife. There is a disused canal running east west about 200m south of the site.
- 3.6 Underground service plans were not available however the Client advised there were no services beneath the area of the proposed investigation, other than a water pipe connection to a garden tap (route unknown). Mapping was obtained from the gas and electricity supply companies and did not show services in the vicinity of the proposed borehole and trial pit.

---

## 4.0 GEOLOGY

- 4.1 The 1:50,000 British Geological Survey of England and Wales Sheet 317/332, “Chichester and Bognor” dated 1996 indicates the site to be underlain by Aeolian Deposit (Brickearth) comprising a silty clay, over Upper Chalk.
- 4.2 Interpretation of the mapping suggests the mapped strata may be intervened by Raised Beach Deposits, comprising sands and gravels.
- 4.3 The solid geology is indicated to be gently folded and dipping to the north with the Littlehampton Anticline approximately 700m to the south and the Chichester Syncline 1km to the north. The Reading Formation that overlies the chalk is shown mapped immediately to the north of the site.
- 4.4 A report prepared by the Institute of Geological Sciences, titled Mineral Assessment Report 138 “Sand and Gravel Resources SU80, 90 Chichester and Bognor Regis, Sussex” includes an exploratory hole referenced 90 SE 25, Tile Barn Farm, located 100m south of the site and recording :

|                                                    |               |
|----------------------------------------------------|---------------|
| Soil and Made Ground                               | 0 to 0.4m     |
| Brickearth (Clay, brown, silty)                    | 0.4m to 3.1m  |
| Upper Chalk (Silt, very chalky with chalk pebbles) | 3.1m to 4.5m  |
| (Chalk, soft, weathered)                           | 4.5m to >5.3m |

## **5.0 DETAILS OF THE GROUND INVESTIGATION**

- 5.1 The ground investigation fieldwork comprised the exploratory holes indicated on Figure 4 and described below. The scope and location were selected to avoid the building footprint whilst targeting possible soakaway positions and allow ongoing monitoring.
- 5.2 The work commenced with excavation of BH1 by hand held window sampling to a depth of 3.0m on 12/3/21 to examine and record the ground profile. A 19mm diameter standpipe was installed within the completed borehole for monitoring of groundwater level.
- 5.3 Following a brief period of monitoring groundwater level, on 16/3/21 a trial pit, TP1, was hand dug to a depth of 1.0m. Large scale soakage testing was then conducted within the pit in accordance with BRE 365 including 3 refills of the test pit. Results of the tests are appended. Deeper excavation requiring a machine was not possible due to environmental constraints pending the conclusion of ecological surveys.
- 5.4 The exploratory holes were logged in general accordance with BS5930:1999 Code of Practice for Site Investigation. The sampling referencing and the results of the insitu testing are presented on the appended logs.
- 5.5 Selected samples were taken from the exploratory holes to be available should laboratory testing be required.

**6.0 GROUND AND GROUNDWATER CONDITIONS**

- 6.1 Descriptions of the soils encountered are presented on the attached exploratory hole logs. The findings can be summarised as follows:

| Strata                                             | Thickness (m) | Depth to base of strata (m bgl) |
|----------------------------------------------------|---------------|---------------------------------|
| TOPSOIL                                            | 0.2 – 0.25    | 0.2 – 0.25                      |
| Soft to firm and firm silty CLAY with flint gravel | 0.7 – >0.75   | >1.0 – 1.2                      |
| Very sandy CLAY / SILT                             | 0.6           | 1.8                             |
| Slightly silty fine SAND                           | 1.1           | 2.9                             |
| Chalk GRAVEL with some comminuted chalk            | > 0.1         | > 3.0                           |

- 6.2 Groundwater was not observed during excavation of the borehole and during monitoring visits between 12/3/21 and 31/3/21 the standpipe remained dry. Ongoing monitoring will assist interpretation.

