Summary of Results for 100 year Return Period (+45%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	42.496	0.496	4.3	0.0	4.3	624.7	O K
30 min Summer	42.664	0.664	4.3	0.0	4.3	837.1	O K
60 min Summer	42.847	0.847	4.3	0.0	4.3	1067.3	O K
120 min Summer	43.032	1.032	4.3	0.0	4.3	1300.5	O K
180 min Summer	43.151	1.151	4.3	0.0	4.3	1450.2	O K
240 min Summer	43.239	1.239	4.4	0.0	4.4	1561.3	O K
360 min Summer	43.367	1.367	4.6	0.0	4.6	1722.0	O K
480 min Summer	43.458	1.458	4.7	0.0	4.7	1837.0	O K
600 min Summer	43.526	1.526	4.8	0.0	4.8	1923.2	O K
720 min Summer	43.579	1.579	4.9	0.0	4.9	1989.8	O K
960 min Summer	43.653	1.653	5.0	0.0	5.0	2082.9	O K
1440 min Summer	43.721	1.721	5.1	0.0	5.1	2168.1	O K
2160 min Summer	43.723	1.723	5.1	0.0	5.1	2171.5	O K
2880 min Summer	43.684	1.684	5.0	0.0	5.0	2121.6	O K
4320 min Summer	43.573	1.573	4.9	0.0	4.9	1981.6	O K
5760 min Summer	43.496	1.496	4.8	0.0	4.8	1885.1	O K
7200 min Summer	43.458	1.458	4.7	0.0	4.7	1836.8	O K
8640 min Summer	43.436	1.436	4.7	0.0	4.7	1809.4	O K
10080 min Summer	43.425	1.425	4.7	0.0	4.7	1796.1	O K
15 min Winter	42.556	0.556	4.3	0.0	4.3	700.3	O K
30 min Winter	42.745	0.745	4.3	0.0	4.3	938.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
15 min Summer	141.021	0.0	367.2	0.0	19
30 min Summer	94.678	0.0	335.4	0.0	34
60 min Summer	60.630	0.0	665.9	0.0	64
120 min Summer	37.271	0.0	655.9	0.0	124
180 min Summer	27.931	0.0	676.3	0.0	184
240 min Summer	22.724	0.0	700.2	0.0	244
360 min Summer	16.947	0.0	733.2	0.0	364
480 min Summer	13.743	0.0	755.8	0.0	484
600 min Summer	11.660	0.0	771.9	0.0	602
720 min Summer	10.181	0.0	783.7	0.0	722
960 min Summer	8.193	0.0	798.9	0.0	962
1440 min Summer	5.968	0.0	808.9	0.0	1442
2160 min Summer	4.289	0.0	1565.4	0.0	2160
2880 min Summer	3.382	0.0	1571.3	0.0	2880
4320 min Summer	2.414	0.0	1546.6	0.0	3672
5760 min Summer	1.911	0.0	2880.0	0.0	4432
7200 min Summer	1.612	0.0	2810.5	0.0	5192
8640 min Summer	1.413	0.0	2761.4	0.0	6048
10080 min Summer	1.271	0.0	2706.6	0.0	6856
15 min Winter	141.021	0.0	360.0	0.0	19
30 min Winter	94.678	0.0	319.5	0.0	34

Summary of Results for 100 year Return Period (+45%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
60 min Winter	42.950	0.950	4.3	0.0	4.3	1196.9	O K
120 min Winter	43.158	1.158	4.3	0.0	4.3	1459.7	O K
180 min Winter	43.293	1.293	4.5	0.0	4.5	1629.5	O K
240 min Winter	43.393	1.393	4.7	0.0	4.7	1755.8	O K
360 min Winter	43.539	1.539	4.9	0.0	4.9	1939.3	O K
480 min Winter	43.644	1.644	5.0	0.0	5.0	2071.9	O K
600 min Winter	43.724	1.724	5.1	0.0	5.1	2172.4	O K
720 min Winter	43.786	1.786	5.2	0.0	5.2	2250.8	O K
960 min Winter	43.875	1.875	5.3	0.0	5.3	2362.9	O K
1440 min Winter	43.964	1.964	5.4	0.0	5.4	2474.3	O K
2160 min Winter	43.987	1.987	5.4	0.0	5.4	2503.7	O K
2880 min Winter	43.963	1.963	5.4	0.0	5.4	2474.0	O K
4320 min Winter	43.862	1.862	5.3	0.0	5.3	2346.5	O K
5760 min Winter	43.765	1.765	5.1	0.0	5.1	2223.4	O K
7200 min Winter	43.706	1.706	5.1	0.0	5.1	2149.3	O K
8640 min Winter	43.672	1.672	5.0	0.0	5.0	2107.0	O K
10080 min Winter	43.650	1.650	5.0	0.0	5.0	2078.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
60 min Winter	60.630	0.0	655.5	0.0	64
120 min Winter	37.271	0.0	675.7	0.0	122
180 min Winter	27.931	0.0	710.7	0.0	182
240 min Winter	22.724	0.0	735.4	0.0	242
360 min Winter	16.947	0.0	769.6	0.0	360
480 min Winter	13.743	0.0	792.4	0.0	478
600 min Winter	11.660	0.0	808.4	0.0	596
720 min Winter	10.181	0.0	819.9	0.0	714
960 min Winter	8.193	0.0	833.7	0.0	950
1440 min Winter	5.968	0.0	839.4	0.0	1414
2160 min Winter	4.289	0.0	1641.1	0.0	2100
2880 min Winter	3.382	0.0	1639.4	0.0	2768
4320 min Winter	2.414	0.0	1596.5	0.0	4060
5760 min Winter	1.911	0.0	2979.5	0.0	4608
7200 min Winter	1.612	0.0	2971.2	0.0	5544
8640 min Winter	1.413	0.0	2938.5	0.0	6480
10080 min Winter	1.271	0.0	2880.8	0.0	7368

