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Bristol Airport 12mpps
Existing Terminal Replan
Q30



Date 01/09/2018

Designed by RJH

File Ex Terminal Replan.SRCX

Checked by

Innovyze

Source Control 2018.1

Model Details

Storage is Online Cover Level (m) 10.000

Cellular Storage Structure

Invert Level (m) 7.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.15100 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.15100

Table with 9 columns: Depth (m), Area (m²), Inf. Area (m²), Depth (m), Area (m²), Inf. Area (m²), Depth (m), Area (m²), Inf. Area (m²). Rows show values for depths 0.000, 2.000, and 2.100.

Bristol Airport 12mpps
Existing Terminal Replan
Q100 +30%



Date 12/11/2018

Designed by RJH

File Ex Terminal Replan.SRCX

Checked by

Innovyze

Source Control 2018.1

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

Half Drain Time : 682 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	7.950	0.950	10.4	360.9	O K
30 min Summer	8.267	1.267	11.0	481.5	O K
60 min Summer	8.587	1.587	11.7	603.2	O K
120 min Summer	8.880	1.880	12.3	714.5	O K
180 min Summer	9.018	2.018	12.6	765.6	O K
240 min Summer	10.017	3.017	12.6	790.5	FLOOD
360 min Summer	10.039	3.039	12.6	812.4	FLOOD
480 min Summer	10.038	3.038	12.6	811.2	FLOOD
600 min Summer	10.026	3.026	12.6	799.7	FLOOD
720 min Summer	10.013	3.013	12.6	786.7	FLOOD
960 min Summer	8.996	1.996	12.6	758.4	O K
1440 min Summer	8.863	1.863	12.3	707.9	O K
2160 min Summer	8.687	1.687	11.9	640.9	O K
2880 min Summer	8.523	1.523	11.6	578.8	O K
4320 min Summer	8.229	1.229	11.0	467.0	O K
5760 min Summer	7.977	0.977	10.4	371.1	O K
7200 min Summer	7.763	0.763	10.0	290.0	O K
8640 min Summer	7.585	0.585	9.6	222.4	O K
10080 min Summer	7.439	0.439	9.3	166.9	O K
15 min Winter	8.071	1.071	10.6	406.9	O K
30 min Winter	8.428	1.428	11.4	542.6	O K
60 min Winter	8.791	1.791	12.1	680.8	O K
120 min Winter	10.036	3.036	12.6	809.9	FLOOD
180 min Winter	10.099	3.099	12.6	872.5	FLOOD

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	124.836	0.0	52
30 min Summer	83.061	0.0	66
60 min Summer	52.662	0.0	92
120 min Summer	32.210	0.0	148
180 min Summer	23.799	0.0	202
240 min Summer	19.065	17.8	258
360 min Summer	13.962	39.7	370
480 min Summer	11.178	38.5	482
600 min Summer	9.399	27.1	542
720 min Summer	8.153	14.0	602
960 min Summer	6.510	0.0	726
1440 min Summer	4.731	0.0	1000
2160 min Summer	3.432	0.0	1412
2880 min Summer	2.730	0.0	1820
4320 min Summer	1.973	0.0	2612
5760 min Summer	1.566	0.0	3368
7200 min Summer	1.308	0.0	4120
8640 min Summer	1.129	0.0	4848
10080 min Summer	0.998	0.0	5552
15 min Winter	124.836	0.0	53
30 min Winter	83.061	0.0	66
60 min Winter	52.662	0.0	92
120 min Winter	32.210	37.2	146
180 min Winter	23.799	99.8	202

.	Bristol Airport 12mpps
.	Existing Terminal Replan
.	Q100 +30%
Date 12/11/2018	Designed by RJH
File Ex Terminal Replan.SRCX	Checked by



Innovyze Source Control 2018.1

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
240 min Winter	10.132	3.132	12.6	905.4	FLOOD
360 min Winter	10.166	3.166	12.6	940.0	FLOOD
480 min Winter	10.175	3.175	12.6	948.5	FLOOD
600 min Winter	10.169	3.169	12.6	942.3	FLOOD
720 min Winter	10.154	3.154	12.6	927.3	FLOOD
960 min Winter	10.118	3.118	12.6	891.4	FLOOD
1440 min Winter	10.044	3.044	12.6	817.2	FLOOD
2160 min Winter	8.889	1.889	12.4	717.8	O K
2880 min Winter	8.646	1.646	11.8	625.3	O K
4320 min Winter	8.215	1.215	10.9	461.9	O K
5760 min Winter	7.861	0.861	10.2	327.1	O K
7200 min Winter	7.573	0.573	9.6	217.6	O K
8640 min Winter	7.344	0.344	9.1	130.8	O K
10080 min Winter	7.172	0.172	8.8	65.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
240 min Winter	19.065	132.8	256
360 min Winter	13.962	167.4	368
480 min Winter	11.178	175.8	478
600 min Winter	9.399	169.6	586
720 min Winter	8.153	154.6	688
960 min Winter	6.510	118.7	780
1440 min Winter	4.731	44.5	1082
2160 min Winter	3.432	0.0	1528
2880 min Winter	2.730	0.0	1964
4320 min Winter	1.973	0.0	2784
5760 min Winter	1.566	0.0	3552
7200 min Winter	1.308	0.0	4280
8640 min Winter	1.129	0.0	4960
10080 min Winter	0.998	0.0	5568

.	Bristol Airport 12mpps
.	Existing Terminal Replan
.	Q100 +30%
Date 12/11/2018	Designed by RJH
File Ex Terminal Replan.SRCX	Checked by
Innovyze	Source Control 2018.1



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	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 1.656

Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)
0	4	0.166	8	12	0.166	16	20	0.166	24	28	0.165	32	36	0.165
4	8	0.166	12	16	0.166	20	24	0.166	28	32	0.165	36	40	0.165

Time Area Diagram

Total Area (ha) 0.000

Time (mins) From:	Time (mins) To:	Area (ha)
0	4	0.000

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Bristol Airport 12mpps
Existing Terminal Replan
Q100 +30%



Date 12/11/2018

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File Ex Terminal Replan.SRCX

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Source Control 2018.1

Model Details

Storage is Online Cover Level (m) 10.000

Cellular Storage Structure

Invert Level (m) 7.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.15100 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.15100

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	400.0	400.0	2.000	400.0	600.0	2.100	0.0	600.0

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Bristol Airport 12mpps
Soakaway 3
Q30



Date 01/09/2018

Designed by RJH

File Point C + Ex Hways.SRCX

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Source Control 2018.1

Summary of Results for 30 year Return Period

Half Drain Time : 259 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	7.412	0.412	5.1	78.3	O K
30 min Summer	7.538	0.538	5.4	102.2	O K
60 min Summer	7.653	0.653	5.7	124.1	O K
120 min Summer	7.737	0.737	5.9	140.0	O K
180 min Summer	7.755	0.755	5.9	143.4	O K
240 min Summer	7.750	0.750	5.9	142.5	O K
360 min Summer	7.732	0.732	5.9	139.0	O K
480 min Summer	7.709	0.709	5.8	134.6	O K
600 min Summer	7.685	0.685	5.7	130.1	O K
720 min Summer	7.661	0.661	5.7	125.5	O K
960 min Summer	7.613	0.613	5.6	116.5	O K
1440 min Summer	7.522	0.522	5.4	99.2	O K
2160 min Summer	7.402	0.402	5.1	76.4	O K
2880 min Summer	7.303	0.303	4.9	57.5	O K
4320 min Summer	7.160	0.160	4.6	30.4	O K
5760 min Summer	7.078	0.078	4.4	14.7	O K
7200 min Summer	7.048	0.048	4.2	9.2	O K
8640 min Summer	7.042	0.042	3.6	8.0	O K
10080 min Summer	7.037	0.037	3.2	7.0	O K
15 min Winter	7.465	0.465	5.2	88.4	O K
30 min Winter	7.608	0.608	5.6	115.5	O K
60 min Winter	7.742	0.742	5.9	140.9	O K
120 min Winter	7.845	0.845	6.1	160.5	O K
180 min Winter	7.875	0.875	6.2	166.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	74.059	0.0	32
30 min Summer	48.833	0.0	45
60 min Summer	30.811	0.0	72
120 min Summer	18.860	0.0	126
180 min Summer	13.992	0.0	182
240 min Summer	11.265	0.0	214
360 min Summer	8.299	0.0	278
480 min Summer	6.674	0.0	344
600 min Summer	5.632	0.0	414
720 min Summer	4.901	0.0	482
960 min Summer	3.933	0.0	620
1440 min Summer	2.881	0.0	888
2160 min Summer	2.107	0.0	1272
2880 min Summer	1.687	0.0	1644
4320 min Summer	1.231	0.0	2344
5760 min Summer	0.984	0.0	3000
7200 min Summer	0.827	0.0	3672
8640 min Summer	0.717	0.0	4408
10080 min Summer	0.636	0.0	5144
15 min Winter	74.059	0.0	32
30 min Winter	48.833	0.0	45
60 min Winter	30.811	0.0	72
120 min Winter	18.860	0.0	126
180 min Winter	13.992	0.0	180

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Bristol Airport 12mpps
Soakaway 3
Q30



Date 01/09/2018

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File Point C + Ex Hways.SRCX

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Source Control 2018.1

Summary of Results for 30 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
240 min Winter	7.873	0.873	6.2	165.9	O K
360 min Winter	7.849	0.849	6.1	161.2	O K
480 min Winter	7.818	0.818	6.0	155.4	O K
600 min Winter	7.783	0.783	6.0	148.8	O K
720 min Winter	7.747	0.747	5.9	141.9	O K
960 min Winter	7.673	0.673	5.7	128.0	O K
1440 min Winter	7.536	0.536	5.4	101.8	O K
2160 min Winter	7.360	0.360	5.0	68.5	O K
2880 min Winter	7.223	0.223	4.7	42.4	O K
4320 min Winter	7.058	0.058	4.3	11.0	O K
5760 min Winter	7.042	0.042	3.6	7.9	O K
7200 min Winter	7.035	0.035	3.0	6.7	O K
8640 min Winter	7.030	0.030	2.6	5.8	O K
10080 min Winter	7.027	0.027	2.3	5.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
240 min Winter	11.265	0.0	234
360 min Winter	8.299	0.0	294
480 min Winter	6.674	0.0	370
600 min Winter	5.632	0.0	448
720 min Winter	4.901	0.0	522
960 min Winter	3.933	0.0	670
1440 min Winter	2.881	0.0	952
2160 min Winter	2.107	0.0	1344
2880 min Winter	1.687	0.0	1708
4320 min Winter	1.231	0.0	2292
5760 min Winter	0.984	0.0	2920
7200 min Winter	0.827	0.0	3672
8640 min Winter	0.717	0.0	4408
10080 min Winter	0.636	0.0	5056

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Bristol Airport 12mpps
Soakaway 3
Q30



Date 01/09/2018
File Point C + Ex Hways.SRCX

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Innovyze Source Control 2018.1

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.618

Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)
0	4	0.124	4	8	0.124	8	12	0.124	12	16	0.123	16	20	0.123

Time Area Diagram

Total Area (ha) 0.000

Time (mins) From:	Time (mins) To:	Area (ha)
0	4	0.000

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Bristol Airport 12mpps
Soakaway 3
Q30



Date 01/09/2018

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File Point C + Ex Hways.SRCX

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Source Control 2018.1

Model Details

Storage is Online Cover Level (m) 11.000

Cellular Storage Structure

Invert Level (m) 7.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.15100 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.15100

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	200.0	200.0	1.800	200.0	394.4	1.900	0.0	394.4

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Bristol Airport 12mpps
Soakaway 3
Q100 +30%



Date 12/11/2018

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Source Control 2018.1

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

Half Drain Time : 382 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	7.716	0.716	5.8	136.0	O K
30 min Summer	7.944	0.944	6.3	179.5	O K
60 min Summer	8.166	1.166	6.8	221.6	O K
120 min Summer	8.349	1.349	7.2	256.3	O K
180 min Summer	8.413	1.413	7.4	268.5	O K
240 min Summer	8.427	1.427	7.4	271.1	O K
360 min Summer	8.413	1.413	7.4	268.4	O K
480 min Summer	8.385	1.385	7.3	263.2	O K
600 min Summer	8.353	1.353	7.3	257.0	O K
720 min Summer	8.319	1.319	7.2	250.5	O K
960 min Summer	8.252	1.252	7.0	238.0	O K
1440 min Summer	8.132	1.132	6.8	215.1	O K
2160 min Summer	7.969	0.969	6.4	184.1	O K
2880 min Summer	7.826	0.826	6.1	156.9	O K
4320 min Summer	7.590	0.590	5.5	112.2	O K
5760 min Summer	7.411	0.411	5.1	78.0	O K
7200 min Summer	7.275	0.275	4.8	52.3	O K
8640 min Summer	7.175	0.175	4.6	33.2	O K
10080 min Summer	7.105	0.105	4.4	20.0	O K
15 min Winter	7.806	0.806	6.0	153.1	O K
30 min Winter	8.064	1.064	6.6	202.2	O K
60 min Winter	8.318	1.318	7.2	250.4	O K
120 min Winter	8.534	1.534	7.7	291.5	O K
180 min Winter	8.618	1.618	7.9	307.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	124.836	0.0	33
30 min Summer	83.061	0.0	47
60 min Summer	52.662	0.0	74
120 min Summer	32.210	0.0	130
180 min Summer	23.799	0.0	186
240 min Summer	19.065	0.0	242
360 min Summer	13.962	0.0	314
480 min Summer	11.178	0.0	376
600 min Summer	9.399	0.0	442
720 min Summer	8.153	0.0	510
960 min Summer	6.510	0.0	648
1440 min Summer	4.731	0.0	924
2160 min Summer	3.432	0.0	1328
2880 min Summer	2.730	0.0	1716
4320 min Summer	1.973	0.0	2472
5760 min Summer	1.566	0.0	3184
7200 min Summer	1.308	0.0	3896
8640 min Summer	1.129	0.0	4584
10080 min Summer	0.998	0.0	5248
15 min Winter	124.836	0.0	33
30 min Winter	83.061	0.0	47
60 min Winter	52.662	0.0	74
120 min Winter	32.210	0.0	128
180 min Winter	23.799	0.0	184

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Bristol Airport 12mpps
Soakaway 3
Q100 +30%



Date 12/11/2018
File Point C + Ex Hways.SRCX
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Innovyze Source Control 2018.1

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

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
240 min Winter	8.644	1.644	7.9	312.3	O K
360 min Winter	8.639	1.639	7.9	311.4	O K
480 min Winter	8.604	1.604	7.8	304.8	O K
600 min Winter	8.567	1.567	7.7	297.7	O K
720 min Winter	8.522	1.522	7.6	289.2	O K
960 min Winter	8.426	1.426	7.4	270.9	O K
1440 min Winter	8.248	1.248	7.0	237.2	O K
2160 min Winter	8.009	1.009	6.5	191.7	O K
2880 min Winter	7.804	0.804	6.0	152.8	O K
4320 min Winter	7.484	0.484	5.3	91.9	O K
5760 min Winter	7.255	0.255	4.8	48.4	O K
7200 min Winter	7.101	0.101	4.4	19.2	O K
8640 min Winter	7.048	0.048	4.1	9.1	O K
10080 min Winter	7.042	0.042	3.6	8.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
240 min Winter	19.065	0.0	240
360 min Winter	13.962	0.0	344
480 min Winter	11.178	0.0	394
600 min Winter	9.399	0.0	468
720 min Winter	8.153	0.0	546
960 min Winter	6.510	0.0	700
1440 min Winter	4.731	0.0	996
2160 min Winter	3.432	0.0	1420
2880 min Winter	2.730	0.0	1824
4320 min Winter	1.973	0.0	2596
5760 min Winter	1.566	0.0	3296
7200 min Winter	1.308	0.0	3904
8640 min Winter	1.129	0.0	4408
10080 min Winter	0.998	0.0	5000

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Bristol Airport 12mpps
Soakaway 3
Q100 +30%



Date 12/11/2018
File Point C + Ex Hways.SRCX

Designed by RJH
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Innovyze Source Control 2018.1

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	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.618

Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)
0	4	0.124	4	8	0.124	8	12	0.124	12	16	0.123	16	20	0.123

Time Area Diagram

Total Area (ha) 0.000

Time (mins) From:	Time (mins) To:	Area (ha)
0	4	0.000

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Bristol Airport 12mpps
Soakaway 3
Q100 +30%



Date 12/11/2018

Designed by RJH

File Point C + Ex Hways.SRCX

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Innovyze

Source Control 2018.1

Model Details

Storage is Online Cover Level (m) 11.000

Cellular Storage Structure

Invert Level (m) 7.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.15100 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.15100

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	200.0	200.0	1.800	200.0	394.4	1.900	0.0	394.4

Bristol Airport 12mpps
Terminal Building Canopy
Q30



Date 01/09/2018

Designed by RJH

File Terminal Canopy.SRCX

Checked by

Innovyze

Source Control 2018.1

Summary of Results for 30 year Return Period

Half Drain Time : 218 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	7.307	0.307	3.3	41.9	O K
30 min Summer	7.398	0.398	3.4	54.5	O K
60 min Summer	7.480	0.480	3.5	65.6	O K
120 min Summer	7.532	0.532	3.6	72.8	O K
180 min Summer	7.537	0.537	3.6	73.4	O K
240 min Summer	7.530	0.530	3.6	72.4	O K
360 min Summer	7.511	0.511	3.5	69.9	O K
480 min Summer	7.489	0.489	3.5	66.9	O K
600 min Summer	7.467	0.467	3.5	63.9	O K
720 min Summer	7.445	0.445	3.5	60.9	O K
960 min Summer	7.401	0.401	3.4	54.9	O K
1440 min Summer	7.320	0.320	3.3	43.7	O K
2160 min Summer	7.217	0.217	3.2	29.7	O K
2880 min Summer	7.141	0.141	3.2	19.4	O K
4320 min Summer	7.059	0.059	3.1	8.0	O K
5760 min Summer	7.043	0.043	2.7	5.9	O K
7200 min Summer	7.037	0.037	2.3	5.0	O K
8640 min Summer	7.032	0.032	1.9	4.3	O K
10080 min Summer	7.028	0.028	1.7	3.8	O K
15 min Winter	7.346	0.346	3.4	47.4	O K
30 min Winter	7.451	0.451	3.5	61.7	O K
60 min Winter	7.546	0.546	3.6	74.7	O K
120 min Winter	7.614	0.614	3.6	83.9	O K
180 min Winter	7.626	0.626	3.7	85.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	74.059	0.0	28
30 min Summer	48.833	0.0	42
60 min Summer	30.811	0.0	68
120 min Summer	18.860	0.0	124
180 min Summer	13.992	0.0	172
240 min Summer	11.265	0.0	200
360 min Summer	8.299	0.0	266
480 min Summer	6.674	0.0	334
600 min Summer	5.632	0.0	402
720 min Summer	4.901	0.0	470
960 min Summer	3.933	0.0	606
1440 min Summer	2.881	0.0	866
2160 min Summer	2.107	0.0	1236
2880 min Summer	1.687	0.0	1588
4320 min Summer	1.231	0.0	2220
5760 min Summer	0.984	0.0	2936
7200 min Summer	0.827	0.0	3672
8640 min Summer	0.717	0.0	4408
10080 min Summer	0.636	0.0	5056
15 min Winter	74.059	0.0	28
30 min Winter	48.833	0.0	42
60 min Winter	30.811	0.0	68
120 min Winter	18.860	0.0	124
180 min Winter	13.992	0.0	178

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Bristol Airport 12mpps
Terminal Building Canopy
Q30



Date 01/09/2018

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Summary of Results for 30 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
240 min Winter	7.617	0.617	3.6	84.5	O K
360 min Winter	7.592	0.592	3.6	81.0	O K
480 min Winter	7.561	0.561	3.6	76.8	O K
600 min Winter	7.527	0.527	3.6	72.2	O K
720 min Winter	7.493	0.493	3.5	67.5	O K
960 min Winter	7.425	0.425	3.4	58.1	O K
1440 min Winter	7.301	0.301	3.3	41.2	O K
2160 min Winter	7.155	0.155	3.2	21.2	O K
2880 min Winter	7.064	0.064	3.1	8.8	O K
4320 min Winter	7.039	0.039	2.4	5.4	O K
5760 min Winter	7.032	0.032	1.9	4.3	O K
7200 min Winter	7.027	0.027	1.6	3.6	O K
8640 min Winter	7.023	0.023	1.4	3.1	O K
10080 min Winter	7.021	0.021	1.3	2.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
240 min Winter	11.265	0.0	228
360 min Winter	8.299	0.0	284
480 min Winter	6.674	0.0	362
600 min Winter	5.632	0.0	438
720 min Winter	4.901	0.0	512
960 min Winter	3.933	0.0	654
1440 min Winter	2.881	0.0	922
2160 min Winter	2.107	0.0	1280
2880 min Winter	1.687	0.0	1564
4320 min Winter	1.231	0.0	2208
5760 min Winter	0.984	0.0	2944
7200 min Winter	0.827	0.0	3680
8640 min Winter	0.717	0.0	4336
10080 min Winter	0.636	0.0	5128

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Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.333

Time (mins) Area	Time (mins) Area	Time (mins) Area	Time (mins) Area
From: To: (ha)	From: To: (ha)	From: To: (ha)	From: To: (ha)
0 4 0.083	4 8 0.083	8 12 0.083	12 16 0.084

Time Area Diagram

Total Area (ha) 0.000

Time (mins) Area
From: To: (ha)
0 4 0.000

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Bristol Airport 12mpps
Terminal Building Canopy
Q30



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Model Details

Storage is Online Cover Level (m) 11.000

Cellular Storage Structure

Invert Level (m) 7.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.15100 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.15100

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	144.0	144.0	1.500	144.0	216.0	1.600	0.0	216.0

Bristol Airport 12mpps
Terminal Building Canopy
Q100 +30%



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

Half Drain Time : 366 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	7.535	0.535	3.6	73.1	O K
30 min Summer	7.704	0.704	3.7	96.3	O K
60 min Summer	7.866	0.866	3.9	118.4	O K
120 min Summer	7.994	0.994	4.0	136.0	O K
180 min Summer	8.035	1.035	4.1	141.6	O K
240 min Summer	8.038	1.038	4.1	142.0	O K
360 min Summer	8.016	1.016	4.0	139.0	O K
480 min Summer	7.987	0.987	4.0	135.1	O K
600 min Summer	7.958	0.958	4.0	131.1	O K
720 min Summer	7.930	0.930	4.0	127.2	O K
960 min Summer	7.875	0.875	3.9	119.8	O K
1440 min Summer	7.772	0.772	3.8	105.6	O K
2160 min Summer	7.629	0.629	3.7	86.1	O K
2880 min Summer	7.504	0.504	3.5	69.0	O K
4320 min Summer	7.307	0.307	3.3	42.0	O K
5760 min Summer	7.171	0.171	3.2	23.4	O K
7200 min Summer	7.088	0.088	3.1	12.0	O K
8640 min Summer	7.050	0.050	3.1	6.8	O K
10080 min Summer	7.044	0.044	2.7	6.0	O K
15 min Winter	7.602	0.602	3.6	82.4	O K
30 min Winter	7.794	0.794	3.8	108.7	O K
60 min Winter	7.981	0.981	4.0	134.2	O K
120 min Winter	8.135	1.135	4.2	155.3	O K
180 min Winter	8.191	1.191	4.2	163.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	124.836	0.0	29
30 min Summer	83.061	0.0	43
60 min Summer	52.662	0.0	72
120 min Summer	32.210	0.0	128
180 min Summer	23.799	0.0	184
240 min Summer	19.065	0.0	242
360 min Summer	13.962	0.0	310
480 min Summer	11.178	0.0	372
600 min Summer	9.399	0.0	436
720 min Summer	8.153	0.0	506
960 min Summer	6.510	0.0	644
1440 min Summer	4.731	0.0	916
2160 min Summer	3.432	0.0	1312
2880 min Summer	2.730	0.0	1700
4320 min Summer	1.973	0.0	2424
5760 min Summer	1.566	0.0	3112
7200 min Summer	1.308	0.0	3752
8640 min Summer	1.129	0.0	4400
10080 min Summer	0.998	0.0	5080
15 min Winter	124.836	0.0	29
30 min Winter	83.061	0.0	43
60 min Winter	52.662	0.0	70
120 min Winter	32.210	0.0	126
180 min Winter	23.799	0.0	182

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Terminal Building Canopy
Q100 +30%



Date 12/11/2018

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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 (m ³)	Status
240 min Winter	8.205	1.205	4.2	164.8	O K
360 min Winter	8.189	1.189	4.2	162.7	O K
480 min Winter	8.151	1.151	4.2	157.5	O K
600 min Winter	8.114	1.114	4.1	152.4	O K
720 min Winter	8.075	1.075	4.1	147.1	O K
960 min Winter	7.996	0.996	4.0	136.3	O K
1440 min Winter	7.840	0.840	3.9	114.9	O K
2160 min Winter	7.627	0.627	3.7	85.8	O K
2880 min Winter	7.447	0.447	3.5	61.2	O K
4320 min Winter	7.181	0.181	3.2	24.8	O K
5760 min Winter	7.050	0.050	3.1	6.9	O K
7200 min Winter	7.042	0.042	2.6	5.7	O K
8640 min Winter	7.036	0.036	2.2	4.9	O K
10080 min Winter	7.032	0.032	2.0	4.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
240 min Winter	19.065	0.0	238
360 min Winter	13.962	0.0	344
480 min Winter	11.178	0.0	392
600 min Winter	9.399	0.0	468
720 min Winter	8.153	0.0	544
960 min Winter	6.510	0.0	698
1440 min Winter	4.731	0.0	992
2160 min Winter	3.432	0.0	1408
2880 min Winter	2.730	0.0	1792
4320 min Winter	1.973	0.0	2476
5760 min Winter	1.566	0.0	2936
7200 min Winter	1.308	0.0	3672
8640 min Winter	1.129	0.0	4312
10080 min Winter	0.998	0.0	5080

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Date 12/11/2018
File Terminal Canopy.SRCX

Bristol Airport 12mpps
Terminal Building Canopy
Q100 +30%



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Innovyze Source Control 2018.1

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	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.333

Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)
0	4	0.083	4	8	0.083	8	12	0.083	12	16	0.084

Time Area Diagram

Total Area (ha) 0.000

Time (mins) From:	Time (mins) To:	Area (ha)
0	4	0.000

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Terminal Building Canopy
Q100 +30%



Date 12/11/2018

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Source Control 2018.1

Model Details

Storage is Online Cover Level (m) 11.000

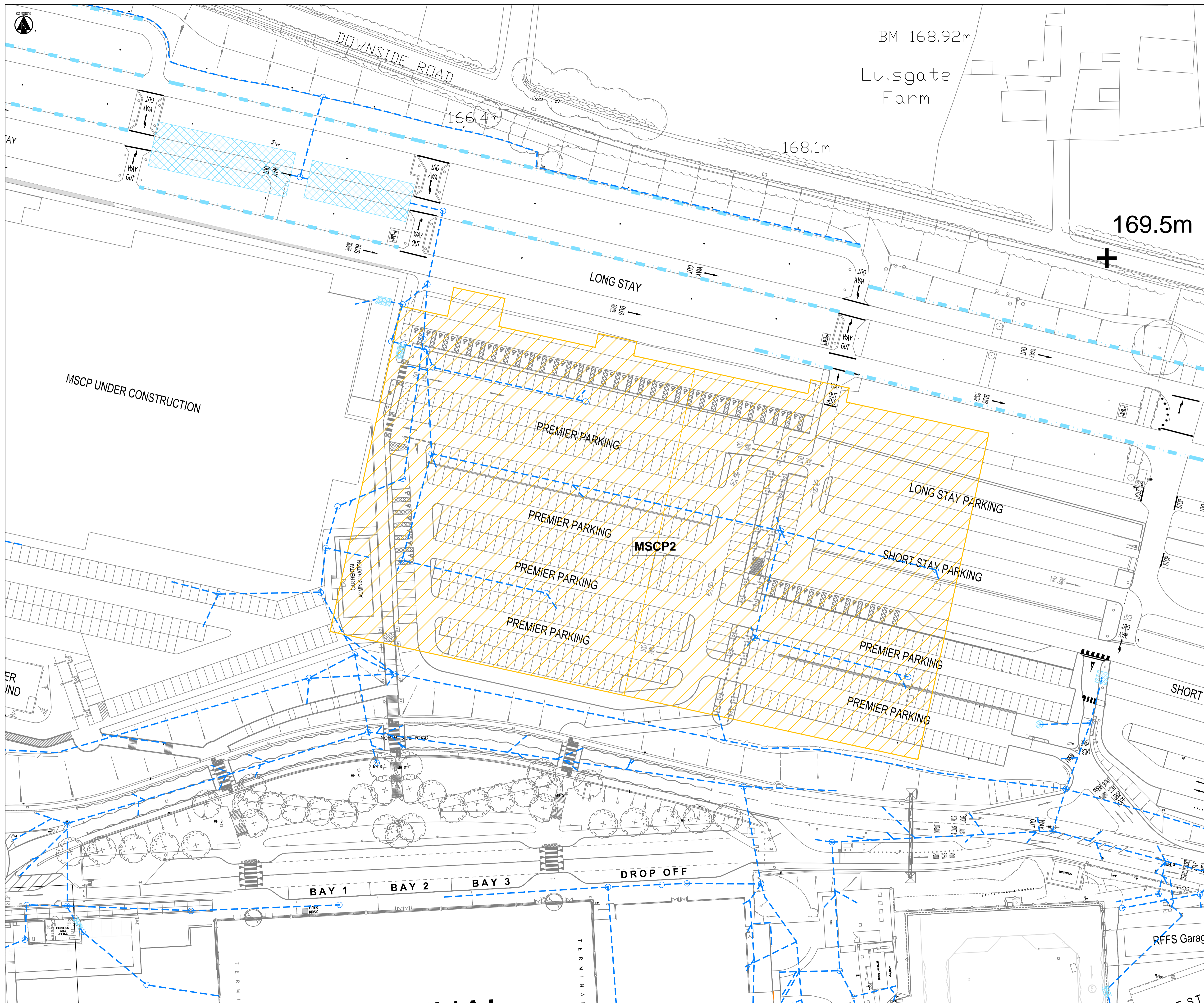
Cellular Storage Structure

Invert Level (m) 7.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.15100 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.15100

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	144.0	144.0	1.500	144.0	216.0	1.600	0.0	216.0

Appendix E – Transport Interchange / MSCP2

Reference	Title
BAE-HYD-XX-XX-DR-D-2007-P03	Existing Surface Water Drainage
BAE-HYD-XX-XX-DR-D-2008-P04	Proposed Surface Water Drainage
MSCP2.SRCX	MSCP2 Soakaway 6 – Q30
MSCP2.SRCX	MSCP2 Soakaway 6 – Q100 +30%
MSCP2 Access South.SRCX	MSCP2 Access South Soakaway 8 - Q30
MSCP2 Access South.SRCX	MSCP2 Access South Soakaway 8 – Q100 +30%



- KEY**
- Existing surface water drain
 - Existing tank soakaway
 - Existing manhole soakaway
 - Existing petrol interceptor
 - Extent of proposed MSCP2

REVISIONS

Rev	Date	Description	By	Ckd	App
P03	16/11/18	Existing drainage updated	RJH		
P02	05/10/18	Project title amended.	RJH		
P01	24/09/18	First Issue.	RJH		

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 OVER LANE
 ALMONDSBURY
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 e: bristol@hydrock.com

