

Project Name:	The Lillies, Horton Heath, Southampton
Document Reference:	056.5043/DTN/2
Document Name:	Drainage Technical Note
Prepared By:	Claire Pritchard (May 2022)
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1. INTRODUCTION

- 1.1 This Drainage Technical Note has been prepared by Paul Basham Associates on behalf of Foreman Homes to support a Planning Application at the site located at The Lillies, Horton Heath, Southampton. The nearest post code for the site is SO50 7QH. The site location is shown indicatively by the red line boundary within **Figure 1**.

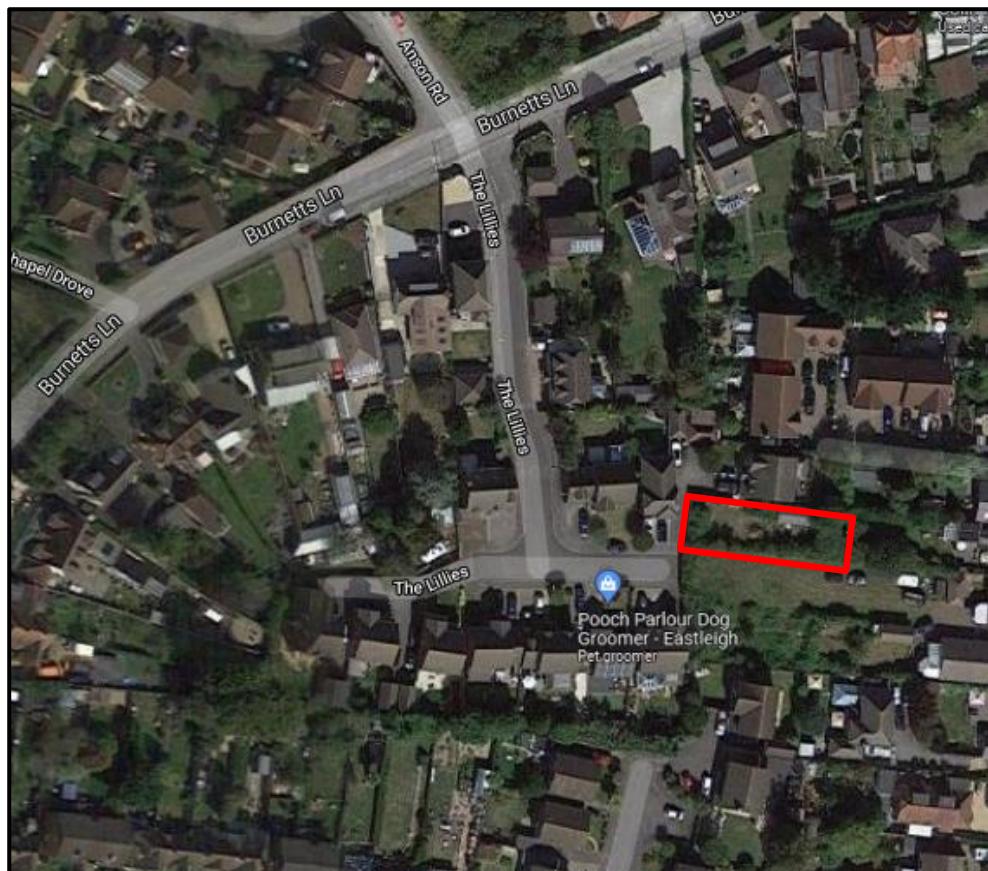


Figure 1: Site Location Plan

- 1.2 The proposed development comprises one 3-bedroom residential dwelling with associated hard and soft landscaping. The existing site is currently brownfield and is in the rear garden of an existing dwelling. The development is classed as More Vulnerable under the Nation Planning Policy Framework (NPPF) Table 2: Flood Risk Vulnerability Classification.
- 1.3 As such, it is deemed to be an appropriate development for Flood Zone 1 under the NPPF Table 3: Flood Risk Vulnerability and Flood Zone Compatibility.
- 1.4 The site assessed within this Drainage Technical Note is shown indicatively by the red line boundary within **Figure 1**. It is a small piece of land circa 360m² in size. Horton Heath is situated approximately 2.36km north of Hedge End Village, 3km west of Durley and 1.5km south of the village of Fair Oak. The proposed site layout can be found in **Appendix A**.

2. SITE GEOLOGY

- 2.1 A review of the British Geological Survey (BGS) mapping shows that the site is underlain by Wittering Sand formation – Sand, Silt, and Clay. Sedimentary bedrock formed approximately 41 to 56 million years ago in the Palaeogene Period. A local environment previously dominated by shallow seas.

These sedimentary bedrocks are shallow marine in origin. They are detrital, ranging from coarse-to-fine grained (locally with some carbonate content) forming interbedded sequences.

- 2.2 No superficial deposits have been recorded at this site.

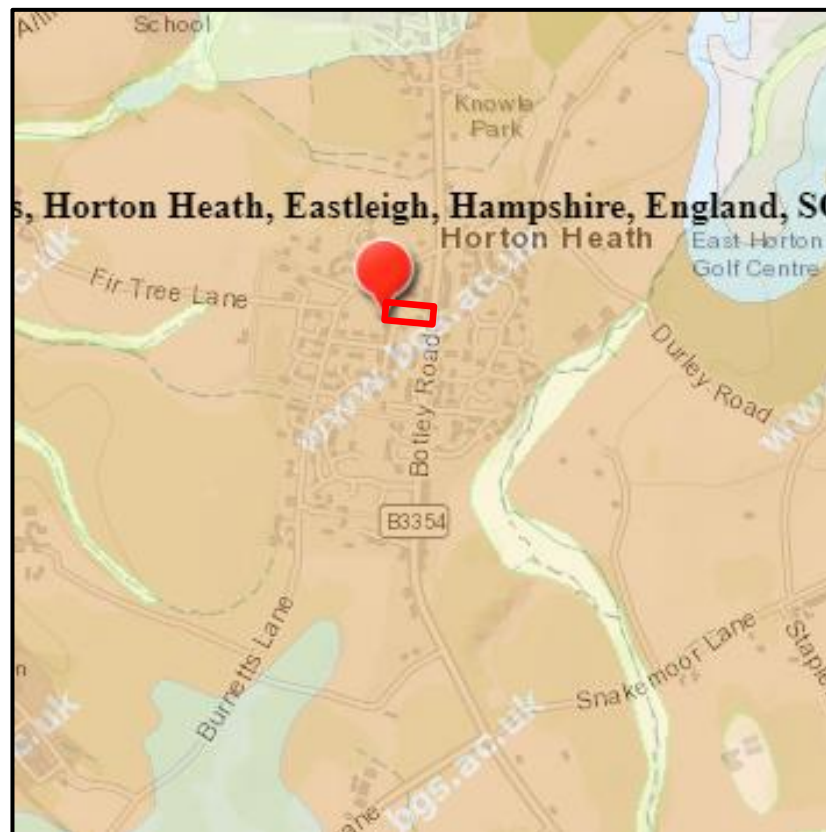


Figure 2: British Geological Survey Mapping.

- 2.3 The Environment Agency online ground water mapping uses the same BGS base information and classifies the site as a Secondary A Aquifer, which is defined as comprising permeable layers that can support local water supplies, and may form an important source of base flow to rivers.

3. FLOOD RISK

- 3.1 Flood plain mapping provided by the Environment Agency indicates that the site lies wholly within Flood Zone 1. Flood Zone 1 is defined as land assessed as having less than 1 in 1000 annual probability of river flooding (0.1%), refer to **Figure 3** below.



Figure 3: Flood Zone Mapping

Long Term Flood Risk

- 3.2 The long-term flood risk mapping shows that each year the proposed development site is outside the risk of long-term flooding from rivers, seas and reservoirs which is reflected in the Flood Zone Mapping below in **Figure 4**.

