ROY LOBLEY CONSULTING
Specialists in Flood Risk Management

OUTLINE SUSTAINABLE DRAINAGE STRATEGY

OFFICE
HOLME LANE, HOLME

Mr J Richardson
September 2025

DOCUMENT ISSUE RECORD

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The information in this report is based on statistical data and qualitative analysis which are for guidance purposes only. This study provides no guarantee against flooding or of the absolute accuracy of water levels, flows and associated probabilities.

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1.0 INTRODUCTION

1.1 This Outline Sustainable Drainage Strategy, (OSDS), has been produced on behalf of Mr J Richardson in respect of a planning application for an office at Holme Lane, Holme.

Data Used

1.2 This OSDS is based on the following information:

- Proposed Plans
- Infiltration Tests By Others

Existing Site

1.3 The site is located at grid reference SE9255407115.

Proposed Development

1.4 The proposed development consists of an office as shown on the extract of the proposed plan below in **Figure 1.1**

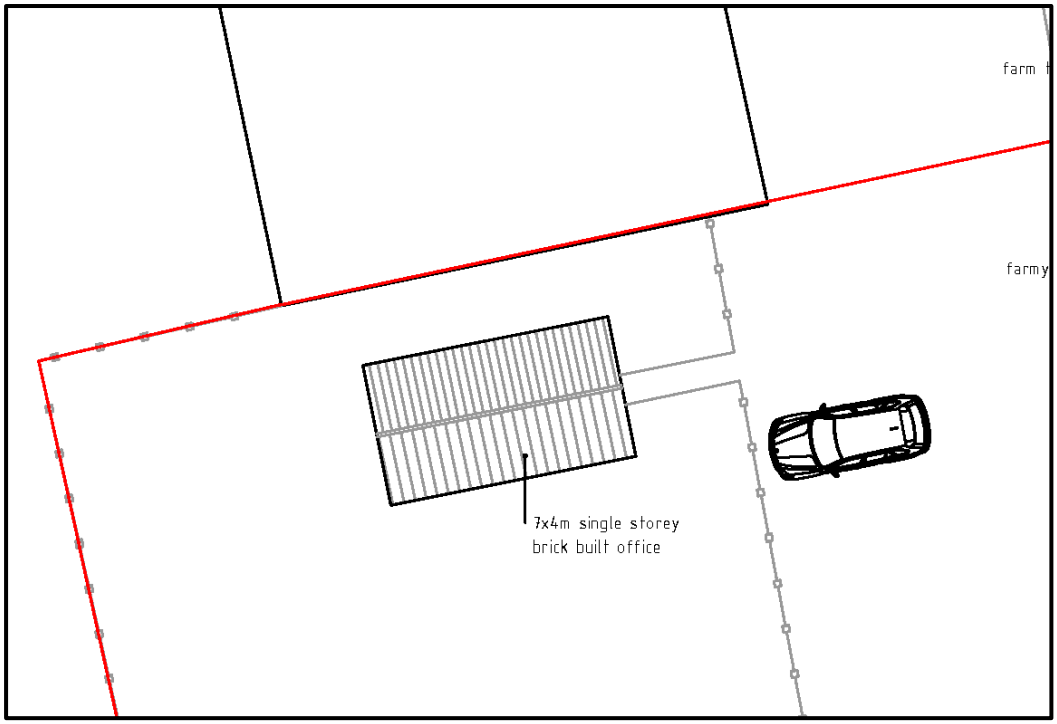

Figure 1.1 Proposed Plan

Development Foul & Surface Water

1.5 The proposed development will require the disposal of surface water which could impact on existing systems and developments. This OSDS will demonstrate that the development will not increase flood risk elsewhere.

2.0 CLIMATE CHANGE

2.1 The NPPF sets out how the planning system should help minimise vulnerability and provide resilience to the impacts of climate change.

2.2 As the Government's expert on flood risk on 19th February 2016 the Environment Agency, (EA), published revised climate change allowances to support the NPPF. The sea level rise allowances were revised on the 17th December 2019, the peak river flows revised on the 20th July 2021 and the peak rainfall allowances were revised on 10th May 2022.

