

#49 Johnson Way, Ford BN19 0TS Planning Reference F17/19/HH

The Design Parameters for the Proposed Geocellular Structure Soakaway, located in the Rear Garden, are as follows :-

Soil Infiltration Rate for the Sides is 3.141E-5 metres / second.

Soil Infiltration Rate for the Base is 3.141E-5 metres / second.

The Installation consists of a GeoCellular Structure of 4.00 metres Long by 1.50 metres Wide and 0.80 metres in Depth.
With a Cover Depth of 0.50 metres.

Percentage Void Space of 95%.

Impermeable Area specified as 87 square metres.

Using a Safety Factor of 2.0

The Design adopts a Factored Soil Infiltration Rate for the Sides of 1.570E-5 metres / second.

And a Factored Soil Infiltration Rate for the Base of 1.570E-5 metres / second.

The Rainfall Ratio for the Location is $r=0.36$

Rainfall Base Rate M5-60min the 5 Year Return Period Rainfall of 60 minutes Duration is 19.0mm.

Lowest Incoming Pipe Invert Height is 700mm above the Installation Base.

The Base Area of the Installation is Included in the calculation.

All Levels are referenced to 'Above Ordinance Datum' (AOD)

The Highest Recorded Groundwater at the Location of the Proposed Soakaway is 6.045 metres at a depth of 1.355 metres Below Ground Level (BGL)

The GroundLevel at the Location of the Proposed Soakaway is 7.400 metres

The Soffit Level of the Proposed Soakaway is 6.900 metres

The Invert Level of the Lowest Incoming Pipe on the Proposed Soakaway is 6.800 metres

The Base Level of the Proposed Soakaway is 6.100 metres

The Base of the Soakaway Structure is 0.055 metres above the Highest Recorded Groundwater at the location of the Soakaway. This meets Building Regulations.

The Design Summary for the Proposed Geocellular Structure Soakaway Installation S/A #1 is as follows :-

For a 10 Year Return Storm Includes a 40% Increase for Climate Change.

The Design requires storage of 2.38 cubic metres out of 3.99 cubic metres available.

Therefore Storage is Passed with a Critical Storm occurring at 2 hours.

And the Half Drain Time is OK within the Allowable 24 hours Period at 2.53 hours.

For a 100 Year Return Storm Includes a 40% Increase for Climate Change.

The Design requires storage of 4.58 cubic metres out of 4.56 cubic metres available.

Storage is Acceptable with a Critical Storm occurring at 3 hours.

And the Half Drain Time is OK within the Allowable 24 hours Period at 3.89 hours.

10 Year Return Storm Includes a 40% Increase for Climate Change.

Storm Duration	Factor Z1-5	M5 Return Rainfall	Factor Z2-10	M10 Return Rainfall	Inflow Cu Metres	Outflow Cu Metres	Internal Water Level	Required Storage	Soakaway Status
5 minutes	0.360	6.80	1.190	11.40	0.991	0.046	166	0.945	-OK-
10 minutes	0.510	9.70	1.220	16.60	1.440	0.093	236	1.347	-OK-
15 minutes	0.620	11.80	1.220	20.10	1.750	0.139	283	1.611	-OK-
30 minutes	0.790	15.00	1.240	26.10	2.267	0.278	349	1.989	-OK-
1 hour	1.000	19.00	1.250	33.20	2.893	0.557	410	2.336	-OK-
2 hours	1.216	23.10	1.240	40.10	3.489	1.114	417	2.376	-OK-
3 hours	1.364	25.90	1.240	45.00	3.914	1.671	394	2.243	-OK-
4 hours	1.495	28.40	1.220	48.50	4.221	2.228	350	1.993	-OK-
5 hours	1.593	30.30	1.220	51.70	4.498	2.784	301	1.713	-OK-
6 hours	1.670	31.70	1.220	54.20	4.715	3.341	241	1.374	-OK-
7 hours	1.745	33.20	1.203	55.80	4.858	3.898	168	0.960	-OK-
8 hours	1.805	34.30	1.203	57.80	5.025	4.455	100	0.570	-OK-
9 hours	1.863	35.40	1.203	59.60	5.187	5.012	31	0.174	-OK-
10 hours	1.915	36.40	1.203	61.30	5.331	5.569	empty	none	-OK-
11 hours	1.960	37.20	1.203	62.70	5.457	6.126	empty	none	-OK-
12 hours	2.005	38.10	1.190	63.50	5.522	6.683	empty	none	-OK-
14 hours	2.085	39.60	1.190	66.00	5.742	7.797	empty	none	-OK-
16 hours	2.155	40.90	1.190	68.20	5.935	8.910	empty	none	-OK-
18 hours	2.225	42.30	1.190	70.40	6.127	10.024	empty	none	-OK-
20 hours	2.295	43.60	1.180	72.00	6.267	11.138	empty	none	-OK-
22 hours	2.360	44.80	1.180	74.10	6.445	12.252	empty	none	-OK-
24 hours	2.430	46.20	1.180	76.30	6.636	13.366	empty	none	-OK-

Effective Volume of the Geocellular Structure Soakaway Installation for an M10 Return Period is 3.99 cubic metres.