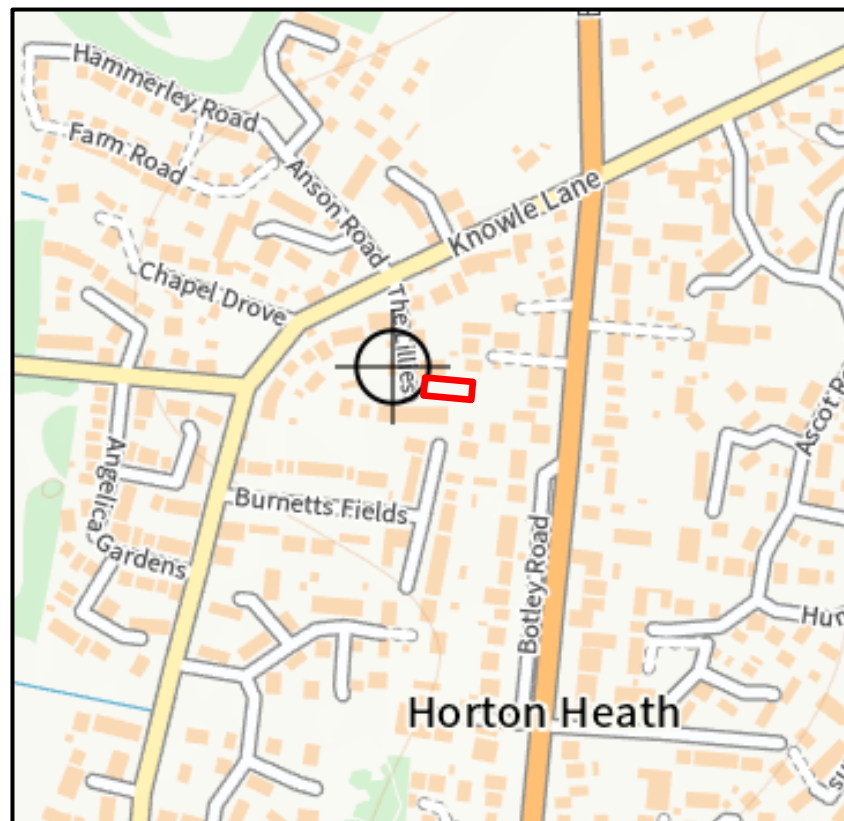


Figure 4: Flood risk from rivers, seas, and reservoirs.

Surface Water Flooding

- 3.3 Surface water or “pluvial” flooding results from rainfall running over ground before entering a watercourse or sewer. It is usually associated with high intensity rainfall events but can also occur with lower intensity rainfall or melting snow where the ground is already fully saturated, frozen, developed (for example, in an urban setting), or land that has low permeability.
- 3.4 The Environment Agency Flooding from Surface Water Map is shown overleaf in **Figure 5** and indicates that the site has a Very Low risk of surface water flooding, meaning that it has a chance of flooding which is less than 0.1% annually.



Figure 5: Flood risk from surface water flooding

- 3.5 However, flooding from surface water is difficult to predict as rainfall location and volume are difficult to forecast. In addition, local features can greatly affect the chance and severity of flooding.

4. EXISTING DRAINAGE

Surface Water

- 4.1 There are no existing surface water sewers within the vicinity of the proposed development site. A copy of the obtained Sewer Mapping Records from Southern Water can be found within **Appendix B**.
- 4.2 Greenfield run-off rates have been estimated using Micro-Drainage. Full copy of the calculations can be found in **Appendix C**. The QBAR run-off rate has been summarised below in **Table 1**.

Results	l/s
QBAR Rural	0.1
QBAR Urban	0.1
Q100 years	0.2
Q1 year	0.1
Q30 years	0.2
Q100 years	0.2

Table 1: Existing Qbar run-off rates

Foul water

- 4.3 There are three existing foul water networks within the vicinity of the proposed development site. A copy of the obtained Sewer Mapping Records from Southern Water can be found within **Appendix B**.
- 4.4 One existing network can be found in the carriageway adjacent to “Appledore” Cottage which is to the west of the proposed development site and consists of a 150mm diameter vitrified clay pipe.
- 4.5 The second existing network is assumed to run adjacent to “Carolina” which is opposite the proposed development site. A drainage survey will be required prior to commencement of works to confirm the existence and directional flow of the sewer.
- 4.6 The third existing network can be found in Burnetts Gardens approximately 40m to the south of the proposed development site. Again, it comprises a 150mm diameter vitrified clay pipe.

- 4.7 The fourth existing network can be found within Botley Road (B3354) approximately 86m to the east of the proposed development site. Again, it comprises a 150mm diameter vitrified clay pipe.

5. DRAINAGE STRATEGY

Proposed Surface Water Strategy

- 5.1 The proposed drainage strategy has been designed to cater for a 1:100yr storm event with a 10% allowance for urban creep, a 3m x 3m patio, and 40% for Climate Change events.
- 5.2 Infiltration testing has been carried out on-site and completed by DF Groundworks. A copy of the received infiltration rates can be found in **Appendix D**.
- 5.3 Based on the achieved infiltration rates, the scheme has been designed using 1.104×10^{-6} (0.039m/hr).
- 5.4 It is proposed that the dwelling will discharge into one gravel filled infiltration trench located in the rear garden sized at 3 x 6 x 1.6m. A copy of the Micro-Drainage calculations supporting this design can be found in **Appendix E**.
- 5.5 The proposed private drive and parking area is to be constructed of permeable block paving with a construction depth of 650mm below existing ground level. This is designed to intercept any surface water run-off running into the highway, which will then permeate through prior to discharging into the ground at source.

Proposed Foul Water Strategy

- 5.6 It is proposed to connect to the existing foul water network via a Section 106 Agreement with Southern Water. The foul water will drain from the proposed dwelling into a drainage network located to the front of the property - adjacent to the property named "Carolina".
- 5.7 A drainage survey to ascertain true cover and invert levels of the foul water sewer network are to be undertaken prior to making a connection and seeking a Section 106 approval.
- 5.8 Based on the Sewers for Adoption 7th Edition allowance of 4000 litres of water per property per day, foul water will be discharged from site at 0.05l/s for the proposed development of 1 residential dwelling.
- 5.9 Sewers for Adoption 7th Edition states that a pipe of 100mm diameter is to be specified in design for 10 properties or less.
- 5.10 The sewer mapping information provided was dated 2014, it may be that additional sewer pipes are now present within the carriageway. Additional information such as cover and invert levels for the existing network will also be required to confirm whether the required gradients can be achieved.

6. MAINTENANCE AND MANAGEMENT STRATEGY

- 6.1 This section sets out the inspection and maintenance requirements for long term management of the developments surface water drainage strategy.

Permeable Paving

- 6.2 The permeable pavement system proposed for the proposed parking areas and driveways on-site is a Type B (total infiltration) system and is designed for full infiltration and allowing the rainwater to infiltrate through the surface and the structural layers into the underlying ground. A typical total infiltration permeable pavement detail is shown in **Figure 6**. Design details are shown in drawing 056.5043.0501

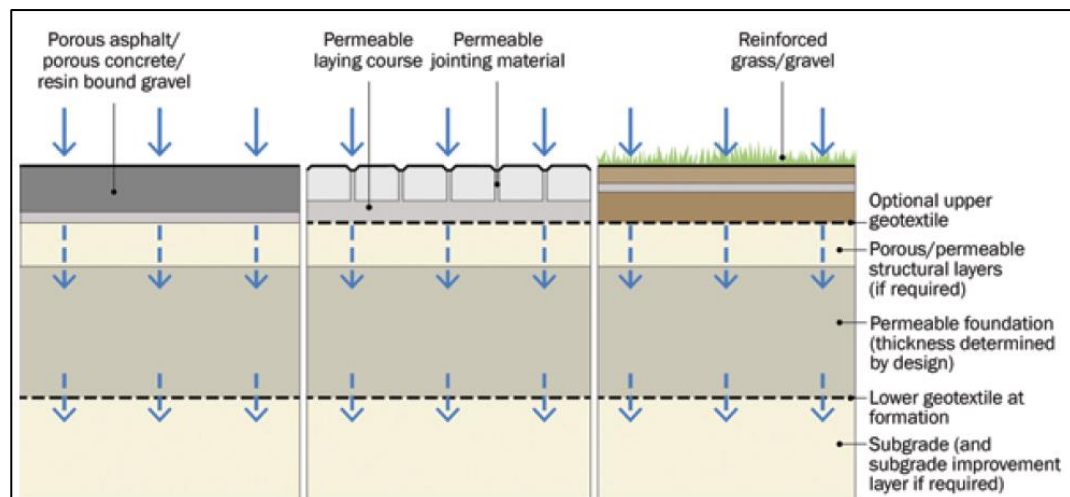


Figure 6: Typical total infiltration permeable pavement system detail

- 6.3 The proposed maintenance regime for the permeable pavement is shown overleaf.

