



Factual Ground Investigation Report

at

Land south of Burndell Road, Yapton, West Sussex BN18 0HR

for

Brookworth Homes

Reference: 15276/GIR

April 2016

Control Document

Project

Land south of Burndell Road, Yapton, West Sussex BN18 0HR

Document Type

Factual Ground Investigation Report

Document Reference

15276/FGIR

Document Status

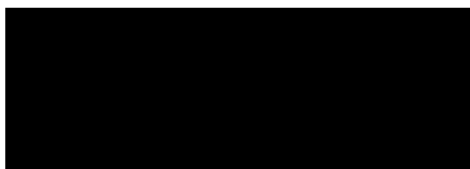
Final

Date

April 2016

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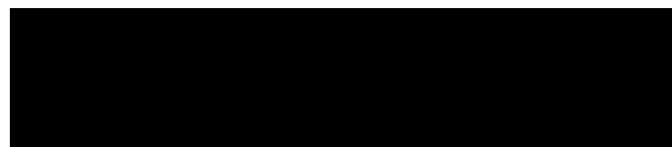
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Second check by

N J Lambert BSc (Hons), CEnv, MEnvSc



This is not a valid document for use in the design of the project unless it is titled Final in the document status box.

Current regulations and good practice were used in the preparation of this report. The recommendations given in this report must be reviewed by an appropriately qualified person at the time of preparation of the scheme design to ensure that any recommendations given remain valid in light of changes in regulation and practice, or additional information obtained regarding the site.



Commission

Soils Limited was commissioned by Brookworth Homes to undertake a Ground Investigation on land south of Burndell Road, Yapton, West Sussex BN18 0HR and to provide a Factual Ground Investigation Report on the findings. The scope of the investigation was outlined in the Soils Limited quotation reference Q16998, dated 30th October 2015.

This document comprises the Factual Ground Investigation Report and incorporates the results from the intrusive works.

Standards

Trial hole is a generic term used to describe a method of direct investigation. The term trial pit, borehole or window sample borehole implies the specific technique used to produce a trial hole.

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Section I Introduction

I.1 Objective of Investigation

Soils Limited was commissioned by Brookworth Homes to undertake a Ground Investigation to supply the client and their designers with factual information regarding ground conditions, to assist in preparing a drainage scheme for the proposed development that was appropriate to the settings present on the site.

The investigation was to be undertaken to provide comment on appropriate surface water disposal options and groundwater levels for the proposed residential development. The investigation was to be made by means of machine excavated trial holes, infiltration testing (in accordance with BRE365) and groundwater monitoring within wells installed within three window sample boreholes.

I.2 Location

The site was located at Land south of Burndell Road, Yapton, West Sussex BN18 0HR and had an approximate O.S Land Ranger Grid Reference of SU 985 028.

The site location plan is given in Figure 1.

I.3 Site Description

At the time of reporting the site comprised an open field. Various species of vegetation were noted, the site was covered with rough scrub and tall grass with abundant mature trees on the southern and western boundaries. The site was bounded in the north by residential properties and Burndell Road, the south by open fields, the east by a tall hedgerow and residential properties, and the west by open fields. The site had no discernible slope, but the ground was uneven.

An aerial photograph has been included in Figure 2.

I.4 Proposed Development

The proposed development comprised 42No. two-storey residential units (both semi-detached and detached). The build was to include a number of garages, hard landscaping such as access roads and soft landscaping such as communal/private gardens, plus a pond.

In compiling this report reliance was placed on drawing number 14004 / C101D, dated March 2015, prepared by OSP Architecture. Any change or deviation from the scheme outlined in the drawing could invalidate the foundation design and remediation recommendations presented within this report. Soils Limited must be notified about any such changes.

The proposed development layout as provided by the client is included within Appendix B.

1.5 Anticipated Geology

The 1:50,000 BGS map showed the site to be located upon the bedrock Lewes Nodular Chalk Formation with superficial River Terrace Deposits overlying.

1.5.1 River Terrace Deposits

River Terrace Deposits are superficial deposits of Quaternary age that lie along the margins of rivers and are predominantly found in the southern part of West Sussex, along the coastal plain and are typically less than 10m thick. The composition of the River Terrace Gravel varies greatly, depending on the source material available in the river's catchment. Deposits generally consist of sands and gravels of roughly bedded flint or chert gravels commonly in a matrix of silts and clays. In West Sussex the rivers flow mainly south over the Weald Clay, which contains some sandstones and limestone that could be incorporated into the river gravel.

1.5.2 Lewes Nodular Chalk Formation

Composed of hard to very hard nodular chalks and hardgrounds (which resist scratching by finger-nail) with interbedded soft to medium hard chalks (some grainy) and marls; some griotte chalks. The softer chalks become more abundant towards the top. Nodular chalks are typically lumpy and iron-stained (usually marking sponges). Brash is rough and flaggy or rubbly, and tends to be dirty. First regular seams of nodular flint, some large, commence near the base and continue throughout.

1.6 Limitations and Disclaimers

This Factual Ground Investigation Report relates to the site located at the south of Burndell Road, Yapton, West Sussex BN18 0HR and was prepared for the sole benefit of Brookworth Homes (The "Client"). The report was prepared solely for the brief described in Section 1.1 of this report.

Soils Limited disclaims any responsibility to the Client and others in respect of any matters outside the scope of the above.

This report has been prepared by Soils Limited, with all reasonable skill, care and diligence within the terms of the Contract with the Client, incorporation of our General Conditions of Contract of Business and taking into account the resources devoted to us by agreement with the Client.

The report is personal and confidential to the Client and Soils Limited accept no responsibility of whatever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report wholly at its own risk.

The Client may not assign the benefit of the report or any part to any third party without the written consent of Soils Limited.

The ground is a product of continuing natural and artificial processes. As a result, the ground will exhibit a variety of characteristics that vary from place to place across a site, and also with time. Whilst a ground investigation will mitigate to a greater or lesser degree against the resulting risk from variation, the risks cannot be eliminated.

The investigation, interpretations, and recommendations given in this report were prepared for the sole benefit of the client in accordance with their brief. As such these do not necessarily address all aspects of ground behaviour at the site.

Current regulations and good practice were used in the preparation of this report. An appropriately qualified person must review the recommendations given in this report at the time of preparation of the scheme design to ensure that any recommendations given remain valid in light of changes in regulation and practice, or additional information obtained regarding the site.

The depth to roots and/or of desiccation may vary from that found during the investigation. The client is responsible for establishing the depth to roots and/or of desiccation on a plot by plot basis prior to the construction of foundations. Supplied site surveys may not include substantial shrubs or bushes and is also unlikely to have data or any trees, bushes or shrubs removed prior to or following the site survey.

Where trees are mentioned in the text this means existing trees, substantial bushes or shrubs, recently removed trees (approximately 20 years to full recovery on cohesive soils) and those planned as part of the site landscaping).

