



MasterDrain
HY 10.07

Muir Associates (UK) Limited www.muir-associates.co.uk		Job No. 18-1022		
		Sheet no. 1		
		Date 31/07/18		
Project	Bridge Road North Wrexham Existing Greenfield Runoff Calculations 0.745 Hectares		By	Checked
Title				Reviewed

Hydrological Data:-

FSR Hydrology:-

Location = WREXHAM	Grid reference = SJ3349
M5-60 (mm) = 18	r = 0.32
Soil runoff = 0.45	SAAR (mm/yr) = 800
WRAP = 4	Area = England & Wales
Hydrological area = 9	Hydrological zone = 4

Soil classification for WRAP type 4

Clayey, or loamy over clayey soils with an impermeable layer at shallow depth.

Design data:-

Area = 0.00745 Km² - 0.745 Ha - 7450 m²

Calculation method:-

Runoff is calculated from:-

$$Q_{\text{BAR(rural)}} = 0.00108 \text{ AREA}^{0.89} \cdot \text{SAAR}^{1.17} \cdot \text{SOIL}^{2.17}$$

where

AREA = Site area in Km²
 SAAR = Standard Average Annual Rainfall (mm/yr)
 SOIL = Soil value derived from Winter Rainfall Acceptance Potential
 Q_{BAR(rural)} = Runoff (cumecs)

Q_{BAR(rural)} is then multiplied by a growth factor - GC(T) - for different storm return periods derived from EA publication W5-074/A.

Calculated data:-

For areas less than 50Ha, a modified calculation which multiplies the 50Ha runoff value by the ratio of the site area to 50Ha is used
Reducing factor used for these calculations is 0.015

Mean Annual Peak Flow Q_{BAR(rural)} = 3.83 l/s



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Sheet no.
2

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Values for $Q_{BAR(rural)}$

Ret. per. 1yr	m ³ /hr 11.708	l/s 3.252	l/s/ha 4.366	Ret. per. 100yr+20%	m ³ /hr 36.035	l/s 10.010	l/s/ha 13.436
2yr	12.810	3.558	4.776	100yr+30%	39.037	10.844	14.555
5yr	16.805	4.668	6.266	100yr+40%	42.040	11.678	15.675
10yr	19.560	5.433	7.293	200yr	34.437	9.566	12.840
30yr	24.106	6.696	8.988	200yr + 30%	44.768	12.435	16.692
50yr	26.723	7.423	9.964	500yr	39.396	10.943	14.689
100yr	30.029	8.341	11.196	1000yr	43.941	12.206	16.384

Growth factors -

1yr	2yr	5yr	10yr	30yr	50yr	100yr	200yr	500yr	1000yr
0.85	0.93	1.22	1.42	1.75	1.94	2.18	2.50	2.86	3.19

The above is based on the Institute of Hydrology Report 124
to which you are referred for further details (see Sect 7).
Note that the 200 and above year growth curves were taken from W5-074.