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 permeable surface from adjacent impermeable areas as this area is most likely to collect the most sediment.
Occasional Maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glysophate applied directly onto 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 50mm 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, 48h after large storms in first 6 months
	Inspect silt accumulation rates and establish appropriate brushing frequencies.	Annually
	Monitor inspection chambers	Annually

Table 2: Proposed maintenance regime for permeable pavement

- 6.4 The responsibility for the maintenance of the permeable block paving would be with the landowner as the paving lies within the curtilage of the property.

Gravel Infiltration Trench

- 6.5 Filter drains/ trenches as shallow trenches filled with stone/ gravel that create temporary subsurface storage for the attenuation, conveyance and infiltration of surface water run-off. An indicative plan can be seen below in **Figure 7**.

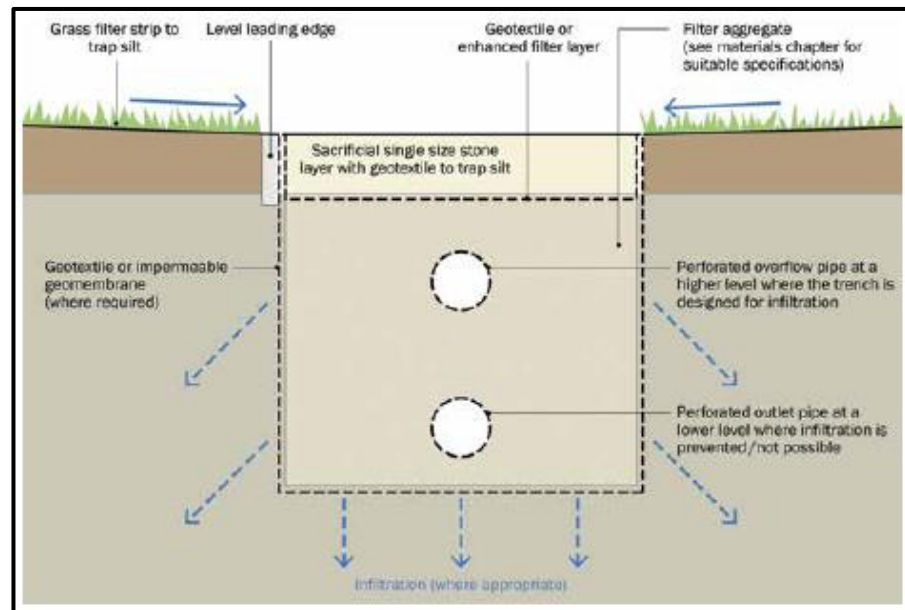


Figure 7: Typical total infiltration permeable pavement system detail

6.6 The proposed maintenance regime for the permeable pavement is shown below.

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Remove litter (including leaf litter) and debris from filter drain surface, access chambers and pre-treatment devices	Monthly (or as required)
	Inspect filter drain surface, inlet/outlet pipework and control systems for blockages, clogging, standing water and structural damage	Monthly
	Inspect pre-treatment systems, inlets, and perforated pipework for silt accumulation, and establish appropriate silt removal frequencies	Bi-annually
	Remove sediment from pre-treatment devices	Bi-annually (or as required)
Occasional Maintenance	Remove or control tree roots where they are encroaching the sides of the infiltration trench using recommended methods (eg. NJUG 2007, or BS 3998:2010)	As required
	At locations with high pollution loads, remove surface geotextile and replace, and wash or replace overlying filter medium	Five yearly (or as required)
	Clear perforated pipework or blockages	As required

Table 3: Proposed maintenance regime for gravel infiltration trench

6.7 The responsibility for the maintenance of the permeable block paving would be with the landowner as the gravel infiltration trench lies within the curtilage of the property.

7. WATER QUALITY

7.1 Table 4, Table 5 and Table 6 are extracted from the SuDS manual and demonstrate the pollution risks associated with various discharge situations. These indices can be used to assess the water quality at the outlet of the surface water system using the Water Quality SuDS Toolkit.

TABLE 26.2 Pollution hazard indices for different land use classifications				
Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydrocarbons
Residential roofs	Very low	0.2	0.2	0.05
Other roofs (typically commercial/ industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways ¹	Medium	0.7	0.6	0.7
Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways ¹	High	0.8 ²	0.8 ²	0.9 ²

Table 4: Table 26.2 of the SuDS Manual

TABLE 26.3 Indicative SuDS mitigation indices for discharges to surface waters			
Type of SuDS component	Mitigation indices ¹		
	TSS	Metals	Hydrocarbons
Filter strip	0.4	0.4	0.5
Filter drain	0.4 ²	0.4	0.4
Swale	0.5	0.6	0.6
Bioretention system	0.8	0.8	0.8
Permeable pavement	0.7	0.6	0.7
Detention basin	0.5	0.5	0.6
Pond ⁴	0.7 ³	0.7	0.5
Wetland	0.8 ³	0.8	0.8
Proprietary treatment systems ^{5,6}	These must demonstrate that they can address each of the contaminant types to acceptable levels for frequent events up to approximately the 1 in 1 year return period event, for inflow concentrations relevant to the contributing drainage area.		

Table 5: Table 26.3 of the SuDS Manual

TABLE 26.4 Indicative SuDS mitigation indices for discharges to groundwater

Characteristics of the material overlying the proposed infiltration surface, through which the runoff percolates ¹	TSS	Metals	Hydrocarbons
A layer of dense vegetation underlain by a soil with good contaminant attenuation potential ² of at least 300 mm in depth ³	0.6 ⁴	0.5	0.6
A soil with good contaminant attenuation potential ² of at least 300 mm in depth ³	0.4 ⁴	0.3	0.3
Infiltration trench (where a suitable depth of filtration material is included that provides treatment, ie graded gravel with sufficient smaller particles but not single size coarse aggregate such as 20 mm gravel) underlain by a soil with good contaminant attenuation potential ² of at least 300 mm in depth ³	0.4 ⁴	0.4	0.4
Constructed permeable pavement (where a suitable filtration layer is included that provides treatment, and including a geotextile at the base separating the foundation from the subgrade) underlain by a soil with good contaminant attenuation potential ² of at least 300 mm in depth ³	0.7	0.6	0.7
Bioretention underlain by a soil with good contaminant attenuation potential ² of at least 300 mm in depth ³	0.8 ⁴	0.8	0.8
Proprietary treatment systems ^{5, 6}	These must demonstrate that they can address each of the contaminant types to acceptable levels for inflow concentrations relevant to the contributing drainage area.		

Table 6: Table 26.4 of the SuDS Manual

- 7.2 Using the Water Quality Toolkit see **Table 7**, all systems of surface water drainage have been assessed, the results of which are summarised in **Table 7** below. For full calculations, please refer to **Appendix G**.