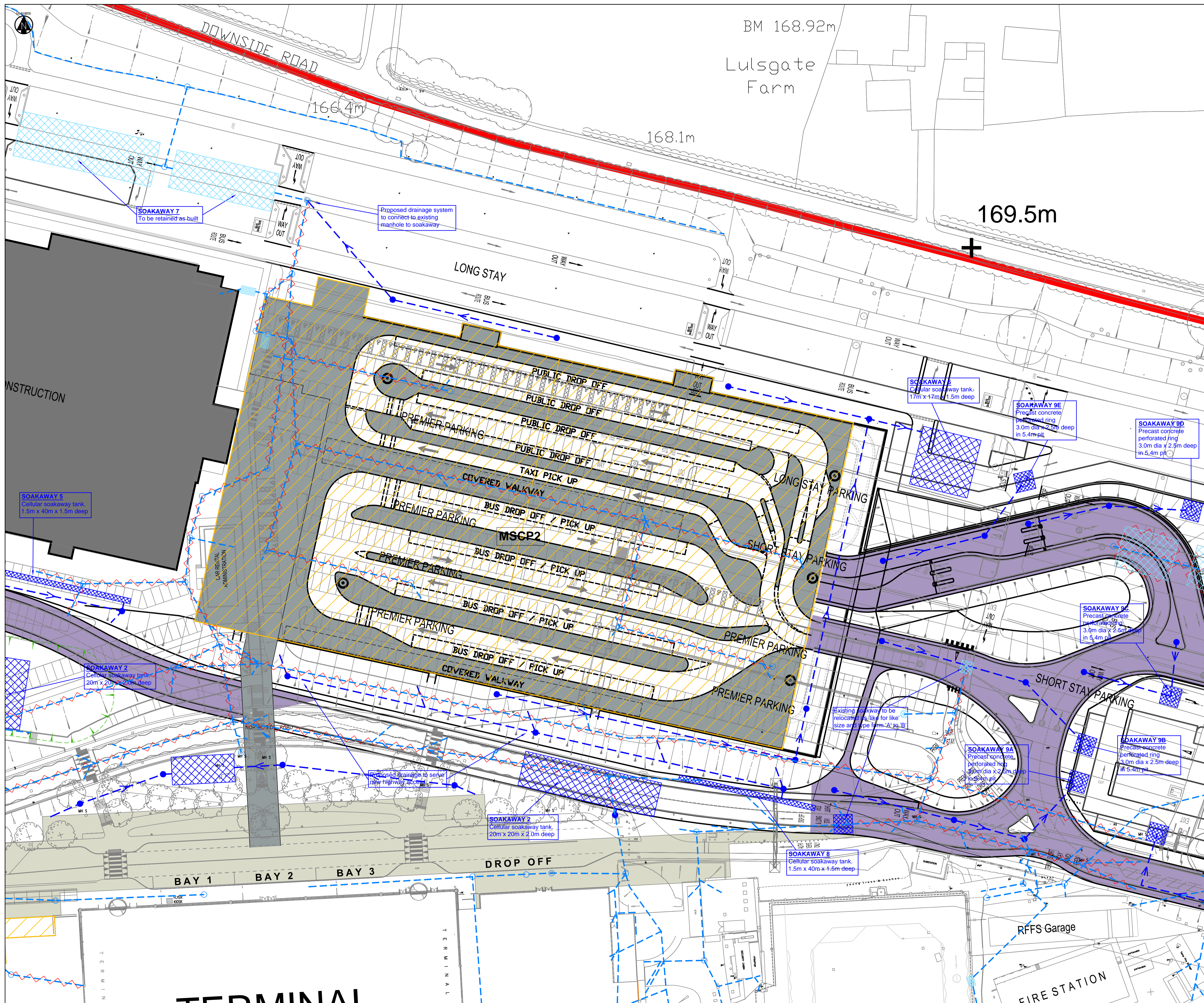
CLIENT
BRISTOL AIRPORT

PROJECT
**BRISTOL AIRPORT
 10mppa EXPANSION SCHEME**

TITLE
**MULTI-STOREY CAR PARK 2
 EXISTING SURFACE WATER DRAINAGE**

HYDROCK PROJECT NO.
C-09194-C SCALE @ A1
1 : 500

STATUS DESCRIPTION	STATUS
FOR APPROVAL	S2
DRAWING NO. (PROJECT CODE-ORIGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER)	REVISION
BAE-HYD-XX-XX-DR-D-2007	P03



KEY

- Existing surface water drain
- ▨ Existing petrol interceptor
- ▨ Existing tank soakaway
- Existing manhole soakaway
- Proposed surface water drain
- ▨ Proposed petrol interceptor
- ▨ Proposed cellular soakaway unit
- - - Existing surface water drain to be abandoned
- ▨ Extent of proposed MSCP2

REVISIONS

Rev	Date	Description	By	Ckd	App
P04	10/5/12/18	Master plan updated.	RJH		
P03	16/11/18	Drainage updated.	RJH		
P02	05/10/18	Project title amended.	RJH		
P01	24/09/18	First Issue.	RJH		

Rev	Date	Description	By	Ckd	App
P04	10/5/12/18	Master plan updated.	RJH		
P03	16/11/18	Drainage updated.	RJH		
P02	05/10/18	Project title amended.	RJH		
P01	24/09/18	First Issue.	RJH		

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PROJECT
**BRISTOL AIRPORT
10mppa EXPANSION SCHEME**

TITLE
**MULTI-STOREY CAR PARK 2
and APPROACH ROADS
PROPOSED SURFACE WATER DRAINAGE**

HYDROCK PROJECT NO. C-09194-C	SCALE @ A1 1 : 500	STATUS S2
STATUS DESCRIPTION FOR APPROVAL		REVISION P04
DRAWING NO. (PROJECT CODE-ORIGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER) BAE-HYD-XX-XX-DR-D-2008		

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Bristol Airport 12mpps
MSCP2 Soakaway 6
Q30

Date 01/09/2018
File MSCP2.SRCX

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Source Control 2018.1

Summary of Results for 30 year Return Period

Half Drain Time : 216 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	7.384	0.384	8.1	105.5	O K
30 min Summer	7.499	0.499	8.3	137.1	O K
60 min Summer	7.602	0.602	8.5	165.1	O K
120 min Summer	7.668	0.668	8.6	183.4	O K
180 min Summer	7.675	0.675	8.6	185.2	O K
240 min Summer	7.665	0.665	8.6	182.5	O K
360 min Summer	7.640	0.640	8.5	175.8	O K
480 min Summer	7.614	0.614	8.5	168.5	O K
600 min Summer	7.587	0.587	8.5	161.1	O K
720 min Summer	7.560	0.560	8.4	153.7	O K
960 min Summer	7.506	0.506	8.3	138.9	O K
1440 min Summer	7.405	0.405	8.1	111.1	O K
2160 min Summer	7.276	0.276	7.9	75.8	O K
2880 min Summer	7.179	0.179	7.7	49.1	O K
4320 min Summer	7.068	0.068	7.5	18.6	O K
5760 min Summer	7.045	0.045	6.7	12.2	O K
7200 min Summer	7.038	0.038	5.7	10.3	O K
8640 min Summer	7.033	0.033	4.9	8.9	O K
10080 min Summer	7.029	0.029	4.4	8.0	O K
15 min Winter	7.434	0.434	8.2	119.2	O K
30 min Winter	7.565	0.565	8.4	155.2	O K
60 min Winter	7.685	0.685	8.6	188.2	O K
120 min Winter	7.771	0.771	8.8	211.7	O K
180 min Winter	7.789	0.789	8.8	216.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	74.059	0.0	28
30 min Summer	48.833	0.0	42
60 min Summer	30.811	0.0	68
120 min Summer	18.860	0.0	124
180 min Summer	13.992	0.0	176
240 min Summer	11.265	0.0	204
360 min Summer	8.299	0.0	268
480 min Summer	6.674	0.0	336
600 min Summer	5.632	0.0	406
720 min Summer	4.901	0.0	474
960 min Summer	3.933	0.0	610
1440 min Summer	2.881	0.0	872
2160 min Summer	2.107	0.0	1240
2880 min Summer	1.687	0.0	1592
4320 min Summer	1.231	0.0	2248
5760 min Summer	0.984	0.0	2936
7200 min Summer	0.827	0.0	3664
8640 min Summer	0.717	0.0	4336
10080 min Summer	0.636	0.0	5104
15 min Winter	74.059	0.0	28
30 min Winter	48.833	0.0	42
60 min Winter	30.811	0.0	68
120 min Winter	18.860	0.0	124
180 min Winter	13.992	0.0	178

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.	MSCP2 Soakaway 6	
.	Q30	
Date 01/09/2018	Designed by RJH	
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Summary of Results for 30 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
240 min Winter	7.778	0.778	8.8	213.7	O K
360 min Winter	7.745	0.745	8.7	204.6	O K
480 min Winter	7.708	0.708	8.7	194.3	O K
600 min Winter	7.667	0.667	8.6	183.1	O K
720 min Winter	7.625	0.625	8.5	171.5	O K
960 min Winter	7.541	0.541	8.4	148.6	O K
1440 min Winter	7.386	0.386	8.1	106.0	O K
2160 min Winter	7.200	0.200	7.8	55.0	O K
2880 min Winter	7.079	0.079	7.6	21.8	O K
4320 min Winter	7.040	0.040	6.0	11.1	O K
5760 min Winter	7.032	0.032	4.8	8.9	O K
7200 min Winter	7.027	0.027	4.1	7.4	O K
8640 min Winter	7.024	0.024	3.6	6.5	O K
10080 min Winter	7.021	0.021	3.2	5.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
240 min Winter	11.265	0.0	230
360 min Winter	8.299	0.0	288
480 min Winter	6.674	0.0	364
600 min Winter	5.632	0.0	440
720 min Winter	4.901	0.0	514
960 min Winter	3.933	0.0	658
1440 min Winter	2.881	0.0	928
2160 min Winter	2.107	0.0	1288
2880 min Winter	1.687	0.0	1588
4320 min Winter	1.231	0.0	2208
5760 min Winter	0.984	0.0	2944
7200 min Winter	0.827	0.0	3640
8640 min Winter	0.717	0.0	4384
10080 min Winter	0.636	0.0	5136

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Bristol Airport 12mpps
 MSCP2 Soakaway 6
 Q30



Date 01/09/2018
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Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.837

Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)
0	4	0.209	4	8	0.209	8	12	0.209	12	16	0.210

Time Area Diagram

Total Area (ha) 0.000

Time (mins) From:	Time (mins) To:	Area (ha)
0	4	0.000

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Bristol Airport 12mpps
 MSCP2 Soakaway 6
 Q30



Date 01/09/2018
 File MSCP2.SRCX

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Model Details

Storage is Online Cover Level (m) 11.000

Cellular Storage Structure

Invert Level (m) 7.000 Safety Factor 2.0
 Infiltration Coefficient Base (m/hr) 0.18500 Porosity 0.95
 Infiltration Coefficient Side (m/hr) 0.18500

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	289.0	289.0	1.500	289.0	391.0	1.600	0.0	391.0

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Bristol Airport 12mpps
MSCP2 Soakaway 6
Q100 +30%



Date 12/11/2018
File MSCP2.SRCX

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Source Control 2018.1

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

Half Drain Time : 371 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	7.670	0.670	8.6	184.0	O K
30 min Summer	7.883	0.883	9.0	242.4	O K
60 min Summer	8.087	1.087	9.3	298.4	O K
120 min Summer	8.251	1.251	9.6	343.5	O K
180 min Summer	8.305	1.305	9.7	358.3	O K
240 min Summer	8.311	1.311	9.7	360.0	O K
360 min Summer	8.285	1.285	9.7	352.7	O K
480 min Summer	8.248	1.248	9.6	342.6	O K
600 min Summer	8.211	1.211	9.5	332.5	O K
720 min Summer	8.176	1.176	9.5	322.9	O K
960 min Summer	8.110	1.110	9.4	304.7	O K
1440 min Summer	7.983	0.983	9.1	269.8	O K
2160 min Summer	7.807	0.807	8.8	221.5	O K
2880 min Summer	7.650	0.650	8.6	178.6	O K
4320 min Summer	7.399	0.399	8.1	109.6	O K
5760 min Summer	7.224	0.224	7.8	61.4	O K
7200 min Summer	7.111	0.111	7.6	30.5	O K
8640 min Summer	7.056	0.056	7.5	15.3	O K
10080 min Summer	7.046	0.046	6.9	12.5	O K
15 min Winter	7.755	0.755	8.7	207.3	O K
30 min Winter	7.996	0.996	9.2	273.5	O K
60 min Winter	8.231	1.231	9.6	338.0	O K
120 min Winter	8.429	1.429	9.9	392.2	O K
180 min Winter	8.502	1.502	10.0	412.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	124.836	0.0	29
30 min Summer	83.061	0.0	43
60 min Summer	52.662	0.0	72
120 min Summer	32.210	0.0	128
180 min Summer	23.799	0.0	184
240 min Summer	19.065	0.0	242
360 min Summer	13.962	0.0	316
480 min Summer	11.178	0.0	380
600 min Summer	9.399	0.0	444
720 min Summer	8.153	0.0	510
960 min Summer	6.510	0.0	648
1440 min Summer	4.731	0.0	922
2160 min Summer	3.432	0.0	1320
2880 min Summer	2.730	0.0	1708
4320 min Summer	1.973	0.0	2428
5760 min Summer	1.566	0.0	3120
7200 min Summer	1.308	0.0	3760
8640 min Summer	1.129	0.0	4408
10080 min Summer	0.998	0.0	5120
15 min Winter	124.836	0.0	29
30 min Winter	83.061	0.0	43
60 min Winter	52.662	0.0	70
120 min Winter	32.210	0.0	126
180 min Winter	23.799	0.0	182

.	Bristol Airport 12mpps	
.	MSCP2 Soakaway 6	
.	Q100 +30%	
Date 12/11/2018	Designed by RJH	
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Innovyze	Source Control 2018.1	

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

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
240 min Winter	8.531	1.531	10.0	418.0	O K
360 min Winter	8.510	1.510	10.0	414.3	O K
480 min Winter	8.460	1.460	10.0	400.9	O K
600 min Winter	8.414	1.414	9.9	388.2	O K
720 min Winter	8.366	1.366	9.8	375.0	O K
960 min Winter	8.270	1.270	9.6	348.7	O K
1440 min Winter	8.079	1.079	9.3	296.4	O K
2160 min Winter	7.815	0.815	8.9	223.8	O K
2880 min Winter	7.588	0.588	8.5	161.4	O K
4320 min Winter	7.245	0.245	7.9	67.2	O K
5760 min Winter	7.058	0.058	7.5	15.9	O K
7200 min Winter	7.043	0.043	6.5	11.8	O K
8640 min Winter	7.037	0.037	5.6	10.2	O K
10080 min Winter	7.033	0.033	4.9	9.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
240 min Winter	19.065	0.0	238
360 min Winter	13.962	0.0	346
480 min Winter	11.178	0.0	402
600 min Winter	9.399	0.0	472
720 min Winter	8.153	0.0	550
960 min Winter	6.510	0.0	704
1440 min Winter	4.731	0.0	998
2160 min Winter	3.432	0.0	1416
2880 min Winter	2.730	0.0	1804
4320 min Winter	1.973	0.0	2512
5760 min Winter	1.566	0.0	3008
7200 min Winter	1.308	0.0	3680
8640 min Winter	1.129	0.0	4288
10080 min Winter	0.998	0.0	5144

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Date 12/11/2018
File MSCP2.SRCX

Bristol Airport 12mpps
MSCP2 Soakaway 6
Q100 +30%

Designed by RJH
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Innovyze Source Control 2018.1

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	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.837

Time (mins) Area	Time (mins) Area	Time (mins) Area	Time (mins) Area
From: To: (ha)	From: To: (ha)	From: To: (ha)	From: To: (ha)
0 4 0.209	4 8 0.209	8 12 0.209	12 16 0.210

Time Area Diagram

Total Area (ha) 0.000

Time (mins) Area
From: To: (ha)
0 4 0.000

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Bristol Airport 12mpps
MSCP2 Soakaway 6
Q100 +30%



Date 12/11/2018
File MSCP2.SRCX

Designed by RJH
Checked by

Innovyze Source Control 2018.1

Model Details

Storage is Online Cover Level (m) 11.000

Cellular Storage Structure

Invert Level (m) 7.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.18500 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.18500

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	289.0	289.0	1.500	289.0	391.0	1.600	0.0	391.0

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Bristol Airport 12mpps
MSCP2 Access South Soakaway 8
Q30



Date 01/09/2018

Designed by RJH

File MSCP2 Access South.SRCX

Checked by

Innovyze

Source Control 2018.1

Summary of Results for 30 year Return Period

Half Drain Time : 123 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	7.327	0.327	2.2	18.6	O K
30 min Summer	7.420	0.420	2.4	24.0	O K
60 min Summer	7.493	0.493	2.6	28.1	O K
120 min Summer	7.521	0.521	2.7	29.7	O K
180 min Summer	7.517	0.517	2.6	29.5	O K
240 min Summer	7.504	0.504	2.6	28.7	O K
360 min Summer	7.474	0.474	2.6	27.0	O K
480 min Summer	7.443	0.443	2.5	25.2	O K
600 min Summer	7.413	0.413	2.4	23.5	O K
720 min Summer	7.384	0.384	2.4	21.9	O K
960 min Summer	7.332	0.332	2.2	18.9	O K
1440 min Summer	7.245	0.245	2.1	14.0	O K
2160 min Summer	7.151	0.151	1.9	8.6	O K
2880 min Summer	7.091	0.091	1.7	5.2	O K
4320 min Summer	7.046	0.046	1.5	2.6	O K
5760 min Summer	7.037	0.037	1.2	2.1	O K
7200 min Summer	7.031	0.031	1.0	1.8	O K
8640 min Summer	7.027	0.027	0.9	1.5	O K
10080 min Summer	7.024	0.024	0.8	1.4	O K
15 min Winter	7.370	0.370	2.3	21.1	O K
30 min Winter	7.476	0.476	2.6	27.1	O K
60 min Winter	7.563	0.563	2.7	32.1	O K
120 min Winter	7.600	0.600	2.8	34.2	O K
180 min Winter	7.593	0.593	2.8	33.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	74.059	0.0	27
30 min Summer	48.833	0.0	40
60 min Summer	30.811	0.0	64
120 min Summer	18.860	0.0	106
180 min Summer	13.992	0.0	138
240 min Summer	11.265	0.0	172
360 min Summer	8.299	0.0	242
480 min Summer	6.674	0.0	310
600 min Summer	5.632	0.0	378
720 min Summer	4.901	0.0	444
960 min Summer	3.933	0.0	574
1440 min Summer	2.881	0.0	824
2160 min Summer	2.107	0.0	1180
2880 min Summer	1.687	0.0	1528
4320 min Summer	1.231	0.0	2204
5760 min Summer	0.984	0.0	2936
7200 min Summer	0.827	0.0	3672
8640 min Summer	0.717	0.0	4352
10080 min Summer	0.636	0.0	5136
15 min Winter	74.059	0.0	28
30 min Winter	48.833	0.0	40
60 min Winter	30.811	0.0	66
120 min Winter	18.860	0.0	116
180 min Winter	13.992	0.0	148

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Date 01/09/2018
File MSCP2 Access South.SRCX

Bristol Airport 12mpps
MSCP2 Access South Soakaway 8
Q30

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Source Control 2018.1

Summary of Results for 30 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
240 min Winter	7.575	0.575	2.8	32.7	O K
360 min Winter	7.529	0.529	2.7	30.2	O K
480 min Winter	7.482	0.482	2.6	27.5	O K
600 min Winter	7.436	0.436	2.5	24.9	O K
720 min Winter	7.394	0.394	2.4	22.5	O K
960 min Winter	7.318	0.318	2.2	18.1	O K
1440 min Winter	7.199	0.199	2.0	11.3	O K
2160 min Winter	7.083	0.083	1.7	4.7	O K
2880 min Winter	7.046	0.046	1.5	2.6	O K
4320 min Winter	7.034	0.034	1.1	1.9	O K
5760 min Winter	7.027	0.027	0.9	1.5	O K
7200 min Winter	7.023	0.023	0.7	1.3	O K
8640 min Winter	7.020	0.020	0.7	1.1	O K
10080 min Winter	7.018	0.018	0.6	1.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
240 min Winter	11.265	0.0	186
360 min Winter	8.299	0.0	262
480 min Winter	6.674	0.0	334
600 min Winter	5.632	0.0	406
720 min Winter	4.901	0.0	474
960 min Winter	3.933	0.0	608
1440 min Winter	2.881	0.0	860
2160 min Winter	2.107	0.0	1196
2880 min Winter	1.687	0.0	1468
4320 min Winter	1.231	0.0	2208
5760 min Winter	0.984	0.0	2912
7200 min Winter	0.827	0.0	3592
8640 min Winter	0.717	0.0	4392
10080 min Winter	0.636	0.0	5152

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Date 01/09/2018
File MSCP2 Access South.SRCX

Bristol Airport 12mpps
MSCP2 Access South Soakaway 8
Q30



Designed by RJH
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Innovyze Source Control 2018.1

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.153

Time (mins) Area	Time (mins) Area	Time (mins) Area	Time (mins) Area
From: To: (ha)	From: To: (ha)	From: To: (ha)	From: To: (ha)
0 4 0.038	4 8 0.038	8 12 0.038	12 16 0.039

Time Area Diagram

Total Area (ha) 0.000

Time (mins) Area
From: To: (ha)
0 4 0.000

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Bristol Airport 12mpps
MSCP2 Access South Soakaway 8
Q30



Date 01/09/2018
File MSCP2 Access South.SRCX

Designed by RJH
Checked by

Innovyze Source Control 2018.1

Model Details

Storage is Online Cover Level (m) 11.000

Cellular Storage Structure

Invert Level (m) 7.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.18500 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.18500

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	60.0	60.0	1.500	60.0	184.5	1.600	0.0	184.5

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Bristol Airport 12mpps
MSCP2 Soakaway 6
Q100 +30%



Date 12/11/2018
File MSCP2.SRCX

Designed by RJH
Checked by

Innovyze

Source Control 2018.1

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

Half Drain Time : 371 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	7.670	0.670		8.6 184.0	O K
30 min Summer	7.883	0.883		9.0 242.4	O K
60 min Summer	8.087	1.087		9.3 298.4	O K
120 min Summer	8.251	1.251		9.6 343.5	O K
180 min Summer	8.305	1.305		9.7 358.3	O K
240 min Summer	8.311	1.311		9.7 360.0	O K
360 min Summer	8.285	1.285		9.7 352.7	O K
480 min Summer	8.248	1.248		9.6 342.6	O K
600 min Summer	8.211	1.211		9.5 332.5	O K
720 min Summer	8.176	1.176		9.5 322.9	O K
960 min Summer	8.110	1.110		9.4 304.7	O K
1440 min Summer	7.983	0.983		9.1 269.8	O K
2160 min Summer	7.807	0.807		8.8 221.5	O K
2880 min Summer	7.650	0.650		8.6 178.6	O K
4320 min Summer	7.399	0.399		8.1 109.6	O K
5760 min Summer	7.224	0.224		7.8 61.4	O K
7200 min Summer	7.111	0.111		7.6 30.5	O K
8640 min Summer	7.056	0.056		7.5 15.3	O K
10080 min Summer	7.046	0.046		6.9 12.5	O K
15 min Winter	7.755	0.755		8.7 207.3	O K
30 min Winter	7.996	0.996		9.2 273.5	O K
60 min Winter	8.231	1.231		9.6 338.0	O K
120 min Winter	8.429	1.429		9.9 392.2	O K
180 min Winter	8.502	1.502		10.0 412.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	124.836	0.0	29
30 min Summer	83.061	0.0	43
60 min Summer	52.662	0.0	72
120 min Summer	32.210	0.0	128
180 min Summer	23.799	0.0	184
240 min Summer	19.065	0.0	242
360 min Summer	13.962	0.0	316
480 min Summer	11.178	0.0	380
600 min Summer	9.399	0.0	444
720 min Summer	8.153	0.0	510
960 min Summer	6.510	0.0	648
1440 min Summer	4.731	0.0	922
2160 min Summer	3.432	0.0	1320
2880 min Summer	2.730	0.0	1708
4320 min Summer	1.973	0.0	2428
5760 min Summer	1.566	0.0	3120
7200 min Summer	1.308	0.0	3760
8640 min Summer	1.129	0.0	4408
10080 min Summer	0.998	0.0	5120
15 min Winter	124.836	0.0	29
30 min Winter	83.061	0.0	43
60 min Winter	52.662	0.0	70
120 min Winter	32.210	0.0	126
180 min Winter	23.799	0.0	182

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Bristol Airport 12mpps
MSCP2 Soakaway 6
Q100 +30%



Date 12/11/2018
File MSCP2.SRCX

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Source Control 2018.1

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

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
240 min Winter	8.531	1.531	10.0	418.0	O K
360 min Winter	8.510	1.510	10.0	414.3	O K
480 min Winter	8.460	1.460	10.0	400.9	O K
600 min Winter	8.414	1.414	9.9	388.2	O K
720 min Winter	8.366	1.366	9.8	375.0	O K
960 min Winter	8.270	1.270	9.6	348.7	O K
1440 min Winter	8.079	1.079	9.3	296.4	O K
2160 min Winter	7.815	0.815	8.9	223.8	O K
2880 min Winter	7.588	0.588	8.5	161.4	O K
4320 min Winter	7.245	0.245	7.9	67.2	O K
5760 min Winter	7.058	0.058	7.5	15.9	O K
7200 min Winter	7.043	0.043	6.5	11.8	O K
8640 min Winter	7.037	0.037	5.6	10.2	O K
10080 min Winter	7.033	0.033	4.9	9.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
240 min Winter	19.065	0.0	238
360 min Winter	13.962	0.0	346
480 min Winter	11.178	0.0	402
600 min Winter	9.399	0.0	472
720 min Winter	8.153	0.0	550
960 min Winter	6.510	0.0	704
1440 min Winter	4.731	0.0	998
2160 min Winter	3.432	0.0	1416
2880 min Winter	2.730	0.0	1804
4320 min Winter	1.973	0.0	2512
5760 min Winter	1.566	0.0	3008
7200 min Winter	1.308	0.0	3680
8640 min Winter	1.129	0.0	4288
10080 min Winter	0.998	0.0	5144

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Bristol Airport 12mpps
MSCP2 Soakaway 6
Q100 +30%



Date 12/11/2018
File MSCP2.SRCX

Designed by RJH
Checked by

Innovyze Source Control 2018.1

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	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.837

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
From:	To:	From:	To:	From:	To:	From:	To:
0	4	4	8	8	12	12	16
	0.209		0.209		0.209		0.210

Time Area Diagram

Total Area (ha) 0.000

Time (mins)	Area (ha)
From:	To:
0	4
	0.000

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Bristol Airport 12mpps
MSCP2 Soakaway 6
Q100 +30%



Date 12/11/2018
File MSCP2.SRCX

Designed by RJH
Checked by

Innovyze Source Control 2018.1

Model Details

Storage is Online Cover Level (m) 11.000

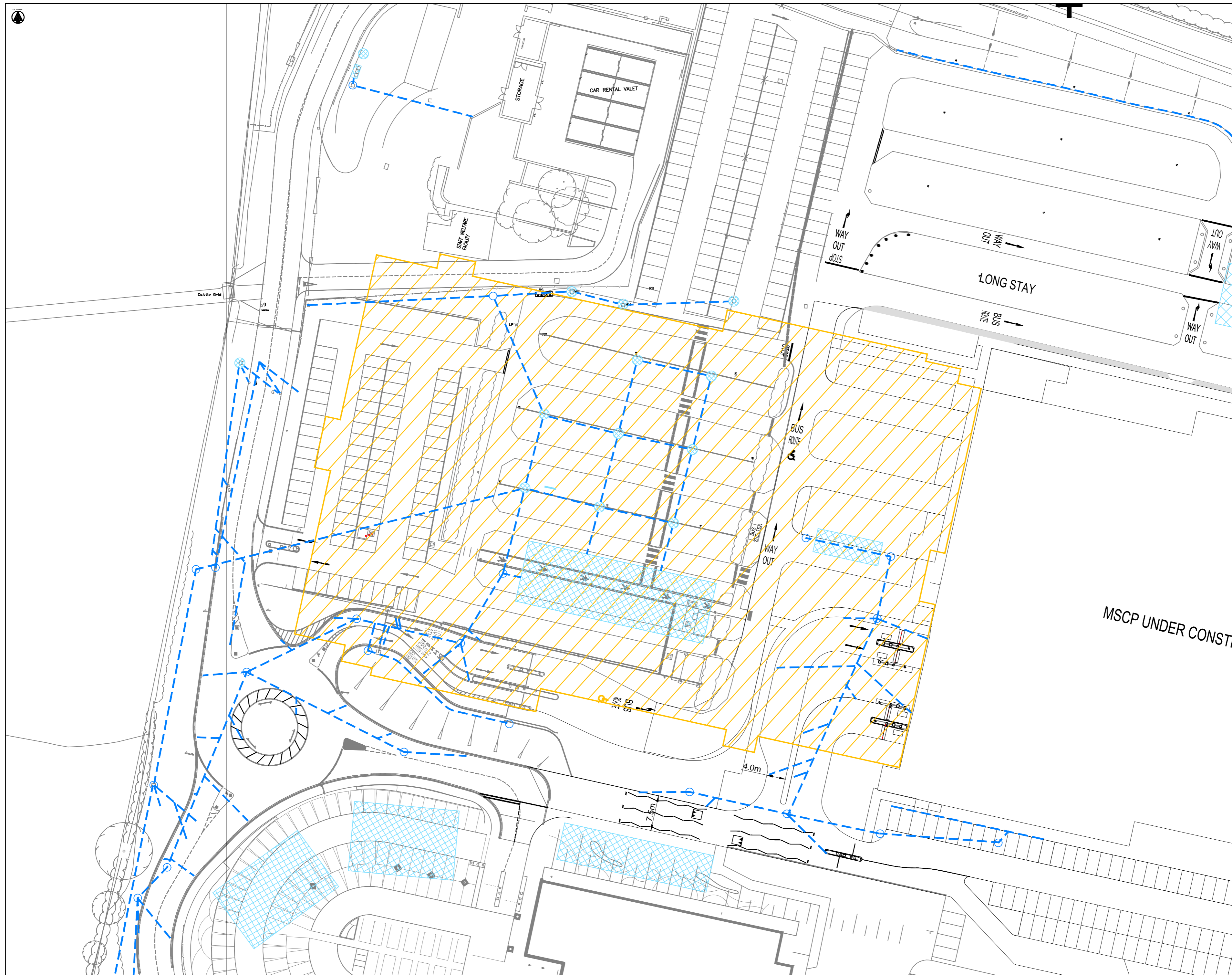
Cellular Storage Structure

Invert Level (m) 7.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.18500 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.18500

Table with 9 columns: Depth (m), Area (m²), Inf. Area (m²), Depth (m), Area (m²), Inf. Area (m²), Depth (m), Area (m²), Inf. Area (m²). Rows show data for depths 0.000, 1.500, and 1.600.

Appendix F – MSCP3

Reference	Title
BAE-HYD-XX-XX-DR-D-2005-P02	Existing Surface Water Drainage
BAE-HYD-XX-XX-DR-D-2006-P03	Proposed Surface Water Drainage
MSCP3.SRCX	MSCP3 Soakaway 4 – Q30
MSCP3.SRCX	MSCP3 Soakaway 4 – Q100 +30%
MSCP3 Access South.SRCX	MSCP3 Access South Soakaway 5 - Q30
MSC32 Access South.SRCX	MSCP3 Access South Soakaway 5 – Q100 +30%



- KEY**
- Existing surface water drain
 - Existing tank soakaway
 - Existing manhole soakaway
 - Existing petrol interceptor
 - Extent of proposed MSCP3

REVISIONS

Rev	Date	Description	By	Chk	App
P01	16/11/18	Existing drainage updated.			
P02	24/05/19	Final Issue			

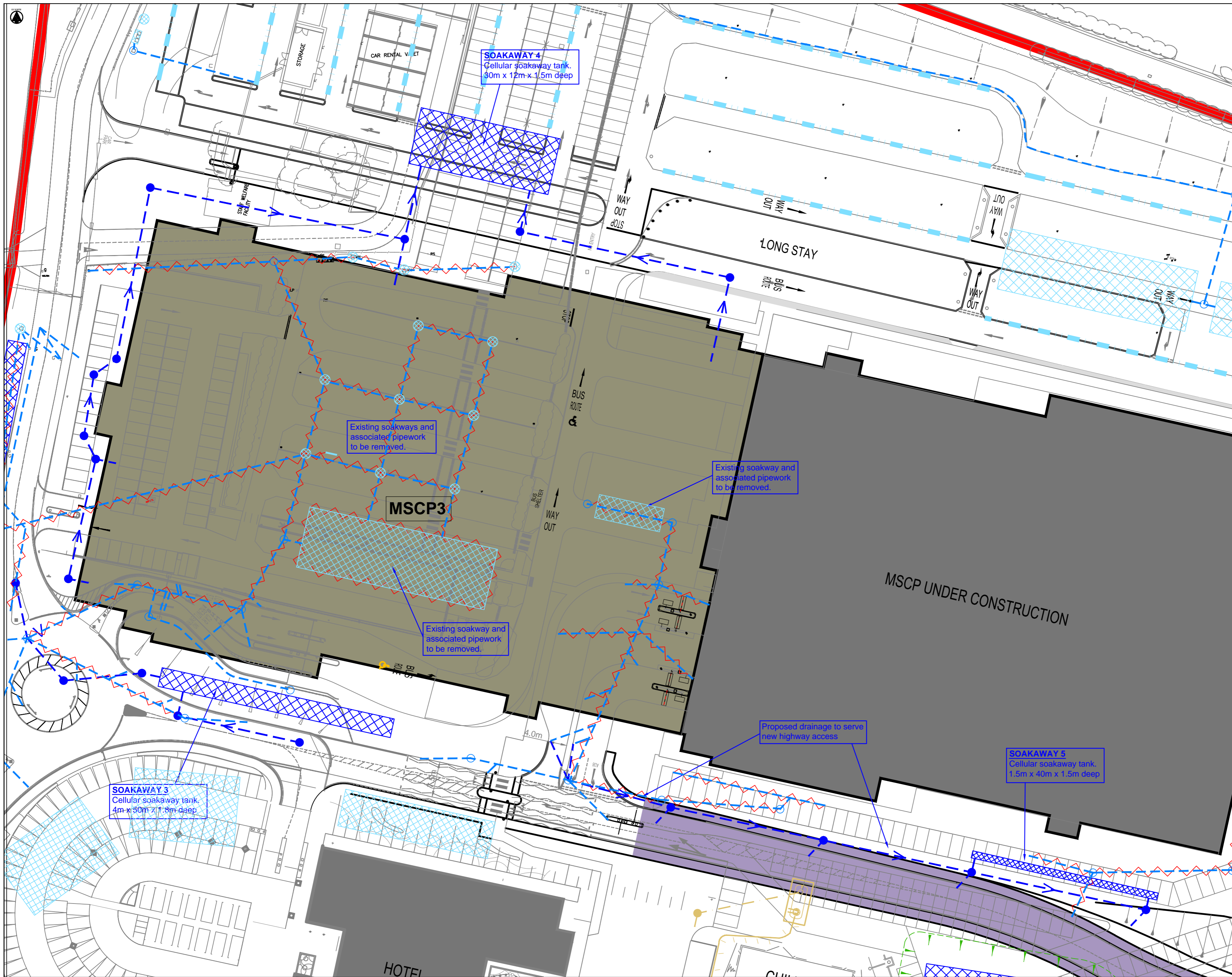


CLIENT
BRISTOL AIRPORT

PROJECT
BRISTOL AIRPORT
12mppa EXPANSION SCHEME

TITLE
MULTI STOREY CAR PARK 3
EXISTING SURFACE WATER DRAINAGE

HYDROCK PROJECT NO. C-09194-C	SCALE @ A2 1:500	STATUS FOR APPROVAL	STATUS S2
DRAWING NO. (PROJECT CODE ORIGINATOR DRAW LEVEL TYPE RISK NUMBER) BAE-HYD-XX-XX-DR-D-2005	REVISION P02		



SOAKAWAY 4
Cellular soakaway tank.
30m x 12m x 1.5m deep

Existing soakways and
associated pipework
to be removed.