2.3 The climate change allowances are based on projections and different scenarios of carbon dioxide (CO2) emissions to the atmosphere and provide predictions of anticipated change for:

- peak river flow and peak rainfall intensity by river Management Catchment;
- sea level rise;
- offshore wind speed and extreme wave height.

2.4 The peak river flow allowances, sea level rise; and offshore wind speed and extreme wave height allowances a form part of the FRA and only the peak rainfall intensity allowances are relevant to the OSDS .

Peak Rainfall Intensity Allowance

2.5 Increased rainfall affects river levels and land and urban drainage and should be applied to surface water drainage systems. Theses allowances are based on the Management Catchment with two allowances; central; and upper end and change over two periods of time, (epoch), over the next century and the appropriate allowance should be chosen based on the expected lifetime of the development.

2.6 This proposed development is in the Lower Trent & Erewash Management Catchment

2.7 This development has a lifetime of up between 2100 and 2125, (2070s epoch), and therefore the Upper End allowance for climate change in peak rainfall intensity is used.

Epoch	Percentage Increase
70s	40

Table 2.1 Climate Change Allowances for Peak Rainfall Intensity

3.0 SURFACE WATER DRAINAGE

3.1 When rain falls on a natural landscape it soaks into the ground, evaporates, is taken up by plants and some of it eventually finds its way into streams and rivers.

3.2 These stages of the water cycle can be impeded when land is developed and there tends to be less permeable ground available for infiltration and less vegetation for evapotranspiration. When rain falls on impermeable surfaces much more of it turns to surface water runoff, which can cause flooding, pollution and erosion problems.

3.3 Sustainable drainage systems, (SuDS), are designed to maximise the opportunities and benefits that can be secured from surface water management.

Infiltrated to ground

3.4 Ground investigation in the form of percolation tests undertaken by others to BRE Digest 365 on the site has identified that soakaways would be suitable with an infiltration rate of 0.00000314m/sec. The test results are included as **Appendix 1.**

3.5 The sizing of soakaways has been undertaken using a software tool developed by HR Wallingford based on the method provided in CIRIA report 156 and a summary is included below with the full results included in **Appendix 2.**

Porosity of Fill Material

3.6 Typical values for the porosity of fill materials are:

- High Void Structure 0.90 - 0.95
- Single Size Clean Stones 0.30 - 0.40
- Graded Sand/Gravel 0.20 - 0.30

3.7 In this instance it is proposed to use plastic soakaway crates with a high void structure of 0.95.

Contributing Area

3.8 The area draining to the soakaway is 28m^2

Soakaways Size

3.9 A factor of safety of 1.5 has been chosen based on the table below.

	CONSEQUENCE OF FAILURE		
Total Area to be Drained	No damage or inconvenience	Minor Inconvenience e.g. SW on Car Park	Damage to Buildings or Major Inconvenience e.g. SW on Roads
<100m^2	1.5	2.0	10.0
100m^2 to 1000m^2	1.5	3.0	10.0
>1000m^2	1.5	5.0	10.0

Table 3.1 Infiltration Factor of Safety

3.10 The size of soakaways has been calculated for the 6 hour storm for the 1:100 year return period with a 40% climate change allowances in peak rainfall intensity.

3.11 The size of the soakaway is 2.00m x 2.00 x minimum 0.60m deep and will be located a minimum of 5.00m from any building.

Appendix 1
Infiltration Test Results

Our Ref: 1260/5063/G
Your Ref: Mendle Farm, Holme
Date: 29th August 2025

John Richardson c/o Fylnn Architecture
Holme Lane
Holme
Scunthorpe
DN16 3RF

Humberside Materials Laboratory LTD
Atherton Way, Brigg
North Lincs DN20 8AR
Tel & fax 01652 652753
Email: info@humbersidematerialslab.co.uk

Dear John Richardson

Mendle Farm

Further to your instruction Humberside Materials Laboratory (HML) were engaged to undertake a site investigation on land at Mendle Farm, Holme, Scunthorpe. The site investigation included two trial pits (TP1 & TP2) to assess the sites potential capacity for underground drainage via soakaway testing. The test locations were selected by the onsite HML engineer with a site brief to test near existing soakaway, a location plan showing test locations and rough location of existing soakaway is included below within figure 1.

