

Summary of Results for 100 year Return Period (+30%)

Half Drain Time : 25 minutes.


Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max $\Sigma$ Outflow (l/s)	Max Volume (m <sup>3</sup> )	Status
15 min Summer	52.423	0.023	0.0	13.0	13.0	11.3	Flood Risk
30 min Summer	52.444	0.044	0.0	13.0	13.0	21.7	Flood Risk
60 min Summer	52.462	0.062	0.0	13.0	13.0	30.1	Flood Risk
120 min Summer	52.462	0.062	0.0	13.0	13.0	30.5	Flood Risk
180 min Summer	52.452	0.052	0.0	13.0	13.0	25.6	Flood Risk
240 min Summer	52.442	0.042	0.0	13.0	13.0	20.3	Flood Risk
360 min Summer	52.423	0.023	0.0	13.0	13.0	11.3	Flood Risk
480 min Summer	52.410	0.010	0.0	13.0	13.0	4.7	Flood Risk
600 min Summer	52.402	0.002	0.0	13.0	13.0	0.8	Flood Risk
720 min Summer	52.400	0.000	0.0	12.3	12.3	0.0	Flood Risk
960 min Summer	52.400	0.000	0.0	10.0	10.0	0.0	Flood Risk
1440 min Summer	52.400	0.000	0.0	7.4	7.4	0.0	Flood Risk
2160 min Summer	52.400	0.000	0.0	5.3	5.3	0.0	Flood Risk
2880 min Summer	52.400	0.000	0.0	4.2	4.2	0.0	Flood Risk
4320 min Summer	52.400	0.000	0.0	3.0	3.0	0.0	Flood Risk
5760 min Summer	52.400	0.000	0.0	2.3	2.3	0.0	Flood Risk
7200 min Summer	52.400	0.000	0.0	1.9	1.9	0.0	Flood Risk
8640 min Summer	52.400	0.000	0.0	1.6	1.6	0.0	Flood Risk
10080 min Summer	52.400	0.000	0.0	1.4	1.4	0.0	Flood Risk
15 min Winter	52.433	0.033	0.0	13.0	13.0	16.3	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m <sup>3</sup> )	Discharge Volume (m <sup>3</sup> )	Time-Peak (mins)
15 min Summer	139.894	0.0	38.9	28
30 min Summer	90.253	0.0	55.0	41
60 min Summer	55.351	0.0	70.7	64
120 min Summer	32.779	0.0	87.7	98
180 min Summer	23.815	0.0	96.3	128
240 min Summer	18.879	0.0	102.3	160
360 min Summer	13.605	0.0	112.3	218
480 min Summer	10.775	0.0	118.5	274
600 min Summer	8.987	0.0	123.7	322
720 min Summer	7.745	0.0	127.9	0
960 min Summer	6.121	0.0	134.3	0
1440 min Summer	4.387	0.0	143.0	0
2160 min Summer	3.141	0.0	150.6	0
2880 min Summer	2.475	0.0	155.0	0
4320 min Summer	1.768	0.0	158.9	0
5760 min Summer	1.391	0.0	159.4	0
7200 min Summer	1.155	0.0	158.4	0
8640 min Summer	0.991	0.0	156.3	0
10080 min Summer	0.871	0.0	153.4	0
15 min Winter	139.894	0.0	45.6	30

Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (1/s)	Max Control (1/s)	Max Σ Outflow (1/s)	Max Volume (m <sup>3</sup> )	Status
30 min Winter	52.458	0.058	0.0	13.0	13.0	28.3	Flood Risk
60 min Winter	52.477	0.077	0.0	13.0	13.0	37.6	Flood Risk
120 min Winter	52.475	0.075	0.0	13.0	13.0	36.8	Flood Risk
180 min Winter	52.459	0.059	0.0	13.0	13.0	29.1	Flood Risk
240 min Winter	52.442	0.042	0.0	13.0	13.0	20.6	Flood Risk
360 min Winter	52.414	0.014	0.0	13.0	13.0	6.8	Flood Risk
480 min Winter	52.400	0.000	0.0	12.9	12.9	0.0	Flood Risk
600 min Winter	52.400	0.000	0.0	10.9	10.9	0.0	Flood Risk
720 min Winter	52.400	0.000	0.0	9.5	9.5	0.0	Flood Risk
960 min Winter	52.400	0.000	0.0	7.5	7.5	0.0	Flood Risk
1440 min Winter	52.400	0.000	0.0	5.4	5.4	0.0	Flood Risk
2160 min Winter	52.400	0.000	0.0	3.9	3.9	0.0	Flood Risk
2880 min Winter	52.400	0.000	0.0	3.0	3.0	0.0	Flood Risk
4320 min Winter	52.400	0.000	0.0	2.1	2.1	0.0	Flood Risk
5760 min Winter	52.400	0.000	0.0	1.6	1.6	0.0	Flood Risk
7200 min Winter	52.400	0.000	0.0	1.3	1.3	0.0	Flood Risk
8640 min Winter	52.400	0.000	0.0	1.1	1.1	0.0	Flood Risk
10080 min Winter	52.400	0.000	0.0	1.0	1.0	0.0	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m <sup>3</sup> )	Discharge Volume (m <sup>3</sup> )	Time-Peak (mins)
30 min Winter	90.253	0.0	63.6	43
60 min Winter	55.351	0.0	81.3	66
120 min Winter	32.779	0.0	100.1	104
180 min Winter	23.815	0.0	110.3	136
240 min Winter	18.879	0.0	117.8	168
360 min Winter	13.605	0.0	128.0	224
480 min Winter	10.775	0.0	135.4	0
600 min Winter	8.987	0.0	141.2	0
720 min Winter	7.745	0.0	145.9	0
960 min Winter	6.121	0.0	153.4	0
1440 min Winter	4.387	0.0	163.5	0
2160 min Winter	3.141	0.0	172.7	0
2880 min Winter	2.475	0.0	178.3	0
4320 min Winter	1.768	0.0	184.1	0
5760 min Winter	1.391	0.0	186.0	0
7200 min Winter	1.155	0.0	185.8	0
8640 min Winter	0.991	0.0	184.4	0
10080 min Winter	0.871	0.0	182.4	0

Ardent Consulting Engineers		Page 3
4th Floor, Diamond House 36-38 Hatton Garden London EC1N 8EB		
Date 23/12/2017 10:20 File Northern Permeable Pavi...	Designed by JChinnock Checked by	
Micro Drainage		Source Control 2017.1.2

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)	21.000	Shortest Storm (mins)	15
Ratio R	0.440	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.051

Time (mins)	Area (ha)	Time (mins)	Area (ha)
From:	To:	From:	To:
0	4 0.025	4	8 0.026

Green Roof

Area (m <sup>2</sup> )	1635	Evaporation (mm/day)	3
Depression Storage (mm)	5	Decay Coefficient	0.050

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
From:	To:	From:	To:	From:	To:	From:	To:
0	4 0.029711	32	36 0.005999	64	68 0.001211	96	100 0.000245
4	8 0.024325	36	40 0.004911	68	72 0.000992	100	104 0.000200
8	12 0.019916	40	44 0.004021	72	76 0.000812	104	108 0.000164
12	16 0.016306	44	48 0.003292	76	80 0.000665	108	112 0.000134
16	20 0.013350	48	52 0.002695	80	84 0.000544	112	116 0.000110
20	24 0.010930	52	56 0.002207	84	88 0.000446	116	120 0.000090
24	28 0.008949	56	60 0.001807	88	92 0.000365		
28	32 0.007327	60	64 0.001479	92	96 0.000299		

Model Details

Storage is Online Cover Level (m) 52.600

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	46.6
Membrane Percolation (mm/hr)	1000	Length (m)	35.0
Max Percolation (l/s)	453.1	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	52.400	Cap Volume Depth (m)	0.150

Hydroslide Outflow Control

Design Head (m)	2.000	Invert Level (m)	50.400
Design Flow (l/s)	13.0	Maximum Head (m)	2.025
Range	VS	Minimum Pipe Diameter (mm)	150
Application	Stormwater	Minimum Manhole Diameter (mm)	1800
Model DR 200/150 VS			

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	6.6	1.200	13.0	3.000	13.7	7.000	20.9
0.200	13.0	1.400	13.0	3.500	14.8	7.500	21.6
0.300	13.0	1.600	13.0	4.000	15.8	8.000	22.3
0.400	13.0	1.800	13.0	4.500	16.7	8.500	23.0
0.500	13.0	2.000	13.0	5.000	17.6	9.000	23.7
0.600	13.0	2.200	11.7	5.500	18.5	9.500	24.3
0.800	13.0	2.400	12.2	6.000	19.3		
1.000	13.0	2.600	12.7	6.500	20.1		