



Frodsham Solar

Environmental Statement: Volume 2

Appendix 9-4: Ince and Frodsham Modelling

May 2025



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Frodsham Solar

Frodsham Marsh, Frodsham, Cheshire West and Chester

Technical Note – Ince and Frodsham Model

April 2025

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This report will remain valid for a period of twelve months (from the date of last issue) after which the source data should be reviewed in order to reassess the findings and conclusions on the basis of latest available information.

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Glossary and Modelling Short Codes

Table 1: Glossary of Technical Terms

Term / Acronym	Definition
1D (model)	One dimensional – A type of model typically built using watercourse cross-section survey data to represent the watercourse and adjacent floodplain
2D (model)	Two dimensional – A type of hydraulic model typically built using LiDAR and site-specific topographic data to represent the wider floodplain
1D-2D (model)	A combination of 1D and 2D modelling (i.e. typically a representation of the watercourse and floodplain respectively)
AEP	Annual Exceedance Probability – the probability that a storm event will occur in any given year
Defra	Department for Environment, Food and Rural Affairs
EA	Environment Agency – non-departmental public body responsible for the protection and enhancement of the environment in England
ESTRY	Industry standard flood modelling software (1D engine built into TUFLOW)
FCA	Flood Consequence Assessment
FRA	Flood Risk Assessment
FFL	Finished Floor Level
Flood risk	The product of the frequency or likelihood of a flood event and the consequences (such as loss, damage, harm, distress and disruption)
FMP	Flood Modeller Pro – industry standard flood modelling software
HMR	Hydraulic Modelling Report
IDB	Internal Drainage Board
LA	Local authority
LiDAR	Light Detection and Ranging (i.e. Ground elevation data)
LLFA	Lead Local Flood Authority
Main river	A watercourse on which the relevant regulatory body (e.g. EA/NRW/SEPA/DfI) has permissive powers, but not a duty, to carry out maintenance, improvement, or construction work.
MIKE (11/21/FLOOD)	Industry standard flood modelling software
NGR	National Grid Reference
NRW	Natural Resources Wales – Welsh Government sponsored body responsible for managing the environment and natural resources of Wales
Ordinary watercourse	A river, stream, ditch, cut, sluice, dyke or non-public sewer that is not a designated main river, and for which the LA has flood risk management responsibilities and powers.
TN	Technical Note
TUFLOW	Industry standard flood modelling software

Short codes are used in the naming and referencing of model files, events and scenarios to ensure a consistent, high-quality naming convention is followed and to simplify communication of model results.

Table 2: Modelling Short Codes

Model Short Code	Definition
ABC	Model identifier
BL[x]-[y]	A y% blockage at location x (e.g. BL1-67 – 67% blockage at location “1”)
BR[x]-[y]	A y metre wide breach scenario at location x (e.g. BR2-50 – 50m wide breach at location “2”)
CC	Climate change
DEV	Post-development site layout
EXG	Existing (pre-development) site layout
MIT	Flood mitigation option
NC	“Normal conditions” A model setup representative of present channel and floodplain conditions throughout the study area – no additional structure blockages, defence breaches or pump failures
OPT	Development option
Q[x]	1 / x % AEP fluvial event
R[x]	1 / x % AEP pluvial event
ST[x]	Sensitivity test x (e.g. ST1 – channel and floodplain roughness +20%)
T[x]	1 / x % AEP tidal event

Introduction

Waterco has been commissioned to undertake a Hydraulic Modelling Technical Note in relation to a proposed solar farm on land north of the M56, Frodsham, Cheshire, WA6 7BQ.

The purpose of this Technical Note is to assess the flood risk associated with the watercourses on site to inform the soffit levels of the proposed watercourse access road bridge crossings.

The proposed watercourse bridge crossing are shown on the Watercourse Crossing Points plans included in Appendix A. The crossings over EA main rivers which have been considered in this report are: CP14 (Approx NGR 351078, 378798), CP17 (Approx NGR 351167, 378581) and CP22 (Approx NGR 351551, 378799).

The 1% AEP plus 67%CC and 1% AEP plus 106%CC water level will be used to inform the soffit level of the proposed watercourse bridge crossings.

The EA Ince and Frodsham model, completed in 2011 and simulated in ISIS 3.4 and TUFLOW 2009-07-AF, identifies the flood risk from the watercourses within the site and will be utilised for this assessment.

As the Ince and Frodsham model has not been simulated for the latest climate change allowances, a hydrology assessment has been undertaken and a comparison to the EA model results has been completed.

Hydrology

To fully investigate the fluvial flood risk at the location of the proposed bridges, a range of fluvial return periods have been derived; namely the 50%, 1% and 0.1% AEP events. The impact of future climate change (CC) has been investigated during the 1% AEP event by increasing flows by 67% and 106%.

A methodology for undertaking the hydrology assessment was agreed during a meeting between Waterco and the Environment Agency on the 14th February 2025. The details of which have been provided below.

The previous EA hydrology split the catchments into three main areas: Upland Catchments, Motorway Catchments and Lowland Catchments. During the meeting it was agreed the hydrology for the Upland Catchments, included in Table 3, would be updated using the latest ReFH2 software and the Motorway Catchments and Lowland Catchments would be scaled by area from the Upland Catchment ReFH2 calculations. Table 4 details which Upland Catchment the remaining catchments have been scaled from, including their scaling ratio.

Table 3: Upland Catchments

	Catchment	EA Model Reference	Area
Upland Catchments	Un-named	WCD2_up	0.68
	Tang	WESB_1158	0.62
	West	WCDR_up	1.65
	East	ECD2_up	0.55
	Hoolpool	HOOL_up	14.32
	Helsby	HETD_up	0.81
	Un-named	SALM_up	0.75
	Helsby Cut	HELS_up	0.76
	Straight	STLC_up	5.34
	Un-named	HATL_up	1.72

Table 4: Catchment Scaling Ratios

	Catchment	Area	Scaling Catchment	Scaling Ratio
Motorway Catchments	Motorway 1	0.03	WCD2_up	0.044
	Motorway 2	0.04	ECD2_up	0.073
	Motorway 3	0.01	HOOL_up	0.001
	Motorway 4	0.03	HETD_up	0.037
	Motorway 5	0.05	SALM_up	0.067
	Motorway 6	0.03	STLC_up	0.006
	Motorway 7	0.04	HATL_up	0.023
	Motorway 8	0.06	HATL_up	0.035
Lowland Catchments	Un-named Drain 01	0.66	WCD2_up	0.971
	West Central Drain	1.40	WCDR_up	0.848
	East Central Drain (south)	0.53	ECD2_up	0.964
	East Central Drain (north)	1.08	WESB_1158	1.742
	Hoolpool Gutter	4.55	STLC_up	0.852
	Helsby Town Ditch	0.13	HETD_up	0.160
	Un-named Drain 02	0.14	SALM_up	0.187
	Helsby Cut	0.87	HELS_up	1.145
	Central New Cut (west)	0.41	SALM_up	0.547
	Central New Cut (east)	1.20	HELS_up	1.579
	Stright Length Course	0.22	STLC_up	0.041
	Un-named Drain 03	0.07	HATL_up	0.041
	Un-named Drain 04	0.35	HATL_up	0.203
	Red Wall Ditch	0.25	HATL_up	0.145

To provide the required Upland Catchment hydrographs, the ReFH2 method (version 4.1) has been undertaken. The catchment descriptors for the 10 Upland Catchments were purchased from the FEH Web Service and have been used to derive hydrographs. The catchment descriptors for the Upland Catchments have been reviewed and remain unchanged. The catchment descriptors for the Upland Catchments are

included in Appendix B.

The adopted storm duration has remained unchanged at 6 hours from the hydrology undertaken for the EA Ince and Frodsham model to allow a direct comparison of flows.

The calculated peak flows for the upland catchments are included in Table 5, along with a comparison against the peak flows derived from the EA Ince and Frodsham hydrology. The ReFH2 reports for the 1% AEP event are included in Appendix C for all the catchments.

As shown in Table 5, the present day Waterco flows are generally lower than the flows for the EA Ince and Frodsham model. When climate change is considered, the Waterco 1% AEP +106% CC flows are generally lower or consistent with the EA's 0.1% AEP flows.

The EA model includes three catchment inflows in the vicinity of the site. These are called Motorway 8 (M56_8), Un-named Drain 04 (MARG_0793) and Red Wall Ditch (REDW_0583). As shown by Table 5, Waterco estimated peak flows are all lower for these catchments in comparison to the previous EA flows. As such, and taking a conservative approach, the previous higher EA flows have been used for this assessment.

Table 5: Comparison of Peak Flows between EA Ince and Frodsham model and Waterco ReFH2 Calculations

	Catchment	Model ref	Area	Q2			Q100			Q100CC					Q1000		
				EA	Waterco	Difference	EA	Waterco	Difference	EA (20% CC)	Waterco (67% CC)	Difference	Waterco (106% CC)	Difference	EA	Waterco	Difference
Upland Catchments -ReFH	Un-named 01	WCD2_up	0.68	0.33	0.25	-0.08	0.82	0.64	-0.18	0.98	1.07	0.09	1.32	0.34	1.40	1.05	-0.35
	Tang Running	WESB_1158	0.62	0.11	0.09	-0.02	0.30	0.25	-0.05	0.36	0.42	0.06	0.52	0.16	0.57	0.42	-0.15
	West Central Drain	WCDR_up	1.65	0.71	0.58	-0.13	1.77	1.50	-0.27	2.12	2.51	0.39	3.09	0.97	3.05	2.43	-0.62
	East Central Drain	ECD2_up	0.55	0.16	0.11	-0.05	0.40	0.28	-0.12	0.48	0.47	-0.01	0.58	0.10	0.69	0.47	-0.22
	Hoolpool Gutter	HOOL_up	14.32	3.08	1.95	-1.13	7.42	5.09	-2.33	8.90	8.50	-0.40	10.49	1.59	12.74	8.36	-4.38
	Helsby Town Ditch	HETD_up	0.81	0.26	0.22	-0.04	0.69	0.58	-0.11	0.83	0.97	0.14	1.19	0.36	1.42	0.95	-0.47
	Un-named 02	SALM_up	0.75	0.20	0.13	-0.07	0.53	0.35	-0.18	0.64	0.58	-0.06	0.72	0.08	0.95	0.59	-0.36
	Helsby Cut	HELS_up	0.76	0.27	0.15	-0.12	0.71	0.41	-0.30	0.85	0.68	-0.17	0.84	-0.01	1.28	0.69	-0.59
	Straight Length Course	STLC_up	5.34	0.41	0.42	0.01	1.28	1.17	-0.11	1.54	1.95	0.41	2.41	0.87	2.64	2.01	-0.63
	Un-named 03	HATL_up	1.72	0.14	0.18	0.04	0.45	0.50	0.05	0.54	0.84	0.30	1.03	0.49	0.97	0.86	-0.11
Motorway Catchment- WinDes	Motorway 1	M56_1	0.03	0.07	0.01	-0.06	0.18	0.03	-0.15	0.22	0.05	-0.17	0.06	-0.16	0.31	0.05	-0.26
	Motorway 2	M56_2	0.04	0.10	0.01	-0.09	0.26	0.02	-0.24	0.31	0.03	-0.28	0.04	-0.27	0.45	0.03	-0.42
	Motorway 3	M56_3	0.01	0.01	0.00	-0.01	0.03	0.00	-0.03	0.04	0.01	-0.03	0.01	-0.03	0.05	0.01	-0.04
	Motorway 4	M56_4	0.03	0.06	0.01	-0.05	0.15	0.02	-0.13	0.18	0.04	-0.14	0.04	-0.14	0.45	0.04	-0.41
	Motorway 5	M56_5	0.05	0.11	0.01	-0.10	0.29	0.02	-0.27	0.35	0.04	-0.31	0.05	-0.30	0.52	0.04	-0.48
	Motorway 6	M56_6	0.03	0.06	0.00	-0.06	0.15	0.01	-0.14	0.18	0.01	-0.17	0.01	-0.17	0.27	0.01	-0.26
	Motorway 7	M56_7	0.04	0.09	0.00	-0.09	0.24	0.01	-0.23	0.29	0.02	-0.27	0.02	-0.27	0.43	0.02	-0.41
	Motorway 8*	M56_8	0.06	0.12	0.01	-0.11	0.32	0.02	-0.30	0.38	0.03	-0.35	0.04	-0.34	0.56	0.03	-0.53
Lowland Catchment - WinDes	Un-named Drain 01	WCD2_low	0.66	0.17	0.24	0.07	0.44	0.62	0.18	0.53	1.04	0.51	1.28	0.75	0.78	1.02	0.24
	West Central Drain	WCDR_low	1.40	0.34	0.49	0.15	0.87	1.27	0.40	1.04	2.13	1.09	2.62	1.58	1.54	2.06	0.52
	East Central Drain (south)	ECD2_low	0.53	0.13	0.11	-0.02	0.34	0.27	-0.07	0.41	0.45	0.04	0.56	0.15	0.59	0.45	-0.14
	East Central Drain (north)	ECDR_0830	1.08	0.26	0.16	-0.10	0.68	0.44	-0.24	0.82	0.73	-0.09	0.90	0.08	1.19	0.73	-0.46
	Hoolpool Gutter	Drain_2479	4.55	1.09	0.36	-0.73	2.85	1.00	-1.85	3.42	1.66	-1.76	2.05	-1.37	5.04	1.71	-3.33
	Helsby Town Ditch	HETD_low	0.13	0.03	0.04	0.01	0.08	0.09	0.01	0.10	0.16	0.06	0.19	0.09	0.15	0.15	0.00
	Un-named Drain 02	SALM_low	0.14	0.04	0.02	-0.02	0.09	0.07	-0.02	0.11	0.11	0.00	0.13	0.02	0.17	0.11	-0.06
	Helsby Cut	HELS_low	0.87	0.22	0.17	-0.05	0.58	0.47	-0.11	0.70	0.78	0.08	0.97	0.27	1.02	0.79	-0.23
	Central New Cut (west)	CENT_low_w	0.41	0.10	0.07	-0.03	0.27	0.19	-0.08	0.32	0.32	0.00	0.39	0.07	0.48	0.32	-0.16
	Central New Cut (east)	CENT_low_e	1.20	0.30	0.24	-0.06	0.79	0.65	-0.14	0.95	1.08	0.13	1.33	0.38	1.40	1.09	-0.31
	Stright Length Course	STLC_low	0.22	0.06	0.02	-0.04	0.15	0.05	-0.10	0.18	0.08	-0.10	0.10	-0.08	0.26	0.08	-0.18
	Un-named Drain 03	HATL_low	0.07	0.02	0.01	-0.01	0.05	0.02	-0.03	0.06	0.03	-0.03	0.04	-0.02	0.08	0.04	-0.05
	Un-named Drain 04*	MARG_0793	0.35	0.09	0.04	-0.05	0.23	0.10	-0.13	0.28	0.17	-0.11	0.21	-0.07	0.41	0.18	-0.24
	Red Wall Ditch*	REDW_0583	0.25	0.06	0.03	-0.03	0.17	0.07	-0.10	0.20	0.12	-0.08	0.15	-0.05	0.30	0.13	-0.18

* Catchment inflows in the region of the study site

Model Results

As shown in Table 5 and discussed in the hydrology section of this report, Waterco flows derived by up-to-date ReFH2 analysis are lower than the EA flows in the Ince and Frodsham Model. It is therefore deemed a reasonable and conservative approach to extract the water levels from the existing EA Ince and Frodsham model results.

Do Minimum and Do Nothing scenarios are included in the EA model. The Do Minimum scenario assumes the maintenance and pump rates/levels are the same as now. The Do Nothing scenario assumes all the Ince and Frodsham pumps are turned off. The channel roughness has been increased by 20% to represent the build up of weeds and blockages. The River Weaver defences are assumed to remain in place.

The results for 50% (Q2), 20% (Q5), 10% (Q10), 4% (Q25), 2% (Q50), 1.33% (Q75) and 1% (Q100) AEP events for the EA Ince and Frodsham model were provided from the EA. Whilst the 1% AEP + 20% CC (Q100CC20) and 0.1% (Q1000) had been set up in the EA model, the results were not provided and the EA confirmed *'In the Ince and Frodsham 2011 modelling report the 100-year plus climate change and 1000-year return periods were not provided as part of the package of works. Please use the information in the P7 to extrapolate any other return periods as required'*. Correspondence is included in Appendix D.

When the Do Minimum and Do Nothing scenarios in the EA model were run in the latest software available at the start of the project FMP 7.2 and TUFLOW 2025.0.2 for the higher return periods, the model would not run. This is likely due to modelling software updates and age of the existing EA model.

The existing information in the EA Ince and Frodsham model has been used to extrapolate water levels for a range of return periods. As the Do Nothing peak water levels are higher than the Do Minimum water levels, the Do Nothing results will be used as a conservative approach.

Water Level Analysis

Water levels for the 1% AEP plus 67% CC and 1% AEP plus 106% CC events are required at the location of the proposed bridges to determine the soffit levels.

Figure 1 shows the locations of the proposed bridge locations (CP14, CP17 and CP22) and the closest FMP nodes. The closest FMP node to the proposed bridges have been used to extract water levels during a range of return periods. Table 6 details which FMP node has been chosen for each bridge location along with the closest EA catchment inflow.

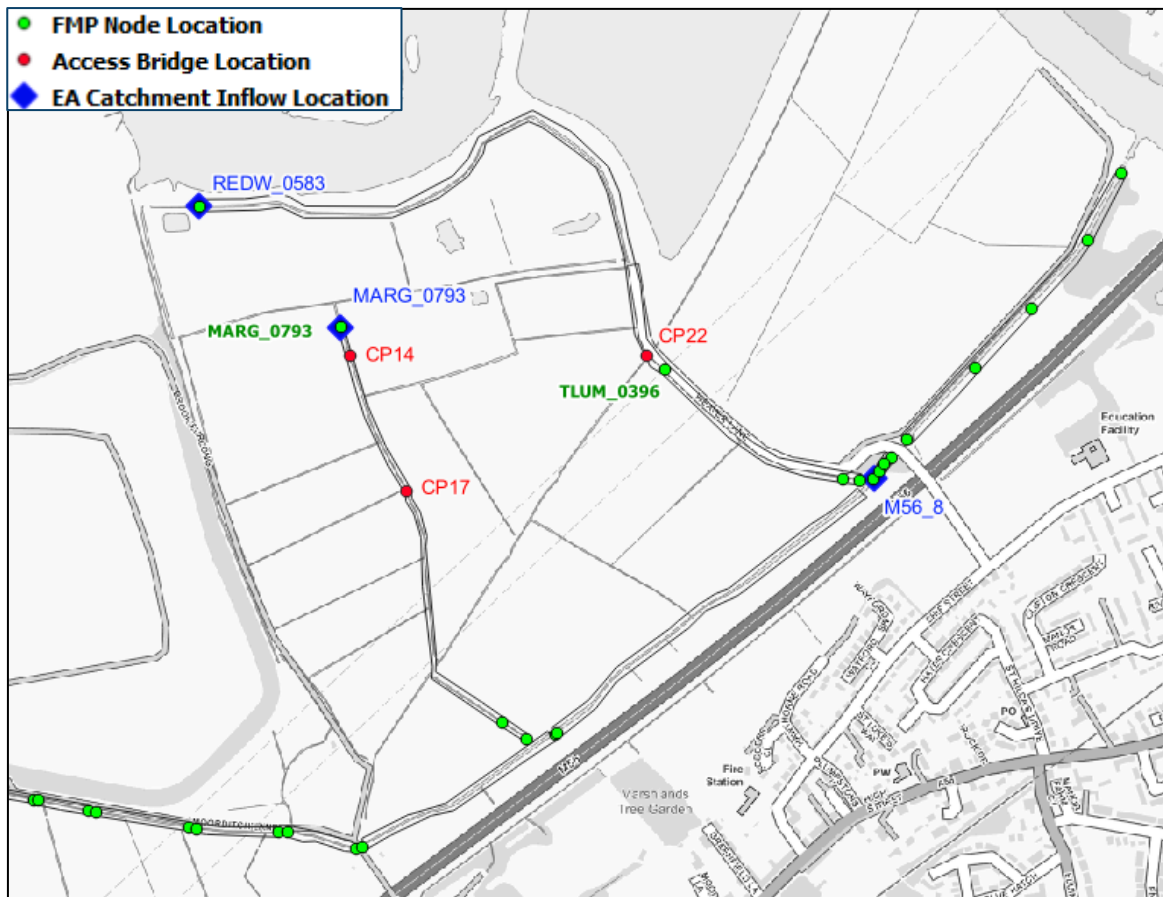


Figure 1: Access Bridge and FMP Node Locations

Table 6: Maximum Water Level at Access Bridge Locations

Access Bridge Location	Approx NGR	EA FMP Node	EA Catchment Inflow
CP14	351078, 378798	MARG_0793	MARG_0793
CP17	351167, 378581		
CP22	351551, 378799	TLUM_0396	M56_8 and REDW_0583

At each of the FMP nodes, the peak water level and peak flow results have been extracted from the EA results for the 50% (Q2), 20% (Q5), 10% (Q10), 4% (Q25), 2% (Q50), 1.33% (Q75) and 1% (Q100) AEP events. These have been plotted in the graphs included in Figures 2 and 3.

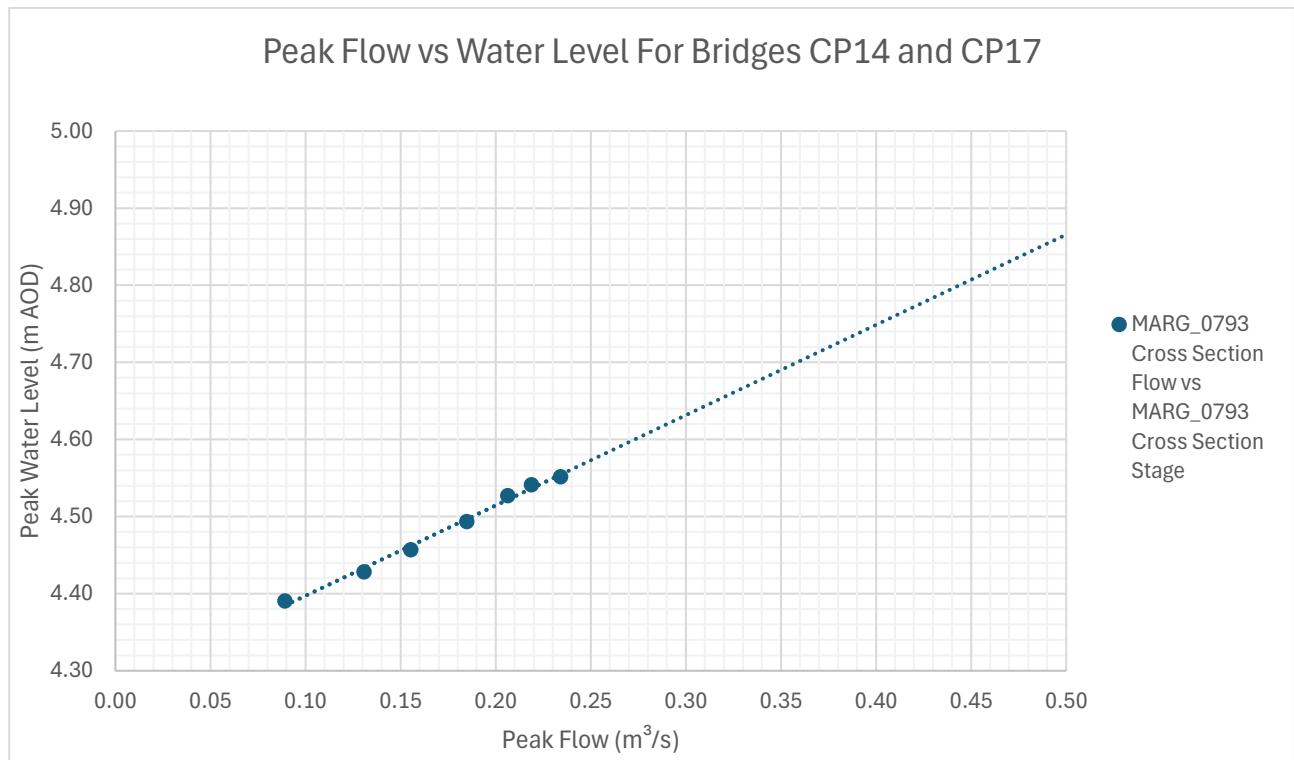


Figure 2: Peak Flow vs Water Level for Bridges CP14 and CP17

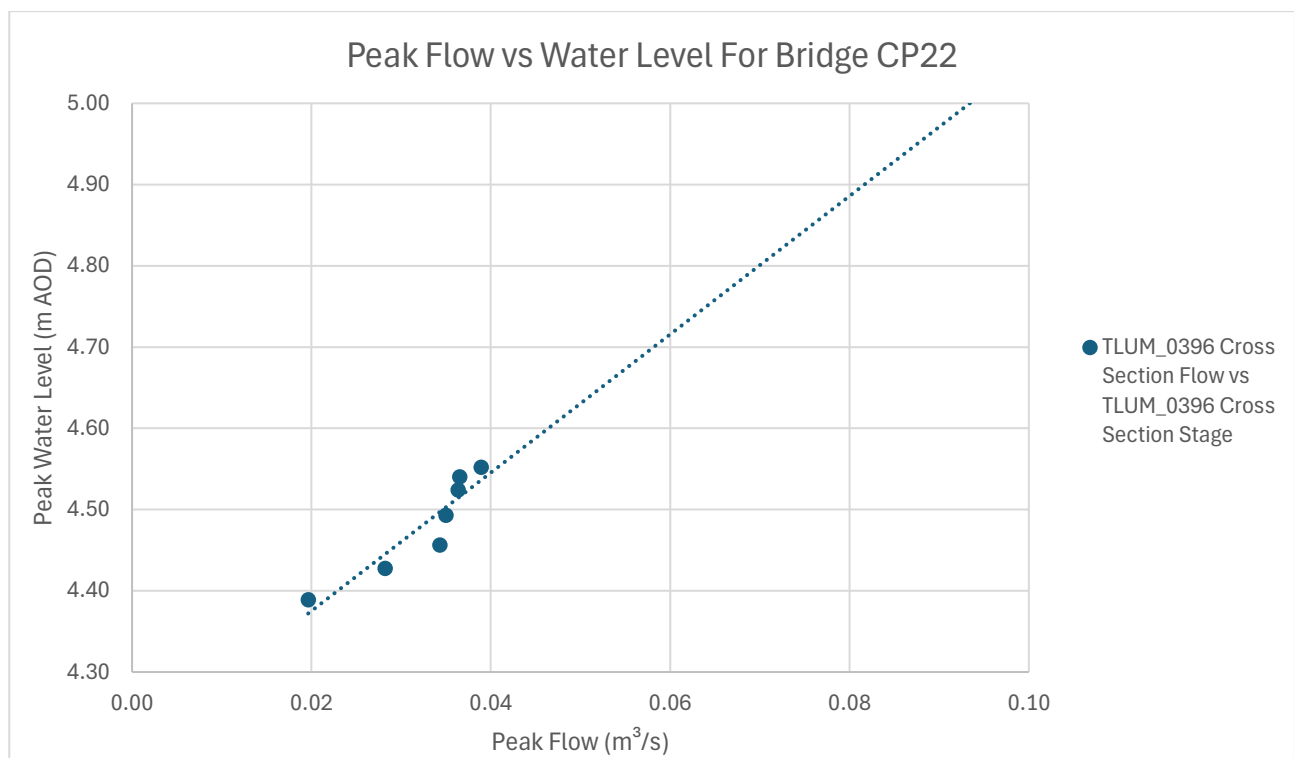


Figure 3: Peak Flow vs Water Level for Bridge CP22

The climate change allowances of 67% and 106% have been applied to the EA's 1% AEP flows at the relevant cross-section (MARG_0793 and TLUM_0396). The values have been included in Table 7.

Table 7: EA 1% AEP Peak Flows Including Climate Change

Cross Section Model Reference	EA 1% AEP Catchment Peak Flow	1% AEP + 67% CC Peak Flow	1% AEP + 106% CC Peak Flow
MARG_0793	0.23	0.39	0.48
TLUM_0396	0.04	0.06	0.08

Using the flow vs level trend lines on the relevant graphs (Figures 2 and 3), the peak climate change flows have been used to extrapolate the corresponding peak water level for each node. The final values are included in Table 8.

Table 8: Peak Water Levels from Graphed Trend Lines

Graph	Trend Line	1% AEP + 67% CC		1% AEP + 106% CC	
		Peak Flow (m ³ /s)	Extrapolated Peak Water Level from Trend Line (m AOD)	Peak Flow (m ³ /s)	Extrapolated Peak Water Level from Trend Line (m AOD)
Peak Water Level Vs Flow for Bridges CP14 and CP17	MARG_0793 Cross Section Flow vs Level	0.39	4.74	0.48	4.84
Peak Water Level Vs Flow for Bridge CP22	TLUM_0396 Cross Section Flow vs Level	0.06	4.76	0.08	4.89

Access Bridge Soffit Levels

The proposed bridge soffit levels should be set 600mm above the 1% AEP plus 67% CC water level to account for freeboard. The 1% AEP plus 106% CC water level should be within the freeboard of the proposed soffit levels. From the results above, the proposed access bridge soffit levels have been included in Table 9.

Table 9: Proposed Access Bridge Soffit Levels

Access Bridge	Proposed Soffit Level including 600mm freeboard (m AOD)
CP14	5.34
CP17	
CP22	5.36

Conclusion

Waterco has been commissioned to undertake a Modelling Technical Note to inform the soffit levels of the proposed watercourse access bridge crossings in relation to a proposed solar farm on land north of the M56, Frodsham, Cheshire, WA6 7BQ.

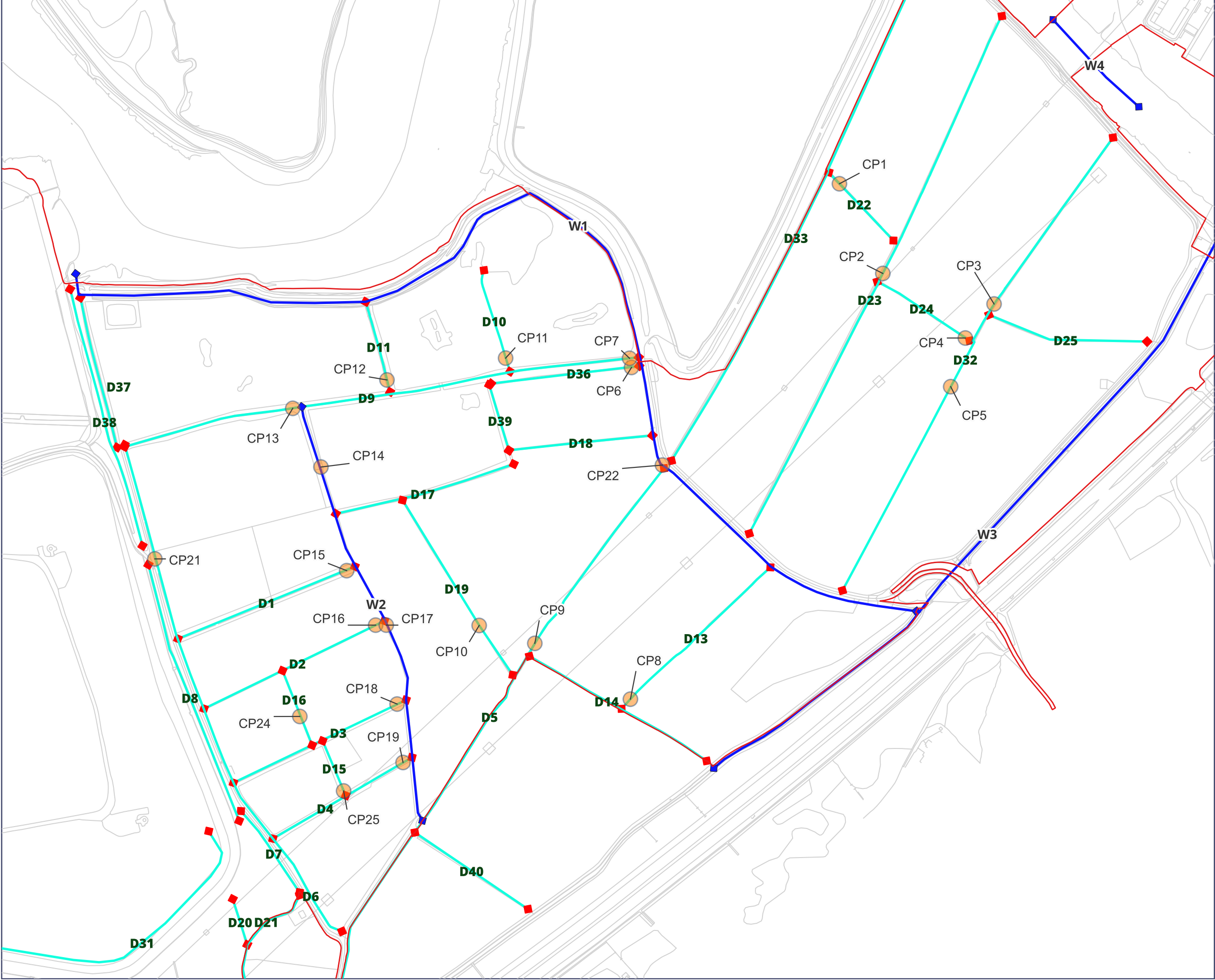
The 1% AEP plus 67%CC and 1% AEP plus 106%CC water levels have been used to inform the soffit level of the proposed bridges.

