

28th February 2020

Our ref: GE18875/LD01/200228



Christian O'Brien
Dandara Limited (Southern)
Wade Park Farm
Salisbury Road
Ower
Hampshire
SO51 6AG

Dear Christian,

RE: Land at Stakers Farm, North End Road, Yapton, Arundel, West Sussex, BN18 0DU – BRE 365 Soakage Testing

We are pleased to present the results of the soakage testing undertaken at the above site. The soakage tests were undertaken in accordance with BRE Digest 365 'Soakaway Design' BRE, 2016.

The intrusive investigation was undertaken between 24th and 27th February 2020 with the works supervised by a Geo-Environmental Technician.

A total of eight soakage tests were undertaken within eight separate trial pits at locations specified by the Client's drainage Engineer, which targeted the proposed locations of the soakaways. The locations of these trial pits are presented in Figure 2.

Background

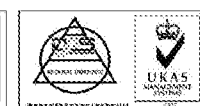
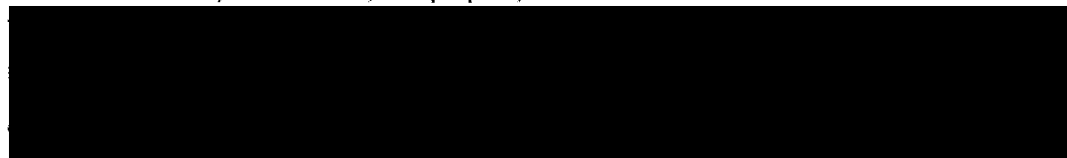
Following a technical review and consultation with Arun District Council (ADC) and their drainage engineer, it was agreed to undertake a supplementary full scale soakage testing in accordance with BRE 365 in order to inform the detailed drainage strategies for the site. The locations and depths of tests were as directed by the client.

A ground investigation was undertaken by Geo-Environmental Services Ltd (Geo-Environmental) on behalf of Dandara Ltd, dated November 2019 entitled '*Land at Stakers Farm, Northern End Road (B2132), Yapton. Ground Investigation Report*', reference no: GE18621/GIR/NOV/19. Reference should be made to the original reports and documents for further details. At the time of the intrusive investigation, the site comprised an irregularly shaped plot of land spanning across two fields on the west side of North End Road. The site consisted two open fields, a concrete hardstanding area, a farm house and associated farm outbuildings (e.g. a shed and several barns to the southwest). At the time of the investigation the northern open field was occupied by horses and it is understood that this part of the site was being used as a grazing field. In addition, a collapsed shed's components (comprised timber side panels, metal roof sheets, possible asbestos containing cement boards, timber floorboards, water proof plastic roof liners) were noted in the northeast corner of the site. It was also noted that the shed in the southwest portion of the site comprised the similar elements.

The overall site extended to c.4.5Ha and was located at NGR 497669, 103728.

The site boundaries were locally lined with densely vegetated hedges (locally tree lined and close boarded fencing) and unlined ditches. The site's topography was generally flat, although some localised and low height undulations were observed.

Geo-Environmental Services Ltd
Unit 7 Danworth Farm, Cuckfield Road, Hurstpierpoint, West Sussex BN6 9GL



Two open fields were bisected with a low voltage powered fence in a west-east direction during the investigation.

The site was accessed via North End Road to the southeast corner of the site. A second access point was noted to the northwest of the site, adjacent to the North End Road. However, the second access point was not used during the course of the investigation. A public footpath and associated access point were also noted in the centre portion of the eastern site boundary. The site was bordered on the west by a large arable field; to the east by a primary school (Yapton CE Primary School), residential properties and North End Road; to the north by a farm house and associated outbuildings and open fields; to the southeast by Stakers Farm, hardstanding areas and associated outbuildings; to the south by an open field.

Ground Conditions

With reference to British Geological Survey (BGS) mapping, the geology of the site was anticipated to comprise sand, silt and clay of the River Terrace Deposits overlying chalk of the Lewes Nodular Chalk Formation, Seaford Chalk Formation, Newhaven Chalk Formation, Culver Chalk Formation and Portsdown Chalk Formation (Undifferentiated). A mantle of Topsoil was assumed to be present over the subsoil and bedrock strata. In addition, given the close proximity of developed areas within the surrounding area of the site (e.g. Northern End Road, a primary school, residential properties, a farm house and farm outbuildings to the immediate southeast), there is the potential for a thickness of Made Ground to be present near to the boundaries of the site. In addition, Made Ground may have been introduced onto the site through other historic activities.