Ownership of land brings with it onerous legal liabilities in respect of harm to the environment. "Contaminated Land" is defined in Section 57 of the Environment Act 1995 as:

"Land which is in such a condition by reason of substances in, on or under the land that significant harm is being caused or that there is a significant possibility of such harm being caused or that pollution of controlled waters is being, or is likely to be caused".

The investigation, analysis or recommendations in respect of contamination are made solely in respect of the prevention of harm to vulnerable receptors, using where possible best practice at the date of preparation of the report. The investigation and report do not address, define or make recommendations in respect of environmental liabilities. A separate environmental audit and liaison with statutory authorities is required to address these issues.

Ownership of copyright of all printed material including reports, laboratory test results, trial pit and borehole log sheets, including drillers log sheets remains with Soils Limited. License is for the sole use of the client and may not be assigned, transferred or given to

a third party.

Section 2 Site Works

2.1 Proposed Project Works

The proposed intrusive investigation was designed to provide information on the ground conditions and to aid the design of surface water drainage for the proposed residential development. The intended investigation, as outlined within the Soils Limited quotation (Q16998 dated 30th October 2015), was therefore to comprise the following items:

- 3No. Windowless sampler boreholes;
- Installation and monitoring of 3No. groundwater wells;
- Machine excavated trial pits;
- Infiltration testing (BRE365).

2.1.1 Actual Project Works

The actual project works were undertaken on 6th November 2015 and comprised:

- 3No. Windowless sampler boreholes (WS1 – WS3);
- 3No. Groundwater monitoring wells;
- 6No. Machine excavated trial pits (TP1 – TP6);
- Infiltration Testing (BRE365) (within TP1 –TP4).

The three windowless sampler boreholes (WS1, WS2 and WS3) were backfilled with gravel and bentonite following the installation of groundwater monitoring wells. Trial pits were backfilled with arisings and mounded over to allow for future settlement. All trial hole locations have been presented in Figure 3.

The investigation was based upon the original proposed development plan (ref: 14004 / C101D, dated March 2015, prepared by OSP Architecture).

Following completion of site works, soil cores were logged and sub sampled.

2.2 Ground Conditions

On 6th November 2015 three windowless sampler boreholes (WS1 – WS3) were drilled, using an Archway Competitor, to a depth of 5.00m below ground level (bgl) at locations selected by Soils Limited using a development plan provided by the client. Three standpipes were installed within all three window sample borehole locations (WS1, WS2 and WS3) to allow for continued monitoring of groundwater. The six trial pits (TP1 – TP6) were machine excavated to depths ranging between 1.90 – 3.10m bgl. The maximum depths of trial holes have been included in Table 2.1.

All trial holes were scanned with a Cable Avoidance Tool (C.A.T.) and GENNY prior to excavation to ensure the health and safety of the operatives.

Table 2.1 Final Depth of Trial Holes

Trial Hole	Depth (m bgl)
WS1 (w)	5.00
WS2 (w)	5.00
WS3 (w)	5.00
TP1	2.50
TP2	3.00
TP3	3.10
TP4	2.50
TP5	2.00
TP6	1.90

Note: w - well installation

The approximate trial hole locations are shown on Figure 3.

The soil conditions encountered were recorded and soil sampling commensurate with the purposes of the investigation was carried out. The depths given on the trial hole logs and quoted in this report were measured from ground level.

The soils encountered from immediately below ground surface have been described in the following manner. Where the soil incorporated an organic content such as either decomposing leaf litter or roots, or has been identified as part of the in-situ weathering profile, it has been described as Topsoil both on the logs and within this report. Where man has clearly either placed the soil, or the composition altered, with say greater than an estimated 5% of a non-natural constituent, it has been referred to as Made Ground both on the log and within this report. No Made Ground was encountered throughout the course of the investigation.

For more complete information about the soils encountered within the general area of the site reference should be made to the detailed records given within Appendix A, but for the purposes of discussion, the succession of conditions encountered in the trial holes in descending order can be summarised:

Topsoil (TS)
River Terrace Deposits (RTD)
Lewes Nodular Chalk Formation (LNCF)

The ground conditions encountered in the trial holes are summarised in Table 2.2.

Table 2.2 Ground Conditions

Strata	Age	Depth Encountered (m bgl)		Typical Thickness (m)	Typical Description
		Top	Base		
TS	Recent	G.L.	0.20 – 0.30	0.30	Soft dark grey brown silty gravelly CLAY with fine roots and rootlets. Gravel was medium sub-angular to angular flint.
RTD	Quaternary	0.20 – 0.30	1.90 ¹ – 3.10 ¹	Not Proven ²	Soft to firm light brown silty gravelly sandy CLAY. Gravel was fine to coarse angular to sub-angular flint. Sand is medium to coarse.
LNCF	Cretaceous	2.70	3.00 ¹	Not Proven ²	Structureless yellowish white CHALK recovered as medium to coarse gravel sized sub-rounded fragments within a light yellowish brown clayey matrix.

Note: ¹ Final depth of trial hole
² Base of strata not encountered

2.3 Ground Conditions Encountered in Trial Holes

The ground conditions encountered in trial holes have been described below in descending order.

2.3.1 Topsoil

Soils described as Topsoil were encountered in all trial holes from ground level to a maximum depth of 0.40m bgl. The Topsoil comprised soft dark grey brown silty gravelly CLAY with fine roots and rootlets. Gravel was medium sub-angular to angular flint. The depth of Topsoil has been included in Table 2.3.

Table 2.3 Final Depth of Topsoil

Trial Hole	Strata	Depth (m bgl)
WS1	TS	0.20
WS2	TS	0.30
WS3	TS	0.40
TP1	TS	0.25
TP2	TS	0.20
TP3	TS	0.20
TP4	TS	0.25
TP5	TS	0.30
TP6	TS	0.30

2.3.2 River Terrace Deposits

Soils described as River Terrace Deposits were encountered in all trial holes directly below the Topsoil and persisted to depths ranging between 1.90 and 3.10m bgl, the final depth of TP3. The River Terrace Deposits typically comprised soft to

firm light brown silty gravelly sandy CLAY. Gravel was fine to coarse angular to sub-angular flint. Sand was medium to coarse. The depth of River Terrace Deposits has been included in Table 2.4.

Table 2.4 Final Depth of River Terrace Deposits

Trial Hole	Depth (m bgl)
WS1	2.70
WS2	4.00
WS3	3.00
TP1	2.50 ¹
TP2	2.70
TP3	3.10 ¹
TP4	2.50 ¹
TP5	2.00 ¹
TP6	1.90 ¹

Note: ¹ Final depth of trial hole

2.3.3 Lewes Nodular Chalk Formation

Soils described as Lewes Nodular Chalk Formation were encountered in four out of the nine trial holes (WS1, WS2 and WS3 and TP2) from depths ranging between 2.70 and 4.00m bgl. In the case of TP2, the addition of water for soakaway testing caused the bottom of the hole to collapse, revealing the underlying Lewes Nodular Chalk Formation. The hole was then deepened to prove this. This is why the final depth of TP2 and the test depth for soakaway testing differ. The Lewes Nodular Chalk Formation was observed to the full depth of investigation, when encountered. The Lewes Nodular Chalk Formation typically comprised light brownish white structureless chalk recovered as fine to medium intact block chalk in a sandy/silty clayey matrix.

