



TEST REPORT.

ISSUED BY : SOIL PROPERTY TESTING LTD.

DATE OF ISSUE : As page 1 PAGE 14 of ()

Contract
Queenswood School, Hatfield

Serial No.
S30997

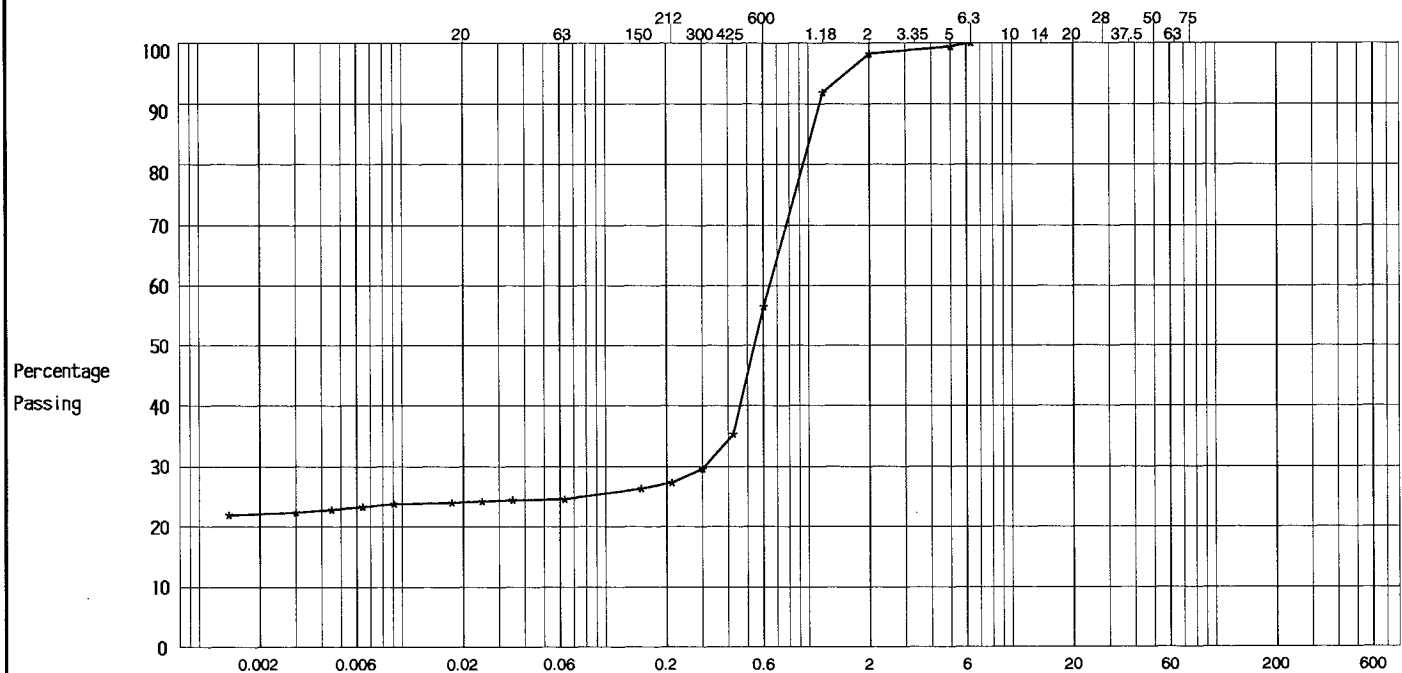


DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole/ Pit No.	Depth m.	Sample	Description	Remarks
TP2	1.50	B1	Firm orange slightly gravelly very sandy CLAY with rare light grey mottling. Gravel is brown and white fine and medium angular and subangular flint	Description in terms of likely engineering behaviour

Method of Test: Wet Sieve + Hydrometer Method of pre-treatment: Not required

Sieve Size	Size (microns)													Size (mm)											
	1.4	3	4.5	6.4	9.1	17.5	24.7	34.9	63	150	212	300	425	600	1.18	2	5	6.3	10	14	20	28	37.5	50	75
Percentage by Mass passing Sieve	22	22	23	23	24	24	24	24	25	26	27	30	35	56	92	98	99	100	-	-	-	-	-	-	-



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

METHOD OF PREPARATION: BS 1377:PART 1:1990:7.3 & 7.4.5

METHOD OF TEST : BS 1377:PART 2:1990:9.2 + 9.5

TYPE OF SAMPLE KEY : U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter

COMMENTS :

REMARKS TO INCLUDE : Sample disturbance, loss of moisture, variation from test procedure, location and origin of test specimen within original sample. Oven drying temperature if not 105-110 deg C.