- 6.3 An assessment of the large scale soakage test results are appended and a summary is presented in the table below:

| Trial Pit | Pit Dimensions LxWxD (metres) | Test No. | Water Level at start of test (mm below ground level) | Duration of test (mins) | Fall of water level during test (mm) | Infiltration Coefficient (m/s) |
|-----------|-------------------------------|----------|------------------------------------------------------|-------------------------|--------------------------------------|--------------------------------|
| TP1       | 0.4 x 1.2 x 1.0               | 1        | 20                                                   | 1000                    | 980                                  | $5.2 \times 10^{-6}$           |
|           |                               | 2        | 15                                                   | 890                     | 875                                  | $2.6 \times 10^{-6}$           |
|           |                               | 3        | 10                                                   | 860                     | 850                                  | $2.0 \times 10^{-6}$           |

## **7.0 DISCUSSION AND RECOMMENDATIONS**

### **7.1 Ground and groundwater conditions**

- 7.1.1 Ground conditions revealed by this investigation generally confirm the anticipated geology of Aeolian Deposits over Raised Beach Deposits and Upper Chalk at depth.
- 7.1.2 Groundwater was not encountered and during the period of monitoring 12 to 31/3/21 BH1 remained dry to a depth of 3m .
- 7.1.3 It should be assumed that there will be seasonal variation of the groundwater level and it should be expected to rise in response to rain. The installed standpipe will allow ongoing monitoring of the groundwater levels to investigate these effects.

### **7.2 Excavations**

- 7.2.1 Shallow excavations above the water table have a reasonable prospect of the sides standing vertically in the short term but where expected to remain open for any length of time or if greater than 1.2m deep and are to be entered by personnel will need support.
- 7.2.2 Deeper excavations extending into the sand strata or below the groundwater may not be required but if they are necessary may be unstable and inflow of groundwater could be problematic and require specialist dewatering techniques.

### **7.3 Drainage**

- 7.3.1 Based on the results of the soakage tests an infiltration coefficient of  $2.0 \times 10^{-6}$  m/s may be adopted for the design of a shallow soakaways extending into the silty clay strata around 1m deep at the location of TP1.
- 7.3.2 Confirmatory tests should be conducted if soakaways are to be located in differing ground conditions elsewhere on the site and higher infiltration rates may be available within the sand strata.

#### 7.4 **Underground Services**

- 7.4.1 It is recommended that utility maps and all available information on the location of underground services should be referenced prior to further excavation of the site.
- 7.4.2 Any redundant drainage pipework and chambers should be removed or properly filled / grouted. Any soakaways serving the existing surface water and roof drains should be located to establish if they will impact on the foundation design.
- 7.4.3 Should land drains be encountered during excavation and construction they should be diverted around the works to allow continued performance.

# Ground Management Ltd

Civil and Geotechnical Engineering Services

Robin Hill Farm, Clay Lane, Fishbourne  
CHICHESTER, West Sussex PO18 8AB  
Phone/Fax: 01243 575073

PROJECT NO: G6445

FIGURE REF: Figure 1

PROJECT: Tile Barn Farm, 32 Hill Lane, Barnham PO22 0BL

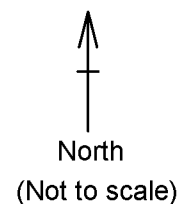
PREPARED: AJHT

SECTION: Preliminary Ground Investigation

CHECKED: AJHT

TITLE: Site Location Plan

DATE: March 2021



Site Location

# Ground Management Ltd

Civil and Geotechnical Engineering Services

Robin Hill Farm, Clay Lane, Fishbourne  
CHICHESTER, West Suss ex PO18 8AB  
Phone/Fax 01243 575073

