

LAND SOUTH OF ARUNDEL ROAD, WALBERTON

Proposed development for 8 No Residential Dwellings

DRAINAGE STRATEGY

Foul Drainage

There is 150mm dia. public foul sewer south of the proposed development in West Walberton Lane.

The proposed development is for mixture of 8 No. four and five bedroom dwellings, Calculated in accordance with the WRc document '*Sewers for Adoption*', the peak foul water flow into this sewer is 0.37 lits/sec.

It is proposed that there will be a gravity connection from the site into the public sewer system at a new manhole constructed on the sewer line. The final connection will be subject to a Section 106 application with Southern Water Services and payment of the current infrastructure charges.

Details of the existing sewer along with the proposed foul drainage strategy can be seen on the Escher Silverman drawing ES1822-502-001C included with this strategy.

Surface Water Drainage

Southern Water sewer records show that there are no public surface water sewers in the vicinity of the development site.

In line with current SuDS (Sustainable Drainage Systems) practise it is proposed to utilise infiltration methods as the means of surface water disposal for the new development. In order to ascertain maximum depths of soakaways winter groundwater measurements have been undertaken. Having established the highest groundwater levels, tests in accordance with BRE365 were undertaken at various locations across the site. The results confirmed the suitability and provided the infiltration rates at the proposed depths of the domestic soakaways and permeable paving sub-grade. The results have been utilised for the detailed design of the infiltration measures, which is in accordance with current Environment Agency recommendations, including an allowance of 40% for climate change.

*Escher Silverman ES1822
May 2019*

'MicroDrainage' calculations have been produced for the design of the soakaways and permeable surfacing and are included with this drainage strategy.

Roof drainage areas will discharge to gravel filled trench soakaways through silt traps in order to minimise sediment deposit in the soakaways. The access road, domestic drives and parking areas will be constructed of permeable block paving.

Details of the proposed surface water drainage strategy utilising a soakaway and permeable paving drainage solution can be seen on the Escher Silverman drawing ES1822-502-001C which is included with this strategy.

Conclusions

The increase in foul water flow from the new site development is low enough not to have any impact on the sewer network and will be covered by Southern Water's infrastructure charges.

The proposal to utilise a soakaway system embraces the concept of the SuDS philosophy for the disposal of surface water drainage on new development sites. Such a proposal further enhances the drainage sustainability of the proposed site. In accordance with standard procedures a *'Maintenance Manual'* for the ongoing servicing of the surface water drainage systems has been produced and is included with this drainage strategy.

ARUNDEL ROAD, FONTWELL

Groundwater Monitoring Results

Escher Silverman ES1822
May 2019

Crayfern Homes

Via email c [REDACTED]

Our ref.: 16971/LR_R36

25th April 2019

Thomas Telford House
Sun Valley Business Park
Winnall Close
Winchester SO23 0LS

Dear Alastair,

RE: Land at Arundel Road, Fontwell, West Sussex BN18 0QP

We are writing regarding the scheme of winter groundwater monitoring undertaken at the above-named site.

Brief

The scope of the investigation was set out within email correspondence between John Hills (Soils Limited), Craig Morrison (Soils Limited), Kazys Narbutas (Esher Silverman) and Alastair Dineen (Crayfern Homes). The scheme consisted of seven groundwater monitoring visits over a period of five months and was commissioned to inform the client and the Local Planning Authority (Arun District Council) on groundwater levels beneath the site over the winter period.

This letter report must be read in conjunction with the following reports undertaken on the site by Soils Limited:

- Preliminary Investigation Report – 16971/PIR, dated July 2018
- Main Investigation Report – 16971/MIR, dated July 2018

General

The site was located at land at Arundel Road, Fontwell, West Sussex BN18 0QP and had an O.S Land Ranger Grid Reference of SU 960 068. At the time of the Main Investigation Report (July 2018), no permanent structures or buildings were present on site. A small road towable caravan was located near the centre of the site. The majority of the site was covered in long grass, with areas of dense vegetation. The access track comprised concrete and brick rubble surfacing.

A site location plan has been included as Figure 1.

Ground Conditions

The ground conditions encountered during the previous site investigation (16971/MIR, dated July 2018) have been summarised in Table 1 and comprised:

Topsoil (TS)
Head (HEAD)
Lambeth Group (LMBE)

Table 1. Ground Conditions

Strata	Epoch	Depth Encountered (m bgl)		Typical Thickness (m)	Typical Description
		Top	Bottom		
TS	Anthropocene	G.L.	0.25 – 0.55	0.50	Dark orangish brown sandy gravelly SILT.
HEAD	Quaternary	0.25 – 0.55	1.00 ¹ – 4.90 ³	2.80	Dark orangish brown very clayey sandy fine to coarse sub-angular to angular flint GRAVEL.
LMBE	Thanetian	2.00 ¹ – 4.90 ³	3.00 ^{1,3} – 7.00 ^{1,3}	Not Proven ²	Orangish brown clayey fine to medium SAND with occasional bands of soft light grey sandy CLAY.

Note: ¹ Final depth of trial hole. ² Base of strata not encountered. ³ Inferred from DP logs

Groundwater - Intrusive Investigation

Groundwater was encountered within two trial holes (TP1 and TP3) during the intrusive investigation and was struck at depths of 2.00m bgl and 3.50m bgl respectively. No change in water depth was noted after a 20minute period.

Changes in groundwater level occur for a number of reasons including seasonal effects and variations in drainage. The investigation was conducted in May 2018, when groundwater levels should have been falling from their annual maximum (highest) elevation, which typically occurs around March.

Groundwater strike information has been included with Table 2.

Table 2. Groundwater Strikes During Intrusive Investigation

Trial Hole	Depth (m bgl)	Trial Hole	Depth (m bgl)
WS1 _w	Not encountered	TP1	2.10
WS2	Not encountered	TP2	Not encountered
WS3 _w	Not encountered	TP3	3.50
WS4	Not encountered	TP4	Not encountered