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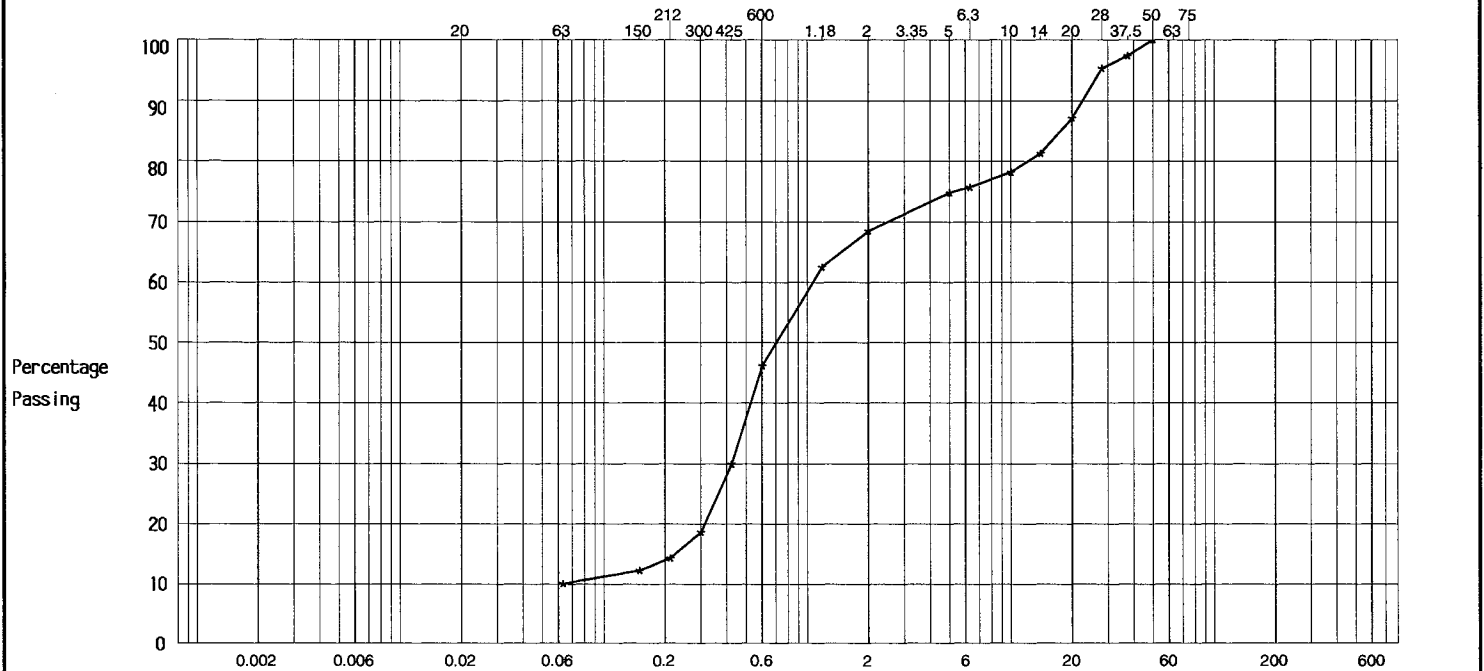


DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole/ Pit No.	Depth m.	Sample	Description	Remarks
TP5	3.00	B2	Pale yellowish brown silty very gravelly SAND with occasional soft pale yellowish brown clay lumps. Gravel is black, white and brown subangular and subrounded flint	

Method of Test: Wet Sieve Method of pre-treatment:

Sieve Size	Size (microns)										Size (mm)									
	63	150	212	300	425	600	1.18	2	5	6.3	10	14	20	28	37.5	50	75			
Percentage by Mass passing Sieve	10	12	14	19	30	46	62	68	75	76	78	81	87	95	97	100	-			



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

METHOD OF PREPARATION: BS 1377:PART 1:1990:7.3 & 7.4.5

METHOD OF TEST : BS 1377:PART 2:1990:9.2

TYPE OF SAMPLE KEY : U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter

COMMENTS :

REMARKS TO INCLUDE : Sample disturbance, loss of moisture, variation from test procedure, location and origin of test specimen within original sample. Oven drying temperature if not 105-110 deg C.



