

GGP Consult				Page 1		
2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY						
Date 07/02/2023 08:03 File Huyton - 5 ls.SRCX		Designed by GGPAeecOne Checked by				
Innovyze		Source Control 2019.1				
<u>Summary of Results for 30 year Return Period (+40%)</u>						
Storm Event		Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer		33.917	0.217	4.9	34.7	O K
30 min Summer		33.973	0.273	5.0	43.7	O K
60 min Summer		34.016	0.316	5.0	50.6	O K
120 min Summer		34.033	0.333	5.0	53.3	O K
180 min Summer		34.031	0.331	5.0	53.0	O K
240 min Summer		34.023	0.323	5.0	51.7	O K
360 min Summer		34.000	0.300	5.0	48.0	O K
480 min Summer		33.975	0.275	5.0	44.1	O K
600 min Summer		33.952	0.252	4.9	40.2	O K
720 min Summer		33.930	0.230	4.9	36.7	O K
960 min Summer		33.892	0.192	4.8	30.8	O K
1440 min Summer		33.841	0.141	4.5	22.6	O K
2160 min Summer		33.807	0.107	3.9	17.1	O K
2880 min Summer		33.790	0.090	3.3	14.4	O K
4320 min Summer		33.773	0.073	2.5	11.7	O K
5760 min Summer		33.763	0.063	2.0	10.1	O K
7200 min Summer		33.757	0.057	1.7	9.1	O K
8640 min Summer		33.752	0.052	1.5	8.3	O K
10080 min Summer		33.748	0.048	1.3	7.7	O K
15 min Winter		33.945	0.245	4.9	39.2	O K
30 min Winter		34.009	0.309	5.0	49.5	O K
Storm Event		Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
15 min Summer		105.725	0.0	38.2	21	
30 min Summer		69.056	0.0	49.9	34	
60 min Summer		43.136	0.0	62.4	62	
120 min Summer		26.149	0.0	75.6	98	
180 min Summer		19.302	0.0	83.7	132	
240 min Summer		15.490	0.0	89.6	166	
360 min Summer		11.343	0.0	98.4	234	
480 min Summer		9.087	0.0	105.2	300	
600 min Summer		7.647	0.0	110.6	364	
720 min Summer		6.639	0.0	115.2	426	
960 min Summer		5.308	0.0	122.9	548	
1440 min Summer		3.869	0.0	134.3	780	
2160 min Summer		2.816	0.0	146.7	1128	
2880 min Summer		2.246	0.0	156.0	1476	
4320 min Summer		1.632	0.0	170.0	2204	
5760 min Summer		1.300	0.0	180.6	2936	
7200 min Summer		1.090	0.0	189.2	3672	
8640 min Summer		0.943	0.0	196.4	4400	
10080 min Summer		0.834	0.0	202.8	5136	
15 min Winter		105.725	0.0	42.8	21	
30 min Winter		69.056	0.0	55.9	34	
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GGP Consult				Page 2	
2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY					
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Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	34.061	0.361	5.0	57.7	O K
120 min Winter	34.080	0.380	5.0	60.8	O K
180 min Winter	34.074	0.374	5.0	59.9	O K
240 min Winter	34.060	0.360	5.0	57.7	O K
360 min Winter	34.024	0.324	5.0	51.8	O K
480 min Winter	33.985	0.285	5.0	45.6	O K
600 min Winter	33.949	0.249	4.9	39.8	O K
720 min Winter	33.916	0.216	4.9	34.6	O K
960 min Winter	33.866	0.166	4.7	26.5	O K
1440 min Winter	33.813	0.113	4.1	18.1	O K
2160 min Winter	33.786	0.086	3.1	13.8	O K
2880 min Winter	33.774	0.074	2.5	11.8	O K
4320 min Winter	33.760	0.060	1.8	9.6	O K
5760 min Winter	33.752	0.052	1.5	8.3	O K
7200 min Winter	33.747	0.047	1.2	7.5	O K
8640 min Winter	33.743	0.043	1.1	6.9	O K
10080 min Winter	33.740	0.040	0.9	6.4	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
60 min Winter	43.136	0.0	69.9	62	
120 min Winter	26.149	0.0	84.7	114	
180 min Winter	19.302	0.0	93.8	142	
240 min Winter	15.490	0.0	100.4	180	
360 min Winter	11.343	0.0	110.3	254	
480 min Winter	9.087	0.0	117.8	322	
600 min Winter	7.647	0.0	123.9	388	
720 min Winter	6.639	0.0	129.1	450	
960 min Winter	5.308	0.0	137.6	568	
1440 min Winter	3.869	0.0	150.4	782	
2160 min Winter	2.816	0.0	164.3	1132	
2880 min Winter	2.246	0.0	174.7	1476	
4320 min Winter	1.632	0.0	190.4	2208	
5760 min Winter	1.300	0.0	202.3	2936	
7200 min Winter	1.090	0.0	211.9	3672	
8640 min Winter	0.943	0.0	220.0	4400	
10080 min Winter	0.834	0.0	227.1	5144	
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GGP Consult		Page 3
2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY		
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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	0.392	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.193

Time (mins)	Area	Time (mins)	Area
From: To: (ha)		From: To: (ha)	
0 4 0.096		4 8 0.097	

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GGP Consult		Page 4
2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY		
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Model Details

Storage is Online Cover Level (m) 35.220

Tank or Pond Structure

Invert Level (m) 33.700

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	160.0	0.800	160.0	0.801	1.0	1.520	1.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0105-5000-1050-5000
Design Head (m)	1.050
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	105
Invert Level (m)	33.697
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.050	5.0
Flush-Flo™	0.313	5.0
Kick-Flo®	0.667	4.1
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	3.5	1.200	5.3	3.000	8.2	7.000	12.2
0.200	4.8	1.400	5.7	3.500	8.8	7.500	12.6
0.300	5.0	1.600	6.1	4.000	9.4	8.000	13.0
0.400	4.9	1.800	6.4	4.500	9.9	8.500	13.4
0.500	4.8	2.000	6.7	5.000	10.4	9.000	13.8
0.600	4.5	2.200	7.1	5.500	10.9	9.500	14.1
0.800	4.4	2.400	7.3	6.000	11.3		
1.000	4.9	2.600	7.6	6.500	11.8		

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