Determination of Soakaway Capacity

Soakage tests should be carried out at or near to the proposed location of the soakaways. A square hole 2m × 2m × 2m deep should be carefully dug and its dimensions measured accurately. It should then be filled to within 1 m of ground surface and the depth to water surface measured at regular intervals of time (1 or 2 min. in rapidly draining soils, 30 min. in very slowly draining soils) until a steady rate of soakage is evident (30 mins. to 4 hours).

From these results, the volume of water (Q) in m^3 the wetted area (A) in m^2 and the soakage rate (C/A/t) in m^3/m^2/min can be calculated and tabulated. The initial value(s) of soakage rate should be ignored for the purpose of the following calculation After an initial period, the rate will steady and it is this steady value of A/A/t which is taken as the design soakage rate.

The storm to be used to calculate the size of the soakaway required is one of 50 mm failing in two hours.

Flowing into soakaway = 50 mm × impermeable area
Flowing out of soakaway = Design Soakage Rate × 2 hours × A

Hence Volume of Soakaway below invert of inlet pipe.

V = (50 mm × Impermeable area) – (Design Soakage Rate × 2 hrs × A).

The two unknowns are interdependent and Oxfordshire County Council standard soakaways being cylindrical, the following substitutions into the equation are made, h being the depth to base of the soakaway below lowest inlet pipe.

$V = \pi r^2 h$
$A = \pi r^2 + 2 \pi r h$

Having selected a radius for the proposed soakaway, the equation is solved for h, the depth to base of soakaway below the lowest inlet pipe.

NOTES

1 . Base of soakaway should generally be above water table level otherwise volume, V, will not be available for storage. However, if the flow out of the soakaway is equal to or greater than the flow into the soakaway, no storage is required and the base of the soakaway may be below the water table but such a proposal may prove difficult to construct. Written Environment Agency approval is required for soakaways.

2. Soakaway trenches should be designed using the equation:

Flow into trench = Soakage out of trench
50 mm × impermeable area = Design soakage Rate × 2 hrs × A

$$\text{ie, wetted area, A} = \frac{50 \text{ mm} \times \text{impermeable area}}{\text{design soakage rate} \times 2 \text{ hrs}}$$

In this case a soakage test using a hole 2m. long × estimated proposed depth × estimated proposed width would be appropriate.

For soakaways, volume of soakaway below invert of inlet pipe:

V = (50mm × Impermeable area) – (Design Soakage Rate × 2 hours × A)

$V = \pi r^2 h$

$A = \pi r^2 + 2 \pi r h$

∴ Transposing for h

$$h = \frac{\text{50mm x Impermeable area - Design Soakage x 2 hrs} \times \pi r^2}{\pi r^2 + (\text{Design Soakage} \times 2 \text{ hrs} \times 2 \pi r)}$$

Date ....
Site ....
Test No. ....
Size of Trail Pit ....

Notes .... Wetted Area ....

Actual Time am/pm	t (min.)	Water Depth (m)	Vol. Water (m^3)	Change in Vol. (m^3)	Wetter Area (m^2)	Av. Wetted Area A (m^2)	Soakage Rate Q / A / t $(m^3/m^2/min)$