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Contract Serial No.
Queenswood School, Hatfield S30997

DETERMINATION OF THE SULPHATE CONTENT OF SOIL AND GROUNDWATER

Borehole/ Pit No.	Depth m.	Sample	Concentration of Soluble Sulphate			% of sample passing 2mm sieve	Description	Remarks
			Soil		Groundwater			
			Acid Soluble SO ₄ %	Water Soluble 2:1 SO ₄ g/l	g/l			
TP2	1.50	B1		0.11		98	Firm orange slightly gravelly very sandy CLAY with rare light grey mottling. Gravel is brown and white fine and medium angular and subangular flint	
TP4	1.00	D2		0.06		97	Very stiff orange slightly gravelly slightly sandy CLAY with occasional light grey mottling and rare recently active roots. Gravel is fine and medium flint	
TP7	2.00	D2		0.04		88	Firm mottled light grey and orange slightly gravelly slightly sandy silty CLAY with rare recently active roots. Gravel is fine and medium flint	

METHOD OF PREPARATION: BS 1377:PART 1:1990:7.5 BS1377:PART 3:1990:5.2 Acid Soluble, 5.3 Soil/Water Extract :5.4 Groundwater

METHOD OF TEST : BS 1377:PART 3:1990:5.5

TYPE OF SAMPLE KEY : U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter

COMMENTS : Test not UKAS accredited.

REMARKS TO INCLUDE : Sample disturbance, loss of moisture, variation from test procedure, location and origin of test specimen within original sample. Oven drying temperature if not 105-110 deg C.



TEST REPORT.

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Contract Serial No.
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DETERMINATION OF THE pH VALUE

Borehole/ Pit No.	Depth m.	Sample	pH Value	Description	Remarks
TP2	1.50	B1	3.5	Firm orange slightly gravelly very sandy CLAY with rare light grey mottling. Gravel is brown and white fine and medium angular and subangular flint	pH value retested and result verified
TP4	1.00	D2	3.5	Very stiff orange slightly gravelly slightly sandy CLAY with occasional light grey mottling and rare recently active roots. Gravel is fine and medium flint	pH value retested and result verified
TP7	2.00	D2	4.2	Firm mottled light grey and orange slightly gravelly slightly sandy silty CLAY with rare recently active roots. Gravel is fine and medium flint	pH value retested and result verified

METHOD OF PREPARATION: BS 1377:PART 1:1990:7 BS 1377:PART 3:1990:9.4

METHOD OF TEST : BS 1377:PART 3:1990:9.5

TYPE OF SAMPLE KEY : U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter

COMMENTS : Test not UKAS accredited.

REMARKS TO INCLUDE : Sample disturbance, loss of moisture, variation from test procedure, location and origin of test specimen within original sample. Oven drying temperature if not 105-110 deg C.

Appendix E

Limitations of Investigation

Limitations of Use

This report is based on the results of the exploratory boreholes, the laboratory testing carried out on samples recovered from those boreholes and on details of the scheme provided by the Client.

This report has been prepared for the benefit of Ball Hall (Property Management) Limited, and its contents should not be relied upon by others without the written authority of Richard Jackson Ltd. If any unauthorised third party makes use of this report they do so at their own risk and Richard Jackson Ltd owes them no duty of care or skill.

All information provided by others is taken as being in good faith as being accurate, but Richard Jackson Ltd cannot, and does not, accept any liability for the detailed accuracy, errors or omissions in such information.

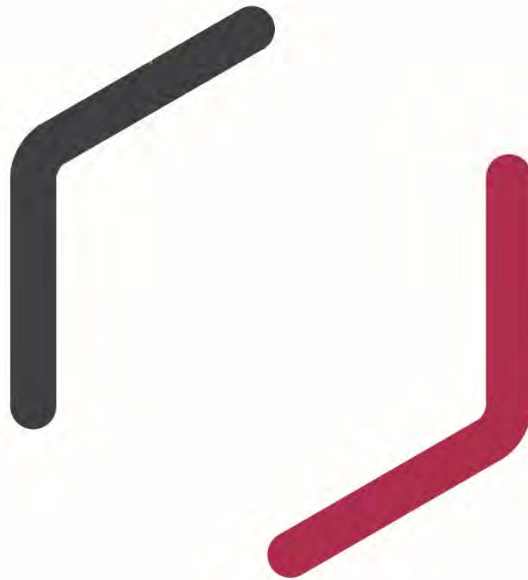
Subsoils are by their nature hidden from view and no investigation can be exhaustive to the extent that all soil conditions are revealed. Conditions may well be present beneath the site which was not evident from the investigations carried out.

