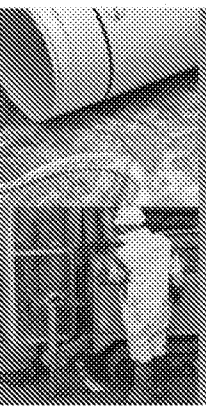
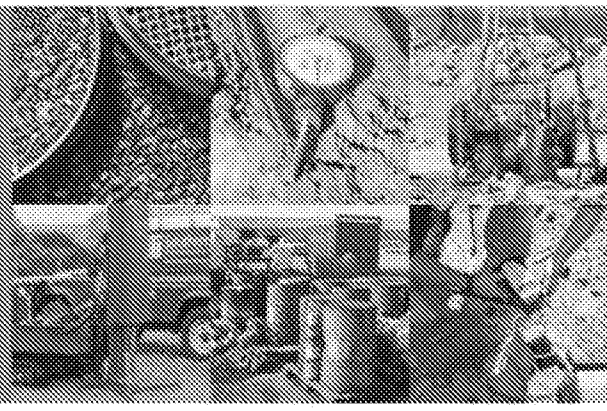
Southern Testing
Environmental & Geotechnical

ST Consult
Environmental & Geotechnical



Soakage Test Report



Project Name: Land to the south of Toddington Lane

Location: Lyminster, Littlehampton, BN17 7FU

Client: Worthing Homes

Project ID: J15618

Report Date: 22 December 2023

Report Issue: 1

Author	J A Clifford BSc FGS		[redacted]
Check / Review	S F Pratt BSc MSc CGeol FGS DIC		

For and on behalf of Southern Testing Laboratories Limited

DOCUMENT HISTORY AND STATUS

Issue No.	Date	Purpose or Status	Author	Check / Review
1	22-Dec-2023	Soakage Test Report	JAC	SFP

TABLE OF CONTENTS

TABLE OF APPENDICES

A INTRODUCTION

1 Authority

Our authority for carrying out this work is contained in a Project Order from Approved by S Gearing of Worthing Homes on the 27th November 2023.

2 Location

The site is located 1.8km north East of Littlehampton Railway station, and just to the south of Toddington Lane. The approximate National Grid Reference of the site is TQ 03400 03859. The site location is indicated on Figure 1 within Appendix A.

3 Investigation Brief

In accordance with the Client's instructions, and our quotation, the following was included in our brief for this soakage investigation:

Soakage tests to be carried out on site using the BRE 365 method at locations specified by the client's engineer.

4 Scope

This factual report presents our exploratory hole logs and test results only.

A UXO risk assessment was not included within our brief for the investigation, however a preliminary UXO risk assessment has been carried out prior to our initial site investigation dated November 2021.

As with any site there may be differences in soil conditions between exploratory hole positions.

This report is not an engineering design and the figures and calculations contained in the report should be used by the Engineer, taking note that variations will apply, according to variations in design loading, in techniques used, and in site conditions. Our figures therefore should not supersede the Engineer's design.

The findings and opinions conveyed via this investigation report are based on information obtained from a variety of sources as detailed within this report, and which Southern Testing Laboratories Ltd. believes are reliable. Nevertheless, Southern Testing Laboratories Ltd. cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.

The investigation was conducted and this report has been prepared for the sole internal use and reliance of Worthing Homes and their appointed Engineers. This report shall not be relied upon or transferred to any other parties without the express written authorisation of Southern Testing Laboratories Ltd. If an unauthorised third party comes into possession of this report they rely on it at their peril and the authors owe them no duty of care and skill.

The recommendations contained in this report are made in respect of the particular context of the investigation as described in the report and may not be appropriate to alternative development schemes. This report should be considered in its entirety and Southern Testing Laboratories Ltd accepts no responsibility for and excludes liability in respect of any omission or alteration made by others, and any use of the report for any purpose other than that for which it was produced.

B SITE SETTING

5 Geological Records

No formal desk study has been carried out, but reference has been made to both online and published geological maps to put the site into context. A geotechnical investigation report has been previously carried out by ourselves (Ref: J14912 November 2021) and the reader is referred to this report for additional information.

5.1 Geology

The British Geological Survey Map No317/332 indicates that the site geology consists of River Terrace Deposits over Raised Beach Deposits over the New Pit Chalk Formation

5.1.1 River Terrace Deposits

The River Terrace Deposits are of fluviatile origin and were laid down by the Thames when the climate was much wetter and cooler than at present. The terraces consist of sheets of gravel and sand with an overlying deposit of Brickearth (really an ancient alluvium). Some variability in soils is to be expected at junctions with the various terraces, as riverbanks existed there. The remains of these former riverbanks can be soft and silty or contain clay.

5.1.2 Brickearth

Brickearth (loess deposit) is a recent deposit which is so called as it is suited to brick manufacture. It is predominantly an aeolian deposit; formed during cold, dry climatic conditions. There is evidence that brickearth has been reworked as part of 'sheet flooding' which helped incorporate flint gravels into the deposit. Brickearth consists mainly of ferruginous silty clay, which is often sandy and may contain some finely divided chalk, scattered flints and gravelly seams, or other locally derived material. It is usually poorly consolidated and may contain numerous hollow root tubes and worm burrows.

5.1.3 Raised Beach Deposits (South Coast)

There are four raised beaches on the south coast. These are:

1. The Higher Raised Beach (30m Beach, Goodwood Slindon Raised Beach).
2. The 15 to 20 m Beach.
3. The Sussex Low Raised Beach (The 7.5 m Raised Beach).
4. The 4 m Beach.

The principal beaches in Southeast England are the Higher and Low beaches, as described below:

The Higher Raised Beach (Goodwood-Slindon Raised Beach)

The higher beach is variously referred to as the 100 foot beach, the 30 m beach, the Goodwood Beach and the upper beach.

The beach deposits consist of uniformly graded, often buff, silty sand, which lie beneath a superficial cover of (usually) clayey gravel. They are above 4 m thick and are dated to the second warm interglacial period (the Hoxnian). They rest on a wave-cut platform which falls gently from its maximum elevation of just over 30 m AOD to about 25 m AOD over a distance of 1 to 2 km. Where the base platform is in chalk there is often a thin gravelly layer and the upper 150 mm or so of the chalk is hard and calcreted. At the interface between the chalk and the overlying beach large solution features may be found.

The northern margin of the beach is marked by a slight break in slope at about +45 m AOD - the beach deposits and overlying cover are about 15 m thick there. A "buried cliff" line may be found and intense reworking and variability of soils must be anticipated.

It is noted that coarse beach deposits are usually absent and it is not entirely clear whether the northern margin is a cliff line or a fault scarp.

Low Sand Beach (7.5 m Beach) (Sussex/Hampshire Low Raised Beach)

The Low Beach deposits comprise fine uniform silty sands with some gravel, which rest on a platform that falls from about +15 m AOD, to present sea level, over a distance of up to 15 km. They lie beneath a superficial cover of brickearth or Coombe deposits.

As the deposits are up to about 5 m thick, the ground level at the inland margin is about +20 m AOD, and a slight change in slope can sometimes be detected at this point. There is a former cliff at the margin, usually in soft Tertiary clays which have been highly degraded but which may have been up to 10 to 12 m high. Highly variable soil conditions must be anticipated in the region of the ancient cliffs.

The beaches were formed in a complex marine transgression which is traditionally considered to belong to the Ipswichian Interglacial (about 80,000 years ago) and there are also deep local cryoturbation and solution features.

5.1.4 New Pit Chalk Formation

The New Pit Chalk Formation typically comprises a blocky creamy white, smooth textured chalk with well-developed marl seams. Small finger shaped flint occurs sporadically in the lower part of the sequence. Conjugate fractures are usually clay-coated and slickensided, reflecting the presence of many clay-rich marl seams.

The White Chalk outcrop in particular is frequently highly fractured and highly permeable, and usually has good infiltration characteristics. On the other hand, Chalk Head, highly weathered Chalk and Chalk under a low permeability superficial cover may have very poor infiltration characteristics.

Chalk is slightly soluble in water and, while it has excellent bearing properties when unweathered, this solubility can lead to deep weathering and softening, and the upper layers of chalk often have an irregular boundary with overlying strata

The Chalk may be softened by solution to a depth of 5 to 15 metres and bearing capacities and engineering properties improve with depth. Where there is an outcrop of impermeable soil overlying the chalk there may be a dramatically increased solution effect due to concentrated surface water flow to the Chalk close to the outcrop boundary.

