



CALCULATIONS

DOCUMENT No
104-012-UA001881-02

OFFICE

CARDIFF

PROJECT TITLE

Bicester Eco-Town - Exemplar Site

SUBJECT

SPINE ROAD SOAKAWAY SIZING

SHEET No

1 OF 67

ISSUE	TOTAL SHEETS	AUTHOR	DATE	CHECKED BY	DATE	APPROVED BY	DATE	COMMENTS
2	67	S.J	31/10/12	M.P	02/11/12	S.A.D	02/11/12	

SUPERSEDES DOC No

DATE

DESIGN BASIS STATEMENT (Inc. sources of info/data, assumptions made, standards, etc.)

Property information (use, size, etc.):

Introduction

This calculation has been prepared to establish the contributing impermeable area for each soakaway based on topographically derived catchment areas and to hydraulically test the soakaways.

Assumptions

- 1) Catchment areas and soakaway lengths are as shown on drawings 103-115-116 UA001881, and have been measured for this calculation using AutoCAD.
- 2) Width of soakaways obtained from standard details drawing 7277-7278-UA001881-Swale Details
- 3) Depth of impermeable stratum determined by subtracting the stratum depth (from the nearest trial pit) from the topographical height of the existing ground.
- 4) The infiltration rate is taken as an average of 0.056mm/hr over the whole site

Summary of Results

SOAKAWAY	WIDTH (m)	LENGTH (m)	DEPTH (m)
1	0.80	36.00	1.95
2	1.20	11.30	1.86
3	0.70	17.00	1.58
4	0.70	6.30	1.45
5	1.80	13.80	1.21
6	2.80	21.60	0.89
7	2.70	12.00	1.13
8	2.70	17.40	2.01
9	0.70	20.80	0.35
10	0.70	45.50	0.57
11	0.70	13.00	1.07
12	0.70	38.60	1.29
13	2.70	17.40	2.01

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SOAKAWAY	TYPE	SOAKAWAY WIDTH (m)	SOAKAWAY LENGTH (m)	CONTRIBUTING AREA (m ²)	INFILTRATION RATE (m/hr)	COVER LEVEL LOWEST POINT AOD(m)	FALL	STEP	RELEVANT TRIAL PIT	TOPO LEVEL AT SOAKAWAY AOD(m)	IMPERMEABLE LAYER DEPTH (m)	IMPERMEABLE LAYER AOD(m)	SOAKAWAY COVER LEVEL AOD(m)	SOAKAWAY INVERT LEVEL AOD(m)	SOAKAWAY DEPTH (m)
1	Type 1A	0.80	36.0	408	0.054	89.18	1 in 500	0.10	TP56	88.23	1.10	87.13	89.08	87.13	2.0
2	Type 1A	1.20	11.3	272	0.054	89.06	1 in 500	0.10	TP56	88.30	1.20	87.10	88.96	87.10	1.9
3	Type 1B	0.70	17.0	386	0.056	88.93	1 in 500	0.10	TP56A	88.50	1.25	87.25	88.83	87.25	1.6
4	Type 1B	0.70	6.3	161	0.056	88.80	1 in 500	0.10	TP56A	88.60	1.35	87.25	88.70	87.25	1.5
5	Type 1A	1.80	13.8	481	0.058	88.47	1 in 500	0.10	TP56A	88.61	1.45	87.16	88.37	87.16	1.2
6	Type 1A	2.80	21.6	680	0.060	87.86	1 in 500	0.10	TP57	88.42	1.55	86.87	87.76	86.87	0.9
7	Type 1A	2.70	12.0	447	0.062	87.43	1 in 500	0.10	TP57	87.85	1.65	86.20	87.33	86.20	1.1
8	Type 1A	2.70	17.4	214	0.064	87.08	1 in 500	0.10	TP57/TP56B	86.70	1.73	84.98	86.98	84.98	2.0
9	Type 1B	0.70	20.8	564	0.056	90.97	1 in 500	0.10	TP61	91.27	0.75	90.52	90.87	90.52	0.4
10	Type 1B	0.70	45.5	630	0.056	91.25	1 in 500	0.10	TP63	91.31	0.73	90.58	91.15	90.58	0.6
11	Type 1B	0.70	13.0	341	0.056	91.65	1 in 500	0.10	TP63	91.20	0.72	90.48	91.55	90.48	1.1
12	Type 1B	0.70	38.6	618	0.056	91.90	1 in 500	0.10	TP63	91.21	0.70	90.51	91.80	90.51	1.3
13	Type 1A	2.70	17.4	253	0.064	87.08	2 in 500	0.10	TP57/TP56B	86.70	1.73	84.98	86.98	84.98	2.0

Parameter Descriptions:


Soakaway Width - As per standard detail
 Soakaway length - As stated on drawing 7253-7253 UA001881-Spine Road Drainage
 Contributing Area - As shown on drawing 103-015-016-UA001881 Exemplar Site Spine Road Drainage Catchment Areas
 Infiltration Rate - For each soakaway, taken as an average of 56mm/hr over the whole site
 Cover Level at lowest point of soakaway - taken from drawings 102-001/009-UA001881-External Works
 Fall - All soakaway beds taken to fall 1 in 500
 Step - Taken from the standard details as the difference in height between the soakaway's lowest cover level and the proposed level at the top of the soakaway
 Impermeable Layer depth - found by subtracting the impermeable layer depth depth from each relevant trial pit from the average topo level at each soakaway.
 Soakaway cover level - the proposed ground's lowest level at the soakaway minus the step from the standard details
 Due to relatively high infiltration rate observed at SA4, a typical rate of 0.056m/hr has been used to mitigate against potential for misleading results.

Relevant Drawings and Reports

103-015-016-UA001881-Spine Road Drainage Catchment Area
 APPENDIX B - UA4012-UP32R-02-SUPPLEMENTARY GI

Relevant WinDes Input

Global	Rainfall Details	Time/Area Diagram
Inflow - Rainfall Data	Return Period - 100yr Event	timestep - 4mins
Additional Inflow - None		Area - as per soakaway
Storage Structure - Infiltration Trench		Slope
Outflow Control - None		Porosity of fill - 30%
Overflow Control - None		
Climate Change - 30%		


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HCL House Fortran Rd St Mellons B'ness Park Cardiff CF3 0EY		
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Summary of Results for 100 year Return Period (+30%)

Half Drain Time : 148 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (1/s)	Max Volume (m³)	Status
15 min Summer	88.244	1.114	0.8	9.3	O K
30 min Summer	88.531	1.401	1.0	11.8	O K
60 min Summer	88.754	1.624	1.1	13.7	O K
120 min Summer	88.851	1.721	1.1	14.6	O K
180 min Summer	88.859	1.729	1.2	14.6	O K
240 min Summer	88.838	1.708	1.1	14.4	O K
360 min Summer	88.771	1.641	1.1	13.9	O K
480 min Summer	88.695	1.565	1.1	13.2	O K
600 min Summer	88.618	1.488	1.0	12.5	O K
720 min Summer	88.546	1.416	1.0	11.9	O K
960 min Summer	88.419	1.289	0.9	10.8	O K
1440 min Summer	88.220	1.090	0.8	9.1	O K
2160 min Summer	88.007	0.877	0.7	7.3	O K
2880 min Summer	87.855	0.725	0.6	5.9	O K
4320 min Summer	87.647	0.517	0.5	4.2	O K
5760 min Summer	87.511	0.381	0.4	3.0	O K
7200 min Summer	87.416	0.286	0.4	2.2	O K
8640 min Summer	87.345	0.215	0.3	1.5	O K

Storm Event	Rain (mm/hr)	Time-Peak (mins)
15 min Summer	128.285	18
30 min Summer	84.226	32
60 min Summer	52.662	62
120 min Summer	31.800	102
180 min Summer	23.353	132
240 min Summer	18.644	166
360 min Summer	13.543	236
480 min Summer	10.792	304
600 min Summer	9.043	374
720 min Summer	7.823	440
960 min Summer	6.219	572
1440 min Summer	4.493	834
2160 min Summer	3.241	1208
2880 min Summer	2.568	1584
4320 min Summer	1.847	2296
5760 min Summer	1.461	3048
7200 min Summer	1.217	3752
8640 min Summer	1.048	4496

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Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
10080 min Summer	87.290	0.160	0.3	1.1	O K
15 min Winter	88.378	1.248	0.9	10.5	O K
30 min Winter	88.705	1.575	1.1	13.3	O K
60 min Winter	88.965	1.835	1.2	15.5	O K
120 min Winter	89.078	1.948	1.3	16.5	O K
180 min Winter	89.079	1.949	1.3	16.5	O K
240 min Winter	89.044	1.914	1.3	16.2	O K
360 min Winter	88.940	1.810	1.2	15.3	O K
480 min Winter	88.829	1.699	1.1	14.4	O K
600 min Winter	88.721	1.591	1.1	13.4	O K
720 min Winter	88.620	1.490	1.0	12.6	O K
960 min Winter	88.445	1.315	0.9	11.1	O K
1440 min Winter	88.183	1.053	0.8	8.8	O K
2160 min Winter	87.919	0.789	0.6	6.5	O K
2880 min Winter	87.741	0.611	0.5	5.0	O K
4320 min Winter	87.516	0.386	0.4	3.0	O K
5760 min Winter	87.379	0.249	0.3	1.8	O K
7200 min Winter	87.288	0.158	0.3	1.1	O K
8640 min Winter	87.225	0.095	0.2	0.5	O K

Storm Event	Rain (mm/hr)	Time-Peak (mins)
10080 min Summer	0.923	5152
15 min Winter	128.285	18
30 min Winter	84.226	32
60 min Winter	52.662	60
120 min Winter	31.800	112
180 min Winter	23.353	140
240 min Winter	18.644	178
360 min Winter	13.543	254
480 min Winter	10.792	326
600 min Winter	9.043	398
720 min Winter	7.823	470
960 min Winter	6.219	606
1440 min Winter	4.493	866
2160 min Winter	3.241	1252
2880 min Winter	2.568	1616
4320 min Winter	1.847	2376
5760 min Winter	1.461	3104
7200 min Winter	1.217	3816
8640 min Winter	1.048	4496

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Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
10080 min Winter	87.199	0.069	0.2	0.3	O K

Storm Event	Rain (mm/hr)	Time-Peak (mins)
10080 min Winter	0.923	5112

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Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time / Area Diagram

Total Area (ha) 0.041

Time (mins)	Area (ha)
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0-4	0.041
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Model Details

Storage is Online Cover Level (m) 89.080

Infiltration Trench Structure

Infiltration Coefficient Base (m/hr)	0.05400	Trench Width (m)	0.8
Infiltration Coefficient Side (m/hr)	0.05400	Trench Length (m)	36.0
Safety Factor	2.0	Slope (1:X)	500.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	87.130	Cap Infiltration Depth (m)	0.000