Updated hydrology (ReFH2 method) undertaken by Waterco derives peak flows which are generally lower than the peak flows in the existing EA Ince and Frodsham model. When climate change is considered, the Waterco 1% AEP plus 106% CC peak flows are generally lower or consistent with the EA's 0.1% AEP flows.

Taking a precautionary approach, the previous (and higher) EA peak flows have been utilised to derive water levels. The existing EA model is not able to simulate the additional climate change runs due to instability. Therefore, water levels for the 1% AEP plus 67% CC and 1% AEP plus 106% CC have been derived using flow vs level trend lines.

The soffit level of bridges CP14 and CP17 should be set to a minimum of 5.34m AOD, which provides 600mm freeboard on the 1% AEP plus 67% CC flood level. The soffit level of bridge CP22 should be set to a minimum 5.36m AOD, which provides 600mm freeboard on the 1% AEP plus 67% CC flood level.

Appendix A Watercourse Crossing Points Plans



- Order Limits
- Crossing Points
- Main Rivers
- Ditches

0344 8700 007
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Project

Frodsham Solar
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Figure Number

Appendix 2-1
Figure 1

Figure Title

Indicative Watercourse
Crossing Points

Scale

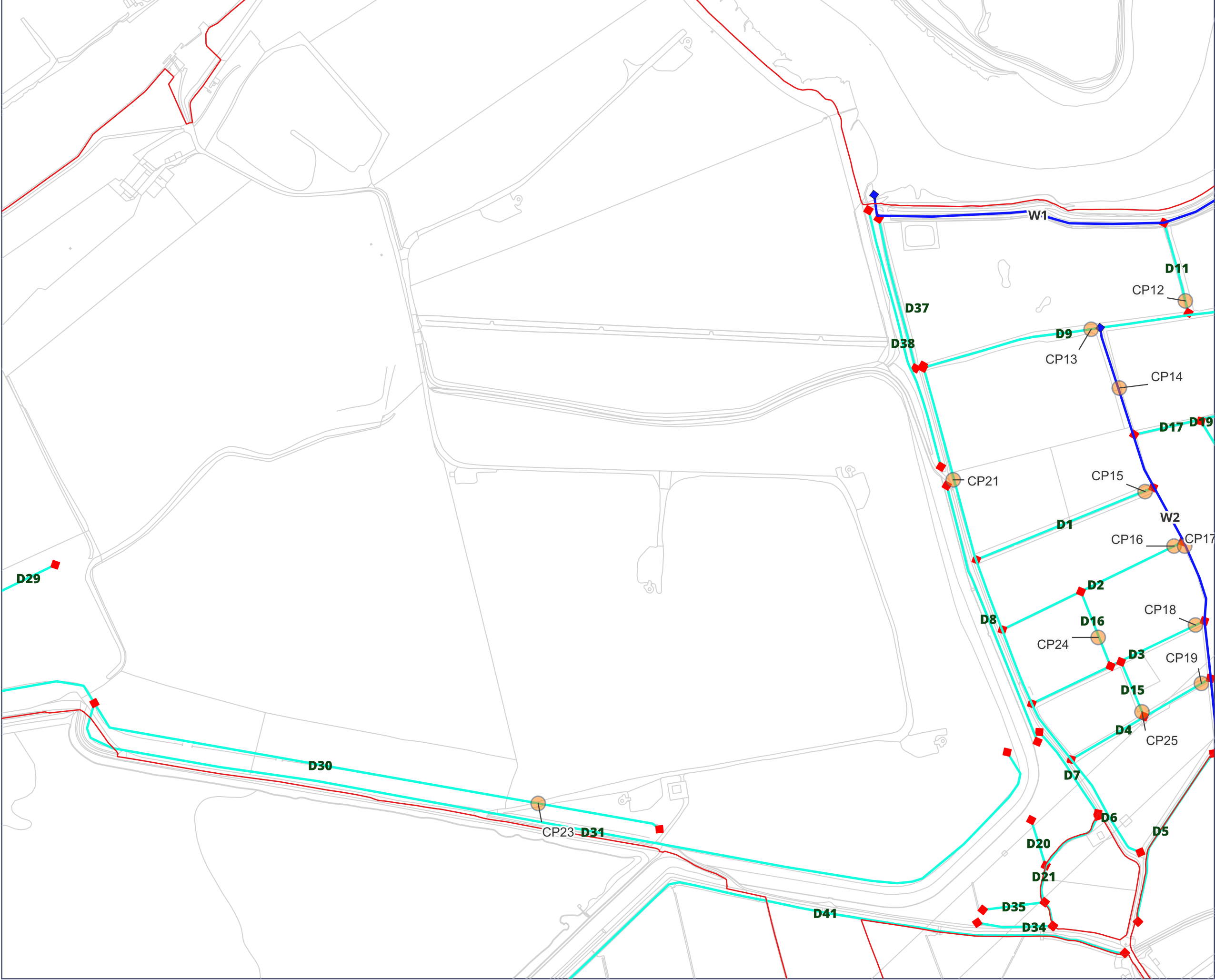
1:5000@A3

Date

April 2025



0 100 200 300 400 500 m



- Order Limits
- Crossing Points
- Main Rivers
- Ditches

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Project

Figure Number

Figure Title

Scale

Date



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**Appendix 2-1
Figure 2**

**Indicative Watercourse
Crossing Points**

1:5000@A3

April 2025



Order Limits



Ditches

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Project

**Frodsham Solar
Environmental Statement**

Figure Number

**Appendix 2-1
Figure 3**

Figure Title

**Indicative Watercourse
Crossing Points**

Scale

1:5000@A3

Date

April 2025



0 100 200 300 400 500 m

Appendix B Catchment Descriptors

	Un-named 01 (WCD2_up)	West Central Drain (WCDR_up)	Tang Running (WESB_1158)	East Central Drain (ECD2_up)	Hoolpool Gutter (HOOL_up)	Helsby Town Ditch (HETD_up)	Un-named 02 (SALM_up)	Helsby Cut (HELS_up)	Straight Length Course (STLC_up)	Un-named 03 (HATL_up)
CATCHMENT	346700, 375000	346900, 374900	346050, 377250	347400, 375350	347850, 375550	348200, 375750	348650, 376450	349350, 376750	350050, 377500	350550, 377500
CENTROID	346120, 374959	347056, 374015	345577, 376888	347477, 374914	349587, 373038	348763, 375317	348790, 376032	349430, 376207	350698, 375354	351208, 376396
AREA	0.6825	1.6475	0.62	0.5475	14.315	0.805	0.75	0.755	5.3425	1.72
ALTBAR	14	15	12	10	53	35	21	23	73	76
ASPBAR	88	337	61	340	262	287	8	345	331	307
ASPVAR	0.5	0.56	0.4	0.4	0.42	0.62	0.42	0.7	0.3	0.59
BFIHOST	0.464	0.393	0.727	0.568	0.559	0.599	0.654	0.626	0.79	0.8
BFIHOST19	0.441	0.395	0.684	0.562	0.569	0.62	0.682	0.711	0.769	0.73
DPLBAR	0.79	1.26	0.88	0.68	4.86	1.5	1.05	0.74	3.62	2.03
DPSBAR	11.8	13.7	15.4	3.3	43	100.6	45.8	56.3	94.9	72.6
FARL	1	1	1	0.914	0.996	1	1	1	0.997	1
FPEXT	0.2857	0.3323	0.7218	0.8995	0.1348	0.4117	0.7633	0.457	0.1218	0.1759
FPDBAR	2.103	2.754	10.371	10.653	1.199	4.519	10.37	7.474	3.383	4.193
FPLOC	0.521	0.542	0.743	0.904	0.554	0.658	0.801	0.593	0.289	0.346
LDP	1.79	2.81	1.74	1.58	9.1	3.01	2.1	1.67	6.1	3.44
PROPWET	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37
RMED-1H	9.9	10.1	10	10.1	10.3	10.3	10.2	10.3	10.5	10.7
RMED-1D	27.4	27.5	28.7	27.5	28.2	27.5	27.6	27.8	28.2	28.6
RMED-2D	35.7	36.1	37.4	36.2	37.8	36.8	36.7	37.3	38.7	39.5
SAAR	712	710	724	711	732	728	734	741	760	767
SAAR4170	704	706	712	713	733	726	729	734	745	744
SPRHOST	35.58	39.06	23.87	30.43	31.23	28.5	25.63	25.55	19.59	18.49
URBCONC1990	0.918	0.476	0.563	0.667	0.651	0.795	0.625	0.725	0.441	-999999
URBEXT1990	0.119	0.0432	0.0403	0.0388	0.0298	0.1977	0.0433	0.0977	0.0148	0
URBLOC1990	1.504	1.131	1.75	1.503	0.599	0.966	1.45	1.461	0.693	-999999
URBCONC2000	0.938	0.516	0.867	0.7	0.747	0.769	0.756	0.881	0.625	-999999
URBEXT2000	0.1044	0.0311	0.0786	0.0845	0.0305	0.207	0.0783	0.1275	0.0145	0
URBLOC2000	1.528	1.451	1.814	1.215	0.402	0.959	1.521	1.476	0.708	-999999
C	-0.025	-0.025	-0.024	-0.025	-0.02457	-0.02404	-0.024	-0.024	-0.024	-0.024
D1	0.30237	0.29602	0.31245	0.29433	0.29796	0.28886	0.28842	0.28895	0.2951	0.29382
D2	0.35634	0.36651	0.33772	0.36273	0.39036	0.36628	0.35285	0.35741	0.38003	0.37655
D3	0.33193	0.32644	0.33506	0.32679	0.30896	0.32568	0.3277	0.3229	0.30717	0.30284
E	0.28906	0.29009	0.29	0.28976	0.28952	0.29	0.29006	0.29002	0.28978	0.29027
F	2.41893	2.43412	2.4369	2.43683	2.44315	2.44622	2.44923	2.45106	2.44987	2.46124
C(1 km)	-0.025	-0.025	-0.024	-0.025	-0.024	-0.024	-0.024	-0.024	-0.024	-0.024
D1(1 km)	0.299	0.299	0.314	0.299	0.287	0.287	0.285	0.301	0.3	0.29
D2(1 km)	0.361	0.361	0.34	0.361	0.352	0.352	0.35	0.344	0.373	0.399
D3(1 km)	0.328	0.328	0.331	0.328	0.331	0.331	0.331	0.317	0.308	0.28
E(1 km)	0.289	0.289	0.29	0.289	0.29	0.29	0.29	0.291	0.29	0.29
F(1 km)	2.425	2.425	2.438	2.425	2.449	2.449	2.448	2.455	2.464	2.47

Appendix C Hydrology

Un-named 01 (WCD2 up) Catchment

UK Design Flood Estimation

Generated on 18 February 2025 14:21:20 by louise.wilcock
Printed from the ReFH2 Flood Modelling software package, version 4.1.8704.23947

Summary of estimate using the Flood Estimation Handbook revitalised flood hydrograph method (ReFH2)

Site details

Checksum: 141E-10FA

Site name: FEH_Catchment_Descriptors_346700_375000_v5_0_1

Easting: 346700

Northing: 375000

Country: England, Wales or Northern Ireland

Catchment Area (km²): 0.68

Using plot scale calculations: No

Model: 2.3

Site description: None

Model run: 100 year

Summary of results

Rainfall - FEH22 (mm):	55.00	Total runoff (ML):	10.24
Total Rainfall (mm):	38.08	Total flow (ML):	26.00
Peak Rainfall (mm):	6.50	Peak flow (m ³ /s):	0.64

Parameters

Where the user has overridden a system-generated value, this original value is shown in square brackets after the value used.

** Indicates that the user locked the duration/timestep*

Rainfall parameters (Rainfall - FEH22)

Name	Value	User-defined?
Duration (hh:mm:ss)	06:00:00 [04:30:00]	Yes
Timestep (hh:mm:ss)	00:24:00 [00:30:00]	Yes
SCF (Seasonal correction factor)	0.7	No
ARF (Areal reduction factor)	0.98	No
Seasonality	Winter	No

Loss model parameters

Name	Value	User-defined?
Cini (mm)	106.7	No
Cmax (mm)	344.24	No
Use alpha correction factor	No	No
Alpha correction factor	n/a	No

Routing model parameters

Name	Value	User-defined?
Tp (hr)	2.38	No
Up	0.65	No
Uk	0.8	No

Baseflow model parameters

Name	Value	User-defined?
BF0 (m ³ /s)	0.02	No
BL (hr)	28.26	No
BR	1.74	No

Urbanisation parameters

Name	Value	User-defined?
Sewer capacity (m ³ /s)	0	No
Exporting drained area (km ²)	0	No
Urban area (km ²)	0.11	No
Effective URBEXT2000	0.1	n/a
Impervious runoff factor	0.7	No
Imperviousness factor	0.4	No
Tp scaling factor	0.75	No
Depression storage depth (mm)	0.5	No

Time series data

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m³/s)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
00:00:00	0.569	0.000	0.192	0.000	0.019	0.019
00:24:00	0.832	0.000	0.286	0.001	0.019	0.020
00:48:00	1.213	0.000	0.421	0.004	0.019	0.023
01:12:00	1.762	0.000	0.619	0.012	0.019	0.030
01:36:00	2.550	0.000	0.911	0.024	0.019	0.043
02:00:00	3.666	0.000	1.341	0.044	0.019	0.064
02:24:00	5.198	0.000	1.966	0.075	0.020	0.095
02:48:00	6.497	0.000	2.562	0.120	0.022	0.142
03:12:00	5.198	0.000	2.134	0.183	0.024	0.207
03:36:00	3.666	0.000	1.550	0.263	0.028	0.291
04:00:00	2.550	0.000	1.100	0.350	0.034	0.384
04:24:00	1.762	0.000	0.767	0.435	0.041	0.477
04:48:00	1.213	0.000	0.533	0.507	0.050	0.557
05:12:00	0.832	0.000	0.368	0.555	0.060	0.615
05:36:00	0.569	0.000	0.253	0.572	0.071	0.644
06:00:00	0.000	0.000	0.000	0.562	0.083	0.645
06:24:00	0.000	0.000	0.000	0.531	0.093	0.624
06:48:00	0.000	0.000	0.000	0.486	0.103	0.589
07:12:00	0.000	0.000	0.000	0.434	0.112	0.546
07:36:00	0.000	0.000	0.000	0.379	0.119	0.498
08:00:00	0.000	0.000	0.000	0.325	0.125	0.451
08:24:00	0.000	0.000	0.000	0.275	0.131	0.405
08:48:00	0.000	0.000	0.000	0.229	0.135	0.363
09:12:00	0.000	0.000	0.000	0.188	0.138	0.326
09:36:00	0.000	0.000	0.000	0.152	0.140	0.292
10:00:00	0.000	0.000	0.000	0.121	0.141	0.262
10:24:00	0.000	0.000	0.000	0.093	0.142	0.235
10:48:00	0.000	0.000	0.000	0.069	0.142	0.211
11:12:00	0.000	0.000	0.000	0.048	0.142	0.190
11:36:00	0.000	0.000	0.000	0.032	0.141	0.172
12:00:00	0.000	0.000	0.000	0.020	0.139	0.159
12:24:00	0.000	0.000	0.000	0.012	0.138	0.150
12:48:00	0.000	0.000	0.000	0.007	0.136	0.143
13:12:00	0.000	0.000	0.000	0.003	0.134	0.138

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
13:36:00	0.000	0.000	0.000	0.001	0.132	0.134
14:00:00	0.000	0.000	0.000	0.000	0.131	0.131
14:24:00	0.000	0.000	0.000	0.000	0.129	0.129
14:48:00	0.000	0.000	0.000	0.000	0.127	0.127
15:12:00	0.000	0.000	0.000	0.000	0.125	0.125
15:36:00	0.000	0.000	0.000	0.000	0.123	0.123
16:00:00	0.000	0.000	0.000	0.000	0.122	0.122
16:24:00	0.000	0.000	0.000	0.000	0.120	0.120
16:48:00	0.000	0.000	0.000	0.000	0.118	0.118
17:12:00	0.000	0.000	0.000	0.000	0.117	0.117
17:36:00	0.000	0.000	0.000	0.000	0.115	0.115
18:00:00	0.000	0.000	0.000	0.000	0.113	0.113
18:24:00	0.000	0.000	0.000	0.000	0.112	0.112
18:48:00	0.000	0.000	0.000	0.000	0.110	0.110
19:12:00	0.000	0.000	0.000	0.000	0.109	0.109
19:36:00	0.000	0.000	0.000	0.000	0.107	0.107
20:00:00	0.000	0.000	0.000	0.000	0.106	0.106
20:24:00	0.000	0.000	0.000	0.000	0.104	0.104
20:48:00	0.000	0.000	0.000	0.000	0.103	0.103
21:12:00	0.000	0.000	0.000	0.000	0.101	0.101
21:36:00	0.000	0.000	0.000	0.000	0.100	0.100
22:00:00	0.000	0.000	0.000	0.000	0.098	0.098
22:24:00	0.000	0.000	0.000	0.000	0.097	0.097
22:48:00	0.000	0.000	0.000	0.000	0.096	0.096
23:12:00	0.000	0.000	0.000	0.000	0.094	0.094
23:36:00	0.000	0.000	0.000	0.000	0.093	0.093
24:00:00	0.000	0.000	0.000	0.000	0.092	0.092
24:24:00	0.000	0.000	0.000	0.000	0.090	0.090
24:48:00	0.000	0.000	0.000	0.000	0.089	0.089
25:12:00	0.000	0.000	0.000	0.000	0.088	0.088
25:36:00	0.000	0.000	0.000	0.000	0.087	0.087
26:00:00	0.000	0.000	0.000	0.000	0.085	0.085
26:24:00	0.000	0.000	0.000	0.000	0.084	0.084
26:48:00	0.000	0.000	0.000	0.000	0.083	0.083
27:12:00	0.000	0.000	0.000	0.000	0.082	0.082

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
27:36:00	0.000	0.000	0.000	0.000	0.081	0.081
28:00:00	0.000	0.000	0.000	0.000	0.080	0.080
28:24:00	0.000	0.000	0.000	0.000	0.078	0.078
28:48:00	0.000	0.000	0.000	0.000	0.077	0.077
29:12:00	0.000	0.000	0.000	0.000	0.076	0.076
29:36:00	0.000	0.000	0.000	0.000	0.075	0.075
30:00:00	0.000	0.000	0.000	0.000	0.074	0.074
30:24:00	0.000	0.000	0.000	0.000	0.073	0.073
30:48:00	0.000	0.000	0.000	0.000	0.072	0.072
31:12:00	0.000	0.000	0.000	0.000	0.071	0.071
31:36:00	0.000	0.000	0.000	0.000	0.070	0.070
32:00:00	0.000	0.000	0.000	0.000	0.069	0.069
32:24:00	0.000	0.000	0.000	0.000	0.068	0.068
32:48:00	0.000	0.000	0.000	0.000	0.067	0.067
33:12:00	0.000	0.000	0.000	0.000	0.066	0.066
33:36:00	0.000	0.000	0.000	0.000	0.065	0.065
34:00:00	0.000	0.000	0.000	0.000	0.064	0.064
34:24:00	0.000	0.000	0.000	0.000	0.063	0.063
34:48:00	0.000	0.000	0.000	0.000	0.063	0.063
35:12:00	0.000	0.000	0.000	0.000	0.062	0.062
35:36:00	0.000	0.000	0.000	0.000	0.061	0.061
36:00:00	0.000	0.000	0.000	0.000	0.060	0.060
36:24:00	0.000	0.000	0.000	0.000	0.059	0.059
36:48:00	0.000	0.000	0.000	0.000	0.058	0.058
37:12:00	0.000	0.000	0.000	0.000	0.057	0.057
37:36:00	0.000	0.000	0.000	0.000	0.057	0.057
38:00:00	0.000	0.000	0.000	0.000	0.056	0.056
38:24:00	0.000	0.000	0.000	0.000	0.055	0.055
38:48:00	0.000	0.000	0.000	0.000	0.054	0.054
39:12:00	0.000	0.000	0.000	0.000	0.053	0.053
39:36:00	0.000	0.000	0.000	0.000	0.053	0.053
40:00:00	0.000	0.000	0.000	0.000	0.052	0.052
40:24:00	0.000	0.000	0.000	0.000	0.051	0.051
40:48:00	0.000	0.000	0.000	0.000	0.051	0.051
41:12:00	0.000	0.000	0.000	0.000	0.050	0.050

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
41:36:00	0.000	0.000	0.000	0.000	0.049	0.049
42:00:00	0.000	0.000	0.000	0.000	0.048	0.048
42:24:00	0.000	0.000	0.000	0.000	0.048	0.048
42:48:00	0.000	0.000	0.000	0.000	0.047	0.047
43:12:00	0.000	0.000	0.000	0.000	0.046	0.046
43:36:00	0.000	0.000	0.000	0.000	0.046	0.046
44:00:00	0.000	0.000	0.000	0.000	0.045	0.045
44:24:00	0.000	0.000	0.000	0.000	0.045	0.045
44:48:00	0.000	0.000	0.000	0.000	0.044	0.044
45:12:00	0.000	0.000	0.000	0.000	0.043	0.043
45:36:00	0.000	0.000	0.000	0.000	0.043	0.043
46:00:00	0.000	0.000	0.000	0.000	0.042	0.042
46:24:00	0.000	0.000	0.000	0.000	0.041	0.041
46:48:00	0.000	0.000	0.000	0.000	0.041	0.041
47:12:00	0.000	0.000	0.000	0.000	0.040	0.040
47:36:00	0.000	0.000	0.000	0.000	0.040	0.040
48:00:00	0.000	0.000	0.000	0.000	0.039	0.039
48:24:00	0.000	0.000	0.000	0.000	0.039	0.039
48:48:00	0.000	0.000	0.000	0.000	0.038	0.038
49:12:00	0.000	0.000	0.000	0.000	0.038	0.038
49:36:00	0.000	0.000	0.000	0.000	0.037	0.037
50:00:00	0.000	0.000	0.000	0.000	0.037	0.037
50:24:00	0.000	0.000	0.000	0.000	0.036	0.036
50:48:00	0.000	0.000	0.000	0.000	0.035	0.035
51:12:00	0.000	0.000	0.000	0.000	0.035	0.035
51:36:00	0.000	0.000	0.000	0.000	0.034	0.034
52:00:00	0.000	0.000	0.000	0.000	0.034	0.034
52:24:00	0.000	0.000	0.000	0.000	0.034	0.034
52:48:00	0.000	0.000	0.000	0.000	0.033	0.033
53:12:00	0.000	0.000	0.000	0.000	0.033	0.033
53:36:00	0.000	0.000	0.000	0.000	0.032	0.032
54:00:00	0.000	0.000	0.000	0.000	0.032	0.032
54:24:00	0.000	0.000	0.000	0.000	0.031	0.031
54:48:00	0.000	0.000	0.000	0.000	0.031	0.031
55:12:00	0.000	0.000	0.000	0.000	0.030	0.030

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
55:36:00	0.000	0.000	0.000	0.000	0.030	0.030
56:00:00	0.000	0.000	0.000	0.000	0.030	0.030
56:24:00	0.000	0.000	0.000	0.000	0.029	0.029
56:48:00	0.000	0.000	0.000	0.000	0.029	0.029
57:12:00	0.000	0.000	0.000	0.000	0.028	0.028
57:36:00	0.000	0.000	0.000	0.000	0.028	0.028
58:00:00	0.000	0.000	0.000	0.000	0.028	0.028
58:24:00	0.000	0.000	0.000	0.000	0.027	0.027
58:48:00	0.000	0.000	0.000	0.000	0.027	0.027
59:12:00	0.000	0.000	0.000	0.000	0.026	0.026
59:36:00	0.000	0.000	0.000	0.000	0.026	0.026
60:00:00	0.000	0.000	0.000	0.000	0.026	0.026
60:24:00	0.000	0.000	0.000	0.000	0.025	0.025
60:48:00	0.000	0.000	0.000	0.000	0.025	0.025
61:12:00	0.000	0.000	0.000	0.000	0.025	0.025
61:36:00	0.000	0.000	0.000	0.000	0.024	0.024
62:00:00	0.000	0.000	0.000	0.000	0.024	0.024
62:24:00	0.000	0.000	0.000	0.000	0.024	0.024
62:48:00	0.000	0.000	0.000	0.000	0.023	0.023
63:12:00	0.000	0.000	0.000	0.000	0.023	0.023
63:36:00	0.000	0.000	0.000	0.000	0.023	0.023
64:00:00	0.000	0.000	0.000	0.000	0.022	0.022
64:24:00	0.000	0.000	0.000	0.000	0.022	0.022
64:48:00	0.000	0.000	0.000	0.000	0.022	0.022
65:12:00	0.000	0.000	0.000	0.000	0.021	0.021
65:36:00	0.000	0.000	0.000	0.000	0.021	0.021
66:00:00	0.000	0.000	0.000	0.000	0.021	0.021
66:24:00	0.000	0.000	0.000	0.000	0.020	0.020
66:48:00	0.000	0.000	0.000	0.000	0.020	0.020
67:12:00	0.000	0.000	0.000	0.000	0.020	0.020
67:36:00	0.000	0.000	0.000	0.000	0.020	0.020

Appendix

Catchment descriptors

Name	Value	User-defined value used?
Area (km ²)	0.68	No
ALTBAR	14	No
ASPBAR	88	No
ASPVAR	0.5	No
BFIHOST	0.46	No
BFIHOST19	0.44	No
DPLBAR (km)	0.79	No
DPSBAR (mkm ⁻¹)	11.8	No
FARL	1	No
LDP	1.79	No
PROPWET	0.37	No
RMED1H	9.9	No
RMED1D	27.4	No
RMED2D	35.7	No
SAAR (mm)	712	No
SAAR4170 (mm)	704	No
SPRHOST	35.58	No
URBEXT2000	0.1	No
URBEXT1990	0.12	No
URBCONC	0.94	No
URBLOC	1.53	No
DDF parameter C	-0.03	No
DDF parameter D1	0.3	No
DDF parameter D2	0.36	No
DDF parameter D3	0.33	No
DDF parameter E	0.29	No
DDF parameter F	2.42	No
DDF parameter C (1km grid value)	-0.03	No
DDF parameter D1 (1km grid value)	0.3	No
DDF parameter D2 (1km grid value)	0.36	No
DDF parameter D3 (1km grid value)	0.33	No
DDF parameter E (1km grid value)	0.29	No
DDF parameter F (1km grid value)	2.43	No

Tang Running (WESB 1158) Catchment

UK Design Flood Estimation

Generated on 18 February 2025 14:26:37 by louise.wilcock
Printed from the ReFH2 Flood Modelling software package, version 4.1.8704.23947

Summary of estimate using the Flood Estimation Handbook revitalised flood hydrograph method (ReFH2)

Site details

Checksum: 9789-D927

Site name: FEH_Catchment_Descriptors_346050_377250_v5_0_1

Easting: 346050

Northing: 377250

Country: England, Wales or Northern Ireland

Catchment Area (km²): 0.62

Using plot scale calculations: No

Model: 2.3

Site description: None

Model run: 100 year

Summary of results

Rainfall - FEH22 (mm):	54.20	Total runoff (ML):	3.93
Total Rainfall (mm):	37.76	Total flow (ML):	12.56
Peak Rainfall (mm):	6.44	Peak flow (m ³ /s):	0.25

Parameters

Where the user has overridden a system-generated value, this original value is shown in square brackets after the value used.

** Indicates that the user locked the duration/timestep*

Rainfall parameters (Rainfall - FEH22)

Name	Value	User-defined?
Duration (hh:mm:ss)	06:00:00 [04:30:00]	Yes
Timestep (hh:mm:ss)	00:24:00 [00:30:00]	Yes
SCF (Seasonal correction factor)	0.71	No
ARF (Areal reduction factor)	0.98	No
Seasonality	Winter	No

Loss model parameters

Name	Value	User-defined?
Cini (mm)	70.62	No
Cmax (mm)	647.13	No
Use alpha correction factor	No	No
Alpha correction factor	n/a	No

Routing model parameters

Name	Value	User-defined?
Tp (hr)	2.32	No
Up	0.65	No
Uk	0.8	No

Baseflow model parameters

Name	Value	User-defined?
BF0 (m ³ /s)	0.01	No
BL (hr)	37.75	No
BR	2.76	No

Urbanisation parameters

Name	Value	User-defined?
Sewer capacity (m ³ /s)	0	No
Exporting drained area (km ²)	0	No
Urban area (km ²)	0.08	No
Effective URBEXT2000	0.08	n/a
Impervious runoff factor	0.7	No
Imperviousness factor	0.4	No
Tp scaling factor	0.75	No
Depression storage depth (mm)	0.5	No

Time series data

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m³/s)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
00:00:00	0.564	0.000	0.078	0.000	0.005	0.005
00:24:00	0.825	0.000	0.117	0.000	0.005	0.005
00:48:00	1.202	0.000	0.172	0.002	0.005	0.007
01:12:00	1.747	0.000	0.253	0.005	0.005	0.009
01:36:00	2.529	0.000	0.375	0.010	0.005	0.015
02:00:00	3.635	0.000	0.556	0.018	0.005	0.023
02:24:00	5.154	0.000	0.821	0.030	0.005	0.036
02:48:00	6.442	0.000	1.082	0.048	0.006	0.054
03:12:00	5.154	0.000	0.911	0.074	0.007	0.081
03:36:00	3.635	0.000	0.666	0.106	0.009	0.114
04:00:00	2.529	0.000	0.475	0.141	0.011	0.152
04:24:00	1.747	0.000	0.333	0.174	0.014	0.188
04:48:00	1.202	0.000	0.232	0.202	0.018	0.220
05:12:00	0.825	0.000	0.160	0.219	0.022	0.241
05:36:00	0.564	0.000	0.110	0.224	0.027	0.251
06:00:00	0.000	0.000	0.000	0.218	0.032	0.250
06:24:00	0.000	0.000	0.000	0.205	0.036	0.241
06:48:00	0.000	0.000	0.000	0.186	0.040	0.226
07:12:00	0.000	0.000	0.000	0.165	0.044	0.209
07:36:00	0.000	0.000	0.000	0.143	0.047	0.190
08:00:00	0.000	0.000	0.000	0.121	0.050	0.172
08:24:00	0.000	0.000	0.000	0.101	0.053	0.154
08:48:00	0.000	0.000	0.000	0.083	0.055	0.138
09:12:00	0.000	0.000	0.000	0.067	0.056	0.123
09:36:00	0.000	0.000	0.000	0.054	0.057	0.111
10:00:00	0.000	0.000	0.000	0.042	0.058	0.100
10:24:00	0.000	0.000	0.000	0.032	0.058	0.090
10:48:00	0.000	0.000	0.000	0.023	0.059	0.081
11:12:00	0.000	0.000	0.000	0.015	0.059	0.074
11:36:00	0.000	0.000	0.000	0.010	0.058	0.068
12:00:00	0.000	0.000	0.000	0.006	0.058	0.064
12:24:00	0.000	0.000	0.000	0.004	0.058	0.061
12:48:00	0.000	0.000	0.000	0.002	0.057	0.059
13:12:00	0.000	0.000	0.000	0.001	0.057	0.057

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
13:36:00	0.000	0.000	0.000	0.000	0.056	0.056
14:00:00	0.000	0.000	0.000	0.000	0.055	0.055
14:24:00	0.000	0.000	0.000	0.000	0.055	0.055
14:48:00	0.000	0.000	0.000	0.000	0.054	0.054
15:12:00	0.000	0.000	0.000	0.000	0.054	0.054
15:36:00	0.000	0.000	0.000	0.000	0.053	0.053
16:00:00	0.000	0.000	0.000	0.000	0.052	0.052
16:24:00	0.000	0.000	0.000	0.000	0.052	0.052
16:48:00	0.000	0.000	0.000	0.000	0.051	0.051
17:12:00	0.000	0.000	0.000	0.000	0.051	0.051
17:36:00	0.000	0.000	0.000	0.000	0.050	0.050
18:00:00	0.000	0.000	0.000	0.000	0.050	0.050
18:24:00	0.000	0.000	0.000	0.000	0.049	0.049
18:48:00	0.000	0.000	0.000	0.000	0.049	0.049
19:12:00	0.000	0.000	0.000	0.000	0.048	0.048
19:36:00	0.000	0.000	0.000	0.000	0.048	0.048
20:00:00	0.000	0.000	0.000	0.000	0.047	0.047
20:24:00	0.000	0.000	0.000	0.000	0.047	0.047
20:48:00	0.000	0.000	0.000	0.000	0.046	0.046
21:12:00	0.000	0.000	0.000	0.000	0.046	0.046
21:36:00	0.000	0.000	0.000	0.000	0.045	0.045
22:00:00	0.000	0.000	0.000	0.000	0.045	0.045
22:24:00	0.000	0.000	0.000	0.000	0.044	0.044
22:48:00	0.000	0.000	0.000	0.000	0.044	0.044
23:12:00	0.000	0.000	0.000	0.000	0.043	0.043
23:36:00	0.000	0.000	0.000	0.000	0.043	0.043
24:00:00	0.000	0.000	0.000	0.000	0.042	0.042
24:24:00	0.000	0.000	0.000	0.000	0.042	0.042
24:48:00	0.000	0.000	0.000	0.000	0.042	0.042
25:12:00	0.000	0.000	0.000	0.000	0.041	0.041
25:36:00	0.000	0.000	0.000	0.000	0.041	0.041
26:00:00	0.000	0.000	0.000	0.000	0.040	0.040
26:24:00	0.000	0.000	0.000	0.000	0.040	0.040
26:48:00	0.000	0.000	0.000	0.000	0.039	0.039
27:12:00	0.000	0.000	0.000	0.000	0.039	0.039