Solution features are common in the Chalk, and these can present significant difficulties to development on affected sites.

Man has also worked the chalk for flints, and for other purposes, for thousands of years and any signs of old workings should be carefully investigated.

C FIELDWORK

6 Strategy and Method

The strategy adopted for the soakage testing comprised the following:

Activity / Method	Purpose	Max Depth Range (mbgl)	Installations / Notes
TP01,TP01A,TP02,TP02A and TP03 JCB 3CX	Trial pit to investigate the shallow ground conditions and allow for assessment of soakage potential using the BRE365 method.	1.00-3.80	BRE365 Soakage tests

Exploratory hole locations were specified by the Client's Engineer and are shown in Figure 2 in Appendix A.

In-situ test method descriptions employed are given in Appendix B together with the test results.

7 General Site Description

The site was roughly rectangular in shape measuring approximately 100m across in the east to west direction and 70m in a north to south direction. The site comprised mostly vacant land overgrown with vegetation, with a part brick and part concrete agricultural barn measuring approximately 15m x 30m. This had a suspected asbestos cement pitched roof and sides. The site was bound by Toddington Lane to the north east, residential housing to the south and commercial buildings and workshops to the west.

7.1 Topography and Drainage

The topography of the site was elevated in comparison to Toddington Lane to the north, south and east and overlooked the flat lying land to the north. The topography of the surrounding area is predominantly flat towards the coastline but rises steeply to the north towards Arundel.

7.2 Vegetation

The site was heavily vegetated with weeds and brambles with the northern and eastern boundaries being the most heavily vegetated. An ecological boundary fence was also in place along the southern boundary.

7.3 Buildings and Land Use on Site and Nearby

A single building was present on site and this comprised a part brick part concrete barn with concrete floor slab and suspected asbestos cement roof and sides that had partially collapsed in several places.

8 Weather Conditions

The fieldwork was carried out on the 6th December 2023 at which time the weather was generally cold following a period of higher than average rainfall.

9 Soils as Found

The soils encountered are described in detail in the attached exploratory hole logs (Appendix A), but in general comprised a covering of Made Ground over variable natural superficial deposits over Chalk. A summary is given below.

Depth (m)	Thickness (m)	Soil Type	Description
0.00-0.40/2.80	0.40-2.80	MADE GROUND	Brown clayey silty sandy GRAVEL with patches of gravelly CLAY. Gravel is fine to coarse subangular to subrounded flint and varying anthropogenic materials such as brick, concrete, plastic bottle, rubber tyre, metal bars and slate roof tile fragments.
0.40/1.00-2.60/3.00	1.20-1.30	Sandy gravelly CLAY	Brown silty sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded flint and occasional chalk.
2.80-3.80 (TP2 only)	Unproven	Gravelly SAND	Greenish yellow very clayey gravelly SAND. Gravel is fine to coarse subrounded flints.
2.60-3.00m (TP3 only)	Unproven	Structureless Chalk	Recovered as: Structureless chalk comprising off white and yellowish brown clayey gravely SILT. Gravel is fine to coarse medium density chalk and occasional flint.

10 Groundwater Observations

Groundwater was not observed in any of the exploratory holes during the fieldwork.

D TEST RESULTS

11 Soakage Test Results

The BRE paper DG365, Ref [22] describes a method for site testing to determine soil infiltration rates at the proposed site of a soakaway. The in-situ test method is described in Appendix B.

A total of 5 soakage tests were carried out across the site, at the locations shown on the attached site plan Figure 2, Appendix A. The full results of the soakage tests are presented within Appendix B.

The DG365 Ref [22], states that each pit should be allowed to drain three times to near empty, with filling on the same or consecutive days. This was not possible given the slow soakage rates on site and the one day of testing allowed for.

The infiltration rate from each trial hole is summarised in the table below. The soakage rate in this report in expressed as ℓ/m²/minute, which is a convenient rate to use. The BRE use a unit of m/sec, which is the value in l/m²/minute divided by 60,000.

Test ID	Test Depth (mbgl)	Design Infiltration Rate ℓ/m²/minute	Design Infiltration Rate m/sec	Notes
TP01	2.5	0.0087	1.45x10-7	Pit not emptied. negligible soakage
TP01A	1.0	0.601	1.00x10-5	Pit not emptied.
TP02	3.8	0.092	1.53x10-6	Pit not emptied. Poor soakage
TP02A	1.20	0.429	7.16x10-6	Pit not emptied.
TP03	3.0	0.253	4.21x10-6	Pit not emptied. Poor soakage

Note: The Design Infiltration Rate is the lowest of the three tests

Where three fillings have not been carried out, a reduction factor should be applied to the result to provide a design infiltration rate.

The soakage results indicated that the shallow soils on site have variable but generally poor soakage potential. Given that Made Ground was encountered in each of the trial holes to variable depths but generally greater than 1m we would not recommend that any permeable paving or soakaways be placed within any made ground soils due to their inherent variability and the risk of inundation settlement.

12 General Guidance on Design of Soakaways

Any soakaway scheme may require the approval of the Environment Agency, Building Control and, where applicable, the adopting Highways Authority.

Soakaways are used to store the immediate surface water run-off from hard surfaced areas, such as roof or carparks, and allow for efficient infiltration into the adjacent soil. They should be designed to discharge their stored water sufficiently quickly to provide the necessary capacity to receive run-off from a subsequent storm. The time taken for discharge depends upon the soakaway shape and size, and the surrounding soil's infiltration characteristics.

Groundwater levels can vary considerably from season to season and year to year, often rising in wet or winter weather, and falling in periods of drought. As such, a high groundwater table may affect the storage capacity of soakaways. In addition, it should be noted that an unsaturated zone may be required between the base of soakaways and the groundwater table, by the Environment Agency. Longer term monitoring may be required to establish actual groundwater levels as part of the planning approval process.

The design of soakaways can be square, circular (conventional) or trench excavations, and may be rubble filled, perforated precast concrete ring units, plastic cells or any similar structure that collects rainwater and run-off and allow discharge directly into the ground. Depending on the geological conditions, and depth at which suitable infiltration is achieved, soakaways can also be deep bored.

Long-term maintenance and inspection must be considered during the design and construction process. Maintenance of silt traps, gully pots and interceptors will improve the long-term performance of soakaways. The use of wet well chambers within the soakaway system can further assist in pollutant trapping and extending the operating life of soakaways.

Risk of pollution to the quality of groundwater must be considered as part of the design.

Generally, roof and surface run-off should not significantly impact on groundwater quality and subject to appropriate approvals from the Environment Agency could be discharged directly to soakaways. However, although again subject to approvals from the Environment Agency, paved surface run-off for larger trafficked areas should generally be passed through a suitable form of oil interception device prior to discharge to the soakaway.

Care must be taken to ensure that the discharge of large volumes of surface run-off into the soil does not disrupt the existing sub-surface drainage patterns. Similarly in areas of sloping topography, consideration should be given to the siting of soakaways to avoid potential discharge and or flooding of down slope areas.

Soakaways should not normally be constructed closer than 10m to buildings.

REFERENCES

[1] Building Research Establishment (BRE), "DG365 Soakaway Design," 2016.

[2] BSI Standards, "BS 5930 Code of practice for ground investigations," 2015.