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Summary of Results for 100 year Return Period (+30%)

Half Drain Time : 215 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (1/s)	Max Overflow (1/s)	Max Σ Outflow (1/s)	Max Volume (m ³)	Status
15 min Summer	88.684	1.584	0.4	0.0	0.4	6.2	O K
30 min Summer	88.983	1.883	0.4	1.8	2.2	7.4	O K
60 min Summer	89.000	1.900	0.4	4.1	4.5	7.5	O K
120 min Summer	89.005	1.905	0.4	4.8	5.3	7.5	O K
180 min Summer	88.997	1.897	0.4	3.6	4.0	7.5	O K
240 min Summer	88.994	1.894	0.4	3.2	3.6	7.5	O K
360 min Summer	88.986	1.886	0.4	2.2	2.6	7.4	O K
480 min Summer	88.982	1.882	0.4	1.7	2.1	7.4	O K
600 min Summer	88.979	1.879	0.4	1.3	1.8	7.4	O K
720 min Summer	88.976	1.876	0.4	1.1	1.5	7.4	O K
960 min Summer	88.971	1.871	0.4	0.6	1.0	7.4	O K
1440 min Summer	88.964	1.864	0.4	0.1	0.6	7.3	O K
2160 min Summer	88.705	1.605	0.4	0.0	0.4	6.3	O K
2880 min Summer	88.474	1.374	0.3	0.0	0.3	5.4	O K
4320 min Summer	88.146	1.046	0.3	0.0	0.3	4.1	O K
5760 min Summer	87.921	0.821	0.2	0.0	0.2	3.2	O K
7200 min Summer	87.759	0.659	0.2	0.0	0.2	2.6	O K
8640 min Summer	87.631	0.531	0.2	0.0	0.2	2.1	O K

Storm Event	Rain (mm/hr)	Overflow Volume (m ³)	Time-Peak (mins)
15 min Summer	128.285	0.0	18
30 min Summer	84.226	0.6	26
60 min Summer	52.662	2.2	38
120 min Summer	31.800	3.4	68
180 min Summer	23.353	3.6	98
240 min Summer	18.644	3.5	130
360 min Summer	13.543	3.3	190
480 min Summer	10.792	3.0	254
600 min Summer	9.043	2.7	316
720 min Summer	7.823	2.3	382
960 min Summer	6.219	1.5	520
1440 min Summer	4.493	0.2	812
2160 min Summer	3.241	0.0	1236
2880 min Summer	2.568	0.0	1616
4320 min Summer	1.847	0.0	2336
5760 min Summer	1.461	0.0	3064
7200 min Summer	1.217	0.0	3816
8640 min Summer	1.048	0.0	4504

Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Overflow (l/s)	Max E Outflow (l/s)	Max Volume (m ³)	Status
10080 min Summer	87.534	0.434	0.2	0.0	0.2	1.7	O K
15 min Winter	88.878	1.778	0.4	0.0	0.4	7.0	O K
30 min Winter	89.009	1.909	0.4	5.5	5.9	7.5	O K
60 min Winter	89.023	1.923	0.4	8.1	8.6	7.6	O K
120 min Winter	89.004	1.904	0.4	4.7	5.1	7.5	O K
180 min Winter	88.999	1.899	0.4	3.9	4.3	7.5	O K
240 min Winter	88.992	1.892	0.4	3.0	3.4	7.5	O K
360 min Winter	88.984	1.884	0.4	1.9	2.4	7.4	O K
480 min Winter	88.979	1.879	0.4	1.4	1.8	7.4	O K
600 min Winter	88.976	1.876	0.4	1.1	1.5	7.4	O K
720 min Winter	88.974	1.874	0.4	0.8	1.3	7.4	O K
960 min Winter	88.970	1.870	0.4	0.5	1.0	7.4	O K
1440 min Winter	88.965	1.865	0.4	0.2	0.6	7.3	O K
2160 min Winter	88.635	1.535	0.4	0.0	0.4	6.0	O K
2880 min Winter	88.349	1.249	0.3	0.0	0.3	4.9	O K
4320 min Winter	87.968	0.868	0.3	0.0	0.3	3.4	O K
5760 min Winter	87.726	0.626	0.2	0.0	0.2	2.4	O K
7200 min Winter	87.559	0.459	0.2	0.0	0.2	1.8	O K
8640 min Winter	87.436	0.336	0.2	0.0	0.2	1.3	O K

Storm Event	Rain (mm/hr)	Overflow Volume (m ³)	Time-Peak (mins)
10080 min Summer	0.923	0.0	5248
15 min Winter	128.285	0.0	18
30 min Winter	84.226	1.7	23
60 min Winter	52.662	3.5	38
120 min Winter	31.800	4.9	68
180 min Winter	23.353	5.3	96
240 min Winter	18.644	5.2	126
360 min Winter	13.543	4.9	186
480 min Winter	10.792	4.4	248
600 min Winter	9.043	3.9	310
720 min Winter	7.823	3.4	380
960 min Winter	6.219	2.3	514
1440 min Winter	4.493	0.4	834
2160 min Winter	3.241	0.0	1296
2880 min Winter	2.568	0.0	1672
4320 min Winter	1.847	0.0	2420
5760 min Winter	1.461	0.0	3168
7200 min Winter	1.217	0.0	3888
8640 min Winter	1.048	0.0	4584

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Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time / Area Diagram

Total Area (ha) 0.027

Time (mins)	Area (ha)
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0-4	0.027
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Model Details


Storage is Online Cover Level (m) 89.106

Infiltration Trench Structure

Infiltration Coefficient Base (m/hr)	0.05400	Trench Width (m)	1.2
Infiltration Coefficient Side (m/hr)	0.05400	Trench Length (m)	11.0
Safety Factor	2.0	Slope (1:X)	500.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	87.100	Cap Infiltration Depth (m)	0.000

Weir Overflow Control

Discharge Coef 0.544 Width (m) 0.300 Invert Level (m) 88.960


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Summary of Results for 100 year Return Period (+30%)

Half Drain Time : 157 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (1/s)	Max Overflow (1/s)	Max Σ Outflow (1/s)	Max Volume (m ³)	Status
15 min Summer	88.892	1.642	0.5	26.1	26.7	5.8	O K
30 min Summer	88.893	1.643	0.5	27.1	27.6	5.8	O K
60 min Summer	88.888	1.638	0.5	23.6	24.2	5.8	O K
120 min Summer	88.865	1.615	0.5	11.3	11.8	5.7	O K
180 min Summer	88.856	1.606	0.5	7.2	7.8	5.7	O K
240 min Summer	88.852	1.602	0.5	5.5	6.0	5.7	O K
360 min Summer	88.847	1.597	0.5	3.9	4.4	5.6	O K
480 min Summer	88.845	1.595	0.5	3.1	3.6	5.6	O K
600 min Summer	88.843	1.593	0.5	2.5	3.0	5.6	O K
720 min Summer	88.841	1.591	0.5	2.0	2.6	5.6	O K
960 min Summer	88.839	1.589	0.5	1.5	2.0	5.6	O K
1440 min Summer	88.837	1.587	0.5	0.9	1.5	5.6	O K
2160 min Summer	88.836	1.586	0.5	0.7	1.3	5.6	O K
2880 min Summer	88.834	1.584	0.5	0.4	0.9	5.6	O K
4320 min Summer	88.645	1.395	0.5	0.0	0.5	4.9	O K
5760 min Summer	88.366	1.116	0.4	0.0	0.4	3.9	O K
7200 min Summer	88.174	0.924	0.3	0.0	0.3	3.2	O K
8640 min Summer	88.027	0.777	0.3	0.0	0.3	2.7	O K

Storm Event	Rain (mm/hr)	Overflow Volume (m ³)	Time-Peak (mins)
15 min Summer	128.285	3.4	11
30 min Summer	84.226	6.0	18
60 min Summer	52.662	8.4	32
120 min Summer	31.800	10.2	62
180 min Summer	23.353	10.7	92
240 min Summer	18.644	10.6	126
360 min Summer	13.543	10.2	188
480 min Summer	10.792	9.8	242
600 min Summer	9.043	9.3	298
720 min Summer	7.823	8.8	372
960 min Summer	6.219	7.7	488
1440 min Summer	4.493	5.7	728
2160 min Summer	3.241	3.1	1084
2880 min Summer	2.568	1.2	1464
4320 min Summer	1.847	0.0	2292
5760 min Summer	1.461	0.0	3008
7200 min Summer	1.217	0.0	3744
8640 min Summer	1.048	0.0	4488

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Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Overflow (l/s)	Max E Outflow (l/s)	Max Volume (m ³)	Status
10080 min Summer	87.914	0.664	0.3	0.0	0.3	2.3	O K
15 min Winter	88.900	1.650	0.5	31.7	32.3	5.8	O K
30 min Winter	88.893	1.643	0.5	27.1	27.6	5.8	O K
60 min Winter	88.878	1.628	0.5	17.8	18.3	5.7	O K
120 min Winter	88.859	1.609	0.5	8.3	8.8	5.7	O K
180 min Winter	88.850	1.600	0.5	4.9	5.4	5.7	O K
240 min Winter	88.847	1.597	0.5	3.9	4.4	5.6	O K
360 min Winter	88.844	1.594	0.5	2.7	3.3	5.6	O K
480 min Winter	88.841	1.591	0.5	2.0	2.6	5.6	O K
600 min Winter	88.840	1.590	0.5	1.8	2.3	5.6	O K
720 min Winter	88.839	1.589	0.5	1.4	1.9	5.6	O K
960 min Winter	88.837	1.587	0.5	0.9	1.5	5.6	O K
1440 min Winter	88.835	1.585	0.5	0.6	1.1	5.6	O K
2160 min Winter	88.833	1.583	0.5	0.3	0.8	5.6	O K
2880 min Winter	88.821	1.571	0.5	0.0	0.5	5.5	O K
4320 min Winter	88.367	1.117	0.4	0.0	0.4	3.9	O K
5760 min Winter	88.095	0.845	0.3	0.0	0.3	3.0	O K
7200 min Winter	87.914	0.664	0.3	0.0	0.3	2.3	O K
8640 min Winter	87.785	0.535	0.2	0.0	0.2	1.9	O K

