

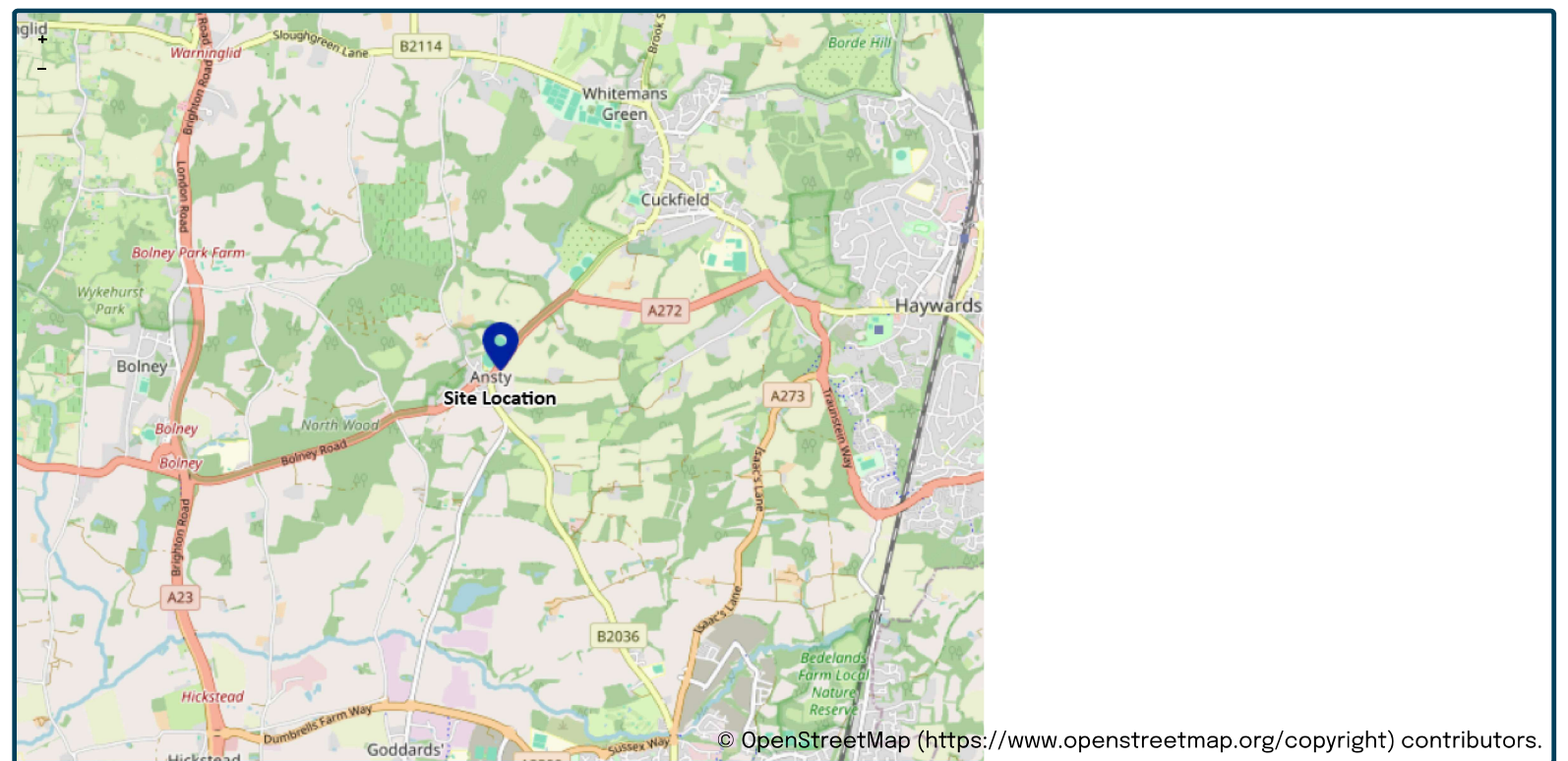
This is an estimation of the storage volume requirements that are needed to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). It is recommended that the total storage volume for the site is distributed across the site using multiple SuDS and that hydraulic modelling software is used to undertake and finalise the detailed design of the drainage system.

Project details

Date	11/02/2026
Calculated by	Richard Pelham
Reference	PTC-BTF-005
Model version	2.2.2

Location

Site name	Birch Tree Farm
Site location	Ansty



Site easting (British National Grid)	529207
Site northing (British National Grid)	123174

Site areas

Total site area (ha)	0.0704	ha
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Roof area

Total roof area (ha)	0.0169	ha
Contributing roof area (ha)	0.0169	ha
Non-contributing roof area (ha)	0	ha

Paved area

Total paved area (ha)	0.0218	ha
Contributing paved area (ha)	0.0218	ha
Non-contributing paved area (ha)	0	ha

Grass / vegetated area

Total grass / vegetated area (ha)	0.0179	ha
Contributing grass / vegetated area (ha)	0	ha
Non-contributing grass / vegetated area (ha)	0.0179	ha

Total area

Total contributing area (ha)	0.0387	ha
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Contributing areas with urban creep allowance

Urban creep allowance factor	+10%	
Contributing roof area (adjusted for urban creep) (ha)	0.0169	ha
Contributing paved area (adjusted for urban creep) (ha)	0.0218	ha
Contributing grass / vegetated area (adjusted for urban creep) (ha)	0	ha

Storage design parameters

Storage base shape	Rectangular / square	
Storage base length to width ratio	2:1	
Storage design depth (m)	1.7	m
Storage side slope (1 in x)	1 in 1	
Storage voids ratio (%)	90% (e.g. geocellular crate systems)	
Storage volume design return period (years)	1:100 years	

Discharge flow rate from the site

Method

Type of site

Greenfield

Specify the method

IH124

IH124

SAAR (mm)

My value

815

mm

Map/default value

815

How should SPR be derived?