The ground conditions encountered within the exploratory holes were broadly consisted with those anticipated, i.e. a thickness of Topsoil overlying cohesive and granular soils of the River Terrace Deposits. The chalk was not encountered during the intrusive investigation.

For a more detailed description of the ground conditions encountered during this phase of investigation, reference should be made to the logs attached.

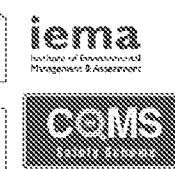
Soakage Testing

Soakage tests were undertaken at eight locations (FEB-TP1 to FEB-TP8) in accordance with BRE Digest 365, primarily to inform the design of a SUDS scheme, with the depth of the tests being specified by the Client's drainage engineer. Three soakage runs were undertaken within each position was commenced on the 24th February 2020 and was left to run over night with the final readings being collected on the 27th February 2020. However, there was insufficient fall in head to calculate an infiltration rate within FEB-TP1 and FEB-TP8. Table 1 summarises the soakage rates, which were calculated based on the results of the soakage testing:

Reference	Calculated Infiltration Rates (m/s)		
	1 st Cycle	2 nd Cycle	3 rd Cycle
FEB-TP1	N/D	N/D	N/D
FEB-TP2	1.5X10 ⁻⁶	1.8X10 ⁻⁶	2.0X10 ⁻⁶
FEB-TP3	1.8X10 ⁻⁶	1.9X10 ⁻⁶	1.7X10 ⁻⁶
FEB-TP4	1.8X10 ⁻⁶	1.8X10 ⁻⁶	1.8X10 ⁻⁶
FEB-TP5	2.1X10 ⁻⁵	1.9X10 ⁻⁶	9.8X10 ⁻⁶
FEB-TP6	2.1X10 ⁻⁶	1.8X10 ⁻⁶	1.7X10 ⁻⁶
FEB-TP7	1.8X10 ⁻⁶	1.9X10 ⁻⁶	3.4X10 ⁻⁶
FEB-TP8	N/D	N/D	N/D

N/D: Not determined due to insufficient fall in head over three day period

Table 1 Summary of Soakage Test Results



Based on the above results and ground conditions encountered on site, it is considered that conventional soakaways may locally be suitable for discharging storm water run-off to the ground. However, the storage capacity of any soakaway may be limited by the presence of groundwater, particularly during the wetter winter months, and it is likely that some allowance for on-site storage and attenuation of peak storm flow with discharge to the drainage ditch network, possible at greenfield run-off rate would be required, under an extension of riparian rights.

Closure

We trust we have interpreted your request correctly and provided sufficient information for your current requirements. If you have any questions or queries in relation the information provided at this stage please do not hesitate to contact the undersigned.

