



# TOPPING ENGINEERS

CONSULTING CIVIL &  
STRUCTURAL ENGINEERS

## DRAINAGE CALCULATIONS

**LOCATION:**

The Hawthorns  
Rimington Lane  
Rimington

**CLIENT:**

**DOCUMENT REF:**  
23379-Calcs-C- 001

**REVISION/DATE:**  
P1 Sept 2025

Topping Engineers Ltd		Page 1
Aire House 12 Victoria Avenue Harrogate, HG1 1ED	The Hawthorns Rimington Lane	
Date 03/09/2025 12:10 File Soakaway rev pl.SRCX	Designed by PB Checked by	
Innovyze	Source Control 2019.1	

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 1000 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m <sup>3</sup> )	Status
15 min Summer	149.322	0.222	0.5	17.4	O K
30 min Summer	149.415	0.315	0.5	24.7	O K
60 min Summer	149.524	0.424	0.5	33.3	O K
120 min Summer	149.644	0.544	0.5	42.7	O K
180 min Summer	149.711	0.611	0.5	47.9	O K
240 min Summer	149.754	0.654	0.5	51.3	O K
360 min Summer	149.813	0.713	0.5	55.9	O K
480 min Summer	149.848	0.748	0.6	58.6	O K
600 min Summer	149.869	0.769	0.6	60.3	O K
720 min Summer	149.881	0.781	0.6	61.2	O K
960 min Summer	149.889	0.789	0.6	61.9	O K
1440 min Summer	149.888	0.788	0.6	61.8	O K
2160 min Summer	149.869	0.769	0.6	60.3	O K
2880 min Summer	149.844	0.744	0.6	58.3	O K
4320 min Summer	149.794	0.694	0.5	54.4	O K
5760 min Summer	149.741	0.641	0.5	50.3	O K
7200 min Summer	149.691	0.591	0.5	46.3	O K
8640 min Summer	149.642	0.542	0.5	42.5	O K
10080 min Summer	149.597	0.497	0.5	39.0	O K
15 min Winter	149.322	0.222	0.5	17.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m <sup>3</sup> )	Time-Peak (mins)
15 min Summer	106.934	0.0	26
30 min Summer	76.143	0.0	41
60 min Summer	52.002	0.0	70
120 min Summer	34.189	0.0	128
180 min Summer	26.194	0.0	188
240 min Summer	21.515	0.0	246
360 min Summer	16.307	0.0	366
480 min Summer	13.364	0.0	484
600 min Summer	11.437	0.0	602
720 min Summer	10.062	0.0	720
960 min Summer	8.208	0.0	874
1440 min Summer	6.140	0.0	1118
2160 min Summer	4.576	0.0	1520
2880 min Summer	3.711	0.0	1936
4320 min Summer	2.769	0.0	2768
5760 min Summer	2.252	0.0	3576
7200 min Summer	1.920	0.0	4392
8640 min Summer	1.688	0.0	5184
10080 min Summer	1.515	0.0	5952
15 min Winter	106.934	0.0	26

Topping Engineers Ltd		Page 2
Aire House 12 Victoria Avenue Harrogate, HG1 1ED	The Hawthorns Rimington Lane	
Date 03/09/2025 12:10 File Soakaway rev pl.SRCX	Designed by PB Checked by	
Innovyze	Source Control 2019.1	

