

Discharge of Condition Drainage Technical Note



The Civil Engineering Practice
11 Tungsten Building
George Street
Fishersgate
Sussex
BN41 1RA

Project	Hangleton Nurseries, Ferring
Project Number	23487

By Martin Kempshall CEng MICE

Date 3 March 2021

1 Introduction

- 1.1 This Technical Note has been produced in support of the Discharge of Condition Application in relation to Condition 8 of Planning Permission FG/183/17/PL for the construction of a new detached office building with access, associated car parking, cycle storage and refuse storage.
- 1.2 This Technical Note is to be read in conjunction with all planning, architectural and other reports that accompany the Planning Application for the proposed development.
- 1.3 The proposed development will incorporate a sustainable drainage system which will discharge all surface water to ground by infiltration via a voided subbase beneath permeable paving.
- 1.4 Foul water will discharge to a new cesspool tank located beneath the western car parking area serving the site.

2 Condition 8

- 2.1 *'Development shall not commence until full details of the proposed provisions for foul and surface water drainage scheme have been submitted to and approved in writing by the Local Planning Authority. The provisions so approved shall be implemented in accordance with the details so approved for the development before it is first occupied.'*

Reason : To ensure that the proposed development is satisfactorily drained in accordance with policies GEN7 and GEN9 of the Arun District Council Local Plan. This is required to be a pre-commencement condition because it is necessary to implement the foul and surface water drainage system prior to commencing any building works.'



3 Information to support discharge of Condition 8.

3.1 Existing Site

- 3.1.1 The development site is located on the land to the east of Hangleton Lane, Ferring at Ordnance Survey reference TQ 089 035. The nearest postcode is BN12 6PP.
- 3.1.2 The site is bounded by commercial development to the north, commercial car parking to the east, the access track for Hangleton Nurseries to the south and the car park for The Sussex District Carers offices to the west.
- 3.1.3 A copy of the site location plan is located at the rear of this Technical Note.

3.2 Existing Drainage

- 3.2.1 The site currently has no positive surface water or foul water drainage infrastructure.
- 3.2.2 Rainfall currently discharges in part to ground and in part overland as runoff to the southwest of the site.

3.3 Geology

- 3.3.1 Site investigation completed by Land Science February 2021 confirms the presence of made ground to a depth of between 0.4m and 0.6m below ground level, which is underlain by River Terrace Deposits comprising slightly gravelly clay to approximately 3.3m below ground level which overlays bedrock Lewes Nodular Chalk.
- 3.3.2 Infiltration testing completed by Land Science in February 2021 was completed in accordance with BRE Digest 365 methodology. The underlying ground has a moderate infiltration rate with the lowest test result producing a rate of 3.06×10^{-5} m/s.
- 3.3.3 Groundwater was recorded within the river terrace deposits at a depth of 2.5m below ground level on 2 February 2021. It is anticipated that following above average rainfall across December 2020 and January 2021 groundwater levels would have been at or close to their winter peak during the site investigations.
- 3.3.4 Extracts from the site investigation by Land Science are located at the rear of this Technical Note.

3.4 Proposed Development

- 3.4.1 The development proposals are for the construction of a new detached office building together with access, car parking, cycle storage and refuse storage.

3.5 Impermeable areas

3.5.1 The impermeable areas of the various elements of the development are summarised as follows:

- Roof areas 258 m²
- Paths and Parking Area 586 m²

3.5.2 A copy of the proposed site layout plan together with an impermeable areas plan is located at the rear of this Technical Note.

3.6 Surface Water Drainage

3.6.1 The surface water drainage design is in compliance with the principles of the Arun District Councils' Supplementary Requirements for Surface Water Drainage Proposals and recognised best practice.

3.6.2 For surface water discharge, the drainage hierarchy notes the following list of drainage options in order of preference:

1. Infiltration to ground
2. Discharge to a watercourse
3. Discharge to a surface water sewer
4. Discharge to a foul water sewer

3.6.3 All surface water runoff from roofs and hardstanding paving will be discharged to ground by infiltration via an unlined voided subbase located beneath permeable paving.

3.6.4 Sufficient storage will be provided to accommodate a 1:100 year storm event, including an additional 40% to account for the predicted effects of future climate change.

