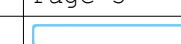


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20 Britton Street London EC1M 5TX		CAR PARK/ATTENUATION TANK PALMER PARK					
Date 27/07/2021 File 1IN100 TANK +40% @ 11.1...		Designed by MH Checked by MK					
Micro Drainage		Source Control 2020.1					
Summary of Results for 100 year Return Period (+40%)							
Half Drain Time : 97 minutes.							
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	47.549	0.379	0.0	11.1	11.1	57.5	O K
30 min Summer	47.681	0.511	0.0	11.1	11.1	77.7	O K
60 min Summer	47.802	0.632	0.0	11.1	11.1	96.0	O K
120 min Summer	47.850	0.680	0.0	11.1	11.1	103.4	O K
180 min Summer	47.839	0.669	0.0	11.1	11.1	101.7	O K
240 min Summer	47.815	0.645	0.0	11.1	11.1	98.0	O K
360 min Summer	47.748	0.578	0.0	11.1	11.1	87.9	O K
480 min Summer	47.673	0.503	0.0	11.1	11.1	76.5	O K
600 min Summer	47.606	0.436	0.0	11.1	11.1	66.3	O K
720 min Summer	47.547	0.377	0.0	11.1	11.1	57.3	O K
960 min Summer	47.452	0.282	0.0	11.1	11.1	42.8	O K
1440 min Summer	47.347	0.177	0.0	10.8	10.8	26.9	O K
2160 min Summer	47.305	0.135	0.0	8.6	8.6	20.5	O K
2880 min Summer	47.286	0.116	0.0	7.0	7.0	17.6	O K
4320 min Summer	47.265	0.095	0.0	5.1	5.1	14.4	O K
5760 min Summer	47.253	0.083	0.0	4.1	4.1	12.6	O K
7200 min Summer	47.244	0.074	0.0	3.4	3.4	11.3	O K
8640 min Summer	47.238	0.068	0.0	2.9	2.9	10.4	O K
10080 min Summer	47.234	0.064	0.0	2.6	2.6	9.7	O K
15 min Winter	47.604	0.434	0.0	11.1	11.1	66.0	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)			
15 min Summer	130.597	0.0	76.3	25			
30 min Summer	85.825	0.0	101.8	40			
60 min Summer	53.779	0.0	129.1	66			
120 min Summer	32.595	0.0	157.4	114			
180 min Summer	24.012	0.0	174.4	144			
240 min Summer	19.224	0.0	186.4	176			
360 min Summer	13.954	0.0	203.2	244			
480 min Summer	11.125	0.0	216.1	306			
600 min Summer	9.325	0.0	226.5	368			
720 min Summer	8.069	0.0	235.2	428			
960 min Summer	6.417	0.0	249.3	542			
1440 min Summer	4.640	0.0	270.0	760			
2160 min Summer	3.350	0.0	291.9	1108			
2880 min Summer	2.656	0.0	307.7	1472			
4320 min Summer	1.912	0.0	330.2	2204			
5760 min Summer	1.513	0.0	346.6	2936			
7200 min Summer	1.261	0.0	359.0	3672			
8640 min Summer	1.086	0.0	368.9	4400			
10080 min Summer	0.957	0.0	377.0	5072			
15 min Winter	130.597	0.0	86.0	26			
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20 Britton Street London EC1M 5TX	CAR PARK/ATTENUATION TANK PALMER PARK						
Date 27/07/2021 File 1IN100 TANK +40% @ 11.1...	Designed by MH Checked by MK						
Micro Drainage Source Control 2020.1							
<u>Summary of Results for 100 year Return Period (+40%)</u>							
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	47.759	0.589	0.0	11.1	11.1	89.5	O K
60 min Winter	47.892	0.722	0.0	11.1	11.1	109.7	O K
120 min Winter	47.952	0.782	0.0	11.1	11.1	118.8	O K
180 min Winter	47.931	0.761	0.0	11.1	11.1	115.6	O K
240 min Winter	47.896	0.726	0.0	11.1	11.1	110.3	O K
360 min Winter	47.800	0.630	0.0	11.1	11.1	95.7	O K
480 min Winter	47.683	0.513	0.0	11.1	11.1	78.0	O K
600 min Winter	47.578	0.408	0.0	11.1	11.1	62.0	O K
720 min Winter	47.490	0.320	0.0	11.1	11.1	48.7	O K
960 min Winter	47.373	0.203	0.0	11.0	11.0	30.8	O K
1440 min Winter	47.309	0.139	0.0	8.9	8.9	21.1	O K
2160 min Winter	47.280	0.110	0.0	6.5	6.5	16.7	O K
2880 min Winter	47.265	0.095	0.0	5.2	5.2	14.5	O K
4320 min Winter	47.248	0.078	0.0	3.7	3.7	11.9	O K
5760 min Winter	47.239	0.069	0.0	2.9	2.9	10.4	O K
7200 min Winter	47.232	0.062	0.0	2.5	2.5	9.4	O K
8640 min Winter	47.227	0.057	0.0	2.1	2.1	8.7	O K
10080 min Winter	47.223	0.053	0.0	1.8	1.8	8.1	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)			
30 min Winter	85.825	0.0	114.7	40			
60 min Winter	53.779	0.0	145.2	66			
120 min Winter	32.595	0.0	176.9	118			
180 min Winter	24.012	0.0	196.0	150			
240 min Winter	19.224	0.0	209.4	188			
360 min Winter	13.954	0.0	228.3	262			
480 min Winter	11.125	0.0	242.8	330			
600 min Winter	9.325	0.0	254.4	390			
720 min Winter	8.069	0.0	264.2	446			
960 min Winter	6.417	0.0	280.1	546			
1440 min Winter	4.640	0.0	303.4	756			
2160 min Winter	3.350	0.0	328.0	1112			
2880 min Winter	2.656	0.0	345.9	1472			
4320 min Winter	1.912	0.0	371.5	2208			
5760 min Winter	1.513	0.0	390.2	2928			
7200 min Winter	1.261	0.0	404.5	3624			
8640 min Winter	1.086	0.0	416.1	4376			
10080 min Winter	0.957	0.0	425.6	5000			
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20 Britton Street London EC1M 5TX	CAR PARK/ATTENUATION TANK PALMER PARK	
Date 27/07/2021 File 1IN100 TANK +40% @ 11.1...	Designed by MH Checked by MK	
Micro Drainage		
Source Control 2020.1		

