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Tekla Tedds		34 Vine Lane	
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59 Mirador Crescent		Mr Harvey Purewal	1
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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	$A = \textbf{135.0} \text{ m}^2$
Return period	Period = **30** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	$r = \textbf{0.440}$
5-year return period rainfall of 60 minutes duration	$M5\_60min = \textbf{20.0}$ mm
Increase of rainfall intensity due to global warming	$p_{climate} = \textbf{100} \%$

Soakaway / infiltration trench details

Soakaway type	Rectangular
Minimum depth of pit (below incoming invert)	$d = \textbf{445}$ mm
Width of pit	$w = \textbf{5000}$ mm
Length of pit	$l = \textbf{5000}$ mm
Percentage free volume	$V_{free} = \textbf{95} \%$

Soil infiltration rate (BRE digest 365)

Length of trial pit	$l_{trial} = \textbf{1000}$ mm
Width of trial pit	$b_{trial} = \textbf{1000}$ mm
Depth of trial pit (below invert)	$d_{trial} = \textbf{1000}$ mm
Free volume (if fill used)	$V_{trial} = \textbf{100} \%$
75% depth of pit	$d_{75} = (d_{trial} \times 0.75) = \textbf{750.00}$ mm
50% depth of pit	$d_{50} = (d_{trial} \times 0.50) = \textbf{500.00}$ mm
25% depth of pit	$d_{25} = (d_{trial} \times 0.25) = \textbf{250.00}$ mm
Test 1 - time to fall from 75% depth to 25% depth	$T1 = \textbf{165}$ min
Test 2 - time to fall from 75% depth to 25% depth	$T2 = \textbf{187}$ min
Test 3 - time to fall from 75% depth to 25% depth	$T3 = \textbf{206}$ min
Longest time to fall from 75% depth to 25% depth	$t_{lg} = max(T1, T2, T3) = \textbf{206}$ min
Storage volume from 75% to 25% depth	$V_{p75\_25} = (l_{trial} \times b_{trial} \times (d_{75} - d_{25})) \times V_{trial} = \textbf{0.50} \text{ m}^3$
Internal surface area to 50% depth	$a_{p50} = ((l_{trial} \times b_{trial}) + (l_{trial} + b_{trial}) \times 2 \times d_{50}) = \textbf{3.00} \text{ m}^2$
Surface area of soakaway to 50% storage depth	$A_{s50} = 2 \times (l_{trial} + b_{trial}) \times d_{trial} / 2 = \textbf{2.000} \text{ m}^2$
Soil infiltration rate	$f = V_{p75\_25} / (a_{p50} \times t_{lg}) = \textbf{13.5×10}^{-6} \text{ m/s}$
Wetted area of pit 50% full	$a_{s50} = l \times d + w \times d = \textbf{4450458} \text{ mm}^2$

Table equations

Inflow (cl.3.3.1)	$I = M30 \times A$
Outflow (cl.3.3.2)	$O = a_{s50} \times f \times D$
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 (m³)	Outflow (m³)	Storage required (m³)
5	0.39;	15.5;	1.53;	23.6;	3.19;	0.02;	3.17
10	0.54;	21.5;	1.54;	33.1;	4.46;	0.04;	4.43
15	0.65;	25.9;	1.53;	39.6;	5.34;	0.05;	5.29

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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;	6.62;	0.11;	6.51
60	1.00;	40.0;	1.47;	58.7;	7.92;	0.22;	7.70
120	1.19;	47.7;	1.43;	68.3;	9.22;	0.43;	8.79
240	1.39;	55.7;	1.40;	78.2;	10.55;	0.86;	9.69
360	1.53;	61.2;	1.39;	84.8;	11.45;	1.30;	10.15
600	1.70;	68.0;	1.36;	92.8;	12.53;	2.16;	10.37
1440	2.07;	82.9;	1.33;	110.3;	14.89;	5.19;	9.70

Required storage volume S_{req} = **10.37** m³

Soakaway storage volume $S_{act} = l \times d \times w \times V_{free}$ = **10.57** m³

PASS - Soakaway storage volume

Time for emptying soakaway to half volume $t_{s50} = S_{req} \times 0.5 / (a_{s50} \times f)$ = 24hr

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