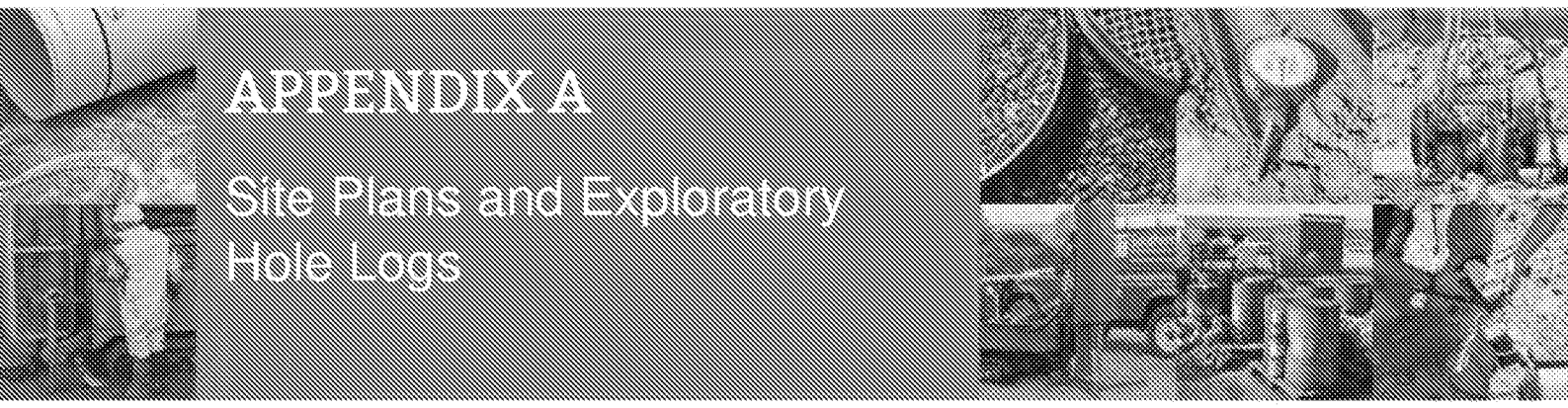
[3] BSI Standards, "BS 3882:2015 Specification for Topsoil," 2015.

[4] CIRIA, "C574 Engineering in Chalk," 2002.

[5] R. N. Mortimore, Logging the Chalk, 2014.

Southern Testing
Environmental & Geotechnical

ST Consult
Environmental & Geotechnical



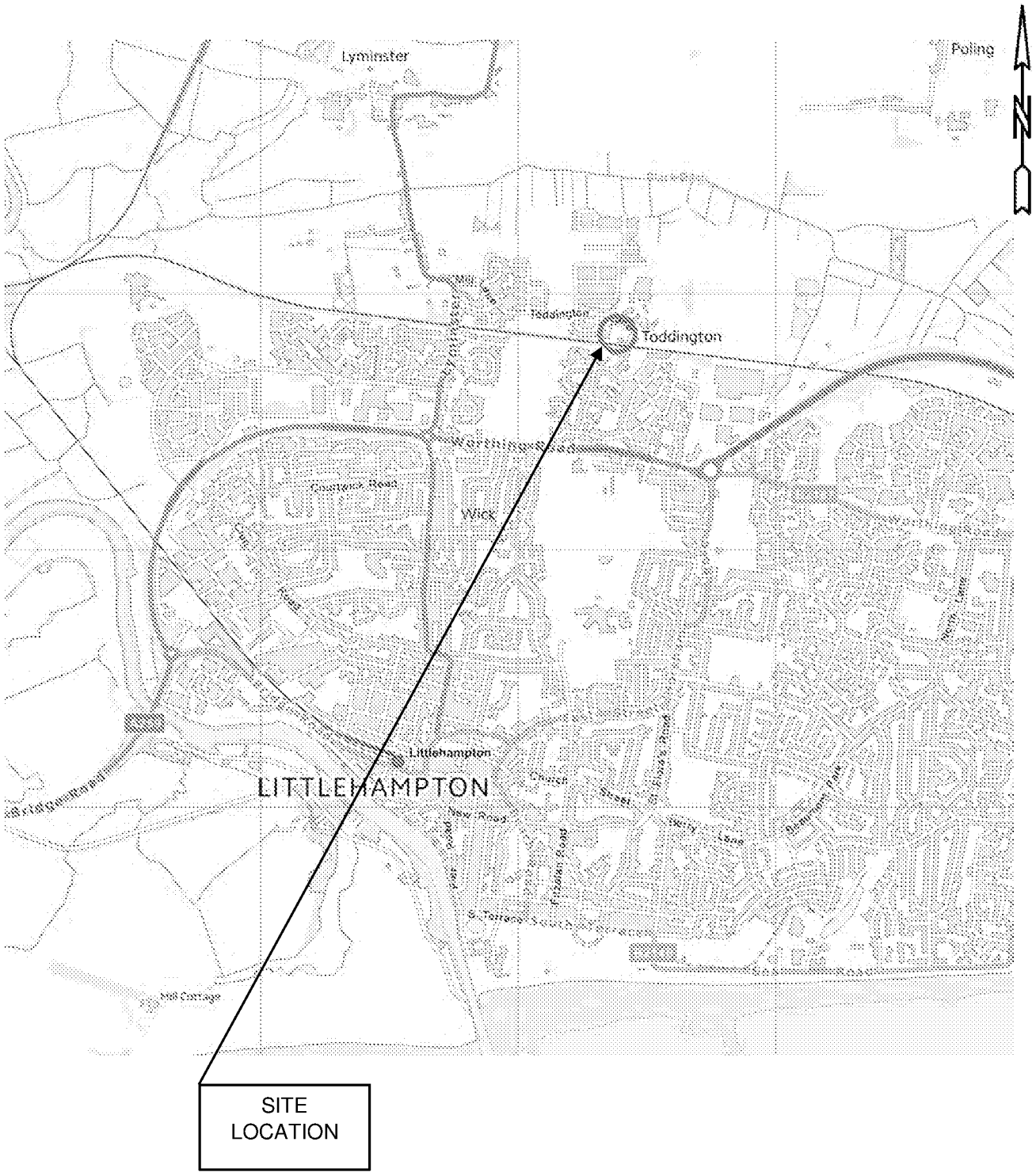
APPENDIX A

Site Plans and Exploratory Hole Logs

A

Southern Testing
Environmental & Geotechnical

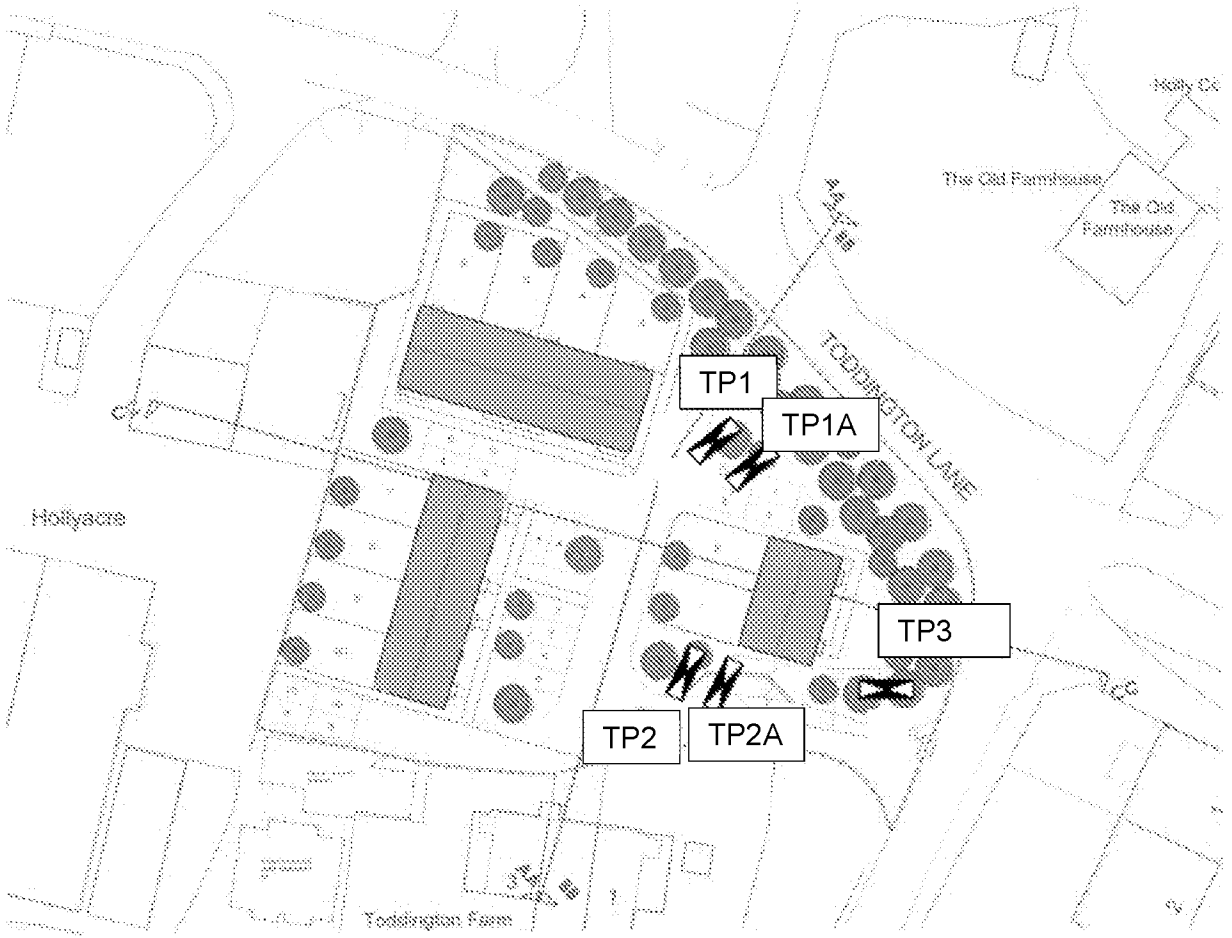
ST Consult
Environmental & Geotechnical



Site:	Land at Toddington Lane, Littlehampton, BN17 7PN	Project ID	J15618
Figure 1	Site Location Plan	Date:	21/12/2023

Southern Testing
Environmental & Geotechnical

ST Consult
Environmental & Geotechnical



NB: Positions of exploratory holes / test positions are only indicative unless dimensioned.