3.6.5 Detailed calculations and design drawings have been prepared in order to demonstrate that surface water drainage can be adequately accommodated within the site without any increased flood risk elsewhere.

3.6.6 A minimum storage volume of 34m³ is to be provided within an unlined voided subbase located beneath permeable paving. The system has an estimated half drain time of 41 minutes.

3.7 Foul Water

3.7.1 Foul water will discharge to a new cesspool located 7.5m from the main office building beneath the western car parking area serving the site.

3.7.2 The capacity of the cesspool has been calculated using British Water Flows and Loads for Sewage Treatment Systems based upon a maximum building occupancy of 34

persons. To provide sufficient storage for approximately one month a 34m³ cesspool tank is required based upon maximum occupancy of the office for 20 working days a month.

3.7.3 A high level alarm will be fitted to the cesspool tank to notify the building management company when the cesspool requires emptying.

3.7.4 The proposed drainage layout plan together with construction details and calculations are located at the rear of this Technical Note.

3.8 Surface Water Quality

3.8.1 In accordance with CIRIA SuDS Manual 2015 (Report C753) the pollution hazard level for the proposed residential development is very low to low.

3.8.2 The surface water scheme will include mitigation to ensure that surface water is suitably treated, and any pollution risk adequately managed prior to discharge.

3.8.3 Table 26.2 in Chapter 26 of CIRIA Report C753 The SuDS Manual provides Pollution Hazard Indices for varying land types and those determined as most relevant to the development proposals are as follows:

Land Use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydrocarbons
Commercial / Industrial roofs	Low	0.3	0.2	0.05
Non-residential car parking with infrequent change (e.g. schools / offices)	Low	0.5	0.4	0.4

Table 1: Pollution Hazard Indices

3.8.4 Table 26.3 in Chapter 26 of CIRIA Report C753 The SuDS Manual identifies the water quality mitigation index of SuDS features. An extract from Table 26.3 of CIRIA Report C753 The SuDS Manual is shown below:

SuDS Type	Total suspended solids (TSS)	Metals	Hydrocarbons
Permeable pavement	0.7	0.6	0.7

Table 2: Pollution Mitigation Indices

3.8.5 Permeable paving provides the target treatment level required for runoff with low risk of pollution hazard, thus demonstrating that the surface water drainage system for the site can adequately meet the water quality mitigation requirements.

3.9 Maintenance During Construction

- 3.9.1 Once appointed the Contractor will prepare a site specific method statement for the control of silt and other pollutants during construction. CIRIA Report C532 'Control of Water Pollution from Construction Sites' provides further guidance on this.
- 3.9.2 Appropriate water quality mitigation will be undertaken in accordance with CIRIA Report C532 to allow surface water to be attenuated and sediments to be captured during the construction phase.
- 3.9.3 The Contractor will maintain the proposed drainage system during construction and until the site is handed over to the private Management Company.

3.10 Management and Maintenance of Proposed SuDS Drainage System

- 3.10.1 Upon completion, management of the drainage facilities will be passed on to the freeholder upon granting of practical completion of the construction phase remaining in their ownership in perpetuity.
- 3.10.2 The regular and corrective maintenance of all elements of the drainage system will be managed and funded by the freeholder either directly or indirectly through any future commercial leaseholders.

4 Summary

- 4.1 A detailed sustainable surface water drainage scheme has been submitted for the site in support of the discharging of Planning Condition 8 of Planning Permission granted by Arun District Council under Application FG/183/17/PL.
- 4.2 Suitable soakage rates and winter groundwater levels recorded during site investigations confirm that an infiltration system is a suitable method for discharging surface water from the site.
- 4.3 The proposed development will incorporate a sustainable drainage system which will discharge all surface water to ground by infiltration via an unlined voided subbase located beneath permeable paving.
- 4.4 Sufficient surface water storage is to be provided to attenuate the 1:100 year storm with a 40% allowance for climate change.
- 4.5 Foul water will discharge to a new cesspool tank located beneath the western car parking area serving the site.
- 4.6 The requirements of Planning Condition 8 of Planning Permission granted by Arun District Council under Application FG/183/17/PL have been met.