Yours sincerely
For and on Behalf of Geo-Environmental

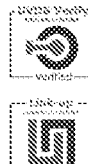
Prepared by

Reviewed by

LEVENT DOGAN BSc, MSc, PGDip, CEng MCIHT, AMICE
Senior Consulting Engineer

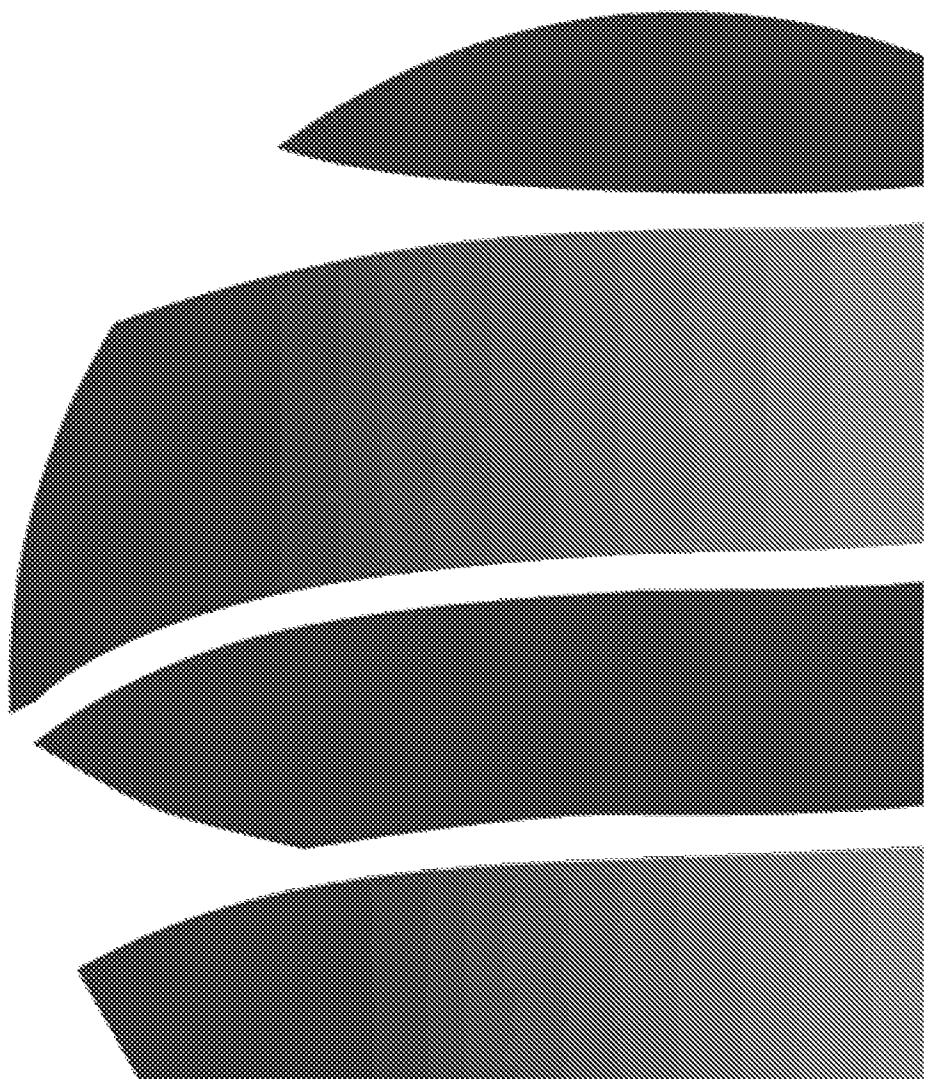
EDWARD NEWMAN BSc (Hons), FGS, MIEnvSc
Head of Road, Rail and Utilities

Enc Figure 1 – Locations Plan
 Figure 2 – Exploratory Hole Locations Plan
 Appendix A – Exploratory Hole Logs