Note: _w = Well installation

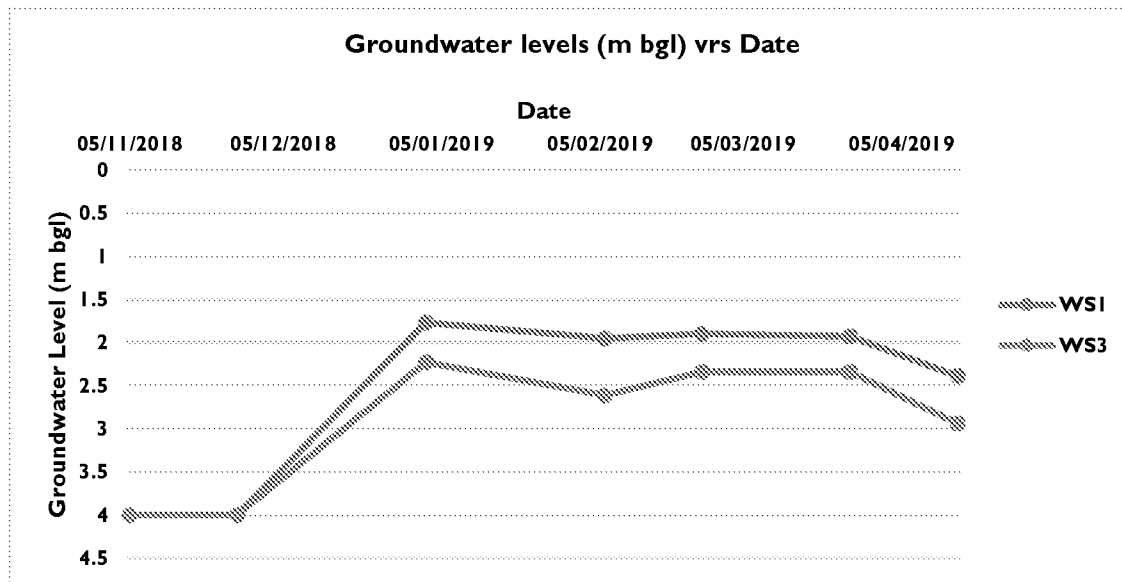
Groundwater – Post Works Monitoring

Groundwater monitoring was conducted within the standpipes installed with borehole locations WS1 and WS3 during the site works. The groundwater monitoring was undertaken between 5th November 2018 and the 16th April 2019. The data obtained from the monitoring visits have been reported in Table 3 and Graph 1.

The trial hole locations have been presented in Figure 2.

Table 3. Groundwater Monitoring

Trial Hole	Depth to Water (m bgl)							Base depth (m bgl)	
	05/11/2018	26/11/2018	02/01/2019	06/02/2019	25/02/2019	26/03/2019	16/04/2019	31/05/2018	16/04/2019
WS1	Dry	Dry	1.77	1.95	1.9	1.93	2.39	4.00	3.33
WS3	Dry	Dry	2.23	2.61	2.34	2.34	2.94	4.00	3.82

Graph 1. Groundwater Levels

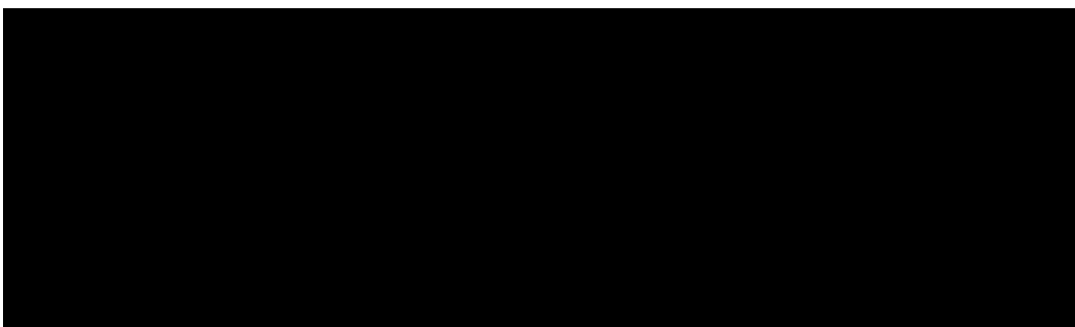
Over the monitoring period, which included winter months, the data set shows a clear rise in groundwater level throughout these months with the highest water levels recorded in January 2019. In line with expected seasonal fluctuations, groundwater was noted to fall in April 2019, beginning the decline towards their lowest levels, typically recorded in September.

The following figures make up the remainder of this letter report.

Figure 1 – Site Location Plan

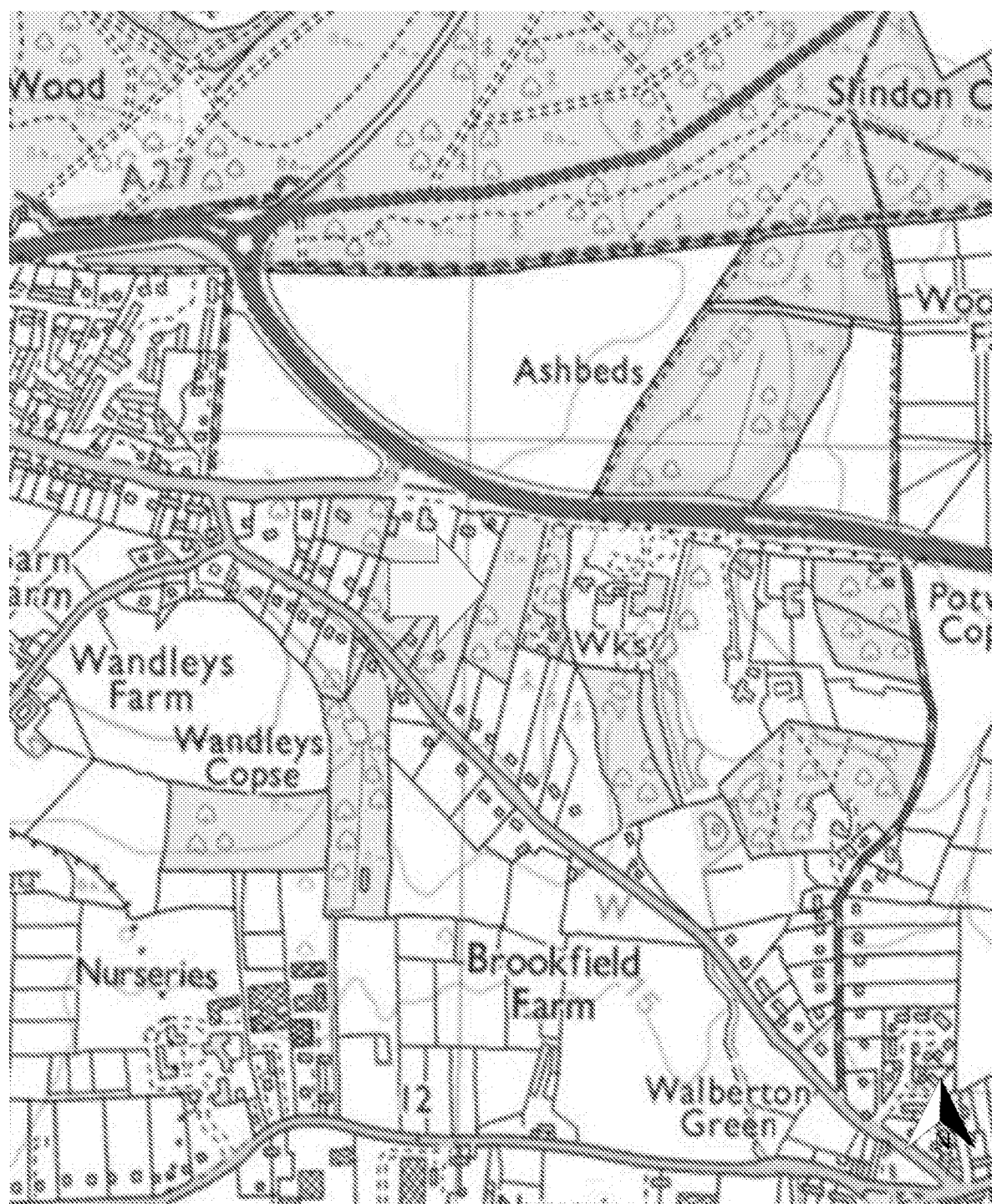
Figure 2 – Trial Hole Location Plan

Should you have any queries, please do not hesitate to contact the undersigned.



