

 AB Structural Designs Limited 59 Mirador Crescent Slough SL2 5JZ	Project 34a Vine Lane				Job no.	
	Calcs for Mr Harvey Purewal				Start page no./Revision 1	
	Calcs by ASB	Calcs date 10/03/2024	Checked by ASB	Checked date	Approved by ASB	Approved date

SOAKAWAY DESIGN

In accordance with BRE Digest 365 - Soakaway design

Tedds calculation version 2.0.03

Design rainfall intensity

Location of catchment area	London
Impermeable area drained to the system	A = 159.0 m ²
Return period	Period = 30 yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = 0.440
5-year return period rainfall of 60 minutes duration	M5_60min = 20.0 mm
Increase of rainfall intensity due to global warming	p _{climate} = 100 %

Soakaway / infiltration trench details

Soakaway type	Rectangular
Minimum depth of pit (below incoming invert)	d = 524 mm
Width of pit	w = 5000 mm
Length of pit	l = 5000 mm
Percentage free volume	V _{free} = 95 %

Soil infiltration rate (BRE digest 365)

Length of trial pit	l _{trial} = 1000 mm
Width of trial pit	b _{trial} = 1000 mm
Depth of trial pit (below invert)	d _{trial} = 1000 mm
Free volume (if fill used)	V _{trial} = 100 %
75% depth of pit	d ₇₅ = (d _{trial} × 0.75) = 750.00 mm
50% depth of pit	d ₅₀ = (d _{trial} × 0.50) = 500.00 mm
25% depth of pit	d ₂₅ = (d _{trial} × 0.25) = 250.00 mm
Test 1 - time to fall from 75% depth to 25% depth	T1 = 165 min
Test 2 - time to fall from 75% depth to 25% depth	T2 = 187 min
Test 3 - time to fall from 75% depth to 25% depth	T3 = 206 min
Longest time to fall from 75% depth to 25% depth	t _{lg} = max(T1, T2, T3) = 206 min
Storage volume from 75% to 25% depth	V _{p75_25} = (l _{trial} × b _{trial} × (d ₇₅ - d ₂₅)) × V _{trial} = 0.50 m ³
Internal surface area to 50% depth	a _{p50} = ((l _{trial} × b _{trial}) + (l _{trial} + b _{trial}) × 2 × d ₅₀) = 3.00 m ²
Surface area of soakaway to 50% storage depth	A _{s50} = 2 × (l _{trial} + b _{trial}) × d _{trial} / 2 = 2.000 m ²
Soil infiltration rate	f = V _{p75_25} / (a _{p50} × t _{lg}) = 13.5×10⁻⁶ m/s
Wetted area of pit 50% full	a _{s50} = l × d + w × d = 5240125 mm ²

Table equations

Inflow (cl.3.3.1)	I = M30 × A
Outflow (cl.3.3.2)	O = a _{s50} × f × D
Storage (cl.3.3.3)	S = I - O

Duration, D (min)	Growth factor Z1	M5 rainfalls (mm)	Growth factor Z2	30 year rainfall, M30 (mm)	Inflow (m ³)	Outflow (m ³)	Storage required (m ³)
5	0.39;	15.5;	1.53;	23.6;	3.76;	0.02;	3.74
10	0.54;	21.5;	1.54;	33.1;	5.26;	0.04;	5.22
15	0.65;	25.9;	1.53;	39.6;	6.29;	0.06;	6.23

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Duration, D (min)	Growth factor Z1	M5 rainfalls (mm)	Growth factor Z2	30 year rainfall, M30 (mm)	Inflow (m³)	Outflow (m³)	Storage required (m³)
30	0.82;	32.7;	1.50;	49.0;	7.80;	0.13;	7.67
60	1.00;	40.0;	1.47;	58.7;	9.33;	0.25;	9.07
120	1.19;	47.7;	1.43;	68.3;	10.86;	0.51;	10.35
240	1.39;	55.7;	1.40;	78.2;	12.43;	1.02;	11.41
360	1.53;	61.2;	1.39;	84.8;	13.48;	1.53;	11.96
600	1.70;	68.0;	1.36;	92.8;	14.76;	2.54;	12.21
1440	2.07;	82.9;	1.33;	110.3;	17.53;	6.11;	11.43

Required storage volume

$$S_{\text{req}} = 12.21 \text{ m}^3$$

Soakaway storage volume

$$S_{\text{act}} = l \times d \times w \times V_{\text{free}} = 12.45 \text{ m}^3$$

PASS - Soakaway storage volume

Time for emptying soakaway to half volume

$$t_{s50} = S_{\text{req}} \times 0.5 / (a_{s50} \times f) = 24\text{hr}$$

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