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
30 min Winter	149.415	0.315	0.5	24.7	O K
60 min Winter	149.525	0.425	0.5	33.3	O K
120 min Winter	149.645	0.545	0.5	42.7	O K
180 min Winter	149.713	0.613	0.5	48.0	O K
240 min Winter	149.757	0.657	0.5	51.5	O K
360 min Winter	149.816	0.716	0.6	56.1	O K
480 min Winter	149.852	0.752	0.6	59.0	O K
600 min Winter	149.875	0.775	0.6	60.7	O K
720 min Winter	149.889	0.789	0.6	61.8	O K
960 min Winter	149.899	0.799	0.6	62.6	O K
1440 min Winter	149.890	0.790	0.6	61.9	O K
2160 min Winter	149.860	0.760	0.6	59.6	O K
2880 min Winter	149.820	0.720	0.6	56.4	O K
4320 min Winter	149.735	0.635	0.5	49.8	O K
5760 min Winter	149.652	0.552	0.5	43.2	O K
7200 min Winter	149.573	0.473	0.5	37.1	O K
8640 min Winter	149.502	0.402	0.5	31.5	O K
10080 min Winter	149.437	0.337	0.5	26.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
30 min Winter	76.143	0.0	40
60 min Winter	52.002	0.0	68
120 min Winter	34.189	0.0	126
180 min Winter	26.194	0.0	184
240 min Winter	21.515	0.0	242
360 min Winter	16.307	0.0	358
480 min Winter	13.364	0.0	472
600 min Winter	11.437	0.0	586
720 min Winter	10.062	0.0	696
960 min Winter	8.208	0.0	912
1440 min Winter	6.140	0.0	1146
2160 min Winter	4.576	0.0	1608
2880 min Winter	3.711	0.0	2076
4320 min Winter	2.769	0.0	2948
5760 min Winter	2.252	0.0	3808
7200 min Winter	1.920	0.0	4616
8640 min Winter	1.688	0.0	5440
10080 min Winter	1.515	0.0	6160

Topping Engineers Ltd		Page 3
Aire House 12 Victoria Avenue Harrogate, HG1 1ED	The Hawthorns Rimington Lane	
Date 03/09/2025 12:10 File Soakaway rev p1.SRCX	Designed by PB Checked by	
Innovyze	Source Control 2019.1	

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	1.000
Region	England and Wales	Cv (Winter)	1.000
M5-60 (mm)	18.400	Shortest Storm (mins)	15
Ratio R	0.250	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.067

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
From:	To:	From:	To:	From:	To:
0	4	0.023	4	8	0.022
				8	12
					0.022

Aire House  
 12 Victoria Avenue  
 Harrogate, HG1 1ED

The Hawthorns  
 Rimington Lane



Date 03/09/2025 12:10  
 File Soakaway rev pl.SRCX

Designed by PB  
 Checked by

Innovyze Source Control 2019.1


Model Details

Storage is Online Cover Level (m) 150.500

Cellular Storage Structure

Invert Level (m) 149.100 Safety Factor 2.0  
 Infiltration Coefficient Base (m/hr) 0.03636 Porosity 0.95  
 Infiltration Coefficient Side (m/hr) 0.03636

Depth (m)	Area (m <sup>2</sup> )	Inf. Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )	Inf. Area (m <sup>2</sup> )
0.000	82.5	82.5	0.900	0.0	112.1
0.800	82.5	112.1			

Topping Engineers Ltd		Page 1
Aire House 12 Victoria Avenue Harrogate, HG1 1ED	The Hawthorns Rimington Lane	
Date 03/09/2025 13:55 File POROUS PAVING.SRCX	Designed by PB Checked by	
Innovyze	Source Control 2019.1	

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 76 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m <sup>3</sup> )	Status
15 min Summer	150.139	0.069	0.9	3.4	O K
30 min Summer	150.167	0.097	0.9	4.9	O K
60 min Summer	150.194	0.124	0.9	6.4	O K
120 min Summer	150.213	0.143	0.9	7.4	Flood Risk
180 min Summer	150.218	0.148	0.9	7.7	Flood Risk
240 min Summer	150.216	0.146	0.9	7.6	Flood Risk
360 min Summer	150.209	0.139	0.9	7.2	Flood Risk
480 min Summer	150.199	0.129	0.9	6.7	O K
600 min Summer	150.188	0.118	0.9	6.1	O K
720 min Summer	150.178	0.108	0.9	5.5	O K
960 min Summer	150.158	0.088	0.9	4.4	O K
1440 min Summer	150.130	0.060	0.9	2.9	O K
2160 min Summer	150.114	0.044	0.8	2.0	O K
2880 min Summer	150.107	0.037	0.7	1.6	O K
4320 min Summer	150.098	0.028	0.5	1.2	O K
5760 min Summer	150.093	0.023	0.4	0.9	O K
7200 min Summer	150.090	0.020	0.4	0.7	O K
8640 min Summer	150.088	0.018	0.3	0.6	O K
10080 min Summer	150.086	0.016	0.3	0.5	O K
15 min Winter	150.139	0.069	0.9	3.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m <sup>3</sup> )	Time-Peak (mins)
15 min Summer	106.934	0.0	17
30 min Summer	76.143	0.0	31
60 min Summer	52.002	0.0	58
120 min Summer	34.189	0.0	92
180 min Summer	26.194	0.0	126
240 min Summer	21.515	0.0	160
360 min Summer	16.307	0.0	230
480 min Summer	13.364	0.0	296
600 min Summer	11.437	0.0	362
720 min Summer	10.062	0.0	426
960 min Summer	8.208	0.0	548
1440 min Summer	6.140	0.0	768
2160 min Summer	4.576	0.0	1108
2880 min Summer	3.711	0.0	1472
4320 min Summer	2.769	0.0	2204
5760 min Summer	2.252	0.0	2936
7200 min Summer	1.920	0.0	3664
8640 min Summer	1.688	0.0	4376
10080 min Summer	1.515	0.0	5136
15 min Winter	106.934	0.0	17