MSCP3

Existing soakway and
associated pipework
to be removed.

Existing soakway and
associated pipework
to be removed.

Proposed drainage to serve
new highway access

SOAKAWAY 5
Cellular soakaway tank.
1.5m x 40m x 1.5m deep

SOAKAWAY 3
Cellular soakaway tank
4m x 50m x 1.8m deep

KEY

- Existing surface water drain
- Existing petrol interceptor
- Existing tank soakaway
- Existing manhole soakaway
- Proposed surface water drain
- Proposed petrol interceptor
- Proposed cellular soakaway unit
- Existing surface water drain to be abandoned

REVISIONS

Rev	Date	Description	By	Clk	App
P03	05/12/18	Master plan updated.			
P02	16/11/18	Drainage updated.			
P01	24/09/18	Pilot Issue.			

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CLIENT
BRISTOL AIRPORT

PROJECT
BRISTOL AIRPORT
12mppa EXPANSION SCHEME

TITLE
MULTI STOREY CAR PARK 3
PROPOSED SURFACE WATER DRAINAGE

HYDROCK PROJECT NO. C-09194-C	SCALE @ A2 1:500	STATUS S2
STATUS DESCRIPTION FOR APPROVAL	REVISION P03	
DRAWING NO. (PROJECT CODE ORIGINATOR CODE LEVEL TYPE ROLE NUMBER) BAE-HYD-XX-XX-DR-D-2006		

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Bristol Airport 12mpps
MSCP3 Soakaway 4
Q100 +30%



Date 12/11/2018
File MSCP3.SRCX

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Source Control 2018.1

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

Half Drain Time : 402 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	7.713	0.713	10.8	243.8	O K
30 min Summer	7.942	0.942	11.3	322.1	O K
60 min Summer	8.163	1.163	11.8	397.9	O K
120 min Summer	8.346	1.346	12.2	460.2	O K
180 min Summer	8.409	1.409	12.3	482.0	O K
240 min Summer	8.423	1.423	12.3	486.5	O K
360 min Summer	8.401	1.401	12.3	479.0	O K
480 min Summer	8.364	1.364	12.2	466.5	O K
600 min Summer	8.326	1.326	12.1	453.4	O K
720 min Summer	8.289	1.289	12.0	441.0	O K
960 min Summer	8.221	1.221	11.9	417.6	O K
1440 min Summer	8.092	1.092	11.6	373.4	O K
2160 min Summer	7.911	0.911	11.2	311.7	O K
2880 min Summer	7.749	0.749	10.9	256.2	O K
4320 min Summer	7.483	0.483	10.3	165.2	O K
5760 min Summer	7.289	0.289	9.9	98.8	O K
7200 min Summer	7.157	0.157	9.6	53.6	O K
8640 min Summer	7.077	0.077	9.4	26.2	O K
10080 min Summer	7.049	0.049	9.1	16.6	O K
15 min Winter	7.803	0.803	11.0	274.7	O K
30 min Winter	8.062	1.062	11.5	363.4	O K
60 min Winter	8.317	1.317	12.1	450.4	O K
120 min Winter	9.119	2.119	12.5	524.9	O K
180 min Winter	11.028	4.028	12.5	554.4	FLOOD

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	124.836	0.0	33
30 min Summer	83.061	0.0	47
60 min Summer	52.662	0.0	74
120 min Summer	32.210	0.0	130
180 min Summer	23.799	0.0	186
240 min Summer	19.065	0.0	244
360 min Summer	13.962	0.0	328
480 min Summer	11.178	0.0	390
600 min Summer	9.399	0.0	452
720 min Summer	8.153	0.0	520
960 min Summer	6.510	0.0	656
1440 min Summer	4.731	0.0	930
2160 min Summer	3.432	0.0	1332
2880 min Summer	2.730	0.0	1716
4320 min Summer	1.973	0.0	2464
5760 min Summer	1.566	0.0	3168
7200 min Summer	1.308	0.0	3824
8640 min Summer	1.129	0.0	4432
10080 min Summer	0.998	0.0	5080
15 min Winter	124.836	0.0	33
30 min Winter	83.061	0.0	47
60 min Winter	52.662	0.0	74
120 min Winter	32.210	0.0	130
180 min Winter	23.799	30.0	186

.	Bristol Airport 12mpps	
.	MSCP3 Soakaway 4	
.	Q100 +30%	
Date 12/11/2018	Designed by RJH	
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Innovyze	Source Control 2018.1	

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

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
240 min Winter	11.037	4.037	12.5	564.2	FLOOD
360 min Winter	11.037	4.037	12.5	563.5	FLOOD
480 min Winter	11.021	4.021	12.5	547.5	FLOOD
600 min Winter	11.004	4.004	12.5	530.5	FLOOD
720 min Winter	8.501	1.501	12.5	513.2	O K
960 min Winter	8.404	1.404	12.3	480.1	O K
1440 min Winter	8.211	1.211	11.9	414.1	O K
2160 min Winter	7.939	0.939	11.3	321.3	O K
2880 min Winter	7.703	0.703	10.8	240.3	O K
4320 min Winter	7.333	0.333	10.0	113.9	O K
5760 min Winter	7.100	0.100	9.5	34.2	O K
7200 min Winter	7.046	0.046	8.7	15.7	O K
8640 min Winter	7.040	0.040	7.4	13.5	O K
10080 min Winter	7.035	0.035	6.6	12.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
240 min Winter	19.065	39.8	242
360 min Winter	13.962	39.1	350
480 min Winter	11.178	23.1	448
600 min Winter	9.399	6.1	482
720 min Winter	8.153	0.0	556
960 min Winter	6.510	0.0	710
1440 min Winter	4.731	0.0	1010
2160 min Winter	3.432	0.0	1432
2880 min Winter	2.730	0.0	1828
4320 min Winter	1.973	0.0	2556
5760 min Winter	1.566	0.0	3128
7200 min Winter	1.308	0.0	3664
8640 min Winter	1.129	0.0	4328
10080 min Winter	0.998	0.0	5120

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Bristol Airport 12mpps
MSCP3 Soakaway 4
Q100 +30%



Date 12/11/2018
File MSCP3.SRCX

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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	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 1.114

Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)
0	4	0.222	4	8	0.223	8	12	0.223	12	16	0.223	16	20	0.223

Time Area Diagram

Total Area (ha) 0.000

Time (mins) From:	Time (mins) To:	Area (ha)
0	4	0.000

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Bristol Airport 12mpps
MSCP3 Soakaway 4
Q100 +30%



Date 12/11/2018
File MSCP3.SRCX

Designed by RJH
Checked by

Innovyze Source Control 2018.1

Model Details

Storage is Online Cover Level (m) 11.000

Cellular Storage Structure

Invert Level (m) 7.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.18500 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.18500

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	360.0	360.0	1.500	360.0	486.0	1.600	0.0	486.0

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Bristol Airport 12mpps
MSCP3 Access South Soakaway 5
Q30



Date 01/09/2018

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Innovyze

Source Control 2018.1

Summary of Results for 30 year Return Period

Half Drain Time : 136 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	7.378	0.378	2.3	21.6	O K
30 min Summer	7.487	0.487	2.6	27.7	O K
60 min Summer	7.574	0.574	2.8	32.7	O K
120 min Summer	7.611	0.611	2.8	34.8	O K
180 min Summer	7.609	0.609	2.8	34.7	O K
240 min Summer	7.597	0.597	2.8	34.0	O K
360 min Summer	7.566	0.566	2.7	32.2	O K
480 min Summer	7.533	0.533	2.7	30.4	O K
600 min Summer	7.502	0.502	2.6	28.6	O K
720 min Summer	7.471	0.471	2.5	26.9	O K
960 min Summer	7.415	0.415	2.4	23.7	O K
1440 min Summer	7.320	0.320	2.2	18.2	O K
2160 min Summer	7.213	0.213	2.0	12.1	O K
2880 min Summer	7.138	0.138	1.8	7.9	O K
4320 min Summer	7.057	0.057	1.7	3.3	O K
5760 min Summer	7.043	0.043	1.4	2.4	O K
7200 min Summer	7.036	0.036	1.2	2.0	O K
8640 min Summer	7.031	0.031	1.0	1.8	O K
10080 min Summer	7.028	0.028	0.9	1.6	O K
15 min Winter	7.427	0.427	2.5	24.4	O K
30 min Winter	7.551	0.551	2.7	31.4	O K
60 min Winter	7.654	0.654	2.9	37.3	O K
120 min Winter	7.704	0.704	3.0	40.1	O K
180 min Winter	7.699	0.699	3.0	39.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	74.059	0.0	27
30 min Summer	48.833	0.0	40
60 min Summer	30.811	0.0	66
120 min Summer	18.860	0.0	110
180 min Summer	13.992	0.0	142
240 min Summer	11.265	0.0	176
360 min Summer	8.299	0.0	244
480 min Summer	6.674	0.0	314
600 min Summer	5.632	0.0	380
720 min Summer	4.901	0.0	448
960 min Summer	3.933	0.0	580
1440 min Summer	2.881	0.0	834
2160 min Summer	2.107	0.0	1196
2880 min Summer	1.687	0.0	1556
4320 min Summer	1.231	0.0	2212
5760 min Summer	0.984	0.0	2936
7200 min Summer	0.827	0.0	3672
8640 min Summer	0.717	0.0	4400
10080 min Summer	0.636	0.0	5048
15 min Winter	74.059	0.0	28
30 min Winter	48.833	0.0	40
60 min Winter	30.811	0.0	66
120 min Winter	18.860	0.0	118
180 min Winter	13.992	0.0	150

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Date 01/09/2018
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Bristol Airport 12mpps
MSCP3 Access South Soakaway 5
Q30



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Summary of Results for 30 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
240 min Winter	7.682	0.682	3.0	38.9	O K
360 min Winter	7.636	0.636	2.9	36.3	O K
480 min Winter	7.587	0.587	2.8	33.4	O K
600 min Winter	7.538	0.538	2.7	30.7	O K
720 min Winter	7.493	0.493	2.6	28.1	O K
960 min Winter	7.411	0.411	2.4	23.4	O K
1440 min Winter	7.278	0.278	2.1	15.9	O K
2160 min Winter	7.141	0.141	1.8	8.0	O K
2880 min Winter	7.059	0.059	1.7	3.4	O K
4320 min Winter	7.039	0.039	1.3	2.2	O K
5760 min Winter	7.031	0.031	1.0	1.8	O K
7200 min Winter	7.026	0.026	0.9	1.5	O K
8640 min Winter	7.023	0.023	0.7	1.3	O K
10080 min Winter	7.020	0.020	0.7	1.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
240 min Winter	11.265	0.0	188
360 min Winter	8.299	0.0	264
480 min Winter	6.674	0.0	338
600 min Winter	5.632	0.0	410
720 min Winter	4.901	0.0	480
960 min Winter	3.933	0.0	616
1440 min Winter	2.881	0.0	874
2160 min Winter	2.107	0.0	1236
2880 min Winter	1.687	0.0	1532
4320 min Winter	1.231	0.0	2204
5760 min Winter	0.984	0.0	2936
7200 min Winter	0.827	0.0	3624
8640 min Winter	0.717	0.0	4344
10080 min Winter	0.636	0.0	5096

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Date 01/09/2018
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Bristol Airport 12mpps
MSCP3 Access South Soakaway 5
Q30
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Innovyze Source Control 2018.1

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.175

Time (mins) Area	Time (mins) Area	Time (mins) Area	Time (mins) Area
From: To: (ha)	From: To: (ha)	From: To: (ha)	From: To: (ha)
0 4 0.044	4 8 0.044	8 12 0.044	12 16 0.043

Time Area Diagram

Total Area (ha) 0.000

Time (mins) Area
From: To: (ha)
0 4 0.000

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Bristol Airport 12mpps
 MSCP3 Access South Soakaway 5
 Q30



Date 01/09/2018
 File MSCP3 ACCESS SOUTH.SRCX

Designed by RJH
 Checked by

Innovyze Source Control 2018.1

Model Details

Storage is Online Cover Level (m) 11.000

Cellular Storage Structure

Invert Level (m) 7.000 Safety Factor 2.0
 Infiltration Coefficient Base (m/hr) 0.18500 Porosity 0.95
 Infiltration Coefficient Side (m/hr) 0.18500

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	60.0	60.0	1.500	60.0	184.5	1.600	0.0	184.5

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Bristol Airport 12mpps
MSCP3 Access South Soakaway 5
Q100 +30%



Date 12/11/2018

Designed by RJH

File MSCP3 Access South.SRCX

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

Half Drain Time : 181 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	7.659	0.659	2.9	37.6	O K
30 min Summer	7.858	0.858	3.4	48.9	O K
60 min Summer	8.033	1.033	3.7	58.9	O K
120 min Summer	8.135	1.135	4.0	64.7	O K
180 min Summer	8.143	1.143	4.0	65.2	O K
240 min Summer	8.131	1.131	4.0	64.4	O K
360 min Summer	8.093	1.093	3.9	62.3	O K
480 min Summer	8.046	1.046	3.8	59.6	O K
600 min Summer	7.999	0.999	3.7	57.0	O K
720 min Summer	7.955	0.955	3.6	54.5	O K
960 min Summer	7.874	0.874	3.4	49.8	O K
1440 min Summer	7.735	0.735	3.1	41.9	O K
2160 min Summer	7.571	0.571	2.8	32.5	O K
2880 min Summer	7.444	0.444	2.5	25.3	O K
4320 min Summer	7.267	0.267	2.1	15.2	O K
5760 min Summer	7.152	0.152	1.9	8.7	O K
7200 min Summer	7.080	0.080	1.7	4.6	O K
8640 min Summer	7.049	0.049	1.6	2.8	O K
10080 min Summer	7.043	0.043	1.4	2.5	O K
15 min Winter	7.742	0.742	3.1	42.3	O K
30 min Winter	7.968	0.968	3.6	55.2	O K
60 min Winter	8.171	1.171	4.0	66.7	O K
120 min Winter	8.299	1.299	4.3	74.0	O K
180 min Winter	8.308	1.308	4.3	74.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	124.836	0.0	28
30 min Summer	83.061	0.0	41
60 min Summer	52.662	0.0	68
120 min Summer	32.210	0.0	120
180 min Summer	23.799	0.0	152
240 min Summer	19.065	0.0	184
360 min Summer	13.962	0.0	252
480 min Summer	11.178	0.0	322
600 min Summer	9.399	0.0	390
720 min Summer	8.153	0.0	460
960 min Summer	6.510	0.0	594
1440 min Summer	4.731	0.0	856
2160 min Summer	3.432	0.0	1236
2880 min Summer	2.730	0.0	1600
4320 min Summer	1.973	0.0	2336
5760 min Summer	1.566	0.0	3048
7200 min Summer	1.308	0.0	3688
8640 min Summer	1.129	0.0	4368
10080 min Summer	0.998	0.0	5136
15 min Winter	124.836	0.0	28
30 min Winter	83.061	0.0	41
60 min Winter	52.662	0.0	68
120 min Winter	32.210	0.0	120
180 min Winter	23.799	0.0	164

.	Bristol Airport 12mpps
.	MSCP3 Access South Soakaway 5
.	Q100 +30%
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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
240 min Winter	8.292	1.292	4.3	73.7	O K
360 min Winter	8.241	1.241	4.2	70.7	O K
480 min Winter	8.174	1.174	4.0	66.9	O K
600 min Winter	8.104	1.104	3.9	63.0	O K
720 min Winter	8.039	1.039	3.8	59.2	O K
960 min Winter	7.921	0.921	3.5	52.5	O K
1440 min Winter	7.726	0.726	3.1	41.4	O K
2160 min Winter	7.508	0.508	2.6	28.9	O K
2880 min Winter	7.351	0.351	2.3	20.0	O K
4320 min Winter	7.145	0.145	1.9	8.2	O K
5760 min Winter	7.049	0.049	1.6	2.8	O K
7200 min Winter	7.041	0.041	1.4	2.3	O K
8640 min Winter	7.036	0.036	1.2	2.0	O K
10080 min Winter	7.031	0.031	1.0	1.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
240 min Winter	19.065	0.0	194
360 min Winter	13.962	0.0	270
480 min Winter	11.178	0.0	346
600 min Winter	9.399	0.0	420
720 min Winter	8.153	0.0	492
960 min Winter	6.510	0.0	634
1440 min Winter	4.731	0.0	906
2160 min Winter	3.432	0.0	1296
2880 min Winter	2.730	0.0	1672
4320 min Winter	1.973	0.0	2380
5760 min Winter	1.566	0.0	2928
7200 min Winter	1.308	0.0	3624
8640 min Winter	1.129	0.0	4384
10080 min Winter	0.998	0.0	5136

.	Bristol Airport 12mpps
.	MSCP3 Access South Soakaway 5
.	Q100 +30%
Date 12/11/2018	Designed by RJH
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Innovyze Source Control 2018.1

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	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.175

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
From:	To:	From:	To:	From:	To:	From:	To:
0	4	4	8	8	12	12	16
	0.044		0.044		0.044		0.043

Time Area Diagram

Total Area (ha) 0.000

Time (mins)	Area (ha)
From:	To:
0	4
	0.000

.	Bristol Airport 12mpps
.	MSCP3 Access South Soakaway 5
.	Q100 +30%
Date 12/11/2018	Designed by RJH
File MSCP3 Access South.SRCX	Checked by



Innovyze Source Control 2018.1

Model Details

Storage is Online Cover Level (m) 11.000

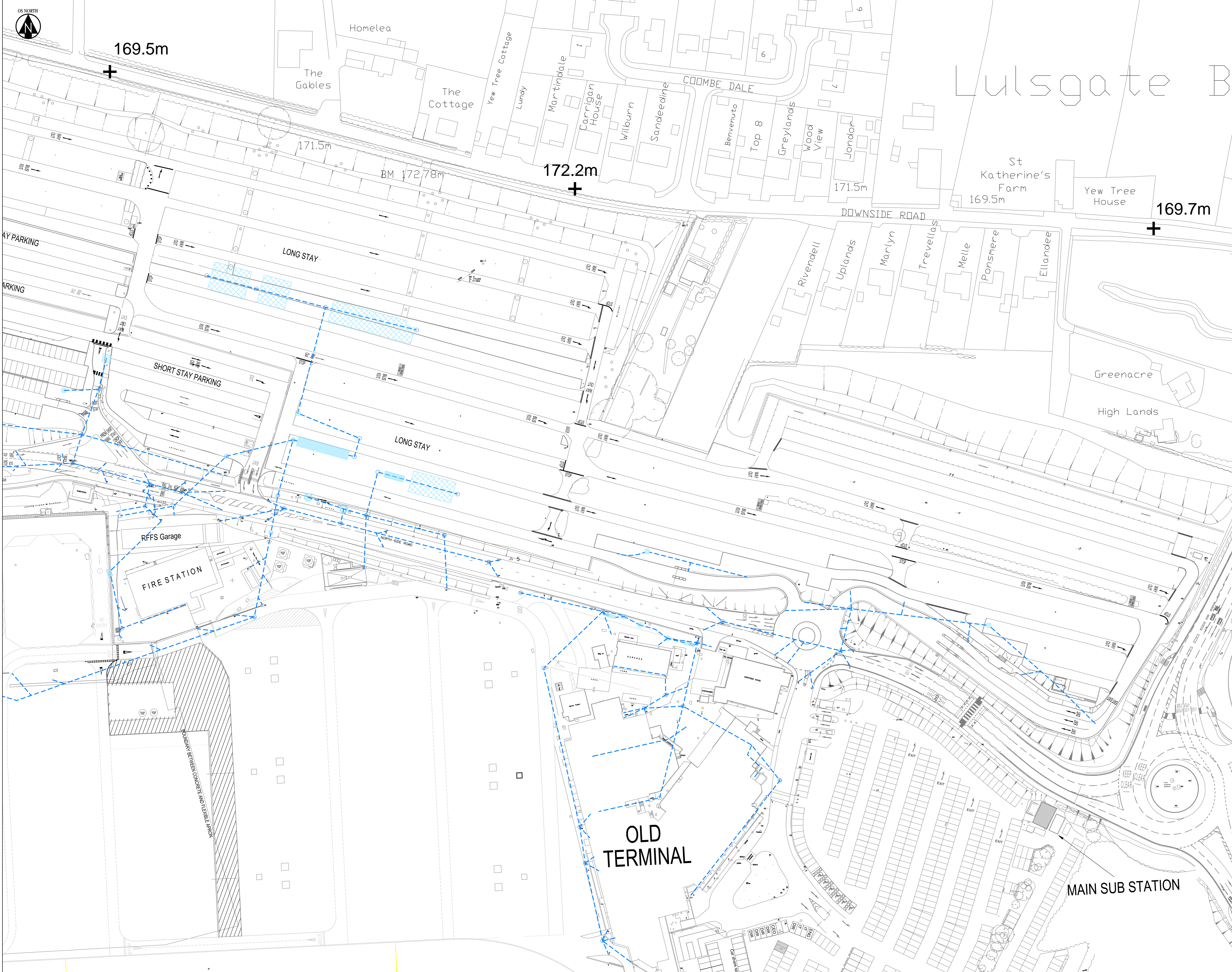
Cellular Storage Structure

Invert Level (m) 7.000 Safety Factor 2.0
 Infiltration Coefficient Base (m/hr) 0.18500 Porosity 0.95
 Infiltration Coefficient Side (m/hr) 0.18500

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	60.0	60.0	1.500	60.0	184.5	1.600	0.0	184.5

Appendix G – New Gyratory Road

Reference	Title
BAE-HYD-XX-XX-DR-D-2009-P02	Existing Surface Water Drainage
BAE-HYD-XX-XX-DR-D-2010-P03	Proposed Surface Water Drainage
GYRATORY.SRCX	Gyratory Soakaway 9x – Q30
GYRATORY.SRCX	Gyratory Soakaway 49x– Q100 +30%



- KEY**
- Existing surface water drain
 - Existing tank soakaway
 - Existing manhole soakaway
 - Existing petrol interceptor
 - Extent of Gyrotary Roads and Internal Surface Parking

REVISIONS

REV	DATE	DESCRIPTION	BY	CHKD	APP
001	16/11/18	Existing drainage updated.			
002	24/09/18	First Issue.			

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CLIENT
BRISTOL AIRPORT

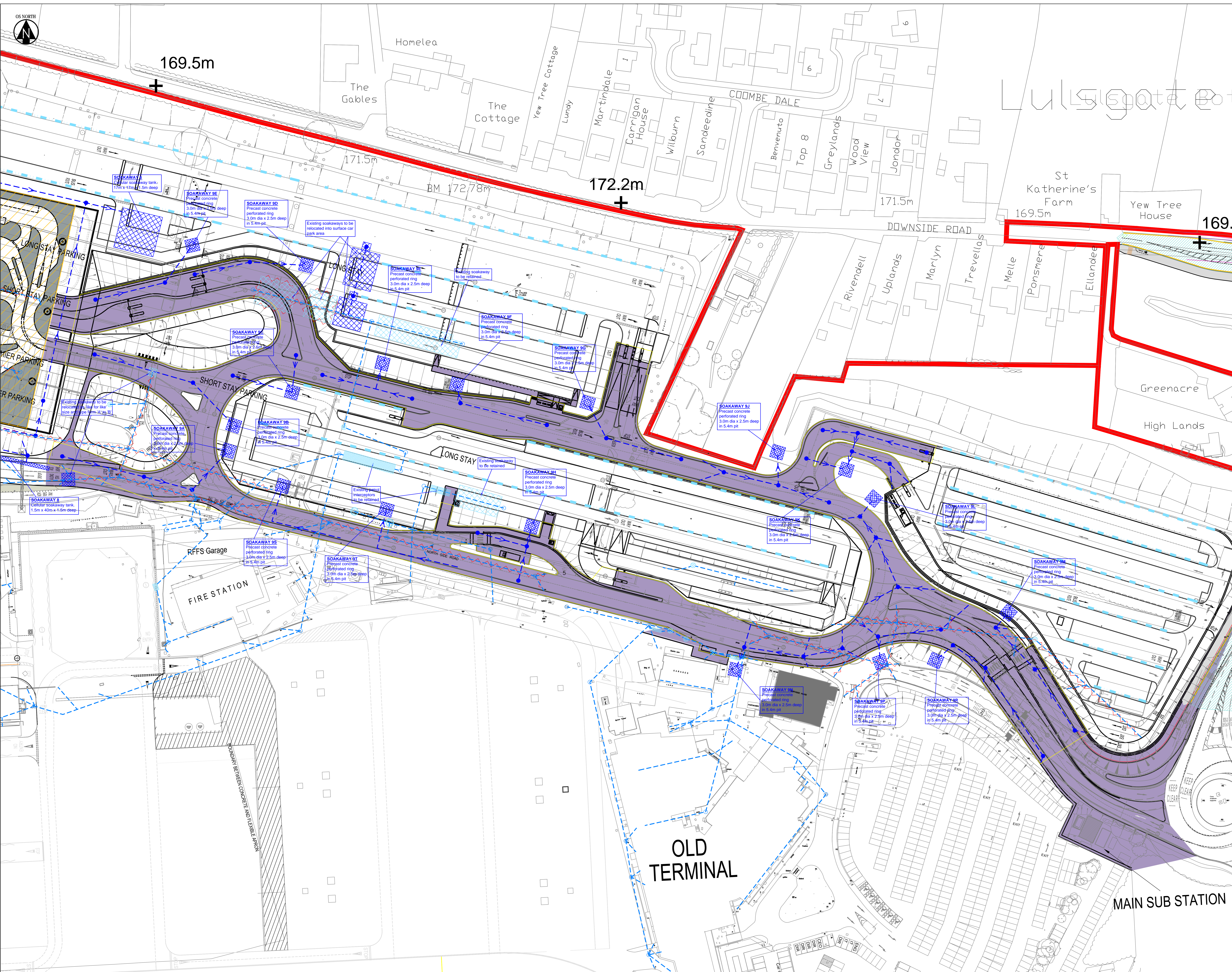
PROJECT
BRISTOL AIRPORT 12mppa
EXPANSION SCHEME

TITLE
GYRATORY ROADS
EXISTING SURFACE WATER DRAINAGE

HYDROCK PROJECT NO. C-09194-C	SCALE @ A0 1:500
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STATUS DESCRIPTION FOR APPROVAL	STATUS S2
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DRAWING NO. (PROJECT CODE ORIGINATOR ZONE LEVEL TYPE ROLE NUMBER) BAE-HYD-XX-XX-DR-D-2009	REVISION P02
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- KEY**
- Existing surface water drain
 - Existing petrel interceptor
 - Existing tank soakaway
 - Existing manhole soakaway
 - Proposed surface water drain
 - Proposed petrel interceptor
 - Proposed cellular soakaway unit
 - Existing surface water drain to be abandoned

REVISIONS

Rev	Date	Description	By	Chd	App
R01	05/12/18	Master plan updated.			
R02	16/11/18	Drainage updated.			
R03	24/09/18	Final Issue.			

