

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	30	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
Rainfall Events	Singular	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	20.000	Additional Storage (m³/ha)	20.0
Ratio-R	0.400	Starting Level (m)	
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
100	45	0	0

Node MH 1 HB Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	39.400	Product Number	CTL-SHE-0089-5000-2300-5000
Design Depth (m)	2.300	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	5.0	Min Node Diameter (mm)	1200

Node PP1 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	41.250	Slope (1:X)	100.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	51	Depth (m)	
Safety Factor	2.0	Width (m)	6.200	Inf Depth (m)	0.300
Porosity	0.30	Length (m)	10.000		

Node PP2 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	41.350	Slope (1:X)	100.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	34	Depth (m)	0.500
Safety Factor	2.0	Width (m)	23.500	Inf Depth (m)	0.300
Porosity	0.30	Length (m)	3.000		

Node Greenroof 1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	56.797
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	53.0	53.0	0.048	53.0	54.2

Node Greenroof 2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	54.082
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	83.0	83.0	0.048	83.0	84.6

Results for 1 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	3	11	40.981	0.028	2.0	0.0044	0.0000	OK
15 minute winter	CP 1	10	40.636	0.048	5.3	0.0076	0.0000	OK
15 minute winter	5	10	40.436	0.037	5.8	0.0124	0.0000	OK
15 minute winter	CP 2	16	40.185	0.636	9.8	0.1011	0.0000	SURCHARGED
15 minute winter	MH 1 HB	16	40.184	0.784	8.0	0.8862	0.0000	SURCHARGED
15 minute winter	EX CW IC	25	39.155	0.035	3.8	0.0099	0.0000	OK
15 minute winter	OUTFALL	25	38.823	0.034	3.8	0.0000	0.0000	OK
15 minute winter	8	16	40.184	0.041	1.7	0.0126	0.0000	OK
15 minute winter	7	16	40.184	0.644	3.8	0.1023	0.0000	SURCHARGED
15 minute winter	PP2	12	41.374	0.024	1.8	0.2084	0.0000	OK
15 minute winter	4	10	40.851	0.043	4.5	0.0166	0.0000	OK
15 minute winter	2	10	41.110	0.036	2.0	0.0058	0.0000	OK
15 minute winter	1	10	41.166	0.036	2.0	0.0222	0.0000	OK
15 minute winter	6	10	40.842	0.017	2.7	0.0068	0.0000	OK
15 minute winter	junction	16	40.185	0.218	8.5	0.0000	0.0000	SURCHARGED
15 minute winter	PP1	11	41.267	0.017	0.8	0.0320	0.0000	OK
15 minute winter	Greenroof 2	10	41.812	0.012	1.1	0.0002	0.0000	OK
15 minute winter	Greenroof 1	10	41.214	0.014	1.0	0.0002	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	3	1.002	4	2.0	0.625	0.073	0.0209	
15 minute winter	CP 1	1.004	5	5.2	1.294	0.188	0.0314	
15 minute winter	5	1.005 (A)	junction	5.8	1.518	0.130	0.0698	
15 minute winter	CP 2	1.006	MH 1 HB	8.0	0.663	0.178	0.0416	
15 minute winter	MH 1 HB	1.007	EX CW IC	3.8	1.425	0.072	0.0085	
15 minute winter	EX CW IC	1.008	OUTFALL	3.8	0.992	0.051	0.0606	5.5
15 minute winter	8	3.000	7	1.7	0.856	0.007	0.4594	
15 minute winter	7	3.001	MH 1 HB	-2.2	0.191	-0.009	0.1983	
15 minute winter	PP2	5.000	CP 2	1.5	1.102	0.109	0.0026	
15 minute winter	4	1.003	CP 1	4.5	1.058	0.169	0.0412	
15 minute winter	2	1.001	3	2.0	0.717	0.117	0.0371	
15 minute winter	1	1.000	2	2.0	0.613	0.112	0.0180	
15 minute winter	6	2.000	junction	2.7	3.160	0.059	0.0060	
15 minute winter	junction	1.005 (B)	CP 2	8.5	1.697	0.189	0.1060	
15 minute winter	PP1	4.000	CP 1	0.8	0.932	0.058	0.0026	
15 minute winter	Greenroof 2	4.000_1	6	1.1	2.347	0.025	0.0008	
15 minute winter	Greenroof 1	2.000_1	4	1.0	1.612	0.035	0.0010	