Figures



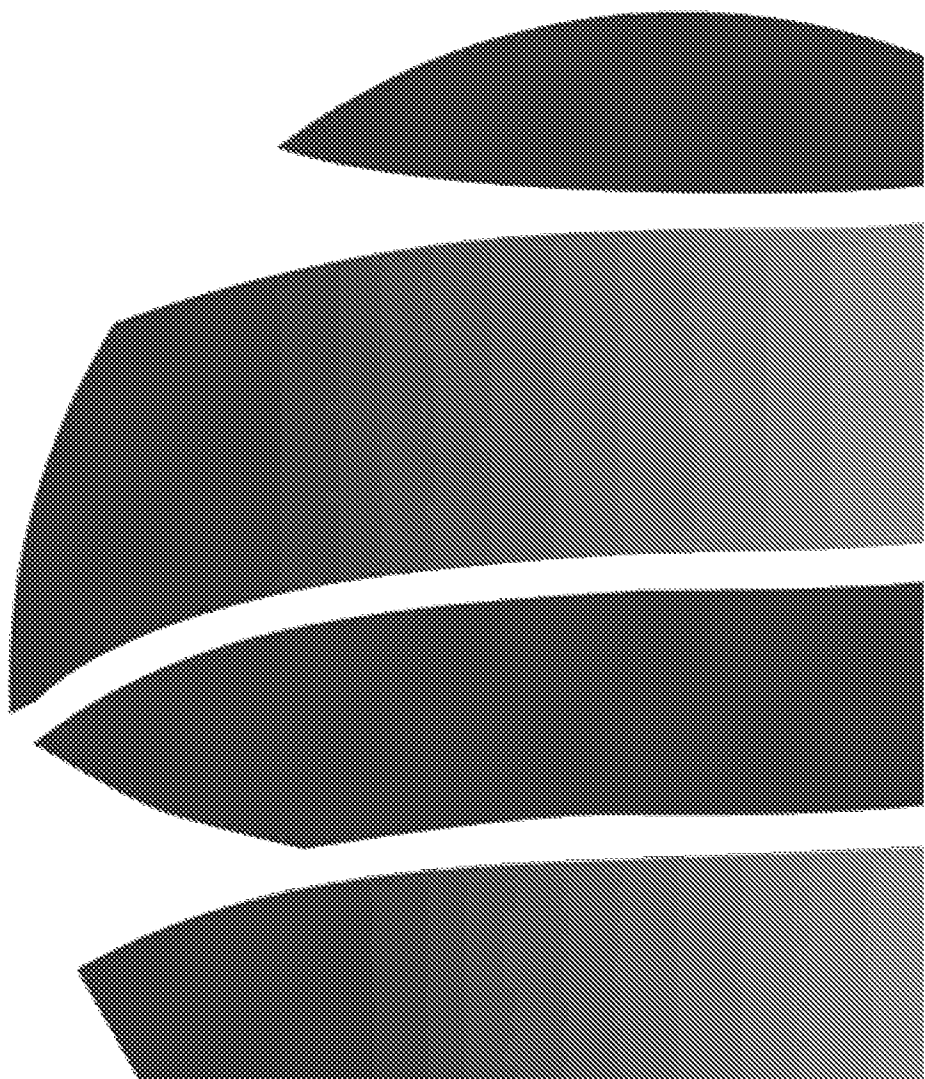


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APPENDIX A

Exploratory Hole Logs





Unit 7, Danworth Farm
Hurstpierpoint
BN6 9GL

Geo-Environment

Trial Pit Log

Trial Pit No
FEB-TP01
Sheet 1 of 1

Project Name:	Land at Stakers Farm, Yapton	Project No.	GE18875	Co-ords: - Level:		Date	
Location:	Land at Stakers Farm, North End Road, Yapton, Arundel, West Sussex, BN18 0DU			Dimensions (m):	1.15	Scale	1:25
Client:	Dandara Ltd			Depth	0.60	Logged	TS

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.11			Grass over brown silty Clay with frequent rootlets. TOPSOIL
				0.60			Light brown silty CLAY. RIVER TERRACE DEPOSITS
							End of Pit at 0.60m

Depth Strike	Water Strike	Remarks	1. BRE 365 Soakage testing undertaken 2. Pit backfilled with arisings on completion.
		Stability	





Unit 7, Danworth Farm
Hurstpierpoint
BN6 9GJ

Geo-Environmental Services Ltd

Trial Pit Log

Trial Pit No
FEB-TP02
Sheet 1 of 1

Project Name:	Land at Stakers Farm, Yapton	Project No.	GE18875	Co-ords: - Level:		Date	
Location:	Land at Stakers Farm, North End Road, Yapton, Arundel, West Sussex, BN18 0DU			Dimensions (m):	1.45	Scale	1:25
Client:	Dandara Ltd			Depth	0.61	Logged	TS

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.18			Grass over brown silty Clay with frequent rootlets. Occasional fine sub-rounded flint gravel. TOPSOIL
				0.61			Light brown slightly sandy silty CLAY with occasional rootlets. RIVER TERRACE DEPOSITS
							End of Pit at 0.61m

Depth Strike	Water Strike	Remarks	1. BRE 365 Soakage testing undertaken 2. Pit backfilled with arisings on completion.
		Stability	





Unit 7, Danworth Farm
Hurstpierpoint
BN6 9GL

Geo-Environment

Trial Pit Log

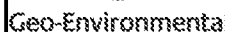
Trial Pit No
FEB-TP03
Sheet 1 of 1

Project Name:	Land at Stakers Farm, Yapton	Project No.	GE18875	Co-ords: - Level:		Date	
Location:	Land at Stakers Farm, North End Road, Yapton, Arundel, West Sussex, BN18 0DU			Dimensions (m):	1.00	Scale	1:25
Client:	Dandara Ltd			Depth	0.60	Logged	TS

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.20			Grass over brown silty Clay with frequent rootlets. TOPSOIL
				0.60			Light brown silty CLAY. RIVER TERRACE DEPOSITS
							End of Pit at 0.60m

Depth Strike	Water Strike	Remarks	1. BRE 365 Soakage testing undertaken 2. Pit backfilled with arisings on completion.
		Stability	