Geological data, with the exception of geological maps held by Richard Jackson Ltd, Ordnance Survey maps and aerial photographs have not been inspected, nor has any other data relating to site conditions past or present, or any information regarding underground services, other than as indicated.

Groundwater levels can be subject to considerable seasonal variations, and the conditions encountered in the exploratory holes may not reflect long-term conditions.

There can be no guarantee that the samples analysed represent the highest concentrations of contamination present beneath the site. The chemical analysis results have been assessed to standards appropriate at the time of investigation.


Unless a greater period of retention of samples is agreed, it is our normal practice to discard all samples one month after submission of our final report.



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Appendix G

Revised Proposal & Micro Drainage Calculations

Richard Jackson Plc		Page 1
26 HIGH ST. HADLEIGH IPSWICH SUFFOLK IP7 5AP	Queens wood school Sports Hall Green Field Run off	
Date 11/04/2017 17:48 File	Designed by MJG Checked by	
Micro Drainage	Source Control 2015.1	


ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.150
Area (ha)	0.189	Urban	0.000
SAAR (mm)	687	Region Number	Region 6

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

Richard Jackson Plc		Page 1
26 HIGH ST. HADLEIGH IPSWICH SUFFOLK IP7 5AP	Queenswood Sch 47175 Proposed rev a	
Date 09/06/2017 14:06 File proposed 1 in 100 plus...	Designed by MJG Checked by	
Micro Drainage	Source Control 2015.1	

Summary of Results for 1 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m ³)	Status
15 min Summer	49.347	0.047	12.0	4.7	O K
30 min Summer	49.345	0.045	11.7	4.5	O K
60 min Summer	49.336	0.036	10.4	3.6	O K
120 min Summer	49.321	0.021	8.4	2.1	O K
180 min Summer	49.311	0.011	7.2	1.1	O K
240 min Summer	49.305	0.005	6.4	0.5	O K
360 min Summer	49.300	0.000	5.5	0.0	O K
480 min Summer	49.300	0.000	4.4	0.0	O K
600 min Summer	49.300	0.000	3.7	0.0	O K
720 min Summer	49.300	0.000	3.3	0.0	O K
960 min Summer	49.300	0.000	2.7	0.0	O K
1440 min Summer	49.300	0.000	2.0	0.0	O K
2160 min Summer	49.300	0.000	1.5	0.0	O K
2880 min Summer	49.300	0.000	1.2	0.0	O K
4320 min Summer	49.300	0.000	0.9	0.0	O K
5760 min Summer	49.300	0.000	0.7	0.0	O K
7200 min Summer	49.300	0.000	0.6	0.0	O K
8640 min Summer	49.300	0.000	0.5	0.0	O K
10080 min Summer	49.300	0.000	0.5	0.0	O K
15 min Winter	49.353	0.053	12.8	5.3	O K
30 min Winter	49.348	0.048	12.1	4.8	O K


Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m ³)	Time-Peak (mins)
15 min Summer	31.547	0.0	11.0	13
30 min Summer	20.414	0.0	14.4	21
60 min Summer	12.800	0.0	17.8	38
120 min Summer	7.858	0.0	22.3	68
180 min Summer	5.877	0.0	24.9	98
240 min Summer	4.776	0.0	26.9	128
360 min Summer	3.550	0.0	30.0	0
480 min Summer	2.865	0.0	32.3	0
600 min Summer	2.426	0.0	34.2	0
720 min Summer	2.117	0.0	35.8	0
960 min Summer	1.708	0.0	38.5	0
1440 min Summer	1.263	0.0	42.7	0
2160 min Summer	0.934	0.0	47.4	0
2880 min Summer	0.754	0.0	51.0	0
4320 min Summer	0.557	0.0	56.5	0
5760 min Summer	0.449	0.0	60.8	0
7200 min Summer	0.380	0.0	64.4	0
8640 min Summer	0.332	0.0	67.5	0
10080 min Summer	0.296	0.0	70.2	0
15 min Winter	31.547	0.0	12.3	13
30 min Winter	20.414	0.0	16.1	22