Figure 1: Soakaway test locations and rough locations of existing soakaway

Trial pits

The trial pits were excavated by a wheeled excavator utilising a 450mm width bucket. Encountered strata was logged on site as the trial pits advanced. Encountered strata is summarised within table 1 below. Photographs are enclosed.

Table 1: Summary of revealed ground conditions		
	Exploratory hole	
	TP102	**TP105**
Strata descriptions	*Depth to base of stratum (m bgl)*	
Brown silty fine to medium SAND with occasional rootlets	0.47	0.33
Yellow brown, light brown and buff slightly silty fine to medium SAND	0.95	0.90
Light grey and light grey brown slightly silty fine to medium SAND	1.15	0.95
Notes: TP1 & TP2 – no water seepage or ingresses noted during or after excavations		

Soakaway testing

Soakaway testing was completed as per guidance within BRE Digest 365.

Soakaway trial pit 1 (TP1) was excavated to 1.15m below ground level (bgl) with a width of 0.45m and a length of 1.30m. Water was added to the pit with its depth monitoring against time elapsed, this pit included three consecutive fills. Calculations show infiltration rates ranging from $3.52x10^{-06}$m/s to $3.14x10^{-06}$m/s with an effective test depth from 0.58m to 1.15m bgl. Individual test report is enclosed.

Soakaway trial pit 2 (TP2) was excavated to 0.95m below ground level (bgl) with a width of 0.45m and a length of 1.50m. Water was added to the pit with its depth monitoring against time elapsed, this pit included three consecutive fills. Calculations show infiltration rates ranging from $3.92x10^{-06}$m/s to $3.34x10^{-06}$m/s with an effective test depth from 0.43m to 0.95m bgl. Individual test report is enclosed.

Summary

The encountered strata appears consistent within both trial pits and was as anticipated from available geology mapping which shows Sutton Sand Formation as the superficial deposit for the site and its wider area. Soakaway test data also appears consistent between the two trial pits, the most conservative infiltration rate of $3.14x10^{-06}$m/s (3rd fill from TP1) wit htest dpepth sranging from 0.43m to 1.15m bgl should be considered when implementing a soakaway design.

If you require any further information, please contact the laboratory.

Yours Sincerely

D. Driver *Director*

Enclosed: *Photographs*
Soakaway test reports

Trial Pit TP1 – After excavations

Trial pit TP1 – Excavated spoil

Trial Pit TP1 – During testing

Trial Pit TP2 – After excavations

Trial pit TP2 – Excavated spoil

Trial Pit TP107 – During testing

HUMBERSIDE MATERIALS LABORATORY LTD

Atherton Way, Brigg
North Lincolnshire DN20 8AR
Tel & Fax 01652 652753

DETERMINATION OF SOIL INFILTRATION RATE

Sample Ref S/75997/01 **Client** John Richardson

Site Mendle Farm, Holme
Location TP1
Date tested 26/08/2025
Determined by D. Driver (HML)
Soil type Slightly silty fine to medium SAND

Calculation of Soil Infiltration Rate :- BRE Digest No. 365

Calculation Data

Soakaway pit No		**TP1**		
Anticipated invert level		Unknown		
Pit Dimensions (l x w x d) (m)	1.30	0.45	1.15	
Effective Depth (75% - 25%)	Determination 1		0.265	m
	Determination 2		0.270	m
	Determination 3		0.285	m
Effective volume (75% - 25%)	Determination 1		0.155	m^3
	Determination 2		0.158	m^3
	Determination 3		0.167	m^3
Effective Surface Area	Determination 1		1.513	m^2
(75% - 25%)	Determination 2		1.530	m^2
	Determination 3		1.583	m^2
Time for soakaway (75%-25% effective depth)				
	Determination 1		29100	Sec.
	Determination 2		33000	Sec.
	Determination 3		33600	Sec.
Soil Infiltration Rate (m/s)	**Determination 1**		**3.52E-06**	**m/s**
	Determination 2		**3.13E-06**	**m/s**
	Determination 3		**3.14E-06**	**m/s**

Comments

File ref 1260/5063/G
Date tested 26/08/2025
Date reported 29/08/2025

Signed - M.Driver / D. Driver / C. Driver
Director

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DETERMINATION OF SOIL INFILTRATION RATE

