

Section: Infiltration/percolation Test hole 1

SUMMARY OF CALCULATIONS

critical design rainfall duration ' t_{crit} ' =	30	min
required storage volume ' V_{req} ' =	3.42	m^3
provided storage volume ' V_{prov} ' =	4.05	m^3
utilisation factor =	0.85	.OK
required time to discharge 50% ' t_{50} ' =	0.61	hours
utilisation factor =	0.03	.OK

GENERAL DATA

site location:	England and Wales
soakaway type:	perforated concrete ring
pit shape:	square pit around ring
impermeable area drained to soakaway ' A ' [m^2] =	200
60 min rainfall depth of 5 year return period ' R ' [mm] =	20
M5-60 to M5-2d rainfall ratio ' r ' =	0.35
allowance for climate change:	30%

SOAKAWAY DATA

number of ring soakaways:	1
square pit side length ' L ' [m] =	1.70
soakaway ring internal diameter ' D_{int} ' [mm] =	900
total depth from ground level ' D_b ' [m] =	2.00
depth to drain invert level ' D_d ' [m] =	0.40
soakaway effective depth ' D_{eff} ' [m] =	1.60
free volume in infill aggregate [%] =	90

SOIL INFILTRATION DATA

allowance for infiltration through soakaway base:	100%
available on-site infiltration test results:	☒ Yes ☐ No
use soakage trial pit table below	
internal surface area of trial pit ' a_{p50} ' [m^2] =	8.28
storage volume between 75-25% ' V_p ' [m^3] =	1.46
time for water to fall from 75-25% ' t_p ' [min] =	26.67
soil infiltration rate ' f ' [m/s] =	1.10E-04

SOAKAGE TRIAL PIT DATA

soakage trial pit width ' W_t ' [m] =	0.60
soakage trial pit length ' L_t ' [m] =	3.00
total depth from ground level ' D_{tb} ' [m] =	2.20
depth to pipe invert level ' D_{tp} ' [m] =	0.40
soakage trial pit effective depth ' D_{teff} ' [m] =	1.80
free volume in infill aggregate [%] =	90

NOTE: faces of excavation assumed to be vertical

REQUIRED STORAGE CAPACITY PER RAINFALL DURATION

rainfall duration [min]	rainfall factor Z1	M5-D rainfalls [mm]	M10-D			ignore			ignore			outflow from soakaway [m^3]	required storage [m^3]
			Z2	rainfalls [mm]	inflow [m^3]	Z2	rainfalls [mm]	inflow [m^3]	Z2	rainfalls [mm]	inflow [m^3]		
5	0.36	7.13	1.20	11.15	2.23							0.28	1.96
10	0.51	10.13	1.22	16.08	3.22							0.55	2.67
15	0.62	12.33	1.23	19.71	3.94							0.83	3.12
30	0.79	15.73	1.24	25.36	5.07							1.65	3.42
60	1.00	20.00	1.24	32.24	6.45							3.30	3.15
120	1.22	24.47	1.24	39.44	7.89							6.60	1.29
240	1.50	29.93	1.22	47.48	9.50							13.20	0.00
360	1.69	33.80	1.21	53.11	10.62							19.80	0.00
600	1.95	38.93	1.19	60.39	12.08							33.00	0.00
1440	2.48	49.60	1.17	75.49	15.10							79.21	0.00

* Z2 is a growth factor from M5 rainfalls

SOAKAGE TRIAL PIT INFILTRATION TEST RESULTS

water level measurement N°:		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Soakage Trial 1	time [min] =	10	20	30	40	50														
	depth to water [m] =	0.50	0.78	0.89	0.97	1.15														
Soakage Trial 2	time [min] =	10	20	30	40	50														
	depth to water [m] =	0.50	0.79	0.91	1.05	1.23														
Soakage Trial 3	time [min] =	10	20	30	40	50														
	depth to water [m] =	0.50	0.81	0.93	1.09	1.21														