Richard Jackson Plc		Page 2
26 HIGH ST. HADLEIGH IPSWICH SUFFOLK IP7 5AP	Queenswood Sch 47175 Proposed rev a	
Date 09/06/2017 14:06 File proposed 1 in 100 plus...	Designed by MJG Checked by	
Micro Drainage	Source Control 2015.1	

Summary of Results for 1 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m ³)	Status
60 min Winter	49.333	0.033	10.1	3.3	O K
120 min Winter	49.314	0.014	7.5	1.4	O K
180 min Winter	49.303	0.003	6.2	0.3	O K
240 min Winter	49.300	0.000	5.3	0.0	O K
360 min Winter	49.300	0.000	4.0	0.0	O K
480 min Winter	49.300	0.000	3.2	0.0	O K
600 min Winter	49.300	0.000	2.7	0.0	O K
720 min Winter	49.300	0.000	2.4	0.0	O K
960 min Winter	49.300	0.000	1.9	0.0	O K
1440 min Winter	49.300	0.000	1.4	0.0	O K
2160 min Winter	49.300	0.000	1.1	0.0	O K
2880 min Winter	49.300	0.000	0.8	0.0	O K
4320 min Winter	49.300	0.000	0.6	0.0	O K
5760 min Winter	49.300	0.000	0.5	0.0	O K
7200 min Winter	49.300	0.000	0.4	0.0	O K
8640 min Winter	49.300	0.000	0.4	0.0	O K
10080 min Winter	49.300	0.000	0.4	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m ³)	Time-Peak (mins)
60 min Winter	12.800	0.0	20.2	38
120 min Winter	7.858	0.0	24.8	70
180 min Winter	5.877	0.0	27.9	98
240 min Winter	4.776	0.0	30.2	0
360 min Winter	3.550	0.0	33.6	0
480 min Winter	2.865	0.0	36.2	0
600 min Winter	2.426	0.0	38.3	0
720 min Winter	2.117	0.0	40.1	0
960 min Winter	1.708	0.0	43.2	0
1440 min Winter	1.263	0.0	47.9	0
2160 min Winter	0.934	0.0	53.1	0
2880 min Winter	0.754	0.0	57.2	0
4320 min Winter	0.557	0.0	63.3	0
5760 min Winter	0.449	0.0	68.1	0
7200 min Winter	0.380	0.0	72.1	0
8640 min Winter	0.332	0.0	75.6	0
10080 min Winter	0.296	0.0	78.6	0

Richard Jackson Plc		Page 3
26 HIGH ST. HADLEIGH IPSWICH SUFFOLK IP7 5AP	Queenswood Sch 47175 Proposed rev a	
Date 09/06/2017 14:06 File proposed 1 in 100 plus...	Designed by MJG Checked by	
Micro Drainage	Source Control 2015.1	

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	1	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.422	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0


Pipe Network

Volume in Pipe Network (m³)	1	Dia of Outfall Pipe (m)	0.2
Slope of Outfall Pipe (1:X)	150	Roughness of Outfall Pipe (mm)	0.600

Time Area Diagram

Total Area (ha) 0.188

Time (mins) Area		
From:	To:	(ha)
0	4	0.188

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26 HIGH ST. HADLEIGH IPSWICH SUFFOLK IP7 5AP	Queenswood Sch 47175 Proposed rev a	
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Micro Drainage	Source Control 2015.1	

Model Details

Storage is Online Cover Level (m) 49.900

Tank or Pond Structure

Invert Level (m) 49.300

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	100.0	0.700	100.0	1.400	100.0	2.100	100.0
0.100	100.0	0.800	100.0	1.500	100.0	2.200	100.0
0.200	100.0	0.900	100.0	1.600	100.0	2.300	100.0
0.300	100.0	1.000	100.0	1.700	100.0	2.400	100.0
0.400	100.0	1.100	100.0	1.800	100.0	2.500	100.0
0.500	100.0	1.200	100.0	1.900	100.0		
0.600	100.0	1.300	100.0	2.000	100.0		