Storm Event	Rain (mm/hr)	Overflow Volume (m ³)	Time-Peak (mins)
10080 min Summer	0.923	0.0	5152
15 min Winter	128.285	4.5	11
30 min Winter	84.226	7.5	17
60 min Winter	52.662	10.2	30
120 min Winter	31.800	12.4	54
180 min Winter	23.353	13.1	90
240 min Winter	18.644	13.2	122
360 min Winter	13.543	12.6	182
480 min Winter	10.792	12.0	252
600 min Winter	9.043	11.3	292
720 min Winter	7.823	10.6	368
960 min Winter	6.219	9.0	488
1440 min Winter	4.493	5.9	676
2160 min Winter	3.241	2.2	1056
2880 min Winter	2.568	0.0	1612
4320 min Winter	1.847	0.0	2336
5760 min Winter	1.461	0.0	3056
7200 min Winter	1.217	0.0	3816
8640 min Winter	1.048	0.0	4496

HCL House Fortran Rd
 St Mellons B'ness Park
 Cardiff CF3 0EY



Date 05/11/2012 18:11
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Source Control W.12.4

Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Overflow (l/s)	Max Outflow (l/s)	Max Volume (m ³)	Status
10080 min Winter	87.688	0.438	0.2	0.0	0.2	1.5	O K
Storm Event	Rain (mm/hr)	Overflow Volume (m ³)	Time-Peak (mins)				
10080 min Winter	0.923	0.0	5240				

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Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time / Area Diagram

Total Area (ha) 0.039

Time (mins)	Area (ha)
------------------------	----------------------

0-4	0.039
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HCL House Fortran Rd
St Mellons B'ness Park
Cardiff CF3 0EY



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Source Control W.12.4

Model Details


Storage is Online Cover Level (m) 88.930

Infiltration Trench Structure

Infiltration Coefficient Base (m/hr)	0.05600	Trench Width (m)	0.7
Infiltration Coefficient Side (m/hr)	0.05600	Trench Length (m)	17.0
Safety Factor	2.0	Slope (1:X)	500.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	87.250	Cap Infiltration Depth (m)	0.000

Weir Overflow Control

Discharge Coef 0.544 Width (m) 1.000 Invert Level (m) 88.830


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Summary of Results for 100 year Return Period (+30%)

Half Drain Time : 124 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (1/s)	Max Overflow (1/s)	Max Σ Outflow (1/s)	Max Volume (m ³)	Status
15 min Summer	88.732	1.482	0.2	9.9	10.1	1.9	O K
30 min Summer	88.741	1.491	0.2	14.0	14.2	2.0	O K
60 min Summer	88.724	1.474	0.2	6.2	6.4	1.9	O K
120 min Summer	88.718	1.468	0.2	4.0	4.2	1.9	O K
180 min Summer	88.716	1.466	0.2	3.4	3.6	1.9	O K
240 min Summer	88.713	1.463	0.2	2.5	2.6	1.9	O K
360 min Summer	88.710	1.460	0.2	1.6	1.8	1.9	O K
480 min Summer	88.708	1.458	0.2	1.3	1.5	1.9	O K
600 min Summer	88.708	1.458	0.2	1.2	1.4	1.9	O K
720 min Summer	88.707	1.457	0.2	0.9	1.1	1.9	O K
960 min Summer	88.706	1.456	0.2	0.7	0.9	1.9	O K
1440 min Summer	88.704	1.454	0.2	0.5	0.7	1.9	O K
2160 min Summer	88.703	1.453	0.2	0.3	0.5	1.9	O K
2880 min Summer	88.702	1.452	0.2	0.2	0.4	1.9	O K
4320 min Summer	88.701	1.451	0.2	0.0	0.2	1.9	O K
5760 min Summer	88.449	1.199	0.2	0.0	0.2	1.6	O K
7200 min Summer	88.243	0.993	0.1	0.0	0.1	1.3	O K
8640 min Summer	88.086	0.836	0.1	0.0	0.1	1.1	O K

Storm Event	Rain (mm/hr)	Overflow Volume (m ³)	Time-Peak (mins)
15 min Summer	128.285	1.8	11
30 min Summer	84.226	2.9	17
60 min Summer	52.662	3.9	34
120 min Summer	31.800	4.7	60
180 min Summer	23.353	4.9	92
240 min Summer	18.644	4.9	124
360 min Summer	13.543	4.8	180
480 min Summer	10.792	4.6	256
600 min Summer	9.043	4.4	312
720 min Summer	7.823	4.2	364
960 min Summer	6.219	3.8	494
1440 min Summer	4.493	3.0	722
2160 min Summer	3.241	2.0	1080
2880 min Summer	2.568	1.1	1412
4320 min Summer	1.847	0.1	2236
5760 min Summer	1.461	0.0	3000
7200 min Summer	1.217	0.0	3744
8640 min Summer	1.048	0.0	4488

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Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Overflow (l/s)	Max E Outflow (l/s)	Max Volume (m ³)	Status
10080 min Summer	87.969	0.719	0.1	0.0	0.1	0.9	O K
15 min Winter	88.742	1.492	0.2	14.5	14.7	2.0	O K
30 min Winter	88.736	1.486	0.2	11.8	12.0	2.0	O K
60 min Winter	88.724	1.474	0.2	6.2	6.4	1.9	O K
120 min Winter	88.716	1.466	0.2	3.4	3.6	1.9	O K
180 min Winter	88.711	1.461	0.2	2.0	2.2	1.9	O K
240 min Winter	88.711	1.461	0.2	1.9	2.1	1.9	O K
360 min Winter	88.708	1.458	0.2	1.3	1.5	1.9	O K
480 min Winter	88.707	1.457	0.2	0.9	1.1	1.9	O K
600 min Winter	88.706	1.456	0.2	0.8	1.0	1.9	O K
720 min Winter	88.705	1.455	0.2	0.6	0.8	1.9	O K
960 min Winter	88.704	1.454	0.2	0.5	0.7	1.9	O K
1440 min Winter	88.703	1.453	0.2	0.3	0.5	1.9	O K
2160 min Winter	88.702	1.452	0.2	0.2	0.4	1.9	O K
2880 min Winter	88.701	1.451	0.2	0.1	0.3	1.9	O K
4320 min Winter	88.440	1.190	0.2	0.0	0.2	1.6	O K
5760 min Winter	88.155	0.905	0.1	0.0	0.1	1.2	O K
7200 min Winter	87.965	0.715	0.1	0.0	0.1	0.9	O K
8640 min Winter	87.830	0.580	0.1	0.0	0.1	0.8	O K

Storm Event	Rain (mm/hr)	Overflow Volume (m ³)	Time-Peak (mins)
10080 min Summer	0.923	0.0	5152
15 min Winter	128.285	2.3	10
30 min Winter	84.226	3.5	16
60 min Winter	52.662	4.6	32
120 min Winter	31.800	5.6	58
180 min Winter	23.353	5.9	86
240 min Winter	18.644	6.0	128
360 min Winter	13.543	5.8	178
480 min Winter	10.792	5.6	236
600 min Winter	9.043	5.3	324
720 min Winter	7.823	5.0	338
960 min Winter	6.219	4.4	460
1440 min Winter	4.493	3.2	748
2160 min Winter	3.241	1.7	1044
2880 min Winter	2.568	0.5	1436
4320 min Winter	1.847	0.0	2332
5760 min Winter	1.461	0.0	3056
7200 min Winter	1.217	0.0	3752
8640 min Winter	1.048	0.0	4496

HCL House Fortran Rd
St Mellons B'ness Park
Cardiff CF3 0EY



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Source Control W.12.4

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time / Area Diagram

Total Area (ha) 0.016

Time (mins)	Area (ha)
------------------------	----------------------

0-4	0.016
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HCL House Fortran Rd
St Mellons B'ness Park
Cardiff CF3 0EY



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Source Control W.12.4

Model Details

Storage is Online Cover Level (m) 88.800

Infiltration Trench Structure

Infiltration Coefficient Base (m/hr)	0.05600	Trench Width (m)	0.7
Infiltration Coefficient Side (m/hr)	0.05600	Trench Length (m)	6.3
Safety Factor	2.0	Slope (1:X)	500.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	87.250	Cap Infiltration Depth (m)	0.000

Weir Overflow Control


Discharge Coef 0.544 Width (m) 1.000 Invert Level (m) 88.700

Summary of Results for 100 year Return Period (+30%)

Half Drain Time : 182 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (1/s)	Max Overflow (1/s)	Max Σ Outflow (1/s)	Max Volume (m ³)	Status
15 min Summer	88.400	1.240	0.5	13.1	13.6	9.1	O K
30 min Summer	88.419	1.259	0.5	27.9	28.4	9.3	O K
60 min Summer	88.419	1.259	0.5	27.5	28.0	9.3	O K
120 min Summer	88.406	1.246	0.5	17.3	17.8	9.2	O K
180 min Summer	88.397	1.237	0.5	11.2	11.7	9.1	O K
240 min Summer	88.392	1.232	0.5	8.2	8.7	9.1	O K
360 min Summer	88.387	1.227	0.5	5.8	6.3	9.0	O K
480 min Summer	88.384	1.224	0.5	4.1	4.6	9.0	O K
600 min Summer	88.382	1.222	0.5	3.5	4.0	9.0	O K
720 min Summer	88.380	1.220	0.5	2.7	3.2	9.0	O K
960 min Summer	88.379	1.219	0.5	2.3	2.8	9.0	O K
1440 min Summer	88.377	1.217	0.5	1.6	2.1	9.0	O K
2160 min Summer	88.375	1.215	0.5	1.0	1.5	9.0	O K
2880 min Summer	88.374	1.214	0.5	0.6	1.1	8.9	O K
4320 min Summer	88.254	1.094	0.5	0.0	0.5	8.0	O K
5760 min Summer	88.012	0.852	0.4	0.0	0.4	6.2	O K
7200 min Summer	87.830	0.670	0.4	0.0	0.4	4.9	O K
8640 min Summer	87.691	0.531	0.3	0.0	0.3	3.9	O K

Storm Event	Rain (mm/hr)	Overflow Volume (m ³)	Time-Peak (mins)
15 min Summer	128.285	2.2	13
30 min Summer	84.226	5.5	19
60 min Summer	52.662	8.6	34
120 min Summer	31.800	11.1	62
180 min Summer	23.353	12.0	90
240 min Summer	18.644	12.2	122
360 min Summer	13.543	11.9	174
480 min Summer	10.792	11.5	240
600 min Summer	9.043	10.9	290
720 min Summer	7.823	10.4	350
960 min Summer	6.219	9.2	486
1440 min Summer	4.493	7.1	716
2160 min Summer	3.241	4.3	1096
2880 min Summer	2.568	2.1	1516
4320 min Summer	1.847	0.0	2380
5760 min Summer	1.461	0.0	3120
7200 min Summer	1.217	0.0	3888
8640 min Summer	1.048	0.0	4584