Sample Ref S/75997/02 **Client** John Richardson

Site Mendle Farm, Holme
Location TP2
Date tested 26/08/2025
Determined by D. Driver (HML)
Soil type Slightly silty fine to medium SAND

Calculation of Soil Infiltration Rate :- BRE Digest No. 365

Calculation Data

Soakaway pit No		**TP2**		
Anticipated invert level		Unknown		
Pit Dimensions (l x w x d) (m)	1.50	0.45	0.95	
Effective Depth (75% - 25%)	Determination 1		0.250	m
	Determination 2		0.250	m
	Determination 3		0.260	m
Effective volume (75% - 25%)	Determination 1		0.169	m^3
	Determination 2		0.169	m^3
	Determination 3		0.176	m^3
Effective Surface Area	Determination 1		1.650	m^2
(75% - 25%)	Determination 2		1.650	m^2
	Determination 3		1.689	m^2
Time for soakaway (75%-25% effective depth)				
	Determination 1		26100	Sec.
	Determination 2		28200	Sec.
	Determination 3		31080	Sec.
Soil Infiltration Rate (m/s)	**Determination 1**		**3.92E-06**	**m/s**
	Determination 2		**3.63E-06**	**m/s**
	Determination 3		**3.34E-06**	**m/s**

Comments

File ref 1260/5063/G
Date tested 26/08/2025
Date reported 29/08/2025

Signed - M.Driver / D. Driver / C. Driver
Director

Appendix 2
Soakaway Size

Infiltration volume design tool

www.uksuds.com | Infiltration volume design tool (https://www.uksuds.com/)

This is an estimation of the infiltration volumes and drain-down time to half empty the infiltration system in line with the on CIRIA infiltration drainage R156 guidance (1996) and CIRIA SuDS manual (C753, 2015). This information may be used as the basis for designing an infiltration system for the drainage of surface water runoff from sites.

Project details

Date	04/09/2025
Calculated by	Roy Lobley
Reference	RLC-1941
Model version	2.1.2

Site details

Site name	Holme Lane, Holme
Site location	Office

Infiltration system

Infiltration system	Soakaway
Type	Rectangular soakaway with infiltration from sides and base

Geometry, porosity and infiltration

Width (m)	2	m
Length (m)	2	m
Infiltration coefficient (m/s)	0.00000314	m/s
Porosity of fill material	95% eg. High void structure / geocellular structure	

Area to be drained

Total area (m^2)	28	m^2
Factor of safety	1.5	

Rainfall

Rainfall input type	FEH22 CSV file
	Holme.csv
Return period (years)	100
Climate change allowance factor	140%

Results

Soakaway minimum height (m)	0.6	m
Time for half-emptying (hours)	20.2	hours
Critical duration (hours)	9.0	hours

Please note storage volume estimation are subject to uncertainty. Infiltration system height and base area are reported to the nearest 1m or 1m² value when the height or base area are greater than 10m or 10m²; and reported to the nearest to 0.1m or 0.1m² value when the height or base area are less than 10m or 10m².