5 Appended Documents

Drawing 101 – Site Location Plan

Drawing 102 – Existing Site Layout Plan

Drawing 103 – Existing and Proposed Impermeable Areas Plan

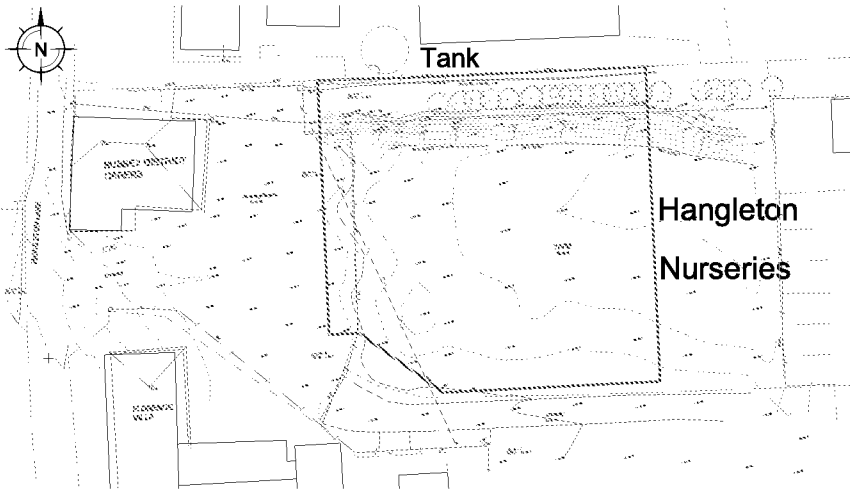
Drawing 201 – Proposed Drainage Layout Plan

Drawing 501 – Construction Details

Land Science Site Investigation Extracts

Causeway Flow Calculations

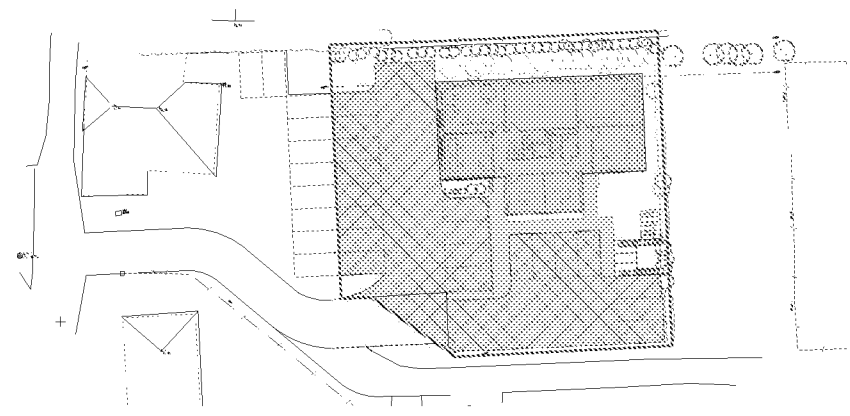
Southern Water Sewer Records



Key

Existing Impermeable Area 0m²

Red Line 1115m²



Key

Proposed Roofs 258m²

Proposed Impermeable surfaces 586m²

Area for voided subbase 526m²



NOTES

1. All drawings to be drawn in A3. All details and dimensions to be drawn to the Contractor's work practice and agreed between the Contractor and the Council.

2. The drawing is to be used for information only. It is not to be used for construction purposes.

3. The Contractor is responsible for ensuring the stability of the structure until the works are complete.

4. Any information relating to the existing structure is given in plan. All other information, including the ground surface, is shown in section. The Contractor is responsible for ensuring the stability of the structure until the works are complete.