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Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Overflow (l/s)	Max E Outflow (l/s)	Max Volume (m ³)	Status
10080 min Summer	87.576	0.416	0.3	0.0	0.3	3.0	O K
15 min Winter	88.419	1.259	0.5	27.9	28.4	9.3	O K
30 min Winter	88.414	1.254	0.5	23.4	23.9	9.2	O K
60 min Winter	88.403	1.243	0.5	15.5	16.0	9.2	O K
120 min Winter	88.396	1.236	0.5	10.9	11.4	9.1	O K
180 min Winter	88.392	1.232	0.5	8.2	8.7	9.1	O K
240 min Winter	88.387	1.227	0.5	5.8	6.3	9.0	O K
360 min Winter	88.383	1.223	0.5	3.9	4.4	9.0	O K
480 min Winter	88.380	1.220	0.5	2.7	3.2	9.0	O K
600 min Winter	88.380	1.220	0.5	2.5	3.0	9.0	O K
720 min Winter	88.378	1.218	0.5	1.9	2.4	9.0	O K
960 min Winter	88.377	1.217	0.5	1.4	1.9	9.0	O K
1440 min Winter	88.375	1.215	0.5	0.8	1.3	9.0	O K
2160 min Winter	88.374	1.214	0.5	0.6	1.1	8.9	O K
2880 min Winter	88.372	1.212	0.5	0.3	0.8	8.9	O K
4320 min Winter	88.093	0.933	0.4	0.0	0.4	6.8	O K
5760 min Winter	87.818	0.658	0.4	0.0	0.4	4.8	O K
7200 min Winter	87.622	0.462	0.3	0.0	0.3	3.3	O K
8640 min Winter	87.476	0.316	0.3	0.0	0.3	2.3	O K

Storm Event	Rain (mm/hr)	Overflow Volume (m ³)	Time-Peak (mins)
10080 min Summer	0.923	0.0	5336
15 min Winter	128.285	3.6	12
30 min Winter	84.226	7.3	19
60 min Winter	52.662	10.9	32
120 min Winter	31.800	13.9	62
180 min Winter	23.353	15.0	84
240 min Winter	18.644	15.4	114
360 min Winter	13.543	15.4	162
480 min Winter	10.792	14.8	250
600 min Winter	9.043	14.1	314
720 min Winter	7.823	13.4	352
960 min Winter	6.219	11.9	500
1440 min Winter	4.493	8.7	740
2160 min Winter	3.241	4.6	1096
2880 min Winter	2.568	1.3	1552
4320 min Winter	1.847	0.0	2468
5760 min Winter	1.461	0.0	3224
7200 min Winter	1.217	0.0	3960
8640 min Winter	1.048	0.0	4672

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Source Control W.12.4

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time / Area Diagram

Total Area (ha) 0.048

Time (mins)	Area (ha)
------------------------	----------------------

0-4	0.048
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HCL House Fortran Rd
St Mellons B'ness Park
Cardiff CF3 0EY



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Source Control W.12.4

Model Details


Storage is Online Cover Level (m) 88.470

Infiltration Trench Structure

Infiltration Coefficient Base (m/hr)	0.05800	Trench Width (m)	1.8
Infiltration Coefficient Side (m/hr)	0.05800	Trench Length (m)	13.8
Safety Factor	2.0	Slope (1:X)	500.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	87.160	Cap Infiltration Depth (m)	0.000

Weir Overflow Control

Discharge Coef 0.544 Width (m) 1.500 Invert Level (m) 88.370


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Summary of Results for 100 year Return Period (+30%)

Half Drain Time : 210 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (1/s)	Max Overflow (1/s)	Max Σ Outflow (1/s)	Max Volume (m ³)	Status
15 min Summer	87.754	0.884	0.9	0.0	0.9	15.6	O K
30 min Summer	87.823	0.953	0.9	8.1	9.0	16.9	O K
60 min Summer	87.846	0.976	0.9	12.9	13.8	17.3	O K
120 min Summer	87.840	0.970	0.9	11.5	12.4	17.2	O K
180 min Summer	87.829	0.959	0.9	9.3	10.2	17.0	O K
240 min Summer	87.820	0.950	0.9	7.6	8.4	16.9	O K
360 min Summer	87.808	0.938	0.9	5.4	6.3	16.6	O K
480 min Summer	87.800	0.930	0.9	4.1	5.0	16.5	O K
600 min Summer	87.794	0.924	0.9	3.2	4.1	16.4	O K
720 min Summer	87.790	0.920	0.9	2.6	3.5	16.3	O K
960 min Summer	87.783	0.913	0.9	1.8	2.7	16.2	O K
1440 min Summer	87.774	0.904	0.9	0.9	1.7	16.0	O K
2160 min Summer	87.714	0.844	0.8	0.0	0.8	14.9	O K
2880 min Summer	87.554	0.684	0.8	0.0	0.8	12.0	O K
4320 min Summer	87.314	0.444	0.7	0.0	0.7	7.7	O K
5760 min Summer	87.148	0.278	0.6	0.0	0.6	4.6	O K
7200 min Summer	87.032	0.162	0.6	0.0	0.6	2.5	O K
8640 min Summer	86.956	0.086	0.5	0.0	0.5	1.2	O K

Storm Event	Rain (mm/hr)	Overflow Volume (m ³)	Time-Peak (mins)
15 min Summer	128.285	0.0	18
30 min Summer	84.226	4.1	23
60 min Summer	52.662	8.3	38
120 min Summer	31.800	11.4	68
180 min Summer	23.353	12.2	98
240 min Summer	18.644	12.0	128
360 min Summer	13.543	11.0	192
480 min Summer	10.792	10.0	254
600 min Summer	9.043	8.9	320
720 min Summer	7.823	7.9	384
960 min Summer	6.219	6.2	514
1440 min Summer	4.493	3.0	792
2160 min Summer	3.241	0.0	1276
2880 min Summer	2.568	0.0	1644
4320 min Summer	1.847	0.0	2380
5760 min Summer	1.461	0.0	3112
7200 min Summer	1.217	0.0	3816
8640 min Summer	1.048	0.0	4488

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Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Overflow (l/s)	Max E Outflow (l/s)	Max Volume (m ³)	Status
10080 min Summer	86.920	0.050	0.5	0.0	0.5	0.5	O K
15 min Winter	87.810	0.940	0.9	5.8	6.6	16.7	O K
30 min Winter	87.855	0.985	0.9	15.0	15.9	17.5	O K
60 min Winter	87.857	0.987	0.9	15.5	16.4	17.5	O K
120 min Winter	87.837	0.967	0.9	10.9	11.8	17.2	O K
180 min Winter	87.823	0.953	0.9	8.1	9.0	16.9	O K
240 min Winter	87.814	0.944	0.9	6.5	7.3	16.7	O K
360 min Winter	87.803	0.933	0.9	4.5	5.4	16.5	O K
480 min Winter	87.795	0.925	0.9	3.4	4.3	16.4	O K
600 min Winter	87.790	0.920	0.9	2.7	3.6	16.3	O K
720 min Winter	87.786	0.916	0.9	2.2	3.0	16.2	O K
960 min Winter	87.781	0.911	0.9	1.5	2.4	16.1	O K
1440 min Winter	87.773	0.903	0.9	0.7	1.6	16.0	O K
2160 min Winter	87.688	0.818	0.8	0.0	0.8	14.5	O K
2880 min Winter	87.475	0.605	0.7	0.0	0.7	10.6	O K
4320 min Winter	87.174	0.304	0.6	0.0	0.6	5.1	O K
5760 min Winter	86.985	0.115	0.5	0.0	0.5	1.7	O K
7200 min Winter	86.918	0.048	0.5	0.0	0.5	0.5	O K
8640 min Winter	86.912	0.042	0.4	0.0	0.4	0.4	O K

Storm Event	Rain (mm/hr)	Overflow Volume (m ³)	Time-Peak (mins)
10080 min Summer	0.923	0.0	5032
15 min Winter	128.285	1.6	16
30 min Winter	84.226	6.7	22
60 min Winter	52.662	11.5	38
120 min Winter	31.800	15.3	68
180 min Winter	23.353	16.5	96
240 min Winter	18.644	16.7	126
360 min Winter	13.543	15.7	190
480 min Winter	10.792	14.4	250
600 min Winter	9.043	13.1	314
720 min Winter	7.823	11.7	378
960 min Winter	6.219	9.0	510
1440 min Winter	4.493	4.2	806
2160 min Winter	3.241	0.0	1344
2880 min Winter	2.568	0.0	1732
4320 min Winter	1.847	0.0	2464
5760 min Winter	1.461	0.0	3120
7200 min Winter	1.217	0.0	3648
8640 min Winter	1.048	0.0	4336

HCL House Fortran Rd
St Mellons B'ness Park
Cardiff CF3 0EY



Date 05/11/2012 18:15
File SOAKAWAY 6.SRCX

Designed By sja74793
Checked By

Elstree Computing Ltd

Source Control W.12.4

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time / Area Diagram

Total Area (ha) 0.068

Time (mins)	Area (ha)
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0-4	0.068
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HCL House Fortran Rd
St Mellons B'ness Park
Cardiff CF3 0EY



Date 05/11/2012 18:15
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Source Control W.12.4

Model Details


Storage is Online Cover Level (m) 87.860

Infiltration Trench Structure

Infiltration Coefficient Base (m/hr)	0.06000	Trench Width (m)	2.8
Infiltration Coefficient Side (m/hr)	0.06000	Trench Length (m)	21.6
Safety Factor	2.0	Slope (1:X)	500.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	86.870	Cap Infiltration Depth (m)	0.000

Weir Overflow Control

Discharge Coef 0.544 Width (m) 0.300 Invert Level (m) 87.760


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HCL House Fortran Rd St Mellons B'ness Park Cardiff CF3 0EY		
Date 05/11/2012 18:15 File SOAKAWAY 7.SRCX	Designed By sja74793 Checked By	
Elstree Computing Ltd		Source Control W.12.4

Summary of Results for 100 year Return Period (+30%)