Disclaimer

Appendix A - Rainfall Depths

Rainfall depths (mm) with climate change

Duration (minutes)	Duration (hours)	1 years	2 years	5 years	10 years	20 years	30 years	50 years	75 years	100 years	150 years	200 years	500 years	1000 years	10000 years
15	0.25	7.00	10.22	17.64	22.69	27.79	30.67	34.37	37.38	39.54	42.56	44.77	51.93	57.69	83.24
30	0.5	9.07	13.16	22.61	29.13	36.02	40.08	45.01	49.00	51.93	56.14	59.19	69.22	77.31	113.29
60	1	11.39	16.38	27.90	36.27	44.77	49.80	56.27	61.47	65.23	70.62	74.54	87.50	98.04	145.64
120	2	17.47	22.93	35.55	44.46	53.38	58.66	65.49	70.98	74.90	80.54	84.67	98.60	110.25	168.81
180	3	21.29	26.99	40.15	49.38	58.60	64.02	71.08	76.72	80.78	86.69	91.00	105.67	118.24	184.34
240	4	24.03	29.90	43.47	52.91	62.37	67.93	75.11	80.89	85.08	91.18	95.66	110.99	124.40	196.15
360	6	27.81	33.96	48.17	57.97	67.75	73.53	80.89	86.94	91.36	97.76	102.48	118.97	133.87	213.56
540	9	31.58	38.00	52.79	62.97	73.14	79.11	86.83	93.18	97.85	104.65	109.72	127.75	144.55	231.64
720	12	34.24	40.84	56.06	66.54	77.01	83.17	91.21	97.82	102.68	109.84	115.21	134.58	152.96	244.72
900	15	36.28	43.02	58.58	69.37	80.09	86.46	94.74	101.58	106.62	114.09	119.70	140.28	160.05	254.87
1080	18	37.95	44.83	60.69	71.75	82.68	89.24	97.75	104.79	110.00	117.74	123.58	145.24	166.15	263.19
1440	24	40.60	47.74	64.22	75.67	87.07	93.88	102.80	110.21	115.70	123.96	130.26	153.72	176.29	276.36
1800	30	42.76	50.13	67.16	78.95	90.75	97.83	107.10	114.83	120.60	129.29	135.93	160.79	184.52	286.57
2160	36	44.68	52.26	69.76	81.89	94.05	101.36	110.95	118.99	124.98	134.02	140.95	166.85	191.41	294.74
2880	48	48.02	56.00	74.41	87.12	99.95	107.67	117.80	126.34	132.73	142.32	149.65	177.00	202.54	307.26

Rainfall depths (mm) without climate change

Duration (minutes)	Duration (hours)	1 years	2 years	5 years	10 years	20 years	30 years	50 years	75 years	100 years	150 years	200 years	500 years	1000 years	10000 years
15	0.25	5.00	7.30	12.60	16.21	19.85	21.91	24.55	26.70	28.24	30.40	31.98	37.09	41.21	59.46
30	0.5	6.48	9.40	16.15	20.81	25.73	28.63	32.15	35.00	37.09	40.10	42.28	49.44	55.22	80.92
60	1	8.13	11.70	19.93	25.91	31.98	35.57	40.19	43.91	46.59	50.44	53.24	62.50	70.03	104.03
120	2	12.48	16.38	25.39	31.76	38.13	41.90	46.78	50.70	53.50	57.53	60.48	70.43	78.75	120.58
180	3	15.21	19.28	28.68	35.27	41.86	45.73	50.77	54.80	57.70	61.92	65.00	75.48	84.46	131.67
240	4	17.16	21.36	31.05	37.79	44.55	48.52	53.65	57.78	60.77	65.13	68.33	79.28	88.86	140.11
360	6	19.86	24.26	34.41	41.41	48.39	52.52	57.78	62.10	65.26	69.83	73.20	84.98	95.62	152.54
540	9	22.56	27.14	37.71	44.98	52.24	56.51	62.02	66.56	69.89	74.75	78.37	91.25	103.25	165.46
720	12	24.46	29.17	40.04	47.53	55.01	59.41	65.15	69.87	73.34	78.46	82.29	96.13	109.26	174.80
900	15	25.92	30.73	41.84	49.55	57.21	61.76	67.67	72.56	76.16	81.49	85.50	100.20	114.32	182.05
1080	18	27.11	32.02	43.35	51.25	59.06	63.74	69.82	74.85	78.57	84.10	88.27	103.74	118.68	187.99
1440	24	29.00	34.10	45.87	54.05	62.19	67.06	73.43	78.72	82.64	88.54	93.04	109.80	125.92	197.40
1800	30	30.54	35.81	47.97	56.39	64.82	69.88	76.50	82.02	86.14	92.35	97.09	114.85	131.80	204.69

Duration (minutes)	Duration (hours)	1 years	2 years	5 years	10 years	20 years	30 years	50 years	75 years	100 years	150 years	200 years	500 years	1000 years	10000 years
2160	**36**	31.91	37.33	49.83	58.49	67.18	72.40	79.25	84.99	89.27	95.73	100.68	119.18	136.72	210.53
2880	**48**	34.30	40.00	53.15	62.23	71.39	76.91	84.14	90.24	94.81	101.66	106.89	126.43	144.67	219.47

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