FEH Greenfield Runoff
Per Hectare

Using 2008 QMED Equation

Project Title	Sheringham Recycling Centre
Project No	332610161

Methodology as set out in SuDS Manual 24.3.2 — SUDS Manual Chapter 24

1 Retrieve FEH Catchment Information

Export catchment data from FEH CDROM as .csv file and save in FEH data export

Catchment Descriptors	**BFIHOST**	0.861	*see note 1*
	SAAR	700.0	*see note 1*
	FARL	1.00	*see note 2*

2 Derive QBAR (mean annual flood)

Define area	**Site Area**	0.4	ha	
	Applied Area	50.0	ha	*see note 3*
FEH Index Flood (SuDS Manual Equation 24.2)	**QMED (Q_2)**	0.2	l/s	*see note 4*
Calculate QBAR by dividing QMED by 2yr growth factor	**QBAR**	0.3	l/s	*see note 5*

3 Select appropriate growth factors

FSR Hydrological Region		5	*(refer to FSR Hydrological Region tab)*
100yr Growth Curve Factor	GQ_{100}	3.56	
30yr Growth Curve Factor	GQ_{30}	2.55	
10yr Growth Curve Factor	GQ_{10}	1.65	
2yr Growth Curve Factor	GQ_2	0.89	
1yr Growth Curve Factor	GQ_1	0.87	

Figure 24.1 Hydrological areas

4 Derive Flood Frequency

Greenfield Runoff per 1ha

100yr Peak Runoff Rate	Q_{100}	1.0	l/s	Q_{100}	2.59	l/s/ha
30yr Peak Runoff Rate	Q_{30}	0.7	l/s	Q_{30}	1.85	l/s/ha
10yr Growth Curve Factor	Q_{10}	0.4	l/s	Q_{10}	1.20	l/s/ha
QBAR Peak Runoff Rate	QBAR	0.3	l/s	Q_{BAR}	0.73	l/s/ha
2yr Peak Runoff Rate	Q_2	0.2	l/s	Q_2	0.65	l/s/ha
1yr Peak Runoff Rate	Q_1	0.2	l/s	Q_1	0.63	l/s/ha

DOCUMENT ISSUE RECORD

Rev	Comments	Prepared	Date	Checked	Date

Notes This spreadsheet has been created to allow derivation of greenfield runoff rates using the FEH statistical method applied in a manner consistent with the recommendations of the SuDS Manual. If you have recommendations to improve this spreadsheet please contact the owner.

Note 1 FEH Web version 3 allows extraction of BFIHOST and SAAR values for each square kilometre grid If you do not think the BFIHOST value is representative of your site then it is possible to derive it manually. This should only very occasionally be necessary. BFI can be derived manually using the the methodology set out in the Flood Estimation Handbook (see *Manual Derivation of BFIHOST tab).*

Note 2 FARL value is a measure of attenuation from reservoirs and lakes for the majority of studies this should be set to 1 (representing no attenuation). If your site includes a large water body with an attenuating affect on runoff please consult a hydrologist.
FARL is a measurement of studies water bodies in the catchment so that their attenuation effects so this term becomes 1.0 and therefore drops out. (see page 23 of the Preliminary rainfall runoff management for developments EA/Defra 2013)
Rainfall runoff management for developments.pdf

Note 3 If the site area is less than 50 hectare the spreadsheet will calculate QMED for 50ha and scale the results automatically to the defined Site Area

Note 4 QMED is calculated using the statistical equation as revised by Kjeldsen in 2008

$$Q_{MED} = 8.3062AREA^{0.8510} .0.1536^{(1000/SAAR)} .FARL^{3.4451} .0.0460^{BFIHOST\wedge 2}$$

Rainfall runoff management for developments.pdf
It is reproduced as Equation 24.2 in the SUDS Manual (pg 512)

Note 5 QBAR is calculated by dividing QMED by the growth factor for the 2 year event, as per the methodology set out in paragraph 6.2.2 of 'Rainfall runoff management for developments' . QBAR is then used as the index flood for the basis of applying the growth factors.

Checked by Natasha Vaughan, Clare Waller, David Collis