

RPS Group Plc		Page 1
Noble House, Capital Drive Linford Wood Mitlton Keynes, MK14 6QP	HLEF81443 Elba Crescent (Residential) Greenfield Runoff Rates (60%)	
Date 12/01/2022 11:55 File HLEF81443.SRCX	Designed by LS Checked by	
Innovyze	Source Control 2020.1	

ICP SUDS Mean Annual Flood

Input

Return Period (years) 100 SAAR (mm) 1078 Urban 0.000
Area (ha) 0.240 Soil 0.400 Region Number Region 9

Results 1/s

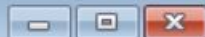
QBAR Rural 1.4
QBAR Urban 1.4

Q100 years 3.0

Q1 year 1.2
Q30 years 2.4
Q100 years 3.0



Quick Storage Estimate



Variables

Results

Design

Overview 2D

Overview 3D

Vt

Variables

FSR Rainfall

Return Period (years)

100

Region

England and Wales

Map

M5-60 (mm)

18.000

Ratio R

0.267

Cv (Summer)

0.750

Cv (Winter)

0.840

Impermeable Area (ha)

0.240

Maximum Allowable Discharge (l/s)

1.4

Infiltration Coefficient (m/hr)

0.00000

Safety Factor

2.0

Climate Change (%)

40



Analyse

OK

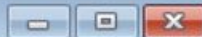
Cancel

Help

Enter Maximum Allowable Discharge between 0.0 and 999999.0



Quick Storage Estimate



Variables

Results

Design

Overview 2D

Overview 3D

Vt

Results

Global Variables require approximate storage of between 173 m³ and 268 m³.

These values are estimates only and should not be used for design purposes.

Analyse

OK

Cancel

Help

Enter Maximum Allowable Discharge between 0.0 and 999999.0

RPS Group Plc		Page 1
Noble House, Capital Drive Linford Wood Mitlton Keynes, MK14 6QP	HLEF81443 Elba Crescent (Residential) Greenfield Runoff Rate (70%)	
Date 12/01/2022 11:58 File HLEF81443.SRCX	Designed by LS Checked by	
Innovyze	Source Control 2020.1	

ICP SUDS Mean Annual Flood

Input

Return Period (years) 100 SAAR (mm) 1078 Urban 0.000
Area (ha) 0.280 Soil 0.400 Region Number Region 9

Results 1/s

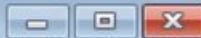
QBAR Rural 1.6
QBAR Urban 1.6

Q100 years 3.4

Q1 year 1.4
Q30 years 2.8
Q100 years 3.4



Quick Storage Estimate



Variables

Results

Design

Overview 2D

Overview 3D

Vt

Variables

FSR Rainfall



Return Period (years)

100

Region

England and Wales



Map

M5-60 (mm)

18.000

Ratio R

0.267

Cv (Summer)

0.750

Cv (Winter)

0.840

Impemeable Area (ha)

0.280

Maximum Allowable Discharge (l/s)

1.6

Infiltration Coefficient (m/hr)

0.00000



Safety Factor

2.0

Climate Change (%)

40

Analyse

OK

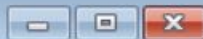
Cancel

Help

Enter Maximum Allowable Discharge between 0.0 and 999999.0



Quick Storage Estimate



Variables

Results

Design

Overview 2D

Overview 3D

Vt

Results

Global Variables require approximate storage of between 203 m³ and 315 m³.

These values are estimates only and should not be used for design purposes.

Analyse

OK

Cancel

Help

Enter Maximum Allowable Discharge between 0.0 and 999999.0

Appendix F

Pre- and Post- Development Surface Water Runoff

Our ref: HLEF81443

20 Farringdon Street
London, EC4A 4AB
T +44 20 72 803 240

Date: 12th January 2022

Design Rainfall

- 1.1 The rainfall used to derive the surface water runoff rates and volumes was obtained from the Flood Estimation Handbook (FEH) Web Service¹, depth-duration-frequency model. This provides design rainfall intensities for a range of return periods and storm durations, which are presented in Table 1.