2.4 Roots

Roots were encountered in four out of the five trial holes at depths ranging between 0.50 and 2.70m bgl. The depths of root penetration have been included in Table 2.5

Table 2.5 Depth of Root Penetration

Trial Hole	Depth (m bgl)
WS1	2.70
WS2	1.60
WS3	2.00
TP1	0.50
TP2	1.50
TP3	1.00
TP4	2.00
TP5	1.80
TP6	1.90

Roots may be found to greater depth at other locations on the site particularly close to trees and/or trees that have been removed both within the site and its close environs.

2.5 Groundwater

Groundwater was only encountered within one trial hole (WS3) and was struck at a depth of 4.00m bgl. Changes in groundwater level occur for a number of reasons including seasonal effects and variations in drainage. The investigation was conducted in November (2015), when groundwater levels should be rising from their annual minimum (lowest) elevation, which typically occurs around September.

A winter groundwater monitoring programme was conducted within the standpipes installed within WS1, WS2 and WS3 following completion of site works and has been presented in Table 2.6.

Table 2.6 Winter Groundwater Monitoring

Trial Hole	Depth to Water (m bgl)						
	13/11/15	30/11/15	21/12/15	08/01/16	12/02/2016	08/03/16	27/04/16
WS1	3.58	3.08	2.55	1.38	1.65	2.19	2.56
WS2	3.15	2.79	1.90	1.28	1.77	1.94	2.19
WS3	3.04	2.68	1.93	0.80	1.09	0.60	1.96

Groundwater, as expected, was rising from its lowest elevation recorded at 4.00m bgl during the intrusive investigation to its highest elevation (0.60m bgl in WS3) in March 2016. The data appear to follow a similar trend, representing a continuous groundwater horizon. Groundwater level reached its annual maximum (highest) elevation in March, as anticipated, before decreasing again.

Section 3 Discussion of Geotechnical In-Situ Testing

3.1 Infiltration Tests (BRE Digest: 365)

Infiltration tests were performed at four locations (TP1, TP2, TP3 and TP4) during the investigation in an area of the site proposed for an infiltration basin in order to provide guidance on the suitability of the ground for the adoption of a surface water drainage system. The test strata comprised the River Terrace Deposits. Tests were conducted in accordance with the principles of BRE Digest 365 Soakaway design: 1991.

BRE 365 states that for an accurate infiltration rate to be obtained a soakage pit needs to be filled three times in quick succession. Each test is completed once 75% of the water present has drained away, in order to determine whether or not the underlying ground conditions may be suitable for surface water drainage. Only a single test was conducted in TP1 and TP3 due to time constraints on site and the slow infiltration rates observed. A second test was attempted within TP2 but upon pumping ~2,000L of water into the hole, a head of water could not be obtained. Two tests were carried out within TP4 before the tanker was emptied.

The test comprised piping water via a 10,000L tanker into the open trial hole, the drop in water level over time was then recorded to give an indication of soakage potential.

Table 3.1 Infiltration Test Results

Trial Hole/Test	Test Stratum	Test Depth (m bgl)	Infiltration Rate (m/sec)	Notes
TP1/S1	RTD	2.50	N/A	Slow infiltration observed over test period – unable to calculate infiltration rate
TP2/S1	RTD	2.20	1.13×10^{-3}	Considered as an outlier due to rapid draining possibly into the underlying chalk
TP2/S2	RTD	2.20	Rapid	Unable to achieve head of water due to rapid infiltration
TP3/S1	RTD	3.10	2.56×10^{-6}	Data was extrapolated from 182 minutes in order to calculate an infiltration rate
TP4/S1	RTD	2.75	3.41×10^{-4}	
TP4/S2	RTD	2.65	2.49×10^{-4}	

Infiltration rates varied across the site, from 2.49×10^{-4} m/sec in TP4, to 2.56×10^{-6} m/sec in TP3, with the infiltration rate being too slow to calculate within TP1. The result of 1.13×10^{-3} m/sec within TP2 has been considered as an outlier due to the high infiltration rate and the second attempt with no head of water obtained. This high rate was most likely due to the presence of the Lewes Nodular Chalk Formation below the test depth.

Full results are included within Appendix A.