Half Drain Time : 210 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (1/s)	Max Overflow (1/s)	Max Σ Outflow (1/s)	Max Volume (m ³)	Status
15 min Summer	87.281	1.081	0.5	0.0	0.5	10.4	O K
30 min Summer	87.358	1.158	0.6	8.1	8.7	11.1	O K
60 min Summer	87.361	1.161	0.6	9.2	9.8	11.2	O K
120 min Summer	87.366	1.166	0.6	11.5	12.1	11.2	O K
180 min Summer	87.361	1.161	0.6	9.4	10.0	11.2	O K
240 min Summer	87.357	1.157	0.6	7.5	8.0	11.1	O K
360 min Summer	87.348	1.148	0.6	4.2	4.8	11.0	O K
480 min Summer	87.345	1.145	0.6	3.2	3.8	11.0	O K
600 min Summer	87.344	1.144	0.6	2.9	3.5	11.0	O K
720 min Summer	87.342	1.142	0.6	2.3	2.9	11.0	O K
960 min Summer	87.339	1.139	0.6	1.5	2.1	11.0	O K
1440 min Summer	87.336	1.136	0.6	0.7	1.3	10.9	O K
2160 min Summer	87.304	1.104	0.6	0.0	0.6	10.6	O K
2880 min Summer	87.119	0.919	0.5	0.0	0.5	8.8	O K
4320 min Summer	86.842	0.642	0.4	0.0	0.4	6.1	O K
5760 min Summer	86.645	0.445	0.4	0.0	0.4	4.2	O K
7200 min Summer	86.500	0.300	0.4	0.0	0.4	2.8	O K
8640 min Summer	86.392	0.192	0.3	0.0	0.3	1.7	O K

Storm Event	Rain (mm/hr)	Overflow Volume (m ³)	Time-Peak (mins)
15 min Summer	128.285	0.0	18
30 min Summer	84.226	2.5	22
60 min Summer	52.662	5.3	36
120 min Summer	31.800	7.3	66
180 min Summer	23.353	7.9	96
240 min Summer	18.644	7.9	126
360 min Summer	13.543	7.3	188
480 min Summer	10.792	6.7	248
600 min Summer	9.043	6.1	312
720 min Summer	7.823	5.5	376
960 min Summer	6.219	4.3	506
1440 min Summer	4.493	2.2	776
2160 min Summer	3.241	0.0	1276
2880 min Summer	2.568	0.0	1648
4320 min Summer	1.847	0.0	2380
5760 min Summer	1.461	0.0	3120
7200 min Summer	1.217	0.0	3824
8640 min Summer	1.048	0.0	4504

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HCL House Fortran Rd St Mellons B'ness Park Cardiff CF3 0EY		
Date 05/11/2012 18:15 File SOAKAWAY 7.SRCX	Designed By sja74793 Checked By	
Elstree Computing Ltd		Source Control W.12.4

Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Overflow (l/s)	Max E Outflow (l/s)	Max Volume (m ³)	Status
10080 min Summer	86.315	0.115	0.3	0.0	0.3	1.0	O K
15 min Winter	87.351	1.151	0.6	5.1	5.7	11.1	O K
30 min Winter	87.374	1.174	0.6	15.6	16.2	11.3	O K
60 min Winter	87.376	1.176	0.6	16.7	17.2	11.3	O K
120 min Winter	87.361	1.161	0.6	9.4	10.0	11.2	O K
180 min Winter	87.353	1.153	0.6	5.8	6.4	11.1	O K
240 min Winter	87.351	1.151	0.6	5.1	5.7	11.1	O K
360 min Winter	87.346	1.146	0.6	3.5	4.1	11.0	O K
480 min Winter	87.343	1.143	0.6	2.6	3.2	11.0	O K
600 min Winter	87.341	1.141	0.6	2.0	2.6	11.0	O K
720 min Winter	87.339	1.139	0.6	1.5	2.1	11.0	O K
960 min Winter	87.338	1.138	0.6	1.2	1.7	10.9	O K
1440 min Winter	87.335	1.135	0.6	0.6	1.1	10.9	O K
2160 min Winter	87.286	1.086	0.6	0.0	0.6	10.4	O K
2880 min Winter	87.042	0.842	0.5	0.0	0.5	8.1	O K
4320 min Winter	86.696	0.496	0.4	0.0	0.4	4.7	O K
5760 min Winter	86.466	0.266	0.3	0.0	0.3	2.5	O K
7200 min Winter	86.312	0.112	0.3	0.0	0.3	1.0	O K
8640 min Winter	86.248	0.048	0.3	0.0	0.3	0.4	O K

Storm Event	Rain (mm/hr)	Overflow Volume (m ³)	Time-Peak (mins)
10080 min Summer	0.923	0.0	5240
15 min Winter	128.285	0.8	15
30 min Winter	84.226	4.2	21
60 min Winter	52.662	7.4	36
120 min Winter	31.800	9.9	64
180 min Winter	23.353	10.8	94
240 min Winter	18.644	10.9	122
360 min Winter	13.543	10.4	180
480 min Winter	10.792	9.7	240
600 min Winter	9.043	8.9	302
720 min Winter	7.823	8.0	376
960 min Winter	6.219	6.2	508
1440 min Winter	4.493	3.1	782
2160 min Winter	3.241	0.0	1344
2880 min Winter	2.568	0.0	1732
4320 min Winter	1.847	0.0	2468
5760 min Winter	1.461	0.0	3224
7200 min Winter	1.217	0.0	3888
8640 min Winter	1.048	0.0	4304

HCL House Fortran Rd
St Mellons B'ness Park
Cardiff CF3 0EY



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Source Control W.12.4

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time / Area Diagram

Total Area (ha) 0.045

Time (mins)	Area (ha)
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0-4	0.045
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HCL House Fortran Rd
St Mellons B'ness Park
Cardiff CF3 0EY



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Source Control W.12.4

Model Details


Storage is Online Cover Level (m) 87.430

Infiltration Trench Structure

Infiltration Coefficient Base (m/hr)	0.06200	Trench Width (m)	2.7
Infiltration Coefficient Side (m/hr)	0.06200	Trench Length (m)	12.0
Safety Factor	2.0	Slope (1:X)	500.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	86.200	Cap Infiltration Depth (m)	0.000

Weir Overflow Control

Discharge Coef 0.544 Width (m) 1.000 Invert Level (m) 87.330


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HCL House Fortran Rd St Mellons B'ness Park Cardiff CF3 0EY		
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Summary of Results for 100 year Return Period (+30%)

Half Drain Time : 117 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (1/s)	Max Overflow (1/s)	Max Σ Outflow (1/s)	Max Volume (m ³)	Status
15 min Summer	85.325	0.345	0.5	0.0	0.5	4.6	O K
30 min Summer	85.407	0.427	0.6	0.0	0.6	5.8	O K
60 min Summer	85.464	0.484	0.6	0.0	0.6	6.6	O K
120 min Summer	85.474	0.494	0.6	0.0	0.6	6.7	O K
180 min Summer	85.459	0.479	0.6	0.0	0.6	6.5	O K
240 min Summer	85.439	0.459	0.6	0.0	0.6	6.2	O K
360 min Summer	85.400	0.420	0.6	0.0	0.6	5.7	O K
480 min Summer	85.364	0.384	0.5	0.0	0.5	5.2	O K
600 min Summer	85.331	0.351	0.5	0.0	0.5	4.7	O K
720 min Summer	85.299	0.319	0.5	0.0	0.5	4.3	O K
960 min Summer	85.243	0.263	0.5	0.0	0.5	3.5	O K
1440 min Summer	85.153	0.173	0.5	0.0	0.5	2.2	O K
2160 min Summer	85.068	0.088	0.4	0.0	0.4	1.0	O K
2880 min Summer	85.031	0.051	0.4	0.0	0.4	0.5	O K
4320 min Summer	85.017	0.037	0.3	0.0	0.3	0.3	O K
5760 min Summer	85.012	0.032	0.3	0.0	0.3	0.2	O K
7200 min Summer	85.009	0.029	0.2	0.0	0.2	0.2	O K
8640 min Summer	85.007	0.027	0.2	0.0	0.2	0.1	O K

Storm Event	Rain (mm/hr)	Overflow Volume (m ³)	Time-Peak (mins)
15 min Summer	128.285	0.0	18
30 min Summer	84.226	0.0	32
60 min Summer	52.662	0.0	60
120 min Summer	31.800	0.0	102
180 min Summer	23.353	0.0	134
240 min Summer	18.644	0.0	168
360 min Summer	13.543	0.0	236
480 min Summer	10.792	0.0	304
600 min Summer	9.043	0.0	372
720 min Summer	7.823	0.0	436
960 min Summer	6.219	0.0	566
1440 min Summer	4.493	0.0	808
2160 min Summer	3.241	0.0	1148
2880 min Summer	2.568	0.0	1468
4320 min Summer	1.847	0.0	2204
5760 min Summer	1.461	0.0	2904
7200 min Summer	1.217	0.0	3664
8640 min Summer	1.048	0.0	4344

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HCL House Fortran Rd St Mellons B'ness Park Cardiff CF3 0EY		
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Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Overflow (l/s)	Max E Outflow (l/s)	Max Volume (m ³)	Status
10080 min Summer	85.006	0.026	0.2	0.0	0.2	0.1	O K
15 min Winter	85.367	0.387	0.5	0.0	0.5	5.2	O K
30 min Winter	85.463	0.483	0.6	0.0	0.6	6.6	O K
60 min Winter	85.534	0.554	0.6	0.0	0.6	7.6	O K
120 min Winter	85.553	0.573	0.6	0.0	0.6	7.8	O K
180 min Winter	85.533	0.553	0.6	0.0	0.6	7.5	O K
240 min Winter	85.506	0.526	0.6	0.0	0.6	7.2	O K
360 min Winter	85.450	0.470	0.6	0.0	0.6	6.4	O K
480 min Winter	85.397	0.417	0.6	0.0	0.6	5.6	O K
600 min Winter	85.347	0.367	0.5	0.0	0.5	4.9	O K
720 min Winter	85.300	0.320	0.5	0.0	0.5	4.3	O K
960 min Winter	85.219	0.239	0.5	0.0	0.5	3.1	O K
1440 min Winter	85.098	0.118	0.5	0.0	0.5	1.4	O K
2160 min Winter	85.027	0.047	0.4	0.0	0.4	0.4	O K
2880 min Winter	85.017	0.037	0.3	0.0	0.3	0.3	O K
4320 min Winter	85.011	0.031	0.2	0.0	0.2	0.2	O K
5760 min Winter	85.007	0.027	0.2	0.0	0.2	0.1	O K
7200 min Winter	85.005	0.025	0.2	0.0	0.2	0.1	O K
8640 min Winter	85.003	0.023	0.1	0.0	0.1	0.1	O K

Storm Event	Rain (mm/hr)	Overflow Volume (m ³)	Time-Peak (mins)
10080 min Summer	0.923	0.0	5120
15 min Winter	128.285	0.0	18
30 min Winter	84.226	0.0	32
60 min Winter	52.662	0.0	60
120 min Winter	31.800	0.0	114
180 min Winter	23.353	0.0	142
240 min Winter	18.644	0.0	180
360 min Winter	13.543	0.0	256
480 min Winter	10.792	0.0	330
600 min Winter	9.043	0.0	398
720 min Winter	7.823	0.0	468
960 min Winter	6.219	0.0	598
1440 min Winter	4.493	0.0	834
2160 min Winter	3.241	0.0	1104
2880 min Winter	2.568	0.0	1468
4320 min Winter	1.847	0.0	2196
5760 min Winter	1.461	0.0	2856
7200 min Winter	1.217	0.0	3672
8640 min Winter	1.048	0.0	4416