Rev	Date	Description	By	Chd	App

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PROJECT
BRISTOL AIRPORT 12mppa EXPANSION SCHEME

TITLE
GYRATORY ROADS PROPOSED SURFACE WATER DRAINAGE

HYDROCK PROJECT NO. C-09194-C	SCALE @ A0 1:500
STATUS DESCRIPTION FOR APPROVAL	STATUS S2
DRAWING NO. (PROJECT CODE-ORIGINATOR ZONE LEVEL-TYPE-ROUTE NUMBER) BAE-HYD-XX-XX-DR-D-2010	REVISION P03

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Bristol Airport 12mppa
Gyratory Highway Typical
Soakaway 9x - Q30



Date 01/09/2018
File GYRATORY.SRCX

Designed by RJH
Checked by

Innovyze

Source Control 2018.1

Summary of Results for 30 year Return Period

Half Drain Time : 126 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	8.223	0.723	1.2	9.9	O K
30 min Summer	8.421	0.921	1.3	12.6	O K
60 min Summer	8.572	1.072	1.3	14.7	O K
120 min Summer	8.626	1.126	1.4	15.4	O K
180 min Summer	8.612	1.112	1.4	15.2	O K
240 min Summer	8.580	1.080	1.3	14.8	O K
360 min Summer	8.515	1.015	1.3	13.9	O K
480 min Summer	8.451	0.951	1.3	13.0	O K
600 min Summer	8.389	0.889	1.2	12.2	O K
720 min Summer	8.330	0.830	1.2	11.4	O K
960 min Summer	8.221	0.721	1.1	9.9	O K
1440 min Summer	8.038	0.538	1.0	7.4	O K
2160 min Summer	7.836	0.336	0.9	4.6	O K
2880 min Summer	7.698	0.198	0.9	2.7	O K
4320 min Summer	7.557	0.057	0.8	0.8	O K
5760 min Summer	7.542	0.042	0.6	0.6	O K
7200 min Summer	7.535	0.035	0.5	0.5	O K
8640 min Summer	7.530	0.030	0.5	0.4	O K
10080 min Summer	7.527	0.027	0.4	0.4	O K
15 min Winter	8.317	0.817	1.2	11.2	O K
30 min Winter	8.544	1.044	1.3	14.3	O K
60 min Winter	8.726	1.226	1.4	16.8	O K
120 min Winter	8.801	1.301	1.5	17.8	O K
180 min Winter	8.783	1.283	1.5	17.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	74.059	0.0	24
30 min Summer	48.833	0.0	37
60 min Summer	30.811	0.0	64
120 min Summer	18.860	0.0	104
180 min Summer	13.992	0.0	136
240 min Summer	11.265	0.0	172
360 min Summer	8.299	0.0	240
480 min Summer	6.674	0.0	310
600 min Summer	5.632	0.0	376
720 min Summer	4.901	0.0	444
960 min Summer	3.933	0.0	574
1440 min Summer	2.881	0.0	826
2160 min Summer	2.107	0.0	1192
2880 min Summer	1.687	0.0	1536
4320 min Summer	1.231	0.0	2208
5760 min Summer	0.984	0.0	2920
7200 min Summer	0.827	0.0	3672
8640 min Summer	0.717	0.0	4336
10080 min Summer	0.636	0.0	4984
15 min Winter	74.059	0.0	24
30 min Winter	48.833	0.0	37
60 min Winter	30.811	0.0	64
120 min Winter	18.860	0.0	114
180 min Winter	13.992	0.0	144

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Bristol Airport 12mppa
Gyratory Highway Typical
Soakaway 9x - Q30



Date 01/09/2018
File GYRATORY.SRCX

Designed by RJH
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Source Control 2018.1

Summary of Results for 30 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
240 min Winter	8.741	1.241	1.4	17.0	O K
360 min Winter	8.641	1.141	1.4	15.6	O K
480 min Winter	8.543	1.043	1.3	14.3	O K
600 min Winter	8.449	0.949	1.3	13.0	O K
720 min Winter	8.361	0.861	1.2	11.8	O K
960 min Winter	8.203	0.703	1.1	9.6	O K
1440 min Winter	7.952	0.452	1.0	6.2	O K
2160 min Winter	7.696	0.196	0.9	2.7	O K
2880 min Winter	7.556	0.056	0.8	0.8	O K
4320 min Winter	7.538	0.038	0.6	0.5	O K
5760 min Winter	7.530	0.030	0.5	0.4	O K
7200 min Winter	7.525	0.025	0.4	0.3	O K
8640 min Winter	7.522	0.022	0.3	0.3	O K
10080 min Winter	7.520	0.020	0.3	0.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
240 min Winter	11.265	0.0	184
360 min Winter	8.299	0.0	260
480 min Winter	6.674	0.0	332
600 min Winter	5.632	0.0	404
720 min Winter	4.901	0.0	474
960 min Winter	3.933	0.0	608
1440 min Winter	2.881	0.0	866
2160 min Winter	2.107	0.0	1220
2880 min Winter	1.687	0.0	1500
4320 min Winter	1.231	0.0	2208
5760 min Winter	0.984	0.0	2928
7200 min Winter	0.827	0.0	3640
8640 min Winter	0.717	0.0	4408
10080 min Winter	0.636	0.0	5144

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Bristol Airport 12mppa
Gyratory Highway Typical
Soakaway 9x - Q30



Date 01/09/2018
File GYRATORY.SRCX

Designed by RJH
Checked by

Innovyze Source Control 2018.1

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.080

Time (mins)		Area	Time (mins)		Area	Time (mins)		Area
From:	To:	(ha)	From:	To:	(ha)	From:	To:	(ha)
0	4	0.027	4	8	0.027	8	12	0.026

Time Area Diagram

Total Area (ha) 0.000

Time (mins)		Area
From:	To:	(ha)
0	4	0.000

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Bristol Airport 12mmpa
Gyratory Highway Typical
Soakaway 9x - Q30



Date 01/09/2018

Designed by RJH

File GYRATORY.SRCX

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Innovyze

Source Control 2018.1

Model Details

Storage is Online Cover Level (m) 10.000

Lined Soakaway Structure

Infiltration Coefficient Base (m/hr) 0.18500 Ring Diameter (m) 3.00
Infiltration Coefficient Side (m/hr) 0.18500 Pit Multiplier 1.8
Safety Factor 2.0 Number Required 1
Porosity 0.30 Cap Volume Depth (m) 0.000
Invert Level (m) 7.500 Cap Infiltration Depth (m) 0.000

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Bristol Airport 12mppa
Gyratory Highway Typical
Soakaway 9x - Q100 +30%



Date 12/11/2018
File Gyratory.SRCX

Designed by RJH
Checked by

Innovyze

Source Control 2018.1

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

Half Drain Time : 167 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	8.757	1.257	1.4	17.2	O K
30 min Summer	9.129	1.629	1.7	22.3	O K
60 min Summer	9.446	1.946	1.8	26.7	O K
120 min Summer	9.613	2.113	1.9	28.9	O K
180 min Summer	9.621	2.121	1.9	29.0	O K
240 min Summer	9.589	2.089	1.9	28.6	O K
360 min Summer	9.502	2.002	1.9	27.4	O K
480 min Summer	9.404	1.904	1.8	26.1	O K
600 min Summer	9.313	1.813	1.8	24.8	O K
720 min Summer	9.227	1.727	1.7	23.7	O K
960 min Summer	9.070	1.570	1.6	21.5	O K
1440 min Summer	8.802	1.302	1.5	17.8	O K
2160 min Summer	8.490	0.990	1.3	13.6	O K
2880 min Summer	8.254	0.754	1.2	10.3	O K
4320 min Summer	7.924	0.424	1.0	5.8	O K
5760 min Summer	7.716	0.216	0.9	3.0	O K
7200 min Summer	7.591	0.091	0.8	1.2	O K
8640 min Summer	7.548	0.048	0.7	0.7	O K
10080 min Summer	7.542	0.042	0.7	0.6	O K
15 min Winter	8.917	1.417	1.5	19.4	O K
30 min Winter	9.340	1.840	1.8	25.2	O K
60 min Winter	9.710	2.210	2.0	30.3	Flood Risk
120 min Winter	9.926	2.426	2.1	33.2	Flood Risk
180 min Winter	9.929	2.429	2.1	33.3	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	124.836	0.0	25
30 min Summer	83.061	0.0	38
60 min Summer	52.662	0.0	64
120 min Summer	32.210	0.0	116
180 min Summer	23.799	0.0	146
240 min Summer	19.065	0.0	178
360 min Summer	13.962	0.0	248
480 min Summer	11.178	0.0	318
600 min Summer	9.399	0.0	386
720 min Summer	8.153	0.0	454
960 min Summer	6.510	0.0	588
1440 min Summer	4.731	0.0	850
2160 min Summer	3.432	0.0	1232
2880 min Summer	2.730	0.0	1592
4320 min Summer	1.973	0.0	2332
5760 min Summer	1.566	0.0	3008
7200 min Summer	1.308	0.0	3680
8640 min Summer	1.129	0.0	4336
10080 min Summer	0.998	0.0	5024
15 min Winter	124.836	0.0	25
30 min Winter	83.061	0.0	38
60 min Winter	52.662	0.0	64
120 min Winter	32.210	0.0	118
180 min Winter	23.799	0.0	152

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Bristol Airport 12mmpa
Gyratory Highway Typical
Soakaway 9x - Q100 +30%



Date 12/11/2018
File Gyratory.SRCX

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Source Control 2018.1

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

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
240 min Winter	9.892	2.392	2.1	32.8	Flood Risk
360 min Winter	9.777	2.277	2.0	31.2	Flood Risk
480 min Winter	9.636	2.136	1.9	29.3	O K
600 min Winter	9.495	1.995	1.9	27.3	O K
720 min Winter	9.369	1.869	1.8	25.6	O K
960 min Winter	9.142	1.642	1.7	22.5	O K
1440 min Winter	8.769	1.269	1.5	17.4	O K
2160 min Winter	8.360	0.860	1.2	11.8	O K
2880 min Winter	8.069	0.569	1.1	7.8	O K
4320 min Winter	7.694	0.194	0.9	2.7	O K
5760 min Winter	7.548	0.048	0.7	0.7	O K
7200 min Winter	7.540	0.040	0.6	0.5	O K
8640 min Winter	7.535	0.035	0.5	0.5	O K
10080 min Winter	7.531	0.031	0.5	0.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
240 min Winter	19.065	0.0	188
360 min Winter	13.962	0.0	266
480 min Winter	11.178	0.0	342
600 min Winter	9.399	0.0	416
720 min Winter	8.153	0.0	486
960 min Winter	6.510	0.0	626
1440 min Winter	4.731	0.0	896
2160 min Winter	3.432	0.0	1280
2880 min Winter	2.730	0.0	1652
4320 min Winter	1.973	0.0	2344
5760 min Winter	1.566	0.0	2936
7200 min Winter	1.308	0.0	3560
8640 min Winter	1.129	0.0	4384
10080 min Winter	0.998	0.0	5096

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Bristol Airport 12mppa
Gyratory Highway Typical
Soakaway 9x - Q100 +30%



Date 12/11/2018
File Gyratory.SRCX

Designed by RJH
Checked by

Innovyze

Source Control 2018.1

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	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.080

Time (mins)	Area	Time (mins)	Area	Time (mins)	Area
From:	To:	From:	To:	From:	To:
	(ha)		(ha)		(ha)
0	4 0.027	4	8 0.027	8	12 0.026

Time Area Diagram

Total Area (ha) 0.000

Time (mins)	Area
From:	To:
	(ha)
0	4 0.000

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Bristol Airport 12mmpa
Gyratory Highway Typical
Soakaway 9x - Q100 +30%



Date 12/11/2018

Designed by RJH

File Gyratory.SRCX

Checked by

Innovyze

Source Control 2018.1

Model Details

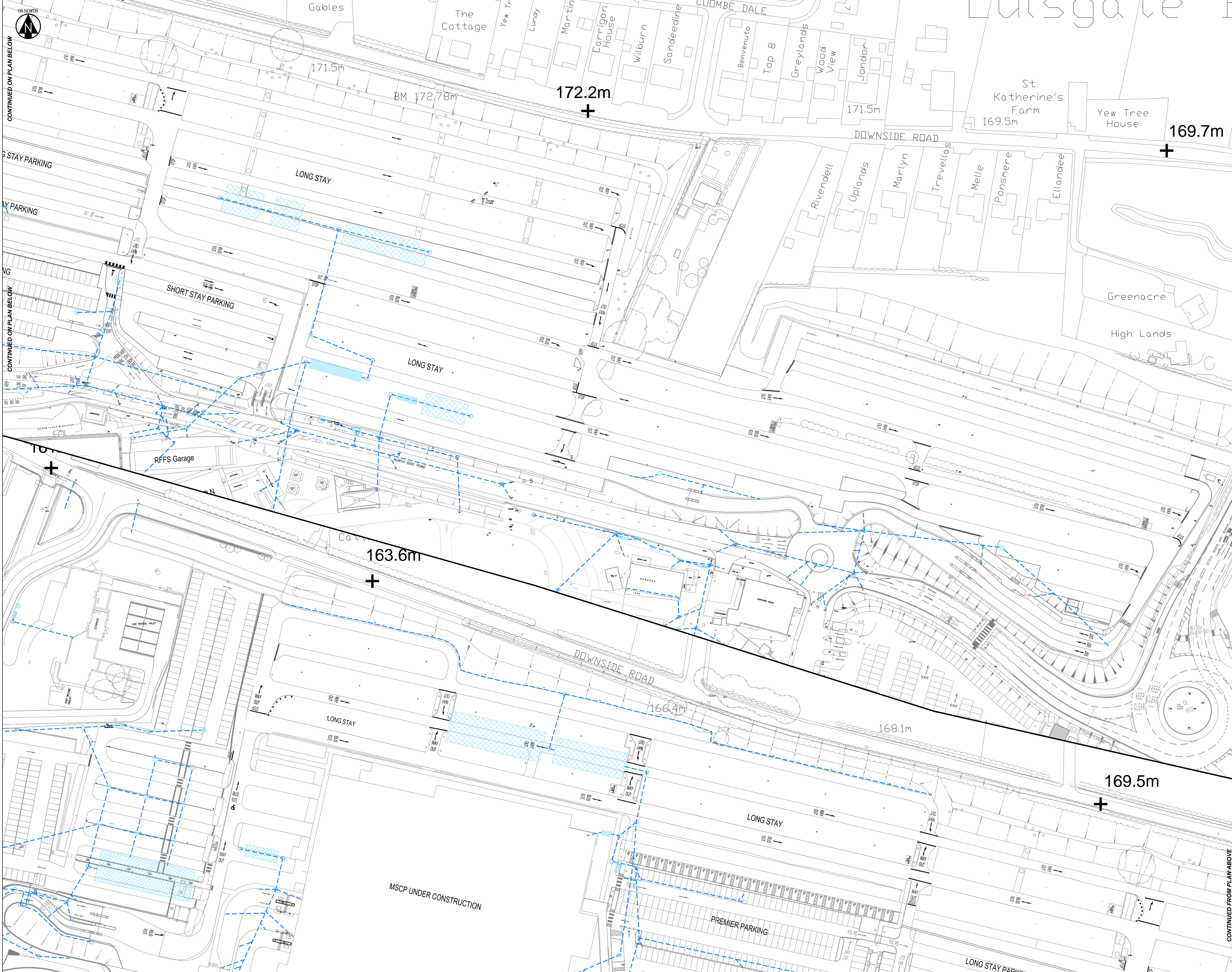
Storage is Online Cover Level (m) 10.000

Lined Soakaway Structure

Infiltration Coefficient Base (m/hr)	0.18500	Ring Diameter (m)	3.00
Infiltration Coefficient Side (m/hr)	0.18500	Pit Multiplier	1.8
Safety Factor	2.0	Number Required	1
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	7.500	Cap Infiltration Depth (m)	0.000

Appendix H – Northern Surface Car Parking

Reference	Title
BAE-HYD-XX-XX-DR-D-2011-P02	Existing Surface Water Drainage
BAE-HYD-XX-XX-DR-D-2012-P03	Proposed Surface Water Drainage
Surface CP.SRCX	Trench Soakaway – Q30
Surface CP.SRCX	Trench Soakaway – Q100 +30%



- KEY**
- Existing surface water drain
 - Existing tank soakaway
 - Existing manhole soakaway
 - Existing petrol interceptor

REVISIONS

Rev	Date	Description	By	Chk	App
PO2	16/11/18	Existing drainage updated.			
PO1	24/09/18	First Issue.			

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PROJECT
 BRISTOL AIRPORT 12mppa
 EXPANSION SCHEME

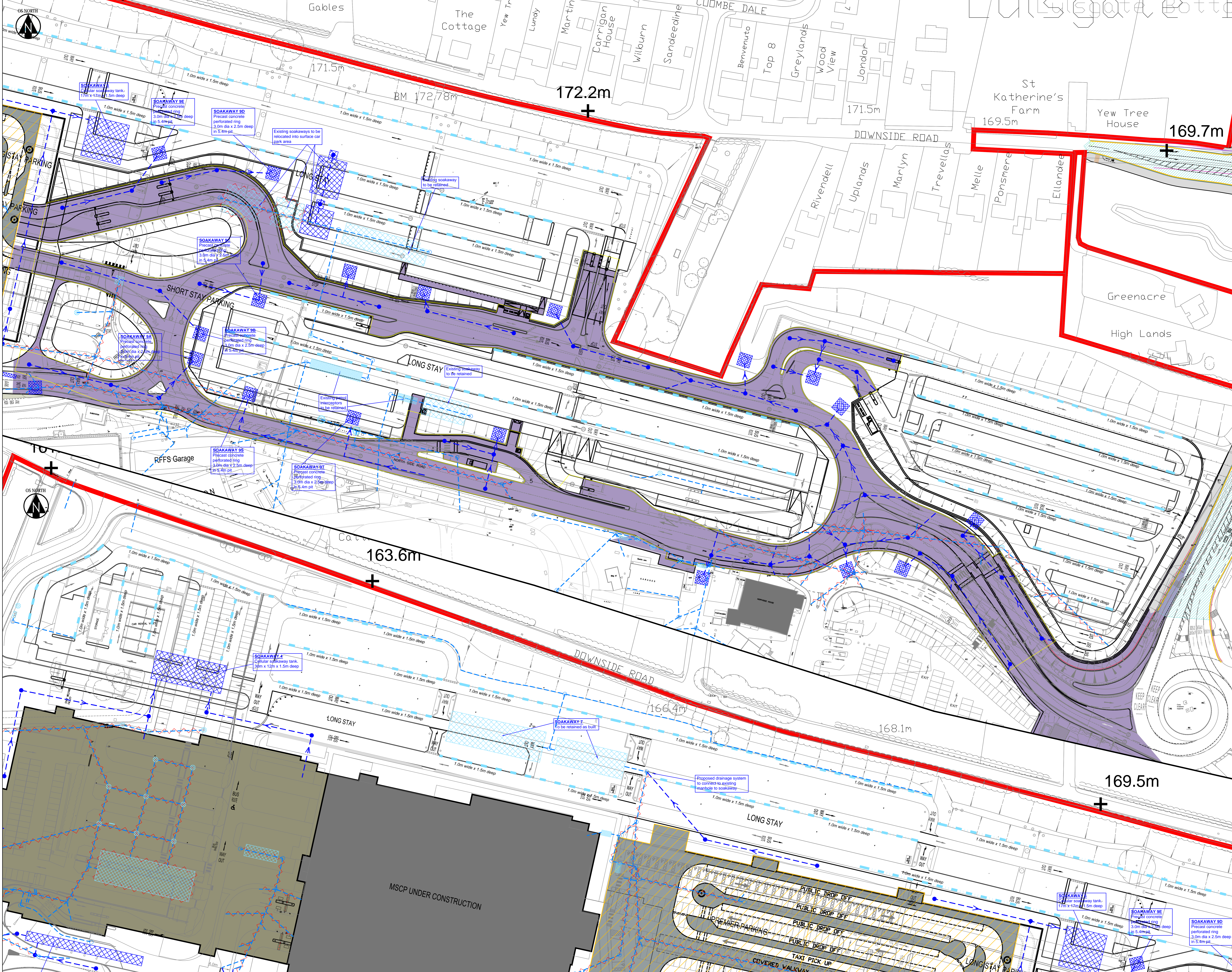
TITLE
 NORTHERN SURFACE PARKING
 EXISTING SURFACE WATER DRAINAGE

HYDROCK PROJECT NO. C-09194-C	SCALE @ A0 1:500
STATUS DESCRIPTION FOR APPROVAL	STATUS S2
DRAWING NO. (PROJECT CODE-ORIGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER) BAE-HYD-XX-XX-DR-D-2011	REVISION PO2

CONTINUED ON PLAN BELOW

CONTINUED ON PLAN BELOW

CONTINUED FROM PLAN ABOVE



- KEY**
- Existing surface water drain
 - Existing petrol interceptor
 - Existing tank soakaway
 - Existing manhole soakaway
 - Proposed surface water drain
 - Proposed petrol interceptor
 - Proposed cellular soakaway unit
 - Existing surface water drain to be abandoned
 - Proposed soakaway trench

REVISIONS

Rev	Date	Description	By	Ckd	App
P03	05/12/18	Master plan updated.	RJH		
P02	16/11/18	Drainage updated.	RJH		
P01	24/09/18	First issue.	RJH		

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PROJECT
**BRISTOL AIRPORT 12mppa
EXPANSION SCHEME**

TITLE
**NORTHERN SURFACE CAR PARKS
PROPOSED SURFACE WATER DRAINAGE**

HYDROCK PROJECT NO. C-09194-C	SCALE @ A0 1:500
STATUS DESCRIPTION FOR APPROVAL	STATUS S2
DRAWING NO. (PROJECT CODE ORIGINATOR ZONE LEVEL TYPE ROLL NUMBER) BAE-HYD-XX-XX-DR-D-2012	REVISION P03

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Bristol Airport 12 mppa
Surface Car Parks
Q30



Date 01/09/2018
File Surface CP.SRCX

Designed by RJH
Checked by

Innovyze

Source Control 2018.1

Summary of Results for 30 year Return Period

Half Drain Time : 37 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	175.224	0.724	5.7	15.2	O K
30 min Summer	175.364	0.864	6.6	20.3	O K
60 min Summer	175.450	0.950	7.1	23.4	O K
120 min Summer	175.473	0.973	7.3	24.2	O K
180 min Summer	175.444	0.944	7.1	23.2	O K
240 min Summer	175.401	0.901	6.8	21.6	O K
360 min Summer	175.317	0.817	6.3	18.6	O K
480 min Summer	175.244	0.744	5.8	16.0	O K
600 min Summer	175.185	0.685	5.5	13.9	O K
720 min Summer	175.137	0.637	5.2	12.1	O K
960 min Summer	175.070	0.570	4.6	9.8	O K
1440 min Summer	174.982	0.482	3.7	7.0	O K
2160 min Summer	174.896	0.396	2.9	4.7	O K
2880 min Summer	174.840	0.340	2.4	3.5	O K
4320 min Summer	174.768	0.268	1.8	2.2	O K
5760 min Summer	174.723	0.223	1.4	1.5	O K
7200 min Summer	174.691	0.191	1.2	1.1	O K
8640 min Summer	174.669	0.169	1.0	0.9	O K
10080 min Summer	174.651	0.151	0.9	0.7	O K
15 min Winter	175.292	0.792	6.1	17.7	O K
30 min Winter	175.451	0.951	7.1	23.4	O K
60 min Winter	175.543	1.043	7.7	26.7	O K
120 min Winter	175.539	1.039	7.7	26.6	O K
180 min Winter	175.480	0.980	7.3	24.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	74.059	0.0	25
30 min Summer	48.833	0.0	35
60 min Summer	30.811	0.0	54
120 min Summer	18.860	0.0	86
180 min Summer	13.992	0.0	120
240 min Summer	11.265	0.0	152
360 min Summer	8.299	0.0	216
480 min Summer	6.674	0.0	278
600 min Summer	5.632	0.0	338
720 min Summer	4.901	0.0	398
960 min Summer	3.933	0.0	516
1440 min Summer	2.881	0.0	756
2160 min Summer	2.107	0.0	1112
2880 min Summer	1.687	0.0	1476
4320 min Summer	1.231	0.0	2204
5760 min Summer	0.984	0.0	2936
7200 min Summer	0.827	0.0	3672
8640 min Summer	0.717	0.0	4400
10080 min Summer	0.636	0.0	5080
15 min Winter	74.059	0.0	26
30 min Winter	48.833	0.0	36
60 min Winter	30.811	0.0	56
120 min Winter	18.860	0.0	92
180 min Winter	13.992	0.0	126

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Bristol Airport 12 mppa
Surface Car Parks
Q30



Date 01/09/2018
File Surface CP.SRCX

Designed by RJH
Checked by

Innovyze

Source Control 2018.1

Summary of Results for 30 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
240 min Winter	175.412	0.912	6.9	22.0	O K
360 min Winter	175.290	0.790	6.1	17.7	O K
480 min Winter	175.194	0.694	5.5	14.2	O K
600 min Winter	175.121	0.621	5.1	11.5	O K
720 min Winter	175.072	0.572	4.6	9.8	O K
960 min Winter	175.000	0.500	3.9	7.5	O K
1440 min Winter	174.904	0.404	2.9	4.9	O K
2160 min Winter	174.819	0.319	2.2	3.1	O K
2880 min Winter	174.767	0.267	1.7	2.1	O K
4320 min Winter	174.704	0.204	1.3	1.3	O K
5760 min Winter	174.667	0.167	1.0	0.8	O K
7200 min Winter	174.643	0.143	0.8	0.6	O K
8640 min Winter	174.625	0.125	0.7	0.5	O K
10080 min Winter	174.611	0.111	0.6	0.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
240 min Winter	11.265	0.0	160
360 min Winter	8.299	0.0	226
480 min Winter	6.674	0.0	288
600 min Winter	5.632	0.0	346
720 min Winter	4.901	0.0	404
960 min Winter	3.933	0.0	524
1440 min Winter	2.881	0.0	764
2160 min Winter	2.107	0.0	1116
2880 min Winter	1.687	0.0	1476
4320 min Winter	1.231	0.0	2204
5760 min Winter	0.984	0.0	2936
7200 min Winter	0.827	0.0	3624
8640 min Winter	0.717	0.0	4280
10080 min Winter	0.636	0.0	4984

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Date 01/09/2018
File Surface CP.SRCX

Bristol Airport 12 mppa
Surface Car Parks
Q30
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Innovyze Source Control 2018.1

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.180

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
From:	To:	From:	To:	From:	To:	From:	To:
0	4	4	8	8	12	12	16
	0.045		0.045		0.045		0.045

Time Area Diagram

Total Area (ha) 0.000

Time (mins)	Area (ha)
From:	To:
0	4
	0.000

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Date 01/09/2018
File Surface CP.SRCX

Bristol Airport 12 mppa
Surface Car Parks
Q30
Designed by RJH
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Innovyze Source Control 2018.1

Model Details

Storage is Online Cover Level (m) 176.000

Complex Structure

Infiltration Trench

Infiltration Coefficient Base (m/hr)	0.18500	Trench Width (m)	1.0
Infiltration Coefficient Side (m/hr)	0.18500	Trench Length (m)	120.0
Safety Factor	2.0	Slope (1:X)	200.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	174.500	Cap Infiltration Depth (m)	0.000

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.18500	Width (m)	9.0
Membrane Percolation (mm/hr)	1000	Length (m)	120.0
Max Percolation (l/s)	300.0	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	175.550	Membrane Depth (m)	0

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Bristol Airport 12 mppa
Surface Car Parks
Q100 +30%



Date 12/11/2018
File Surface CP.SRCX

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Source Control 2018.1

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

Half Drain Time : 40 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	175.611	1.111	9.5	29.7	O K
30 min Summer	175.730	1.230	13.0	37.9	Flood Risk
60 min Summer	175.779	1.279	14.5	42.3	Flood Risk
120 min Summer	175.785	1.285	14.6	42.9	Flood Risk
180 min Summer	175.764	1.264	14.0	40.9	Flood Risk
240 min Summer	175.736	1.236	13.2	38.4	Flood Risk
360 min Summer	175.683	1.183	11.6	34.2	O K
480 min Summer	175.634	1.134	10.2	31.0	O K
600 min Summer	175.591	1.091	8.8	28.7	O K
720 min Summer	175.527	1.027	7.6	26.2	O K
960 min Summer	175.391	0.891	6.8	21.3	O K
1440 min Summer	175.208	0.708	5.6	14.7	O K
2160 min Summer	175.066	0.566	4.6	9.6	O K
2880 min Summer	174.990	0.490	3.8	7.2	O K
4320 min Summer	174.892	0.392	2.8	4.6	O K
5760 min Summer	174.828	0.328	2.2	3.2	O K
7200 min Summer	174.784	0.284	1.9	2.4	O K
8640 min Summer	174.751	0.251	1.6	1.9	O K
10080 min Summer	174.726	0.226	1.4	1.5	O K
15 min Winter	175.674	1.174	11.4	33.6	O K
30 min Winter	175.782	1.282	14.6	42.7	Flood Risk
60 min Winter	175.826	1.326	15.9	47.2	Flood Risk
120 min Winter	175.817	1.317	15.6	46.2	Flood Risk
180 min Winter	175.781	1.281	14.5	42.5	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	124.836	0.0	25
30 min Summer	83.061	0.0	34
60 min Summer	52.662	0.0	52
120 min Summer	32.210	0.0	84
180 min Summer	23.799	0.0	116
240 min Summer	19.065	0.0	150
360 min Summer	13.962	0.0	212
480 min Summer	11.178	0.0	276
600 min Summer	9.399	0.0	342
720 min Summer	8.153	0.0	408
960 min Summer	6.510	0.0	530
1440 min Summer	4.731	0.0	768
2160 min Summer	3.432	0.0	1120
2880 min Summer	2.730	0.0	1480
4320 min Summer	1.973	0.0	2208
5760 min Summer	1.566	0.0	2936
7200 min Summer	1.308	0.0	3672
8640 min Summer	1.129	0.0	4400
10080 min Summer	0.998	0.0	5120
15 min Winter	124.836	0.0	25
30 min Winter	83.061	0.0	35
60 min Winter	52.662	0.0	54
120 min Winter	32.210	0.0	88
180 min Winter	23.799	0.0	122

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Bristol Airport 12 mppa
Surface Car Parks
Q100 +30%



Date 12/11/2018
File Surface CP.SRCX

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Source Control 2018.1

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

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
240 min Winter	175.741	1.241	13.3	38.8	Flood Risk
360 min Winter	175.670	1.170	11.3	33.3	O K
480 min Winter	175.610	1.110	9.5	29.6	O K
600 min Winter	175.537	1.037	7.7	26.5	O K
720 min Winter	175.431	0.931	7.0	22.7	O K
960 min Winter	175.270	0.770	6.0	16.9	O K
1440 min Winter	175.085	0.585	4.8	10.3	O K
2160 min Winter	174.968	0.468	3.5	6.6	O K
2880 min Winter	174.894	0.394	2.8	4.7	O K
4320 min Winter	174.805	0.305	2.1	2.8	O K
5760 min Winter	174.752	0.252	1.6	1.9	O K
7200 min Winter	174.716	0.216	1.4	1.4	O K
8640 min Winter	174.689	0.189	1.2	1.1	O K
10080 min Winter	174.670	0.170	1.0	0.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
240 min Winter	19.065	0.0	156
360 min Winter	13.962	0.0	220
480 min Winter	11.178	0.0	286
600 min Winter	9.399	0.0	360
720 min Winter	8.153	0.0	422
960 min Winter	6.510	0.0	544
1440 min Winter	4.731	0.0	770
2160 min Winter	3.432	0.0	1128
2880 min Winter	2.730	0.0	1480
4320 min Winter	1.973	0.0	2208
5760 min Winter	1.566	0.0	2920
7200 min Winter	1.308	0.0	3672
8640 min Winter	1.129	0.0	4400
10080 min Winter	0.998	0.0	5128

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Bristol Airport 12 mppa
Surface Car Parks
Q100 +30%

Date 12/11/2018
File Surface CP.SRCX

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Innovyze

Source Control 2018.1

Model Details

Storage is Online Cover Level (m) 176.000

Complex Structure

Infiltration Trench

Infiltration Coefficient Base (m/hr)	0.18500	Trench Width (m)	1.0
Infiltration Coefficient Side (m/hr)	0.18500	Trench Length (m)	120.0
Safety Factor	2.0	Slope (1:X)	200.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	174.500	Cap Infiltration Depth (m)	0.000

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.18500	Width (m)	9.0
Membrane Percolation (mm/hr)	1000	Length (m)	120.0
Max Percolation (l/s)	300.0	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	175.550	Membrane Depth (m)	0

Appendix I – Cogloop 2 Surface Parking

Reference	Title
BAE-HYD-XX-XX-DR-D-2002-P02	Proposed Surface Water Drainage
Cog A1.SRCX to A22	Trench Soakaways – Q100 +30%
Cog A1.SRCX to A22	Trench Soakaways – Q30

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A4
Q100 +30%



Date 12/11/2018
File Cog A4.SRCX

Designed by RJH
Checked by

Innovyze

Source Control 2018.1

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

Half Drain Time : 70 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	180.575	0.975	6.4	44.0	O K
30 min Summer	180.754	1.154	10.7	59.1	O K
60 min Summer	180.823	1.223	13.3	69.3	Flood Risk
120 min Summer	180.851	1.251	14.3	74.3	Flood Risk
180 min Summer	180.851	1.251	14.3	74.3	Flood Risk
240 min Summer	180.841	1.241	13.9	72.5	Flood Risk
360 min Summer	180.816	1.216	13.0	68.2	Flood Risk
480 min Summer	180.790	1.190	12.0	64.0	O K
600 min Summer	180.764	1.164	11.0	60.3	O K
720 min Summer	180.740	1.140	10.1	57.3	O K
960 min Summer	180.697	1.097	8.4	52.7	O K
1440 min Summer	180.543	0.943	6.3	42.0	O K
2160 min Summer	180.343	0.743	5.5	28.8	O K
2880 min Summer	180.219	0.619	5.0	20.7	O K
4320 min Summer	180.100	0.500	3.9	13.5	O K
5760 min Summer	180.024	0.424	3.2	9.7	O K
7200 min Summer	179.969	0.369	2.7	7.3	O K
8640 min Summer	179.926	0.326	2.3	5.8	O K
10080 min Summer	179.893	0.293	2.1	4.6	O K
15 min Winter	180.677	1.077	7.3	50.9	O K
30 min Winter	180.810	1.210	12.7	67.1	Flood Risk
60 min Winter	180.874	1.274	15.2	78.7	Flood Risk
120 min Winter	180.893	1.293	15.9	82.6	Flood Risk
180 min Winter	180.884	1.284	15.5	80.7	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	124.836	0.0	27
30 min Summer	83.061	0.0	37
60 min Summer	52.662	0.0	58
120 min Summer	32.210	0.0	90
180 min Summer	23.799	0.0	124
240 min Summer	19.065	0.0	156
360 min Summer	13.962	0.0	222
480 min Summer	11.178	0.0	288
600 min Summer	9.399	0.0	352
720 min Summer	8.153	0.0	416
960 min Summer	6.510	0.0	548
1440 min Summer	4.731	0.0	810
2160 min Summer	3.432	0.0	1172
2880 min Summer	2.730	0.0	1508
4320 min Summer	1.973	0.0	2216
5760 min Summer	1.566	0.0	2944
7200 min Summer	1.308	0.0	3672
8640 min Summer	1.129	0.0	4408
10080 min Summer	0.998	0.0	5136
15 min Winter	124.836	0.0	27
30 min Winter	83.061	0.0	37
60 min Winter	52.662	0.0	58
120 min Winter	32.210	0.0	94
180 min Winter	23.799	0.0	132

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A4
Q100 +30%



Date 12/11/2018
File Cog A4.SRCX

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Source Control 2018.1

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

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
240 min Winter	180.866	1.266	14.9	77.1	Flood Risk
360 min Winter	180.828	1.228	13.4	70.2	Flood Risk
480 min Winter	180.792	1.192	12.1	64.3	O K
600 min Winter	180.759	1.159	10.8	59.7	O K
720 min Winter	180.730	1.130	9.7	56.1	O K
960 min Winter	180.679	1.079	7.4	51.1	O K
1440 min Winter	180.439	0.839	5.9	35.1	O K
2160 min Winter	180.211	0.611	4.9	20.1	O K
2880 min Winter	180.117	0.517	4.0	14.4	O K
4320 min Winter	180.000	0.400	3.0	8.6	O K
5760 min Winter	179.928	0.328	2.3	5.8	O K
7200 min Winter	179.880	0.280	2.0	4.2	O K
8640 min Winter	179.844	0.244	1.7	3.2	O K
10080 min Winter	179.818	0.218	1.5	2.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
240 min Winter	19.065	0.0	166
360 min Winter	13.962	0.0	234
480 min Winter	11.178	0.0	300
600 min Winter	9.399	0.0	364
720 min Winter	8.153	0.0	432
960 min Winter	6.510	0.0	580
1440 min Winter	4.731	0.0	842
2160 min Winter	3.432	0.0	1172
2880 min Winter	2.730	0.0	1528
4320 min Winter	1.973	0.0	2248
5760 min Winter	1.566	0.0	2944
7200 min Winter	1.308	0.0	3672
8640 min Winter	1.129	0.0	4408
10080 min Winter	0.998	0.0	5104

