

Alex Nicholls

BoKlok Housing Ltd
Maple Cross House Denham Way,
Maple Cross,
Rickmansworth,
WD3 9SW
United Kingdom



20th September 2021

Our ref. MW/21/LP2688

Re: LP2688 Elmgrove Road, Littlehampton - Additional Infiltration Testing

Dear Alex,

1 Introduction

Leap Environmental Ltd (hereafter referred to as LEAP) was appointed by BoKlok Housing Ltd to undertake an additional investigation and testing of the ground at land off Elmgrove Road, Littlehampton, BN17 6AH. This was as per purchase order reference number PO-0603 dated 11 Aug 2021.

2 Development Plans

The proposed development comprises 80 No. modular residential dwellings and an apartment block consisting of 32 No. residential units. Residential houses include private rear gardens and there are two areas of public open space, one adjacent to the apartments (POS1) and one in the centre of the site (POS2). The development layout is shown in drawing ref LTH-ECE-ZZ-ZZ-SK-A-SL-5000 Rev P09, Appendix B.

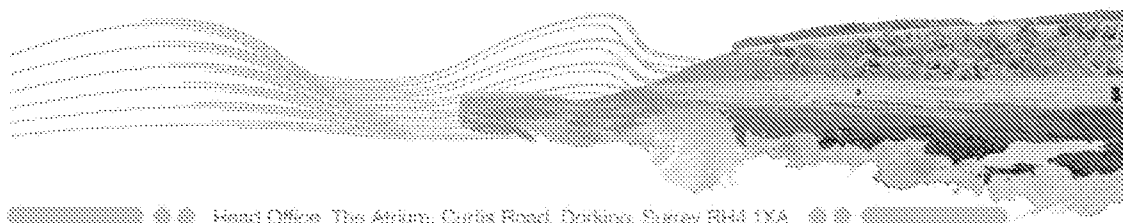
3 Objectives

The purpose of the additional ground investigation was to:

- Provide further detail on infiltration rates at different depths across the site to inform soakaway and permeable paving design; and
- Determine geotechnical properties in a number of locations adjacent to infiltration test locations via cone penetrometer testing (CPT) and geotechnical laboratory analysis on selected samples.

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4 Previous Reports

The site has been subjected to the following reporting by LEAP and others:

- LEAP Environmental Ltd, *Phase I Desk Study, Site Reconnaissance and Phase II Site Investigation Report at Land west of Elmgrove Road, Littlehampton BN17 6LT* Ref. LP2265 dated July 2020
- LEAP Environmental Ltd, *CBR Testing – Letter Report at Land west of Elmgrove Road, Littlehampton BN17 6LT* Ref. LP2265 dated September 2020
- LEAP Environmental Ltd, *Soakage Tests – Letter Report at Land west of Elmgrove Road, Littlehampton BN17 6LT* Ref. LP2466soakage dated February 2021
- LEAP Environmental Ltd, *Additional Investigation and Testing – Letter Report at Land west of Elmgrove Road, Littlehampton BN17 6LT* Ref. LP2466v2 dated March 2021
- LEAP Environmental Ltd, *Remediation Method Statement at Land west of Elmgrove Road, Littlehampton BN17 6LT* Ref. LP2466 dated March 2021
- LEAP Environmental Ltd, *Ground Gas Risk Assessment – Letter Report at Land west of Elmgrove Road, Littlehampton BN17 6LT* Ref. LP2466/GRA dated April 2021

5 Background

A summary of the site description, layout and its historical uses is provided in Table 1. Further information can be found in the reports listed in Section 4.

Table 1: Summary of the site setting and its history

Subject	Details
Site Location	West of Elmgrove Road, Littlehampton, BN17 6AH
Site Usage	• Derelict land overgrown with scrub vegetation • Two large stockpiles of material are present in the west and south of the site.
Site Area	2.56 ha Roughly rectangular-shaped
Topography and Elevation	The site is a largely level, with a slight downwards incline from west to east and south to north (excluding the stockpiles). The western boundary is at approximately 8.2 m AOD and the eastern boundary at approximately 7.5 m AOD.
Surrounding Area	The site is situated in a predominantly residential area. The immediate surrounding land uses are as follows: • North: The Littlehampton Academy (Secondary School). • South: Rosemead park with housing beyond. • Southeast: Residential housing.

Subject	Details
	- East: Littlehampton Day Nursery with housing beyond. - West: Fitzalan Link Road and housing beyond.
Site History	- Boundaries cover three rectangular shaped fields from maps dating 1876 to 1958. - Secondary school and infants school mapped across the central and eastern parts of the site from 1959 to 1968 - Additional infants school mapped in the northwest of the site from 1970 - A bund is mapped in the west of the site from 1980 - Aerial imagery shows that the school buildings are demolished from 2012-2013 - Stockpiles in the west and south of the site present on aerial imagery from 2015.
Mapped Geology	- Superficial – River Terrace Deposits - Bedrock – Lewes Nodular Chalk Formation, Seaford Chalk Formation, Newhaven Chalk Formation, Culver Chalk Formation and Portsdown Chalk Formation (Undifferentiated)
Hydrogeology	- Superficial – Secondary A Aquifer - Bedrock – Principal Aquifer - The site is not mapped within a groundwater potable water supply source protection zone
Unexploded Ordnance (UXO)	Moderate potential for UXO to be present on site.

6 Fieldwork

6.1 Methodology

The trial pits were carried out between 19th to 23rd August 2021, the soakage tests were carried between 23rd August and 27th August 2021 and the cone penetrometer tests were undertaken on the 15th September 2021. The works included the following tasks:

- 12 No. 4m deep machine excavated trial pits for infiltration testing to BRE DG365 (3 fills);
- 8 No. shallow infiltration tests for permeable paving – excavated to sand (circa 1.5mbgl);
- 12 No. machine mounted cone penetrometer tests adjacent to deep trial pits
- Limited geotechnical testing on chalk samples from the deep trial pits.

The weather during the fieldwork was predominantly dry and warm.

A site plan for the location of each excavation is presented in Figure 2 of Appendix B.

7 Geology

The excavated trial pits were logged and samples were collected. The logs created for each trial hole from all phases of investigation are presented in the Appendix C. In summary the ground encountered was Topsoil, over made ground over clay, over sand over chalk.

Table 2: Summary of trial hole logs

Depth to (mBGL)	Depth to (mBGL)	Geology	Description
GL	0.02-0.4	Topsoil	Dark brown silty sandy slightly clayey sometimes gravelly TOPSOIL, often with roots and rootlets. Gravel, where encountered, comprised brick, blacktop, flint, and rare clinker.
GL/0.15	0.25/2.5	Made Ground	MADE GROUND comprising brown to reddish brown varying mixtures of clay, silt, sand, gravel, cobbles, and rare boulders. Gravel and cobbles include brick, rounded to angular flint, concrete, and occasional blacktop, whole bricks, glass, clay pipes, re-bar, metal, tile fragments and slate. Boulders include concrete and parts of old brick structures.
GL/2.15	0.7/5.2	CLAY (silty/sandy/gravelly)	Firm to stiff reddish to orangish brown sandy, sometimes silty and/or gravelly CLAY. Gravel is rare fine to cobble-sized sub-angular to rounded flint.
0.1/3.0	1.9/4.1	SAND (clayey/silty/gravelly)	Loose to Dense reddish to orangish brown occasionally clayey/silty/gravelly fine to coarse SAND. Gravel is medium to cobble-sized angular to rounded flint.
2.4 / 5.2	3.0* / 6.0	CHALK	Highly weathered off-white mottled pale orange CHALK recovered as gravelly silt (and silty gravel with depth). Gravel is fine to coarse low to medium density chalk and occasional coarse rounded flint. Encountered in VS2 – 5, BH07, BH08 DTP2, DTP10 and DTP11 only.

The findings were consistent with the findings of earlier ground investigations, although it was noted that in DTP2 and DTP9 the shallow clay soils were absent. In DTP1 and DTP8 interbedded sand and clay layers were recorded from 2.20 m to 3.40 m and 1.90 m to 2.60 m, respectively. Deep made ground – presumably from a relict foundation - was encountered in DTP7 to 2.60 m bgl and the trial pit was relocated to the west by ~3.0 m.

Groundwater was not encountered within any of the trial hole locations during this phase of investigation. A summary of groundwater strikes and groundwater monitoring records

encountered previously can be found in LP2466 listed in Section 4.0, above, but in summary standing water levels were identified at depths of around 4.3 to 5.8m below ground level in the deeper wells. As per the local authority's request, the testing here was designed to be above the highest recorded groundwater level (i.e. 4m max depth).

During the recent investigation a number of additional obstructions and / or services were identified. A summary of the obstruction encountering during all phases of investigation is provided in the table below:

Table 3: Summary of obstructions and services encountered

Job Number	Trial Hole ID	Depth of Obstruction/Service	Comments
LP2265	TP6	0.7	Concrete
	TP8	0.5	Electrical cable
	WS1A	0.3	Concrete
	WS1B	0.35	Concrete
	WS1C	0.3	Concrete
LP2466	FP1	1.5	Concrete – possibly BT or UKPN
	FP3	1.1	Possible relict concrete pad footing (0.7x0.7x0.3m)
	TP206	0.3-0.45	Shingle on northern side of pit
	TP207	0.25	Electrical cable warning tape
	TP215	0.4	Concrete
	TP216	0.3	Dead electrical cable
	TP221	0.4	Electrical cable warning tape
	TP227	0.3	E-W oriented plastic pipe at 0.3m (50mm thick)
	TP229	0.5	Dead electric cable (oriented E-W)
LP2688	DTP7A	0.9-1.1	Concrete slab on southern face of trial pit
	DTP12	1.3	Yellow pipe encountered on eastern face of trial pit
	TP301	0.7	Plastic pipe / service duct
	TP303	0.3	Manhole / inspection chamber uncovered on northern face of trial pit

8 Geotechnical Testing Results

During this phase of investigation, geotechnical field tests were undertaken comprising perth penetrometer tests in the trial pits. Vehicle mounted cone penetrometer tests were also undertaken adjacent to the deep trial pits. SPT tests were also undertaken in the boreholes during the previous investigations by LEAP and Wilson Bailey.

The results are summarised in the table below.

Table 4: Summary of in-situ geotechnical test results

Stratum	Test Type	Range of Values including results from previous investigations
Clay	SPT 'N' Value	5 – 28
	Unconfined Compressive Strength (kPa)*	90– 580
Sand	SPT 'N' Value	5 ^{^^} – 37
Chalk	SPT 'N' Value	3 ^{^^} – 47

*Measured using a hand penetrometer ^^ interpolated from vehicle mounted CPT rig results

SPT 'N' values of 5 - 28 were recorded in the clays, indicative of firm to stiff soils. 'N' values of 5 – 37 were recorded in the sands, consistent with a variable loose to dense soil. Loose sands were encountered in WS3 between 3 and 4m and WS5 at 2m, both located near the site's eastern boundary, and at various locations across the site in the CPT results around 2-3m bgl.

The upper surface of the chalk, encountered around 2.5 to 5m bgl, was often found to be heavily weathered (SPT N equivalents of 3 in many of the CPT results), but quickly increasing in strength with depth.

The results of the geotechnical laboratory testing completed on the chalk gave saturated moisture contents in the range 16-20%, corresponding to intact dry densities of 1.75-1.88 Mg/m³ indicating that the chalk tested in the laboratory was of high density, although it is inferred from the CPT results that some low density chalk is also present at its upper surface.

9 Soakage Potential

9.1 Test Results

11 No. soakage tests were undertaken in the deep trial pits and 9 No in the shallow trial pits in accordance with BRE365¹. Three tests were undertaken in each location. The results are attached in Appendix D and are summarised in the tables below:

¹ Building Research Establishment DG365: 2016. Digest Soakaway Design

Table 5: Summary of deep soakage tests

Test Location	Design Soakage Rate per location ^A (m/s)	Depth of water at start (m bgl)	Comments
DTP1	7.97E-06	2.00-2.34	Test undertaken within interbedded SAND/CLAY and SAND
DTP2	1.11E-06	2.00-2.55	Test undertaken within SAND/CHALK
DTP3	1.01E-06	2.00-2.20	Test undertaken within CLAY/SAND
DTP4	2.45E-07	1.97-2.05	Test undertaken within SAND/CLAY
DTP5	1.78E-07	2.01-2.10	Test undertaken within SAND/CLAY
DTP6	1.70E-06	2.24-2.47	Test undertaken within silty SAND
DTP7A	1.44E-06	2.07-2.25	Test undertaken within silty SAND
DTP8	1.17E-04	2.31-3.10	Test undertaken within CLAY/SAND
DTP9	1.41E-06	2.20-2.25	Test undertaken within silty SAND
DTP10	7.24E-06	2.20-2.35	Test undertaken within SAND/CHALK
DTP11	8.91E-05	2.79-2.98	Test undertaken within SAND/CHALK
DTP12A	1.11E-06	1.80-2.26	Test undertaken within CLAY/SAND

^Alowest of the three tests

The tests results overall were poor with the only utilisable results obtained in a localised part of the east of the site (DTP 7A, 8 and 10) where the infiltration results ranged from 1.44E-06 to 1.17E-04 m/sec.

Table 6: Summary of shallow soakage tests

Test Location	Design Soakage Rate ^A (m/s)	Depth of water at start (m bgl)	Comments
TP302	3.69E-07	0.30-0.84	Test undertaken within sandy CLAY
TP304	1.09E-06	0.67-1.00	Test undertaken within clayey SAND
TP305	1.21E-06	0.50-1.10	Test undertaken within CLAY/ SAND
TP306	3.85E-06	0.89-1.30	Test undertaken within sandy CLAY
TP307	1.03E-06	0.80	Test undertaken within CLAY/SAND
TP308	1.14E-06	0.80-1.20	Test undertaken within CLAY/SAND
TP309	7.38E-05	0.80	Test undertaken within sandy CLAY

^Alowest of the three tests

As might be expected, given the shallower test depths, the results were generally lower than for the deep tests, with the utilisable results localised to the centre and east of the site.

10 Conclusions and Recommendations

The most recent round of detailed infiltration tests of the shallow and deeper soils and associated soil strength tests have produced a wide range of results which generally correspond with the findings of previous investigations in that soakaway drainage is not feasible for much of the site.

Loose sandy soils were encountered, notably in the east (corresponding to the findings of previous windowless sampler boreholes in this area). Some of the upper surface of the chalk from across the site was also encountered as very weak chalk, although the depth of the weak soils was found to be limited. On the basis of this, and the higher density soils found in limited geotechnical laboratory tests, chalk solution features are not considered to be prevalent across the site. However, locally loose soils pervade – notably in the east - and pockets of deep made ground are also present (presumed to be the result of relict foundations) – e.g. DTP7.

In summary, the shallow tests, undertaken along the lines of the proposed roads, had to be extended to at least 1.5m below ground level in order to penetrate the near surface superficial clays and discharge in to the underlying sandier soils. The acceptable results at this depth were limited to the area of the central loop road (TP305 and 306) for which a design rate of 2.5E-06 m/sec can be utilised, and the eastern side of the site (TP307, 308 and 309) for which a design rate of 2.0E-6 m/sec can be utilised.

It is noted, however, that the depth required to achieve that rate does not correspond with a traditional permeable paving design. These drains would need to be linked system, draining over a dispersed area, in order to limit settlement due to chalk solutioning although localised settlement may occur in loose soils.

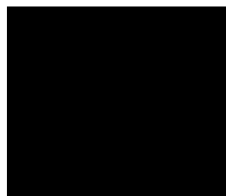
For the deeper tests, the only reliably utilisable results came from sands in the eastern side of the site. However, these soils are locally loose, with a variable clay content and limited in lateral extent. As such, they should be considered to be a limited resource from an infiltration point of view and discharge rates limited to reduce the risk of settlement and over-utilisation of the limited extent of permeable soils. At this stage, a design rate of 1.7E-05 m/sec should be used for soakaways limited to the area of DTP07, 08 and 10 (that being the average of the two successful results from DTP7A and a reasonable allowance for the area as a whole noting the above limitations). As with the shallow tests, allowance should be made for surface settlement and for a trench system rather than discrete chambers in order to accommodate the soil variability. The previous recommendation for a 10m offset from structures (based on CIRIA C574 for a low density chalk) should be adhered to as discharges will be at, or very near to, the top of the chalk.

Soakage into any made ground should be completely avoided. Regulatory consent will be required for any soakaway drainage scheme, noting in particular the lack of unsaturated zone beneath the lowest discharge level.

Finally, it should be noted that all tests have been undertaken in summer, following a generally dry period, and whilst the tests have been set to sit above the previous winter high groundwater level, it should be assumed that winter infiltration rates could be lower and / or storage further limited by higher groundwater conditions.

Please do not hesitate to contact the undersigned if you require any further information.

Yours faithfully,



Richard Brinkworth

Enc.

Appendix A - Limitations

Appendix B – Site Plans

Appendix C – Trial Pit and CPT records

Appendix D – Infiltration Test Results

Appendix E – Geotechnical Test Results

This letter report has been prepared by Leap Environmental Ltd on the basis of information received from a variety of sources which Leap Environmental Ltd believes to be accurate. Nevertheless, Leap Environmental Ltd cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.

Leap Environmental Ltd has used all reasonable skill, care and diligence in the design and execution of this report, taking into account the manpower and resources devoted to it in agreement with the Client. Although every reasonable effort has been made to obtain all relevant information, all potential contamination, environmental constraints or liabilities associated with the site may not necessarily have been revealed.

This report is generally consistent with the Eurocode requirements for a Ground Investigation Report, noting the limitations on brief to provision of pile design information only. However, the laboratory testing has been carried out on samples which do not comply with the Eurocode classifications as identified in tables 2 and 3 of EN ISO 22475-1. This report should not be deemed as a Geotechnical Design Report, and where any calculations have been made, these are not Eurocode compliant and are for indicative purposes only.

The conclusions reached in this report are necessarily restricted to those which can be determined from the information consulted, and may be subject to amendment in the light of additional information becoming available. These conclusions may not be appropriate for alternative schemes.

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This report is confidential to the Client, and Leap Environmental Ltd accepts no responsibility whatsoever to third parties to whom this report, or any part thereof, is made known, unless formally agreed by Leap Environmental Ltd beforehand. Any such party relies upon the report at their own risk.

APPENDIX A - LIMITATIONS

Limitations

LIMITATIONS

This report is confidential to the Client, and Leap Environmental Ltd accepts no responsibility whatsoever to third parties to whom this report, or any part thereof, is made known, unless formally agreed by Leap Environmental Ltd beforehand. Any such party relies upon the report at their own risk. Unless explicitly agreed otherwise in writing, this report has been prepared under LEAP's standard terms and conditions, as included in the quotation for this works.

This report has been prepared by Leap Environmental Ltd on the basis of information received from a variety of sources which Leap Environmental Ltd believes to be accurate. Nevertheless, Leap Environmental Ltd cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.

Leap Environmental Ltd has used all reasonable skill, care and diligence in the design and execution of this report, taking into account the manpower and resources devoted to it in agreement with the Client. Although every reasonable effort has been made to obtain all relevant information, all potential contamination, environmental constraints or liabilities associated with the site may not necessarily have been revealed. LEAP cannot be held responsible for any disclosures or changes in regulation that are provided post production of this report, and will not automatically update the report.

The conclusions reached in this report are necessarily restricted to those which can be determined from the information consulted, and may be subject to amendment in the light of additional information becoming available. These conclusions may not be appropriate for alternative schemes.

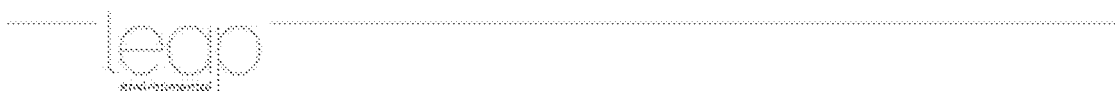
The extent of the exploratory holes, laboratory testing and monitoring undertaken may have been restricted due to a number of factors including accessibility, the presence of buried or overhead services, current development and site usage, timescales or clients specification. The exploratory holes only assess a small proportion of the site area with respect to the site as a whole, and as such may only provide an overall assessment of ground conditions on site. The presence of hotspots of undisclosed contamination or exceptional and unforeseen ground conditions cannot be discounted.

Eurocode 7 gives guidance on the type of sampling, sample quality, number and spacing of intrusive investigations, and number of laboratory tests required. It is intended that the Geotechnical Information section of this report will fulfil the general requirements of the Ground Investigation Report as set out in section 6 of Eurocode², although this is subject to the restrictions imposed on the investigation as listed above. For geotechnical design, Eurocode 7 requires the Geotechnical Design Report to address both the geotechnical and

² BS EN 1997 Eurocode 7- Geotechnical Design - Part 1: General Rules (2004) and Part 2: Ground Investigation and Testing (2007)

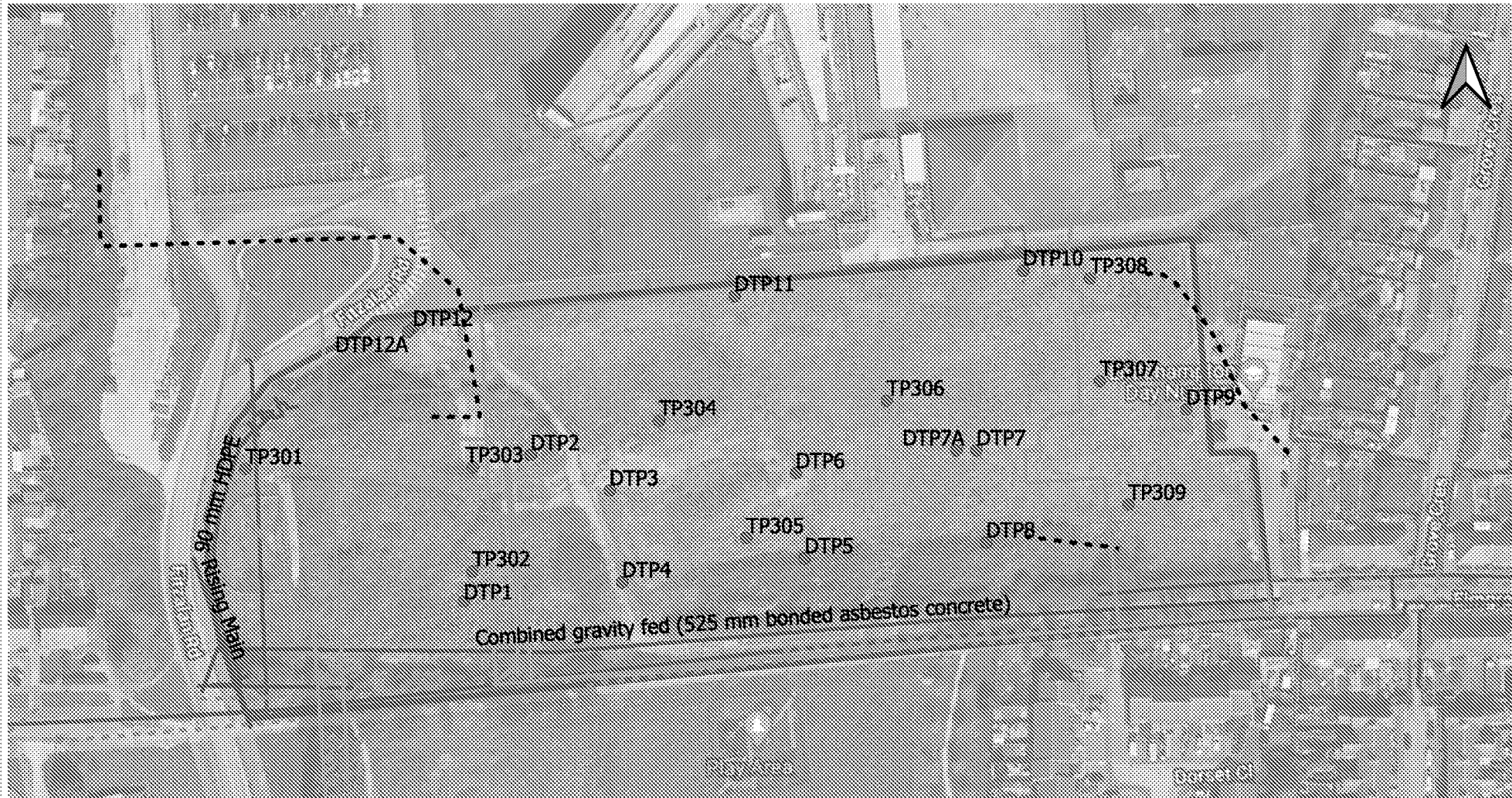
structural aspects of the geotechnical design for both the limit and serviceability states. The Geotechnical Appraisal section of this report will not meet the requirements of a Geotechnical Design Report (GDR), and should therefore be used for preliminary guidance only.

The presence of asbestos may be noted during the site walkover survey, intrusive investigations and/or from the results of contamination testing. However, this report does not constitute an asbestos survey. On this basis, the presence of asbestos on site cannot be discounted and a full asbestos survey should be undertaken.



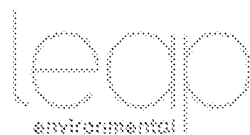
APPENDIX B - FIGURES

Figures



Basemap: © OpenStreetMapcontributors

 Site boundary



Client: BoKlok Housing Ltd

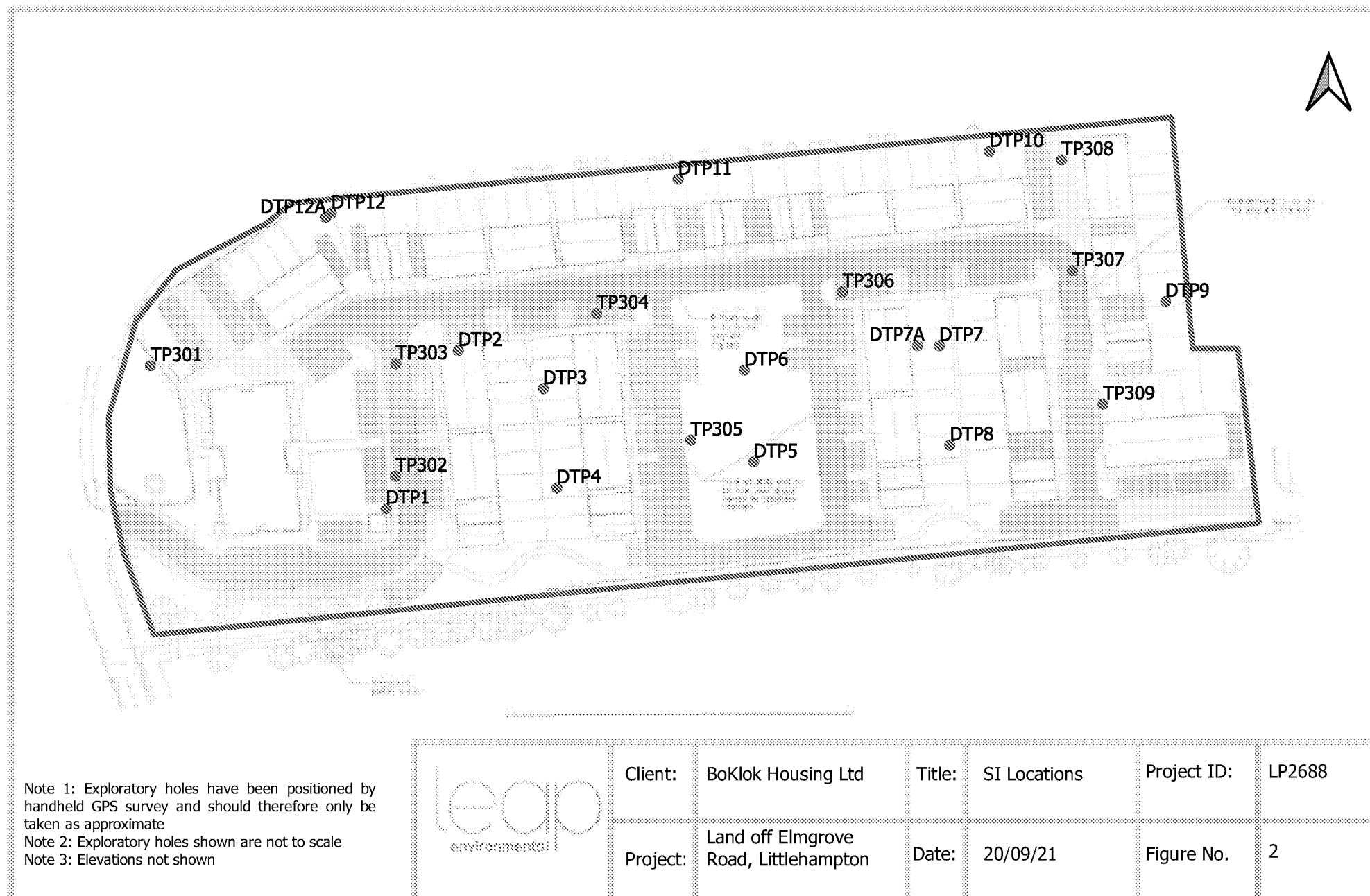
Title: Site Location Plan

Project ID: LP2688

Project: Land off Elmgrove Road, Littlehampton

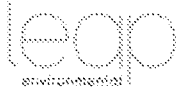
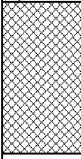
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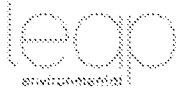
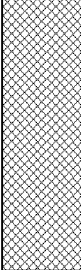
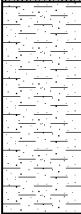
Figure No. 1



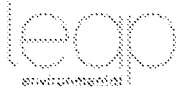
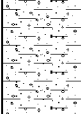
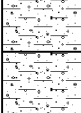
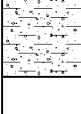
APPENDIX C – TRIAL HOLE AND CPT LOGS

Trial Hole and
CPT Logs

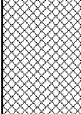
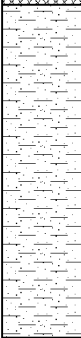
 Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA www.leapenvironmental.com				Trial Pit Log				Trialpit No TP301 Sheet 1 of 1	
Project Name: Elmgrove Road, Littlehampton				Project No. LP2688		Co-ords: - Level:		Date	
Location: Elmgrove Road, Littlehampton						Dimensions (m):		Scale 1:25	
Client: Boklok						Depth 1.00		Logged ADC	
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
				0.30			Concrete with rebar.		
				0.80			MADE GROUND blacktop gravel and plastic pipe/ services duct noted at 0.7m.		
							End of pit at 1.00 m		
							1		
							2		
							3		
							4		
							5		
Remarks: Pit terminated at 0.8m bgl due to pea shingle.									
Stability:									

 Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA www.leapenvironmental.com				Trial Pit Log				Trialpit No TP302 Sheet 1 of 1	
Project Name: Elmgrove Road, Littlehampton				Project No. LP2688		Co-ords: - Level:		Date	
Location: Elmgrove Road, Littlehampton						Dimensions (m):		Scale 1:25	
Client: Boklok						Depth 1.60		Logged ADC	
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
				0.90			Grass over brown gravelly sandy clayey MADE GROUND.		
				1.60			Firm orange brown sandy CLAY, sand is fine to medium grained.		
							End of pit at 1.60 m		
1 2 3 4 5									
Remarks: Trial pit remained dry and stable. Pit was backfilled with 20mm shingle and a 110mm monitoring pipe.									
Stability:									

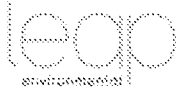


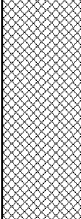
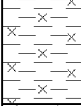
 Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA www.leapenvironmental.com				Trial Pit Log				Trialpit No TP305 Sheet 1 of 1	
Project Name: Elmgrove Road, Littlehampton				Project No. LP2688		Co-ords: - Level:		Date	
Location: Elmgrove Road, Littlehampton						Dimensions (m):		Scale 1:25	
Client: Boklok						Depth 1.50		Logged AU	
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
			N=26	0.40			Grass over light brown silty sandy clayey gravelly reworked TOPSOIL. Gravel is brick red, concrete and medium coarse rounded flints.		
							Firm orange brown sandy gravelly CLAY. Gravel of fine to coarse flints.		
				1.00			Dense orange brown clayey slightly gravelly SAND. Gravel is fine to coarse rounded to angular flints. <i>Hand Pen at 0.8m = 230kPa</i> <i>Hand Pen at 1.1m = 130kPa</i>		
				1.50			End of pit at 1.50 m		
Remarks: 1 Stability: 2 3 4 5									



 Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA www.leapenvironmental.com				Trial Pit Log			Trialpit No TP306 Sheet 1 of 1		
Project Name: Elmgrove Road, Littlehampton				Project No. LP2688		Co-ords: - Level:		Date	
Location: Elmgrove Road, Littlehampton						Dimensions (m):		Scale 1:25	
Client: Boklok						Depth 1.70		Logged ADC	
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
				0.15			Grass over brown to orange brown slightly gravelly silty sandy TOPSOIL. Gravel is fine to medium brick and concrete. Brown mottled off white gravelly clayey MADE GROUND. Grave is flint, brick and concrete.		
				0.60					
				1.70			Firm orange brown slightly silty sandy CLAY with fine grained sand.		
							End of pit at 1.70 m		
Remarks: Trial pit remained dry and stable. Pit was backfilled with 20mm shingle and a 110mm monitoring pipe.									
Stability:									



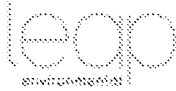
 Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA www.leapenvironmental.com				Trial Pit Log				Trialpit No TP307 Sheet 1 of 1	
Project Name: Elmgrove Road, Littlehampton				Project No. LP2688		Co-ords: - Level:		Date	
Location: Elmgrove Road, Littlehampton						Dimensions (m): Depth 1.60		Scale 1:25 Logged ADC	
Client: Boklok									

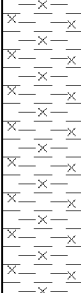
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.25			Grass over brown reworked silty sandy clayey TOPSOIL. Gravel is fine to coarse brick, concrete and flint.	
							Brown slightly sandy gravelly clay MADE GROUND. Gravel is whole brick and concrete cobbles with medium to coarse flint, brick and concrete.	
				1.00			Firm brown slightly silty CLAY with occasional medium to coarse flint.	1
				1.35			Orangish brown slightly silty fine SAND with pockets of weekly cemented sand.	
				1.60		End of pit at 1.60 m		
								2
								3
								4
								5

Remarks: Trial pit remained dry and stable. Pit was backfilled with 20mm shingle and a 110mm monitoring pipe.

Stability:



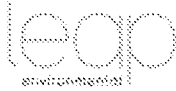
 Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA www.leapenvironmental.com				Trial Pit Log				Trialpit No TP308 Sheet 1 of 1	
Project Name: Elmgrove Road, Littlehampton				Project No. LP2688		Co-ords: - Level:		Date	
Location: Elmgrove Road, Littlehampton						Dimensions (m): Depth 1.60		Scale 1:25 Logged ADC	
Client: Boklok									

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.20			Grass over pale brown reworked TOPSOIL with gravel of whole brick, concrete and flint.	
							Firm to stiff brown silty CLAY.	1
				1.20			Orangish brown slightly silty clayey SAND. Sand is fine grained. <u>Hand Pen at 1.2m = 210kPa</u>	
				1.60			End of pit at 1.60 m	2
								3
								4
								5

Remarks: Trial pit remained dry and stable. Pit was backfilled with 20mm shingle and a 110mm monitoring pipe.

Stability:



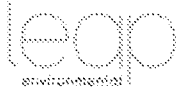
 Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA www.leapenvironmental.com				Trial Pit Log				Trialpit No TP309 Sheet 1 of 1	
Project Name: Elmgrove Road, Littlehampton				Project No. LP2688		Co-ords: - Level:		Date	
Location: Elmgrove Road, Littlehampton						Dimensions (m): Depth 1.60		Scale 1:25 Logged ADC	
Client: Boklok									

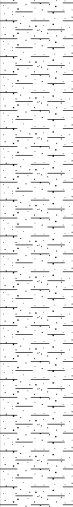
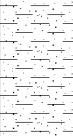
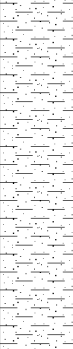
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.30			Grass over orangish brown clayey silty TOPSOIL with medium to coarse brick fragments.	1 2 3 4 5
				0.85			Orangish brown slightly gravelly slightly silty clay MADE GROUND. Gravel s occasional medium brick.	
				1.40			Firm brown slightly silty slightly sandy CLAY.	
				1.60			Orange fine sand with pockets of sandy CLAY.	
						End of pit at 1.60 m		

Remarks: Trial pit remained dry and stable. Pit was backfilled with 20mm shingle and a 110mm monitoring pipe.

Stability:



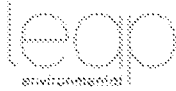
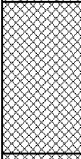
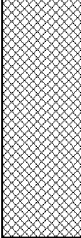
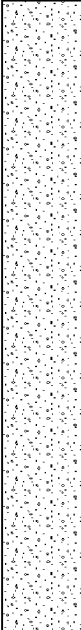
 Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA www.leapenvironmental.com				Trial Pit Log				Trialpit No DTP1 Sheet 1 of 1	
Project Name: Elmgrove Road, Littlehampton				Project No. LP2688		Co-ords: - Level:		Date	
Location: Elmgrove Road, Littlehampton						Dimensions (m): Depth 4.00		Scale 1:25 Logged ADC	
Client: Boklok									

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
			N=14	1.70			Grass over brown slightly silty slightly sandy CLAY.	1
				2.20			Firm to stiff fine laminated yellowish brown slightly sandy silty CLAY.	2
				3.40			Interbedded yellow brown sandy CLAY and clayey SAND with occasional medium to coarse sub rounded flints.	3
				4.00			Dark orange brown fine clayey SAND with rare coarse sub rounded flint and rare coarse low density chalk clast gravel below 3.8m.	4
							End of pit at 4.00 m	5

Remarks: Trial pit remained dry and stable. Pit was backfilled with 20mm shingle and a 110mm monitoring pipe.

Stability:



 Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA www.leapenvironmental.com				Trial Pit Log				Trialpit No DTP2 Sheet 1 of 1	
Project Name: Elmgrove Road, Littlehampton				Project No. LP2688		Co-ords: - Level:		Date	
Location: Elmgrove Road, Littlehampton						Dimensions (m): Depth 4.00		Scale 1:25 Logged ADC	
Client: Boklok									
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
				0.30			Grass over brown silty TOPSOIL.		
				0.80			Brown reworked silty clay MADE GROUND with occasional brick.		
				1.60			Brown reworked silty clay MADE GROUND.		
				3.70			Orange slightly gravelly fine to medium grained SAND with gravel of fine to medium flint, becoming slightly clayey below 2.5m		
				4.00			Off white mottled orange low density CHALK recovered as silty sandy gravel of chalk. Gravel is fine to coarse and cobbles of sub rounded to sub angular low density chalk clasts.		
						End of pit at 4.00 m			
Remarks: Trial pit remained dry and stable. Pit was backfilled with 20mm shingle and a 110mm monitoring pipe.									
Stability:									



Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA www.leapenvironmental.com				Trial Pit Log				Trialpit No DTP3 Sheet 1 of 1	
Project Name: Elmgrove Road, Littlehampton				Project No. LP2688		Co-ords: - Level:		Date	
Location: Elmgrove Road, Littlehampton						Dimensions (m): Depth 4.00		Scale 1:25 Logged ADC	
Client: Boklok									

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
			N=12	0.50			Grass and demolition rubble over Pale brown slightly clayey gravelly sandy MADE GROUND. Gravel is medium to whole bricks medium to coarse concrete and flint.	1
				1.30			Orangish brown slightly silty CLAY with medium to coarse rounded flint.	
				2.80			Orangish slightly clayey slightly gravelly SAND. Sand is fine to medium grained, gravel is fine to medium sub angular to rounded flint with pockets of laminated silty sandy clay.	2
				3.60			Firm greenish orangish brown laminated silty sandy CLAY with occasional medium rounded flint. Hand Pen at 3m = 170kPa	3
				4.00			Orangish yellowish slightly silty slightly gravelly SAND. Gravel is fine to medium sub angular flint and sand is fine grained.	4
						----- End of pit at 4.00 m -----		5

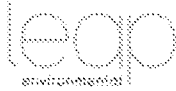
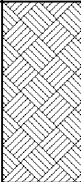
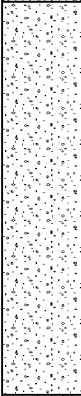
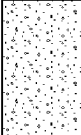
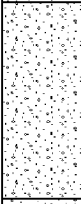
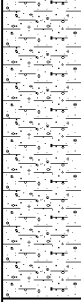
Remarks: Trial pit remained dry and stable. Pit was backfilled with 20mm shingle and a 110mm monitoring pipe.	
Stability:	

Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA www.leapenvironmental.com				Trial Pit Log				Trialpit No DTP4 Sheet 1 of 1	
Project Name: Elmgrove Road, Littlehampton				Project No. LP2688		Co-ords: - Level:		Date	
Location: Elmgrove Road, Littlehampton						Dimensions (m): Depth 4.00		Scale 1:25 Logged ADC	
Client: Boklok									

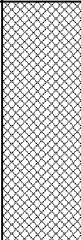
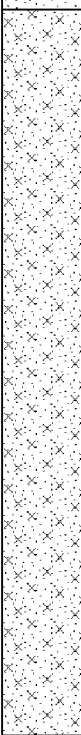
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
			N=10	0.80			Grass over orange brown sandy gravelly MADE GROUND. Gravel is whole bricks, concrete, flint glass and slate.	1
				1.30			Firm orangish brown slightly sandy slightly silty CLAY with occasional medium to coarse flint. <u>Hand Pen at 1m = 120kPa</u>	
				2.20			Orange slightly gravelly clayey SAND with pockets of sandy clay. Gravel is medium to coarse rounded flint.	2
				3.40			Orange gravelly SAND. Sand is medium grained. Gravel is medium to coarse rounded flint. <u>Hand Pen at 3m = 330kPa</u>	
				4.00			Stiff fissured greenish grey laminated slightly silty CLAY <u>Hand Pen at 3.5m = 400kPa</u>	4
						End of pit at 4.00 m		

Remarks: Minor collapses within the made ground. Trial pit remained dry. Pit was backfilled with 20mm shingle and a 110mm monitoring pipe.

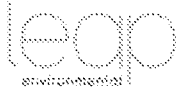
 Stability:

 Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA www.leapenvironmental.com				Trial Pit Log				Trialpit No DTP5 Sheet 1 of 1	
Project Name: Elmgrove Road, Littlehampton				Project No. LP2688		Co-ords: - Level:		Date	
Location: Elmgrove Road, Littlehampton						Dimensions (m): Depth 4.00		Scale 1:25	
Client: Boklok								Logged AU	
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
			N=44	0.60			Grass over dark brown silty gravelly reworked TOPSOIL. Gravel is medium to whole bricks and occasional fine to medium concrete and flint.		
				1.90			Firm orange and brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is occasional medium flint.		
				2.35			Stiff orange brown silty slightly gravelly CLAY. Gravel is fine to coarse angular flint. <u>Hand Pen at 2m = 130kPa</u>		
				3.00			Orange brown clayey slightly gravelly SAND. Gravel is medium to coarse occasionally cobble sized flint. Gravel increases with depth. <u>Hand Pen at 2.5m = 150kPa</u>		
				4.00			Very stiff bluish purple grey slightly gravelly CLAY. <u>Hand Pen at 3.4m = 370kPa</u> <u>Hand Pen at 3.7m = 550kPa</u>		
						End of pit at 4.00 m			
Remarks: Trial pit remained dry and stable. Pit was backfilled with 20mm shingle and a 110mm monitoring pipe.									
Stability:									

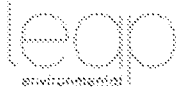
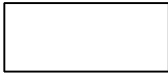
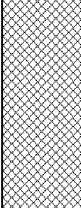


 Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA www.leapenvironmental.com				Trial Pit Log			Trialpit No DTP6 Sheet 1 of 1		
Project Name: Elmgrove Road, Littlehampton				Project No. LP2688		Co-ords: - Level:		Date	
Location: Elmgrove Road, Littlehampton						Dimensions (m):		Scale 1:25	
Client: Boklok						Depth 4.00		Logged ADC	
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
			N=26	0.80			Demolition rubble over Pale brown gravelly sandy MADE GROUND. Gravel is brick, tile, concrete, clay pipe and flint. Becoming clayey with depth.		
				1.60			Firm brown slightly silty CLAY, becoming sandy with depth.		
				4.00			Orange slightly clayey silty fine SAND.		
							End of pit at 4.00 m		
Remarks: Trial pit remained dry and stable. Pit was backfilled with 20mm shingle and a 110mm monitoring pipe.									
Stability:									

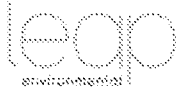


 Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA www.leapenvironmental.com				Trial Pit Log				Trialpit No DTP7 Sheet 1 of 1	
Project Name: Elmgrove Road, Littlehampton				Project No. LP2688		Co-ords: - Level:		Date	
Location: Elmgrove Road, Littlehampton						Dimensions (m):		Scale 1:25	
Client: Boklok						Depth 2.80		Logged AU	
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
							Grass over light brown silty gravelly MADE GROUND. Gravel of whole red brick, metal pipework and cobbles of concrete and occasional fine to medium flint.		
				2.60			Soft blue grey with orange mottling sandy CLAY.		
				2.80			End of pit at 2.80 m		
Remarks: Trial pit terminated at 2.8m bgl due to the depth of the made ground and the presence of services making the excavation unsuitable for soakage testing.									
Stability:									



 Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA www.leapenvironmental.com				Trial Pit Log				Trialpit No DTP7A Sheet 1 of 1	
Project Name: Elmgrove Road, Littlehampton				Project No. LP2688		Co-ords: - Level:		Date	
Location: Elmgrove Road, Littlehampton						Dimensions (m): Depth 4.00		Scale 1:25	
Client: Boklok								Logged ADC	
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
				0.20			Grass over pale brown sandy silty TOPSOIL reworked with brick and concrete fragments.		
							Brown gravelly sandy clayey MADE GROUND. Gravel is brick, concrete and flint with occasional rebar.		
				0.90			CONCRETE on south side of pit only.		
				1.10			Yellowish mottled orangish brown slightly silty SAND with occasional medium to coarse rounded to sub rounded flint. Sand is fine with rare sub rounded flint cobbles. Becomes yellow and weakly cemented below 3m.		
				4.00			End of pit at 4.00 m		
Remarks: Trial pit remained dry and stable. Pit was backfilled with 20mm shingle and a 110mm monitoring pipe.									
Stability:									



 Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA www.leapenvironmental.com				Trial Pit Log				Trialpit No DTP8 Sheet 1 of 1	
Project Name: Elmgrove Road, Littlehampton				Project No. LP2688		Co-ords: - Level:		Date	
Location: Elmgrove Road, Littlehampton						Dimensions (m): Depth 4.00		Scale 1:25 Logged ADC	
Client: Boklok									

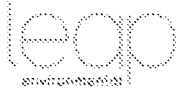
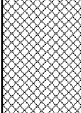
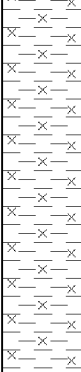
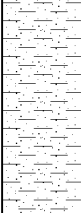
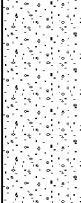
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
			N=20	0.70			Grass over pale orange brown gravelly sandy MADE GROUND. Gravel is coarse brick, tile, concrete and flint.	1
				1.90			Orange brown fine to medium SAND.	2
				2.60			Firm to stiff grey mottled orangish very sandy laminated CLAY. <i>Too friable for hand pen</i>	3
				3.00			Pale orangish silty fine SAND with abundant gravel of medium to coarse sub rounded to rounded flint.	4
				4.00			End of pit at 4.00 m	5

Remarks: Trial pit remained dry and stable. Pit was backfilled with 20mm shingle and a 110mm monitoring pipe.	
Stability:	

Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA [REDACTED] www.leapenvironmental.com				Trial Pit Log				Trialpit No DTP9 Sheet 1 of 1	
Project Name: Elmgrove Road, Littlehampton				Project No. LP2688		Co-ords: - Level:		Date	
Location: Elmgrove Road, Littlehampton						Dimensions (m): Depth 4.00		Scale 1:25 Logged ADC	
Client: Boklok									

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.15			Grass over grey brown reworked sandy silty TOPSOIL. Gravel is fine to medium chalk and flint.	1 2 3 4 5
				0.50			Reworked orange silty very sandy clay MADE GROUND with fragments of pipe and plastic bottles.	
				1.50			Orange and pale grey clayey medium grained SAND.	
				4.00			Yellowish orange fine silty SAND with rare fine to coarse flint.	
	4.00	B	N=24	4.00			End of pit at 4.00 m	

Remarks:	Slight collapse within the sand. Trial pit remained dry. Pit was backfilled with 20mm shingle and a 110mm monitoring pipe.	
Stability:		

 Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA www.leapenvironmental.com				Trial Pit Log				Trialpit No DTP10 Sheet 1 of 1	
Project Name: Elmgrove Road, Littlehampton				Project No. LP2688		Co-ords: - Level:		Date	
Location: Elmgrove Road, Littlehampton						Dimensions (m):		Scale 1:25	
Client: Boklok						Depth 4.00		Logged ADC	
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
				0.40			Grass and rubble over Pale grey sandy gravelly MADE GROUND. Gravel is medium to coarse and cobbles of brick, tile and concrete.		
			N=16	1.65			Firm orange slightly sandy very silty CLAY. <i>Hand Pen at 1m = 230kPa</i>		
				2.40			Firm orangish sandy CLAY with rare gravel. Sand is fine to medium grained and gravel fine to coarse rounded flint, with pockets of clayey sand. <i>Hand Pen at 1.8m = 210kPa</i>		
				3.10			Yellowish orange gravelly fine SAND with fine to medium sub angular flint.		
				4.00			Off white weathered structureless medium density CHALK recovered as silty gravel of chalk.		
	4.00	B				End of pit at 4.00 m			
Remarks: Minor collapses within the sands. Trial pit remained dry. Pit was backfilled with 20mm shingle and a 110mm monitoring pipe.									
Stability:									



Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA www.leapenvironmental.com				Trial Pit Log				Trialpit No DTP11 Sheet 1 of 1	
Project Name: Elmgrove Road, Littlehampton				Project No. LP2688		Co-ords: - Level:		Date	
Location: Elmgrove Road, Littlehampton						Dimensions (m): Depth 4.00		Scale 1:25 Logged ADC	
Client: Boklok									

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
			N=9				Brown sandy gravelly very silty MADE GROUND with gravel of brick, medium to coarse angular flint, occasional medium to coarse concrete and blacktop with rare chalk fragments.	1
				1.80			Light brown slightly silty slightly clayey medium to fine SAND.	2
				3.40			Light brown and white slightly silty slightly clayey slightly gravelly SAND, with gravel of fine to medium rounded to angular flint and fine to medium sub rounded to rounded low density chalk.	3
	4.00	B		3.80			Grey white low density CHALK recovered as grey white silty sandy gravel of medium to coarse and cobbles of rounded to sub rounded flint, fine to coarse sub rounded to rounded low density chalk and chalk sand.	4
				4.00			End of pit at 4.00 m	5

Remarks: Trial pit remained dry and stable. Pit was backfilled with 20mm shingle and a 110mm monitoring pipe.

Stability:

 Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA www.leapenvironmental.com				Trial Pit Log				Trialpit No DTP12 Sheet 1 of 1	
Project Name: Elmgrove Road, Littlehampton				Project No. LP2688		Co-ords: - Level:		Date	
Location: Elmgrove Road, Littlehampton						Dimensions (m): Depth 1.40		Scale 1:25 Logged ADC	
Client: Boklok									

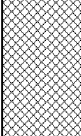
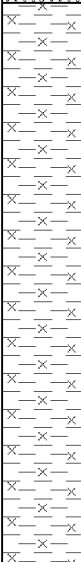
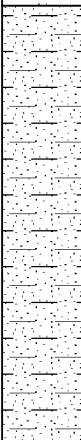
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
							Demolition rubble over pale brown sandy gravelly MADE GROUND. Gravel is fine brick, concrete and tile.	
				0.60				
				0.65			Blacktop layer.	
							Pinkish brown slightly silty sandy gravelly MADE GROUND. Gravel is medium to coarse crystalline rock	
				0.90			Firm brown very silty CLAY.	1
			N=13					
				1.40			End of pit at 1.40 m	2
								3
								4
								5

Remarks: Trial pit remained dry. Sides were collapsing within the made ground. Pit was terminated due to yellow pipe exposed in the side of the pit at 1.3m bgl.

Stability:



 Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA www.leapenvironmental.com				Trial Pit Log				Trialpit No DTP12A Sheet 1 of 1	
Project Name: Elmgrove Road, Littlehampton				Project No. LP2688		Co-ords: - Level:		Date	
Location: Elmgrove Road, Littlehampton						Dimensions (m): Depth 4.10		Scale 1:25 Logged ADC	
Client: Boklok									

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.50			Demolition rubble over brown sandy gravelly MADE GROUND. Gravel is brick, concrete, tile and flint.	
				0.70			Pinking brown silty sandy gravelly MADE GROUND. Gravel is medium to coarse crystalline rock	
							Firm brown very silty CLAY becoming orange brown and sandy below 1.7m.	1
				2.60			Orange brown slightly clayey SAND, weakly cemented below 3m.	2
				4.10			End of pit at 4.10 m	3
								4
								5

Remarks: Trial pit remained dry and stable. Pit was backfilled with 20mm shingle and a 110mm monitoring pipe.

Stability:



IN SITU

SITE INVESTIGATION

STATIC CONE PENETRATION TEST FACTUAL REPORT

CLIENT Leap Environmental
PROJECT Elmgrove Road, Littlehampton

Project	Elmgrove Road, Littlehampton
Project No.	1210450
Client	Leap Environmental
Address	LEAP Environmental, Book House, Glebelands Centre, Vincent Lane, Dorking, RH4 3HW

Attention: Mr Martin Wells

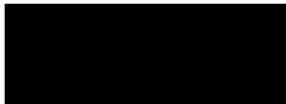
Dear Mr Wells,

We have pleasure in providing a digital copy of our report and data in AGS format for the above project.

We hope that you are satisfied with the performance of our staff, equipment and reporting on this project. If you should have any queries about any aspect of the works carried out, please do not hesitate to contact us. We look forward to being of service to you in the future.

Yours faithfully,

In Situ Site Investigation Limited



Darren Ward

Director

Report Issue

Issue	Date	Prepared	Sign	Checked	Sign	Approved	Sign
01	17/09/2021	Zoe Jeffery		Luisa Dhimitri		Darren Ward	

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1.0 INTRODUCTION

In Situ Site Investigation Limited (In Situ) was engaged in a geotechnical site investigation at Elmgrove Road at the request of Leap Environmental (the client). The site investigation consisted of completing *12 Static Piezocone Penetration Tests (CPTU)* to provide information on the soil conditions and derived geotechnical parameters at:

***Land off Elmgrove Road,
Littlehampton
BN17 6AH***

All test locations were provided by the client. A site map is included in the end of Appendix A of this report (if provided by the client). The tests were stopped when they reached the target depth as per the client's technical specifications or for other technical reasons, as detailed in the *Project Summary Table* in *Appendix A.1* and on each CPTU log included in Appendix B of this report.

The fieldwork was carried out from 15/09/2021 as per the client's request.

The work on site and the final factual reporting have been undertaken in accordance with the international technical standard *BS EN ISO 22476-1:2012*.

2.0 FIELDWORK

2.1 CONE PENETRATION TESTS

The fieldwork activity is summarised in Table 2.1.

Table 2.1 Fieldwork Summary	
CPT Operator/s	Lewis Smith
Date Started	15/09/2021
Date Finished	15/09/2021
In Situ S.I. Project Manager	Darren Ward
Main Contractor's Site Manager	Martin Wells

2.1.1 Rig Information

Details of CPTU rig used in this project are shown in Table 2.2. Full data sheet for the rigs presented in *Appendix A.2*.

Table 2.2 Rig Summary	
Rig Name	Rig Description
CPT016	22 Tonne CPT Wheel Mounted Rig

2.1.2 CPTU Cone

Details of electric CPTU cone (Type TE2) used in this project conforming to the requirements of Application Class 2 of *ISO 22476-1:2012*, are shown in Table 2.3.

Table 2.3 Cone Summary		
Number	Cross-section area	Filter position
S15-CFIP.1750	15cm ²	U ₂

A full datasheet of the cone used is shown in *Appendix A.3*.

The cone's measured parameters are shown in Table 2.4.

Table 2.4 Completed Fieldwork Summary
12 CPTU to a maximum depth of 8.59 m. Each test measured Cone Resistance, q_c , Sleeve Friction, f_s , Porewater Pressure in the shoulder position, u_2 , Inclination in X and Y axes.
<i>Provision of factual report with estimated soil type, derived geotechnical parameters & AGS datafile.</i>

2.1.3 CPTU Cone Calibration

The cone resistance and sleeve friction are recorded by calibrated load cells in the cone. The CPTU load cells and pressure transducers are regularly calibrated in line with *ISO 22476-1:2012* standard by the cone manufacturer. The cone calibration certificate for the cone used at this site are presented in *Appendix A.4*.

2.1.4 CPTU Cone Saturation

The pore water pressure is recorded using a calibrated pressure transducer located in the piezocone. To ensure pore water pressure measurements are not affected by the presence of air in the measuring transducer, a de-airing procedure is carried out prior to each test. The cone and filter are saturated using a glycerine fluid with a viscosity of 10,000CST.

2.1.5 Test Procedure

The tests are carried out in accordance with the *International Standard for Electrical Cone and Piezocone Penetration Test (ISO 22476-1:2012)*.

The final depths of the tests were determined by either completion to the specified test depth or when the maximal safe capacity of the equipment was reached. A schedule of the tests performed is shown in *Appendix A.1*, which has been compiled from the operators' daily progress reports.

The data is transmitted from the digital CPTU through an umbilical cable that runs through the push rods to the data acquisition system. Results are displayed instantaneously on the computer logging screen. The results are recorded on the computer hard disc.

The rate of penetration is kept constant at 20 mm/s $\pm$ 5 mm/s except when penetrating very dense or hard strata. Before each test is carried out zero values are taken of the cone to check if it is within calibration. At the end of each test, zero values are taken again to see if there has been any drift during the test. These values are inspected during the post processing stage. This is a quality check on the data and the testing procedure. Individual test zero values are shown on their corresponding test results in *Appendix B*.

2.1.6 In Situ Pore Pressure (u_0)

The in situ or hydrostatic pore pressure is required for the calculation of several derived parameters included in this report. For this report, the groundwater level is 5.00 m below ground surface, this was determined from water strike levels in boreholes provided by the

cleint. The in situ pore pressure (u_0) values are presented on the pore pressure plot, on *CPT Log 01*, which is included in *Appendix B*.

2.2 POSITIONING

Positioning and surveying of all investigated locations was the responsibility of the client. The site map and position of the tests are presented in *Appendix A.9*. All test coordinates are included in the summary sheet in *Appendix A.1*.

3.0 CONE PENETRATION MEASURED PARAMETERS

All measured parameters of tests carried with the CPTU cone are shown in *Appendix B* and all the information about data processing and results are given in sections 3.1, 3.2 and 3.3.

3.1 DATA PROCESSING

The measured parameters, cone end resistance, q_c , sleeve friction, f_s , porewater pressure measurements with filter in shoulder position, u_2 and inclination for x and y axis, I_x , I_y , were recorded for every 10 mm of penetration keeping a constant speed of 20 mm/s $\pm$ 5 mm/s, which may slightly change when the cone is penetrating hard strata.

The measured data from the site works is processed and presented using specialised CPT software. The interpretations on the CPTU results were carried out following the recommendations of *Lunne et al. (1997)*, *Robertson (2015)* and *BS EN ISO 22476-1:2012*. Measured parameters, mentioned in *Sections 3.2* and *3.3*, were used to derive all the geotechnical parameters, which are presented in *Chapter 4.0*. The soil behaviour type method used on this report is *Robertson et al. (1986)*, shown in *Figure 3.2*.

3.1.1 Zero Measurements

Before and after each CPTU test, zero measurements are recorded for each channel of the cone. The zero measurements are presented on the logs in *Appendix B*. This is a routine quality check carried out on site.

3.2 MEASURED PARAMETERS

3.2.1 Cone Resistance (q_c)

Cone resistance, q_c , is measured as the total force acting on the cone, divided by the projected area of the cone. The results are presented in MPa, on *CPT Log 01*, in *Appendix B*, scale 0-20 MPa with a minor scale printing on the same graph at 0-4 MPa.

3.2.2 Sleeve Friction (f_s)

Sleeve friction, f_s , is measured as the total frictional force acting on the friction sleeve divided by its surface area. The results are presented in kPa, on *CPT Log 01*, in *Appendix B*, using a scale of 0-500 kPa.

3.2.3 Porewater pressure (u_2)

The pore pressure, u_2 , is measured during the test. If the material is free draining and saturation is maintained it will normally measure hydrostatic pore pressure. In materials that are not free draining, it will record the total pore pressure (hydrostatic plus any excess pore pressures generated) created by the cone penetration through this material.

The filter element can be mounted in one of three positions. For all tests carried out in this project the filter was mounted in the u_2 position (see *Figure 3.1*).

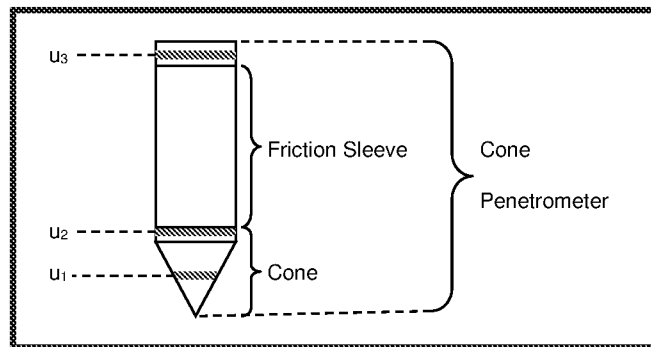


Figure 3.1: Diagram showing pore pressure filter locations (after Lunne et al., 1997)

3.2.4 Inclination (i_x, i_y)

The CPT rig was set up to obtain a thrust direction as near as possible to vertical. The CPTU cones have inclinometers incorporated to measure the non-verticality of the test. For test depths less than 15m, significant non-verticality is unusual, provided the initial thrust direction is vertical.

3.3 ESTIMATED SOIL BEHAVIOUR TYPE

3.3.1 Friction Ratio (R_f)

The friction ratio, R_f is the ratio between the sleeve friction and the cone resistance (Lunne et al., 1997).

$$\text{Friction Ratio } (R_f) = \left(\frac{\text{Sleeve Friction } (f_s)}{\text{Cone Resistance } (q_c)} \right) \times 100$$

3.3.2 Estimated Soil Behaviour Type (SBT)

The estimation of soil behaviour type, *SBT*, using measurements of cone resistance and sleeve friction is based upon the variations of the friction ratio and cone resistance. The friction

ratio varies depending upon whether the soil is cohesive or granular. The cone resistance varies depending on the strength and densities of the soil.

The interpretation used in this report is *Robertson et al. (1986)*, which is shown in Figure 3.2. The results are presented on *CPT Log 01*, in *Appendix B*.

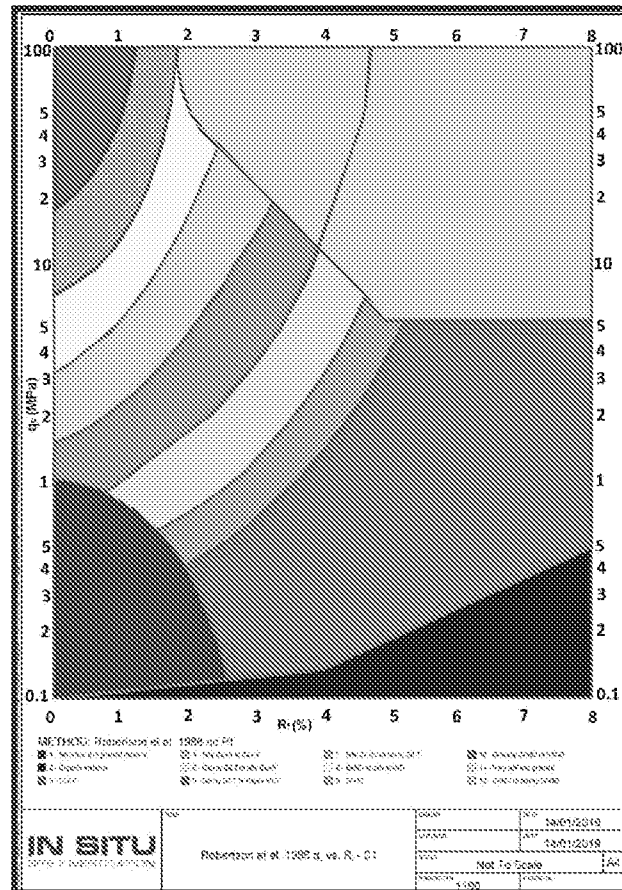


Figure 3.2: *Robertson et al., 1986 soil behaviour type chart.*

3.3.3 Pore Pressure Ratio (B_q)

Pore pressure ratio, B_q is the ratio between the measured pore pressure generated during penetration and the corrected cone resistance minus the total overburden stress.

Pore pressure ratio as defined by *Senneset and Janbu (1985)* is defined as:

$$B_q = \frac{u_2 - u_0}{q_t - \sigma_{vo}}$$

where

- u_2 is pore pressure measured between the cone and the friction sleeve
- u_0 is equilibrium pore pressure
- σ_{vo} is total overburden stress
- q_t is cone resistance corrected for unequal end area effects

3.4 APPLIED CORRECTIONS

3.4.1 Corrected Cone Resistance (q_c)

For each penetration test, the measured cone resistance, q_c , can be corrected for the “unequal area effect” due to the influence of the ambient pore water pressure acting on the cone.

The correction has been applied using the following equation by Lunne et al., 1997:

$$q_t = q_c + [u_2 \cdot (1 - \alpha)]$$

where

α is the cone area ratio

The cone used on this project has a cone area ratio of 0.79. This value is geometrically measured.