PROJECT NO: G6445

FIGURE REF: Figure 2

PROJECT: Tile Barn Farm, 32 Hill Lane, Barnham PO22 0BL

PREPARED: AJHT

SECTION: Preliminary Ground Investigation

CHECKED: AJHT

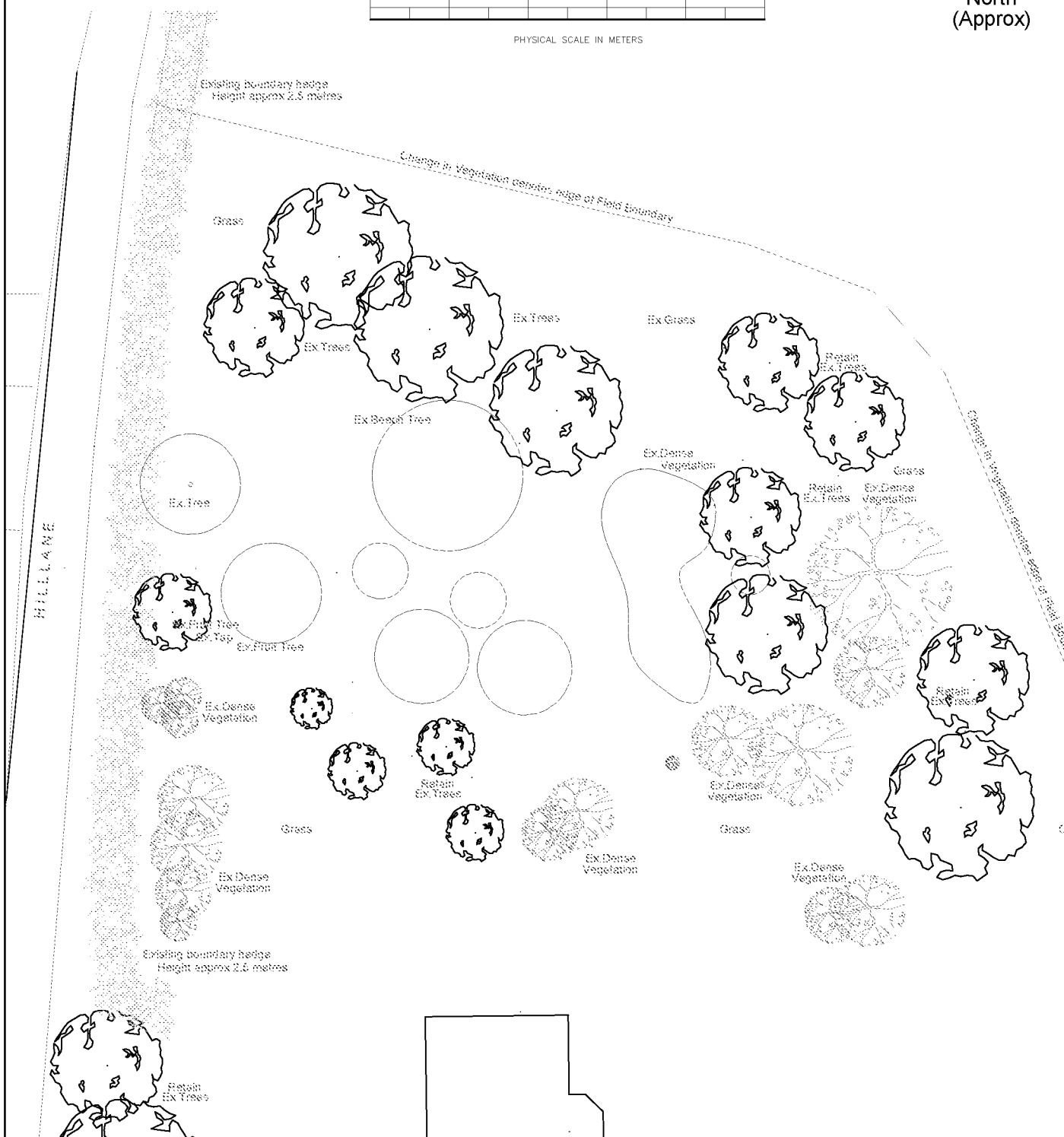
TITLE: Existing Site Layout

DATE: March 2021

APPROXIMATE SCALE:

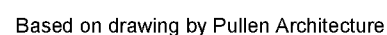


PHYSICAL SCALE IN METERS



Based on drawing by Pullen Architecture

DATE: **March 2021**



# Ground Management Ltd

Civil and Geotechnical Engineering Services

Robin Hill Farm, Clay Lane, Fishbourne  
CHICHESTER, West Sussex PO18 8AB  
Phone/Fax 01243 575073

PROJECT NO: G6445

FIGURE REF: Figure 4

PROJECT: Tile Barn Farm, 32 Hill Lane, Barnham PO22 0BL

PREPARED: AJHT

SECTION: Preliminary Ground Investigation

CHECKED: AJHT

TITLE: Exploratory Hole Location Plan

DATE: March 2021

(HOLE LOCATIONS ARE INDICATIVE ONLY UNLESS DIMENSIONED)

North  
(Approx)

APPROXIMATE SCALE:

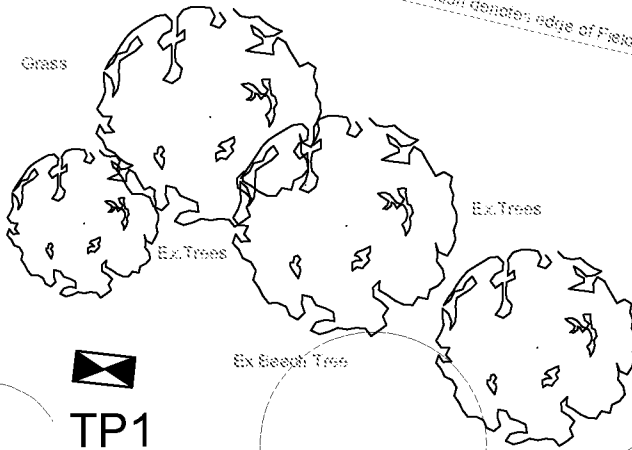


PHYSICAL SCALE IN METERS

Existing boundary hedge  
Height approx 2.5 metres

Change in Vegetation denotes edge of Field Boundary

Grass



Ex. Tree

Ex. Grass

Retain  
Ex. Trees

Ex. Dense  
Vegetation

Retain  
Ex. Trees

Grass

Ex. Dense  
Vegetation

Change in Vegetation denotes edge of Field Boundary



Ex. Fruit Tree



Ex. Dense  
Vegetation



Grass



Retain  
Ex. Trees



Ex. Dense  
Vegetation

BH1



Ex. Dense  
Vegetation

Grass

Ex. Dense  
Vegetation



Retain  
Ex. Trees

Existing boundary hedge  
Height approx 2.5 metres



Retain  
Ex. Trees

# Ground Management Ltd

Civil and Geotechnical Engineering Services

Robin Hill Farm Clay Lane Fishbourne  
CHICHESTER West Sussex PO18 8AB  
Phone/Fax: 01243 575073  
mail@groundmanagement.com

|                                    |                             |
|------------------------------------|-----------------------------|
| <b>Site</b>                        | <b>Number</b><br><b>BH1</b> |
| Tile Barn Farm, Hill Lane, Barnham |                             |

|                                                      |                                                                      |                            |                                |                            |
|------------------------------------------------------|----------------------------------------------------------------------|----------------------------|--------------------------------|----------------------------|
| <b>Excavation Method</b><br>Hand held window sampler | <b>Dimensions</b><br>80mm to 1.10m<br>60mm to 2.00m<br>50mm to 3.00m | <b>Ground Level (mOD)</b>  | <b>Client</b><br>Matt Lonsdale | <b>Job Number</b><br>G6445 |
|                                                      | <b>Location</b><br>See Location Plan                                 | <b>Dates</b><br>12/03/2021 | <b>Engineer</b>                | <b>Sheet</b><br>1/1        |

| Depth (m) | Sample / Tests | Water Depth (m) | Field Records               | Level (mOD) | Depth (m) (Thickness) | Description                                                                                                 | Legend | Water |
|-----------|----------------|-----------------|-----------------------------|-------------|-----------------------|-------------------------------------------------------------------------------------------------------------|--------|-------|
| 0.30-0.50 | D1             |                 | HV at 0.4m : 25, 30, 30 kPa |             | (0.15)<br>0.15        | Grass over moist dark brown slightly sandy silty TOPSOIL. Many fine roots / rootlets.                       |        |       |
| 0.50-0.80 | D2             |                 | HV at 0.6m : 60, 65, 60     |             | (0.35)<br>0.50        | Soft brown slightly sandy CLAY / SILT                                                                       |        |       |
|           |                |                 |                             |             | (0.30)<br>0.80        | Firm orange brown silty CLAY with occasional subangular flint gravel                                        |        |       |
|           |                |                 |                             |             | (0.40)<br>1.20        | Firm orange brown silty CLAY with some coarse medium and fine subangular flint gravel                       |        |       |
| 1.20-1.60 | D3             |                 |                             |             | (0.60)<br>1.80        | Yellow brown very sandy (fine) CLAY / SILT                                                                  |        |       |
| 1.90-2.70 | D4             |                 |                             |             | (1.10)<br>2.90        | Yellow brown slightly silty fine SAND with occasional rounded flint gravel                                  |        |       |
|           |                |                 |                             |             | (0.10)<br>3.00        | Off-white well graded coarse medium and fine subangular CHALK GRAVEL with some firm comminuted chalk / silt |        |       |
| 2.90-3.00 | D5             |                 |                             |             |                       | Complete at 3.00m                                                                                           |        |       |

|                                                                                                                                                                                                                                                                                 |                                |                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|------------------------|
| <b>Remarks</b><br>Hole remained stable and open during excavation<br>Groundwater was not encountered<br>19mm dia standpipe installed to 3.0m. 1m slotted with geosoc, 2m plain with gravel surround to 0.6m then bentonite pellet seal<br>Standpipe remained dry after 48 hours | <b>Scale (approx)</b><br>1:25  | <b>Logged By</b><br>AT |
|                                                                                                                                                                                                                                                                                 | <b>Figure No.</b><br>G6445.BH1 |                        |