Estimate using BFI

BFIHOST

0.49

SPR

0.394

Total area for greenfield runoff calculation (ha)

0.0566

ha

0.0566

QBar (l/s)

0.2

l/s

Hydrological region

7

7

Return period (years)

Qbar (1:2.3 years)

Growth curve factor

1

Flow rate (IH124) (l/s)

0.2

l/s

Final discharge rate

Runoff calculation method

IH124

Design flow rate (l/s)

0.2

l/s

Blockage risk

Specify the method

Flow rate

Minimum discharge flow rate to prevent blockage

1l/s

Design orifice diameter (mm)

My value

19

mm

Calculated value

19

Flow rate of orifice (l/s)

0.98

l/s

Rainfall and runoff

Rainfall input type

Generic rainfall CSV file

design_rainfall_grid BTF.csv

Climate change allowance factor

145%

Specify the runoff method from grass / vegetated areas

Fixed percentage - equal to SPR

How should SPR be derived?

My value

Estimate using BFI

Map value

Model results

- Maximum discharge flow rate: 1.0 (l/s)
- Outflow orifice diameter: 19 (mm)
- Storage base length: 3.1 (m)
- Storage base width: 1.5 (m)
- Storage base area: 4.8 (m²)
- Storage total volume: 28 (m³)
- Storage total water volume: 25 (m³)
- Storm return periods run: 1, 2, 5, 10, 30, 100, 200 (years)
- Storm durations run: 15, 30, 60, 120, 180, 240, 360, 540, 720, 900, 1080, 1440, 1800, 2160, 2880 (minutes)

Return Period (years)	Critical Duration (minutes)	Peak Flow Rate (l/s)	Max Depth (m)	Max water volume (m ³)	Max storage volume (m ³)
1	2880	0.03	0.01	0.0	0.0
2	240	0.7	0.87	7.8	8.7
5	240	0.8	1.12	12	13
10	240	0.8	1.27	15	17
30	240	0.9	1.48	20	22
<u>100</u>	<u>240</u>	<u>1.0</u>	<u>1.70</u>	<u>25</u>	<u>28</u>
200	360	1.0	1.83	29	32

Please note runoff estimation and storage volume estimation are subject to uncertainty. Storage volume results are therefore reported to the nearest 1 m³ value, unless storage volumes are less than 10 m³, in which case, storage volumes are provided to 1 decimal place.

Disclaimer

This report was produced using the surface water storage volume design tool (2.2.2) developed by HR Wallingford and available at [uksuds.com](https://www.uksuds.com/) (<https://www.uksuds.com/>). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at [uksuds.com/terms-conditions](https://www.uksuds.com/terms-conditions) (<https://www.uksuds.com/terms-conditions>). The outputs from this tool have been used to estimate surface water storage volumes for the whole site based on a limiting discharge rate from the site. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

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Appendix A – Rainfall Depths

Rainfall depths (mm) with climate change

Duration (minutes)	Duration (hours)	1 years	2 years	5 years	10 years	30 years	100 years	200 years
15	0.25	0.02	11.37	18.10	22.33	29.23	36.83	41.32
30	0.5	0.03	14.94	23.59	29.58	39.00	49.36	55.94
60	1	0.06	18.91	29.72	37.41	49.50	63.42	71.92
120	2	0.12	26.74	38.98	47.41	60.74	76.17	85.83
180	3	0.18	31.74	44.76	53.78	67.90	84.51	95.16
240	4	0.24	35.38	49.00	58.42	73.20	90.84	102.43
360	6	0.36	40.50	55.01	64.92	80.78	100.33	113.69
540	9	0.54	45.62	61.00	71.48	88.65	110.77	126.66
720	12	0.72	49.34	65.32	76.28	94.50	118.83	136.82
900	15	0.91	52.32	68.80	80.14	99.25	125.56	145.19
1080	18	1.09	54.85	71.72	83.39	103.27	131.28	152.26
1440	24	1.45	59.16	76.57	88.78	109.88	140.68	163.53
1800	30	1.81	62.94	80.82	93.44	115.49	148.29	172.39
2160	36	2.17	66.40	84.72	97.66	120.49	154.82	179.86
2880	48	2.90	72.70	91.81	105.27	129.33	165.84	192.13

Rainfall depths (mm) without climate change

Duration (minutes)	Duration (hours)	1 years	2 years	5 years	10 years	30 years	100 years	200 years
15	0.25	0.01	7.84	12.48	15.40	20.16	25.40	28.50
30	0.5	0.02	10.30	16.27	20.40	26.90	34.04	38.58
60	1	0.04	13.04	20.50	25.80	34.14	43.74	49.60
120	2	0.08	18.44	26.88	32.70	41.89	52.53	59.19
180	3	0.13	21.89	30.87	37.09	46.83	58.28	65.63
240	4	0.17	24.40	33.79	40.29	50.48	62.65	70.64
360	6	0.25	27.93	37.94	44.77	55.71	69.19	78.41
540	9	0.38	31.46	42.07	49.30	61.14	76.39	87.35
720	12	0.50	34.03	45.05	52.61	65.17	81.95	94.36
900	15	0.63	36.08	47.45	55.27	68.45	86.59	100.13
1080	18	0.75	37.83	49.46	57.51	71.22	90.54	105.01
1440	24	1.00	40.80	52.81	61.23	75.78	97.02	112.78
1800	30	1.25	43.41	55.74	64.44	79.65	102.27	118.89
2160	36	1.50	45.79	58.43	67.35	83.10	106.77	124.04
2880	48	2.00	50.14	63.32	72.60	89.19	114.37	132.50