3.4.2 Depth Correction

All tests in the report have been corrected for depth difference caused by inclination. This has been calculated using the method described in ISO 22476-1:2012.

To calculate the corrected depth the following formula is used:

$$z = \int_0^l C_{inc} \cdot dl$$

where

z is penetration depth, in m

l is penetration length, in m

C_{inc} is correction factor for the effect of the inclination of the CPTU relative to the vertical axis.

The equation for calculating the correction factor for the influence of the inclination for a bi-axial inclinometer is:

$$C_{inc} = \frac{1}{\sqrt{(1 + \tan^2 \beta_1 + \tan^2 \beta_2)}}$$

where

β_1 is the angle between the vertical axis and the projection of the axis of the CPTU on a vertical plane, in degrees

β_2 is the angle between the vertical axis and the projection of the axis of the CPTU on a vertical plane that is perpendicular to the plane of angle β_1 , in degrees

4.0 GEOTECHNICAL DERIVED PARAMETERS

A number of empirical correlations can be used to derive geotechnical parameters from CPTU data. This report includes only the parameters which are described in this chapter. The results of all correlations used to obtain the geotechnical derived parameters are presented on *CPT Log 02* and *CPT Log 03* in *Appendix B*.

Please, note that each empirical correlation is derived for a certain type of soil, and may not be appropriate for all the soil types encountered on this project.

4.1 SOIL BEHAVIOUR TYPE INDEX (I_c)

The soil behaviour type index, I_c , was derived by *Jefferies and Davies (1991)*, and was created to simplify the application of CPTU SBT chart shown in *Chapter 3, Figure 3.2*. This approach has been modified for use with the *Robertson (1990)* normalised CPT soil classification chart, *Figure 4.1*. The normalised cone parameters Q_t and F_r (for definitions see *Appendix A5 Symbol List*) can be combined into one Soil Behaviour Type Index, I_c , (*Lunne et al., 1997*).

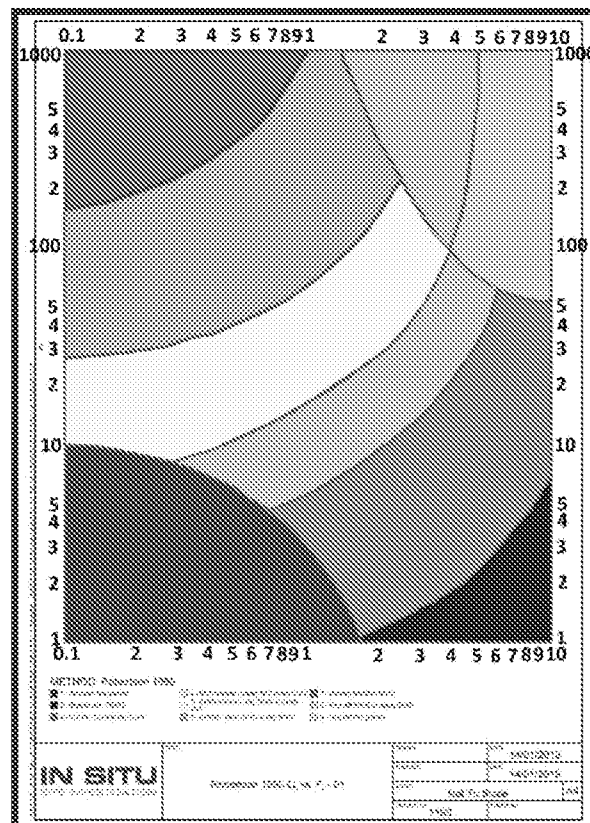


Figure 4.1: Robertson 1990 soil behaviour type chart.

The soil behaviour type index, I_c , can then be defined using *Robertson (2010)* formula, given below:

$$I_c = ((3.47 - \log Q_t)^2 + (\log F_r + 1.22)^2)^{0.5}$$

where

Q_t is the normalized cone resistance which represents the simple normalization with a stress exponent (n) of 1.0, which applies well to clay-like soils

F_r is the normalized friction ratio, in %

The boundaries of soil behaviour type are then given in terms of the index, I_c , presented in *Table 4.1* below.

The soils behaviour type index does not apply to zones 1, 8 and 9. The profiles of I_c provide a simple guide to the continuous variation of soil behaviour type in a given soil profile based on CPTU results, with a reliability greater than 80% compared with soil samples (*Robertson, 2015*).

Zone	Soil Behaviour Type	I_c
1	Sensitive fine grained	N/A
2	Organic Soils – clay	>3.6
3	Clays – silty clay to clay	2.95 – 3.6
4	Silt mixtures – clayey silt to silty clay	2.60 – 2.95
5	Sand mixtures – silty sand to sandy silt	2.05 – 2.6
6	Sands – clean sand to silty sand	1.31 – 2.05
7	Gravelly sand to dense sand	<1.31
8	Very stiff sand to clayey sand*	N/A
9	Very stiff fine grained *	N/A

* Heavily over consolidated or cemented

Table 4.1: Normalized CPTU Soil Behaviour Type (SBT_n) Index values, I_c . (*Robertson, 2010*)

4.2 N VALUE OF STANDARD PENETRATION TEST (SPT) (N_{60})

The derived N value of SPT , N_{60} , is strongly and directly related to the cone resistance, q_c .

In this report the N_{60} value is derived using the following correlations, developed by *Robertson and Wride (1998)* and *Jefferies and Davies (1998)*

1) *Robertson & Wride (1998)*

$$N_{60} = \frac{q_c}{8.5 \cdot p_a \left(1 - \frac{I_c}{4.6}\right)}$$

2) *Jefferies and Davies (1993)*

$$N_{60} = \frac{q_c}{0.85 \cdot \left(1 - \frac{I_c}{4.75}\right)}$$

where

- q_c is the cone resistance
- p_a is the atmospheric pressure equal to **100 kPa**
- I_c is the soil behaviour type index calculated as given in *section 4.1*

It is suggested that this method provides a better estimation of the N value than the actual SPT test, due to its poor repeatability. But in fine grained soil with high sensitivity these methods of estimating N_{60} may overestimate it (*Jefferies and Davies, 1991*).

4.3 RELATIVE DENSITY (D_r)

Relative density, D_r , is an intermediate parameter for coarse grained soils, widely used to describe sand deposits. All the research on deriving the relative density from CPTU tests results are carried out for **clean predominantly quartz sands**. The studies have shown that CPTU resistance in granular soils is controlled by sand relative density, in situ effective stresses and compressibility. The more compressible sands tend to give lower penetration resistance for a given relative density than less compressible sands.

In this report relative density is calculated using the methods suggested by *Baldi et al., (1986)*, *Jamiołkowski et al., (2001)* and *Kulhawy and Mayne (1990)* as shown in the equations below:

1) *Baldi et al., (1986)*

$$D_r = \frac{1}{C_2} \cdot \ln \left(\frac{q_c \cdot Wehr}{C_1 \cdot (\sigma'_{v0})^{0.55}} \right) \cdot 100$$

where

C_1 is a consolidation coefficient which is *157* for normally consolidated soils and *181* for over consolidated soils

C_2 is a consolidation coefficient which is *2.41* for normally consolidated soils and *2.46* for over consolidated soils

Wehr is a correction coefficient for calcareous soils

2) Jamiolkowski et al., (2001)

$$D_r = 100 \cdot \left[0.268 \cdot \ln \left(\frac{q_t / \sigma_{atm}}{\sqrt{\sigma'_{v0} / \sigma_{atm}}} \right) + C_1 \right]$$

where

C_1 is a compressibility coefficient which is *-0.675* for average compressible soils, *≤1.0* for high compressible soils and carbonate or calcareous sands and *≥-2.0* for low compressible soils

q_t is corrected cone resistance

σ_{atm} is the atmospheric pressure

3) Kulhawy and Mayne, (1990)

$$D_r = \left[\frac{q_{c1}}{305 \cdot C_1 \cdot OCR^{0.18} \cdot (1.2 + 0.05 \cdot \log(t/100))} \right]^{0.5} \cdot 100$$

where

q_{c1} is the cone resistance corrected for initial vertical effective stress and atmospheric pressure, calculated by the following formula

$$q_{c1} = \frac{q_c}{\sqrt{\sigma'_{v0} \cdot \sigma_{atm}}}$$

where

q_c is the cone resistance in *kPa*

σ'_{v0} is the initial vertical effective stress in *kPa*

C_1 is a compressibility coefficient which is *-0.91* for low compressible sands, *1.0* for medium compressible sands and *1.09* for high compressible sands

t is time in years

4.4 FRICTION ANGLE (ϕ')

Friction angle, ϕ' , is used to express the shear strength of uncemented, coarse grained soils. In this report friction angle is derived by the correlations of *Mayne and Campanella (2005)*, *Robertson and Campanella (1983)* and *Kulhawy and Mayne (1990)*.

1) Mayne and Campanella, (2005)

$$\varphi' = 29.5^0 \cdot B_q^{0.121} \cdot [0.256 + 0.336 \cdot B_q + \log Q_t]$$

where

B_q is the pore pressure ratio, calculated as in Session 3.3

Q_t is the normalized cone resistance

2) Robertson and Campanella, (1983)

$$\varphi' = \tan^{-1} \left(0.1 + 0.38 \cdot \log \left(\frac{q_t}{\sigma'_{v0}} \right) \right)$$

where

q_c is the cone resistance in *kPa*

σ'_{v0} is the initial vertical effective stress in *kPa*

3) Kulhawy and Mayne, (1990)

$$\varphi' = 17.6^0 + 11.0^0 \cdot \log(q_{t1})$$

where

q_{t1} is the corrected cone resistance corrected for initial vertical effective stress and atmospheric pressure, calculated by the following formula

$$q_{t1} = \frac{q_t}{\sqrt{\sigma'_{v0} \cdot \sigma_{atm}}}$$

The method suggested by *Mayne and Campanella (2005)* will not provide reliable results for heavily over consolidated soils, fissured geomaterials and highly cemented or structures clays. This approach gives reliable results when pore pressure is positive and varies $0.1 < B_q < 1.0$. The correlation suggested by *Robertson and Campanella (1983)* estimates the peak friction angle for uncemented, unaged, moderately compressible, predominately quartz sands. For sands of higher compressibility, the method will tend to predict low friction angles. The method suggested by *Kulhawy and Mayne (1990)* is an alternate relationship for clean, rounded, uncemented, quartz sands.

4.5 FINES CONTENT (FC)

The fines content, *FC*, in this report is estimated using two different methods, one from *Robertson and Wride (1998)* and the other, *Suzuki et al. (1998)* as presented below:

1) Robertson and Wride (1998)

$$I_c < 1.26: FC = 0$$

$$1.26 \leq I_c \leq 3.5: FC(\%) = 1.75I_c^{3.25} - 3.7$$

$$3.5 < I_c: FC = 100\%$$

2) Suzuki et al. (1998)

$$FC(\%) = 2.8I_c^{2.6}$$

where

I_c is the soil behaviour type index, calculated as in section 4.1

4.6 UNDRAINED SHEAR STRENGTH (s_u)

Estimation of undrained shear strength, s_u , from CPTU tests using corrected cone resistance is carried out using the following correlation from *Lunne et al. (1981)*:

$$S_u = \frac{(q_t - \sigma_{v0})}{N_{kt}}$$

where

N_{kt} is the empirical cone factor, which varies from 10 (6 for very soft sensitive fine grained soils) to 20. In this report 3 values are considered: 15, 17.5 and 20. N_{kt} tends to increase with increasing plasticity and decrease with increasing soil sensitivity. It decreases as B_q increases. (*Lunne et al., 1997*)

σ_{v0} = total overburden stress.

This report only presents the undrained shear strength data on soils with soil behaviour type index, I_c values greater than 2.60.

The value of undrained shear strength, s_u to be used in analysis depends on the design problem. In general, the simple shear in the direction of loading often represents the average undrained strength. For larger, moderate to high risk projects, where high quality field and laboratory data may be available, site specific correlations should be developed based on appropriate and reliable values of s_u .

4.7 SENSITIVITY (S_t)

The sensitivity, S_t of clays is defined as the ratio of undisturbed peak undrained shear strength to totally remoulded undrained shear strength.

In this report S_t is calculated using two correlations developed by *Schmertmann (1978)* and *Mayne (2007)*.

1) Schmertmann (1978)

$$S_t = \frac{s_u}{s_{u(rem)}} = \frac{q_t - \sigma_v}{N_{kt}} \left(\frac{1}{f_s} \right)$$

where

$s_{u(rem)}$ is the remoulded undrained shear strength. It can be assumed equal to the sleeve resistance, f_s .

2) Mayne (2007)

$$S_t = \frac{0.073 \cdot (q_t - \sigma_{v0})}{f_s}$$

For relatively sensitive clays, $S_t > 10$, the value of f_s can be very low and not very accurate, hence the estimate of sensitivity should be used as a guide only.

4.8 SOIL UNIT WEIGHT (γ)

Soil unit weight, γ in this report is calculated by using one method for sands, considered under dry conditions and two methods for clays, considered under saturated conditions. These relationships are developed by *Mayne (2007)* and the equations are presented below:

1) Mayne (2007)

Dry unit weight for sands:

$$\gamma_{dry} = 1.89 \cdot \log(q_{t1}) + 11.82$$

Saturated unit weight for clays method 1

$$\gamma_{sat} = 8.32 \cdot \log(V_s) - 1.61 \cdot \log(z)$$

Saturated unit for clays method 2

$$\gamma_{sat} = 2.60 \cdot \log(f_s) + 15 \cdot G_s - 26.5$$

where

q_{t1} is the corrected cone resistance corrected for initial vertical effective stress and atmospheric pressure, calculated by the following formula:

$$q_{t1} = \frac{q_t}{\sqrt{\sigma'_{v0} \cdot \sigma_{atm}}}$$

z is the depth

V_s is the shear wave velocity, calculated as $V_s = 118.8 \cdot \log(f_s) + 18.5$

G_s is the specific gravity of solids, typically between 2.40 and 2.90

5.0 CHALK

In order to provide an estimate of the Chalk Grade Classification as defined by Ward et al. (1968) and Wakeling (1969) a modified correlation originally derived by Power (1982) has been used. This is presented in table 5.1 and has been used to give the degree of weathering quoted on the soil type estimates on the cone penetration graphs.

It should be noted that the correlation is approximate and that Chalk at different locations can differ from that described by Ward et al. at one particular site (Mundford in Norfolk). The descriptions in figure 5.1 are typical, and do not necessarily relate to this site. Simplified descriptions are therefore presented on the logs. It should also be noted that the Chalk grade classification was derived to describe the chalk mass. Localised variations in the cone resistance do not necessarily represent changes in Classification. Peaks may represent flints or local indurated zones.

Table 5.1: Chalk classification table modified from Power (1992).

GRADE	TYPICAL BRIEF DESCRIPTION (After Wakeling,1969)	FRICTION RATIO (%)	CONE END RESISTANCE(MPa)
		(modified from Power, 1982)	
6	Extremely soft structureless CHALK containing small lumps of intact chalk.	-	Below 5
5	Structureless remoulded CHALK containing lumps of intact chalk.	0.75 – 1.00	5-10
4	Rubbly partly-weathered CHALK with bedding and jointing. Joints 10-60mm apart and open to 20mm and often infilled with soft remoulded chalk and fragments.	1.00 – 1.25	10-15
3	Rubbly to blocky unweathered CHALK. Joints 60-200mm apart and open to 20mm and often infilled with fragments.	1.25 – 1.50	15-20
2	Blocky medium-hard CHALK. Joints more than 200mm apart and closed.	1.50 – 2.00	More than 20
1	As for grade 2 but hard and brittle.	No penetration-	No penetration

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APPENDIX A

APPENDIX A1 – Project Summary Sheet

Piezocene Tests Summary Sheet

HOLE ID	Final Depth (m)	Date of Test	Cone Used	Test Remarks
CPT01	4.74	15/09/2021	S15-CFIP.1750	Test refused on total pressure.
CPT02	4.91	15/09/2021	S15-CFIP.1750	Test refused on total pressure.
CPT03	5.09	15/09/2021	S15-CFIP.1750	Test refused on total pressure.
CPT04	8.59	15/09/2021	S15-CFIP.1750	Test completed at target depth.
CPT05	6.69	15/09/2021	S15-CFIP.1750	Test completed at target depth.
CPT06	4.88	15/09/2021	S15-CFIP.1750	Test refused on total pressure.
CPT07	6.99	15/09/2021	S15-CFIP.1750	Test completed at target depth.
CPT08	7.09	15/09/2021	S15-CFIP.1750	Test completed at target depth.
CPT09	5.04	15/09/2021	S15-CFIP.1750	Test refused on total pressure.
CPT10	3.77	15/09/2021	S15-CFIP.1750	Test refused on total pressure.
CPT11	5.88	15/09/2021	S15-CFIP.1750	Test completed at target depth.
CPT12	8.22	15/09/2021	S15-CFIP.1750	Test completed at target depth.

Piezocene Tests Coordinates

HOLE ID	Eastings	Northings	Elevation
CPT01	503227.756	102591.310	
CPT02	503225.666	102607.142	
CPT03	503274.036	102610.172	7.706
CPT04	503279.832	102587.456	7.934
CPT05	503323.787	102595.967	7.366
CPT06	503321.830	102614.470	7.492
CPT07	503368.299	102620.351	7.248
CPT08	503370.805	102601.515	7.109
CPT09	503420.551	102630.715	7.117
CPT10	503380.263	102666.603	6.678
CPT11	503303.128	102657.952	7.476
CPT12	503224.714	102650.456	7.707

APPENDIX A2 – CPT Rig Datasheet

RIGS

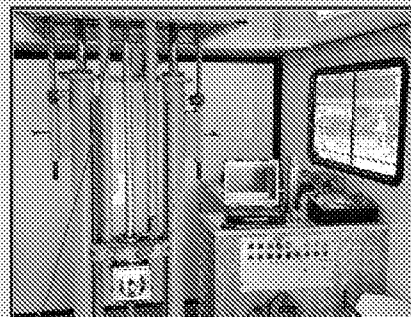
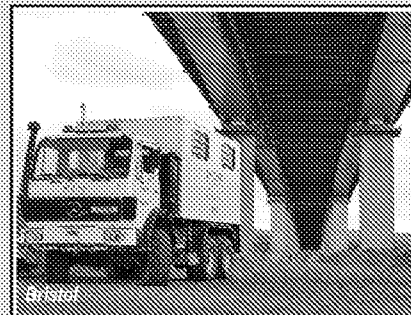
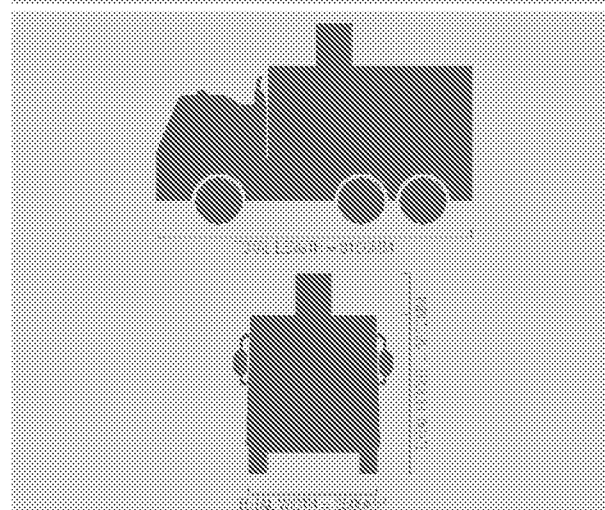
22 TONNE CPT WHEEL MOUNTED RIG (CPT 016)

This 6 x 6 wheeled drive CPT rig is ideal for geotechnical testing on hardstanding sites such as roads and car parks. It can also be used on dry non-hardstanding sites making it one of our versatile rigs as it can be deployed to many different types of site. It weighs 22 tonnes and can push up to 100-150 metres per day, depending on the ground conditions.

CPT RIG DETAILS

DRIVE SYSTEM	6x6 WHEELED DRIVE
TOTAL WEIGHT	22 TONNES
GROUND BEARING PRESSURE	100 KPa
CPT RAM THRUST CAPACITY	20 TONNES
MAXIMUM PENETRATION	30-40m DEPENDING ON THE RIGGIDITY OF THE SOIL
PERFORMANCE RATES	100-150m PER DAY DEPENDING ON GROUND CONDITIONS
TYPICAL SITES FOR THIS RIG	ROADS, CAR PARKS, AIRPORTS, RAILWAYS, INDUSTRIAL SITES, ETC.

CPT RIG DIMENSIONS

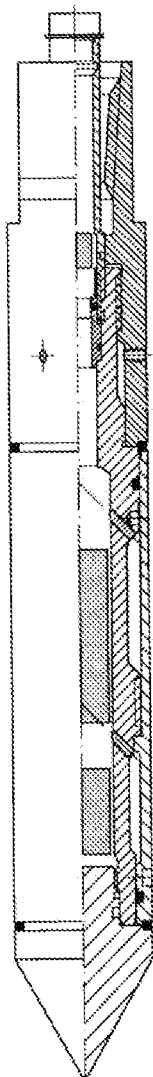


APPENDIX A3 – Cone Datasheet



High Street, Wey 33F
2171 AL Haslemere

ING BANK: 88.25.87.358
PACBANK: 8226738
RTW AL: 81098831027004



SPECIFICATIONS S15 SERIES ELECTRICAL CONES

The electronic subtraction cones have been developed to address the durability problems inherent in other cone designs. The unit consists of a single element temperature compensated strain gauge transducer for measuring both cone resistance and local sleeve friction. This design is therefore more robust than a compression type cone. The cone support electronics package is located directly behind the transducer. The precision strain gauge amplifiers and power supply eliminate the effects of cable resistance on the measurements. A standard subtraction cone is capable of measuring simultaneously the following channels: Tip, Local friction, Pore pressure, Temperature and Inclination.

GENERAL SPECIFICATIONS

Cone Tip Section Area	1,500 mm ²
Friction Sleeve Surface	22,500 mm ²
Total Length	325 mm
Weight	4200 g
Power Supply	± 15 VDC, 100 mA.
Output	0 – 10 VDC*
Working Temperature	0 - 60°C
Storage Temperature	- 40 to + 85°C
Connector	Lemo 10 pins (others on request)

TIP RESISTANCE

Range	100/150* kN
Accuracy	0.25 % FS
Maximum Load	150 % of range
Cone Area Ratio	0.75

LOCAL SLEEVE FRICTION

Range	100/150* kN
Accuracy	0.50 % FS
Maximum Load	150 %
Sleeve Area Ratio	1.0 (EA)

PORE PRESSURE

Range	1/2/5/10* MPa
Accuracy	0.5 % FS
Maximum Load	150 % of range

INCLINATION

Range	25 ° (biaxial)
Accuracy	< 2 °

All our equipment complies with the ISO9001, ASTM, DIN and NEN Standards

*Other output and voltage ranges available on request. Loadcells may be calibrated for lower ranges.

APPENDIX A4 – Cone Calibration Certificate

Eijkelkamp GeoPoint
SoilSolutions

Rijksweg 22F
2171 AL Sassenheim
The Netherlands

Cone Calibration Certificate

Certificate: **GS-1750-005**
Instrument Type: Magnetometer
Model: Z50 µT(analog)
Serial number: 1750
Calibration date: 21-07-2021
Client: Insitu
Calibrated by: M. de Bruin
Calibration Instruments
Manufacturer: Hottinger Baldwin Messtechnik GmbH
HBM certificate NMI certificate: 2461165.00501
Calibration conditions
Ambient temperature: 23.4 °C
Atmospheric pressure: 1024 mBar
Cone specifications
Cone base area: 1500 mm²
Load tip resistance (nom.): 50 kN
Friction sleeve area: 22500 mm²
Load tip + local friction (nom.): 50 kN
Load friction sleeve (nom.): 22.5 kN
Load pore pressure (nom.): 2 MPa
Inclination (nom.): ± 20 °
Temperature compensation (all channels): 0...+40 °C
Maximum overload capacity (all channels): 50 %
Cone area ratio (α): 0.79
Max. inaccuracy, relative to measurement value: 1.0 %

Zero points:	Tip:		Sleeve:		Pore Pressure:		Inclinometer:		
	qc in kN	mV	fs in kN	mV	MPa	mV	Degrees	X (mV)	Y (mV)
	0	0245	0	0257	0	0242	0	2526	2380
	5	0305	5	0319	0.4	1674	-20	0558	0452
	10	0818	10	0839	0.8	3355	20	4503	4307
	15	0928	15	0958	1.2	5042			
	20	1228	20	1271	1.6	6702			
	25	1542	25	1584	2.0	8364			
	30	1850	30	1910					
	35	2158	35	2223					
	40	2469	40	2544					
	45	2761	45	2850					
	50	3080	50	3178					

Max. error, abs. qc: 35 kPa
Max. error, abs. fs: 2 kPa
Max. error, abs. u2: 10 kPa
Max. error, abs. i: 1 °

This calibration is compliant with Eijkelkamp GeoPoint SoilSolutions internal quality system, internal calibration procedures and meets the requirements of NEN-EN-ISO 22476-1, NORSOK G-001, ISO 9001 and ASTM using calibration equipment traceable to (inter-)National Standards.

Approved by: B. Kop
Date: 21-07-2021

Eijkelkamp GeoPoint SoilSolutions
V.A.T. NO. NL8584.21.422.B01
Trade Reg. Arnhem no. 70686149

IBAN NL43 RABO 0325 7504 38
BIC: RABONL2U

APPENDIX A5 – Symbol List

English

a	is area ratio of the cone ($= A_n/A_c$)
A	is area
A_c	is projected area of the cone
A_n	is cross sectional area of load cell or shaft
A_s	is area of friction sleeve
A_{sb}	is bottom end area of friction sleeve
A_{st}	is top end area of friction sleeve
B_q	is pore pressure parameter ($= (u_2 - u_0)/(q_t - \sigma_{v0})$)
c_h	is horizontal coefficient of consolidation
c_v	is vertical coefficient of consolidation
D	is diameter
D_r	is relative density ($= \frac{e_{max}-e}{e_{max}-e_{min}} \times 100\%$)
e	is void ratio
e_{max}	is maximum void ratio
e_{min}	is minimum void ratio
E	is Young's modulus
f_s	is unit sleeve friction resistance
f_t	is sleeve friction corrected for pore pressure effects
F_s	is total force acting on friction sleeve
F_R	is normalized friction ratio ($= f_s/(q_t - \sigma_{v0})$)
FoS	is factor of safety
FC	is fines content
g	is acceleration due to gravity
G_0	is initial or maximum shear modulus, shear stiffness
I_c	is soil behavior type index
I_r	is rigidity index ($= G/s_u$)
I_p	is plasticity index
k	is coefficient of permeability
k_h	is coefficient of permeability in horizontal direction
k_v	is coefficient of permeability in vertical direction
K_0	is coefficient of earth pressure at rest ($= \sigma'_{h0}/\sigma'_{v0}$)
L	is length
m_v	is coefficient of volume change
M	is constrained deformation modulus
M7.5	is earthquake magnitude of 7.5 Richter scale
N	is number of blows of SPT
N_{60}	is SPT energy ratio
N_k	is cone factor
N_{ke}	is cone factor
N_{kt}	is cone factor
$N_{\Delta u}$	is cone factor
p_a	is reference stress ($= 100 \text{ kPa}$)
q_c	is measured cone resistance
q_e	is effective cone resistance ($= q_t - u_2$)
q_n	is net cone resistance ($= q_t - \sigma_{v0}$)
q_t	is corrected cone resistance ($= q_c - (1 - a)u_2$)
Q_c	is total force acting on the cone
Q_t	is normalized cone resistance ($= q_t - \sigma_{v0}/\sigma'_{v0}$)

R_f	is friction ratio ($= (f_t/q_t) \times 100\%$ or alternatively $= (f_t/q_t) \times 100\%$)
s_u	is undrained shear strength
s_{ur}	is remoulded undrained shear strength
S_t	is sensitivity
t	is time
t_{50}	is time for 50% dissipation of excess pore water pressure
T_{50}	is time factor at $U = 50\%$
u	is pore water pressure
u_0	is in situ pore pressure
u_1	is pore pressure measured on the cone
u_2	is pore pressure measured behind the cone
u_3	is pore pressure measured behind sleeve friction
Δu	is excess pore water pressure
U	is normalized excess pore pressure
V_s	is shear wave velocity
z	is depth

Greek

α	is constant
α	is cone roughness
β	is constant
β_1	is the angle between the vertical axis and the projection of the axis of the CPTU on a vertical plane, in degrees
β_2	is the angle between the vertical axis and the projection of the axis of the CPTU on a vertical plane that is perpendicular to the plane of angle β_1 , in degrees
γ	is unit weight of soil
γ_w	unit weight of water
Δ	is change
Δu	is excess pore pressure ($= u - u_0$)
μ	is Poisson's ratio
ρ	is density
ψ	is state parameter
σ, σ'	is normal stress (total, effective)
σ_h, σ_h'	is horizontal stress (total, effective)
σ_v, σ_v'	is horizontal stress (total, effective)
$\sigma_{v0}, \sigma_{v0}'$	is overburden stress (total, effective)
τ_{av}	is average cyclic shear stress
τ_{cy}	is cyclic shear stress
φ'	is effective friction angle

APPENDIX A6 –Abbreviations

ASTM	American Society for Testing and Materials
CPTU	Cone Penetration Test with Pore Pressure Measurement (Piezocone Test)
CRR	Cyclic Resistance Ratio
CSR	Cyclic Stress Ratio
GWT	Ground Water Table
NC	Normally Consolidated
OC	Over consolidated
OCR	Over consolidation Ratio
PL	Limit Pressure
SDMT	Seismic Dilatometer Marchetti
SPT	Standard Penetration Test
TC	Technical Committee

APPENDIX A7 – Glossary

CPT

Cone Penetration Test.

Cone

The part of the cone penetrometer on which the end bearing is developed.

Cone Penetrometer

The assembly containing the *cone*, *friction sleeve*, any other sensors and measuring systems, as well as the connections to the *push-rods*.

Cone resistance, q_c

The total force acting on the cone, Q_c , divided by the projected area of the cone, A_c . $q_c = Q_c / A_c$

Corrected cone resistance, q_t

The *cone resistance*, q_c corrected for pore water pressure effects.

Corrected sleeve friction, f_t

The *sleeve friction* corrected for pore water pressure effects on the ends of the *friction sleeve*.

Data acquisition system

The system used to measure and record the measurements made by the *cone penetrometer*.

Dissipation Test

A test when the decay of the pore water pressure is monitored during a pause in penetration.

Filter element

The porous element inserted into the cone penetrometer to allow transmission of the pore water pressure to the pore pressure sensor, while maintaining the correct profile of the *cone penetrometer*.

Friction ratio, R_f

The ratio, expressed as a percentage of the *sleeve friction*, f_s , to the *cone resistance*, q_c , both measured at the same depth.

Friction reducer

A local enlargement on the push-rod surface, placed at a distance above the cone penetrometer, and provided to reduce the friction on the *push-rods*.

Friction sleeve

The section of the *cone penetrometer* upon which the *sleeve friction* is measured.

Normalized cone resistance, Q_c or Q_t

The *cone resistance* expressed in a non-dimensional form and taking account of stress changes *in situ*, $Q_c = (q_c - \sigma_{v0}) / \sigma'_{v0}$, or when the *corrected cone resistance* is used $Q_t = (q_t - \sigma_{v0}) / \sigma'_{v0}$. Where σ_{v0} and σ'_{v0} are the total and effective vertical stress respectively.

Net cone resistance, q_n

The *corrected cone resistance* minus the vertical total stress. $q_n = q_t - \sigma_{v0}$

Normalized friction ratio, F_r

The *sleeve friction* normalized by the *net cone resistance*.

Piezocone

A *cone penetrometer* containing a pore pressure sensor.

Pore pressure, u

The pore pressure generated during penetration and measured by a pore pressure sensor, u_1 when measured on the cone, u_2 when measured just behind the cone and u_3 when measured just behind the friction sleeve.

Pore pressure ratio, B_q

The *net pore pressure* normalized with respect to the *net cone resistance*.

Push-rods

The thick-walled tubes or rods used for advancing the cone penetrometer.

Rig machine

The equipment which pushes the cone penetrometer and rods into the ground.

Sleeve friction, f_s

The total frictional force acting on the *friction sleeve*, F_s , divided by its *surface area*, A_s . $f_s = F_s / A_s$

APPENDIX A8 – Soils Description Tables

GRANULAR SOILS (Sands and Gravels)

Description	Relative Density D_r (%)	SPT N value, N_{SPT}
Very Loose	0 – 15	0 - 4
Loose	15 – 35	4 - 10
Medium Dense	35 – 65	10 - 30
Dense	65 – 85	30 - 50
Very Dense	>85	>50

COHESIVE SOILS (Clays and Silts)

Term based on measurement	Undrained Shear Strength Classification, s_u (kPa)
Extremely low	<10
Very low	10 - 20
Low	20 - 40
Medium	40 - 75
High	75 - 150
Very high	150 - 300
Extremely high	>300

APPENDIX B

Cone Penetration Measured Parameters and Geotechnical Derived Parameters

PointID

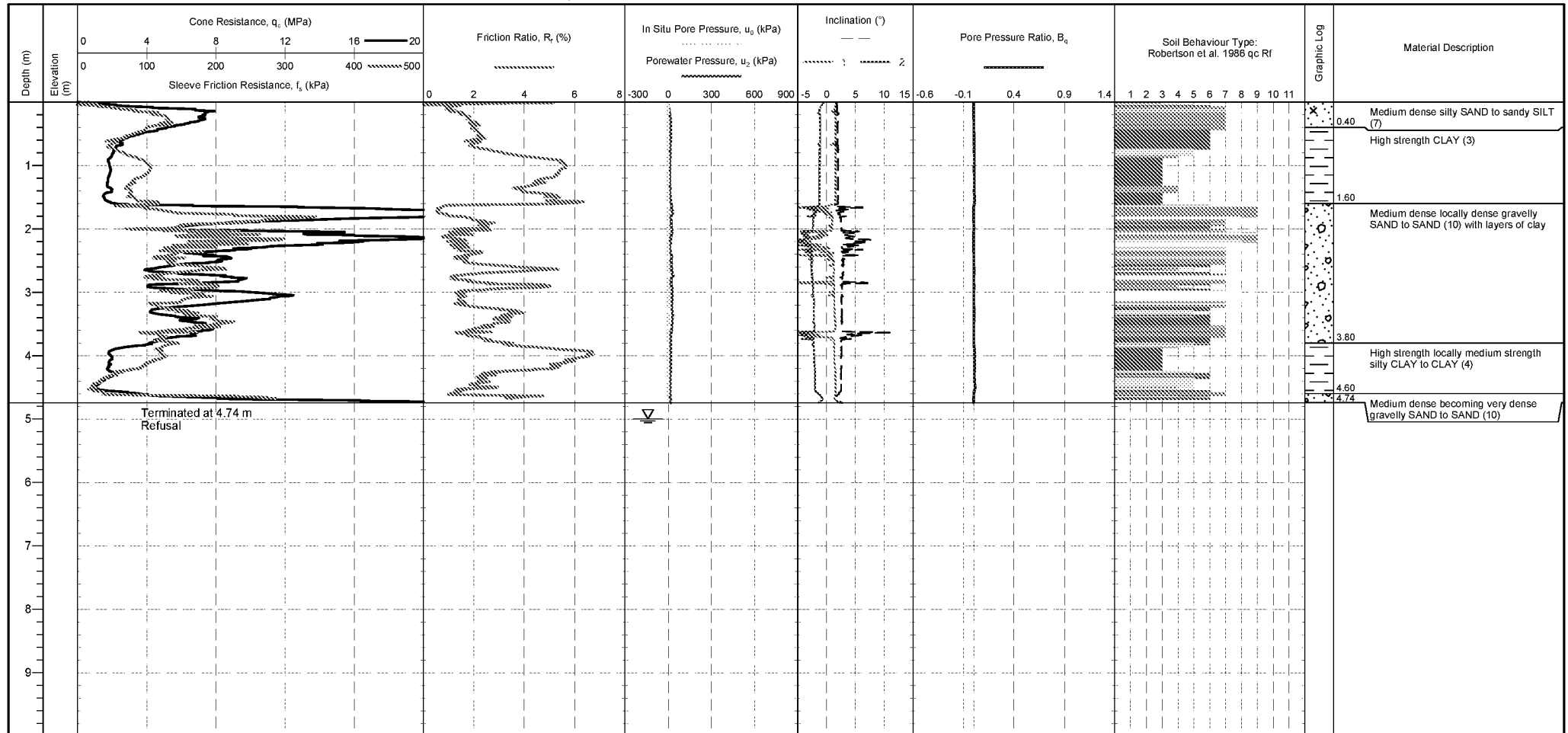
CPT01

CLIENT : Leap Environmental
PROJECT: Elmgrove Road
LOCATION : Littlehampton
PROJECT No. : 1210450

EASTING : 503227.8 m
NORTHING : 102591.3 m
ELEVATION : OD
CHECKED BY : LD
TERMINATION REASON : Refusal

Remark:
Test refused on total pressure.

SHEET : 1 OF 1
STATUS : Final
TEST DATE : 15/09/2021
PLOT DATE : 17/09/2021
METHOD : ISO 22476-1:2012



CONE ID : S15-CFIP.1750
CALIBRATION DATE : 25/08/2020
CONE MODEL : Subtraction
CONE AREA : 15cm²
CONE AREA RATIO : 0.79
FILTER POSITION : u2
FILTER TYPE : HDPE

TEST TYPE : TE2
APPLICATION CLASS : 2
RIG : CPT 016
OPERATOR : LS
FRICTION REDUCER : None
WEATHER : Sunny & Mild
GROUNDWATER DEPTH : Supplied by the client

Transducer
Tip
Sleeve
Pore Pressure 2
X-Y Inclinator

CPTU ZERO VALUES

Pre	Post	Difference
255 mV	257 mV	0.022 MPa
274 mV	276 mV	0.001 kPa
271 mV	255 mV	-0.004 kPa
2509 mV	2673 mV	

METHOD: Robertson et al. 1986 qc Rf

1 - Sensitive fine grained material	5 - Clayey SILT to silty CLAY	9 - SAND
2 - Organic material	6 - Sandy SILT to clayey SILT	10 - Gravelly SAND to SAND
3 - CLAY	7 - Silty SAND to sandy SILT	11 - Very stiff fine grained
4 - Silty CLAY to CLAY	8 - SAND to silty SAND	12 - SAND to clayey SAND

Groundwater
Level

Dissipation Test

PointID

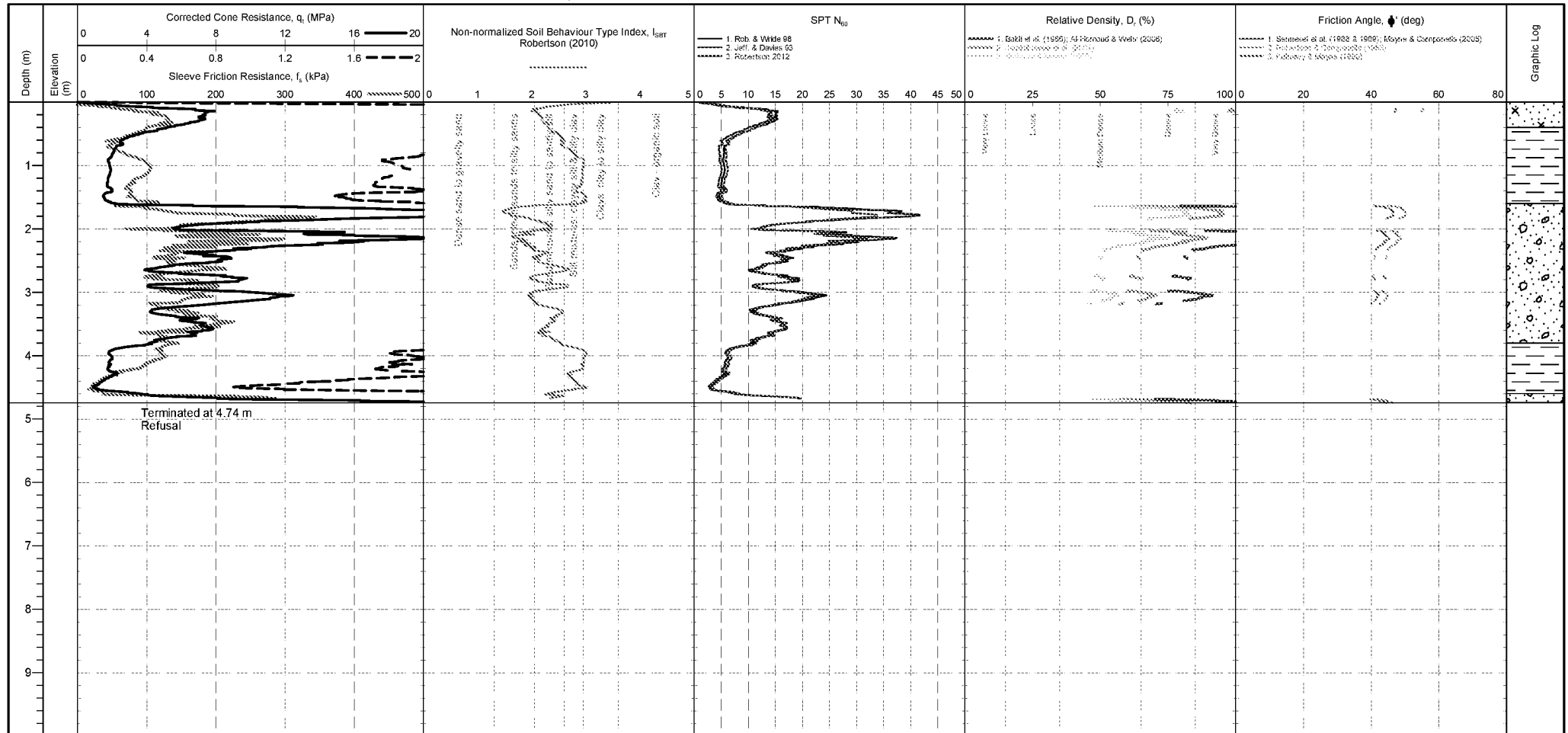
CPT01

CLIENT : Leap Environmental
PROJECT: Elmgrove Road
LOCATION : Littlehampton
PROJECT No. : 1210450

EASTING : 503227.8 m
NORTHING : 102591.3 m
ELEVATION : OD
CHECKED BY : LD
TERMINATION REASON : Refusal

Remark:
Test refused on total pressure.

SHEET : 1 OF 1
STATUS : Final
TEST DATE : 15/09/2021
PLOT DATE : 17/09/2021
METHOD : ISO 22476-1:2012



CONE ID : S15-CFIP:1750
CONE MODEL : Subtraction
CONE AREA : 15cm²
CONE AREA RATIO : 0.79
FILTER POSITION : u2
FILTER TYPE : HDPE

TEST TYPE : TE2
APPLICATION CLASS : 2
RIG : CPT 016
OPERATOR : LS
FRICTION REDUCER : None
WEATHER : Sunny & Mild

Transducer
Tip
Sleeve
Pore Pressure 2
X-Y Inclinator

Pre
255 mV
274 mV
271 mV
2509 mV

Post
257 mV
276 mV
255 mV
2673 mV

Difference
0.022 MPa
0.001 kPa
-0.004 kPa

CPTU ZERO VALUES

GRANULAR SOILS (Sands & Gravels) Robertson et al. 1986 Zones 7-10 and Zone 12					
Description	SBT Index, I_c	Description	SPT N value, NSPT	Description	Relative Density D_r (%)
Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15
Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35
Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65
Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85
Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85

Groundwater Level

Dissipation Test

PointID

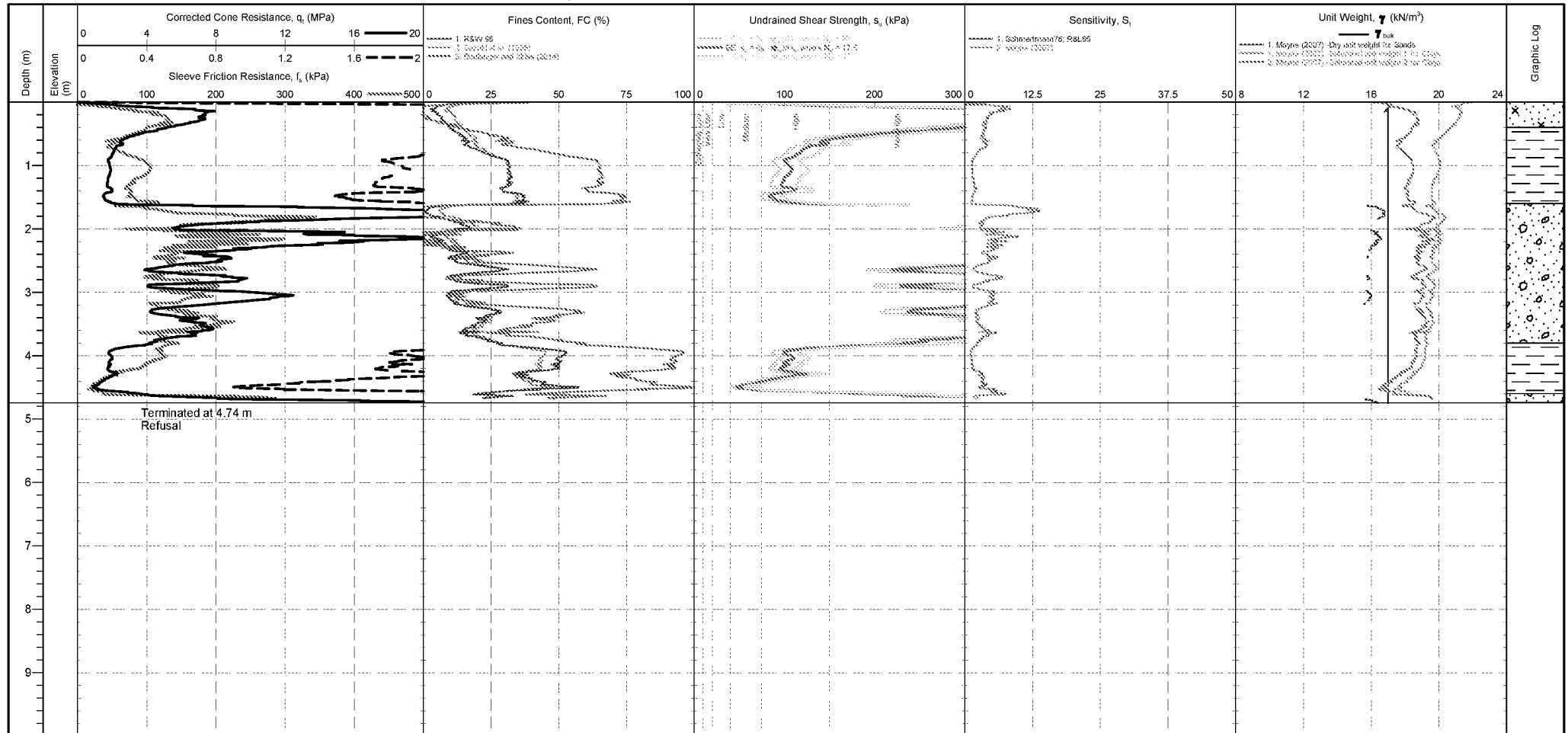
CPT01

CLIENT : Leap Environmental
PROJECT: Elmgrove Road
LOCATION : Littlehampton
PROJECT No. : 1210450

EASTING : 503227.8 m
NORTHING : 102591.3 m
ELEVATION : OD
CHECKED BY : LD
TERMINATION REASON : Refusal

Remark:
Test refused on total pressure.

SHEET : 1 OF 1
STATUS : Final
TEST DATE : 15/09/2021
PLOT DATE : 17/09/2021
METHOD : ISO 22476-1:2012



CONE ID : S15-CFIP.1750
CONE MODEL : Subtraction
CONE AREA : 15cm²
CONE AREA RATIO : 0.79
FILTER POSITION : u2
FILTER TYPE : HDPE

TEST TYPE : TE2
APPLICATION CLASS : 2
RIG : CPT 016
OPERATOR : LS
FRICTION REDUCER : None
WEATHER : Sunny & Mild

Transducer
Tip
Sleeve
Pore Pressure 2
X-Y Inclinator

CPTU ZERO VALUES

Pre	Post	Difference
255 mV	257 mV	0.022 MPa
274 mV	276 mV	0.001 kPa
271 mV	255 mV	-0.004 kPa
2509 mV	2673 mV	

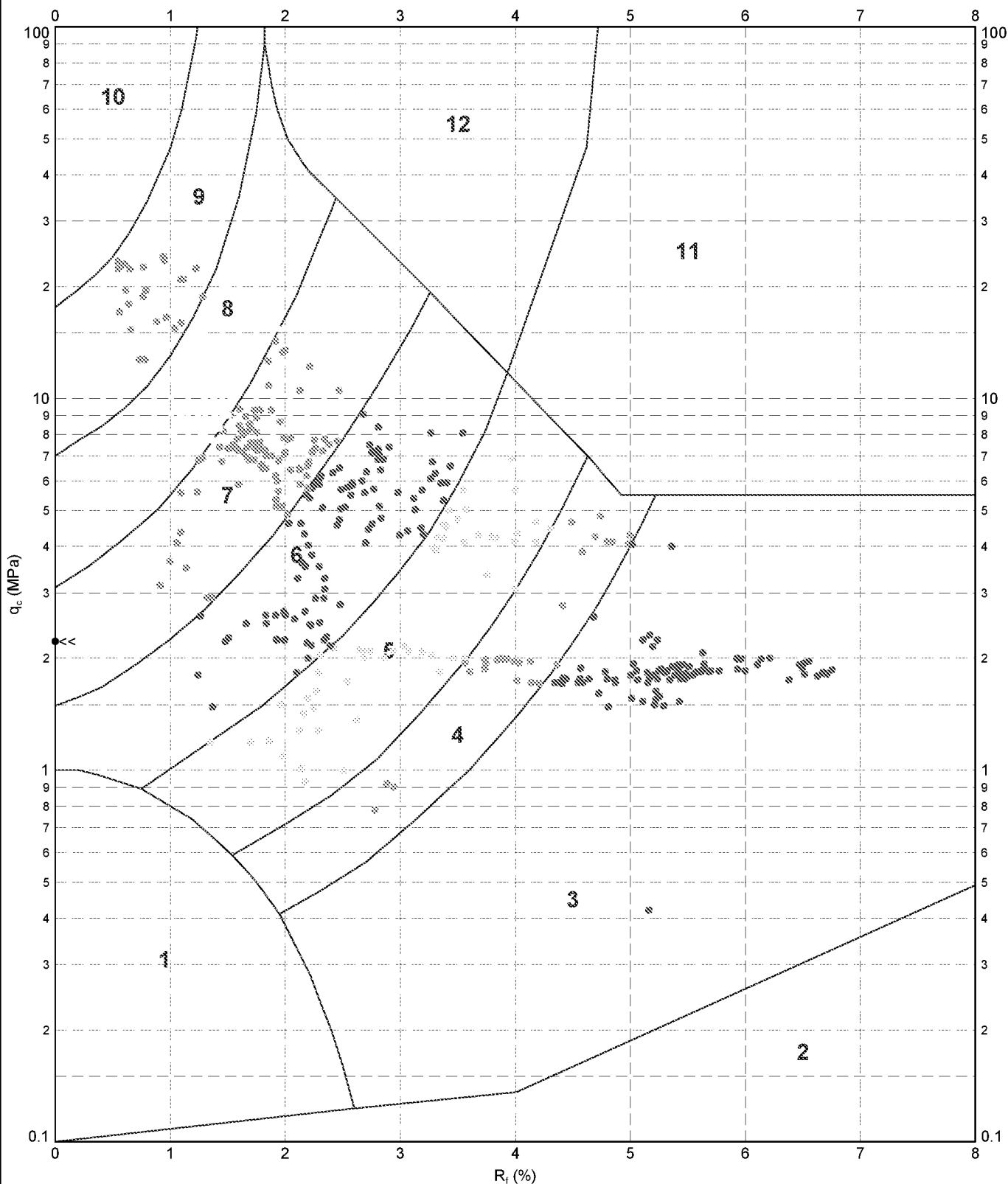
COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11

Term based on measurement	s_u (kPa)	Term based on measurement	s_u (kPa)
Extremely low strength	<10	Medium strength	40-75
Very low strength	10-20	High strength	75-150
Low strength	20-40	Very high strength	150-300
		Extremely high strength	>300

Groundwater Level

Dissipation Test

210528-ADVANCED REPORT INSTITUTE 2.02.1 LIB. ZOE GLEB Graph CPT ROBERTSON ET AL. 88 QC VS. RF MAP 1210450 ELMGROVE ROAD LITTLEHAMPTON LEAP ENVIRONMENTAL GPJ <<DrawingFile>> 17/09/2021 15:01 10.02.00.04 D:\gep\Lab and in Situ Test - DGD Lib in Situ SI 2.02.0 2017-07-10 PhJ in Situ SI 2.02.0 2017-07-10



METHOD: Robertson et al. 1986 qc Rf

- | | | | |
|-------------------------------------|-------------------------------|------------------------------|------------------------------|
| 1 - Sensitive fine grained material | 4 - Silty CLAY to CLAY | 7 - Silty SAND to sandy SILT | 10 - Gravelly SAND to SAND |
| 2 - Organic material | 5 - Clayey SILT to silty CLAY | 8 - SAND to silty SAND | 11 - Very stiff fine grained |
| 3 - CLAY | 6 - Sandy SILT to clayey SILT | 9 - SAND | 12 - SAND to clayey SAND |

IN SITU
SITE INVESTIGATION

TITLE

Leap Environmental
Littlehampton
Elmgrove Road
Robertson et al. 1986 qc vs. Rf - CPT01

DRAWN

DATE

17/09/2021

CHECKED

DATE

17/09/2021

SCALE

Not To Scale

A4

PROJECT No

1210450

FIGURE No

PointID

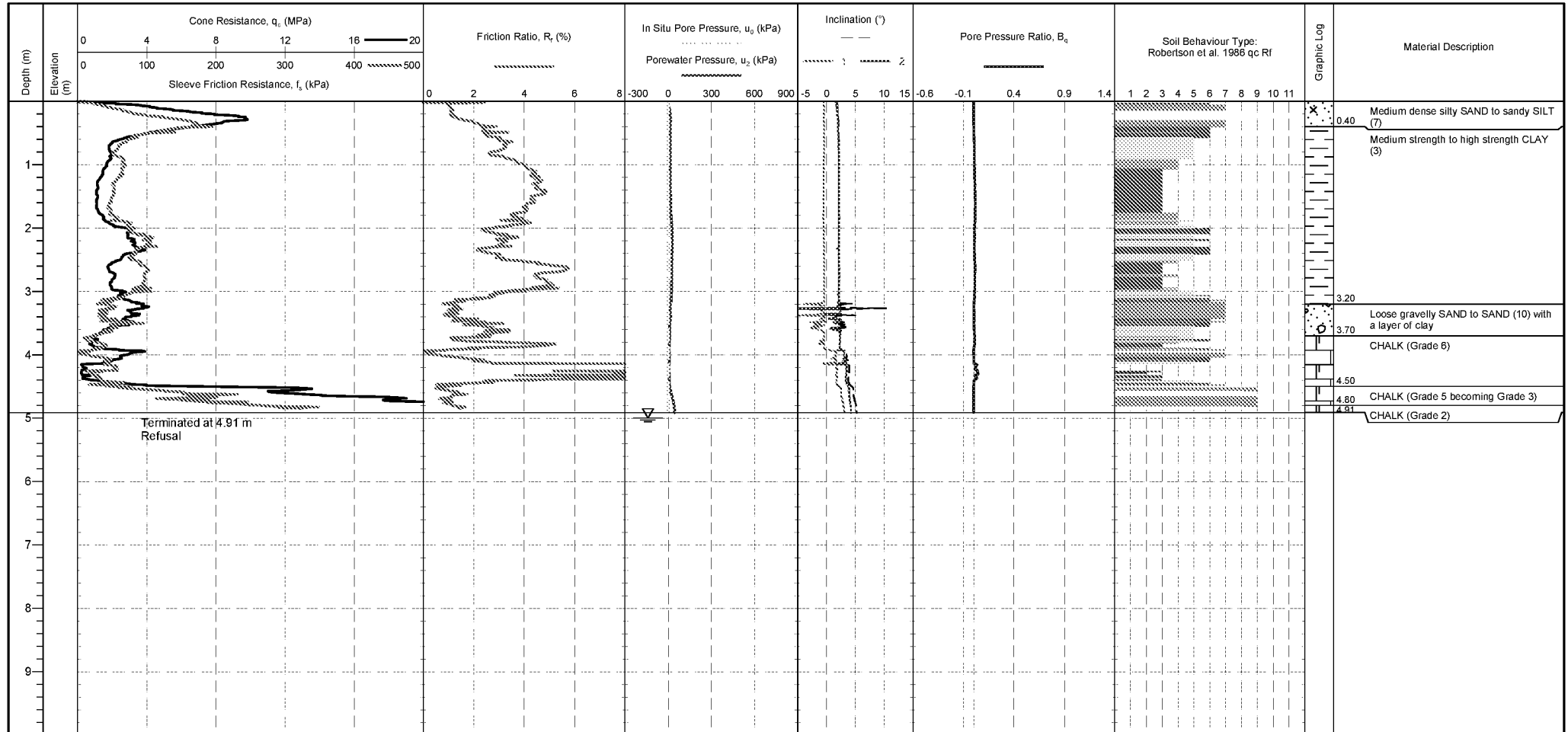
CPT02

CLIENT : Leap Environmental
PROJECT: Elmgrove Road
LOCATION : Littlehampton
PROJECT No. : 1210450

EASTING : 503225.7 m
NORTHING : 102607.1 m
ELEVATION : OD
CHECKED BY : LD
TERMINATION REASON : Refusal

Remark:
Test refused on total pressure.

SHEET : 1 OF 1
STATUS : Final
TEST DATE : 15/09/2021
PLOT DATE : 17/09/2021
METHOD : ISO 22476-1:2012



CONE ID : S15-CFIP.1750
CALIBRATION DATE : 25/08/2020
CONE MODEL : Subtraction
CONE AREA : 15cm²
CONE AREA RATIO : 0.79
FILTER POSITION : u2
FILTER TYPE : HDPE

TEST TYPE : TE2
APPLICATION CLASS : 2
RIG : CPT 016
OPERATOR : LS
FRICTION REDUCER : None
WEATHER : Sunny & Mild
GROUNDWATER DEPTH : Supplied by the client

Transducer :
Tip : 253 mV
Sleeve : 273 mV
Pore Pressure 2 : 258 mV
X-Y Inclinator : 2439 mV

CPTU ZERO VALUES

Post : 258 mV
Difference : 0.054 MPa
0.003 kPa
282 mV
2475 mV

METHOD: Robertson et al. 1986 qc Rf

1 - Sensitive fine grained material
2 - Organic material
3 - CLAY
4 - Silty CLAY to CLAY
5 - Clayey SILT to silty CLAY
6 - Sandy SILT to clayey SILT
7 - Silty SAND to sandy SILT
8 - SAND to silty SAND
9 - SAND
10 - Gravelly SAND to SAND
11 - Very stiff fine grained
12 - SAND to clayey SAND

Groundwater
Level

Dissipation Test

PointID

CPT02

CLIENT : Leap Environmental

PROJECT: Elmgrove Road

LOCATION : Littlehampton

PROJECT No. : 1210450

EASTING : 503225.7 m

NORTHING : 102607.1 m

ELEVATION : OD

CHECKED BY : LD

TERMINATION REASON : Refusal

Remark:
Test refused on total pressure.

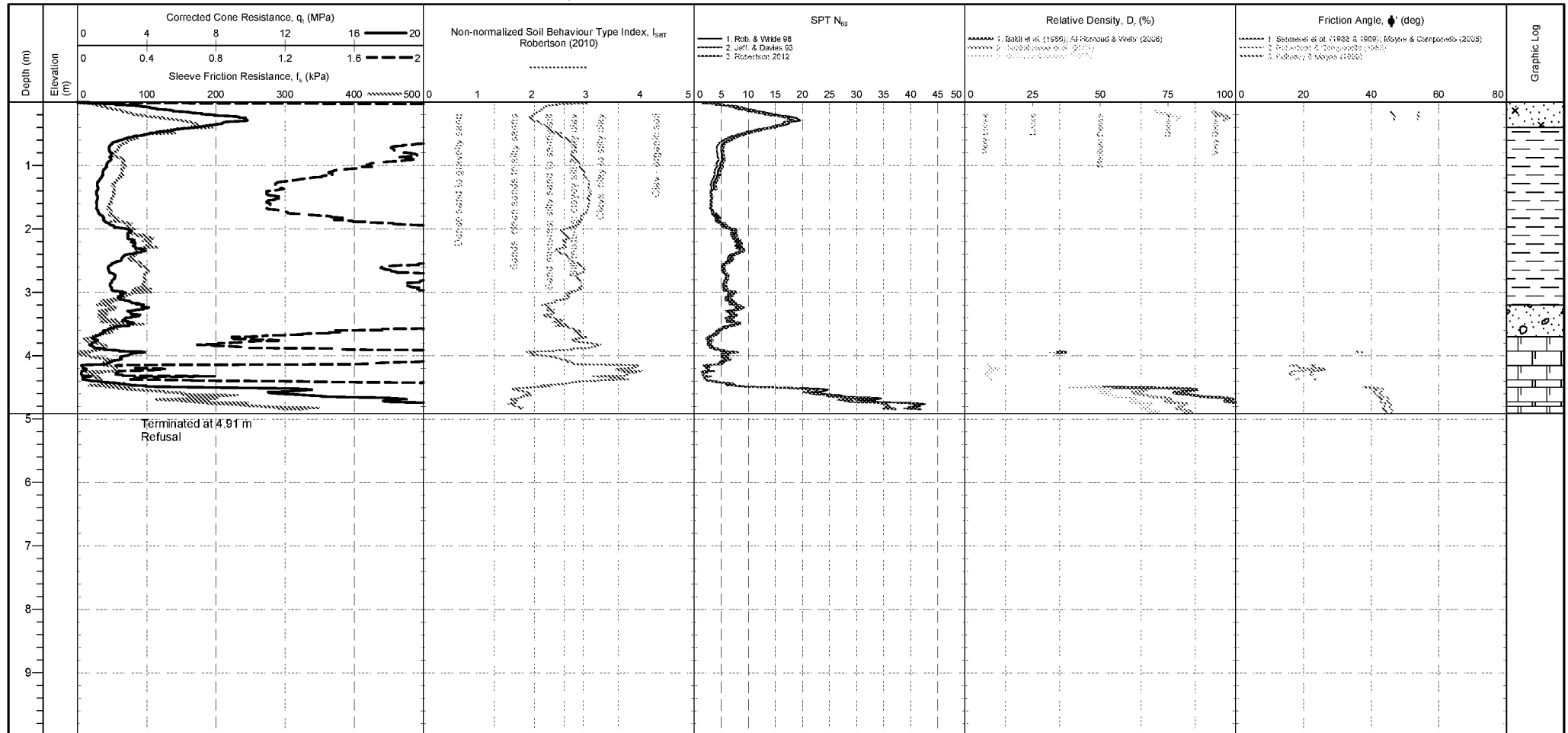
SHEET : 1 OF 1

STATUS : Final

TEST DATE : 15/09/2021

PLOT DATE : 17/09/2021

METHOD : ISO 22476-1:2012



CONE ID : S15-CFIP:1750
CONE MODEL : Subtraction
CONE AREA : 15cm²
CONE AREA RATIO : 0.79
FILTER POSITION : u2
FILTER TYPE : HDPE

TEST TYPE : TE2
APPLICATION CLASS : 2
RIG : CPT 016
OPERATOR : LS
FRICTION REDUCER : None
WEATHER : Sunny & Mild

Transducer :
Tip :
Sleeve :
Pore Pressure 2 :
X-Y Inclinator :
CPTU ZERO VALUES
Pre : 253 mV
Post : 258 mV
Difference : 0.054 MPa
Pre : 273 mV
Post : 277 mV
Difference : 0.003 kPa
Pre : 258 mV
Post : 282 mV
Difference : 0.006 kPa
Pre : 2439 mV
Post : 2475 mV

GRANULAR SOILS (Sands & Gravels) Robertson et al. 1986 Zones 7-10 and Zone 12					
Description	SBT Index, I _c	Description	SPT N value, NSPT	Description	Relative Density D _r (%)
Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15
Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35
Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65
Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85
Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85

Groundwater
Level

Dissipation Test

PointID

CPT02

CLIENT : Leap Environmental

PROJECT: Elmgrove Road

LOCATION : Littlehampton

PROJECT No. : 1210450

EASTING : 503225.7 m

NORTHING : 102607.1 m

ELEVATION : OD

CHECKED BY : LD

TERMINATION REASON : Refusal

Remark:

Test refused on total pressure.

