

Our Ref: D6643/04

Elliot Martindale  
Partner Construction  
Durhamgate Suite 1  
Green Lane  
Spennymoor  
County Durham  
DL16 6FY

Date: 18<sup>th</sup> December 2015

Dear Elliot,

## **NANNY MARR ROAD, DARFIELD SOAKAWAY TESTING**

### **Introduction**

Dunelm Geotechnical and Environmental was appointed by Partner Construction and Peveril Securities Ltd to carry out a soakaway investigation on land at Nanny Marr Road, Darfield.

The purpose of the investigation was to provide information on the subsurface conditions at the site for installing soakaways.

This letter report details the study to determine the infiltration characteristics of the superficial deposits.

Infiltration drainage systems rely on the infiltration properties of the surrounding soils to facilitate natural drainage of water within the unsaturated zone that lies above the groundwater table. The system disposes of storm water by providing detention storage during a storm and allowing the water to infiltrate into the underlying soil or rock. The system must be designed so that infiltration occurs quickly enough to be able to deal with the next storm event without overloading the design capacity.

The hydraulic parameters for soakaway systems are based on field permeability tests, and on information provided in the trial pits excavated as part of the investigation.

### **Soil Infiltration Tests**

The purpose of the tests was to determine the soil infiltration rate of the strata identified in the trial pits. This information is required in order to design the infiltration drainage system.

No details of the proposed development are available, however it is assumed the system will dispose of storm water run-off generated from the roof areas and possibly the estate roads.

The fieldwork was carried out based on the advice contained in BRE Digest 365. For the purpose of this report, the design is based on the lowest value of the soil infiltration rate calculated from the successful field tests.

### **Fieldwork**

Two trial pits (designated TPs SA 3 and SA 4) were excavated by a mini digger to a maximum depth of 1.50m below ground level (bgl) on 17<sup>th</sup> December 2015.

Both trial pits were excavated on the eastern side of the site within the proposed residential area. Both pits were terminated in a granular horizon comprising yellow gravelly fine to coarse SAND (highly weathered sandstone). The trial pit logs are attached to this letter.

A plan showing the position of the trial pits is attached to this letter report.

### **Test Procedure**

Following the guidance in BRE Digest 365, the trial pits were filled with water. The water in the pit was allowed to drain to near empty or empty, and the water level recorded at intervals from the time of filling.

### **Groundwater**

Groundwater was absent from the trial pits.

### **Infiltration Test Results**

Calculations to determine the soil infiltration rate (permeability) of the soil were carried out and the calculated soil infiltration rates are listed below:

<b>Trial Pit No.</b>	<b>Initial Water Depth (m)</b>	<b>Soil Infiltration Rate <math>f</math> (m/sec)</b>
<b>TP SA 3</b>	0.19	$1.26 \times 10^{-4}$
<b>TP SA 4</b>	0.36	$1.38 \times 10^{-4}$

The calculation sheets are attached to this letter report.

Yours sincerely,

Sarah Crick  
On behalf of Dunelm Geotechnical and Environmental Ltd.