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 403424 96712 SZ 03424 96712
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+45

Time Area Diagram

Total Area (ha) 2.380

Time (mins) From:	To:	Area (ha)
0	4	2.380

Model Details

Storage is Online Cover Level (m) 44.525

Tank or Pond Structure

Invert Level (m) 42.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1260.0	2.000	1260.0	2.001	0.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0093-5200-2000-5200
Design Head (m)	2.000
Design Flow (l/s)	5.2
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	93
Invert Level (m)	41.810
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.000	5.2
Flush-Flo™	0.405	4.3
Kick-Flo®	0.832	3.5
Mean Flow over Head Range	-	4.1

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.0	1.200	4.1	3.000	6.3	7.000	9.4
0.200	4.0	1.400	4.4	3.500	6.8	7.500	9.7
0.300	4.3	1.600	4.7	4.000	7.2	8.000	10.0
0.400	4.3	1.800	4.9	4.500	7.6	8.500	10.3
0.500	4.3	2.000	5.2	5.000	8.0	9.000	10.6
0.600	4.2	2.200	5.4	5.500	8.4	9.500	10.8
0.800	3.6	2.400	5.7	6.000	8.7		
1.000	3.8	2.600	5.9	6.500	9.1		

Weir Overflow Control

Discharge Coef 0.544 Width (m) 1.000 Invert Level (m) 44.300

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Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Sean Whelan
Site name:	Canford EfW
Site location:	Wimborne

This is an estimation of the greenfield runoff rates that are used 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). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	50.77017° N
Longitude:	1.95232° W
Reference:	2657742111
Date:	Nov 10 2022 13:37

Runoff estimation approach IH124

Site characteristics

Total site area (ha): 1

Methodology

Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics	Default	Edited
SOIL type:	2	2
HOST class:	N/A	N/A
SPR/SPRHOST:	0.3	0.3

Hydrological characteristics	Default	Edited
SAAR (mm):	823	823
Hydrological region:	7	7
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 30 years:	2.3	2.3
Growth curve factor 100 years:	3.19	3.19
Growth curve factor 200 years:	3.74	3.74

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates	Default	Edited
Q_{BAR} (l/s):	2.2	2.2
1 in 1 year (l/s):	1.87	1.87
1 in 30 years (l/s):	5.07	5.07
1 in 100 year (l/s):	7.03	7.03
1 in 200 years (l/s):	8.24	8.24

CALCULATIONS

Company:	WIE	Office:	London
Sheet No:	1 of 3	Project No:	WIE18278
By	S Whelan	Date	09/12/2022
Checked:	B McCarthy	Date	09/12/2022

Project Title Canford EfW CHP Facility

Calculations Title Summary of surface water strategy

LOCATION	CALCULATIONS	OPTIONS

Surface water at the Site will be managed in accordance with the Local Authority requirements, i.e. surface water discharge restricted to the greenfield runoff rate, including for the impacts of climate change.

Existing surface water discharge from EfW CHP Facility:

	Area (ha)	Calculation method	Discharge Rate
Site Area	2.380	Wallingford (Page 2)	265.2 l/s
(calculated with PIMP of	## %)		

Existing discharge rate for 1 in 100 year storm (PIMP = 100%) = 265.2 l/s

Proposed discharge rate:

Greenfield runoff rates: 7.0 l/s/ha 16.7 l/s

	l/s/ha	l/s
Q_{BAR}	2.2	5.2
1 in 1 year	1.87	4.4
1 in 30 year	5.07	12.1
1 in 100 year	7.03	16.7
1 in 200 year	8.24	19.6

Proposed discharge for the Site is at the Q_{BAR} greenfield runoff rate = 5.2 l/s

The proposed discharge rate results in a 98% reduction in peak runoff from the Site.

Storage requirements:

A required storage volume of 2505 m^3 has been calculated for the Site using MicroDrainage Source Control. Runoff from the Site was limited 5.2 l/s and storage been represented within a single feature to identify to total storage required for the Site.

