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20 Milton Park Abingdon Oxfordshire OX14 4SH	Land North of Green Lane Chesterton Basin 2	
Date 07/11/2016 File Cascade.casx	Designed by HSS Checked by JR	
Causeway		Source Control 2014.1.1

Cascade Summary of Results for Basin 2 + Hydrobreak.srcx

Upstream Structures	Outflow To	Overflow To
Basin 1 - Infiltration - 2100 area.srcx	(None)	(None)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	74.464	0.364	4.9	139.2	O K
30 min Summer	74.546	0.446	4.9	181.4	O K
60 min Summer	74.621	0.521	4.9	222.5	O K
120 min Summer	74.683	0.583	4.9	258.5	O K
180 min Summer	74.710	0.610	4.9	274.3	O K
240 min Summer	74.722	0.622	4.9	281.3	O K
360 min Summer	74.728	0.628	4.9	284.9	O K
480 min Summer	74.722	0.622	4.9	281.3	O K
600 min Summer	74.713	0.613	4.9	275.9	O K
720 min Summer	74.703	0.603	4.9	270.2	O K
960 min Summer	74.683	0.583	4.9	258.4	O K
1440 min Summer	74.642	0.542	4.9	234.7	O K
2160 min Summer	74.583	0.483	4.9	201.3	O K
2880 min Summer	74.527	0.427	4.9	171.1	O K
4320 min Summer	74.428	0.328	4.9	122.2	O K
5760 min Summer	74.350	0.250	4.8	87.9	O K
7200 min Summer	74.292	0.192	4.6	65.4	O K
8640 min Summer	74.252	0.152	4.4	51.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	128.285	0.0	141.6	26
30 min Summer	84.226	0.0	186.3	40
60 min Summer	52.662	0.0	235.7	70
120 min Summer	31.800	0.0	284.8	128
180 min Summer	23.353	0.0	313.8	186
240 min Summer	18.644	0.0	334.0	244
360 min Summer	13.543	0.0	364.0	362
480 min Summer	10.792	0.0	386.7	468
600 min Summer	9.043	0.0	405.0	514
720 min Summer	7.823	0.0	420.4	574
960 min Summer	6.219	0.0	445.4	694
1440 min Summer	4.493	0.0	482.3	962
2160 min Summer	3.241	0.0	524.3	1364
2880 min Summer	2.568	0.0	553.8	1740
4320 min Summer	1.847	0.0	596.8	2472
5760 min Summer	1.461	0.0	630.6	3176
7200 min Summer	1.217	0.0	656.6	3832
8640 min Summer	1.048	0.0	678.2	4504


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Cascade Summary of Results for Basin 2 + Hydrobreak.srcx

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m ³)	Status
10080 min Summer	74.227	0.127	4.2	41.9	O K
15 min Winter	74.499	0.399	4.9	156.5	O K
30 min Winter	74.588	0.488	4.9	204.1	O K
60 min Winter	74.670	0.570	4.9	250.8	O K
120 min Winter	74.741	0.641	4.9	293.0	O K
180 min Winter	74.772	0.672	4.9	312.5	O K
240 min Winter	74.788	0.688	4.9	322.2	O K
360 min Winter	74.800	0.700	4.9	330.0	O K
480 min Winter	74.800	0.700	4.9	329.7	O K
600 min Winter	74.792	0.692	4.9	324.5	O K
720 min Winter	74.779	0.679	4.9	316.4	O K
960 min Winter	74.751	0.651	4.9	299.2	O K
1440 min Winter	74.695	0.595	4.9	265.2	O K
2160 min Winter	74.606	0.506	4.9	214.1	O K
2880 min Winter	74.521	0.421	4.9	168.4	O K
4320 min Winter	74.377	0.277	4.9	99.4	O K
5760 min Winter	74.278	0.178	4.6	60.3	O K
7200 min Winter	74.225	0.125	4.2	41.2	O K
8640 min Winter	74.207	0.107	3.7	35.0	O K
10080 min Winter	74.195	0.095	3.2	31.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m ³)	Time-Peak (mins)
10080 min Summer	0.923	0.0	696.4	5152
15 min Winter	128.285	0.0	158.8	26
30 min Winter	84.226	0.0	208.8	40
60 min Winter	52.662	0.0	264.1	68
120 min Winter	31.800	0.0	319.0	126
180 min Winter	23.353	0.0	351.5	184
240 min Winter	18.644	0.0	374.1	242
360 min Winter	13.543	0.0	407.6	356
480 min Winter	10.792	0.0	433.1	468
600 min Winter	9.043	0.0	453.5	576
720 min Winter	7.823	0.0	470.7	678
960 min Winter	6.219	0.0	498.8	758
1440 min Winter	4.493	0.0	540.0	1054
2160 min Winter	3.241	0.0	587.2	1476
2880 min Winter	2.568	0.0	620.4	1876
4320 min Winter	1.847	0.0	668.8	2560
5760 min Winter	1.461	0.0	706.5	3224
7200 min Winter	1.217	0.0	735.6	3760
8640 min Winter	1.048	0.0	759.8	4488
10080 min Winter	0.923	0.0	780.4	5152

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Cascade Rainfall Details for Basin 2 + Hydrobreak.srcx

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)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.600

Time (mins)	Area	Time (mins)	Area	Time (mins)	Area
From:	To:	(ha)	From:	To:	(ha)
0	4	0.200	4	8	0.200
			8	12	0.200

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Cascade Model Details for Basin 2 + Hydrobreak.srcx

Storage is Online Cover Level (m) 75.300

Tank or Pond Structure

Invert Level (m) 74.100

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	310.0	1.400	0.0	2.800	0.0	4.200	0.0
0.200	375.0	1.600	0.0	3.000	0.0	4.400	0.0
0.400	517.0	1.800	0.0	3.200	0.0	4.600	0.0
0.600	595.0	2.000	0.0	3.400	0.0	4.800	0.0
0.800	676.0	2.200	0.0	3.600	0.0	5.000	0.0
1.000	761.0	2.400	0.0	3.800	0.0		
1.200	850.0	2.600	0.0	4.000	0.0		

Hydro-Brake Optimum® Outflow Control

Unit Reference	MD-SHE-0102-5000-1200-5000
Design Head (m)	1.200
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Diameter (mm)	102
Invert Level (m)	74.100
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	5.0
Flush-Flo™	0.353	4.9
Kick-Flo®	0.740	4.0
Mean Flow over Head Range	-	4.3

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	3.4	1.200	5.0	3.000	7.6	7.000	11.4
0.200	4.7	1.400	5.3	3.500	8.2	7.500	11.8
0.300	4.9	1.600	5.7	4.000	8.7	8.000	12.1
0.400	4.9	1.800	6.0	4.500	9.2	8.500	12.5
0.500	4.8	2.000	6.3	5.000	9.7	9.000	12.8
0.600	4.6	2.200	6.6	5.500	10.2	9.500	13.2
0.800	4.1	2.400	6.9	6.000	10.6		
1.000	4.6	2.600	7.1	6.500	11.0		