APPENDIX B: Rainfall Runoff Method

Catchment schematisation

Using the FEH CD-ROM, 4 sub-catchments were identified and verified using OS data. The remaining catchment area was assigned catchment descriptors using the area weighting method, and split up into five lateral areas. The locations of the lateral inputs were identified during the site visit.

Hydrograph simulation

Due to the lack of observed data, the ReFH boundaries were constructed using catchment descriptors alone, the values of which are shown in **Table B-1**.

Table B-1: Cinderford Brook Catchment Descriptors

|	Dry Brook	Nailbridge	Bilson Green	Birch Wood	Stream Mills
AREA (km^2)	4.72	1.04	1.3	1.76	3.55
ALTBAR (m)	230	234	206	173	190.7
BFIHOST	0.524	0.547	0.414	0.459	0.452
DPLBAR (km)	2.2	0.99	1.19	1.14	2
LDP (km)	4.17	1.83	2.21	1.83	NA
PROPWET	0.33	0.33	0.33	0.33	0.33
SAAR (mm)	865	902	912	902	900
SPRHOST	24.76	24.39	32.61	30.25	30.62
URBEXT1990	0.0556	0.0108	0.2395	0	0.026
URBEXT2008	0.0592	0.0115	0.2548	0.0000	0.0277

Glossary

AREA	Catchment area (km^2)
ALTBAR	Average altitude (m)
BFIHOST	Base flow index derived using the Hydrology of Soil Types classification
DPLBAR	Index describing the catchment size and drainage path configuration (km)
LDP	Longest drainage path in the catchment (km)
PROPWET	Index of the proportion of time that the soils are wet
SAAR	1961-1990 standard-period average annual rainfall (mm)
SPRHOST	Standard Percentage Runoff derived using the Hydrology of Soil Types classification
URBEXT$_{1990}$	Urban extent in 1990
URBEXT$_{2008}$	Updated URBEXT$_{1990}$ value

The design storm applied to each sub-catchments adopted a winter profile, given the predominantly rural nature of the catchment. A critical storm duration of 5.25 hours was determined which gave the greatest peak flow estimate and a timestep of 0.25 hours was applied.

Peak flow estimation

The FEH statistical analysis was considered for the derivation of peak flows. A pooled group was derived based on the subject catchment (12.66 km²). The pooled analysis produced a relatively homogenous group (h2 score). The resultant growth curve was applied to a QMED value based on catchment descriptors for the subject site (QMED = 4.7m³s⁻¹). The final flood frequency curve is shown below along with the peak flow estimates from the ReFH model.
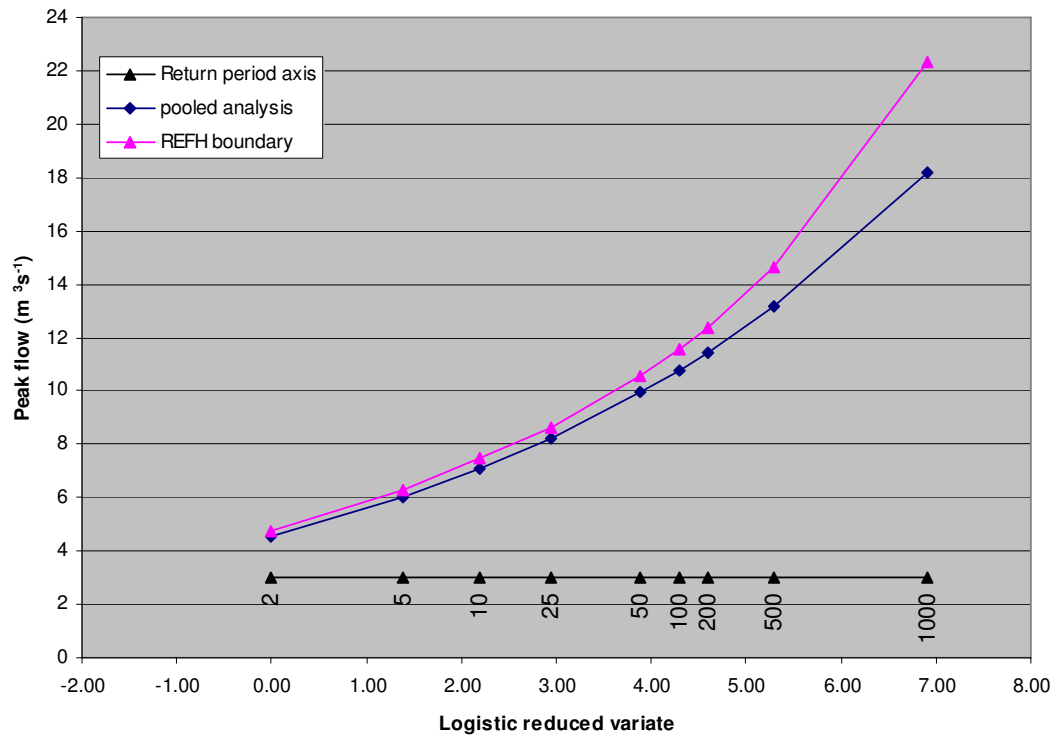
It was decided that the ReFH method was suitable for the study, as the results of using one ReFH boundary to describe the catchment were similar to results of the pooled analysis.