Site:	Land to the south of Toddington Lane, Littlehampton	Project Id:	J15618
Figure 2	Site Location Plan	Date:	12/12/2023

Southern Testing
Environmental & Geotechnical

ST Consult
Environmental & Geotechnical

Key to Exploratory Hole Logs, Plans and Sections

Backfill Symbols		Pipe Symbols		Principal Soil Types		Principal Rock Types		Drilling Records	
Arisings		Plain Pipe		Topsoil		Mudstone		Water Strike	
Concrete		Slotted Pipe		Made Ground		Claystone		Depth Water Rose	
Blacktop		Piezometer		Clay		Siltstone		Total Core Recovery (%) [TCR]	
Bentonite		Piezometer Tip		Silt		Sandstone		Solid Core Recovery (%) [SCR]	
Gravel Filter		Filter Tip		Sand		Limestone		Rock Quality Index (%) RQD]	
Sand Filter		Extensometer		Gravel		Chalk		Fracture Index (fractures / m) [FI]	
		Inclinometers		Peat					

All soil and rock descriptions are in general accordance with BS5930 2015, BS EN ISO 14688-1:2002+A1:2013 and BS EN ISO 14689-1:2003. Chalk descriptions are also based on CIRIA C574 and "Logging the Chalk – R.N. Mortimer 2015". The Geology Code is only provided where a positive identification of the sample strata has been made.

Location / Method Identifiers	
BH	Borehole (undefined)
CP	Cable Percussive
RC	Rotary Core
RO	Rotary Open Hole
ODC	Rotary Odex/Symmetrix drilling cased
CP+RC	Cable Percussive to Rotary Core
SNC	Sonic
CFA	Continuous Flight Auger
FA	Flight Auger
VC	Vibro Core
WLS+RC	Windowless (Dynamic) Sampler to Rotary Core
WLS	Windowless Sampler
WS	Window Sampler
HA	Hand Auger
C	Road / Pavement Core
IP	Inspection Pit (Hand Excavation)
TP	Trial Pit (Machine Excavated)
OP	Observation Pit (Supported Excavation Hand or Machine)

In-situ Test Location / Method	
DP	Dynamic Probe
CPT	Cone Penetration Test
CBR	In-situ CBR Test
DCP	CBR using Dynamic Cone Penetrometer
CBRT	CBR using TRL Probe
PB	Plate Bearing Test
SPT (S)	Standard Penetration Test (Split Barrel Sampler)
SPT (C)	Standard Penetration Test (Solid Cone)
N	SPT Result
-/-	Blows/Penetration (mm) after seating drive
-*/-	Total Blows / Penetration (mm)
( )	Extrapolated Value
PPT	Perth Penetration (In-House Method - Equivalent N Value)
HP / UCS	Strength from Hand Penetrometer (kN/m^2)
IVN	Strength from Hand Vane ((kN/m^2) P = peak, R = residual
PID	Photo Ionisation Detector (ppm)
MEXE	Mexi-Cone CBR (%)

Samples / Test Type	
B	Bulk Sample
BLK	Block Sample
C	Core Sample
CBRS	CBR Mould Sample
D	Small Disturbed Sample
ES	Environmental Sample (Soil)
EW	Environmental Sample (Water)
GS	Environmental Sample (Gas)

Samples / Test Type	
SPTLS	Standard Penetration Test Split Barrel Sample
TW	Thin Wall Push In Sample (e.g. Shelby Sampler)
U	Undisturbed Open Drive Sample (blows to take)
UT	Thin Wall Undisturbed Open Drive Sample (blows to take)
W	Water Sample (Geotechnical)
SP	Sample from Stockpile
P	Piston Sample
AMAL	Amalgamated Sample

Southern Testing ST Consult	Start - End Date:	Project ID:	Hole Type:	TP1
	06/12/2023	J15618	TP	Sheet 1 of 1

Client:	Worthing Homes	Co-ordinates:	Level (m AOD)	Logger:
				JAC
Project Name:	Land to the south of Toddington Road	Location:	Littlehamton	

Samples and Insitu Testing			Level (m AOD)	Thickness (m)	Legend	Depth (m bgl)	Stratum Description
Depth (m bgl)	Type	Results					
				(1.00)			Brown silty sandy GRAVEL. Gravel is fine to coarse subangular brick, concrete, roots, tile fragments and cobbles of concrete. (MADE GROUND)
						1.00	
				(0.80)			Stiff light brown silty lightly fine sandy CLAY.
							1.50m slightly gravelly. Gravel is fine to coarse subangular flint.
						1.80	
				(1.20)			Orange brown and yellow brown very sandy slightly gravelly CLAY with occasional patches of clayey sand. Gravel is fine to coarse subrounded and subangular flint.
						3.00	Pit terminated at 3.00m

Pit Dimension (m)		Pit Stability:	Stable	Water Strikes		
		Weather:		Depth (m)	Date/Time	Remarks
Width:	0.45	Remarks:				
Length:	2.10					
Depth:	3.00					
Status:		DRAFT	Log Print Date and Time: 12/12/2023 09:48	Log Approved By:		

Southern Testing ST Consult	Start - End Date:	Project ID:	Hole Type:	TP1A
	06/12/2023	J15618	TP	Sheet 1 of 1

Client:	Worthing Homes	Co-ordinates:	Level (m AOD)	Logger:
Project Name:	Land to the south of Toddington Road	Location:	Littlehamton	

Samples and Insitu Testing			Level (m AOD)	Thickness (m)	Legend	Depth (m bgl)	Stratum Description
Depth (m bgl)	Type	Results					
				(0.40)			Brown silty GRAVEL. Gravel is fine to coarse concrete, brick, flint, tile, chalk, rubber and plastic (MADE Ground)
						0.40	
				(0.60)			Firm brown and orange brown silty slightly sandy CLAY.
						1.00	Pit terminated at 1.00m

1
2
3
4

Pit Dimension (m)		Pit Stability:	Stable.	Water Strikes		
		Weather:		Depth (m)	Date/Time	Remarks
Width:	0.45	Remarks:				
Length:	2.10					
Depth:	1.00					

Status:	DRAFT	Log Print Date and Time:	12/12/2023 09:48	Log Approved By:	

Southern Testing ST Consult	Start - End Date:	Project ID:	Hole Type:	TP2
	06/12/2023	J15618	TP	Sheet 1 of 1

Client:	Worthing Homes	Co-ordinates:	Level (m AOD)	Logger:
				JAC
Project Name:	Land to the south of Toddington Road	Location:	Littlehamton	

Samples and Insitu Testing			Level (m AOD)	Thickness (m)	Legend	Depth (m bgl)	Stratum Description
Depth (m bgl)	Type	Results					
				(1.20)			Probably loose brown clayey silty sandy GRAVEL with patches of gravelly CLAY. Gravel is fine to coarse subangular to subrounded flint, brick, concrete, plastic bottle, rubber tyre, metal bars. (MADE GROUND) *0.1m geotextile fabric*
				(1.10)		1.20	Orange brown silty slightly gravelly very sandy CLAY. Gravel comprises fine brick and tile fragments (MADE GROUND)
				(0.50)		2.30	Orange brown silty gravelly clayey SAND/slightly very sandy CLAY. Gravel comprises fine brick and tile fragments (MADE GROUND)
				(1.00)		2.80	Greenish yellow very clayey gravelly SAND. Gravel is fine to coarse subrounded flints.
						3.80	Pit terminated at 3.80m

