



MasterDrain
SW 13.17

Civil Engineering Services

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Project	WARGRAVE PATIO AREA
Title	Trench soakaway calculations for WARGRAVE

Data:-

Location hydrological data (FSR):-

Location	=	WARGRAVE	Grid reference	=	SU7878
M5-60 (mm)	=	18.8	r	=	0.40
Soil index	=	0.30	SAAR (mm/yr)	=	660
WRAP	=	2	Area	=	England and Wales

Soil classification for WRAP type 2

- i) Very permeable soils with shallow ground water;
- ii) Permeable soils over rock or fragipan, commonly on slopes in western Britain associated with smaller areas of less permeable wet soils;
- iii) Moderately permeable soils, some with slowly permeable subsoils.

Design data:-

Safety factor = 1.5 - No damage or inconvenience
Fill porosity = 0.95 - Plastic cells (porosity = 0.95)

Equivalent porosity (n1) = 0.95

Area drained = 12 m²

Infiltration coefficient = 0.0052 m/hr
Effective inf. coeff (q) = 0.0034667

Return period = 100 yrs

Climate change factor = 45%

Calculations :-

Perimeter of pit = (2 x Excavation Width)+(2 x Excavation Length)
Area of base = Excavation Width x Excavation Length
Infiltration area = (Area of base)+(Perimeter of pit x Hmax)
Temporary constant 'a'
= (Area of base / perimeter)-((AreaDrained x Rainfall depth /1000)/(Perimeter/Inf. coeff))
Temporary constant 'b' = (Perimeter/Inf. coeff) / (Area of base x porosity)
Hmax = a*((EXP(-1 x b x Duration of storm))-1)

Note: The Hmax calculation is iterated to a maximum value of Hmax.

Note: Duration of storm in hours, Rainfall depth in mm/hr x Climate Change factor.

Results :-

Emptying time to 50% volume = 21:33 (hr:min)

hMax (Depth) = 0.2 metres

Time to maximum = 11:01 hr:min

Rainfall at maximum = 8.29mm/hr

Width (m) = 2.0

Length (m) = 2.5

Total Infiltration area = 6.8m² (base area + sidewall area).

Total available volume = 0.95m³

N.B. The rainfall rates are calculated using the location specific values above in accordance with the Wallingford procedure.

Formulae and methods from CIRIA 156.
Custom safety factor used in preference to CIRIA values.