Runoff	SuDS Component	Water Quality result from toolkit
Residential roofing	Gravel infiltration trench	<i>Sufficient</i>
Individual Driveways	Permeable block paving	<i>Sufficient</i>

Table 7: Water Quality Toolkit results

8. CONCLUSION AND RECOMMENDATIONS

- 8.1 This Drainage Technical Note has been prepared by Paul Basham Associates to support a planning application for land at The Lillies, Horton Heath. As long as the overall developed area red-line boundaries are outside of the flood zones and long-term flood risk areas, the development is suitable without the need for Sequential or Exception tests.
- 8.2 There is no increase of flood risk, either on site or downstream has been introduced as a result of the development and no additional flood reduction measures are required.
- 8.3 It has been identified that the site falls wholly within Flood Zone 1 and has a very low risk of flooding.
- 8.4 The drainage strategy employed will comprise the following:
- Infiltration System (Soakaway crate systems, permeable pavement systems where possible).
 - Connection to a piped network via Section 104 Agreement with Southern Water.
- 8.5 Proposals include a gravel infiltration trench sized at 6 x 3 x 1.6m in the rear garden and permeable pavement techniques in parking areas.
- 8.6 A Section 104 and Section 106 will need to be entered into with Southern Water prior to building a new pipe run in the carriageway and connecting into the existing Foul Water Sewer Network. All drainage up stream of the existing manhole is to remain private
- 8.7 Based on Sewers for Adoption 7th Edition allowance at 4000 litres of water per property per day, the foul water will be discharged from the site at 0.05l/s for the proposed 1 dwelling and be connected into the existing manhole ref: 4308
- 8.8 The foul water piped network shall be no smaller than 100mm diameter as per Sewers for Adoption 7th Edition.

Appendix A



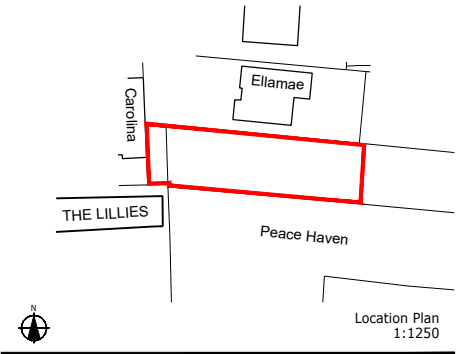
Please Note:

This drawing must not be scaled, dimensions to be checked on site and any discrepancies are to be highlighted to the Architect prior to construction.

Prior to the commencement of any works, the Contractor is to check and / or determine all construction details including checking existing site levels and dimensions.

This drawing is to be read in conjunction with all other project drawings, construction notes and / or project specifications including those by other project consultants and specialists. All discrepancies should be reported immediately.

Design subject to detail development / approval.
Measurements and accommodation schedules subject to amendments following coordinated input by others.
Costings cannot be finalised until approval /confirmation by relevant authorities and Client.



B	Amended to client's comments	16.02.21	VP/HJE
A	Amended to client's comments	03.02.21	VP/HJE
Rev.	Description	DATE	DB / CB

Date Jan '21
Drawn By/Checked By VP/HJE
Scale 1:500 @ A3

Revision B

Project Land at The Lillies, Horton Heath, Eastleigh

Title Location Plan and Site Plan

Dwg# 19.043.25.01

Status Planning

HGP

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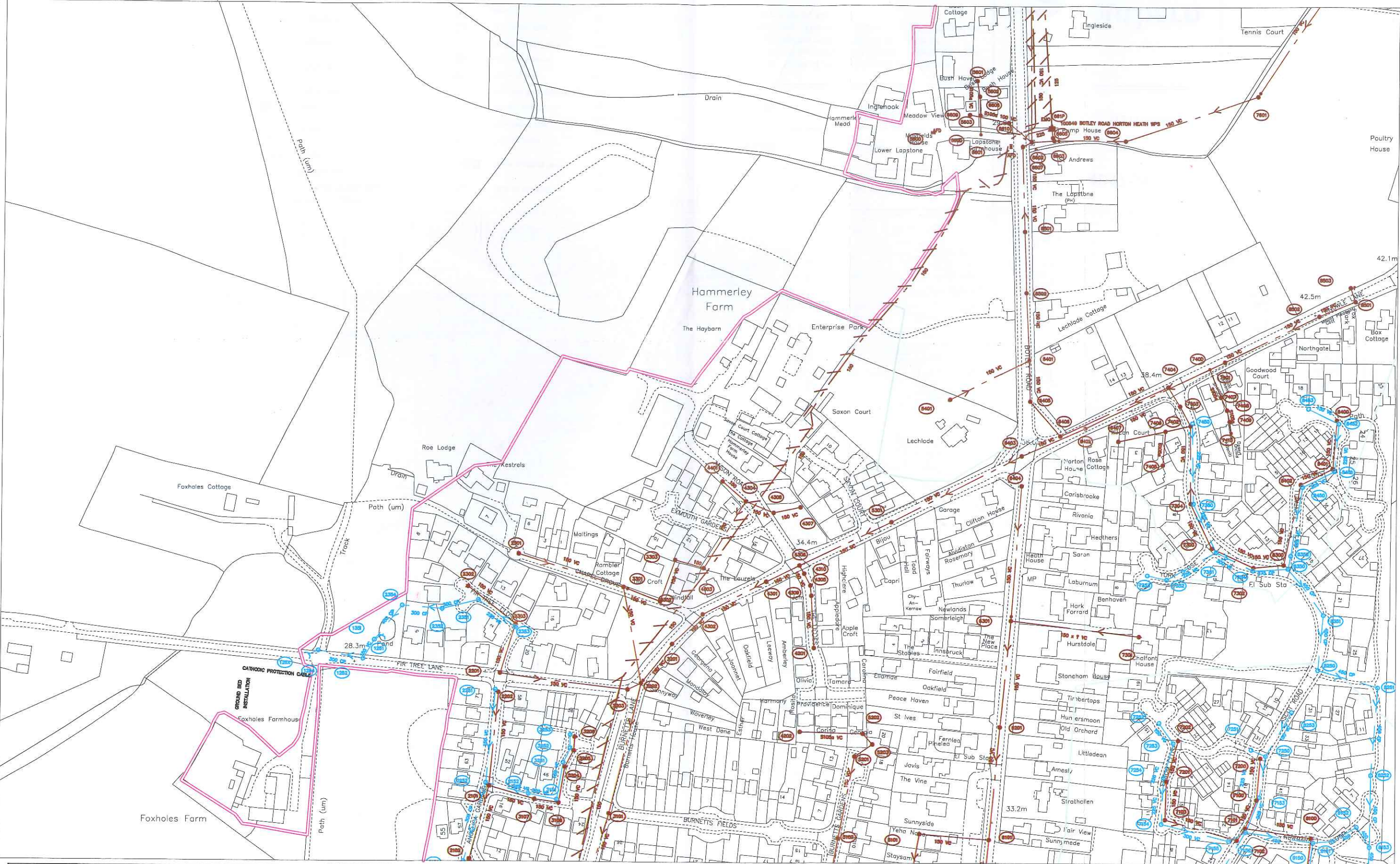
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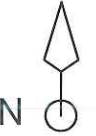
Appendix B

SEWER RECORDS PAGE 1 OF 2

117726



117148

O.S. REF. SU4917SW	Drawn by: goswama	The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site. WARNING: BAC pipes are constructed of Bonded Asbestos Cement WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement	 N	
	Scale: 1:2500			
Title: 185002_Hammerley Farm Burnetts	Date: 17/11/2014	Based upon Ordnance Survey Digital Data with the permission of the controller of H.M.S.O. Crown Copyright Reserved Licence No. WU 298530.		