Scale 1:100

FOR APPROVAL

Client: Sussex District Council Ltd

Project: Hangleton Nurseries, Hangleton Lane, Ferring

Title: Existing & Proposed Impermeable Areas

Drawn: M. Pacifico

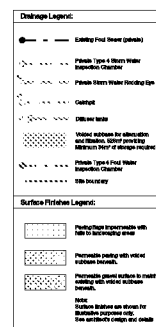
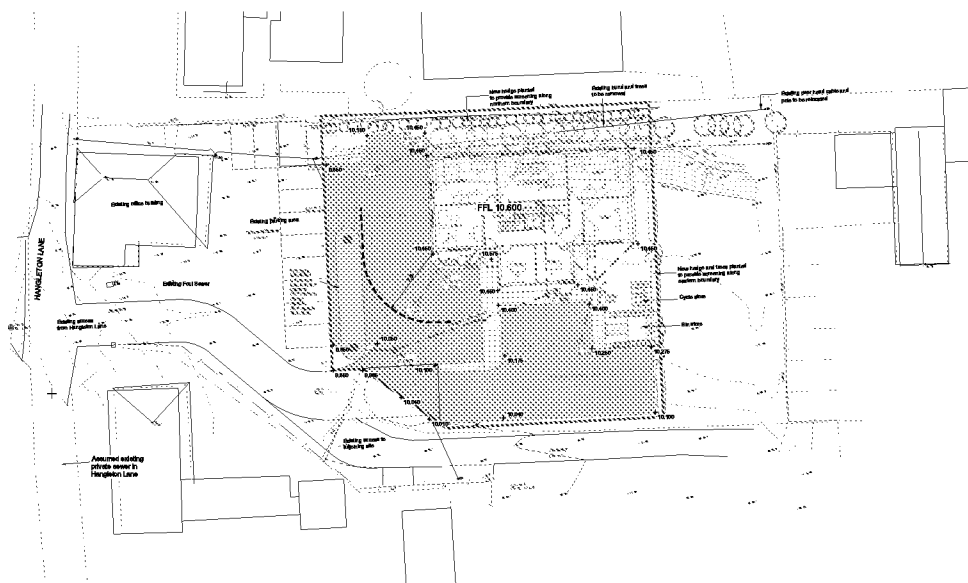
Check: M. Pacifico

Scale: 1:100

Rev: 1

Project No: 23487

Page No: 103



NOTES

1. All directions to be checked on site. All details and dimensions relating to these connections with/without design and agreed between the sub-Contractor or supplier and the general Contractor.
2. This drawing is to be used in conjunction with all relevant Authorities and Engineer's drawings and specifications.
3. The main Contractor is responsible for maintaining stability of the structure until the works are in progress.
4. Any information given regarding existing underground services is given in good faith after consultation with the relevant authority. Its liability is accepted by the Consultant and the main Contractor is responsible for checking and checking all information and taking due care and attention to the construction of the structure.

A:	03.05.21	SLP	Open Mark added	50%
BN	50T	NT		0%

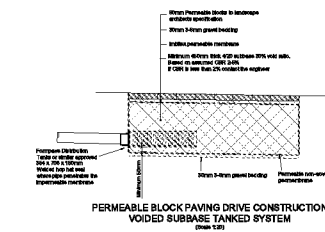
Issue Status **FOR APPROVAL**

11 Target Building
George Street
Perth
WA 6151

client	Sussex District Carers Ltd
project	Hangleton Nurseries, Hangleton Lane Farningham

THE Proposed Drainage Layout Plan

INQUIRY	DATE	PROJECT NO.
M Pacifico	Feb 2021	23487
DIVISION	CUSTOMER	DRIVE IN
M Kampohell		201 A
WAGE		
1:000 @ A1		



BY EMAIL ONLY

Our Ref: LS 5492

10th February 2021

Tim Wilson
Sussex District Carers Ltd
Hangleton Lane
Worthing
West Sussex
BN12 6PP

Unit 10, 19 Albert Drive,
Burgess Hill,
West Sussex, RH15 9TN

Dear Client,

RE: HANGLETON NURSERY, HANGLETON LANE, FERRING, BN12 6PP

We write to present the results of the soakage testing conducted at the above site on 2nd February 2021. The locations of the tests are shown on the attached plan, enclosed together with trial pit and borehole logs, test data, and infiltration calculations. Long term groundwater monitoring is also currently being carried out over a two-month period between February 2021 and April 2021; this will be reported separately.

Soakage Testing

A soakage test in the most fundamental principle involves filling a trial hole rapidly with water and recording the fall in water level over time. A number of different test procedures are commonly used in the UK, with the procedure for this test based on BRE365.

Scope of Works

1no trial hole (TP1) was to be excavated to a scheduled depth of approximately 2.00-2.50mbgl and up to three repeat tests were to be carried out over a period of one day on site. In addition, 1no 5.00m deep dynamic sampler borehole (BH1) was to be excavated in order to install a groundwater monitoring well and automatic water level logger.