Trial Pit Log

TrialPit No
FEB-TP04
Sheet 1 of 1

Project Name: Land at Stakers Farm, Yapton

Project No.
GE18875

Co-ords: -
Level:

Date _____

Location: Land at Stakers Farm, North End Road, Yapton, Arundel,
West Sussex, BN18 0DU

Dimensions
(m):

1.20

Scale
1:25

Client: Dandara Ltd

Depth
0.66

0.45

Logged
TS

[illegible]

Water Strikes	
Depth Strike	Rose to (mbs)

Remarks	1. BRE 365 Soakage testing undertaken 2. Pit backfilled with arisings on completion.
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Stability





Unit 7, Danworth Farm
Hurstpierpoint
BN6 9GL

Trial Pit Log

Trial Pit No
FEB-TP05
Sheet 1 of 1

Project Name:	Land at Stakers Farm, Yapton	Project No.	GE18875	Co-ords: - Level:		Date	
Location:	Land at Stakers Farm, North End Road, Yapton, Arundel, West Sussex, BN18 0DU			Dimensions (m):	1.00	Scale	1:25
Client:	Dandara Ltd			Depth	0.68	Logged	TS

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.16			Grass over brown silty Clay with frequent rootlets.. TOPSOIL	
				0.65			Light brown slightly sandy silty CLAY with occasional subrounded coarse flint gravel. RIVER TERRACE DEPOSITS	
							End of Pit at 0.68m	

Depth Strike	Water Strike	Remarks	1. BRE 365 Soakage testing undertaken 2. Pit backfilled with arisings on completion.
		Stability	





Unit 7, Danworth Farm
Hurstpierpoint
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Geo-Environment

Trial Pit Log

Trial Pit No
FEB-TP06
Sheet 1 of 1

Project Name:	Land at Stakers Farm, Yapton	Project No.	GE18875	Co-ords: - Level:		Date	
Location:	Land at Stakers Farm, North End Road, Yapton, Arundel, West Sussex, BN18 0DU			Dimensions (m):	1.10	Scale	1:25
Client:	Dandara Ltd			Depth	0.65	Logged	TS

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.18			Grass over brown silty Clay with frequent rootlets. TOPSOIL	
				0.65			Light brown silty CLAY. RIVER TERRACE DEPOSITS	
							End of Pit at 0.65m	

Depth Strike	Water Strike	Remarks	1. BRE 365 Soakage testing undertaken 2. Pit backfilled with arisings on completion.
		Stability	





Unit 7, Danworth Farm
Hurstpierpoint
BN6 9GL

Geo-Environment

Trial Pit Log

Trial Pit No
FEB-TP07
Sheet 1 of 1

Project Name: Land at Stakers Farm, Yapton

Project No.
GE18875

Co-ords: -
Level:

Date

Location: Land at Stakers Farm, North End Road, Yapton, Arundel,
West Sussex, BN18 0DU

Dimensions
(m):

1.00

Depth
0.65

0.45

Scale
1:25

Logged
TS

Client: Dandara Ltd

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.13			Grass over brown clayey Silt with frequent rootlets. TOPSOIL
				0.65			Light brown slightly sandy silty CLAY. RIVER TERRACE DEPOSITS
							End of Pit at 0.65m

Water Strike Depth Strike		Remarks Stability	1. BRE 365 Soakage testing undertaken 2. Pit backfilled with arisings on completion.
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Unit 7, Danworth Farm
Hurstpierpoint
BN6 9GL

Geo-Environmental

Trial Pit Log

Trial Pit No
FEB-TP08
Sheet 1 of 1

Project Name: Land at Stakers Farm, Yapton

Project No.
GE18875

Co-ords: -
Level:

Date

Location: Land at Stakers Farm, North End Road, Yapton, Arundel,
West Sussex, BN18 0DU

Dimensions
(m):

1.10

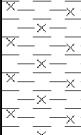
Depth
0.60

0.45

Scale
1:25

Logged
TS

Client: Dandara Ltd

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.10			Grass over brown silty Clay with frequent rootlets. TOPSOIL
							Light brown silty CLAY with occasional rootlets. RIVER TERRACE DEPOSITS
				0.60			End of Pit at 0.60m

Water Strike		Remarks	1. BRE 365 Soakage testing undertaken 2. Pit backfilled with arisings on completion.
Depth Strike	Notes to (relog)		
		Stability	