# Ground Management Ltd

Civil and Geotechnical Engineering Services

Robin Hill Farm Clay Lane Fishbourne  
CHICHESTER West Sussex PO18 8AB  
Phone/Fax: 01243 575073  
mail@groundmanagement.com

## Site

Tile Barn Farm, Hill Lane, Barnham

**Trial Pit  
Number  
TP1**

## Excavation Method

Hand dug

## Dimensions

0.4m x 1.2m

## Ground Level (mOD)

## Client

Matt Lonsdale

## Job Number

G6445

## Location

See Location Plan

## Dates

16/03/2021

## Engineer

## Sheet

1/1

| Depth<br>(m) | Sample / Tests | Water<br>Depth<br>(m) | Field Records | Level<br>(mOD) | Depth<br>(m)<br>(Thickness) | Description                                                                                                                  | Legend                                                                              | Water |
|--------------|----------------|-----------------------|---------------|----------------|-----------------------------|------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------|
|              |                |                       |               |                |                             | Grass over moist brown slightly sandy slightly clayey silty TOPSOIL. Occasional brick fragment and many roots up to 5mm dia. |  |       |
|              |                |                       |               |                | 0.25                        | Soft to firm orange brown silty CLAY with occasional flint cobble.                                                           |  |       |
|              |                |                       |               |                | 0.75                        | ... some gravel at base                                                                                                      |  |       |
|              |                |                       |               |                | 1.00                        | Complete at 1.00m                                                                                                            |                                                                                     |       |

## Plan

|   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|
| . | . | . | . | . | . | . | . | . | . |
| . | . | . | . | . | . | . | . | . | . |
| . | . | . | . | . | . | . | . | . | . |
| . | . | . | . | . | . | . | . | . | . |
| . | . | . | . | . | . | . | . | . | . |
| . | . | . | . | . | . | . | . | . | . |

## Remarks

Pit sides remained stable and vertical during excavation  
Groundwater was not encountered  
Soakage test carried out in completed pit

## Scale (approx)

1:25

## Logged By

AT

## Figure No.

G6445.TP1

## G6445 Tile Barn Farm, Hill Lane, Barnham Soakage Test

TP1 Test 1

Test Start Date: 16-Mar-21

Dimensions (m):

width = 0.40

length = 1.20

depth = 1.00

[illegible]

End Fit

## Weather

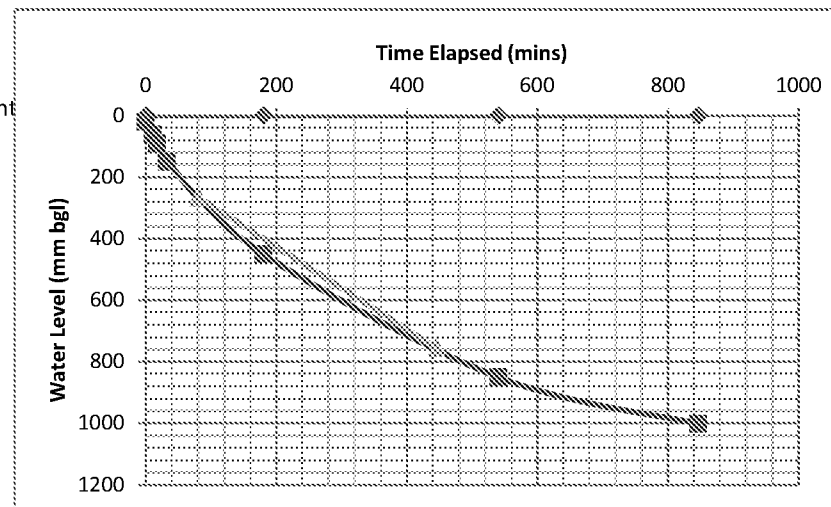
0 Dry & Bright

o inserted

inserted

dry

0



|           | Time (mins) |       |
|-----------|-------------|-------|
| t0        | 20          |       |
| t25       | 265         | 80    |
| t50       | 510         |       |
| t75       | 755         | 445   |
| t100      | 1000        |       |
| fall      |             | 0.98  |
| t25 - t75 |             | 0.49  |
| Area t50  |             | 2.048 |