Topping Engineers Ltd		Page 2
Aire House 12 Victoria Avenue Harrogate, HG1 1ED	The Hawthorns Rimington Lane	
Date 03/09/2025 13:55 File POROUS PAVING.SRCX	Designed by PB Checked by	
Innovyze	Source Control 2019.1	

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m <sup>3</sup> )	Status
30 min Winter	150.167	0.097	0.9	4.9	O K
60 min Winter	150.193	0.123	0.9	6.4	O K
120 min Winter	150.210	0.140	0.9	7.3	Flood Risk
180 min Winter	150.212	0.142	0.9	7.4	Flood Risk
240 min Winter	150.207	0.137	0.9	7.1	Flood Risk
360 min Winter	150.193	0.123	0.9	6.3	O K
480 min Winter	150.176	0.106	0.9	5.4	O K
600 min Winter	150.159	0.089	0.9	4.5	O K
720 min Winter	150.145	0.075	0.9	3.7	O K
960 min Winter	150.123	0.053	0.9	2.5	O K
1440 min Winter	150.110	0.040	0.7	1.8	O K
2160 min Winter	150.101	0.031	0.6	1.3	O K
2880 min Winter	150.095	0.025	0.5	1.0	O K
4320 min Winter	150.089	0.019	0.3	0.6	O K
5760 min Winter	150.085	0.015	0.3	0.4	O K
7200 min Winter	150.084	0.014	0.2	0.4	O K
8640 min Winter	150.083	0.013	0.2	0.3	O K
10080 min Winter	150.082	0.012	0.2	0.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m <sup>3</sup> )	Time-Peak (mins)
30 min Winter	76.143	0.0	31
60 min Winter	52.002	0.0	58
120 min Winter	34.189	0.0	94
180 min Winter	26.194	0.0	134
240 min Winter	21.515	0.0	172
360 min Winter	16.307	0.0	244
480 min Winter	13.364	0.0	312
600 min Winter	11.437	0.0	374
720 min Winter	10.062	0.0	434
960 min Winter	8.208	0.0	532
1440 min Winter	6.140	0.0	764
2160 min Winter	4.576	0.0	1124
2880 min Winter	3.711	0.0	1496
4320 min Winter	2.769	0.0	2180
5760 min Winter	2.252	0.0	2888
7200 min Winter	1.920	0.0	3696
8640 min Winter	1.688	0.0	4264
10080 min Winter	1.515	0.0	5136

Topping Engineers Ltd		Page 3
Aire House 12 Victoria Avenue Harrogate, HG1 1ED	The Hawthorns Rimington Lane	
Date 03/09/2025 13:55 File POROUS PAVING.SRCX	Designed by PB Checked by	
Innovyze	Source Control 2019.1	

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	1.000
Region	England and Wales	Cv (Winter)	1.000
M5-60 (mm)	18.400	Shortest Storm (mins)	15
Ratio R	0.250	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.018

Time (mins)	Area
From:	To: (ha)
0	4 0.018

Aire House  
 12 Victoria Avenue  
 Harrogate, HG1 1ED

The Hawthorns  
 Rimington Lane



Date 03/09/2025 13:55  
 File POROUS PAVING.SRCX

Designed by PB  
 Checked by

Innovyze Source Control 2019.1

Model Details

Storage is Online Cover Level (m) 150.500

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.03636	Width (m)	13.0
Membrane Percolation (mm/hr)	1000	Length (m)	14.0
Max Percolation (l/s)	50.6	Slope (1:X)	1000.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	150.070	Cap Volume Depth (m)	0.300