For and on behalf of Soils Limited

Figure I - Site Location Plan



Job Number
16971

Project
Land at Arundel Road, Fontwell, West Sussex BN18 0QP

Client
Crayfern Homes

Date
April 2019

Figure 2 – Trial Hole Location Plan



Job Number
16971

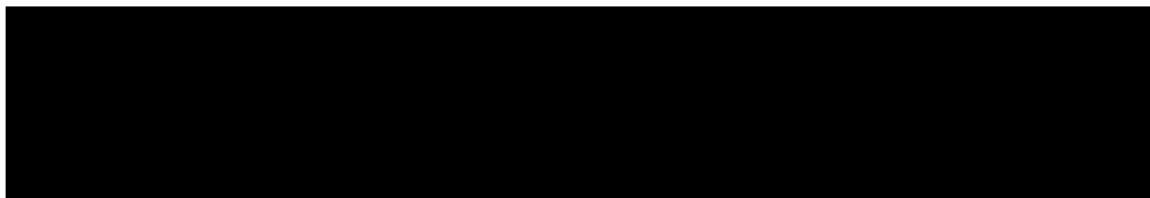
Project
Land at Arundel Road, Fontwell, West Sussex BN18 0QP

Client
Crayfern Homes

Date
April 2019

Soils Limited
Geotechnical & Environmental Consultants

Newton House
Cross Road, Tadworth
Surrey KT20 5SR



ARUNDEL ROAD, FONTWELL

MicroDrainage Calculations

*Escher Silverman ES1822
May 2019*

Escher Silverman		Page 1
Lone Barn Studios Stanbridge Lane Romsey SO51 0HE	Arundel Road Fontwell Permeable Access Road	
Date April 2019 File Permeable Access Road.SRC	Designed By KN Checked By	
Micro Drainage	Source Control W.11.2	

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 88 minutes

Storm Duration (mins)	Maximum Filtration (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Maximum Volume (m³)	Status
15 Summer	3.0	3.0	26.1258	0.4257	17.4	O K
30 Summer	3.5	3.5	26.1988	0.4987	23.9	O K
60 Summer	3.8	3.8	26.2498	0.5497	29.0	O K
120 Summer	4.0	4.0	26.2773	0.5772	32.0	O K
180 Summer	4.1	4.1	26.2823	0.5822	32.6	O K
240 Summer	4.0	4.0	26.2788	0.5787	32.1	O K
360 Summer	3.9	3.9	26.2633	0.5632	30.4	O K
480 Summer	3.8	3.8	26.2438	0.5437	28.4	O K
600 Summer	3.7	3.7	26.2243	0.5242	26.4	O K
720 Summer	3.5	3.5	26.2053	0.5052	24.5	O K
15 Winter	3.2	3.2	26.1583	0.4582	20.2	O K
30 Winter	3.7	3.7	26.2358	0.5357	27.6	O K
60 Winter	4.1	4.1	26.2908	0.5908	33.5	O K
120 Winter	4.3	4.3	26.3163	0.6163	36.5	O K
180 Winter	4.3	4.3	26.3178	0.6178	36.7	O K
240 Winter	4.3	4.3	26.3088	0.6088	35.6	O K
360 Winter	4.1	4.1	26.2833	0.5832	32.6	O K
480 Winter	3.9	3.9	26.2543	0.5542	29.5	O K

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)
15 Summer	125.44	22
30 Summer	84.53	36
60 Summer	54.37	64
120 Summer	33.76	94
180 Summer	25.15	128
240 Summer	20.26	162
360 Summer	14.92	230
480 Summer	12.00	298
600 Summer	10.13	362
720 Summer	8.81	426
15 Winter	125.44	22
30 Winter	84.53	35
60 Winter	54.37	62
120 Winter	33.76	100
180 Winter	25.15	138
240 Winter	20.26	176
360 Winter	14.92	248
480 Winter	12.00	318

Escher Silverman		Page 2
Lone Barn Studios Stanbridge Lane Romsey SO51 0HE	Arundel Road Fontwell Permeable Access Road	
Date April 2019 File Permeable Access Road.SRC	Designed By KN Checked By	
Micro Drainage	Source Control W.11.2	

Summary of Results for 100 year Return Period (+40%)

Storm Duration (mins)	Maximum Filtration (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Maximum Volume (m³)	Status
600 Winter	3.7	3.7	26.2263	0.5262	26.6	O K
720 Winter	3.5	3.5	26.1992	0.4992	23.9	O K

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)
600 Winter	10.13	384
720 Winter	8.81	450

Escher Silverman		Page 3
Lone Barn Studios Stanbridge Lane Romsey SO51 0HE	Arundel Road Fontwell Permeable Access Road	
Date April 2019 File Permeable Access Road.SRC	Designed By KN Checked By	
Micro Drainage	Source Control W.11.2	

Rainfall Details

Region	ENG+WAL	Cv (Summer)	0.750	Summer Storms	Yes
Return Period (years)	100	Cv (Winter)	0.840	Winter Storms	Yes
M5-60 (mm)	19.200	Shortest Storm (mins)	15	Climate Change %	+40
Ratio-R	0.345	Longest Storm (mins)	720		

Time / Area Diagram

Total Area (ha) = 0.103

Time from:	(mins) to:	Area (ha)	Time from:	(mins) to:	Area (ha)
0	4	0.000	4	8	0.103

Escher Silverman		Page 4
Lone Barn Studios Stanbridge Lane Romsey SO51 0HE	Arundel Road Fontwell Permeable Access Road	
Date April 2019 File Permeable Access Road.SRC	Designed By KN Checked By	
Micro Drainage	Source Control W.11.2	

Porous Car Park Details

Infil Coef - Base (m/hr)	0.523800	Invert Level (m)	25.700
Membrane Percolation (mm/hr)	1000	Cover Level (m)	28.100
Safety Factor	10.0	Slope (1:x)	100.0
Porosity	0.40	Max Percolation (l/s)	286.7
Length (m)	215.0	Depression Storage (mm)	5
Width (m)	4.8	Evaporation (mm/day)	3

Escher Silverman		Page 1
Lone Barn Studios Stanbridge Lane Romsey SO51 0HE	Arundel Road Fontwell Permeable Drives	
Date April 2019 File Permeable Drives.SRC	Designed By KN Checked By	
Micro Drainage	Source Control W.11.2	

