

	Project Land Adjacent to Red Cottage				Job no. 536	
	Calcs for Soakaway				Start page no./Revision 1	
	Calcs by BH	Calcs date 08/01/2018	Checked by	Checked date	Approved by	Approved date

SOAKAWAY DESIGN

In accordance with CIRIA C697 SUDS

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Brighton
Impermeable area drained to the system	A = 250.0 m²
Return period	Period = 100 yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = 0.350
5-year return period rainfall of 60 minutes duration	M5_60min = 19.0 mm
Increase of rainfall intensity due to global warming	pclimate = 30 %

Soakaway / infiltration trench details

Soakaway type	Rectangular
Width of pit	w = 1000 mm
Length of pit	l =3000 mm
Percentage free volume	Vfree = 95 %

Soil infiltration rate (BRE digest 365)

Length of trial pit	ltrial = 3000 mm
Width of trial pit	btrial = 450 mm
Depth of trial pit (below invert)	dtrial = 1500 mm
Free volume (if fill used)	Vtrial = 100 %
75% depth of pit	d75 = (dtrial × 0.75) = 1125.00 mm
50% depth of pit	d50 = (dtrial × 0.50) = 750.00 mm
25% depth of pit	d25 = (dtrial × 0.25) = 375.00 mm
Test 1 - time to fall from 75% depth to 25% depth	T1 = 10 min
Test 2 - time to fall from 75% depth to 25% depth	T2 = 12 min
Test 3 - time to fall from 75% depth to 25% depth	T3 = 13 min
Longest time to fall from 75% depth to 25% depth	tig = max(T1, T2, T3) = 13 min
Storage volume from 75% to 25% depth	Vp75_25 = (ltrial × btrial × (d75 - d25)) × Vtrial = 1.01 m³
Internal surface area to 50% depth	ap50 = ((ltrial × btrial) + (ltrial + btrial) × 2 × d50) = 6.53 m²
Surface area of soakaway to 50% storage depth	As50 = 2 × (ltrial + btrial) × dtrial / 2 = 5.175 m²
Soil infiltration rate	f = Vp75_25 / (ap50 × tig) = 199.x10 ⁻⁶ m/s
Base area	Ab = w × l = 3000000 mm²
Perimeter	P = 2 × (w + l) = 8000 mm
Coefficient b	b = P × f / (Ab × Vfree) = 2.01 hr ⁻¹

Table equations

Rainfall intensity	i = M100 / D
Coefficient a	a = Ab / P - (A × i / (P × f))
Minimum depth required	H = a × (e ^(-bD) - 1)

Duration, D (min)	Growth factor Z1	M5 rainfalls (mm)	Growth factor Z2	100 year rainfall, M100 (mm)	Intensity, i (mm/hr)	a (mm)	Min depth req (mm)
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	Project				Job no.	
	Land Adjacent to Red Cottage				536	
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	Soakaway				2	
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BH	08/01/2018					

Duration, D (min)	Growth factor Z1	M5 rainfalls (mm)	Growth factor Z2	100 year rainfall, M100 (mm)	Intensity, i (mm/hr)	a (mm)	Min depth req (mm)
5	0.36	8.8	1.88	16.6	198.90	-8304	1281
10	0.51	12.5	1.95	24.4	146.44	-6015	1712
15	0.62	15.2	1.99	30.3	121.36	-4920	1944
30	0.79	19.4	2.03	39.4	78.71	-3060	1940
60	1.00	24.7	2.01	49.7	49.68	-1793	1552
120	1.22	30.2	1.97	59.5	29.74	-923	906
240	1.50	37.0	1.91	70.8	17.69	-397	397
360	1.69	41.7	1.88	78.3	13.05	-195	195
600	1.95	48.1	1.83	87.8	8.78	-8	8
1440	2.48	61.3	1.73	106.2	4.42	182	0

Minimum depth of soakaway
Time for emptying soakaway to half volume

$H_{max} = 1944 \text{ mm}$

$$t_{s50} = V_{free} \times A_b / (f \times P) \times \ln((H_{max} + A_b / P) / (H_{max} / 2 + A_b / P)) =$$
16min 13s

PASS - Soakaway discharge time less than or equal to 24 hours