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Appendix A Field Work

Appendix B Information Provided by the Client

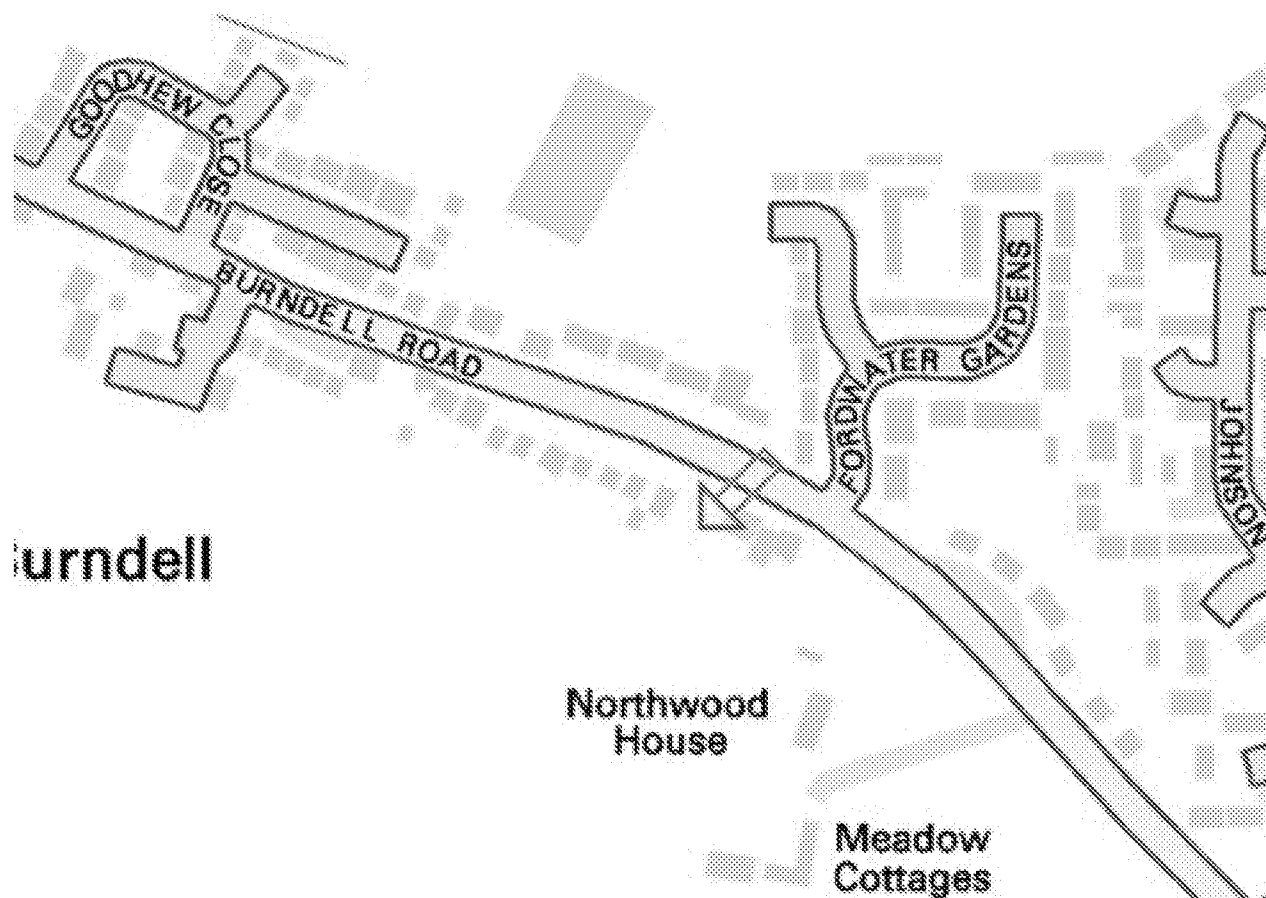


Figure number
1

Title
Site Location Map

Project
Land south of Burndell Road, Yapton, West Sussex
BN18 0HR

Date
April 2016

Client
Brookworth Homes

Job Number
15276



Figure number

2

Project

Land south of Burndell Road,
Yapton, West Sussex BN18 0HR

Client

Brookworth Homes

Title

Aerial Photograph

Date

April 2016

Job Number

15276



Figure number

3

Project

Land south of Burndell Road,
Yapton, West Sussex BN18 0HR

Client

Brookworth Homes

Title

Trial Hole Location Map

Date

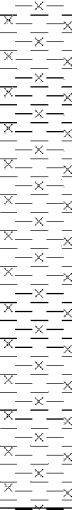
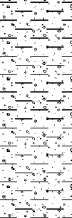
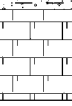
April 2016

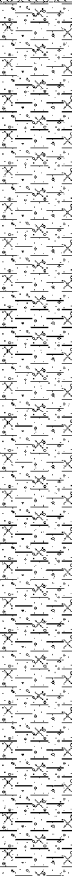
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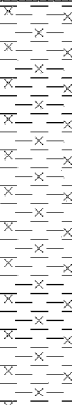
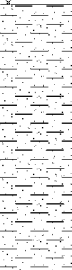
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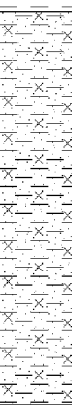
Appendix A Field Work

		Soils Limited Newton House, Cross Road, Tadworth KT20 5SR Tel: 01737 814221 Email: admin@soilslimited.co.uk		Trial Pit Log		Trial Pit No. TP1	
		Sheet 1 of 1					
Project Name: Burndell Road			Project No.: 15276		Method:		Hole Type TP
Location: Yapton BN18 0HR					Plant: JCB 3CX		
Client: Brookworth Homes			Trial Pit Length: m		Trial Pit Width: m		Scale 1:25
Dates: 06/11/2015			Level:		Co-ords:		
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20	D		0.25			Turf over soft brown slightly gravelly silty CLAY. Gravel is medium angular flint. Abundant roots and rootlets. TOPSOIL
	0.50	D					
	2.40	D		2.20			Soft light orangish brown gravelly sandy CLAY. Gravel is fine to coarse, angular to sub-rounded flint with frequent cobbles. Occasional 5cm pockets of light yellow sandy clay. RIVER TERRACE DEPOSITS
				2.50			
General Remarks: No groundwater encountered, roots observed to 0.50m bgl.							Sample Type D: Disturbed B: Bulk J: Jar W: Water
Groundwater Remarks:							

		Soils Limited Newton House, Cross Road, Tadworth KT20 5SR Tel: 01737 814221 Email: admin@soilslimited.co.uk			Trial Pit Log		Trial Pit No. TP2 Sheet 1 of 1	
Project Name: Burndell Road				Project No.: 15276		Method:		Hole Type TP
Location: Yapton BN18 0HR						Plant: JCB 3CX		
Client: Brookworth Homes				Trial Pit Length: m		Trial Pit Width: m		Scale 1:25
Dates: 06/11/2015				Level:		Co-ords:		Logged By LP
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10	D		0.20			Turf over soft brown silty CLAY. Abundant roots. TOPSOIL	
	0.50	D						Soft light brown silty CLAY. Occasional fine sub-angular flint. Frequent pockets of light yellowish brown SILT. RIVER TERRACE DEPOSITS
	2.00	D			Soft orangish brown sandy gravelly CLAY. Gravel is fine to coarse angular to sub-angular flint. Sand is medium to coarse. RIVER TERRACE DEPOSITS <i>Pocket of firm light grey sandy gravelly CLAY.</i>			
	2.90	D				Structureless yellowish white CHALK recovered as medium to coarse gravel sized sub-rounded fragments within a light yellowish brown clayey matrix. LEWES NODULAR CHALK FORMATION		
				3.00			End of Pit at 3.00m	
General Remarks:								Sample Type D: Disturbed B: Bulk J: Jar W: Water
No groundwater encountered, roots observed to 1.50m bgl.								
Groundwater Remarks:								

		Soils Limited Newton House, Cross Road, Tadworth KT20 5SR Tel: 01737 814221 Email: admin@soilslimited.co.uk			Trial Pit Log		Trial Pit No. TP3 Sheet 1 of 1	
Project Name: Burndell Road				Project No.: 15276		Method:		Hole Type TP
Location: Yapton BN18 0HR						Plant: JCB 3CX		
Client: Brookworth Homes				Trial Pit Length: m		Trial Pit Width: m		Scale 1:25
Dates: 06/11/2015				Level:		Co-ords:		Logged By LP
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10	D		0.20			Turf over soft light brown slightly gravelly silty CLAY. Gravel is medium angular to sub-angular flint. Frequent roots. TOPSOIL	
	1.60	D					Soft orangish brown slightly sandy slightly gravelly silty CLAY. Gravel is medium to coarse flint, sand is medium. RIVER TERRACE DEPOSITS	
				3.10			Becoming light yellowish brown and more gravelly with pockets of yellowish white coarse sub-rounded chalk fragments within a clayey matrix. End of Pit at 3.10m	
General Remarks:								Sample Type
No groundwater encountered, roots observed to 1.00m bgl.								
Groundwater Remarks:								D: Disturbed B: Bulk J: Jar W: Water