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 27 minutes

Storm Duration (mins)	Maximum Filtration (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Maximum Volume (m ³)	Status
15 Summer	1.1	1.1	25.8448	0.1447	2.1	O K
30 Summer	1.2	1.2	25.8633	0.1632	2.7	O K
60 Summer	1.3	1.3	25.8743	0.1742	3.0	O K
120 Summer	1.3	1.3	25.8738	0.1737	3.0	O K
180 Summer	1.2	1.2	25.8663	0.1662	2.8	O K
240 Summer	1.1	1.1	25.8573	0.1572	2.5	O K
360 Summer	1.0	1.0	25.8413	0.1413	2.0	O K
480 Summer	0.9	0.9	25.8288	0.1288	1.7	O K
600 Summer	0.9	0.9	25.8178	0.1178	1.4	O K
720 Summer	0.8	0.8	25.8088	0.1088	1.2	O K
15 Winter	1.1	1.1	25.8563	0.1562	2.4	O K
30 Winter	1.3	1.3	25.8753	0.1752	3.1	O K
60 Winter	1.3	1.3	25.8848	0.1847	3.4	O K
120 Winter	1.3	1.3	25.8793	0.1792	3.2	O K
180 Winter	1.2	1.2	25.8673	0.1672	2.8	O K
240 Winter	1.1	1.1	25.8548	0.1547	2.4	O K
360 Winter	1.0	1.0	25.8333	0.1333	1.8	O K
480 Winter	0.8	0.8	25.8163	0.1163	1.4	O K

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)
15 Summer	125.44	20
30 Summer	84.53	30
60 Summer	54.37	46
120 Summer	33.76	80
180 Summer	25.15	114
240 Summer	20.26	146
360 Summer	14.92	208
480 Summer	12.00	268
600 Summer	10.13	330
720 Summer	8.81	388
15 Winter	125.44	20
30 Winter	84.53	31
60 Winter	54.37	50
120 Winter	33.76	86
180 Winter	25.15	120
240 Winter	20.26	152
360 Winter	14.92	216
480 Winter	12.00	276

Escher Silverman		Page 2
Lone Barn Studios Stanbridge Lane Romsey SO51 0HE	Arundel Road Fontwell Permeable Drives	
Date April 2019 File Permeable Drives.SRC	Designed By KN Checked By	
Micro Drainage	Source Control W.11.2	

Summary of Results for 100 year Return Period (+40%)

Storm Duration (mins)	Maximum Filtration (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Maximum Volume (m³)	Status
600 Winter	0.7	0.7	25.8028	0.1028	1.1	O K
720 Winter	0.7	0.7	25.7923	0.0923	0.9	O K

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)
600 Winter	10.13	336
720 Winter	8.81	396

Escher Silverman		Page 3
Lone Barn Studios Stanbridge Lane Romsey SO51 0HE	Arundel Road Fontwell Permeable Drives	
Date April 2019 File Permeable Drives.SRC	Designed By KN Checked By	
Micro Drainage	Source Control W.11.2	

Rainfall Details

Region	ENG+WAL	Cv (Summer)	0.750	Summer Storms	Yes
Return Period (years)	100	Cv (Winter)	0.840	Winter Storms	Yes
M5-60 (mm)	19.200	Shortest Storm (mins)	15	Climate Change %	+40
Ratio-R	0.345	Longest Storm (mins)	720		

Time / Area Diagram

Total Area (ha) = 0.014

Time from:	(mins) to:	Area (ha)	Time from:	(mins) to:	Area (ha)
0	4	0.000	4	8	0.014

Escher Silverman		Page 4
Lone Barn Studios Stanbridge Lane Romsey SO51 0HE	Arundel Road Fontwell Permeable Drives	
Date April 2019 File Permeable Drives.SRC	Designed By KN Checked By	
Micro Drainage	Source Control W.11.2	

Porous Car Park Details

Infil Coef - Base (m/hr)	0.523800	Invert Level (m)	25.700
Membrane Percolation (mm/hr)	1000	Cover Level (m)	26.400
Safety Factor	10.0	Slope (1:x)	100.0
Porosity	0.40	Max Percolation (l/s)	37.5
Length (m)	27.0	Depression Storage (mm)	5
Width (m)	5.0	Evaporation (mm/day)	3

Escher Silverman		Page 1
Lone Barn Studios Stanbridge Lane Romsey SO51 0HE	Arundel Road Fontwell Soakaway So1-So3	
Date April 2019 File Soakaway So1 10yrs.SRC	Designed By KN Checked By	
Micro Drainage	Source Control W.11.2	

Summary of Results for 10 year Return Period

Half Drain Time : 27 minutes

Storm Duration (mins)	Maximum Filtration (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Maximum Volume (m³)	Status
15 Summer	0.6	0.6	26.9248	0.5247	1.3	O K
30 Summer	0.6	0.6	27.0103	0.6103	1.5	O K
60 Summer	0.7	0.7	27.0563	0.6563	1.6	O K
120 Summer	0.7	0.7	27.0408	0.6408	1.5	O K
180 Summer	0.6	0.6	26.9988	0.5988	1.4	O K
240 Summer	0.6	0.6	26.9568	0.5567	1.3	O K
360 Summer	0.5	0.5	26.8877	0.4877	1.2	O K
480 Summer	0.5	0.5	26.8353	0.4352	1.0	O K
600 Summer	0.4	0.4	26.7943	0.3942	0.9	O K
720 Summer	0.4	0.4	26.7613	0.3612	0.9	O K
15 Winter	0.6	0.6	26.9898	0.5897	1.4	O K
30 Winter	0.7	0.7	27.0818	0.6818	1.6	O K
60 Winter	0.8	0.8	27.1153	0.7153	1.7	O K
120 Winter	0.7	0.7	27.0648	0.6648	1.6	O K
180 Winter	0.6	0.6	26.9978	0.5978	1.4	O K
240 Winter	0.6	0.6	26.9388	0.5387	1.3	O K
360 Winter	0.5	0.5	26.8493	0.4492	1.1	O K
480 Winter	0.4	0.4	26.7868	0.3867	0.9	O K

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)
15 Summer	54.77	20
30 Summer	36.22	28
60 Summer	23.03	46
120 Summer	14.29	78
180 Summer	10.72	112
240 Summer	8.72	144
360 Summer	6.50	206
480 Summer	5.28	266
600 Summer	4.49	328
720 Summer	3.93	388
15 Winter	54.77	20
30 Winter	36.22	29
60 Winter	23.03	48
120 Winter	14.29	84
180 Winter	10.72	116
240 Winter	8.72	150
360 Winter	6.50	212
480 Winter	5.28	274

Escher Silverman		Page 2
Lone Barn Studios Stanbridge Lane Romsey SO51 0HE	Arundel Road Fontwell Soakaway So1-So3	
Date April 2019 File Soakaway So1 10yrs.SRC	Designed By KN Checked By	
Micro Drainage	Source Control W.11.2	