Maximum Available (Effective) Outflow Surface Area at M10 Return is 9.85 square metres referenced to the Invert of the lowest incoming pipe.

Maximum Allowable Pre-Flood Water Level for 10 Year Return (Lowest Pipe Invert Level for Building Control) is 700mm.

For a 10 Year Return Period the Critical Storm occurs at 2 hours

With a Maximum Internal Structure Critical Water Level of 417mm.

Requiring a Maximum (Critical) Storage Capacity of 2.38 cubic metres.

The Outflow Surface Area for the Critical Storm Duration for the M10 Return is 8.29 square metres referenced to the Critical Water Level.

Half Drain Time for a 10 Year Return Critical Storm is 2.53 hours.

100 Year Return Storm Includes a 40% Increase for Climate Change.

Storm Duration	Factor Z1-5	M5 Return Rainfall	Factor Z2-100	M100 Return Rainfall	Inflow Cu Metres	Outflow Cu Metres	Internal Water Level	Required Storage	Soakaway Status
5 minutes	0.360	6.80	1.790	17.10	1.491	0.049	253	1.442	-OK-
10 minutes	0.510	9.70	1.910	25.90	2.254	0.098	378	2.156	-OK-
15 minutes	0.620	11.80	1.910	31.50	2.740	0.147	455	2.593	-OK-
30 minutes	0.790	15.00	1.990	41.80	3.638	0.294	587	3.344	-OK-
1 hour	1.000	19.00	2.030	54.00	4.698	0.588	721	4.110	-OK-
2 hours	1.216	23.10	2.010	65.00	5.656	1.176	786	4.480	-OK-
3 hours	1.364	25.90	2.010	72.90	6.345	1.764	804	4.581	Flood
4 hours	1.495	28.40	1.970	78.30	6.816	2.352	783	4.464	-OK-
5 hours	1.593	30.30	1.970	83.50	7.262	2.940	758	4.322	-OK-
6 hours	1.670	31.70	1.970	87.50	7.613	3.528	717	4.086	-OK-
7 hours	1.745	33.20	1.930	89.60	7.794	4.116	645	3.678	-OK-
8 hours	1.805	34.30	1.930	92.70	8.062	4.704	589	3.358	-OK-
9 hours	1.863	35.40	1.930	95.60	8.321	5.292	531	3.029	-OK-
10 hours	1.915	36.40	1.930	98.30	8.553	5.880	469	2.673	-OK-
11 hours	1.960	37.20	1.930	100.60	8.754	6.468	401	2.286	-OK-
12 hours	2.005	38.10	1.890	100.80	8.770	7.056	301	1.714	-OK-
14 hours	2.085	39.60	1.890	104.80	9.119	8.232	156	0.888	-OK-
16 hours	2.155	40.90	1.890	108.30	9.426	9.408	3	0.018	-OK-
18 hours	2.225	42.30	1.890	111.90	9.732	10.584	empty	none	-OK-
20 hours	2.295	43.60	1.855	113.20	9.852	11.760	empty	none	-OK-
22 hours	2.360	44.80	1.855	116.40	10.131	12.936	empty	none	-OK-
24 hours	2.430	46.20	1.855	119.90	10.432	14.112	empty	none	-OK-

Effective Volume of the Geocellular Structure Soakaway Installation for an M100 Return Period is 4.56 cubic metres.

Maximum Available (Effective) Outflow Surface Area at M100 Return is 10.40 square metres referenced to the top of the GeoCell Installation.

Maximum Allowable Pre-Flood Water Level for 100 Year Return (Soakaway Height) is 800mm.

For a 100 Year Return Period the Critical Storm occurs at 3 hours

With a Maximum Internal Structure Critical Water Level of 804mm.

Requiring a Maximum (Critical) Storage Capacity of 4.58 cubic metres.

With an excess of 4mm 'above' the soffit of the soakaway, no flooding occurs above ground level. This additional volume of 0.024 cubic metres is accommodated in surcharging the 100mm diameter underground pipe for a length of 3.06 metres which is acceptable.

The Outflow Surface Area for the Critical Storm Duration for the M100 Return is 10.42 square metres referenced to the Critical Water Level.

Half Drain Time for a 100 Year Return Critical Storm is 3.89 hours.

* * * END of REPORT * * *