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Appendix C

Paul Basham Associates		Page 1
Lancaster Court 8 Barnes Wallis Road Fareham PO15 5TU		
Date 28/09/2021 10:42 File	Designed by c.pritchard Checked by	
XP Solutions	Source Control 2014.1	

ICP SUDS Mean Annual Flood

Input

Return Period (years) 100 SAAR (mm) 800 Urban 0.000
Area (ha) 0.036 Soil 0.300 Region Number Region 7

Results 1/s

QBAR Rural 0.1
QBAR Urban 0.1

Q100 years 0.2

Q1 year 0.1
Q30 years 0.2
Q100 years 0.2

Appendix D

Percolation test results sheet

Site name: Location (Post Code): *THE LINGS Harrow Heath. SO50*

Contact Telephone number: *07818 574266*

Storm Event (Normally 1:100 Yr):

Climate Change % (Usually 40%):

(Once development has been completed) Roof area.....m² Hard standing.....m²

Test Pit 1

Length	Width	Depth
<i>1.6m</i>	<i>300mm</i>	<i>1.5m</i>

Percolation Test (date / start time)	Time taken to drain from 75%-25%
<i>¹ 20/08/2021 12.00 PM</i>	<i>27.2 Hrs</i>
<i>² 23/08/2021 10.00 AM</i>	<i>26.8 Hrs</i>
<i>³ 24/08/2021 15.00 PM</i>	<i>26.7 Hrs</i>

Test Pit 2

Length	Width	Depth
<i>1.2m</i>	<i>300mm</i>	<i>1.5m</i>

Percolation Test (date / start time)	Time taken to drain from 75%-25%
<i>¹ 20/08/2021 1.00 PM</i>	<i>27.6 Hrs</i>
<i>² 23/08/2021 10.30 AM</i>	<i>27.4 Hrs</i>
<i>³ 24/08/2021 15.30 PM</i>	<i>26.9 Hrs</i>

Appendix E

Paul Basham Associates		Page 1
Lancaster Court 8 Barnes Wallis Road Fareham PO15 5TU	056.5043 The Lillies Horton Heath Infiltration Crate	
Date 04.10.2021	Designed by C Pritchard	
File 056.5043 The Lillies - Infilt...	Checked by R Wilson	
XP Solutions	Source Control 2014.1	

Summary of Results for 30 year Return Period (+40%)

Half Drain Time : 1379 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	99.048	0.648	0.0	1.9	O K
30 min Summer	99.161	0.761	0.0	2.5	O K
60 min Summer	99.282	0.882	0.0	3.1	O K
120 min Summer	99.406	1.006	0.0	3.8	O K
180 min Summer	99.477	1.077	0.0	4.2	O K
240 min Summer	99.523	1.123	0.0	4.4	O K
360 min Summer	99.586	1.186	0.0	4.8	O K
480 min Summer	99.625	1.225	0.0	5.0	O K
600 min Summer	99.650	1.250	0.0	5.1	O K
720 min Summer	99.665	1.265	0.0	5.2	O K
960 min Summer	99.679	1.279	0.0	5.3	O K
1440 min Summer	99.685	1.285	0.0	5.3	O K
2160 min Summer	99.677	1.277	0.0	5.3	O K
2880 min Summer	99.658	1.258	0.0	5.2	O K
4320 min Summer	99.606	1.206	0.0	4.9	O K
5760 min Summer	99.550	1.150	0.0	4.6	O K
7200 min Summer	99.496	1.096	0.0	4.3	O K
8640 min Summer	99.446	1.046	0.0	4.0	O K
10080 min Summer	99.400	1.000	0.0	3.8	O K
15 min Winter	99.090	0.690	0.0	2.1	O K
30 min Winter	99.217	0.817	0.0	2.8	O K
60 min Winter	99.352	0.952	0.0	3.5	O K
120 min Winter	99.493	1.093	0.0	4.3	O K
180 min Winter	99.574	1.174	0.0	4.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Summer	101.215	0.0	19
30 min Summer	67.354	0.0	34
60 min Summer	42.916	0.0	64
120 min Summer	26.522	0.0	124
180 min Summer	19.777	0.0	182
240 min Summer	15.980	0.0	242
360 min Summer	11.837	0.0	362
480 min Summer	9.553	0.0	482
600 min Summer	8.084	0.0	602
720 min Summer	7.051	0.0	720
960 min Summer	5.678	0.0	934
1440 min Summer	4.179	0.0	1154
2160 min Summer	3.071	0.0	1540
2880 min Summer	2.466	0.0	1960
4320 min Summer	1.808	0.0	2768
5760 min Summer	1.450	0.0	3624
7200 min Summer	1.222	0.0	4400
8640 min Summer	1.063	0.0	5192
10080 min Summer	0.944	0.0	5960
15 min Winter	101.215	0.0	19
30 min Winter	67.354	0.0	33
60 min Winter	42.916	0.0	64
120 min Winter	26.522	0.0	122
180 min Winter	19.777	0.0	180

Paul Basham Associates		Page 2
Lancaster Court 8 Barnes Wallis Road Fareham PO15 5TU	056.5043 The Lillies Horton Heath Infiltration Crate	
Date 04.10.2021 File 056.5043 The Lillies - Infilt...	Designed by C Pritchard Checked by R Wilson	
XP Solutions	Source Control 2014.1	

Summary of Results for 30 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
240 min Winter	99.627	1.227	0.0	5.0	O K
360 min Winter	99.701	1.301	0.0	5.4	Flood Risk
480 min Winter	99.747	1.347	0.0	5.7	Flood Risk
600 min Winter	99.778	1.378	0.0	5.8	Flood Risk
720 min Winter	99.799	1.399	0.0	5.9	Flood Risk
960 min Winter	99.821	1.421	0.0	6.1	Flood Risk
1440 min Winter	99.823	1.423	0.0	6.1	Flood Risk
2160 min Winter	99.809	1.409	0.0	6.0	Flood Risk
2880 min Winter	99.779	1.379	0.0	5.8	Flood Risk
4320 min Winter	99.699	1.299	0.0	5.4	O K
5760 min Winter	99.615	1.215	0.0	4.9	O K
7200 min Winter	99.535	1.135	0.0	4.5	O K
8640 min Winter	99.463	1.063	0.0	4.1	O K
10080 min Winter	99.396	0.996	0.0	3.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
240 min Winter	15.980	0.0	240
360 min Winter	11.837	0.0	356
480 min Winter	9.553	0.0	472
600 min Winter	8.084	0.0	586
720 min Winter	7.051	0.0	700
960 min Winter	5.678	0.0	922
1440 min Winter	4.179	0.0	1312
2160 min Winter	3.071	0.0	1644
2880 min Winter	2.466	0.0	2104
4320 min Winter	1.808	0.0	3024
5760 min Winter	1.450	0.0	3872
7200 min Winter	1.222	0.0	4752
8640 min Winter	1.063	0.0	5536
10080 min Winter	0.944	0.0	6352

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Lancaster Court 8 Barnes Wallis Road Fareham PO15 5TU	056.5043 The Lillies Horton Heath Infiltration Crate	
Date 04.10.2021 File 056.5043 The Lillies - Infilt...	Designed by C Pritchard Checked by R Wilson	
XP Solutions	Source Control 2014.1	

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.900	Shortest Storm (mins)	15
Ratio R	0.350	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.010

Time (mins)	Area
From:	To: (ha)

0	4	0.010
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Lancaster Court 8 Barnes Wallis Road Fareham PO15 5TU	056.5043 The Lillies Horton Heath Infiltration Crate	
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XP Solutions Source Control 2014.1		

Model Details

Storage is Online Cover Level (m) 100.000

Infiltration Trench Structure

Infiltration Coefficient Base (m/hr)	0.00398	Trench Width (m)	3.0
Infiltration Coefficient Side (m/hr)	0.00398	Trench Length (m)	6.0
Safety Factor	1.0	Slope (1:X)	10.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	98.400	Cap Infiltration Depth (m)	0.000

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XP Solutions	Source Control 2014.1	