Summary of Results for 10 year Return Period

Storm Duration (mins)	Maximum Filtration (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Maximum Volume (m³)	Status
600 Winter	0.4	0.4	26.7403	0.3402	0.8	O K
720 Winter	0.3	0.3	26.7048	0.3047	0.7	O K

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)
600 Winter	4.49	336
720 Winter	3.93	396

Escher Silverman		Page 3
Lone Barn Studios Stanbridge Lane Romsey SO51 0HE	Arundel Road Fontwell Soakaway So1-So3	
Date April 2019 File Soakaway So1 10yrs.SRC	Designed By KN Checked By	
Micro Drainage	Source Control W.11.2	

Rainfall Details

Region	ENG+WAL	Cv (Summer)	0.750	Summer Storms	Yes
Return Period (years)	10	Cv (Winter)	0.840	Winter Storms	Yes
M5-60 (mm)	19.200	Shortest Storm (mins)	15	Climate Change %	+0
Ratio-R	0.345	Longest Storm (mins)	720		

Time / Area Diagram

Total Area (ha) = 0.015

Time from:	(mins) to:	Area (ha)	Time from:	(mins) to:	Area (ha)
0	4	0.000	4	8	0.015

Escher Silverman		Page 4
Lone Barn Studios Stanbridge Lane Romsey SO51 0HE	Arundel Road Fontwell Soakaway So1-So3	
Date April 2019 File Soakaway So1 10yrs.SRC	Designed By KN Checked By	
Micro Drainage	Source Control W.11.2	

Trench Soakaway Details

Infil Coef - Base (m/hr)	0.000000	Length (m)	5.0
Infil Coef - Sides (m/hr)	0.305960	Invert Level (m)	26.400
Safety Factor	1.0	Cover Level (m)	27.450
Porosity	0.40	Slope (1:x)	0.0
Width (m)	1.2		

Escher Silverman		Page 1
Lone Barn Studios Stanbridge Lane Romsey SO51 0HE	Arundel Road Fontwell Soakaway So1-So3	
Date April 2019 File Soakaway So1100+40%.SRC	Designed By KN Checked By	
Micro Drainage	Source Control W.11.2	

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 38 minutes

Storm Duration (mins)	Maximum Filtration (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Maximum Volume (m³)	Status
15 Summer	1.3	1.3	27.6023	1.2023	2.9	O K
30 Summer	1.5	1.5	27.8242	1.4242	3.4	O K
60 Summer	1.6	1.6	27.9487	1.5487	3.7	O K
120 Summer	1.6	1.6	27.9132	1.5132	3.6	O K
180 Summer	1.5	1.5	27.8047	1.4047	3.4	O K
240 Summer	1.4	1.4	27.6938	1.2937	3.1	O K
360 Summer	1.2	1.2	27.5193	1.1193	2.7	O K
480 Summer	1.0	1.0	27.3898	0.9898	2.4	O K
600 Summer	0.9	0.9	27.2898	0.8898	2.1	O K
720 Summer	0.9	0.9	27.2103	0.8103	1.9	O K
15 Winter	1.4	1.4	27.7507	1.3507	3.2	O K
30 Winter	1.7	1.7	27.9907	1.5907	3.8	O K
60 Winter	1.8	1.8	28.0887	1.6887	4.1	O K
120 Winter	1.7	1.7	27.9692	1.5692	3.8	O K
180 Winter	1.5	1.5	27.8017	1.4017	3.4	O K
240 Winter	1.3	1.3	27.6523	1.2523	3.0	O K
360 Winter	1.1	1.1	27.4313	1.0313	2.5	O K
480 Winter	0.9	0.9	27.2793	0.8793	2.1	O K

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)
15 Summer	125.44	20
30 Summer	84.53	28
60 Summer	54.37	46
120 Summer	33.76	78
180 Summer	25.15	112
240 Summer	20.26	144
360 Summer	14.92	206
480 Summer	12.00	266
600 Summer	10.13	328
720 Summer	8.81	388
15 Winter	125.44	20
30 Winter	84.53	29
60 Winter	54.37	48
120 Winter	33.76	84
180 Winter	25.15	116
240 Winter	20.26	150
360 Winter	14.92	212
480 Winter	12.00	274

Escher Silverman		Page 2
Lone Barn Studios Stanbridge Lane Romsey SO51 0HE	Arundel Road Fontwell Soakaway So1-So3	
Date April 2019 File Soakaway So1100+40%.SRC	Designed By KN Checked By	
Micro Drainage	Source Control W.11.2	

Summary of Results for 100 year Return Period (+40%)

Storm Duration (mins)	Maximum Filtration (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Maximum Volume (m³)	Status
600 Winter	0.8	0.8	27.1683	0.7683	1.8	O K
720 Winter	0.7	0.7	27.0838	0.6838	1.6	O K

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)
600 Winter	10.13	336
720 Winter	8.81	396

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Lone Barn Studios Stanbridge Lane Romsey SO51 0HE	Arundel Road Fontwell Soakaway So1-So3	
Date April 2019 File Soakaway So1100+40%.SRC	Designed By KN Checked By	
Micro Drainage	Source Control W.11.2	

Rainfall Details

Region	ENG+WAL	Cv (Summer)	0.750	Summer Storms	Yes
Return Period (years)	100	Cv (Winter)	0.840	Winter Storms	Yes
M5-60 (mm)	19.200	Shortest Storm (mins)	15	Climate Change %	+40
Ratio-R	0.345	Longest Storm (mins)	720		

Time / Area Diagram

Total Area (ha) = 0.015

Time from:	(mins) to:	Area (ha)	Time from:	(mins) to:	Area (ha)
0	4	0.000	4	8	0.015

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Lone Barn Studios Stanbridge Lane Romsey SO51 0HE	Arundel Road Fontwell Soakaway So1-So3	
Date April 2019 File Soakaway So1100+40%.SRC	Designed By KN Checked By	
Micro Drainage	Source Control W.11.2	

Trench Soakaway Details

Infil Coef - Base (m/hr)	0.000000	Length (m)	5.0
Infil Coef - Sides (m/hr)	0.305960	Invert Level (m)	26.400
Safety Factor	1.0	Cover Level (m)	28.100
Porosity	0.40	Slope (1:x)	0.0
Width (m)	1.2		

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Lone Barn Studios Stanbridge Lane Romsey SO51 0HE	Arundel Road Fontwell Soakaway So4-So5	
Date April 2019 File Soakaway So4 10yrs.SRC	Designed By KN Checked By	
Micro Drainage	Source Control W.11.2	