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A4
Q100 +30%



Date 12/11/2018
File Cog A4.SRCX

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Innovyze Source Control 2018.1

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	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.265

Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)
0	4	0.066	4	8	0.066	8	12	0.066	12	16	0.067

Time Area Diagram

Total Area (ha) 0.000

Time (mins) From:	Time (mins) To:	Area (ha)
0	4	0.000

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A4
Q100 +30%

Date 12/11/2018
File Cog A4.SRCX

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Innovyze

Source Control 2018.1

Model Details

Storage is Online Cover Level (m) 181.100

Complex Structure

Infiltration Trench

Infiltration Coefficient Base (m/hr)	0.12048	Trench Width (m)	1.8
Infiltration Coefficient Side (m/hr)	0.12048	Trench Length (m)	121.5
Safety Factor	2.0	Slope (1:X)	200.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	179.600	Cap Infiltration Depth (m)	0.000

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.12048	Width (m)	20.0
Membrane Percolation (mm/hr)	1000	Length (m)	121.5
Max Percolation (l/s)	675.0	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	180.650	Membrane Depth (m)	0

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A5
Q100 +30%



Date 12/11/2018
File Cog A5.SRCX

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Source Control 2018.1

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

Half Drain Time : 76 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	178.694	0.944	6.3	42.0	O K
30 min Summer	178.884	1.134	8.8	55.8	O K
60 min Summer	178.968	1.218	10.9	65.3	Flood Risk
120 min Summer	178.999	1.249	11.7	69.4	Flood Risk
180 min Summer	178.997	1.247	11.7	69.2	Flood Risk
240 min Summer	178.984	1.234	11.4	67.4	Flood Risk
360 min Summer	178.953	1.203	10.6	63.3	Flood Risk
480 min Summer	178.918	1.168	9.7	59.4	O K
600 min Summer	178.885	1.135	8.9	55.9	O K
720 min Summer	178.853	1.103	8.1	52.9	O K
960 min Summer	178.766	1.016	6.6	46.7	O K
1440 min Summer	178.588	0.838	5.9	35.0	O K
2160 min Summer	178.414	0.664	5.1	23.6	O K
2880 min Summer	178.321	0.571	4.5	17.6	O K
4320 min Summer	178.211	0.461	3.5	11.5	O K
5760 min Summer	178.140	0.390	2.9	8.2	O K
7200 min Summer	178.088	0.338	2.4	6.2	O K
8640 min Summer	178.049	0.299	2.1	4.8	O K
10080 min Summer	178.019	0.269	1.9	3.9	O K
15 min Winter	178.789	1.039	6.7	48.2	O K
30 min Winter	178.952	1.202	10.5	63.2	Flood Risk
60 min Winter	179.030	1.280	12.5	74.0	Flood Risk
120 min Winter	179.052	1.302	13.1	77.5	Flood Risk
180 min Winter	179.042	1.292	12.8	75.8	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	124.836	0.0	27
30 min Summer	83.061	0.0	38
60 min Summer	52.662	0.0	60
120 min Summer	32.210	0.0	92
180 min Summer	23.799	0.0	126
240 min Summer	19.065	0.0	158
360 min Summer	13.962	0.0	226
480 min Summer	11.178	0.0	292
600 min Summer	9.399	0.0	358
720 min Summer	8.153	0.0	424
960 min Summer	6.510	0.0	560
1440 min Summer	4.731	0.0	806
2160 min Summer	3.432	0.0	1156
2880 min Summer	2.730	0.0	1508
4320 min Summer	1.973	0.0	2216
5760 min Summer	1.566	0.0	2944
7200 min Summer	1.308	0.0	3672
8640 min Summer	1.129	0.0	4408
10080 min Summer	0.998	0.0	5136
15 min Winter	124.836	0.0	27
30 min Winter	83.061	0.0	38
60 min Winter	52.662	0.0	60
120 min Winter	32.210	0.0	96
180 min Winter	23.799	0.0	134

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A5
Q100 +30%



Date 12/11/2018
File Cog A5.SRCX

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Source Control 2018.1

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

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
240 min Winter	179.020	1.270	12.3	72.5	Flood Risk
360 min Winter	178.974	1.224	11.1	66.0	Flood Risk
480 min Winter	178.929	1.179	10.0	60.5	O K
600 min Winter	178.886	1.136	8.9	56.0	O K
720 min Winter	178.846	1.096	7.8	52.4	O K
960 min Winter	178.715	0.965	6.4	43.4	O K
1440 min Winter	178.485	0.735	5.4	28.3	O K
2160 min Winter	178.312	0.562	4.5	17.1	O K
2880 min Winter	178.225	0.475	3.6	12.2	O K
4320 min Winter	178.117	0.367	2.7	7.3	O K
5760 min Winter	178.051	0.301	2.1	4.9	O K
7200 min Winter	178.006	0.256	1.8	3.6	O K
8640 min Winter	177.974	0.224	1.5	2.7	O K
10080 min Winter	177.950	0.200	1.3	2.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
240 min Winter	19.065	0.0	168
360 min Winter	13.962	0.0	238
480 min Winter	11.178	0.0	306
600 min Winter	9.399	0.0	374
720 min Winter	8.153	0.0	446
960 min Winter	6.510	0.0	588
1440 min Winter	4.731	0.0	832
2160 min Winter	3.432	0.0	1168
2880 min Winter	2.730	0.0	1528
4320 min Winter	1.973	0.0	2220
5760 min Winter	1.566	0.0	2944
7200 min Winter	1.308	0.0	3672
8640 min Winter	1.129	0.0	4400
10080 min Winter	0.998	0.0	5136

.	Bristol Airport 12 mppa
.	Cogloop 2 Car Park- A5
.	Q100 +30%
Date 12/11/2018	Designed by RJH
File Cog A5.SRCX	Checked by



Innovyze Source Control 2018.1

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	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.237

Time (mins) Area	Time (mins) Area	Time (mins) Area	Time (mins) Area
From: To: (ha)	From: To: (ha)	From: To: (ha)	From: To: (ha)
0 4 0.059	4 8 0.059	8 12 0.059	12 16 0.060

Time Area Diagram

Total Area (ha) 0.000

Time (mins) Area
From: To: (ha)
0 4 0.000

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Date 12/11/2018
File Cog A5.SRCX

Bristol Airport 12 mppa
Cogloop 2 Car Park- A5
Q100 +30%

Designed by RJH
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Innovyze

Source Control 2018.1

Model Details

Storage is Online Cover Level (m) 179.250

Complex Structure

Infiltration Trench

Infiltration Coefficient Base (m/hr)	0.12048	Trench Width (m)	1.8
Infiltration Coefficient Side (m/hr)	0.12048	Trench Length (m)	121.5
Safety Factor	2.0	Slope (1:X)	200.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	177.750	Cap Infiltration Depth (m)	0.000

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.12048	Width (m)	12.5
Membrane Percolation (mm/hr)	1000	Length (m)	121.5
Max Percolation (l/s)	421.9	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	178.800	Membrane Depth (m)	0

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A6
Q100 +30%



Date 12/11/2018
File Cog A6.SRCX

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

Half Drain Time : 62 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	177.213	0.913	5.6	37.6	O K
30 min Summer	177.419	1.119	8.7	51.0	O K
60 min Summer	177.492	1.192	11.4	59.9	O K
120 min Summer	177.520	1.220	12.4	64.2	Flood Risk
180 min Summer	177.520	1.220	12.5	64.2	Flood Risk
240 min Summer	177.511	1.211	12.1	62.7	Flood Risk
360 min Summer	177.487	1.187	11.2	59.2	O K
480 min Summer	177.461	1.161	10.3	55.8	O K
600 min Summer	177.437	1.137	9.4	52.9	O K
720 min Summer	177.413	1.113	8.5	50.4	O K
960 min Summer	177.365	1.065	6.3	46.5	O K
1440 min Summer	177.175	0.875	5.5	35.3	O K
2160 min Summer	176.979	0.679	4.8	23.9	O K
2880 min Summer	176.858	0.558	4.3	16.8	O K
4320 min Summer	176.748	0.448	3.4	10.8	O K
5760 min Summer	176.678	0.378	2.8	7.7	O K
7200 min Summer	176.627	0.327	2.3	5.8	O K
8640 min Summer	176.589	0.289	2.0	4.5	O K
10080 min Summer	176.559	0.259	1.8	3.6	O K
15 min Winter	177.316	1.016	6.0	43.6	O K
30 min Winter	177.478	1.178	10.9	57.9	O K
60 min Winter	177.542	1.242	13.3	67.8	Flood Risk
120 min Winter	177.561	1.261	14.0	71.3	Flood Risk
180 min Winter	177.552	1.252	13.6	69.7	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	124.836	0.0	27
30 min Summer	83.061	0.0	38
60 min Summer	52.662	0.0	58
120 min Summer	32.210	0.0	90
180 min Summer	23.799	0.0	124
240 min Summer	19.065	0.0	156
360 min Summer	13.962	0.0	222
480 min Summer	11.178	0.0	288
600 min Summer	9.399	0.0	352
720 min Summer	8.153	0.0	418
960 min Summer	6.510	0.0	560
1440 min Summer	4.731	0.0	810
2160 min Summer	3.432	0.0	1168
2880 min Summer	2.730	0.0	1508
4320 min Summer	1.973	0.0	2216
5760 min Summer	1.566	0.0	2944
7200 min Summer	1.308	0.0	3672
8640 min Summer	1.129	0.0	4408
10080 min Summer	0.998	0.0	5136
15 min Winter	124.836	0.0	27
30 min Winter	83.061	0.0	37
60 min Winter	52.662	0.0	58
120 min Winter	32.210	0.0	94
180 min Winter	23.799	0.0	130

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A6
Q100 +30%



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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 (m ³)	Status
240 min Winter	177.535	1.235	13.0	66.7	Flood Risk
360 min Winter	177.500	1.200	11.7	61.0	O K
480 min Winter	177.465	1.165	10.4	56.3	O K
600 min Winter	177.434	1.134	9.3	52.7	O K
720 min Winter	177.406	1.106	8.2	49.8	O K
960 min Winter	177.322	1.022	6.0	43.9	O K
1440 min Winter	177.071	0.771	5.1	29.2	O K
2160 min Winter	176.848	0.548	4.3	16.2	O K
2880 min Winter	176.761	0.461	3.5	11.5	O K
4320 min Winter	176.654	0.354	2.6	6.8	O K
5760 min Winter	176.590	0.290	2.0	4.5	O K
7200 min Winter	176.546	0.246	1.7	3.3	O K
8640 min Winter	176.515	0.215	1.5	2.5	O K
10080 min Winter	176.491	0.191	1.3	2.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
240 min Winter	19.065	0.0	166
360 min Winter	13.962	0.0	234
480 min Winter	11.178	0.0	300
600 min Winter	9.399	0.0	366
720 min Winter	8.153	0.0	434
960 min Winter	6.510	0.0	592
1440 min Winter	4.731	0.0	840
2160 min Winter	3.432	0.0	1172
2880 min Winter	2.730	0.0	1524
4320 min Winter	1.973	0.0	2220
5760 min Winter	1.566	0.0	2944
7200 min Winter	1.308	0.0	3672
8640 min Winter	1.129	0.0	4400
10080 min Winter	0.998	0.0	5136

.	Bristol Airport 12 mppa
.	Cogloop 2 Car Park- A6
.	Q100 +30%
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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	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.230

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
From:	To:	From:	To:	From:	To:	From:	To:
0	4	4	8	8	12	12	16
	0.058		0.058		0.057		0.057

Time Area Diagram

Total Area (ha) 0.000

Time (mins)	Area (ha)
From:	To:
0	4
	0.000

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A6
Q100 +30%



Date 12/11/2018
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Source Control 2018.1

Model Details

Storage is Online Cover Level (m) 177.800

Complex Structure

Infiltration Trench

Infiltration Coefficient Base (m/hr)	0.12048	Trench Width (m)	1.8
Infiltration Coefficient Side (m/hr)	0.12048	Trench Length (m)	108.3
Safety Factor	2.0	Slope (1:X)	200.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	176.300	Cap Infiltration Depth (m)	0.000

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.12048	Width (m)	20.0
Membrane Percolation (mm/hr)	1000	Length (m)	111.5
Max Percolation (l/s)	619.4	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	177.350	Membrane Depth (m)	0

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A7
Q30 +30%



Date 12/11/2018
File Cog A7.SRCX

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Source Control 2018.1

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

Half Drain Time : 59 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	175.481	0.881	4.9	32.9	O K
30 min Summer	175.701	1.101	7.5	45.0	O K
60 min Summer	175.772	1.172	10.2	52.6	O K
120 min Summer	175.799	1.199	11.3	56.2	O K
180 min Summer	175.799	1.199	11.3	56.2	O K
240 min Summer	175.790	1.190	10.9	55.0	O K
360 min Summer	175.768	1.168	10.1	52.0	O K
480 min Summer	175.744	1.144	9.2	49.2	O K
600 min Summer	175.721	1.121	8.3	46.8	O K
720 min Summer	175.700	1.100	7.4	44.9	O K
960 min Summer	175.639	1.039	5.4	41.0	O K
1440 min Summer	175.443	0.843	4.8	31.0	O K
2160 min Summer	175.243	0.643	4.2	20.8	O K
2880 min Summer	175.117	0.517	3.8	14.3	O K
4320 min Summer	175.005	0.405	3.0	8.9	O K
5760 min Summer	174.940	0.340	2.4	6.3	O K
7200 min Summer	174.894	0.294	2.1	4.7	O K
8640 min Summer	174.859	0.259	1.8	3.6	O K
10080 min Summer	174.831	0.231	1.6	2.9	O K
15 min Winter	175.585	0.985	5.3	38.2	O K
30 min Winter	175.759	1.159	9.7	50.9	O K
60 min Winter	175.819	1.219	12.1	59.4	Flood Risk
120 min Winter	175.837	1.237	12.8	62.3	Flood Risk
180 min Winter	175.828	1.228	12.5	60.9	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	124.836	0.0	27
30 min Summer	83.061	0.0	38
60 min Summer	52.662	0.0	58
120 min Summer	32.210	0.0	90
180 min Summer	23.799	0.0	122
240 min Summer	19.065	0.0	156
360 min Summer	13.962	0.0	222
480 min Summer	11.178	0.0	288
600 min Summer	9.399	0.0	352
720 min Summer	8.153	0.0	418
960 min Summer	6.510	0.0	564
1440 min Summer	4.731	0.0	812
2160 min Summer	3.432	0.0	1172
2880 min Summer	2.730	0.0	1512
4320 min Summer	1.973	0.0	2216
5760 min Summer	1.566	0.0	2944
7200 min Summer	1.308	0.0	3672
8640 min Summer	1.129	0.0	4408
10080 min Summer	0.998	0.0	5136
15 min Winter	124.836	0.0	27
30 min Winter	83.061	0.0	37
60 min Winter	52.662	0.0	58
120 min Winter	32.210	0.0	94
180 min Winter	23.799	0.0	130

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A7
Q30 +30%



Date 12/11/2018
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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 (m ³)	Status
240 min Winter	175.812	1.212	11.8	58.3	Flood Risk
360 min Winter	175.779	1.179	10.5	53.5	O K
480 min Winter	175.748	1.148	9.3	49.7	O K
600 min Winter	175.720	1.120	8.2	46.7	O K
720 min Winter	175.696	1.096	7.2	44.6	O K
960 min Winter	175.594	0.994	5.3	38.7	O K
1440 min Winter	175.340	0.740	4.5	25.7	O K
2160 min Winter	175.106	0.506	3.7	13.8	O K
2880 min Winter	175.017	0.417	3.1	9.4	O K
4320 min Winter	174.918	0.318	2.3	5.5	O K
5760 min Winter	174.860	0.260	1.8	3.6	O K
7200 min Winter	174.820	0.220	1.5	2.6	O K
8640 min Winter	174.791	0.191	1.3	2.0	O K
10080 min Winter	174.770	0.170	1.1	1.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
240 min Winter	19.065	0.0	164
360 min Winter	13.962	0.0	232
480 min Winter	11.178	0.0	298
600 min Winter	9.399	0.0	366
720 min Winter	8.153	0.0	436
960 min Winter	6.510	0.0	592
1440 min Winter	4.731	0.0	842
2160 min Winter	3.432	0.0	1180
2880 min Winter	2.730	0.0	1512
4320 min Winter	1.973	0.0	2216
5760 min Winter	1.566	0.0	2944
7200 min Winter	1.308	0.0	3672
8640 min Winter	1.129	0.0	4408
10080 min Winter	0.998	0.0	5136

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Bristol Airport 12 mppa
 Cogloop 2 Car Park- A7
 Q30 +30%



Date 12/11/2018
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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	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.203

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
From:	To:	From:	To:	From:	To:	From:	To:
0	4	4	8	8	12	12	16
	0.051		0.051		0.051		0.050

Time Area Diagram

Total Area (ha) 0.000

Time (mins)	Area (ha)
From:	To:
0	4
	0.000

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A7
Q30 +30%

Date 12/11/2018
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Model Details

Storage is Online Cover Level (m) 176.100

Complex Structure

Infiltration Trench

Infiltration Coefficient Base (m/hr)	0.12048	Trench Width (m)	1.8
Infiltration Coefficient Side (m/hr)	0.12048	Trench Length (m)	94.5
Safety Factor	2.0	Slope (1:X)	200.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	174.600	Cap Infiltration Depth (m)	0.000

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.12048	Width (m)	21.5
Membrane Percolation (mm/hr)	1000	Length (m)	94.5
Max Percolation (l/s)	564.4	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	175.650	Membrane Depth (m)	0

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A8
Q100 +30%



Date 12/11/2018
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Source Control 2018.1

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

Half Drain Time : 76 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	174.192	0.592	3.8	17.8	O K
30 min Summer	174.330	0.730	4.3	24.6	O K
60 min Summer	174.438	0.838	4.6	29.8	O K
120 min Summer	174.485	0.885	4.7	32.1	O K
180 min Summer	174.482	0.882	4.7	31.9	O K
240 min Summer	174.460	0.860	4.7	30.8	O K
360 min Summer	174.405	0.805	4.5	28.2	O K
480 min Summer	174.348	0.748	4.3	25.4	O K
600 min Summer	174.295	0.695	4.2	22.9	O K
720 min Summer	174.247	0.647	4.0	20.5	O K
960 min Summer	174.167	0.567	3.8	16.6	O K
1440 min Summer	174.058	0.458	3.4	11.3	O K
2160 min Summer	173.978	0.378	2.8	7.7	O K
2880 min Summer	173.923	0.323	2.3	5.6	O K
4320 min Summer	173.854	0.254	1.8	3.5	O K
5760 min Summer	173.809	0.209	1.4	2.4	O K
7200 min Summer	173.778	0.178	1.2	1.7	O K
8640 min Summer	173.755	0.155	1.0	1.3	O K
10080 min Summer	173.738	0.138	0.9	1.0	O K
15 min Winter	174.252	0.652	4.0	20.8	O K
30 min Winter	174.410	0.810	4.5	28.5	O K
60 min Winter	174.533	0.933	4.9	34.4	O K
120 min Winter	174.577	0.977	5.0	36.6	O K
180 min Winter	174.561	0.961	5.0	35.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	124.836	0.0	26
30 min Summer	83.061	0.0	38
60 min Summer	52.662	0.0	62
120 min Summer	32.210	0.0	94
180 min Summer	23.799	0.0	128
240 min Summer	19.065	0.0	162
360 min Summer	13.962	0.0	230
480 min Summer	11.178	0.0	296
600 min Summer	9.399	0.0	360
720 min Summer	8.153	0.0	422
960 min Summer	6.510	0.0	544
1440 min Summer	4.731	0.0	776
2160 min Summer	3.432	0.0	1132
2880 min Summer	2.730	0.0	1484
4320 min Summer	1.973	0.0	2208
5760 min Summer	1.566	0.0	2936
7200 min Summer	1.308	0.0	3672
8640 min Summer	1.129	0.0	4400
10080 min Summer	0.998	0.0	5096
15 min Winter	124.836	0.0	27
30 min Winter	83.061	0.0	38
60 min Winter	52.662	0.0	62
120 min Winter	32.210	0.0	100
180 min Winter	23.799	0.0	138

.	Bristol Airport 12 mppa	
.	Cogloop 2 Car Park- A8	
.	Q100 +30%	
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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 (m ³)	Status
240 min Winter	174.522	0.922	4.9	33.9	O K
360 min Winter	174.436	0.836	4.6	29.7	O K
480 min Winter	174.352	0.752	4.3	25.6	O K
600 min Winter	174.276	0.676	4.1	21.9	O K
720 min Winter	174.210	0.610	3.9	18.7	O K
960 min Winter	174.105	0.505	3.6	13.6	O K
1440 min Winter	173.998	0.398	2.9	8.5	O K
2160 min Winter	173.912	0.312	2.2	5.2	O K
2880 min Winter	173.858	0.258	1.8	3.6	O K
4320 min Winter	173.793	0.193	1.3	2.0	O K
5760 min Winter	173.755	0.155	1.0	1.3	O K
7200 min Winter	173.731	0.131	0.8	0.9	O K
8640 min Winter	173.713	0.113	0.7	0.7	O K
10080 min Winter	173.700	0.100	0.6	0.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
240 min Winter	19.065	0.0	174
360 min Winter	13.962	0.0	246
480 min Winter	11.178	0.0	314
600 min Winter	9.399	0.0	380
720 min Winter	8.153	0.0	442
960 min Winter	6.510	0.0	560
1440 min Winter	4.731	0.0	788
2160 min Winter	3.432	0.0	1144
2880 min Winter	2.730	0.0	1500
4320 min Winter	1.973	0.0	2212
5760 min Winter	1.566	0.0	2936
7200 min Winter	1.308	0.0	3640
8640 min Winter	1.129	0.0	4384
10080 min Winter	0.998	0.0	5136

.	Bristol Airport 12 mppa
.	Cogloop 2 Car Park- A8
.	Q100 +30%
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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	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.115

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
From:	To:	From:	To:	From:	To:	From:	To:
0	4	4	8	8	12	12	16
	0.029		0.029		0.029		0.028

Time Area Diagram

Total Area (ha) 0.000

Time (mins)	Area (ha)
From:	To:
0	4
	0.000

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A8
Q100 +30%

Date 12/11/2018
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Source Control 2018.1

Model Details

Storage is Online Cover Level (m) 175.100

Complex Structure

Infiltration Trench

Infiltration Coefficient Base (m/hr)	0.12048	Trench Width (m)	1.8
Infiltration Coefficient Side (m/hr)	0.12048	Trench Length (m)	90.0
Safety Factor	2.0	Slope (1:X)	200.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	173.600	Cap Infiltration Depth (m)	0.000

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.12048	Width (m)	12.8
Membrane Percolation (mm/hr)	1000	Length (m)	90.0
Max Percolation (l/s)	320.0	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	174.650	Membrane Depth (m)	0

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A9
Q100 +30%



Date 12/11/2018
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Innovyze

Source Control 2018.1

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

Half Drain Time : 67 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	173.537	0.637	3.9	19.8	O K
30 min Summer	173.656	0.756	4.2	25.4	O K
60 min Summer	173.734	0.834	4.5	29.1	O K
120 min Summer	173.751	0.851	4.5	29.9	O K
180 min Summer	173.731	0.831	4.5	29.0	O K
240 min Summer	173.698	0.798	4.4	27.4	O K
360 min Summer	173.636	0.736	4.2	24.5	O K
480 min Summer	173.579	0.679	4.0	21.8	O K
600 min Summer	173.529	0.629	3.9	19.4	O K
720 min Summer	173.485	0.585	3.7	17.3	O K
960 min Summer	173.412	0.512	3.5	13.9	O K
1440 min Summer	173.322	0.422	3.1	9.6	O K
2160 min Summer	173.248	0.348	2.5	6.5	O K
2880 min Summer	173.197	0.297	2.1	4.8	O K
4320 min Summer	173.133	0.233	1.6	2.9	O K
5760 min Summer	173.093	0.193	1.3	2.0	O K
7200 min Summer	173.064	0.164	1.1	1.5	O K
8640 min Summer	173.044	0.144	0.9	1.1	O K
10080 min Summer	173.028	0.128	0.8	0.9	O K
15 min Winter	173.592	0.692	4.1	22.4	O K
30 min Winter	173.728	0.828	4.5	28.8	O K
60 min Winter	173.822	0.922	4.7	33.3	O K
120 min Winter	173.836	0.936	4.8	33.9	O K
180 min Winter	173.802	0.902	4.7	32.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	124.836	0.0	26
30 min Summer	83.061	0.0	37
60 min Summer	52.662	0.0	60
120 min Summer	32.210	0.0	94
180 min Summer	23.799	0.0	128
240 min Summer	19.065	0.0	162
360 min Summer	13.962	0.0	228
480 min Summer	11.178	0.0	294
600 min Summer	9.399	0.0	358
720 min Summer	8.153	0.0	420
960 min Summer	6.510	0.0	540
1440 min Summer	4.731	0.0	772
2160 min Summer	3.432	0.0	1132
2880 min Summer	2.730	0.0	1484
4320 min Summer	1.973	0.0	2208
5760 min Summer	1.566	0.0	2936
7200 min Summer	1.308	0.0	3672
8640 min Summer	1.129	0.0	4400
10080 min Summer	0.998	0.0	5080
15 min Winter	124.836	0.0	26
30 min Winter	83.061	0.0	38
60 min Winter	52.662	0.0	62
120 min Winter	32.210	0.0	100
180 min Winter	23.799	0.0	136

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A9
Q100 +30%



Date 12/11/2018
File Cog A9.SRCX

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Source Control 2018.1

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
240 min Winter	173.754	0.854	4.5	30.1	O K
360 min Winter	173.661	0.761	4.3	25.6	O K
480 min Winter	173.577	0.677	4.0	21.7	O K
600 min Winter	173.506	0.606	3.8	18.3	O K
720 min Winter	173.445	0.545	3.6	15.4	O K
960 min Winter	173.353	0.453	3.3	11.1	O K
1440 min Winter	173.265	0.365	2.7	7.2	O K
2160 min Winter	173.186	0.286	2.0	4.4	O K
2880 min Winter	173.136	0.236	1.6	3.0	O K
4320 min Winter	173.078	0.178	1.2	1.7	O K
5760 min Winter	173.044	0.144	0.9	1.1	O K
7200 min Winter	173.022	0.122	0.8	0.8	O K
8640 min Winter	173.006	0.106	0.7	0.6	O K
10080 min Winter	172.994	0.094	0.6	0.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
240 min Winter	19.065	0.0	174
360 min Winter	13.962	0.0	244
480 min Winter	11.178	0.0	312
600 min Winter	9.399	0.0	376
720 min Winter	8.153	0.0	438
960 min Winter	6.510	0.0	550
1440 min Winter	4.731	0.0	784
2160 min Winter	3.432	0.0	1136
2880 min Winter	2.730	0.0	1500
4320 min Winter	1.973	0.0	2208
5760 min Winter	1.566	0.0	2920
7200 min Winter	1.308	0.0	3672
8640 min Winter	1.129	0.0	4320
10080 min Winter	0.998	0.0	5136

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A9
Q100 +30%

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Source Control 2018.1

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	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.102

Time (mins) Area	Time (mins) Area	Time (mins) Area	Time (mins) Area
From: To: (ha)	From: To: (ha)	From: To: (ha)	From: To: (ha)
0 4 0.026	4 8 0.026	8 12 0.025	12 16 0.025

Time Area Diagram

Total Area (ha) 0.000

Time (mins) Area
From: To: (ha)
0 4 0.000

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A9
Q100 +30%



Date 12/11/2018
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Model Details

Storage is Online Cover Level (m) 174.400

Infiltration Trench Structure

Infiltration Coefficient Base (m/hr) 0.12048 Trench Width (m) 1.8
Infiltration Coefficient Side (m/hr) 0.12048 Trench Length (m) 87.7
Safety Factor 2.0 Slope (1:X) 200.0
Porosity 0.30 Cap Volume Depth (m) 0.000
Invert Level (m) 172.900 Cap Infiltration Depth (m) 0.000

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A10
Q100 +30%



Date 12/11/2018
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Source Control 2018.1

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

Half Drain Time : 84 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	181.123	0.623	1.1	6.9	O K
30 min Summer	181.281	0.781	1.3	8.8	O K
60 min Summer	181.384	0.884	1.4	10.1	O K
120 min Summer	181.409	0.909	1.4	10.4	O K
180 min Summer	181.385	0.885	1.4	10.1	O K
240 min Summer	181.346	0.846	1.3	9.6	O K
360 min Summer	181.272	0.772	1.3	8.7	O K
480 min Summer	181.204	0.704	1.2	7.9	O K
600 min Summer	181.142	0.642	1.2	7.1	O K
720 min Summer	181.085	0.585	1.1	6.4	O K
960 min Summer	180.986	0.486	1.0	5.2	O K
1440 min Summer	180.838	0.338	0.9	3.4	O K
2160 min Summer	180.696	0.196	0.8	1.7	O K
2880 min Summer	180.622	0.122	0.7	0.8	O K
4320 min Summer	180.588	0.088	0.6	0.4	O K
5760 min Summer	180.571	0.071	0.4	0.3	O K
7200 min Summer	180.560	0.060	0.4	0.2	O K
8640 min Summer	180.552	0.052	0.3	0.1	O K
10080 min Summer	180.548	0.048	0.3	0.1	O K
15 min Winter	181.200	0.700	1.2	7.8	O K
30 min Winter	181.383	0.883	1.3	10.0	O K
60 min Winter	181.509	1.009	1.5	11.6	O K
120 min Winter	181.534	1.034	1.5	11.9	O K
180 min Winter	181.498	0.998	1.4	11.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	124.836	0.0	20
30 min Summer	83.061	0.0	33
60 min Summer	52.662	0.0	60
120 min Summer	32.210	0.0	92
180 min Summer	23.799	0.0	126
240 min Summer	19.065	0.0	160
360 min Summer	13.962	0.0	228
480 min Summer	11.178	0.0	296
600 min Summer	9.399	0.0	362
720 min Summer	8.153	0.0	426
960 min Summer	6.510	0.0	552
1440 min Summer	4.731	0.0	796
2160 min Summer	3.432	0.0	1148
2880 min Summer	2.730	0.0	1476
4320 min Summer	1.973	0.0	2200
5760 min Summer	1.566	0.0	2912
7200 min Summer	1.308	0.0	3656
8640 min Summer	1.129	0.0	4400
10080 min Summer	0.998	0.0	5048
15 min Winter	124.836	0.0	20
30 min Winter	83.061	0.0	33
60 min Winter	52.662	0.0	60
120 min Winter	32.210	0.0	96
180 min Winter	23.799	0.0	134

.	Bristol Airport 12 mppa	
.	Cogloop 2 Car Park- A10	
.	Q100 +30%	
Date 12/11/2018	Designed by RJH	
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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 (m ³)	Status
240 min Winter	181.441	0.941	1.4	10.8	O K
360 min Winter	181.331	0.831	1.3	9.4	O K
480 min Winter	181.230	0.730	1.2	8.2	O K
600 min Winter	181.141	0.641	1.2	7.1	O K
720 min Winter	181.062	0.562	1.1	6.1	O K
960 min Winter	180.930	0.430	1.0	4.5	O K
1440 min Winter	180.742	0.242	0.8	2.3	O K
2160 min Winter	180.609	0.109	0.7	0.6	O K
2880 min Winter	180.588	0.088	0.6	0.4	O K
4320 min Winter	180.565	0.065	0.4	0.2	O K
5760 min Winter	180.552	0.052	0.3	0.1	O K
7200 min Winter	180.547	0.047	0.3	0.1	O K
8640 min Winter	180.543	0.043	0.2	0.1	O K
10080 min Winter	180.541	0.041	0.2	0.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
240 min Winter	19.065	0.0	172
360 min Winter	13.962	0.0	246
480 min Winter	11.178	0.0	316
600 min Winter	9.399	0.0	384
720 min Winter	8.153	0.0	450
960 min Winter	6.510	0.0	578
1440 min Winter	4.731	0.0	820
2160 min Winter	3.432	0.0	1104
2880 min Winter	2.730	0.0	1468
4320 min Winter	1.973	0.0	2176
5760 min Winter	1.566	0.0	2936
7200 min Winter	1.308	0.0	3568
8640 min Winter	1.129	0.0	4368
10080 min Winter	0.998	0.0	5040

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A10
Q100 +30%



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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	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.035

Time (mins)		Area	Time (mins)		Area
From:	To:	(ha)	From:	To:	(ha)
0	4	0.018	4	8	0.017