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
27:36:00	0.000	0.000	0.000	0.000	0.039	0.039
28:00:00	0.000	0.000	0.000	0.000	0.038	0.038
28:24:00	0.000	0.000	0.000	0.000	0.038	0.038
28:48:00	0.000	0.000	0.000	0.000	0.037	0.037
29:12:00	0.000	0.000	0.000	0.000	0.037	0.037
29:36:00	0.000	0.000	0.000	0.000	0.037	0.037
30:00:00	0.000	0.000	0.000	0.000	0.036	0.036
30:24:00	0.000	0.000	0.000	0.000	0.036	0.036
30:48:00	0.000	0.000	0.000	0.000	0.035	0.035
31:12:00	0.000	0.000	0.000	0.000	0.035	0.035
31:36:00	0.000	0.000	0.000	0.000	0.035	0.035
32:00:00	0.000	0.000	0.000	0.000	0.034	0.034
32:24:00	0.000	0.000	0.000	0.000	0.034	0.034
32:48:00	0.000	0.000	0.000	0.000	0.034	0.034
33:12:00	0.000	0.000	0.000	0.000	0.033	0.033
33:36:00	0.000	0.000	0.000	0.000	0.033	0.033
34:00:00	0.000	0.000	0.000	0.000	0.033	0.033
34:24:00	0.000	0.000	0.000	0.000	0.032	0.032
34:48:00	0.000	0.000	0.000	0.000	0.032	0.032
35:12:00	0.000	0.000	0.000	0.000	0.032	0.032
35:36:00	0.000	0.000	0.000	0.000	0.031	0.031
36:00:00	0.000	0.000	0.000	0.000	0.031	0.031
36:24:00	0.000	0.000	0.000	0.000	0.031	0.031
36:48:00	0.000	0.000	0.000	0.000	0.030	0.030
37:12:00	0.000	0.000	0.000	0.000	0.030	0.030
37:36:00	0.000	0.000	0.000	0.000	0.030	0.030
38:00:00	0.000	0.000	0.000	0.000	0.029	0.029
38:24:00	0.000	0.000	0.000	0.000	0.029	0.029
38:48:00	0.000	0.000	0.000	0.000	0.029	0.029
39:12:00	0.000	0.000	0.000	0.000	0.028	0.028
39:36:00	0.000	0.000	0.000	0.000	0.028	0.028
40:00:00	0.000	0.000	0.000	0.000	0.028	0.028
40:24:00	0.000	0.000	0.000	0.000	0.028	0.028
40:48:00	0.000	0.000	0.000	0.000	0.027	0.027
41:12:00	0.000	0.000	0.000	0.000	0.027	0.027

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
41:36:00	0.000	0.000	0.000	0.000	0.027	0.027
42:00:00	0.000	0.000	0.000	0.000	0.026	0.026
42:24:00	0.000	0.000	0.000	0.000	0.026	0.026
42:48:00	0.000	0.000	0.000	0.000	0.026	0.026
43:12:00	0.000	0.000	0.000	0.000	0.026	0.026
43:36:00	0.000	0.000	0.000	0.000	0.025	0.025
44:00:00	0.000	0.000	0.000	0.000	0.025	0.025
44:24:00	0.000	0.000	0.000	0.000	0.025	0.025
44:48:00	0.000	0.000	0.000	0.000	0.024	0.024
45:12:00	0.000	0.000	0.000	0.000	0.024	0.024
45:36:00	0.000	0.000	0.000	0.000	0.024	0.024
46:00:00	0.000	0.000	0.000	0.000	0.024	0.024
46:24:00	0.000	0.000	0.000	0.000	0.023	0.023
46:48:00	0.000	0.000	0.000	0.000	0.023	0.023
47:12:00	0.000	0.000	0.000	0.000	0.023	0.023
47:36:00	0.000	0.000	0.000	0.000	0.023	0.023
48:00:00	0.000	0.000	0.000	0.000	0.022	0.022
48:24:00	0.000	0.000	0.000	0.000	0.022	0.022
48:48:00	0.000	0.000	0.000	0.000	0.022	0.022
49:12:00	0.000	0.000	0.000	0.000	0.022	0.022
49:36:00	0.000	0.000	0.000	0.000	0.022	0.022
50:00:00	0.000	0.000	0.000	0.000	0.021	0.021
50:24:00	0.000	0.000	0.000	0.000	0.021	0.021
50:48:00	0.000	0.000	0.000	0.000	0.021	0.021
51:12:00	0.000	0.000	0.000	0.000	0.021	0.021
51:36:00	0.000	0.000	0.000	0.000	0.020	0.020
52:00:00	0.000	0.000	0.000	0.000	0.020	0.020
52:24:00	0.000	0.000	0.000	0.000	0.020	0.020
52:48:00	0.000	0.000	0.000	0.000	0.020	0.020
53:12:00	0.000	0.000	0.000	0.000	0.020	0.020
53:36:00	0.000	0.000	0.000	0.000	0.019	0.019
54:00:00	0.000	0.000	0.000	0.000	0.019	0.019
54:24:00	0.000	0.000	0.000	0.000	0.019	0.019
54:48:00	0.000	0.000	0.000	0.000	0.019	0.019
55:12:00	0.000	0.000	0.000	0.000	0.019	0.019

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
55:36:00	0.000	0.000	0.000	0.000	0.018	0.018
56:00:00	0.000	0.000	0.000	0.000	0.018	0.018
56:24:00	0.000	0.000	0.000	0.000	0.018	0.018
56:48:00	0.000	0.000	0.000	0.000	0.018	0.018
57:12:00	0.000	0.000	0.000	0.000	0.018	0.018
57:36:00	0.000	0.000	0.000	0.000	0.017	0.017
58:00:00	0.000	0.000	0.000	0.000	0.017	0.017
58:24:00	0.000	0.000	0.000	0.000	0.017	0.017
58:48:00	0.000	0.000	0.000	0.000	0.017	0.017
59:12:00	0.000	0.000	0.000	0.000	0.017	0.017
59:36:00	0.000	0.000	0.000	0.000	0.017	0.017
60:00:00	0.000	0.000	0.000	0.000	0.016	0.016
60:24:00	0.000	0.000	0.000	0.000	0.016	0.016
60:48:00	0.000	0.000	0.000	0.000	0.016	0.016
61:12:00	0.000	0.000	0.000	0.000	0.016	0.016
61:36:00	0.000	0.000	0.000	0.000	0.016	0.016
62:00:00	0.000	0.000	0.000	0.000	0.016	0.016
62:24:00	0.000	0.000	0.000	0.000	0.015	0.015
62:48:00	0.000	0.000	0.000	0.000	0.015	0.015
63:12:00	0.000	0.000	0.000	0.000	0.015	0.015
63:36:00	0.000	0.000	0.000	0.000	0.015	0.015
64:00:00	0.000	0.000	0.000	0.000	0.015	0.015
64:24:00	0.000	0.000	0.000	0.000	0.015	0.015
64:48:00	0.000	0.000	0.000	0.000	0.014	0.014
65:12:00	0.000	0.000	0.000	0.000	0.014	0.014
65:36:00	0.000	0.000	0.000	0.000	0.014	0.014
66:00:00	0.000	0.000	0.000	0.000	0.014	0.014
66:24:00	0.000	0.000	0.000	0.000	0.014	0.014
66:48:00	0.000	0.000	0.000	0.000	0.014	0.014
67:12:00	0.000	0.000	0.000	0.000	0.014	0.014
67:36:00	0.000	0.000	0.000	0.000	0.013	0.013
68:00:00	0.000	0.000	0.000	0.000	0.013	0.013
68:24:00	0.000	0.000	0.000	0.000	0.013	0.013
68:48:00	0.000	0.000	0.000	0.000	0.013	0.013
69:12:00	0.000	0.000	0.000	0.000	0.013	0.013

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
69:36:00	0.000	0.000	0.000	0.000	0.013	0.013
70:00:00	0.000	0.000	0.000	0.000	0.013	0.013
70:24:00	0.000	0.000	0.000	0.000	0.012	0.012
70:48:00	0.000	0.000	0.000	0.000	0.012	0.012
71:12:00	0.000	0.000	0.000	0.000	0.012	0.012
71:36:00	0.000	0.000	0.000	0.000	0.012	0.012
72:00:00	0.000	0.000	0.000	0.000	0.012	0.012
72:24:00	0.000	0.000	0.000	0.000	0.012	0.012
72:48:00	0.000	0.000	0.000	0.000	0.012	0.012
73:12:00	0.000	0.000	0.000	0.000	0.012	0.012
73:36:00	0.000	0.000	0.000	0.000	0.011	0.011
74:00:00	0.000	0.000	0.000	0.000	0.011	0.011
74:24:00	0.000	0.000	0.000	0.000	0.011	0.011
74:48:00	0.000	0.000	0.000	0.000	0.011	0.011
75:12:00	0.000	0.000	0.000	0.000	0.011	0.011
75:36:00	0.000	0.000	0.000	0.000	0.011	0.011
76:00:00	0.000	0.000	0.000	0.000	0.011	0.011
76:24:00	0.000	0.000	0.000	0.000	0.011	0.011
76:48:00	0.000	0.000	0.000	0.000	0.010	0.010
77:12:00	0.000	0.000	0.000	0.000	0.010	0.010
77:36:00	0.000	0.000	0.000	0.000	0.010	0.010
78:00:00	0.000	0.000	0.000	0.000	0.010	0.010
78:24:00	0.000	0.000	0.000	0.000	0.010	0.010
78:48:00	0.000	0.000	0.000	0.000	0.010	0.010
79:12:00	0.000	0.000	0.000	0.000	0.010	0.010
79:36:00	0.000	0.000	0.000	0.000	0.010	0.010
80:00:00	0.000	0.000	0.000	0.000	0.010	0.010
80:24:00	0.000	0.000	0.000	0.000	0.010	0.010
80:48:00	0.000	0.000	0.000	0.000	0.009	0.009
81:12:00	0.000	0.000	0.000	0.000	0.009	0.009
81:36:00	0.000	0.000	0.000	0.000	0.009	0.009
82:00:00	0.000	0.000	0.000	0.000	0.009	0.009
82:24:00	0.000	0.000	0.000	0.000	0.009	0.009
82:48:00	0.000	0.000	0.000	0.000	0.009	0.009
83:12:00	0.000	0.000	0.000	0.000	0.009	0.009

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
83:36:00	0.000	0.000	0.000	0.000	0.009	0.009
84:00:00	0.000	0.000	0.000	0.000	0.009	0.009
84:24:00	0.000	0.000	0.000	0.000	0.009	0.009
84:48:00	0.000	0.000	0.000	0.000	0.008	0.008
85:12:00	0.000	0.000	0.000	0.000	0.008	0.008
85:36:00	0.000	0.000	0.000	0.000	0.008	0.008
86:00:00	0.000	0.000	0.000	0.000	0.008	0.008
86:24:00	0.000	0.000	0.000	0.000	0.008	0.008
86:48:00	0.000	0.000	0.000	0.000	0.008	0.008
87:12:00	0.000	0.000	0.000	0.000	0.008	0.008
87:36:00	0.000	0.000	0.000	0.000	0.008	0.008
88:00:00	0.000	0.000	0.000	0.000	0.008	0.008
88:24:00	0.000	0.000	0.000	0.000	0.008	0.008
88:48:00	0.000	0.000	0.000	0.000	0.008	0.008
89:12:00	0.000	0.000	0.000	0.000	0.008	0.008
89:36:00	0.000	0.000	0.000	0.000	0.007	0.007
90:00:00	0.000	0.000	0.000	0.000	0.007	0.007
90:24:00	0.000	0.000	0.000	0.000	0.007	0.007
90:48:00	0.000	0.000	0.000	0.000	0.007	0.007
91:12:00	0.000	0.000	0.000	0.000	0.007	0.007
91:36:00	0.000	0.000	0.000	0.000	0.007	0.007
92:00:00	0.000	0.000	0.000	0.000	0.007	0.007
92:24:00	0.000	0.000	0.000	0.000	0.007	0.007
92:48:00	0.000	0.000	0.000	0.000	0.007	0.007
93:12:00	0.000	0.000	0.000	0.000	0.007	0.007
93:36:00	0.000	0.000	0.000	0.000	0.007	0.007
94:00:00	0.000	0.000	0.000	0.000	0.007	0.007
94:24:00	0.000	0.000	0.000	0.000	0.007	0.007
94:48:00	0.000	0.000	0.000	0.000	0.007	0.007
95:12:00	0.000	0.000	0.000	0.000	0.006	0.006
95:36:00	0.000	0.000	0.000	0.000	0.006	0.006
96:00:00	0.000	0.000	0.000	0.000	0.006	0.006
96:24:00	0.000	0.000	0.000	0.000	0.006	0.006
96:48:00	0.000	0.000	0.000	0.000	0.006	0.006
97:12:00	0.000	0.000	0.000	0.000	0.006	0.006

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
97:36:00	0.000	0.000	0.000	0.000	0.006	0.006
98:00:00	0.000	0.000	0.000	0.000	0.006	0.006
98:24:00	0.000	0.000	0.000	0.000	0.006	0.006
98:48:00	0.000	0.000	0.000	0.000	0.006	0.006
99:12:00	0.000	0.000	0.000	0.000	0.006	0.006
99:36:00	0.000	0.000	0.000	0.000	0.006	0.006
100:00:00	0.000	0.000	0.000	0.000	0.006	0.006
100:24:00	0.000	0.000	0.000	0.000	0.006	0.006
100:48:00	0.000	0.000	0.000	0.000	0.006	0.006
101:12:00	0.000	0.000	0.000	0.000	0.005	0.005
101:36:00	0.000	0.000	0.000	0.000	0.005	0.005
102:00:00	0.000	0.000	0.000	0.000	0.005	0.005
102:24:00	0.000	0.000	0.000	0.000	0.005	0.005
102:48:00	0.000	0.000	0.000	0.000	0.005	0.005
103:12:00	0.000	0.000	0.000	0.000	0.005	0.005
103:36:00	0.000	0.000	0.000	0.000	0.005	0.005
104:00:00	0.000	0.000	0.000	0.000	0.005	0.005
104:24:00	0.000	0.000	0.000	0.000	0.005	0.005
104:48:00	0.000	0.000	0.000	0.000	0.005	0.005
105:12:00	0.000	0.000	0.000	0.000	0.005	0.005
105:36:00	0.000	0.000	0.000	0.000	0.005	0.005
106:00:00	0.000	0.000	0.000	0.000	0.005	0.005

Appendix

Catchment descriptors

Name	Value	User-defined value used?
Area (km ²)	0.62	No
ALTBAR	12	No
ASPBAR	61	No
ASPVAR	0.4	No
BFIHOST	0.73	No
BFIHOST19	0.68	No
DPLBAR (km)	0.88	No
DPSBAR (mkm ⁻¹)	15.4	No
FARL	1	No
LDP	1.74	No
PROPWET	0.37	No
RMED1H	10	No
RMED1D	28.7	No
RMED2D	37.4	No
SAAR (mm)	724	No
SAAR4170 (mm)	712	No
SPRHOST	23.87	No
URBEXT2000	0.08	No
URBEXT1990	0.04	No
URBCONC	0.87	No
URBLOC	1.81	No
DDF parameter C	-0.02	No
DDF parameter D1	0.31	No
DDF parameter D2	0.34	No
DDF parameter D3	0.34	No
DDF parameter E	0.29	No
DDF parameter F	2.44	No
DDF parameter C (1km grid value)	-0.02	No
DDF parameter D1 (1km grid value)	0.31	No
DDF parameter D2 (1km grid value)	0.34	No
DDF parameter D3 (1km grid value)	0.33	No
DDF parameter E (1km grid value)	0.29	No
DDF parameter F (1km grid value)	2.44	No

West Central Drain (WCDR up) Catchment

UK Design Flood Estimation

Generated on 18 February 2025 14:23:52 by louise.wilcock
Printed from the ReFH2 Flood Modelling software package, version 4.1.8704.23947

Summary of estimate using the Flood Estimation Handbook revitalised flood hydrograph method (ReFH2)

Site detailsChecksum: 36F2-A354

Site name: FEH_Catchment_Descriptors_346900_374900_v5_0_1

Easting: 346900

Northing: 374900

Country: England, Wales or Northern Ireland

Catchment Area (km²): 1.65

Using plot scale calculations: No

Model: 2.3

Site description:None

Model run: 100 year

Summary of results

Rainfall - FEH22 (mm):	55.40	Total runoff (ML):	28.07
Total Rainfall (mm):	38.07	Total flow (ML):	62.73
Peak Rainfall (mm):	6.50	Peak flow (m³/s):	1.50

Parameters

Where the user has overridden a system-generated value, this original value is shown in square brackets after the value used.
* Indicates that the user locked the duration/timestep

Rainfall parameters (Rainfall - FEH22)

Name	Value	User-defined?
Duration (hh:mm:ss)	06:00:00 [05:30:00]	Yes
Timestep (hh:mm:ss)	00:24:00 [00:30:00]	Yes
SCF (Seasonal correction factor)	0.7	No
ARF (Areal reduction factor)	0.98	No
Seasonality	Winter	No

Loss model parameters

Name	Value	User-defined?
Cini (mm)	115.37	No
Cmax (mm)	305.47	No
Use alpha correction factor	No	No
Alpha correction factor	n/a	No

Routing model parameters

Name	Value	User-defined?
Tp (hr)	2.96	No
Up	0.65	No
Uk	0.8	No

Baseflow model parameters

Name	Value	User-defined?
BF0 (m ³ /s)	0.06	No
BL (hr)	29.26	No
BR	1.27	No

Urbanisation parameters

Name	Value	User-defined?
Sewer capacity (m ³ /s)	0	No
Exporting drained area (km ²)	0	No
Urban area (km ²)	0.08	No
Effective URBEXT2000	0.03	n/a
Impervious runoff factor	0.7	No
Imperviousness factor	0.4	No
Tp scaling factor	0.75	No
Depression storage depth (mm)	0.5	No

Time series data

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m³/s)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
00:00:00	0.569	0.000	0.219	0.000	0.058	0.058
00:24:00	0.832	0.000	0.324	0.002	0.057	0.059
00:48:00	1.212	0.000	0.476	0.007	0.056	0.063
01:12:00	1.762	0.000	0.700	0.018	0.056	0.074
01:36:00	2.550	0.000	1.031	0.038	0.056	0.093
02:00:00	3.666	0.000	1.519	0.070	0.056	0.125
02:24:00	5.198	0.000	2.229	0.120	0.056	0.176
02:48:00	6.496	0.000	2.908	0.196	0.058	0.255
03:12:00	5.198	0.000	2.425	0.308	0.062	0.369
03:36:00	3.666	0.000	1.763	0.452	0.067	0.519
04:00:00	2.550	0.000	1.252	0.617	0.075	0.691
04:24:00	1.762	0.000	0.877	0.790	0.085	0.875
04:48:00	1.212	0.000	0.609	0.960	0.098	1.058
05:12:00	0.832	0.000	0.417	1.114	0.114	1.227
05:36:00	0.569	0.000	0.287	1.235	0.132	1.367
06:00:00	0.000	0.000	0.000	1.310	0.151	1.461
06:24:00	0.000	0.000	0.000	1.328	0.171	1.499
06:48:00	0.000	0.000	0.000	1.297	0.191	1.488
07:12:00	0.000	0.000	0.000	1.232	0.209	1.441
07:36:00	0.000	0.000	0.000	1.145	0.226	1.371
08:00:00	0.000	0.000	0.000	1.045	0.242	1.287
08:24:00	0.000	0.000	0.000	0.938	0.255	1.194
08:48:00	0.000	0.000	0.000	0.833	0.267	1.100
09:12:00	0.000	0.000	0.000	0.735	0.277	1.011
09:36:00	0.000	0.000	0.000	0.647	0.284	0.931
10:00:00	0.000	0.000	0.000	0.568	0.291	0.859
10:24:00	0.000	0.000	0.000	0.496	0.296	0.792
10:48:00	0.000	0.000	0.000	0.428	0.300	0.728
11:12:00	0.000	0.000	0.000	0.365	0.303	0.668
11:36:00	0.000	0.000	0.000	0.307	0.305	0.611
12:00:00	0.000	0.000	0.000	0.252	0.305	0.557
12:24:00	0.000	0.000	0.000	0.200	0.305	0.505
12:48:00	0.000	0.000	0.000	0.152	0.304	0.456
13:12:00	0.000	0.000	0.000	0.109	0.302	0.411

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
13:36:00	0.000	0.000	0.000	0.073	0.300	0.373
14:00:00	0.000	0.000	0.000	0.047	0.297	0.344
14:24:00	0.000	0.000	0.000	0.029	0.293	0.322
14:48:00	0.000	0.000	0.000	0.016	0.290	0.306
15:12:00	0.000	0.000	0.000	0.009	0.286	0.295
15:36:00	0.000	0.000	0.000	0.004	0.282	0.286
16:00:00	0.000	0.000	0.000	0.001	0.279	0.280
16:24:00	0.000	0.000	0.000	0.000	0.275	0.275
16:48:00	0.000	0.000	0.000	0.000	0.271	0.271
17:12:00	0.000	0.000	0.000	0.000	0.267	0.267
17:36:00	0.000	0.000	0.000	0.000	0.264	0.264
18:00:00	0.000	0.000	0.000	0.000	0.260	0.260
18:24:00	0.000	0.000	0.000	0.000	0.257	0.257
18:48:00	0.000	0.000	0.000	0.000	0.253	0.253
19:12:00	0.000	0.000	0.000	0.000	0.250	0.250
19:36:00	0.000	0.000	0.000	0.000	0.246	0.246
20:00:00	0.000	0.000	0.000	0.000	0.243	0.243
20:24:00	0.000	0.000	0.000	0.000	0.240	0.240
20:48:00	0.000	0.000	0.000	0.000	0.236	0.236
21:12:00	0.000	0.000	0.000	0.000	0.233	0.233
21:36:00	0.000	0.000	0.000	0.000	0.230	0.230
22:00:00	0.000	0.000	0.000	0.000	0.227	0.227
22:24:00	0.000	0.000	0.000	0.000	0.224	0.224
22:48:00	0.000	0.000	0.000	0.000	0.221	0.221
23:12:00	0.000	0.000	0.000	0.000	0.218	0.218
23:36:00	0.000	0.000	0.000	0.000	0.215	0.215
24:00:00	0.000	0.000	0.000	0.000	0.212	0.212
24:24:00	0.000	0.000	0.000	0.000	0.209	0.209
24:48:00	0.000	0.000	0.000	0.000	0.206	0.206
25:12:00	0.000	0.000	0.000	0.000	0.203	0.203
25:36:00	0.000	0.000	0.000	0.000	0.201	0.201
26:00:00	0.000	0.000	0.000	0.000	0.198	0.198
26:24:00	0.000	0.000	0.000	0.000	0.195	0.195
26:48:00	0.000	0.000	0.000	0.000	0.193	0.193
27:12:00	0.000	0.000	0.000	0.000	0.190	0.190

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
27:36:00	0.000	0.000	0.000	0.000	0.187	0.187
28:00:00	0.000	0.000	0.000	0.000	0.185	0.185
28:24:00	0.000	0.000	0.000	0.000	0.182	0.182
28:48:00	0.000	0.000	0.000	0.000	0.180	0.180
29:12:00	0.000	0.000	0.000	0.000	0.177	0.177
29:36:00	0.000	0.000	0.000	0.000	0.175	0.175
30:00:00	0.000	0.000	0.000	0.000	0.173	0.173
30:24:00	0.000	0.000	0.000	0.000	0.170	0.170
30:48:00	0.000	0.000	0.000	0.000	0.168	0.168
31:12:00	0.000	0.000	0.000	0.000	0.166	0.166
31:36:00	0.000	0.000	0.000	0.000	0.163	0.163
32:00:00	0.000	0.000	0.000	0.000	0.161	0.161
32:24:00	0.000	0.000	0.000	0.000	0.159	0.159
32:48:00	0.000	0.000	0.000	0.000	0.157	0.157
33:12:00	0.000	0.000	0.000	0.000	0.155	0.155
33:36:00	0.000	0.000	0.000	0.000	0.153	0.153
34:00:00	0.000	0.000	0.000	0.000	0.151	0.151
34:24:00	0.000	0.000	0.000	0.000	0.149	0.149
34:48:00	0.000	0.000	0.000	0.000	0.147	0.147
35:12:00	0.000	0.000	0.000	0.000	0.145	0.145
35:36:00	0.000	0.000	0.000	0.000	0.143	0.143
36:00:00	0.000	0.000	0.000	0.000	0.141	0.141
36:24:00	0.000	0.000	0.000	0.000	0.139	0.139
36:48:00	0.000	0.000	0.000	0.000	0.137	0.137
37:12:00	0.000	0.000	0.000	0.000	0.135	0.135
37:36:00	0.000	0.000	0.000	0.000	0.133	0.133
38:00:00	0.000	0.000	0.000	0.000	0.131	0.131
38:24:00	0.000	0.000	0.000	0.000	0.130	0.130
38:48:00	0.000	0.000	0.000	0.000	0.128	0.128
39:12:00	0.000	0.000	0.000	0.000	0.126	0.126
39:36:00	0.000	0.000	0.000	0.000	0.124	0.124
40:00:00	0.000	0.000	0.000	0.000	0.123	0.123
40:24:00	0.000	0.000	0.000	0.000	0.121	0.121
40:48:00	0.000	0.000	0.000	0.000	0.119	0.119
41:12:00	0.000	0.000	0.000	0.000	0.118	0.118

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
41:36:00	0.000	0.000	0.000	0.000	0.116	0.116
42:00:00	0.000	0.000	0.000	0.000	0.115	0.115
42:24:00	0.000	0.000	0.000	0.000	0.113	0.113
42:48:00	0.000	0.000	0.000	0.000	0.111	0.111
43:12:00	0.000	0.000	0.000	0.000	0.110	0.110
43:36:00	0.000	0.000	0.000	0.000	0.108	0.108
44:00:00	0.000	0.000	0.000	0.000	0.107	0.107
44:24:00	0.000	0.000	0.000	0.000	0.106	0.106
44:48:00	0.000	0.000	0.000	0.000	0.104	0.104
45:12:00	0.000	0.000	0.000	0.000	0.103	0.103
45:36:00	0.000	0.000	0.000	0.000	0.101	0.101
46:00:00	0.000	0.000	0.000	0.000	0.100	0.100
46:24:00	0.000	0.000	0.000	0.000	0.099	0.099
46:48:00	0.000	0.000	0.000	0.000	0.097	0.097
47:12:00	0.000	0.000	0.000	0.000	0.096	0.096
47:36:00	0.000	0.000	0.000	0.000	0.095	0.095
48:00:00	0.000	0.000	0.000	0.000	0.093	0.093
48:24:00	0.000	0.000	0.000	0.000	0.092	0.092
48:48:00	0.000	0.000	0.000	0.000	0.091	0.091
49:12:00	0.000	0.000	0.000	0.000	0.090	0.090
49:36:00	0.000	0.000	0.000	0.000	0.088	0.088
50:00:00	0.000	0.000	0.000	0.000	0.087	0.087
50:24:00	0.000	0.000	0.000	0.000	0.086	0.086
50:48:00	0.000	0.000	0.000	0.000	0.085	0.085
51:12:00	0.000	0.000	0.000	0.000	0.084	0.084
51:36:00	0.000	0.000	0.000	0.000	0.083	0.083
52:00:00	0.000	0.000	0.000	0.000	0.081	0.081
52:24:00	0.000	0.000	0.000	0.000	0.080	0.080
52:48:00	0.000	0.000	0.000	0.000	0.079	0.079
53:12:00	0.000	0.000	0.000	0.000	0.078	0.078
53:36:00	0.000	0.000	0.000	0.000	0.077	0.077
54:00:00	0.000	0.000	0.000	0.000	0.076	0.076
54:24:00	0.000	0.000	0.000	0.000	0.075	0.075
54:48:00	0.000	0.000	0.000	0.000	0.074	0.074
55:12:00	0.000	0.000	0.000	0.000	0.073	0.073

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
55:36:00	0.000	0.000	0.000	0.000	0.072	0.072
56:00:00	0.000	0.000	0.000	0.000	0.071	0.071
56:24:00	0.000	0.000	0.000	0.000	0.070	0.070
56:48:00	0.000	0.000	0.000	0.000	0.069	0.069
57:12:00	0.000	0.000	0.000	0.000	0.068	0.068
57:36:00	0.000	0.000	0.000	0.000	0.067	0.067
58:00:00	0.000	0.000	0.000	0.000	0.066	0.066
58:24:00	0.000	0.000	0.000	0.000	0.065	0.065
58:48:00	0.000	0.000	0.000	0.000	0.065	0.065
59:12:00	0.000	0.000	0.000	0.000	0.064	0.064
59:36:00	0.000	0.000	0.000	0.000	0.063	0.063
60:00:00	0.000	0.000	0.000	0.000	0.062	0.062
60:24:00	0.000	0.000	0.000	0.000	0.061	0.061
60:48:00	0.000	0.000	0.000	0.000	0.060	0.060
61:12:00	0.000	0.000	0.000	0.000	0.059	0.059
61:36:00	0.000	0.000	0.000	0.000	0.059	0.059

Appendix

Catchment descriptors

Name	Value	User-defined value used?
Area (km ²)	1.65	No
ALTBAR	15	No
ASPBAR	337	No
ASPVAR	0.56	No
BFIHOST	0.39	No
BFIHOST19	0.4	No
DPLBAR (km)	1.26	No
DPSBAR (mkm ⁻¹)	13.7	No
FARL	1	No
LDP	2.81	No
PROPWET	0.37	No
RMED1H	10.1	No
RMED1D	27.5	No
RMED2D	36.1	No
SAAR (mm)	710	No
SAAR4170 (mm)	706	No
SPRHOST	39.06	No
URBEXT2000	0.03	No
URBEXT1990	0.04	No
URBCONC	0.52	No
URBLOC	1.45	No
DDF parameter C	-0.03	No
DDF parameter D1	0.3	No
DDF parameter D2	0.37	No
DDF parameter D3	0.33	No
DDF parameter E	0.29	No
DDF parameter F	2.43	No
DDF parameter C (1km grid value)	-0.03	No
DDF parameter D1 (1km grid value)	0.3	No
DDF parameter D2 (1km grid value)	0.36	No
DDF parameter D3 (1km grid value)	0.33	No
DDF parameter E (1km grid value)	0.29	No
DDF parameter F (1km grid value)	2.43	No

East Central Drain (ECD2 up) Catchment

UK Design Flood Estimation

Generated on 18 February 2025 13:56:02 by louise.wilcock
Printed from the ReFH2 Flood Modelling software package, version 4.1.8704.23947

Summary of estimate using the Flood Estimation Handbook revitalised flood hydrograph method (ReFH2)

Site details

Checksum: 9EE4-8A9F

Site name: FEH_Catchment_Descriptors_347400_375350_v5_0_1

Easting: 347400

Northing: 375350

Country: England, Wales or Northern Ireland

Catchment Area (km²): 0.55

Using plot scale calculations: No

Model: 2.3

Site description: None

Model run: 100 year

Summary of results

Rainfall - FEH22 (mm):	55.10	Total runoff (ML):	5.30
Total Rainfall (mm):	38.18	Total flow (ML):	16.40
Peak Rainfall (mm):	6.51	Peak flow (m ³ /s):	0.28

Parameters

Where the user has overridden a system-generated value, this original value is shown in square brackets after the value used.