Summary of Results for 10 year Return Period

Half Drain Time : 33 minutes

Storm Duration (mins)	Maximum Filtration (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Maximum Volume (m³)	Status
15 Summer	0.5	0.5	25.0313	0.5312	1.4	O K
30 Summer	0.6	0.6	25.1233	0.6233	1.6	O K
60 Summer	0.6	0.6	25.1793	0.6793	1.8	O K
120 Summer	0.6	0.6	25.1778	0.6778	1.8	O K
180 Summer	0.6	0.6	25.1428	0.6428	1.7	O K
240 Summer	0.6	0.6	25.1038	0.6038	1.6	O K
360 Summer	0.5	0.5	25.0368	0.5367	1.4	O K
480 Summer	0.5	0.5	24.9838	0.4837	1.3	O K
600 Summer	0.4	0.4	24.9413	0.4412	1.1	O K
720 Summer	0.4	0.4	24.9063	0.4062	1.1	O K
15 Winter	0.6	0.6	25.0968	0.5968	1.6	O K
30 Winter	0.7	0.7	25.1983	0.6983	1.8	O K
60 Winter	0.7	0.7	25.2453	0.7453	1.9	O K
120 Winter	0.7	0.7	25.2128	0.7128	1.9	O K
180 Winter	0.6	0.6	25.1523	0.6523	1.7	O K
240 Winter	0.6	0.6	25.0958	0.5958	1.5	O K
360 Winter	0.5	0.5	25.0053	0.5052	1.3	O K
480 Winter	0.4	0.4	24.9393	0.4392	1.1	O K

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)
15 Summer	54.77	20
30 Summer	36.22	29
60 Summer	23.03	46
120 Summer	14.29	80
180 Summer	10.72	112
240 Summer	8.72	146
360 Summer	6.50	208
480 Summer	5.28	270
600 Summer	4.49	330
720 Summer	3.93	392
15 Winter	54.77	20
30 Winter	36.22	30
60 Winter	23.03	48
120 Winter	14.29	84
180 Winter	10.72	118
240 Winter	8.72	152
360 Winter	6.50	216
480 Winter	5.28	278

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Lone Barn Studios Stanbridge Lane Romsey SO51 0HE	Arundel Road Fontwell Soakaway So4-So5	
Date April 2019 File Soakaway So4 10yrs.SRC	Designed By KN Checked By	
Micro Drainage	Source Control W.11.2	

Summary of Results for 10 year Return Period

Storm Duration (mins)	Maximum Filtration (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Maximum Volume (m³)	Status
600 Winter	0.4	0.4	24.8893	0.3892	1.0	O K
720 Winter	0.3	0.3	24.8508	0.3507	0.9	O K

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)
600 Winter	4.49	340
720 Winter	3.93	402

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Micro Drainage	Source Control W.11.2	

Rainfall Details

Region	ENG+WAL	Cv (Summer)	0.750	Summer Storms	Yes
Return Period (years)	10	Cv (Winter)	0.840	Winter Storms	Yes
M5-60 (mm)	19.200	Shortest Storm (mins)	15	Climate Change %	+0
Ratio-R	0.345	Longest Storm (mins)	720		

Time / Area Diagram

Total Area (ha) = 0.016

Time from:	(mins) to:	Area (ha)	Time from:	(mins) to:	Area (ha)
0	4	0.000	4	8	0.016

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Micro Drainage	Source Control W.11.2	

Trench Soakaway Details

Infil Coef - Base (m/hr)	0.000000	Length (m)	5.0
Infil Coef - Sides (m/hr)	0.273300	Invert Level (m)	24.500
Safety Factor	1.0	Cover Level (m)	25.700
Porosity	0.40	Slope (1:x)	0.0
Width (m)	1.3		

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Micro Drainage	Source Control W.11.2	

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 33 minutes

Storm Duration (mins)	Maximum Filtration (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Maximum Volume (m³)	Status
15 Summer	1.2	1.2	25.7173	1.2173	3.2	O K
30 Summer	1.4	1.4	25.9542	1.4542	3.8	O K
60 Summer	1.5	1.5	26.1037	1.6037	4.2	O K
120 Summer	1.5	1.5	26.1007	1.6007	4.2	O K
180 Summer	1.4	1.4	26.0072	1.5072	3.9	O K
240 Summer	1.3	1.3	25.9032	1.4032	3.6	O K
360 Summer	1.2	1.2	25.7313	1.2313	3.2	O K
480 Summer	1.1	1.1	25.5998	1.0998	2.9	O K
600 Summer	1.0	1.0	25.4958	0.9958	2.6	O K
720 Summer	0.9	0.9	25.4108	0.9108	2.4	O K
15 Winter	1.3	1.3	25.8672	1.3672	3.6	O K
30 Winter	1.6	1.6	26.1292	1.6292	4.2	O K
60 Winter	1.7	1.7	26.2592	1.7592	4.6	O K
120 Winter	1.6	1.6	26.1827	1.6827	4.4	O K
180 Winter	1.5	1.5	26.0302	1.5302	4.0	O K
240 Winter	1.3	1.3	25.8847	1.3847	3.6	O K
360 Winter	1.1	1.1	25.6593	1.1593	3.0	O K
480 Winter	1.0	1.0	25.4988	0.9988	2.6	O K

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)
15 Summer	125.44	20
30 Summer	84.53	29
60 Summer	54.37	46
120 Summer	33.76	80
180 Summer	25.15	112
240 Summer	20.26	146
360 Summer	14.92	208
480 Summer	12.00	270
600 Summer	10.13	330
720 Summer	8.81	392
15 Winter	125.44	20
30 Winter	84.53	30
60 Winter	54.37	48
120 Winter	33.76	84
180 Winter	25.15	118
240 Winter	20.26	152
360 Winter	14.92	216
480 Winter	12.00	278

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Lone Barn Studios Stanbridge Lane Romsey SO51 0HE	Arundel Road Fontwell Soakaway So4-So5	
Date April 2019 File Soakaway So4 100+40%.SRC	Designed By KN Checked By	
Micro Drainage	Source Control W.11.2	

Summary of Results for 100 year Return Period (+40%)

Storm Duration (mins)	Maximum Filtration (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Maximum Volume (m³)	Status
600 Winter	0.8	0.8	25.3788	0.8788	2.3	OK
720 Winter	0.8	0.8	25.2863	0.7863	2.0	OK

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)
600 Winter	10.13	340
720 Winter	8.81	402

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Lone Barn Studios Stanbridge Lane Romsey SO51 0HE	Arundel Road Fontwell Soakaway So4-So5	
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Micro Drainage	Source Control W.11.2	

Rainfall Details

Region	ENG+WAL	Cv (Summer)	0.750	Summer Storms	Yes
Return Period (years)	100	Cv (Winter)	0.840	Winter Storms	Yes
M5-60 (mm)	19.200	Shortest Storm (mins)	15	Climate Change %	+40
Ratio-R	0.345	Longest Storm (mins)	720		

Time / Area Diagram

Total Area (ha) = 0.016

Time from:	(mins) to:	Area (ha)	Time from:	(mins) to:	Area (ha)
0	4	0.000	4	8	0.016

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Micro Drainage	Source Control W.11.2	