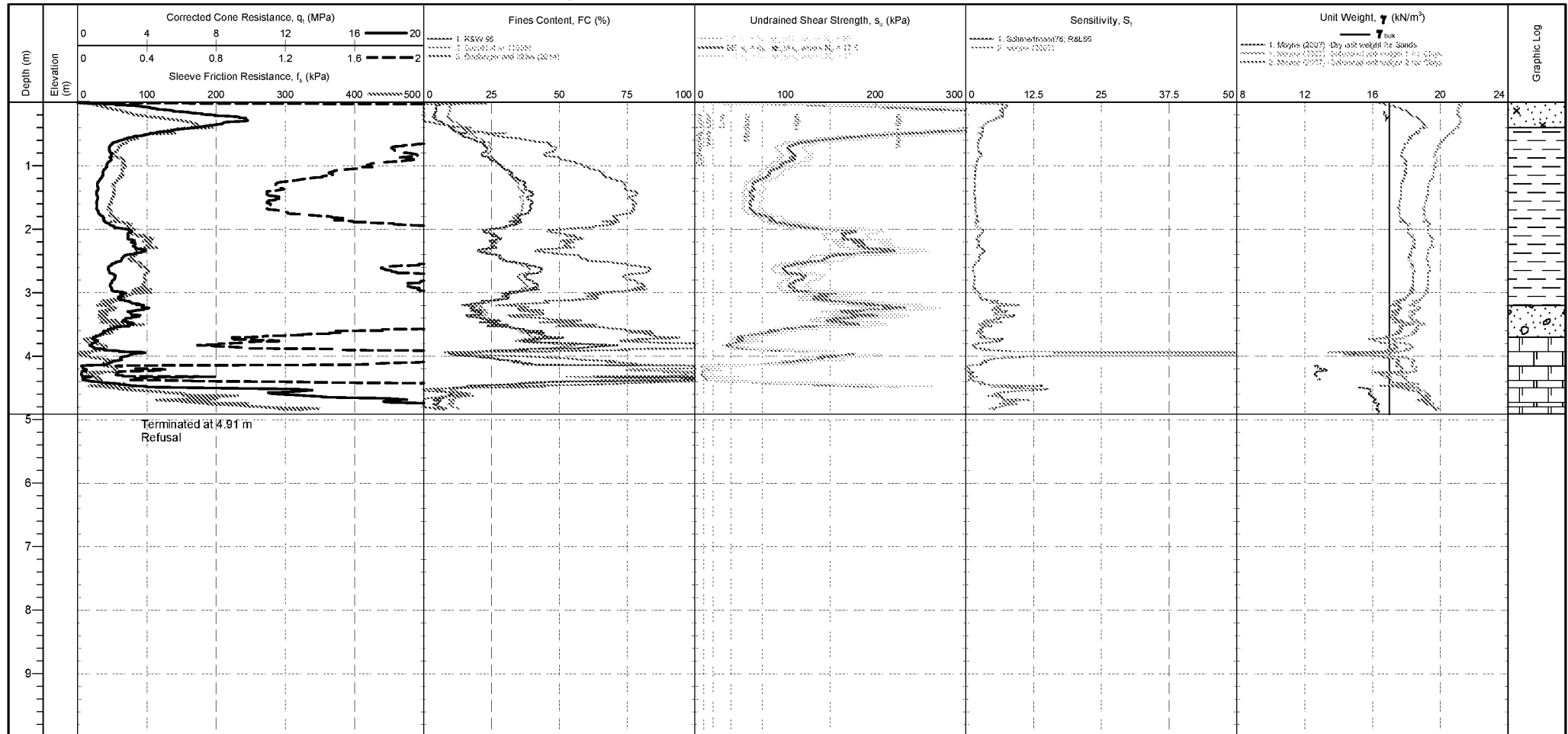
SHEET : 1 OF 1

STATUS : Final

TEST DATE : 15/09/2021

PLOT DATE : 17/09/2021

METHOD : ISO 22476-1:2012



CONE ID : S15-CFIP.1750
 CONE MODEL : Subtraction
 CONE AREA : 15cm²
 CONE AREA RATIO : 0.79
 FILTER POSITION : u2
 FILTER TYPE : HDPE

TEST TYPE : TE2
 APPLICATION CLASS : 2
 RIG : CPT 016
 OPERATOR : LS
 FRICTION REDUCER : None
 WEATHER : Sunny & Mild

Transducer Pre Post Difference
 Tip 253 mV 258 mV 0.054 MPa
 Sleeve 273 mV 277 mV 0.003 kPa
 Pore Pressure 2 258 mV 282 mV 0.006 kPa
 X-Y Inclinator 2439 mV 2475 mV

CPTU ZERO VALUES

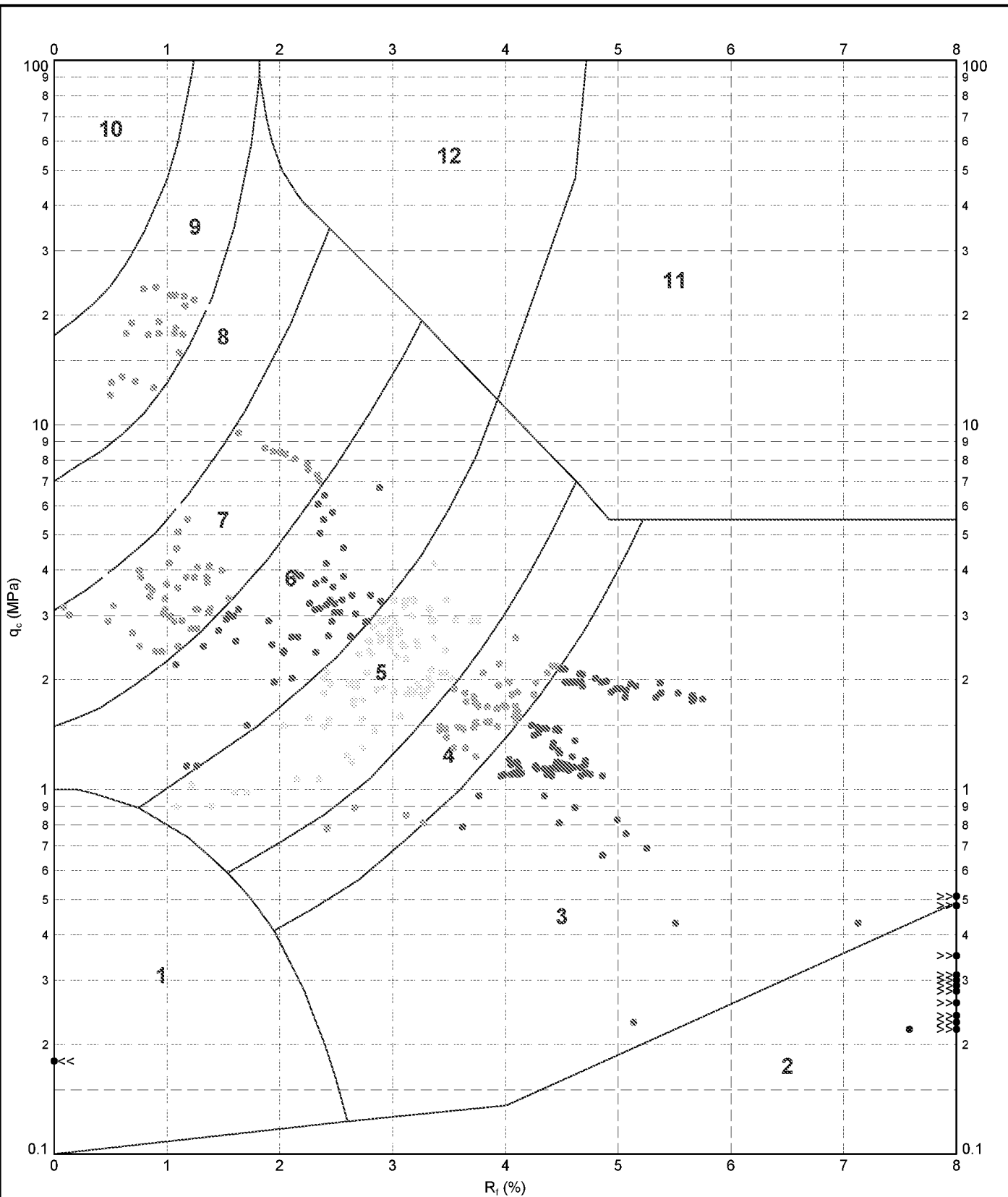
COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11

Term based on measurement	s_u (kPa)	Term based on measurement	s_u (kPa)
Extremely low strength	<10	Medium strength	40-75
Very low strength	10-20	High strength	75-150
Low strength	20-40	Very high strength	150-300
		Extremely high strength	>300

Groundwater Level

Dissipation Test

210528-ADVANCED REPORT INSTITUTE 2.02.1 LIB. ZOE GLB Graph CPT ROBERTSON ET AL. 88 QC VS. RF MP. 1210450 ELMGROVE ROAD LITTLEHAMPTON LEAP ENVIRONMENTAL GPJ <<DrawingFile>> 17/09/2021 15:03 10.02.00.04 D:\geol\lab and in situ\Tost - DGD [Lib. in situ SI 2.02.0 2017-07-10 PJ] in situ SI 2.02.0 2017-07-10



METHOD: Robertson et al. 1986 qc Rf

- | | | | |
|-------------------------------------|-------------------------------|------------------------------|------------------------------|
| 1 - Sensitive fine grained material | 4 - Silty CLAY to CLAY | 7 - Silty SAND to sandy SILT | 10 - Gravelly SAND to SAND |
| 2 - Organic material | 5 - Clayey SILT to silty CLAY | 8 - SAND to silty SAND | 11 - Very stiff fine grained |
| 3 - CLAY | 6 - Sandy SILT to clayey SILT | 9 - SAND | 12 - SAND to clayey SAND |

IN SITU
SITE INVESTIGATION

Leap Environmental
Littlehampton
Elmgrove Road
Robertson et al. 1986 q_c vs. R_f - CPT02

DRAWN	DATE	17/09/2021
CHECKED	DATE	17/09/2021
SCALE	Not To Scale	
PROJECT No	FIGURE No	A4
1210450		

PointID

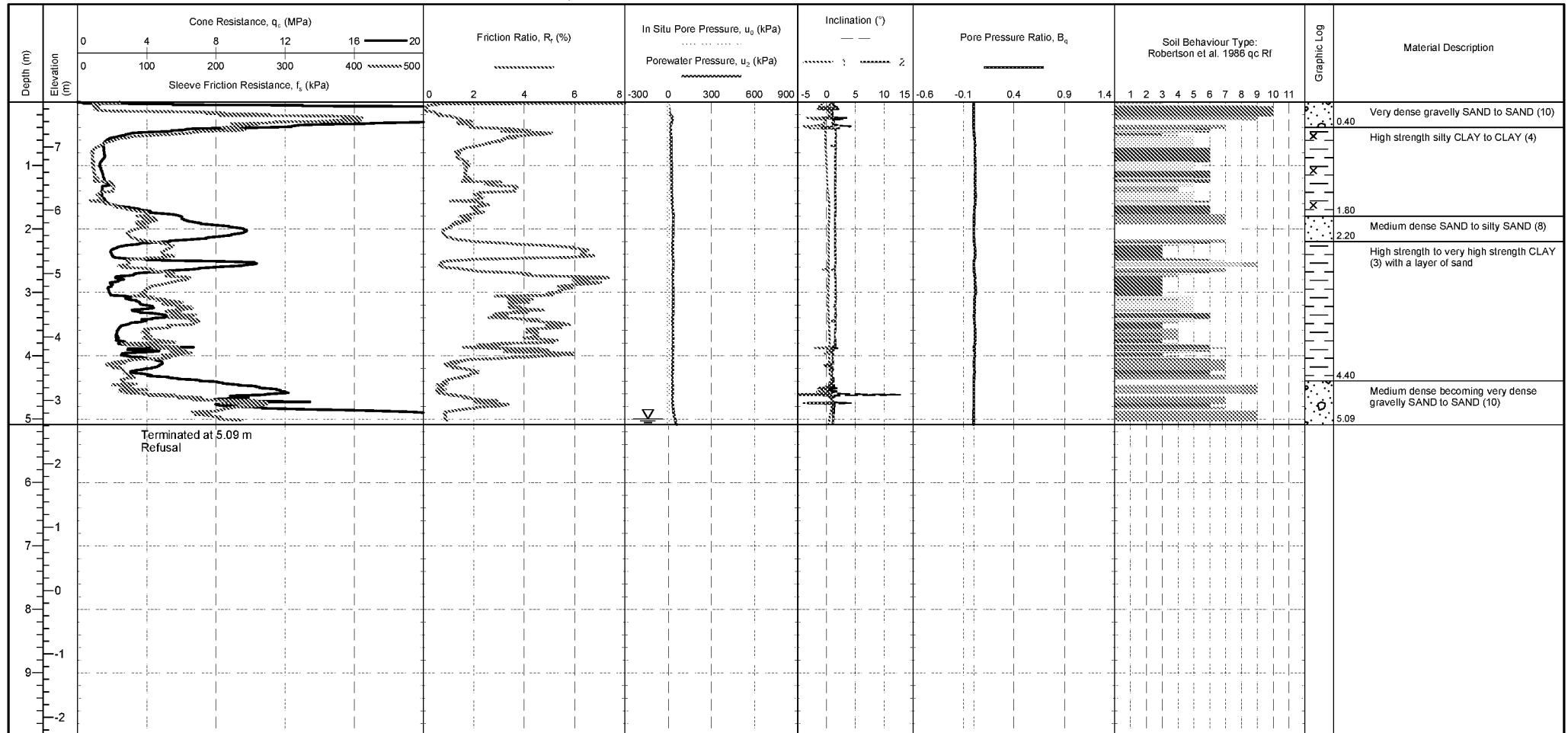
CPT03

CLIENT : Leap Environmental
PROJECT: Elmgrove Road
LOCATION : Littlehampton
PROJECT No. : 1210450

EASTING : 503274.0 m
NORTHING : 102610.2 m
ELEVATION : 7.71 m OD
CHECKED BY : LD
TERMINATION REASON : Refusal

Remark:
Test refused on total pressure.

SHEET : 1 OF 1
STATUS : Final
TEST DATE : 15/09/2021
PLOT DATE : 17/09/2021
METHOD : ISO 22476-1:2012



CONE ID : S15-CFIP.1750
CALIBRATION DATE : 25/08/2020
CONE MODEL : Subtraction
CONE AREA : 15cm²
CONE AREA RATIO : 0.79
FILTER POSITION : u2
FILTER TYPE : HDPE

TEST TYPE : TE2
APPLICATION CLASS : 2
RIG : CPT 016
OPERATOR : LS
FRICTION REDUCER : None
WEATHER : Sunny & Mild
GROUNDWATER DEPTH : Supplied by the client

Transducer
Tip
Sleeve
Pore Pressure 2
X-Y Inclinator

CPTU ZERO VALUES

Pre	Post	Difference
253 mV	259 mV	0.065 MPa
273 mV	277 mV	0.003 kPa
230 mV	292 mV	0.015 kPa
2435 mV	2444 mV	

METHOD: Robertson et al. 1986 qc Rf

1 - Sensitive fine grained material	5 - Clayey SILT to silty CLAY	9 - SAND
2 - Organic material	6 - Sandy SILT to clayey SILT	10 - Gravelly SAND to SAND
3 - CLAY	7 - Silty SAND to sandy SILT	11 - Very stiff fine grained
4 - Silty CLAY to CLAY	8 - SAND to silty SAND	12 - SAND to clayey SAND

Groundwater
Level

Dissipation Test

PointID

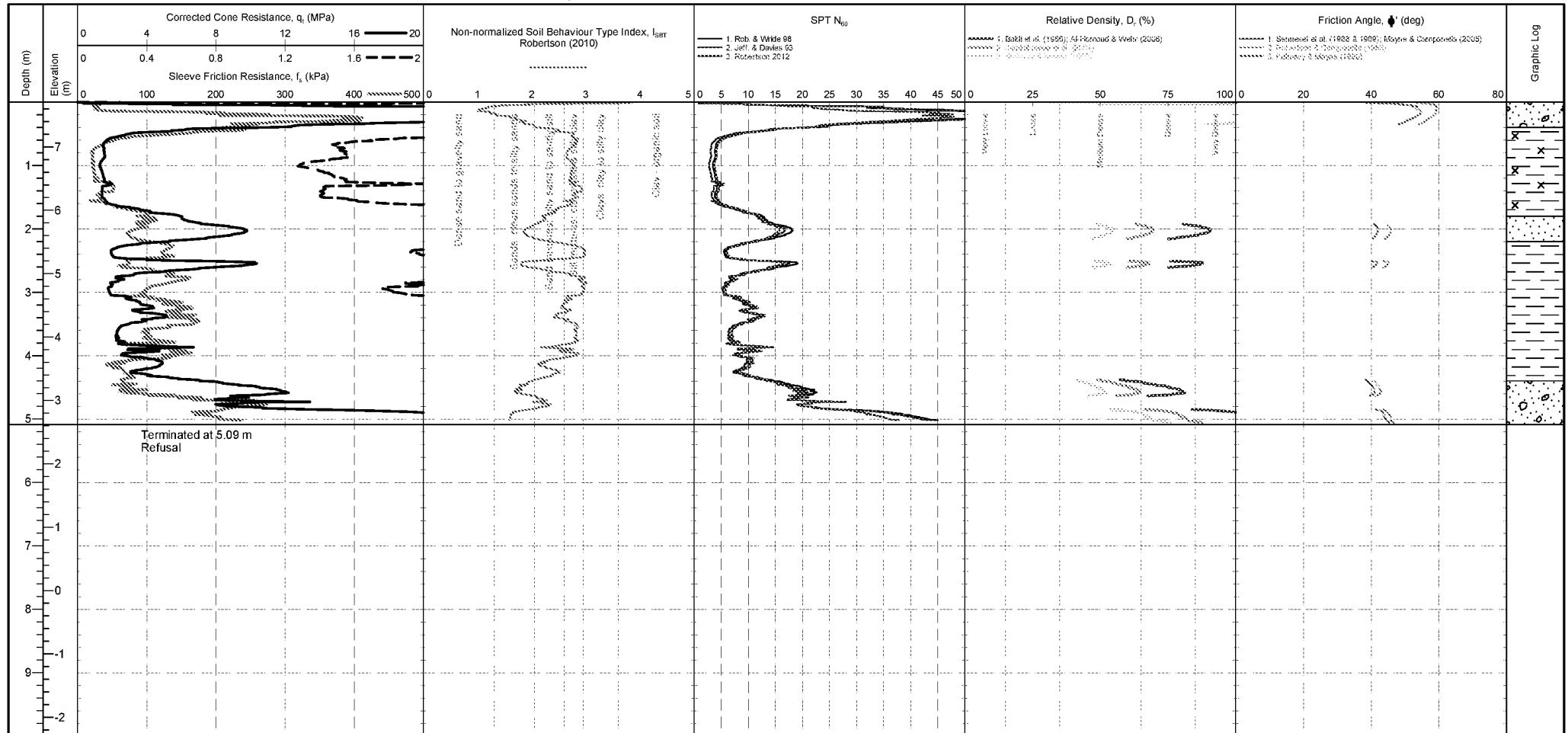
CPT03

CLIENT : Leap Environmental
PROJECT: Elmgrove Road
LOCATION : Littlehampton
PROJECT No. : 1210450

EASTING : 503274.0 m
NORTHING : 102610.2 m
ELEVATION : 7.71 m OD
CHECKED BY : LD
TERMINATION REASON : Refusal

Remark:
Test refused on total pressure.

SHEET : 1 OF 1
STATUS : Final
TEST DATE : 15/09/2021
PLOT DATE : 17/09/2021
METHOD : ISO 22476-1:2012



CONE ID : S15-CFIP.1750
CONE MODEL : Subtraction
CONE AREA : 15cm²
CONE AREA RATIO : 0.79
FILTER POSITION : u2
FILTER TYPE : HDPE

TEST TYPE : TE2
APPLICATION CLASS : 2
RIG : CPT 016
OPERATOR : LS
FRICTION REDUCER : None
WEATHER : Sunny & Mild

Transducer :
Tip :
Sleeve :
Pore Pressure 2 :
X-Y Inclinator :
CPTU ZERO VALUES
Pre : 253 mV
Post : 259 mV
Difference : 0.065 MPa
Pre : 273 mV
Post : 277 mV
Difference : 0.003 kPa
Pre : 230 mV
Post : 292 mV
Difference : 0.015 kPa
Pre : 2435 mV
Post : 2444 mV

GRANULAR SOILS (Sands & Gravels) Robertson et al. 1986 Zones 7-10 and Zone 12					
Description	SBT Index, I_c	Description	SPT N value, NSPT	Description	Relative Density D_r (%)
Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15
Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35
Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65
Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85
Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85

Groundwater Level

Dissipation Test

PointID

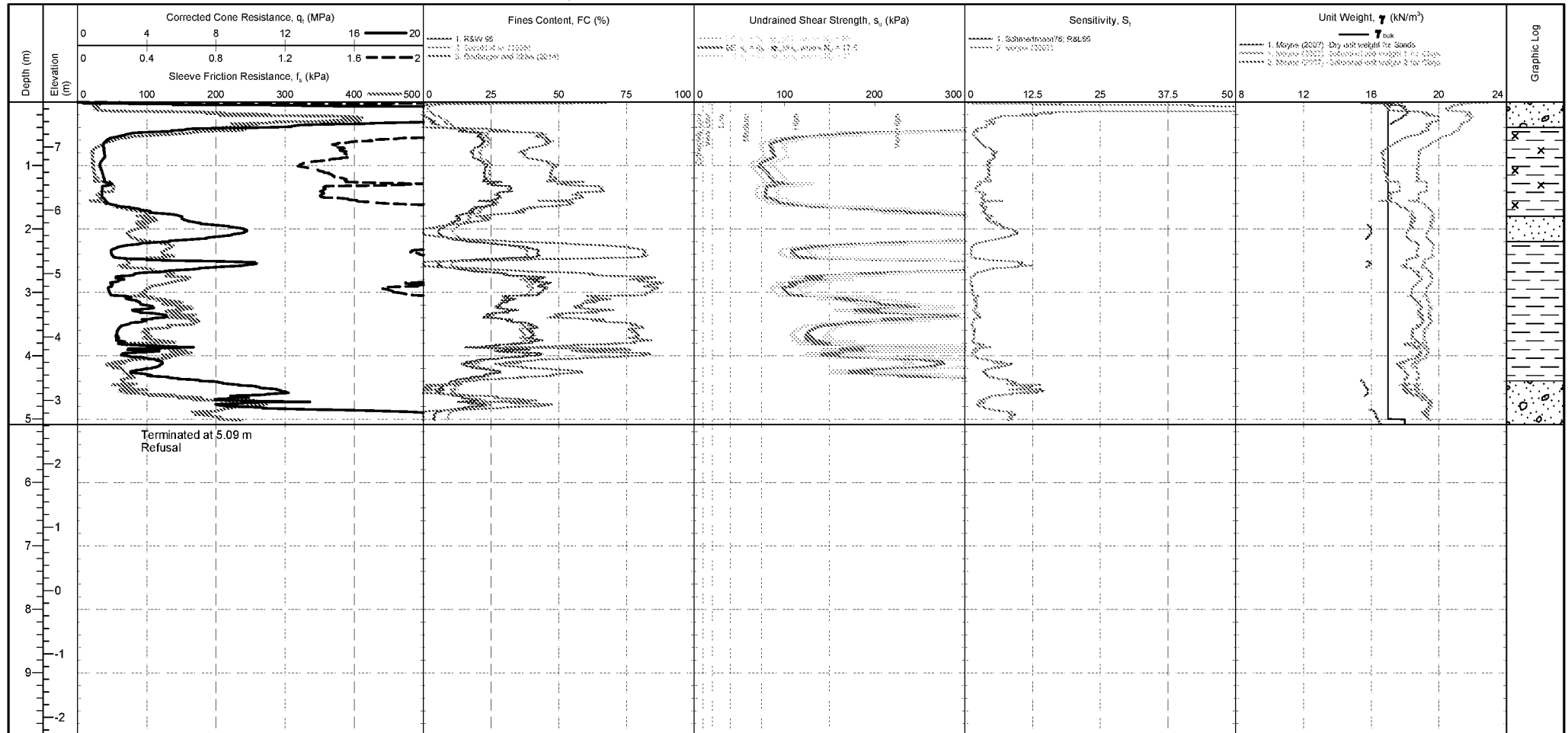
CPT03

CLIENT : Leap Environmental
PROJECT: Elmgrove Road
LOCATION : Littlehampton
PROJECT No. : 1210450

EASTING : 503274.0 m
NORTHING : 102610.2 m
ELEVATION : 7.71 m OD
CHECKED BY : LD
TERMINATION REASON : Refusal

Remark:
Test refused on total pressure.

SHEET : 1 OF 1
STATUS : Final
TEST DATE : 15/09/2021
PLOT DATE : 17/09/2021
METHOD : ISO 22476-1:2012



CONE ID : S15-CFIP.1750
CONE MODEL : Subtraction
CONE AREA : 15cm²
CONE AREA RATIO : 0.79
FILTER POSITION : u2
FILTER TYPE : HDPE

TEST TYPE : TE2
APPLICATION CLASS : 2
RIG : CPT 016
OPERATOR : LS
FRICTION REDUCER : None
WEATHER : Sunny & Mild

Transducer
Tip
Sleeve
Pore Pressure 2
X-Y Inclinator

CPTU ZERO VALUES

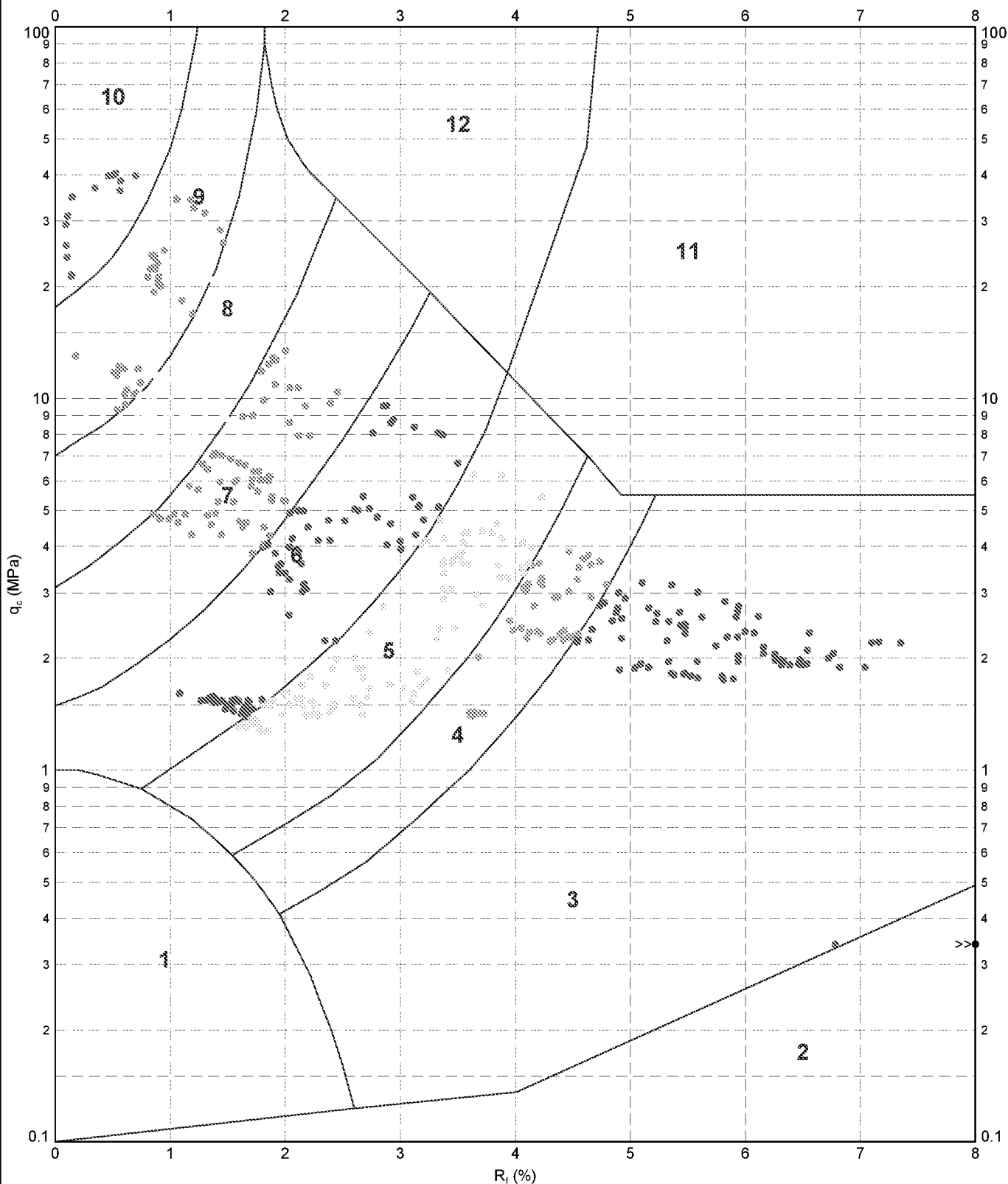
Pre	Post	Difference
253 mV	259 mV	0.065 MPa
273 mV	277 mV	0.003 kPa
230 mV	292 mV	0.015 kPa
2435 mV	2444 mV	

COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11

Term based on measurement	s_u (kPa)	Term based on measurement	s_u (kPa)
Extremely low strength	<10	Medium strength	40-75
Very low strength	10-20	High strength	75-150
Low strength	20-40	Very high strength	150-300
		Extremely high strength	>300

Groundwater Level
Dissipation Test

210528-ADVANCED REPORT INSTITUTE 2.02.1 LIB. ZOE GLB Graph CPT ROBERTSON ET AL. 88 QC VS. RF MP. 1210450 ELMGROVE ROAD LITTLEHAMPTON LEAP ENVIRONMENTAL GPJ <<DrawingFile>> 17/09/2021 15:04 10.02.00.04 D:\glb Lab and in Situ Test - DGD Lib in Situ SI 2.02.0 2017-07-10 PhJ in Situ SI 2.02.0 2017-07-10



METHOD: Robertson et al. 1986 qc Rf

- | | | | |
|-------------------------------------|-------------------------------|------------------------------|------------------------------|
| 1 - Sensitive fine grained material | 4 - Silty CLAY to CLAY | 7 - Silty SAND to sandy SILT | 10 - Gravelly SAND to SAND |
| 2 - Organic material | 5 - Clayey SILT to silty CLAY | 8 - SAND to silty SAND | 11 - Very stiff fine grained |
| 3 - CLAY | 6 - Sandy SILT to clayey SILT | 9 - SAND | 12 - SAND to clayey SAND |

IN SITU
SITE INVESTIGATION

TITLE

Leap Environmental
Littlehampton
Elmgrove Road
Robertson et al. 1986 qc vs. Rf - CPT03

DRAWN

DATE

17/09/2021

CHECKED

DATE

17/09/2021

SCALE

Not To Scale

A4

PROJECT No

1210450

FIGURE No

PointID

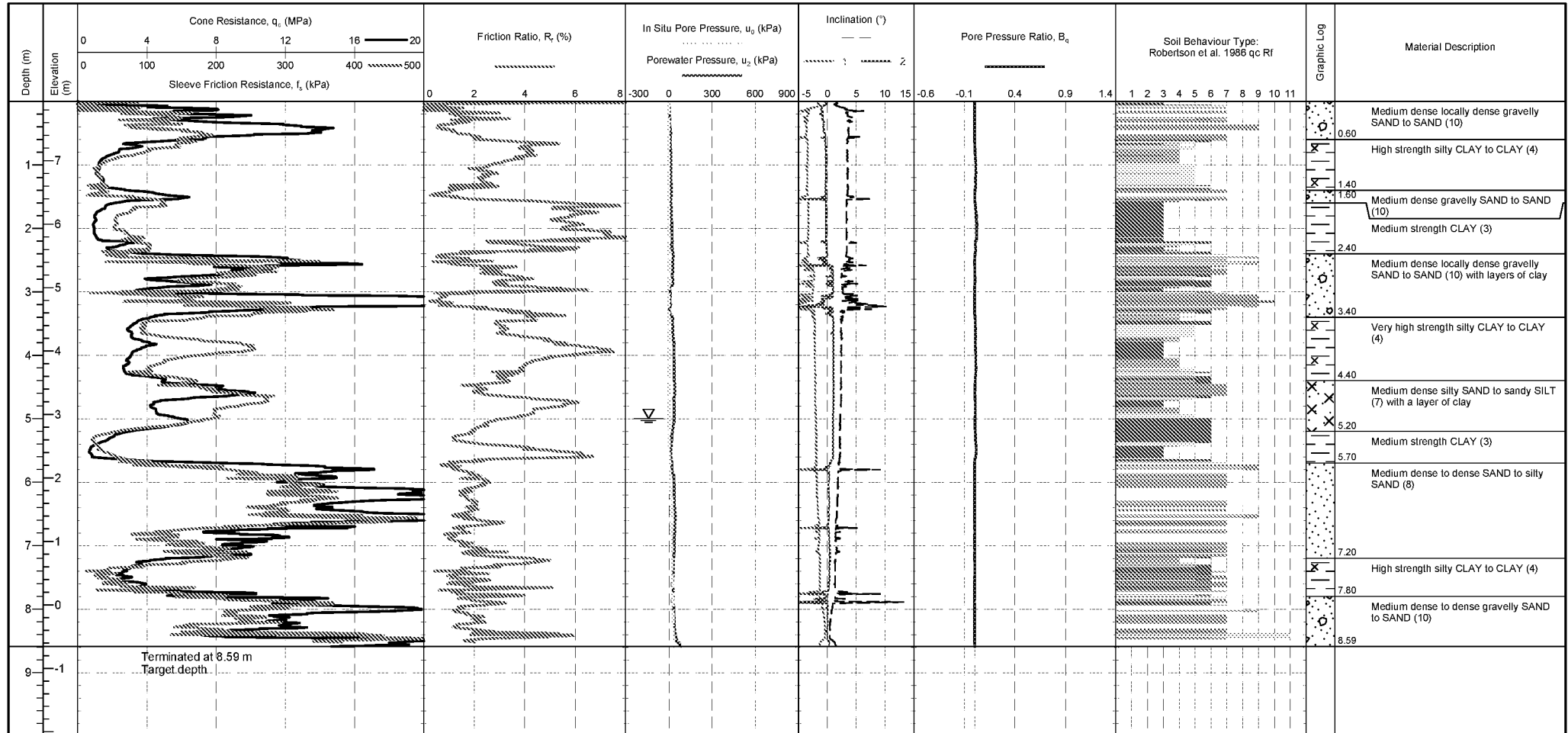
CPT04

CLIENT : Leap Environmental
PROJECT: Elmgrove Road
LOCATION : Littlehampton
PROJECT No. : 1210450

EASTING : 503279.8 m
NORTHING : 102587.5 m
ELEVATION : 7.93 m OD
CHECKED BY : LD
TERMINATION REASON : Target depth

Remark:
Test completed at target depth.

SHEET : 1 OF 1
STATUS : Final
TEST DATE : 15/09/2021
PLOT DATE : 17/09/2021
METHOD : ISO 22476-1:2012



CONE ID : S15-CFIP.1750
CALIBRATION DATE : 25/08/2020
CONE MODEL : Subtraction
CONE AREA : 15cm²
CONE AREA RATIO : 0.79
FILTER POSITION : u2
FILTER TYPE : HDPE

TEST TYPE : TE2
APPLICATION CLASS : 2
RIG : CPT 016
OPERATOR : LS
FRICTION REDUCER : None
WEATHER : Sunny & Mild
GROUNDWATER DEPTH : Supplied by the client

CPTU ZERO VALUES

Transducer	Pre	Post	Difference
Tip	255 mV	256 mV	0.011 MPa
Sleeve	273 mV	276 mV	0.002 kPa
Pore Pressure 2	263 mV	271 mV	0.002 kPa
X-Y Inclinator	2382 mV	2345 mV	

METHOD: Robertson et al. 1986 qc Rf

1 - Sensitive fine grained material	5 - Clayey SILT to silty CLAY	9 - SAND
2 - Organic material	6 - Sandy SILT to clayey SILT	10 - Gravelly SAND to SAND
3 - CLAY	7 - Silty SAND to sandy SILT	11 - Very stiff fine grained
4 - Silty CLAY to CLAY	8 - SAND to silty SAND	12 - SAND to clayey SAND

Groundwater Level

Dissipation Test

PointID

CPT04

CLIENT : Leap Environmental

PROJECT: Elmgrove Road

LOCATION : Littlehampton

PROJECT No. : 1210450

EASTING : 503279.8 m

NORTHING : 102587.5 m

ELEVATION : 7.93 m OD

CHECKED BY : LD

TERMINATION REASON : Target depth

Remark:
Test completed at target depth.

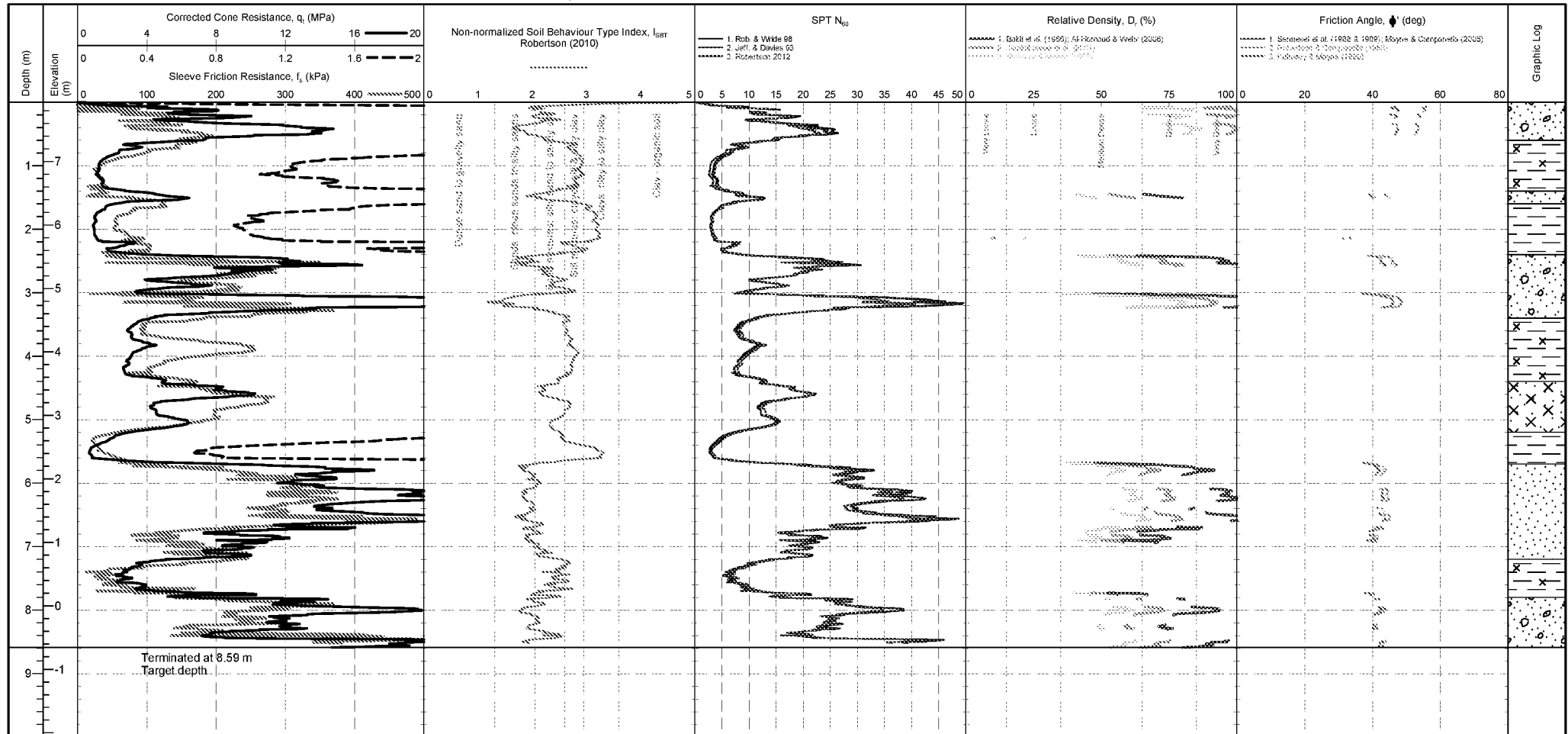
SHEET : 1 OF 1

STATUS : Final

TEST DATE : 15/09/2021

PLOT DATE : 17/09/2021

METHOD : ISO 22476-1:2012



CONE ID : S15-CFIP.1750
CONE MODEL : Subtraction
CONE AREA : 15cm²
CONE AREA RATIO : 0.79
FILTER POSITION : u2
FILTER TYPE : HDPE

TEST TYPE : TE2
APPLICATION CLASS : 2
RIG : CPT 016
OPERATOR : LS
FRICTION REDUCER : None
WEATHER : Sunny & Mild

Transducer :
Tip : 255 mV
Sleeve : 273 mV
Pore Pressure 2 : 263 mV
X-Y Inclinator : 2382 mV

CPTU ZERO VALUES

Pre	Post	Difference
256 mV	256 mV	0.011 MPa
276 mV	276 mV	0.002 kPa
271 mV	271 mV	0.002 kPa
2345 mV	2345 mV	

GRANULAR SOILS (Sands & Gravels) Robertson et al. 1986 Zones 7-10 and Zone 12

Description	SBT Index, I_c	Description	SPT N value, NSPT	Description	Relative Density D_r (%)
Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15
Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35
Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65
Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85
Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85

Groundwater Level

Dissipation Test

PointID

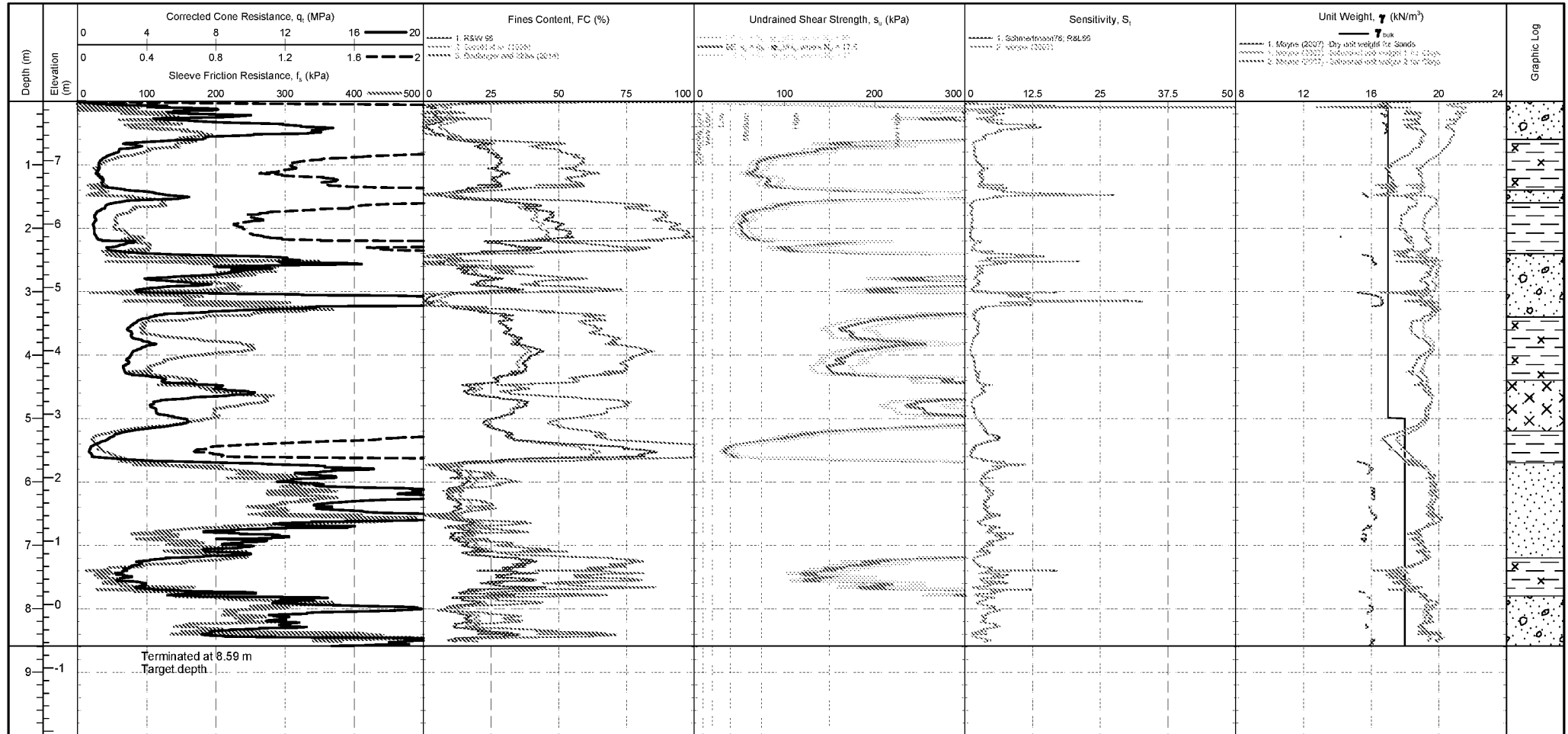
CPT04

CLIENT : Leap Environmental
PROJECT: Elmgrove Road
LOCATION : Littlehampton
PROJECT No. : 1210450

EASTING : 503279.8 m
NORTHING : 102587.5 m
ELEVATION : 7.93 m OD
CHECKED BY : LD
TERMINATION REASON : Target depth

Remark:
Test completed at target depth.

SHEET : 1 OF 1
STATUS : Final
TEST DATE : 15/09/2021
PLOT DATE : 17/09/2021
METHOD : ISO 22476-1:2012



CONE ID : S15-CFIP.1750
CONE MODEL : Subtraction
CONE AREA : 15cm²
CONE AREA RATIO : 0.79
FILTER POSITION : u2
FILTER TYPE : HDPE

TEST TYPE : TE2
APPLICATION CLASS : 2
RIG : CPT 016
OPERATOR : LS
FRICTION REDUCER : None
WEATHER : Sunny & Mild

Transducer
Tip
Sleeve
Pore Pressure 2
X-Y Inclinator

CPTU ZERO VALUES

Pre	Post	Difference
255 mV	256 mV	0.011 MPa
273 mV	276 mV	0.002 kPa
263 mV	271 mV	0.002 kPa
2382 mV	2345 mV	

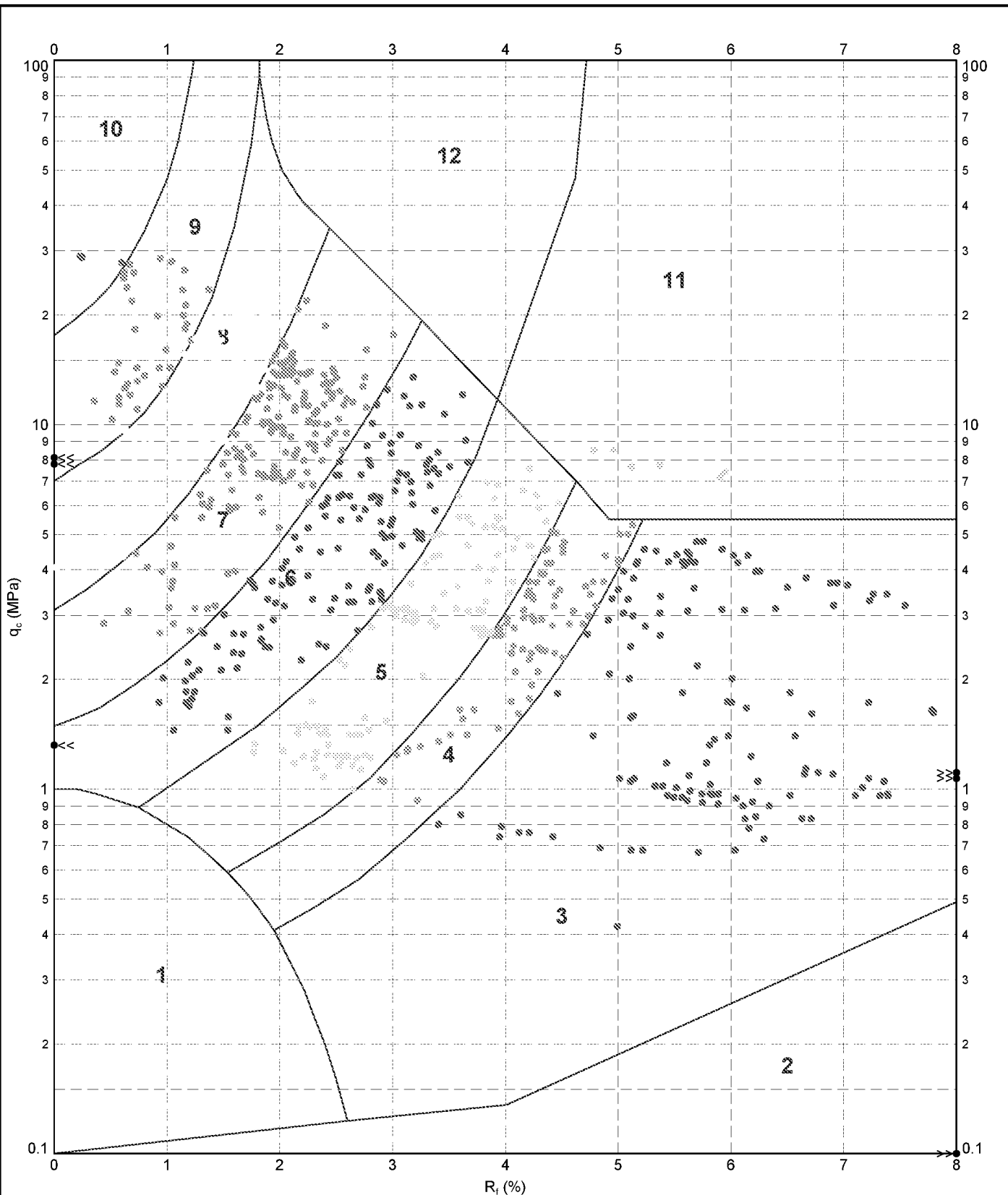
COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11

Term based on measurement	s_u (kPa)	Term based on measurement	s_u (kPa)
Extremely low strength	<10	Medium strength	40-75
Very low strength	10-20	High strength	75-150
Low strength	20-40	Very high strength	150-300
		Extremely high strength	>300

Groundwater Level

Dissipation Test

210538-ADVANCED REPORT INSTITUTE 2.02.1 LIB. ZOE GLB Graph CPT ROBERTSON ET AL. 88 QC VS. RF MAP 1210450 ELMGROVE ROAD LITTLEHAMPTON LEAP ENVIRONMENTAL GPJ <<DrawingFile>> 17/09/2021 15:05 10.02.00.04 D:\gep Lab and in Situ Test - DGD [Lib. in Situ SI 2.02.0 2017-07-10 PJ] in Situ SI 2.02.0 2017-07-10



METHOD: Robertson et al. 1986 qc R_f

- | | | | |
|-------------------------------------|-------------------------------|------------------------------|------------------------------|
| 1 - Sensitive fine grained material | 4 - Silty CLAY to CLAY | 7 - Silty SAND to sandy SILT | 10 - Gravelly SAND to SAND |
| 2 - Organic material | 5 - Clayey SILT to silty CLAY | 8 - SAND to silty SAND | 11 - Very stiff fine grained |
| 3 - CLAY | 6 - Sandy SILT to clayey SILT | 9 - SAND | 12 - SAND to clayey SAND |

IN SITU
SITE INVESTIGATION

TITLE

Leap Environmental
Littlehampton
Elmgrove Road
Robertson et al. 1986 q_c vs. R_f - CPT04

DRAWN

DATE

17/09/2021

CHECKED

DATE

17/09/2021

SCALE

Not To Scale

A4

PROJECT No

1210450

FIGURE No

PointID

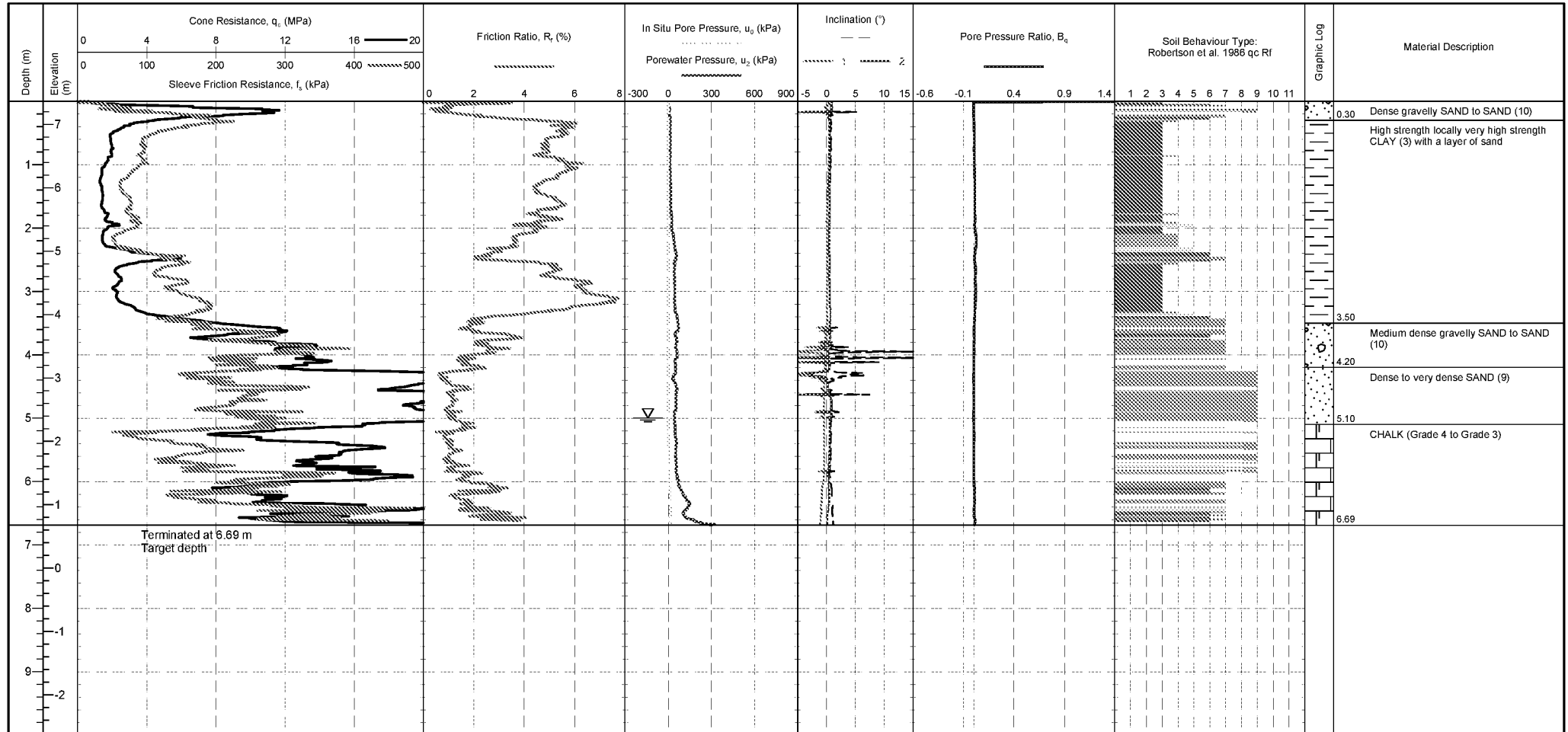
CPT05

CLIENT : Leap Environmental
PROJECT: Elmgrove Road
LOCATION : Littlehampton
PROJECT No. : 1210450

EASTING : 503323.8 m
NORTHING : 102596.0 m
ELEVATION : 7.37 m OD
CHECKED BY : LD
TERMINATION REASON : Target depth

Remark:
Test completed at target depth.

SHEET : 1 OF 1
STATUS : Final
TEST DATE : 15/09/2021
PLOT DATE : 17/09/2021
METHOD : ISO 22476-1:2012



CONE ID : S15-CFIP.1750
CALIBRATION DATE : 25/08/2020
CONE MODEL : Subtraction
CONE AREA : 15cm²
CONE AREA RATIO : 0.79
FILTER POSITION : u2
FILTER TYPE : HDPE

TEST TYPE : TE2
APPLICATION CLASS : 2
RIG : CPT 016
OPERATOR : LS
FRICTION REDUCER : None
WEATHER : Sunny & Mild
GROUNDWATER DEPTH : Supplied by the client

Transducer :
Tip : 255 mV
Sleeve : 275 mV
Pore Pressure 2 : 236 mV
X-Y Inclinator : 2564 mV

CPTU ZERO VALUES
Post : 258 mV
Difference : 0.032 MPa
0.001 kPa
0.015 kPa
2528 mV

METHOD: Robertson et al. 1986 qc Rf

1 - Sensitive fine grained material
2 - Organic material
3 - CLAY
4 - Silty CLAY to CLAY
5 - Clayey SILT to silty CLAY
6 - Sandy SILT to clayey SILT
7 - Silty SAND to sandy SILT
8 - SAND to silty SAND
9 - SAND
10 - Gravelly SAND to SAND
11 - Very stiff fine grained
12 - SAND to clayey SAND

Groundwater
Level

Dissipation Test

PointID

CPT05

CLIENT : Leap Environmental

PROJECT: Elmgrove Road

LOCATION : Littlehampton

PROJECT No. : 1210450

EASTING : 503323.8 m

NORTHING : 102596.0 m

ELEVATION : 7.37 m OD

CHECKED BY : LD

TERMINATION REASON : Target depth

Remark:
Test completed at target depth.

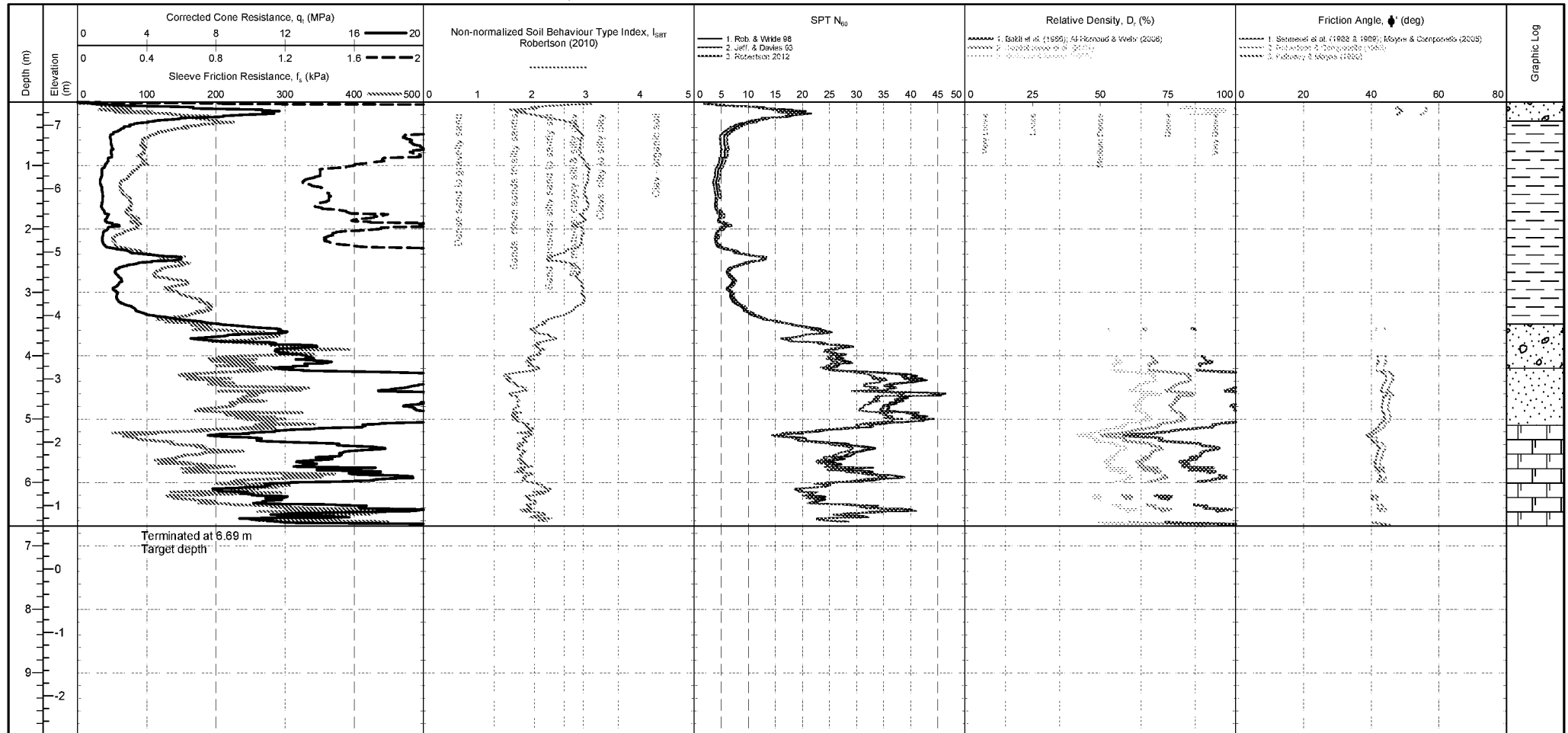
SHEET : 1 OF 1

STATUS : Final

TEST DATE : 15/09/2021

PLOT DATE : 17/09/2021

METHOD : ISO 22476-1:2012



CONE ID : S15-CFIP.1750
CONE MODEL : Subtraction
CONE AREA : 15cm²
CONE AREA RATIO : 0.79
FILTER POSITION : u2
FILTER TYPE : HDPE

TEST TYPE : TE2
APPLICATION CLASS : 2
RIG : CPT 016
OPERATOR : LS
FRICTION REDUCER : None
WEATHER : Sunny & Mild

Transducer
Tip
Sleeve
Pore Pressure 2
X-Y Inclinator

Pre	Post	Difference
255 mV	258 mV	0.032 MPa
275 mV	277 mV	0.001 kPa
236 mV	298 mV	0.015 kPa
2564 mV	2528 mV	

GRANULAR SOILS (Sands & Gravels) Robertson et al. 1986 Zones 7-10 and Zone 12					
Description	SBT Index, I_c	Description	SPT N value, NSPT	Description	Relative Density D_r (%)
Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15
Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35
Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65
Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85
Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85

Groundwater
Level

Dissipation Test

PointID

CPT05

CLIENT : Leap Environmental

PROJECT: Elmgrove Road

LOCATION : Littlehampton

PROJECT No. : 1210450

EASTING : 503323.8 m

NORTHING : 102596.0 m

ELEVATION : 7.37 m OD

CHECKED BY : LD

TERMINATION REASON : Target depth

Remark:

Test completed at target depth.