Table 1 - Design Rainfall Intensity (mm/hour)

	Storm Durations (hr)								
	0.25	0.5	1	2	3	5	12	24	48
1	25.24	17.04	11.21	7.77	6.20	4.64	2.68	1.67	1.09
2	32.64	22.14	14.48	9.63	7.57	5.54	3.12	1.91	1.24
5	43.24	29.1	19.13	12.21	9.40	6.73	3.69	2.23	1.44
10	50.92	34.82	22.87	14.21	10.82	7.65	4.12	2.48	1.58
30	63.36	43.66	29	17.60	13.16	9.17	4.86	2.90	1.83
50	69.12	47.88	32.04	19.29	14.37	9.93	5.23	3.12	1.95
100	77.6	54.44	36.51	21.82	16.19	11.16	5.83	3.46	2.14
100+5%	81.48	57.162	38.3355	22.91	17.00	11.72	6.13	3.63	2.24
100+10%	85.36	59.884	40.161	24.00	17.81	12.27	6.42	3.80	2.35
100+20%	93.12	65.328	43.812	26.18	19.43	13.39	7.00	4.15	2.57
100+30%	100.88	70.772	47.463	28.37	21.05	14.51	7.58	4.50	2.78
100+40%	108.64	76.216	51.114	30.55	22.67	15.62	8.17	4.84	2.99

Climate Change

- 1.2 Climate change is currently predicted to increase the wetness of winters and the dryness of summers. The intensity of storm events is anticipated to increase with rises of 5% expected by 2025, 10% by 2055, 20% by 2085 and 40% by 2115.

¹ Centre for Ecology & Hydrology (2016), Flood Estimation Handbook (FEH) [Accessed online on 08/05/2019 at <https://fehweb.ceh.ac.uk/>]

Existing Surface Water Runoff Rates

- 1.3 The site area is approximately 4'000 m² and it currently consists of approximately 30% impermeable area.
- 1.4 The Wallingford Modified Rational Method has been used to estimate the surface water runoff generated during peak rainfall events based on the nature of the ground surface (hard standing, vegetation, etc) and rainfall depth, duration and frequency information for the immediate area. A runoff coefficient of 1 and 0.3 was applied for the impermeable and permeable areas respectively in line with best practise for surface water runoff estimation.
- 1.5 The results of this calculation for a range of return periods are presented in Table 2.

Table 2 – Existing Surface Water Runoff Rates (l/s)

	Storm Durations (hr)								
	0.25	0.5	1	2	3	5	12	24	48
1	8.5	5.7	3.8	2.6	2.1	1.6	0.9	0.6	0.4
2	11.0	7.4	4.9	3.2	2.5	1.9	1.0	0.6	0.4
5	14.5	9.8	6.4	4.1	3.2	2.3	1.2	0.7	0.5
10	17.1	11.7	7.7	4.8	3.6	2.6	1.4	0.8	0.5
30	21.3	14.7	9.7	5.9	4.4	3.1	1.6	1.0	0.6
50	23.2	16.1	10.8	6.5	4.8	3.3	1.8	1.0	0.7
100	26.1	18.3	12.3	7.3	5.4	3.7	2.0	1.2	0.7
100+5%	27.4	19.2	12.9	7.7	5.7	3.9	2.1	1.2	0.8
100+10%	28.7	20.1	13.5	8.1	6.0	4.1	2.2	1.3	0.8
100+20%	31.3	22.0	14.7	8.8	6.5	4.5	2.4	1.4	0.9
100+30%	33.9	23.8	15.9	9.5	7.1	4.9	2.5	1.5	0.9
100+40%	36.5	25.6	17.2	10.3	7.6	5.2	2.7	1.6	1.0

- 1.6 The surface water runoff volume for the existing site are presented in Table 3.

Table 3 – Existing Surface Water Runoff Volume (m³)

	Storm Durations (hr)								
	0.25	0.5	1	2	3	5	12	24	48
1	7.6	10.3	13.6	18.8	22.5	28.0	38.9	48.5	63.4
2	9.9	13.4	17.5	23.3	27.5	33.5	45.2	55.4	72.1
5	13.1	17.6	23.1	29.5	34.1	40.7	53.5	64.7	83.4
10	15.4	21.1	27.7	34.4	39.3	46.2	59.8	71.9	92.0
30	19.2	26.4	35.1	42.6	47.8	55.4	70.5	84.1	106.2
50	20.9	29.0	38.8	46.7	52.1	60.1	75.9	90.4	113.4

Our ref: HLEF81119/002L

100	23.5	32.9	44.2	52.8	58.8	67.5	84.7	100.4	124.1
100+5%	24.6	34.6	46.4	55.4	61.7	70.9	88.9	105.4	130.3
100+10%	25.8	36.2	48.6	58.1	64.6	74.2	93.2	110.4	136.5
100+20%	28.2	39.5	53.0	63.3	70.5	81.0	101.6	120.5	148.9
100+30%	30.5	42.8	57.4	68.6	76.4	87.7	110.1	130.5	161.4
100+40%	32.9	46.1	61.8	73.9	82.3	94.5	118.6	140.5	173.8