Encountered Conditions

The investigation locations confirmed the anticipated geology and encountered a thin layer of Made Ground overlying River Terrace Deposits overlying White Chalk Subgroup, as summarised in the table below.

Base Depth m		Strata	Summary description
TP1	BH1		
0.40	0.70	Made Ground	Dark brown slightly clayey very gravelly SAND with abundant brick, concrete and tile fragments and dark brown slightly sandy gravelly CLAY with rare brick and charcoal fragments.
2.70+	3.30	River Terrace Deposits	Soft to firm light orangish brown slightly gravelly CLAY. Gravels are fine to medium, sub-angular to sub-rounded flints. Sand is fine grained. With depth the deposits became a wet soft light orangish brown white mottled slightly gravelly CLAY with occasional chalk fragments. Gravels are fine, angular to sub-rounded flints. Chalk fragments are low density.

Base Depth m		Strata	Summary description
TP1	BH1		
-	5.00+	White Chalk Subgroup	Saturated off-white structureless CHALK composed of rare gravels and clay pockets. Gravels are fine, sub-angular to sub-rounded flints. Chalk clasts are medium density. Matrix is white. Grade Dc.

Groundwater was struck during the excavation of both positions with short-term standing water depths in the order of 2.50m.

Test Results

Three tests were able to be carried out within TP1. All three tests drained at a steady rate and had emptied within 2.5 hours.

The infiltration rates for all tests are shown on the following table:

Position	Test 1	Test 2	Test 3
TP1	$3.45 \times 10^{-5} \text{m/s}$	$3.06 \times 10^{-5} \text{m/s}$	$3.12 \times 10^{-5} \text{m/s}$

We trust the above fulfils the investigation brief, but please get in touch if you have any questions or further requirements.

Kind regards

For and on Behalf of Land Science



SAMUEL PRIOR, B.Sc. (Hons.)
Project Geologist

Enclosed:

Figure 1
Figure 2
Engineering Logs
Soakage data



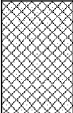
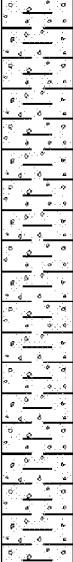
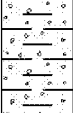
Title: Site Location			Reference: LS5492
Project: Hangleton Nursery, Ferring, BN12 6PP			Figure: 1
Client: Sussex District Carers Ltd			Date: 09/02/2021
Prepared by: SP	Checked by: JZ	Version: 1	Sheet: 1 of 1



Title: Exploratory Hole Location Plan	Reference: LS5492	Prepared by: SP
Project: Hangleton Nursery, Ferring, BN12 6PP	Figure: 2	Checked by: ET
Client: Sussex District Carers Ltd	Date: 09/02/2021	Version: 1

www.landscience.co.uk
0345 604 6494

Unit 10, 19 Albert Drive, Burgess Hill, West Sussex, RH15 9TN
2nd Floor, 25-28 Field Street, London, WC1X 9DA

				Brighton London Bristol		Site Hangleton Nurseries, Hangleton Lane, Ferring, BN12 6PP		Trial Pit Number TP1	
Excavation Method Trial Pit		Dimensions 1.60mx0.60mx2.70m		Ground Level (mOD)		Client Sussex District Carers Ltd		Job Number LS5492	
		Location		Dates 02/02/2021		Project Contractor Land Science		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description		Legend	Water
0.50	D12				0.40	Dark brown slightly clayey very gravelly SAND with abundant brick, concrete and tile fragments. (MADE GROUND)			
1.00	D13				(1.90)	Soft to firm light orangish brown slightly gravelly CLAY. Gravels are fine to medium, sub-angular to sub-rounded flints. Sand is fine grained. (RIVER TERRACE DEPOSITS)			
1.50	D14								
2.00	D15				2.30	Wet soft light orangish brown white mottled slightly gravelly CLAY with occasional chalk fragments. Gravels are fine, angular to sub-rounded flints. Chalk fragments are low density. (RIVER TERRACE DEPOSITS)			▼1
2.50	D16		Water strike(1) at 2.50m, no rise after 20 mins.		(0.40)				
					2.70	Complete at 2.70m			
					Remarks GROUNDWATER: Struck at 2.50m, standing at 2.50m after 20mins. STABILITY: e.g No instability encountered. BACKFILL: Trial hole backfilled with clean arisings DIMENSIONS: 1.60m (l) 0.60m (w) (approx) NOTES: Trial hole complete at 2.70m.				
					Scale (approx) 1:25		Logged By JZ		Figure No. LS5492.TP1