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

Half Drain Time : 825 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	99.646	0.296	0.1	2.1	O K
30 min Summer	99.698	0.348	0.1	2.9	O K
60 min Summer	99.745	0.395	0.1	3.8	Flood Risk
120 min Summer	99.788	0.438	0.1	4.6	Flood Risk
180 min Summer	99.810	0.460	0.1	5.0	Flood Risk
240 min Summer	99.822	0.472	0.1	5.2	Flood Risk
360 min Summer	99.838	0.488	0.1	5.5	Flood Risk
480 min Summer	99.844	0.494	0.1	5.7	Flood Risk
600 min Summer	99.846	0.496	0.1	5.7	Flood Risk
720 min Summer	99.847	0.497	0.1	5.7	Flood Risk
960 min Summer	99.846	0.496	0.1	5.7	Flood Risk
1440 min Summer	99.839	0.489	0.1	5.6	Flood Risk
2160 min Summer	99.823	0.473	0.1	5.2	Flood Risk
2880 min Summer	99.804	0.454	0.1	4.9	Flood Risk
4320 min Summer	99.768	0.418	0.1	4.2	Flood Risk
5760 min Summer	99.740	0.390	0.1	3.6	Flood Risk
7200 min Summer	99.716	0.366	0.1	3.2	Flood Risk
8640 min Summer	99.696	0.346	0.1	2.9	O K
10080 min Summer	99.677	0.327	0.1	2.6	O K
15 min Winter	99.666	0.316	0.1	2.4	O K
30 min Winter	99.721	0.371	0.1	3.3	Flood Risk
60 min Winter	99.772	0.422	0.1	4.3	Flood Risk
120 min Winter	99.820	0.470	0.1	5.2	Flood Risk
180 min Winter	99.846	0.496	0.1	5.7	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	131.128	0.0	19
30 min Summer	88.088	0.0	34
60 min Summer	56.422	0.0	64
120 min Summer	34.839	0.0	122
180 min Summer	25.861	0.0	182
240 min Summer	20.787	0.0	242
360 min Summer	15.300	0.0	362
480 min Summer	12.289	0.0	480
600 min Summer	10.359	0.0	582
720 min Summer	9.004	0.0	626
960 min Summer	7.211	0.0	750
1440 min Summer	5.263	0.0	1010
2160 min Summer	3.833	0.0	1408
2880 min Summer	3.056	0.0	1816
4320 min Summer	2.218	0.0	2596
5760 min Summer	1.764	0.0	3352
7200 min Summer	1.478	0.0	4112
8640 min Summer	1.279	0.0	4840
10080 min Summer	1.133	0.0	5552
15 min Winter	131.128	0.0	19
30 min Winter	88.088	0.0	33
60 min Winter	56.422	0.0	62
120 min Winter	34.839	0.0	120
180 min Winter	25.861	0.0	180

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

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
240 min Winter	99.861	0.511	0.1	6.0	Flood Risk
360 min Winter	99.880	0.530	0.1	6.3	Flood Risk
480 min Winter	99.889	0.539	0.1	6.5	Flood Risk
600 min Winter	99.894	0.544	0.1	6.6	Flood Risk
720 min Winter	99.895	0.545	0.1	6.6	Flood Risk
960 min Winter	99.891	0.541	0.1	6.5	Flood Risk
1440 min Winter	99.880	0.530	0.1	6.3	Flood Risk
2160 min Winter	99.856	0.506	0.1	5.9	Flood Risk
2880 min Winter	99.827	0.477	0.1	5.3	Flood Risk
4320 min Winter	99.773	0.423	0.1	4.3	Flood Risk
5760 min Winter	99.733	0.383	0.1	3.5	Flood Risk
7200 min Winter	99.702	0.352	0.1	3.0	Flood Risk
8640 min Winter	99.674	0.324	0.1	2.5	O K
10080 min Winter	99.651	0.301	0.1	2.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
240 min Winter	20.787	0.0	238
360 min Winter	15.300	0.0	354
480 min Winter	12.289	0.0	466
600 min Winter	10.359	0.0	578
720 min Winter	9.004	0.0	686
960 min Winter	7.211	0.0	876
1440 min Winter	5.263	0.0	1096
2160 min Winter	3.833	0.0	1540
2880 min Winter	3.056	0.0	1988
4320 min Winter	2.218	0.0	2768
5760 min Winter	1.764	0.0	3520
7200 min Winter	1.478	0.0	4320
8640 min Winter	1.279	0.0	5016
10080 min Winter	1.133	0.0	5752

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XP Solutions	Source Control 2014.1	

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.900	Shortest Storm (mins)	15
Ratio R	0.350	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.010

Time (mins)	Area
From:	To: (ha)

0	4	0.010
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XP Solutions	Source Control 2014.1	

Model Details

Storage is Online Cover Level (m) 100.000

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.00398	Width (m)	8.0
Membrane Percolation (mm/hr)	1000	Length (m)	8.0
Max Percolation (l/s)	17.8	Slope (1:X)	20.0
Safety Factor	1.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	99.350	Cap Volume Depth (m)	0.000

Appendix F

PLEASE NOTE THAT DESIGN LEVELS SHOWN ARE BASED ON
ARBITRARY DATUM. EXISTING MANHOLE COVER AND INVERT LEVELS
SHOULD BE CHECKED PRIOR TO MAKING A CONNECTION TO
ENSURE DRAINAGE GRADIENTS CAN BE ACHIEVED.
EXISTING SEWER NETWORKS HAVE BEEN DRAWN BASED ON
EXISTING SEWER INFORMATION OBTAINED FROM SOUTHERN WATER
DATED: 17/11/2014.
UP TO DATE INFORMATION INCLUDING MANHOLE SCHEDULE WILL BE
REQUIRED TO CONFIRM MANHOLE COVER AND INVERT LEVELS.

LEGEND

- | | |
|---|--|
|  | ADOPTABLE FOUL |
|  | FOUL WATER MANHOLE, TYPE SHOWN |
|  | ADOPTABLE SURFACE, 100# 1/100 U.N.O. |
|  | ACO-RAIN+SUMP |
|  | SURFACE WATER MANHOLE |
|  | RAIN WATER PIPE |
|  | RODDING EYE (LEVEL SHOWN IS INVERT) |
|  | GRAVEL INFILTRATION TRENCH (SIZE AS NOTED) |
|  | EXISTING SURFACE WATER |
|  | EXISTING FOUL WATER |
|  | EXISTING FOUL / SURFACE WATER MANHOLE, |
|  | PROPOSED PERMEABLE BLOCK PAVING |
|  | FINISHED FLOOR LEVEL |

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2. ANY VARIATIONS OR DISCREPANCIES BETWEEN THESE DRAWINGS IN TERMS OF DIMENSIONS OR DETAILS SHOULD BE DRAWN TO THE ATTENTION OF THE ARCHITECT AND/OR THE ENGINEER FOR CLARIFICATION.
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Carolinn

mara

THE LILLIES

Ellamae

Peace Haven

PRELIMINARY

DRAWING/DESIGN IS STILL 'IN DEVELOPMENT'
YOU ARE ADVISED TO MAKE DUE ALLOWANCE

A	SITE LAYOUT UPDATED	10.05.2022	CLP	RW
Rev	Description	Date	By	Chkd



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Client	
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Project Name
THE LILLIES
HORTON HEATH

Project Phase

PRELIMINARY

Checked By	Checked Date	Drawn By	Drawn Date
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RW	08.10.2021	CLP	27.09.2021
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Client Drawing No. _____ Scale _____ (AT A1 0175)

PRA Drawing No.		Revision
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1:100

Appendix G

SIMPLE INDEX APPROACH: TOOL



HRW shall not be liable for any direct or indirect damage claim, loss, cost, expense or liability howsoever arising out of the use or impossibility to use the tools, even when HRW has been informed of the possibility of the same. The user hereby indemnifies HRW from and against any damage claim, loss, expense or liability resulting from any action taken against HRW that is related in any way to the use of the tool or any reliance made in respect of the output of such use by any person whatsoever. HRW does not guarantee that the tool's functions meet the requirements of any person, nor that the tool is free from errors.

1. The steps set out in the tool should be applied for each inflow or 'runoff area' (ie each impermeable surface area separately discharging to a SuDS component).
2. The supporting 'Design Conditions' stated by the tool must be fully considered and implemented in all cases.
3. Relevant design examples are included in the SuDS Manual Appendix C.
4. Each of the steps below are part of the process set out in the flowchart on Sheet 3.