Pit Dimension (m)		Pit Stability:	Minor collapse in top 1.0m	Water Strikes		
		Weather:		Depth (m)	Date/Time	Remarks
Width:		Remarks:				
Length:						
Depth:	3.80					
Status:		DRAFT	Log Print Date and Time: 12/12/2023 09:48	Log Approved By:		

Southern Testing ST Consult	Start - End Date:	Project ID:	Hole Type:	TP2A
	06/12/2023	J15618	TP	Sheet 1 of 1

Client:	Worthing Homes	Co-ordinates:	Level (m AOD)	Logger:
				JAC
Project Name:	Land to the south of Toddington Road	Location:	Littlehamton	

Samples and Insitu Testing			Level (m AOD)	Thickness (m)	Legend	Depth (m bgl)	Stratum Description
Depth (m bgl)	Type	Results					
				(0.90)			Brown clayey GRAVEL. Gravel comprises fine to coarse subangular to subrounded concrete, brick, plastic, metal, wire, tile (MADE GROUND)
						0.90	
				(0.30)			Soft to firm orange brown silty slightly fine sandy CLAY with fragments of tile and fine brick (MADE GROUND)
						1.20	Pit terminated at 1.20m

1
2
3
4

Pit Dimension (m)		Pit Stability:	Stable	Water Strikes		
		Weather:		Depth (m)	Date/Time	Remarks
Width:	0.45	Remarks:				
Length:	1.20					
Depth:	1.20					

Status:	DRAFT	Log Print Date and Time:	12/12/2023 09:48	Log Approved By:	

Southern Testing ST Consult	Start - End Date:	Project ID:	Hole Type:	TP3
	06/12/2023	J15618	TP	Sheet 1 of 1

Client:	Worthing Homes	Co-ordinates:	Level (m AOD)	Logger:
				JAC
Project Name:	Land to the south of Toddington Road	Location:	Littlehamton	

Samples and Insitu Testing			Level (m AOD)	Thickness (m)	Legend	Depth (m bgl)	Stratum Description
Depth (m bgl)	Type	Results					
				(1.30)			Dark brown silty sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded brick, plastic, roots, flint, slate, aluminium can, paving slab. (MADE GROUND)
						1.30	
				(1.30)			Firm brown and light brown silty gravelly CLAY. Gravel is fine to coarse subrounded flint and occasional chalk.
						2.60	
				(0.40)			Recovered as: Structureless chalk comprising off white and yellowish brown clayey gravely SILT. Gravel is fine to coarse medium density chalk and occasional flint.
						3.00	Pit terminated at 3.00m

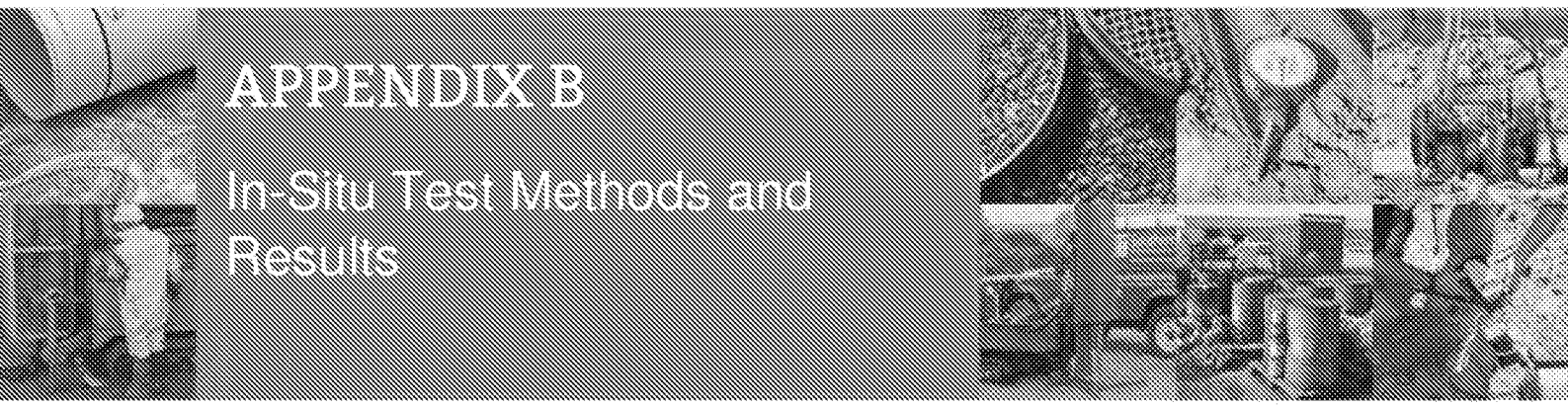
1 2 3 4

Pit Dimension (m)		Pit Stability:	Generally stable with minor collapse in upper 0.8m	Water Strikes		
		Weather:		Depth (m)	Date/Time	Remarks
Width:		Remarks:				
Length:						
Depth:	3.00					

Status:	DRAFT	Log Print Date and Time:	12/12/2023 09:48	Log Approved By:	

Southern Testing
Environmental & Geotechnical

ST Consult
Environmental & Geotechnical



APPENDIX B

In-Situ Test Methods and Results

B

Soil and Rock Descriptions

All soil and rock descriptions are in general accordance with BS5930 Ref [4].

Anthropogenic soils ('made ground' or 'fill') describe materials which have been placed by man and can be divided into those composed of reworked natural soils and those composed of or containing man-made materials. 'Fill' is used to describe material placed in a controlled manner and 'made ground' is used to describe materials placed without strict engineering control.

The classification of materials such as topsoil is based on visual description only and should not be interpreted to mean that the material complies with criteria used in BS 3882 Ref [33].

Chalk descriptions are based on CIRIA C574 Ref [34] and Mortimore Ref [35].

The geology code is only provided on logs where a positive identification of the sample strata has been made.

Soakage Tests (after BRE DG365 2016)

The BRE DG365 Ref [22] paper on soakaway design allows for the design of trench soakaways as well as traditional square and circular soakaways.

The test to measure the soil infiltration rate is carried out in pits which are excavated to the full depth of the proposed soakaway. The trial pits are filled and allowed to drain to empty or near empty, three times, on the same day or on consecutive days. Water levels are recorded against time. Where the sides are unstable the pit should be filled with granular material to provide stability during the test.

Calculated soakage rates are expressed as l/m^2/minute, which is a convenient rate to use. The BRE use a unit of m/sec, which is the value in l/m^2/minute divided by 60,000.