Time Area Diagram

Total Area (ha) 0.000

Time (mins)		Area
From:	To:	(ha)
0	4	0.000

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A10
Q100 +30%



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Source Control 2018.1

Model Details

Storage is Online Cover Level (m) 182.000

Complex Structure

Infiltration Trench

Infiltration Coefficient Base (m/hr)	0.12048	Trench Width (m)	1.8
Infiltration Coefficient Side (m/hr)	0.12048	Trench Length (m)	22.5
Safety Factor	2.0	Slope (1:X)	200.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	180.500	Cap Infiltration Depth (m)	0.000

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.12048	Width (m)	3.5
Membrane Percolation (mm/hr)	1000	Length (m)	22.5
Max Percolation (l/s)	21.9	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	181.550	Membrane Depth (m)	0

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A11
Q100 +30%



Date 12/11/2018
File Cog All.SRCX

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Source Control 2018.1

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

Half Drain Time : 74 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	181.020	1.020	6.4	46.0	O K
30 min Summer	181.186	1.186	10.5	60.6	O K
60 min Summer	181.258	1.258	12.6	70.7	Flood Risk
120 min Summer	181.286	1.286	13.4	75.4	Flood Risk
180 min Summer	181.285	1.285	13.4	75.1	Flood Risk
240 min Summer	181.273	1.273	13.0	73.2	Flood Risk
360 min Summer	181.244	1.244	12.2	68.6	Flood Risk
480 min Summer	181.213	1.213	11.3	64.2	Flood Risk
600 min Summer	181.184	1.184	10.4	60.4	O K
720 min Summer	181.156	1.156	9.6	57.1	O K
960 min Summer	181.106	1.106	8.2	52.1	O K
1440 min Summer	180.952	0.952	6.1	41.7	O K
2160 min Summer	180.747	0.747	5.3	28.7	O K
2880 min Summer	180.617	0.617	4.8	20.5	O K
4320 min Summer	180.495	0.495	3.8	13.2	O K
5760 min Summer	180.420	0.420	3.1	9.5	O K
7200 min Summer	180.365	0.365	2.7	7.2	O K
8640 min Summer	180.324	0.324	2.3	5.7	O K
10080 min Summer	180.291	0.291	2.0	4.6	O K
15 min Winter	181.111	1.111	8.3	52.6	O K
30 min Winter	181.244	1.244	12.2	68.7	Flood Risk
60 min Winter	181.313	1.313	14.2	80.2	Flood Risk
120 min Winter	181.334	1.334	14.8	84.0	Flood Risk
180 min Winter	181.323	1.323	14.5	82.0	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	124.836	0.0	27
30 min Summer	83.061	0.0	37
60 min Summer	52.662	0.0	58
120 min Summer	32.210	0.0	90
180 min Summer	23.799	0.0	124
240 min Summer	19.065	0.0	158
360 min Summer	13.962	0.0	224
480 min Summer	11.178	0.0	290
600 min Summer	9.399	0.0	354
720 min Summer	8.153	0.0	418
960 min Summer	6.510	0.0	548
1440 min Summer	4.731	0.0	812
2160 min Summer	3.432	0.0	1172
2880 min Summer	2.730	0.0	1512
4320 min Summer	1.973	0.0	2216
5760 min Summer	1.566	0.0	2944
7200 min Summer	1.308	0.0	3672
8640 min Summer	1.129	0.0	4408
10080 min Summer	0.998	0.0	5136
15 min Winter	124.836	0.0	27
30 min Winter	83.061	0.0	37
60 min Winter	52.662	0.0	60
120 min Winter	32.210	0.0	96
180 min Winter	23.799	0.0	132

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A11
Q100 +30%



Date 12/11/2018
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Source Control 2018.1

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

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
240 min Winter	181.303	1.303	13.9	78.3	Flood Risk
360 min Winter	181.260	1.260	12.7	71.1	Flood Risk
480 min Winter	181.218	1.218	11.5	64.9	Flood Risk
600 min Winter	181.181	1.181	10.4	60.0	O K
720 min Winter	181.147	1.147	9.4	56.1	O K
960 min Winter	181.087	1.087	7.4	50.5	O K
1440 min Winter	180.849	0.849	5.7	35.1	O K
2160 min Winter	180.609	0.609	4.8	20.0	O K
2880 min Winter	180.512	0.512	4.0	14.1	O K
4320 min Winter	180.396	0.396	2.9	8.5	O K
5760 min Winter	180.326	0.326	2.3	5.7	O K
7200 min Winter	180.278	0.278	1.9	4.2	O K
8640 min Winter	180.243	0.243	1.7	3.2	O K
10080 min Winter	180.217	0.217	1.5	2.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
240 min Winter	19.065	0.0	168
360 min Winter	13.962	0.0	236
480 min Winter	11.178	0.0	302
600 min Winter	9.399	0.0	368
720 min Winter	8.153	0.0	434
960 min Winter	6.510	0.0	578
1440 min Winter	4.731	0.0	844
2160 min Winter	3.432	0.0	1180
2880 min Winter	2.730	0.0	1528
4320 min Winter	1.973	0.0	2248
5760 min Winter	1.566	0.0	2944
7200 min Winter	1.308	0.0	3672
8640 min Winter	1.129	0.0	4400
10080 min Winter	0.998	0.0	5136

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Date 12/11/2018
File Cog All.SRCX

Bristol Airport 12 mppa
Cogloop 2 Car Park- A11
Q100 +30%



Designed by RJH
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Innovyze Source Control 2018.1

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	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.260

Time (mins) Area	Time (mins) Area	Time (mins) Area	Time (mins) Area
From: To: (ha)	From: To: (ha)	From: To: (ha)	From: To: (ha)
0 4 0.065	4 8 0.065	8 12 0.065	12 16 0.065

Time Area Diagram

Total Area (ha) 0.000

Time (mins) Area
From: To: (ha)
0 4 0.000

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A11
Q100 +30%



Date 12/11/2018
File Cog A11.SRCX

Designed by RJH
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Innovyze Source Control 2018.1

Model Details

Storage is Online Cover Level (m) 181.500

Complex Structure

Infiltration Trench

Infiltration Coefficient Base (m/hr) 0.12048 Trench Width (m) 1.8
Infiltration Coefficient Side (m/hr) 0.12048 Trench Length (m) 117.0
Safety Factor 2.0 Slope (1:X) 200.0
Porosity 0.30 Cap Volume Depth (m) 0.000
Invert Level (m) 180.000 Cap Infiltration Depth (m) 0.000

Porous Car Park

Infiltration Coefficient Base (m/hr) 0.12048 Width (m) 15.1
Membrane Percolation (mm/hr) 1000 Length (m) 117.0
Max Percolation (l/s) 490.8 Slope (1:X) 100.0
Safety Factor 2.0 Depression Storage (mm) 5
Porosity 0.30 Evaporation (mm/day) 3
Invert Level (m) 181.050 Membrane Depth (m) 0

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A12
Q100 +30%



Date 12/11/2018
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Source Control 2018.1

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

Half Drain Time : 62 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	180.442	0.942	6.1	41.1	O K
30 min Summer	180.635	1.135	9.7	55.4	O K
60 min Summer	180.706	1.206	12.4	65.0	Flood Risk
120 min Summer	180.734	1.234	13.4	69.7	Flood Risk
180 min Summer	180.734	1.234	13.4	69.7	Flood Risk
240 min Summer	180.725	1.225	13.1	68.0	Flood Risk
360 min Summer	180.700	1.200	12.2	64.1	Flood Risk
480 min Summer	180.674	1.174	11.2	60.3	O K
600 min Summer	180.649	1.149	10.2	57.0	O K
720 min Summer	180.624	1.124	9.3	54.2	O K
960 min Summer	180.581	1.081	7.3	50.1	O K
1440 min Summer	180.404	0.904	6.0	38.6	O K
2160 min Summer	180.209	0.709	5.2	26.3	O K
2880 min Summer	180.090	0.590	4.7	18.8	O K
4320 min Summer	179.977	0.477	3.6	12.3	O K
5760 min Summer	179.903	0.403	3.0	8.8	O K
7200 min Summer	179.850	0.350	2.5	6.6	O K
8640 min Summer	179.809	0.309	2.2	5.2	O K
10080 min Summer	179.778	0.278	1.9	4.2	O K
15 min Winter	180.546	1.046	6.5	47.6	O K
30 min Winter	180.692	1.192	11.9	62.9	O K
60 min Winter	180.756	1.256	14.3	73.7	Flood Risk
120 min Winter	180.776	1.276	15.0	77.4	Flood Risk
180 min Winter	180.767	1.267	14.7	75.7	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	124.836	0.0	27
30 min Summer	83.061	0.0	37
60 min Summer	52.662	0.0	58
120 min Summer	32.210	0.0	90
180 min Summer	23.799	0.0	124
240 min Summer	19.065	0.0	156
360 min Summer	13.962	0.0	222
480 min Summer	11.178	0.0	288
600 min Summer	9.399	0.0	352
720 min Summer	8.153	0.0	418
960 min Summer	6.510	0.0	554
1440 min Summer	4.731	0.0	810
2160 min Summer	3.432	0.0	1168
2880 min Summer	2.730	0.0	1508
4320 min Summer	1.973	0.0	2216
5760 min Summer	1.566	0.0	2944
7200 min Summer	1.308	0.0	3672
8640 min Summer	1.129	0.0	4408
10080 min Summer	0.998	0.0	5136
15 min Winter	124.836	0.0	27
30 min Winter	83.061	0.0	37
60 min Winter	52.662	0.0	58
120 min Winter	32.210	0.0	94
180 min Winter	23.799	0.0	130

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A12
Q100 +30%



Date 12/11/2018
File Cog A12.SRCX

Designed by RJH
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Innovyze

Source Control 2018.1

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

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
240 min Winter	180.750	1.250	14.0	72.4	Flood Risk
360 min Winter	180.713	1.213	12.6	66.1	Flood Risk
480 min Winter	180.677	1.177	11.3	60.8	O K
600 min Winter	180.645	1.145	10.1	56.6	O K
720 min Winter	180.616	1.116	9.0	53.3	O K
960 min Winter	180.551	1.051	6.5	47.9	O K
1440 min Winter	180.300	0.800	5.5	32.0	O K
2160 min Winter	180.082	0.582	4.7	18.3	O K
2880 min Winter	179.992	0.492	3.8	13.1	O K
4320 min Winter	179.879	0.379	2.8	7.8	O K
5760 min Winter	179.811	0.311	2.2	5.2	O K
7200 min Winter	179.765	0.265	1.8	3.8	O K
8640 min Winter	179.731	0.231	1.6	2.9	O K
10080 min Winter	179.705	0.205	1.4	2.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
240 min Winter	19.065	0.0	166
360 min Winter	13.962	0.0	234
480 min Winter	11.178	0.0	300
600 min Winter	9.399	0.0	366
720 min Winter	8.153	0.0	434
960 min Winter	6.510	0.0	592
1440 min Winter	4.731	0.0	840
2160 min Winter	3.432	0.0	1168
2880 min Winter	2.730	0.0	1528
4320 min Winter	1.973	0.0	2244
5760 min Winter	1.566	0.0	2944
7200 min Winter	1.308	0.0	3672
8640 min Winter	1.129	0.0	4408
10080 min Winter	0.998	0.0	5136

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A12
Q100 +30%



Date 12/11/2018
File Cog A12.SRCX
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Innovyze Source Control 2018.1

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	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.249

Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)
0	4	0.062	4	8	0.062	8	12	0.062	12	16	0.063

Time Area Diagram

Total Area (ha) 0.000

Time (mins) From:	Time (mins) To:	Area (ha)
0	4	0.000

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A12
Q100 +30%



Date 12/11/2018
File Cog A12.SRCX

Designed by RJH
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Innovyze Source Control 2018.1

Model Details

Storage is Online Cover Level (m) 181.000

Complex Structure

Infiltration Trench

Infiltration Coefficient Base (m/hr) 0.12048 Trench Width (m) 1.8
Infiltration Coefficient Side (m/hr) 0.12048 Trench Length (m) 117.0
Safety Factor 2.0 Slope (1:X) 200.0
Porosity 0.30 Cap Volume Depth (m) 0.000
Invert Level (m) 179.500 Cap Infiltration Depth (m) 0.000

Porous Car Park

Infiltration Coefficient Base (m/hr) 0.12048 Width (m) 20.0
Membrane Percolation (mm/hr) 1000 Length (m) 117.0
Max Percolation (l/s) 650.0 Slope (1:X) 100.0
Safety Factor 2.0 Depression Storage (mm) 5
Porosity 0.30 Evaporation (mm/day) 3
Invert Level (m) 180.550 Membrane Depth (m) 0

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A13
Q100 +30%



Date 12/11/2018
File Cog A13.SRCX

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Innovyze

Source Control 2018.1

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

Half Drain Time : 62 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	180.442	0.942	6.1	41.1	O K
30 min Summer	180.635	1.135	9.7	55.4	O K
60 min Summer	180.706	1.206	12.4	65.0	Flood Risk
120 min Summer	180.734	1.234	13.4	69.7	Flood Risk
180 min Summer	180.734	1.234	13.4	69.7	Flood Risk
240 min Summer	180.725	1.225	13.1	68.0	Flood Risk
360 min Summer	180.700	1.200	12.2	64.1	Flood Risk
480 min Summer	180.674	1.174	11.2	60.3	O K
600 min Summer	180.649	1.149	10.2	57.0	O K
720 min Summer	180.624	1.124	9.3	54.2	O K
960 min Summer	180.581	1.081	7.3	50.1	O K
1440 min Summer	180.404	0.904	6.0	38.6	O K
2160 min Summer	180.209	0.709	5.2	26.3	O K
2880 min Summer	180.090	0.590	4.7	18.8	O K
4320 min Summer	179.977	0.477	3.6	12.3	O K
5760 min Summer	179.903	0.403	3.0	8.8	O K
7200 min Summer	179.850	0.350	2.5	6.6	O K
8640 min Summer	179.809	0.309	2.2	5.2	O K
10080 min Summer	179.778	0.278	1.9	4.2	O K
15 min Winter	180.546	1.046	6.5	47.6	O K
30 min Winter	180.692	1.192	11.9	62.9	O K
60 min Winter	180.756	1.256	14.3	73.7	Flood Risk
120 min Winter	180.776	1.276	15.0	77.4	Flood Risk
180 min Winter	180.767	1.267	14.7	75.7	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	124.836	0.0	27
30 min Summer	83.061	0.0	37
60 min Summer	52.662	0.0	58
120 min Summer	32.210	0.0	90
180 min Summer	23.799	0.0	124
240 min Summer	19.065	0.0	156
360 min Summer	13.962	0.0	222
480 min Summer	11.178	0.0	288
600 min Summer	9.399	0.0	352
720 min Summer	8.153	0.0	418
960 min Summer	6.510	0.0	554
1440 min Summer	4.731	0.0	810
2160 min Summer	3.432	0.0	1168
2880 min Summer	2.730	0.0	1508
4320 min Summer	1.973	0.0	2216
5760 min Summer	1.566	0.0	2944
7200 min Summer	1.308	0.0	3672
8640 min Summer	1.129	0.0	4408
10080 min Summer	0.998	0.0	5136
15 min Winter	124.836	0.0	27
30 min Winter	83.061	0.0	37
60 min Winter	52.662	0.0	58
120 min Winter	32.210	0.0	94
180 min Winter	23.799	0.0	130

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Date 12/11/2018
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Bristol Airport 12 mppa
Cogloop 2 Car Park- A13
Q100 +30%



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Innovyze

Source Control 2018.1

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
240 min Winter	180.750	1.250	14.0	72.4	Flood Risk
360 min Winter	180.713	1.213	12.6	66.1	Flood Risk
480 min Winter	180.677	1.177	11.3	60.8	O K
600 min Winter	180.645	1.145	10.1	56.6	O K
720 min Winter	180.616	1.116	9.0	53.3	O K
960 min Winter	180.551	1.051	6.5	47.9	O K
1440 min Winter	180.300	0.800	5.5	32.0	O K
2160 min Winter	180.082	0.582	4.7	18.3	O K
2880 min Winter	179.992	0.492	3.8	13.1	O K
4320 min Winter	179.879	0.379	2.8	7.8	O K
5760 min Winter	179.811	0.311	2.2	5.2	O K
7200 min Winter	179.765	0.265	1.8	3.8	O K
8640 min Winter	179.731	0.231	1.6	2.9	O K
10080 min Winter	179.705	0.205	1.4	2.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
240 min Winter	19.065	0.0	166
360 min Winter	13.962	0.0	234
480 min Winter	11.178	0.0	300
600 min Winter	9.399	0.0	366
720 min Winter	8.153	0.0	434
960 min Winter	6.510	0.0	592
1440 min Winter	4.731	0.0	840
2160 min Winter	3.432	0.0	1168
2880 min Winter	2.730	0.0	1528
4320 min Winter	1.973	0.0	2244
5760 min Winter	1.566	0.0	2944
7200 min Winter	1.308	0.0	3672
8640 min Winter	1.129	0.0	4408
10080 min Winter	0.998	0.0	5136

.	Bristol Airport 12 mppa
.	Cogloop 2 Car Park- A13
.	Q100 +30%
Date 12/11/2018	Designed by RJH
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Innovyze Source Control 2018.1

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	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.249

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
From:	To:	From:	To:	From:	To:	From:	To:
0	4	4	8	8	12	12	16
	0.062		0.062		0.062		0.063

Time Area Diagram

Total Area (ha) 0.000

Time (mins)	Area (ha)
From:	To:
0	4
	0.000

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A13
Q100 +30%



Date 12/11/2018
File Cog A13.SRCX

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Innovyze

Source Control 2018.1

Model Details

Storage is Online Cover Level (m) 181.000

Complex Structure

Infiltration Trench

Infiltration Coefficient Base (m/hr)	0.12048	Trench Width (m)	1.8
Infiltration Coefficient Side (m/hr)	0.12048	Trench Length (m)	117.0
Safety Factor	2.0	Slope (1:X)	200.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	179.500	Cap Infiltration Depth (m)	0.000

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.12048	Width (m)	20.0
Membrane Percolation (mm/hr)	1000	Length (m)	117.0
Max Percolation (l/s)	650.0	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	180.550	Membrane Depth (m)	0

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A14
Q100 +30%



Date 12/11/2018
File Cog A14.SRCX

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Innovyze

Source Control 2018.1

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

Half Drain Time : 76 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	177.983	0.983	6.3	43.6	O K
30 min Summer	178.165	1.165	9.4	57.6	O K
60 min Summer	178.244	1.244	11.4	67.2	Flood Risk
120 min Summer	178.274	1.274	12.1	71.4	Flood Risk
180 min Summer	178.272	1.272	12.1	71.1	Flood Risk
240 min Summer	178.259	1.259	11.7	69.3	Flood Risk
360 min Summer	178.228	1.228	11.0	65.0	Flood Risk
480 min Summer	178.194	1.194	10.1	60.8	O K
600 min Summer	178.161	1.161	9.3	57.2	O K
720 min Summer	178.130	1.130	8.5	54.2	O K
960 min Summer	178.069	1.069	6.8	49.2	O K
1440 min Summer	177.884	0.884	5.9	37.3	O K
2160 min Summer	177.694	0.694	5.1	25.4	O K
2880 min Summer	177.582	0.582	4.7	18.3	O K
4320 min Summer	177.470	0.470	3.6	11.9	O K
5760 min Summer	177.398	0.398	2.9	8.6	O K
7200 min Summer	177.346	0.346	2.5	6.5	O K
8640 min Summer	177.306	0.306	2.2	5.1	O K
10080 min Summer	177.275	0.275	1.9	4.1	O K
15 min Winter	178.081	1.081	7.1	50.0	O K
30 min Winter	178.229	1.229	11.0	65.2	Flood Risk
60 min Winter	178.305	1.305	12.9	76.2	Flood Risk
120 min Winter	178.327	1.327	13.4	79.7	Flood Risk
180 min Winter	178.316	1.316	13.2	77.9	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	124.836	0.0	27
30 min Summer	83.061	0.0	37
60 min Summer	52.662	0.0	58
120 min Summer	32.210	0.0	92
180 min Summer	23.799	0.0	124
240 min Summer	19.065	0.0	158
360 min Summer	13.962	0.0	226
480 min Summer	11.178	0.0	292
600 min Summer	9.399	0.0	356
720 min Summer	8.153	0.0	422
960 min Summer	6.510	0.0	560
1440 min Summer	4.731	0.0	808
2160 min Summer	3.432	0.0	1168
2880 min Summer	2.730	0.0	1508
4320 min Summer	1.973	0.0	2216
5760 min Summer	1.566	0.0	2944
7200 min Summer	1.308	0.0	3672
8640 min Summer	1.129	0.0	4408
10080 min Summer	0.998	0.0	5136
15 min Winter	124.836	0.0	27
30 min Winter	83.061	0.0	38
60 min Winter	52.662	0.0	60
120 min Winter	32.210	0.0	96
180 min Winter	23.799	0.0	132

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A14
Q100 +30%



Date 12/11/2018
File Cog A14.SRCX

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Innovyze

Source Control 2018.1

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

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
240 min Winter	178.294	1.294	12.6	74.5	Flood Risk
360 min Winter	178.248	1.248	11.5	67.7	Flood Risk
480 min Winter	178.203	1.203	10.4	61.9	Flood Risk
600 min Winter	178.161	1.161	9.3	57.2	O K
720 min Winter	178.123	1.123	8.3	53.5	O K
960 min Winter	178.025	1.025	6.4	46.3	O K
1440 min Winter	177.780	0.780	5.5	30.8	O K
2160 min Winter	177.574	0.574	4.6	17.8	O K
2880 min Winter	177.485	0.485	3.7	12.7	O K
4320 min Winter	177.375	0.375	2.7	7.6	O K
5760 min Winter	177.308	0.308	2.2	5.1	O K
7200 min Winter	177.263	0.263	1.8	3.7	O K
8640 min Winter	177.230	0.230	1.6	2.8	O K
10080 min Winter	177.205	0.205	1.4	2.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
240 min Winter	19.065	0.0	168
360 min Winter	13.962	0.0	238
480 min Winter	11.178	0.0	306
600 min Winter	9.399	0.0	372
720 min Winter	8.153	0.0	440
960 min Winter	6.510	0.0	590
1440 min Winter	4.731	0.0	838
2160 min Winter	3.432	0.0	1168
2880 min Winter	2.730	0.0	1528
4320 min Winter	1.973	0.0	2244
5760 min Winter	1.566	0.0	2944
7200 min Winter	1.308	0.0	3672
8640 min Winter	1.129	0.0	4400
10080 min Winter	0.998	0.0	5136

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A14
Q100 +30%



Date 12/11/2018
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Innovyze Source Control 2018.1

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	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.243

Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)
0	4	0.061	4	8	0.061	8	12	0.061	12	16	0.060

Time Area Diagram

Total Area (ha) 0.000

Time (mins) From:	Time (mins) To:	Area (ha)
0	4	0.000

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A14
Q100 +30%



Date 12/11/2018
File Cog A14.SRCX

Designed by RJH
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Innovyze Source Control 2018.1

Model Details

Storage is Online Cover Level (m) 178.500

Complex Structure

Infiltration Trench

Infiltration Coefficient Base (m/hr) 0.12048 Trench Width (m) 1.8
Infiltration Coefficient Side (m/hr) 0.12048 Trench Length (m) 117.0
Safety Factor 2.0 Slope (1:X) 200.0
Porosity 0.30 Cap Volume Depth (m) 0.000
Invert Level (m) 177.000 Cap Infiltration Depth (m) 0.000

Porous Car Park

Infiltration Coefficient Base (m/hr) 0.12048 Width (m) 12.5
Membrane Percolation (mm/hr) 1000 Length (m) 117.0
Max Percolation (l/s) 406.3 Slope (1:X) 100.0
Safety Factor 2.0 Depression Storage (mm) 5
Porosity 0.30 Evaporation (mm/day) 3
Invert Level (m) 178.050 Membrane Depth (m) 0

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A15
Q100 +30%



Date 12/11/2018
File Cog A15.SRCX

Designed by RJH
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Innovyze

Source Control 2018.1

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

Half Drain Time : 62 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	180.442	0.942	6.1	41.1	O K
30 min Summer	180.635	1.135	9.7	55.4	O K
60 min Summer	180.706	1.206	12.4	65.0	Flood Risk
120 min Summer	180.734	1.234	13.4	69.7	Flood Risk
180 min Summer	180.734	1.234	13.4	69.7	Flood Risk
240 min Summer	180.725	1.225	13.1	68.0	Flood Risk
360 min Summer	180.700	1.200	12.2	64.1	Flood Risk
480 min Summer	180.674	1.174	11.2	60.3	O K
600 min Summer	180.649	1.149	10.2	57.0	O K
720 min Summer	180.624	1.124	9.3	54.2	O K
960 min Summer	180.581	1.081	7.3	50.1	O K
1440 min Summer	180.404	0.904	6.0	38.6	O K
2160 min Summer	180.209	0.709	5.2	26.3	O K
2880 min Summer	180.090	0.590	4.7	18.8	O K
4320 min Summer	179.977	0.477	3.6	12.3	O K
5760 min Summer	179.903	0.403	3.0	8.8	O K
7200 min Summer	179.850	0.350	2.5	6.6	O K
8640 min Summer	179.809	0.309	2.2	5.2	O K
10080 min Summer	179.778	0.278	1.9	4.2	O K
15 min Winter	180.546	1.046	6.5	47.6	O K
30 min Winter	180.692	1.192	11.9	62.9	O K
60 min Winter	180.756	1.256	14.3	73.7	Flood Risk
120 min Winter	180.776	1.276	15.0	77.4	Flood Risk
180 min Winter	180.767	1.267	14.7	75.7	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	124.836	0.0	27
30 min Summer	83.061	0.0	37
60 min Summer	52.662	0.0	58
120 min Summer	32.210	0.0	90
180 min Summer	23.799	0.0	124
240 min Summer	19.065	0.0	156
360 min Summer	13.962	0.0	222
480 min Summer	11.178	0.0	288
600 min Summer	9.399	0.0	352
720 min Summer	8.153	0.0	418
960 min Summer	6.510	0.0	554
1440 min Summer	4.731	0.0	810
2160 min Summer	3.432	0.0	1168
2880 min Summer	2.730	0.0	1508
4320 min Summer	1.973	0.0	2216
5760 min Summer	1.566	0.0	2944
7200 min Summer	1.308	0.0	3672
8640 min Summer	1.129	0.0	4408
10080 min Summer	0.998	0.0	5136
15 min Winter	124.836	0.0	27
30 min Winter	83.061	0.0	37
60 min Winter	52.662	0.0	58
120 min Winter	32.210	0.0	94
180 min Winter	23.799	0.0	130

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A15
Q100 +30%



Date 12/11/2018
File Cog A15.SRCX

Designed by RJH
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Source Control 2018.1

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

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
240 min Winter	180.750	1.250	14.0	72.4	Flood Risk
360 min Winter	180.713	1.213	12.6	66.1	Flood Risk
480 min Winter	180.677	1.177	11.3	60.8	O K
600 min Winter	180.645	1.145	10.1	56.6	O K
720 min Winter	180.616	1.116	9.0	53.3	O K
960 min Winter	180.551	1.051	6.5	47.9	O K
1440 min Winter	180.300	0.800	5.5	32.0	O K
2160 min Winter	180.082	0.582	4.7	18.3	O K
2880 min Winter	179.992	0.492	3.8	13.1	O K
4320 min Winter	179.879	0.379	2.8	7.8	O K
5760 min Winter	179.811	0.311	2.2	5.2	O K
7200 min Winter	179.765	0.265	1.8	3.8	O K
8640 min Winter	179.731	0.231	1.6	2.9	O K
10080 min Winter	179.705	0.205	1.4	2.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
240 min Winter	19.065	0.0	166
360 min Winter	13.962	0.0	234
480 min Winter	11.178	0.0	300
600 min Winter	9.399	0.0	366
720 min Winter	8.153	0.0	434
960 min Winter	6.510	0.0	592
1440 min Winter	4.731	0.0	840
2160 min Winter	3.432	0.0	1168
2880 min Winter	2.730	0.0	1528
4320 min Winter	1.973	0.0	2244
5760 min Winter	1.566	0.0	2944
7200 min Winter	1.308	0.0	3672
8640 min Winter	1.129	0.0	4408
10080 min Winter	0.998	0.0	5136

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A15
Q100 +30%



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Innovyze Source Control 2018.1

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	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.249

Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)
0	4	0.062	4	8	0.062	8	12	0.062	12	16	0.063

Time Area Diagram

Total Area (ha) 0.000

Time (mins) From:	Time (mins) To:	Area (ha)
0	4	0.000

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A15
Q100 +30%



Date 12/11/2018
File Cog A15.SRCX

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Source Control 2018.1

Model Details

Storage is Online Cover Level (m) 181.000

Complex Structure

Infiltration Trench

Infiltration Coefficient Base (m/hr)	0.12048	Trench Width (m)	1.8
Infiltration Coefficient Side (m/hr)	0.12048	Trench Length (m)	117.0
Safety Factor	2.0	Slope (1:X)	200.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	179.500	Cap Infiltration Depth (m)	0.000

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.12048	Width (m)	20.0
Membrane Percolation (mm/hr)	1000	Length (m)	117.0
Max Percolation (l/s)	650.0	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	180.550	Membrane Depth (m)	0

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A16
Q100 +30%



Date 12/11/2018
File Cog A16.SRCX

Designed by RJH
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Innovyze

Source Control 2018.1

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

Half Drain Time : 62 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	180.442	0.942	6.1	41.1	O K
30 min Summer	180.635	1.135	9.7	55.4	O K
60 min Summer	180.706	1.206	12.4	65.0	Flood Risk
120 min Summer	180.734	1.234	13.4	69.7	Flood Risk
180 min Summer	180.734	1.234	13.4	69.7	Flood Risk
240 min Summer	180.725	1.225	13.1	68.0	Flood Risk
360 min Summer	180.700	1.200	12.2	64.1	Flood Risk
480 min Summer	180.674	1.174	11.2	60.3	O K
600 min Summer	180.649	1.149	10.2	57.0	O K
720 min Summer	180.624	1.124	9.3	54.2	O K
960 min Summer	180.581	1.081	7.3	50.1	O K
1440 min Summer	180.404	0.904	6.0	38.6	O K
2160 min Summer	180.209	0.709	5.2	26.3	O K
2880 min Summer	180.090	0.590	4.7	18.8	O K
4320 min Summer	179.977	0.477	3.6	12.3	O K
5760 min Summer	179.903	0.403	3.0	8.8	O K
7200 min Summer	179.850	0.350	2.5	6.6	O K
8640 min Summer	179.809	0.309	2.2	5.2	O K
10080 min Summer	179.778	0.278	1.9	4.2	O K
15 min Winter	180.546	1.046	6.5	47.6	O K
30 min Winter	180.692	1.192	11.9	62.9	O K
60 min Winter	180.756	1.256	14.3	73.7	Flood Risk
120 min Winter	180.776	1.276	15.0	77.4	Flood Risk
180 min Winter	180.767	1.267	14.7	75.7	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	124.836	0.0	27
30 min Summer	83.061	0.0	37
60 min Summer	52.662	0.0	58
120 min Summer	32.210	0.0	90
180 min Summer	23.799	0.0	124
240 min Summer	19.065	0.0	156
360 min Summer	13.962	0.0	222
480 min Summer	11.178	0.0	288
600 min Summer	9.399	0.0	352
720 min Summer	8.153	0.0	418
960 min Summer	6.510	0.0	554
1440 min Summer	4.731	0.0	810
2160 min Summer	3.432	0.0	1168
2880 min Summer	2.730	0.0	1508
4320 min Summer	1.973	0.0	2216
5760 min Summer	1.566	0.0	2944
7200 min Summer	1.308	0.0	3672
8640 min Summer	1.129	0.0	4408
10080 min Summer	0.998	0.0	5136
15 min Winter	124.836	0.0	27
30 min Winter	83.061	0.0	37
60 min Winter	52.662	0.0	58
120 min Winter	32.210	0.0	94
180 min Winter	23.799	0.0	130

.	Bristol Airport 12 mppa
.	Cogloop 2 Car Park- A16
.	Q100 +30%
Date 12/11/2018	Designed by RJH
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Innovyze Source Control 2018.1

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
240 min Winter	180.750	1.250	14.0	72.4	Flood Risk
360 min Winter	180.713	1.213	12.6	66.1	Flood Risk
480 min Winter	180.677	1.177	11.3	60.8	O K
600 min Winter	180.645	1.145	10.1	56.6	O K
720 min Winter	180.616	1.116	9.0	53.3	O K
960 min Winter	180.551	1.051	6.5	47.9	O K
1440 min Winter	180.300	0.800	5.5	32.0	O K
2160 min Winter	180.082	0.582	4.7	18.3	O K
2880 min Winter	179.992	0.492	3.8	13.1	O K
4320 min Winter	179.879	0.379	2.8	7.8	O K
5760 min Winter	179.811	0.311	2.2	5.2	O K
7200 min Winter	179.765	0.265	1.8	3.8	O K
8640 min Winter	179.731	0.231	1.6	2.9	O K
10080 min Winter	179.705	0.205	1.4	2.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
240 min Winter	19.065	0.0	166
360 min Winter	13.962	0.0	234
480 min Winter	11.178	0.0	300
600 min Winter	9.399	0.0	366
720 min Winter	8.153	0.0	434
960 min Winter	6.510	0.0	592
1440 min Winter	4.731	0.0	840
2160 min Winter	3.432	0.0	1168
2880 min Winter	2.730	0.0	1528
4320 min Winter	1.973	0.0	2244
5760 min Winter	1.566	0.0	2944
7200 min Winter	1.308	0.0	3672
8640 min Winter	1.129	0.0	4408
10080 min Winter	0.998	0.0	5136