HCL House Fortran Rd
St Mellons B'ness Park
Cardiff CF3 0EY



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Source Control W.12.4

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time / Area Diagram

Total Area (ha) 0.021

Time (mins)	Area (ha)
------------------------	----------------------

0-4	0.021
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HCL House Fortran Rd
St Mellons B'ness Park
Cardiff CF3 0EY



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Source Control W.12.4

Model Details


Storage is Online Cover Level (m) 87.080

Infiltration Trench Structure

Infiltration Coefficient Base (m/hr)	0.06400	Trench Width (m)	2.7
Infiltration Coefficient Side (m/hr)	0.06400	Trench Length (m)	17.4
Safety Factor	2.0	Slope (1:X)	500.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	84.980	Cap Infiltration Depth (m)	0.000

Weir Overflow Control

Discharge Coef 0.544 Width (m) 1.000 Invert Level (m) 86.980

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HCL House Fortran Rd St Mellons B'ness Park Cardiff CF3 0EY		
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Summary of Results for 100 year Return Period (+30%)

Half Drain Time : 90 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (1/s)	Max Overflow (1/s)	Max Σ Outflow (1/s)	Max Volume (m ³)	Status
15 min Summer	90.962	0.442	0.3	37.0	37.2	1.8	O K
30 min Summer	90.957	0.437	0.3	30.0	30.3	1.8	O K
60 min Summer	90.949	0.429	0.2	21.3	21.6	1.8	O K
120 min Summer	90.942	0.422	0.2	13.7	13.9	1.8	O K
180 min Summer	90.938	0.418	0.2	10.1	10.3	1.7	O K
240 min Summer	90.936	0.416	0.2	8.8	9.1	1.7	O K
360 min Summer	90.933	0.413	0.2	6.1	6.4	1.7	O K
480 min Summer	90.931	0.411	0.2	5.1	5.3	1.7	O K
600 min Summer	90.930	0.410	0.2	4.1	4.3	1.7	O K
720 min Summer	90.929	0.409	0.2	3.5	3.7	1.7	O K
960 min Summer	90.928	0.408	0.2	2.9	3.1	1.7	O K
1440 min Summer	90.926	0.406	0.2	2.1	2.3	1.7	O K
2160 min Summer	90.925	0.405	0.2	1.6	1.9	1.7	O K
2880 min Summer	90.924	0.404	0.2	1.2	1.4	1.7	O K
4320 min Summer	90.923	0.403	0.2	0.8	1.0	1.7	O K
5760 min Summer	90.923	0.403	0.2	0.6	0.9	1.7	O K
7200 min Summer	90.923	0.403	0.2	0.6	0.9	1.7	O K
8640 min Summer	90.922	0.402	0.2	0.5	0.7	1.7	O K

Storm Event	Rain (mm/hr)	Overflow Volume (m ³)	Time-Peak (mins)
15 min Summer	128.285	11.6	9
30 min Summer	84.226	15.6	17
60 min Summer	52.662	19.6	32
120 min Summer	31.800	23.4	62
180 min Summer	23.353	25.3	88
240 min Summer	18.644	26.4	126
360 min Summer	13.543	27.5	184
480 min Summer	10.792	28.0	238
600 min Summer	9.043	28.1	312
720 min Summer	7.823	28.0	358
960 min Summer	6.219	27.2	478
1440 min Summer	4.493	25.5	718
2160 min Summer	3.241	23.4	1052
2880 min Summer	2.568	21.5	1468
4320 min Summer	1.847	18.0	2220
5760 min Summer	1.461	14.8	2896
7200 min Summer	1.217	11.9	3648
8640 min Summer	1.048	9.4	4488

Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Overflow (l/s)	Max E Outflow (l/s)	Max Volume (m ³)	Status
10080 min Summer	90.922	0.402	0.2	0.3	0.6	1.7	O K
15 min Winter	90.963	0.443	0.3	37.7	37.9	1.8	O K
30 min Winter	90.953	0.433	0.3	25.8	26.1	1.8	O K
60 min Winter	90.946	0.426	0.2	17.6	17.8	1.8	O K
120 min Winter	90.938	0.418	0.2	10.1	10.3	1.7	O K
180 min Winter	90.935	0.415	0.2	8.0	8.3	1.7	O K
240 min Winter	90.933	0.413	0.2	6.5	6.7	1.7	O K
360 min Winter	90.931	0.411	0.2	4.7	5.0	1.7	O K
480 min Winter	90.929	0.409	0.2	3.5	3.7	1.7	O K
600 min Winter	90.928	0.408	0.2	3.2	3.4	1.7	O K
720 min Winter	90.927	0.407	0.2	2.6	2.9	1.7	O K
960 min Winter	90.926	0.406	0.2	2.1	2.3	1.7	O K
1440 min Winter	90.925	0.405	0.2	1.6	1.9	1.7	O K
2160 min Winter	90.924	0.404	0.2	1.0	1.2	1.7	O K
2880 min Winter	90.924	0.404	0.2	1.0	1.2	1.7	O K
4320 min Winter	90.922	0.402	0.2	0.5	0.7	1.7	O K
5760 min Winter	90.922	0.402	0.2	0.5	0.7	1.7	O K
7200 min Winter	90.922	0.402	0.2	0.3	0.6	1.7	O K
8640 min Winter	90.921	0.401	0.2	0.2	0.4	1.7	O K

Storm Event	Rain (mm/hr)	Overflow Volume (m ³)	Time-Peak (mins)
10080 min Summer	0.923	7.1	4872
15 min Winter	128.285	13.2	9
30 min Winter	84.226	17.7	18
60 min Winter	52.662	22.3	32
120 min Winter	31.800	26.6	64
180 min Winter	23.353	28.8	96
240 min Winter	18.644	30.2	118
360 min Winter	13.543	31.7	188
480 min Winter	10.792	32.5	214
600 min Winter	9.043	32.8	328
720 min Winter	7.823	32.9	376
960 min Winter	6.219	32.4	478
1440 min Winter	4.493	30.5	726
2160 min Winter	3.241	27.7	1000
2880 min Winter	2.568	25.0	1508
4320 min Winter	1.847	19.7	2096
5760 min Winter	1.461	14.9	3064
7200 min Winter	1.217	10.6	3808
8640 min Winter	1.048	6.9	4760

HCL House Fortran Rd
St Mellons B'ness Park
Cardiff CF3 0EY



Date 05/11/2012 18:17
File SOAKAWAY 9.SRCX

Designed By sja74793
Checked By

Elstree Computing Ltd

Source Control W.12.4

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time / Area Diagram

Total Area (ha) 0.056

Time (mins)	Area (ha)
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0-4	0.056
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HCL House Fortran Rd
St Mellons B'ness Park
Cardiff CF3 0EY



Date 05/11/2012 18:17
File SOAKAWAY 9.SRCX

Designed By sja74793
Checked By

Elstree Computing Ltd

Source Control W.12.4

Model Details


Storage is Online Cover Level (m) 91.970

Infiltration Trench Structure

Infiltration Coefficient Base (m/hr)	0.05600	Trench Width (m)	0.7
Infiltration Coefficient Side (m/hr)	0.05600	Trench Length (m)	20.8
Safety Factor	2.0	Slope (1:X)	500.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	90.520	Cap Infiltration Depth (m)	0.000

Weir Overflow Control

Discharge Coef 0.544 Width (m) 2.500 Invert Level (m) 90.920

Hyder Consulting Ltd		Page 1
HCL House Fortran Rd St Mellons B'ness Park Cardiff CF3 0EY		
Date 05/11/2012 18:18 File SOAKAWAY 10.SRCX	Designed By sja74793 Checked By	
Elstree Computing Ltd		Source Control W.12.4

Summary of Results for 100 year Return Period (+30%)

Half Drain Time : 107 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (1/s)	Max Overflow (1/s)	Max Σ Outflow (1/s)	Max Volume (m ³)	Status
15 min Summer	91.205	0.625	0.7	43.7	44.3	5.5	O K
30 min Summer	91.195	0.615	0.7	32.8	33.5	5.5	O K
60 min Summer	91.188	0.608	0.7	25.5	26.1	5.4	O K
120 min Summer	91.177	0.597	0.6	15.3	16.0	5.3	O K
180 min Summer	91.172	0.592	0.6	11.3	12.0	5.2	O K
240 min Summer	91.169	0.589	0.6	8.7	9.4	5.2	O K
360 min Summer	91.165	0.585	0.6	6.4	7.1	5.2	O K
480 min Summer	91.163	0.583	0.6	5.2	5.8	5.1	O K
600 min Summer	91.162	0.582	0.6	4.3	5.0	5.1	O K
720 min Summer	91.160	0.580	0.6	3.5	4.2	5.1	O K
960 min Summer	91.159	0.579	0.6	2.8	3.4	5.1	O K
1440 min Summer	91.156	0.576	0.6	1.7	2.3	5.1	O K
2160 min Summer	91.155	0.575	0.6	1.1	1.7	5.1	O K
2880 min Summer	91.154	0.574	0.6	0.8	1.4	5.1	O K
4320 min Summer	91.152	0.572	0.6	0.4	1.0	5.0	O K
5760 min Summer	91.151	0.571	0.6	0.2	0.8	5.0	O K
7200 min Summer	91.049	0.469	0.6	0.0	0.6	4.0	O K
8640 min Summer	90.959	0.379	0.5	0.0	0.5	3.2	O K

Storm Event	Rain (mm/hr)	Overflow Volume (m ³)	Time-Peak (mins)
15 min Summer	128.285	9.6	10
30 min Summer	84.226	13.9	16
60 min Summer	52.662	17.9	32
120 min Summer	31.800	21.1	62
180 min Summer	23.353	22.2	92
240 min Summer	18.644	22.5	124
360 min Summer	13.543	22.0	186
480 min Summer	10.792	21.2	244
600 min Summer	9.043	20.4	292
720 min Summer	7.823	19.7	362
960 min Summer	6.219	18.1	478
1440 min Summer	4.493	15.2	736
2160 min Summer	3.241	11.4	1112
2880 min Summer	2.568	8.1	1420
4320 min Summer	1.847	3.1	2156
5760 min Summer	1.461	0.2	2976
7200 min Summer	1.217	0.0	3744
8640 min Summer	1.048	0.0	4488

Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Overflow (l/s)	Max E Outflow (l/s)	Max Volume (m ³)	Status
10080 min Summer	90.889	0.309	0.4	0.0	0.4	2.5	O K
15 min Winter	91.211	0.631	0.7	51.7	52.3	5.6	O K
30 min Winter	91.192	0.612	0.7	29.1	29.7	5.4	O K
60 min Winter	91.181	0.601	0.6	18.4	19.0	5.3	O K
120 min Winter	91.172	0.592	0.6	11.3	12.0	5.2	O K
180 min Winter	91.168	0.588	0.6	8.1	8.7	5.2	O K
240 min Winter	91.165	0.585	0.6	6.4	7.1	5.2	O K
360 min Winter	91.162	0.582	0.6	4.6	5.3	5.1	O K
480 min Winter	91.160	0.580	0.6	3.5	4.2	5.1	O K
600 min Winter	91.159	0.579	0.6	2.8	3.4	5.1	O K
720 min Winter	91.158	0.578	0.6	2.3	3.0	5.1	O K
960 min Winter	91.157	0.577	0.6	1.9	2.5	5.1	O K
1440 min Winter	91.155	0.575	0.6	1.1	1.7	5.1	O K
2160 min Winter	91.153	0.573	0.6	0.6	1.3	5.1	O K
2880 min Winter	91.152	0.572	0.6	0.4	1.0	5.0	O K
4320 min Winter	91.151	0.571	0.6	0.1	0.7	5.0	O K
5760 min Winter	91.001	0.421	0.5	0.0	0.5	3.6	O K
7200 min Winter	90.889	0.309	0.4	0.0	0.4	2.5	O K
8640 min Winter	90.809	0.229	0.4	0.0	0.4	1.8	O K

Storm Event	Rain (mm/hr)	Overflow Volume (m ³)	Time-Peak (mins)
10080 min Summer	0.923	0.0	5152
15 min Winter	128.285	11.4	9
30 min Winter	84.226	16.2	18
60 min Winter	52.662	20.9	34
120 min Winter	31.800	24.7	66
180 min Winter	23.353	26.2	92
240 min Winter	18.644	26.7	130
360 min Winter	13.543	26.6	184
480 min Winter	10.792	25.7	236
600 min Winter	9.043	24.6	300
720 min Winter	7.823	23.7	356
960 min Winter	6.219	21.5	466
1440 min Winter	4.493	17.2	784
2160 min Winter	3.241	11.4	1072
2880 min Winter	2.568	6.5	1460
4320 min Winter	1.847	0.2	2240
5760 min Winter	1.461	0.0	3056
7200 min Winter	1.217	0.0	3816
8640 min Winter	1.048	0.0	4496

HCL House Fortran Rd
St Mellons B'ness Park
Cardiff CF3 0EY



Date 05/11/2012 18:18
File SOAKAWAY 10.SRCX

Designed By sja74793
Checked By

Elstree Computing Ltd

Source Control W.12.4

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time / Area Diagram

Total Area (ha) 0.063

Time (mins)	Area (ha)
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0-4	0.063
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HCL House Fortran Rd
St Mellons B'ness Park
Cardiff CF3 0EY



Date 05/11/2012 18:18
File SOAKAWAY 10.SRCX

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Elstree Computing Ltd

Source Control W.12.4

Model Details


Storage is Online Cover Level (m) 91.250

Infiltration Trench Structure

Infiltration Coefficient Base (m/hr)	0.05600	Trench Width (m)	0.7
Infiltration Coefficient Side (m/hr)	0.05600	Trench Length (m)	45.5
Safety Factor	2.0	Slope (1:X)	500.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	90.580	Cap Infiltration Depth (m)	0.000

Weir Overflow Control

Discharge Coef 0.544 Width (m) 2.000 Invert Level (m) 91.150


Hyder Consulting Ltd		Page 1
HCL House Fortran Rd St Mellons B'ness Park Cardiff CF3 0EY		
Date 05/11/2012 18:19 File SOAKAWAY 11.SRCX	Designed By sja74793 Checked By	
Elstree Computing Ltd		Source Control W.12.4

Summary of Results for 100 year Return Period (+30%)

Half Drain Time : 132 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (1/s)	Max Overflow (1/s)	Max Σ Outflow (1/s)	Max Volume (m ³)	Status
15 min Summer	91.597	1.117	0.3	25.8	26.1	3.0	O K
30 min Summer	91.590	1.110	0.3	20.3	20.6	3.0	O K
60 min Summer	91.584	1.104	0.3	15.8	16.1	3.0	O K
120 min Summer	91.573	1.093	0.3	9.1	9.4	2.9	O K
180 min Summer	91.569	1.089	0.3	6.6	6.9	2.9	O K
240 min Summer	91.566	1.086	0.3	5.1	5.4	2.9	O K
360 min Summer	91.563	1.083	0.3	3.7	4.0	2.9	O K
480 min Summer	91.561	1.081	0.3	2.8	3.1	2.9	O K
600 min Summer	91.559	1.079	0.3	2.3	2.6	2.9	O K
720 min Summer	91.559	1.079	0.3	2.1	2.4	2.9	O K
960 min Summer	91.557	1.077	0.3	1.6	1.9	2.9	O K
1440 min Summer	91.556	1.076	0.3	1.1	1.4	2.9	O K
2160 min Summer	91.554	1.074	0.3	0.7	1.0	2.9	O K
2880 min Summer	91.554	1.074	0.3	0.6	0.9	2.9	O K
4320 min Summer	91.552	1.072	0.3	0.3	0.6	2.9	O K
5760 min Summer	91.552	1.072	0.3	0.2	0.5	2.9	O K
7200 min Summer	91.551	1.071	0.3	0.1	0.3	2.9	O K
8640 min Summer	91.397	0.917	0.3	0.0	0.3	2.5	O K

Storm Event	Rain (mm/hr)	Overflow Volume (m ³)	Time-Peak (mins)
15 min Summer	128.285	5.0	10
30 min Summer	84.226	7.4	18
60 min Summer	52.662	9.6	32
120 min Summer	31.800	11.6	66
180 min Summer	23.353	12.3	92
240 min Summer	18.644	12.6	120
360 min Summer	13.543	12.6	182
480 min Summer	10.792	12.2	234
600 min Summer	9.043	11.9	302
720 min Summer	7.823	11.6	368
960 min Summer	6.219	10.9	476
1440 min Summer	4.493	9.5	716
2160 min Summer	3.241	7.5	1100
2880 min Summer	2.568	5.8	1448
4320 min Summer	1.847	3.0	2172
5760 min Summer	1.461	1.1	2912
7200 min Summer	1.217	0.0	3720
8640 min Summer	1.048	0.0	4488

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HCL House Fortran Rd St Mellons B'ness Park Cardiff CF3 0EY		
Date 05/11/2012 18:19 File SOAKAWAY 11.SRCX	Designed By sja74793 Checked By	
Elstree Computing Ltd		Source Control W.12.4

Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Overflow (l/s)	Max E Outflow (l/s)	Max Volume (m ³)	Status
10080 min Summer	91.270	0.790	0.2	0.0	0.2	2.1	O K
15 min Winter	91.600	1.120	0.3	28.4	28.7	3.0	O K
30 min Winter	91.583	1.103	0.3	15.5	15.8	3.0	O K
60 min Winter	91.576	1.096	0.3	10.9	11.2	3.0	O K
120 min Winter	91.568	1.088	0.3	6.0	6.3	2.9	O K
180 min Winter	91.566	1.086	0.3	5.1	5.4	2.9	O K
240 min Winter	91.563	1.083	0.3	3.9	4.2	2.9	O K
360 min Winter	91.560	1.080	0.3	2.7	3.0	2.9	O K
480 min Winter	91.559	1.079	0.3	2.1	2.4	2.9	O K
600 min Winter	91.558	1.078	0.3	1.7	2.0	2.9	O K
720 min Winter	91.557	1.077	0.3	1.4	1.7	2.9	O K
960 min Winter	91.556	1.076	0.3	1.1	1.4	2.9	O K
1440 min Winter	91.554	1.074	0.3	0.7	1.0	2.9	O K
2160 min Winter	91.553	1.073	0.3	0.5	0.8	2.9	O K
2880 min Winter	91.552	1.072	0.3	0.3	0.6	2.9	O K
4320 min Winter	91.551	1.071	0.3	0.1	0.4	2.9	O K
5760 min Winter	91.474	0.994	0.3	0.0	0.3	2.7	O K
7200 min Winter	91.269	0.789	0.2	0.0	0.2	2.1	O K
8640 min Winter	91.124	0.644	0.2	0.0	0.2	1.7	O K

Storm Event	Rain (mm/hr)	Overflow Volume (m ³)	Time-Peak (mins)
10080 min Summer	0.923	0.0	5152
15 min Winter	128.285	6.0	9
30 min Winter	84.226	8.7	18
60 min Winter	52.662	11.3	30
120 min Winter	31.800	13.5	64
180 min Winter	23.353	14.5	96
240 min Winter	18.644	14.9	132
360 min Winter	13.543	15.0	188
480 min Winter	10.792	14.8	238
600 min Winter	9.043	14.4	280
720 min Winter	7.823	13.9	350
960 min Winter	6.219	12.9	468
1440 min Winter	4.493	10.9	734
2160 min Winter	3.241	8.0	1176
2880 min Winter	2.568	5.4	1412
4320 min Winter	1.847	1.5	2152
5760 min Winter	1.461	0.0	3056
7200 min Winter	1.217	0.0	3816
8640 min Winter	1.048	0.0	4496

HCL House Fortran Rd
St Mellons B'ness Park
Cardiff CF3 0EY



Date 05/11/2012 18:19
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Elstree Computing Ltd

Source Control W.12.4

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time / Area Diagram

Total Area (ha) 0.034

Time (mins)	Area (ha)
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0-4	0.034
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HCL House Fortran Rd
St Mellons B'ness Park
Cardiff CF3 0EY



Date 05/11/2012 18:19
File SOAKAWAY 11.SRCX

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Elstree Computing Ltd

Source Control W.12.4

Model Details


Storage is Online Cover Level (m) 91.650

Infiltration Trench Structure

Infiltration Coefficient Base (m/hr)	0.05600	Trench Width (m)	0.7
Infiltration Coefficient Side (m/hr)	0.05600	Trench Length (m)	13.0
Safety Factor	2.0	Slope (1:X)	500.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	90.480	Cap Infiltration Depth (m)	0.000

Weir Overflow Control

Discharge Coef 0.544 Width (m) 1.500 Invert Level (m) 91.550

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HCL House Fortran Rd St Mellons B'ness Park Cardiff CF3 0EY		
Date 05/11/2012 17:14 File Soakaway 12.srcx	Designed By sja74793 Checked By	
Elstree Computing Ltd		Source Control W.12.4

Summary of Results for 100 year Return Period (+30%)