** Indicates that the user locked the duration/timestep*

Rainfall parameters (Rainfall - FEH22)

Name	Value	User-defined?
Duration (hh:mm:ss)	06:00:00 [05:30:00]	Yes
Timestep (hh:mm:ss)	00:24:00 [00:30:00]	Yes
SCF (Seasonal correction factor)	0.7	No
ARF (Areal reduction factor)	0.98	No
Seasonality	Winter	No

Loss model parameters

Name	Value	User-defined?
Cini (mm)	86.88	No
Cmax (mm)	471.37	No
Use alpha correction factor	No	No
Alpha correction factor	n/a	No

Routing model parameters

Name	Value	User-defined?
Tp (hr)	3.27	No
Up	0.65	No
Uk	0.8	No

Baseflow model parameters

Name	Value	User-defined?
BF0 (m ³ /s)	0.01	No
BL (hr)	31.68	No
BR	2.45	No

Urbanisation parameters

Name	Value	User-defined?
Sewer capacity (m ³ /s)	0	No
Exporting drained area (km ²)	0	No
Urban area (km ²)	0.07	No
Effective URBEXT2000	0.08	n/a
Impervious runoff factor	0.7	No
Imperviousness factor	0.4	No
Tp scaling factor	0.75	No
Depression storage depth (mm)	0.5	No

Time series data

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
00:00:00	0.571	0.000	0.121	0.000	0.009	0.009
00:24:00	0.834	0.000	0.181	0.000	0.009	0.009
00:48:00	1.216	0.000	0.266	0.001	0.009	0.010
01:12:00	1.767	0.000	0.392	0.003	0.009	0.012
01:36:00	2.557	0.000	0.578	0.007	0.009	0.015
02:00:00	3.676	0.000	0.855	0.012	0.009	0.021
02:24:00	5.212	0.000	1.259	0.021	0.009	0.030
02:48:00	6.515	0.000	1.652	0.034	0.010	0.044
03:12:00	5.212	0.000	1.384	0.053	0.011	0.064
03:36:00	3.676	0.000	1.010	0.078	0.012	0.090
04:00:00	2.557	0.000	0.719	0.107	0.014	0.121
04:24:00	1.767	0.000	0.504	0.138	0.016	0.154
04:48:00	1.216	0.000	0.351	0.168	0.020	0.187
05:12:00	0.834	0.000	0.241	0.195	0.024	0.219
05:36:00	0.571	0.000	0.166	0.217	0.028	0.246
06:00:00	0.000	0.000	0.000	0.232	0.033	0.266
06:24:00	0.000	0.000	0.000	0.239	0.039	0.278
06:48:00	0.000	0.000	0.000	0.237	0.044	0.281
07:12:00	0.000	0.000	0.000	0.228	0.050	0.278
07:36:00	0.000	0.000	0.000	0.214	0.055	0.269
08:00:00	0.000	0.000	0.000	0.198	0.060	0.258
08:24:00	0.000	0.000	0.000	0.180	0.064	0.244
08:48:00	0.000	0.000	0.000	0.162	0.068	0.230
09:12:00	0.000	0.000	0.000	0.144	0.072	0.216
09:36:00	0.000	0.000	0.000	0.127	0.074	0.202
10:00:00	0.000	0.000	0.000	0.112	0.077	0.189
10:24:00	0.000	0.000	0.000	0.099	0.079	0.178
10:48:00	0.000	0.000	0.000	0.086	0.081	0.167
11:12:00	0.000	0.000	0.000	0.075	0.082	0.157
11:36:00	0.000	0.000	0.000	0.065	0.083	0.148
12:00:00	0.000	0.000	0.000	0.055	0.084	0.139
12:24:00	0.000	0.000	0.000	0.047	0.085	0.131
12:48:00	0.000	0.000	0.000	0.039	0.085	0.124
13:12:00	0.000	0.000	0.000	0.031	0.085	0.116

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
13:36:00	0.000	0.000	0.000	0.025	0.085	0.110
14:00:00	0.000	0.000	0.000	0.018	0.085	0.103
14:24:00	0.000	0.000	0.000	0.013	0.084	0.097
14:48:00	0.000	0.000	0.000	0.009	0.083	0.092
15:12:00	0.000	0.000	0.000	0.005	0.083	0.088
15:36:00	0.000	0.000	0.000	0.003	0.082	0.085
16:00:00	0.000	0.000	0.000	0.002	0.081	0.083
16:24:00	0.000	0.000	0.000	0.001	0.080	0.081
16:48:00	0.000	0.000	0.000	0.000	0.079	0.079
17:12:00	0.000	0.000	0.000	0.000	0.078	0.078
17:36:00	0.000	0.000	0.000	0.000	0.077	0.077
18:00:00	0.000	0.000	0.000	0.000	0.076	0.076
18:24:00	0.000	0.000	0.000	0.000	0.075	0.075
18:48:00	0.000	0.000	0.000	0.000	0.074	0.074
19:12:00	0.000	0.000	0.000	0.000	0.073	0.073
19:36:00	0.000	0.000	0.000	0.000	0.072	0.072
20:00:00	0.000	0.000	0.000	0.000	0.071	0.071
20:24:00	0.000	0.000	0.000	0.000	0.070	0.070
20:48:00	0.000	0.000	0.000	0.000	0.069	0.069
21:12:00	0.000	0.000	0.000	0.000	0.069	0.069
21:36:00	0.000	0.000	0.000	0.000	0.068	0.068
22:00:00	0.000	0.000	0.000	0.000	0.067	0.067
22:24:00	0.000	0.000	0.000	0.000	0.066	0.066
22:48:00	0.000	0.000	0.000	0.000	0.065	0.065
23:12:00	0.000	0.000	0.000	0.000	0.064	0.064
23:36:00	0.000	0.000	0.000	0.000	0.064	0.064
24:00:00	0.000	0.000	0.000	0.000	0.063	0.063
24:24:00	0.000	0.000	0.000	0.000	0.062	0.062
24:48:00	0.000	0.000	0.000	0.000	0.061	0.061
25:12:00	0.000	0.000	0.000	0.000	0.060	0.060
25:36:00	0.000	0.000	0.000	0.000	0.060	0.060
26:00:00	0.000	0.000	0.000	0.000	0.059	0.059
26:24:00	0.000	0.000	0.000	0.000	0.058	0.058
26:48:00	0.000	0.000	0.000	0.000	0.057	0.057
27:12:00	0.000	0.000	0.000	0.000	0.057	0.057

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
27:36:00	0.000	0.000	0.000	0.000	0.056	0.056
28:00:00	0.000	0.000	0.000	0.000	0.055	0.055
28:24:00	0.000	0.000	0.000	0.000	0.055	0.055
28:48:00	0.000	0.000	0.000	0.000	0.054	0.054
29:12:00	0.000	0.000	0.000	0.000	0.053	0.053
29:36:00	0.000	0.000	0.000	0.000	0.053	0.053
30:00:00	0.000	0.000	0.000	0.000	0.052	0.052
30:24:00	0.000	0.000	0.000	0.000	0.051	0.051
30:48:00	0.000	0.000	0.000	0.000	0.051	0.051
31:12:00	0.000	0.000	0.000	0.000	0.050	0.050
31:36:00	0.000	0.000	0.000	0.000	0.049	0.049
32:00:00	0.000	0.000	0.000	0.000	0.049	0.049
32:24:00	0.000	0.000	0.000	0.000	0.048	0.048
32:48:00	0.000	0.000	0.000	0.000	0.048	0.048
33:12:00	0.000	0.000	0.000	0.000	0.047	0.047
33:36:00	0.000	0.000	0.000	0.000	0.046	0.046
34:00:00	0.000	0.000	0.000	0.000	0.046	0.046
34:24:00	0.000	0.000	0.000	0.000	0.045	0.045
34:48:00	0.000	0.000	0.000	0.000	0.045	0.045
35:12:00	0.000	0.000	0.000	0.000	0.044	0.044
35:36:00	0.000	0.000	0.000	0.000	0.044	0.044
36:00:00	0.000	0.000	0.000	0.000	0.043	0.043
36:24:00	0.000	0.000	0.000	0.000	0.042	0.042
36:48:00	0.000	0.000	0.000	0.000	0.042	0.042
37:12:00	0.000	0.000	0.000	0.000	0.041	0.041
37:36:00	0.000	0.000	0.000	0.000	0.041	0.041
38:00:00	0.000	0.000	0.000	0.000	0.040	0.040
38:24:00	0.000	0.000	0.000	0.000	0.040	0.040
38:48:00	0.000	0.000	0.000	0.000	0.039	0.039
39:12:00	0.000	0.000	0.000	0.000	0.039	0.039
39:36:00	0.000	0.000	0.000	0.000	0.038	0.038
40:00:00	0.000	0.000	0.000	0.000	0.038	0.038
40:24:00	0.000	0.000	0.000	0.000	0.037	0.037
40:48:00	0.000	0.000	0.000	0.000	0.037	0.037
41:12:00	0.000	0.000	0.000	0.000	0.036	0.036

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
41:36:00	0.000	0.000	0.000	0.000	0.036	0.036
42:00:00	0.000	0.000	0.000	0.000	0.036	0.036
42:24:00	0.000	0.000	0.000	0.000	0.035	0.035
42:48:00	0.000	0.000	0.000	0.000	0.035	0.035
43:12:00	0.000	0.000	0.000	0.000	0.034	0.034
43:36:00	0.000	0.000	0.000	0.000	0.034	0.034
44:00:00	0.000	0.000	0.000	0.000	0.033	0.033
44:24:00	0.000	0.000	0.000	0.000	0.033	0.033
44:48:00	0.000	0.000	0.000	0.000	0.033	0.033
45:12:00	0.000	0.000	0.000	0.000	0.032	0.032
45:36:00	0.000	0.000	0.000	0.000	0.032	0.032
46:00:00	0.000	0.000	0.000	0.000	0.031	0.031
46:24:00	0.000	0.000	0.000	0.000	0.031	0.031
46:48:00	0.000	0.000	0.000	0.000	0.031	0.031
47:12:00	0.000	0.000	0.000	0.000	0.030	0.030
47:36:00	0.000	0.000	0.000	0.000	0.030	0.030
48:00:00	0.000	0.000	0.000	0.000	0.029	0.029
48:24:00	0.000	0.000	0.000	0.000	0.029	0.029
48:48:00	0.000	0.000	0.000	0.000	0.029	0.029
49:12:00	0.000	0.000	0.000	0.000	0.028	0.028
49:36:00	0.000	0.000	0.000	0.000	0.028	0.028
50:00:00	0.000	0.000	0.000	0.000	0.028	0.028
50:24:00	0.000	0.000	0.000	0.000	0.027	0.027
50:48:00	0.000	0.000	0.000	0.000	0.027	0.027
51:12:00	0.000	0.000	0.000	0.000	0.027	0.027
51:36:00	0.000	0.000	0.000	0.000	0.026	0.026
52:00:00	0.000	0.000	0.000	0.000	0.026	0.026
52:24:00	0.000	0.000	0.000	0.000	0.026	0.026
52:48:00	0.000	0.000	0.000	0.000	0.025	0.025
53:12:00	0.000	0.000	0.000	0.000	0.025	0.025
53:36:00	0.000	0.000	0.000	0.000	0.025	0.025
54:00:00	0.000	0.000	0.000	0.000	0.024	0.024
54:24:00	0.000	0.000	0.000	0.000	0.024	0.024
54:48:00	0.000	0.000	0.000	0.000	0.024	0.024
55:12:00	0.000	0.000	0.000	0.000	0.023	0.023

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
55:36:00	0.000	0.000	0.000	0.000	0.023	0.023
56:00:00	0.000	0.000	0.000	0.000	0.023	0.023
56:24:00	0.000	0.000	0.000	0.000	0.023	0.023
56:48:00	0.000	0.000	0.000	0.000	0.022	0.022
57:12:00	0.000	0.000	0.000	0.000	0.022	0.022
57:36:00	0.000	0.000	0.000	0.000	0.022	0.022
58:00:00	0.000	0.000	0.000	0.000	0.021	0.021
58:24:00	0.000	0.000	0.000	0.000	0.021	0.021
58:48:00	0.000	0.000	0.000	0.000	0.021	0.021
59:12:00	0.000	0.000	0.000	0.000	0.021	0.021
59:36:00	0.000	0.000	0.000	0.000	0.020	0.020
60:00:00	0.000	0.000	0.000	0.000	0.020	0.020
60:24:00	0.000	0.000	0.000	0.000	0.020	0.020
60:48:00	0.000	0.000	0.000	0.000	0.020	0.020
61:12:00	0.000	0.000	0.000	0.000	0.019	0.019
61:36:00	0.000	0.000	0.000	0.000	0.019	0.019
62:00:00	0.000	0.000	0.000	0.000	0.019	0.019
62:24:00	0.000	0.000	0.000	0.000	0.019	0.019
62:48:00	0.000	0.000	0.000	0.000	0.018	0.018
63:12:00	0.000	0.000	0.000	0.000	0.018	0.018
63:36:00	0.000	0.000	0.000	0.000	0.018	0.018
64:00:00	0.000	0.000	0.000	0.000	0.018	0.018
64:24:00	0.000	0.000	0.000	0.000	0.018	0.018
64:48:00	0.000	0.000	0.000	0.000	0.017	0.017
65:12:00	0.000	0.000	0.000	0.000	0.017	0.017
65:36:00	0.000	0.000	0.000	0.000	0.017	0.017
66:00:00	0.000	0.000	0.000	0.000	0.017	0.017
66:24:00	0.000	0.000	0.000	0.000	0.016	0.016
66:48:00	0.000	0.000	0.000	0.000	0.016	0.016
67:12:00	0.000	0.000	0.000	0.000	0.016	0.016
67:36:00	0.000	0.000	0.000	0.000	0.016	0.016
68:00:00	0.000	0.000	0.000	0.000	0.016	0.016
68:24:00	0.000	0.000	0.000	0.000	0.015	0.015
68:48:00	0.000	0.000	0.000	0.000	0.015	0.015
69:12:00	0.000	0.000	0.000	0.000	0.015	0.015

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
69:36:00	0.000	0.000	0.000	0.000	0.015	0.015
70:00:00	0.000	0.000	0.000	0.000	0.015	0.015
70:24:00	0.000	0.000	0.000	0.000	0.015	0.015
70:48:00	0.000	0.000	0.000	0.000	0.014	0.014
71:12:00	0.000	0.000	0.000	0.000	0.014	0.014
71:36:00	0.000	0.000	0.000	0.000	0.014	0.014
72:00:00	0.000	0.000	0.000	0.000	0.014	0.014
72:24:00	0.000	0.000	0.000	0.000	0.014	0.014
72:48:00	0.000	0.000	0.000	0.000	0.013	0.013
73:12:00	0.000	0.000	0.000	0.000	0.013	0.013
73:36:00	0.000	0.000	0.000	0.000	0.013	0.013
74:00:00	0.000	0.000	0.000	0.000	0.013	0.013
74:24:00	0.000	0.000	0.000	0.000	0.013	0.013
74:48:00	0.000	0.000	0.000	0.000	0.013	0.013
75:12:00	0.000	0.000	0.000	0.000	0.012	0.012
75:36:00	0.000	0.000	0.000	0.000	0.012	0.012
76:00:00	0.000	0.000	0.000	0.000	0.012	0.012
76:24:00	0.000	0.000	0.000	0.000	0.012	0.012
76:48:00	0.000	0.000	0.000	0.000	0.012	0.012
77:12:00	0.000	0.000	0.000	0.000	0.012	0.012
77:36:00	0.000	0.000	0.000	0.000	0.012	0.012
78:00:00	0.000	0.000	0.000	0.000	0.011	0.011
78:24:00	0.000	0.000	0.000	0.000	0.011	0.011
78:48:00	0.000	0.000	0.000	0.000	0.011	0.011
79:12:00	0.000	0.000	0.000	0.000	0.011	0.011
79:36:00	0.000	0.000	0.000	0.000	0.011	0.011
80:00:00	0.000	0.000	0.000	0.000	0.011	0.011
80:24:00	0.000	0.000	0.000	0.000	0.011	0.011
80:48:00	0.000	0.000	0.000	0.000	0.010	0.010
81:12:00	0.000	0.000	0.000	0.000	0.010	0.010
81:36:00	0.000	0.000	0.000	0.000	0.010	0.010
82:00:00	0.000	0.000	0.000	0.000	0.010	0.010
82:24:00	0.000	0.000	0.000	0.000	0.010	0.010
82:48:00	0.000	0.000	0.000	0.000	0.010	0.010
83:12:00	0.000	0.000	0.000	0.000	0.010	0.010

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
83:36:00	0.000	0.000	0.000	0.000	0.010	0.010
84:00:00	0.000	0.000	0.000	0.000	0.009	0.009
84:24:00	0.000	0.000	0.000	0.000	0.009	0.009

Appendix

Catchment descriptors

Name	Value	User-defined value used?
Area (km ²)	0.55	No
ALTBAR	10	No
ASPBAR	340	No
ASPVAR	0.4	No
BFIHOST	0.57	No
BFIHOST19	0.56	No
DPLBAR (km)	0.68	No
DPSBAR (mkm ⁻¹)	3.3	No
FARL	0.91	No
LDP	1.58	No
PROPWET	0.37	No
RMED1H	10.1	No
RMED1D	27.5	No
RMED2D	36.2	No
SAAR (mm)	711	No
SAAR4170 (mm)	713	No
SPRHOST	30.43	No
URBEXT2000	0.08	No
URBEXT1990	0.04	No
URBCONC	0.7	No
URBLOC	1.22	No
DDF parameter C	-0.03	No
DDF parameter D1	0.29	No
DDF parameter D2	0.36	No
DDF parameter D3	0.33	No
DDF parameter E	0.29	No
DDF parameter F	2.44	No
DDF parameter C (1km grid value)	-0.03	No
DDF parameter D1 (1km grid value)	0.3	No
DDF parameter D2 (1km grid value)	0.36	No
DDF parameter D3 (1km grid value)	0.33	No
DDF parameter E (1km grid value)	0.29	No
DDF parameter F (1km grid value)	2.43	No

Hoolpool Gutter (HOOL up) Catchment

UK Design Flood Estimation

Generated on 18 February 2025 14:12:26 by louise.wilcock
Printed from the ReFH2 Flood Modelling software package, version 4.1.8704.23947

Summary of estimate using the Flood Estimation Handbook revitalised flood hydrograph method (ReFH2)

Site detailsChecksum: 24B6-1B4B

Site name: FEH_Catchment_Descriptors_347850_375550_v5_0_1

Easting: 347850

Northing: 375550

Country: England, Wales or Northern Ireland

Catchment Area (km²): 14.32

Using plot scale calculations: No

Model: 2.3

Site description:None

Model run: 100 year

Summary of results

Rainfall - FEH22 (mm):	55.90	Total runoff (ML):	123.58
Total Rainfall (mm):	37.76	Total flow (ML):	407.98
Peak Rainfall (mm):	6.44	Peak flow (m³/s):	5.09

Parameters

Where the user has overridden a system-generated value, this original value is shown in square brackets after the value used.
* Indicates that the user locked the duration/timestep

Rainfall parameters (Rainfall - FEH22)

Name	Value	User-defined?
Duration (hh:mm:ss)	06:00:00 [07:30:00]	Yes
Timestep (hh:mm:ss)	00:24:00 [00:30:00]	Yes
SCF (Seasonal correction factor)	0.71	No
ARF (Areal reduction factor)	0.95	No
Seasonality	Winter	No

Loss model parameters

Name	Value	User-defined?
Cini (mm)	85.85	No
Cmax (mm)	480.02	No
Use alpha correction factor	No	No
Alpha correction factor	n/a	No

Routing model parameters

Name	Value	User-defined?
Tp (hr)	4.46	No
Up	0.65	No
Uk	0.8	No

Baseflow model parameters

Name	Value	User-defined?
BF0 (m ³ /s)	0.26	No
BL (hr)	49.01	No
BR	2.45	No

Urbanisation parameters

Name	Value	User-defined?
Sewer capacity (m ³ /s)	0	No
Exporting drained area (km ²)	0	No
Urban area (km ²)	0.68	No
Effective URBEXT2000	0.03	n/a
Impervious runoff factor	0.7	No
Imperviousness factor	0.4	No
Tp scaling factor	0.75	No
Depression storage depth (mm)	0.5	No

Time series data

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
00:00:00	0.564	0.000	0.107	0.000	0.256	0.256
00:24:00	0.825	0.000	0.158	0.003	0.254	0.257
00:48:00	1.202	0.000	0.233	0.013	0.253	0.266
01:12:00	1.747	0.000	0.344	0.035	0.251	0.286
01:36:00	2.529	0.000	0.509	0.073	0.250	0.322
02:00:00	3.635	0.000	0.755	0.134	0.249	0.384
02:24:00	5.155	0.000	1.117	0.231	0.251	0.482
02:48:00	6.442	0.000	1.473	0.381	0.254	0.634
03:12:00	5.155	0.000	1.240	0.602	0.260	0.862
03:36:00	3.635	0.000	0.907	0.899	0.271	1.170
04:00:00	2.529	0.000	0.647	1.254	0.288	1.542
04:24:00	1.747	0.000	0.455	1.650	0.310	1.960
04:48:00	1.202	0.000	0.317	2.070	0.340	2.410
05:12:00	0.825	0.000	0.219	2.496	0.378	2.874
05:36:00	0.564	0.000	0.151	2.915	0.422	3.338
06:00:00	0.000	0.000	0.000	3.313	0.474	3.787
06:24:00	0.000	0.000	0.000	3.669	0.532	4.201
06:48:00	0.000	0.000	0.000	3.962	0.597	4.558
07:12:00	0.000	0.000	0.000	4.173	0.666	4.839
07:36:00	0.000	0.000	0.000	4.280	0.738	5.018
08:00:00	0.000	0.000	0.000	4.277	0.811	5.088
08:24:00	0.000	0.000	0.000	4.184	0.883	5.067
08:48:00	0.000	0.000	0.000	4.028	0.953	4.981
09:12:00	0.000	0.000	0.000	3.829	1.019	4.847
09:36:00	0.000	0.000	0.000	3.601	1.081	4.682
10:00:00	0.000	0.000	0.000	3.359	1.138	4.497
10:24:00	0.000	0.000	0.000	3.110	1.190	4.300
10:48:00	0.000	0.000	0.000	2.861	1.237	4.099
11:12:00	0.000	0.000	0.000	2.623	1.280	3.903
11:36:00	0.000	0.000	0.000	2.400	1.317	3.717
12:00:00	0.000	0.000	0.000	2.195	1.351	3.546
12:24:00	0.000	0.000	0.000	2.013	1.380	3.393
12:48:00	0.000	0.000	0.000	1.849	1.406	3.255
13:12:00	0.000	0.000	0.000	1.699	1.430	3.129

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
13:36:00	0.000	0.000	0.000	1.559	1.450	3.009
14:00:00	0.000	0.000	0.000	1.427	1.467	2.895
14:24:00	0.000	0.000	0.000	1.301	1.483	2.784
14:48:00	0.000	0.000	0.000	1.180	1.495	2.676
15:12:00	0.000	0.000	0.000	1.064	1.506	2.570
15:36:00	0.000	0.000	0.000	0.951	1.514	2.465
16:00:00	0.000	0.000	0.000	0.840	1.520	2.360
16:24:00	0.000	0.000	0.000	0.731	1.524	2.255
16:48:00	0.000	0.000	0.000	0.626	1.525	2.151
17:12:00	0.000	0.000	0.000	0.523	1.525	2.047
17:36:00	0.000	0.000	0.000	0.424	1.522	1.946
18:00:00	0.000	0.000	0.000	0.331	1.517	1.848
18:24:00	0.000	0.000	0.000	0.245	1.511	1.756
18:48:00	0.000	0.000	0.000	0.171	1.503	1.674
19:12:00	0.000	0.000	0.000	0.112	1.494	1.606
19:36:00	0.000	0.000	0.000	0.070	1.483	1.553
20:00:00	0.000	0.000	0.000	0.041	1.472	1.514
20:24:00	0.000	0.000	0.000	0.023	1.461	1.484
20:48:00	0.000	0.000	0.000	0.011	1.450	1.461
21:12:00	0.000	0.000	0.000	0.004	1.438	1.442
21:36:00	0.000	0.000	0.000	0.001	1.426	1.427
22:00:00	0.000	0.000	0.000	0.000	1.415	1.415
22:24:00	0.000	0.000	0.000	0.000	1.403	1.403
22:48:00	0.000	0.000	0.000	0.000	1.392	1.392
23:12:00	0.000	0.000	0.000	0.000	1.381	1.381
23:36:00	0.000	0.000	0.000	0.000	1.369	1.369
24:00:00	0.000	0.000	0.000	0.000	1.358	1.358
24:24:00	0.000	0.000	0.000	0.000	1.347	1.347
24:48:00	0.000	0.000	0.000	0.000	1.336	1.336
25:12:00	0.000	0.000	0.000	0.000	1.325	1.325
25:36:00	0.000	0.000	0.000	0.000	1.315	1.315
26:00:00	0.000	0.000	0.000	0.000	1.304	1.304
26:24:00	0.000	0.000	0.000	0.000	1.293	1.293
26:48:00	0.000	0.000	0.000	0.000	1.283	1.283
27:12:00	0.000	0.000	0.000	0.000	1.272	1.272

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
27:36:00	0.000	0.000	0.000	0.000	1.262	1.262
28:00:00	0.000	0.000	0.000	0.000	1.252	1.252
28:24:00	0.000	0.000	0.000	0.000	1.242	1.242
28:48:00	0.000	0.000	0.000	0.000	1.232	1.232
29:12:00	0.000	0.000	0.000	0.000	1.222	1.222
29:36:00	0.000	0.000	0.000	0.000	1.212	1.212
30:00:00	0.000	0.000	0.000	0.000	1.202	1.202
30:24:00	0.000	0.000	0.000	0.000	1.192	1.192
30:48:00	0.000	0.000	0.000	0.000	1.182	1.182
31:12:00	0.000	0.000	0.000	0.000	1.173	1.173
31:36:00	0.000	0.000	0.000	0.000	1.163	1.163
32:00:00	0.000	0.000	0.000	0.000	1.154	1.154
32:24:00	0.000	0.000	0.000	0.000	1.144	1.144
32:48:00	0.000	0.000	0.000	0.000	1.135	1.135
33:12:00	0.000	0.000	0.000	0.000	1.126	1.126
33:36:00	0.000	0.000	0.000	0.000	1.117	1.117
34:00:00	0.000	0.000	0.000	0.000	1.108	1.108
34:24:00	0.000	0.000	0.000	0.000	1.099	1.099
34:48:00	0.000	0.000	0.000	0.000	1.090	1.090
35:12:00	0.000	0.000	0.000	0.000	1.081	1.081
35:36:00	0.000	0.000	0.000	0.000	1.072	1.072
36:00:00	0.000	0.000	0.000	0.000	1.063	1.063
36:24:00	0.000	0.000	0.000	0.000	1.055	1.055
36:48:00	0.000	0.000	0.000	0.000	1.046	1.046
37:12:00	0.000	0.000	0.000	0.000	1.038	1.038
37:36:00	0.000	0.000	0.000	0.000	1.029	1.029
38:00:00	0.000	0.000	0.000	0.000	1.021	1.021
38:24:00	0.000	0.000	0.000	0.000	1.012	1.012
38:48:00	0.000	0.000	0.000	0.000	1.004	1.004
39:12:00	0.000	0.000	0.000	0.000	0.996	0.996
39:36:00	0.000	0.000	0.000	0.000	0.988	0.988
40:00:00	0.000	0.000	0.000	0.000	0.980	0.980
40:24:00	0.000	0.000	0.000	0.000	0.972	0.972
40:48:00	0.000	0.000	0.000	0.000	0.964	0.964
41:12:00	0.000	0.000	0.000	0.000	0.956	0.956

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
41:36:00	0.000	0.000	0.000	0.000	0.948	0.948
42:00:00	0.000	0.000	0.000	0.000	0.941	0.941
42:24:00	0.000	0.000	0.000	0.000	0.933	0.933
42:48:00	0.000	0.000	0.000	0.000	0.926	0.926
43:12:00	0.000	0.000	0.000	0.000	0.918	0.918
43:36:00	0.000	0.000	0.000	0.000	0.911	0.911
44:00:00	0.000	0.000	0.000	0.000	0.903	0.903
44:24:00	0.000	0.000	0.000	0.000	0.896	0.896
44:48:00	0.000	0.000	0.000	0.000	0.889	0.889
45:12:00	0.000	0.000	0.000	0.000	0.881	0.881
45:36:00	0.000	0.000	0.000	0.000	0.874	0.874
46:00:00	0.000	0.000	0.000	0.000	0.867	0.867
46:24:00	0.000	0.000	0.000	0.000	0.860	0.860
46:48:00	0.000	0.000	0.000	0.000	0.853	0.853
47:12:00	0.000	0.000	0.000	0.000	0.846	0.846
47:36:00	0.000	0.000	0.000	0.000	0.839	0.839
48:00:00	0.000	0.000	0.000	0.000	0.832	0.832
48:24:00	0.000	0.000	0.000	0.000	0.826	0.826
48:48:00	0.000	0.000	0.000	0.000	0.819	0.819
49:12:00	0.000	0.000	0.000	0.000	0.812	0.812
49:36:00	0.000	0.000	0.000	0.000	0.806	0.806
50:00:00	0.000	0.000	0.000	0.000	0.799	0.799
50:24:00	0.000	0.000	0.000	0.000	0.793	0.793
50:48:00	0.000	0.000	0.000	0.000	0.786	0.786
51:12:00	0.000	0.000	0.000	0.000	0.780	0.780
51:36:00	0.000	0.000	0.000	0.000	0.773	0.773
52:00:00	0.000	0.000	0.000	0.000	0.767	0.767
52:24:00	0.000	0.000	0.000	0.000	0.761	0.761
52:48:00	0.000	0.000	0.000	0.000	0.755	0.755
53:12:00	0.000	0.000	0.000	0.000	0.749	0.749
53:36:00	0.000	0.000	0.000	0.000	0.742	0.742
54:00:00	0.000	0.000	0.000	0.000	0.736	0.736
54:24:00	0.000	0.000	0.000	0.000	0.730	0.730
54:48:00	0.000	0.000	0.000	0.000	0.725	0.725
55:12:00	0.000	0.000	0.000	0.000	0.719	0.719

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
55:36:00	0.000	0.000	0.000	0.000	0.713	0.713
56:00:00	0.000	0.000	0.000	0.000	0.707	0.707
56:24:00	0.000	0.000	0.000	0.000	0.701	0.701
56:48:00	0.000	0.000	0.000	0.000	0.696	0.696
57:12:00	0.000	0.000	0.000	0.000	0.690	0.690
57:36:00	0.000	0.000	0.000	0.000	0.684	0.684
58:00:00	0.000	0.000	0.000	0.000	0.679	0.679
58:24:00	0.000	0.000	0.000	0.000	0.673	0.673
58:48:00	0.000	0.000	0.000	0.000	0.668	0.668
59:12:00	0.000	0.000	0.000	0.000	0.662	0.662
59:36:00	0.000	0.000	0.000	0.000	0.657	0.657
60:00:00	0.000	0.000	0.000	0.000	0.652	0.652
60:24:00	0.000	0.000	0.000	0.000	0.646	0.646
60:48:00	0.000	0.000	0.000	0.000	0.641	0.641
61:12:00	0.000	0.000	0.000	0.000	0.636	0.636
61:36:00	0.000	0.000	0.000	0.000	0.631	0.631
62:00:00	0.000	0.000	0.000	0.000	0.626	0.626
62:24:00	0.000	0.000	0.000	0.000	0.620	0.620
62:48:00	0.000	0.000	0.000	0.000	0.615	0.615
63:12:00	0.000	0.000	0.000	0.000	0.610	0.610
63:36:00	0.000	0.000	0.000	0.000	0.605	0.605
64:00:00	0.000	0.000	0.000	0.000	0.601	0.601
64:24:00	0.000	0.000	0.000	0.000	0.596	0.596
64:48:00	0.000	0.000	0.000	0.000	0.591	0.591
65:12:00	0.000	0.000	0.000	0.000	0.586	0.586
65:36:00	0.000	0.000	0.000	0.000	0.581	0.581
66:00:00	0.000	0.000	0.000	0.000	0.577	0.577
66:24:00	0.000	0.000	0.000	0.000	0.572	0.572
66:48:00	0.000	0.000	0.000	0.000	0.567	0.567
67:12:00	0.000	0.000	0.000	0.000	0.563	0.563
67:36:00	0.000	0.000	0.000	0.000	0.558	0.558
68:00:00	0.000	0.000	0.000	0.000	0.553	0.553
68:24:00	0.000	0.000	0.000	0.000	0.549	0.549
68:48:00	0.000	0.000	0.000	0.000	0.544	0.544
69:12:00	0.000	0.000	0.000	0.000	0.540	0.540

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
69:36:00	0.000	0.000	0.000	0.000	0.536	0.536
70:00:00	0.000	0.000	0.000	0.000	0.531	0.531
70:24:00	0.000	0.000	0.000	0.000	0.527	0.527
70:48:00	0.000	0.000	0.000	0.000	0.523	0.523
71:12:00	0.000	0.000	0.000	0.000	0.518	0.518
71:36:00	0.000	0.000	0.000	0.000	0.514	0.514
72:00:00	0.000	0.000	0.000	0.000	0.510	0.510
72:24:00	0.000	0.000	0.000	0.000	0.506	0.506
72:48:00	0.000	0.000	0.000	0.000	0.502	0.502
73:12:00	0.000	0.000	0.000	0.000	0.498	0.498
73:36:00	0.000	0.000	0.000	0.000	0.494	0.494
74:00:00	0.000	0.000	0.000	0.000	0.490	0.490
74:24:00	0.000	0.000	0.000	0.000	0.486	0.486
74:48:00	0.000	0.000	0.000	0.000	0.482	0.482
75:12:00	0.000	0.000	0.000	0.000	0.478	0.478
75:36:00	0.000	0.000	0.000	0.000	0.474	0.474
76:00:00	0.000	0.000	0.000	0.000	0.470	0.470
76:24:00	0.000	0.000	0.000	0.000	0.466	0.466
76:48:00	0.000	0.000	0.000	0.000	0.462	0.462
77:12:00	0.000	0.000	0.000	0.000	0.459	0.459
77:36:00	0.000	0.000	0.000	0.000	0.455	0.455
78:00:00	0.000	0.000	0.000	0.000	0.451	0.451
78:24:00	0.000	0.000	0.000	0.000	0.448	0.448
78:48:00	0.000	0.000	0.000	0.000	0.444	0.444
79:12:00	0.000	0.000	0.000	0.000	0.440	0.440
79:36:00	0.000	0.000	0.000	0.000	0.437	0.437
80:00:00	0.000	0.000	0.000	0.000	0.433	0.433
80:24:00	0.000	0.000	0.000	0.000	0.430	0.430
80:48:00	0.000	0.000	0.000	0.000	0.426	0.426
81:12:00	0.000	0.000	0.000	0.000	0.423	0.423
81:36:00	0.000	0.000	0.000	0.000	0.419	0.419
82:00:00	0.000	0.000	0.000	0.000	0.416	0.416
82:24:00	0.000	0.000	0.000	0.000	0.413	0.413
82:48:00	0.000	0.000	0.000	0.000	0.409	0.409
83:12:00	0.000	0.000	0.000	0.000	0.406	0.406