.	Bristol Airport 12 mppa
.	Cogloop 2 Car Park- A16
.	Q100 +30%
Date 12/11/2018	Designed by RJH
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Innovyze Source Control 2018.1

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	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.249

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
From:	To:	From:	To:	From:	To:	From:	To:
0	4	4	8	8	12	12	16
	0.062		0.062		0.062		0.063

Time Area Diagram

Total Area (ha) 0.000

Time (mins)	Area (ha)
From:	To:
0	4
	0.000

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A16
Q100 +30%



Date 12/11/2018
File Cog A16.SRCX

Designed by RJH
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Innovyze

Source Control 2018.1

Model Details

Storage is Online Cover Level (m) 181.000

Complex Structure

Infiltration Trench

Infiltration Coefficient Base (m/hr)	0.12048	Trench Width (m)	1.8
Infiltration Coefficient Side (m/hr)	0.12048	Trench Length (m)	117.0
Safety Factor	2.0	Slope (1:X)	200.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	179.500	Cap Infiltration Depth (m)	0.000

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.12048	Width (m)	20.0
Membrane Percolation (mm/hr)	1000	Length (m)	117.0
Max Percolation (l/s)	650.0	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	180.550	Membrane Depth (m)	0

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A18
Q100 +30%



Date 12/11/2018
File Cog A18.SRCX

Designed by RJH
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Innovyze


Source Control 2018.1

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

Half Drain Time : 73 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	172.649	0.849	5.3	33.4	O K
30 min Summer	172.824	1.024	5.9	43.4	O K
60 min Summer	172.925	1.125	7.5	50.0	O K
120 min Summer	172.950	1.150	8.1	52.1	O K
180 min Summer	172.941	1.141	7.9	51.4	O K
240 min Summer	172.921	1.121	7.5	49.8	O K
360 min Summer	172.877	1.077	6.4	46.6	O K
480 min Summer	172.812	1.012	5.9	42.8	O K
600 min Summer	172.748	0.948	5.7	39.1	O K
720 min Summer	172.690	0.890	5.4	35.8	O K
960 min Summer	172.591	0.791	5.1	30.1	O K
1440 min Summer	172.443	0.643	4.6	21.7	O K
2160 min Summer	172.316	0.516	4.0	14.4	O K
2880 min Summer	172.248	0.448	3.4	10.9	O K
4320 min Summer	172.159	0.359	2.6	6.9	O K
5760 min Summer	172.101	0.301	2.1	4.9	O K
7200 min Summer	172.060	0.260	1.8	3.6	O K
8640 min Summer	172.029	0.229	1.6	2.8	O K
10080 min Summer	172.005	0.205	1.4	2.3	O K
15 min Winter	172.727	0.927	5.6	37.9	O K
30 min Winter	172.911	1.111	7.3	49.0	O K
60 min Winter	172.993	1.193	8.9	56.2	O K
120 min Winter	173.010	1.210	9.3	58.0	Flood Risk
180 min Winter	172.995	1.195	9.0	56.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	124.836	0.0	27
30 min Summer	83.061	0.0	38
60 min Summer	52.662	0.0	60
120 min Summer	32.210	0.0	92
180 min Summer	23.799	0.0	126
240 min Summer	19.065	0.0	162
360 min Summer	13.962	0.0	232
480 min Summer	11.178	0.0	300
600 min Summer	9.399	0.0	366
720 min Summer	8.153	0.0	430
960 min Summer	6.510	0.0	554
1440 min Summer	4.731	0.0	794
2160 min Summer	3.432	0.0	1140
2880 min Summer	2.730	0.0	1504
4320 min Summer	1.973	0.0	2212
5760 min Summer	1.566	0.0	2944
7200 min Summer	1.308	0.0	3672
8640 min Summer	1.129	0.0	4408
10080 min Summer	0.998	0.0	5136
15 min Winter	124.836	0.0	27
30 min Winter	83.061	0.0	38
60 min Winter	52.662	0.0	60
120 min Winter	32.210	0.0	96
180 min Winter	23.799	0.0	134

.	Bristol Airport 12 mppa	
.	Cogloop 2 Car Park- A18	
.	Q100 +30%	
Date 12/11/2018	Designed by RJH	
File Cog A18.SRCX	Checked by	
Innovyze	Source Control 2018.1	

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

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
240 min Winter	172.968	1.168	8.4	53.8	O K
360 min Winter	172.912	1.112	7.3	49.0	O K
480 min Winter	172.840	1.040	6.0	44.4	O K
600 min Winter	172.749	0.949	5.7	39.1	O K
720 min Winter	172.667	0.867	5.4	34.5	O K
960 min Winter	172.533	0.733	4.9	26.8	O K
1440 min Winter	172.351	0.551	4.2	16.4	O K
2160 min Winter	172.238	0.438	3.3	10.3	O K
2880 min Winter	172.167	0.367	2.7	7.3	O K
4320 min Winter	172.081	0.281	2.0	4.3	O K
5760 min Winter	172.030	0.230	1.6	2.8	O K
7200 min Winter	171.995	0.195	1.3	2.1	O K
8640 min Winter	171.971	0.171	1.1	1.6	O K
10080 min Winter	171.952	0.152	1.0	1.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
240 min Winter	19.065	0.0	170
360 min Winter	13.962	0.0	244
480 min Winter	11.178	0.0	320
600 min Winter	9.399	0.0	388
720 min Winter	8.153	0.0	452
960 min Winter	6.510	0.0	578
1440 min Winter	4.731	0.0	808
2160 min Winter	3.432	0.0	1156
2880 min Winter	2.730	0.0	1508
4320 min Winter	1.973	0.0	2216
5760 min Winter	1.566	0.0	2936
7200 min Winter	1.308	0.0	3672
8640 min Winter	1.129	0.0	4352
10080 min Winter	0.998	0.0	5056

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A18
Q100 +30%



Date 12/11/2018
File Cog A18.SRCX
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Innovyze Source Control 2018.1

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	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.171

Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)
0	4	0.043	4	8	0.043	8	12	0.043	12	16	0.042

Time Area Diagram

Total Area (ha) 0.000

Time (mins) From:	Time (mins) To:	Area (ha)
0	4	0.000

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A18
Q100 +30%



Date 12/11/2018
File Cog A18.SRCX

Designed by RJH
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Innovyze Source Control 2018.1

Model Details

Storage is Online Cover Level (m) 173.300

Complex Structure

Infiltration Trench

Infiltration Coefficient Base (m/hr) 0.12048 Trench Width (m) 1.8
Infiltration Coefficient Side (m/hr) 0.12048 Trench Length (m) 106.0
Safety Factor 2.0 Slope (1:X) 200.0
Porosity 0.30 Cap Volume Depth (m) 0.000
Invert Level (m) 171.800 Cap Infiltration Depth (m) 0.000

Porous Car Park

Infiltration Coefficient Base (m/hr) 0.12048 Width (m) 10.0
Membrane Percolation (mm/hr) 1000 Length (m) 24.9
Max Percolation (l/s) 69.2 Slope (1:X) 100.0
Safety Factor 2.0 Depression Storage (mm) 5
Porosity 0.30 Evaporation (mm/day) 3
Invert Level (m) 172.850 Membrane Depth (m) 0

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A19
Q100 +30%



Date 12/11/2018
File Cog A19.SRCX

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

Half Drain Time : 102 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	178.187	0.987	3.6	27.4	O K
30 min Summer	178.429	1.229	4.1	35.4	O K
60 min Summer	178.613	1.413	4.5	41.4	O K
120 min Summer	178.679	1.479	4.6	43.6	O K
180 min Summer	178.666	1.466	4.6	43.1	O K
240 min Summer	178.626	1.426	4.5	41.8	O K
360 min Summer	178.540	1.340	4.3	39.0	O K
480 min Summer	178.456	1.256	4.1	36.2	O K
600 min Summer	178.377	1.177	4.0	33.7	O K
720 min Summer	178.305	1.105	3.8	31.3	O K
960 min Summer	178.177	0.977	3.6	27.1	O K
1440 min Summer	177.977	0.777	3.1	20.5	O K
2160 min Summer	177.769	0.569	2.7	13.7	O K
2880 min Summer	177.631	0.431	2.4	9.1	O K
4320 min Summer	177.494	0.294	2.1	4.7	O K
5760 min Summer	177.445	0.245	1.7	3.2	O K
7200 min Summer	177.410	0.210	1.4	2.4	O K
8640 min Summer	177.385	0.185	1.2	1.8	O K
10080 min Summer	177.365	0.165	1.1	1.5	O K
15 min Winter	178.295	1.095	3.8	31.0	O K
30 min Winter	178.571	1.371	4.4	40.0	O K
60 min Winter	178.787	1.587	4.8	47.1	O K
120 min Winter	178.865	1.665	5.0	49.7	O K
180 min Winter	178.841	1.641	5.0	48.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	124.836	0.0	27
30 min Summer	83.061	0.0	39
60 min Summer	52.662	0.0	64
120 min Summer	32.210	0.0	100
180 min Summer	23.799	0.0	134
240 min Summer	19.065	0.0	168
360 min Summer	13.962	0.0	236
480 min Summer	11.178	0.0	304
600 min Summer	9.399	0.0	372
720 min Summer	8.153	0.0	438
960 min Summer	6.510	0.0	566
1440 min Summer	4.731	0.0	816
2160 min Summer	3.432	0.0	1176
2880 min Summer	2.730	0.0	1532
4320 min Summer	1.973	0.0	2212
5760 min Summer	1.566	0.0	2944
7200 min Summer	1.308	0.0	3672
8640 min Summer	1.129	0.0	4400
10080 min Summer	0.998	0.0	5136
15 min Winter	124.836	0.0	27
30 min Winter	83.061	0.0	39
60 min Winter	52.662	0.0	64
120 min Winter	32.210	0.0	106
180 min Winter	23.799	0.0	142

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A19
Q100 +30%



Date 12/11/2018
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Innovyze

Source Control 2018.1

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
240 min Winter	178.783	1.583	4.8	47.0	O K
360 min Winter	178.655	1.455	4.6	42.8	O K
480 min Winter	178.530	1.330	4.3	38.7	O K
600 min Winter	178.416	1.216	4.1	34.9	O K
720 min Winter	178.314	1.114	3.8	31.6	O K
960 min Winter	178.140	0.940	3.5	25.9	O K
1440 min Winter	177.879	0.679	2.9	17.3	O K
2160 min Winter	177.629	0.429	2.4	9.1	O K
2880 min Winter	177.500	0.300	2.1	4.8	O K
4320 min Winter	177.427	0.227	1.5	2.8	O K
5760 min Winter	177.385	0.185	1.2	1.9	O K
7200 min Winter	177.357	0.157	1.0	1.3	O K
8640 min Winter	177.337	0.137	0.9	1.0	O K
10080 min Winter	177.322	0.122	0.8	0.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
240 min Winter	19.065	0.0	180
360 min Winter	13.962	0.0	254
480 min Winter	11.178	0.0	326
600 min Winter	9.399	0.0	396
720 min Winter	8.153	0.0	464
960 min Winter	6.510	0.0	596
1440 min Winter	4.731	0.0	850
2160 min Winter	3.432	0.0	1204
2880 min Winter	2.730	0.0	1504
4320 min Winter	1.973	0.0	2212
5760 min Winter	1.566	0.0	2936
7200 min Winter	1.308	0.0	3648
8640 min Winter	1.129	0.0	4376
10080 min Winter	0.998	0.0	5096

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A19
Q100 +30%



Date 12/11/2018
File Cog A19.SRCX

Designed by RJH
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Innovyze Source Control 2018.1

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	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.134

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
From:	To:	From:	To:	From:	To:	From:	To:
0	4	4	8	8	12	12	16
	0.033		0.033		0.034		0.034

Time Area Diagram

Total Area (ha) 0.000

Time (mins)	Area (ha)
From:	To:
0	4
	0.000

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A19
Q100 +30%



Date 12/11/2018

Designed by RJH

File Cog A19.SRCX

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Innovyze

Source Control 2018.1

Model Details

Storage is Online Cover Level (m) 179.200

Infiltration Trench Structure

Infiltration Coefficient Base (m/hr) 0.12048 Trench Width (m) 1.8
Infiltration Coefficient Side (m/hr) 0.12048 Trench Length (m) 60.8
Safety Factor 2.0 Slope (1:X) 200.0
Porosity 0.30 Cap Volume Depth (m) 0.000
Invert Level (m) 177.200 Cap Infiltration Depth (m) 0.000

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A20
Q100 +30%



Date 12/11/2018
File Cog A20.SRCX

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Innovyze


Source Control 2018.1

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

Half Drain Time : 72 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	173.482	0.582	2.3	12.2	O K
30 min Summer	173.612	0.712	2.5	15.7	O K
60 min Summer	173.698	0.798	2.6	18.0	O K
120 min Summer	173.713	0.813	2.7	18.4	O K
180 min Summer	173.689	0.789	2.6	17.7	O K
240 min Summer	173.653	0.753	2.6	16.8	O K
360 min Summer	173.587	0.687	2.5	15.0	O K
480 min Summer	173.525	0.625	2.3	13.4	O K
600 min Summer	173.470	0.570	2.3	11.9	O K
720 min Summer	173.421	0.521	2.2	10.6	O K
960 min Summer	173.338	0.438	2.0	8.4	O K
1440 min Summer	173.221	0.321	1.8	5.3	O K
2160 min Summer	173.135	0.235	1.6	3.0	O K
2880 min Summer	173.099	0.199	1.3	2.1	O K
4320 min Summer	173.052	0.152	1.0	1.3	O K
5760 min Summer	173.024	0.124	0.8	0.8	O K
7200 min Summer	173.005	0.105	0.7	0.6	O K
8640 min Summer	172.991	0.091	0.6	0.5	O K
10080 min Summer	172.981	0.081	0.5	0.4	O K
15 min Winter	173.543	0.643	2.4	13.9	O K
30 min Winter	173.693	0.793	2.6	17.8	O K
60 min Winter	173.796	0.896	2.8	20.6	O K
120 min Winter	173.810	0.910	2.8	21.0	O K
180 min Winter	173.773	0.873	2.8	20.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	124.836	0.0	26
30 min Summer	83.061	0.0	37
60 min Summer	52.662	0.0	60
120 min Summer	32.210	0.0	94
180 min Summer	23.799	0.0	128
240 min Summer	19.065	0.0	162
360 min Summer	13.962	0.0	230
480 min Summer	11.178	0.0	296
600 min Summer	9.399	0.0	360
720 min Summer	8.153	0.0	424
960 min Summer	6.510	0.0	546
1440 min Summer	4.731	0.0	782
2160 min Summer	3.432	0.0	1120
2880 min Summer	2.730	0.0	1476
4320 min Summer	1.973	0.0	2208
5760 min Summer	1.566	0.0	2936
7200 min Summer	1.308	0.0	3672
8640 min Summer	1.129	0.0	4400
10080 min Summer	0.998	0.0	5136
15 min Winter	124.836	0.0	26
30 min Winter	83.061	0.0	38
60 min Winter	52.662	0.0	62
120 min Winter	32.210	0.0	100
180 min Winter	23.799	0.0	138

.	Bristol Airport 12 mppa	
.	Cogloop 2 Car Park- A20	
.	Q100 +30%	
Date 12/11/2018	Designed by RJH	
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Innovyze	Source Control 2018.1	

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
240 min Winter	173.721	0.821	2.7	18.6	O K
360 min Winter	173.621	0.721	2.5	15.9	O K
480 min Winter	173.531	0.631	2.4	13.5	O K
600 min Winter	173.453	0.553	2.2	11.5	O K
720 min Winter	173.385	0.485	2.1	9.6	O K
960 min Winter	173.274	0.374	1.9	6.7	O K
1440 min Winter	173.144	0.244	1.7	3.2	O K
2160 min Winter	173.088	0.188	1.3	1.9	O K
2880 min Winter	173.053	0.153	1.0	1.3	O K
4320 min Winter	173.014	0.114	0.7	0.7	O K
5760 min Winter	172.992	0.092	0.6	0.5	O K
7200 min Winter	172.977	0.077	0.5	0.3	O K
8640 min Winter	172.967	0.067	0.4	0.2	O K
10080 min Winter	172.960	0.060	0.4	0.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
240 min Winter	19.065	0.0	174
360 min Winter	13.962	0.0	246
480 min Winter	11.178	0.0	316
600 min Winter	9.399	0.0	382
720 min Winter	8.153	0.0	446
960 min Winter	6.510	0.0	568
1440 min Winter	4.731	0.0	772
2160 min Winter	3.432	0.0	1128
2880 min Winter	2.730	0.0	1480
4320 min Winter	1.973	0.0	2204
5760 min Winter	1.566	0.0	2920
7200 min Winter	1.308	0.0	3624
8640 min Winter	1.129	0.0	4336
10080 min Winter	0.998	0.0	5064

.	Bristol Airport 12 mppa
.	Cogloop 2 Car Park- A20
.	Q100 +30%
Date 12/11/2018	Designed by RJH
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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	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.063

Time (mins) Area	Time (mins) Area	Time (mins) Area	Time (mins) Area
From: To: (ha)	From: To: (ha)	From: To: (ha)	From: To: (ha)
0 4 0.016	4 8 0.016	8 12 0.016	12 16 0.015

Time Area Diagram

Total Area (ha) 0.000

Time (mins) Area
From: To: (ha)
0 4 0.000

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A20
Q100 +30%



Date 12/11/2018

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File Cog A20.SRCX

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Innovyze

Source Control 2018.1

Model Details

Storage is Online Cover Level (m) 175.400

Infiltration Trench Structure

Infiltration Coefficient Base (m/hr) 0.12048 Trench Width (m) 1.8
Infiltration Coefficient Side (m/hr) 0.12048 Trench Length (m) 49.4
Safety Factor 2.0 Slope (1:X) 200.0
Porosity 0.30 Cap Volume Depth (m) 0.000
Invert Level (m) 172.900 Cap Infiltration Depth (m) 0.000

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A22
Q100 +30%



Date 12/11/2018
File Cog A22.SRCX

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Source Control 2018.1

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

Half Drain Time : 83 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	178.165	1.165	2.9	18.3	O K
30 min Summer	178.317	1.317	3.5	23.4	Flood Risk
60 min Summer	178.415	1.415	3.8	27.0	Flood Risk
120 min Summer	178.450	1.450	4.0	28.4	Flood Risk
180 min Summer	178.442	1.442	4.0	28.1	Flood Risk
240 min Summer	178.419	1.419	3.9	27.2	Flood Risk
360 min Summer	178.367	1.367	3.7	25.2	Flood Risk
480 min Summer	178.315	1.315	3.5	23.3	Flood Risk
600 min Summer	178.265	1.265	3.3	21.6	Flood Risk
720 min Summer	178.219	1.219	3.1	20.1	Flood Risk
960 min Summer	178.139	1.139	2.8	17.5	O K
1440 min Summer	178.013	1.013	2.4	13.9	O K
2160 min Summer	177.876	0.876	2.0	10.4	O K
2880 min Summer	177.776	0.776	1.7	8.1	O K
4320 min Summer	177.638	0.638	1.3	5.5	O K
5760 min Summer	177.547	0.547	1.1	4.0	O K
7200 min Summer	177.481	0.481	0.9	3.1	O K
8640 min Summer	177.430	0.430	0.8	2.5	O K
10080 min Summer	177.390	0.390	0.7	2.1	O K
15 min Winter	178.236	1.236	3.2	20.6	Flood Risk
30 min Winter	178.398	1.398	3.8	26.4	Flood Risk
60 min Winter	178.500	1.500	4.2	30.6	FLOOD
120 min Winter	178.502	1.502	4.2	31.9	FLOOD
180 min Winter	178.501	1.501	4.2	31.1	FLOOD

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	124.836	0.0	26
30 min Summer	83.061	0.0	37
60 min Summer	52.662	0.0	60
120 min Summer	32.210	0.0	94
180 min Summer	23.799	0.0	128
240 min Summer	19.065	0.0	162
360 min Summer	13.962	0.0	228
480 min Summer	11.178	0.0	294
600 min Summer	9.399	0.0	360
720 min Summer	8.153	0.0	424
960 min Summer	6.510	0.0	548
1440 min Summer	4.731	0.0	794
2160 min Summer	3.432	0.0	1156
2880 min Summer	2.730	0.0	1512
4320 min Summer	1.973	0.0	2244
5760 min Summer	1.566	0.0	2944
7200 min Summer	1.308	0.0	3680
8640 min Summer	1.129	0.0	4408
10080 min Summer	0.998	0.0	5144
15 min Winter	124.836	0.0	27
30 min Winter	83.061	0.0	38
60 min Winter	52.662	0.2	62
120 min Winter	32.210	1.5	100
180 min Winter	23.799	0.7	136

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A22
Q100 +30%



Date 12/11/2018
File Cog A22.SRCX

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Source Control 2018.1

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

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
240 min Winter	178.481	1.481	4.1	29.6	Flood Risk
360 min Winter	178.404	1.404	3.8	26.6	Flood Risk
480 min Winter	178.329	1.329	3.5	23.9	Flood Risk
600 min Winter	178.261	1.261	3.3	21.5	Flood Risk
720 min Winter	178.200	1.200	3.0	19.4	O K
960 min Winter	178.094	1.094	2.7	16.2	O K
1440 min Winter	177.935	0.935	2.2	11.8	O K
2160 min Winter	177.772	0.772	1.7	8.1	O K
2880 min Winter	177.662	0.662	1.4	5.9	O K
4320 min Winter	177.521	0.521	1.0	3.7	O K
5760 min Winter	177.434	0.434	0.8	2.5	O K
7200 min Winter	177.374	0.374	0.7	1.9	O K
8640 min Winter	177.330	0.330	0.6	1.5	O K
10080 min Winter	177.297	0.297	0.5	1.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
240 min Winter	19.065	0.0	172
360 min Winter	13.962	0.0	244
480 min Winter	11.178	0.0	312
600 min Winter	9.399	0.0	378
720 min Winter	8.153	0.0	444
960 min Winter	6.510	0.0	570
1440 min Winter	4.731	0.0	818
2160 min Winter	3.432	0.0	1176
2880 min Winter	2.730	0.0	1536
4320 min Winter	1.973	0.0	2252
5760 min Winter	1.566	0.0	2952
7200 min Winter	1.308	0.0	3680
8640 min Winter	1.129	0.0	4408
10080 min Winter	0.998	0.0	5136

.	Bristol Airport 12 mppa
.	Cogloop 2 Car Park- A22
.	Q100 +30%
Date 12/11/2018	Designed by RJH
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Innovyze Source Control 2018.1

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	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.090

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
From:	To:	From:	To:	From:	To:	From:	To:
0	4	4	8	8	12	12	16
	0.023		0.023		0.022		0.022

Time Area Diagram

Total Area (ha) 0.000

Time (mins)	Area (ha)
From:	To:
0	4
	0.000

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A22
Q100 +30%

Date 12/11/2018
File Cog A22.SRCX

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Innovyze Source Control 2018.1

Model Details

Storage is Online Cover Level (m) 178.500

Infiltration Trench Structure

Infiltration Coefficient Base (m/hr)	0.12048	Trench Width (m)	1.8
Infiltration Coefficient Side (m/hr)	0.12048	Trench Length (m)	91.9
Safety Factor	2.0	Slope (1:X)	50.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	177.000	Cap Infiltration Depth (m)	0.000

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Bristol Airport 12 mppa
Cogloop 2 Car Park - A1
Q30



Date 01/08/2018
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Source Control 2018.1

Summary of Results for 30 year Return Period

Half Drain Time : 66 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	181.147	0.847	5.9	35.6	O K
30 min Summer	181.336	1.036	6.7	48.1	O K
60 min Summer	181.439	1.139	9.3	56.6	O K
120 min Summer	181.473	1.173	10.3	60.5	O K
180 min Summer	181.476	1.176	10.4	60.7	O K
240 min Summer	181.467	1.167	10.1	59.7	O K
360 min Summer	181.441	1.141	9.4	56.7	O K
480 min Summer	181.410	1.110	8.5	53.7	O K
600 min Summer	181.379	1.079	7.3	51.1	O K
720 min Summer	181.329	1.029	6.7	47.6	O K
960 min Summer	181.226	0.926	6.2	40.8	O K
1440 min Summer	181.069	0.769	5.6	30.6	O K
2160 min Summer	180.920	0.620	5.0	20.8	O K
2880 min Summer	180.843	0.543	4.3	15.9	O K
4320 min Summer	180.741	0.441	3.3	10.5	O K
5760 min Summer	180.674	0.374	2.7	7.5	O K
7200 min Summer	180.626	0.326	2.3	5.7	O K
8640 min Summer	180.589	0.289	2.0	4.5	O K
10080 min Summer	180.560	0.260	1.8	3.6	O K
15 min Winter	181.232	0.932	6.3	41.2	O K
30 min Winter	181.421	1.121	8.8	54.8	O K
60 min Winter	181.501	1.201	11.1	64.0	Flood Risk
120 min Winter	181.525	1.225	11.8	67.3	Flood Risk
180 min Winter	181.518	1.218	11.6	66.3	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	74.059	0.0	27
30 min Summer	48.833	0.0	39
60 min Summer	30.811	0.0	60
120 min Summer	18.860	0.0	92
180 min Summer	13.992	0.0	126
240 min Summer	11.265	0.0	158
360 min Summer	8.299	0.0	226
480 min Summer	6.674	0.0	294
600 min Summer	5.632	0.0	364
720 min Summer	4.901	0.0	432
960 min Summer	3.933	0.0	558
1440 min Summer	2.881	0.0	800
2160 min Summer	2.107	0.0	1152
2880 min Summer	1.687	0.0	1504
4320 min Summer	1.231	0.0	2216
5760 min Summer	0.984	0.0	2944
7200 min Summer	0.827	0.0	3672
8640 min Summer	0.717	0.0	4408
10080 min Summer	0.636	0.0	5136
15 min Winter	74.059	0.0	27
30 min Winter	48.833	0.0	38
60 min Winter	30.811	0.0	60
120 min Winter	18.860	0.0	96
180 min Winter	13.992	0.0	132

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Bristol Airport 12 mppa
Cogloop 2 Car Park - A1
Q30



Date 01/08/2018
File Cog A1.SRCX

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Source Control 2018.1

Summary of Results for 30 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
240 min Winter	181.501	1.201	11.1	64.0	Flood Risk
360 min Winter	181.462	1.162	10.0	59.1	O K
480 min Winter	181.421	1.121	8.8	54.8	O K
600 min Winter	181.382	1.082	7.4	51.3	O K
720 min Winter	181.312	1.012	6.6	46.4	O K
960 min Winter	181.171	0.871	6.0	37.2	O K
1440 min Winter	180.970	0.670	5.2	24.0	O K
2160 min Winter	180.831	0.531	4.2	15.2	O K
2880 min Winter	180.750	0.450	3.4	10.9	O K
4320 min Winter	180.649	0.349	2.5	6.6	O K
5760 min Winter	180.587	0.287	2.0	4.5	O K
7200 min Winter	180.546	0.246	1.7	3.3	O K
8640 min Winter	180.515	0.215	1.5	2.5	O K
10080 min Winter	180.492	0.192	1.3	2.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
240 min Winter	11.265	0.0	168
360 min Winter	8.299	0.0	238
480 min Winter	6.674	0.0	308
600 min Winter	5.632	0.0	384
720 min Winter	4.901	0.0	456
960 min Winter	3.933	0.0	584
1440 min Winter	2.881	0.0	820
2160 min Winter	2.107	0.0	1164
2880 min Winter	1.687	0.0	1516
4320 min Winter	1.231	0.0	2220
5760 min Winter	0.984	0.0	2944
7200 min Winter	0.827	0.0	3672
8640 min Winter	0.717	0.0	4408
10080 min Winter	0.636	0.0	5136

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Date 01/08/2018
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Bristol Airport 12 mppa
Cogloop 2 Car Park - A1
Q30
Designed by RJH
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XP Solutions

Source Control 2018.1

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.360

Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)
0	4	0.090	4	8	0.090	8	12	0.090	12	16	0.090

Time Area Diagram

Total Area (ha) 0.000

Time (mins) From:	Time (mins) To:	Area (ha)
0	4	0.000

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Date 01/08/2018
File Cog A1.SRCX

Bristol Airport 12 mppa
Cogloop 2 Car Park - A1
Q30



Designed by RJH
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Source Control 2018.1

Model Details

Storage is Online Cover Level (m) 181.800

Complex Structure

Infiltration Trench

Infiltration Coefficient Base (m/hr)	0.12048	Trench Width (m)	1.8
Infiltration Coefficient Side (m/hr)	0.12048	Trench Length (m)	121.5
Safety Factor	2.0	Slope (1:X)	200.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	180.300	Cap Infiltration Depth (m)	0.000

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.12048	Width (m)	14.9
Membrane Percolation (mm/hr)	1000	Length (m)	121.5
Max Percolation (l/s)	502.9	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	181.350	Membrane Depth (m)	0

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Bristol Airport 12 mppa
Cogloop 2 Car Park - A1
Q100 +30%



Date 12/11/2018
File COG A1.SRCX

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Source Control 2018.1

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

Half Drain Time : 74 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	181.518	1.218	11.6	66.3	Flood Risk
30 min Summer	181.637	1.337	15.1	86.3	Flood Risk
60 min Summer	181.706	1.406	17.1	100.6	Flood Risk
120 min Summer	181.734	1.434	17.9	107.1	Flood Risk
180 min Summer	181.732	1.432	17.8	106.7	Flood Risk
240 min Summer	181.720	1.420	17.5	103.8	Flood Risk
360 min Summer	181.689	1.389	16.6	96.9	Flood Risk
480 min Summer	181.657	1.357	15.7	90.1	Flood Risk
600 min Summer	181.625	1.325	14.7	84.0	Flood Risk
720 min Summer	181.597	1.297	13.9	78.7	Flood Risk
960 min Summer	181.546	1.246	12.4	70.4	Flood Risk
1440 min Summer	181.465	1.165	10.1	59.5	O K
2160 min Summer	181.367	1.067	7.0	50.2	O K
2880 min Summer	181.180	0.880	6.0	37.8	O K
4320 min Summer	180.946	0.646	5.1	22.5	O K
5760 min Summer	180.845	0.545	4.3	16.0	O K
7200 min Summer	180.779	0.479	3.7	12.4	O K
8640 min Summer	180.727	0.427	3.2	9.9	O K
10080 min Summer	180.687	0.387	2.8	8.1	O K
15 min Winter	181.575	1.275	13.3	75.1	Flood Risk
30 min Winter	181.693	1.393	16.7	97.7	Flood Risk
60 min Winter	181.763	1.463	18.7	114.3	Flood Risk
120 min Winter	181.785	1.485	19.4	119.7	Flood Risk
180 min Winter	181.774	1.474	19.1	116.9	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	124.836	0.0	26
30 min Summer	83.061	0.0	37
60 min Summer	52.662	0.0	58
120 min Summer	32.210	0.0	92
180 min Summer	23.799	0.0	124
240 min Summer	19.065	0.0	158
360 min Summer	13.962	0.0	224
480 min Summer	11.178	0.0	290
600 min Summer	9.399	0.0	352
720 min Summer	8.153	0.0	414
960 min Summer	6.510	0.0	538
1440 min Summer	4.731	0.0	786
2160 min Summer	3.432	0.0	1188
2880 min Summer	2.730	0.0	1556
4320 min Summer	1.973	0.0	2252
5760 min Summer	1.566	0.0	2944
7200 min Summer	1.308	0.0	3680
8640 min Summer	1.129	0.0	4408
10080 min Summer	0.998	0.0	5144
15 min Winter	124.836	0.0	27
30 min Winter	83.061	0.0	37
60 min Winter	52.662	0.0	60
120 min Winter	32.210	0.0	96
180 min Winter	23.799	0.0	134

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Bristol Airport 12 mppa
Cogloop 2 Car Park - A1
Q100 +30%