5. Sheet 4 summarises the selections made below and indicates the acceptability of the proposed SuDS components.

DROP DOWN LIST

RELEVANT INPUTS NEED TO BE SELECTED FROM THESE LISTS, FOR EACH STEP

USER ENTRY

USER ENTRY CELLS ARE ONLY REQUIRED WHERE INDICATED BY THE TOOL

STEP 1: Determine the Pollution Hazard Index for the runoff area discharging to the proposed SuDS scheme

This step requires the user to select the appropriate land use type for the area from which the runoff is occurring

If the land use varies across the 'runoff area', either:

- use the land use type with the highest Pollution Hazard Index
- apply the approach for each of the land use types to determine whether the proposed SuDS design is sufficient for all. If it is not, consider collecting more hazardous runoff separately and providing additional treatment.

If the generic land use types suggested are not applicable, select 'Other' and enter a description of the land use of the runoff area and agreed user defined indices in the row below the drop down lists.

Select land use type from the drop down list (or 'Other' if none applicable):

Runoff Area Land Use Description

Residential parking

If the generic land use types in the drop down list above are not applicable, select 'Other' and enter a description of the land use of the runoff area and agreed user defined indices in this row:

Pollution Hazard

Total Suspended Solids

Metals

Hydrocarbons

Low

0.5

0.4

0.4

DESIGN CONDITIONS

1

2

Landuse Pollution Hazard Index

Low

0.5

0.4

0.4

STEP 2A: Determine the Pollution Mitigation Index for the proposed SuDS components

This step requires the user to select the proposed SuDS components that will be used to treat runoff - before it is discharged to a receiving surface waterbody or downstream infiltration component

If the runoff is discharged directly to an infiltration component, without upstream treatment, select 'None' for each of the 3 SuDS components and move to Step 2B

This step should be applied to evaluate the water quality protection provided by proposed SuDS components for discharges to receiving surface waters or downstream infiltration components (note: in England and Wales this will include components that allow any amount of infiltration, however small, even where infiltration is not specifically accounted for in the design).

If you have fewer than 3 components, select 'None' for the components that are not required

If the proposed component is bespoke and/or a proprietary treatment product and not generically described by the suggested components, then 'Proprietary treatment system' or 'User defined indices' should be selected and a description of the component and agreed user defined indices should be entered in the rows below the drop down lists

Select SuDS Component 1 (i.e. the upstream SuDS component) from the drop down list:

SuDS Component Description

Pervious pavement (where the pavement is not designed as an infiltration component)

Select SuDS Component 2 (i.e. the second SuDS component in a series) from the drop down list:

None

Select SuDS Component 3 (i.e. the third SuDS component in a series) from the drop down list:

None

If the proposed SuDS components are bespoke/proprietary and/or the generic indices above are not considered appropriate, select 'Proprietary treatment system' or 'User defined indices' and enter component descriptions and agreed user defined indices in these rows:

Total Suspended Solids

Metals

Hydrocarbons

0.7

0.6

0.7

DESIGN CONDITIONS

1

2

3

Aggregated Surface Water Pollution Mitigation Index

0.7

0.6

0.7

Note: If the total aggregated mitigation index is > 1 (which is not a realistic outcome), then the outcome is fixed at ">0.95". In this scenario, the proposed components are likely to have a very high mitigation potential for reducing pollutant levels in the runoff and should be sufficient for any proposed land use (note: where risk assessment is required, this outcome would need more detailed verification).

Is the runoff now discharged to an infiltration component?

Yes ? [Go to Step 2B](#)

No ? [Go to Step 2C](#)

STEP 2B: Determine the Pollution Mitigation Index for the proposed Groundwater Protection

This step requires the user to select the type of groundwater protection that is either part of the SuDS component or that lies between the component and the groundwater

This step should be applied where a SuDS component is specifically designed to infiltrate runoff (note: in England and Wales this will include components that allow any amount of infiltration, however small, even where infiltration is not specifically accounted for in the design).

'Groundwater protection' describes the proposed depth of soil or other material through which runoff will flow between the runoff surface and the underlying groundwater.

Where the discharge is to surface waters and risks to groundwater need not be considered, select 'None'

If the proposed groundwater protection is bespoke and/or a proprietary product and not generically described by the suggested measures, then a description of the protection and agreed user defined indices should be entered in the row below the drop down list

Select type of groundwater protection from the drop down list:

300 mm minimum depth of soils with good contamination attenuation potential

If the proposed groundwater protection is bespoke/proprietary and/or the generic indices above are not considered appropriate, select 'Proprietary product' or 'User defined indices' and enter a description of the protection and agreed user defined indices in this row:

Total Suspended Solids

Metals

Hydrocarbons

0.4

0.3

0.3

DESIGN CONDITIONS

1

2

3

4

Groundwater Protection Pollution Mitigation Index

0.4

0.3

0.3

All designs must include a minimum of 1 m unsaturated depth of subsoil or aquifer material between the infiltration surface and the maximum likely groundwater level. Infiltration components should always be preceded by upstream component(s) that trap(s) silt, or designed specifically to retain sediment in a separate lined zone, easily accessible for maintenance, such that the sediment will not be re-suspended in subsequent events

The underlying soils must provide good contaminant attenuation potential (eg as recommended in Sniffer 2006 (a) and (b) / Scott Wilson (2010) or other appropriate guidance). Alternative depth and soil combinations must provide equivalent protection to the underlying groundwater

STEP 2C: Determine the Combined Pollution Mitigation Indices for the Runoff Area

This is an automatic step which combines the proposed SuDS Pollution Mitigation Indices with any Groundwater Protection Pollution Mitigation Indices

Combined Pollution Mitigation Indices			
Total Suspended Solids	Metals	Hydrocarbons	
0.9	0.75	0.85	

Note: If the total aggregated mitigation index is > 1 (which is not a realistic outcome), then the outcome is fixed at ">0.95". In this scenario, the proposed components are likely to have a very high mitigation potential for reducing pollutant levels in the runoff and should be sufficient for any proposed land use (note: where risk assessment is required, this outcome would need more detailed verification).

STEP 2D: Determine Sufficiency of Pollution Mitigation Indices for Selected SuDS Components

This is an automatic step which compares the Combined Pollution Mitigation Indices with the Land Use Hazard Indices, to determine whether the proposed components are sufficient to manage each pollutant category type

When the combined mitigation index exceeds the land use pollution hazard index, then the proposed components are considered sufficient in providing pollution risk mitigation.

In England and Wales, where the discharge is to protected surface waters or groundwater, an additional treatment component (ie over and above that required for standard discharges), or other equivalent protection, is required that provides environmental protection in the event of an unexpected pollution event or poor system performance. Protected surface waters are those designated for drinking water abstraction. In England and Wales, protected groundwater resources are defined as Source Protection Zone 1. In Northern Ireland, a more precautionary approach may be required and this should be checked with the environmental regulator on a site by site basis.

Sufficiency of Pollution Mitigation Indices

Total Suspended Solids

Metals

Hydrocarbons

Sufficient

Sufficient

Sufficient

DESIGN CONDITIONS

1

Reference to local planning documents should also be made to identify any additional protection required for sites due to habitat conservation (see Chapter 7 The SuDS design process). The implications of developments on or within close proximity to an area with an environmental designation, such as a Site of Special Scientific Interest (SSSI), should be considered via consultation with relevant conservation bodies such as Natural England

SIMPLE INDEX APPROACH: TOOL



HRW shall not be liable for any direct or indirect damage claim, loss, cost, expense or liability howsoever arising out of the use or impossibility to use the tools, even when HRW has been informed of the possibility of the same. The user hereby indemnifies HRW from and against any damage claim, loss, expense or liability resulting from any action taken against HRW that is related in any way to the use of the tool or any reliance made in respect of the output of such use by any person whatsoever. HRW does not guarantee that the tool's functions meet the requirements of any person, nor that the tool is free from errors.