Summary Sheet

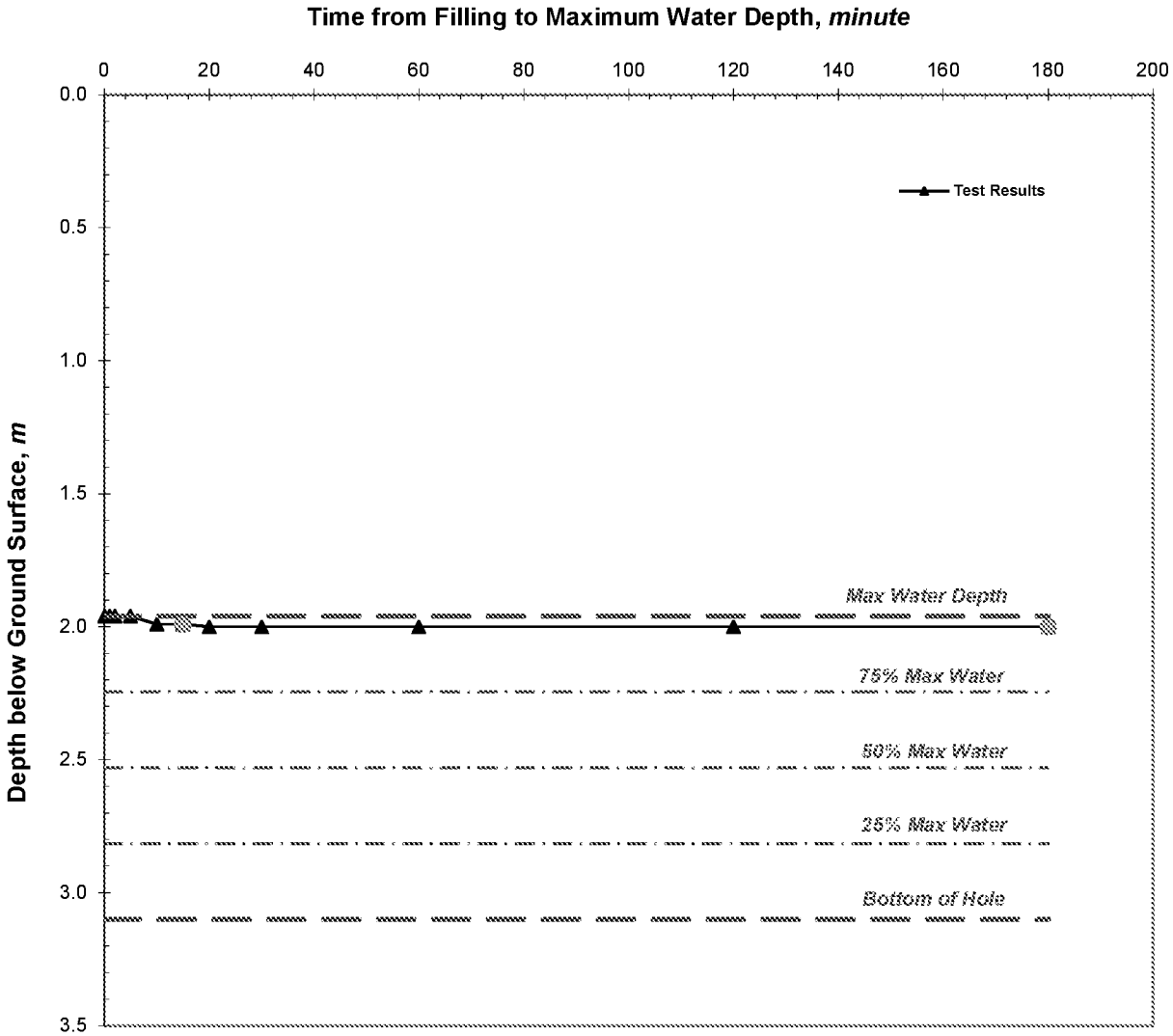
Results of BRE Digest DG365 Soakage Tests

Site :	Land to the South of Toddington Lane	**Job No :**	J15618
Client :	Worthing Homes	**O S Reference :**	
Tested By :	JB	**Engineer:** JC	**Test Date :** 06/Nov/2023

Hole No	Test No	Hole Depth *m*	Soakage Rate for Each Test *litre/m² /min*	Soakage Rate for Each Hole *litre/m² /min*	*m/sec*	Water Level at Finish of Test	Remarks
TP03	No 1	3.00	0.253	0.253	4.21E-6	Pit was not emptied; Non compliant value was calculated.	
TP02	No 1	3.80	0.092	0.092	1.53E-6	Pit was not emptied; Non compliant value was calculated.	
TP02A	No 1	1.20	0.429	0.429	7.16E-6	Pit was not emptied; Non compliant value was calculated.	
TP01	No 1	3.10	0.0087	0.0087	1.45E-7	Pit was not emptied; Non compliant value was calculated.	
TP01A	No 1	1.00	0.601	0.601	1.00E-5	Pit was not emptied; Non compliant value was calculated.	
Mean Value of All Calculated Soakage Rates :				**0.277** *litre/m² /min*	**4.61E-6** *m/sec*		

BRE Digest DG365 Soakage Test

Test Hole No: TP01
Test No: Test No 1 (Initial)



Pit Length, m	2.100	Depth to Water at Start of Test, *m*	1.960
Pit Width, m	0.450	Max Water Dropdown during Test, *m*	0.040
Depth to Pit Base, m	3.100	Total Soakage Test Time, *min*	180.0
Depth to Top of Permeable Soils, *m*		Mean Internal Discharge Area, m^2	6.581
Depth to Groundwater Surface, *m*		Discharge Rate, *litre/min*	0.057
Depth to Top of Granular Fill, *m*		Soakage Rate, $litre/m^2/min$	**0.0087**
Voids Assumed for Granular Fill, %	100%	BRE Soil Infiltration Rate, *m/sec*	**1.45E-07**

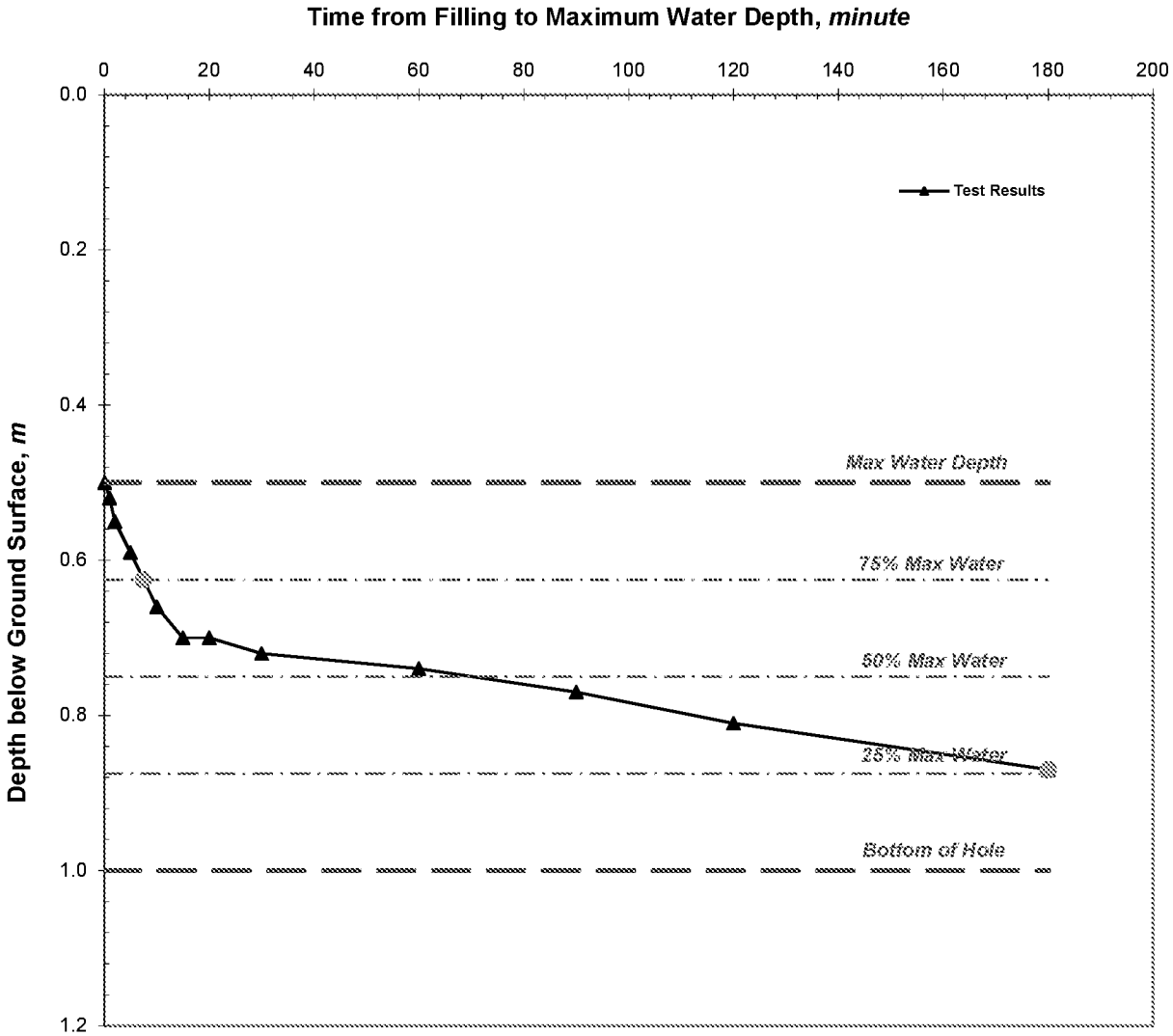
Comments:

Water level did not fall to 75% max water depth, calculations were based on actual fall of water level achieved.
Result not compliant with BRE365 requirement since water did not fall to 25% max water depth.