Hydro-Brake Optimum® Outflow Control

Unit Reference	MD-SHE-0206-2100-0600-2100
Design Head (m)	0.600
Design Flow (l/s)	21.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Diameter (mm)	206
Invert Level (m)	49.210
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.600	20.8
Flush-Flo™	0.300	20.8
Kick-Flo®	0.491	18.9
Mean Flow over Head Range	-	16.2

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake Optimum® as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated


Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	7.1	1.200	28.9	3.000	45.0	7.000	67.6
0.200	19.8	1.400	31.2	3.500	48.5	7.500	70.0
0.300	20.8	1.600	33.2	4.000	51.7	8.000	72.3
0.400	20.3	1.800	35.2	4.500	54.8	8.500	74.6
0.500	19.1	2.000	37.0	5.000	57.7	9.000	76.8
0.600	20.8	2.200	38.8	5.500	60.4	9.500	78.9
0.800	23.8	2.400	40.4	6.000	63.0		
1.000	26.5	2.600	42.0	6.500	65.1		

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Date 09/06/2017 14:12 File proposed 1 in 100 plus...	Designed by MJG Checked by	
Micro Drainage	Source Control 2015.1	

Summary of Results for 30 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m ³)	Status
15 min Summer	49.494	0.194	20.7	19.4	O K
30 min Summer	49.501	0.201	20.7	20.1	O K
60 min Summer	49.477	0.177	20.7	17.7	O K
120 min Summer	49.427	0.127	20.3	12.7	O K
180 min Summer	49.395	0.095	18.2	9.5	O K
240 min Summer	49.376	0.076	15.9	7.6	O K
360 min Summer	49.351	0.051	12.5	5.1	O K
480 min Summer	49.335	0.035	10.4	3.5	O K
600 min Summer	49.324	0.024	8.9	2.4	O K
720 min Summer	49.316	0.016	7.9	1.6	O K
960 min Summer	49.305	0.005	6.5	0.5	O K
1440 min Summer	49.300	0.000	4.9	0.0	O K
2160 min Summer	49.300	0.000	3.6	0.0	O K
2880 min Summer	49.300	0.000	2.8	0.0	O K
4320 min Summer	49.300	0.000	2.1	0.0	O K
5760 min Summer	49.300	0.000	1.6	0.0	O K
7200 min Summer	49.300	0.000	1.4	0.0	O K
8640 min Summer	49.300	0.000	1.2	0.0	O K
10080 min Summer	49.300	0.000	1.1	0.0	O K
15 min Winter	49.528	0.228	20.8	22.8	O K
30 min Winter	49.532	0.232	20.8	23.2	O K


Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m ³)	Time-Peak (mins)
15 min Summer	92.906	0.0	32.5	14
30 min Summer	59.953	0.0	42.0	22
60 min Summer	36.973	0.0	51.3	38
120 min Summer	22.137	0.0	62.4	70
180 min Summer	16.232	0.0	68.5	100
240 min Summer	12.972	0.0	73.0	130
360 min Summer	9.428	0.0	79.7	190
480 min Summer	7.517	0.0	84.8	250
600 min Summer	6.302	0.0	88.9	310
720 min Summer	5.454	0.0	92.3	370
960 min Summer	4.341	0.0	97.8	492
1440 min Summer	3.143	0.0	106.4	0
2160 min Summer	2.273	0.0	115.4	0
2880 min Summer	1.806	0.0	122.2	0
4320 min Summer	1.304	0.0	132.4	0
5760 min Summer	1.034	0.0	140.0	0
7200 min Summer	0.864	0.0	146.2	0
8640 min Summer	0.746	0.0	151.4	0
10080 min Summer	0.658	0.0	155.9	0
15 min Winter	92.906	0.0	36.7	15
30 min Winter	59.953	0.0	46.9	24

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Date 09/06/2017 14:12 File proposed 1 in 100 plus...	Designed by MJG Checked by	
Micro Drainage	Source Control 2015.1	