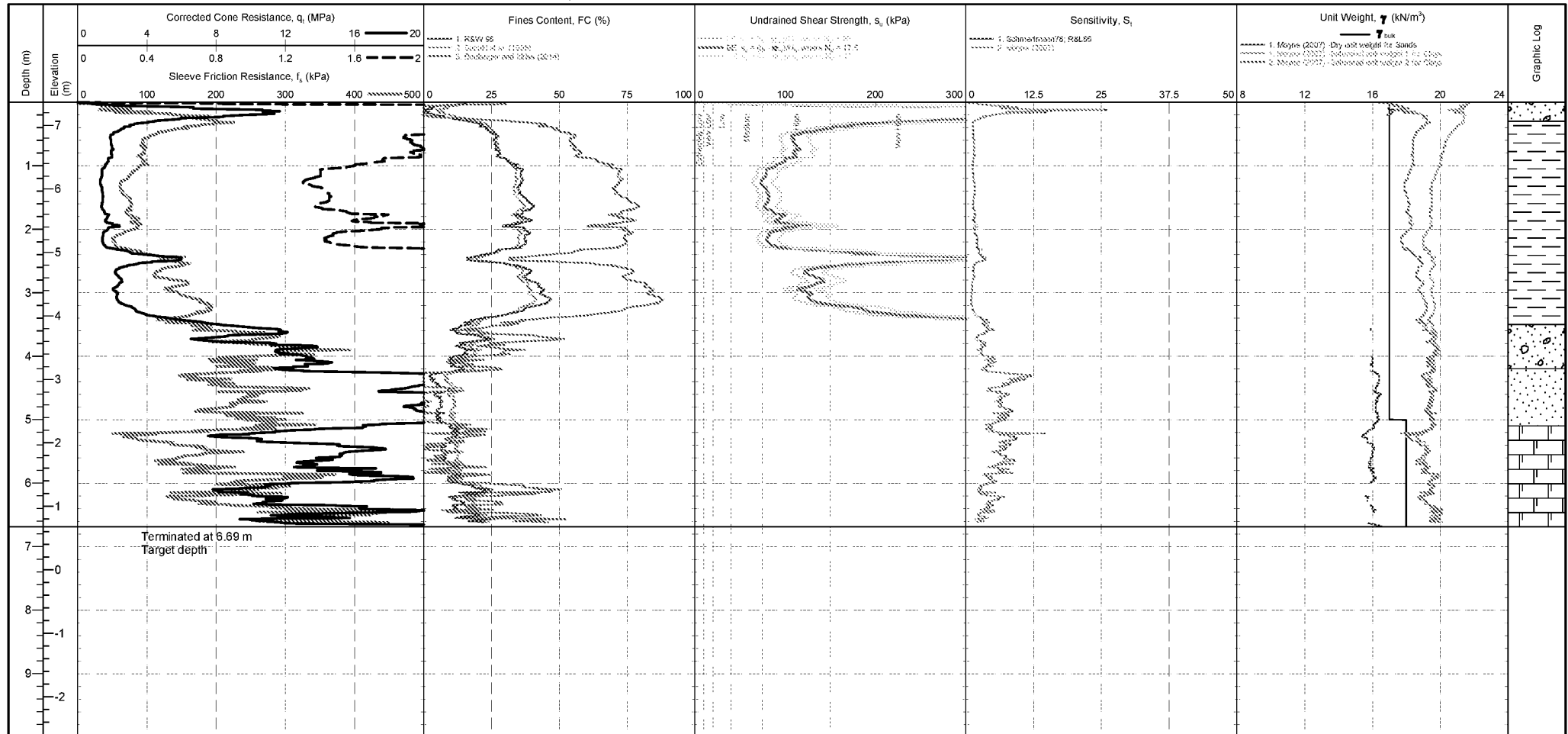
SHEET : 1 OF 1

STATUS : Final

TEST DATE : 15/09/2021

PLOT DATE : 17/09/2021

METHOD : ISO 22476-1:2012



CONE ID : S15-CFIP.1750
 CONE MODEL : Subtraction
 CONE AREA : 15cm²
 CONE AREA RATIO : 0.79
 FILTER POSITION : u2
 FILTER TYPE : HDPE

TEST TYPE : TE2
 APPLICATION CLASS : 2
 RIG : CPT 016
 OPERATOR : LS
 FRICTION REDUCER : None
 WEATHER : Sunny & Mild

Transducer
 Tip
 Sleeve
 Pore Pressure 2
 X-Y Inclinator

Pre
 255 mV
 275 mV
 236 mV
 2564 mV

Post
 258 mV
 277 mV
 298 mV
 2528 mV

Difference
 0.032 MPa
 0.001 kPa
 0.015 kPa

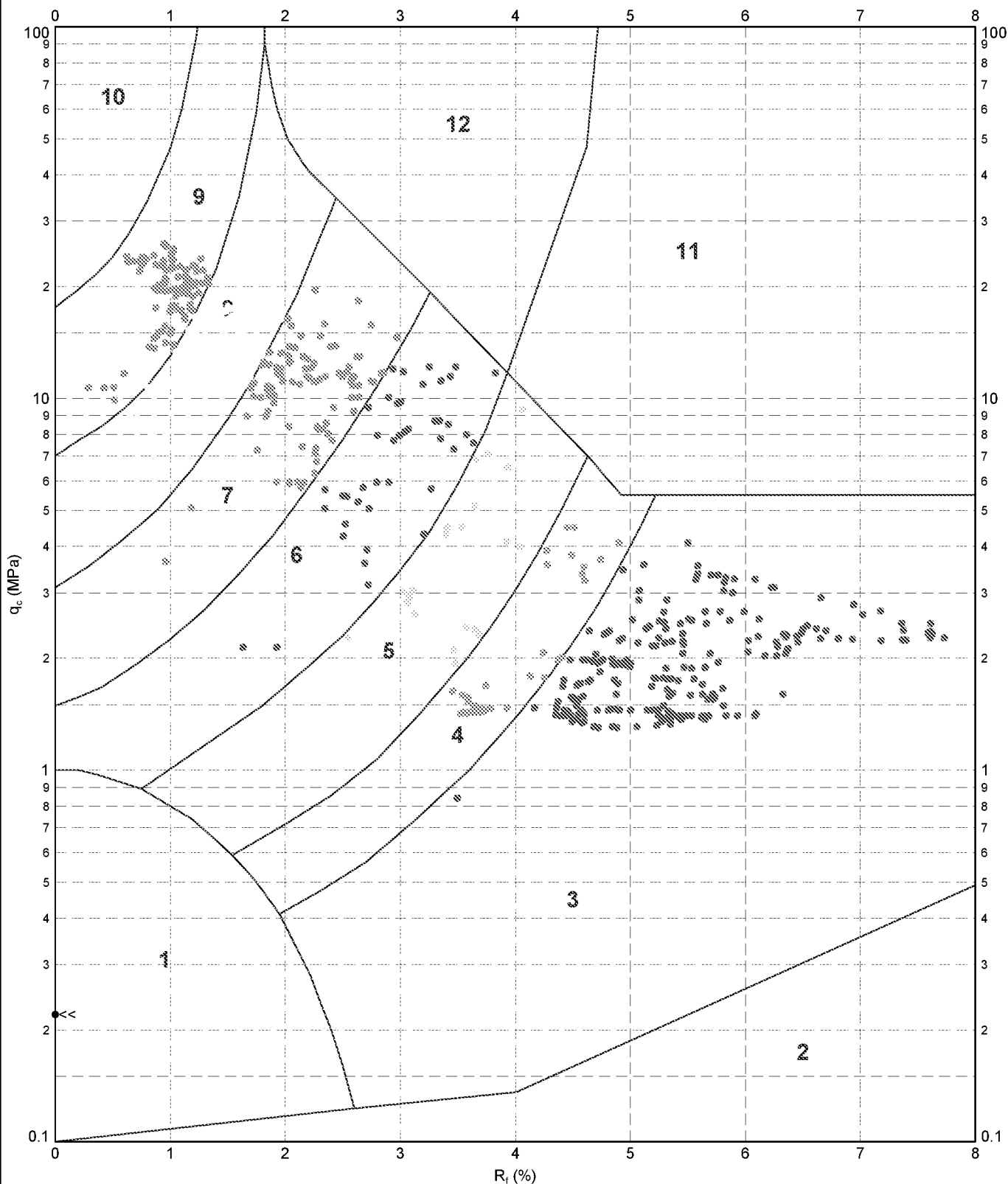
COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11

Term based on measurement	s_u (kPa)	Term based on measurement	s_u (kPa)
Extremely low strength	<10	Medium strength	40-75
Very low strength	10-20	High strength	75-150
Low strength	20-40	Very high strength	150-300
		Extremely high strength	>300

Groundwater Level

Dissipation Test

210528-ADVANCED REPORT INSTITUTE 2.02.1 LIB. ZOE GLB Graph CPT ROBERTSON ET AL. 88 QC VS. RF MAP 1210450 ELMGROVE ROAD LITTLEHAMPTON LEAP ENVIRONMENTAL GPJ <<DrawingFile>> 17/09/2021 15:08 10.02.00.04 D:\glb Lab and in Situ Test - DGD Lib in Situ SI 2.02.0 2017-07-10 PHJ in Situ SI 2.02.0 2017-07-10



METHOD: Robertson et al. 1986 q_c R_f

- | | | | |
|-------------------------------------|-------------------------------|------------------------------|------------------------------|
| 1 - Sensitive fine grained material | 4 - Silty CLAY to CLAY | 7 - Silty SAND to sandy SILT | 10 - Gravelly SAND to SAND |
| 2 - Organic material | 5 - Clayey SILT to silty CLAY | 8 - SAND to silty SAND | 11 - Very stiff fine grained |
| 3 - CLAY | 6 - Sandy SILT to clayey SILT | 9 - SAND | 12 - SAND to clayey SAND |

IN SITU
SITE INVESTIGATION

Leap Environmental
Littlehampton
Elmgrove Road
Robertson et al. 1986 q_c vs. R_f - CPT05

DRAWN	DATE	17/09/2021
CHECKED	DATE	17/09/2021
SCALE	Not To Scale	
PROJECT No	FIGURE No	A4
1210450		

PointID

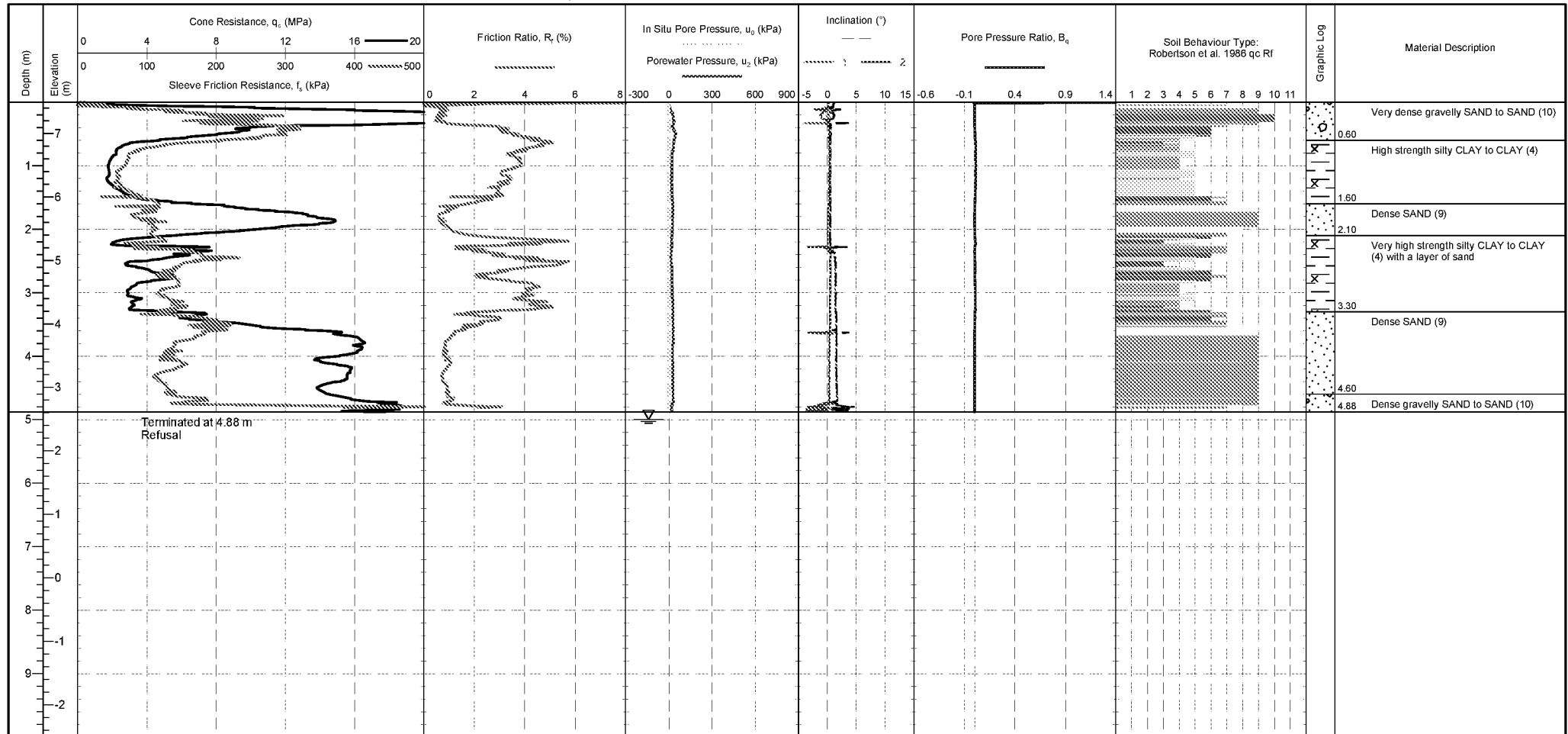
CPT06

CLIENT : Leap Environmental
PROJECT: Elmgrove Road
LOCATION : Littlehampton
PROJECT No. : 1210450

EASTING : 503321.8 m
NORTHING : 102614.5 m
ELEVATION : 7.49 m OD
CHECKED BY : LD
TERMINATION REASON : Refusal

Remark:
Test refused on total pressure.

SHEET : 1 OF 1
STATUS : Final
TEST DATE : 15/09/2021
PLOT DATE : 17/09/2021
METHOD : ISO 22476-1:2012



CONE ID : S15-CFIP.1750
CALIBRATION DATE : 25/08/2020
CONE MODEL : Subtraction
CONE AREA : 15cm²
CONE AREA RATIO : 0.79
FILTER POSITION : u2
FILTER TYPE : HDPE

TEST TYPE : TE2
APPLICATION CLASS : 2
RIG : CPT 016
OPERATOR : LS
FRICTION REDUCER : None
WEATHER : Sunny & Mild
GROUNDWATER DEPTH : Supplied by the client

Transducer :
Tip : 256 mV
Sleeve : 274 mV
Pore Pressure 2 : 280 mV
X-Y Inclinator : 2622 mV

CPTU ZERO VALUES
Post : 257 mV
Difference : 0.011 MPa
0.001 kPa
-0.003 kPa
2636 mV

METHOD: Robertson et al. 1986 qc Rf

1 - Sensitive fine grained material
2 - Organic material
3 - CLAY
4 - Silty CLAY to CLAY
5 - Clayey SILT to silty CLAY
6 - Sandy SILT to clayey SILT
7 - Silty SAND to sandy SILT
8 - SAND to silty SAND
9 - SAND
10 - Gravelly SAND to SAND
11 - Very stiff fine grained
12 - SAND to clayey SAND

Groundwater Level

Dissipation Test

PointID

CPT06

CLIENT : Leap Environmental

PROJECT: Elmgrove Road

LOCATION : Littlehampton

PROJECT No. : 1210450

EASTING : 503321.8 m

NORTHING : 102614.5 m

ELEVATION : 7.49 m OD

CHECKED BY : LD

TERMINATION REASON : Refusal

Remark:
Test refused on total pressure.

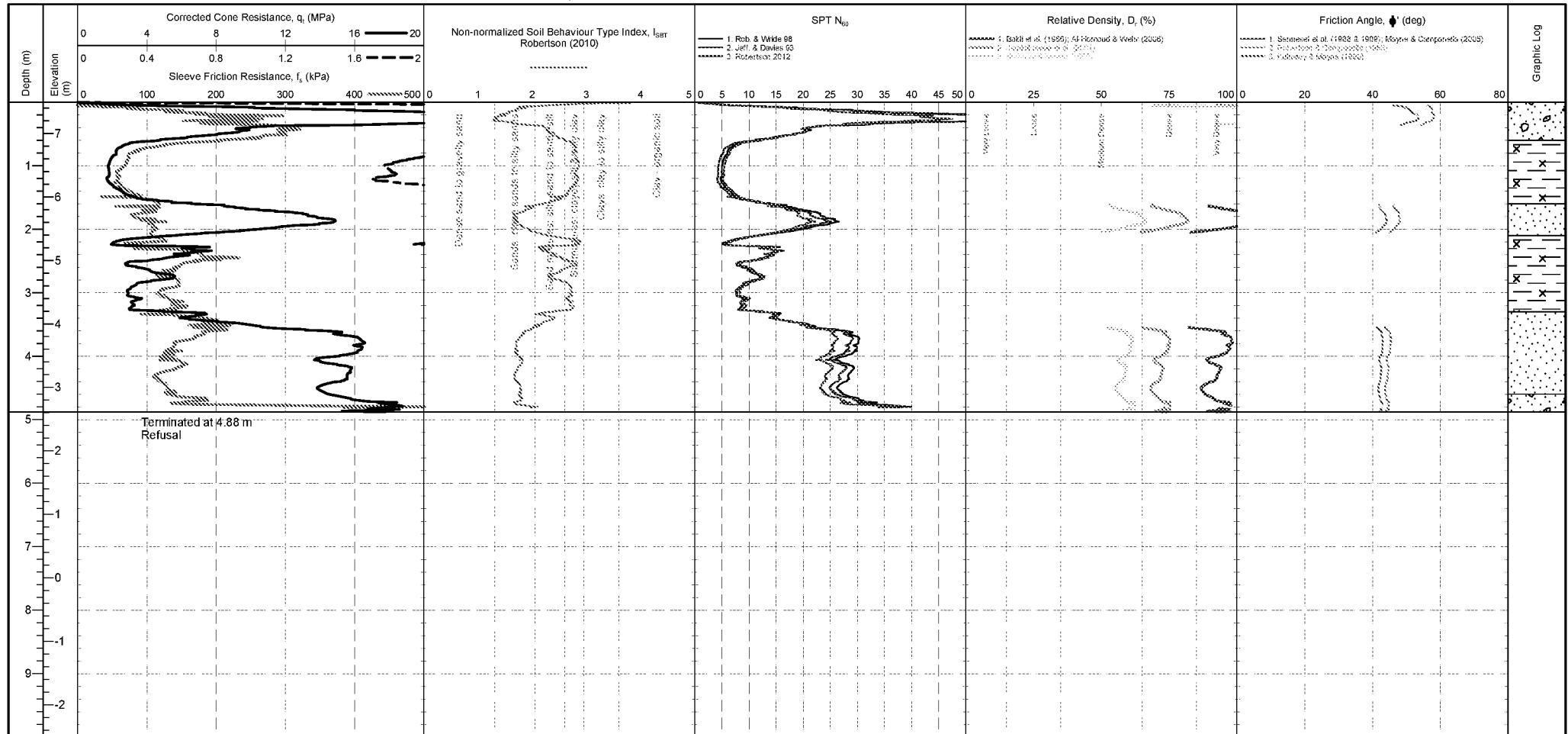
SHEET : 1 OF 1

STATUS : Final

TEST DATE : 15/09/2021

PLOT DATE : 17/09/2021

METHOD : ISO 22476-1:2012



CONE ID : S15-CFIP.1750
CONE MODEL : Subtraction
CONE AREA : 15cm²
CONE AREA RATIO : 0.79
FILTER POSITION : u2
FILTER TYPE : HDPE

TEST TYPE : TE2
APPLICATION CLASS : 2
RIG : CPT 016
OPERATOR : LS
FRICTION REDUCER : None
WEATHER : Sunny & Mild

Transducer
Tip
Sleeve
Pore Pressure 2
X-Y Inclinator

CPTU ZERO VALUES

Pre	Post	Difference
256 mV	257 mV	0.011 MPa
274 mV	275 mV	0.001 kPa
280 mV	267 mV	-0.003 kPa
2622 mV	2636 mV	

GRANULAR SOILS (Sands & Gravels) Robertson et al. 1986 Zones 7-10 and Zone 12					
Description	SBT Index, I_c	Description	SPT N value, NSPT	Description	Relative Density D_r (%)
Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15
Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35
Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65
Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85
Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85

Groundwater
Level

Dissipation Test

PointID

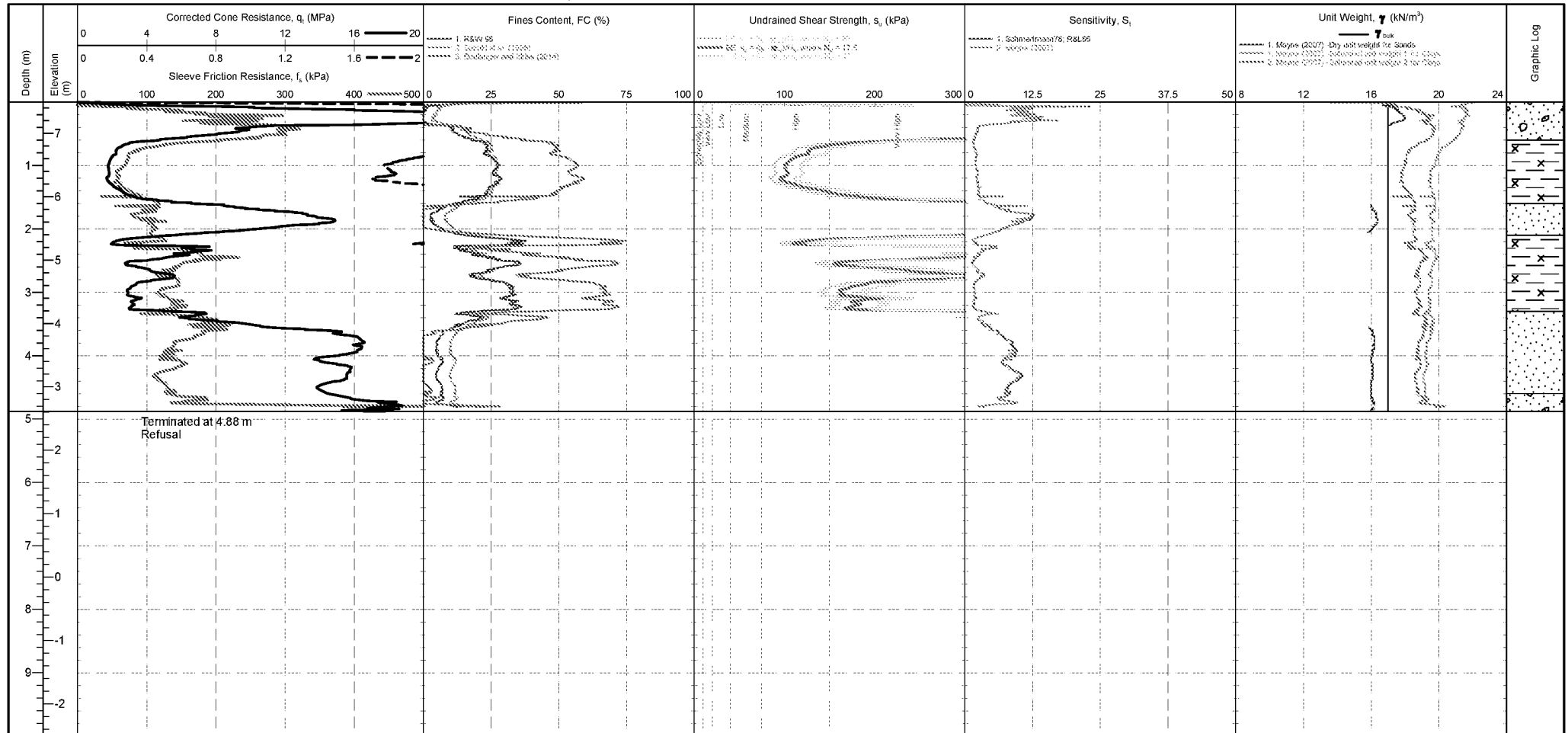
CPT06

CLIENT : Leap Environmental
PROJECT: Elmgrove Road
LOCATION : Littlehampton
PROJECT No. : 1210450

EASTING : 503321.8 m
NORTHING : 102614.5 m
ELEVATION : 7.49 m OD
CHECKED BY : LD
TERMINATION REASON : Refusal

Remark:
Test refused on total pressure.

SHEET : 1 OF 1
STATUS : Final
TEST DATE : 15/09/2021
PLOT DATE : 17/09/2021
METHOD : ISO 22476-1:2012



CONE ID : S15-CFIP.1750
CONE MODEL : Subtraction
CONE AREA : 15cm²
CONE AREA RATIO : 0.79
FILTER POSITION : u2
FILTER TYPE : HDPE

TEST TYPE : TE2
APPLICATION CLASS : 2
RIG : CPT 016
OPERATOR : LS
FRICTION REDUCER : None
WEATHER : Sunny & Mild

Transducer
Tip
Sleeve
Pore Pressure 2
X-Y Inclinator

Pre
256 mV
274 mV
280 mV
2622 mV

Post
257 mV
275 mV
267 mV
2636 mV

Difference
0.011 MPa
0.001 kPa
-0.003 kPa

CPTU ZERO VALUES

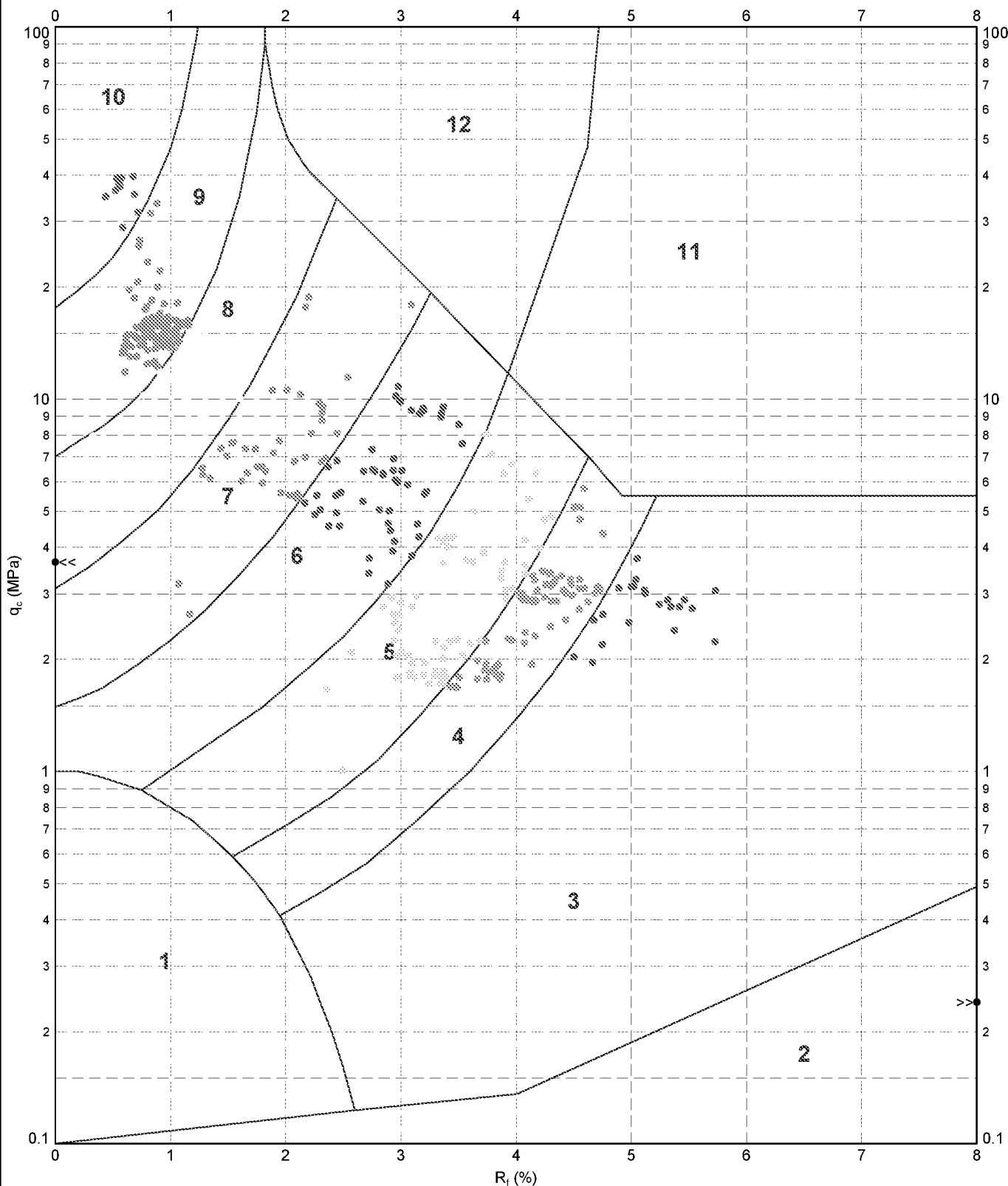
COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11

Term based on measurement	s_u (kPa)	Term based on measurement	s_u (kPa)
Extremely low strength	<10	Medium strength	40-75
Very low strength	10-20	High strength	75-150
Low strength	20-40	Very high strength	150-300
		Extremely high strength	>300

Groundwater Level

Dissipation Test

210528-ADVANCED REPORT INSTITUTE 2.02.1 LIB. ZOE GLB Graph CPT ROBERTSON ET AL. 88 QC VS. RF MP. 1210450 ELMGROVE ROAD LITTLEHAMPTON LEAP ENVIRONMENTAL GPJ <<DrawingFile>> 17/09/2021 15:09 10.02.00.04 D:\glb\lib\in situ\2.02.0 2017-07-10 PJ\in situ\2.02.0 2017-07-10



METHOD: Robertson et al. 1986 qc Rf

- | | | | |
|-------------------------------------|-------------------------------|------------------------------|------------------------------|
| 1 - Sensitive fine grained material | 4 - Silty CLAY to CLAY | 7 - Silty SAND to sandy SILT | 10 - Gravelly SAND to SAND |
| 2 - Organic material | 5 - Clayey SILT to silty CLAY | 8 - SAND to silty SAND | 11 - Very stiff fine grained |
| 3 - CLAY | 6 - Sandy SILT to clayey SILT | 9 - SAND | 12 - SAND to clayey SAND |

IN SITU
SITE INVESTIGATION

Leap Environmental
Littlehampton
Elmgrove Road
Robertson et al. 1986 qc vs. Rf - CPT06

DRAWN	DATE	17/09/2021
CHECKED	DATE	17/09/2021
SCALE	Not To Scale	
PROJECT No	FIGURE No	A4
1210450		

PointID

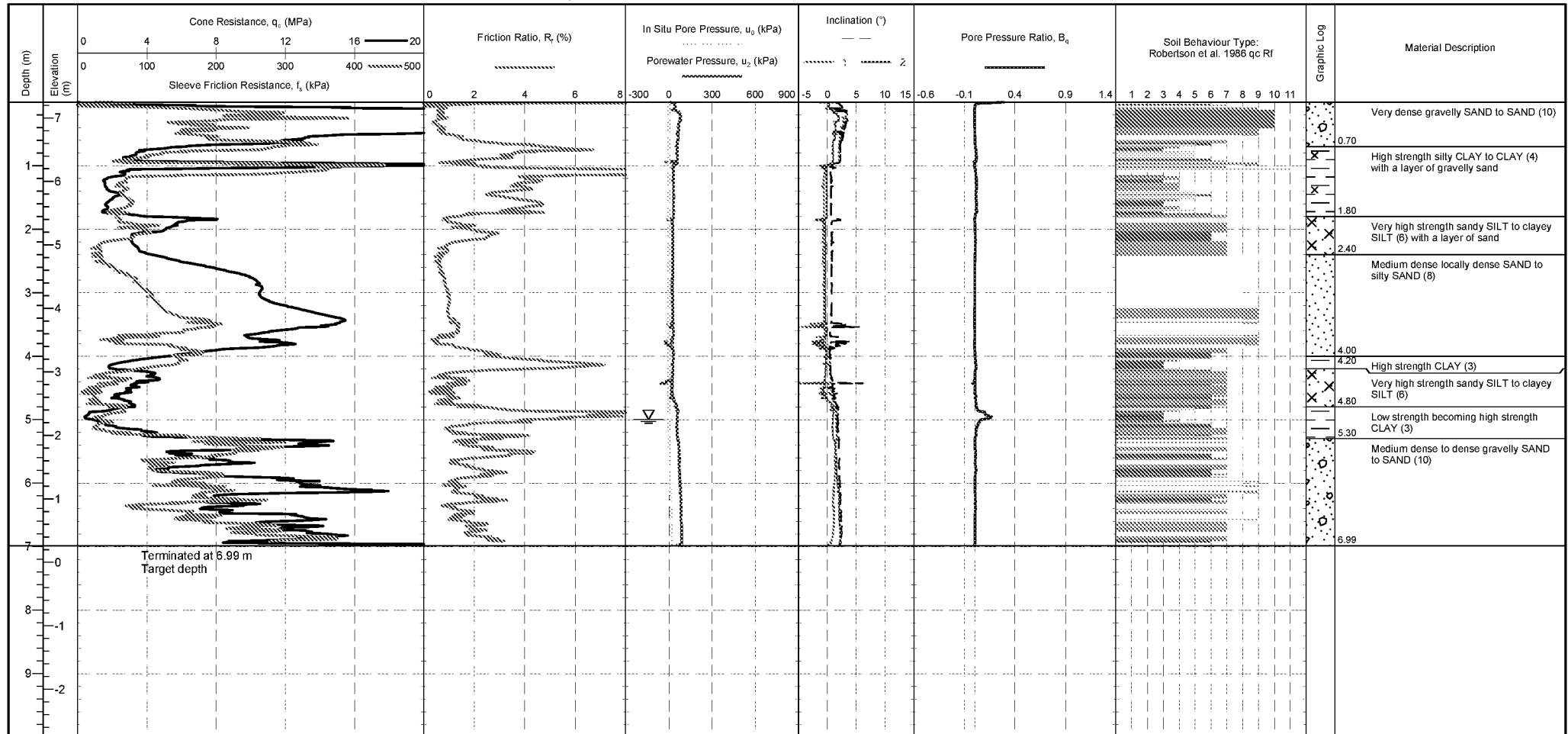
CPT07A

CLIENT : Leap Environmental
PROJECT: Elmgrove Road
LOCATION : Littlehampton
PROJECT No. : 1210450

EASTING : 503368.3 m
NORTHING : 102620.4 m
ELEVATION : 7.25 m OD
CHECKED BY : LD
TERMINATION REASON : Target depth

Remark:
Test completed at target depth.

SHEET : 1 OF 1
STATUS : Final
TEST DATE : 15/09/2021
PLOT DATE : 17/09/2021
METHOD : ISO 22476-1:2012



CONE ID : S15-CFIP.1750
CALIBRATION DATE : 25/08/2020
CONE MODEL : Subtraction
CONE AREA : 15cm²
CONE AREA RATIO : 0.79
FILTER POSITION : u2
FILTER TYPE : HDPE

TEST TYPE : TE2
APPLICATION CLASS : 2
RIG : CPT 016
OPERATOR : LS
FRICTION REDUCER : None
WEATHER : Sunny & Mild
GROUNDWATER DEPTH : Supplied by the client

Transducer :
Tip : 257 mV
Sleeve : 272 mV
Pore Pressure 2 : 2229 mV
X-Y Inclinator : 2528 mV

CPTU ZERO VALUES

Pre	Post	Difference
257 mV	257 mV	0 MPa
272 mV	277 mV	0.003 kPa
2229 mV	236 mV	-0.475 kPa
2528 mV	2465 mV	

METHOD: Robertson et al. 1986 qc Rf

1 - Sensitive fine grained material	5 - Clayey SILT to silty CLAY	9 - SAND
2 - Organic material	6 - Sandy SILT to clayey SILT	10 - Gravelly SAND to SAND
3 - CLAY	7 - Silty SAND to sandy SILT	11 - Very stiff fine grained
4 - Silty CLAY to CLAY	8 - SAND to silty SAND	12 - SAND to clayey SAND

Groundwater
Level

Dissipation Test

PointID

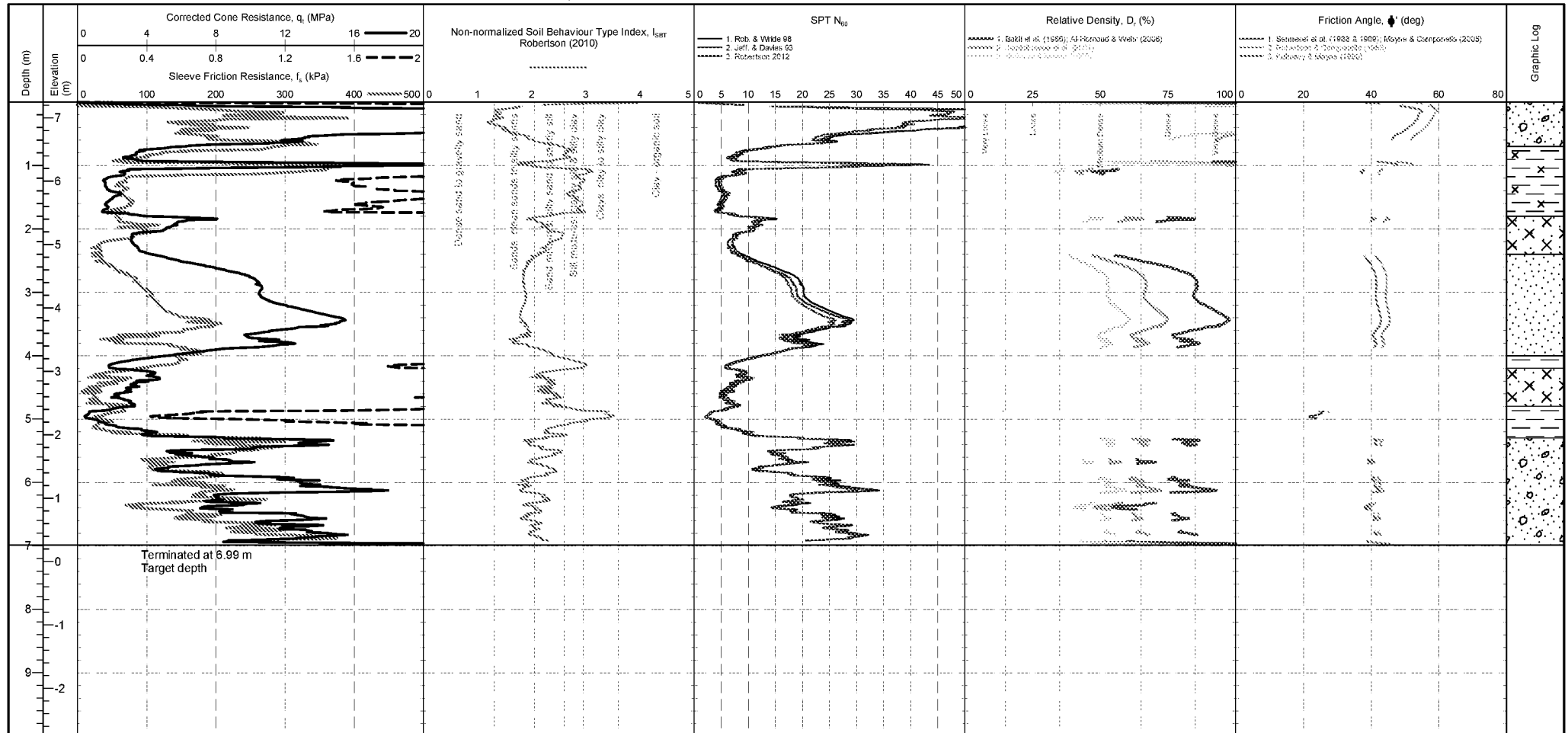
CPT07A

CLIENT : Leap Environmental
PROJECT: Elmgrove Road
LOCATION : Littlehampton
PROJECT No. : 1210450

EASTING : 503368.3 m
NORTHING : 102620.4 m
ELEVATION : 7.25 m OD
CHECKED BY : LD
TERMINATION REASON : Target depth

Remark:
Test completed at target depth.

SHEET : 1 OF 1
STATUS : Final
TEST DATE : 15/09/2021
PLOT DATE : 17/09/2021
METHOD : ISO 22476-1:2012



CONE ID : S15-CFIP.1750
CONE MODEL : Subtraction
CONE AREA : 15cm²
CONE AREA RATIO : 0.79
FILTER POSITION : u2
FILTER TYPE : HDPE

TEST TYPE : TE2
APPLICATION CLASS : 2
RIG : CPT 016
OPERATOR : LS
FRICTION REDUCER : None
WEATHER : Sunny & Mild

Transducer :
Tip :
Sleeve :
Pore Pressure 2 :
X-Y Inclinator :
CPTU ZERO VALUES
Pre :
Post :
Difference :
257 mV : 257 mV : 0 MPa
272 mV : 277 mV : 0.003 kPa
2229 mV : 236 mV : -0.475 kPa
2528 mV : 2465 mV

GRANULAR SOILS (Sands & Gravels) Robertson et al. 1986 Zones 7-10 and Zone 12					
Description	SBT Index, I_c	Description	SPT N value, NSPT	Description	Relative Density D_r (%)
Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15
Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35
Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65
Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85
Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85

Groundwater Level

Dissipation Test

PointID

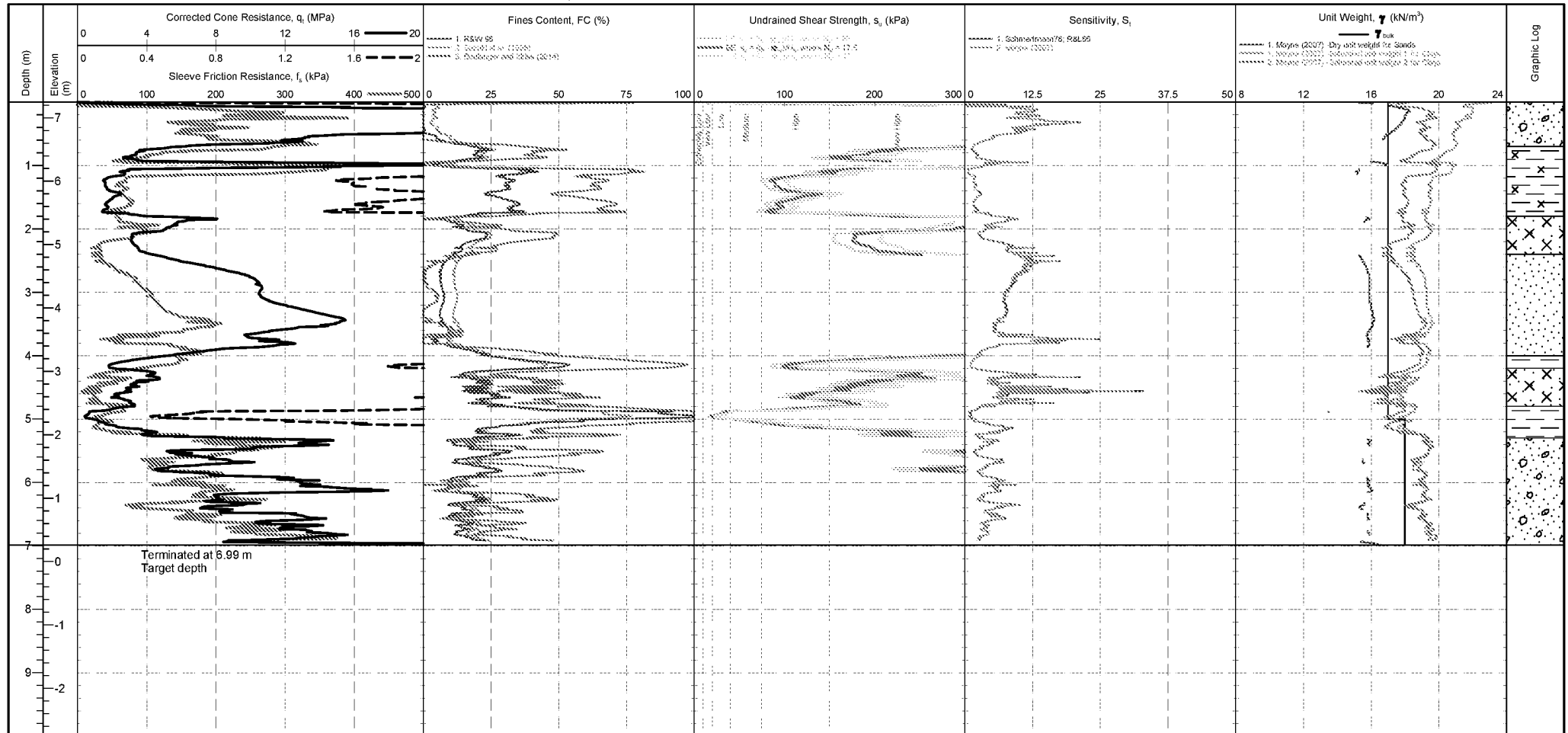
CPT07A

CLIENT : Leap Environmental
PROJECT: Elmgrove Road
LOCATION : Littlehampton
PROJECT No. : 1210450

EASTING : 503368.3 m
NORTHING : 102620.4 m
ELEVATION : 7.25 m OD
CHECKED BY : LD
TERMINATION REASON : Target depth

Remark:
Test completed at target depth.

SHEET : 1 OF 1
STATUS : Final
TEST DATE : 15/09/2021
PLOT DATE : 17/09/2021
METHOD : ISO 22476-1:2012



CONE ID : S15-CFIP.1750
CONE MODEL : Subtraction
CONE AREA : 15cm²
CONE AREA RATIO : 0.79
FILTER POSITION : u2
FILTER TYPE : HDPE

TEST TYPE : TE2
APPLICATION CLASS : 2
RIG : CPT 016
OPERATOR : LS
FRICTION REDUCER : None
WEATHER : Sunny & Mild

Transducer
Tip
Sleeve
Pore Pressure 2
X-Y Inclinator

Pre
257 mV
272 mV
2229 mV
2528 mV

Post
257 mV
277 mV
236 mV
2465 mV

Difference
0 MPa
0.003 kPa
-0.475 kPa

CPTU ZERO VALUES

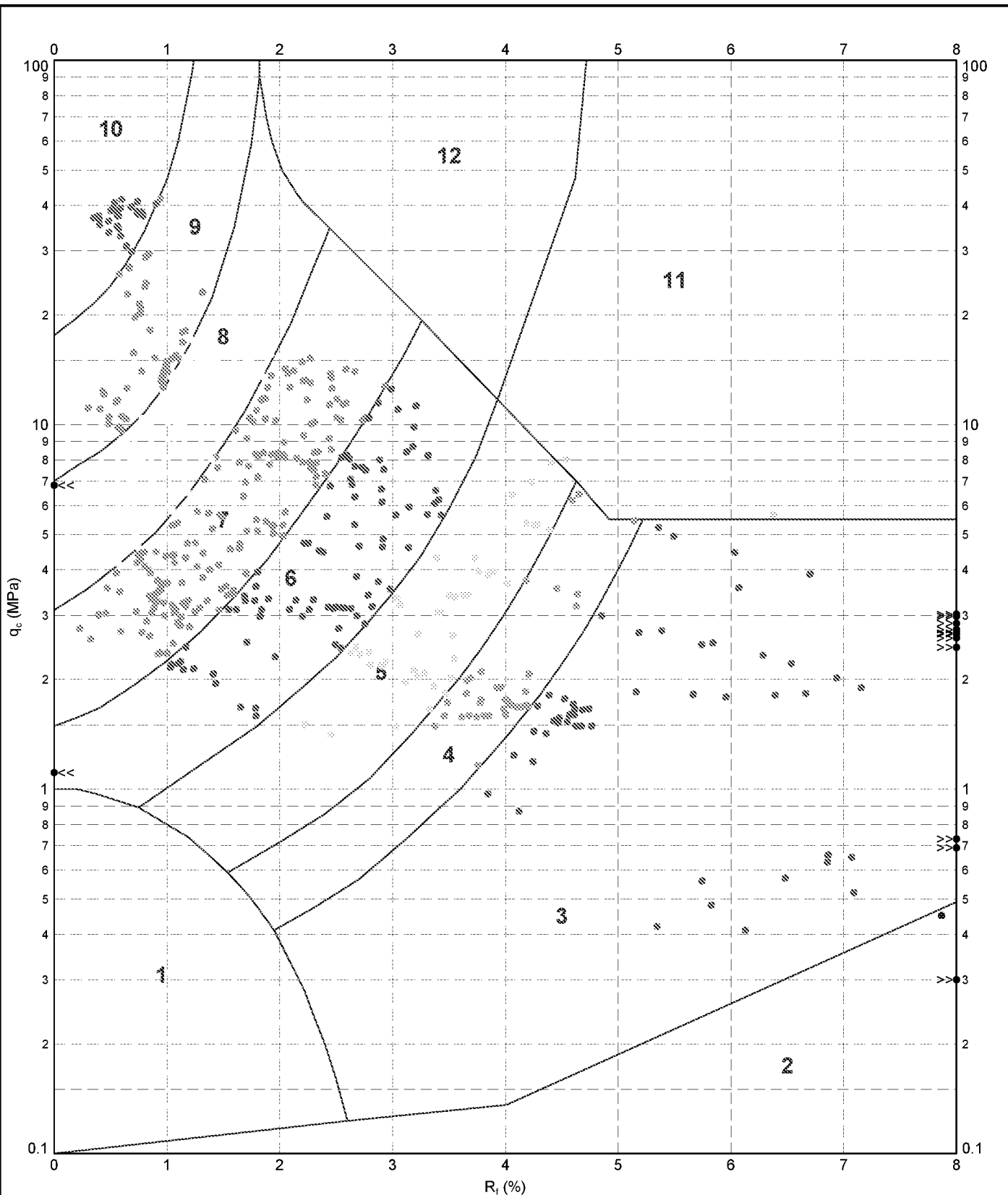
COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11

Term based on measurement	s_u (kPa)	Term based on measurement	s_u (kPa)
Extremely low strength	<10	Medium strength	40-75
Very low strength	10-20	High strength	75-150
Low strength	20-40	Very high strength	150-300
		Extremely high strength	>300

Groundwater Level

Dissipation Test

210528-ADVANCED REPORT INSTITUTE 2.02.1 LIB. ZOE GLEB Graph CPT ROBERTSON ET AL. 86 QC VS. RF MAP 1210450 ELMGROVE ROAD LITTLEHAMPTON LEAP ENVIRONMENTAL GPJ <<DrawingFile>> 17/09/2021 15:11 10:02:00 04 Dargel Lab and in Situ Test - DGD Lib in Situ SI 2.02.0 2017-07-10 PhJ in Situ SI 2.02.0 2017-07-10



METHOD: Robertson et al. 1986 qc Rf

- | | | | |
|-------------------------------------|-------------------------------|------------------------------|------------------------------|
| 1 - Sensitive fine grained material | 4 - Silty CLAY to CLAY | 7 - Silty SAND to sandy SILT | 10 - Gravelly SAND to SAND |
| 2 - Organic material | 5 - Clayey SILT to silty CLAY | 8 - SAND to silty SAND | 11 - Very stiff fine grained |
| 3 - CLAY | 6 - Sandy SILT to clayey SILT | 9 - SAND | 12 - SAND to clayey SAND |

IN SITU
SITE INVESTIGATION

TITLE

Leap Environmental
Littlehampton
Elmgrove Road
Robertson et al. 1986 qc vs. Rf - CPT07A

DRAWN

DATE

17/09/2021

CHECKED

DATE

17/09/2021

SCALE

Not To Scale

A4

PROJECT No

1210450

FIGURE No

PointID

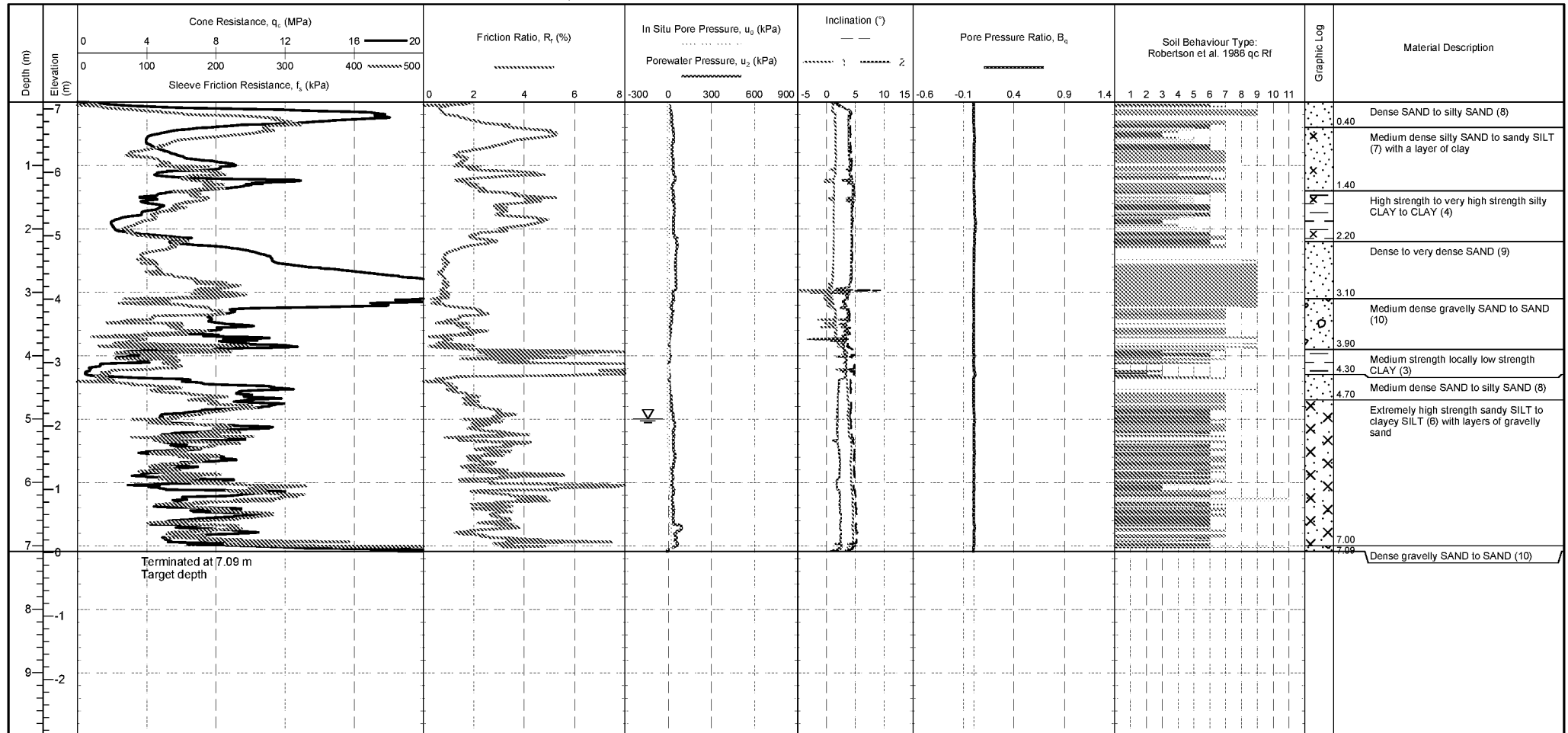
CPT08

CLIENT : Leap Environmental
PROJECT: Elmgrove Road
LOCATION : Littlehampton
PROJECT No. : 1210450

EASTING : 503370.8 m
NORTHING : 102601.5 m
ELEVATION : 7.11 m OD
CHECKED BY : LD
TERMINATION REASON : Target depth

Remark:
Test completed at target depth.

SHEET : 1 OF 1
STATUS : Final
TEST DATE : 15/09/2021
PLOT DATE : 17/09/2021
METHOD : ISO 22476-1:2012



CONE ID : S15-CFIP.1750
CALIBRATION DATE : 25/08/2020
CONE MODEL : Subtraction
CONE AREA : 15cm²
CONE AREA RATIO : 0.79
FILTER POSITION : u2
FILTER TYPE : HDPE

TEST TYPE : TE2
APPLICATION CLASS : 2
RIG : CPT 016
OPERATOR : LS
FRICTION REDUCER : None
WEATHER : Sunny & Mild
GROUNDWATER DEPTH : Supplied by the client

Transducer
Tip
Sleeve
Pore Pressure 2
X-Y Inclinator

CPTU ZERO VALUES

Pre	Post	Difference
253 mV	283 mV	0.108 MPa
273 mV	284 mV	0.008 kPa
231 mV	245 mV	0.003 kPa
2595 mV	2649 mV	

METHOD: Robertson et al. 1986 qc Rf

1 - Sensitive fine grained material	5 - Clayey SILT to silty CLAY	9 - SAND
2 - Organic material	6 - Sandy SILT to clayey SILT	10 - Gravely SAND to SAND
3 - CLAY	7 - Silty SAND to sandy SILT	11 - Very stiff fine grained
4 - Silty CLAY to CLAY	8 - SAND to silty SAND	12 - SAND to clayey SAND

Groundwater
Level

Dissipation Test

PointID

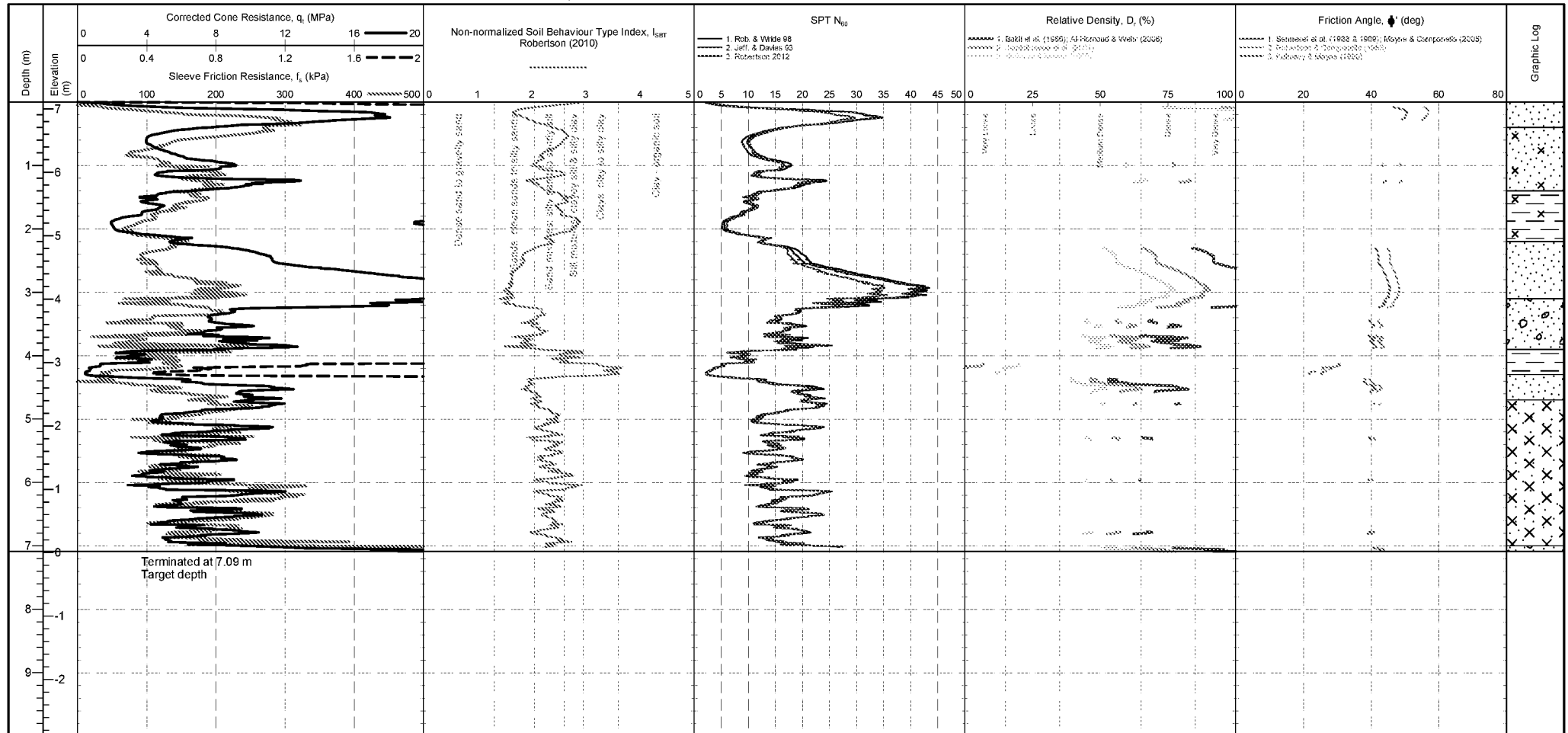
CPT08

CLIENT : Leap Environmental
PROJECT: Elmgrove Road
LOCATION : Littlehampton
PROJECT No. : 1210450

EASTING : 503370.8 m
NORTHING : 102601.5 m
ELEVATION : 7.11 m OD
CHECKED BY : LD
TERMINATION REASON : Target depth

Remark:
Test completed at target depth.

SHEET : 1 OF 1
STATUS : Final
TEST DATE : 15/09/2021
PLOT DATE : 17/09/2021
METHOD : ISO 22476-1:2012



CONE ID : S15-CFIP.1750
CONE MODEL : Subtraction
CONE AREA : 15cm²
CONE AREA RATIO : 0.79
FILTER POSITION : u2
FILTER TYPE : HDPE

TEST TYPE : TE2
APPLICATION CLASS : 2
RIG : CPT 016
OPERATOR : LS
FRICTION REDUCER : None
WEATHER : Sunny & Mild

Transducer :
Tip :
Sleeve :
Pore Pressure 2 :
X-Y Inclinator :
CPTU ZERO VALUES
Pre :
Post :
Difference :
253 mV : 263 mV : 0.108 MPa
273 mV : 284 mV : 0.008 kPa
231 mV : 245 mV : 0.003 kPa
2595 mV : 2649 mV

GRANULAR SOILS (Sands & Gravels) Robertson et al. 1986 Zones 7-10 and Zone 12					
Description	SBT Index, I_c	Description	SPT N value, NSPT	Description	Relative Density D_r (%)
Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15
Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35
Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65
Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85
Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85

Groundwater Level

Dissipation Test

PointID

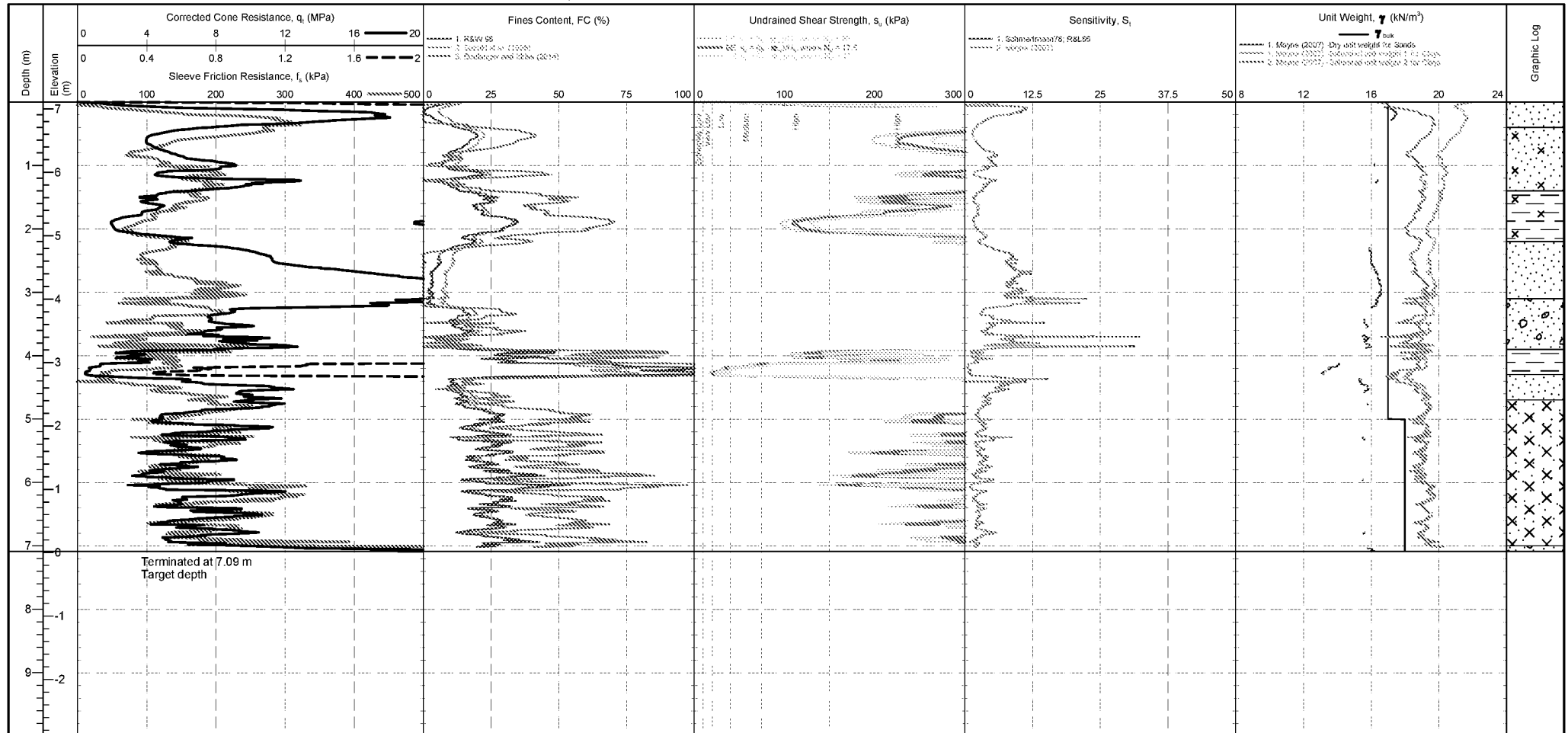
CPT08

CLIENT : Leap Environmental
PROJECT: Elmgrove Road
LOCATION : Littlehampton
PROJECT No. : 1210450

EASTING : 503370.8 m
NORTHING : 102601.5 m
ELEVATION : 7.11 m OD
CHECKED BY : LD
TERMINATION REASON : Target depth

Remark:
Test completed at target depth.