**SOAKAWAY DESIGN IN ACCORDANCE WITH BRE DIGEST 365: 1991**

**BRE Digest 365, Figure 2, Page 5**

**Client:** Partner Construction and Peveril Securities Ltd

**Site:** Nanny Marr Road

**Job No:** D6643

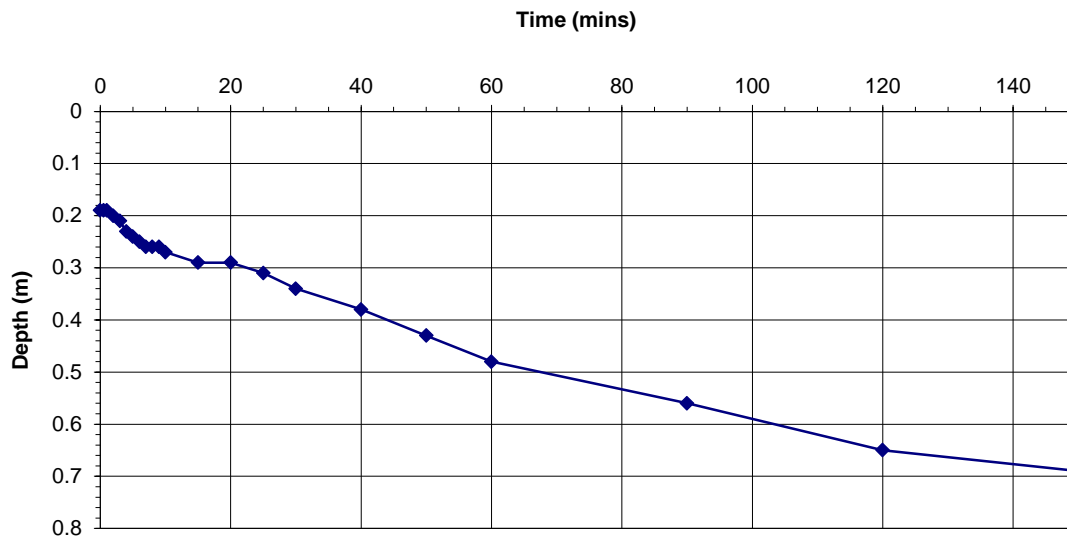
**Pit No:** SA3

**Test No:**

**1**

**CALCULATION OF SOIL INFILTRATION RATE**

Time (min)	Depth (m)	Pit Dimensions		Length (m) =	1.80
0	0.19			Width (m) =	0.50
0.5	0.19			Depth (m) =	0.80
1	0.19				
2	0.2			Depth at start of test (m) =	0.190
3	0.21			Depth at end of test (m) =	0.730
4	0.23			75% level (m) =	0.325
5	0.24			50% Effective Depth	0.270
6	0.25			25% level (m) =	0.595
7	0.26				
8	0.26			Base area of pit (m <sup>2</sup> ) =	0.900
9	0.26			V <sub>p75-25</sub> (m <sup>3</sup> ) =	0.243
10	0.27			α <sub>p50</sub> (m <sup>2</sup> ) =	2.142
15	0.29				
20	0.29			From the graph:	
25	0.31			tp 75 (min) =	1
30	0.34			tp 25 (min) =	16
40	0.38				
50	0.43	Soil infiltration rate, f, (m/s) =		1.26E-04	normal test
60	0.48				
90	0.56				
120	0.65	Input by:	AS	Date:	18.12.15
180	0.73	Checked by:	SC	Date:	18.12.15