Summary of Results for 30 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m ³)	Status
60 min Winter	49.491	0.191	20.7	19.1	O K
120 min Winter	49.411	0.111	19.9	11.1	O K
180 min Winter	49.377	0.077	16.1	7.7	O K
240 min Winter	49.357	0.057	13.4	5.7	O K
360 min Winter	49.333	0.033	10.0	3.3	O K
480 min Winter	49.318	0.018	8.1	1.8	O K
600 min Winter	49.308	0.008	6.8	0.8	O K
720 min Winter	49.301	0.001	6.0	0.1	O K
960 min Winter	49.300	0.000	4.8	0.0	O K
1440 min Winter	49.300	0.000	3.5	0.0	O K
2160 min Winter	49.300	0.000	2.6	0.0	O K
2880 min Winter	49.300	0.000	2.1	0.0	O K
4320 min Winter	49.300	0.000	1.5	0.0	O K
5760 min Winter	49.300	0.000	1.2	0.0	O K
7200 min Winter	49.300	0.000	1.0	0.0	O K
8640 min Winter	49.300	0.000	0.8	0.0	O K
10080 min Winter	49.300	0.000	0.8	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m ³)	Time-Peak (mins)
60 min Winter	36.973	0.0	58.1	42
120 min Winter	22.137	0.0	70.0	72
180 min Winter	16.232	0.0	77.0	102
240 min Winter	12.972	0.0	81.9	132
360 min Winter	9.428	0.0	89.3	192
480 min Winter	7.517	0.0	95.0	254
600 min Winter	6.302	0.0	99.5	314
720 min Winter	5.454	0.0	103.4	368
960 min Winter	4.341	0.0	109.7	0
1440 min Winter	3.143	0.0	119.1	0
2160 min Winter	2.273	0.0	129.2	0
2880 min Winter	1.806	0.0	136.9	0
4320 min Winter	1.304	0.0	148.2	0
5760 min Winter	1.034	0.0	156.8	0
7200 min Winter	0.864	0.0	163.7	0
8640 min Winter	0.746	0.0	169.6	0
10080 min Winter	0.658	0.0	174.7	0

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Micro Drainage	Source Control 2015.1	

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)	20.000	Shortest Storm (mins)	15
Ratio R	0.422	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+20


Pipe Network

Volume in Pipe Network (m³)	1	Dia of Outfall Pipe (m)	0.2
Slope of Outfall Pipe (1:X)	150	Roughness of Outfall Pipe (mm)	0.600

Time Area Diagram

Total Area (ha) 0.188

Time (mins)		Area
From:	To:	(ha)
0	4	0.188

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Model Details

Storage is Online Cover Level (m) 49.900

Tank or Pond Structure

Invert Level (m) 49.300

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	100.0	0.700	100.0	1.400	100.0	2.100	100.0
0.100	100.0	0.800	100.0	1.500	100.0	2.200	100.0
0.200	100.0	0.900	100.0	1.600	100.0	2.300	100.0
0.300	100.0	1.000	100.0	1.700	100.0	2.400	100.0
0.400	100.0	1.100	100.0	1.800	100.0	2.500	100.0
0.500	100.0	1.200	100.0	1.900	100.0		
0.600	100.0	1.300	100.0	2.000	100.0		


Hydro-Brake Optimum® Outflow Control

Unit Reference	MD-SHE-0206-2100-0600-2100
Design Head (m)	0.600
Design Flow (l/s)	21.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Diameter (mm)	206
Invert Level (m)	49.210
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.600	20.8
Flush-Flo™	0.300	20.8
Kick-Flo®	0.491	18.9
Mean Flow over Head Range	-	16.2

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake Optimum® as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	7.1	1.200	28.9	3.000	45.0	7.000	67.6
0.200	19.8	1.400	31.2	3.500	48.5	7.500	70.0
0.300	20.8	1.600	33.2	4.000	51.7	8.000	72.3
0.400	20.3	1.800	35.2	4.500	54.8	8.500	74.6
0.500	19.1	2.000	37.0	5.000	57.7	9.000	76.8
0.600	20.8	2.200	38.8	5.500	60.4	9.500	78.9
0.800	23.8	2.400	40.4	6.000	63.0		
1.000	26.5	2.600	42.0	6.500	65.1		

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Micro Drainage	Source Control 2015.1	