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
83:36:00	0.000	0.000	0.000	0.000	0.403	0.403
84:00:00	0.000	0.000	0.000	0.000	0.399	0.399
84:24:00	0.000	0.000	0.000	0.000	0.396	0.396
84:48:00	0.000	0.000	0.000	0.000	0.393	0.393
85:12:00	0.000	0.000	0.000	0.000	0.390	0.390
85:36:00	0.000	0.000	0.000	0.000	0.386	0.386
86:00:00	0.000	0.000	0.000	0.000	0.383	0.383
86:24:00	0.000	0.000	0.000	0.000	0.380	0.380
86:48:00	0.000	0.000	0.000	0.000	0.377	0.377
87:12:00	0.000	0.000	0.000	0.000	0.374	0.374
87:36:00	0.000	0.000	0.000	0.000	0.371	0.371
88:00:00	0.000	0.000	0.000	0.000	0.368	0.368
88:24:00	0.000	0.000	0.000	0.000	0.365	0.365
88:48:00	0.000	0.000	0.000	0.000	0.362	0.362
89:12:00	0.000	0.000	0.000	0.000	0.359	0.359
89:36:00	0.000	0.000	0.000	0.000	0.356	0.356
90:00:00	0.000	0.000	0.000	0.000	0.353	0.353
90:24:00	0.000	0.000	0.000	0.000	0.350	0.350
90:48:00	0.000	0.000	0.000	0.000	0.348	0.348
91:12:00	0.000	0.000	0.000	0.000	0.345	0.345
91:36:00	0.000	0.000	0.000	0.000	0.342	0.342
92:00:00	0.000	0.000	0.000	0.000	0.339	0.339
92:24:00	0.000	0.000	0.000	0.000	0.336	0.336
92:48:00	0.000	0.000	0.000	0.000	0.334	0.334
93:12:00	0.000	0.000	0.000	0.000	0.331	0.331
93:36:00	0.000	0.000	0.000	0.000	0.328	0.328
94:00:00	0.000	0.000	0.000	0.000	0.326	0.326
94:24:00	0.000	0.000	0.000	0.000	0.323	0.323
94:48:00	0.000	0.000	0.000	0.000	0.320	0.320
95:12:00	0.000	0.000	0.000	0.000	0.318	0.318
95:36:00	0.000	0.000	0.000	0.000	0.315	0.315
96:00:00	0.000	0.000	0.000	0.000	0.313	0.313
96:24:00	0.000	0.000	0.000	0.000	0.310	0.310
96:48:00	0.000	0.000	0.000	0.000	0.308	0.308
97:12:00	0.000	0.000	0.000	0.000	0.305	0.305

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
97:36:00	0.000	0.000	0.000	0.000	0.303	0.303
98:00:00	0.000	0.000	0.000	0.000	0.300	0.300
98:24:00	0.000	0.000	0.000	0.000	0.298	0.298
98:48:00	0.000	0.000	0.000	0.000	0.295	0.295
99:12:00	0.000	0.000	0.000	0.000	0.293	0.293
99:36:00	0.000	0.000	0.000	0.000	0.290	0.290
100:00:00	0.000	0.000	0.000	0.000	0.288	0.288
100:24:00	0.000	0.000	0.000	0.000	0.286	0.286
100:48:00	0.000	0.000	0.000	0.000	0.283	0.283
101:12:00	0.000	0.000	0.000	0.000	0.281	0.281
101:36:00	0.000	0.000	0.000	0.000	0.279	0.279
102:00:00	0.000	0.000	0.000	0.000	0.277	0.277
102:24:00	0.000	0.000	0.000	0.000	0.274	0.274
102:48:00	0.000	0.000	0.000	0.000	0.272	0.272
103:12:00	0.000	0.000	0.000	0.000	0.270	0.270
103:36:00	0.000	0.000	0.000	0.000	0.268	0.268
104:00:00	0.000	0.000	0.000	0.000	0.266	0.266
104:24:00	0.000	0.000	0.000	0.000	0.263	0.263
104:48:00	0.000	0.000	0.000	0.000	0.261	0.261
105:12:00	0.000	0.000	0.000	0.000	0.259	0.259

Appendix

Catchment descriptors

Name	Value	User-defined value used?
Area (km ²)	14.32	No
ALTBAR	53	No
ASPBAR	262	No
ASPVAR	0.42	No
BFIHOST	0.56	No
BFIHOST19	0.57	No
DPLBAR (km)	4.86	No
DPSBAR (mkm ⁻¹)	43	No
FARL	1	No
LDP	9.1	No
PROPWET	0.37	No
RMED1H	10.3	No
RMED1D	28.2	No
RMED2D	37.8	No
SAAR (mm)	732	No
SAAR4170 (mm)	733	No
SPRHOST	31.23	No
URBEXT2000	0.03	No
URBEXT1990	0.03	No
URBCONC	0.75	No
URBLOC	0.4	No
DDF parameter C	-0.02	No
DDF parameter D1	0.3	No
DDF parameter D2	0.39	No
DDF parameter D3	0.31	No
DDF parameter E	0.29	No
DDF parameter F	2.44	No
DDF parameter C (1km grid value)	-0.02	No
DDF parameter D1 (1km grid value)	0.29	No
DDF parameter D2 (1km grid value)	0.35	No
DDF parameter D3 (1km grid value)	0.33	No
DDF parameter E (1km grid value)	0.29	No
DDF parameter F (1km grid value)	2.45	No

Helsby Town Ditch (HETD up) Catchment

UK Design Flood Estimation

Generated on 18 February 2025 14:09:46 by louise.wilcock
Printed from the ReFH2 Flood Modelling software package, version 4.1.8704.23947

Summary of estimate using the Flood Estimation Handbook revitalised flood hydrograph method (ReFH2)

Site details

Checksum: 31B0-6B98

Site name: FEH_Catchment_Descriptors_348200_375750_v5_0_1

Easting: 348200

Northing: 375750

Country: England, Wales or Northern Ireland

Catchment Area (km²): 0.81

Using plot scale calculations: No

Model: 2.3

Site description: None

Model run: 100 year

Summary of results

Rainfall - FEH22 (mm):	54.90	Total runoff (ML):	7.79
Total Rainfall (mm):	38.25	Total flow (ML):	20.14
Peak Rainfall (mm):	6.53	Peak flow (m ³ /s):	0.58

Parameters

Where the user has overridden a system-generated value, this original value is shown in square brackets after the value used.

** Indicates that the user locked the duration/timestep*

Rainfall parameters (Rainfall - FEH22)

Name	Value	User-defined?
Duration (hh:mm:ss)	06:00:00 [03:15:00]	Yes
Timestep (hh:mm:ss)	00:24:00 [00:15:00]	Yes
SCF (Seasonal correction factor)	0.71	No
ARF (Areal reduction factor)	0.98	No
Seasonality	Winter	No

Loss model parameters

Name	Value	User-defined?
Cini (mm)	78.73	No
Cmax (mm)	548.01	No
Use alpha correction factor	No	No
Alpha correction factor	n/a	No

Routing model parameters

Name	Value	User-defined?
Tp (hr)	1.74	No
Up	0.65	No
Uk	0.8	No

Baseflow model parameters

Name	Value	User-defined?
BF0 (m ³ /s)	0.01	No
BL (hr)	39.95	No
BR	2.48	No

Urbanisation parameters

Name	Value	User-defined?
Sewer capacity (m ³ /s)	0	No
Exporting drained area (km ²)	0	No
Urban area (km ²)	0.26	No
Effective URBEXT2000	0.21	n/a
Impervious runoff factor	0.7	No
Imperviousness factor	0.4	No
Tp scaling factor	0.75	No
Depression storage depth (mm)	0.5	No

Time series data

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
00:00:00	0.572	0.000	0.124	0.000	0.009	0.009
00:24:00	0.836	0.000	0.186	0.002	0.009	0.011
00:48:00	1.218	0.000	0.274	0.008	0.009	0.017
01:12:00	1.770	0.000	0.402	0.020	0.009	0.029
01:36:00	2.562	0.000	0.591	0.041	0.010	0.050
02:00:00	3.683	0.000	0.869	0.071	0.010	0.081
02:24:00	5.222	0.000	1.271	0.112	0.011	0.123
02:48:00	6.526	0.000	1.651	0.172	0.013	0.184
03:12:00	5.222	0.000	1.372	0.254	0.015	0.269
03:36:00	3.683	0.000	0.995	0.352	0.019	0.371
04:00:00	2.562	0.000	0.705	0.447	0.024	0.471
04:24:00	1.770	0.000	0.494	0.516	0.030	0.545
04:48:00	1.218	0.000	0.343	0.541	0.037	0.578
05:12:00	0.836	0.000	0.236	0.526	0.044	0.571
05:36:00	0.572	0.000	0.162	0.484	0.052	0.536
06:00:00	0.000	0.000	0.000	0.428	0.059	0.487
06:24:00	0.000	0.000	0.000	0.364	0.065	0.430
06:48:00	0.000	0.000	0.000	0.298	0.071	0.369
07:12:00	0.000	0.000	0.000	0.234	0.075	0.309
07:36:00	0.000	0.000	0.000	0.175	0.078	0.254
08:00:00	0.000	0.000	0.000	0.127	0.081	0.208
08:24:00	0.000	0.000	0.000	0.089	0.083	0.172
08:48:00	0.000	0.000	0.000	0.060	0.084	0.144
09:12:00	0.000	0.000	0.000	0.038	0.084	0.123
09:36:00	0.000	0.000	0.000	0.023	0.084	0.108
10:00:00	0.000	0.000	0.000	0.013	0.084	0.097
10:24:00	0.000	0.000	0.000	0.007	0.083	0.091
10:48:00	0.000	0.000	0.000	0.004	0.083	0.087
11:12:00	0.000	0.000	0.000	0.002	0.082	0.084
11:36:00	0.000	0.000	0.000	0.001	0.081	0.082
12:00:00	0.000	0.000	0.000	0.000	0.080	0.081
12:24:00	0.000	0.000	0.000	0.000	0.080	0.080
12:48:00	0.000	0.000	0.000	0.000	0.079	0.079
13:12:00	0.000	0.000	0.000	0.000	0.078	0.078

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
13:36:00	0.000	0.000	0.000	0.000	0.077	0.077
14:00:00	0.000	0.000	0.000	0.000	0.077	0.077
14:24:00	0.000	0.000	0.000	0.000	0.076	0.076
14:48:00	0.000	0.000	0.000	0.000	0.075	0.075
15:12:00	0.000	0.000	0.000	0.000	0.074	0.074
15:36:00	0.000	0.000	0.000	0.000	0.074	0.074
16:00:00	0.000	0.000	0.000	0.000	0.073	0.073
16:24:00	0.000	0.000	0.000	0.000	0.072	0.072
16:48:00	0.000	0.000	0.000	0.000	0.071	0.071
17:12:00	0.000	0.000	0.000	0.000	0.071	0.071
17:36:00	0.000	0.000	0.000	0.000	0.070	0.070
18:00:00	0.000	0.000	0.000	0.000	0.069	0.069
18:24:00	0.000	0.000	0.000	0.000	0.069	0.069
18:48:00	0.000	0.000	0.000	0.000	0.068	0.068
19:12:00	0.000	0.000	0.000	0.000	0.067	0.067
19:36:00	0.000	0.000	0.000	0.000	0.067	0.067
20:00:00	0.000	0.000	0.000	0.000	0.066	0.066
20:24:00	0.000	0.000	0.000	0.000	0.065	0.065
20:48:00	0.000	0.000	0.000	0.000	0.065	0.065
21:12:00	0.000	0.000	0.000	0.000	0.064	0.064
21:36:00	0.000	0.000	0.000	0.000	0.063	0.063
22:00:00	0.000	0.000	0.000	0.000	0.063	0.063
22:24:00	0.000	0.000	0.000	0.000	0.062	0.062
22:48:00	0.000	0.000	0.000	0.000	0.061	0.061
23:12:00	0.000	0.000	0.000	0.000	0.061	0.061
23:36:00	0.000	0.000	0.000	0.000	0.060	0.060
24:00:00	0.000	0.000	0.000	0.000	0.060	0.060
24:24:00	0.000	0.000	0.000	0.000	0.059	0.059
24:48:00	0.000	0.000	0.000	0.000	0.058	0.058
25:12:00	0.000	0.000	0.000	0.000	0.058	0.058
25:36:00	0.000	0.000	0.000	0.000	0.057	0.057
26:00:00	0.000	0.000	0.000	0.000	0.057	0.057
26:24:00	0.000	0.000	0.000	0.000	0.056	0.056
26:48:00	0.000	0.000	0.000	0.000	0.056	0.056
27:12:00	0.000	0.000	0.000	0.000	0.055	0.055

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
27:36:00	0.000	0.000	0.000	0.000	0.054	0.054
28:00:00	0.000	0.000	0.000	0.000	0.054	0.054
28:24:00	0.000	0.000	0.000	0.000	0.053	0.053
28:48:00	0.000	0.000	0.000	0.000	0.053	0.053
29:12:00	0.000	0.000	0.000	0.000	0.052	0.052
29:36:00	0.000	0.000	0.000	0.000	0.052	0.052
30:00:00	0.000	0.000	0.000	0.000	0.051	0.051
30:24:00	0.000	0.000	0.000	0.000	0.051	0.051
30:48:00	0.000	0.000	0.000	0.000	0.050	0.050
31:12:00	0.000	0.000	0.000	0.000	0.050	0.050
31:36:00	0.000	0.000	0.000	0.000	0.049	0.049
32:00:00	0.000	0.000	0.000	0.000	0.049	0.049
32:24:00	0.000	0.000	0.000	0.000	0.048	0.048
32:48:00	0.000	0.000	0.000	0.000	0.048	0.048
33:12:00	0.000	0.000	0.000	0.000	0.047	0.047
33:36:00	0.000	0.000	0.000	0.000	0.047	0.047
34:00:00	0.000	0.000	0.000	0.000	0.046	0.046
34:24:00	0.000	0.000	0.000	0.000	0.046	0.046
34:48:00	0.000	0.000	0.000	0.000	0.045	0.045
35:12:00	0.000	0.000	0.000	0.000	0.045	0.045
35:36:00	0.000	0.000	0.000	0.000	0.045	0.045
36:00:00	0.000	0.000	0.000	0.000	0.044	0.044
36:24:00	0.000	0.000	0.000	0.000	0.044	0.044
36:48:00	0.000	0.000	0.000	0.000	0.043	0.043
37:12:00	0.000	0.000	0.000	0.000	0.043	0.043
37:36:00	0.000	0.000	0.000	0.000	0.042	0.042
38:00:00	0.000	0.000	0.000	0.000	0.042	0.042
38:24:00	0.000	0.000	0.000	0.000	0.042	0.042
38:48:00	0.000	0.000	0.000	0.000	0.041	0.041
39:12:00	0.000	0.000	0.000	0.000	0.041	0.041
39:36:00	0.000	0.000	0.000	0.000	0.040	0.040
40:00:00	0.000	0.000	0.000	0.000	0.040	0.040
40:24:00	0.000	0.000	0.000	0.000	0.040	0.040
40:48:00	0.000	0.000	0.000	0.000	0.039	0.039
41:12:00	0.000	0.000	0.000	0.000	0.039	0.039

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
41:36:00	0.000	0.000	0.000	0.000	0.038	0.038
42:00:00	0.000	0.000	0.000	0.000	0.038	0.038
42:24:00	0.000	0.000	0.000	0.000	0.038	0.038
42:48:00	0.000	0.000	0.000	0.000	0.037	0.037
43:12:00	0.000	0.000	0.000	0.000	0.037	0.037
43:36:00	0.000	0.000	0.000	0.000	0.036	0.036
44:00:00	0.000	0.000	0.000	0.000	0.036	0.036
44:24:00	0.000	0.000	0.000	0.000	0.036	0.036
44:48:00	0.000	0.000	0.000	0.000	0.035	0.035
45:12:00	0.000	0.000	0.000	0.000	0.035	0.035
45:36:00	0.000	0.000	0.000	0.000	0.035	0.035
46:00:00	0.000	0.000	0.000	0.000	0.034	0.034
46:24:00	0.000	0.000	0.000	0.000	0.034	0.034
46:48:00	0.000	0.000	0.000	0.000	0.034	0.034
47:12:00	0.000	0.000	0.000	0.000	0.033	0.033
47:36:00	0.000	0.000	0.000	0.000	0.033	0.033
48:00:00	0.000	0.000	0.000	0.000	0.033	0.033
48:24:00	0.000	0.000	0.000	0.000	0.032	0.032
48:48:00	0.000	0.000	0.000	0.000	0.032	0.032
49:12:00	0.000	0.000	0.000	0.000	0.032	0.032
49:36:00	0.000	0.000	0.000	0.000	0.031	0.031
50:00:00	0.000	0.000	0.000	0.000	0.031	0.031
50:24:00	0.000	0.000	0.000	0.000	0.031	0.031
50:48:00	0.000	0.000	0.000	0.000	0.030	0.030
51:12:00	0.000	0.000	0.000	0.000	0.030	0.030
51:36:00	0.000	0.000	0.000	0.000	0.030	0.030
52:00:00	0.000	0.000	0.000	0.000	0.030	0.030
52:24:00	0.000	0.000	0.000	0.000	0.029	0.029
52:48:00	0.000	0.000	0.000	0.000	0.029	0.029
53:12:00	0.000	0.000	0.000	0.000	0.029	0.029
53:36:00	0.000	0.000	0.000	0.000	0.028	0.028
54:00:00	0.000	0.000	0.000	0.000	0.028	0.028
54:24:00	0.000	0.000	0.000	0.000	0.028	0.028
54:48:00	0.000	0.000	0.000	0.000	0.028	0.028
55:12:00	0.000	0.000	0.000	0.000	0.027	0.027

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
55:36:00	0.000	0.000	0.000	0.000	0.027	0.027
56:00:00	0.000	0.000	0.000	0.000	0.027	0.027
56:24:00	0.000	0.000	0.000	0.000	0.026	0.026
56:48:00	0.000	0.000	0.000	0.000	0.026	0.026
57:12:00	0.000	0.000	0.000	0.000	0.026	0.026
57:36:00	0.000	0.000	0.000	0.000	0.026	0.026
58:00:00	0.000	0.000	0.000	0.000	0.025	0.025
58:24:00	0.000	0.000	0.000	0.000	0.025	0.025
58:48:00	0.000	0.000	0.000	0.000	0.025	0.025
59:12:00	0.000	0.000	0.000	0.000	0.025	0.025
59:36:00	0.000	0.000	0.000	0.000	0.024	0.024
60:00:00	0.000	0.000	0.000	0.000	0.024	0.024
60:24:00	0.000	0.000	0.000	0.000	0.024	0.024
60:48:00	0.000	0.000	0.000	0.000	0.024	0.024
61:12:00	0.000	0.000	0.000	0.000	0.023	0.023
61:36:00	0.000	0.000	0.000	0.000	0.023	0.023
62:00:00	0.000	0.000	0.000	0.000	0.023	0.023
62:24:00	0.000	0.000	0.000	0.000	0.023	0.023
62:48:00	0.000	0.000	0.000	0.000	0.023	0.023
63:12:00	0.000	0.000	0.000	0.000	0.022	0.022
63:36:00	0.000	0.000	0.000	0.000	0.022	0.022
64:00:00	0.000	0.000	0.000	0.000	0.022	0.022
64:24:00	0.000	0.000	0.000	0.000	0.022	0.022
64:48:00	0.000	0.000	0.000	0.000	0.021	0.021
65:12:00	0.000	0.000	0.000	0.000	0.021	0.021
65:36:00	0.000	0.000	0.000	0.000	0.021	0.021
66:00:00	0.000	0.000	0.000	0.000	0.021	0.021
66:24:00	0.000	0.000	0.000	0.000	0.021	0.021
66:48:00	0.000	0.000	0.000	0.000	0.020	0.020
67:12:00	0.000	0.000	0.000	0.000	0.020	0.020
67:36:00	0.000	0.000	0.000	0.000	0.020	0.020
68:00:00	0.000	0.000	0.000	0.000	0.020	0.020
68:24:00	0.000	0.000	0.000	0.000	0.020	0.020
68:48:00	0.000	0.000	0.000	0.000	0.019	0.019
69:12:00	0.000	0.000	0.000	0.000	0.019	0.019

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
69:36:00	0.000	0.000	0.000	0.000	0.019	0.019
70:00:00	0.000	0.000	0.000	0.000	0.019	0.019
70:24:00	0.000	0.000	0.000	0.000	0.019	0.019
70:48:00	0.000	0.000	0.000	0.000	0.018	0.018
71:12:00	0.000	0.000	0.000	0.000	0.018	0.018
71:36:00	0.000	0.000	0.000	0.000	0.018	0.018
72:00:00	0.000	0.000	0.000	0.000	0.018	0.018
72:24:00	0.000	0.000	0.000	0.000	0.018	0.018
72:48:00	0.000	0.000	0.000	0.000	0.018	0.018
73:12:00	0.000	0.000	0.000	0.000	0.017	0.017
73:36:00	0.000	0.000	0.000	0.000	0.017	0.017
74:00:00	0.000	0.000	0.000	0.000	0.017	0.017
74:24:00	0.000	0.000	0.000	0.000	0.017	0.017
74:48:00	0.000	0.000	0.000	0.000	0.017	0.017
75:12:00	0.000	0.000	0.000	0.000	0.017	0.017
75:36:00	0.000	0.000	0.000	0.000	0.016	0.016
76:00:00	0.000	0.000	0.000	0.000	0.016	0.016
76:24:00	0.000	0.000	0.000	0.000	0.016	0.016
76:48:00	0.000	0.000	0.000	0.000	0.016	0.016
77:12:00	0.000	0.000	0.000	0.000	0.016	0.016
77:36:00	0.000	0.000	0.000	0.000	0.016	0.016
78:00:00	0.000	0.000	0.000	0.000	0.015	0.015
78:24:00	0.000	0.000	0.000	0.000	0.015	0.015
78:48:00	0.000	0.000	0.000	0.000	0.015	0.015
79:12:00	0.000	0.000	0.000	0.000	0.015	0.015
79:36:00	0.000	0.000	0.000	0.000	0.015	0.015
80:00:00	0.000	0.000	0.000	0.000	0.015	0.015
80:24:00	0.000	0.000	0.000	0.000	0.015	0.015
80:48:00	0.000	0.000	0.000	0.000	0.014	0.014
81:12:00	0.000	0.000	0.000	0.000	0.014	0.014
81:36:00	0.000	0.000	0.000	0.000	0.014	0.014
82:00:00	0.000	0.000	0.000	0.000	0.014	0.014
82:24:00	0.000	0.000	0.000	0.000	0.014	0.014
82:48:00	0.000	0.000	0.000	0.000	0.014	0.014
83:12:00	0.000	0.000	0.000	0.000	0.014	0.014

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
83:36:00	0.000	0.000	0.000	0.000	0.013	0.013
84:00:00	0.000	0.000	0.000	0.000	0.013	0.013
84:24:00	0.000	0.000	0.000	0.000	0.013	0.013
84:48:00	0.000	0.000	0.000	0.000	0.013	0.013
85:12:00	0.000	0.000	0.000	0.000	0.013	0.013
85:36:00	0.000	0.000	0.000	0.000	0.013	0.013
86:00:00	0.000	0.000	0.000	0.000	0.013	0.013
86:24:00	0.000	0.000	0.000	0.000	0.012	0.012
86:48:00	0.000	0.000	0.000	0.000	0.012	0.012
87:12:00	0.000	0.000	0.000	0.000	0.012	0.012
87:36:00	0.000	0.000	0.000	0.000	0.012	0.012
88:00:00	0.000	0.000	0.000	0.000	0.012	0.012
88:24:00	0.000	0.000	0.000	0.000	0.012	0.012
88:48:00	0.000	0.000	0.000	0.000	0.012	0.012
89:12:00	0.000	0.000	0.000	0.000	0.012	0.012
89:36:00	0.000	0.000	0.000	0.000	0.012	0.012
90:00:00	0.000	0.000	0.000	0.000	0.011	0.011
90:24:00	0.000	0.000	0.000	0.000	0.011	0.011
90:48:00	0.000	0.000	0.000	0.000	0.011	0.011
91:12:00	0.000	0.000	0.000	0.000	0.011	0.011
91:36:00	0.000	0.000	0.000	0.000	0.011	0.011
92:00:00	0.000	0.000	0.000	0.000	0.011	0.011
92:24:00	0.000	0.000	0.000	0.000	0.011	0.011
92:48:00	0.000	0.000	0.000	0.000	0.011	0.011
93:12:00	0.000	0.000	0.000	0.000	0.011	0.011
93:36:00	0.000	0.000	0.000	0.000	0.010	0.010
94:00:00	0.000	0.000	0.000	0.000	0.010	0.010
94:24:00	0.000	0.000	0.000	0.000	0.010	0.010
94:48:00	0.000	0.000	0.000	0.000	0.010	0.010
95:12:00	0.000	0.000	0.000	0.000	0.010	0.010
95:36:00	0.000	0.000	0.000	0.000	0.010	0.010
96:00:00	0.000	0.000	0.000	0.000	0.010	0.010

Appendix

Catchment descriptors

Name	Value	User-defined value used?
Area (km ²)	0.81	No
ALTBAR	35	No
ASPBAR	287	No
ASPVAR	0.62	No
BFIHOST	0.6	No
BFIHOST19	0.62	No
DPLBAR (km)	1.5	No
DPSBAR (mkm ⁻¹)	100.6	No
FARL	1	No
LDP	3.01	No
PROPWET	0.37	No
RMED1H	10.3	No
RMED1D	27.5	No
RMED2D	36.8	No
SAAR (mm)	728	No
SAAR4170 (mm)	726	No
SPRHOST	28.5	No
URBEXT2000	0.21	No
URBEXT1990	0.2	No
URBCONC	0.77	No
URBLOC	0.96	No
DDF parameter C	-0.02	No
DDF parameter D1	0.29	No
DDF parameter D2	0.37	No
DDF parameter D3	0.33	No
DDF parameter E	0.29	No
DDF parameter F	2.45	No
DDF parameter C (1km grid value)	-0.02	No
DDF parameter D1 (1km grid value)	0.29	No
DDF parameter D2 (1km grid value)	0.35	No
DDF parameter D3 (1km grid value)	0.33	No
DDF parameter E (1km grid value)	0.29	No
DDF parameter F (1km grid value)	2.45	No

Un-named 02 (SALM up) Catchment

UK Design Flood Estimation

Generated on 18 February 2025 14:16:20 by louise.wilcock
Printed from the ReFH2 Flood Modelling software package, version 4.1.8704.23947

Summary of estimate using the Flood Estimation Handbook revitalised flood hydrograph method (ReFH2)

Site detailsChecksum: 9407-DDC4

Site name: FEH_Catchment_Descriptors_348650_376450_v5_0_1

Easting: 348650

Northing: 376450

Country: England, Wales or Northern Ireland

Catchment Area (km²): 0.75

Using plot scale calculations: No

Model: 2.3

Site description:None

Model run: 100 year

Summary of results

Rainfall - FEH22 (mm):	54.70	Total runoff (ML):	4.85
Total Rainfall (mm):	38.23	Total flow (ML):	15.41
Peak Rainfall (mm):	6.52	Peak flow (m³/s):	0.35

Parameters

Where the user has overridden a system-generated value, this original value is shown in square brackets after the value used.
* Indicates that the user locked the duration/timestep

Rainfall parameters (Rainfall - FEH22)

Name	Value	User-defined?
Duration (hh:mm:ss)	06:00:00 [03:15:00]	Yes
Timestep (hh:mm:ss)	00:24:00 [00:15:00]	Yes
SCF (Seasonal correction factor)	0.71	No
ARF (Areal reduction factor)	0.98	No
Seasonality	Winter	No

Loss model parameters

Name	Value	User-defined?
Cini (mm)	70.86	No
Cmax (mm)	643.78	No
Use alpha correction factor	No	No
Alpha correction factor	n/a	No

Routing model parameters

Name	Value	User-defined?
Tp (hr)	1.82	No
Up	0.65	No
Uk	0.8	No

Baseflow model parameters

Name	Value	User-defined?
BF0 (m ³ /s)	0.01	No
BL (hr)	39.16	No
BR	2.75	No

Urbanisation parameters

Name	Value	User-defined?
Sewer capacity (m ³ /s)	0	No
Exporting drained area (km ²)	0	No
Urban area (km ²)	0.09	No
Effective URBEXT2000	0.08	n/a
Impervious runoff factor	0.7	No
Imperviousness factor	0.4	No
Tp scaling factor	0.75	No
Depression storage depth (mm)	0.5	No

Time series data

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
00:00:00	0.572	0.000	0.080	0.000	0.006	0.006
00:24:00	0.835	0.000	0.119	0.001	0.006	0.007
00:48:00	1.218	0.000	0.175	0.004	0.006	0.010
01:12:00	1.769	0.000	0.258	0.009	0.006	0.016
01:36:00	2.561	0.000	0.382	0.019	0.006	0.026
02:00:00	3.681	0.000	0.566	0.035	0.007	0.042
02:24:00	5.219	0.000	0.838	0.056	0.008	0.064
02:48:00	6.523	0.000	1.104	0.087	0.009	0.096
03:12:00	5.219	0.000	0.929	0.131	0.011	0.142
03:36:00	3.681	0.000	0.680	0.185	0.014	0.199
04:00:00	2.561	0.000	0.485	0.240	0.018	0.258
04:24:00	1.769	0.000	0.341	0.286	0.023	0.309
04:48:00	1.218	0.000	0.237	0.313	0.029	0.342
05:12:00	0.835	0.000	0.164	0.317	0.035	0.352
05:36:00	0.572	0.000	0.113	0.303	0.042	0.345
06:00:00	0.000	0.000	0.000	0.277	0.048	0.325
06:24:00	0.000	0.000	0.000	0.244	0.053	0.298
06:48:00	0.000	0.000	0.000	0.208	0.058	0.266
07:12:00	0.000	0.000	0.000	0.172	0.062	0.234
07:36:00	0.000	0.000	0.000	0.137	0.066	0.203
08:00:00	0.000	0.000	0.000	0.106	0.068	0.174
08:24:00	0.000	0.000	0.000	0.080	0.070	0.150
08:48:00	0.000	0.000	0.000	0.058	0.071	0.129
09:12:00	0.000	0.000	0.000	0.040	0.072	0.111
09:36:00	0.000	0.000	0.000	0.026	0.072	0.098
10:00:00	0.000	0.000	0.000	0.016	0.072	0.088
10:24:00	0.000	0.000	0.000	0.009	0.071	0.081
10:48:00	0.000	0.000	0.000	0.005	0.071	0.076
11:12:00	0.000	0.000	0.000	0.003	0.070	0.073
11:36:00	0.000	0.000	0.000	0.001	0.070	0.071
12:00:00	0.000	0.000	0.000	0.000	0.069	0.069
12:24:00	0.000	0.000	0.000	0.000	0.068	0.068
12:48:00	0.000	0.000	0.000	0.000	0.068	0.068
13:12:00	0.000	0.000	0.000	0.000	0.067	0.067