		Soils Limited Newton House, Cross Road, Tadworth KT20 5SR Tel: 01737 814221 Email: admin@soilslimited.co.uk			Trial Pit Log		Trial Pit No. TP4 Sheet 1 of 1	
Project Name: Burndell Road				Project No.: 15276		Method:		Hole Type TP
Location: Yapton BN18 0HR						Plant: JCB 3CX		
Client: Brookworth Homes				Trial Pit Length: m		Trial Pit Width: m		Scale 1:25
Dates: 06/11/2015				Level:		Co-ords:		Logged By LP
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10	D		0.25			Turf over soft to firm light brown silty CLAY. Frequent roots. TOPSOIL	
	0.80	D		1.60			Soft to firm light brown friable silty CLAY with occasional medium sub-angular flint gravel. Occasional fine roots. RIVER TERRACE DEPOSITS	1
	1.80	D		2.50			Soft to firm light brown mottled orange sandy CLAY. Sand is fine to medium with occasional fine roots. RIVER TERRACE DEPOSITS	2
							End of Pit at 2.50m	3
								4
								5
General Remarks: No groundwater encountered, roots observed to 2.00m bgl.								Sample Type D: Disturbed B: Bulk J: Jar W: Water
Groundwater Remarks:								

		Soils Limited Newton House, Cross Road, Tadworth KT20 5SR Tel: 01737 814221 Email: admin@soilslimited.co.uk			Trial Pit Log		Trial Pit No. TP5 Sheet 1 of 1	
Project Name: Burndell Road				Project No.: 15276		Method:		Hole Type TP
Location: Yapton BN18 0HR						Plant: JCB 3CX		
Client: Brookworth Homes				Trial Pit Length: m		Trial Pit Width: m		Scale 1:25
Dates: 06/11/2015				Level:		Co-ords:		Logged By LP
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.30			Turf over firm light brown silty CLAY. Abundant roots. TOPSOIL	
				0.70			Soft light brown CLAY. Occasional roots. RIVER TERRACE DEPOSITS	
				2.00			Firm yellowish brown and orange mottled silty sandy CLAY. Sand is medium. Occasional coarse flint gravel. Occasional fine roots. RIVER TERRACE DEPOSITS	
						End of Pit at 2.00m		2
								3
								4
								5
General Remarks:								Sample Type
No groundwater encountered, roots observed to 1.80m bgl.								
Groundwater Remarks:								D: Disturbed B: Bulk J: Jar W: Water

Trial Pit Log

Trial Pit No.

TP6

Sheet 1 of 1

Project Name: Burndell Road

Project No.: 15276

Method:

Plant:	JCB 3CX
--------	---------

Support:

Hole Type

TP

Scale

1:25

Logged By

LP

Dates: 06/11/2015

Level:

Co-ords:

Water Strike

Samples & In Situ Testing

Depth

Type

Results

Depth
(m)Level
(m)

Legend

Stratum Description

Turf over soft friable light brown silty CLAY. Abundant roots.
TOPSOIL

Soft to firm brown and orange sandy CLAY. Sand is medium. Occasional roots. RIVER TERRACE DEPOSITS

0.30

1.90

End of Pit at 1.90m

1

2

3

4

5

General Remarks:	
------------------	--

No groundwater encountered, roots observed to base of hole.

Sample Type

D: Disturbed

B: Bulk

J: Jar

W: Water

Groundwater Remarks:

Project Name: Burndell Road

Project No.: 15276

Co-ords:

Hole Type
WS

Location: Yapton BN18 0HR

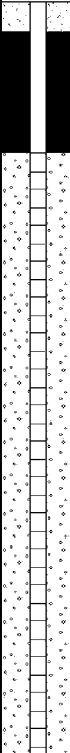
Level:

Scale
1:50

Client: Brookworth Homes

Dates: 06/11/2015

Logged By
OK

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10	J+D		0.20			Grass over very soft brown silty CLAY. Abundant fine roots and rootlets. TOPSOIL	
		0.40	J+D		0.60			Brown very clayey SILT. Rare fine to coarse sub-angular flint gravels. Frequent fine roots and rootlets. RIVER TERRACE DEPOSITS	
		0.80	J+D		1.00			Orangish brown slightly sandy clayey SILT. Sand is fine. Occasional fine to coarse sub-angular flint gravels. Frequent fine roots and rootlets. RIVER TERRACE DEPOSITS	
		1.20	D		1.60			Orangish brown clayey fine SAND. Gravel is fine to coarse angular flint. Occasional fine roots and rootlets. RIVER TERRACE DEPOSITS	1
		1.50	D		2.70			Band of gravelly very clayey fine to medium sand	
		1.90	D		3.20			Orangish brown clayey fine to medium SAND. Occasional fine to coarse sub-angular flint gravels. Rare fine transparent roots and rootlets. RIVER TERRACE DEPOSITS	2
		2.40	D		3.20			Yellowish brown weathered CHALK recovered as fine to medium intact blocks. LEWES NODULAR CHALK FORMATION	3
		2.80	D		3.20			Pocket of fine to medium angular flint gravel in a slightly sandy clayey matrix.	
		3.05	D		3.20			Light brownish white structureless CHALK recovered as occasional fine to medium intact block chalk. LEWES NODULAR CHALK FORMATION	4
		3.60	D		5.00			Band of fine to coarse angular flint gravel in a silty clayey matrix.	5
		4.30	D						6
		4.80	D						7
									8
									9
									10

General Remarks:

Fine roots and rootlets to 2.70m bgl. No groundwater encountered.

Borehole Type

CP: Cable Percussive
WS: Windowless Sampler
RC: Rotary Cored

Sample Types

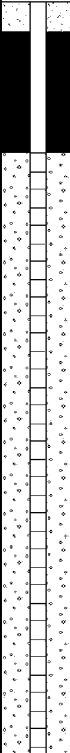
D: Disturbed
B: Bulk
J: Jar
W: Water
U: Undisturbed

In-Situ Testing

SPT: Split spoon - Standard Penetration Test
CPT: Cone - Standard Penetration Test

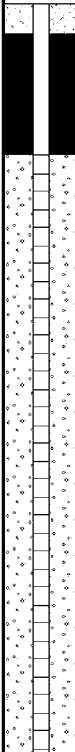
Groundwater Remarks:

Project Name: Burndell Road	Project No.: 15276	Co-ords:	Hole Type WS
Location: Yapton BN18 0HR		Level:	Scale 1:50
Client: Brookworth Homes		Dates: 06/11/2015	Logged By OK