SUMMARY OF CALCULATIONS

critical design rainfall duration ' t_{crit} ' =	60	min
required storage volume ' V_{req} ' =	3.83	m^3
provided storage volume ' V_{prov} ' =	4.05	m^3
utilisation factor =	0.95	.OK
required time to discharge 50% ' t_{50} ' =	0.77	hours
utilisation factor =	0.03	.OK

GENERAL DATA

site location:	England and Wales
soakaway type:	perforated concrete ring
pit shape:	square pit around ring
impermeable area drained to soakaway ' A ' [m^2] =	200
60 min rainfall depth of 5 year return period ' R ' [mm] =	20
M5-60 to M5-2d rainfall ratio ' r ' =	0.35
allowance for climate change:	30%

SOAKAWAY DATA

number of ring soakaways:	1
square pit side length ' L ' [m] =	1.70
soakaway ring internal diameter ' D_{int} ' [mm] =	900
total depth from ground level ' D_b ' [m] =	2.00
depth to drain invert level ' D_d ' [m] =	0.40
soakaway effective depth ' D_{eff} ' [m] =	1.60
free volume in infill aggregate [%] =	90

SOIL INFILTRATION DATA

allowance for infiltration through soakaway base:	100%
available on-site infiltration test results:	☒ Yes ☐ No
use soakage trial pit table below	
internal surface area of trial pit ' a_{p50} ' [m^2] =	7.56
storage volume between 75-25% ' V_p ' [m^3] =	1.30
time for water to fall from 75-25% ' t_p ' [min] =	32.68
soil infiltration rate ' f ' [m/s] =	8.74E-05

SOAKAGE TRIAL PIT DATA

soakage trial pit width ' W_t ' [m] =	0.60
soakage trial pit length ' L_t ' [m] =	3.00
total depth from ground level ' D_{tb} ' [m] =	2.00
depth to pipe invert level ' D_{tp} ' [m] =	0.40
soakage trial pit effective depth ' D_{teff} ' [m] =	1.60
free volume in infill aggregate [%] =	90

NOTE: faces of excavation assumed to be vertical

REQUIRED STORAGE CAPACITY PER RAINFALL DURATION

rainfall duration [min]	rainfall factor Z1	M5-D rainfalls [mm]	M10-D			ignore			ignore			outflow from soakaway [m^3]	required storage [m^3]
			Z2	rainfalls [mm]	inflow [m^3]	Z2	rainfalls [mm]	inflow [m^3]	Z2	rainfalls [mm]	inflow [m^3]		
5	0.36	7.13	1.20	11.15	2.23							0.22	2.01
10	0.51	10.13	1.22	16.08	3.22							0.44	2.78
15	0.62	12.33	1.23	19.71	3.94							0.66	3.29
30	0.79	15.73	1.24	25.36	5.07							1.31	3.76
60	1.00	20.00	1.24	32.24	6.45							2.62	3.83
120	1.22	24.47	1.24	39.44	7.89							5.24	2.64
240	1.50	29.93	1.22	47.48	9.50							10.49	0.00
360	1.69	33.80	1.21	53.11	10.62							15.73	0.00
600	1.95	38.93	1.19	60.39	12.08							26.22	0.00
1440	2.48	49.60	1.17	75.49	15.10							62.92	0.00

* Z2 is a growth factor from M5 rainfalls

SOAKAGE TRIAL PIT INFILTRATION TEST RESULTS

water level measurement N°:		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Soakage Trial 1	time [min] =	10	20	30	40	50														
	depth to water [m] =	0.50	0.85	1.21	1.45	1.65														
Soakage Trial 2	time [min] =	10	20	30	40	50														
	depth to water [m] =	0.50	0.82	1.18	1.39	1.51														
Soakage Trial 3	time [min] =	10	20	30	40	50														
	depth to water [m] =	0.50	0.91	1.14	1.35	1.49														

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**Infiltration testing to
determine soil capability**

Revision

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Prepared By:

DJH

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Section: **Infiltration/percolation Test hole 3**

SUMMARY OF CALCULATIONS

critical design rainfall duration ' t_{cnt} ' =	30	min
required storage volume ' V_{req} ' =	3.66	m^3
provided storage volume ' V_{prov} ' =	4.05	m^3
utilisation factor =	0.90	.OK
required time to discharge 50% ' t_{50} ' =	0.72	hours
utilisation factor =	0.03	.OK

GENERAL DATA

site location:	England and Wales
soakaway type:	perforated concrete ring
pit shape:	square pit around ring
impermeable area drained to soakaway ' A ' [m^2] =	200
60 min rainfall depth of 5 year return period ' R ' [mm] =	20
M5-60 to M5-2d rainfall ratio ' r ' =	0.35
allowance for climate change:	30%

SOAKAWAY DATA

number of ring soakaways:	1
square pit side length ' L ' [m] =	1.70
soakaway ring internal diameter ' D_{int} ' [mm] =	900
total depth from ground level ' D_b ' [m] =	2.00
depth to drain invert level ' D_d ' [m] =	0.40
soakaway effective depth ' D_{eff} ' [m] =	1.60
free volume in infill aggregate [%] =	90

SOIL INFILTRATION DATA

allowance for infiltration through soakaway base:	100%
available on-site infiltration test results:	☒ Yes ☐ No
use soakage trial pit table below	
internal surface area of trial pit ' a_{p50} ' [m^2] =	7.56
storage volume between 75-25% ' V_p ' [m^3] =	1.30
time for water to fall from 75-25% ' t_p ' [min] =	30.32
soil infiltration rate ' f ' [m/s] =	9.42E-05

SOAKAGE TRIAL PIT DATA

soakage trial pit width ' W_t ' [m] =	0.60
soakage trial pit length ' L_t ' [m] =	3.00
total depth from ground level ' D_{tb} ' [m] =	2.00
depth to pipe invert level ' D_{tp} ' [m] =	0.40
soakage trial pit effective depth ' D_{teff} ' [m] =	1.60
free volume in infill aggregate [%] =	90

NOTE: faces of excavation assumed to be vertical

REQUIRED STORAGE CAPACITY PER RAINFALL DURATION

rainfall duration [min]	rainfall factor Z1	M5-D rainfalls [mm]	M10-D			ignore			ignore			outflow from soakaway [m^3]	required storage [m^3]
			Z2	rainfalls [mm]	inflow [m^3]	Z2	rainfalls [mm]	inflow [m^3]	Z2	rainfalls [mm]	inflow [m^3]		
5	0.36	7.13	1.20	11.15	2.23							0.24	2.00
10	0.51	10.13	1.22	16.08	3.22							0.47	2.74
15	0.62	12.33	1.23	19.71	3.94							0.71	3.24
30	0.79	15.73	1.24	25.36	5.07							1.41	3.66
60	1.00	20.00	1.24	32.24	6.45							2.83	3.62
120	1.22	24.47	1.24	39.44	7.89							5.65	2.24
240	1.50	29.93	1.22	47.48	9.50							11.30	0.00
360	1.69	33.80	1.21	53.11	10.62							16.95	0.00
600	1.95	38.93	1.19	60.39	12.08							28.26	0.00
1440	2.48	49.60	1.17	75.49	15.10							67.81	0.00

* Z2 is a growth factor from M5 rainfalls

SOAKAGE TRIAL PIT INFILTRATION TEST RESULTS

water level measurement N°:		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Soakage Trial 1	time [min] =	10	20	30	40	50														
	depth to water [m] =	0.50	0.75	0.90	1.20	1.48														
Soakage Trial 2	time [min] =	10	20	30	40	50														
	depth to water [m] =	0.50	0.78	0.92	1.22	1.51														
Soakage Trial 3	time [min] =	10	20	30	40	50														
	depth to water [m] =	0.50	0.81	0.95	1.20	1.49														