Trench Soakaway Details

Infil Coef - Base (m/hr)	0.000000	Length (m)	5.0
Infil Coef - Sides (m/hr)	0.273300	Invert Level (m)	24.500
Safety Factor	1.0	Cover Level (m)	26.500
Porosity	0.40	Slope (1:x)	0.0
Width (m)	1.3		

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Lone Barn Studios Stanbridge Lane Romsey SO51 0HE	Arundel Road Fontwell Soakaway So6-So8	
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Micro Drainage	Source Control W.11.2	

Summary of Results for 10 year Return Period

Half Drain Time : 72 minutes

Storm Duration (mins)	Maximum Filtration (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Maximum Volume (m³)	Status
15 Summer	0.2	0.2	24.8478	0.3477	1.4	O K
30 Summer	0.3	0.3	24.9323	0.4322	1.8	O K
60 Summer	0.3	0.3	24.9892	0.4892	2.0	O K
120 Summer	0.3	0.3	25.0263	0.5262	2.1	O K
180 Summer	0.3	0.3	25.0318	0.5317	2.2	O K
240 Summer	0.3	0.3	25.0258	0.5257	2.1	O K
360 Summer	0.3	0.3	25.0027	0.5027	2.1	O K
480 Summer	0.3	0.3	24.9763	0.4762	1.9	O K
600 Summer	0.3	0.3	24.9507	0.4507	1.8	O K
720 Summer	0.3	0.3	24.9278	0.4277	1.7	O K
15 Winter	0.2	0.2	24.8903	0.3902	1.6	O K
30 Winter	0.3	0.3	24.9862	0.4862	2.0	O K
60 Winter	0.3	0.3	25.0498	0.5497	2.2	O K
120 Winter	0.4	0.4	25.0823	0.5822	2.4	O K
180 Winter	0.4	0.4	25.0768	0.5767	2.4	O K
240 Winter	0.4	0.4	25.0593	0.5592	2.3	O K
360 Winter	0.3	0.3	25.0178	0.5177	2.1	O K
480 Winter	0.3	0.3	24.9773	0.4772	1.9	O K

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)
15 Summer	54.77	22
30 Summer	36.22	35
60 Summer	23.03	56
120 Summer	14.29	88
180 Summer	10.72	122
240 Summer	8.72	156
360 Summer	6.50	222
480 Summer	5.28	288
600 Summer	4.49	352
720 Summer	3.93	416
15 Winter	54.77	21
30 Winter	36.22	35
60 Winter	23.03	60
120 Winter	14.29	94
180 Winter	10.72	130
240 Winter	8.72	166
360 Winter	6.50	236
480 Winter	5.28	304

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Lone Barn Studios Stanbridge Lane Romsey SO51 0HE	Arundel Road Fontwell Soakaway So6-So8	
Date April 2019 File Soakaway So6 10yrs.SRC	Designed By KN Checked By	
Micro Drainage	Source Control W.11.2	

Summary of Results for 10 year Return Period

Storm Duration (mins)	Maximum Filtration (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Maximum Volume (m³)	Status
600 Winter	0.3	0.3	24.9418	0.4417	1.8	O K
720 Winter	0.3	0.3	24.9108	0.4107	1.7	O K

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)
600 Winter	4.49	368
720 Winter	3.93	432

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Lone Barn Studios Stanbridge Lane Romsey SO51 0HE	Arundel Road Fontwell Soakaway So6-So8	
Date April 2019 File Soakaway So6 10yrs.SRC	Designed By KN Checked By	
Micro Drainage	Source Control W.11.2	

Rainfall Details

Region	ENG+WAL	Cv (Summer)	0.750	Summer Storms	Yes
Return Period (years)	10	Cv (Winter)	0.840	Winter Storms	Yes
M5-60 (mm)	19.200	Shortest Storm (mins)	15	Climate Change %	+0
Ratio-R	0.345	Longest Storm (mins)	720		

Time / Area Diagram

Total Area (ha) = 0.015

Time from:	(mins) to:	Area (ha)	Time from:	(mins) to:	Area (ha)
0	4	0.000	4	8	0.015

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Lone Barn Studios Stanbridge Lane Romsey SO51 0HE	Arundel Road Fontwell Soakaway So6-So8	
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Micro Drainage	Source Control W.11.2	

Trench Soakaway Details

Infil Coef - Base (m/hr)	0.000000	Length (m)	6.0
Infil Coef - Sides (m/hr)	0.148530	Invert Level (m)	24.500
Safety Factor	1.0	Cover Level (m)	25.500
Porosity	0.40	Slope (1:x)	0.0
Width (m)	1.7		

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Lone Barn Studios Stanbridge Lane Romsey SO51 0HE	Arundel Road Fontwell Soakaway So6-So8	
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Micro Drainage	Source Control W.11.2	

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 72 minutes

Storm Duration (mins)	Maximum Filtration (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Maximum Volume (m³)	Status
15 Summer	0.5	0.5	25.2968	0.7968	3.3	O K
30 Summer	0.6	0.6	25.5093	1.0093	4.1	O K
60 Summer	0.7	0.7	25.6553	1.1553	4.7	O K
120 Summer	0.8	0.8	25.7428	1.2428	5.1	O K
180 Summer	0.8	0.8	25.7473	1.2473	5.1	O K
240 Summer	0.8	0.8	25.7218	1.2218	5.0	O K
360 Summer	0.7	0.7	25.6528	1.1528	4.7	O K
480 Summer	0.7	0.7	25.5823	1.0823	4.4	O K
600 Summer	0.6	0.6	25.5173	1.0173	4.2	O K
720 Summer	0.6	0.6	25.4593	0.9593	3.9	O K
15 Winter	0.6	0.6	25.3938	0.8938	3.6	O K
30 Winter	0.7	0.7	25.6353	1.1353	4.6	O K
60 Winter	0.8	0.8	25.7983	1.2982	5.3	O K
120 Winter	0.9	0.9	25.8747	1.3747	5.6	O K
180 Winter	0.9	0.9	25.8527	1.3527	5.5	O K
240 Winter	0.8	0.8	25.8003	1.3002	5.3	O K
360 Winter	0.8	0.8	25.6878	1.1878	4.8	O K
480 Winter	0.7	0.7	25.5858	1.0858	4.4	O K

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)
15 Summer	125.44	22
30 Summer	84.53	35
60 Summer	54.37	56
120 Summer	33.76	88
180 Summer	25.15	122
240 Summer	20.26	156
360 Summer	14.92	222
480 Summer	12.00	288
600 Summer	10.13	352
720 Summer	8.81	416
15 Winter	125.44	21
30 Winter	84.53	35
60 Winter	54.37	60
120 Winter	33.76	94
180 Winter	25.15	130
240 Winter	20.26	166
360 Winter	14.92	236
480 Winter	12.00	304

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Date April 2019 File Soakaway So6 100+40%.SRC	Designed By KN Checked By	
Micro Drainage	Source Control W.11.2	

Summary of Results for 100 year Return Period (+40%)