Land Science				Brighton London Bristol		Site Hanglenton Nurseries, Hanglenton Lane, Ferring, BN12 6PP		Number BH1	
Excavation Method Drive-in Windowless Sampler		Dimensions		Ground Level (mOD)		Client Sussex District Carers Ltd		Job Number LS5492	
		Location		Dates 02/02/2021		Project Contractor Land Science		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.20	D1				(0.40)	Dark brown slightly clayey very gravelly SAND with abundant brick, concrete and tile fragments. (MADE GROUND)			
0.50	D2				0.40 (0.30)	Dark brown slightly sandy gravelly CLAY with rare brick and charcoal fragments. (MADE GROUND)			
1.00 1.00 1.00	HP 25kPa D3 SV 20kPa				0.70	Soft to firm light orangish brown slightly gravelly CLAY. Gravels are fine to medium, sub-angular to sub-rounded flints. Sand is fine grained. (RIVER TERRACE DEPOSITS)			
1.50 1.50 1.50	HP 25kPa D4 SV 30kPa				(2.00)				
2.00 2.00 2.00	HP 50kPa D5 SV 60kPa								
2.50 2.50 2.50	HP 50kPa D6 SV 75kPa								
			Water strike(1) at 2.60m, rose to 2.50m in 20 mins.		2.70	Wet soft light orangish brown white mottled slightly gravelly CLAY with occasional chalk fragments. Gravels are fine, angular to sub-rounded flints. Chalk fragments are low density. (RIVER TERRACE DEPOSITS)			
3.00 3.00 3.00	HP 100kPa D7 SV 100kPa				(0.60)				
3.50	D8				3.30	Saturated off-white structureless CHALK composed of rare gravels and clay pockets. Gravels are fine, sub-angular to sub-rounded flints. Chalk clasts are medium density. Matrix is white. Grade Dc. (LEWES NODULAR CHALK)			
4.00	D9				(1.70)				
4.50	D10								
5.00	D11				5.00				
Remarks GROUNDWATER: Struck at 2.60m, standing at 2.50m after 20mins. Drilling rods coming out wet after 3.00m. CASING: No casing used. INSTALLATION: 50mm diameter HDPE standpipe to 5.00m; plain casing to 1.00m, slotted response zone 1.00m to 5.00m. Geotextile sock? BACKFILL: Bentonite sealing pellets 0.00-0.50m. 10mm washed pea gravel filter pack 0.50-5.00m. SLOW PROGRESS: None. NOTES: Hand excavated inspection pit to 1.20mbgl. Borehole completed at target depth.							Scale (approx)	Logged By	
							1:25	JZ	
							Figure No. LS5492.BH1		