1. The steps set out in the tool should be applied for each inflow or 'runoff area' (ie each impermeable surface area separately discharging to a SuDS component).
2. The supporting 'Design Conditions' stated by the tool must be fully considered and implemented in all cases.
3. Relevant design examples are included in the SuDS Manual Appendix C.
4. Each of the steps below are part of the process set out in the flowchart on Sheet 3.

DROP DOWN LIST

RELEVANT INPUTS NEED TO BE SELECTED FROM THESE LISTS, FOR EACH STEP

USER ENTRY

USER ENTRY CELLS ARE ONLY REQUIRED WHERE INDICATED BY THE TOOL

STEP 1: Determine the Pollution Hazard Index for the runoff area discharging to the proposed SuDS scheme

This step requires the user to select the appropriate land use type for the area from which the runoff is occurring

If the land use varies across the 'runoff area', either:

- use the land use type with the highest Pollution Hazard Index
- apply the approach for each of the land use types to determine whether the proposed SuDS design is sufficient for all. If it is not, consider collecting more hazardous runoff separately and providing additional treatment.

If the generic land use types suggested are not applicable, select 'Other' and enter a description of the land use of the runoff area and agreed user defined indices in the row below the drop down lists.

Select land use type from the drop down list (or 'Other' if none applicable):

If the generic land use types in the drop down list above are not applicable, select 'Other' and enter a description of the land use of the runoff area and agreed user defined indices in this row:

Runoff Area Land Use Description

Residential roofing

Pollution Hazard

Very low

Pollution Hazard Indices

Total Suspended Solids

0.2

Metals

0.2

Hydrocarbons

0.05

DESIGN CONDITIONS

1

2

Landuse Pollution Hazard Index

Very low

0.2

0.2

0.05

STEP 2A: Determine the Pollution Mitigation Index for the proposed SuDS components

This step requires the user to select the proposed SuDS components that will be used to treat runoff - before it is discharged to a receiving surface waterbody or downstream infiltration component

If the runoff is discharged directly to an infiltration component, without upstream treatment, select 'None' for each of the 3 SuDS components and move to Step 2B

This step should be applied to evaluate the water quality protection provided by proposed SuDS components for discharges to receiving surface waters or downstream infiltration components (note: in England and Wales this will include components that allow any amount of infiltration, however small, even where infiltration is not specifically accounted for in the design).

If you have fewer than 3 components, select 'None' for the components that are not required

If the proposed component is bespoke and/or a proprietary treatment product and not generically described by the suggested components, then 'Proprietary treatment system' or 'User defined indices' should be selected and a description of the component and agreed user defined indices should be entered in the rows below the drop down lists

Select SuDS Component 1 (i.e. the upstream SuDS component) from the drop down list:

Select SuDS Component 2 (i.e. the second SuDS component in a series) from the drop down list:

Select SuDS Component 3 (i.e. the third SuDS component in a series) from the drop down list:

If the proposed SuDS components are bespoke/proprietary and/or the generic indices above are not considered appropriate, select 'Proprietary treatment system' or 'User defined indices' and enter component descriptions and agreed user defined indices in these rows:

SuDS Component Description

Filter drain (where the trench is not designed as an infiltration component)

None

None

Total Suspended Solids

0.4

Pollution Mitigation Indices

Metals

0.4

Hydrocarbons

0.4

DESIGN CONDITIONS

1

2

3

Aggregated Surface Water Pollution Mitigation Index

0.4

0.4

0.4

SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B

Filter drains should be preceded by upstream component(s) that trap(s) silt, or designed specifically to retain sediment in a separate zone, easily accessible for maintenance, such that the sediment will not be re-suspended in subsequent events

Note: If the total aggregated mitigation index is > 1 (which is not a realistic outcome), then the outcome is fixed at ">0.95". In this scenario, the proposed components are likely to have a very high mitigation potential for reducing pollutant levels in the runoff and should be sufficient for any proposed land use (note: where risk assessment is required, this outcome would need more detailed verification).

Is the runoff now discharged to an infiltration component?

Yes ? [Go to Step 2B](#)

No ? [Go to Step 2C](#)

STEP 2B: Determine the Pollution Mitigation Index for the proposed Groundwater Protection

This step requires the user to select the type of groundwater protection that is either part of the SuDS component or that lies between the component and the groundwater

This step should be applied where a SuDS component is specifically designed to infiltrate runoff (note: in England and Wales this will include components that allow any amount of infiltration, however small, even where infiltration is not specifically accounted for in the design).

'Groundwater protection' describes the proposed depth of soil or other material through which runoff will flow between the runoff surface and the underlying groundwater.

Where the discharge is to surface waters and risks to groundwater need not be considered, select 'None'

If the proposed groundwater protection is bespoke and/or a proprietary product and not generically described by the suggested measures, then a description of the protection and agreed user defined indices should be entered in the row below the drop down list

Select type of groundwater protection from the drop down list:

If the proposed groundwater protection is bespoke/proprietary and/or the generic indices above are not considered appropriate, select 'Proprietary product' or 'User defined indices' and enter a description of the protection and agreed user defined indices in this row:

300 mm minimum depth of soils with good contamination attenuation potential

Total Suspended Solids

0.4

Pollution Mitigation Indices

Metals

0.3

Hydrocarbons

0.3

DESIGN CONDITIONS

1

2

3

4

Groundwater Protection Pollution Mitigation Index

0.4

0.3

0.3

All designs must include a minimum of 1 m unsaturated depth of subsoil or aquifer material between the infiltration surface and the maximum likely groundwater level. Infiltration components should always be preceded by upstream component(s) that trap(s) silt, or designed specifically to retain sediment in a separate lined zone, easily accessible for maintenance, such that the sediment will not be re-suspended in subsequent events

The underlying soils must provide good contaminant attenuation potential (eg as recommended in Sniffer 2008 (a) and (b) / Scott Wilson (2010) or other appropriate guidance). Alternative depth and soil combinations must provide equivalent protection to the underlying groundwater

STEP 2C: Determine the Combined Pollution Mitigation Indices for the Runoff Area

This is an automatic step which combines the proposed SuDS Pollution Mitigation Indices with any Groundwater Protection Pollution Mitigation Indices

Combined Pollution Mitigation Indices			
Total Suspended Solids	Metals	Hydrocarbons	
0.6	0.55	0.55	

Note: If the total aggregated mitigation index is > 1 (which is not a realistic outcome), then the outcome is fixed at ">0.95". In this scenario, the proposed components are likely to have a very high mitigation potential for reducing pollutant levels in the runoff and should be sufficient for any proposed land use (note: where risk assessment is required, this outcome would need more detailed verification).

STEP 2D: Determine Sufficiency of Pollution Mitigation Indices for Selected SuDS Components

This is an automatic step which compares the Combined Pollution Mitigation Indices with the Land Use Hazard Indices, to determine whether the proposed components are sufficient to manage each pollutant category type

When the combined mitigation index exceeds the land use pollution hazard index, then the proposed components are considered sufficient in providing pollution risk mitigation.

In England and Wales, where the discharge is to protected surface waters or groundwater, an additional treatment component (ie over and above that required for standard discharges), or other equivalent protection, is required that provides environmental protection in the event of an unexpected pollution event or poor system performance. Protected surface waters are those designated for drinking water abstraction. In England and Wales, protected groundwater resources are defined as Source Protection Zone 1. In Northern Ireland, a more precautionary approach may be required and this should be checked with the environmental regulator on a site by site basis.

Sufficiency of Pollution Mitigation Indices

Total Suspended Solids

Metals

Hydrocarbons

1

Sufficient

Sufficient

Sufficient

Reference to local planning documents should also be made to identify any additional protection required for sites due to habitat conservation (see Chapter 7 The SuDS design process). The implications of developments on or within close proximity to an area with an environmental designation, such as a Site of Special Scientific Interest (SSSI), should be considered via consultation with relevant conservation bodies such as Natural England