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
13:36:00	0.000	0.000	0.000	0.000	0.066	0.066
14:00:00	0.000	0.000	0.000	0.000	0.066	0.066
14:24:00	0.000	0.000	0.000	0.000	0.065	0.065
14:48:00	0.000	0.000	0.000	0.000	0.064	0.064
15:12:00	0.000	0.000	0.000	0.000	0.064	0.064
15:36:00	0.000	0.000	0.000	0.000	0.063	0.063
16:00:00	0.000	0.000	0.000	0.000	0.062	0.062
16:24:00	0.000	0.000	0.000	0.000	0.062	0.062
16:48:00	0.000	0.000	0.000	0.000	0.061	0.061
17:12:00	0.000	0.000	0.000	0.000	0.060	0.060
17:36:00	0.000	0.000	0.000	0.000	0.060	0.060
18:00:00	0.000	0.000	0.000	0.000	0.059	0.059
18:24:00	0.000	0.000	0.000	0.000	0.059	0.059
18:48:00	0.000	0.000	0.000	0.000	0.058	0.058
19:12:00	0.000	0.000	0.000	0.000	0.057	0.057
19:36:00	0.000	0.000	0.000	0.000	0.057	0.057
20:00:00	0.000	0.000	0.000	0.000	0.056	0.056
20:24:00	0.000	0.000	0.000	0.000	0.056	0.056
20:48:00	0.000	0.000	0.000	0.000	0.055	0.055
21:12:00	0.000	0.000	0.000	0.000	0.055	0.055
21:36:00	0.000	0.000	0.000	0.000	0.054	0.054
22:00:00	0.000	0.000	0.000	0.000	0.053	0.053
22:24:00	0.000	0.000	0.000	0.000	0.053	0.053
22:48:00	0.000	0.000	0.000	0.000	0.052	0.052
23:12:00	0.000	0.000	0.000	0.000	0.052	0.052
23:36:00	0.000	0.000	0.000	0.000	0.051	0.051
24:00:00	0.000	0.000	0.000	0.000	0.051	0.051
24:24:00	0.000	0.000	0.000	0.000	0.050	0.050
24:48:00	0.000	0.000	0.000	0.000	0.050	0.050
25:12:00	0.000	0.000	0.000	0.000	0.049	0.049
25:36:00	0.000	0.000	0.000	0.000	0.049	0.049
26:00:00	0.000	0.000	0.000	0.000	0.048	0.048
26:24:00	0.000	0.000	0.000	0.000	0.048	0.048
26:48:00	0.000	0.000	0.000	0.000	0.047	0.047
27:12:00	0.000	0.000	0.000	0.000	0.047	0.047

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
27:36:00	0.000	0.000	0.000	0.000	0.046	0.046
28:00:00	0.000	0.000	0.000	0.000	0.046	0.046
28:24:00	0.000	0.000	0.000	0.000	0.045	0.045
28:48:00	0.000	0.000	0.000	0.000	0.045	0.045
29:12:00	0.000	0.000	0.000	0.000	0.044	0.044
29:36:00	0.000	0.000	0.000	0.000	0.044	0.044
30:00:00	0.000	0.000	0.000	0.000	0.044	0.044
30:24:00	0.000	0.000	0.000	0.000	0.043	0.043
30:48:00	0.000	0.000	0.000	0.000	0.043	0.043
31:12:00	0.000	0.000	0.000	0.000	0.042	0.042
31:36:00	0.000	0.000	0.000	0.000	0.042	0.042
32:00:00	0.000	0.000	0.000	0.000	0.041	0.041
32:24:00	0.000	0.000	0.000	0.000	0.041	0.041
32:48:00	0.000	0.000	0.000	0.000	0.041	0.041
33:12:00	0.000	0.000	0.000	0.000	0.040	0.040
33:36:00	0.000	0.000	0.000	0.000	0.040	0.040
34:00:00	0.000	0.000	0.000	0.000	0.039	0.039
34:24:00	0.000	0.000	0.000	0.000	0.039	0.039
34:48:00	0.000	0.000	0.000	0.000	0.039	0.039
35:12:00	0.000	0.000	0.000	0.000	0.038	0.038
35:36:00	0.000	0.000	0.000	0.000	0.038	0.038
36:00:00	0.000	0.000	0.000	0.000	0.037	0.037
36:24:00	0.000	0.000	0.000	0.000	0.037	0.037
36:48:00	0.000	0.000	0.000	0.000	0.037	0.037
37:12:00	0.000	0.000	0.000	0.000	0.036	0.036
37:36:00	0.000	0.000	0.000	0.000	0.036	0.036
38:00:00	0.000	0.000	0.000	0.000	0.036	0.036
38:24:00	0.000	0.000	0.000	0.000	0.035	0.035
38:48:00	0.000	0.000	0.000	0.000	0.035	0.035
39:12:00	0.000	0.000	0.000	0.000	0.034	0.034
39:36:00	0.000	0.000	0.000	0.000	0.034	0.034
40:00:00	0.000	0.000	0.000	0.000	0.034	0.034
40:24:00	0.000	0.000	0.000	0.000	0.033	0.033
40:48:00	0.000	0.000	0.000	0.000	0.033	0.033
41:12:00	0.000	0.000	0.000	0.000	0.033	0.033

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
41:36:00	0.000	0.000	0.000	0.000	0.032	0.032
42:00:00	0.000	0.000	0.000	0.000	0.032	0.032
42:24:00	0.000	0.000	0.000	0.000	0.032	0.032
42:48:00	0.000	0.000	0.000	0.000	0.031	0.031
43:12:00	0.000	0.000	0.000	0.000	0.031	0.031
43:36:00	0.000	0.000	0.000	0.000	0.031	0.031
44:00:00	0.000	0.000	0.000	0.000	0.030	0.030
44:24:00	0.000	0.000	0.000	0.000	0.030	0.030
44:48:00	0.000	0.000	0.000	0.000	0.030	0.030
45:12:00	0.000	0.000	0.000	0.000	0.030	0.030
45:36:00	0.000	0.000	0.000	0.000	0.029	0.029
46:00:00	0.000	0.000	0.000	0.000	0.029	0.029
46:24:00	0.000	0.000	0.000	0.000	0.029	0.029
46:48:00	0.000	0.000	0.000	0.000	0.028	0.028
47:12:00	0.000	0.000	0.000	0.000	0.028	0.028
47:36:00	0.000	0.000	0.000	0.000	0.028	0.028
48:00:00	0.000	0.000	0.000	0.000	0.028	0.028
48:24:00	0.000	0.000	0.000	0.000	0.027	0.027
48:48:00	0.000	0.000	0.000	0.000	0.027	0.027
49:12:00	0.000	0.000	0.000	0.000	0.027	0.027
49:36:00	0.000	0.000	0.000	0.000	0.026	0.026
50:00:00	0.000	0.000	0.000	0.000	0.026	0.026
50:24:00	0.000	0.000	0.000	0.000	0.026	0.026
50:48:00	0.000	0.000	0.000	0.000	0.026	0.026
51:12:00	0.000	0.000	0.000	0.000	0.025	0.025
51:36:00	0.000	0.000	0.000	0.000	0.025	0.025
52:00:00	0.000	0.000	0.000	0.000	0.025	0.025
52:24:00	0.000	0.000	0.000	0.000	0.025	0.025
52:48:00	0.000	0.000	0.000	0.000	0.024	0.024
53:12:00	0.000	0.000	0.000	0.000	0.024	0.024
53:36:00	0.000	0.000	0.000	0.000	0.024	0.024
54:00:00	0.000	0.000	0.000	0.000	0.024	0.024
54:24:00	0.000	0.000	0.000	0.000	0.023	0.023
54:48:00	0.000	0.000	0.000	0.000	0.023	0.023
55:12:00	0.000	0.000	0.000	0.000	0.023	0.023

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
55:36:00	0.000	0.000	0.000	0.000	0.023	0.023
56:00:00	0.000	0.000	0.000	0.000	0.022	0.022
56:24:00	0.000	0.000	0.000	0.000	0.022	0.022
56:48:00	0.000	0.000	0.000	0.000	0.022	0.022
57:12:00	0.000	0.000	0.000	0.000	0.022	0.022
57:36:00	0.000	0.000	0.000	0.000	0.022	0.022
58:00:00	0.000	0.000	0.000	0.000	0.021	0.021
58:24:00	0.000	0.000	0.000	0.000	0.021	0.021
58:48:00	0.000	0.000	0.000	0.000	0.021	0.021
59:12:00	0.000	0.000	0.000	0.000	0.021	0.021
59:36:00	0.000	0.000	0.000	0.000	0.020	0.020
60:00:00	0.000	0.000	0.000	0.000	0.020	0.020
60:24:00	0.000	0.000	0.000	0.000	0.020	0.020
60:48:00	0.000	0.000	0.000	0.000	0.020	0.020
61:12:00	0.000	0.000	0.000	0.000	0.020	0.020
61:36:00	0.000	0.000	0.000	0.000	0.019	0.019
62:00:00	0.000	0.000	0.000	0.000	0.019	0.019
62:24:00	0.000	0.000	0.000	0.000	0.019	0.019
62:48:00	0.000	0.000	0.000	0.000	0.019	0.019
63:12:00	0.000	0.000	0.000	0.000	0.019	0.019
63:36:00	0.000	0.000	0.000	0.000	0.018	0.018
64:00:00	0.000	0.000	0.000	0.000	0.018	0.018
64:24:00	0.000	0.000	0.000	0.000	0.018	0.018
64:48:00	0.000	0.000	0.000	0.000	0.018	0.018
65:12:00	0.000	0.000	0.000	0.000	0.018	0.018
65:36:00	0.000	0.000	0.000	0.000	0.018	0.018
66:00:00	0.000	0.000	0.000	0.000	0.017	0.017
66:24:00	0.000	0.000	0.000	0.000	0.017	0.017
66:48:00	0.000	0.000	0.000	0.000	0.017	0.017
67:12:00	0.000	0.000	0.000	0.000	0.017	0.017
67:36:00	0.000	0.000	0.000	0.000	0.017	0.017
68:00:00	0.000	0.000	0.000	0.000	0.017	0.017
68:24:00	0.000	0.000	0.000	0.000	0.016	0.016
68:48:00	0.000	0.000	0.000	0.000	0.016	0.016
69:12:00	0.000	0.000	0.000	0.000	0.016	0.016

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
69:36:00	0.000	0.000	0.000	0.000	0.016	0.016
70:00:00	0.000	0.000	0.000	0.000	0.016	0.016
70:24:00	0.000	0.000	0.000	0.000	0.016	0.016
70:48:00	0.000	0.000	0.000	0.000	0.015	0.015
71:12:00	0.000	0.000	0.000	0.000	0.015	0.015
71:36:00	0.000	0.000	0.000	0.000	0.015	0.015
72:00:00	0.000	0.000	0.000	0.000	0.015	0.015
72:24:00	0.000	0.000	0.000	0.000	0.015	0.015
72:48:00	0.000	0.000	0.000	0.000	0.015	0.015
73:12:00	0.000	0.000	0.000	0.000	0.014	0.014
73:36:00	0.000	0.000	0.000	0.000	0.014	0.014
74:00:00	0.000	0.000	0.000	0.000	0.014	0.014
74:24:00	0.000	0.000	0.000	0.000	0.014	0.014
74:48:00	0.000	0.000	0.000	0.000	0.014	0.014
75:12:00	0.000	0.000	0.000	0.000	0.014	0.014
75:36:00	0.000	0.000	0.000	0.000	0.014	0.014
76:00:00	0.000	0.000	0.000	0.000	0.013	0.013
76:24:00	0.000	0.000	0.000	0.000	0.013	0.013
76:48:00	0.000	0.000	0.000	0.000	0.013	0.013
77:12:00	0.000	0.000	0.000	0.000	0.013	0.013
77:36:00	0.000	0.000	0.000	0.000	0.013	0.013
78:00:00	0.000	0.000	0.000	0.000	0.013	0.013
78:24:00	0.000	0.000	0.000	0.000	0.013	0.013
78:48:00	0.000	0.000	0.000	0.000	0.013	0.013
79:12:00	0.000	0.000	0.000	0.000	0.012	0.012
79:36:00	0.000	0.000	0.000	0.000	0.012	0.012
80:00:00	0.000	0.000	0.000	0.000	0.012	0.012
80:24:00	0.000	0.000	0.000	0.000	0.012	0.012
80:48:00	0.000	0.000	0.000	0.000	0.012	0.012
81:12:00	0.000	0.000	0.000	0.000	0.012	0.012
81:36:00	0.000	0.000	0.000	0.000	0.012	0.012
82:00:00	0.000	0.000	0.000	0.000	0.012	0.012
82:24:00	0.000	0.000	0.000	0.000	0.011	0.011
82:48:00	0.000	0.000	0.000	0.000	0.011	0.011
83:12:00	0.000	0.000	0.000	0.000	0.011	0.011

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
83:36:00	0.000	0.000	0.000	0.000	0.011	0.011
84:00:00	0.000	0.000	0.000	0.000	0.011	0.011
84:24:00	0.000	0.000	0.000	0.000	0.011	0.011
84:48:00	0.000	0.000	0.000	0.000	0.011	0.011
85:12:00	0.000	0.000	0.000	0.000	0.011	0.011
85:36:00	0.000	0.000	0.000	0.000	0.011	0.011
86:00:00	0.000	0.000	0.000	0.000	0.010	0.010
86:24:00	0.000	0.000	0.000	0.000	0.010	0.010
86:48:00	0.000	0.000	0.000	0.000	0.010	0.010
87:12:00	0.000	0.000	0.000	0.000	0.010	0.010
87:36:00	0.000	0.000	0.000	0.000	0.010	0.010
88:00:00	0.000	0.000	0.000	0.000	0.010	0.010
88:24:00	0.000	0.000	0.000	0.000	0.010	0.010
88:48:00	0.000	0.000	0.000	0.000	0.010	0.010
89:12:00	0.000	0.000	0.000	0.000	0.010	0.010
89:36:00	0.000	0.000	0.000	0.000	0.010	0.010
90:00:00	0.000	0.000	0.000	0.000	0.009	0.009
90:24:00	0.000	0.000	0.000	0.000	0.009	0.009
90:48:00	0.000	0.000	0.000	0.000	0.009	0.009
91:12:00	0.000	0.000	0.000	0.000	0.009	0.009
91:36:00	0.000	0.000	0.000	0.000	0.009	0.009
92:00:00	0.000	0.000	0.000	0.000	0.009	0.009
92:24:00	0.000	0.000	0.000	0.000	0.009	0.009
92:48:00	0.000	0.000	0.000	0.000	0.009	0.009
93:12:00	0.000	0.000	0.000	0.000	0.009	0.009
93:36:00	0.000	0.000	0.000	0.000	0.009	0.009
94:00:00	0.000	0.000	0.000	0.000	0.009	0.009
94:24:00	0.000	0.000	0.000	0.000	0.008	0.008
94:48:00	0.000	0.000	0.000	0.000	0.008	0.008
95:12:00	0.000	0.000	0.000	0.000	0.008	0.008
95:36:00	0.000	0.000	0.000	0.000	0.008	0.008
96:00:00	0.000	0.000	0.000	0.000	0.008	0.008
96:24:00	0.000	0.000	0.000	0.000	0.008	0.008
96:48:00	0.000	0.000	0.000	0.000	0.008	0.008
97:12:00	0.000	0.000	0.000	0.000	0.008	0.008

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
97:36:00	0.000	0.000	0.000	0.000	0.008	0.008
98:00:00	0.000	0.000	0.000	0.000	0.008	0.008
98:24:00	0.000	0.000	0.000	0.000	0.008	0.008
98:48:00	0.000	0.000	0.000	0.000	0.008	0.008
99:12:00	0.000	0.000	0.000	0.000	0.007	0.007
99:36:00	0.000	0.000	0.000	0.000	0.007	0.007
100:00:00	0.000	0.000	0.000	0.000	0.007	0.007
100:24:00	0.000	0.000	0.000	0.000	0.007	0.007
100:48:00	0.000	0.000	0.000	0.000	0.007	0.007
101:12:00	0.000	0.000	0.000	0.000	0.007	0.007
101:36:00	0.000	0.000	0.000	0.000	0.007	0.007
102:00:00	0.000	0.000	0.000	0.000	0.007	0.007

Appendix

Catchment descriptors

Name	Value	User-defined value used?
Area (km ²)	0.75	No
ALTBAR	21	No
ASPBAR	8	No
ASPVAR	0.42	No
BFIHOST	0.65	No
BFIHOST19	0.68	No
DPLBAR (km)	1.05	No
DPSBAR (mkm ⁻¹)	45.8	No
FARL	1	No
LDP	2.1	No
PROPWET	0.37	No
RMED1H	10.2	No
RMED1D	27.6	No
RMED2D	36.7	No
SAAR (mm)	734	No
SAAR4170 (mm)	729	No
SPRHOST	25.63	No
URBEXT2000	0.08	No
URBEXT1990	0.04	No
URBCONC	0.76	No
URBLOC	1.52	No
DDF parameter C	-0.02	No
DDF parameter D1	0.29	No
DDF parameter D2	0.35	No
DDF parameter D3	0.33	No
DDF parameter E	0.29	No
DDF parameter F	2.45	No
DDF parameter C (1km grid value)	-0.02	No
DDF parameter D1 (1km grid value)	0.29	No
DDF parameter D2 (1km grid value)	0.35	No
DDF parameter D3 (1km grid value)	0.33	No
DDF parameter E (1km grid value)	0.29	No
DDF parameter F (1km grid value)	2.45	No

Helsby Cut (HELS up) Catchment

UK Design Flood Estimation

Generated on 18 February 2025 14:06:56 by louise.wilcock
Printed from the ReFH2 Flood Modelling software package, version 4.1.8704.23947

Summary of estimate using the Flood Estimation Handbook revitalised flood hydrograph method (ReFH2)

Site details

Checksum: 4E14-50C3

Site name: FEH_Catchment_Descriptors_349350_376750_v5_0_1

Easting: 349350

Northing: 376750

Country: England, Wales or Northern Ireland

Catchment Area (km²): 0.76

Using plot scale calculations: No

Model: 2.3

Site description: None

Model run: 100 year

Summary of results

Rainfall - FEH22 (mm):	54.60	Total runoff (ML):	5.02
Total Rainfall (mm):	38.28	Total flow (ML):	14.10
Peak Rainfall (mm):	6.53	Peak flow (m ³ /s):	0.41

Parameters

Where the user has overridden a system-generated value, this original value is shown in square brackets after the value used.

** Indicates that the user locked the duration/timestep*

Rainfall parameters (Rainfall - FEH22)

Name	Value	User-defined?
Duration (hh:mm:ss)	06:00:00 [02:15:00]	Yes
Timestep (hh:mm:ss)	00:24:00 [00:15:00]	Yes
SCF (Seasonal correction factor)	0.71	No
ARF (Areal reduction factor)	0.98	No
Seasonality	Winter	No

Loss model parameters

Name	Value	User-defined?
Cini (mm)	67.45	No
Cmax (mm)	694.15	No
Use alpha correction factor	No	No
Alpha correction factor	n/a	No

Routing model parameters

Name	Value	User-defined?
Tp (hr)	1.39	No
Up	0.65	No
Uk	0.8	No

Baseflow model parameters

Name	Value	User-defined?
BF0 (m ³ /s)	0.01	No
BL (hr)	37.21	No
BR	2.89	No

Urbanisation parameters

Name	Value	User-defined?
Sewer capacity (m ³ /s)	0	No
Exporting drained area (km ²)	0	No
Urban area (km ²)	0.15	No
Effective URBEXT2000	0.13	n/a
Impervious runoff factor	0.7	No
Imperviousness factor	0.4	No
Tp scaling factor	0.75	No
Depression storage depth (mm)	0.5	No

Time series data

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
00:00:00	0.572	0.000	0.084	0.000	0.005	0.005
00:24:00	0.836	0.000	0.125	0.002	0.005	0.006
00:48:00	1.219	0.000	0.183	0.007	0.005	0.012
01:12:00	1.772	0.000	0.270	0.018	0.005	0.023
01:36:00	2.564	0.000	0.398	0.035	0.005	0.041
02:00:00	3.686	0.000	0.588	0.059	0.006	0.065
02:24:00	5.226	0.000	0.866	0.092	0.007	0.099
02:48:00	6.531	0.000	1.134	0.138	0.009	0.147
03:12:00	5.226	0.000	0.949	0.203	0.012	0.215
03:36:00	3.686	0.000	0.692	0.279	0.016	0.294
04:00:00	2.564	0.000	0.492	0.344	0.021	0.365
04:24:00	1.772	0.000	0.345	0.378	0.028	0.406
04:48:00	1.219	0.000	0.240	0.375	0.035	0.410
05:12:00	0.836	0.000	0.166	0.346	0.042	0.388
05:36:00	0.572	0.000	0.114	0.303	0.049	0.352
06:00:00	0.000	0.000	0.000	0.254	0.055	0.309
06:24:00	0.000	0.000	0.000	0.204	0.060	0.263
06:48:00	0.000	0.000	0.000	0.155	0.063	0.218
07:12:00	0.000	0.000	0.000	0.111	0.066	0.177
07:36:00	0.000	0.000	0.000	0.074	0.068	0.142
08:00:00	0.000	0.000	0.000	0.047	0.069	0.116
08:24:00	0.000	0.000	0.000	0.028	0.070	0.098
08:48:00	0.000	0.000	0.000	0.016	0.070	0.086
09:12:00	0.000	0.000	0.000	0.009	0.069	0.078
09:36:00	0.000	0.000	0.000	0.004	0.069	0.073
10:00:00	0.000	0.000	0.000	0.002	0.068	0.070
10:24:00	0.000	0.000	0.000	0.001	0.067	0.068
10:48:00	0.000	0.000	0.000	0.000	0.067	0.067
11:12:00	0.000	0.000	0.000	0.000	0.066	0.066
11:36:00	0.000	0.000	0.000	0.000	0.065	0.065
12:00:00	0.000	0.000	0.000	0.000	0.065	0.065
12:24:00	0.000	0.000	0.000	0.000	0.064	0.064
12:48:00	0.000	0.000	0.000	0.000	0.063	0.063
13:12:00	0.000	0.000	0.000	0.000	0.062	0.062

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
13:36:00	0.000	0.000	0.000	0.000	0.062	0.062
14:00:00	0.000	0.000	0.000	0.000	0.061	0.061
14:24:00	0.000	0.000	0.000	0.000	0.061	0.061
14:48:00	0.000	0.000	0.000	0.000	0.060	0.060
15:12:00	0.000	0.000	0.000	0.000	0.059	0.059
15:36:00	0.000	0.000	0.000	0.000	0.059	0.059
16:00:00	0.000	0.000	0.000	0.000	0.058	0.058
16:24:00	0.000	0.000	0.000	0.000	0.057	0.057
16:48:00	0.000	0.000	0.000	0.000	0.057	0.057
17:12:00	0.000	0.000	0.000	0.000	0.056	0.056
17:36:00	0.000	0.000	0.000	0.000	0.056	0.056
18:00:00	0.000	0.000	0.000	0.000	0.055	0.055
18:24:00	0.000	0.000	0.000	0.000	0.054	0.054
18:48:00	0.000	0.000	0.000	0.000	0.054	0.054
19:12:00	0.000	0.000	0.000	0.000	0.053	0.053
19:36:00	0.000	0.000	0.000	0.000	0.053	0.053
20:00:00	0.000	0.000	0.000	0.000	0.052	0.052
20:24:00	0.000	0.000	0.000	0.000	0.051	0.051
20:48:00	0.000	0.000	0.000	0.000	0.051	0.051
21:12:00	0.000	0.000	0.000	0.000	0.050	0.050
21:36:00	0.000	0.000	0.000	0.000	0.050	0.050
22:00:00	0.000	0.000	0.000	0.000	0.049	0.049
22:24:00	0.000	0.000	0.000	0.000	0.049	0.049
22:48:00	0.000	0.000	0.000	0.000	0.048	0.048
23:12:00	0.000	0.000	0.000	0.000	0.048	0.048
23:36:00	0.000	0.000	0.000	0.000	0.047	0.047
24:00:00	0.000	0.000	0.000	0.000	0.047	0.047
24:24:00	0.000	0.000	0.000	0.000	0.046	0.046
24:48:00	0.000	0.000	0.000	0.000	0.046	0.046
25:12:00	0.000	0.000	0.000	0.000	0.045	0.045
25:36:00	0.000	0.000	0.000	0.000	0.045	0.045
26:00:00	0.000	0.000	0.000	0.000	0.044	0.044
26:24:00	0.000	0.000	0.000	0.000	0.044	0.044
26:48:00	0.000	0.000	0.000	0.000	0.043	0.043
27:12:00	0.000	0.000	0.000	0.000	0.043	0.043

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
27:36:00	0.000	0.000	0.000	0.000	0.042	0.042
28:00:00	0.000	0.000	0.000	0.000	0.042	0.042
28:24:00	0.000	0.000	0.000	0.000	0.042	0.042
28:48:00	0.000	0.000	0.000	0.000	0.041	0.041
29:12:00	0.000	0.000	0.000	0.000	0.041	0.041
29:36:00	0.000	0.000	0.000	0.000	0.040	0.040
30:00:00	0.000	0.000	0.000	0.000	0.040	0.040
30:24:00	0.000	0.000	0.000	0.000	0.039	0.039
30:48:00	0.000	0.000	0.000	0.000	0.039	0.039
31:12:00	0.000	0.000	0.000	0.000	0.039	0.039
31:36:00	0.000	0.000	0.000	0.000	0.038	0.038
32:00:00	0.000	0.000	0.000	0.000	0.038	0.038
32:24:00	0.000	0.000	0.000	0.000	0.037	0.037
32:48:00	0.000	0.000	0.000	0.000	0.037	0.037
33:12:00	0.000	0.000	0.000	0.000	0.037	0.037
33:36:00	0.000	0.000	0.000	0.000	0.036	0.036
34:00:00	0.000	0.000	0.000	0.000	0.036	0.036
34:24:00	0.000	0.000	0.000	0.000	0.035	0.035
34:48:00	0.000	0.000	0.000	0.000	0.035	0.035
35:12:00	0.000	0.000	0.000	0.000	0.035	0.035
35:36:00	0.000	0.000	0.000	0.000	0.034	0.034
36:00:00	0.000	0.000	0.000	0.000	0.034	0.034
36:24:00	0.000	0.000	0.000	0.000	0.034	0.034
36:48:00	0.000	0.000	0.000	0.000	0.033	0.033
37:12:00	0.000	0.000	0.000	0.000	0.033	0.033
37:36:00	0.000	0.000	0.000	0.000	0.032	0.032
38:00:00	0.000	0.000	0.000	0.000	0.032	0.032
38:24:00	0.000	0.000	0.000	0.000	0.032	0.032
38:48:00	0.000	0.000	0.000	0.000	0.031	0.031
39:12:00	0.000	0.000	0.000	0.000	0.031	0.031
39:36:00	0.000	0.000	0.000	0.000	0.031	0.031
40:00:00	0.000	0.000	0.000	0.000	0.030	0.030
40:24:00	0.000	0.000	0.000	0.000	0.030	0.030
40:48:00	0.000	0.000	0.000	0.000	0.030	0.030
41:12:00	0.000	0.000	0.000	0.000	0.029	0.029

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
41:36:00	0.000	0.000	0.000	0.000	0.029	0.029
42:00:00	0.000	0.000	0.000	0.000	0.029	0.029
42:24:00	0.000	0.000	0.000	0.000	0.029	0.029
42:48:00	0.000	0.000	0.000	0.000	0.028	0.028
43:12:00	0.000	0.000	0.000	0.000	0.028	0.028
43:36:00	0.000	0.000	0.000	0.000	0.028	0.028
44:00:00	0.000	0.000	0.000	0.000	0.027	0.027
44:24:00	0.000	0.000	0.000	0.000	0.027	0.027
44:48:00	0.000	0.000	0.000	0.000	0.027	0.027
45:12:00	0.000	0.000	0.000	0.000	0.026	0.026
45:36:00	0.000	0.000	0.000	0.000	0.026	0.026
46:00:00	0.000	0.000	0.000	0.000	0.026	0.026
46:24:00	0.000	0.000	0.000	0.000	0.026	0.026
46:48:00	0.000	0.000	0.000	0.000	0.025	0.025
47:12:00	0.000	0.000	0.000	0.000	0.025	0.025
47:36:00	0.000	0.000	0.000	0.000	0.025	0.025
48:00:00	0.000	0.000	0.000	0.000	0.025	0.025
48:24:00	0.000	0.000	0.000	0.000	0.024	0.024
48:48:00	0.000	0.000	0.000	0.000	0.024	0.024
49:12:00	0.000	0.000	0.000	0.000	0.024	0.024
49:36:00	0.000	0.000	0.000	0.000	0.023	0.023
50:00:00	0.000	0.000	0.000	0.000	0.023	0.023
50:24:00	0.000	0.000	0.000	0.000	0.023	0.023
50:48:00	0.000	0.000	0.000	0.000	0.023	0.023
51:12:00	0.000	0.000	0.000	0.000	0.023	0.023
51:36:00	0.000	0.000	0.000	0.000	0.022	0.022
52:00:00	0.000	0.000	0.000	0.000	0.022	0.022
52:24:00	0.000	0.000	0.000	0.000	0.022	0.022
52:48:00	0.000	0.000	0.000	0.000	0.022	0.022
53:12:00	0.000	0.000	0.000	0.000	0.021	0.021
53:36:00	0.000	0.000	0.000	0.000	0.021	0.021
54:00:00	0.000	0.000	0.000	0.000	0.021	0.021
54:24:00	0.000	0.000	0.000	0.000	0.021	0.021
54:48:00	0.000	0.000	0.000	0.000	0.020	0.020
55:12:00	0.000	0.000	0.000	0.000	0.020	0.020

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
55:36:00	0.000	0.000	0.000	0.000	0.020	0.020
56:00:00	0.000	0.000	0.000	0.000	0.020	0.020
56:24:00	0.000	0.000	0.000	0.000	0.020	0.020
56:48:00	0.000	0.000	0.000	0.000	0.019	0.019
57:12:00	0.000	0.000	0.000	0.000	0.019	0.019
57:36:00	0.000	0.000	0.000	0.000	0.019	0.019
58:00:00	0.000	0.000	0.000	0.000	0.019	0.019
58:24:00	0.000	0.000	0.000	0.000	0.019	0.019
58:48:00	0.000	0.000	0.000	0.000	0.018	0.018
59:12:00	0.000	0.000	0.000	0.000	0.018	0.018
59:36:00	0.000	0.000	0.000	0.000	0.018	0.018
60:00:00	0.000	0.000	0.000	0.000	0.018	0.018
60:24:00	0.000	0.000	0.000	0.000	0.018	0.018
60:48:00	0.000	0.000	0.000	0.000	0.017	0.017
61:12:00	0.000	0.000	0.000	0.000	0.017	0.017
61:36:00	0.000	0.000	0.000	0.000	0.017	0.017
62:00:00	0.000	0.000	0.000	0.000	0.017	0.017
62:24:00	0.000	0.000	0.000	0.000	0.017	0.017
62:48:00	0.000	0.000	0.000	0.000	0.016	0.016
63:12:00	0.000	0.000	0.000	0.000	0.016	0.016
63:36:00	0.000	0.000	0.000	0.000	0.016	0.016
64:00:00	0.000	0.000	0.000	0.000	0.016	0.016
64:24:00	0.000	0.000	0.000	0.000	0.016	0.016
64:48:00	0.000	0.000	0.000	0.000	0.016	0.016
65:12:00	0.000	0.000	0.000	0.000	0.015	0.015
65:36:00	0.000	0.000	0.000	0.000	0.015	0.015
66:00:00	0.000	0.000	0.000	0.000	0.015	0.015
66:24:00	0.000	0.000	0.000	0.000	0.015	0.015
66:48:00	0.000	0.000	0.000	0.000	0.015	0.015
67:12:00	0.000	0.000	0.000	0.000	0.015	0.015
67:36:00	0.000	0.000	0.000	0.000	0.014	0.014
68:00:00	0.000	0.000	0.000	0.000	0.014	0.014
68:24:00	0.000	0.000	0.000	0.000	0.014	0.014
68:48:00	0.000	0.000	0.000	0.000	0.014	0.014
69:12:00	0.000	0.000	0.000	0.000	0.014	0.014

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
69:36:00	0.000	0.000	0.000	0.000	0.014	0.014
70:00:00	0.000	0.000	0.000	0.000	0.014	0.014
70:24:00	0.000	0.000	0.000	0.000	0.013	0.013
70:48:00	0.000	0.000	0.000	0.000	0.013	0.013
71:12:00	0.000	0.000	0.000	0.000	0.013	0.013
71:36:00	0.000	0.000	0.000	0.000	0.013	0.013
72:00:00	0.000	0.000	0.000	0.000	0.013	0.013
72:24:00	0.000	0.000	0.000	0.000	0.013	0.013
72:48:00	0.000	0.000	0.000	0.000	0.013	0.013
73:12:00	0.000	0.000	0.000	0.000	0.012	0.012
73:36:00	0.000	0.000	0.000	0.000	0.012	0.012
74:00:00	0.000	0.000	0.000	0.000	0.012	0.012
74:24:00	0.000	0.000	0.000	0.000	0.012	0.012
74:48:00	0.000	0.000	0.000	0.000	0.012	0.012
75:12:00	0.000	0.000	0.000	0.000	0.012	0.012
75:36:00	0.000	0.000	0.000	0.000	0.012	0.012
76:00:00	0.000	0.000	0.000	0.000	0.012	0.012
76:24:00	0.000	0.000	0.000	0.000	0.011	0.011
76:48:00	0.000	0.000	0.000	0.000	0.011	0.011
77:12:00	0.000	0.000	0.000	0.000	0.011	0.011
77:36:00	0.000	0.000	0.000	0.000	0.011	0.011
78:00:00	0.000	0.000	0.000	0.000	0.011	0.011
78:24:00	0.000	0.000	0.000	0.000	0.007	0.007
78:48:00	0.000	0.000	0.000	0.000	0.007	0.007
79:12:00	0.000	0.000	0.000	0.000	0.007	0.007
79:36:00	0.000	0.000	0.000	0.000	0.006	0.006
80:00:00	0.000	0.000	0.000	0.000	0.006	0.006
80:24:00	0.000	0.000	0.000	0.000	0.006	0.006
80:48:00	0.000	0.000	0.000	0.000	0.006	0.006