SHEET : 1 OF 1
STATUS : Final
TEST DATE : 15/09/2021
PLOT DATE : 17/09/2021
METHOD : ISO 22476-1:2012



CONE ID : S15-CFIP.1750
CONE MODEL : Subtraction
CONE AREA : 15cm²
CONE AREA RATIO : 0.79
FILTER POSITION : u2
FILTER TYPE : HDPE

TEST TYPE : TE2
APPLICATION CLASS : 2
RIG : CPT 016
OPERATOR : LS
FRICTION REDUCER : None
WEATHER : Sunny & Mild

Transducer Pre Post Difference
Tip 253 mV 263 mV 0.108 MPa
Sleeve 273 mV 284 mV 0.008 kPa
Pore Pressure 2 231 mV 245 mV 0.003 kPa
X-Y Inclinator 2595 mV 2649 mV

CPTU ZERO VALUES

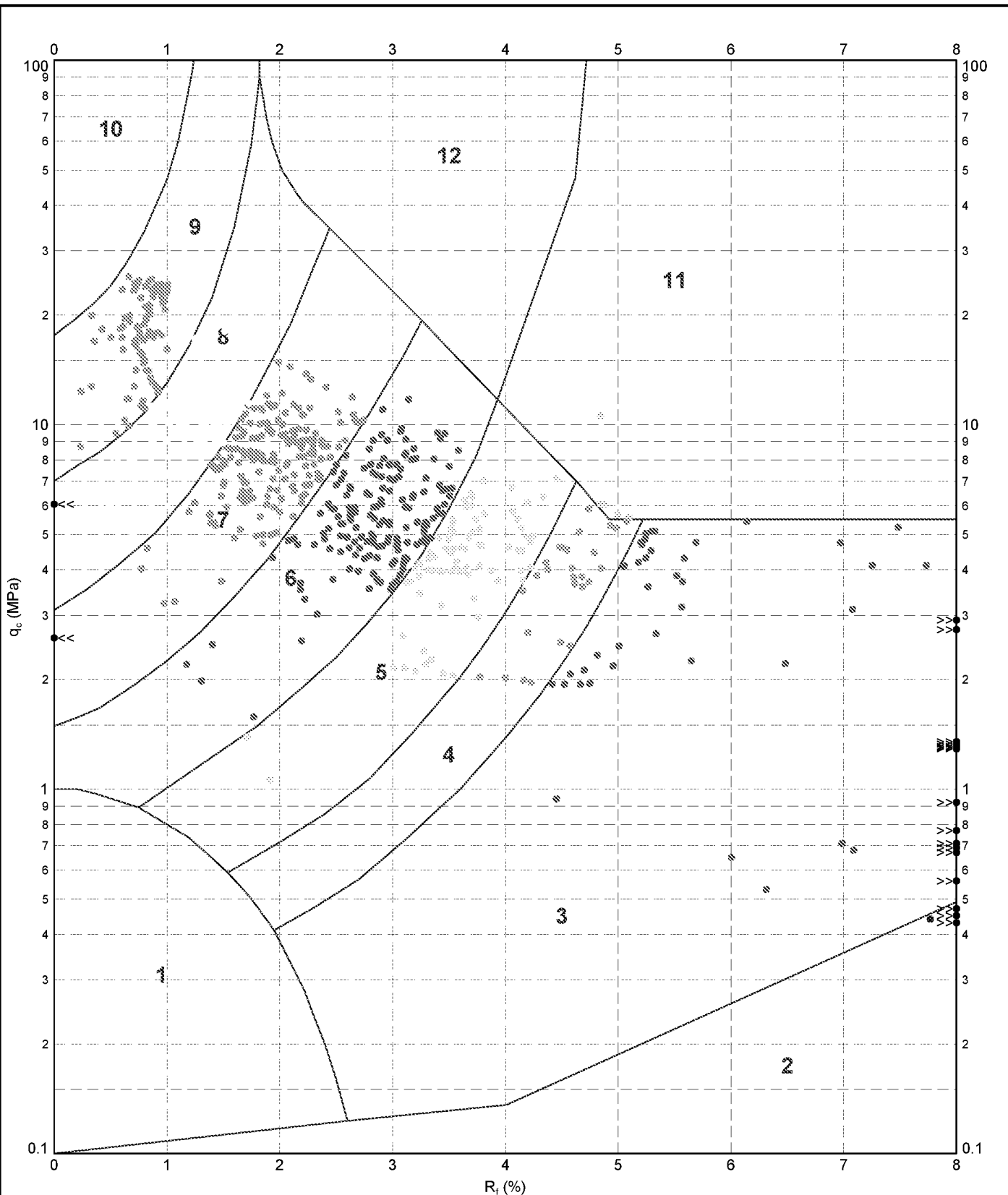
COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11

Term based on measurement	s_u (kPa)	Term based on measurement	s_u (kPa)
Extremely low strength	<10	Medium strength	40-75
Very low strength	10-20	High strength	75-150
Low strength	20-40	Very high strength	150-300
		Extremely high strength	>300

Groundwater Level

Dissipation Test

210528-ADVANCED REPORT INSTITUTE 2.02.1 LIB. ZOE GLEB Graph CPT ROBERTSON ET AL. 88 QC VS. RF MAP 1210450 ELMGROVE ROAD LITTLEHAMPTON LEAP ENVIRONMENTAL GPJ <<DrawingFile>> 17/09/2021 15:13 10.02.00.04 D:\gleb\lab and in situ\Tool - DGD [Lib. in situ SI 2.02.0 2017-07-10 PJ] in situ SI 2.02.0 2017-07-10



METHOD: Robertson et al. 1986 qc Rf

- | | | | |
|-------------------------------------|-------------------------------|------------------------------|------------------------------|
| 1 - Sensitive fine grained material | 4 - Silty CLAY to CLAY | 7 - Silty SAND to sandy SILT | 10 - Gravelly SAND to SAND |
| 2 - Organic material | 5 - Clayey SILT to silty CLAY | 8 - SAND to silty SAND | 11 - Very stiff fine grained |
| 3 - CLAY | 6 - Sandy SILT to clayey SILT | 9 - SAND | 12 - SAND to clayey SAND |

IN SITU
SITE INVESTIGATION

Leap Environmental
Littlehampton
Elmgrove Road
Robertson et al. 1986 qc vs. Rf - CPT08

DRAWN	DATE	17/09/2021
CHECKED	DATE	17/09/2021
SCALE	Not To Scale	
PROJECT No	FIGURE No	A4
1210450		

PointID

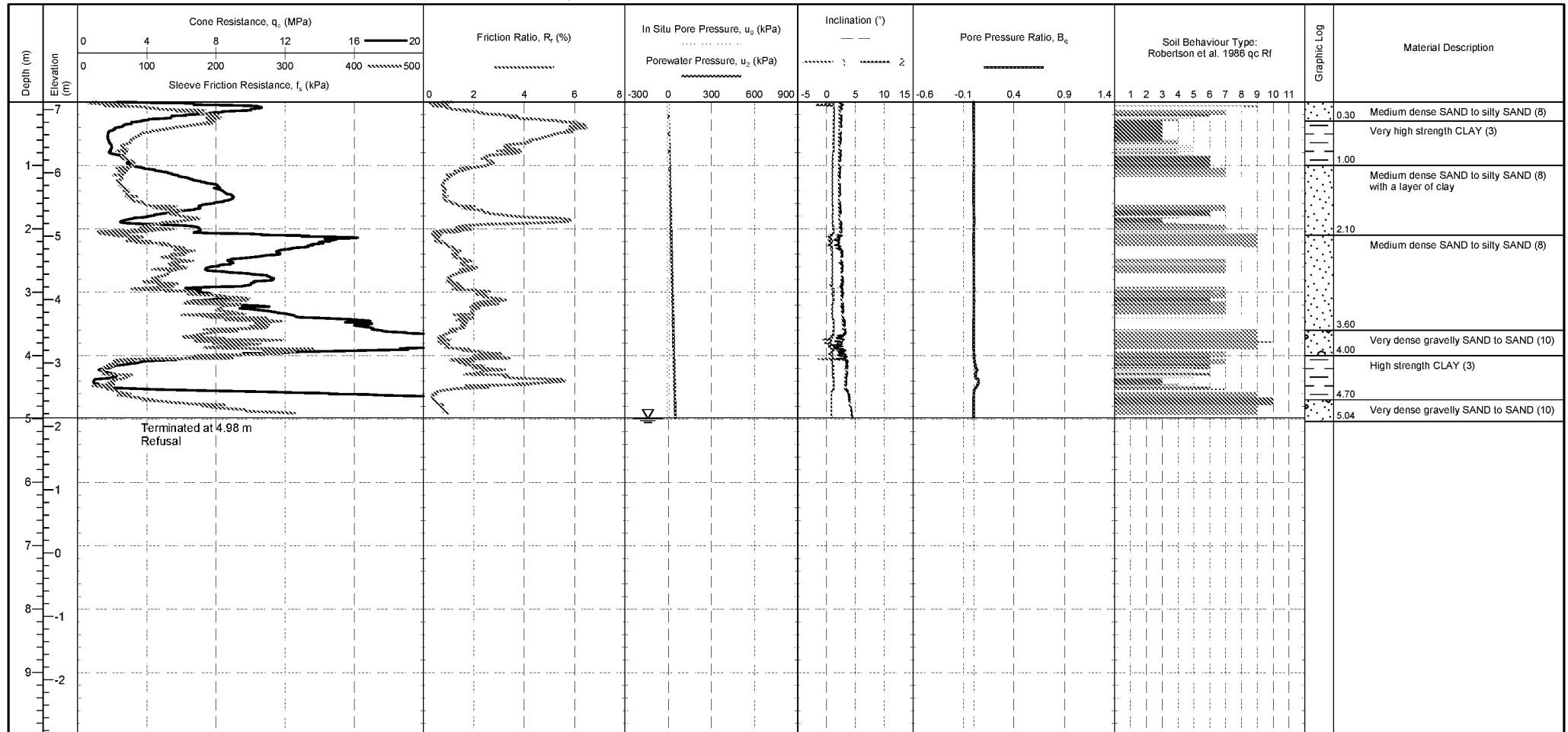
CPT09

CLIENT : Leap Environmental
PROJECT: Elmgrove Road
LOCATION : Littlehampton
PROJECT No. : 1210450

EASTING : 503420.6 m
NORTHING : 102630.7 m
ELEVATION : 7.12 m OD
CHECKED BY : LD
TERMINATION REASON : Refusal

Remark:
Test refused on total pressure.

SHEET : 1 OF 1
STATUS : Final
TEST DATE : 15/09/2021
PLOT DATE : 17/09/2021
METHOD : ISO 22476-1:2012



CONE ID : S15-CFIP.1750
CALIBRATION DATE : 25/08/2020
CONE MODEL : Subtraction
CONE AREA : 15cm²
CONE AREA RATIO : 0.79
FILTER POSITION : u2
FILTER TYPE : HDPE

TEST TYPE : TE2
APPLICATION CLASS : 2
RIG : CPT 016
OPERATOR : LS
FRICTION REDUCER : None
WEATHER : Sunny & Mild
GROUNDWATER DEPTH : Supplied by the client

Transducer
Tip
Sleeve
Pore Pressure 2
X-Y Inclinator

CPTU ZERO VALUES

Pre	Post	Difference
254 mV	260 mV	0.065 MPa
273 mV	276 mV	0.002 kPa
2373 mV	2522 mV	0.036 kPa
2753 mV	2667 mV	

METHOD: Robertson et al. 1986 qc Rf

1 - Sensitive fine grained material	5 - Clayey SILT to silty CLAY	9 - SAND
2 - Organic material	6 - Sandy SILT to clayey SILT	10 - Gravelly SAND to SAND
3 - CLAY	7 - Silty SAND to sandy SILT	11 - Very stiff fine grained
4 - Silty CLAY to CLAY	8 - SAND to silty SAND	12 - SAND to clayey SAND

Groundwater
Level

Dissipation Test

PointID

CPT09

CLIENT : Leap Environmental

PROJECT: Elmgrove Road

LOCATION : Littlehampton

PROJECT No. : 1210450

EASTING : 503420.6 m

NORTHING : 102630.7 m

ELEVATION : 7.12 m OD

CHECKED BY : LD

TERMINATION REASON : Refusal

Remark:
Test refused on total pressure.

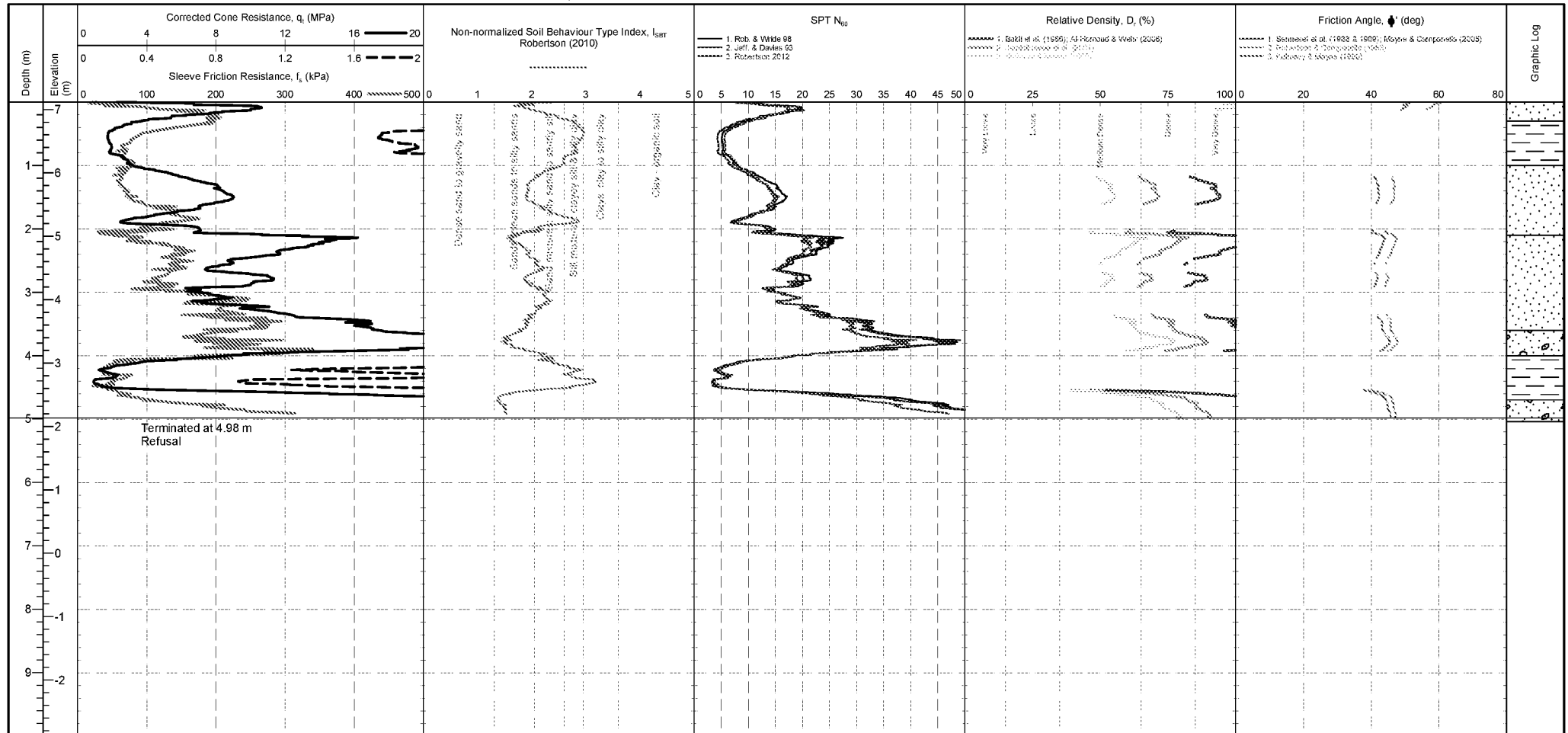
SHEET : 1 OF 1

STATUS : Final

TEST DATE : 15/09/2021

PLOT DATE : 17/09/2021

METHOD : ISO 22476-1:2012



CONE ID : S15-CFIP.1750
CONE MODEL : Subtraction
CONE AREA : 15cm²
CONE AREA RATIO : 0.79
FILTER POSITION : u2
FILTER TYPE : HDPE

TEST TYPE : TE2
APPLICATION CLASS : 2
RIG : CPT 016
OPERATOR : LS
FRICTION REDUCER : None
WEATHER : Sunny & Mild

Transducer :
Tip :
Sleeve :
Pore Pressure 2 :
X-Y Inclinator :
CPTU ZERO VALUES
Pre : 254 mV
Post : 260 mV
Difference : 0.065 MPa
273 mV
276 mV
0.002 kPa
2373 mV
2522 mV
0.036 kPa
2753 mV
2667 mV

GRANULAR SOILS (Sands & Gravels) Robertson et al. 1986 Zones 7-10 and Zone 12					
Description	SBT Index, I_c	Description	SPT N value, NSPT	Description	Relative Density D_r (%)
Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15
Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35
Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65
Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85
Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85

Groundwater Level

Dissipation Test

PointID

CPT09

CLIENT : Leap Environmental

PROJECT: Elmgrove Road

LOCATION : Littlehampton

PROJECT No. : 1210450

EASTING : 503420.6 m

NORTHING : 102630.7 m

ELEVATION : 7.12 m OD

CHECKED BY : LD

TERMINATION REASON : Refusal

Remark:
Test refused on total pressure.

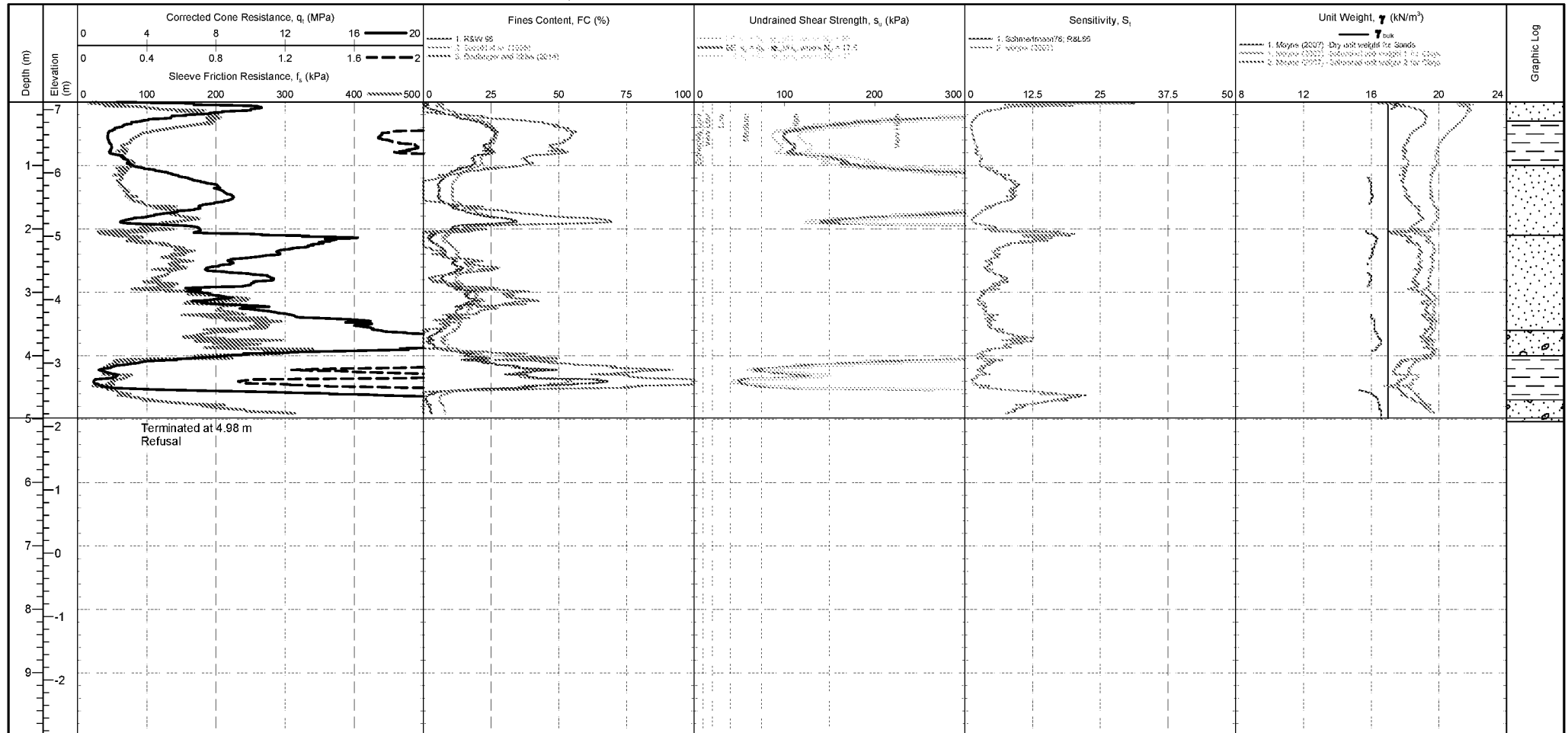
SHEET : 1 OF 1

STATUS : Final

TEST DATE : 15/09/2021

PLOT DATE : 17/09/2021

METHOD : ISO 22476-1:2012



CONE ID : S15-CFIP.1750
 CONE MODEL : Subtraction
 CONE AREA : 15cm²
 CONE AREA RATIO : 0.79
 FILTER POSITION : u2
 FILTER TYPE : HDPE

TEST TYPE : TE2
 APPLICATION CLASS : 2
 RIG : CPT 016
 OPERATOR : LS
 FRICTION REDUCER : None
 WEATHER : Sunny & Mild

Transducer Pre Post Difference
 Tip 254 mV 260 mV 0.065 MPa
 Sleeve 273 mV 276 mV 0.002 kPa
 Pore Pressure 2 2373 mV 2522 mV 0.036 kPa
 X-Y Inclinator 2753 mV 2667 mV

CPTU ZERO VALUES

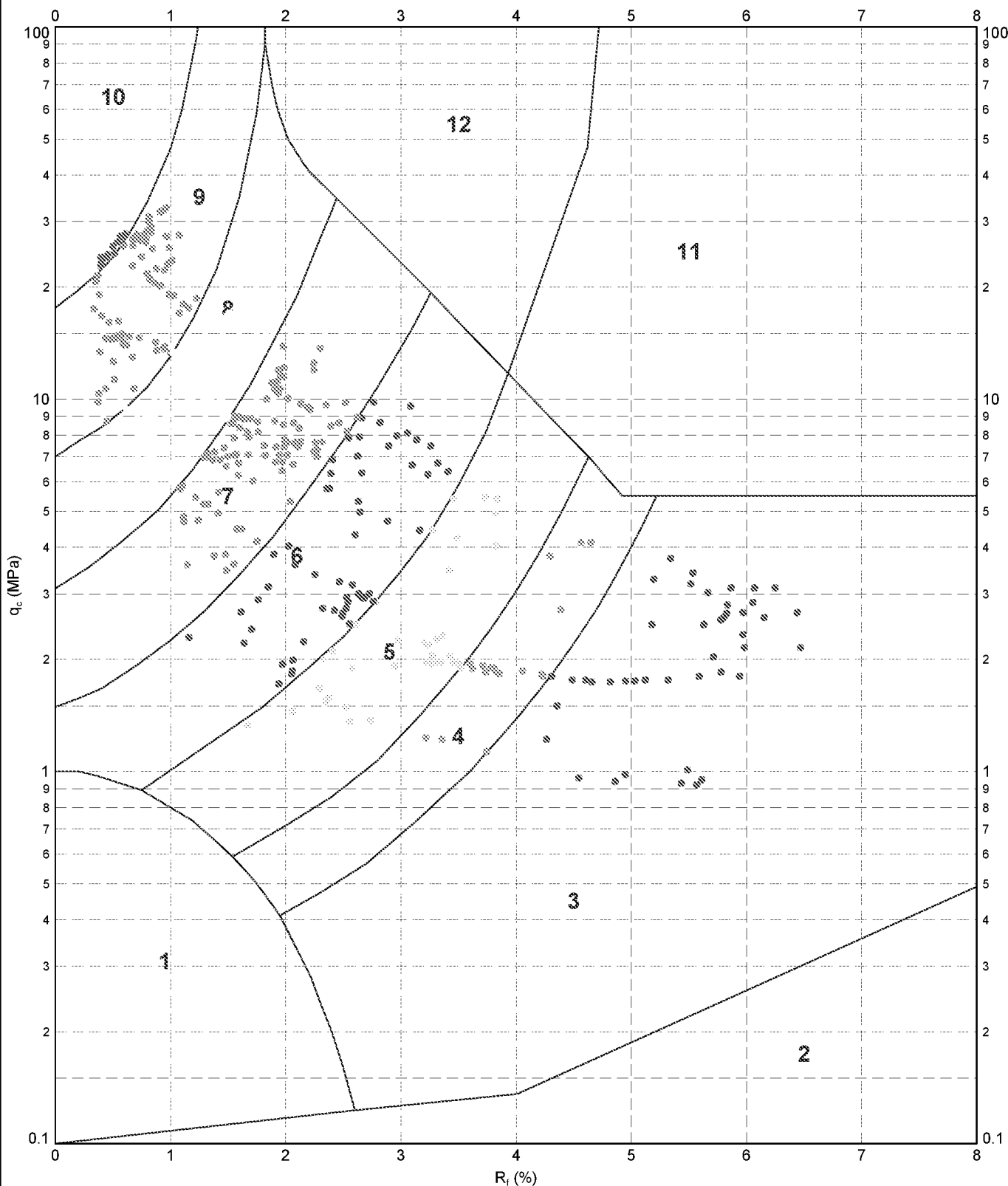
COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11

Term based on measurement	s_u (kPa)	Term based on measurement	s_u (kPa)
Extremely low strength	<10	Medium strength	40-75
Very low strength	10-20	High strength	75-150
Low strength	20-40	Very high strength	150-300
		Extremely high strength	>300

Groundwater Level

Dissipation Test

210528-ADVANCED REPORT INSTITUTE 2.02.1 LIB. ZOE GLEB Graph CPT ROBERTSON ET AL. 88 QC VS. RF MAP 1210450 ELMGROVE ROAD LITTLEHAMPTON LEAP ENVIRONMENTAL GPJ <<DrawingFile>> 17/09/2021 15:14 10.02.00.04 D:\gleb Lab and in Situ Test - DGD Lib in Situ SI 2.02.0 2017-07-10 PHJ in Situ SI 2.02.0 2017-07-10



METHOD: Robertson et al. 1986 q_c vs R_f

- | | | | |
|-------------------------------------|-------------------------------|------------------------------|------------------------------|
| 1 - Sensitive fine grained material | 4 - Silty CLAY to CLAY | 7 - Silty SAND to sandy SILT | 10 - Gravelly SAND to SAND |
| 2 - Organic material | 5 - Clayey SILT to silty CLAY | 8 - SAND to silty SAND | 11 - Very stiff fine grained |
| 3 - CLAY | 6 - Sandy SILT to clayey SILT | 9 - SAND | 12 - SAND to clayey SAND |

IN SITU
SITE INVESTIGATION

TITLE

Leap Environmental
Littlehampton
Elmgrove Road
Robertson et al. 1986 q_c vs. R_f - CPT09

DRAWN

DATE

17/09/2021

CHECKED

DATE

17/09/2021

SCALE

Not To Scale

A4

PROJECT No

1210450

FIGURE No

PointID

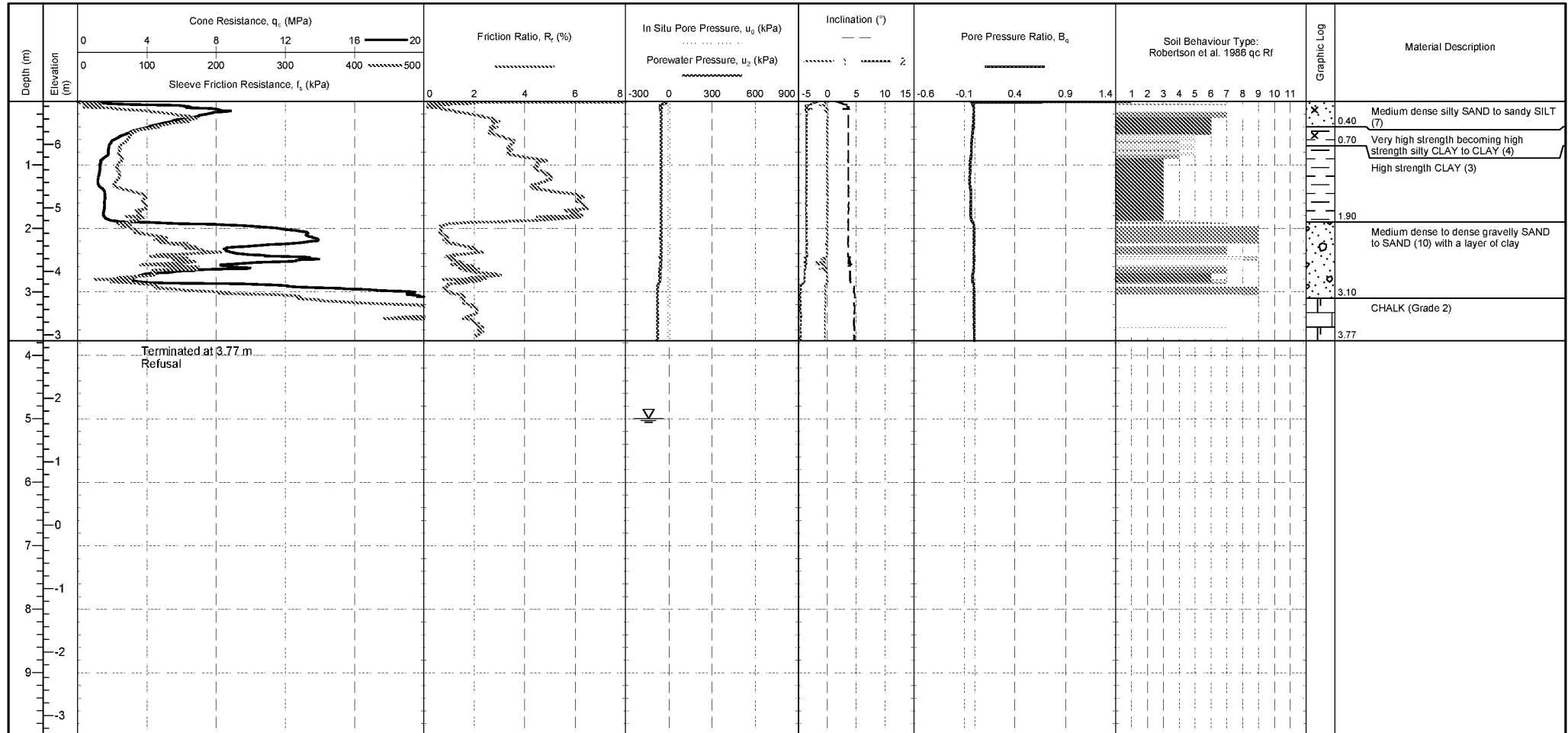
CPT10

CLIENT : Leap Environmental
PROJECT: Elmgrove Road
LOCATION : Littlehampton
PROJECT No. : 1210450

EASTING : 503380.3 m
NORTHING : 102666.6 m
ELEVATION : 6.68 m OD
CHECKED BY : LD
TERMINATION REASON : Refusal

Remark:
Test refused on total pressure.

SHEET : 1 OF 1
STATUS : Final
TEST DATE : 15/09/2021
PLOT DATE : 17/09/2021
METHOD : ISO 22476-1:2012



CONE ID : S15-CFIP.1750 CALIBRATION DATE : 25/08/2020 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 016 OPERATOR : LS FRICTION REDUCER : None WEATHER : Sunny & Mild GROUNDWATER DEPTH : Supplied by the client	Transducer Tip : 255 mV Sleeve : 272 mV Pore Pressure 2 : 2243 mV X-Y Inclinator : 2554 mV	CPTU ZERO VALUES Pre : 256 mV Post : 272 mV Difference : 0.011 MPa 0 kPa -0.002 kPa 2505 mV	METHOD: Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravelly SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	Groundwater Level Dissipation Test
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PointID

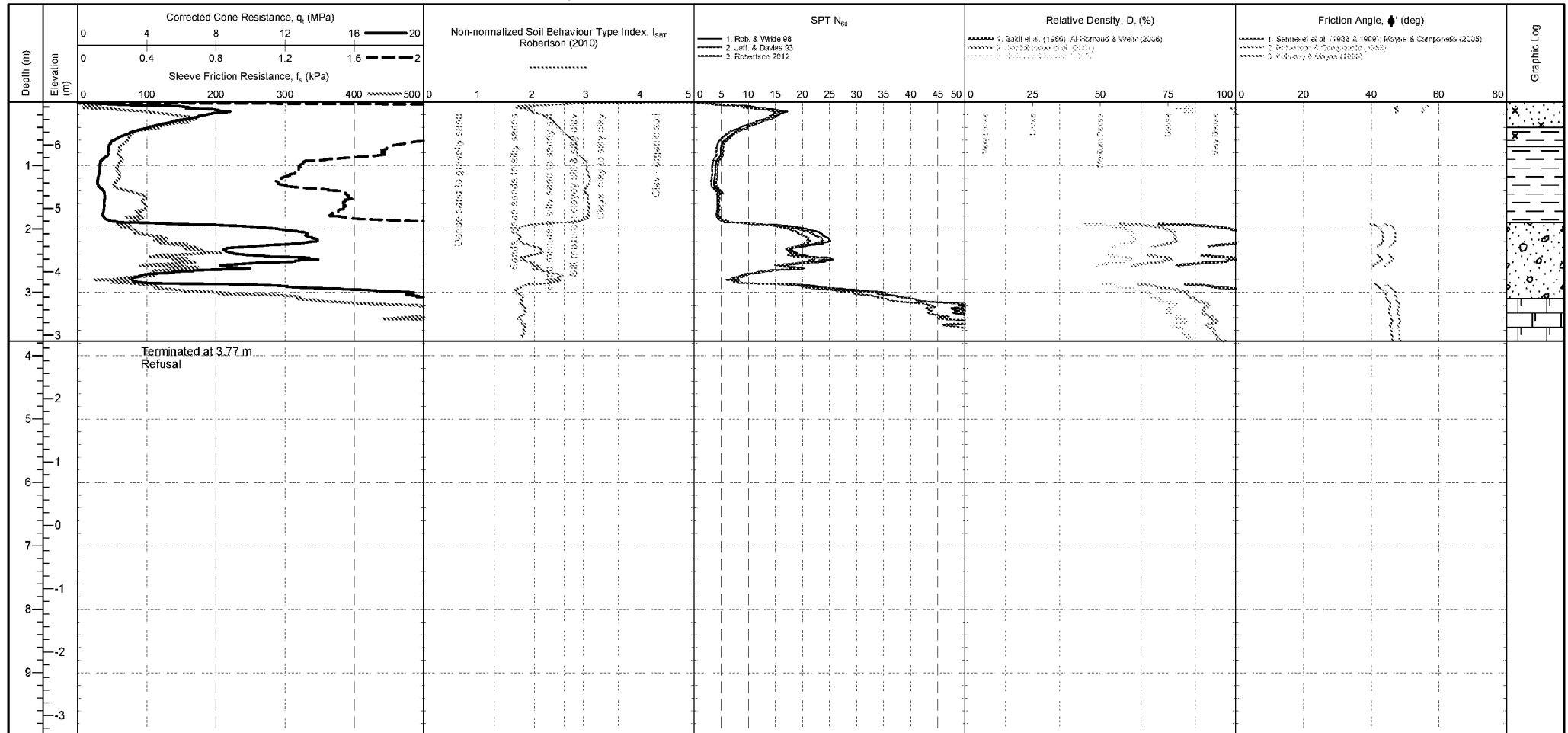
CPT10

CLIENT : Leap Environmental
PROJECT: Elmgrove Road
LOCATION : Littlehampton
PROJECT No. : 1210450

EASTING : 503380.3 m
NORTHING : 102666.6 m
ELEVATION : 6.68 m OD
CHECKED BY : LD
TERMINATION REASON : Refusal

Remark:
Test refused on total pressure.

SHEET : 1 OF 1
STATUS : Final
TEST DATE : 15/09/2021
PLOT DATE : 17/09/2021
METHOD : ISO 22476-1:2012



CONE ID : S15-CFIP.1750
CONE MODEL : Subtraction
CONE AREA : 15cm²
CONE AREA RATIO : 0.79
FILTER POSITION : u2
FILTER TYPE : HDPE

TEST TYPE : TE2
APPLICATION CLASS : 2
RIG : CPT 016
OPERATOR : LS
FRICTION REDUCER : None
WEATHER : Sunny & Mild

Transducer :
Tip :
Sleeve :
Pore Pressure 2 :
X-Y Inclinator :
CPTU ZERO VALUES
Pre : 255 mV
Post : 256 mV
Difference : 0.011 MPa
Pre : 272 mV
Post : 272 mV
Difference : 0 kPa
Pre : 2243 mV
Post : 2235 mV
Difference : -0.002 kPa
Pre : 2554 mV
Post : 2505 mV
Difference : -0.049 kPa

GRANULAR SOILS (Sands & Gravels) Robertson et al. 1986 Zones 7-10 and Zone 12					
Description	SBT Index, Ic	Description	SPT N value, NSPT	Description	Relative Density Dr (%)
Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15
Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35
Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65
Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85
Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85

Groundwater Level

Dissipation Test

PointID

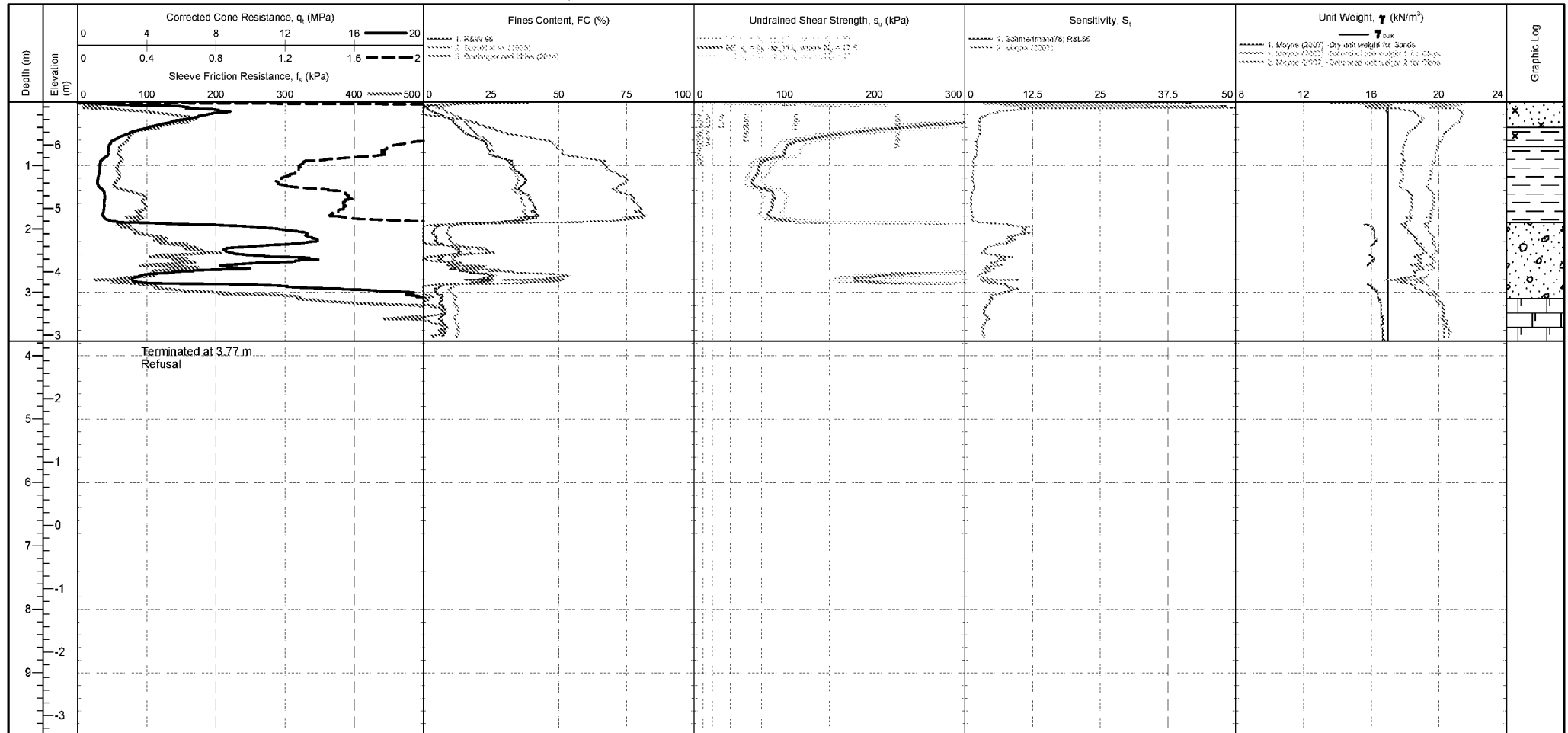
CPT10

CLIENT : Leap Environmental
PROJECT: Elmgrove Road
LOCATION : Littlehampton
PROJECT No. : 1210450

EASTING : 503380.3 m
NORTHING : 102666.6 m
ELEVATION : 6.68 m OD
CHECKED BY : LD
TERMINATION REASON : Refusal

Remark:
Test refused on total pressure.

SHEET : 1 OF 1
STATUS : Final
TEST DATE : 15/09/2021
PLOT DATE : 17/09/2021
METHOD : ISO 22476-1:2012



CONE ID : S15-CFIP.1750
CONE MODEL : Subtraction
CONE AREA : 15cm²
CONE AREA RATIO : 0.79
FILTER POSITION : u2
FILTER TYPE : HDPE

TEST TYPE : TE2
APPLICATION CLASS : 2
RIG : CPT 016
OPERATOR : LS
FRICTION REDUCER : None
WEATHER : Sunny & Mild

Transducer
Tip
Sleeve
Pore Pressure 2
X-Y Inclinator

Pre
255 mV
272 mV
2243 mV
2554 mV

Post
256 mV
272 mV
2235 mV
2505 mV

Difference
0.011 MPa
0 kPa
-0.002 kPa

CPTU ZERO VALUES

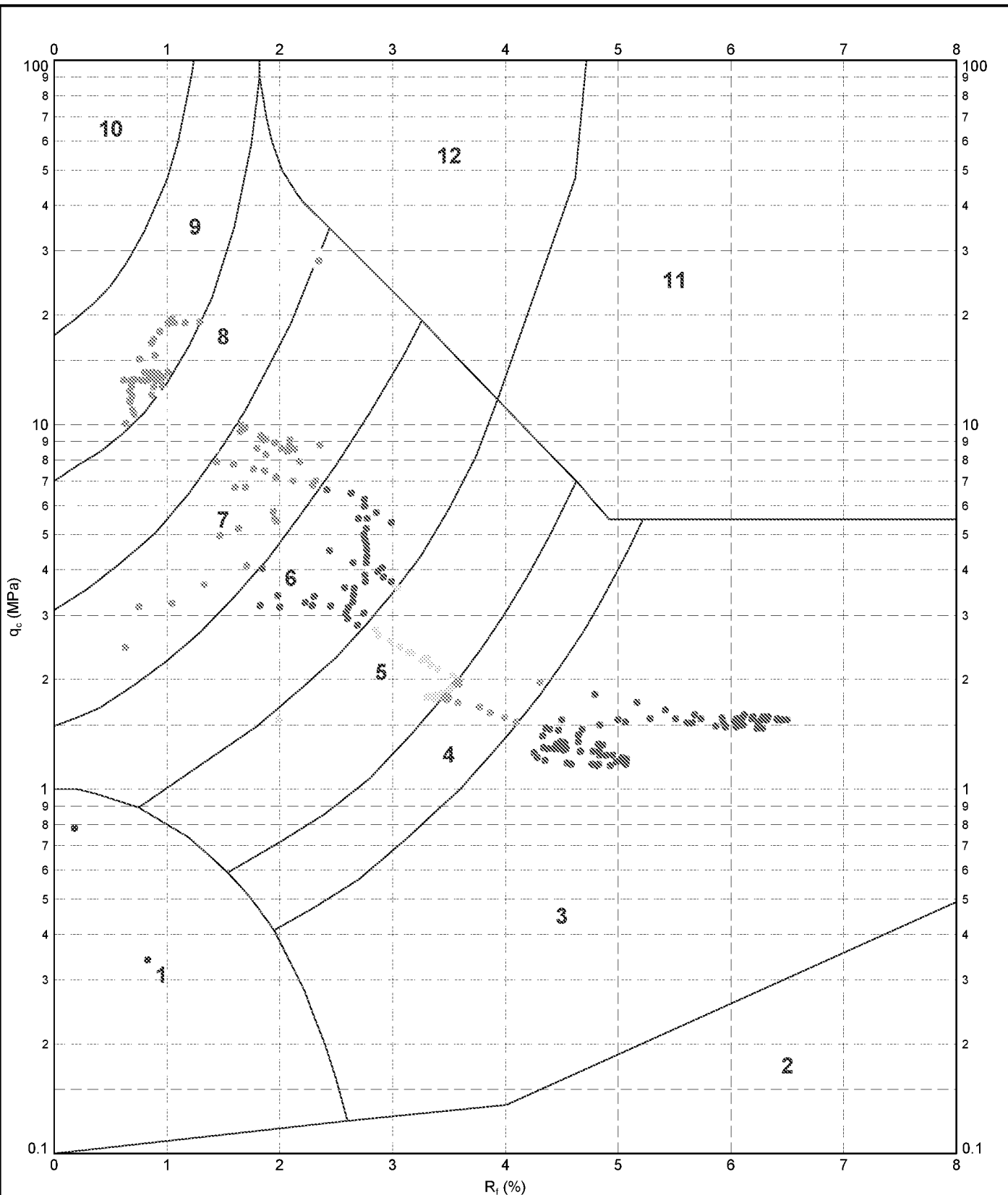
COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11

Term based on measurement	s_u (kPa)	Term based on measurement	s_u (kPa)
Extremely low strength	<10	Medium strength	40-75
Very low strength	10-20	High strength	75-150
Low strength	20-40	Very high strength	150-300
		Extremely high strength	>300

Groundwater Level

Dissipation Test

210528-ADVANCED REPORT INSTITUTE 2.02.1 LIB. ZOE GLB Graph CPT ROBERTSON ET AL. 88 QC VS. RF MAP 1210450 ELMGROVE ROAD LITTLEHAMPTON LEAP ENVIRONMENTAL GPJ <<DrawingFile>> 17/09/2021 15:16 10.02.00.04 D:\glb Lab and in Situ Test - DGD Lib in Situ SI 2.02.0 2017-07-10 PJ in Situ SI 2.02.0 2017-07-10



METHOD: Robertson et al. 1986 q_c vs. R_f

1 - Sensitive fine grained material

2 - Organic material

3 - CLAY

4 - Silty CLAY to CLAY

5 - Clayey SILT to silty CLAY

6 - Sandy SILT to clayey SILT

7 - Silty SAND to sandy SILT

8 - SAND to silty SAND

9 - SAND

10 - Gravelly SAND to SAND

11 - Very stiff fine grained

12 - SAND to clayey SAND

IN SITU
SITE INVESTIGATION

TITLE

Leap Environmental
Littlehampton
Elmgrove Road
Robertson et al. 1986 q_c vs. R_f - CPT10

DRAWN

DATE

17/09/2021

CHECKED

DATE

17/09/2021

SCALE

Not To Scale

A4

PROJECT No

1210450

FIGURE No

PointID

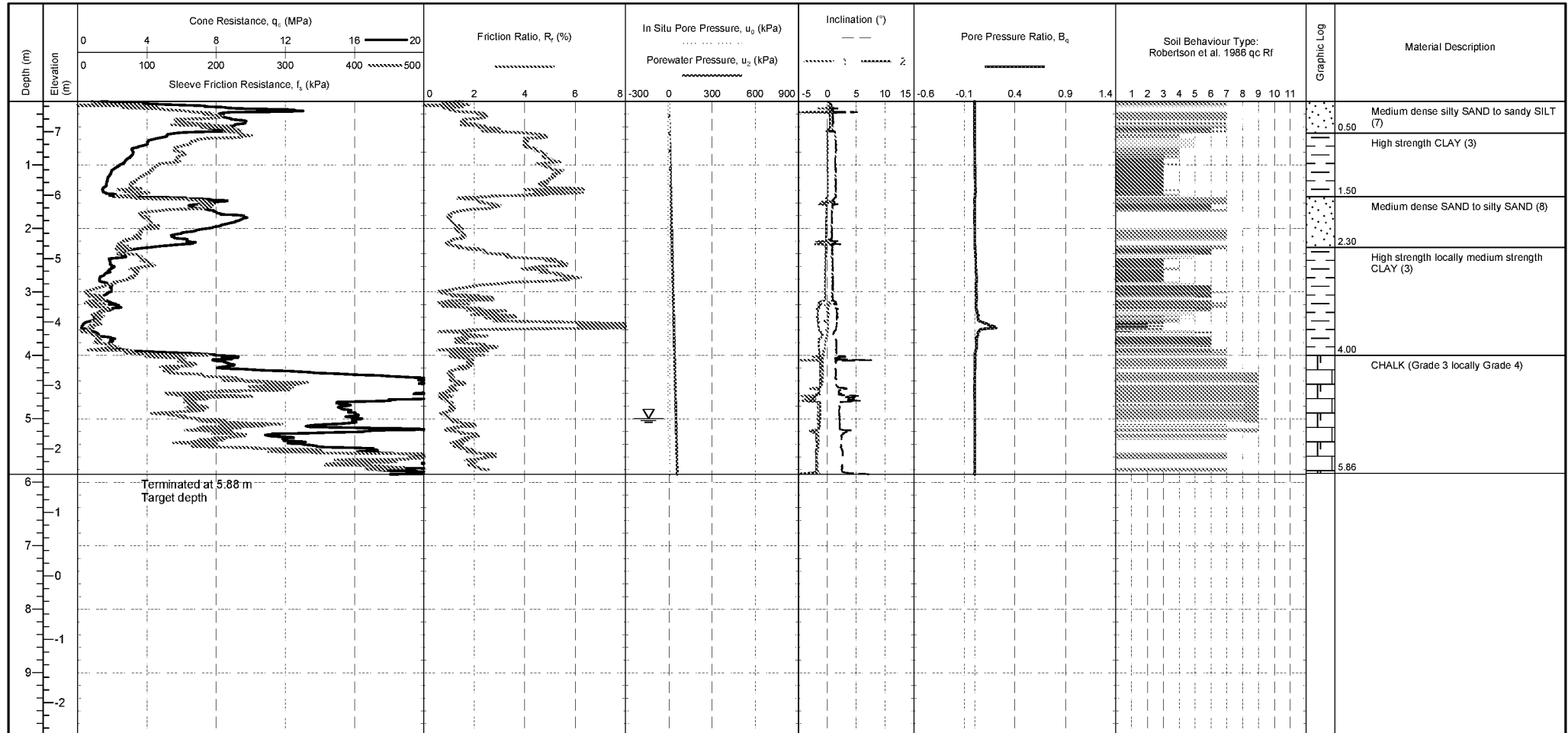
CPT11

CLIENT : Leap Environmental
PROJECT: Elmgrove Road
LOCATION : Littlehampton
PROJECT No. : 1210450

EASTING : 503303.1 m
NORTHING : 102658.0 m
ELEVATION : 7.48 m OD
CHECKED BY : LD
TERMINATION REASON : Target depth

Remark:
Test completed at target depth.

SHEET : 1 OF 1
STATUS : Final
TEST DATE : 15/09/2021
PLOT DATE : 17/09/2021
METHOD : ISO 22476-1:2012



CONE ID : S15-CFIP.1750
CALIBRATION DATE : 25/08/2020
CONE MODEL : Subtraction
CONE AREA : 15cm²
CONE AREA RATIO : 0.79
FILTER POSITION : u2
FILTER TYPE : HDPE

TEST TYPE : TE2
APPLICATION CLASS : 2
RIG : CPT 016
OPERATOR : LS
FRICTION REDUCER : None
WEATHER : Sunny & Mild
GROUNDWATER DEPTH : Supplied by the client

Transducer :
Tip : 255 mV
Sleeve : 271 mV
Pore Pressure 2 : 246 mV
X-Y Inclinator : 2332 mV

CPTU ZERO VALUES
Post : 257 mV
Difference : 0.022 MPa
0.004 kPa
-0.007 kPa
2483 mV

METHOD: Robertson et al. 1986 qc Rf

1 - Sensitive fine grained material
2 - Organic material
3 - CLAY
4 - Silty CLAY to CLAY
5 - Clayey SILT to silty CLAY
6 - Sandy SILT to clayey SILT
7 - Silty SAND to sandy SILT
8 - SAND to silty SAND
9 - SAND
10 - Gravely SAND to SAND
11 - Very stiff fine grained
12 - SAND to clayey SAND

Groundwater
Level

Dissipation Test

PointID

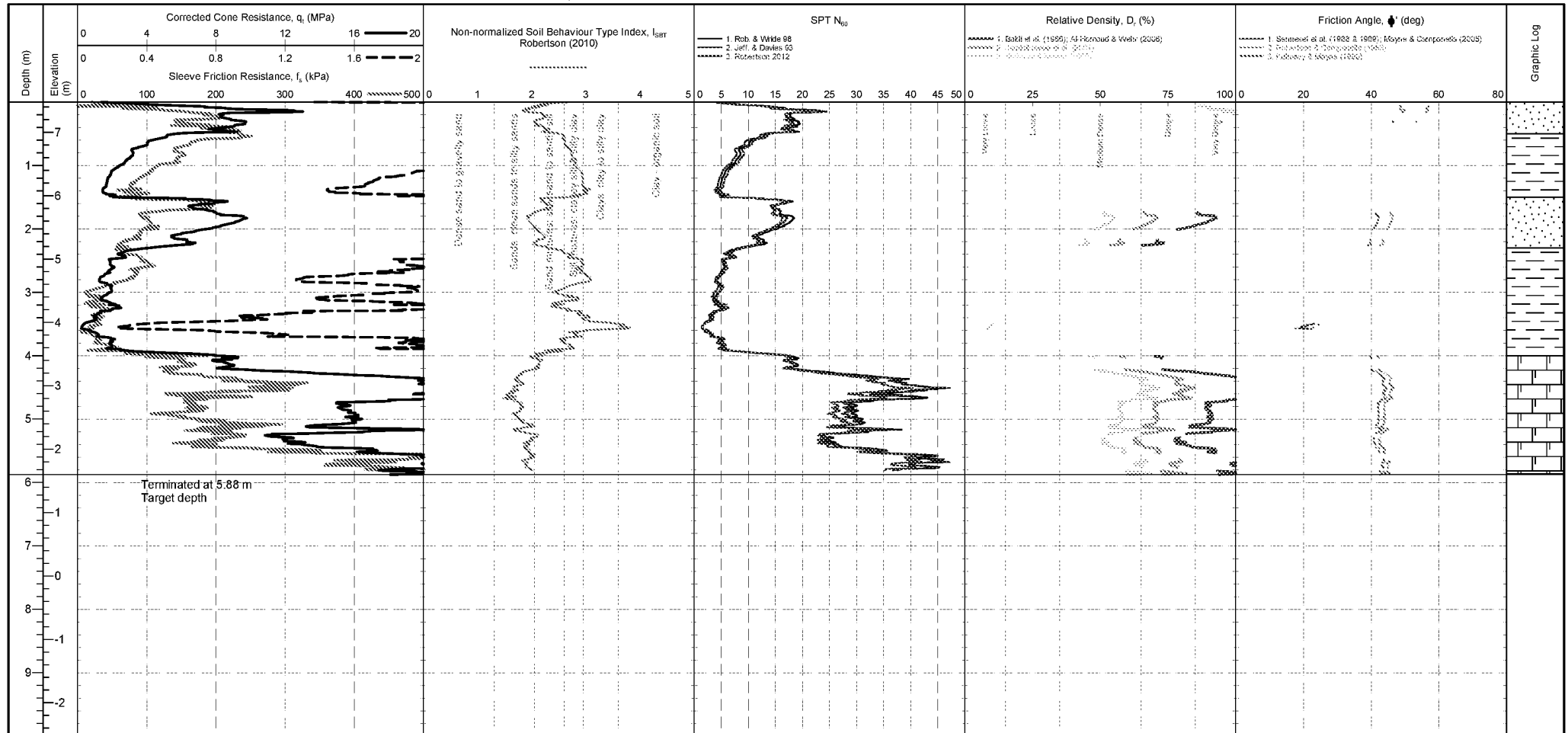
CPT11

CLIENT : Leap Environmental
PROJECT: Elmgrove Road
LOCATION : Littlehampton
PROJECT No. : 1210450

EASTING : 503303.1 m
NORTHING : 102658.0 m
ELEVATION : 7.48 m OD
CHECKED BY : LD
TERMINATION REASON : Target depth

Remark:
Test completed at target depth.

SHEET : 1 OF 1
STATUS : Final
TEST DATE : 15/09/2021
PLOT DATE : 17/09/2021
METHOD : ISO 22476-1:2012



CONE ID : S15-CFIP.1750
CONE MODEL : Subtraction
CONE AREA : 15cm²
CONE AREA RATIO : 0.79
FILTER POSITION : u2
FILTER TYPE : HDPE

TEST TYPE : TE2
APPLICATION CLASS : 2
RIG : CPT 016
OPERATOR : LS
FRICTION REDUCER : None
WEATHER : Sunny & Mild

Transducer
Tip
Sleeve
Pore Pressure 2
X-Y Inclinator

CPTU ZERO VALUES

Pre	Post	Difference
255 mV	257 mV	0.022 MPa
271 mV	277 mV	0.004 kPa
246 mV	216 mV	-0.007 kPa
2332 mV	2483 mV	

GRANULAR SOILS (Sands & Gravels) Robertson et al. 1986 Zones 7-10 and Zone 12					
Description	SBT Index, I_c	Description	SPT N value, NSPT	Description	Relative Density D_r (%)
Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15
Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35
Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65
Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85
Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85

Groundwater Level

Dissipation Test

PointID

CPT11

CLIENT : Leap Environmental

PROJECT: Elmgrove Road

LOCATION : Littlehampton

PROJECT No. : 1210450

EASTING : 503303.1 m

NORTHING : 102658.0 m

ELEVATION : 7.48 m OD

CHECKED BY : LD

TERMINATION REASON : Target depth

Remark:
Test completed at target depth.

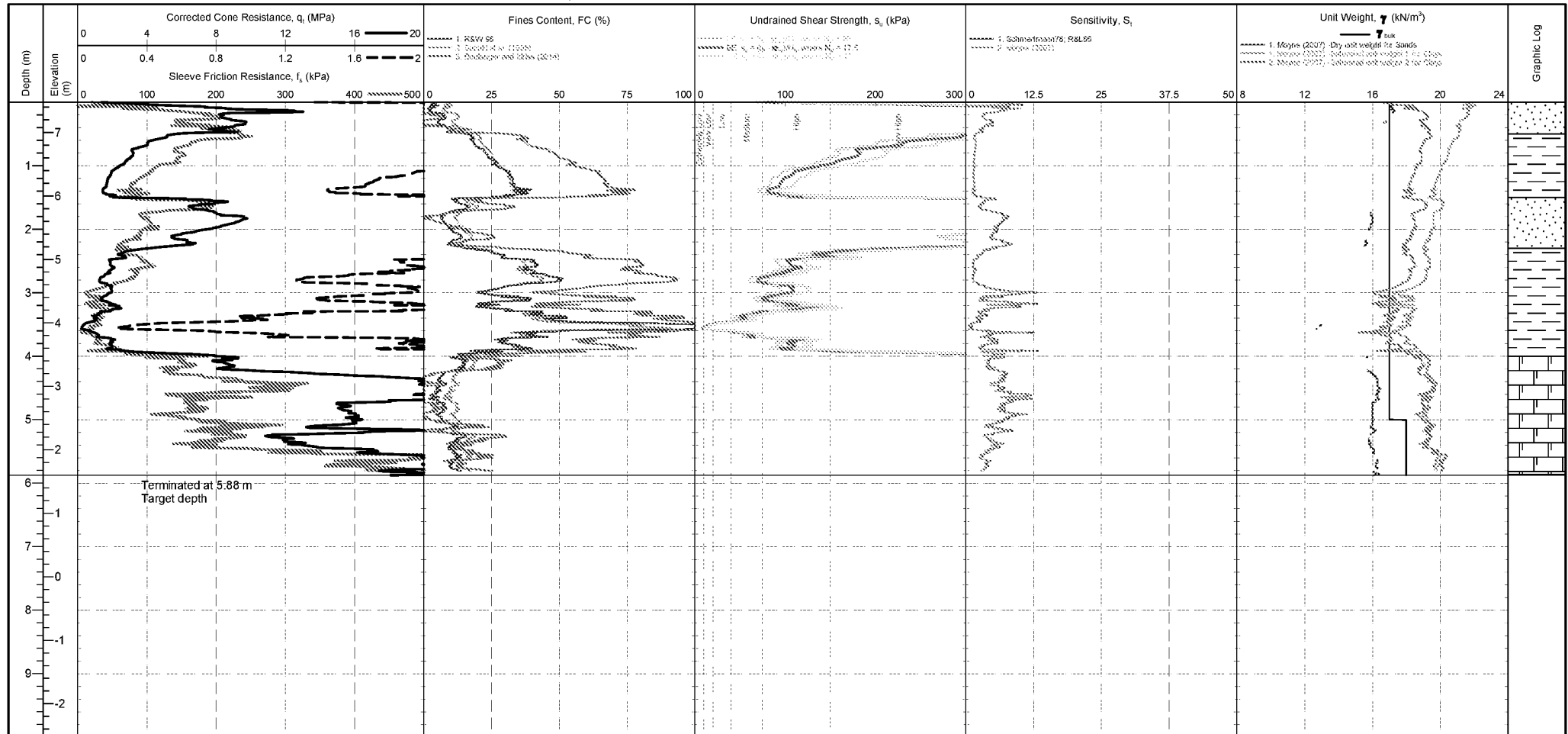
SHEET : 1 OF 1

STATUS : Final

TEST DATE : 15/09/2021

PLOT DATE : 17/09/2021

METHOD : ISO 22476-1:2012



CONE ID : S15-CFIP.1750
 CONE MODEL : Subtraction
 CONE AREA : 15cm²
 CONE AREA RATIO : 0.79
 FILTER POSITION : u2
 FILTER TYPE : HDPE

TEST TYPE : TE2
 APPLICATION CLASS : 2
 RIG : CPT 016
 OPERATOR : LS
 FRICTION REDUCER : None
 WEATHER : Sunny & Mild

Transducer

Pre	Post	Difference
Tip	255 mV	257 mV
Sleeve	271 mV	277 mV
Pore Pressure 2	246 mV	216 mV
X-Y Inclinator	2332 mV	2483 mV

COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11

Term based on measurement	s_u (kPa)	Term based on measurement	s_u (kPa)
Extremely low strength	<10	Medium strength	40-75
Very low strength	10-20	High strength	75-150
Low strength	20-40	Very high strength	150-300
		Extremely high strength	>300

Groundwater Level

Dissipation Test

PointID

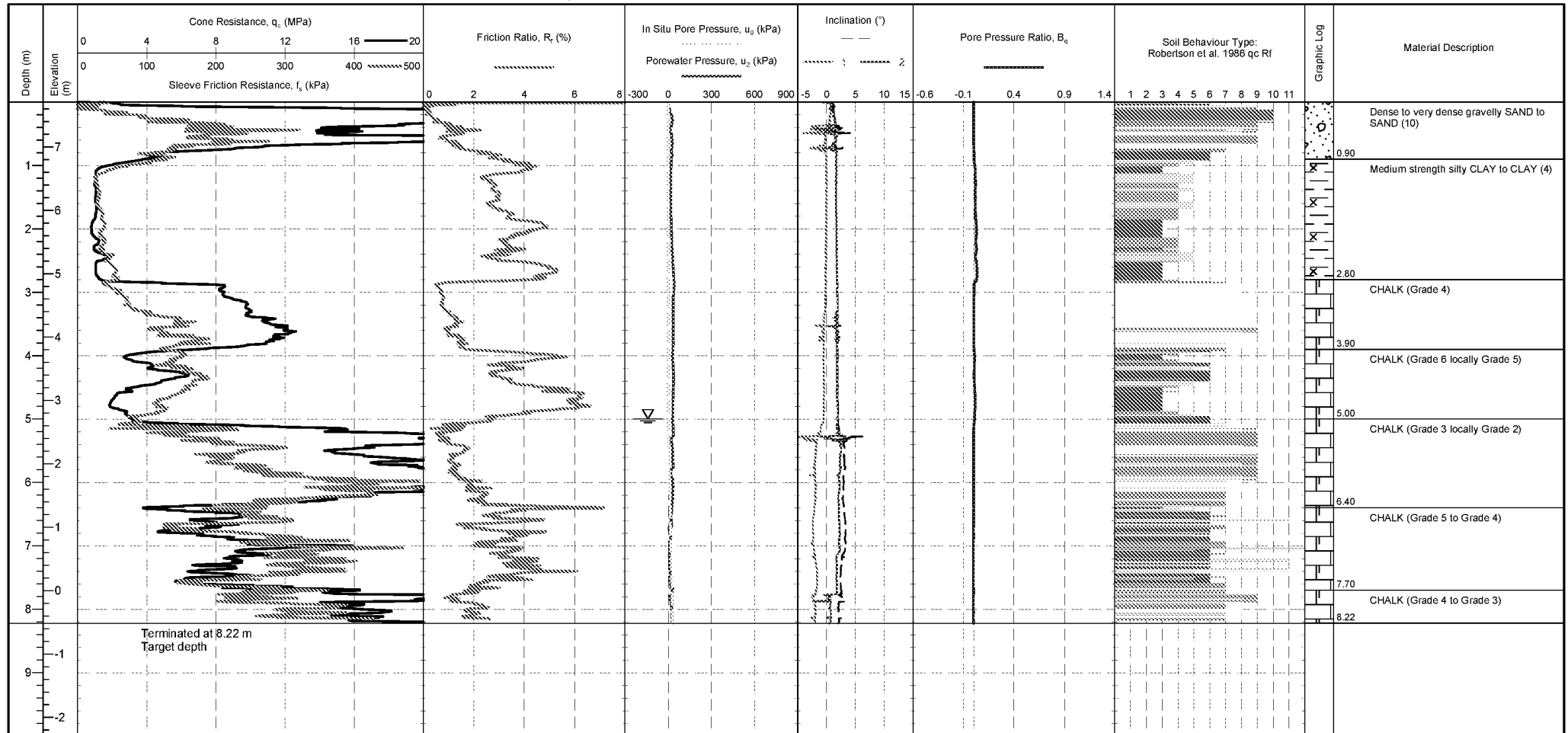
CPT12

CLIENT : Leap Environmental
PROJECT: Elmgrove Road
LOCATION : Littlehampton
PROJECT No. : 1210450

EASTING : 503224.7 m
NORTHING : 102650.5 m
ELEVATION : 7.71 m OD
CHECKED BY : LD
TERMINATION REASON : Target depth

Remark:
Test completed at target depth.

SHEET : 1 OF 1
STATUS : Final
TEST DATE : 15/09/2021
PLOT DATE : 17/09/2021
METHOD : ISO 22476-1:2012



CONE ID : S15-CFIP.1750
CALIBRATION DATE : 25/08/2020
CONE MODEL : Subtraction
CONE AREA : 15cm²
CONE AREA RATIO : 0.79
FILTER POSITION : u2
FILTER TYPE : HDPE

TEST TYPE : TE2
APPLICATION CLASS : 2
RIG : CPT 016
OPERATOR : LS
FRICTION REDUCER : None
WEATHER : Sunny & Mild
GROUNDWATER DEPTH : Supplied by the client

Transducer
Tip
Sleeve
Pore Pressure 2
X-Y Inclinator

CPTU ZERO VALUES

Pre	Post	Difference
254 mV	259 mV	0.054 MPa
273 mV	278 mV	0.003 kPa
217 mV	246 mV	0.007 kPa
2511 mV	2526 mV	

METHOD: Robertson et al. 1986 qc Rf

1 - Sensitive fine grained material	5 - Clayey SILT to silty CLAY	9 - SAND
2 - Organic material	6 - Sandy SILT to clayey SILT	10 - Gravelly SAND to SAND
3 - CLAY	7 - Silty SAND to sandy SILT	11 - Very stiff fine grained
4 - Silty CLAY to CLAY	8 - SAND to silty SAND	12 - SAND to clayey SAND

Groundwater
Level

Dissipation Test

PointID

CPT12

CLIENT : Leap Environmental

PROJECT: Elmgrove Road

LOCATION : Littlehampton

PROJECT No. : 1210450

EASTING : 503224.7 m

NORTHING : 102650.5 m

ELEVATION : 7.71 m OD

CHECKED BY : LD

TERMINATION REASON : Target depth

Remark:

Test completed at target depth.