Results for 30 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	3	29	41.232	0.279	3.7	0.0444	0.0000	SURCHARGED
30 minute winter	CP 1	29	41.232	0.644	10.2	0.1024	0.0000	SURCHARGED
30 minute winter	5	29	41.230	0.831	11.3	0.2827	0.0000	SURCHARGED
30 minute winter	CP 2	29	41.227	1.678	14.6	0.2669	0.0000	SURCHARGED
30 minute winter	MH 1 HB	29	41.225	1.825	11.6	2.0640	0.0000	SURCHARGED
30 minute winter	EX CW IC	29	39.158	0.038	4.5	0.0107	0.0000	OK
30 minute winter	OUTFALL	29	38.826	0.037	4.5	0.0000	0.0000	OK
30 minute winter	8	29	41.225	1.082	4.5	0.3354	0.0000	SURCHARGED
30 minute winter	7	29	41.225	1.685	4.7	0.2679	0.0000	SURCHARGED
15 minute winter	PP2	12	41.389	0.039	4.5	0.5231	0.0000	OK
30 minute winter	4	29	41.233	0.425	8.5	0.1632	0.0000	SURCHARGED
30 minute winter	2	29	41.234	0.160	3.7	0.0254	0.0000	SURCHARGED
30 minute winter	1	29	41.233	0.103	3.7	0.0647	0.0000	OK
30 minute winter	6	29	41.230	0.405	5.0	0.1571	0.0000	SURCHARGED
30 minute winter	junction	29	41.229	1.262	14.9	0.0000	0.0000	SURCHARGED
15 minute winter	PP1	11	41.277	0.027	2.1	0.0777	0.0000	OK
15 minute winter	Greenroof 2	10	41.819	0.019	2.8	0.0004	0.0000	OK
30 minute winter	Greenroof 1	29	41.232	0.032	1.9	0.0006	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute winter	3	1.002	4	3.7	0.755	0.139	0.1146	
30 minute winter	CP 1	1.004	5	10.2	1.491	0.365	0.1357	
30 minute winter	5	1.005 (A)	junction	10.1	1.584	0.227	0.1218	
30 minute winter	CP 2	1.006	MH 1 HB	11.6	0.727	0.258	0.0416	
30 minute winter	MH 1 HB	1.007	EX CW IC	4.5	1.484	0.083	0.0094	
30 minute winter	EX CW IC	1.008	OUTFALL	4.5	1.035	0.059	0.0675	17.8
30 minute winter	8	3.000	7	2.4	0.741	0.010	0.8498	
30 minute winter	7	3.001	MH 1 HB	-4.7	0.188	-0.019	0.1983	
15 minute winter	PP2	5.000	CP 2	3.7	1.395	0.270	0.0051	
30 minute winter	4	1.003	CP 1	8.6	1.270	0.323	0.1708	
30 minute winter	2	1.001	3	3.7	0.856	0.220	0.2372	
30 minute winter	1	1.000	2	3.7	0.718	0.208	0.0851	
30 minute winter	6	2.000	junction	4.9	3.411	0.107	0.0112	
30 minute winter	junction	1.005 (B)	CP 2	12.2	1.579	0.274	0.1060	
15 minute winter	PP1	4.000	CP 1	2.0	1.212	0.149	0.0051	
15 minute winter	Greenroof 2	4.000_1	6	2.8	3.026	0.063	0.0074	
30 minute winter	Greenroof 1	2.000_1	4	1.9	1.918	0.067	0.0080	

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	3	57	41.623	0.670	4.1	0.1066	0.0000	FLOOD RISK
60 minute winter	CP 1	57	41.622	1.034	9.1	0.1644	0.0000	FLOOD RISK
60 minute winter	5	57	41.620	1.221	8.7	0.4152	0.0000	FLOOD RISK
60 minute winter	CP 2	57	41.616	2.067	10.9	0.3286	0.0000	FLOOD RISK
60 minute winter	MH 1 HB	57	41.613	2.213	8.6	2.5025	0.0000	FLOOD RISK
60 minute winter	EX CW IC	57	39.160	0.040	4.9	0.0112	0.0000	OK
60 minute winter	OUTFALL	57	38.828	0.039	4.9	0.0000	0.0000	OK
60 minute winter	8	57	41.613	1.470	4.0	0.4556	0.0000	FLOOD RISK
60 minute winter	7	57	41.613	2.073	3.7	0.3296	0.0000	FLOOD RISK
60 minute winter	PP2	57	41.616	0.266	8.7	5.4480	0.0000	FLOOD RISK
60 minute winter	4	56	41.623	0.815	8.9	0.3130	0.0000	FLOOD RISK
60 minute winter	2	57	41.624	0.550	4.2	0.0874	0.0000	FLOOD RISK
60 minute winter	1	57	41.624	0.494	4.7	0.3091	0.0000	FLOOD RISK
60 minute winter	6	56	41.619	0.794	6.4	0.3082	0.0000	FLOOD RISK
60 minute winter	junction	57	41.618	1.651	10.8	0.0000	0.0000	FLOOD RISK
60 minute winter	PP1	57	41.622	0.372	10.1	6.0800	0.0000	FLOOD RISK
15 minute winter	Greenroof 2	9	41.825	0.025	5.2	0.0005	0.0000	OK
60 minute winter	Greenroof 1	56	41.623	0.423	2.4	0.0072	0.0000	SURCHARGED
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute winter	3	1.002	4	3.8	0.742	0.143	0.1146	
60 minute winter	CP 1	1.004	5	7.8	1.366	0.279	0.1357	
60 minute winter	5	1.005 (A)	junction	7.1	1.421	0.159	0.1218	
60 minute winter	CP 2	1.006	MH 1 HB	8.6	0.650	0.191	0.0416	
60 minute winter	MH 1 HB	1.007	EX CW IC	4.9	1.519	0.091	0.0101	
60 minute winter	EX CW IC	1.008	OUTFALL	4.9	1.062	0.064	0.0720	42.4
60 minute winter	8	3.000	7	3.7	0.741	0.015	0.8498	
60 minute winter	7	3.001	MH 1 HB	3.3	0.204	0.013	0.1983	
60 minute winter	PP2	5.000	CP 2	-4.6	1.380	-0.334	0.0151	
60 minute winter	4	1.003	CP 1	8.4	1.207	0.314	0.1708	
60 minute winter	2	1.001	3	4.1	0.866	0.245	0.2372	
60 minute winter	1	1.000	2	4.2	0.772	0.236	0.0981	
60 minute winter	6	2.000	junction	6.0	3.013	0.130	0.0112	
60 minute winter	junction	1.005 (B)	CP 2	8.9	1.508	0.200	0.1060	
60 minute winter	PP1	4.000	CP 1	-8.1	1.159	-0.598	0.0236	
15 minute winter	Greenroof 2	4.000_1	6	5.2	3.324	0.117	0.0081	
60 minute winter	Greenroof 1	2.000_1	4	2.2	1.889	0.078	0.0124	