



MasterDrain
SW 7.0



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Project	
Title	ADAS runoff calculations for BOSCASTLE

Data:-

Hydrology:-

Location	= BOSCASTLE	Grid reference	= SX0990
M5-60 (mm)	= 18.4	SAAR (mm/yr)	= 1100
r	= 0.31	Soil	= 0.30
Return period	= 30	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; (fragipan - a natural subsurface horizon having a higher bulk density than the solum above. Seemingly cemented when dry but showing moderate to weak brittleness when moist. The layer is low in organic matter, mottled and slowly or very slowly permeable to water. It is found in profiles of either cultivated or virgin soils but not in calcareous material).
- iii) Moderately permeable soils, some with slowly permeable subsoils.

Site values used in design:-

Catchment area	= 3 Ha	Catchment length	= 50 m
Catchment height	= 3.00 m		

Calculations :-

Formula used: $Q = 2.78 \times S_m^2 \times F_a \times A \times \text{Rainfall rate} \times M_f \text{ l/s}$

where

Time of Concentration for rainfall is $ToC = 6.09 \times L_c^{0.39}$
 $L_c = 0.0001 \times (\text{Catchment length}^2 / \text{Height over outfall})$
 $M_f = 4.938 \times S_m^2$ (Soil modification value(S_m) =fractional value of the WRAP)
 F_a = dimensionless annual rainfall factor ($F_a = \{0.00127 * SAAR\} - 0.321$)
 A = Catchment Area (Ha)

Results :-

Characteristic length L_c	= 0.083
Catchment ToC	= 2.31 hrs
Soil modification factor	= 0.444
Catchment Intensity at ToC	= 16.24 mm/hr
Flow off site	= 64.76 l/s
Catchment flow	= 21.59 l/s/Ha

Calculations derived from formulae in ADAS Land Drainage Service report 5 (1980)
 For further information, you are directed to the above document.

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