Storm Duration (mins)	Maximum Filtration (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Maximum Volume (m³)	Status
600 Winter	0.6	0.6	25.4968	0.9968	4.1	O K
720 Winter	0.6	0.6	25.4208	0.9208	3.8	O K

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)
600 Winter	10.13	368
720 Winter	8.81	432

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Lone Barn Studios Stanbridge Lane Romsey SO51 0HE	Arundel Road Fontwell Soakaway So6-So8	
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Micro Drainage	Source Control W.11.2	

Rainfall Details

Region	ENG+WAL	Cv (Summer)	0.750	Summer Storms	Yes
Return Period (years)	100	Cv (Winter)	0.840	Winter Storms	Yes
M5-60 (mm)	19.200	Shortest Storm (mins)	15	Climate Change %	+40
Ratio-R	0.345	Longest Storm (mins)	720		

Time / Area Diagram

Total Area (ha) = 0.015

Time from:	(mins) to:	Area (ha)	Time from:	(mins) to:	Area (ha)
0	4	0.000	4	8	0.015

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Date April 2019 File Soakaway So6 100+40%.SRC	Designed By KN Checked By	
Micro Drainage	Source Control W.11.2	

Trench Soakaway Details

Infil Coef - Base (m/hr)	0.000000	Length (m)	6.0
Infil Coef - Sides (m/hr)	0.148530	Invert Level (m)	24.500
Safety Factor	1.0	Cover Level (m)	26.200
Porosity	0.40	Slope (1:x)	0.0
Width (m)	1.7		



**Arundel Road,
Fontwell**

SuDS Operations & Maintenance Manual

Prepared by:

Escher Silverman

Roughton, A2 Omega Park,
Electron Way, Chandlers Ford,
Hampshire. SO53 4SE

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Reviewed by Kevin Mitchell Signed:
I Eng, FIHIE Date: 1

Revision	Description	Date	Initials
O	Initial issue	May 2019	KN

1.0 INTRODUCTION

- 1.1 Regular inspection and maintenance is important for the effective operation of the SuDS drainage features across the development.
- 1.2 The following SuDS features have been designed into the development to control the surface water run-off created through the construction of areas such as roofs, drives and roads.
- Permeable Pavements (block paving)
 - Discharge Soakaways
- 1.3 In order to ensure the continued effective operation of the SuDS features maintenance regimes have been provided for each of the above features.
- 1.4 This document has been prepared at the design stage and should be considered as part of an evolving process. Following construction as built information and drawings should be included. The post construction information should include drawings detailing the extent and location of SuDS features together with relevant manufacturer's details.
- 1.5 The following maintenance regimes should be amended/updated to suit specific manufacturer's requirements for the various components installed.
- 1.6 The following appendices have been included to allow for additional information and records to be included post construction.
- **Appendix A** As built Information
 - **Appendix B** Manufacturer's Information
 - **Appendix C** Inspection Records
 - **Appendix D** Maintenance Regime Monitoring and Amendments

-
- 1.7 It should also be recognised that for a maintenance regime to continue to be appropriate and fit for purpose a constant monitoring ethos should be adopted and any corrective measures implemented to ensure that the correct maintenance regimes going forward are in place. Inspection records should be kept and used as a basis for the determining the suitability of the maintenance regimes and the areas of the development requiring attention.
- 1.8 Upon completion of the development, a management company will be formed, with residents of the development comprising the board of directors. The management company will appoint a managing agent who will be responsible for maintaining all communal aspects of the development, including SUDS. The obligations of the Management Company will be funded by an annual contribution from the residents of the development. This manual will form part of the brief provided to the management agents, who will use it to calculate fees which will be paid by residents.
- 1.9 At the end of the manufacturer's recommended design life for all SUDs components they shall be replaced at the Management Company's expense to the satisfaction of the Planning Authority.

2.0 PERMEABLE PAVEMENTS

- 2.1 Permeable pavements have been provided around the development to infiltrate water down through the sub base and into the substrata.
- 2.2 Permeable pavements need to be regularly cleaned of silt and other sediments to preserve their infiltration capacity. Extensive experience suggests that sweeping once per year should be sufficient to maintain an acceptable infiltration rate on most sites.
- 2.3 A maintenance regime has been prepared for the development as indicated in Table 1 below.
- 2.4 Inspection reports should be kept and the maintenance regime for the permeable paving should be adjusted, if necessary, to suit ongoing site-specific circumstances as they arise.
- 2.5 A brush and suction cleaner (which can be a lorry-mounted device or a smaller precinct sweeper) should be used for regular sweeping. Care should be taken in adjusting vacuuming equipment to avoid removal of jointing material. Any lost material should be replaced. It is also possible to clean the surface using lightweight rotating brush cleaners combined with power spraying using hot water.
- 2.6 If the surface has clogged then a more specialist sweeper with water jetting and oscillating and rotating brushes may be required.
- 2.7 Proprietary permeable surfacing to be jet washed to remove sediment.

Table 1: Operation and Maintenance Requirements - Permeable Pavements

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance.	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment.
	Permeable surfacing; power wash	Annually
	Empty silt traps	Once a year at the same time as the permeable paving is being cleaned.
Occasional maintenance.	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying.	As required – once per year on less frequently used pavements.
Remedial Actions.	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving.	As required.
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material.	As required.
	Rehabilitation of surface and upper substructure by remedial sweeping.	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging).
Monitoring.	Initial inspection.	Monthly for three months after installation.
	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action.	Three-monthly, 48hours after large storms in the first six months.
	Inspect silt accumulation rates and establish appropriate brushing frequencies.	Annually.
	Monitor silt taps.	At same frequency of permeable paving inspections.

3.0 SOAKAWAYS & CHANNEL DRAIN

- 3.1 The soakaways installed on site have been installed to assist in the reduction in the discharge rate of surface water discharge from the site and catch overland flows.
- 3.2 It is important that residents should be aware that no major planting, i.e. trees or bushes, should be planted adjacent to, or over the proposed soakaways. Residents should be issued with plans in their '*home welcome*' that accurately locates soakaways serving their property.

Table 2: Operation and Maintenance Requirements – Soakaways & Channel Drain.

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance.	Inspect for sediment and debris in pre-treatment components and floor of inspection tube.	Annually.
	Trimming any roots that may be causing blockages.	Annually (or as required).
Occasional maintenance.	Remove sediment and debris from pre-treatment components and floor of inspection tube.	As required, based on inspections.
Remedial actions.	Reconstruct soakaway and/or replace or clean void fill, if performance deteriorates.	As required.
	Replacement of clogged geotextile (will require reconstruction of soakaway).	As required.
Monitoring.	Inspect silt traps and note rate of sediment accumulation.	Monthly in the first year and then annually.
	Drainage channel to be inspected	Leaves to be removed from drainage cover during the Autumn period. Channel to be cleaned annually when silt traps and pervious paving cleaned.

Appendix A

Appendix B

Appendix C

Appendix D

Monitoring and Review Table

Revision	Revision Description	Date	Initials