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m ³)	Status
15 min Summer	49.569	0.269	20.8	26.9	O K
30 min Summer	49.606	0.306	20.8	30.6	Flood Risk
60 min Summer	49.574	0.274	20.8	27.4	O K
120 min Summer	49.510	0.210	20.8	21.0	O K
180 min Summer	49.452	0.152	20.5	15.2	O K
240 min Summer	49.414	0.114	20.1	11.4	O K
360 min Summer	49.378	0.078	16.2	7.8	O K
480 min Summer	49.358	0.058	13.4	5.8	O K
600 min Summer	49.344	0.044	11.5	4.4	O K
720 min Summer	49.334	0.034	10.2	3.3	O K
960 min Summer	49.319	0.019	8.2	1.9	O K
1440 min Summer	49.302	0.002	6.1	0.2	O K
2160 min Summer	49.300	0.000	4.5	0.0	O K
2880 min Summer	49.300	0.000	3.6	0.0	O K
4320 min Summer	49.300	0.000	2.6	0.0	O K
5760 min Summer	49.300	0.000	2.1	0.0	O K
7200 min Summer	49.300	0.000	1.7	0.0	O K
8640 min Summer	49.300	0.000	1.4	0.0	O K
10080 min Summer	49.300	0.000	1.3	0.0	O K
15 min Winter	49.620	0.320	20.8	32.0	Flood Risk
30 min Winter	49.651	0.351	20.8	35.1	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m ³)	Time-Peak (mins)
15 min Summer	120.653	0.0	41.2	15
30 min Summer	78.493	0.0	55.3	24
60 min Summer	48.611	0.0	67.7	40
120 min Summer	29.095	0.0	82.0	74
180 min Summer	21.273	0.0	90.1	102
240 min Summer	16.942	0.0	95.6	130
360 min Summer	12.241	0.0	103.5	190
480 min Summer	9.724	0.0	109.7	250
600 min Summer	8.128	0.0	114.6	310
720 min Summer	7.017	0.0	118.7	370
960 min Summer	5.561	0.0	125.4	492
1440 min Summer	4.002	0.0	135.4	734
2160 min Summer	2.875	0.0	145.9	0
2880 min Summer	2.272	0.0	153.8	0
4320 min Summer	1.628	0.0	165.3	0
5760 min Summer	1.285	0.0	173.9	0
7200 min Summer	1.068	0.0	180.7	0
8640 min Summer	0.918	0.0	186.5	0
10080 min Summer	0.808	0.0	191.4	0
15 min Winter	120.653	0.0	47.0	16
30 min Winter	78.493	0.0	61.4	26

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m ³)	Status
60 min Winter	49.609	0.309	20.8	30.9	Flood Risk
120 min Winter	49.498	0.198	20.7	19.8	O K
180 min Winter	49.419	0.119	20.2	11.9	O K
240 min Winter	49.387	0.087	17.3	8.7	O K
360 min Winter	49.355	0.055	13.0	5.5	O K
480 min Winter	49.336	0.036	10.5	3.6	O K
600 min Winter	49.324	0.024	8.8	2.4	O K
720 min Winter	49.315	0.015	7.7	1.5	O K
960 min Winter	49.302	0.002	6.1	0.2	O K
1440 min Winter	49.300	0.000	4.5	0.0	O K
2160 min Winter	49.300	0.000	3.3	0.0	O K
2880 min Winter	49.300	0.000	2.6	0.0	O K
4320 min Winter	49.300	0.000	1.9	0.0	O K
5760 min Winter	49.300	0.000	1.5	0.0	O K
7200 min Winter	49.300	0.000	1.2	0.0	O K
8640 min Winter	49.300	0.000	1.1	0.0	O K
10080 min Winter	49.300	0.000	0.9	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m ³)	Time-Peak (mins)
60 min Winter	48.611	0.0	75.9	44
120 min Winter	29.095	0.0	91.8	76
180 min Winter	21.273	0.0	100.6	104
240 min Winter	16.942	0.0	107.1	132
360 min Winter	12.241	0.0	116.0	192
480 min Winter	9.724	0.0	122.7	252
600 min Winter	8.128	0.0	128.3	314
720 min Winter	7.017	0.0	132.9	374
960 min Winter	5.561	0.0	140.5	494
1440 min Winter	4.002	0.0	151.7	0
2160 min Winter	2.875	0.0	163.5	0
2880 min Winter	2.272	0.0	172.2	0
4320 min Winter	1.628	0.0	185.2	0
5760 min Winter	1.285	0.0	194.7	0
7200 min Winter	1.068	0.0	202.4	0
8640 min Winter	0.918	0.0	208.9	0
10080 min Winter	0.808	0.0	214.4	0