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (mAOD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	J+D		0.30			Grass over very soft light brown silty CLAY. Abundant fine roots and rootlets to 0.10m bgl. Frequent fine roots and rootlets. TOPSOIL	
		0.50	J+D		0.60			Soft light brown very silty CLAY. Rare fine sub-angular flint gravels. Frequent fine roots and rootlets. RIVER TERRACE DEPOSITS	
		0.80	J+D		1.00			Light brown very clayey SILT. Frequent fine roots and rootlets. RIVER TERRACE DEPOSITS	
		1.30	D		1.60			Firm light brown silty CLAY. Rare transparent fine roots and rootlets. RIVER TERRACE DEPOSITS	1
		1.80	D		2.00			Soft light brown silty CLAY. Occasional fine sub-angular flint gravels. RIVER TERRACE DEPOSITS	
		2.20	D		2.30			Single angular flint cobble	
		2.80	D		3.00			Firm brownish grey silty CLAY. RIVER TERRACE DEPOSITS	2
								Very soft yellowish grey sandy CLAY with frequent pockets of fine clayey sand. Sand is fine. Occasional fine to coarse sub-angular flint gravels. RIVER TERRACE DEPOSITS	
								Single angular flint cobble	
								30% recovery	3
		3.95	D		4.00			Pocket of clayey sandy fine to coarse angular flint gravel.	
								Light brownish white structureless CHALK recovered as occasional fine to coarse intact block chalk with rare fine to medium angular flint gravels in a sandy clayey matrix. Sand is fine. LEWES NODULAR CHALK FORMATION	4
								Single angular flint cobble	
		4.80	D		5.00			50% recovery	
								End of Borehole at 5.00m	5
									6
									7
									8
									9
									10

General Remarks: Fine roots and rootlets to 1.60m bgl. No groundwater encountered.	Borehole Type CP: Cable Percussive WS: Windowless Sampler RC: Rotary Cored	Sample Types D: Disturbed B: Bulk J: Jar W: Water U: Undisturbed
	In-Situ Testing SPT: Split spoon - Standard Penetration Test CPT: Cone - Standard Penetration Test	
	Groundwater Remarks:	

Project Name: Burndell Road	Project No.: 15276	Co-ords:	Hole Type WS
Location: Yapton BN18 0HR		Level:	Scale 1:50
Client: Brookworth Homes		Dates: 06/11/2015	Logged By OK

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	J+D		0.40			Grass over soft brown silty CLAY. Rare fine to medium sub-angular flint gravels. Abundant fine roots and rootlets until 0.10m bgl. Frequent fine roots and rootlets. TOPSOIL	1
		0.50	J+D					Orangish brown very clayey SILT. Frequent fine roots and rootlets becoming occasional at 1.00m bgl to 1.50m bgl. RIVER TERRACE DEPOSITS	
		0.80	J+D						
		1.30	D		1.50			Firm orangish brown gravelly sandy CLAY with occasional pockets of clayey fine sand. Sand is fine. Gravel is fine to coarse angular flint. Occasional fine roots and rootlets. RIVER TERRACE DEPOSITS	2
		1.80	D					Orangish brown clayey fine SAND. Occasional fine to coarse angular flint gravels. RIVER TERRACE DEPOSITS	
		2.10	D						
		2.40			2.40			Soft yellowish brown gravelly sandy CLAY with frequent pockets of clayey fine sand. Sand is fine. Gravel is fine to coarse sub-angular flint and chalk. RIVER TERRACE DEPOSITS	3
		2.70	D						
		3.00							
		3.30	D		3.00			Light brownish white structureless CHALK recovered as occasional fine to coarse intact block chalk with rare fine to medium angular flint gravels in a slightly sandy clayey matrix. Sand is fine. LEWES NODULAR CHALK FORMATION	4
		3.80	D						
		4.30	D						
		4.80	D		5.00			Organic odour Water strike at 4.00m bgl resulting in 4.00 to 5.00m bgl being recovered as very soft light brown gravelly sandy CLAY with frequent pockets of clayey fine sand. Sand is fine. Gravel is fine to coarse sub-angular flint and chalk. A single angular flint cobble at 5.00m bgl.	5
End of Borehole at 5.00m									6
									7
									8
									9
									10

General Remarks: Fine roots and rootlets to 2.00m bgl. Groundwater struck at 4.00m bgl.	Borehole Type CP: Cable Percussive WS: Windowless Sampler RC: Rotary Cored	Sample Types D: Disturbed B: Bulk J: Jar W: Water U: Undisturbed
	In-Situ Testing SPT: Split spoon - Standard Penetration Test CPT: Cone - Standard Penetration Test	
Groundwater Remarks:		

Soakaway Calculations

Soakaway Test No.	TP1 SA1
Contract:	Burndell Road, Yapton BN18 0HR
Contract No.	15276

Field Test

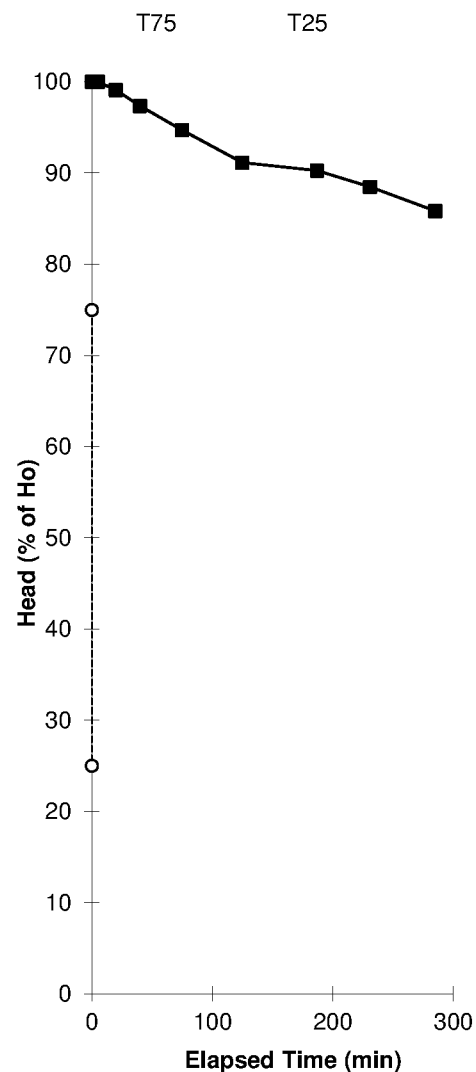
Trial Pit Log (include details of groundwater):

See trial Pit record

Depth of Pit	2.50 m
Width of Pit	0.70 m
Length of Pit	2.30 m
Depth of Pit Soaked	1.13 m
$a_p S_0$	5 m ²
V_{p75-25}	0.90965 m ³
t_{75-25}	0.0 min
water used	1.8193 m ³
i	N/A m/sec.