Site : Hanglenton Nurseries, Hanglenton Lane, Ferring, BN12 6PP

Client : Sussex District Carers Ltd

Project Contractor
: Land Science

Job Number
LS5492

Sheet
1 / 1

Location	Date	Level	Location
TP1	01/02/2021		

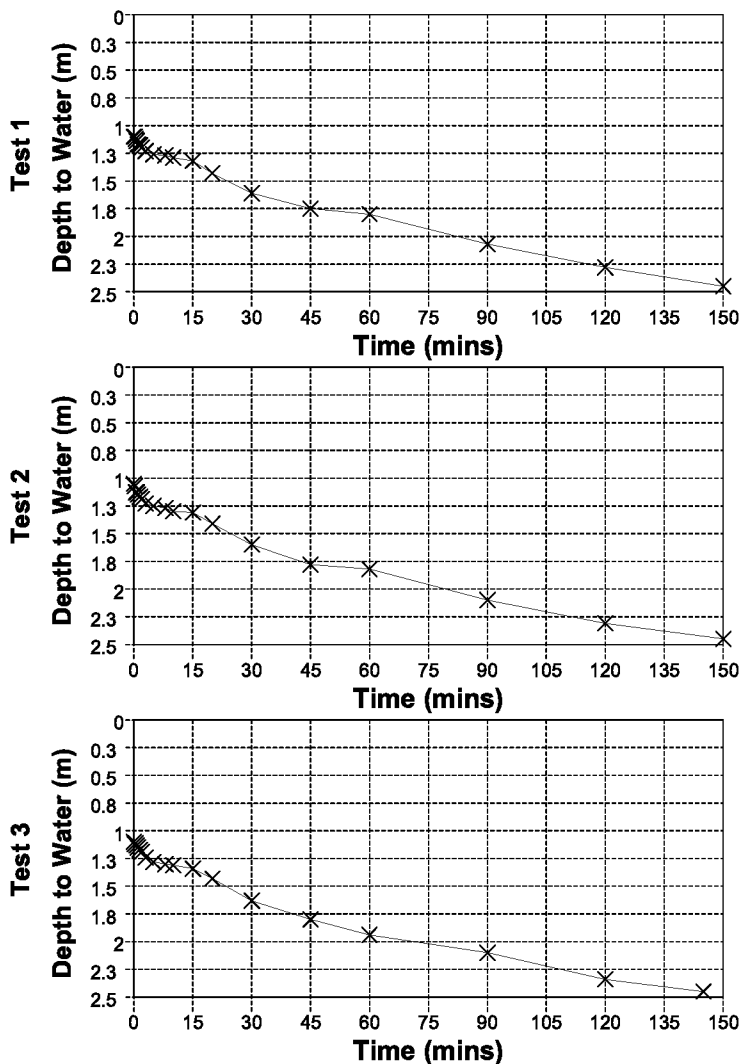
Pit Width (m)	0.60
Pit Depth (m)	2.50
Pit Length (m)	1.60

Soil type at test level	
Groundwater	
Drain discharge depth	
Sidewall stability	
Stone filled or open pit	Open Pit

	1	2	3
Effective depth (m)	1.40	1.65	1.60
Volume outflowing between 75% & 25% (m3)	0.67	0.79	0.77
Mean surface area through which outflow occurs (m2)	4.04	4.59	4.48
Time for outflow between 75% & 25% (min)	80.32	94.03	91.50
SOIL INFILTRATION RATE (ms-1), f	3.45E-5	3.06E-5	3.12E-5

Remarks

Elapsed time (mins)	Depth to Water Test 1	Depth to Water Test 2	Depth to Water Test 3
0	1.10	1.05	1.10
0.25	1.10	1.07	1.12
0.5	1.12	1.13	1.11
0.75	1.14	1.13	1.13
1	1.17	1.15	1.15
1.5	1.18	1.17	1.17
2	1.20	1.19	1.19
3	1.23	1.23	1.24
5	1.26	1.25	1.28
8	1.27	1.27	1.30
10	1.29	1.30	1.31
15	1.32	1.31	1.34
20	1.43	1.41	1.43
30	1.61	1.60	1.63
45	1.75	1.78	1.80
60	1.80	1.82	1.94
90	2.07	2.10	2.10
120	2.28	2.31	2.34
145			2.45
150	2.45	2.45	



The Civil Engineering Practice BN41 1RA [REDACTED] [REDACTED]	File: 1 in 100 plus 40.pfd Network: Storm Network Martin Kempshall 24 February 2021	Page 1 Hangleton Nurseries Hangleton, Ferring West Sussex
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Design Settings

Rainfall Methodology	FEH-13	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	0.750	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Depth (m)
1	0.076	5.00	10.300	0.340

Simulation Settings

Rainfall Methodology	FEH-13	Analysis Speed	Normal	Additional Storage (m³/ha)	20.0
Summer CV	0.750	Skip Steady State	x	Check Discharge Rate(s)	x
Winter CV	0.840	Drain Down Time (mins)	240	Check Discharge Volume	x

Storm Durations

15 30 60 120 180 240 360 480 600 720 960 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	40	0	0

Node 1 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.11020	Invert Level (m)	9.960	Slope (1:X)	9999.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	41	Depth (m)	0.250
Safety Factor	5.0	Width (m)	20.000	Inf Depth (m)	0.250
Porosity	0.30	Length (m)	26.000		

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	1	60	10.171	0.211	28.9	33.6404	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)
60 minute winter	1	Infiltration	3.2