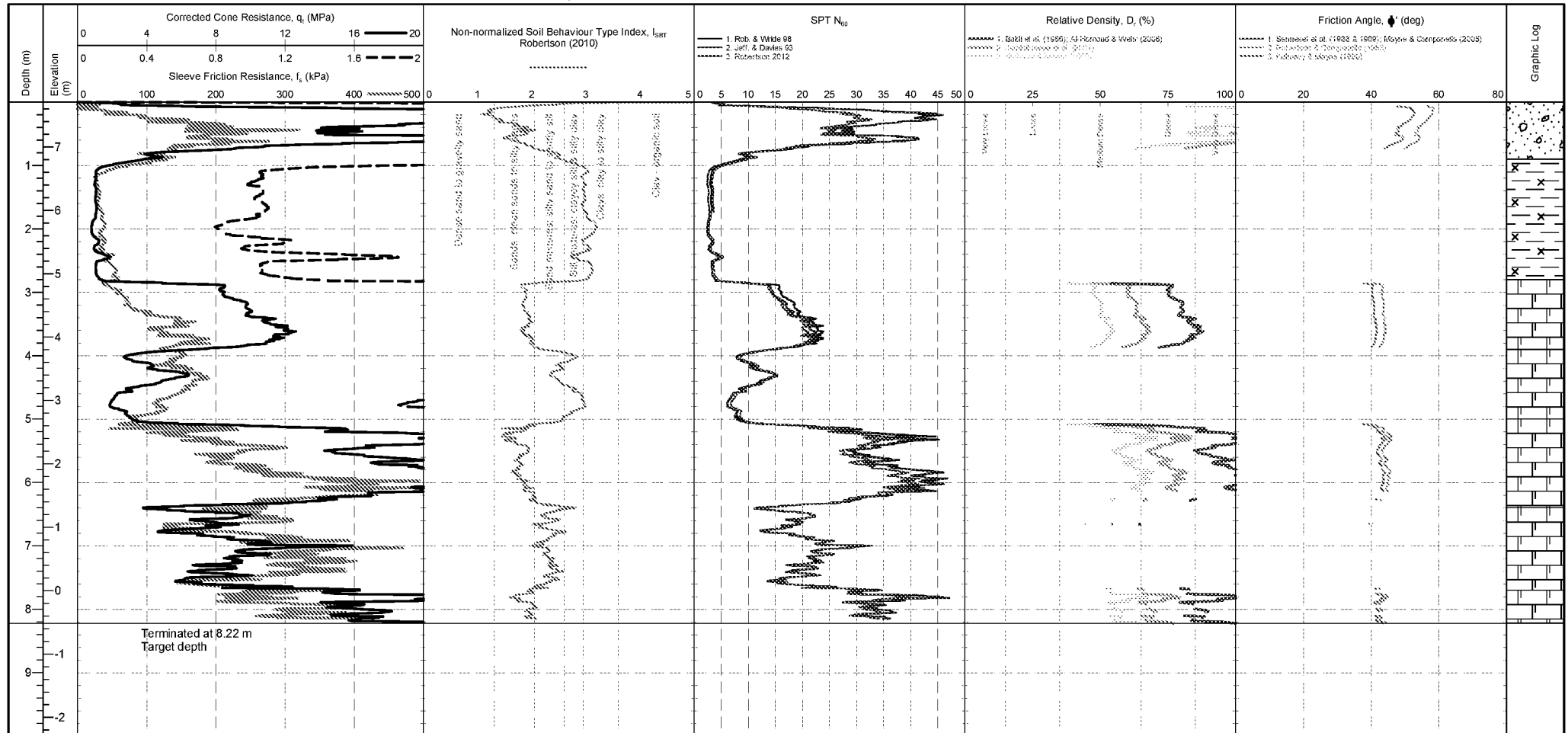
SHEET : 1 OF 1

STATUS : Final

TEST DATE : 15/09/2021

PLOT DATE : 17/09/2021

METHOD : ISO 22476-1:2012



CONE ID : S15-CFIP.1750
CONE MODEL : Subtraction
CONE AREA : 15cm²
CONE AREA RATIO : 0.79
FILTER POSITION : u2
FILTER TYPE : HDPE

TEST TYPE : TE2
APPLICATION CLASS : 2
RIG : CPT 016
OPERATOR : LS
FRICTION REDUCER : None
WEATHER : Sunny & Mild

Transducer :
Tip :
Sleeve :
Pore Pressure 2 :
X-Y Inclinator :
CPTU ZERO VALUES
Pre : 254 mV
Post : 259 mV
Difference : 0.054 MPa
Pre : 273 mV
Post : 278 mV
Difference : 0.003 kPa
Pre : 217 mV
Post : 246 mV
Difference : 0.007 kPa
Pre : 2511 mV
Post : 2526 mV

GRANULAR SOILS (Sands & Gravels) Robertson et al. 1986 Zones 7-10 and Zone 12					
Description	SBT Index, I_c	Description	SPT N value, NSPT	Description	Relative Density D_r (%)
Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15
Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35
Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65
Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85
Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85

Groundwater Level

Dissipation Test

PointID

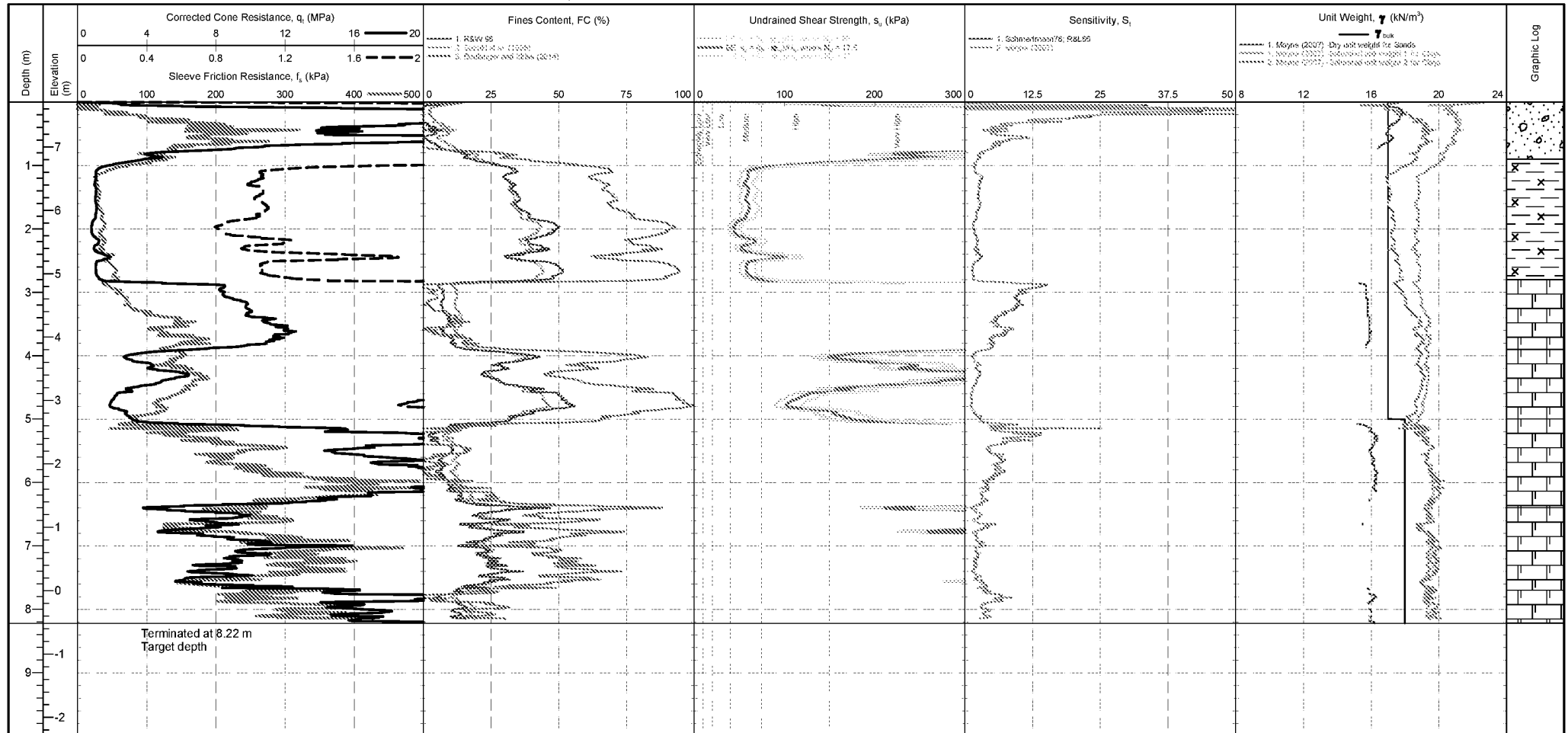
CPT12

CLIENT : Leap Environmental
PROJECT: Elmgrove Road
LOCATION : Littlehampton
PROJECT No. : 1210450

EASTING : 503224.7 m
NORTHING : 102650.5 m
ELEVATION : 7.71 m OD
CHECKED BY : LD
TERMINATION REASON : Target depth

Remark:
Test completed at target depth.

SHEET : 1 OF 1
STATUS : Final
TEST DATE : 15/09/2021
PLOT DATE : 17/09/2021
METHOD : ISO 22476-1:2012



CONE ID : S15-CFIP.1750
CONE MODEL : Subtraction
CONE AREA : 15cm²
CONE AREA RATIO : 0.79
FILTER POSITION : u2
FILTER TYPE : HDPE

TEST TYPE : TE2
APPLICATION CLASS : 2
RIG : CPT 016
OPERATOR : LS
FRICTION REDUCER : None
WEATHER : Sunny & Mild

Transducer
Tip
Sleeve
Pore Pressure 2
X-Y Inclinator

CPTU ZERO VALUES

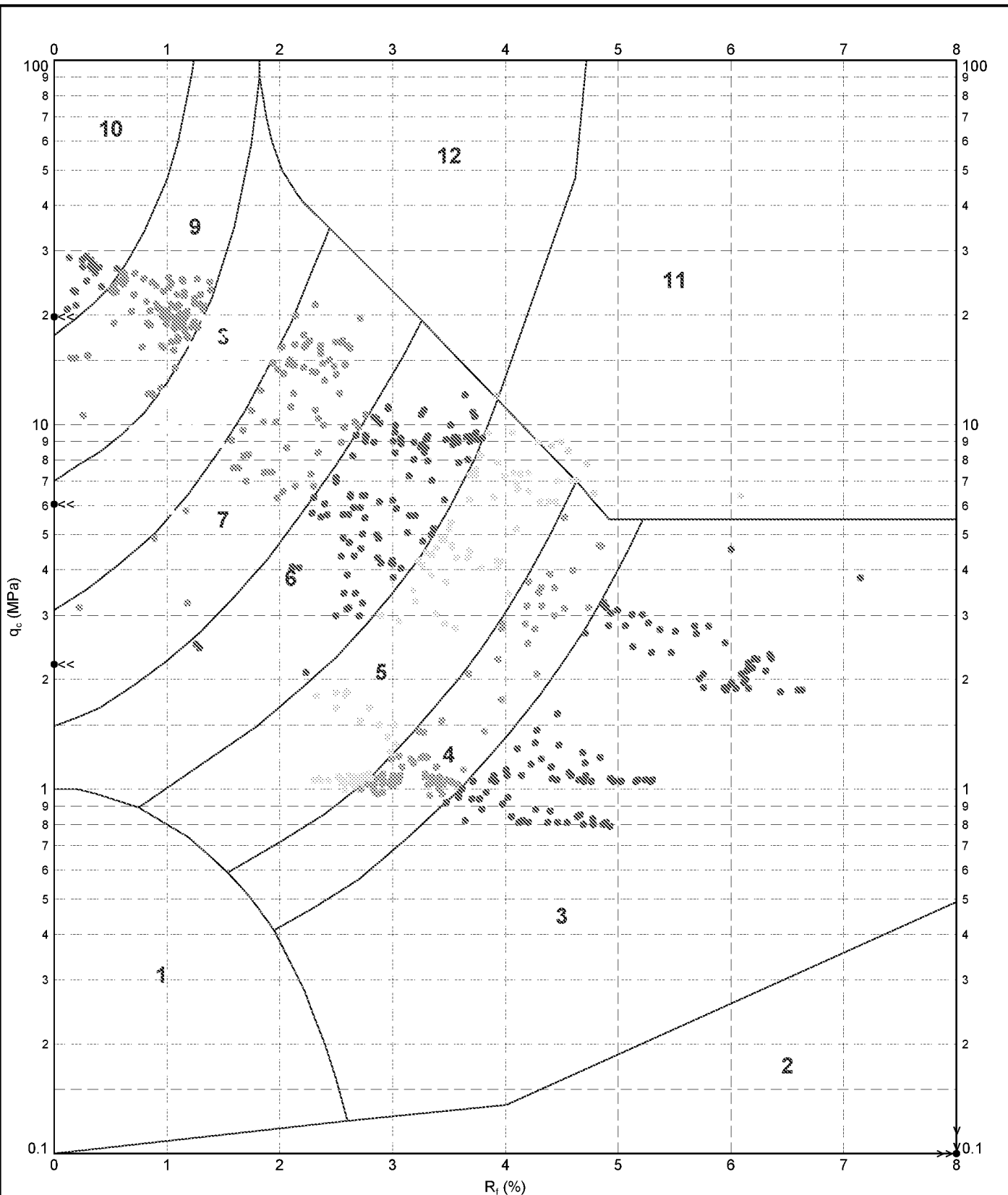
Pre	Post	Difference
254 mV	259 mV	0.054 MPa
273 mV	278 mV	0.003 kPa
217 mV	246 mV	0.007 kPa
2511 mV	2526 mV	

COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11

Term based on measurement	s_u (kPa)	Term based on measurement	s_u (kPa)
Extremely low strength	<10	Medium strength	40-75
Very low strength	10-20	High strength	75-150
Low strength	20-40	Very high strength	150-300
		Extremely high strength	>300

Groundwater Level
Dissipation Test

210528-ADVANCED REPORT INSTITUTE 2.02.1 L.B. ZOE G.L.B. Graph CPT ROBERTSON ET AL. 88 QC VS. RF MAP 1210450 ELMGROVE ROAD LITTLEHAMPTON LEAP ENVIRONMENTAL GPJ <<DrawingFile>> 17/09/2021 15:20 10.02.00.04 D:\gep Lab and in Situ Test - DGD Lib in Situ SI 2.02.0 2017-07-10 PHJ in Situ SI 2.02.0 2017-07-10



METHOD: Robertson et al. 1986 q_c R_f

- | | | | |
|-------------------------------------|-------------------------------|------------------------------|------------------------------|
| 1 - Sensitive fine grained material | 4 - Silty CLAY to CLAY | 7 - Silty SAND to sandy SILT | 10 - Gravelly SAND to SAND |
| 2 - Organic material | 5 - Clayey SILT to silty CLAY | 8 - SAND to silty SAND | 11 - Very stiff fine grained |
| 3 - CLAY | 6 - Sandy SILT to clayey SILT | 9 - SAND | 12 - SAND to clayey SAND |

IN SITU
SITE INVESTIGATION

TITLE

Leap Environmental
Littlehampton
Elmgrove Road
Robertson et al. 1986 q_c vs. R_f - CPT12

DRAWN

DATE

17/09/2021

CHECKED

DATE

17/09/2021

SCALE

Not To Scale

A4

PROJECT No

1210450

FIGURE No



IN SITU SITE INVESTIGATION

Unit 23 Hastings Innovation
Centre,
Highfield Drive
St. Leonards on Sea, East Sussex,
TN38 9UH, U.K.

Company No.: 6339499
VAT No.: 922 3581 41

APPENDIX D – IN SITU INFILTRATION TEST RESULTS

Infiltration Test Results

Results of BRE Digest 365 Soakage Tests

Site : Elmgrove Road, Littlehampton
 Client : Boklok
 O S Reference :

Tested By : ADC/AU/SH
 Test Date : 02/09/2021

Hole Number	Test Number	Hole Depth m	Test Soakage Rate litre/m2/min	Design Soakage Rate litre/m2/min	m/sec	End Water Level	Remarks
DTP1	No 1	4	0.48	0.48	7.97909E-06	Nearly empty pit.	
DTP1	No 2	4	0.61			Nearly empty pit.	
DTP1	No 3	4	0.54			Empty pit.	
DTP2	No 1	4	0.65	0.07	1.11168E-06	Nearly empty pit.	
DTP2	No 2	4	0.07			Nearly empty pit.	
DTP2	No 3	4	0.64			Empty pit.	
DTP3	No 1	4	0.10	0.06	1.01882E-06	Nearly empty pit.	
DTP3	No 2	4	0.06			Nearly empty pit.	
DTP3	No 3	4	0.10			Nearly empty pit.	
DTP4	No 1	4	0.01	0.01	2.45792E-07	Pit was not empty	
DTP4	No 2	4	0.03			Pit was not empty	
DTP4	No 3	4	0.06			Pit was not empty	
DTP5	No 1	4	0.04	0.01	1.7851E-07	Pit was not empty	
DTP5	No 2	4	0.01			Pit was not empty	
DTP5	No 3	4	0.02			Pit was not empty	

DTP6	No 1	3.74	0.87	0.83	1.70242E-06	Empty pit.	
DTP6	No 2	3.74	0.83			Empty pit.	
DTP6	No 3	3.74	0.10			Nearly empty pit.	
DTP7A	No 1	4	1.08	0.09	1.44467E-06	Nearly empty pit.	
DTP7A	No 2	4	0.09			Empty pit.	
DTP7A	No 3	4	0.95			Empty pit.	
DTP8	No 1	4.18	7.00	7.00	0.000116654	Nearly empty pit.	
DTP8	No 2	4.18	10.41			Empty pit.	
DTP8	No 3	4.18	11.90			Nearly empty pit.	
DTP9	No 1	4	0.08	0.08	1.41248E-06	Empty pit.	
DTP9	No 2	4	0.57			Empty pit.	
DTP9	No 3	4	0.18			Nearly empty pit.	
DTP10	No 1	4.12	1.39	1.27	7.24636E-06	Nearly empty pit.	
DTP10	No 2	4.12	1.27			Nearly empty pit.	
DTP10	No 3	4.12	0.43			Empty pit.	
Mean Value of All Calculated Soakage Rates :				0.99 litre/m2/min 1.39E-05 m/sec			



Results of BRE Digest 365 Soakage Tests

Site : Elmgrove Road, Littlehampton
 Client : Boklok
 O S Reference :

Tested By : ADC/AU/SH
 Test Date : 02/09/2021

Hole Number	Test Number	Hole Depth m	Test Soakage Rate litre/m ² /min	Design Soakage Rate litre/m ² /min	m/sec	End Water Level	Remarks
DTP11	No 1	4	5.81	5.34	8.90758E-05	Nearly empty pit.	
DTP11	No 2	4	5.34			Nearly empty pit.	
DTP11	No 3	4	6.74			Nearly empty pit.	
DTP12A	No 1	4.1	1.11	0.33	1.10689E-06	Nearly empty pit.	
DTP12A	No 2	4.1	0.33			Nearly empty pit.	
DTP12A	No 3	4.1	0.07			Nearly empty pit.	
Mean Value of All Calculated Soakage Rates :				2.84 litre/m ² /min	4.509E-05 m/sec		

Results of BRE Digest 365 Soakage Tests

Site : Elmgrove Road Littlehampton
 Client : Boklok
 O S Reference :

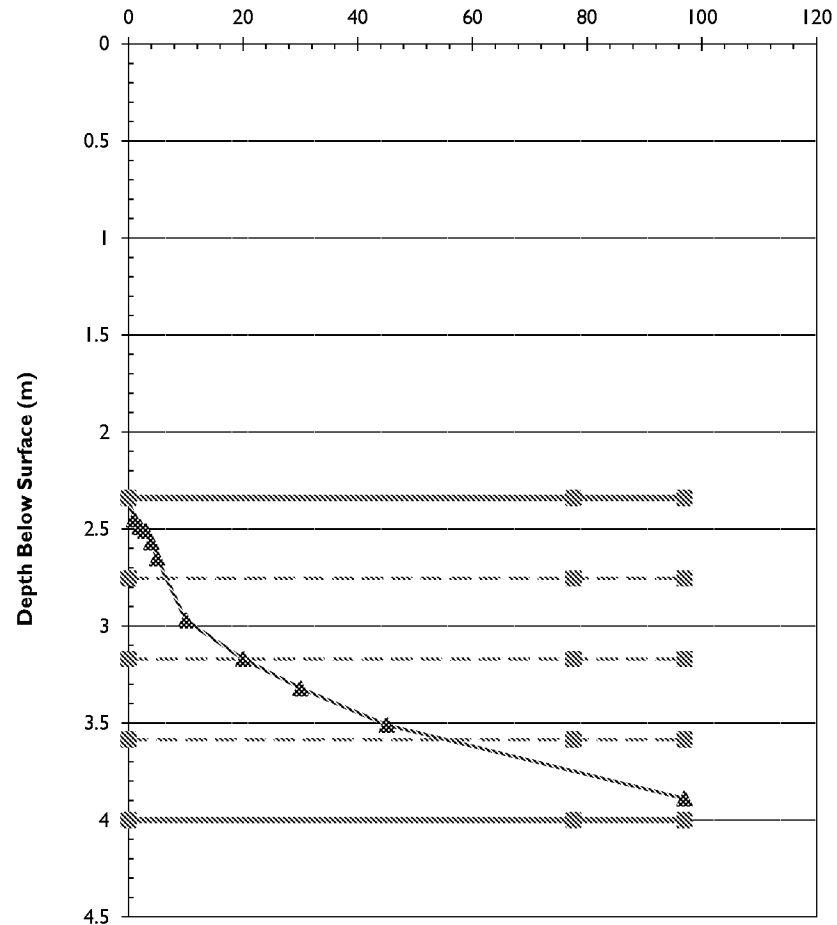
Tested By : ADC/AU/SH
 Test Date : 02/09/2021

Hole Number	Test Number	Hole Depth m	Test Soakage Rate litre/m2/min	Design Soakage Rate litre/m2/min	m/sec	End Water Level	Remarks
TP302	No 1	1.6	0.05	0.02	3.69223E-07	Nearly empty pit.	
TP302	No 2	1.6	0.02			Pit was not emptied	
TP302	No 3	1.6	0.22			Nearly empty pit.	
TP304	No 1	1.7	0.41	0.10	1.08932E-06	Pit was not emptied	
TP304	No 2	1.7	0.10			Pit was not emptied	
TP304	No 3	1.7	0.07			Pit was not emptied	
TP305	No 1	1.5	0.77	0.63	1.21494E-06	Empty pit.	
TP305	No 2	1.5	0.63			Empty pit.	
TP305	No 3	1.5	0.07			Nearly empty pit.	
TP306	No 1	1.84	1.36	0.23	3.85528E-06	Empty pit.	
TP306	No 2	1.84	0.23			Pit was not emptied	
TP306	No 3	1.84	1.13			Empty pit.	
TP308	No 1	1.6	0.25	0.07	1.14497E-06	Empty pit.	
TP308	No 2	1.6	0.07			Nearly empty pit.	
TP308	No 3	1.6	0.36			Empty pit.	

TP307	No 1	1.6	0.06	0.06 1.02996E-06	Empty pit.	
TP307	No 2	1.6	0.07		Nearly empty pit.	
TP307	No 3	1.6	0.07		Nearly empty pit.	
TP309	No 1	1.6	4.43	4.43 7.38753E-05	Nearly empty pit.	
TP309	No 2	1.6	5.38		Empty pit.	
TP309	No 3	1.6	5.45		Empty pit.	
Mean Value of All Calculated Soakage Rates :				0.79 litre/m2/min 1.18E-05 m/sec		

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



initial)

Test Hole No: DTP1
Test No: Test No 1



Pit Length (m)	2.2
Pit Width (m)	0.6
Depth to Pit Base (m)	4
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	2
Voids Assumed for Granular Fill (%)	35%
Depth of Water at Start of Test (m)	2.34
Max Water Dropdown during Test (m)	1.55
Total Soakage Test Time (min)	97
Mean Internal Discharge Area (m2)	5.968
Discharge Rate (litre/min)	2.857153
Soakage Rate (litre/m2/min)	0.478745
BRE Soil Infiltration Rate (m/sec)	7.98E-06

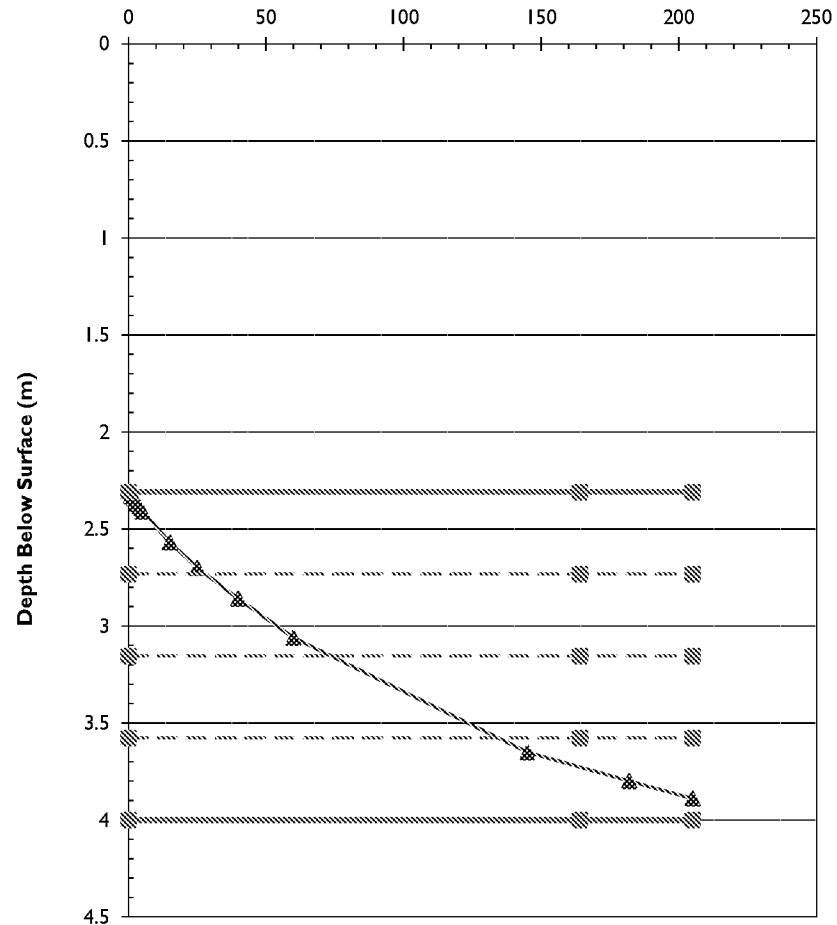
Comments:

Pit was nearly emptied at finish of test.

Client: Boklok
Site: Elmgrove Road, Littlehampton
Tested By: ADC/AU/SH
Test Date: 01/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



Test Hole No: DTP1
Test No: Test No 2

repeated)



Pit Length (m)	2.2
Pit Width (m)	0.6
Depth to Pit Base (m)	4
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	2
Voids Assumed for Granular Fill (%)	35%

Depth of Water at Start of Test (m)	2.31
Max Water Dropdown during Test (m)	1.58
Total Soakage Test Time (min)	205
Mean Internal Discharge Area (m2)	6.052
Discharge Rate (litre/min)	3.665351
Soakage Rate (litre/m2/min)	0.605643

BRE Soil Infiltration Rate (m/sec) 1.01E-05

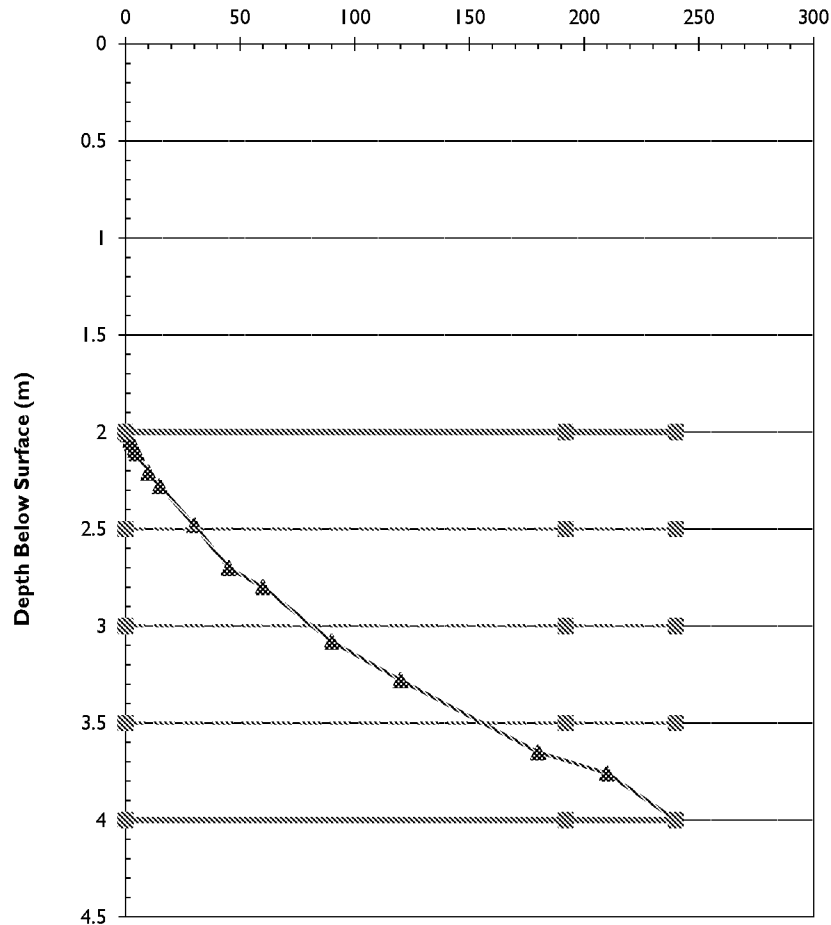
Comments:

Pit was nearly emptied at finish of test.

Client: Boklok
Site: Elmgrove Road, Littlehampton
Tested By: ADC/AU/SH
Test Date: 01/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



Test Hole No: DTP1
Test No: Test No 3

repeated)



Pit Length (m)	2.2
Pit Width (m)	0.6
Depth to Pit Base (m)	4
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	2
Voids Assumed for Granular Fill (%)	35%
Depth of Water at Start of Test (m)	2
Max Water Dropdown during Test (m)	2
Total Soakage Test Time (min)	240
Mean Internal Discharge Area (m2)	6.92
Discharge Rate (litre/min)	3.716454
Soakage Rate (litre/m2/min)	0.53706
BRE Soil Infiltration Rate (m/sec)	8.95E-06

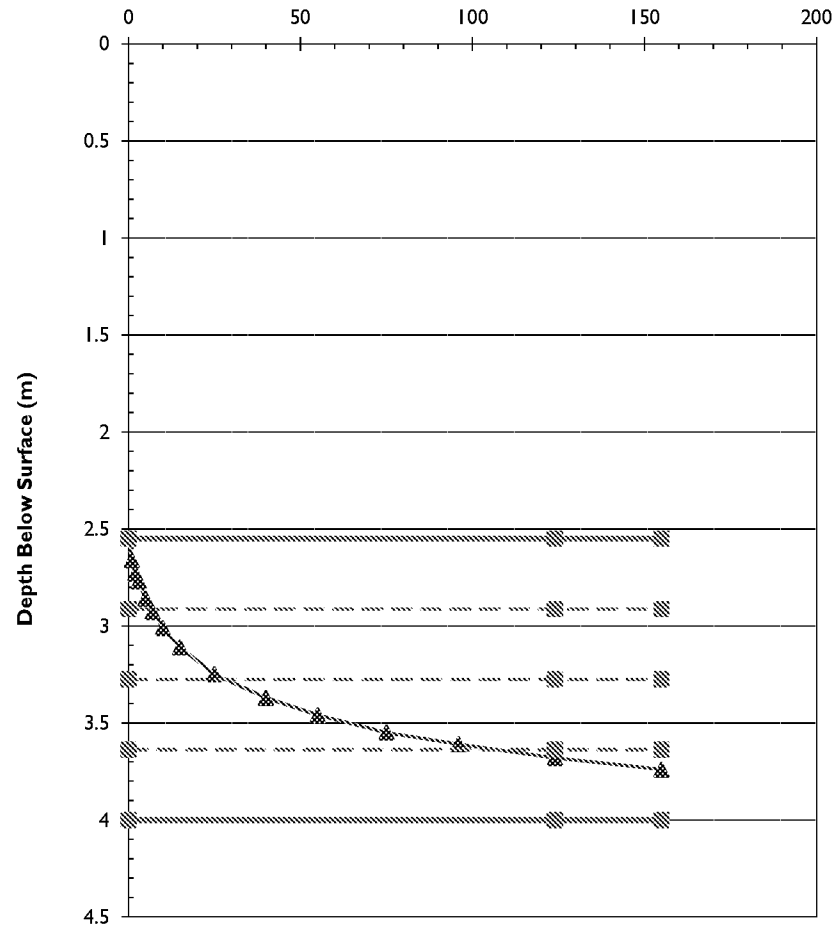
Comments:

Pit was emptied at finish of test.

Client: Boklok
Site: Elmgrove Road, Littlehampton
Tested By: ADC/AU/SH
Test Date: 01/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



initial)

Test Hole No: DTP2
Test No: Test No 1



Pit Length (m)	2.2
Pit Width (m)	0.65
Depth to Pit Base (m)	4
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	2
Voids Assumed for Granular Fill (%)	35%
Depth of Water at Start of Test (m)	2.55
Max Water Dropdown during Test (m)	1.19
Total Soakage Test Time (min)	155
Mean Internal Discharge Area (m2)	5.5625
Discharge Rate (litre/min)	3.610572
Soakage Rate (litre/m2/min)	0.649092
BRE Soil Infiltration Rate (m/sec)	1.08E-05

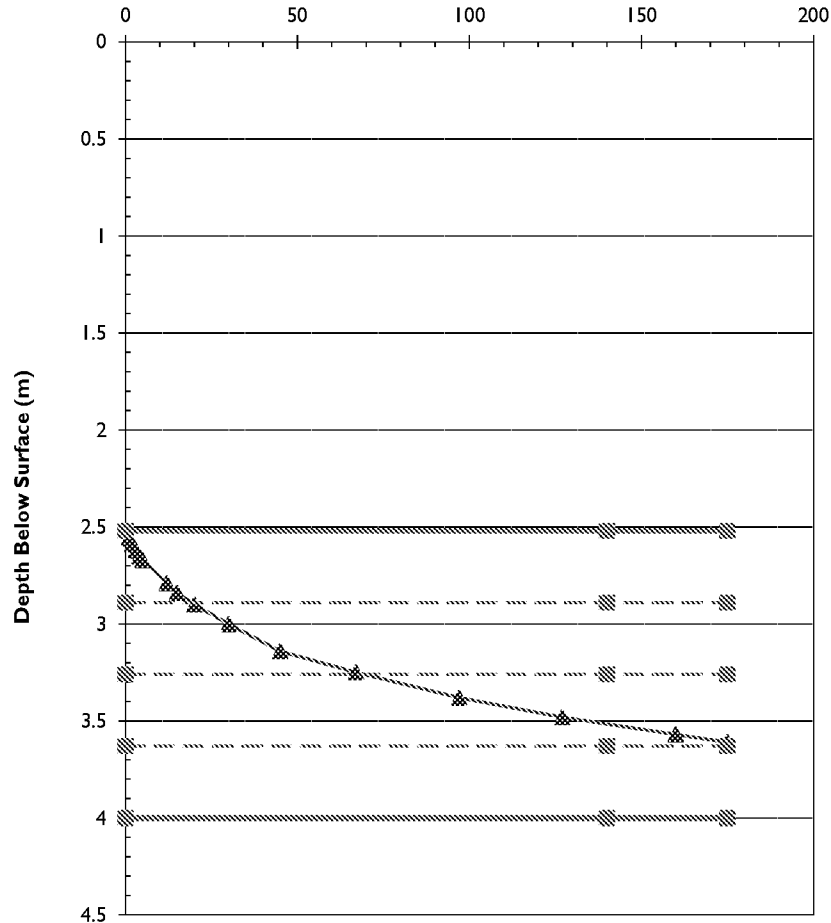
Comments:

Pit was nearly emptied at finish of test.

Client: Boklok
Site: Elmgrove Road, Littlehampton
Tested By: ADC/AU/SH
Test Date: 01/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



Test Hole No: DTP2
Test No: Test No 2

repeated)



Pit Length (m)	2.2
Pit Width (m)	0.65
Depth to Pit Base (m)	4
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	2
Voids Assumed for Granular Fill (%)	35%

Depth of Water at Start of Test (m)	2.52
Max Water Dropdown during Test (m)	1.09
Total Soakage Test Time (min)	175
Mean Internal Discharge Area (m2)	5.705
Discharge Rate (litre/min)	0.380528
Soakage Rate (litre/m2/min)	0.066701

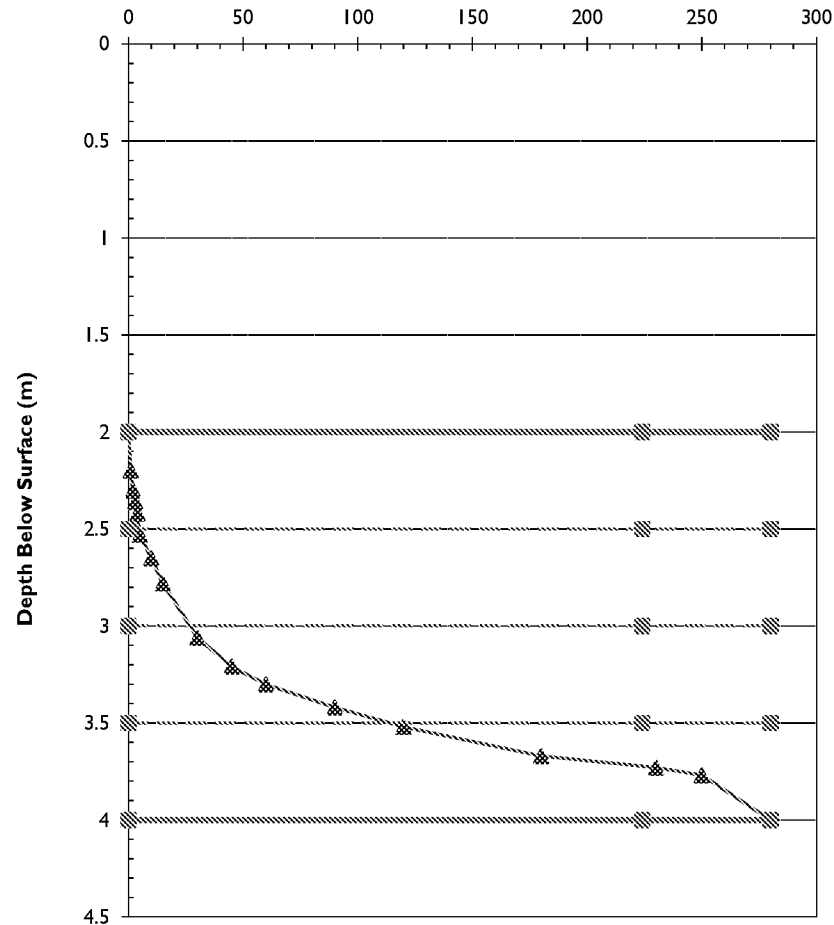
BRE Soil Infiltration Rate (m/sec) 1.11E-06

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

Client: Boklok
Site: Elmgrove Road, Littlehampton
Tested By: ADC/AU/SH
Test Date: 01/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



Test Hole No: DTP2
Test No: Test No 3

repeated)



Pit Length (m)	2.2
Pit Width (m)	0.65
Depth to Pit Base (m)	4
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	2
Voids Assumed for Granular Fill (%)	35%
Depth of Water at Start of Test (m)	2
Max Water Dropdown during Test (m)	2
Total Soakage Test Time (min)	280
Mean Internal Discharge Area (m2)	7.13
Discharge Rate (litre/min)	4.580283
Soakage Rate (litre/m2/min)	0.642396
BRE Soil Infiltration Rate (m/sec)	1.07E-05

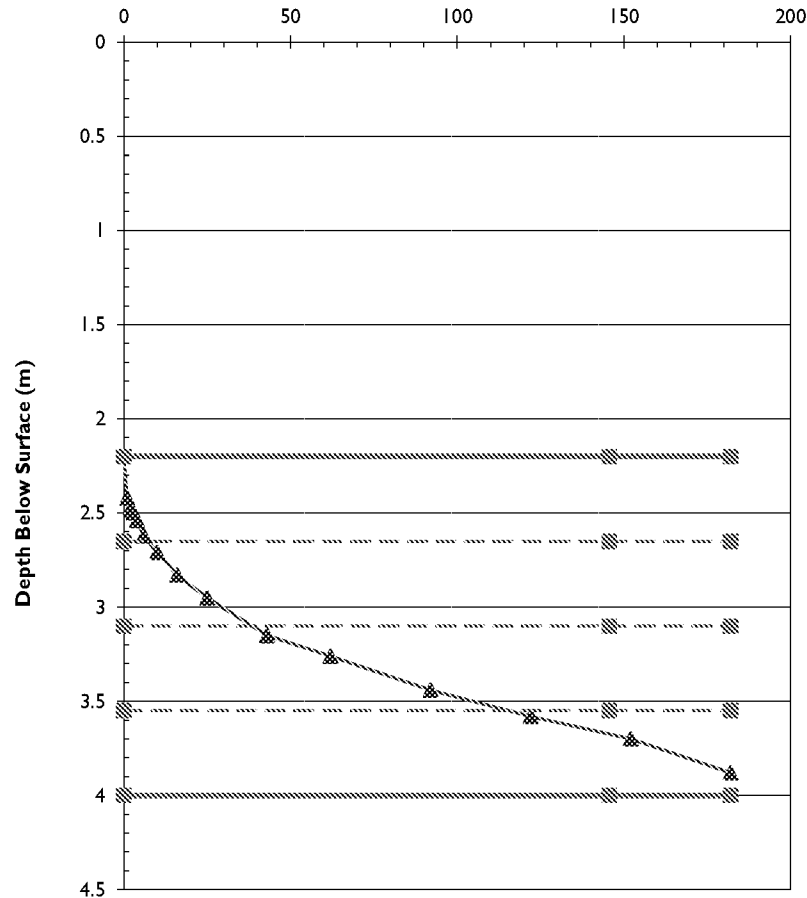
Comments:

Pit was emptied at finish of test.

Client: Boklok
Site: Elmgrove Road, Littlehampton
Tested By: ADC/AU/SH
Test Date: 01/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



initial)

Test Hole No: DTP3
Test No: Test No 1



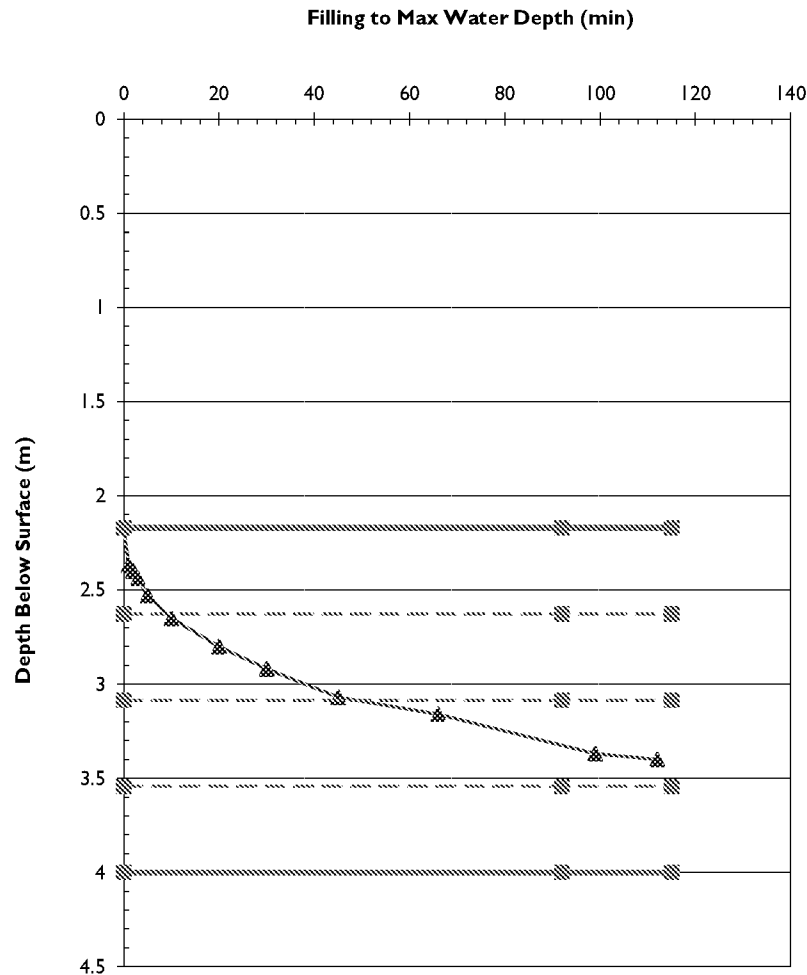
Pit Length (m)	2.3
Pit Width (m)	0.7
Depth to Pit Base (m)	4
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	2
Voids Assumed for Granular Fill (%)	35%
Depth of Water at Start of Test (m)	2.2
Max Water Dropdown during Test (m)	1.68
Total Soakage Test Time (min)	182
Mean Internal Discharge Area (m2)	7.01
Discharge Rate (litre/min)	0.678396713
Soakage Rate (litre/m2/min)	0.096775565
BRE Soil Infiltration Rate (m/sec)	1.61293E-06

Comments:

Pit was nearly emptied at finish of test.

Client: Boklok
Site: Elmgrove Road, Littlehampton
Tested By: ADC/AU/SH
Test Date: 01/09/21

BRE Digest 365 - Soakage Test



Test Hole No: DTP3
Test No: Test No 2

repeated)



Pit Length (m)	2.3
Pit Width (m)	0.7
Depth to Pit Base (m)	4
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	2
Voids Assumed for Granular Fill (%)	35%

Depth of Water at Start of Test (m)	2.17
Max Water Dropdown during Test (m)	1.23
Total Soakage Test Time (min)	115
Mean Internal Discharge Area (m ²)	7.5275
Discharge Rate (litre/min)	0.460151956
Soakage Rate (litre/m ² /min)	0.061129453

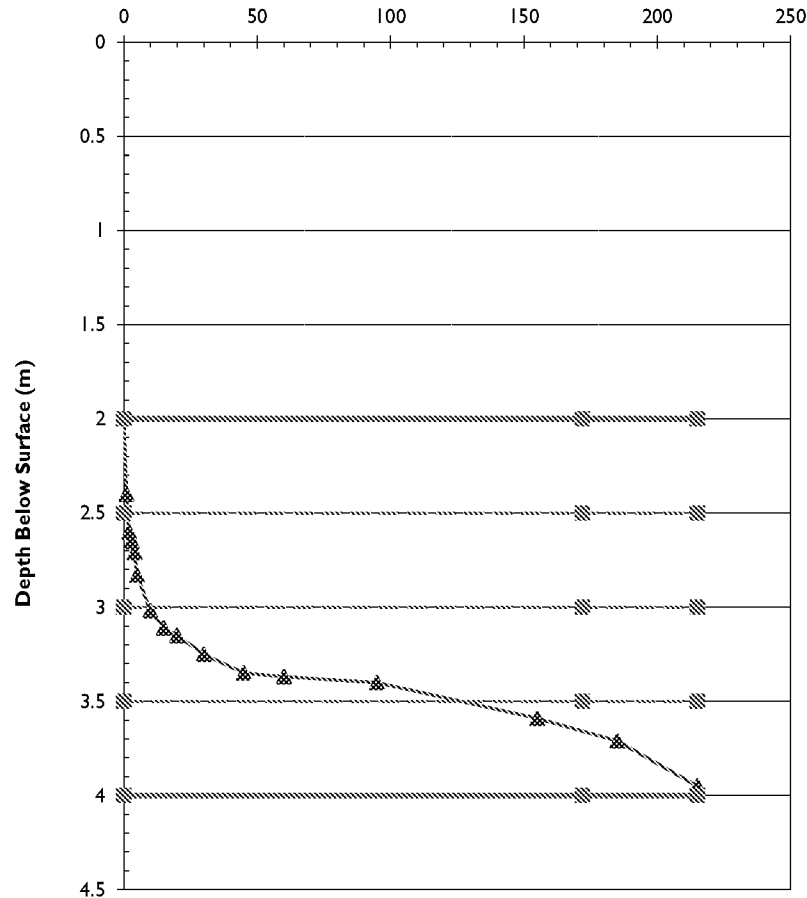
BRE Soil Infiltration Rate (m/sec) 1.01882E-06

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: Boklok
Site: Elmgrove Road, Littlehampton
Tested By: ADC/AU/SH
Test Date: 01/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



Test Hole No: DTP3
Test No: Test No 3

repeated)



Pit Length (m)	2.3
Pit Width (m)	0.7
Depth to Pit Base (m)	4
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	2
Voids Assumed for Granular Fill (%)	35%

Depth of Water at Start of Test (m)	2
Max Water Dropdown during Test (m)	1.95
Total Soakage Test Time (min)	215
Mean Internal Discharge Area (m2)	7.61
Discharge Rate (litre/min)	0.749754902
Soakage Rate (litre/m2/min)	0.098522326

BRE Soil Infiltration Rate (m/sec)	1.64204E-06
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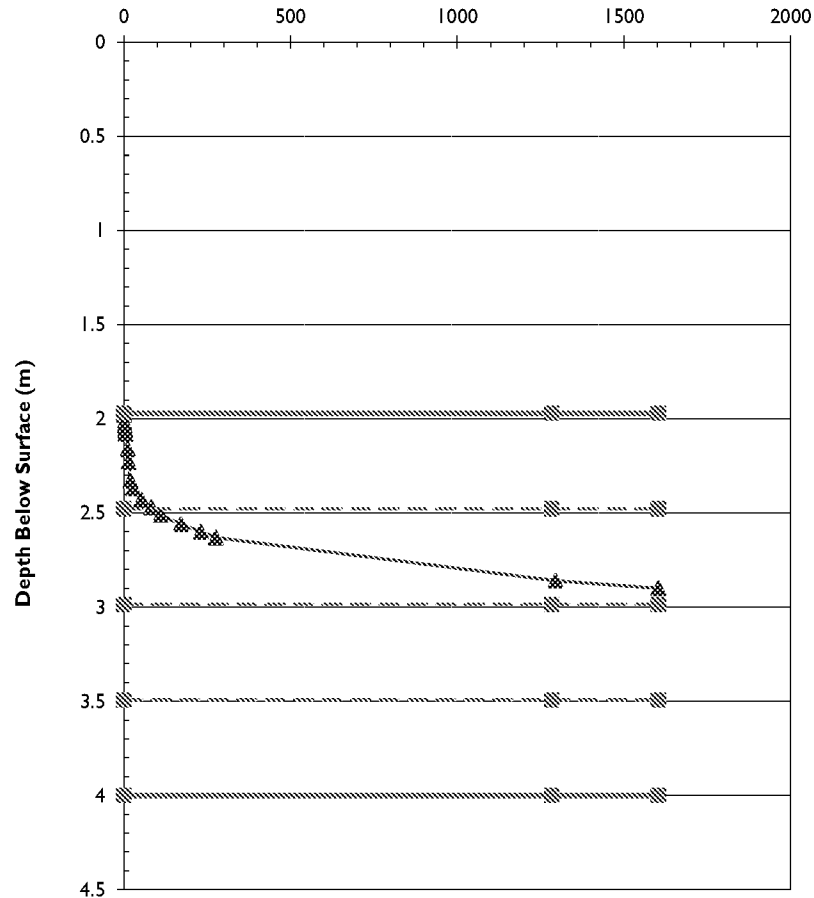
Comments:

Pit was nearly emptied at finish of test.

Client:	Boklok
Site:	Elmgrove Road, Littlehampton
Tested By:	ADC/AU/SH
Test Date:	01/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



initial)

Test Hole No: DTP4
Test No: Test No 1



Pit Length (m)	2.1
Pit Width (m)	0.6
Depth to Pit Base (m)	4
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	2
Voids Assumed for Granular Fill (%)	35%

Depth of Water at Start of Test (m)	1.97
Max Water Dropdown during Test (m)	0.93
Total Soakage Test Time (min)	1603
Mean Internal Discharge Area (m2)	8.34075
Discharge Rate (litre/min)	0.123005446
Soakage Rate (litre/m2/min)	0.014747528

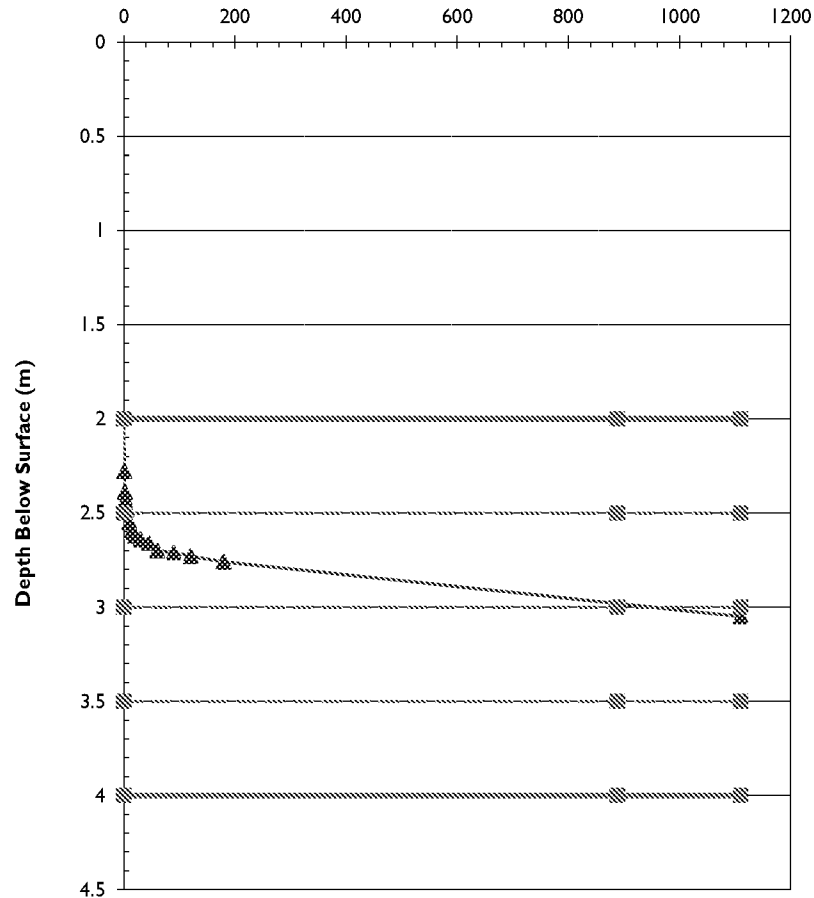
BRE Soil Infiltration Rate (m/sec) 2.45792E-07

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: Boklok
Site: Elmgrove Road, Littlehampton
Tested By: ADC/AU/SH
Test Date: 01/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



Test Hole No: DTP4
Test No: Test No 2

repeated)



Pit Length (m)	2.1
Pit Width (m)	0.6
Depth to Pit Base (m)	4
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	2
Voids Assumed for Granular Fill (%)	35%

Depth of Water at Start of Test (m)	2
Max Water Dropdown during Test (m)	1.05
Total Soakage Test Time (min)	1110
Mean Internal Discharge Area (m2)	7.875
Discharge Rate (litre/min)	0.219786408
Soakage Rate (litre/m2/min)	0.027909385

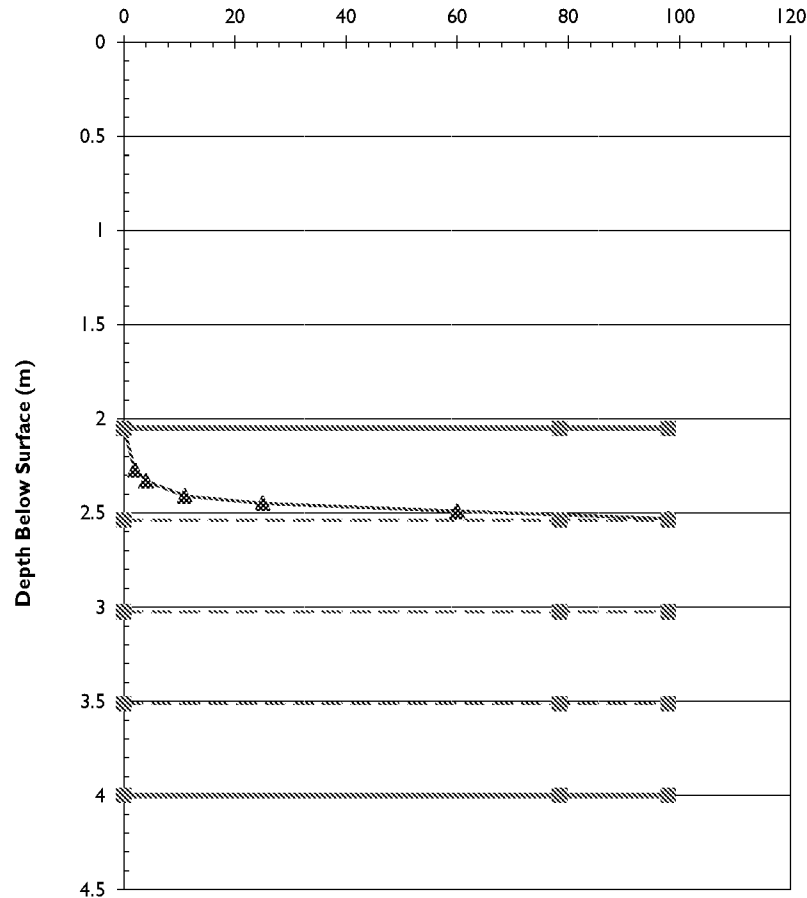
BRE Soil Infiltration Rate (m/sec) 4.65156E-07

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: Boklok
Site: Elmgrove Road, Littlehampton
Tested By: ADC/AU/SH
Test Date: 01/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



Test Hole No: DTP4
Test No: Test No 3

repeated)



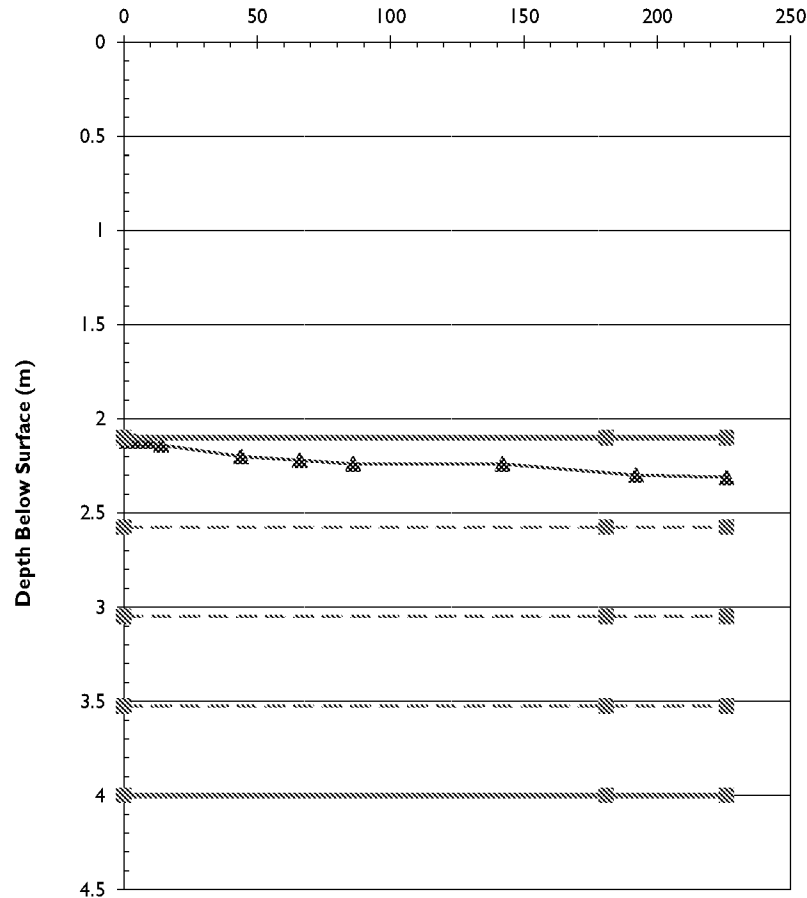
Pit Length (m)	2.1
Pit Width (m)	0.6
Depth to Pit Base (m)	4
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	2
Voids Assumed for Granular Fill (%)	35%
Depth of Water at Start of Test (m)	2.05
Max Water Dropdown during Test (m)	0.48
Total Soakage Test Time (min)	98
Mean Internal Discharge Area (m2)	9.522
Discharge Rate (litre/min)	0.608275862
Soakage Rate (litre/m2/min)	0.063881103
BRE Soil Infiltration Rate (m/sec)	1.06469E-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: Boklok
Site: Elmgrove Road, Littlehampton
Tested By: ADC/AU/SH
Test Date: 01/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



initial)

Test Hole No: DTP5
Test No: Test No 1



Pit Length (m)	2.1
Pit Width (m)	0.7
Depth to Pit Base (m)	4
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	2
Voids Assumed for Granular Fill (%)	35%

Depth of Water at Start of Test (m)	2.1
Max Water Dropdown during Test (m)	0.21
Total Soakage Test Time (min)	226
Mean Internal Discharge Area (m2)	11.081
Discharge Rate (litre/min)	0.389117647
Soakage Rate (litre/m2/min)	0.035115752

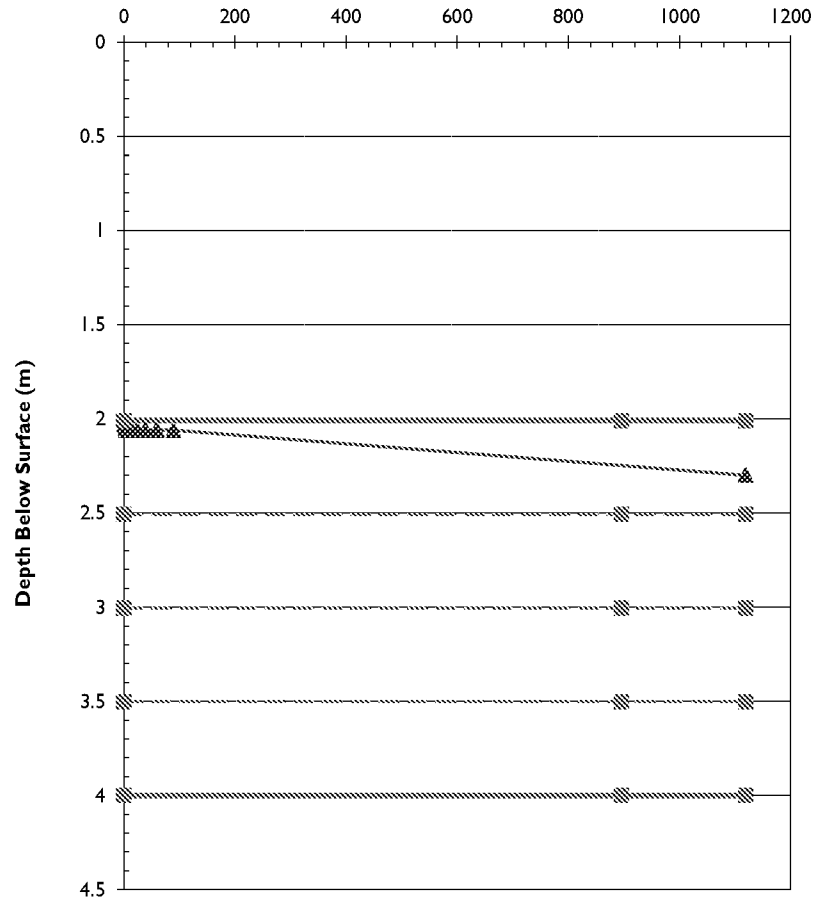
BRE Soil Infiltration Rate (m/sec) 5.85263E-07

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: Boklok
Site: Elmgrove Road, Littlehampton
Tested By: ADC/AU/SH
Test Date: 01/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



Test Hole No: DTP5
Test No: Test No 2

repeated)



Pit Length (m)	2.1
Pit Width (m)	0.7
Depth to Pit Base (m)	4
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	2
Voids Assumed for Granular Fill (%)	35%

Depth of Water at Start of Test (m)	2.01
Max Water Dropdown during Test (m)	0.29
Total Soakage Test Time (min)	1119
Mean Internal Discharge Area (m2)	11.193
Discharge Rate (litre/min)	0.119883495
Soakage Rate (litre/m2/min)	0.010710578

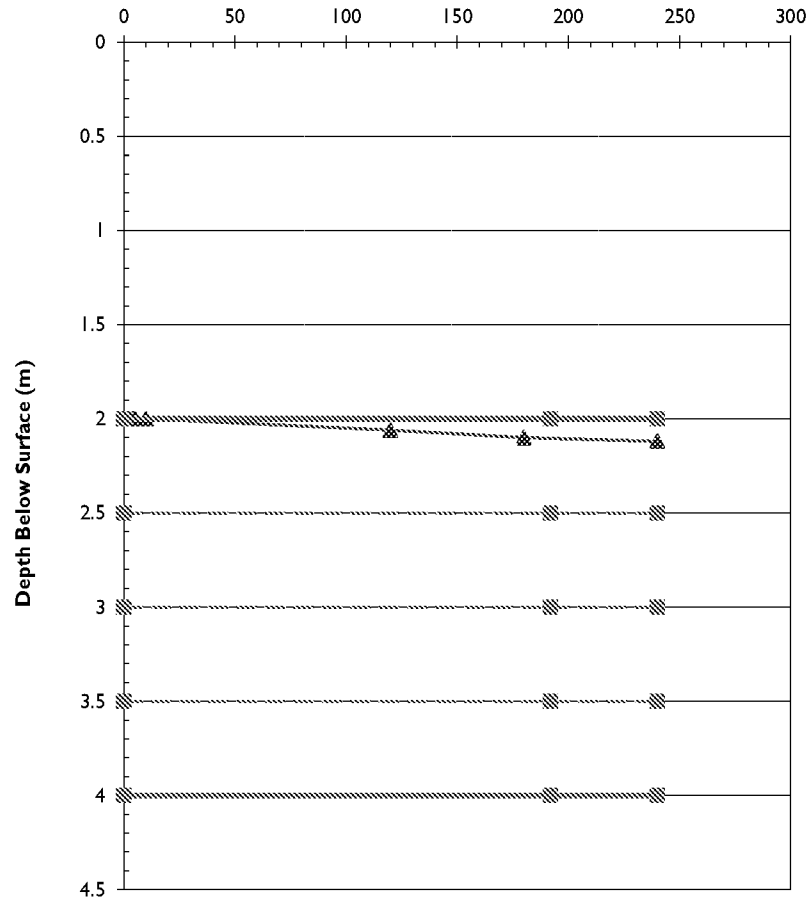
BRE Soil Infiltration Rate (m/sec) 1.7851E-07

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: Boklok
Site: Elmgrove Road, Littlehampton
Tested By: ADC/AU/SH
Test Date: 01/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



Test Hole No: DTP5
Test No: Test No 3

repeated)



Pit Length (m)	2.1
Pit Width (m)	0.7
Depth to Pit Base (m)	4
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	2
Voids Assumed for Granular Fill (%)	35%

Depth of Water at Start of Test (m)	2
Max Water Dropdown during Test (m)	0.12
Total Soakage Test Time (min)	240
Mean Internal Discharge Area (m2)	12.082
Discharge Rate (litre/min)	0.2058
Soakage Rate (litre/m2/min)	0.017033604

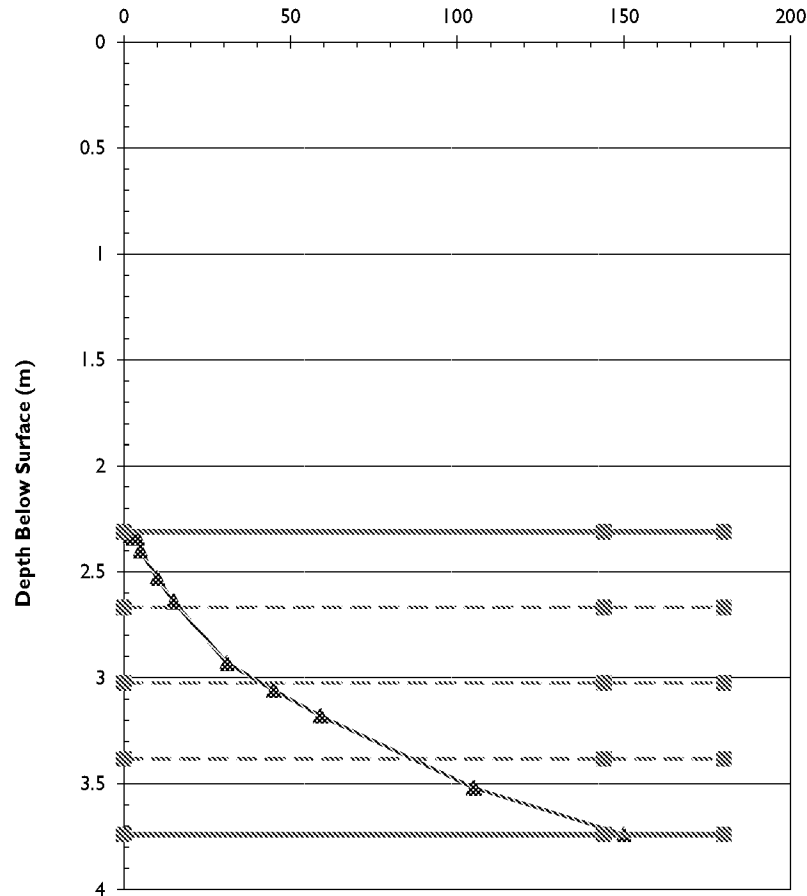
BRE Soil Infiltration Rate (m/sec)	2.83893E-07
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Comments: Water level did not fall to 75% max water depth, calculations were based on actual fall of water level achieved.
Result not compliant with BRE365 requirement since water did not fall to 25% max water depth.