Appendix

Catchment descriptors

Name	Value	User-defined value used?
Area (km ²)	0.76	No
ALTBAR	23	No
ASPBAR	345	No
ASPVAR	0.7	No
BFIHOST	0.63	No
BFIHOST19	0.71	No
DPLBAR (km)	0.74	No
DPSBAR (mkm ⁻¹)	56.3	No
FARL	1	No
LDP	1.67	No
PROPWET	0.37	No
RMED1H	10.3	No
RMED1D	27.8	No
RMED2D	37.3	No
SAAR (mm)	741	No
SAAR4170 (mm)	734	No
SPRHOST	25.55	No
URBEXT2000	0.13	No
URBEXT1990	0.1	No
URBCONC	0.88	No
URBLOC	1.48	No
DDF parameter C	-0.02	No
DDF parameter D1	0.29	No
DDF parameter D2	0.36	No
DDF parameter D3	0.32	No
DDF parameter E	0.29	No
DDF parameter F	2.45	No
DDF parameter C (1km grid value)	-0.02	No
DDF parameter D1 (1km grid value)	0.3	No
DDF parameter D2 (1km grid value)	0.34	No
DDF parameter D3 (1km grid value)	0.32	No
DDF parameter E (1km grid value)	0.29	No
DDF parameter F (1km grid value)	2.46	No

Straight Length Course (STLC up) Catchment

UK Design Flood Estimation

Generated on 18 February 2025 14:18:51 by louise.wilcock
Printed from the ReFH2 Flood Modelling software package, version 4.1.8704.23947

Summary of estimate using the Flood Estimation Handbook revitalised flood hydrograph method (ReFH2)

Site details
Site name: FEH_Catchment_Descriptors_350050_377500_v5_0_1
Easting: 350050
Northing: 377500
Country: England, Wales or Northern Ireland
Catchment Area (km²): 5.34
Using plot scale calculations: No
Model: 2.3
Site description: None

Checksum: 2C87-688A

Model run: 100 year

Summary of results

Rainfall - FEH22 (mm):	55.20	Total runoff (ML):	21.54
Total Rainfall (mm):	38.32	Total flow (ML):	85.52
Peak Rainfall (mm):	6.54	Peak flow (m ³ /s):	1.17

Parameters

Where the user has overridden a system-generated value, this original value is shown in square brackets after the value used.
* Indicates that the user locked the duration/timestep

Rainfall parameters (Rainfall - FEH22)

Name	Value	User-defined?
Duration (hh:mm:ss)	06:00:00 [05:30:00]	Yes
Timestep (hh:mm:ss)	00:24:00 [00:30:00]	Yes
SCF (Seasonal correction factor)	0.72	No
ARF (Areal reduction factor)	0.96	No
Seasonality	Winter	No

Loss model parameters

Name	Value	User-defined?
Cini (mm)	61.13	No
Cmax (mm)	807.02	No
Use alpha correction factor	No	No
Alpha correction factor	n/a	No

Routing model parameters

Name	Value	User-defined?
Tp (hr)	2.93	No
Up	0.65	No
Uk	0.8	No

Baseflow model parameters

Name	Value	User-defined?
BF0 (m ³ /s)	0.02	No
BL (hr)	55.17	No
BR	3.16	No

Urbanisation parameters

Name	Value	User-defined?
Sewer capacity (m ³ /s)	0	No
Exporting drained area (km ²)	0	No
Urban area (km ²)	0.12	No
Effective URBEXT2000	0.01	n/a
Impervious runoff factor	0.7	No
Imperviousness factor	0.4	No
Tp scaling factor	0.75	No
Depression storage depth (mm)	0.5	No

Time series data

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m³/s)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
00:00:00	0.573	0.000	0.047	0.000	0.021	0.021
00:24:00	0.837	0.000	0.069	0.001	0.021	0.022
00:48:00	1.220	0.000	0.103	0.005	0.021	0.026
01:12:00	1.773	0.000	0.152	0.013	0.021	0.034
01:36:00	2.566	0.000	0.227	0.027	0.021	0.049
02:00:00	3.689	0.000	0.341	0.051	0.022	0.073
02:24:00	5.231	0.000	0.512	0.088	0.023	0.111
02:48:00	6.538	0.000	0.688	0.144	0.025	0.170
03:12:00	5.231	0.000	0.588	0.228	0.029	0.257
03:36:00	3.689	0.000	0.435	0.338	0.034	0.373
04:00:00	2.566	0.000	0.313	0.466	0.042	0.508
04:24:00	1.773	0.000	0.221	0.601	0.053	0.654
04:48:00	1.220	0.000	0.154	0.735	0.066	0.801
05:12:00	0.837	0.000	0.107	0.856	0.082	0.938
05:36:00	0.573	0.000	0.073	0.952	0.100	1.053
06:00:00	0.000	0.000	0.000	1.012	0.120	1.133
06:24:00	0.000	0.000	0.000	1.028	0.141	1.169
06:48:00	0.000	0.000	0.000	1.005	0.162	1.167
07:12:00	0.000	0.000	0.000	0.956	0.182	1.138
07:36:00	0.000	0.000	0.000	0.888	0.200	1.089
08:00:00	0.000	0.000	0.000	0.810	0.217	1.027
08:24:00	0.000	0.000	0.000	0.727	0.233	0.959
08:48:00	0.000	0.000	0.000	0.644	0.246	0.890
09:12:00	0.000	0.000	0.000	0.567	0.257	0.824
09:36:00	0.000	0.000	0.000	0.498	0.267	0.765
10:00:00	0.000	0.000	0.000	0.436	0.276	0.712
10:24:00	0.000	0.000	0.000	0.379	0.283	0.662
10:48:00	0.000	0.000	0.000	0.327	0.289	0.616
11:12:00	0.000	0.000	0.000	0.278	0.294	0.572
11:36:00	0.000	0.000	0.000	0.233	0.297	0.530
12:00:00	0.000	0.000	0.000	0.190	0.300	0.490
12:24:00	0.000	0.000	0.000	0.150	0.302	0.452
12:48:00	0.000	0.000	0.000	0.113	0.303	0.416
13:12:00	0.000	0.000	0.000	0.080	0.303	0.383

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
13:36:00	0.000	0.000	0.000	0.054	0.302	0.356
14:00:00	0.000	0.000	0.000	0.034	0.301	0.335
14:24:00	0.000	0.000	0.000	0.021	0.299	0.320
14:48:00	0.000	0.000	0.000	0.012	0.298	0.309
15:12:00	0.000	0.000	0.000	0.006	0.296	0.302
15:36:00	0.000	0.000	0.000	0.003	0.294	0.296
16:00:00	0.000	0.000	0.000	0.001	0.292	0.292
16:24:00	0.000	0.000	0.000	0.000	0.289	0.289
16:48:00	0.000	0.000	0.000	0.000	0.287	0.287
17:12:00	0.000	0.000	0.000	0.000	0.285	0.285
17:36:00	0.000	0.000	0.000	0.000	0.283	0.283
18:00:00	0.000	0.000	0.000	0.000	0.281	0.281
18:24:00	0.000	0.000	0.000	0.000	0.279	0.279
18:48:00	0.000	0.000	0.000	0.000	0.277	0.277
19:12:00	0.000	0.000	0.000	0.000	0.275	0.275
19:36:00	0.000	0.000	0.000	0.000	0.273	0.273
20:00:00	0.000	0.000	0.000	0.000	0.271	0.271
20:24:00	0.000	0.000	0.000	0.000	0.269	0.269
20:48:00	0.000	0.000	0.000	0.000	0.267	0.267
21:12:00	0.000	0.000	0.000	0.000	0.265	0.265
21:36:00	0.000	0.000	0.000	0.000	0.263	0.263
22:00:00	0.000	0.000	0.000	0.000	0.261	0.261
22:24:00	0.000	0.000	0.000	0.000	0.260	0.260
22:48:00	0.000	0.000	0.000	0.000	0.258	0.258
23:12:00	0.000	0.000	0.000	0.000	0.256	0.256
23:36:00	0.000	0.000	0.000	0.000	0.254	0.254
24:00:00	0.000	0.000	0.000	0.000	0.252	0.252
24:24:00	0.000	0.000	0.000	0.000	0.250	0.250
24:48:00	0.000	0.000	0.000	0.000	0.249	0.249
25:12:00	0.000	0.000	0.000	0.000	0.247	0.247
25:36:00	0.000	0.000	0.000	0.000	0.245	0.245
26:00:00	0.000	0.000	0.000	0.000	0.243	0.243
26:24:00	0.000	0.000	0.000	0.000	0.241	0.241
26:48:00	0.000	0.000	0.000	0.000	0.240	0.240
27:12:00	0.000	0.000	0.000	0.000	0.238	0.238

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
27:36:00	0.000	0.000	0.000	0.000	0.236	0.236
28:00:00	0.000	0.000	0.000	0.000	0.235	0.235
28:24:00	0.000	0.000	0.000	0.000	0.233	0.233
28:48:00	0.000	0.000	0.000	0.000	0.231	0.231
29:12:00	0.000	0.000	0.000	0.000	0.229	0.229
29:36:00	0.000	0.000	0.000	0.000	0.228	0.228
30:00:00	0.000	0.000	0.000	0.000	0.226	0.226
30:24:00	0.000	0.000	0.000	0.000	0.225	0.225
30:48:00	0.000	0.000	0.000	0.000	0.223	0.223
31:12:00	0.000	0.000	0.000	0.000	0.221	0.221
31:36:00	0.000	0.000	0.000	0.000	0.220	0.220
32:00:00	0.000	0.000	0.000	0.000	0.218	0.218
32:24:00	0.000	0.000	0.000	0.000	0.217	0.217
32:48:00	0.000	0.000	0.000	0.000	0.215	0.215
33:12:00	0.000	0.000	0.000	0.000	0.213	0.213
33:36:00	0.000	0.000	0.000	0.000	0.212	0.212
34:00:00	0.000	0.000	0.000	0.000	0.210	0.210
34:24:00	0.000	0.000	0.000	0.000	0.209	0.209
34:48:00	0.000	0.000	0.000	0.000	0.207	0.207
35:12:00	0.000	0.000	0.000	0.000	0.206	0.206
35:36:00	0.000	0.000	0.000	0.000	0.204	0.204
36:00:00	0.000	0.000	0.000	0.000	0.203	0.203
36:24:00	0.000	0.000	0.000	0.000	0.201	0.201
36:48:00	0.000	0.000	0.000	0.000	0.200	0.200
37:12:00	0.000	0.000	0.000	0.000	0.199	0.199
37:36:00	0.000	0.000	0.000	0.000	0.197	0.197
38:00:00	0.000	0.000	0.000	0.000	0.196	0.196
38:24:00	0.000	0.000	0.000	0.000	0.194	0.194
38:48:00	0.000	0.000	0.000	0.000	0.193	0.193
39:12:00	0.000	0.000	0.000	0.000	0.191	0.191
39:36:00	0.000	0.000	0.000	0.000	0.190	0.190
40:00:00	0.000	0.000	0.000	0.000	0.189	0.189
40:24:00	0.000	0.000	0.000	0.000	0.187	0.187
40:48:00	0.000	0.000	0.000	0.000	0.186	0.186
41:12:00	0.000	0.000	0.000	0.000	0.185	0.185

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
41:36:00	0.000	0.000	0.000	0.000	0.183	0.183
42:00:00	0.000	0.000	0.000	0.000	0.182	0.182
42:24:00	0.000	0.000	0.000	0.000	0.181	0.181
42:48:00	0.000	0.000	0.000	0.000	0.179	0.179
43:12:00	0.000	0.000	0.000	0.000	0.178	0.178
43:36:00	0.000	0.000	0.000	0.000	0.177	0.177
44:00:00	0.000	0.000	0.000	0.000	0.175	0.175
44:24:00	0.000	0.000	0.000	0.000	0.174	0.174
44:48:00	0.000	0.000	0.000	0.000	0.173	0.173
45:12:00	0.000	0.000	0.000	0.000	0.172	0.172
45:36:00	0.000	0.000	0.000	0.000	0.170	0.170
46:00:00	0.000	0.000	0.000	0.000	0.169	0.169
46:24:00	0.000	0.000	0.000	0.000	0.168	0.168
46:48:00	0.000	0.000	0.000	0.000	0.167	0.167
47:12:00	0.000	0.000	0.000	0.000	0.166	0.166
47:36:00	0.000	0.000	0.000	0.000	0.164	0.164
48:00:00	0.000	0.000	0.000	0.000	0.163	0.163
48:24:00	0.000	0.000	0.000	0.000	0.162	0.162
48:48:00	0.000	0.000	0.000	0.000	0.161	0.161
49:12:00	0.000	0.000	0.000	0.000	0.160	0.160
49:36:00	0.000	0.000	0.000	0.000	0.159	0.159
50:00:00	0.000	0.000	0.000	0.000	0.157	0.157
50:24:00	0.000	0.000	0.000	0.000	0.156	0.156
50:48:00	0.000	0.000	0.000	0.000	0.155	0.155
51:12:00	0.000	0.000	0.000	0.000	0.154	0.154
51:36:00	0.000	0.000	0.000	0.000	0.153	0.153
52:00:00	0.000	0.000	0.000	0.000	0.152	0.152
52:24:00	0.000	0.000	0.000	0.000	0.151	0.151
52:48:00	0.000	0.000	0.000	0.000	0.150	0.150
53:12:00	0.000	0.000	0.000	0.000	0.149	0.149
53:36:00	0.000	0.000	0.000	0.000	0.147	0.147
54:00:00	0.000	0.000	0.000	0.000	0.146	0.146
54:24:00	0.000	0.000	0.000	0.000	0.145	0.145
54:48:00	0.000	0.000	0.000	0.000	0.144	0.144
55:12:00	0.000	0.000	0.000	0.000	0.143	0.143

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
55:36:00	0.000	0.000	0.000	0.000	0.142	0.142
56:00:00	0.000	0.000	0.000	0.000	0.141	0.141
56:24:00	0.000	0.000	0.000	0.000	0.140	0.140
56:48:00	0.000	0.000	0.000	0.000	0.139	0.139
57:12:00	0.000	0.000	0.000	0.000	0.138	0.138
57:36:00	0.000	0.000	0.000	0.000	0.137	0.137
58:00:00	0.000	0.000	0.000	0.000	0.136	0.136
58:24:00	0.000	0.000	0.000	0.000	0.135	0.135
58:48:00	0.000	0.000	0.000	0.000	0.134	0.134
59:12:00	0.000	0.000	0.000	0.000	0.133	0.133
59:36:00	0.000	0.000	0.000	0.000	0.132	0.132
60:00:00	0.000	0.000	0.000	0.000	0.131	0.131
60:24:00	0.000	0.000	0.000	0.000	0.130	0.130
60:48:00	0.000	0.000	0.000	0.000	0.129	0.129
61:12:00	0.000	0.000	0.000	0.000	0.128	0.128
61:36:00	0.000	0.000	0.000	0.000	0.128	0.128
62:00:00	0.000	0.000	0.000	0.000	0.127	0.127
62:24:00	0.000	0.000	0.000	0.000	0.126	0.126
62:48:00	0.000	0.000	0.000	0.000	0.125	0.125
63:12:00	0.000	0.000	0.000	0.000	0.124	0.124
63:36:00	0.000	0.000	0.000	0.000	0.123	0.123
64:00:00	0.000	0.000	0.000	0.000	0.122	0.122
64:24:00	0.000	0.000	0.000	0.000	0.121	0.121
64:48:00	0.000	0.000	0.000	0.000	0.120	0.120
65:12:00	0.000	0.000	0.000	0.000	0.120	0.120
65:36:00	0.000	0.000	0.000	0.000	0.119	0.119
66:00:00	0.000	0.000	0.000	0.000	0.118	0.118
66:24:00	0.000	0.000	0.000	0.000	0.117	0.117
66:48:00	0.000	0.000	0.000	0.000	0.116	0.116
67:12:00	0.000	0.000	0.000	0.000	0.115	0.115
67:36:00	0.000	0.000	0.000	0.000	0.114	0.114
68:00:00	0.000	0.000	0.000	0.000	0.114	0.114
68:24:00	0.000	0.000	0.000	0.000	0.113	0.113
68:48:00	0.000	0.000	0.000	0.000	0.112	0.112
69:12:00	0.000	0.000	0.000	0.000	0.111	0.111

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
69:36:00	0.000	0.000	0.000	0.000	0.110	0.110
70:00:00	0.000	0.000	0.000	0.000	0.110	0.110
70:24:00	0.000	0.000	0.000	0.000	0.109	0.109
70:48:00	0.000	0.000	0.000	0.000	0.108	0.108
71:12:00	0.000	0.000	0.000	0.000	0.107	0.107
71:36:00	0.000	0.000	0.000	0.000	0.106	0.106
72:00:00	0.000	0.000	0.000	0.000	0.106	0.106
72:24:00	0.000	0.000	0.000	0.000	0.105	0.105
72:48:00	0.000	0.000	0.000	0.000	0.104	0.104
73:12:00	0.000	0.000	0.000	0.000	0.103	0.103
73:36:00	0.000	0.000	0.000	0.000	0.103	0.103
74:00:00	0.000	0.000	0.000	0.000	0.102	0.102
74:24:00	0.000	0.000	0.000	0.000	0.101	0.101
74:48:00	0.000	0.000	0.000	0.000	0.100	0.100
75:12:00	0.000	0.000	0.000	0.000	0.100	0.100
75:36:00	0.000	0.000	0.000	0.000	0.099	0.099
76:00:00	0.000	0.000	0.000	0.000	0.098	0.098
76:24:00	0.000	0.000	0.000	0.000	0.098	0.098
76:48:00	0.000	0.000	0.000	0.000	0.097	0.097
77:12:00	0.000	0.000	0.000	0.000	0.096	0.096
77:36:00	0.000	0.000	0.000	0.000	0.095	0.095
78:00:00	0.000	0.000	0.000	0.000	0.095	0.095
78:24:00	0.000	0.000	0.000	0.000	0.094	0.094
78:48:00	0.000	0.000	0.000	0.000	0.093	0.093
79:12:00	0.000	0.000	0.000	0.000	0.093	0.093
79:36:00	0.000	0.000	0.000	0.000	0.092	0.092
80:00:00	0.000	0.000	0.000	0.000	0.091	0.091
80:24:00	0.000	0.000	0.000	0.000	0.091	0.091
80:48:00	0.000	0.000	0.000	0.000	0.090	0.090
81:12:00	0.000	0.000	0.000	0.000	0.089	0.089
81:36:00	0.000	0.000	0.000	0.000	0.089	0.089
82:00:00	0.000	0.000	0.000	0.000	0.088	0.088
82:24:00	0.000	0.000	0.000	0.000	0.087	0.087
82:48:00	0.000	0.000	0.000	0.000	0.087	0.087
83:12:00	0.000	0.000	0.000	0.000	0.086	0.086

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
83:36:00	0.000	0.000	0.000	0.000	0.086	0.086
84:00:00	0.000	0.000	0.000	0.000	0.085	0.085
84:24:00	0.000	0.000	0.000	0.000	0.084	0.084
84:48:00	0.000	0.000	0.000	0.000	0.084	0.084
85:12:00	0.000	0.000	0.000	0.000	0.083	0.083
85:36:00	0.000	0.000	0.000	0.000	0.083	0.083
86:00:00	0.000	0.000	0.000	0.000	0.082	0.082
86:24:00	0.000	0.000	0.000	0.000	0.081	0.081
86:48:00	0.000	0.000	0.000	0.000	0.081	0.081
87:12:00	0.000	0.000	0.000	0.000	0.080	0.080
87:36:00	0.000	0.000	0.000	0.000	0.080	0.080
88:00:00	0.000	0.000	0.000	0.000	0.079	0.079
88:24:00	0.000	0.000	0.000	0.000	0.078	0.078
88:48:00	0.000	0.000	0.000	0.000	0.078	0.078
89:12:00	0.000	0.000	0.000	0.000	0.077	0.077
89:36:00	0.000	0.000	0.000	0.000	0.077	0.077
90:00:00	0.000	0.000	0.000	0.000	0.076	0.076
90:24:00	0.000	0.000	0.000	0.000	0.076	0.076
90:48:00	0.000	0.000	0.000	0.000	0.075	0.075
91:12:00	0.000	0.000	0.000	0.000	0.075	0.075
91:36:00	0.000	0.000	0.000	0.000	0.074	0.074
92:00:00	0.000	0.000	0.000	0.000	0.074	0.074
92:24:00	0.000	0.000	0.000	0.000	0.073	0.073
92:48:00	0.000	0.000	0.000	0.000	0.072	0.072
93:12:00	0.000	0.000	0.000	0.000	0.072	0.072
93:36:00	0.000	0.000	0.000	0.000	0.071	0.071
94:00:00	0.000	0.000	0.000	0.000	0.071	0.071
94:24:00	0.000	0.000	0.000	0.000	0.070	0.070
94:48:00	0.000	0.000	0.000	0.000	0.070	0.070
95:12:00	0.000	0.000	0.000	0.000	0.069	0.069
95:36:00	0.000	0.000	0.000	0.000	0.069	0.069
96:00:00	0.000	0.000	0.000	0.000	0.068	0.068
96:24:00	0.000	0.000	0.000	0.000	0.068	0.068
96:48:00	0.000	0.000	0.000	0.000	0.067	0.067
97:12:00	0.000	0.000	0.000	0.000	0.067	0.067

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
97:36:00	0.000	0.000	0.000	0.000	0.066	0.066
98:00:00	0.000	0.000	0.000	0.000	0.066	0.066
98:24:00	0.000	0.000	0.000	0.000	0.065	0.065
98:48:00	0.000	0.000	0.000	0.000	0.065	0.065
99:12:00	0.000	0.000	0.000	0.000	0.065	0.065
99:36:00	0.000	0.000	0.000	0.000	0.064	0.064
100:00:00	0.000	0.000	0.000	0.000	0.064	0.064
100:24:00	0.000	0.000	0.000	0.000	0.063	0.063
100:48:00	0.000	0.000	0.000	0.000	0.063	0.063
101:12:00	0.000	0.000	0.000	0.000	0.062	0.062
101:36:00	0.000	0.000	0.000	0.000	0.062	0.062
102:00:00	0.000	0.000	0.000	0.000	0.061	0.061
102:24:00	0.000	0.000	0.000	0.000	0.061	0.061
102:48:00	0.000	0.000	0.000	0.000	0.060	0.060
103:12:00	0.000	0.000	0.000	0.000	0.060	0.060
103:36:00	0.000	0.000	0.000	0.000	0.060	0.060
104:00:00	0.000	0.000	0.000	0.000	0.059	0.059
104:24:00	0.000	0.000	0.000	0.000	0.059	0.059
104:48:00	0.000	0.000	0.000	0.000	0.058	0.058
105:12:00	0.000	0.000	0.000	0.000	0.058	0.058
105:36:00	0.000	0.000	0.000	0.000	0.057	0.057
106:00:00	0.000	0.000	0.000	0.000	0.057	0.057
106:24:00	0.000	0.000	0.000	0.000	0.057	0.057
106:48:00	0.000	0.000	0.000	0.000	0.056	0.056
107:12:00	0.000	0.000	0.000	0.000	0.056	0.056
107:36:00	0.000	0.000	0.000	0.000	0.055	0.055
108:00:00	0.000	0.000	0.000	0.000	0.055	0.055
108:24:00	0.000	0.000	0.000	0.000	0.055	0.055
108:48:00	0.000	0.000	0.000	0.000	0.054	0.054
109:12:00	0.000	0.000	0.000	0.000	0.054	0.054
109:36:00	0.000	0.000	0.000	0.000	0.053	0.053
110:00:00	0.000	0.000	0.000	0.000	0.053	0.053
110:24:00	0.000	0.000	0.000	0.000	0.053	0.053
110:48:00	0.000	0.000	0.000	0.000	0.052	0.052
111:12:00	0.000	0.000	0.000	0.000	0.052	0.052

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
111:36:00	0.000	0.000	0.000	0.000	0.052	0.052
112:00:00	0.000	0.000	0.000	0.000	0.051	0.051
112:24:00	0.000	0.000	0.000	0.000	0.051	0.051
112:48:00	0.000	0.000	0.000	0.000	0.050	0.050
113:12:00	0.000	0.000	0.000	0.000	0.050	0.050
113:36:00	0.000	0.000	0.000	0.000	0.050	0.050
114:00:00	0.000	0.000	0.000	0.000	0.049	0.049
114:24:00	0.000	0.000	0.000	0.000	0.049	0.049
114:48:00	0.000	0.000	0.000	0.000	0.049	0.049
115:12:00	0.000	0.000	0.000	0.000	0.048	0.048
115:36:00	0.000	0.000	0.000	0.000	0.048	0.048
116:00:00	0.000	0.000	0.000	0.000	0.048	0.048
116:24:00	0.000	0.000	0.000	0.000	0.047	0.047
116:48:00	0.000	0.000	0.000	0.000	0.047	0.047
117:12:00	0.000	0.000	0.000	0.000	0.047	0.047
117:36:00	0.000	0.000	0.000	0.000	0.046	0.046
118:00:00	0.000	0.000	0.000	0.000	0.046	0.046
118:24:00	0.000	0.000	0.000	0.000	0.046	0.046
118:48:00	0.000	0.000	0.000	0.000	0.045	0.045
119:12:00	0.000	0.000	0.000	0.000	0.045	0.045
119:36:00	0.000	0.000	0.000	0.000	0.045	0.045
120:00:00	0.000	0.000	0.000	0.000	0.044	0.044
120:24:00	0.000	0.000	0.000	0.000	0.044	0.044
120:48:00	0.000	0.000	0.000	0.000	0.044	0.044
121:12:00	0.000	0.000	0.000	0.000	0.043	0.043
121:36:00	0.000	0.000	0.000	0.000	0.043	0.043
122:00:00	0.000	0.000	0.000	0.000	0.043	0.043
122:24:00	0.000	0.000	0.000	0.000	0.042	0.042
122:48:00	0.000	0.000	0.000	0.000	0.042	0.042
123:12:00	0.000	0.000	0.000	0.000	0.042	0.042
123:36:00	0.000	0.000	0.000	0.000	0.041	0.041
124:00:00	0.000	0.000	0.000	0.000	0.041	0.041
124:24:00	0.000	0.000	0.000	0.000	0.041	0.041
124:48:00	0.000	0.000	0.000	0.000	0.041	0.041
125:12:00	0.000	0.000	0.000	0.000	0.040	0.040

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
125:36:00	0.000	0.000	0.000	0.000	0.040	0.040
126:00:00	0.000	0.000	0.000	0.000	0.040	0.040
126:24:00	0.000	0.000	0.000	0.000	0.039	0.039
126:48:00	0.000	0.000	0.000	0.000	0.039	0.039
127:12:00	0.000	0.000	0.000	0.000	0.039	0.039
127:36:00	0.000	0.000	0.000	0.000	0.039	0.039
128:00:00	0.000	0.000	0.000	0.000	0.038	0.038
128:24:00	0.000	0.000	0.000	0.000	0.038	0.038
128:48:00	0.000	0.000	0.000	0.000	0.038	0.038
129:12:00	0.000	0.000	0.000	0.000	0.037	0.037
129:36:00	0.000	0.000	0.000	0.000	0.037	0.037
130:00:00	0.000	0.000	0.000	0.000	0.037	0.037
130:24:00	0.000	0.000	0.000	0.000	0.037	0.037
130:48:00	0.000	0.000	0.000	0.000	0.036	0.036
131:12:00	0.000	0.000	0.000	0.000	0.036	0.036
131:36:00	0.000	0.000	0.000	0.000	0.036	0.036
132:00:00	0.000	0.000	0.000	0.000	0.036	0.036
132:24:00	0.000	0.000	0.000	0.000	0.035	0.035
132:48:00	0.000	0.000	0.000	0.000	0.035	0.035
133:12:00	0.000	0.000	0.000	0.000	0.035	0.035
133:36:00	0.000	0.000	0.000	0.000	0.035	0.035
134:00:00	0.000	0.000	0.000	0.000	0.034	0.034
134:24:00	0.000	0.000	0.000	0.000	0.034	0.034
134:48:00	0.000	0.000	0.000	0.000	0.034	0.034
135:12:00	0.000	0.000	0.000	0.000	0.034	0.034
135:36:00	0.000	0.000	0.000	0.000	0.033	0.033
136:00:00	0.000	0.000	0.000	0.000	0.033	0.033
136:24:00	0.000	0.000	0.000	0.000	0.033	0.033
136:48:00	0.000	0.000	0.000	0.000	0.033	0.033
137:12:00	0.000	0.000	0.000	0.000	0.032	0.032
137:36:00	0.000	0.000	0.000	0.000	0.032	0.032
138:00:00	0.000	0.000	0.000	0.000	0.032	0.032
138:24:00	0.000	0.000	0.000	0.000	0.032	0.032
138:48:00	0.000	0.000	0.000	0.000	0.031	0.031
139:12:00	0.000	0.000	0.000	0.000	0.031	0.031

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
139:36:00	0.000	0.000	0.000	0.000	0.031	0.031
140:00:00	0.000	0.000	0.000	0.000	0.031	0.031
140:24:00	0.000	0.000	0.000	0.000	0.031	0.031
140:48:00	0.000	0.000	0.000	0.000	0.030	0.030
141:12:00	0.000	0.000	0.000	0.000	0.030	0.030
141:36:00	0.000	0.000	0.000	0.000	0.030	0.030
142:00:00	0.000	0.000	0.000	0.000	0.030	0.030
142:24:00	0.000	0.000	0.000	0.000	0.029	0.029
142:48:00	0.000	0.000	0.000	0.000	0.029	0.029
143:12:00	0.000	0.000	0.000	0.000	0.029	0.029
143:36:00	0.000	0.000	0.000	0.000	0.029	0.029
144:00:00	0.000	0.000	0.000	0.000	0.029	0.029
144:24:00	0.000	0.000	0.000	0.000	0.028	0.028
144:48:00	0.000	0.000	0.000	0.000	0.028	0.028
145:12:00	0.000	0.000	0.000	0.000	0.028	0.028
145:36:00	0.000	0.000	0.000	0.000	0.028	0.028
146:00:00	0.000	0.000	0.000	0.000	0.028	0.028
146:24:00	0.000	0.000	0.000	0.000	0.027	0.027
146:48:00	0.000	0.000	0.000	0.000	0.027	0.027
147:12:00	0.000	0.000	0.000	0.000	0.027	0.027
147:36:00	0.000	0.000	0.000	0.000	0.027	0.027
148:00:00	0.000	0.000	0.000	0.000	0.027	0.027
148:24:00	0.000	0.000	0.000	0.000	0.026	0.026
148:48:00	0.000	0.000	0.000	0.000	0.026	0.026
149:12:00	0.000	0.000	0.000	0.000	0.026	0.026
149:36:00	0.000	0.000	0.000	0.000	0.026	0.026
150:00:00	0.000	0.000	0.000	0.000	0.026	0.026
150:24:00	0.000	0.000	0.000	0.000	0.026	0.026
150:48:00	0.000	0.000	0.000	0.000	0.025	0.025
151:12:00	0.000	0.000	0.000	0.000	0.025	0.025
151:36:00	0.000	0.000	0.000	0.000	0.025	0.025
152:00:00	0.000	0.000	0.000	0.000	0.025	0.025
152:24:00	0.000	0.000	0.000	0.000	0.025	0.025
152:48:00	0.000	0.000	0.000	0.000	0.024	0.024
153:12:00	0.000	0.000	0.000	0.000	0.024	0.024

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
153:36:00	0.000	0.000	0.000	0.000	0.024	0.024
154:00:00	0.000	0.000	0.000	0.000	0.024	0.024
154:24:00	0.000	0.000	0.000	0.000	0.024	0.024
154:48:00	0.000	0.000	0.000	0.000	0.024	0.024
155:12:00	0.000	0.000	0.000	0.000	0.023	0.023
155:36:00	0.000	0.000	0.000	0.000	0.023	0.023
156:00:00	0.000	0.000	0.000	0.000	0.023	0.023
156:24:00	0.000	0.000	0.000	0.000	0.023	0.023
156:48:00	0.000	0.000	0.000	0.000	0.023	0.023
157:12:00	0.000	0.000	0.000	0.000	0.023	0.023
157:36:00	0.000	0.000	0.000	0.000	0.022	0.022
158:00:00	0.000	0.000	0.000	0.000	0.022	0.022
158:24:00	0.000	0.000	0.000	0.000	0.022	0.022
158:48:00	0.000	0.000	0.000	0.000	0.022	0.022
159:12:00	0.000	0.000	0.000	0.000	0.022	0.022
159:36:00	0.000	0.000	0.000	0.000	0.022	0.022

Appendix

Catchment descriptors

Name	Value	User-defined value used?
Area (km ²)	5.34	No
ALTBAR	73	No
ASPBAR	331	No
ASPVAR	0.3	No
BFIHOST	0.79	No
BFIHOST19	0.77	No
DPLBAR (km)	3.62	No
DPSBAR (mkm ⁻¹)	94.9	No
FARL	1	No
LDP	6.1	No
PROPWET	0.37	No
RMED1H	10.5	No
RMED1D	28.2	No
RMED2D	38.7	No
SAAR (mm)	760	No
SAAR4170 (mm)	745	No
SPRHOST	19.59	No
URBEXT2000	0.01	No
URBEXT1990	0.01	No
URBCONC	0.63	No
URBLOC	0.71	No
DDF parameter C	-0.02	No
DDF parameter D1	0.3	No
DDF parameter D2	0.38	No
DDF parameter D3	0.31	No
DDF parameter E	0.29	No
DDF parameter F	2.45	No
DDF parameter C (1km grid value)	-0.02	No
DDF parameter D1 (1km grid value)	0.3	No
DDF parameter D2 (1km grid value)	0.37	No
DDF parameter D3 (1km grid value)	0.31	No
DDF parameter E (1km grid value)	0.29	No
DDF parameter F (1km grid value)	2.46	No

Un-named 03 (HATL up) Catchment

UK Design Flood Estimation

Generated on 18 February 2025 14:04:32 by louise.wilcock
Printed from the ReFH2 Flood Modelling software package, version 4.1.8704.23947

Summary of estimate using the Flood Estimation Handbook revitalised flood hydrograph method (ReFH2)

Site details

Checksum: 545B-E6ED

Site name: FEH_Catchment_Descriptors_350550_377500_v5_0_1

Easting: 350550

Northing: 377500

Country: England, Wales or Northern Ireland

Catchment Area (km²): 1.72

Using plot scale calculations: No

Model: 2.3

Site description: None

Model run: 100 year

Summary of results

Rainfall - FEH22 (mm):	54.80	Total runoff (ML):	7.71
Total Rainfall (mm):	38.62	Total flow (ML):	30.64
Peak Rainfall (mm):	6.59	Peak flow (m ³ /s):	0.50

Parameters

Where the user has overridden a system-generated value, this original value is shown in square brackets after the value used.