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)	19.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Green Roof

Area (m³)	905	Evaporation (mm/day)	3
Depression Storage (mm)	5	Decay Coefficient	0.050

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.016446	32	36	0.003320	64	68	0.000670	96	100	0.000135
4	8	0.013465	36	40	0.002718	68	72	0.000549	100	104	0.000111
8	12	0.011024	40	44	0.002226	72	76	0.000449	104	108	0.000091
12	16	0.009026	44	48	0.001822	76	80	0.000368	108	112	0.000074
16	20	0.007389	48	52	0.001492	80	84	0.000301	112	116	0.000061
20	24	0.006050	52	56	0.001221	84	88	0.000247	116	120	0.000050
24	28	0.004953	56	60	0.001000	88	92	0.000202			
28	32	0.004055	60	64	0.000819	92	96	0.000165			

Time Area Diagram

Total Area (ha) 0.242

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.081	4	8	0.081	8	12	0.080

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20 Britton Street London EC1M 5TX	CAR PARK/ATTENUATION TANK PALMER PARK	
Date 27/07/2021 File 1IN100 TANK +40% @ 11.1...	Designed by MH Checked by MK	
Micro Drainage Source Control 2020.1		

Model Details

Storage is Online Cover Level (m) 48.710

Cellular Storage Structure

Invert Level (m) 47.170 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	160.0	0.0	0.801	0.0	0.0
0.800	160.0	0.0			

Hydro-Brake® Optimum Outflow Control

Unit Reference MD-SHE-0156-1110-0800-1110
Design Head (m) 0.800
Design Flow (l/s) 11.1
Flush-Flo™ Calculated
Objective Minimise upstream storage
Application Surface
Sump Available Yes
Diameter (mm) 156
Invert Level (m) 47.170
Minimum Outlet Pipe Diameter (mm) 225
Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.800	11.1
Flush-Flo™	0.267	11.1
Kick-Flo®	0.574	9.5
Mean Flow over Head Range	-	9.3

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	5.6	1.200	13.4	3.000	20.8	7.000	31.3
0.200	10.9	1.400	14.5	3.500	22.4	7.500	32.3
0.300	11.1	1.600	15.4	4.000	23.9	8.000	33.3
0.400	10.8	1.800	16.3	4.500	25.3	8.500	34.2
0.500	10.4	2.000	17.1	5.000	26.6	9.000	35.2
0.600	9.7	2.200	17.9	5.500	27.8	9.500	36.2
0.800	11.1	2.400	18.7	6.000	29.0		
1.000	12.3	2.600	19.4	6.500	30.2		

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