Client: Boklok
Site: Elmgrove Road, Littlehampton
Tested By: ADC/AU/SH
Test Date: 01/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



initial)

Test Hole No: DTP6
Test No: Test No 1



Pit Length (m)	2.1
Pit Width (m)	0.6
Depth to Pit Base (m)	3.74
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	2
Voids Assumed for Granular Fill (%)	35%
Depth of Water at Start of Test (m)	2.31
Max Water Dropdown during Test (m)	1.43
Total Soakage Test Time (min)	180
Mean Internal Discharge Area (m2)	5.121
Discharge Rate (litre/min)	4.454546093
Soakage Rate (litre/m2/min)	0.869858639
BRE Soil Infiltration Rate (m/sec)	1.44976E-05

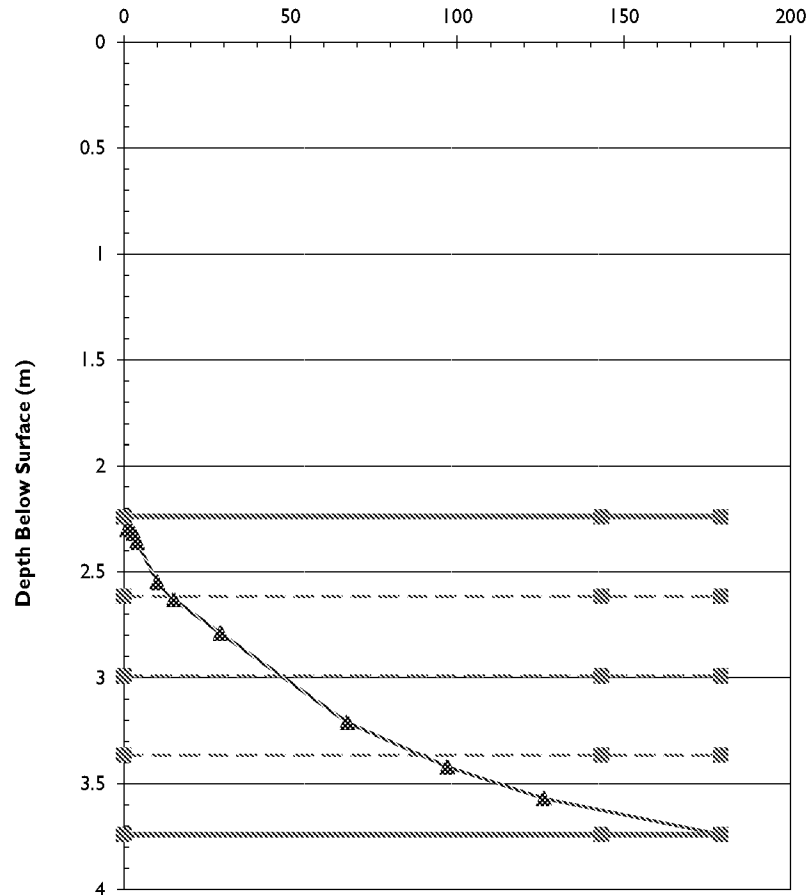
Comments:

Pit was emptied at finish of test.

Client: Boklok
Site: Elmgrove Road, Littlehampton
Tested By: ADC/AU/SH
Test Date: 01/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



Test Hole No: DTP6
Test No: Test No 2

repeated)



Pit Length (m)	2.1
Pit Width (m)	0.6
Depth to Pit Base (m)	3.74
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	2
Voids Assumed for Granular Fill (%)	35%
Depth of Water at Start of Test (m)	2.24
Max Water Dropdown during Test (m)	1.5
Total Soakage Test Time (min)	179
Mean Internal Discharge Area (m2)	5.31
Discharge Rate (litre/min)	4.405280057
Soakage Rate (litre/m2/min)	0.829619596
BRE Soil Infiltration Rate (m/sec)	1.3827E-05

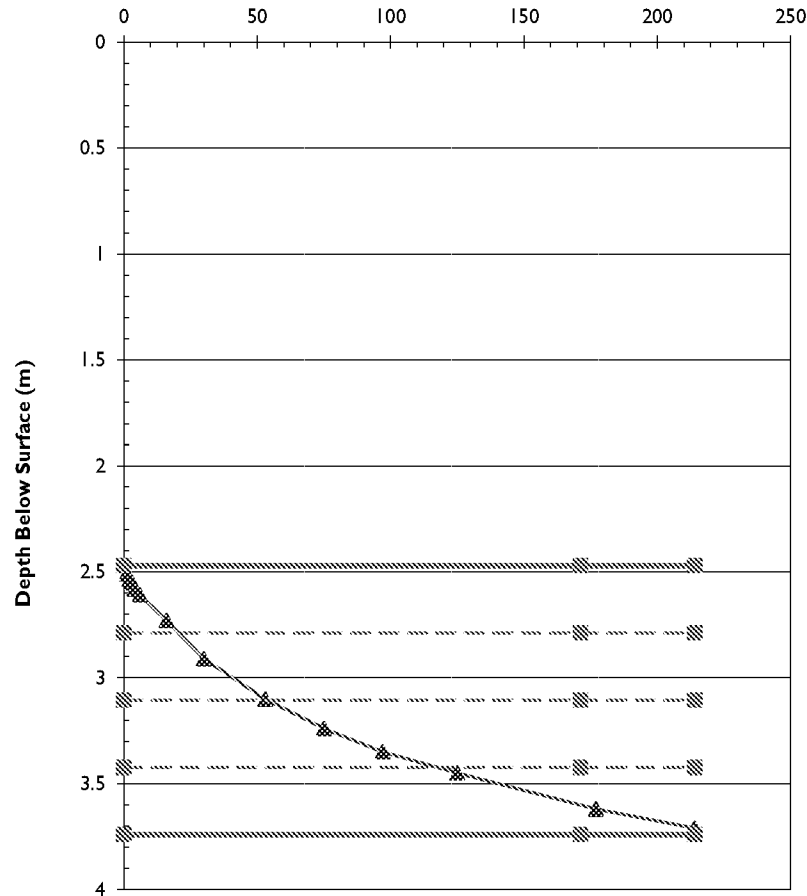
Comments:

Pit was emptied at finish of test.

Client: Boklok
Site: Elmgrove Road, Littlehampton
Tested By: ADC/AU/SH
Test Date: 01/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



Test Hole No: DTP6
Test No: Test No 3

repeated)



Pit Length (m)	2.1
Pit Width (m)	0.6
Depth to Pit Base (m)	3.74
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	2
Voids Assumed for Granular Fill (%)	35%
Depth of Water at Start of Test (m)	2.47
Max Water Dropdown during Test (m)	1.24
Total Soakage Test Time (min)	214
Mean Internal Discharge Area (m2)	4.689
Discharge Rate (litre/min)	0.478958396
Soakage Rate (litre/m2/min)	0.102145105
BRE Soil Infiltration Rate (m/sec)	1.70242E-06

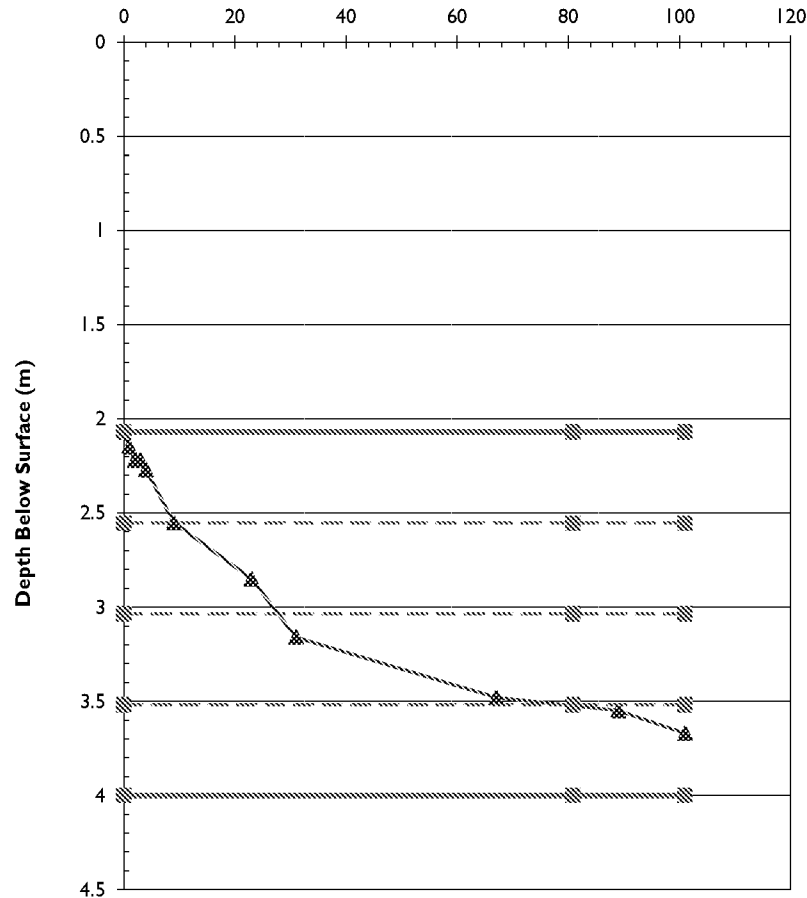
Comments:

Pit was nearly emptied at finish of test.

Client: Boklok
Site: Elmgrove Road, Littlehampton
Tested By: ADC/AU/SH
Test Date: 01/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



initial)

Test Hole No: DTP7A
Test No: Test No 1



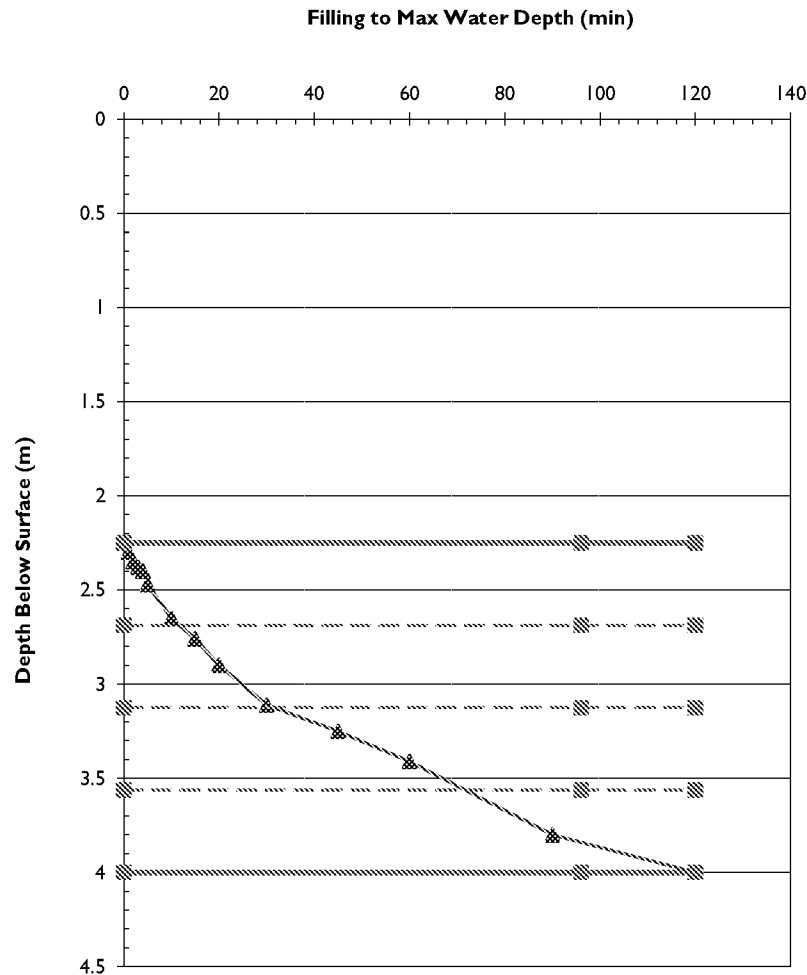
Pit Length (m)	2.7
Pit Width (m)	0.7
Depth to Pit Base (m)	4
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	2
Void Assumed for Granular Fill (%)	35%
Depth of Water at Start of Test (m)	2.07
Max Water Dropdown during Test (m)	1.6
Total Soakage Test Time (min)	101
Mean Internal Discharge Area (m2)	8.452
Discharge Rate (litre/min)	9.162569632
Soakage Rate (litre/m2/min)	1.084071182
BRE Soil Infiltration Rate (m/sec)	1.80679E-05

Comments:

Pit was nearly emptied at finish of test.

Client: Boklok
Site: Elmgrove Road, Littlehampton
Tested By: ADC/AU/SH
Test Date: 01/09/21

BRE Digest 365 - Soakage Test



Test Hole No: DTP7A
Test No: Test No 2

repeated)



Pit Length (m)	2.7
Pit Width (m)	0.7
Depth to Pit Base (m)	4
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	2
Voids Assumed for Granular Fill (%)	35%

Depth of Water at Start of Test (m)	2.25
Max Water Dropdown during Test (m)	1.75
Total Soakage Test Time (min)	120
Mean Internal Discharge Area (m2)	7.84
Discharge Rate (litre/min)	0.679572138
Soakage Rate (litre/m2/min)	0.08668012

BRE Soil Infiltration Rate (m/sec) 1.44467E-06

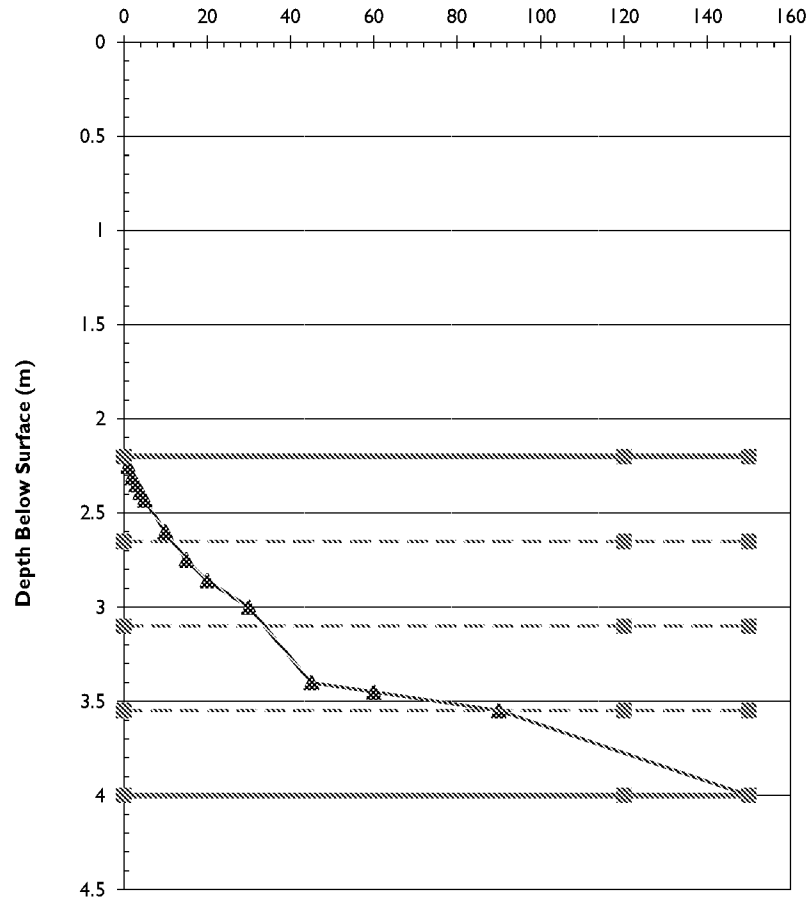
Comments:

Pit was emptied at finish of test.

Client: Boklok
Site: Elmgrove Road, Littlehampton
Tested By: ADC/AU/SH
Test Date: 01/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



Test Hole No: DTP7A
Test No: Test No 3

repeated)



Pit Length (m)	2.7
Pit Width (m)	0.7
Depth to Pit Base (m)	4
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	2
Voids Assumed for Granular Fill (%)	35%
Depth of Water at Start of Test (m)	2.2
Max Water Dropdown during Test (m)	1.8
Total Soakage Test Time (min)	150
Mean Internal Discharge Area (m2)	8.01
Discharge Rate (litre/min)	7.600212766
Soakage Rate (litre/m2/min)	0.948840545
BRE Soil Infiltration Rate (m/sec)	1.5814E-05

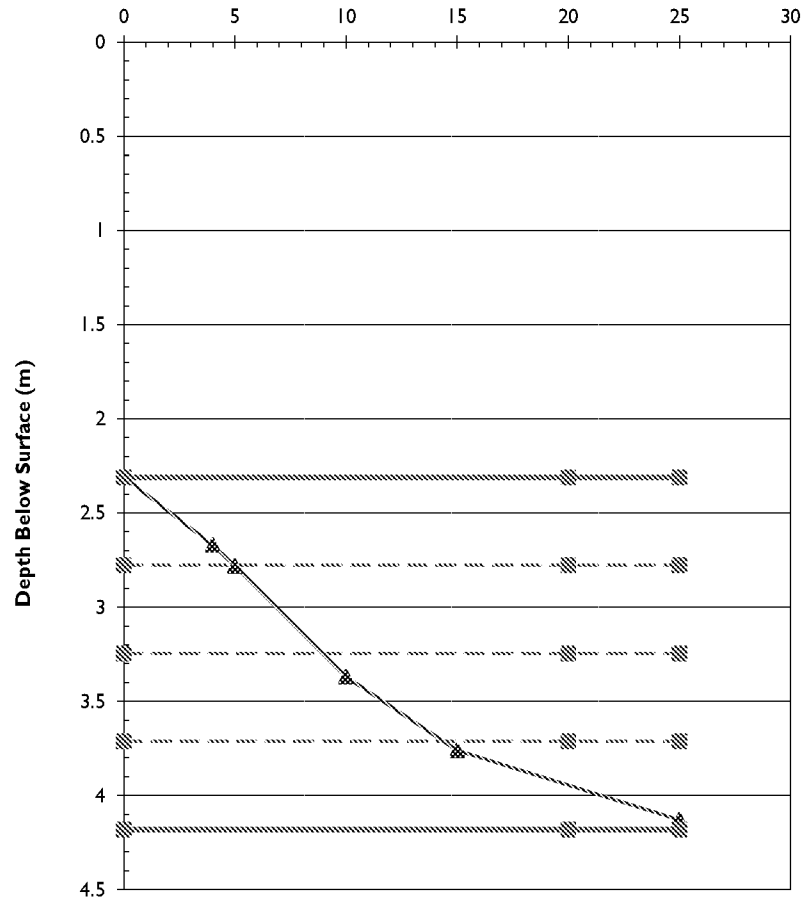
Comments:

Pit was emptied at finish of test.

Client: Boklok
Site: Elmgrove Road, Littlehampton
Tested By: ADC/AU/SH
Test Date: 01/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



initial)

Test Hole No: DTP8
Test No: Test No 1



Pit Length (m)	2.2
Pit Width (m)	0.6
Depth to Pit Base (m)	4.18
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	2
Voids Assumed for Granular Fill (%)	35%
Depth of Water at Start of Test (m)	2.31
Max Water Dropdown during Test (m)	1.82
Total Soakage Test Time (min)	25
Mean Internal Discharge Area (m2)	6.556
Discharge Rate (litre/min)	45.88711898
Soakage Rate (litre/m2/min)	6.999255488
BRE Soil Infiltration Rate (m/sec)	0.000116654

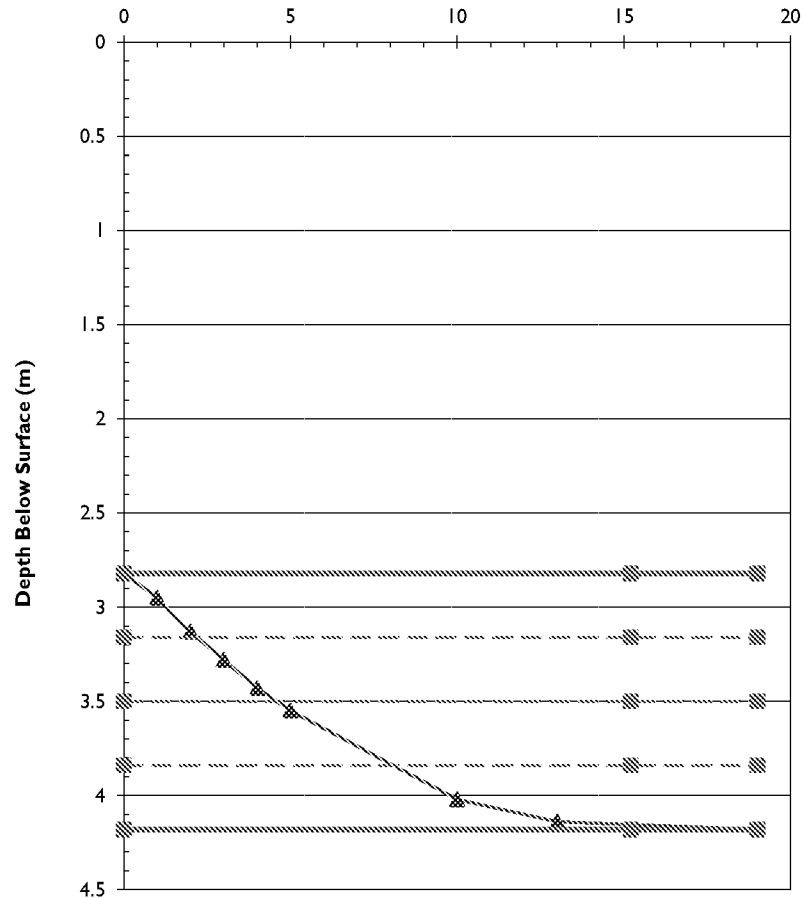
Comments:

Pit was nearly emptied at finish of test.

Client: Boklok
Site: Elmgrove Road, Littlehampton
Tested By: ADC/AU/SH
Test Date: 01/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



Test Hole No: DTP8
Test No: Test No 2

repeated)



Pit Length (m)	2.2
Pit Width (m)	0.6
Depth to Pit Base (m)	4.18
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	2
Voids Assumed for Granular Fill (%)	35%

Depth of Water at Start of Test (m)	2.82
Max Water Dropdown during Test (m)	1.36
Total Soakage Test Time (min)	19
Mean Internal Discharge Area (m2)	5.128
Discharge Rate (litre/min)	53.38221258
Soakage Rate (litre/m2/min)	10.40994785

BRE Soil Infiltration Rate (m/sec) 0.000173499

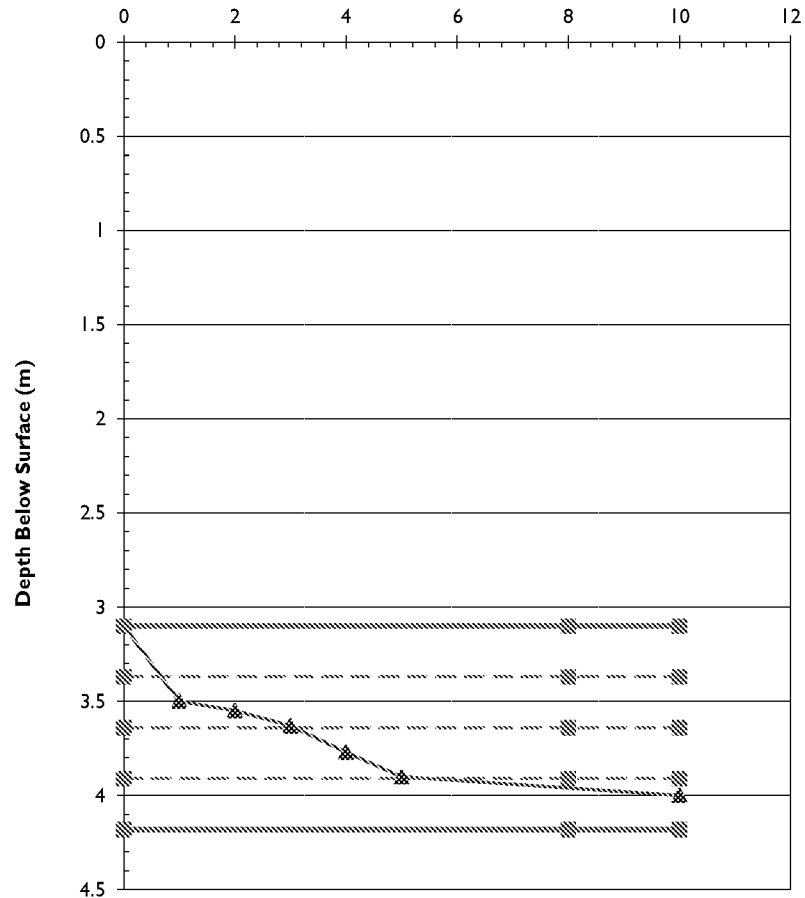
Comments:

Pit was emptied at finish of test.

Client: Boklok
Site: Elmgrove Road, Littlehampton
Tested By: ADC/AU/SH
Test Date: 01/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



Test Hole No: DTP8
Test No: Test No 3

repeated)



Pit Length (m)	2.2
Pit Width (m)	0.6
Depth to Pit Base (m)	4.18
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	2
Voids Assumed for Granular Fill (%)	35%
Depth of Water at Start of Test (m)	3.1
Max Water Dropdown during Test (m)	0.9
Total Soakage Test Time (min)	10
Mean Internal Discharge Area (m2)	4.344
Discharge Rate (litre/min)	51.70569948
Soakage Rate (litre/m2/min)	11.90278533
BRE Soil Infiltration Rate (m/sec)	0.00019838

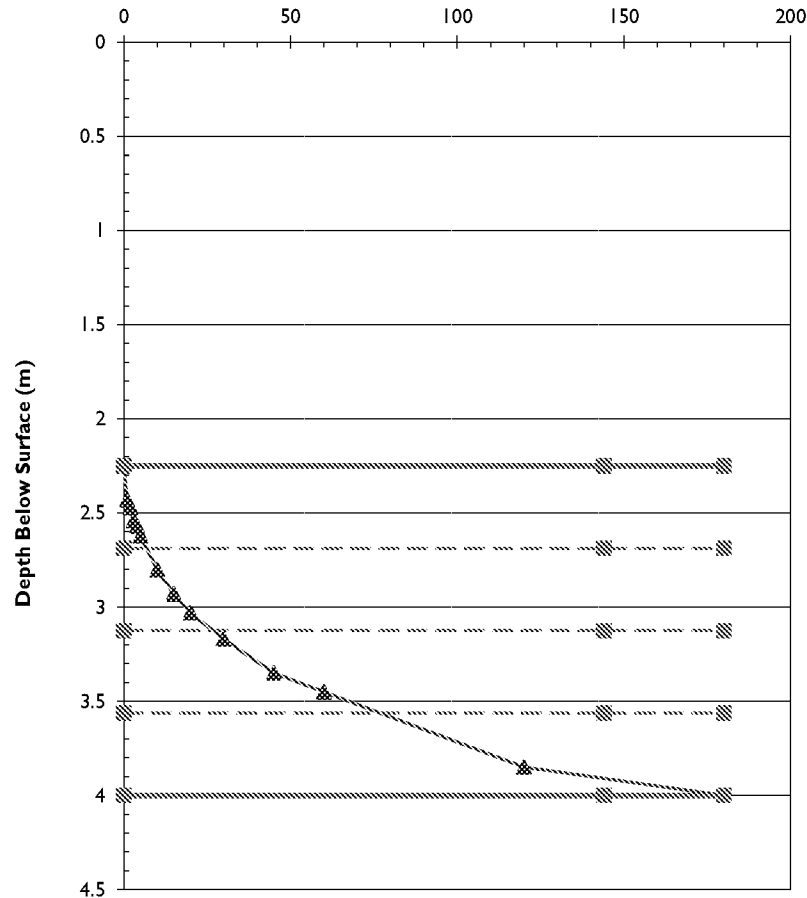
Comments:

Pit was nearly emptied at finish of test.

Client: Boklok
Site: Elmgrove Road, Littlehampton
Tested By: ADC/AU/SH
Test Date: 01/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



initial)

Test Hole No: DTP9
Test No: Test No 1



Pit Length (m)	2.2
Pit Width (m)	0.6
Depth to Pit Base (m)	4
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	2
Voids Assumed for Granular Fill (%)	35%

Depth of Water at Start of Test (m)	2.25
Max Water Dropdown during Test (m)	1.75
Total Soakage Test Time (min)	180
Mean Internal Discharge Area (m2)	6.22
Discharge Rate (litre/min)	0.527139364
Soakage Rate (litre/m2/min)	0.084749094

BRE Soil Infiltration Rate (m/sec) 1.41248E-06

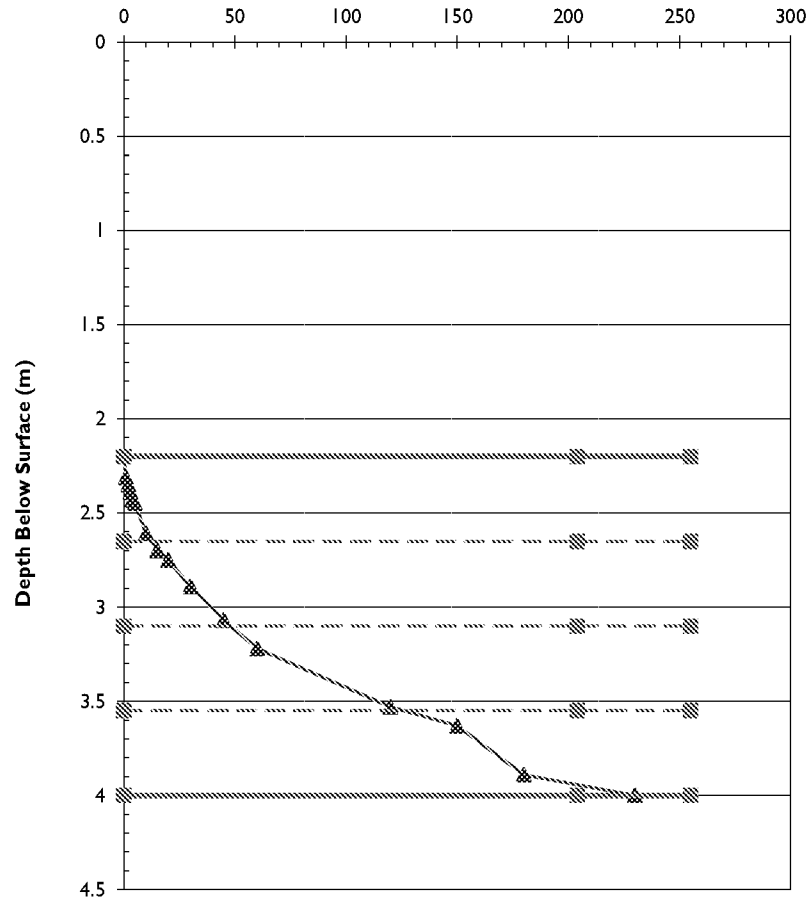
Comments:

Pit was emptied at finish of test.

Client: Boklok
Site: Elmgrove Road, Littlehampton
Tested By: ADC/AU/SH
Test Date: 01/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



Test Hole No: DTP9
Test No: Test No 2

repeated)



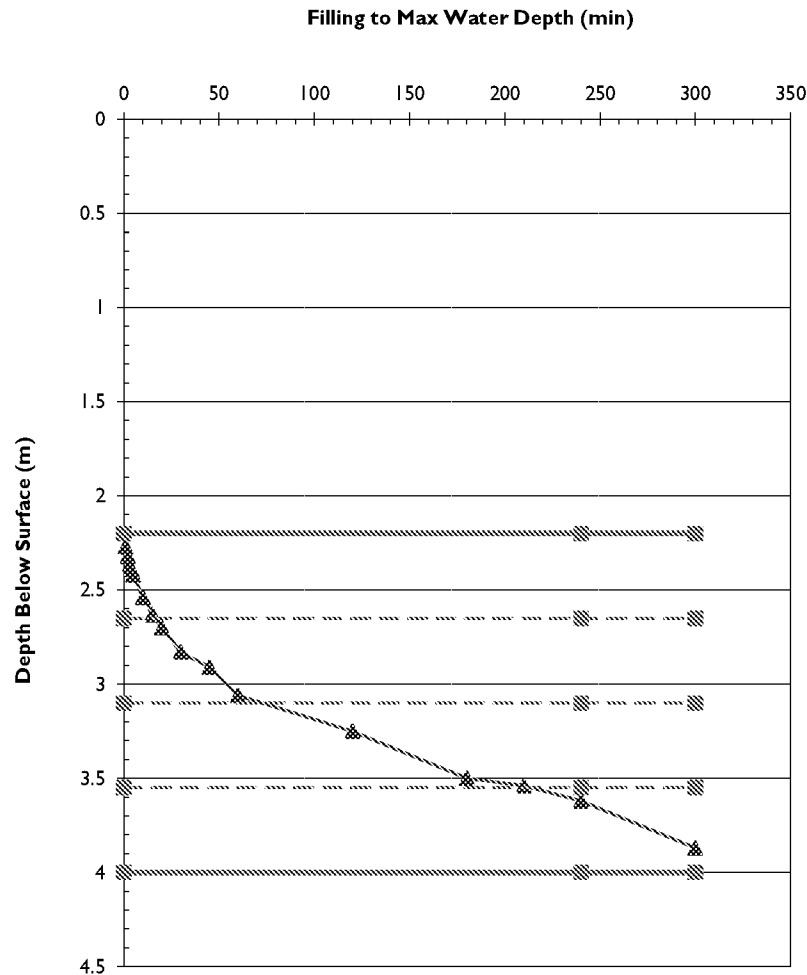
Pit Length (m)	2.2
Pit Width (m)	0.6
Depth to Pit Base (m)	4
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	2
Voids Assumed for Granular Fill (%)	35%
Depth of Water at Start of Test (m)	2.2
Max Water Dropdown during Test (m)	1.8
Total Soakage Test Time (min)	255
Mean Internal Discharge Area (m2)	6.36
Discharge Rate (litre/min)	3.654492188
Soakage Rate (litre/m2/min)	0.57460569
BRE Soil Infiltration Rate (m/sec)	9.57676E-06

Comments:

Pit was emptied at finish of test.

Client: Boklok
Site: Elmgrove Road, Littlehampton
Tested By: ADC/AU/SH
Test Date: 01/09/21

BRE Digest 365 - Soakage Test



Test Hole No: DTP9
Test No: Test No 3

repeated)



Pit Length (m)	2.2
Pit Width (m)	0.6
Depth to Pit Base (m)	4
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	2
Voids Assumed for Granular Fill (%)	35%

Depth of Water at Start of Test (m)	2.2
Max Water Dropdown during Test (m)	1.67
Total Soakage Test Time (min)	300
Mean Internal Discharge Area (m2)	6.36
Discharge Rate (litre/min)	1.123241679
Soakage Rate (litre/m2/min)	0.176610327

BRE Soil Infiltration Rate (m/sec) 2.94351E-06

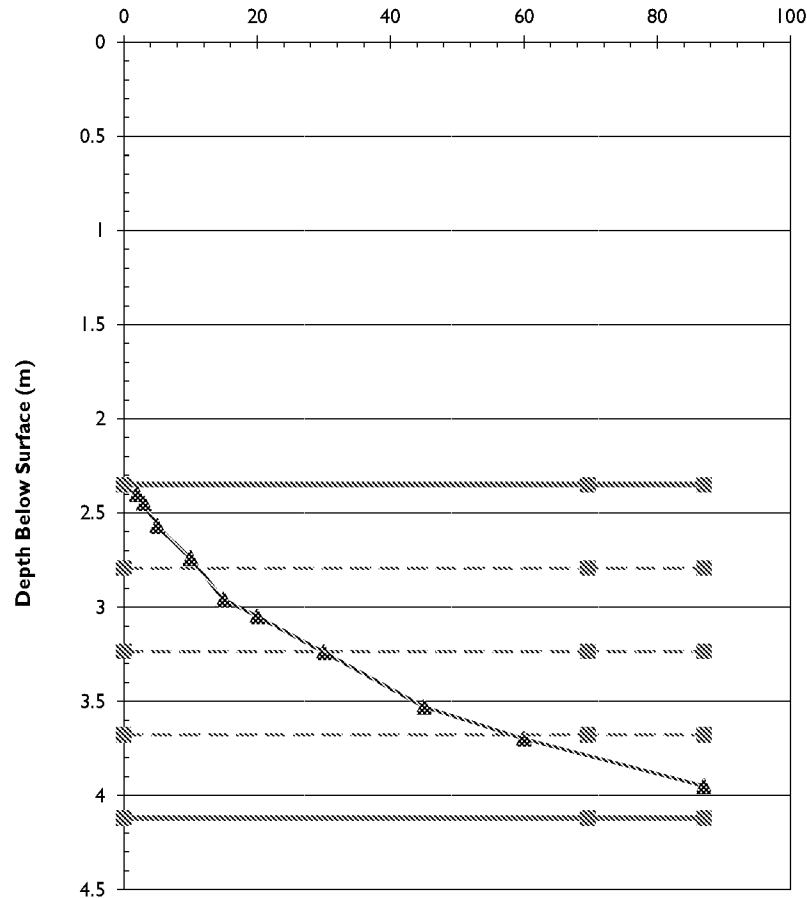
Comments:

Pit was nearly emptied at finish of test.

Client: Boklok
Site: Elmgrove Road, Littlehampton
Tested By: ADC/AU/SH
Test Date: 01/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



initial)

Test Hole No: DTP10
Test No: Test No 1



Pit Length (m)	2.2
Pit Width (m)	0.6
Depth to Pit Base (m)	4.12
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	2
Voids Assumed for Granular Fill (%)	35%

Depth of Water at Start of Test (m)	2.35
Max Water Dropdown during Test (m)	1.6
Total Soakage Test Time (min)	87
Mean Internal Discharge Area (m2)	6.276
Discharge Rate (litre/min)	8.732522236
Soakage Rate (litre/m2/min)	1.39141527

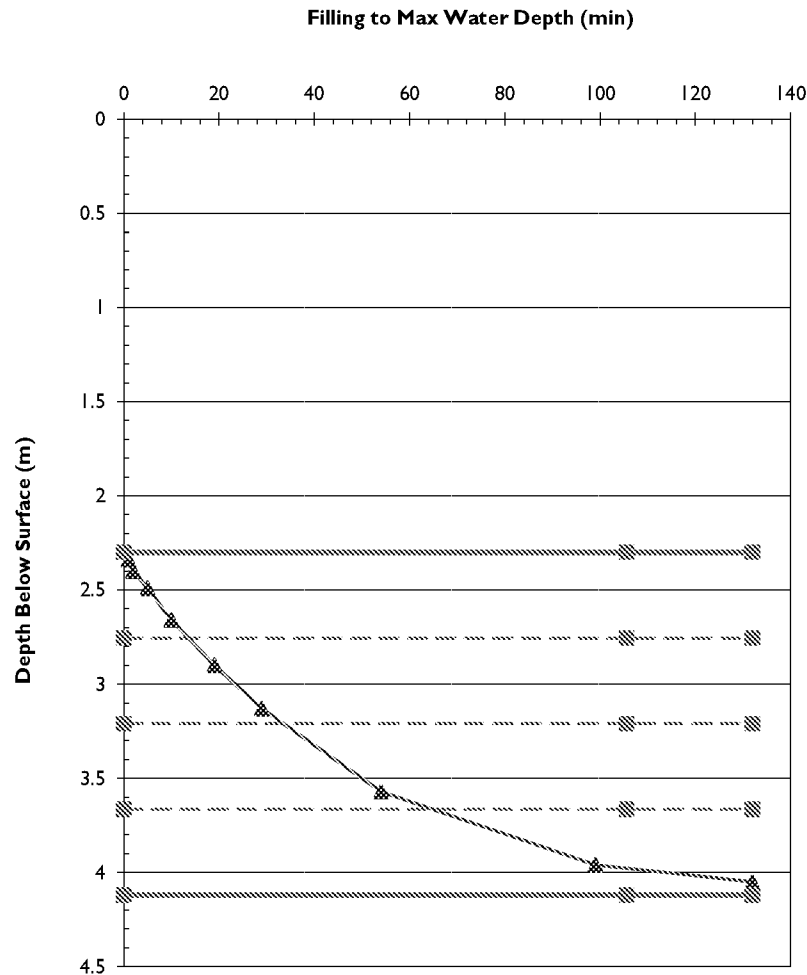
BRE Soil Infiltration Rate (m/sec) 2.31903E-05

Comments:

Pit was nearly emptied at finish of test.

Client: Boklok
Site: Elmgrove Road, Littlehampton
Tested By: ADC/AU/SH
Test Date: 01/09/21

BRE Digest 365 - Soakage Test



repeated)

Test Hole No: DTP10
Test No: Test No 2



Pit Length (m)	2.2
Pit Width (m)	0.6
Depth to Pit Base (m)	4.12
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	2
Void Assumed for Granular Fill (%)	35%

Depth of Water at Start of Test (m)	2.3
Max Water Dropdown during Test (m)	1.75
Total Soakage Test Time (min)	132
Mean Internal Discharge Area (m2)	6.416
Discharge Rate (litre/min)	8.179530446
Soakage Rate (litre/m2/min)	1.274864471

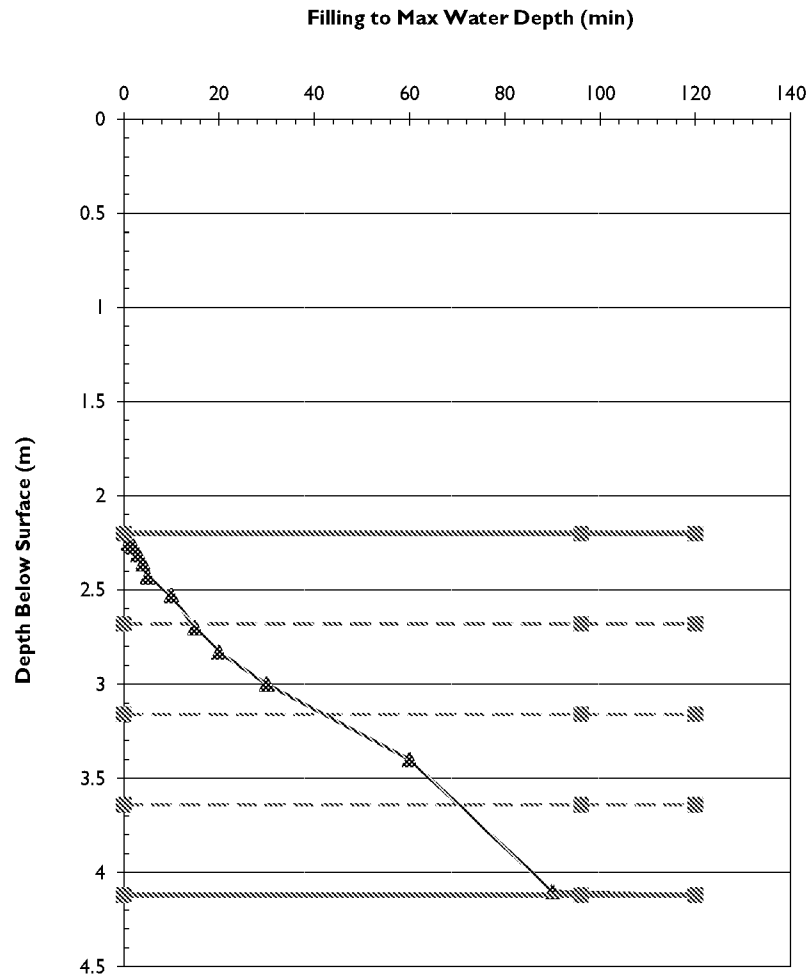
BRE Soil Infiltration Rate (m/sec) 2.12477E-05

Comments:

Pit was nearly emptied at finish of test.

Client: Boklok
Site: Elmgrove Road, Littlehampton
Tested By: ADC/AU/SH
Test Date: 01/09/21

BRE Digest 365 - Soakage Test



Test Hole No: DTP10
Test No: Test No 3

repeated)



Pit Length (m)	2.2
Pit Width (m)	0.6
Depth to Pit Base (m)	4.12
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	2
Voids Assumed for Granular Fill (%)	35%

Depth of Water at Start of Test (m)	2.2
Max Water Dropdown during Test (m)	1.92
Total Soakage Test Time (min)	120
Mean Internal Discharge Area (m2)	6.696
Discharge Rate (litre/min)	2.911295714
Soakage Rate (litre/m2/min)	0.434781319

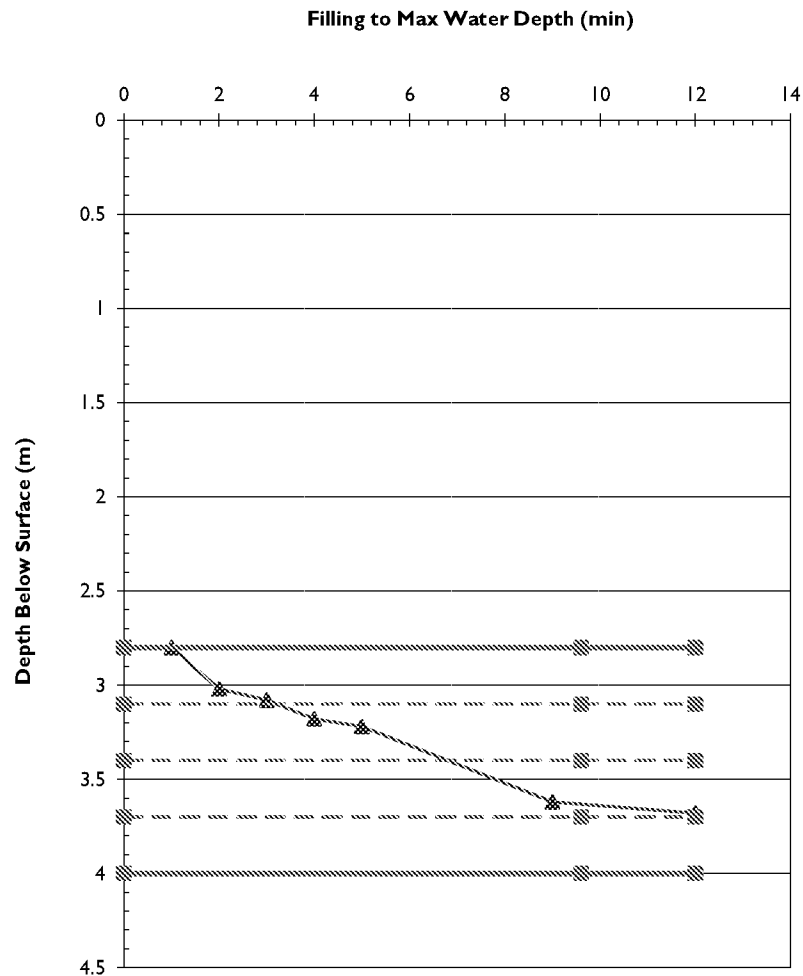
BRE Soil Infiltration Rate (m/sec) 7.24636E-06

Comments:

Pit was emptied at finish of test.

Client: Boklok
Site: Elmgrove Road, Littlehampton
Tested By: ADC/AU/SH
Test Date: 01/09/21

BRE Digest 365 - Soakage Test



initial)

Test Hole No: DTP11
Test No: Test No 1



Pit Length (m)	2.3
Pit Width (m)	0.6
Depth to Pit Base (m)	4
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	2
Voids Assumed for Granular Fill (%)	35%

Depth of Water at Start of Test (m)	2.8
Max Water Dropdown during Test (m)	0.88
Total Soakage Test Time (min)	12
Mean Internal Discharge Area (m2)	4.918
Discharge Rate (litre/min)	28.58571429
Soakage Rate (litre/m2/min)	5.812467321

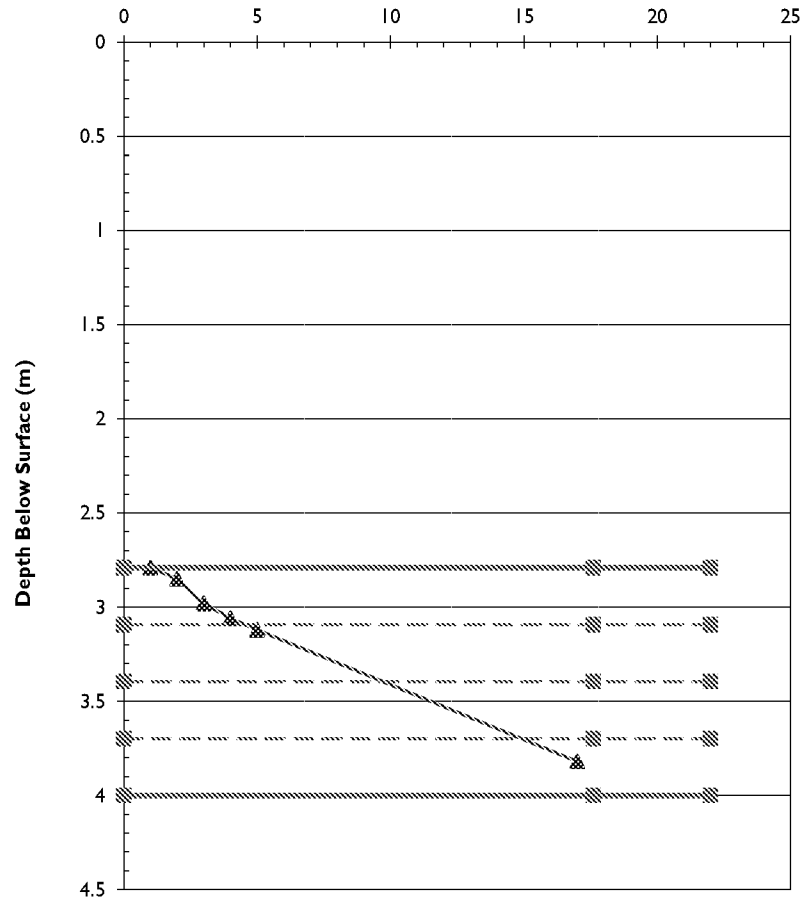
BRE Soil Infiltration Rate (m/sec) 9.68745E-05

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: Boklok
Site: Elmgrove Road, Littlehampton
Tested By: ADC/AU/SH
Test Date: 01/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



Test Hole No: DTP11
Test No: Test No 2

repeated)



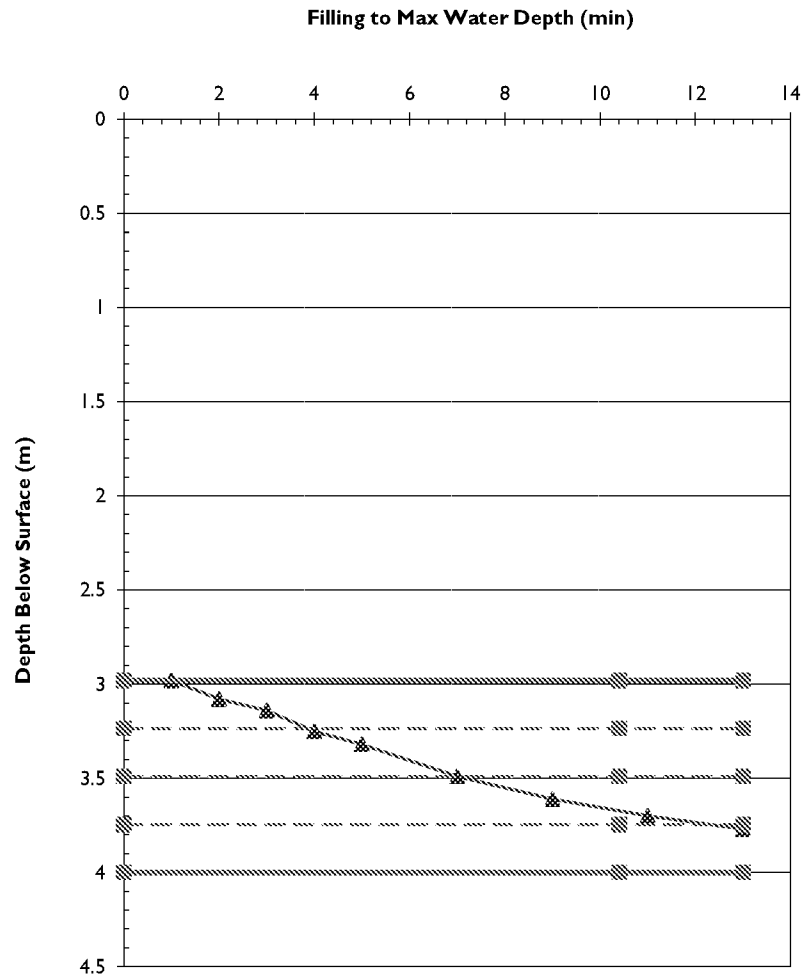
Pit Length (m)	2.3
Pit Width (m)	0.6
Depth to Pit Base (m)	4
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	2
Voids Assumed for Granular Fill (%)	35%
Depth of Water at Start of Test (m)	2.79
Max Water Dropdown during Test (m)	1.03
Total Soakage Test Time (min)	22
Mean Internal Discharge Area (m2)	4.889
Discharge Rate (litre/min)	26.1295082
Soakage Rate (litre/m2/min)	5.344550664
BRE Soil Infiltration Rate (m/sec)	8.90758E-05

Comments:

Pit was nearly emptied at finish of test.

Client: Boklok
Site: Elmgrove Road, Littlehampton
Tested By: ADC/AU/SH
Test Date: 01/09/21

BRE Digest 365 - Soakage Test



Test Hole No: DTP11
Test No: Test No 3

repeated)



Pit Length (m)	2.3
Pit Width (m)	0.6
Depth to Pit Base (m)	4
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	2
Voids Assumed for Granular Fill (%)	35%
Depth of Water at Start of Test (m)	2.98
Max Water Dropdown during Test (m)	0.79
Total Soakage Test Time (min)	13
Mean Internal Discharge Area (m2)	4.338
Discharge Rate (litre/min)	29.24812645
Soakage Rate (litre/m2/min)	6.742306696
BRE Soil Infiltration Rate (m/sec)	0.000112372

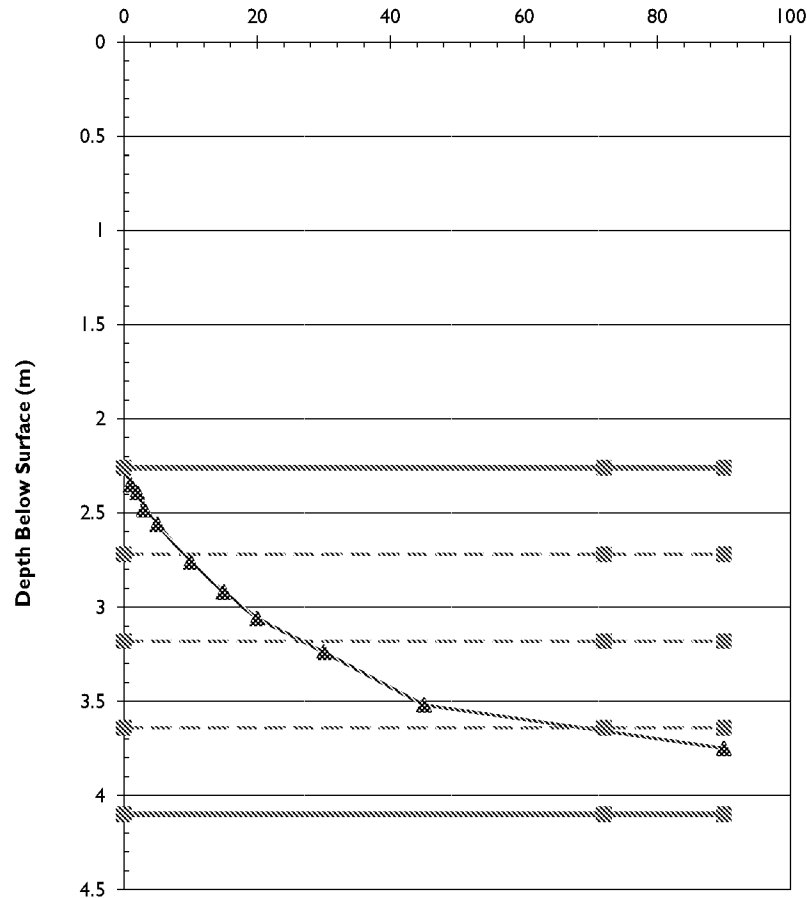
Comments:

Pit was nearly emptied at finish of test.

Client: Boklok
Site: Elmgrove Road, Littlehampton
Tested By: ADC/AU/SH
Test Date: 01/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



initial)

Test Hole No: DTP12A
Test No: Test No 1



Pit Length (m)	2.3
Pit Width (m)	0.6
Depth to Pit Base (m)	4.1
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	2
Voids Assumed for Granular Fill (%)	35%

Depth of Water at Start of Test (m)	2.26
Max Water Dropdown during Test (m)	1.49
Total Soakage Test Time (min)	90
Mean Internal Discharge Area (m2)	6.716
Discharge Rate (litre/min)	7.470964912
Soakage Rate (litre/m2/min)	1.112412882

BRE Soil Infiltration Rate (m/sec) 1.85402E-05

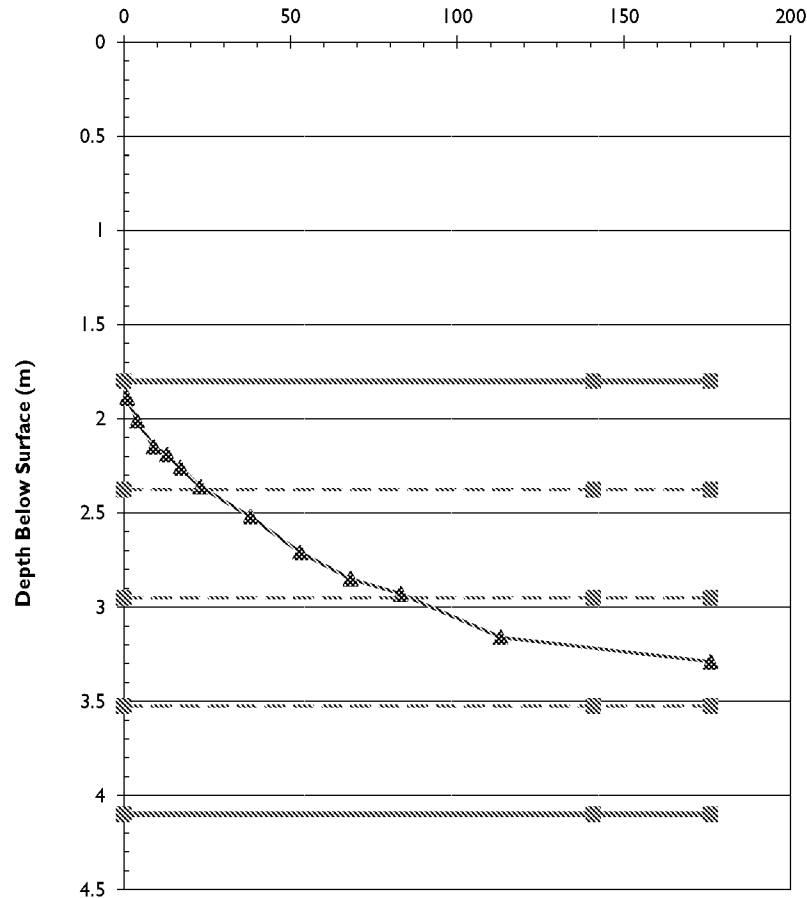
Comments:

Pit was nearly emptied at finish of test.

Client: Boklok
Site: Elmgrove Road, Littlehampton
Tested By: ADC/AU/SH
Test Date: 01/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



Test Hole No: DTP12A
Test No: Test No 2

repeated)



Pit Length (m)	2.3
Pit Width (m)	0.6
Depth to Pit Base (m)	4.1
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	2
Voids Assumed for Granular Fill (%)	35%

Depth of Water at Start of Test (m)	1.8
Max Water Dropdown during Test (m)	1.49
Total Soakage Test Time (min)	176
Mean Internal Discharge Area (m ²)	8.7315
Discharge Rate (litre/min)	2.915324675
Soakage Rate (litre/m ² /min)	0.333885893

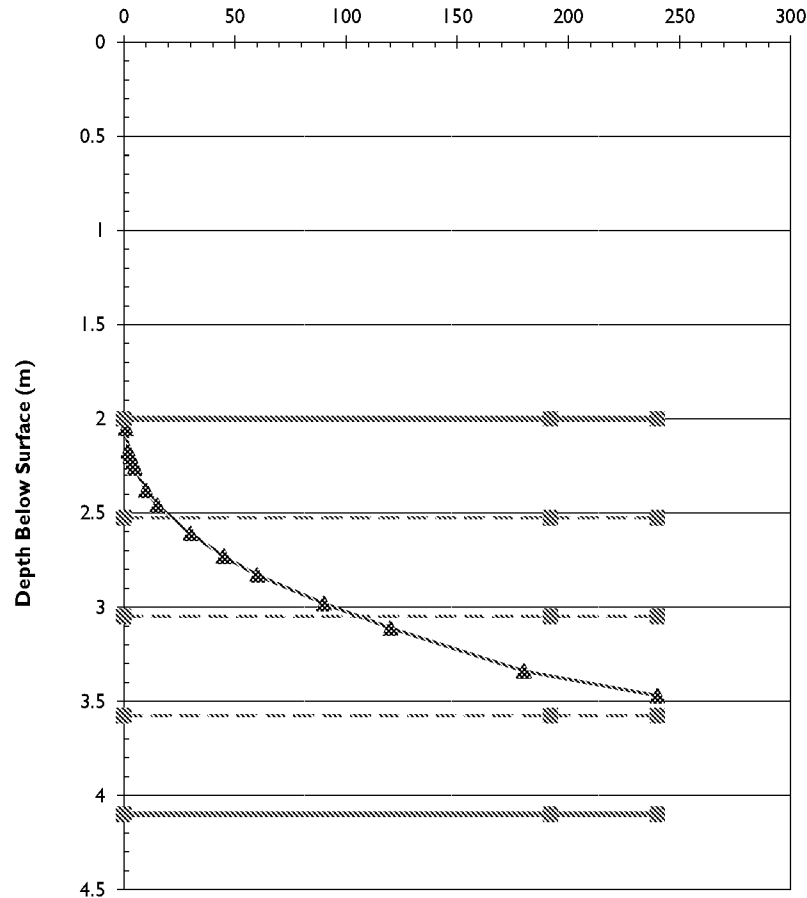
BRE Soil Infiltration Rate (m/sec)	5.56476E-06
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Comments: Water level fell to 50% -- 25% max water depth, calculations were based on actual fall of water level achieved.
Result not compliant with BRE365 requirement since water did not fall to 25% max water depth.