Field Data

Depth to Water (m)	Elapsed Time (min)	Head of Water (% of Ho)	Head of Water (m)
1.37	0	100	1.13
1.37	1.0	100	1.13
1.37	2.0	100	1.13
1.37	3.0	100	1.13
1.37	4.0	100	1.13
1.37	5.0	100	1.13
1.38	20.0	99	1.12
1.40	40.0	97	1.10
1.43	75.0	95	1.07
1.47	125.0	91	1.03
1.48	187.0	90	1.02
1.50	231.0	88	1.00
1.53	285.0	86	0.97



T75	0.000	75
T25	0.000	25
T75-25	0.000	Derived from Best Fit

Comments

Poor infiltration observed throughout test period - unable to calculate infiltration rate

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Soakaway Calculations

Soakaway Test No.	TP2 SA1
Contract:	Burndell Road, Yapton BN18 0HR
Contract No.	15276

Field Test

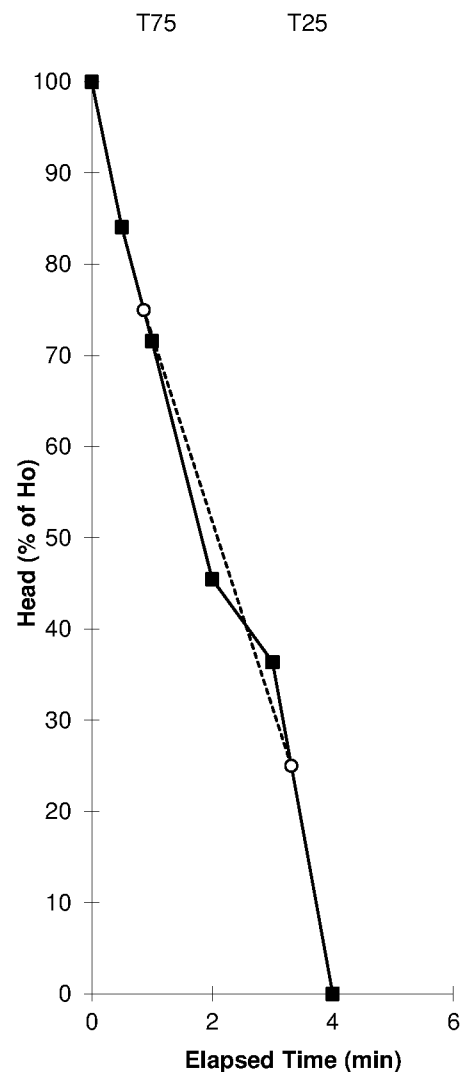
Trial Pit Log (include details of groundwater):

See trial Pit record

Depth of Pit	2.20 m
Width of Pit	0.70 m
Length of Pit	2.30 m
Depth of Pit Soaked	0.88 m
$ap50$	4.25 m ²
V_{p75-25}	0.7084 m ³
t_{75-25}	2.4 min
water used	1.4168 m ³
i	1.134E-03 m/sec.

Field Data

Depth to Water (m)	Elapsed Time (min)	Head of Water (% of Ho)	Head of Water (m)
1.32	0	100	0.88
1.46	0.5	84	0.74
1.57	1.0	72	0.63
1.80	2.0	45	0.40
1.88	3.0	36	0.32
2.20	4.0	0	0.00



T75	0.864	75
T25	3.313	25
T75-25	2.449	Derived from Best Fit

Comments

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Soakaway Calculations

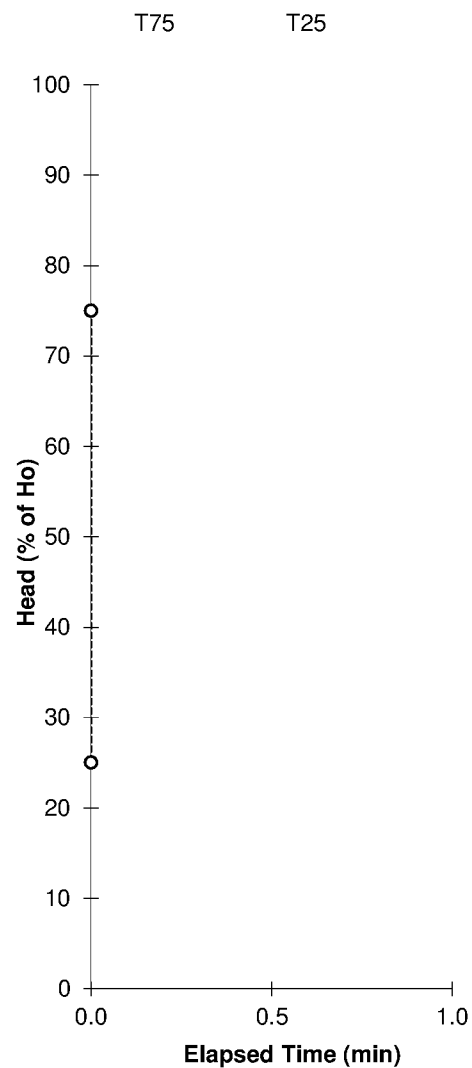
Soakaway Test No.	TP2 SA2
Contract:	Burdell Road, Yapton BN18 0HR
Contract No.	15276

Field Test

Trial Pit Log (include details of groundwater):
See trial Pit record

Depth of Pit	2.20 m
Width of Pit	0.70 m
Length of Pit	2.30 m
Depth of Pit Soaked	2.20 m
ap50	8.21 m2
Vp75-25	1.771 m3
v75-25	0.0 min
water used	3.5420 m3
f	#DIV/0! m/sec.

Field Data

[illegible]

Comments

2,000L of water was pumped into the trial pit, however no head of water was obtained so soakaway testing could not be carried out.

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Soakaway Calculations

Soakaway Test No.	TP3 SA1
Contract:	Burndell Road, Yapton BN18 0HR
Contract No.	15276

Field Test

Trial Pit Log (include details of groundwater):

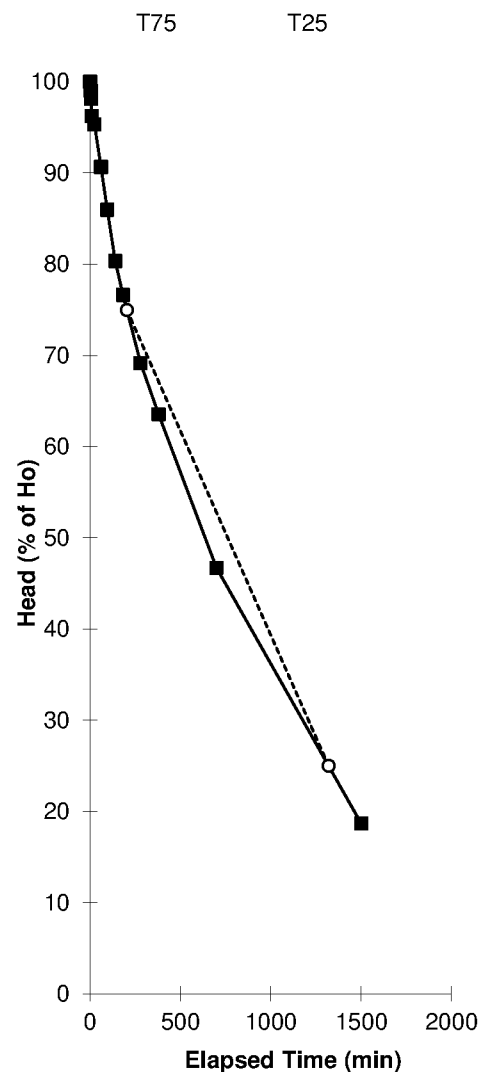
See trial Pit record

Depth of Pit	3.10 m
Width of Pit	0.70 m
Length of Pit	1.80 m
Depth of Pit Soaked	1.07 m
ap_{50}	3.935 m ²
V_{p75-25}	0.6741 m ³
t_{75-25}	1116.6 min
water used	1.3482 m ³
i	2.557E-06 m/sec.