**SOAKAWAY DESIGN IN ACCORDANCE WITH BRE DIGEST 365: 1991**

**BRE Digest 365, Figure 2, Page 5**

**Client:** Partner Construction and Peveril Securities Ltd

**Site:** Nanny Marr Road

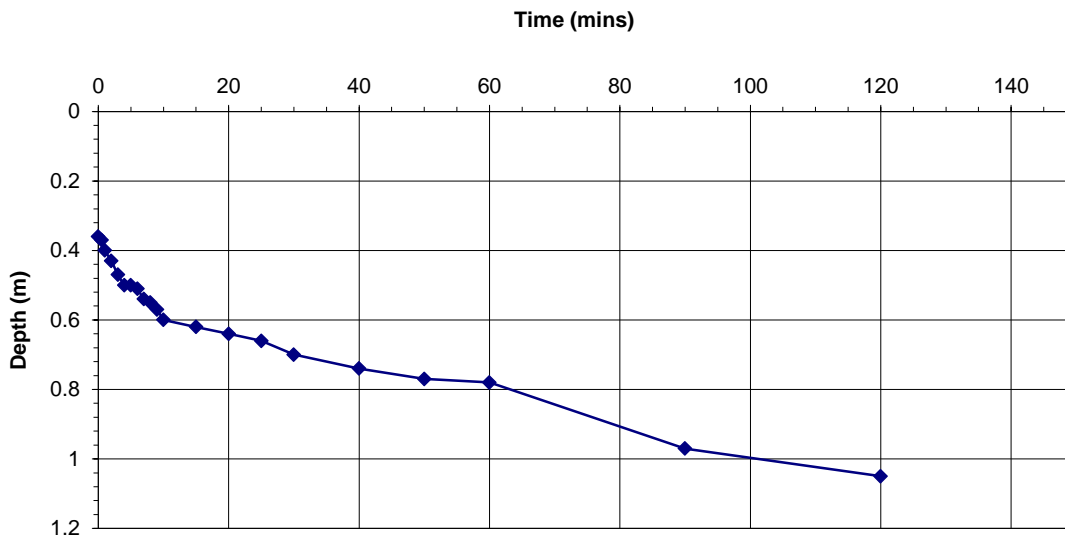
**Job No:** D6643

**Pit No:** SA4

**Test No:** 1

**CALCULATION OF SOIL INFILTRATION RATE**

Time (min)	Depth (m)	Pit Dimensions	
0	0.36	Length (m) =	1.70
0.5	0.37	Width (m) =	0.50
1	0.4	Depth (m) =	1.50
2	0.43	Depth at start of test (m) =	0.360
3	0.47	Depth at end of test (m) =	1.050
4	0.5	75% level (m) =	0.533
5	0.5	50% Effective Depth	0.345
6	0.51	25% level (m) =	0.878
7	0.54		
8	0.55	Base area of pit (m <sup>2</sup> ) =	0.850
9	0.57	V <sub>p75-25</sub> (m <sup>3</sup> ) =	0.293
10	0.6	α <sub>p50</sub> (m <sup>2</sup> ) =	2.368
15	0.62		
20	0.64	From the graph:	
25	0.66	tp 75 (min) =	1
30	0.7	tp 25 (min) =	16
40	0.74		
50	0.77	Soil infiltration rate, f, (m/s) =	1.38E-04 normal test
60	0.78		
90	0.97		
120	1.05	Input by:	AS Date: 18.12.15
		Checked by:	SC Date: 18.12.15





## TRIAL PIT RECORD

**TP No.**  
**SA3**

**Contract No.:** D6643

**Site:** Nanny Marr Road, Darfield

Scale 1:25

**Client:** Partner Construction and Peveril Securities Ltd

**Logged By:** AS

Sheet 1 of 1

**Method:** Hand Dug Trial Pit

**Checked By:** SC

Dates: 17/12/2015

SAMPLE DETAILS			Groundwater	STRATA RECORD Description	Depth (m)	Level (m AOD) PID (ppm)	Legend	Backfill
Type	Depth From-To (m)	Insitu Testing						
				Brown slightly clayey TOPSOIL.				
				Yellow sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of dolomite.	0.15			
				Orangish brown gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of weathered sandstone. Cobbles of sandstone noted.	0.30			
				----- End of Trial Pit at 0.80 m	0.80			
			1					
			2					
			3					
			4					
			5					

Remarks 1) No groundwater encountered.	Ground Water (m)		Excavation Details		Orientation	
	Depth	Strike	Remarks	Dimensions: 0.50m x 1.80m		<div style="border: 1px solid black; padding: 5px; display: inline-block;">           D      A      B                  C      °         </div>
				Stability:		
				Weather:		
			Remarks: Hand Dug Trial Pit			



## TRIAL PIT RECORD

**TP No.**  
**SA4**

**Contract No.:** D6643

**Site:** Nanny Marr Road, Darfield

Scale 1:25

**Client:** Partner Construction and Peveril Securities Ltd

**Logged By:** AS

Sheet 1 of 1

**Method:** Hand Dug Trial Pit

**Checked By:** SC

Dates: 17/12/2015

SAMPLE DETAILS			Groundwater	STRATA RECORD Description	Depth (m)	Level (m AOD) PID (ppm)	Legend	Backfill
Type	Depth From-To (m)	In situ Testing						
				Grass over slightly clayey TOPSOIL.				
				Brown sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of sandstone.	0.15			
				Orangish brown gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of sandstone. Cobbles are subangular to subrounded of sandstone.	0.35			
			1					
				----- End of Trial Pit at 1.50 m	1.50			
			2					
			3					
			4					
			5					

<b>Remarks</b> 1) Side walls of pit unstable. 2) No groundwater encountered.	<b>Ground Water (m)</b>		<b>Excavation Details</b>		<b>Orientation</b>	
	Depth	Strike	Remarks	Dimensions: 0.50m x 1.70m		<div style="border: 1px solid black; padding: 5px; display: inline-block;">           D      A      B                     C      °         </div>
				Stability:		
				Weather:		
			Remarks: Hand Dug Trial Pit			