Client: Boklok
Site: Elmgrove Road, Littlehampton
Tested By: ADC/AU/SH
Test Date: 01/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



Test Hole No: DTP12A
Test No: Test No 3

repeated)



Pit Length (m)	2.3
Pit Width (m)	0.6
Depth to Pit Base (m)	4.1
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	2
Voids Assumed for Granular Fill (%)	35%

Depth of Water at Start of Test (m)	2
Max Water Dropdown during Test (m)	1.47
Total Soakage Test Time (min)	240
Mean Internal Discharge Area (m ²)	7.7745
Discharge Rate (litre/min)	0.516329186
Soakage Rate (litre/m ² /min)	0.066413169

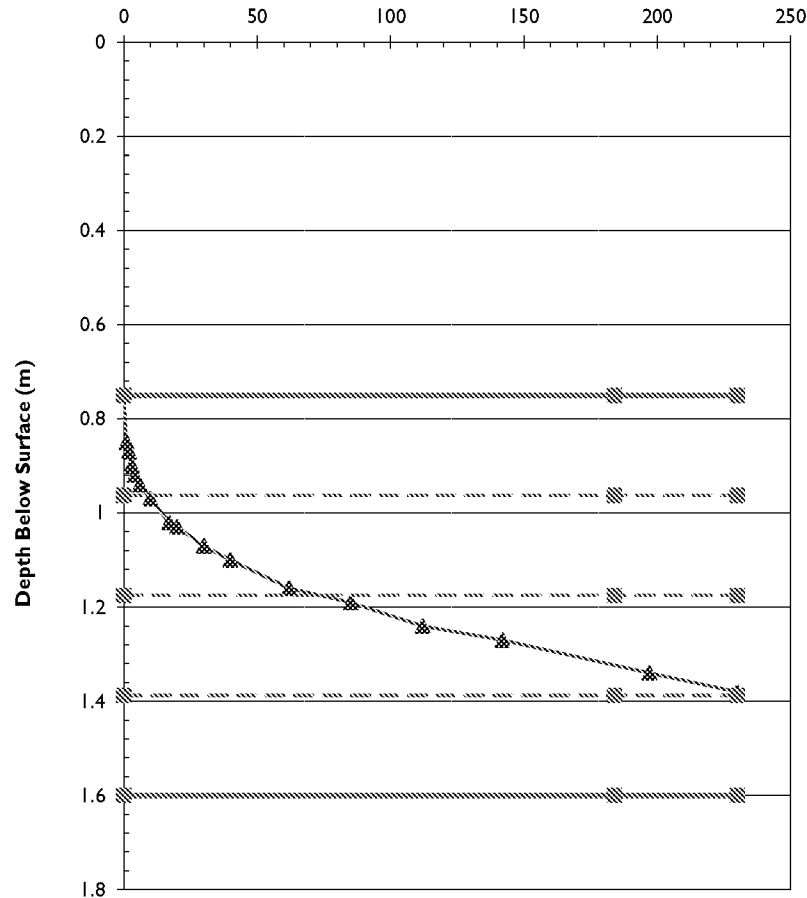
BRE Soil Infiltration Rate (m/sec) 1.10689E-06

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: Boklok
Site: Elmgrove Road, Littlehampton
Tested By: ADC/AU/SH
Test Date: 01/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



initial)

Test Hole No: TP302
Test No: Test No 1



Pit Length (m)	1.6
Pit Width (m)	0.6
Depth to Pit Base (m)	1.6
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	0.7
Voids Assumed for Granular Fill (%)	35%

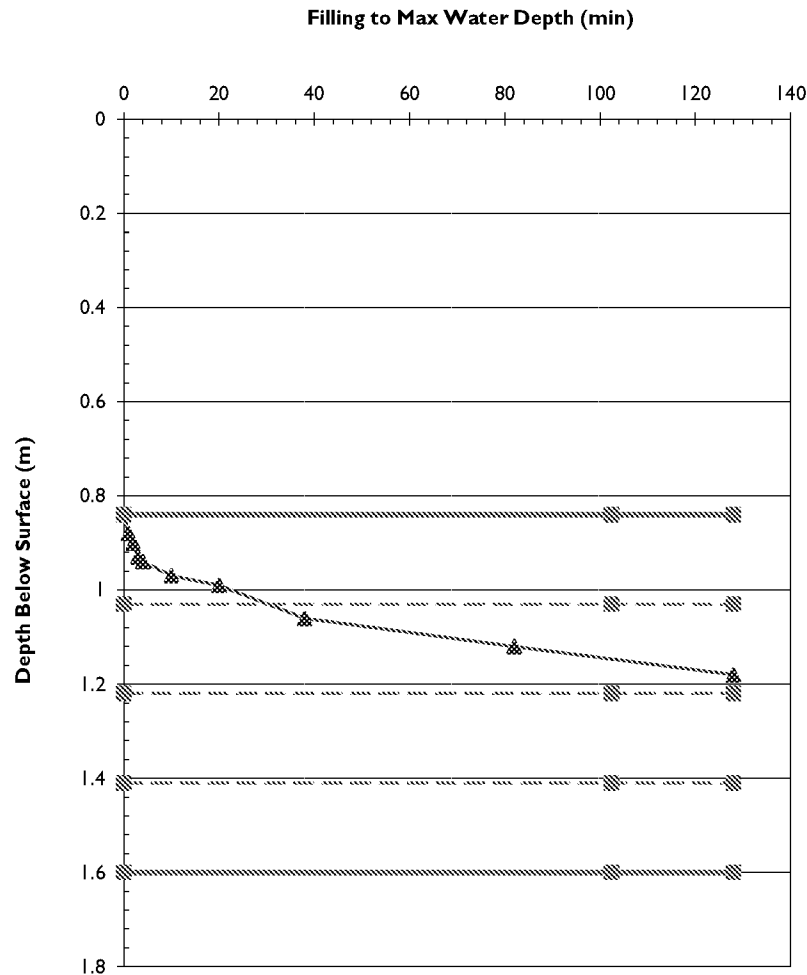
Depth of Water at Start of Test (m)	0.75
Max Water Dropdown during Test (m)	0.63
Total Soakage Test Time (min)	230
Mean Internal Discharge Area (m ²)	2.8465
Discharge Rate (litre/min)	0.149234043
Soakage Rate (litre/m ² /min)	0.052427206

BRE Soil Infiltration Rate (m/sec) 8.73787E-07

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: Boklok
Site: Elmgrove Road Littlehampton
Tested By: ADC/AU/SH
Test Date: 01/09/21

BRE Digest 365 - Soakage Test



Test Hole No: TP302
Test No: Test No 2

repeated)



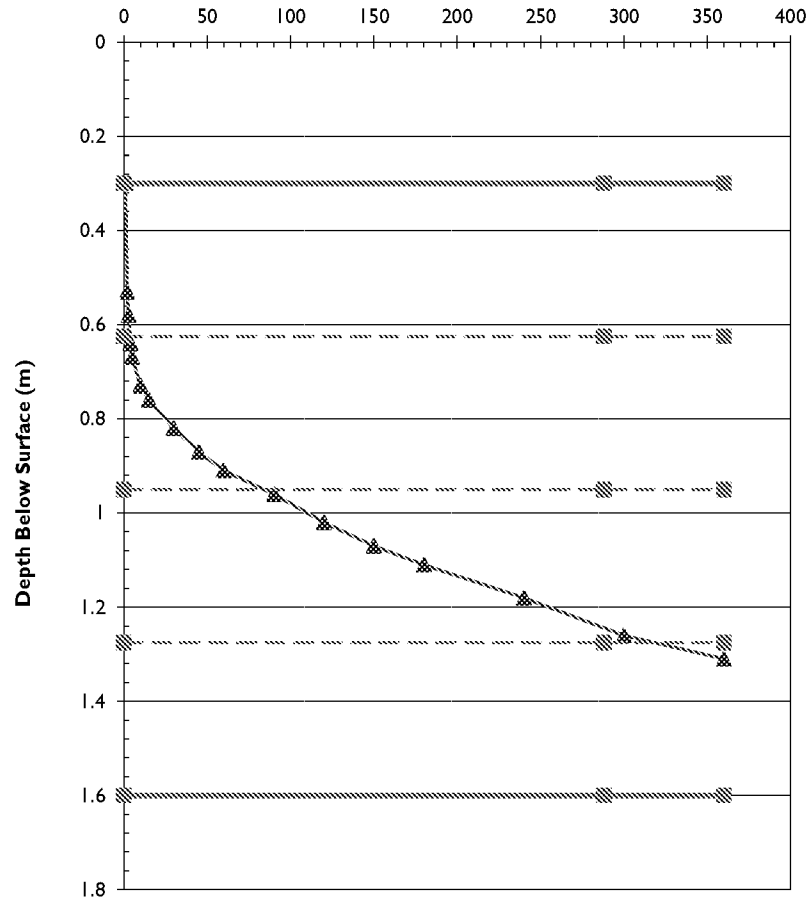
Pit Length (m)	1.6
Pit Width (m)	0.6
Depth to Pit Base (m)	1.6
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	0.7
Voids Assumed for Granular Fill (%)	35%
Depth of Water at Start of Test (m)	0.84
Max Water Dropdown during Test (m)	0.34
Total Soakage Test Time (min)	128
Mean Internal Discharge Area (m2)	3.138
Discharge Rate (litre/min)	0.069517241
Soakage Rate (litre/m2/min)	0.022153359
BRE Soil Infiltration Rate (m/sec)	3.69223E-07

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: Boklok
Site: Elmgrove Road Littlehampton
Tested By: ADC/AU/SH
Test Date: 02/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



Test Hole No: TP302
Test No: Test No 3

repeated)



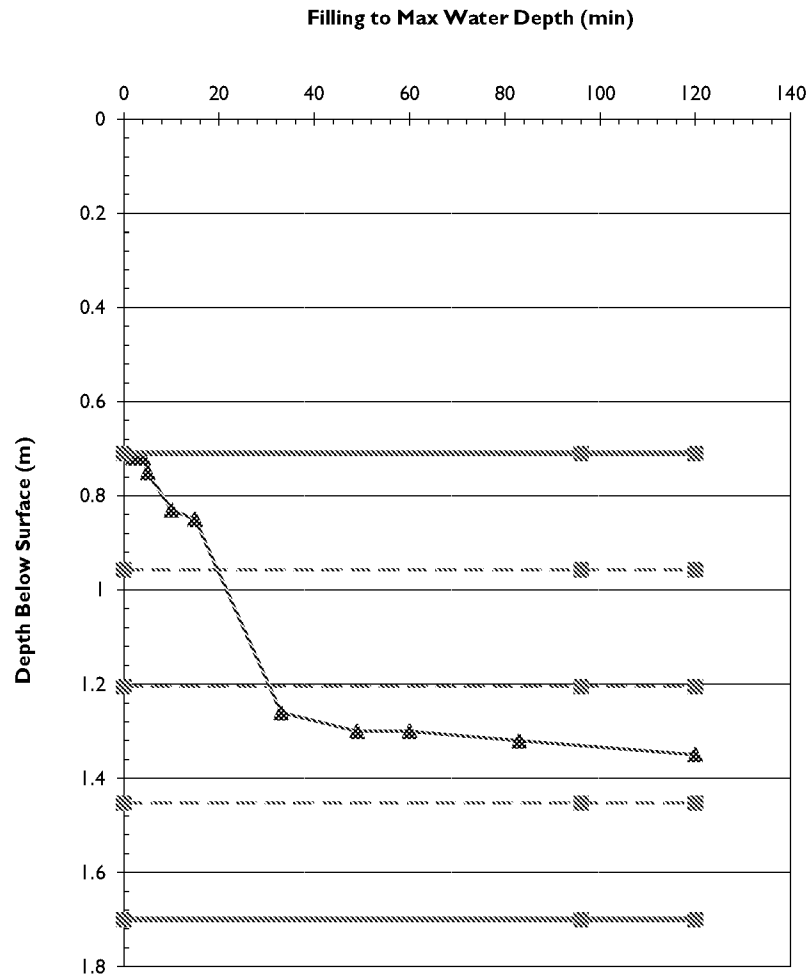
Pit Length (m)	1.6
Pit Width (m)	0.6
Depth to Pit Base (m)	1.6
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	0.7
Voids Assumed for Granular Fill (%)	35%
Depth of Water at Start of Test (m)	0.3
Max Water Dropdown during Test (m)	1.01
Total Soakage Test Time (min)	360
Mean Internal Discharge Area (m2)	3.82
Discharge Rate (litre/min)	0.843914081
Soakage Rate (litre/m2/min)	0.220919917
BRE Soil Infiltration Rate (m/sec)	3.682E-06

Comments:

Pit was nearly emptied at finish of test.

Client: Boklok
Site: Elmgrove Road Littlehampton
Tested By: ADC/AU/SH
Test Date: 02/09/21

BRE Digest 365 - Soakage Test



initial)

Test Hole No: TP304
Test No: Test No 1



Pit Length (m)	2.2
Pit Width (m)	0.6
Depth to Pit Base (m)	1.7
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	0.9
Voids Assumed for Granular Fill (%)	35%

Depth of Water at Start of Test (m)	0.71
Max Water Dropdown during Test (m)	0.64
Total Soakage Test Time (min)	120
Mean Internal Discharge Area (m ²)	4.379
Discharge Rate (litre/min)	1.808278001
Soakage Rate (litre/m ² /min)	0.412943138

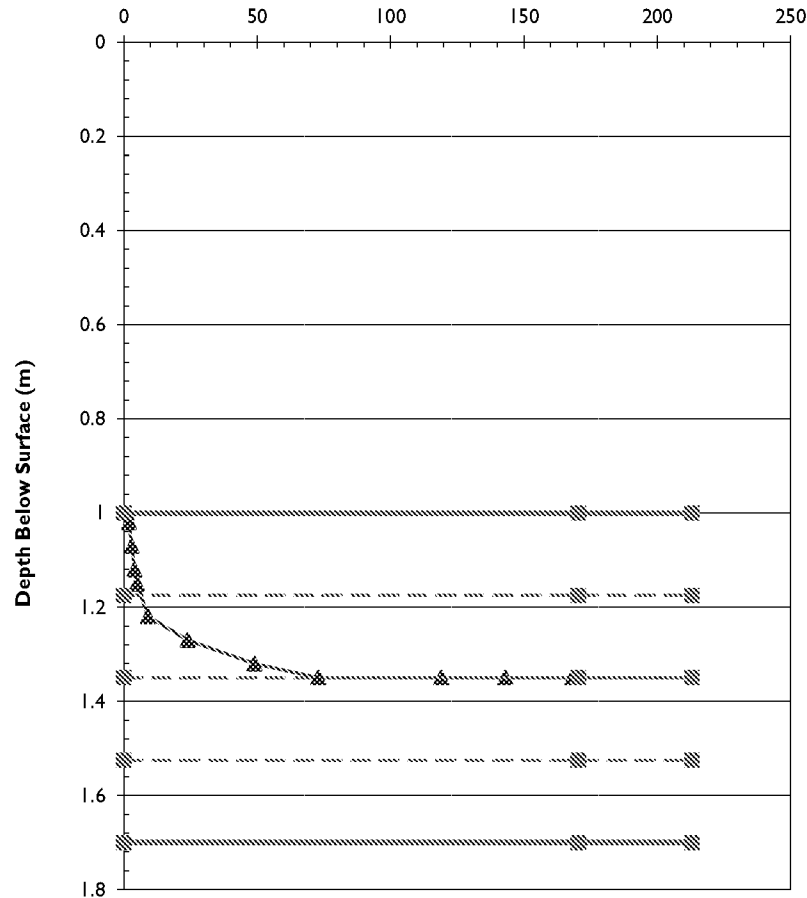
BRE Soil Infiltration Rate (m/sec) 6.88239E-06

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: Boklok
Site: Elmgrove Road Littlehampton
Tested By: ADC/AU/SH
Test Date: 02/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



Test Hole No: TP304
Test No: Test No 2

repeated)



Pit Length (m)	2.2
Pit Width (m)	0.6
Depth to Pit Base (m)	1.7
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	0.9
Voids Assumed for Granular Fill (%)	35%

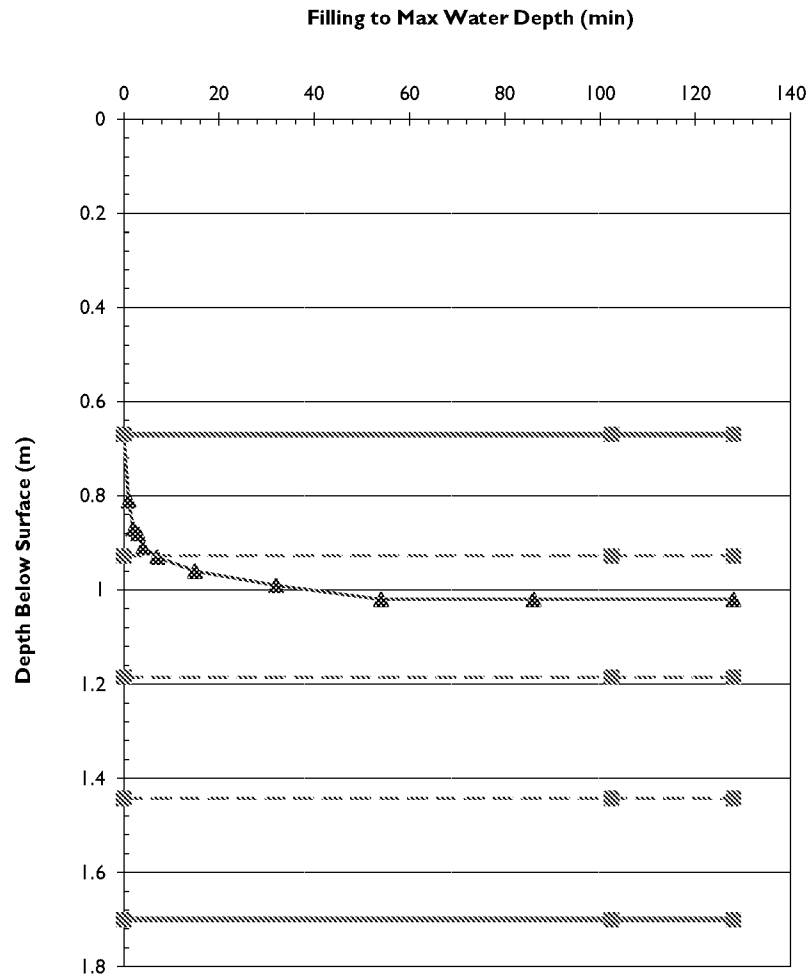
Depth of Water at Start of Test (m)	1
Max Water Dropdown during Test (m)	0.35
Total Soakage Test Time (min)	213
Mean Internal Discharge Area (m2)	3.77
Discharge Rate (litre/min)	0.390175801
Soakage Rate (litre/m2/min)	0.103494908

BRE Soil Infiltration Rate (m/sec) 1.72492E-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: Boklok
Site: Elmgrove Road Littlehampton
Tested By: ADC/AU/SH
Test Date: 02/09/21

BRE Digest 365 - Soakage Test



Test Hole No: TP304
Test No: Test No 3

repeated)



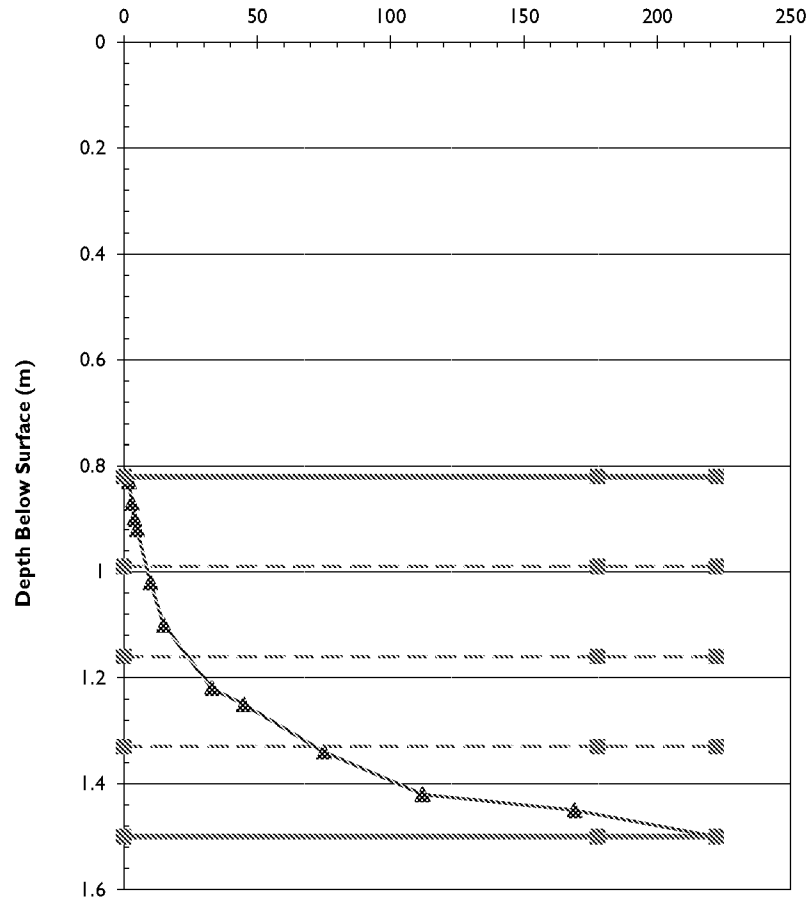
Pit Length (m)	2.2
Pit Width (m)	0.6
Depth to Pit Base (m)	1.7
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	0.9
Voids Assumed for Granular Fill (%)	35%
Depth of Water at Start of Test (m)	0.67
Max Water Dropdown during Test (m)	0.35
Total Soakage Test Time (min)	128
Mean Internal Discharge Area (m2)	5.387
Discharge Rate (litre/min)	0.352090628
Soakage Rate (litre/m2/min)	0.065359315
BRE Soil Infiltration Rate (m/sec)	1.08932E-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: Boklok
Site: Elmgrove Road Littlehampton
Tested By: ADC/AU/SH
Test Date: 02/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



initial)

Test Hole No: TP305
Test No: Test No 1



Pit Length (m)	1.8
Pit Width (m)	0.65
Depth to Pit Base (m)	1.5
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	0.8
Voids Assumed for Granular Fill (%)	35%
Depth of Water at Start of Test (m)	0.82
Max Water Dropdown during Test (m)	0.68
Total Soakage Test Time (min)	222
Mean Internal Discharge Area (m2)	2.836
Discharge Rate (litre/min)	2.169818182
Soakage Rate (litre/m2/min)	0.765098089
BRE Soil Infiltration Rate (m/sec)	1.27516E-05

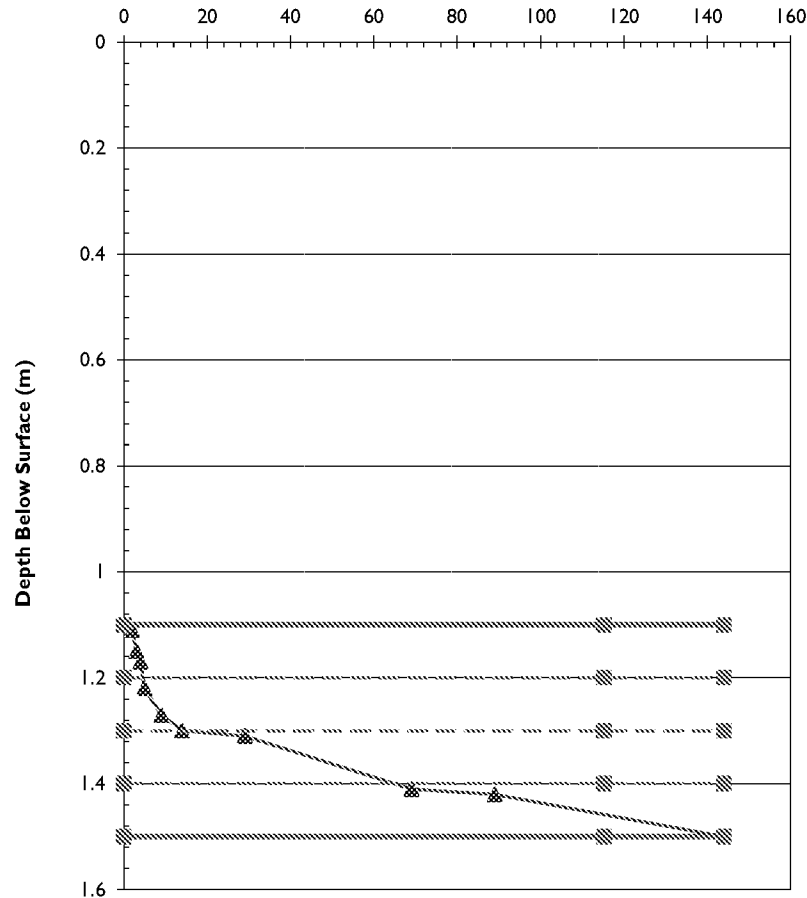
Comments:

Pit was emptied at finish of test.

Client: Boklok
Site: Elmgrove Road Littlehampton
Tested By: ADC/AU/SH
Test Date: 02/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



Test Hole No: TP305
Test No: Test No 2

repeated)



Pit Length (m)	1.8
Pit Width (m)	0.65
Depth to Pit Base (m)	1.5
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	0.8
Voids Assumed for Granular Fill (%)	35%
Depth of Water at Start of Test (m)	1.1
Max Water Dropdown during Test (m)	0.4
Total Soakage Test Time (min)	144
Mean Internal Discharge Area (m2)	2.15
Discharge Rate (litre/min)	1.355960265
Soakage Rate (litre/m2/min)	0.630679193
BRE Soil Infiltration Rate (m/sec)	1.05113E-05

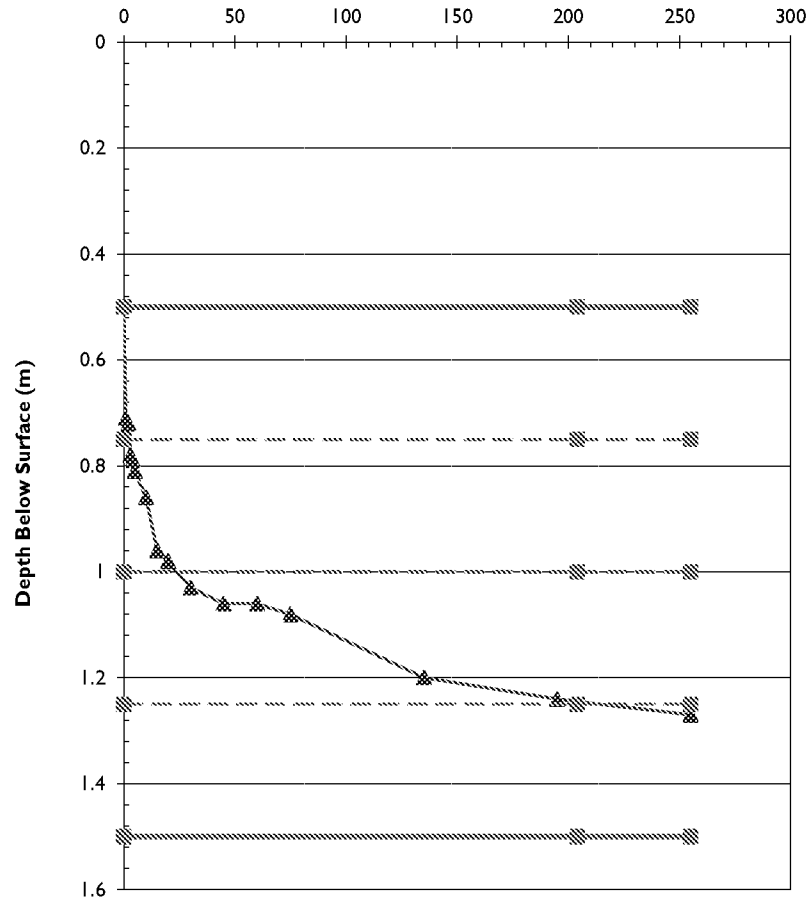
Comments:

Pit was emptied at finish of test.

Client: Boklok
Site: Elmgrove Road Littlehampton
Tested By: ADC/AU/SH
Test Date: 02/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



Test Hole No: TP305
Test No: Test No 3

repeated)



Pit Length (m)	1.8
Pit Width (m)	0.65
Depth to Pit Base (m)	1.5
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	0.8
Voids Assumed for Granular Fill (%)	35%

Depth of Water at Start of Test (m)	0.5
Max Water Dropdown during Test (m)	0.77
Total Soakage Test Time (min)	255
Mean Internal Discharge Area (m2)	3.62
Discharge Rate (litre/min)	0.26388587
Soakage Rate (litre/m2/min)	0.072896649

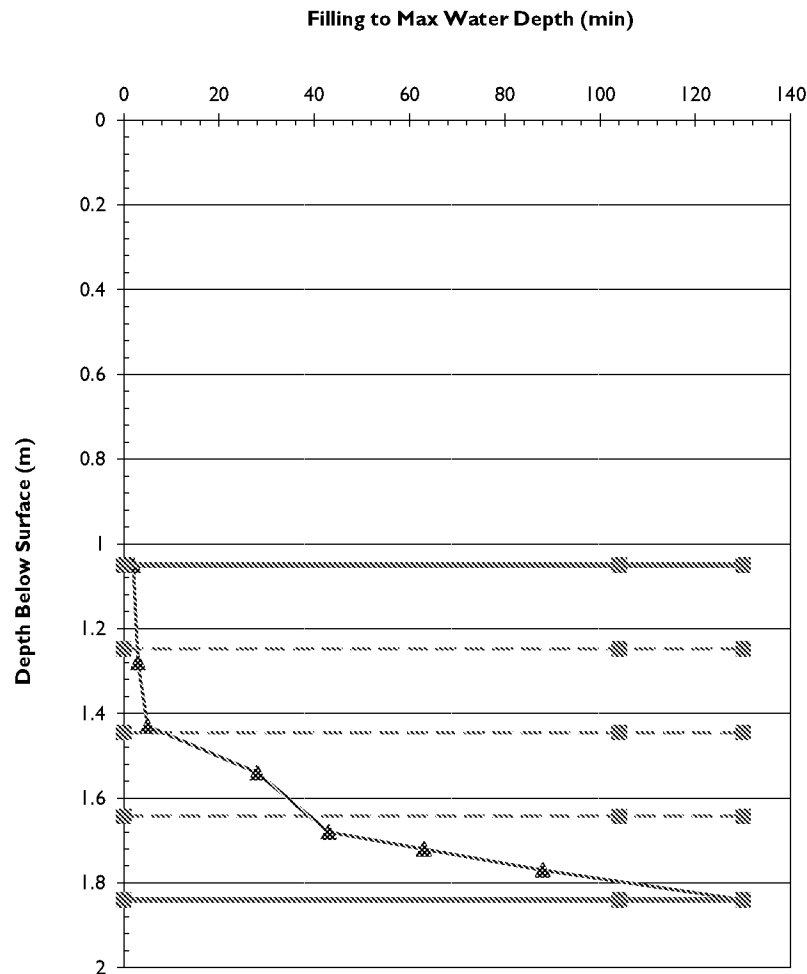
BRE Soil Infiltration Rate (m/sec)	1.21494E-06
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Comments:

Pit was nearly emptied at finish of test.

Client: Boklok
Site: Elmgrove Road Littlehampton
Tested By: ADC/AU/SH
Test Date: 02/09/21

BRE Digest 365 - Soakage Test



initial)

Test Hole No: TP306
Test No: Test No 1



Pit Length (m)	2.2
Pit Width (m)	0.6
Depth to Pit Base (m)	1.84
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	1
Voids Assumed for Granular Fill (%)	35%

Depth of Water at Start of Test (m)	1.05
Max Water Dropdown during Test (m)	0.79
Total Soakage Test Time (min)	130
Mean Internal Discharge Area (m2)	3.532
Discharge Rate (litre/min)	4.786817913
Soakage Rate (litre/m2/min)	1.35527121

BRE Soil Infiltration Rate (m/sec) 2.25879E-05

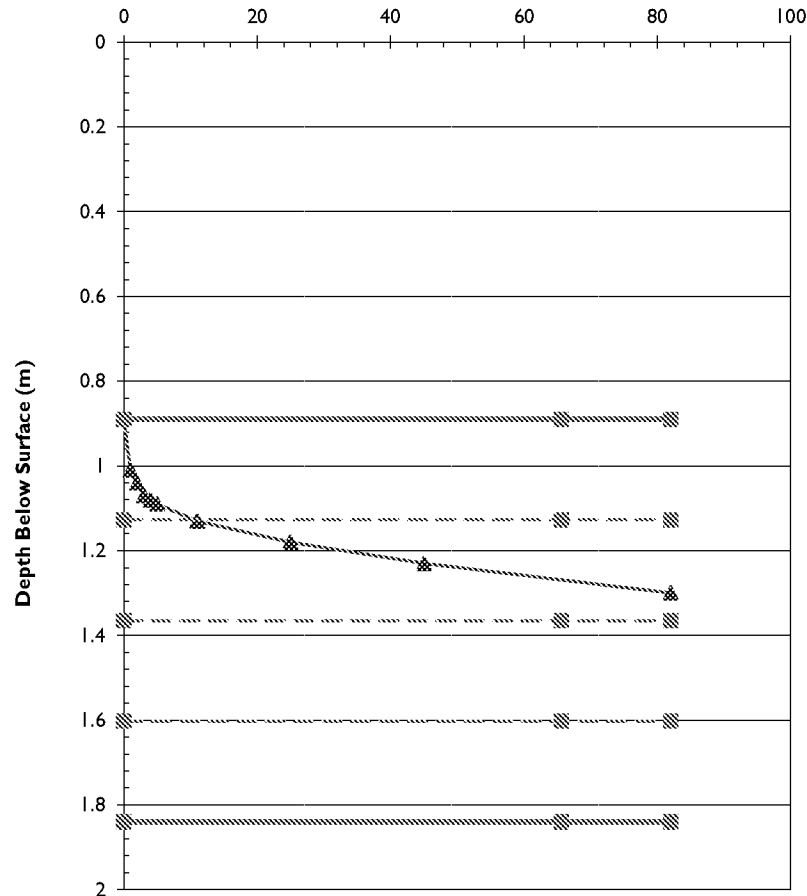
Comments:

Pit was emptied at finish of test.

Client: Boklok
Site: Elmgrove Road Littlehampton
Tested By: ADC/AU/SH
Test Date: 02/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



Test Hole No: TP306
Test No: Test No 2

repeated)

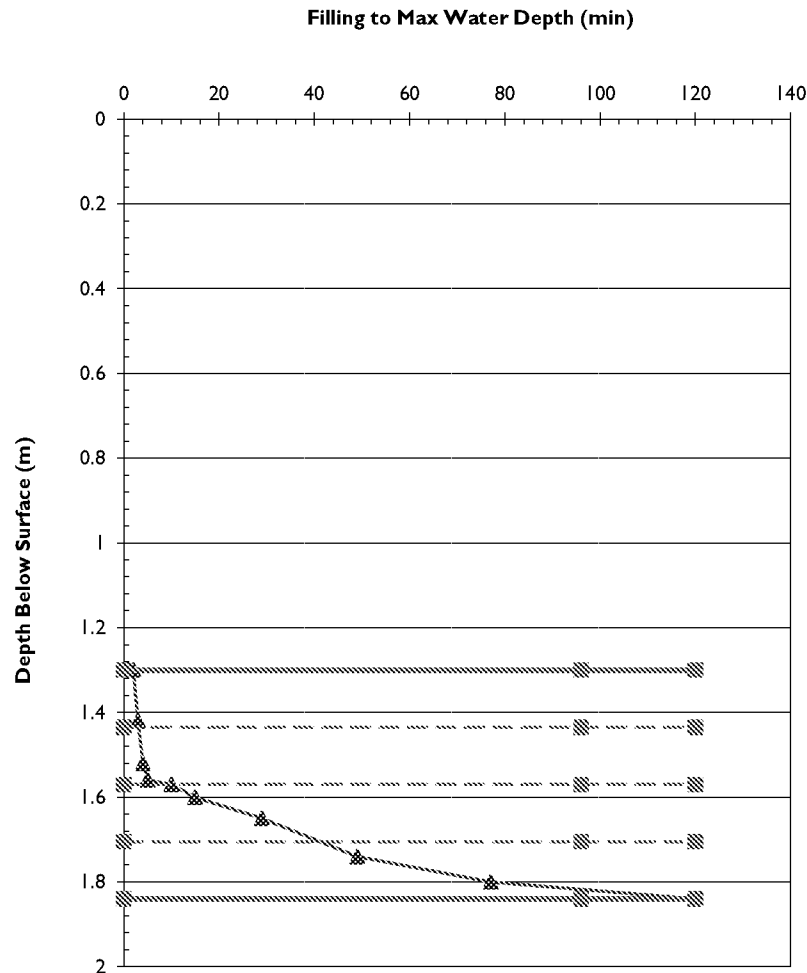


Pit Length (m)	2.2
Pit Width (m)	0.6
Depth to Pit Base (m)	1.84
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	1
Voids Assumed for Granular Fill (%)	35%
Depth of Water at Start of Test (m)	0.89
Max Water Dropdown during Test (m)	0.41
Total Soakage Test Time (min)	82
Mean Internal Discharge Area (m2)	4.827
Discharge Rate (litre/min)	1.116567426
Soakage Rate (litre/m2/min)	0.231317055
BRE Soil Infiltration Rate (m/sec)	3.85528E-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: Boklok
Site: Elmgrove Road Littlehampton
Tested By: ADC/AU/SH
Test Date: 02/09/21

BRE Digest 365 - Soakage Test



Test Hole No: TP306
Test No: Test No 3

repeated)



Pit Length (m)	2.2
Pit Width (m)	0.6
Depth to Pit Base (m)	1.84
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	1
Voids Assumed for Granular Fill (%)	35%
Depth of Water at Start of Test (m)	1.3
Max Water Dropdown during Test (m)	0.54
Total Soakage Test Time (min)	120
Mean Internal Discharge Area (m2)	2.832
Discharge Rate (litre/min)	3.19254941
Soakage Rate (litre/m2/min)	1.127312645
BRE Soil Infiltration Rate (m/sec)	1.87885E-05

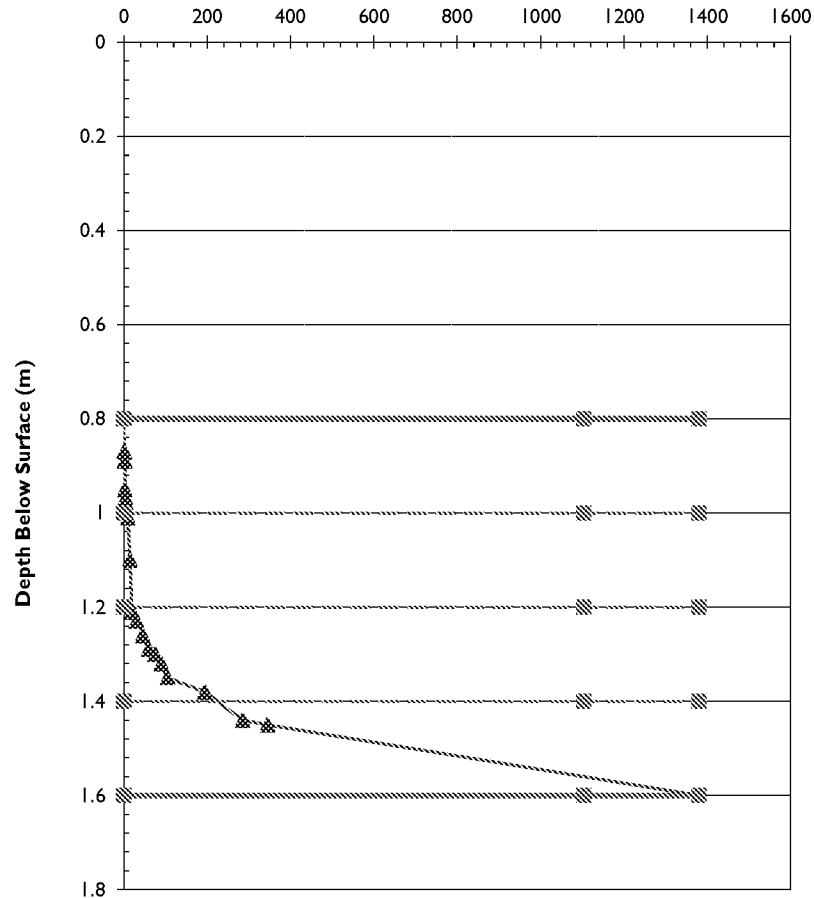
Comments:

Pit was emptied at finish of test.

Client: Boklok
Site: Elmgrove Road Littlehampton
Tested By: ADC/AU/SH
Test Date: 02/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



initial)

Test Hole No: TP307
Test No: Test No 1



Pit Length (m)	2.2
Pit Width (m)	0.6
Depth to Pit Base (m)	1.6
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	0.8
Voids Assumed for Granular Fill (%)	35%
Depth of Water at Start of Test (m)	0.8
Max Water Dropdown during Test (m)	0.8
Total Soakage Test Time (min)	1380
Mean Internal Discharge Area (m2)	3.56
Discharge Rate (litre/min)	0.22
Soakage Rate (litre/m2/min)	0.061797753
BRE Soil Infiltration Rate (m/sec)	1.02996E-06

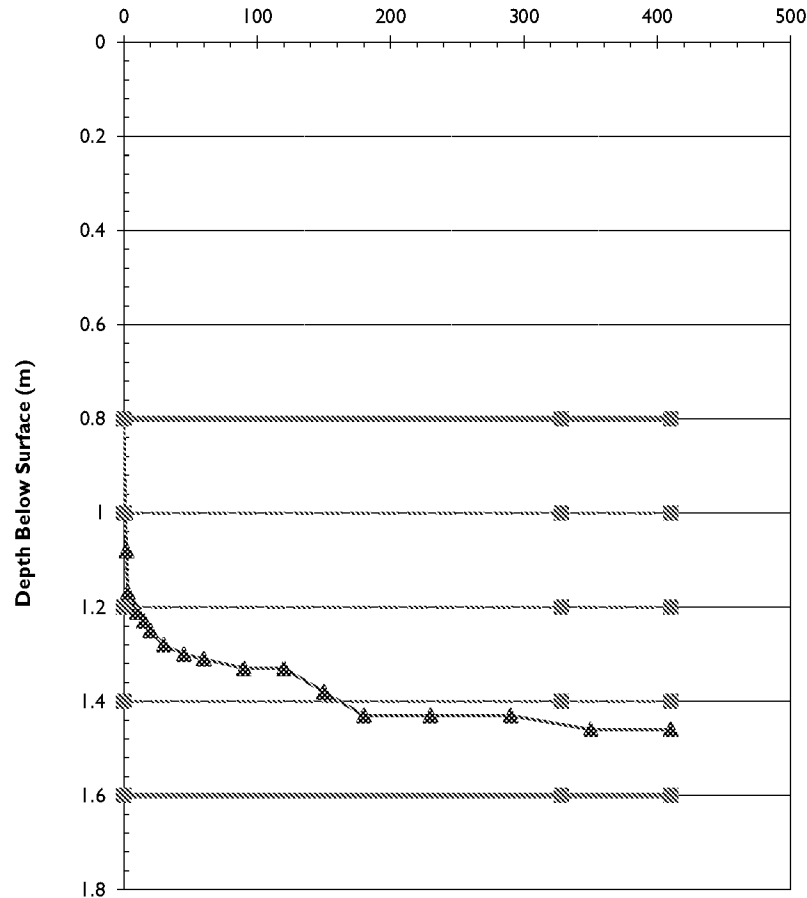
Comments:

Pit was emptied at finish of test.

Client: Boklok
Site: Elmgrove Road Littlehampton
Tested By: ADC/AU/SH
Test Date: 02/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



Test Hole No: TP307
Test No: Test No 2

repeated)



Pit Length (m)	2.2
Pit Width (m)	0.6
Depth to Pit Base (m)	1.6
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	0.8
Voids Assumed for Granular Fill (%)	35%
Depth of Water at Start of Test (m)	0.8
Max Water Dropdown during Test (m)	0.66
Total Soakage Test Time (min)	410
Mean Internal Discharge Area (m2)	3.56
Discharge Rate (litre/min)	0.259550562
Soakage Rate (litre/m2/min)	0.072907461
BRE Soil Infiltration Rate (m/sec)	1.21512E-06

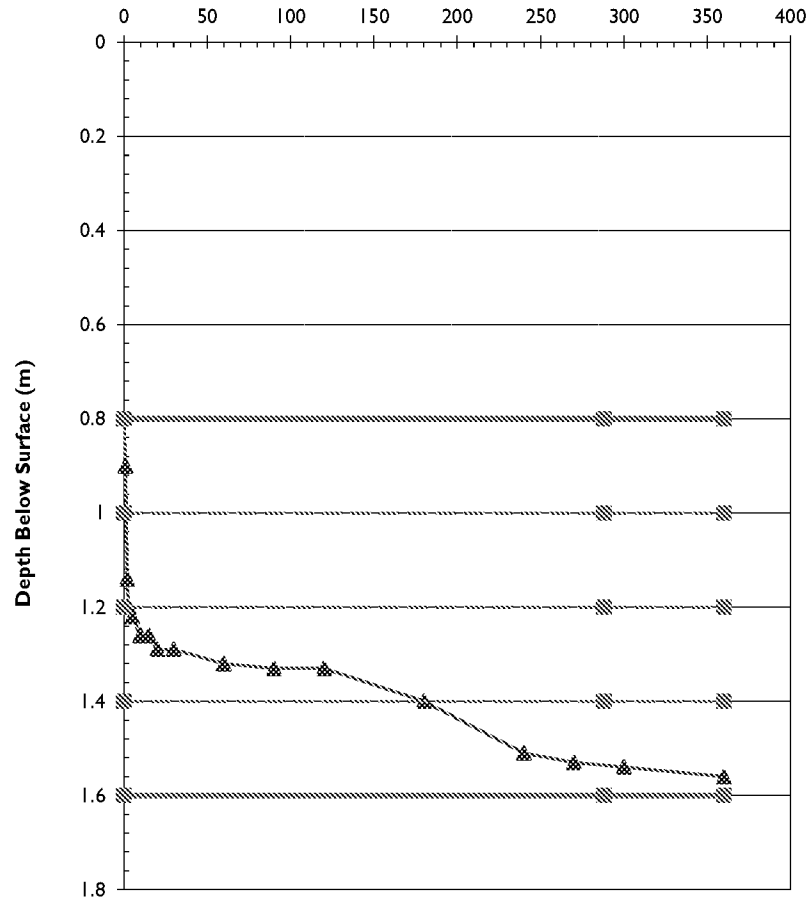
Comments:

Pit was nearly emptied at finish of test.

Client: Boklok
Site: Elmgrove Road Littlehampton
Tested By: ADC/AU/SH
Test Date: 02/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



Test Hole No: TP307
Test No: Test No 3

repeated)



Pit Length (m)	2.2
Pit Width (m)	0.6
Depth to Pit Base (m)	1.6
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	0.8
Voids Assumed for Granular Fill (%)	35%
Depth of Water at Start of Test (m)	0.8
Max Water Dropdown during Test (m)	0.76
Total Soakage Test Time (min)	360
Mean Internal Discharge Area (m2)	3.56
Discharge Rate (litre/min)	0.256666667
Soakage Rate (litre/m2/min)	0.072097378
BRE Soil Infiltration Rate (m/sec)	1.20162E-06

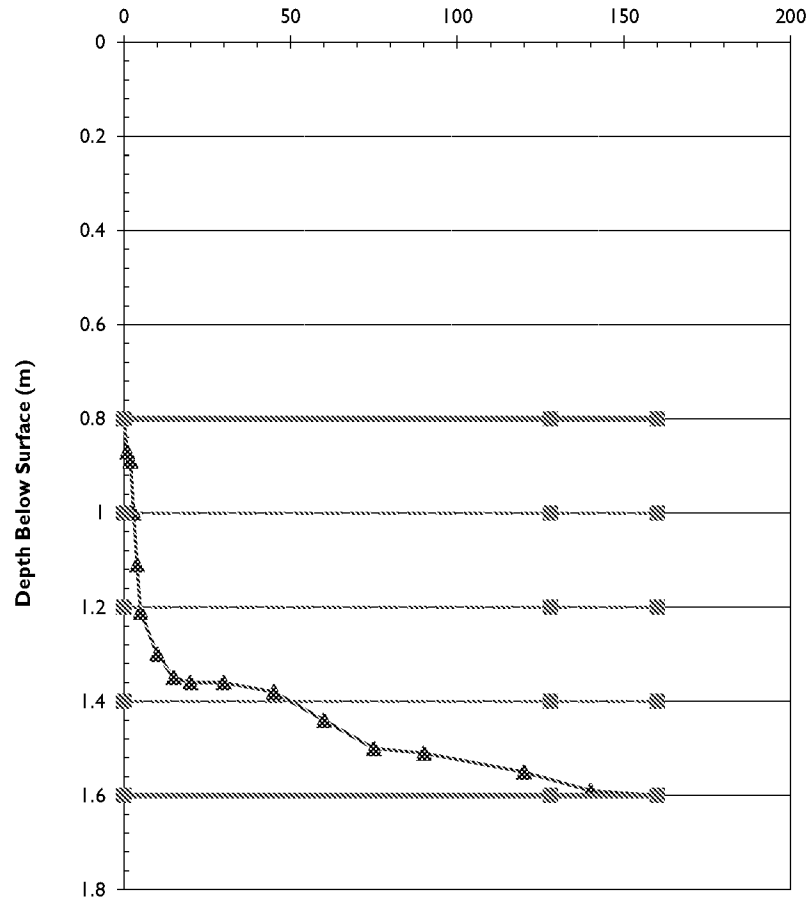
Comments:

Pit was nearly emptied at finish of test.

Client: Boklok
Site: Elmgrove Road Littlehampton
Tested By: ADC/AU/SH
Test Date: 02/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



initial)

Test Hole No: TP308
Test No: Test No 1



Pit Length (m)	2.15
Pit Width (m)	0.6
Depth to Pit Base (m)	1.6
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	1
Voids Assumed for Granular Fill (%)	35%
Depth of Water at Start of Test (m)	0.8
Max Water Dropdown during Test (m)	0.8
Total Soakage Test Time (min)	160
Mean Internal Discharge Area (m2)	3.49
Discharge Rate (litre/min)	0.873870968
Soakage Rate (litre/m2/min)	0.250392827
BRE Soil Infiltration Rate (m/sec)	4.17321E-06

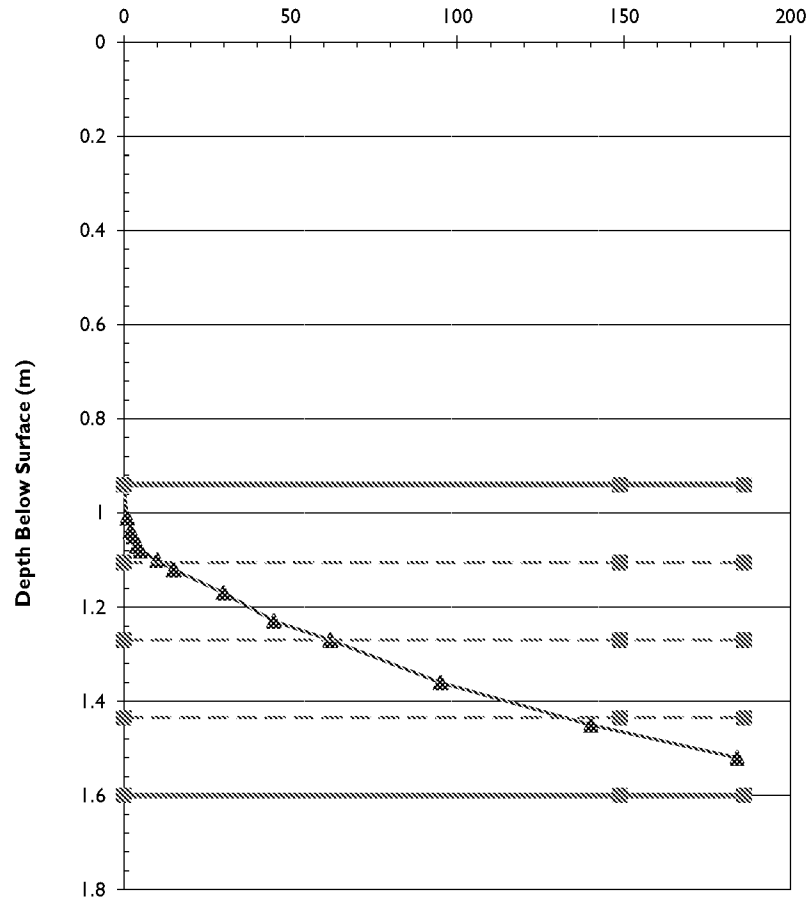
Comments:

Pit was emptied at finish of test.

Client: Boklok
Site: Elmgrove Road Littlehampton
Tested By: ADC/AU/SH
Test Date: 02/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



Test Hole No: TP308
Test No: Test No 2

repeated)



Pit Length (m)	2.15
Pit Width (m)	0.6
Depth to Pit Base (m)	1.6
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	1
Voids Assumed for Granular Fill (%)	35%
Depth of Water at Start of Test (m)	0.94
Max Water Dropdown during Test (m)	0.58
Total Soakage Test Time (min)	186
Mean Internal Discharge Area (m2)	3.105
Discharge Rate (litre/min)	0.213307087
Soakage Rate (litre/m2/min)	0.068697934
BRE Soil Infiltration Rate (m/sec)	1.14497E-06

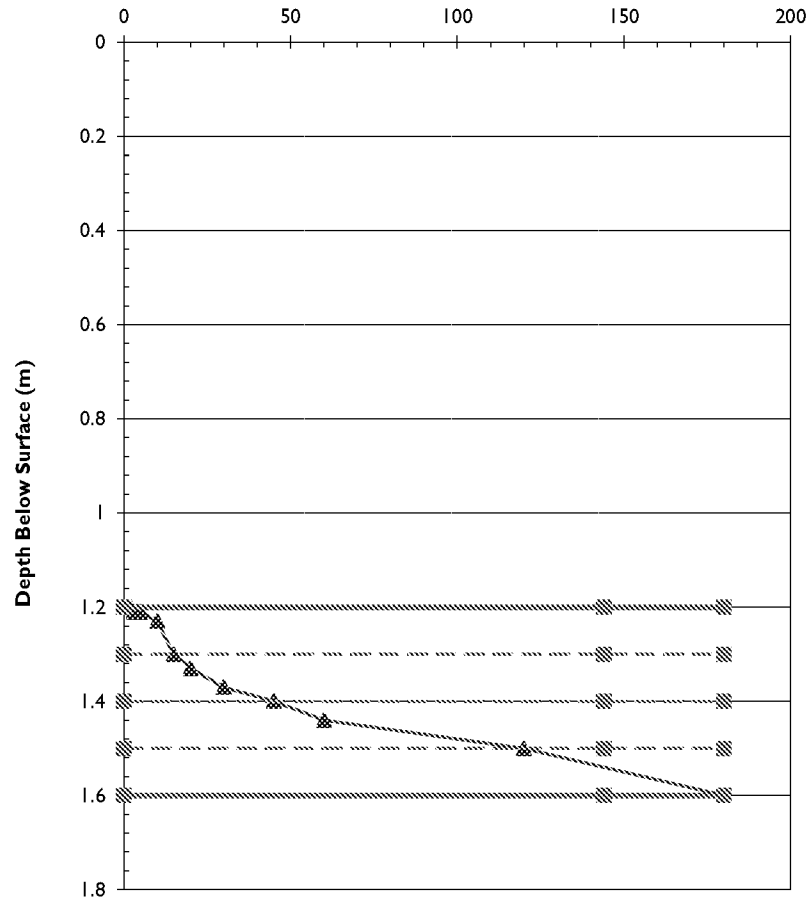
Comments:

Pit was nearly emptied at finish of test.

Client: Boklok
Site: Elmgrove Road Littlehampton
Tested By: ADC/AU/SH
Test Date: 02/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



Test Hole No: TP308
Test No: Test No 3

repeated)



Pit Length (m)	2.15
Pit Width (m)	0.6
Depth to Pit Base (m)	1.6
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	1
Voids Assumed for Granular Fill (%)	35%
Depth of Water at Start of Test (m)	1.2
Max Water Dropdown during Test (m)	0.4
Total Soakage Test Time (min)	180
Mean Internal Discharge Area (m2)	2.39
Discharge Rate (litre/min)	0.86
Soakage Rate (litre/m2/min)	0.359832636
BRE Soil Infiltration Rate (m/sec)	5.99721E-06

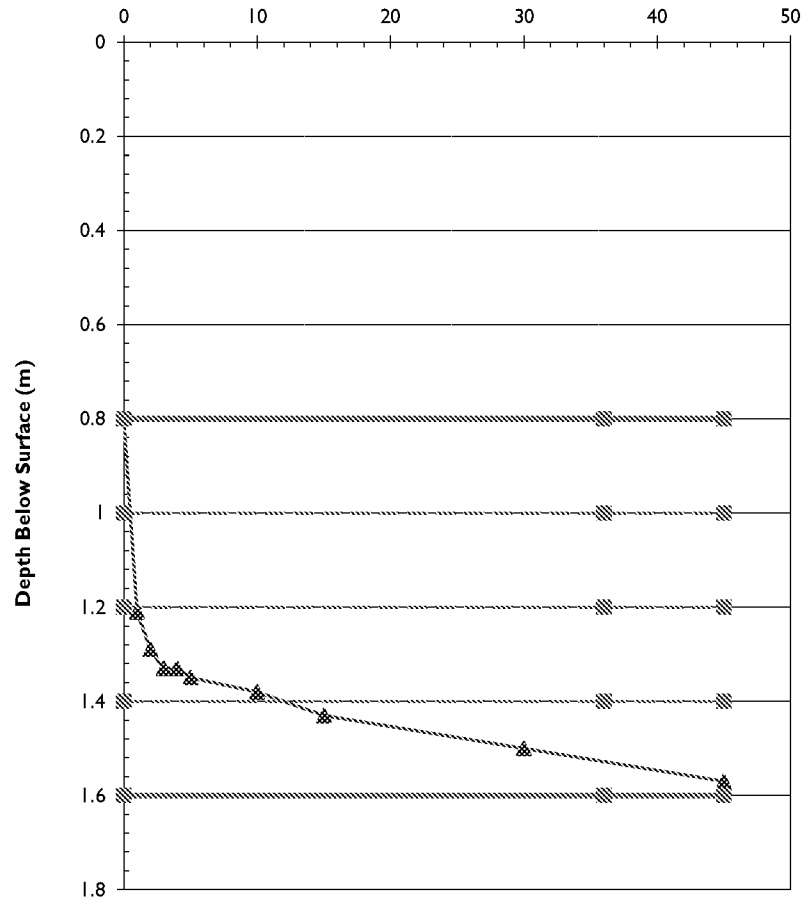
Comments:

Pit was emptied at finish of test.

Client: Boklok
Site: Elmgrove Road Littlehampton
Tested By: ADC/AU/SH
Test Date: 02/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



initial)

Test Hole No: TP309
Test No: Test No 1



Pit Length (m)	1.95
Pit Width (m)	0.6
Depth to Pit Base (m)	1.6
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	1
Voids Assumed for Granular Fill (%)	35%
Depth of Water at Start of Test (m)	0.8
Max Water Dropdown during Test (m)	0.77
Total Soakage Test Time (min)	45
Mean Internal Discharge Area (m2)	3.21
Discharge Rate (litre/min)	14.22838983
Soakage Rate (litre/m2/min)	4.432520196
BRE Soil Infiltration Rate (m/sec)	7.38753E-05

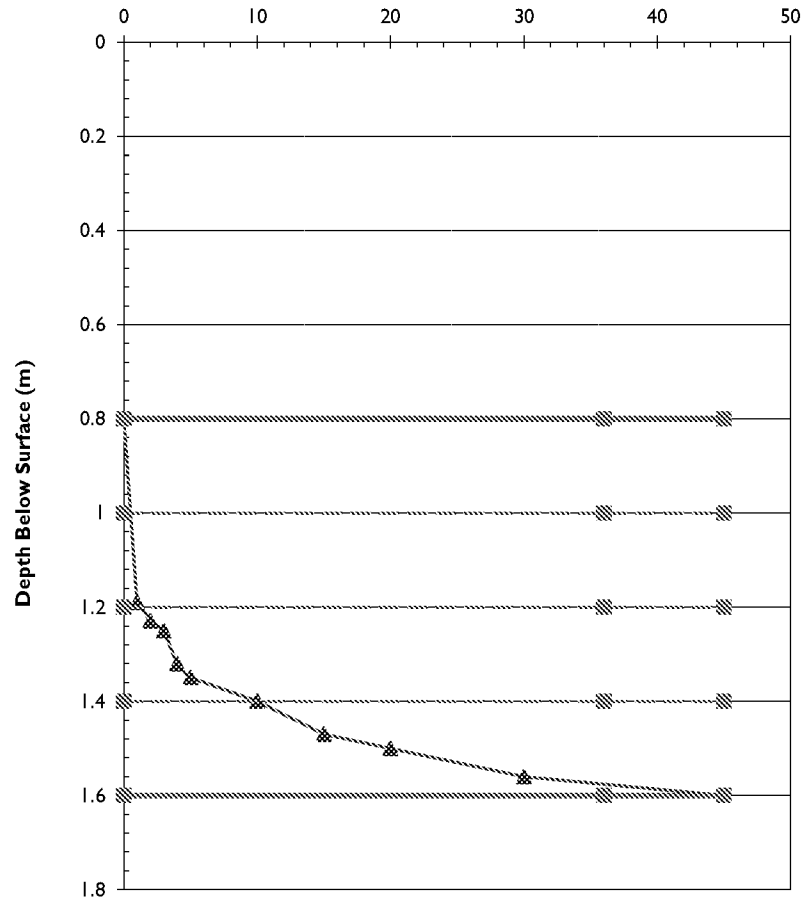
Comments:

Pit was nearly emptied at finish of test.

Client: Boklok
Site: Elmgrove Road Littlehampton
Tested By: ADC/AU/SH
Test Date: 02/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



Test Hole No: TP309
Test No: Test No 2

repeated)



Pit Length (m)	1.95
Pit Width (m)	0.6
Depth to Pit Base (m)	1.6
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	1
Voids Assumed for Granular Fill (%)	35%
Depth of Water at Start of Test (m)	0.8
Max Water Dropdown during Test (m)	0.8
Total Soakage Test Time (min)	45
Mean Internal Discharge Area (m2)	3.21
Discharge Rate (litre/min)	17.26540541
Soakage Rate (litre/m2/min)	5.378630967
BRE Soil Infiltration Rate (m/sec)	8.96438E-05

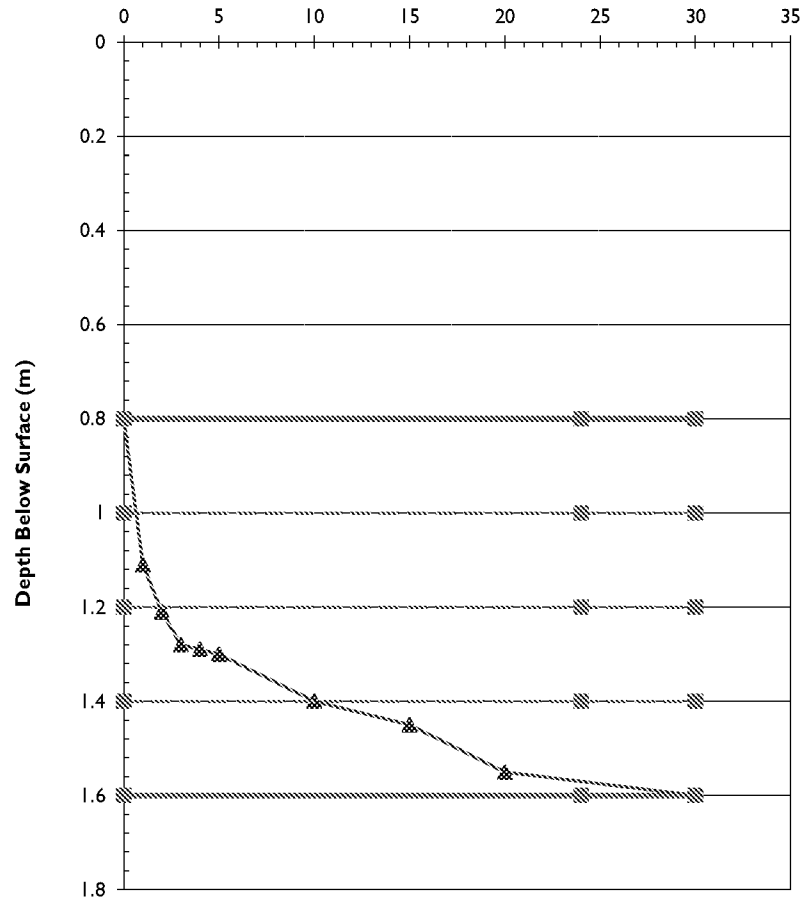
Comments:

Pit was emptied at finish of test.

Client: Boklok
Site: Elmgrove Road Littlehampton
Tested By: ADC/AU/SH
Test Date: 02/09/21

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



Test Hole No: TP309
Test No: Test No 3

repeated)



Pit Length (m)	1.95
Pit Width (m)	0.6
Depth to Pit Base (m)	1.6
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	1
Voids Assumed for Granular Fill (%)	35%
Depth of Water at Start of Test (m)	0.8
Max Water Dropdown during Test (m)	0.8
Total Soakage Test Time (min)	30
Mean Internal Discharge Area (m2)	3.21
Discharge Rate (litre/min)	17.50965517
Soakage Rate (litre/m2/min)	5.454721238
BRE Soil Infiltration Rate (m/sec)	9.0912E-05

Comments:

Pit was emptied at finish of test.

Client: Boklok
Site: Elmgrove Road Littlehampton
Tested By: ADC/AU/SH
Test Date: 02/09/21

APPENDIX E – GEOTECHNICAL LABORATORY TEST RESULTS

Geotechnical Laboratory Test Results

Notes

J Sturges - Operations Manager
07/09/2021

**ELMGROVE ROAD, LITTLEHAMPTON
LP2688**