Storage provided = 2,511 m^3 ,see stroage details on sheet 3

CALCULATIONS

Company:	WIE	Office:	London
Sheet No:	2 of 3	Project No:	WIE18278
By	S Whelan	Date	09/12/2022
Checked:	B McCarthy	Date	09/12/2022

Project Title Canford EfW CHP Facility

Calculations Title Existing Discharge Rate - Modified Rational Method

LOCATION	CALCULATIONS	OPTIONS
	Calculations based on: Design and Analysis of urban storm drainage. The Wallingford Procedure, Volume 1 Principles methods and practice.	
	User Input Data	
	Total site area 2.38 ha	
	SAAR (From FEH) 575	
	Rainfall Intensity (From FEH) 41.81	
	PIMP (% impervious) 100 %	
	Soil Type 0.30	
	Very Low Runoff (well drained sandy, loamy or earthy peat soils) 0.15	
	Low Runoff (Very permeable soils (e.g. gravel, sand) 0.30	
	Moderate (Very fine sands, silts and sedimentary clays) 0.40	
	High Runoff (Clayey or loamy soils) 0.45	
	Very High Runoff (Soils of the wet uplands) 0.50	
Fig. 9.7	UCWI (From Figure 9.7 of Wallingford Method) 52	
Eqn. 13	Qp (peak discharge) = 2.78 Cv CR i A	
	Where: Qp (Peak Discharge) i = rainfall intensity A = Total Area	
From FEH	Average rainfall Intensity (i)	
	M100_60 is: 41.81 mm	
Eqn 7.20	Cv = PR/100	
Eqn 7.3	PR = (0.829 PIMP) + (25.0 SOIL) + (0.078 UCWI) - 20.7	
	PIMP (Percentage of catchment which is impervious) 100 %	
Page 52	Note: PIMP can not be less than 40% 40 %	
	Thus value of PIMP to be used 100 %	
	Soil: 0.30 UCWI: 52	
	PR = 73.76	
	Thus Cv = 0.74	
Sec 7.10	CR (Recommended for simulation and design) 1.3	
	Qp for 1 in 100 year 60 minute duration = 265.2 l/s or 111.4 l/s/ha	

waterman

CALCULATIONS

Company:	WIE	Office:	London
Sheet No:	3of 3	Project No:	WIE18278
By	S Whelan	Date	09/12/2022
Checked:	B McCarthy	Date	09/12/2022

Project Title **Canford Energy from Waste Facility**

Calculations Title **Proposed surface water storage**

LOCATION	CALCULATIONS	OPTIONS

Surface water at the Site will be managed in accordance with the Local Authority requirements, i.e. surface water discharge restricted to the greenfield runoff rate, including for the impacts of climate change.

Outfall details

Invert Level =	41.81	mAOD	No. outgoing pipes =	2		
Ground Level =	44.53	mAOD	Outgoing diameter =	150	mm	
Depth bgl =	2.72	m				

Storage details

Tank 1:

run length =	46	m	Invert Level =	42.00	mAOD	Cover =	0.53	m
gradient =	245	(1:X)	Ground Level =	44.53	mAOD	Area =	137	m^2
Backdrop =	0	mm	Tank Depth =	2.00	m	Volume =	260	m^3

Tank 2:

run length =	91	m	Invert Level =	42.18	mAOD	Cover =	0.54	m
gradient =	245	(1:X)	Ground Level =	44.53	mAOD	Area =	90	m^2
Backdrop =	0	mm	Tank Depth =	1.80	m	Volume =	154	m^3

Tank 3:

run length =	115	m	Invert Level =	42.28	mAOD	Cover =	0.50	m
gradient =	245	(1:X)	Ground Level =	44.53	mAOD	Area =	840	m^2
Backdrop =	0	mm	Tank Depth =	1.75	m	Volume =	1397	m^3

Paving 01

run length =	158	m	Invert Level =	42.45	mAOD	Cover =	0.57	m
gradient =	245	(1:X)	Ground Level =	44.53	mAOD	Area =	163	m^2
Backdrop =	0	mm	Storage Depth =	1.50	m	Volume =	73	m^3

Paving 02

run length =	215	m	Invert Level =	42.69	mAOD	Cover =	1.11	m
gradient =	245	(1:X)	Ground Level =	45.80	mAOD	Area =	126	m^2
Backdrop =	0	mm	Storage Depth =	2.00	m	Volume =	76	m^3

Paving 03

run length =	125	m	Invert Level =	42.32	mAOD	Cover =	0.50	m
gradient =	245	(1:X)	Ground Level =	44.53	mAOD	Area =	1082	m^2
Backdrop =	0	mm	Storage Depth =	1.70	m	Volume =	552	m^3

Storage volume summary

Tank 1:	260	m^3
Tank 2:	154	m^3
Tank 3:	1397	m^3
Paving 01	73	m^3
Paving 02	76	m^3
Paving 03	552	m^3
Total	2511	m^3