** Indicates that the user locked the duration/timestep*

Rainfall parameters (Rainfall - FEH22)

Name	Value	User-defined?
Duration (hh:mm:ss)	06:00:00 [04:30:00]	Yes
Timestep (hh:mm:ss)	00:24:00 [00:30:00]	Yes
SCF (Seasonal correction factor)	0.72	No
ARF (Areal reduction factor)	0.98	No
Seasonality	Winter	No

Loss model parameters

Name	Value	User-defined?
Cini (mm)	65.31	No
Cmax (mm)	729.26	No
Use alpha correction factor	No	No
Alpha correction factor	n/a	No

Routing model parameters

Name	Value	User-defined?
Tp (hr)	2.29	No
Up	0.65	No
Uk	0.8	No

Baseflow model parameters

Name	Value	User-defined?
BF0 (m ³ /s)	0.01	No
BL (hr)	47.12	No
BR	2.98	No

Urbanisation parameters

Name	Value	User-defined?
Sewer capacity (m ³ /s)	0	No
Exporting drained area (km ²)	0	No
Urban area (km ²)	0	No
Effective URBEXT2000	0	n/a
Impervious runoff factor	0.7	No
Imperviousness factor	0.4	No
Tp scaling factor	0.75	No
Depression storage depth (mm)	0.5	No

Time series data

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
00:00:00	0.577	0.000	0.052	0.000	0.012	0.012
00:24:00	0.844	0.000	0.077	0.001	0.012	0.013
00:48:00	1.230	0.000	0.114	0.003	0.012	0.015
01:12:00	1.787	0.000	0.169	0.007	0.012	0.019
01:36:00	2.586	0.000	0.252	0.015	0.012	0.027
02:00:00	3.718	0.000	0.378	0.028	0.013	0.040
02:24:00	5.272	0.000	0.569	0.048	0.014	0.061
02:48:00	6.589	0.000	0.764	0.078	0.015	0.093
03:12:00	5.272	0.000	0.655	0.121	0.017	0.138
03:36:00	3.718	0.000	0.485	0.176	0.021	0.197
04:00:00	2.586	0.000	0.348	0.240	0.026	0.266
04:24:00	1.787	0.000	0.246	0.304	0.033	0.337
04:48:00	1.230	0.000	0.172	0.362	0.041	0.403
05:12:00	0.844	0.000	0.119	0.406	0.050	0.456
05:36:00	0.577	0.000	0.082	0.428	0.060	0.488
06:00:00	0.000	0.000	0.000	0.427	0.070	0.497
06:24:00	0.000	0.000	0.000	0.408	0.080	0.489
06:48:00	0.000	0.000	0.000	0.378	0.090	0.468
07:12:00	0.000	0.000	0.000	0.340	0.098	0.438
07:36:00	0.000	0.000	0.000	0.300	0.105	0.405
08:00:00	0.000	0.000	0.000	0.261	0.111	0.372
08:24:00	0.000	0.000	0.000	0.223	0.116	0.339
08:48:00	0.000	0.000	0.000	0.188	0.121	0.309
09:12:00	0.000	0.000	0.000	0.157	0.124	0.281
09:36:00	0.000	0.000	0.000	0.128	0.126	0.254
10:00:00	0.000	0.000	0.000	0.101	0.128	0.229
10:24:00	0.000	0.000	0.000	0.077	0.129	0.206
10:48:00	0.000	0.000	0.000	0.055	0.130	0.185
11:12:00	0.000	0.000	0.000	0.038	0.130	0.168
11:36:00	0.000	0.000	0.000	0.024	0.130	0.154
12:00:00	0.000	0.000	0.000	0.015	0.129	0.144
12:24:00	0.000	0.000	0.000	0.009	0.128	0.137
12:48:00	0.000	0.000	0.000	0.004	0.127	0.132
13:12:00	0.000	0.000	0.000	0.002	0.126	0.128

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
13:36:00	0.000	0.000	0.000	0.001	0.125	0.126
14:00:00	0.000	0.000	0.000	0.000	0.124	0.124
14:24:00	0.000	0.000	0.000	0.000	0.123	0.123
14:48:00	0.000	0.000	0.000	0.000	0.122	0.122
15:12:00	0.000	0.000	0.000	0.000	0.121	0.121
15:36:00	0.000	0.000	0.000	0.000	0.120	0.120
16:00:00	0.000	0.000	0.000	0.000	0.119	0.119
16:24:00	0.000	0.000	0.000	0.000	0.118	0.118
16:48:00	0.000	0.000	0.000	0.000	0.117	0.117
17:12:00	0.000	0.000	0.000	0.000	0.116	0.116
17:36:00	0.000	0.000	0.000	0.000	0.115	0.115
18:00:00	0.000	0.000	0.000	0.000	0.114	0.114
18:24:00	0.000	0.000	0.000	0.000	0.113	0.113
18:48:00	0.000	0.000	0.000	0.000	0.112	0.112
19:12:00	0.000	0.000	0.000	0.000	0.111	0.111
19:36:00	0.000	0.000	0.000	0.000	0.110	0.110
20:00:00	0.000	0.000	0.000	0.000	0.109	0.109
20:24:00	0.000	0.000	0.000	0.000	0.109	0.109
20:48:00	0.000	0.000	0.000	0.000	0.108	0.108
21:12:00	0.000	0.000	0.000	0.000	0.107	0.107
21:36:00	0.000	0.000	0.000	0.000	0.106	0.106
22:00:00	0.000	0.000	0.000	0.000	0.105	0.105
22:24:00	0.000	0.000	0.000	0.000	0.104	0.104
22:48:00	0.000	0.000	0.000	0.000	0.103	0.103
23:12:00	0.000	0.000	0.000	0.000	0.102	0.102
23:36:00	0.000	0.000	0.000	0.000	0.101	0.101
24:00:00	0.000	0.000	0.000	0.000	0.101	0.101
24:24:00	0.000	0.000	0.000	0.000	0.100	0.100
24:48:00	0.000	0.000	0.000	0.000	0.099	0.099
25:12:00	0.000	0.000	0.000	0.000	0.098	0.098
25:36:00	0.000	0.000	0.000	0.000	0.097	0.097
26:00:00	0.000	0.000	0.000	0.000	0.096	0.096
26:24:00	0.000	0.000	0.000	0.000	0.096	0.096
26:48:00	0.000	0.000	0.000	0.000	0.095	0.095
27:12:00	0.000	0.000	0.000	0.000	0.094	0.094

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
27:36:00	0.000	0.000	0.000	0.000	0.093	0.093
28:00:00	0.000	0.000	0.000	0.000	0.092	0.092
28:24:00	0.000	0.000	0.000	0.000	0.092	0.092
28:48:00	0.000	0.000	0.000	0.000	0.091	0.091
29:12:00	0.000	0.000	0.000	0.000	0.090	0.090
29:36:00	0.000	0.000	0.000	0.000	0.089	0.089
30:00:00	0.000	0.000	0.000	0.000	0.089	0.089
30:24:00	0.000	0.000	0.000	0.000	0.088	0.088
30:48:00	0.000	0.000	0.000	0.000	0.087	0.087
31:12:00	0.000	0.000	0.000	0.000	0.086	0.086
31:36:00	0.000	0.000	0.000	0.000	0.086	0.086
32:00:00	0.000	0.000	0.000	0.000	0.085	0.085
32:24:00	0.000	0.000	0.000	0.000	0.084	0.084
32:48:00	0.000	0.000	0.000	0.000	0.083	0.083
33:12:00	0.000	0.000	0.000	0.000	0.083	0.083
33:36:00	0.000	0.000	0.000	0.000	0.082	0.082
34:00:00	0.000	0.000	0.000	0.000	0.081	0.081
34:24:00	0.000	0.000	0.000	0.000	0.081	0.081
34:48:00	0.000	0.000	0.000	0.000	0.080	0.080
35:12:00	0.000	0.000	0.000	0.000	0.079	0.079
35:36:00	0.000	0.000	0.000	0.000	0.079	0.079
36:00:00	0.000	0.000	0.000	0.000	0.078	0.078
36:24:00	0.000	0.000	0.000	0.000	0.077	0.077
36:48:00	0.000	0.000	0.000	0.000	0.077	0.077
37:12:00	0.000	0.000	0.000	0.000	0.076	0.076
37:36:00	0.000	0.000	0.000	0.000	0.075	0.075
38:00:00	0.000	0.000	0.000	0.000	0.075	0.075
38:24:00	0.000	0.000	0.000	0.000	0.074	0.074
38:48:00	0.000	0.000	0.000	0.000	0.073	0.073
39:12:00	0.000	0.000	0.000	0.000	0.073	0.073
39:36:00	0.000	0.000	0.000	0.000	0.072	0.072
40:00:00	0.000	0.000	0.000	0.000	0.072	0.072
40:24:00	0.000	0.000	0.000	0.000	0.071	0.071
40:48:00	0.000	0.000	0.000	0.000	0.070	0.070
41:12:00	0.000	0.000	0.000	0.000	0.070	0.070

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
41:36:00	0.000	0.000	0.000	0.000	0.069	0.069
42:00:00	0.000	0.000	0.000	0.000	0.069	0.069
42:24:00	0.000	0.000	0.000	0.000	0.068	0.068
42:48:00	0.000	0.000	0.000	0.000	0.067	0.067
43:12:00	0.000	0.000	0.000	0.000	0.067	0.067
43:36:00	0.000	0.000	0.000	0.000	0.066	0.066
44:00:00	0.000	0.000	0.000	0.000	0.066	0.066
44:24:00	0.000	0.000	0.000	0.000	0.065	0.065
44:48:00	0.000	0.000	0.000	0.000	0.065	0.065
45:12:00	0.000	0.000	0.000	0.000	0.064	0.064
45:36:00	0.000	0.000	0.000	0.000	0.064	0.064
46:00:00	0.000	0.000	0.000	0.000	0.063	0.063
46:24:00	0.000	0.000	0.000	0.000	0.062	0.062
46:48:00	0.000	0.000	0.000	0.000	0.062	0.062
47:12:00	0.000	0.000	0.000	0.000	0.061	0.061
47:36:00	0.000	0.000	0.000	0.000	0.061	0.061
48:00:00	0.000	0.000	0.000	0.000	0.060	0.060
48:24:00	0.000	0.000	0.000	0.000	0.060	0.060
48:48:00	0.000	0.000	0.000	0.000	0.059	0.059
49:12:00	0.000	0.000	0.000	0.000	0.059	0.059
49:36:00	0.000	0.000	0.000	0.000	0.058	0.058
50:00:00	0.000	0.000	0.000	0.000	0.058	0.058
50:24:00	0.000	0.000	0.000	0.000	0.057	0.057
50:48:00	0.000	0.000	0.000	0.000	0.057	0.057
51:12:00	0.000	0.000	0.000	0.000	0.056	0.056
51:36:00	0.000	0.000	0.000	0.000	0.056	0.056
52:00:00	0.000	0.000	0.000	0.000	0.055	0.055
52:24:00	0.000	0.000	0.000	0.000	0.055	0.055
52:48:00	0.000	0.000	0.000	0.000	0.055	0.055
53:12:00	0.000	0.000	0.000	0.000	0.054	0.054
53:36:00	0.000	0.000	0.000	0.000	0.054	0.054
54:00:00	0.000	0.000	0.000	0.000	0.053	0.053
54:24:00	0.000	0.000	0.000	0.000	0.053	0.053
54:48:00	0.000	0.000	0.000	0.000	0.052	0.052
55:12:00	0.000	0.000	0.000	0.000	0.052	0.052

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
55:36:00	0.000	0.000	0.000	0.000	0.051	0.051
56:00:00	0.000	0.000	0.000	0.000	0.051	0.051
56:24:00	0.000	0.000	0.000	0.000	0.051	0.051
56:48:00	0.000	0.000	0.000	0.000	0.050	0.050
57:12:00	0.000	0.000	0.000	0.000	0.050	0.050
57:36:00	0.000	0.000	0.000	0.000	0.049	0.049
58:00:00	0.000	0.000	0.000	0.000	0.049	0.049
58:24:00	0.000	0.000	0.000	0.000	0.048	0.048
58:48:00	0.000	0.000	0.000	0.000	0.048	0.048
59:12:00	0.000	0.000	0.000	0.000	0.048	0.048
59:36:00	0.000	0.000	0.000	0.000	0.047	0.047
60:00:00	0.000	0.000	0.000	0.000	0.047	0.047
60:24:00	0.000	0.000	0.000	0.000	0.046	0.046
60:48:00	0.000	0.000	0.000	0.000	0.046	0.046
61:12:00	0.000	0.000	0.000	0.000	0.046	0.046
61:36:00	0.000	0.000	0.000	0.000	0.045	0.045
62:00:00	0.000	0.000	0.000	0.000	0.045	0.045
62:24:00	0.000	0.000	0.000	0.000	0.044	0.044
62:48:00	0.000	0.000	0.000	0.000	0.044	0.044
63:12:00	0.000	0.000	0.000	0.000	0.044	0.044
63:36:00	0.000	0.000	0.000	0.000	0.043	0.043
64:00:00	0.000	0.000	0.000	0.000	0.043	0.043
64:24:00	0.000	0.000	0.000	0.000	0.043	0.043
64:48:00	0.000	0.000	0.000	0.000	0.042	0.042
65:12:00	0.000	0.000	0.000	0.000	0.042	0.042
65:36:00	0.000	0.000	0.000	0.000	0.042	0.042
66:00:00	0.000	0.000	0.000	0.000	0.041	0.041
66:24:00	0.000	0.000	0.000	0.000	0.041	0.041
66:48:00	0.000	0.000	0.000	0.000	0.041	0.041
67:12:00	0.000	0.000	0.000	0.000	0.040	0.040
67:36:00	0.000	0.000	0.000	0.000	0.040	0.040
68:00:00	0.000	0.000	0.000	0.000	0.040	0.040
68:24:00	0.000	0.000	0.000	0.000	0.039	0.039
68:48:00	0.000	0.000	0.000	0.000	0.039	0.039
69:12:00	0.000	0.000	0.000	0.000	0.039	0.039

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
69:36:00	0.000	0.000	0.000	0.000	0.038	0.038
70:00:00	0.000	0.000	0.000	0.000	0.038	0.038
70:24:00	0.000	0.000	0.000	0.000	0.038	0.038
70:48:00	0.000	0.000	0.000	0.000	0.037	0.037
71:12:00	0.000	0.000	0.000	0.000	0.037	0.037
71:36:00	0.000	0.000	0.000	0.000	0.037	0.037
72:00:00	0.000	0.000	0.000	0.000	0.036	0.036
72:24:00	0.000	0.000	0.000	0.000	0.036	0.036
72:48:00	0.000	0.000	0.000	0.000	0.036	0.036
73:12:00	0.000	0.000	0.000	0.000	0.035	0.035
73:36:00	0.000	0.000	0.000	0.000	0.035	0.035
74:00:00	0.000	0.000	0.000	0.000	0.035	0.035
74:24:00	0.000	0.000	0.000	0.000	0.034	0.034
74:48:00	0.000	0.000	0.000	0.000	0.034	0.034
75:12:00	0.000	0.000	0.000	0.000	0.034	0.034
75:36:00	0.000	0.000	0.000	0.000	0.034	0.034
76:00:00	0.000	0.000	0.000	0.000	0.033	0.033
76:24:00	0.000	0.000	0.000	0.000	0.033	0.033
76:48:00	0.000	0.000	0.000	0.000	0.033	0.033
77:12:00	0.000	0.000	0.000	0.000	0.033	0.033
77:36:00	0.000	0.000	0.000	0.000	0.032	0.032
78:00:00	0.000	0.000	0.000	0.000	0.032	0.032
78:24:00	0.000	0.000	0.000	0.000	0.032	0.032
78:48:00	0.000	0.000	0.000	0.000	0.031	0.031
79:12:00	0.000	0.000	0.000	0.000	0.031	0.031
79:36:00	0.000	0.000	0.000	0.000	0.031	0.031
80:00:00	0.000	0.000	0.000	0.000	0.031	0.031
80:24:00	0.000	0.000	0.000	0.000	0.030	0.030
80:48:00	0.000	0.000	0.000	0.000	0.030	0.030
81:12:00	0.000	0.000	0.000	0.000	0.030	0.030
81:36:00	0.000	0.000	0.000	0.000	0.030	0.030
82:00:00	0.000	0.000	0.000	0.000	0.029	0.029
82:24:00	0.000	0.000	0.000	0.000	0.029	0.029
82:48:00	0.000	0.000	0.000	0.000	0.029	0.029
83:12:00	0.000	0.000	0.000	0.000	0.029	0.029

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
83:36:00	0.000	0.000	0.000	0.000	0.028	0.028
84:00:00	0.000	0.000	0.000	0.000	0.028	0.028
84:24:00	0.000	0.000	0.000	0.000	0.028	0.028
84:48:00	0.000	0.000	0.000	0.000	0.028	0.028
85:12:00	0.000	0.000	0.000	0.000	0.027	0.027
85:36:00	0.000	0.000	0.000	0.000	0.027	0.027
86:00:00	0.000	0.000	0.000	0.000	0.027	0.027
86:24:00	0.000	0.000	0.000	0.000	0.027	0.027
86:48:00	0.000	0.000	0.000	0.000	0.027	0.027
87:12:00	0.000	0.000	0.000	0.000	0.026	0.026
87:36:00	0.000	0.000	0.000	0.000	0.026	0.026
88:00:00	0.000	0.000	0.000	0.000	0.026	0.026
88:24:00	0.000	0.000	0.000	0.000	0.026	0.026
88:48:00	0.000	0.000	0.000	0.000	0.025	0.025
89:12:00	0.000	0.000	0.000	0.000	0.025	0.025
89:36:00	0.000	0.000	0.000	0.000	0.025	0.025
90:00:00	0.000	0.000	0.000	0.000	0.025	0.025
90:24:00	0.000	0.000	0.000	0.000	0.025	0.025
90:48:00	0.000	0.000	0.000	0.000	0.024	0.024
91:12:00	0.000	0.000	0.000	0.000	0.024	0.024
91:36:00	0.000	0.000	0.000	0.000	0.024	0.024
92:00:00	0.000	0.000	0.000	0.000	0.024	0.024
92:24:00	0.000	0.000	0.000	0.000	0.024	0.024
92:48:00	0.000	0.000	0.000	0.000	0.023	0.023
93:12:00	0.000	0.000	0.000	0.000	0.023	0.023
93:36:00	0.000	0.000	0.000	0.000	0.023	0.023
94:00:00	0.000	0.000	0.000	0.000	0.023	0.023
94:24:00	0.000	0.000	0.000	0.000	0.023	0.023
94:48:00	0.000	0.000	0.000	0.000	0.022	0.022
95:12:00	0.000	0.000	0.000	0.000	0.022	0.022
95:36:00	0.000	0.000	0.000	0.000	0.022	0.022
96:00:00	0.000	0.000	0.000	0.000	0.022	0.022
96:24:00	0.000	0.000	0.000	0.000	0.022	0.022
96:48:00	0.000	0.000	0.000	0.000	0.021	0.021
97:12:00	0.000	0.000	0.000	0.000	0.021	0.021

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
97:36:00	0.000	0.000	0.000	0.000	0.021	0.021
98:00:00	0.000	0.000	0.000	0.000	0.021	0.021
98:24:00	0.000	0.000	0.000	0.000	0.021	0.021
98:48:00	0.000	0.000	0.000	0.000	0.021	0.021
99:12:00	0.000	0.000	0.000	0.000	0.020	0.020
99:36:00	0.000	0.000	0.000	0.000	0.020	0.020
100:00:00	0.000	0.000	0.000	0.000	0.020	0.020
100:24:00	0.000	0.000	0.000	0.000	0.020	0.020
100:48:00	0.000	0.000	0.000	0.000	0.020	0.020
101:12:00	0.000	0.000	0.000	0.000	0.020	0.020
101:36:00	0.000	0.000	0.000	0.000	0.019	0.019
102:00:00	0.000	0.000	0.000	0.000	0.019	0.019
102:24:00	0.000	0.000	0.000	0.000	0.019	0.019
102:48:00	0.000	0.000	0.000	0.000	0.019	0.019
103:12:00	0.000	0.000	0.000	0.000	0.019	0.019
103:36:00	0.000	0.000	0.000	0.000	0.019	0.019
104:00:00	0.000	0.000	0.000	0.000	0.018	0.018
104:24:00	0.000	0.000	0.000	0.000	0.018	0.018
104:48:00	0.000	0.000	0.000	0.000	0.018	0.018
105:12:00	0.000	0.000	0.000	0.000	0.018	0.018
105:36:00	0.000	0.000	0.000	0.000	0.018	0.018
106:00:00	0.000	0.000	0.000	0.000	0.018	0.018
106:24:00	0.000	0.000	0.000	0.000	0.017	0.017
106:48:00	0.000	0.000	0.000	0.000	0.017	0.017
107:12:00	0.000	0.000	0.000	0.000	0.017	0.017
107:36:00	0.000	0.000	0.000	0.000	0.017	0.017
108:00:00	0.000	0.000	0.000	0.000	0.017	0.017
108:24:00	0.000	0.000	0.000	0.000	0.017	0.017
108:48:00	0.000	0.000	0.000	0.000	0.017	0.017
109:12:00	0.000	0.000	0.000	0.000	0.016	0.016
109:36:00	0.000	0.000	0.000	0.000	0.016	0.016
110:00:00	0.000	0.000	0.000	0.000	0.016	0.016
110:24:00	0.000	0.000	0.000	0.000	0.016	0.016
110:48:00	0.000	0.000	0.000	0.000	0.016	0.016
111:12:00	0.000	0.000	0.000	0.000	0.016	0.016

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m ³ /s)	Net Rain (mm)	Runoff (m ³ /s)	Baseflow (m ³ /s)	Total Flow (m ³ /s)
111:36:00	0.000	0.000	0.000	0.000	0.016	0.016
112:00:00	0.000	0.000	0.000	0.000	0.016	0.016
112:24:00	0.000	0.000	0.000	0.000	0.015	0.015
112:48:00	0.000	0.000	0.000	0.000	0.015	0.015
113:12:00	0.000	0.000	0.000	0.000	0.015	0.015
113:36:00	0.000	0.000	0.000	0.000	0.015	0.015
114:00:00	0.000	0.000	0.000	0.000	0.015	0.015
114:24:00	0.000	0.000	0.000	0.000	0.015	0.015
114:48:00	0.000	0.000	0.000	0.000	0.015	0.015
115:12:00	0.000	0.000	0.000	0.000	0.015	0.015
115:36:00	0.000	0.000	0.000	0.000	0.014	0.014
116:00:00	0.000	0.000	0.000	0.000	0.014	0.014
116:24:00	0.000	0.000	0.000	0.000	0.014	0.014
116:48:00	0.000	0.000	0.000	0.000	0.014	0.014
117:12:00	0.000	0.000	0.000	0.000	0.014	0.014
117:36:00	0.000	0.000	0.000	0.000	0.014	0.014
118:00:00	0.000	0.000	0.000	0.000	0.014	0.014
118:24:00	0.000	0.000	0.000	0.000	0.014	0.014
118:48:00	0.000	0.000	0.000	0.000	0.013	0.013
119:12:00	0.000	0.000	0.000	0.000	0.013	0.013
119:36:00	0.000	0.000	0.000	0.000	0.013	0.013
120:00:00	0.000	0.000	0.000	0.000	0.013	0.013
120:24:00	0.000	0.000	0.000	0.000	0.013	0.013
120:48:00	0.000	0.000	0.000	0.000	0.013	0.013
121:12:00	0.000	0.000	0.000	0.000	0.013	0.013
121:36:00	0.000	0.000	0.000	0.000	0.013	0.013
122:00:00	0.000	0.000	0.000	0.000	0.013	0.013
122:24:00	0.000	0.000	0.000	0.000	0.012	0.012
122:48:00	0.000	0.000	0.000	0.000	0.012	0.012

Appendix

Catchment descriptors

Name	Value	User-defined value used?
Area (km ²)	1.72	No
ALTBAR	76	No
ASPBAR	307	No
ASPVAR	0.59	No
BFIHOST	0.8	No
BFIHOST19	0.73	No
DPLBAR (km)	2.03	No
DPSBAR (mkm ⁻¹)	72.6	No
FARL	1	No
LDP	3.44	No
PROPWET	0.37	No
RMED1H	10.7	No
RMED1D	28.6	No
RMED2D	39.5	No
SAAR (mm)	767	No
SAAR4170 (mm)	744	No
SPRHOST	18.49	No
URBEXT2000	0	No
URBEXT1990	0	No
URBCONC	0	No
URBLOC	0	No
DDF parameter C	-0.02	No
DDF parameter D1	0.29	No
DDF parameter D2	0.38	No
DDF parameter D3	0.3	No
DDF parameter E	0.29	No
DDF parameter F	2.46	No
DDF parameter C (1km grid value)	-0.02	No
DDF parameter D1 (1km grid value)	0.29	No
DDF parameter D2 (1km grid value)	0.4	No
DDF parameter D3 (1km grid value)	0.28	No
DDF parameter E (1km grid value)	0.29	No
DDF parameter F (1km grid value)	2.47	No

Appendix D EA Correspondence

From: GMMC Info Requests <InfoRequests.GMMC@environment-agency.gov.uk>
Sent: 03 March 2025 12:08
To: [REDACTED]
Subject: GMMC370715LB Response from the Environment Agency

Caution: This is an external email and may be malicious. Please take care when clicking links or opening attachments.

Dear [REDACTED],

Thank you for your further query. I have forwarded it to the team and will be in touch shortly,

Kind regards,

[REDACTED]
Customer and Engagement Officer

Greater Manchester, Merseyside and Cheshire

Office address: Richard Fairclough House, Knutsford Road, Latchford, Warrington, WA4 1HT

From: [REDACTED]@waterco.co.uk>
Sent: 03 March 2025 11:18
To: GMMC Info Requests <InfoRequests.GMMC@environment-agency.gov.uk>
Subject: RE: GMMC370715LB Response from the Environment Agency

Hi [REDACTED],

Thanks for sending over the officers response.

We appreciate the 1000 year return period was not provided in the package of the Ince and Frodsham 2011 modelling report, however as the run files (.ief and .tcf) for the Q1000 year were provided in the model files, we had assumed the EA had simulated this event and just not written up the results.

Are the results for the Q1000 Do Minimum/Do Nothing scenario available separately, or is there a reason why they were not included in the reporting (i.e. model did not run/complete). The model was previously run in an older version FMP-TUFLOW as such when run in the latest software the model crashes, which is why we are hoping the EA have the model results on their filing system.

Thanks,

[REDACTED] [REDACTED]
Senior Hydraulic Modeller





From: GMMC Info Requests <InfoRequests.GMMC@environment-agency.gov.uk>

Sent: Thursday, February 27, 2025 3:32 PM

To: [REDACTED]

Subject: GMMC370715LB Response from the Environment Agency

Caution: This is an external email and may be malicious. Please take care when clicking links or opening attachments.

Dear [REDACTED],

Thank you for your further enquiry

Please see response from our relevant officer

In the Ince and Frodsham 2011 modelling report the 100-year plus climate change and 1000-year return periods were not provided as part of the package of works.

Please use the information in the P7 to extrapolate any other return periods as required.

If needed, we can re-supply the P567.

Kind regards,

[REDACTED]
Customer and Engagement Officer

Greater Manchester, Merseyside and Cheshire

Email: inforequests.gmmc@environment-agency.gov.uk

Office address: Richard Fairclough House, Knutsford Road, Latchford, Warrington, WA4 1HT

From: GMMC Info Requests

Sent: 25 February 2025 10:57

To: [REDACTED]

Subject: GMMC370715LB Response from the Environment Agency - request for missing Q1000 data

Dear [REDACTED],

Thank you for your further query. I have forwarded it to the team and will be in touch shortly,

Kind regards,

[REDACTED]
Customer and Engagement Officer

Greater Manchester, Merseyside and Cheshire

Office address: Richard Fairclough House, Knutsford Road, Latchford, Warrington, WA4 1HT

From: [REDACTED]
Sent: 24 February 2025 11:20
To: GMMC Info Requests <InfoRequests.GMMC@environment-agency.gov.uk>
Subject: RE: GMMC370715LB Response from the Environment Agency - request for missing Q1000 data

Hi [REDACTED],

I hope you are well.

You provided my colleague the Ince and Frodsham 2011 model back in August 2024. However, the results for the option models Do Nothing and Do Minimum did not include the FMP-TUFLOW results for the Q100CC or Q1000 events, only lower return periods were provided in the link below. We are mainly looking for the FMP Q1000 results for both the Do Nothing and Do Minimum scenarios. Is this something you can provide as a matter of urgency as we would have expected them to be in the original package of the model as such the missing data is currently holding up our scheme.

Should you have any queries please do not hesitate to ask.

Many thanks,

[REDACTED]
[REDACTED]
Senior Hydraulic Modeller



For email confidentiality, limitations and company details please see our disclaimer webpage. Registered in Wales under company no. 3577754. Waterco Ltd, Eden Court, Ruthin LL15 1NJ. Please click for our GDPR policy.

 Please consider the environment before printing this email.

From: GMMC Info Requests <InfoRequests.GMMC@environment-agency.gov.uk>
Sent: Monday, August 5, 2024 3:27 PM
To: [REDACTED]
Subject: GMMC370715LB Response from the Environment Agency

Caution: This is an external email and may be malicious. Please take care when clicking links or opening attachments.

Dear [REDACTED],

Thank you for your enquiry which was received on 02/08/2024.

We respond to requests under the Freedom of Information Act 2000 and Environmental Information Regulations 2004.

The following information is not available under the Open Government Licence but we may be able to license it to you under the [Environment Agency Conditional Licence](#):

The ShareFile links contains the following data:

<https://ea.sharefile.com/d-s19c95271484642dc9b6647ba6e85a80c>

Ince and Frodsham 2011 Report (P5) Outputs (P6) Mapedit (P6) Model (P7)

Please can you advise that the link will expire in 30 days from 05/08/2024. It is therefore advisable that the client saves this data to their own system.

Product 5/6/7

1. You may use the Information for your internal or personal purposes and may only sublicense others to use it if you do so under a written licence which includes the terms of these conditions and the agreement and in particular may not allow any period of use longer than the period licensed to you.
2. Notwithstanding the fact that the standard wording of the Environment Agency Conditional Licence indicates that it is perpetual, this Licence has a limited duration of 5 years at the end of which it will terminate automatically without notice.
3. We have restricted use of the Information as a result of legal restrictions placed upon us to protect the rights or confidentiality of others. In this instance it is because of third party data. If you contact us in writing (this includes email) we will, as far as confidentiality rules allow, provide you with details including, if available, how you might seek permission from a third party to extend your use rights.
- 4.1 The Information may contain some data that we believe is within the definition of "personal data" under the Data Protection Act 1998 but we consider that we will not be in breach of the Act if we disclose it to you with conditions set out in this condition and the conditions above. This personal data comprises names of individuals or commentary relating to property that may be owned by an individual or commentary relating to the activities of an individual.
- 4.2 Under the Act a person who holds and uses or passes to others personal data is responsible for any compliance with the Act and so we have no option but to warn you that this means you have responsibility to check that you are compliant with the Act in respect of this personal data.
- 5 The location of public water supply abstraction sources must not be published to a resolution more detailed than 1km². Information about the operation of flood assets should not be published.
- 6 .1 Where we have supplied model data which may include model inputs or outputs you agree to supply to the Environment Agency copies of any assessments/studies and related outputs, modifications or derivatives created pursuant to the supply to you of the Information, all of which are hereinafter referred to as "the Data".
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Please get in touch if you have any further queries or contact us within two months if you'd like us to review the information we have sent.

Kind regards,

[Redacted Signature]

Customer and Engagement Officer

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