

Mate Geo-Technic Services

Report prepared by RC on 16th May 2019

"the Red House" Westergate Street, Westergate, Planning Reference AL/102/18/HH

The Design Parameters for the Proposed Geocellular Structure Soakaway SA#2 in the Front Garden is as follows :-

Soil Infiltration Rate for the Sides is 4.263×10^{-5} metres / second.

Soil Infiltration Rate for the Base is 4.263×10^{-5} metres / second.

The Full GeoCellular Installation is 3.50 metres Long by 1.00 metres Wide at 0.40 metres in Depth.

With a Cover Depth of 0.40 metres.

Percentage Void Space of 95%.

Impermeable Area specified as 32 square metres.

Using a Safety Factor of 2

The Design adopts a Factored Soil Infiltration Rate for the Sides of 2.132×10^{-5} metres / second.

And a Factored Soil Infiltration Rate for the Base of 2.132×10^{-5} metres / second.

The Rainfall Ratio for the Location is 0.36

Rainfall Base Rate M5-60min the 5 Year Return Period Rainfall of 60 minutes Duration is 19mm.

Lowest Incoming Pipe Invert Height is 300mm above the Installation Base.

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

The Design Summary for the Proposed Geocellular Structure Soakaway Installation SA#2 in the Front Garden is as follows :-

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

The Design requires storage of 0.69 cubic metres out of 1.00 cubic metres available.

Therefore Storage is Passed with a Critical Storm occurring at 1 hour.

And the Half Drain Time is OK within the Allowable 24 hours Period at 1.02 hours.

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

The Design requires storage of 1.32 cubic metres out of 1.33 cubic metres available.

Therefore Storage is Passed with a Critical Storm occurring at 1 hour.

And the Half Drain Time is OK within the Allowable 24 hours Period at 1.63 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	0.365	0.031	100	0.334	-OK-
10 minutes	0.510	9.70	1.220	16.60	0.530	0.062	141	0.468	-OK-
15 minutes	0.620	11.80	1.220	20.10	0.644	0.093	166	0.551	-OK-
30 minutes	0.790	15.00	1.240	26.10	0.834	0.186	195	0.648	-OK-
1 hour	1.000	19.00	1.250	33.20	1.064	0.372	208	0.692	-OK-
2 hours	1.220	23.20	1.240	40.20	1.288	0.744	163	0.543	-OK-
3 hours	1.360	25.80	1.240	44.90	1.435	1.116	96	0.319	-OK-
4 hours	1.480	28.10	1.220	48.00	1.537	1.489	15	0.048	-OK-
5 hours	1.580	30.00	1.220	51.30	1.641	1.861	empty	none	-OK-
6 hours	1.660	31.50	1.220	53.90	1.724	2.233	empty	none	-OK-
8 hours	1.795	34.10	1.203	57.40	1.838	2.977	empty	none	-OK-
10 hours	1.905	36.20	1.203	61.00	1.951	3.722	empty	none	-OK-
12 hours	2.000	38.00	1.190	63.30	2.026	4.466	empty	none	-OK-
14 hours	2.090	39.70	1.190	66.20	2.117	5.210	empty	none	-OK-
16 hours	2.180	41.40	1.190	69.00	2.208	5.955	empty	none	-OK-
18 hours	2.250	42.80	1.180	70.60	2.260	6.699	empty	none	-OK-
20 hours	2.320	44.10	1.180	72.80	2.330	7.443	empty	none	-OK-
22 hours	2.380	45.20	1.180	74.70	2.391	8.188	empty	none	-OK-
24 hours	2.430	46.20	1.180	76.30	2.441	8.932	empty	none	-OK-

Effective Volume of the Geocellular Structure Soakaway Installation for an M10 Return Period is 1.00 cubic metres.

Maximum Available (Effective) Outflow Surface Area at M10 Return is 4.85 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 300mm.

For a 10 Year Return Period the Critical Storm occurs at 1 hour

With a Maximum Internal Structure Critical Water Level of 208mm.

Requiring a Maximum (Critical) Storage Capacity of 0.69 cubic metres.

The Outflow Surface Area for the Critical Storm Duration for the M10 Return is 4.44 square metres referenced to the Critical Water Level.

Half Drain Time for a 10 Year Return Critical Storm is 1.02 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	0.549	0.034	155	0.515	-OK-
10 minutes	0.510	9.70	1.910	25.90	0.829	0.068	229	0.761	-OK-
15 minutes	0.620	11.80	1.910	31.50	1.008	0.102	273	0.906	-OK-
30 minutes	0.790	15.00	1.990	41.80	1.338	0.203	341	1.135	-OK-
1 hour	1.000	19.00	2.030	54.00	1.728	0.407	397	1.321	-OK-
2 hours	1.220	23.20	2.010	65.20	2.087	0.813	383	1.274	-OK-
3 hours	1.360	25.80	2.010	72.70	2.327	1.220	333	1.107	-OK-
4 hours	1.480	28.10	1.970	77.60	2.482	1.627	257	0.855	-OK-
5 hours	1.580	30.00	1.970	82.80	2.649	2.033	185	0.616	-OK-
6 hours	1.660	31.50	1.970	87.00	2.784	2.440	103	0.343	-OK-
8 hours	1.795	34.10	1.930	92.20	2.949	3.254	empty	none	-OK-
10 hours	1.905	36.20	1.930	97.80	3.130	4.067	empty	none	-OK-
12 hours	2.000	38.00	1.890	100.50	3.218	4.880	empty	none	-OK-
14 hours	2.090	39.70	1.890	105.10	3.362	5.694	empty	none	-OK-
16 hours	2.180	41.40	1.890	109.60	3.507	6.507	empty	none	-OK-
18 hours	2.250	42.80	1.855	111.00	3.553	7.320	empty	none	-OK-
20 hours	2.320	44.10	1.855	114.50	3.663	8.134	empty	none	-OK-
22 hours	2.380	45.20	1.855	117.40	3.758	8.947	empty	none	-OK-
24 hours	2.430	46.20	1.855	119.90	3.837	9.761	empty	none	-OK-

Effective Volume of the Geocellular Structure Soakaway Installationn for an M100 Return Period is 1.33 cubic metres.

Maximum Available (Effective) Outflow Surface Area at M100 Return is 5.30 square metres referenced to the top of the GeoCell Installation.

Maximum Allowable Pre-Flood Water Level for 100 Year Return (Soakaway Height) is 400mm.

For a 100 Year Return Period the Critical Storm occurs at 1 hour

With a Maximum Internal Structure Critical Water Level of 397mm.

Requiring a Maximum (Critical) Storage Capacity of 1.32 cubic metres.

The Outflow Surface Area for the Critical Storm Duration for the M100 Return is 5.29 square metres referenced to the Critical Water Level.

Half Drain Time for a 100 Year Return Critical Storm is 1.63 hours.

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