

 AB Structural Designs Limited 59 Mirador Crescent Slough SL2 5JZ	Project 34 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 = 147.0 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 = 485 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 = 4845292 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;	3.47;	0.02;	3.45
10	0.54;	21.5;	1.54;	33.1;	4.86;	0.04;	4.82
15	0.65;	25.9;	1.53;	39.6;	5.82;	0.06;	5.76

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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;	7.21;	0.12;	7.09
60	1.00;	40.0;	1.47;	58.7;	8.62;	0.24;	8.39
120	1.19;	47.7;	1.43;	68.3;	10.04;	0.47;	9.57
240	1.39;	55.7;	1.40;	78.2;	11.49;	0.94;	10.55
360	1.53;	61.2;	1.39;	84.8;	12.47;	1.41;	11.05
600	1.70;	68.0;	1.36;	92.8;	13.64;	2.35;	11.29
1440	2.07;	82.9;	1.33;	110.3;	16.21;	5.65;	10.56

Required storage volume

Soakaway storage volume

Time for emptying soakaway to half volume

$S_{req} = 11.29\text{ m}^3$
 $S_{act} = l \times d \times w \times V_{free} = 11.51\text{ m}^3$
 $t_{s50} = S_{req} \times 0.5 / (a_{s50} \times f) = 24\text{hr}$

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