Field Data

Depth to Water (m)	Elapsed Time (min)	Head of Water (% of Ho)	Head of Water (m)
2.03	0	100	1.07
2.03	1.0	100	1.07
2.04	2.0	99	1.06
2.04	3.0	99	1.06
2.04	4.0	99	1.06
2.05	5.0	98	1.05
2.07	10.0	96	1.03
2.08	25.0	95	1.02
2.13	60.0	91	0.97
2.18	95.0	86	0.92
2.24	140.0	80	0.86
2.28	182.0	77	0.82
2.36	280.0	69	0.74
2.42	380.0	64	0.68
2.60	700.0	47	0.50
2.90	1500.0	19	0.20

T75	203.438	75
T25	1320.000	25
T75-25	1116.563	Derived from Best Fit



Comments

Data extrapolated from 182 minutes in order to calculate an infiltration rate.

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Soakaway Calculations

Soakaway Test No.	TP4 SA1
Contract:	Burndell Road, Yapton BN18 0HR
Contract No.	15276

Field Test

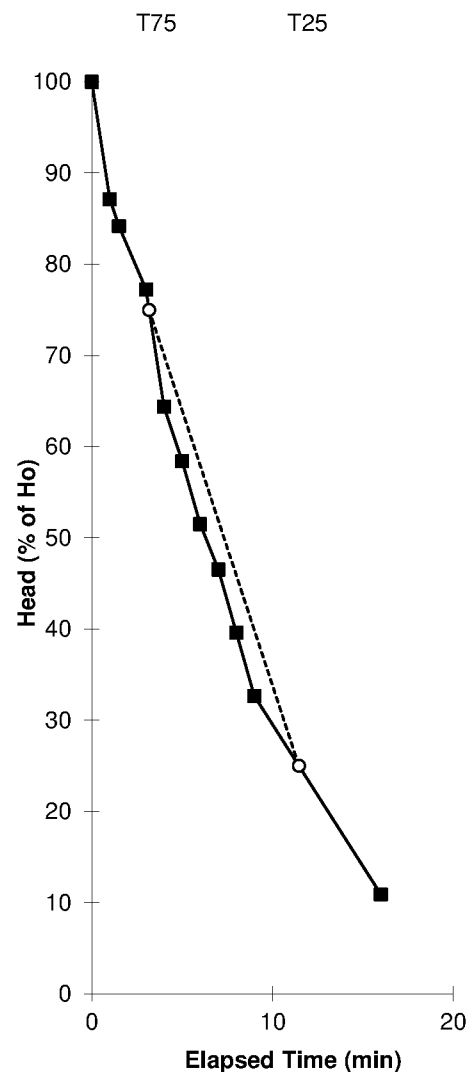
Trial Pit Log (include details of groundwater):

See trial Pit record

Depth of Pit	2.75 m
Width of Pit	0.70 m
Length of Pit	1.90 m
Depth of Pit Soaked	1.01 m
ap_{50}	3.956 m ²
V_{p75-25}	0.67165 m ³
t_{75-25}	8.3 min
water used	1.3433 m ³
f	3.412E-04 m/sec.

Field Data

Depth to Water (m)	Elapsed Time (min)	Head of Water (% of Ho)	Head of Water (m)
1.74	0	100	1.01
1.87	1.0	87	0.88
1.90	1.5	84	0.85
1.97	3.0	77	0.78
2.10	4.0	64	0.65
2.16	5.0	58	0.59
2.23	6.0	51	0.52
2.28	7.0	47	0.47
2.35	8.0	40	0.40
2.42	9.0	33	0.33
2.64	16.0	11	0.11



T75	3.173	75
T25	11.466	25
T75-25	8.293	Derived from Best Fit

Comments

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Soakaway Calculations

Spokaway Test No.	TP4 SA2
Contract:	Burndell Road, Yapton BN18 0HR
Contract No.	15276

Field Test

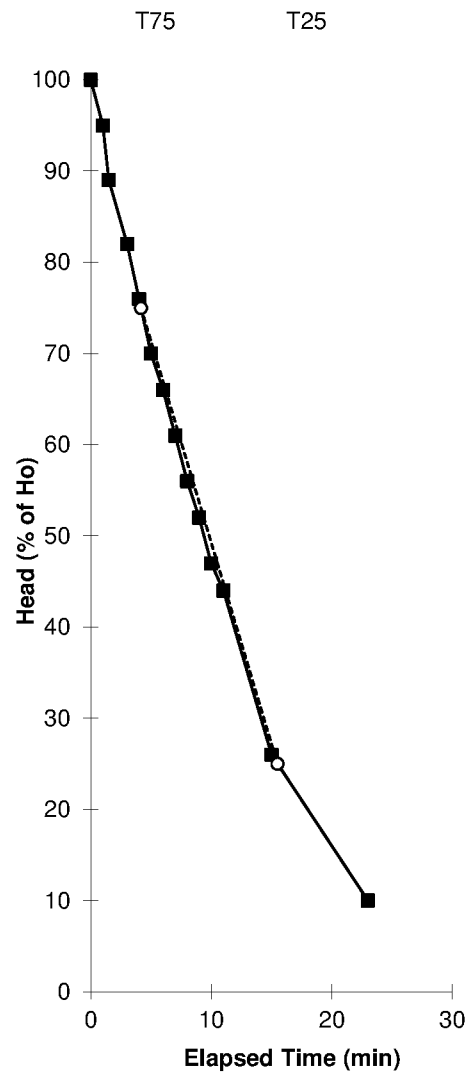
Trial Pit Log (include details of groundwater):

See trial Pit record

Depth of Pit	2.65 m
Width of Pit	0.70 m
Length of Pit	1.90 m
Depth of Pit Soaked	1.00 m
$ap50$	3.93 m ²
$Vp75-25$	0.665 m ³
$t75-25$	11.3 min
water used	1.3300 m ³
i	2.488E-04 m/sec.

Field Data

Depth to	Elapsed	Head of	Head of
Water	Time	Water	Water
(m)	(min)	(% of Ho)	(m)
1.65	0	100	1.00
1.70	1.0	95	0.95
1.76	1.5	89	0.89
1.83	3.0	82	0.82
1.89	4.0	76	0.76
1.95	5.0	70	0.70
1.99	6.0	66	0.66
2.04	7.0	61	0.61
2.09	8.0	56	0.56
2.13	9.0	52	0.52
2.18	10.0	47	0.47
2.21	11.0	44	0.44
2.39	15.0	26	0.26
2.55	23.0	10	0.10



T75	4.167	75
T25	15.500	25
T75-25	11.333	Derived from Best Fit

Comments

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Appendix B Information Provided by the Client



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