



PLANE BASE INFILTRATION SYSTEMS CIRIA C753 - EQ 25.1 & 25.2 - using FEH 22 rainfall data

PROJECT TITLE:	Gardners Arms New hotel block		JOB No:	25049
PERM AREA No.:	3	LOCATION:	Permeable Area 3	DATE: Apr-26

1. FEH Rainfall data		2. Design Inflow		3. Test rate calculations			4. Design Outflow results		
Event:	30 year	Roof (m²):	0	Test pit L:	2.00	Tot vol.:	2.0	a ₅₀ (sq.m):	3.00
CC %	1.45	Yard (m²):	0	Test pit W:	1.00	Q _{p50} :	3.0	Inflow (cu.m):	531.00
Index:	7	Paths/patios (m²):	531	Test pit D:	1.00	V _{p75-25} :	1.0	Outflow(cu.m):	1.00
Urban Creep (%):	10	Total Area (sq.m):	584	Free vol (%):	100	t _{p75-25} :	1182	Storage(cu.m):	1060.00
						Effective depth:	1.000		
						Infiltration rate (f) (m/s):	4.700E-06		

5. Infiltration system data				6. Infiltration coefficient (q) (m/h)		7. FOS
Length (m):	45.300	Width (m):	4.80	q value (m/h):	0.0034	
stimated depth (d):	0.500	Inlet IL:	9.355	Calculated base:	9.490	Rate (q) provided by SI: 5
Porosity n %:	96	diam inlet:	0.100	Top of s/away:	9.490	Calculated Soil Rate (f): 0.016920

Summary of designer's sizes for chosen D min duration for 30 year storm							
L	W	d	A _b	A _d	P	R	n
45.30	4.80	0.500	217	584	100.20	2.69	0.96

Soakaway calculations are based on BRE 365 infiltration results and the calculated method shown in CIRIA document C697 & C753 and uses FEH 22 rainfall data. The rainfall depths are factored by the climate change growth factor chases. The porosity rate is further factored for safety to suit risk from long term silting. Always refer to the project construction detail sheets 200 or 201 for the soakaway or permeable pavement make-up and the main general arrangement (GA) showing the size, levels and position of the soakaway.

Calculations used are derived from CIRIA document C753 - SUDS manual Eq 25.4

D (Hrs)	mm	i (m/h)	h _{max}
0.25	21.56	0.1250	0.0866
0.50	28.73	0.0833	0.1148
1.00	36.66	0.0532	0.1452
2.00	45.16	0.0327	0.1762
4.00	53.75	0.0195	0.2040
6.00	58.49	0.0141	0.2162
10.00	64.17	0.0093	0.2251
24.00	73.89	0.0045	0.2152
36.00	79.57	0.0032	0.1959
48.00	84.56	0.0026	0.1739
60.00	89.15	0.0022	0.1502
72.00	93.48	0.0019	0.1255
84.00	97.63	0.0017	0.1000
96.00	101.66	0.0015	0.0741

$$h_{max} = \frac{D(Ri - q)}{n}$$

where:

h_{max} = maximum head of water above base of infiltration component

R = ratio of the drained area to the infiltration area, $R = \frac{A_D}{A_b}$

q = infiltration coefficient, from percolation test (m/h), adjusted by the appropriate factor of safety

i, D = intensity and duration of rainfall events with the required return period at the site location (m/h, h)

A_b = base area of infiltration system (m²)

A_D = area to be drained (m²)

n = porosity of fill material (voids volume/total volume)

This may be obtained from laboratory tests, or else the guide values provided in the following table may be used. If a value of porosity greater than 0.3 is used, the material delivered to site should be tested to ensure that it meets the design requirement.

Material	Porosity, n
geocellular systems	0.9–0.95
uniform gravel	0.3–0.4
graded sand or gravel	0.2–0.3

MAX HEIGHT (H_{max}): 0.2251

MAX WATER VOL (cu.m): 46.99

Time to empty	
H _{max} :	0.2251
R:	2.69
Time to empty (hrs):	1105
The time to empty is high due to the the base not included in the calculation.	
Recalculated q (m/h):	0.00417802
Equivalent f rate:	0.00000116
EMPTY TIME IS GREATER THAN 24 HOURS SEE REQUIRED q ABOVE	