Infiltration Coefficient = 5.24E-06 m/s

G6445 Tile Barn Farm, Hill Lane, Barnham  
Soakage Test

TP1 Test 2

Test Start Date: 17-Mar-21

Dimensions (m):

width = 0.40

length = 1.20

depth = 1.00

[illegible]

End Fit

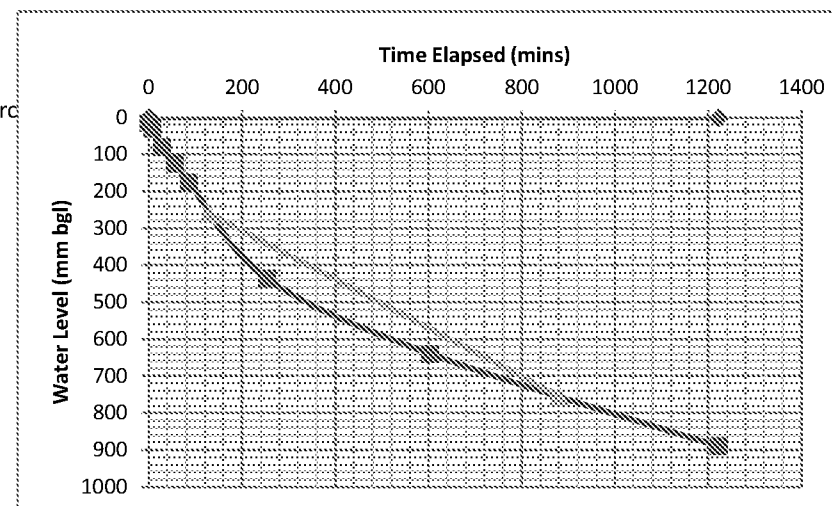
## Weather

0 Dry & Overc

v light rain

end test

0



|      |           | Time (mins) |
|------|-----------|-------------|
| t0   | 15        |             |
| t25  | 261.25    | 130         |
| t50  | 507.5     |             |
| t75  | 753.75    | 880         |
| t100 | 1000      |             |
|      | fall      | 0.985       |
|      | t25 - t75 | 0.4925      |
|      | Area t50  | 2.056       |

Infiltration Coefficient = 2.56E-06 m/s

## G6445 Tile Barn Farm, Hill Lane, Barnham Soakage Test

TP1 Test 3

Test Start Date: 18-Mar-21

Dimensions (m):

width = 0.40

length = 1.20

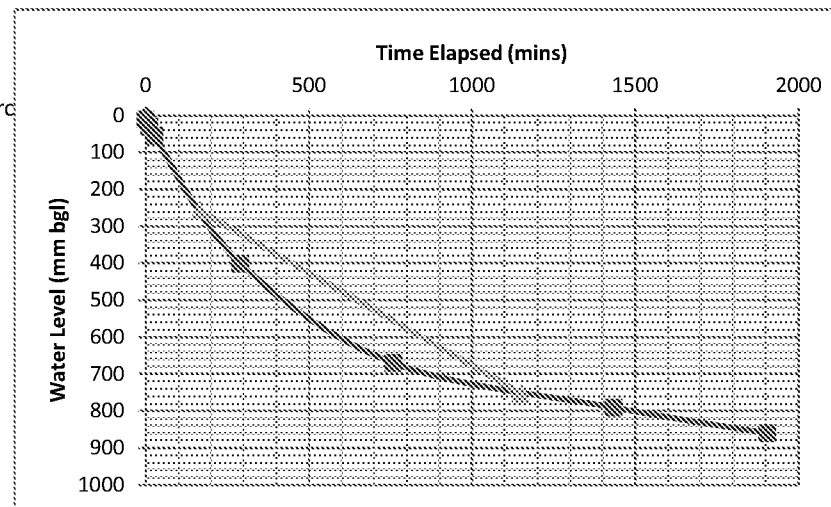
depth = 1.00

[illegible]

End Fit

## |Weather

0 Dry & Overc



0

|           | Time (mins) |       |
|-----------|-------------|-------|
| t0        | 10          |       |
| t25       | 257.5       | 165   |
| t50       | 505         |       |
| t75       | 752.5       | 1150  |
| t100      | 1000        |       |
| fall      |             | 0.99  |
| t25 - t75 |             | 0.495 |
| Area t50  |             | 2.064 |

Infiltration Coefficient = 1.95E-06 m/s