Client: Worthing Homes	**Job No:** J15618	**Test Date:** 06/Nov/2023	
Site: Land to the South of Toddington Lane	**Tested By:** JB	**Engineer:** JC	**Fig. S4**

BRE Digest DG365 Soakage Test

Test Hole No: TP01A
Test No: Test No 1 (Initial)



Pit Length, m	2.100	Depth to Water at Start of Test, *m*	0.500
Pit Width, m	0.450	Max Water Dropdown during Test, *m*	0.370
Depth to Pit Base, m	1.000	Total Soakage Test Time, *min*	180.0
Depth to Top of Permeable Soils, *m*		Mean Internal Discharge Area, m^2	2.233
Depth to Groundwater Surface, *m*		Discharge Rate, *litre/min*	1.342
Depth to Top of Granular Fill, *m*		Soakage Rate, *litre/m^2/min*	**0.601**
Voids Assumed for Granular Fill, %	100%	BRE Soil Infiltration Rate, *m/sec*	**1.00E-05**

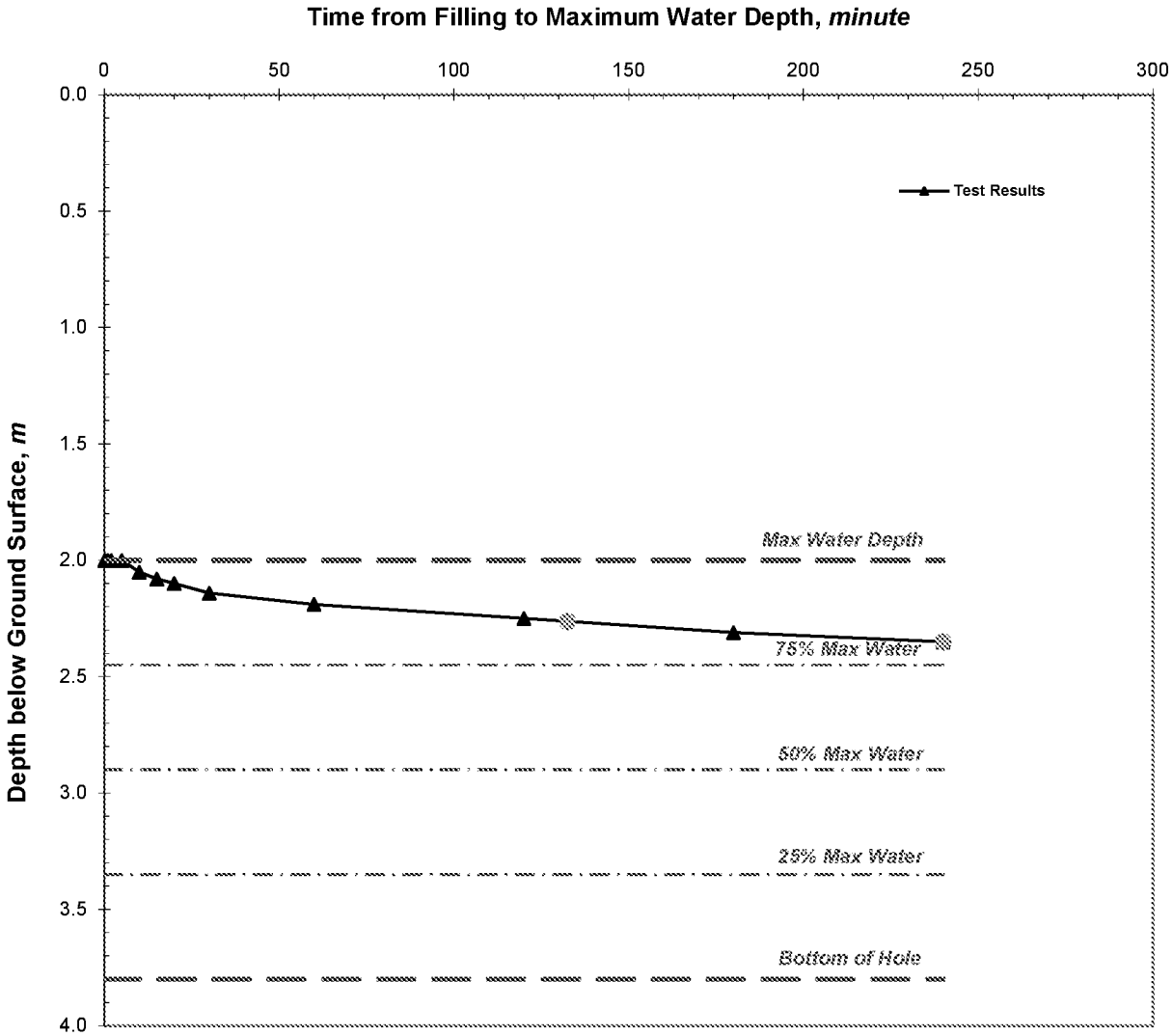
Comments:

Water level fell to 50% -- 25% max water depth, calculations were based on actual fall of water level achieved.
Result not compliant with BRE365 requirement since water did not fall to 25% max water depth.

Client: Worthing Homes	**Job No:** J15618	**Test Date:** 06/Nov/2023	
Site: Land to the South of Toddington Lane	**Tested By:** JB	**Engineer:** JC	**Fig. S5**

BRE Digest DG365 Soakage Test

Test Hole No: TP02
Test No: Test No 1 (Initial)



Pit Length, m	2.400	Depth to Water at Start of Test, *m*	2.000
Pit Width, m	0.450	Max Water Dropdown during Test, *m*	0.350
Depth to Pit Base, m	3.800	Total Soakage Test Time, *min*	240.0
Depth to Top of Permeable Soils, *m*		Mean Internal Discharge Area, m^2	9.594
Depth to Groundwater Surface, *m*		Discharge Rate, *litre/min*	0.879
Depth to Top of Granular Fill, *m*		Soakage Rate, $litre/m^2/min$	**0.092**
Voids Assumed for Granular Fill, %	100%	BRE Soil Infiltration Rate, *m/sec*	**1.53E-06**

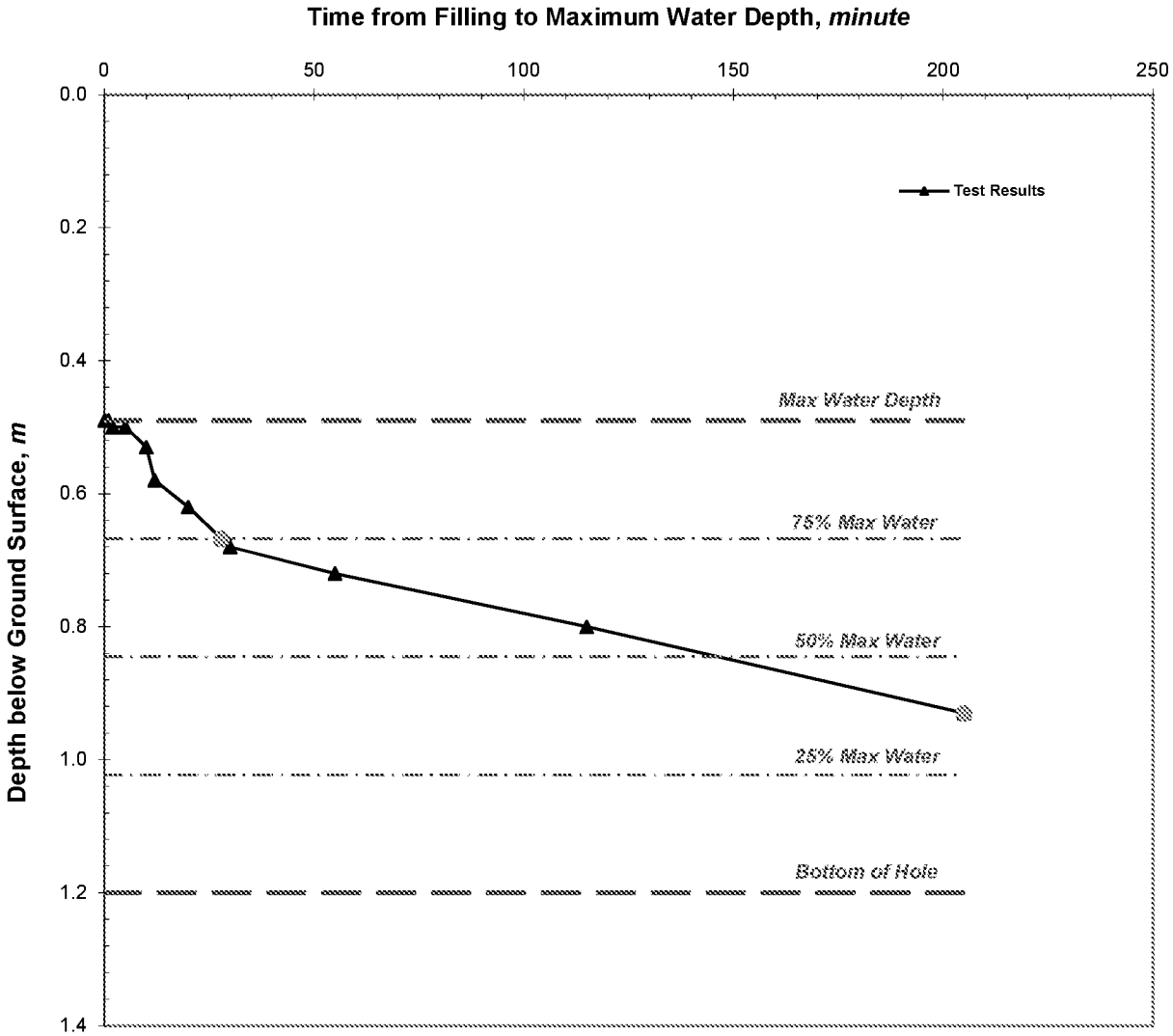
Comments:

Water level did not fall to 75% max water depth, calculations were based on actual fall of water level achieved.
Result not compliant with BRE365 requirement since water did not fall to 25% max water depth.

Client: Worthing Homes	**Job No:** J15618	**Test Date:** 06/Nov/2023	
Site: Land to the South of Toddington Lane	**Tested By:** JB	**Engineer:** JC	**Fig. S2**

BRE Digest DG365 Soakage Test

Test Hole No: TP02A
Test No: Test No 1 (Initial)



Pit Length, m	1.200	Depth to Water at Start of Test, *m*	0.490
Pit Width, m	0.450	Max Water Dropdown during Test, *m*	0.440
Depth to Pit Base, m	1.200	Total Soakage Test Time, *min*	205.0
Depth to Top of Permeable Soils, *m*		Mean Internal Discharge Area, m^2	1.864
Depth to Groundwater Surface, *m*		Discharge Rate, *litre/min*	0.800
Depth to Top of Granular Fill, *m*		Soakage Rate, $litre/m^2/min$	**0.429**
Voids Assumed for Granular Fill, %	100%	BRE Soil Infiltration Rate, *m/sec*	**7.16E-06**

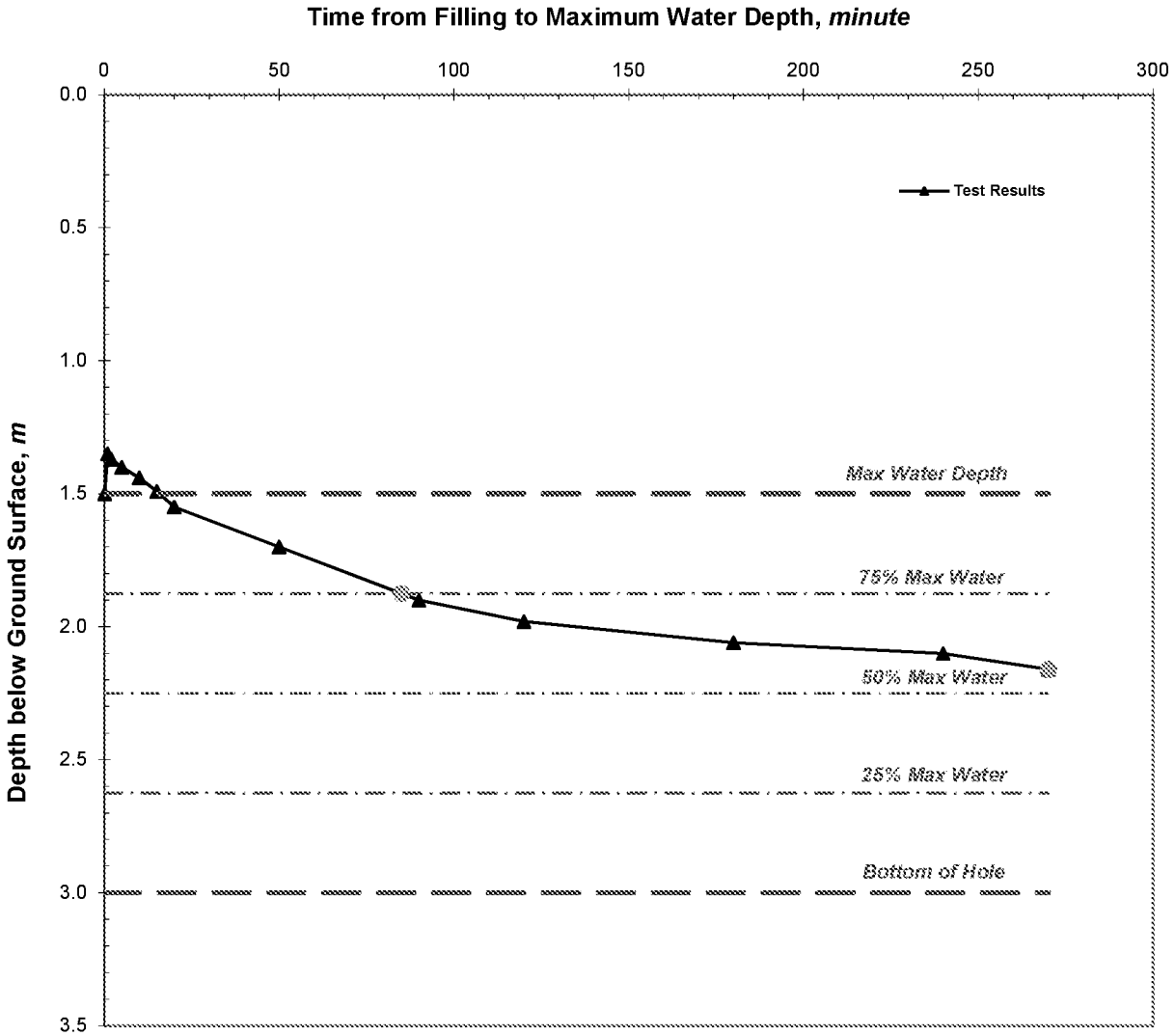
Comments:

Water level fell to 50% -- 25% max water depth, calculations were based on actual fall of water level achieved.
Result not compliant with BRE365 requirement since water did not fall to 25% max water depth.

Client: Worthing Homes	**Job No:** J15618	**Test Date:** 06/Nov/2023	
Site: Land to the South of Toddington Lane	**Tested By:** JB	**Engineer:** JC	**Fig. S3**

BRE Digest DG365 Soakage Test

Test Hole No: TP03
Test No: Test No 1 (Initial)



Pit Length, m	2.700	Depth to Water at Start of Test, *m*	1.500
Pit Width, m	0.450	Max Water Dropdown during Test, *m*	0.660
Depth to Pit Base, m	3.000	Total Soakage Test Time, *min*	270.0
Depth to Top of Permeable Soils, *m*		Mean Internal Discharge Area, m^2	7.405
Depth to Groundwater Surface, *m*		Discharge Rate, *litre/min*	1.872
Depth to Top of Granular Fill, *m*		Soakage Rate, *litre/m^2/min*	**0.253**
Voids Assumed for Granular Fill, %	100%	BRE Soil Infiltration Rate, *m/sec*	**4.21E-06**

Comments:

Water level fell to 75% -- 50% max water depth, calculations were based on actual fall of water level achieved.
Result not compliant with BRE365 requirement since water did not fall to 25% max water depth.

Client: Worthing Homes	**Job No:** J15618	**Test Date:** 06/Nov/2023	
Site: Land to the South of Toddington Lane	**Tested By:** JB	**Engineer:** JC	**Fig. S1**

Southern Testing
Environmental & Geotechnical

ST Consult
Environmental & Geotechnical

Head Office
East Grinstead

ST Consult Midlands
Northampton

ST Consult Thames Valley
Hannington

ST Consult North West
Warrington