Half Drain Time : 125 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (1/s)	Max Overflow (1/s)	Max Σ Outflow (1/s)	Max Volume (m ³)	Status
15 min Summer	91.869	1.359	1.0	30.7	31.7	10.7	O K
30 min Summer	91.866	1.356	1.0	29.1	30.1	10.7	O K
60 min Summer	91.860	1.350	1.0	24.9	25.9	10.6	O K
120 min Summer	91.844	1.334	1.0	15.6	16.6	10.5	O K
180 min Summer	91.837	1.327	1.0	12.0	13.0	10.5	O K
240 min Summer	91.829	1.319	1.0	8.5	9.5	10.4	O K
360 min Summer	91.823	1.313	1.0	5.8	6.8	10.3	O K
480 min Summer	91.819	1.309	1.0	4.6	5.5	10.3	O K
600 min Summer	91.817	1.307	1.0	3.7	4.7	10.3	O K
720 min Summer	91.815	1.305	1.0	3.1	4.0	10.3	O K
960 min Summer	91.812	1.302	1.0	2.2	3.2	10.2	O K
1440 min Summer	91.809	1.299	1.0	1.5	2.5	10.2	O K
2160 min Summer	91.805	1.295	1.0	0.6	1.6	10.2	O K
2880 min Summer	91.734	1.224	0.9	0.0	0.9	9.6	O K
4320 min Summer	91.429	0.919	0.7	0.0	0.7	7.1	O K
5760 min Summer	91.230	0.720	0.6	0.0	0.6	5.5	O K
7200 min Summer	91.093	0.583	0.5	0.0	0.5	4.4	O K
8640 min Summer	90.988	0.478	0.5	0.0	0.5	3.6	O K

Storm Event	Rain (mm/hr)	Overflow Volume (m ³)	Time-Peak (mins)
15 min Summer	128.285	4.0	12
30 min Summer	84.226	8.1	19
60 min Summer	52.662	11.7	34
120 min Summer	31.800	14.2	60
180 min Summer	23.353	14.6	88
240 min Summer	18.644	14.4	116
360 min Summer	13.543	13.7	180
480 min Summer	10.792	12.8	244
600 min Summer	9.043	11.9	288
720 min Summer	7.823	10.9	366
960 min Summer	6.219	9.0	490
1440 min Summer	4.493	5.6	732
2160 min Summer	3.241	1.7	1112
2880 min Summer	2.568	0.0	1560
4320 min Summer	1.847	0.0	2292
5760 min Summer	1.461	0.0	3008
7200 min Summer	1.217	0.0	3744
8640 min Summer	1.048	0.0	4488

Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Overflow (l/s)	Max E Outflow (l/s)	Max Volume (m ³)	Status
10080 min Summer	90.908	0.398	0.4	0.0	0.4	2.9	O K
15 min Winter	91.866	1.356	1.0	28.7	29.7	10.7	O K
30 min Winter	91.875	1.365	1.0	34.8	35.8	10.7	O K
60 min Winter	91.858	1.348	1.0	24.0	25.0	10.6	O K
120 min Winter	91.834	1.324	1.0	10.8	11.8	10.4	O K
180 min Winter	91.828	1.318	1.0	8.1	9.1	10.4	O K
240 min Winter	91.823	1.313	1.0	5.8	6.8	10.3	O K
360 min Winter	91.818	1.308	1.0	4.0	5.0	10.3	O K
480 min Winter	91.815	1.305	1.0	3.1	4.0	10.3	O K
600 min Winter	91.812	1.302	1.0	2.3	3.3	10.2	O K
720 min Winter	91.811	1.301	1.0	2.0	3.0	10.2	O K
960 min Winter	91.809	1.299	1.0	1.4	2.4	10.2	O K
1440 min Winter	91.806	1.296	1.0	0.7	1.7	10.2	O K
2160 min Winter	91.801	1.291	1.0	0.1	1.1	10.2	O K
2880 min Winter	91.555	1.045	0.8	0.0	0.8	8.2	O K
4320 min Winter	91.231	0.721	0.6	0.0	0.6	5.5	O K
5760 min Winter	91.037	0.527	0.5	0.0	0.5	4.0	O K
7200 min Winter	90.908	0.398	0.4	0.0	0.4	2.9	O K
8640 min Winter	90.816	0.306	0.4	0.0	0.4	2.2	O K

Storm Event	Rain (mm/hr)	Overflow Volume (m ³)	Time-Peak (mins)
10080 min Summer	0.923	0.0	5152
15 min Winter	128.285	5.8	12
30 min Winter	84.226	10.4	18
60 min Winter	52.662	14.6	32
120 min Winter	31.800	17.7	56
180 min Winter	23.353	18.4	82
240 min Winter	18.644	18.3	122
360 min Winter	13.543	17.2	184
480 min Winter	10.792	16.0	234
600 min Winter	9.043	14.7	308
720 min Winter	7.823	13.2	354
960 min Winter	6.219	10.4	480
1440 min Winter	4.493	5.3	724
2160 min Winter	3.241	0.1	1208
2880 min Winter	2.568	0.0	1612
4320 min Winter	1.847	0.0	2336
5760 min Winter	1.461	0.0	3056
7200 min Winter	1.217	0.0	3816
8640 min Winter	1.048	0.0	4496

HCL House Fortran Rd
St Mellons B'ness Park
Cardiff CF3 0EY



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Source Control W.12.4

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time / Area Diagram

Total Area (ha) 0.062

Time (mins)	Area (ha)
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0-4	0.062
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HCL House Fortran Rd
St Mellons B'ness Park
Cardiff CF3 0EY



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Model Details


Storage is Online Cover Level (m) 91.900

Infiltration Trench Structure

Infiltration Coefficient Base (m/hr)	0.05600	Trench Width (m)	0.7
Infiltration Coefficient Side (m/hr)	0.05600	Trench Length (m)	38.6
Safety Factor	2.0	Slope (1:X)	500.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	90.510	Cap Infiltration Depth (m)	0.000

Weir Overflow Control

Discharge Coef 0.544 Width (m) 1.000 Invert Level (m) 91.800


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Summary of Results for 100 year Return Period (+30%)

Half Drain Time : 138 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (1/s)	Max Volume (m³)	Status
15 min Summer	86.411	0.411	0.6	5.6	O K
30 min Summer	86.514	0.514	0.6	7.0	O K
60 min Summer	86.590	0.590	0.6	8.1	O K
120 min Summer	86.610	0.610	0.6	8.4	O K
180 min Summer	86.596	0.596	0.6	8.2	O K
240 min Summer	86.575	0.575	0.6	7.9	O K
360 min Summer	86.533	0.533	0.6	7.3	O K
480 min Summer	86.495	0.495	0.6	6.7	O K
600 min Summer	86.459	0.459	0.6	6.2	O K
720 min Summer	86.425	0.425	0.6	5.7	O K
960 min Summer	86.362	0.362	0.5	4.9	O K
1440 min Summer	86.259	0.259	0.5	3.4	O K
2160 min Summer	86.149	0.149	0.5	1.8	O K
2880 min Summer	86.082	0.082	0.4	0.9	O K
4320 min Summer	86.044	0.044	0.4	0.4	O K
5760 min Summer	86.035	0.035	0.3	0.2	O K
7200 min Summer	86.032	0.032	0.3	0.2	O K
8640 min Summer	86.030	0.030	0.2	0.2	O K

Storm Event	Rain (mm/hr)	Time-Peak (mins)
15 min Summer	128.285	18
30 min Summer	84.226	32
60 min Summer	52.662	62
120 min Summer	31.800	108
180 min Summer	23.353	140
240 min Summer	18.644	172
360 min Summer	13.543	240
480 min Summer	10.792	310
600 min Summer	9.043	378
720 min Summer	7.823	444
960 min Summer	6.219	576
1440 min Summer	4.493	824
2160 min Summer	3.241	1172
2880 min Summer	2.568	1504
4320 min Summer	1.847	2200
5760 min Summer	1.461	2904
7200 min Summer	1.217	3664
8640 min Summer	1.048	4384

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Elstree Computing Ltd		Source Control W.12.4

Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
10080 min Summer	86.028	0.028	0.2	0.2	O K
15 min Winter	86.462	0.462	0.6	6.3	O K
30 min Winter	86.580	0.580	0.6	7.9	O K
60 min Winter	86.673	0.673	0.7	9.2	O K
120 min Winter	86.708	0.708	0.7	9.7	O K
180 min Winter	86.689	0.689	0.7	9.5	O K
240 min Winter	86.663	0.663	0.6	9.1	O K
360 min Winter	86.604	0.604	0.6	8.3	O K
480 min Winter	86.548	0.548	0.6	7.5	O K
600 min Winter	86.494	0.494	0.6	6.7	O K
720 min Winter	86.444	0.444	0.6	6.0	O K
960 min Winter	86.353	0.353	0.5	4.7	O K
1440 min Winter	86.209	0.209	0.5	2.7	O K
2160 min Winter	86.074	0.074	0.4	0.8	O K
2880 min Winter	86.044	0.044	0.4	0.4	O K
4320 min Winter	86.033	0.033	0.3	0.2	O K
5760 min Winter	86.030	0.030	0.2	0.2	O K
7200 min Winter	86.027	0.027	0.2	0.1	O K
8640 min Winter	86.025	0.025	0.2	0.1	O K

Storm Event	Rain (mm/hr)	Time-Peak (mins)
10080 min Summer	0.923	5080
15 min Winter	128.285	18
30 min Winter	84.226	32
60 min Winter	52.662	60
120 min Winter	31.800	116
180 min Winter	23.353	146
240 min Winter	18.644	184
360 min Winter	13.543	260
480 min Winter	10.792	336
600 min Winter	9.043	406
720 min Winter	7.823	478
960 min Winter	6.219	614
1440 min Winter	4.493	864
2160 min Winter	3.241	1188
2880 min Winter	2.568	1460
4320 min Winter	1.847	2204
5760 min Winter	1.461	2856
7200 min Winter	1.217	3664
8640 min Winter	1.048	4384

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Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
10080 min Winter	86.024	0.024	0.1	0.1	O K

Storm Event	Rain (mm/hr)	Time-Peak (mins)
10080 min Winter	0.923	5112

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Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time / Area Diagram

Total Area (ha) 0.025

Time (mins)	Area (ha)
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0-4	0.025
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Source Control W.12.4

Model Details

Storage is Online Cover Level (m) 86.980

Infiltration Trench Structure

Infiltration Coefficient Base (m/hr)	0.06400	Trench Width (m)	2.7
Infiltration Coefficient Side (m/hr)	0.06400	Trench Length (m)	17.4
Safety Factor	2.0	Slope (1:X)	500.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	86.000	Cap Infiltration Depth (m)	0.000