Date 12/11/2018
File COG A1.SRCX

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Source Control 2018.1

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

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
240 min Winter	181.752	1.452	18.4	111.4	Flood Risk
360 min Winter	181.704	1.404	17.0	100.3	Flood Risk
480 min Winter	181.658	1.358	15.7	90.4	Flood Risk
600 min Winter	181.616	1.316	14.5	82.2	Flood Risk
720 min Winter	181.578	1.278	13.4	75.6	Flood Risk
960 min Winter	181.515	1.215	11.5	65.9	Flood Risk
1440 min Winter	181.421	1.121	8.8	54.8	O K
2160 min Winter	181.208	0.908	6.2	39.6	O K
2880 min Winter	180.993	0.693	5.3	25.5	O K
4320 min Winter	180.819	0.519	4.0	14.6	O K
5760 min Winter	180.731	0.431	3.2	10.0	O K
7200 min Winter	180.671	0.371	2.7	7.4	O K
8640 min Winter	180.626	0.326	2.3	5.7	O K
10080 min Winter	180.592	0.292	2.1	4.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
240 min Winter	19.065	0.0	170
360 min Winter	13.962	0.0	238
480 min Winter	11.178	0.0	304
600 min Winter	9.399	0.0	368
720 min Winter	8.153	0.0	430
960 min Winter	6.510	0.0	554
1440 min Winter	4.731	0.0	808
2160 min Winter	3.432	0.0	1232
2880 min Winter	2.730	0.0	1572
4320 min Winter	1.973	0.0	2252
5760 min Winter	1.566	0.0	2952
7200 min Winter	1.308	0.0	3680
8640 min Winter	1.129	0.0	4408
10080 min Winter	0.998	0.0	5136

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Date 12/11/2018
File COG A1.SRCX

Bristol Airport 12 mppa
Cogloop 2 Car Park - A1
Q100 +30%



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Innovyze Source Control 2018.1

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	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.360

Time (mins)		Area	Time (mins)		Area	Time (mins)		Area	Time (mins)		Area
From:	To:	(ha)	From:	To:	(ha)	From:	To:	(ha)	From:	To:	(ha)
0	4	0.090	4	8	0.090	8	12	0.090	12	16	0.090

Time Area Diagram

Total Area (ha) 0.000

Time (mins)		Area
From:	To:	(ha)
0	4	0.000

.	Bristol Airport 12 mppa
.	Cogloop 2 Car Park - A1
.	Q100 +30%
Date 12/11/2018	Designed by RJH
File COG A1.SRCX	Checked by



Innovyze Source Control 2018.1

Model Details

Storage is Online Cover Level (m) 181.800

Complex Structure

Infiltration Trench

Infiltration Coefficient Base (m/hr)	0.12048	Trench Width (m)	1.8
Infiltration Coefficient Side (m/hr)	0.12048	Trench Length (m)	121.5
Safety Factor	2.0	Slope (1:X)	200.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	180.300	Cap Infiltration Depth (m)	0.000

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.12048	Width (m)	14.9
Membrane Percolation (mm/hr)	1000	Length (m)	121.5
Max Percolation (l/s)	502.9	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	181.350	Membrane Depth (m)	0

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A2
Q30



Date 01/08/2018
File Cog A2.SRCX

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Source Control 2018.1

Summary of Results for 30 year Return Period

Half Drain Time : 70 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	180.820	0.620	5.0	20.8	O K
30 min Summer	180.955	0.755	5.5	29.6	O K
60 min Summer	181.064	0.864	6.0	36.7	O K
120 min Summer	181.124	0.924	6.2	40.7	O K
180 min Summer	181.135	0.935	6.3	41.4	O K
240 min Summer	181.127	0.927	6.2	40.9	O K
360 min Summer	181.091	0.891	6.1	38.5	O K
480 min Summer	181.045	0.845	5.9	35.5	O K
600 min Summer	180.999	0.799	5.7	32.5	O K
720 min Summer	180.955	0.755	5.5	29.6	O K
960 min Summer	180.880	0.680	5.2	24.7	O K
1440 min Summer	180.780	0.580	4.6	18.2	O K
2160 min Summer	180.689	0.489	3.8	12.9	O K
2880 min Summer	180.624	0.424	3.2	9.7	O K
4320 min Summer	180.539	0.339	2.4	6.2	O K
5760 min Summer	180.484	0.284	2.0	4.4	O K
7200 min Summer	180.445	0.245	1.7	3.2	O K
8640 min Summer	180.415	0.215	1.5	2.5	O K
10080 min Summer	180.392	0.192	1.3	2.0	O K
15 min Winter	180.881	0.681	5.2	24.8	O K
30 min Winter	181.035	0.835	5.9	34.8	O K
60 min Winter	181.160	0.960	6.4	43.0	O K
120 min Winter	181.216	1.016	6.6	46.7	O K
180 min Winter	181.214	1.014	6.6	46.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	74.059	0.0	26
30 min Summer	48.833	0.0	38
60 min Summer	30.811	0.0	62
120 min Summer	18.860	0.0	96
180 min Summer	13.992	0.0	130
240 min Summer	11.265	0.0	164
360 min Summer	8.299	0.0	230
480 min Summer	6.674	0.0	296
600 min Summer	5.632	0.0	360
720 min Summer	4.901	0.0	422
960 min Summer	3.933	0.0	542
1440 min Summer	2.881	0.0	780
2160 min Summer	2.107	0.0	1136
2880 min Summer	1.687	0.0	1500
4320 min Summer	1.231	0.0	2212
5760 min Summer	0.984	0.0	2944
7200 min Summer	0.827	0.0	3672
8640 min Summer	0.717	0.0	4408
10080 min Summer	0.636	0.0	5136
15 min Winter	74.059	0.0	27
30 min Winter	48.833	0.0	38
60 min Winter	30.811	0.0	62
120 min Winter	18.860	0.0	102
180 min Winter	13.992	0.0	138

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A2
Q30



Date 01/08/2018
File Cog A2.SRCX

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Source Control 2018.1

Summary of Results for 30 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
240 min Winter	181.189	0.989	6.5	45.0	O K
360 min Winter	181.122	0.922	6.2	40.5	O K
480 min Winter	181.049	0.849	5.9	35.8	O K
600 min Winter	180.981	0.781	5.6	31.3	O K
720 min Winter	180.919	0.719	5.4	27.3	O K
960 min Winter	180.822	0.622	5.0	20.9	O K
1440 min Winter	180.714	0.514	4.0	14.3	O K
2160 min Winter	180.611	0.411	3.1	9.1	O K
2880 min Winter	180.544	0.344	2.5	6.4	O K
4320 min Winter	180.462	0.262	1.8	3.7	O K
5760 min Winter	180.413	0.213	1.4	2.5	O K
7200 min Winter	180.381	0.181	1.2	1.8	O K
8640 min Winter	180.357	0.157	1.0	1.3	O K
10080 min Winter	180.339	0.139	0.9	1.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
240 min Winter	11.265	0.0	176
360 min Winter	8.299	0.0	246
480 min Winter	6.674	0.0	314
600 min Winter	5.632	0.0	380
720 min Winter	4.901	0.0	442
960 min Winter	3.933	0.0	558
1440 min Winter	2.881	0.0	796
2160 min Winter	2.107	0.0	1152
2880 min Winter	1.687	0.0	1508
4320 min Winter	1.231	0.0	2212
5760 min Winter	0.984	0.0	2944
7200 min Winter	0.827	0.0	3656
8640 min Winter	0.717	0.0	4400
10080 min Winter	0.636	0.0	5120

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A2
Q30



Date 01/08/2018
File Cog A2.SRCX
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Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.264

Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)
0	4	0.066	4	8	0.066	8	12	0.066	12	16	0.066

Time Area Diagram

Total Area (ha) 0.000

Time (mins) From:	Time (mins) To:	Area (ha)
0	4	0.000

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A2
Q30



Date 01/08/2018
File Cog A2.SRCX

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Source Control 2018.1

Model Details

Storage is Online Cover Level (m) 181.700

Complex Structure

Infiltration Trench

Infiltration Coefficient Base (m/hr) 0.12048 Trench Width (m) 1.8
Infiltration Coefficient Side (m/hr) 0.12048 Trench Length (m) 121.5
Safety Factor 2.0 Slope (1:X) 200.0
Porosity 0.30 Cap Volume Depth (m) 0.000
Invert Level (m) 180.200 Cap Infiltration Depth (m) 0.000

Porous Car Park

Infiltration Coefficient Base (m/hr) 0.12048 Width (m) 20.0
Membrane Percolation (mm/hr) 1000 Length (m) 121.5
Max Percolation (l/s) 675.0 Slope (1:X) 100.0
Safety Factor 2.0 Depression Storage (mm) 5
Porosity 0.30 Evaporation (mm/day) 3
Invert Level (m) 181.250 Membrane Depth (m) 0

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A2
Q100 +30%



Date 12/11/2018
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Source Control 2018.1

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

Half Drain Time : 70 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	181.172	0.972	6.4	43.8	O K
30 min Summer	181.353	1.153	10.6	58.8	O K
60 min Summer	181.422	1.222	13.2	69.0	Flood Risk
120 min Summer	181.450	1.250	14.2	74.0	Flood Risk
180 min Summer	181.449	1.249	14.2	74.0	Flood Risk
240 min Summer	181.440	1.240	13.9	72.2	Flood Risk
360 min Summer	181.415	1.215	12.9	67.9	Flood Risk
480 min Summer	181.388	1.188	11.9	63.8	O K
600 min Summer	181.363	1.163	11.0	60.1	O K
720 min Summer	181.338	1.138	10.1	57.1	O K
960 min Summer	181.296	1.096	8.3	52.6	O K
1440 min Summer	181.139	0.939	6.3	41.7	O K
2160 min Summer	180.940	0.740	5.5	28.6	O K
2880 min Summer	180.817	0.617	5.0	20.6	O K
4320 min Summer	180.699	0.499	3.9	13.4	O K
5760 min Summer	180.623	0.423	3.2	9.6	O K
7200 min Summer	180.567	0.367	2.7	7.3	O K
8640 min Summer	180.525	0.325	2.3	5.7	O K
10080 min Summer	180.492	0.292	2.1	4.6	O K
15 min Winter	181.274	1.074	7.2	50.7	O K
30 min Winter	181.408	1.208	12.7	66.9	Flood Risk
60 min Winter	181.472	1.272	15.1	78.3	Flood Risk
120 min Winter	181.491	1.291	15.8	82.2	Flood Risk
180 min Winter	181.482	1.282	15.5	80.4	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	124.836	0.0	27
30 min Summer	83.061	0.0	37
60 min Summer	52.662	0.0	58
120 min Summer	32.210	0.0	90
180 min Summer	23.799	0.0	124
240 min Summer	19.065	0.0	156
360 min Summer	13.962	0.0	222
480 min Summer	11.178	0.0	288
600 min Summer	9.399	0.0	352
720 min Summer	8.153	0.0	416
960 min Summer	6.510	0.0	548
1440 min Summer	4.731	0.0	810
2160 min Summer	3.432	0.0	1172
2880 min Summer	2.730	0.0	1508
4320 min Summer	1.973	0.0	2216
5760 min Summer	1.566	0.0	2944
7200 min Summer	1.308	0.0	3672
8640 min Summer	1.129	0.0	4408
10080 min Summer	0.998	0.0	5136
15 min Winter	124.836	0.0	27
30 min Winter	83.061	0.0	37
60 min Winter	52.662	0.0	58
120 min Winter	32.210	0.0	94
180 min Winter	23.799	0.0	132

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A2
Q100 +30%



Date 12/11/2018
File Cog A2.SRCX

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Source Control 2018.1

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

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
240 min Winter	181.465	1.265	14.8	76.8	Flood Risk
360 min Winter	181.427	1.227	13.4	69.9	Flood Risk
480 min Winter	181.391	1.191	12.0	64.1	O K
600 min Winter	181.358	1.158	10.8	59.5	O K
720 min Winter	181.329	1.129	9.7	56.0	O K
960 min Winter	181.277	1.077	7.3	50.9	O K
1440 min Winter	181.035	0.835	5.9	34.8	O K
2160 min Winter	180.809	0.609	4.9	20.0	O K
2880 min Winter	180.716	0.516	4.0	14.4	O K
4320 min Winter	180.598	0.398	2.9	8.6	O K
5760 min Winter	180.527	0.327	2.3	5.8	O K
7200 min Winter	180.479	0.279	1.9	4.2	O K
8640 min Winter	180.444	0.244	1.7	3.2	O K
10080 min Winter	180.417	0.217	1.5	2.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
240 min Winter	19.065	0.0	166
360 min Winter	13.962	0.0	234
480 min Winter	11.178	0.0	300
600 min Winter	9.399	0.0	364
720 min Winter	8.153	0.0	432
960 min Winter	6.510	0.0	582
1440 min Winter	4.731	0.0	840
2160 min Winter	3.432	0.0	1172
2880 min Winter	2.730	0.0	1528
4320 min Winter	1.973	0.0	2248
5760 min Winter	1.566	0.0	2944
7200 min Winter	1.308	0.0	3672
8640 min Winter	1.129	0.0	4400
10080 min Winter	0.998	0.0	5136

.	Bristol Airport 12 mppa
.	Cogloop 2 Car Park- A2
.	Q100 +30%
Date 12/11/2018	Designed by RJH
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Innovyze Source Control 2018.1

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	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.264

Time (mins) Area	Time (mins) Area	Time (mins) Area	Time (mins) Area
From: To: (ha)	From: To: (ha)	From: To: (ha)	From: To: (ha)
0 4 0.066	4 8 0.066	8 12 0.066	12 16 0.066

Time Area Diagram

Total Area (ha) 0.000

Time (mins) Area
From: To: (ha)
0 4 0.000

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A2
Q100 +30%

Date 12/11/2018
File Cog A2.SRCX

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Innovyze

Source Control 2018.1

Model Details

Storage is Online Cover Level (m) 181.700

Complex Structure

Infiltration Trench

Infiltration Coefficient Base (m/hr)	0.12048	Trench Width (m)	1.8
Infiltration Coefficient Side (m/hr)	0.12048	Trench Length (m)	121.5
Safety Factor	2.0	Slope (1:X)	200.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	180.200	Cap Infiltration Depth (m)	0.000

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.12048	Width (m)	20.0
Membrane Percolation (mm/hr)	1000	Length (m)	121.5
Max Percolation (l/s)	675.0	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	181.250	Membrane Depth (m)	0

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A3
Q30



Date 01/08/2018
File Cog A3.SRCX

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Summary of Results for 30 year Return Period

Half Drain Time : 70 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	180.220	0.620	5.0	20.8	O K
30 min Summer	180.355	0.755	5.5	29.6	O K
60 min Summer	180.464	0.864	6.0	36.7	O K
120 min Summer	180.524	0.924	6.2	40.7	O K
180 min Summer	180.535	0.935	6.3	41.4	O K
240 min Summer	180.527	0.927	6.2	40.9	O K
360 min Summer	180.491	0.891	6.1	38.5	O K
480 min Summer	180.445	0.845	5.9	35.5	O K
600 min Summer	180.399	0.799	5.7	32.5	O K
720 min Summer	180.355	0.755	5.5	29.6	O K
960 min Summer	180.280	0.680	5.2	24.7	O K
1440 min Summer	180.180	0.580	4.6	18.2	O K
2160 min Summer	180.089	0.489	3.8	12.9	O K
2880 min Summer	180.024	0.424	3.2	9.7	O K
4320 min Summer	179.939	0.339	2.4	6.2	O K
5760 min Summer	179.884	0.284	2.0	4.4	O K
7200 min Summer	179.845	0.245	1.7	3.2	O K
8640 min Summer	179.815	0.215	1.5	2.5	O K
10080 min Summer	179.792	0.192	1.3	2.0	O K
15 min Winter	180.281	0.681	5.2	24.8	O K
30 min Winter	180.435	0.835	5.9	34.8	O K
60 min Winter	180.560	0.960	6.4	43.0	O K
120 min Winter	180.616	1.016	6.6	46.7	O K
180 min Winter	180.614	1.014	6.6	46.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	74.059	0.0	26
30 min Summer	48.833	0.0	38
60 min Summer	30.811	0.0	62
120 min Summer	18.860	0.0	96
180 min Summer	13.992	0.0	130
240 min Summer	11.265	0.0	164
360 min Summer	8.299	0.0	230
480 min Summer	6.674	0.0	296
600 min Summer	5.632	0.0	360
720 min Summer	4.901	0.0	422
960 min Summer	3.933	0.0	542
1440 min Summer	2.881	0.0	780
2160 min Summer	2.107	0.0	1136
2880 min Summer	1.687	0.0	1500
4320 min Summer	1.231	0.0	2212
5760 min Summer	0.984	0.0	2944
7200 min Summer	0.827	0.0	3672
8640 min Summer	0.717	0.0	4408
10080 min Summer	0.636	0.0	5136
15 min Winter	74.059	0.0	27
30 min Winter	48.833	0.0	38
60 min Winter	30.811	0.0	62
120 min Winter	18.860	0.0	102
180 min Winter	13.992	0.0	138

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Cogloop 2 Car Park- A3
Q30



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Summary of Results for 30 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
240 min Winter	180.589	0.989	6.5	45.0	O K
360 min Winter	180.522	0.922	6.2	40.5	O K
480 min Winter	180.449	0.849	5.9	35.8	O K
600 min Winter	180.381	0.781	5.6	31.3	O K
720 min Winter	180.319	0.719	5.4	27.3	O K
960 min Winter	180.222	0.622	5.0	20.9	O K
1440 min Winter	180.114	0.514	4.0	14.3	O K
2160 min Winter	180.011	0.411	3.1	9.1	O K
2880 min Winter	179.944	0.344	2.5	6.4	O K
4320 min Winter	179.862	0.262	1.8	3.7	O K
5760 min Winter	179.813	0.213	1.4	2.5	O K
7200 min Winter	179.781	0.181	1.2	1.8	O K
8640 min Winter	179.757	0.157	1.0	1.3	O K
10080 min Winter	179.739	0.139	0.9	1.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
240 min Winter	11.265	0.0	176
360 min Winter	8.299	0.0	246
480 min Winter	6.674	0.0	314
600 min Winter	5.632	0.0	380
720 min Winter	4.901	0.0	442
960 min Winter	3.933	0.0	558
1440 min Winter	2.881	0.0	796
2160 min Winter	2.107	0.0	1152
2880 min Winter	1.687	0.0	1508
4320 min Winter	1.231	0.0	2212
5760 min Winter	0.984	0.0	2944
7200 min Winter	0.827	0.0	3656
8640 min Winter	0.717	0.0	4400
10080 min Winter	0.636	0.0	5120

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A3
Q30



Date 01/08/2018
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Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.264

Time (mins) Area	Time (mins) Area	Time (mins) Area	Time (mins) Area
From: To: (ha)	From: To: (ha)	From: To: (ha)	From: To: (ha)
0 4 0.066	4 8 0.066	8 12 0.066	12 16 0.066

Time Area Diagram

Total Area (ha) 0.000

Time (mins) Area
From: To: (ha)
0 4 0.000

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A3
Q30



Date 01/08/2018
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Source Control 2018.1

Model Details

Storage is Online Cover Level (m) 181.100

Complex Structure

Infiltration Trench

Infiltration Coefficient Base (m/hr) 0.12048 Trench Width (m) 1.8
Infiltration Coefficient Side (m/hr) 0.12048 Trench Length (m) 121.5
Safety Factor 2.0 Slope (1:X) 200.0
Porosity 0.30 Cap Volume Depth (m) 0.000
Invert Level (m) 179.600 Cap Infiltration Depth (m) 0.000

Porous Car Park

Infiltration Coefficient Base (m/hr) 0.12048 Width (m) 20.0
Membrane Percolation (mm/hr) 1000 Length (m) 121.5
Max Percolation (l/s) 675.0 Slope (1:X) 100.0
Safety Factor 2.0 Depression Storage (mm) 5
Porosity 0.30 Evaporation (mm/day) 3
Invert Level (m) 180.650 Membrane Depth (m) 0

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A3
Q100 +30%



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Source Control 2018.1

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

Half Drain Time : 70 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	180.572	0.972	6.4	43.8	O K
30 min Summer	180.753	1.153	10.6	58.8	O K
60 min Summer	180.822	1.222	13.2	69.0	Flood Risk
120 min Summer	180.850	1.250	14.2	74.0	Flood Risk
180 min Summer	180.849	1.249	14.2	74.0	Flood Risk
240 min Summer	180.840	1.240	13.9	72.2	Flood Risk
360 min Summer	180.815	1.215	12.9	67.9	Flood Risk
480 min Summer	180.788	1.188	11.9	63.8	O K
600 min Summer	180.763	1.163	11.0	60.1	O K
720 min Summer	180.738	1.138	10.1	57.1	O K
960 min Summer	180.696	1.096	8.3	52.6	O K
1440 min Summer	180.539	0.939	6.3	41.7	O K
2160 min Summer	180.340	0.740	5.5	28.6	O K
2880 min Summer	180.217	0.617	5.0	20.6	O K
4320 min Summer	180.099	0.499	3.9	13.4	O K
5760 min Summer	180.023	0.423	3.2	9.6	O K
7200 min Summer	179.967	0.367	2.7	7.3	O K
8640 min Summer	179.925	0.325	2.3	5.7	O K
10080 min Summer	179.892	0.292	2.1	4.6	O K
15 min Winter	180.674	1.074	7.2	50.7	O K
30 min Winter	180.808	1.208	12.7	66.9	Flood Risk
60 min Winter	180.872	1.272	15.1	78.3	Flood Risk
120 min Winter	180.891	1.291	15.8	82.2	Flood Risk
180 min Winter	180.882	1.282	15.5	80.4	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	124.836	0.0	27
30 min Summer	83.061	0.0	37
60 min Summer	52.662	0.0	58
120 min Summer	32.210	0.0	90
180 min Summer	23.799	0.0	124
240 min Summer	19.065	0.0	156
360 min Summer	13.962	0.0	222
480 min Summer	11.178	0.0	288
600 min Summer	9.399	0.0	352
720 min Summer	8.153	0.0	416
960 min Summer	6.510	0.0	548
1440 min Summer	4.731	0.0	810
2160 min Summer	3.432	0.0	1172
2880 min Summer	2.730	0.0	1508
4320 min Summer	1.973	0.0	2216
5760 min Summer	1.566	0.0	2944
7200 min Summer	1.308	0.0	3672
8640 min Summer	1.129	0.0	4408
10080 min Summer	0.998	0.0	5136
15 min Winter	124.836	0.0	27
30 min Winter	83.061	0.0	37
60 min Winter	52.662	0.0	58
120 min Winter	32.210	0.0	94
180 min Winter	23.799	0.0	132

.	Bristol Airport 12 mppa	
.	Cogloop 2 Car Park- A3	
.	Q100 +30%	
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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 (m ³)	Status
240 min Winter	180.865	1.265	14.8	76.8	Flood Risk
360 min Winter	180.827	1.227	13.4	69.9	Flood Risk
480 min Winter	180.791	1.191	12.0	64.1	O K
600 min Winter	180.758	1.158	10.8	59.5	O K
720 min Winter	180.729	1.129	9.7	56.0	O K
960 min Winter	180.677	1.077	7.3	50.9	O K
1440 min Winter	180.435	0.835	5.9	34.8	O K
2160 min Winter	180.209	0.609	4.9	20.0	O K
2880 min Winter	180.116	0.516	4.0	14.4	O K
4320 min Winter	179.998	0.398	2.9	8.6	O K
5760 min Winter	179.927	0.327	2.3	5.8	O K
7200 min Winter	179.879	0.279	1.9	4.2	O K
8640 min Winter	179.844	0.244	1.7	3.2	O K
10080 min Winter	179.817	0.217	1.5	2.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
240 min Winter	19.065	0.0	166
360 min Winter	13.962	0.0	234
480 min Winter	11.178	0.0	300
600 min Winter	9.399	0.0	364
720 min Winter	8.153	0.0	432
960 min Winter	6.510	0.0	582
1440 min Winter	4.731	0.0	840
2160 min Winter	3.432	0.0	1172
2880 min Winter	2.730	0.0	1528
4320 min Winter	1.973	0.0	2248
5760 min Winter	1.566	0.0	2944
7200 min Winter	1.308	0.0	3672
8640 min Winter	1.129	0.0	4400
10080 min Winter	0.998	0.0	5136

.	Bristol Airport 12 mppa
.	Cogloop 2 Car Park- A3
.	Q100 +30%
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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	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.264

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
From:	To:	From:	To:	From:	To:	From:	To:
0	4	4	8	8	12	12	16
	0.066		0.066		0.066		0.066

Time Area Diagram

Total Area (ha) 0.000

Time (mins)	Area (ha)
From:	To:
0	4
	0.000

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A3
Q100 +30%



Date 12/11/2018
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Innovyze Source Control 2018.1

Model Details

Storage is Online Cover Level (m) 181.100

Complex Structure

Infiltration Trench

Infiltration Coefficient Base (m/hr) 0.12048 Trench Width (m) 1.8
Infiltration Coefficient Side (m/hr) 0.12048 Trench Length (m) 121.5
Safety Factor 2.0 Slope (1:X) 200.0
Porosity 0.30 Cap Volume Depth (m) 0.000
Invert Level (m) 179.600 Cap Infiltration Depth (m) 0.000

Porous Car Park

Infiltration Coefficient Base (m/hr) 0.12048 Width (m) 20.0
Membrane Percolation (mm/hr) 1000 Length (m) 121.5
Max Percolation (l/s) 675.0 Slope (1:X) 100.0
Safety Factor 2.0 Depression Storage (mm) 5
Porosity 0.30 Evaporation (mm/day) 3
Invert Level (m) 180.650 Membrane Depth (m) 0

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A4
Q30



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Summary of Results for 30 year Return Period

Half Drain Time : 71 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	180.222	0.622	5.0	20.9	O K
30 min Summer	180.357	0.757	5.5	29.8	O K
60 min Summer	180.467	0.867	6.0	36.9	O K
120 min Summer	180.527	0.927	6.2	40.9	O K
180 min Summer	180.539	0.939	6.3	41.6	O K
240 min Summer	180.530	0.930	6.2	41.1	O K
360 min Summer	180.494	0.894	6.1	38.7	O K
480 min Summer	180.448	0.848	5.9	35.7	O K
600 min Summer	180.402	0.802	5.7	32.7	O K
720 min Summer	180.358	0.758	5.5	29.8	O K
960 min Summer	180.282	0.682	5.2	24.8	O K
1440 min Summer	180.182	0.582	4.7	18.3	O K
2160 min Summer	180.090	0.490	3.8	13.0	O K
2880 min Summer	180.026	0.426	3.2	9.8	O K
4320 min Summer	179.940	0.340	2.4	6.3	O K
5760 min Summer	179.885	0.285	2.0	4.4	O K
7200 min Summer	179.845	0.245	1.7	3.3	O K
8640 min Summer	179.816	0.216	1.5	2.5	O K
10080 min Summer	179.793	0.193	1.3	2.0	O K
15 min Winter	180.283	0.683	5.2	24.9	O K
30 min Winter	180.437	0.837	5.9	35.0	O K
60 min Winter	180.563	0.963	6.4	43.3	O K
120 min Winter	180.620	1.020	6.6	47.0	O K
180 min Winter	180.618	1.018	6.6	46.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	74.059	0.0	27
30 min Summer	48.833	0.0	38
60 min Summer	30.811	0.0	62
120 min Summer	18.860	0.0	96
180 min Summer	13.992	0.0	130
240 min Summer	11.265	0.0	164
360 min Summer	8.299	0.0	230
480 min Summer	6.674	0.0	296
600 min Summer	5.632	0.0	360
720 min Summer	4.901	0.0	422
960 min Summer	3.933	0.0	542
1440 min Summer	2.881	0.0	780
2160 min Summer	2.107	0.0	1136
2880 min Summer	1.687	0.0	1500
4320 min Summer	1.231	0.0	2212
5760 min Summer	0.984	0.0	2944
7200 min Summer	0.827	0.0	3672
8640 min Summer	0.717	0.0	4400
10080 min Summer	0.636	0.0	5136
15 min Winter	74.059	0.0	27
30 min Winter	48.833	0.0	38
60 min Winter	30.811	0.0	62
120 min Winter	18.860	0.0	102
180 min Winter	13.992	0.0	138

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A4
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Summary of Results for 30 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
240 min Winter	180.593	0.993	6.5	45.2	O K
360 min Winter	180.525	0.925	6.2	40.8	O K
480 min Winter	180.452	0.852	5.9	36.0	O K
600 min Winter	180.384	0.784	5.6	31.5	O K
720 min Winter	180.322	0.722	5.4	27.4	O K
960 min Winter	180.224	0.624	5.0	21.0	O K
1440 min Winter	180.116	0.516	4.0	14.4	O K
2160 min Winter	180.012	0.412	3.1	9.2	O K
2880 min Winter	179.945	0.345	2.5	6.4	O K
4320 min Winter	179.863	0.263	1.8	3.7	O K
5760 min Winter	179.814	0.214	1.5	2.5	O K
7200 min Winter	179.781	0.181	1.2	1.8	O K
8640 min Winter	179.758	0.158	1.0	1.3	O K
10080 min Winter	179.740	0.140	0.9	1.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
240 min Winter	11.265	0.0	176
360 min Winter	8.299	0.0	246
480 min Winter	6.674	0.0	314
600 min Winter	5.632	0.0	380
720 min Winter	4.901	0.0	442
960 min Winter	3.933	0.0	558
1440 min Winter	2.881	0.0	796
2160 min Winter	2.107	0.0	1152
2880 min Winter	1.687	0.0	1508
4320 min Winter	1.231	0.0	2212
5760 min Winter	0.984	0.0	2936
7200 min Winter	0.827	0.0	3672
8640 min Winter	0.717	0.0	4384
10080 min Winter	0.636	0.0	5104

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A4
Q30



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Source Control 2018.1

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.265

Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)
0	4	0.066	4	8	0.066	8	12	0.066	12	16	0.067

Time Area Diagram

Total Area (ha) 0.000

Time (mins) From:	Time (mins) To:	Area (ha)
0	4	0.000

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A4
Q30



Date 01/08/2018
File Cog A4.SRCX

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Model Details

Storage is Online Cover Level (m) 181.100

Complex Structure

Infiltration Trench

Infiltration Coefficient Base (m/hr) 0.12048 Trench Width (m) 1.8
Infiltration Coefficient Side (m/hr) 0.12048 Trench Length (m) 121.5
Safety Factor 2.0 Slope (1:X) 200.0
Porosity 0.30 Cap Volume Depth (m) 0.000
Invert Level (m) 179.600 Cap Infiltration Depth (m) 0.000

Porous Car Park

Infiltration Coefficient Base (m/hr) 0.12048 Width (m) 20.0
Membrane Percolation (mm/hr) 1000 Length (m) 121.5
Max Percolation (l/s) 675.0 Slope (1:X) 100.0
Safety Factor 2.0 Depression Storage (mm) 5
Porosity 0.30 Evaporation (mm/day) 3
Invert Level (m) 180.650 Membrane Depth (m) 0

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A5
Q30



Date 01/08/2018
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Summary of Results for 30 year Return Period

Half Drain Time : 70 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	178.379	0.629	5.0	21.3	O K
30 min Summer	178.497	0.747	5.5	29.1	O K
60 min Summer	178.587	0.837	5.9	35.0	O K
120 min Summer	178.632	0.882	6.0	37.9	O K
180 min Summer	178.633	0.883	6.0	38.0	O K
240 min Summer	178.617	0.867	6.0	37.0	O K
360 min Summer	178.573	0.823	5.8	34.1	O K
480 min Summer	178.525	0.775	5.6	31.0	O K
600 min Summer	178.480	0.730	5.4	28.0	O K
720 min Summer	178.439	0.689	5.3	25.3	O K
960 min Summer	178.373	0.623	5.0	20.9	O K
1440 min Summer	178.289	0.539	4.2	15.7	O K
2160 min Summer	178.203	0.453	3.4	11.1	O K
2880 min Summer	178.142	0.392	2.9	8.3	O K
4320 min Summer	178.063	0.313	2.2	5.3	O K
5760 min Summer	178.012	0.262	1.8	3.7	O K
7200 min Summer	177.975	0.225	1.5	2.7	O K
8640 min Summer	177.948	0.198	1.3	2.1	O K
10080 min Summer	177.927	0.177	1.2	1.7	O K
15 min Winter	178.433	0.683	5.2	24.9	O K
30 min Winter	178.568	0.818	5.8	33.7	O K
60 min Winter	178.672	0.922	6.2	40.6	O K
120 min Winter	178.711	0.961	6.4	43.1	O K
180 min Winter	178.699	0.949	6.3	42.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	74.059	0.0	26
30 min Summer	48.833	0.0	37
60 min Summer	30.811	0.0	60
120 min Summer	18.860	0.0	94
180 min Summer	13.992	0.0	128
240 min Summer	11.265	0.0	162
360 min Summer	8.299	0.0	228
480 min Summer	6.674	0.0	294
600 min Summer	5.632	0.0	356
720 min Summer	4.901	0.0	418
960 min Summer	3.933	0.0	538
1440 min Summer	2.881	0.0	778
2160 min Summer	2.107	0.0	1136
2880 min Summer	1.687	0.0	1500
4320 min Summer	1.231	0.0	2212
5760 min Summer	0.984	0.0	2944
7200 min Summer	0.827	0.0	3672
8640 min Summer	0.717	0.0	4400
10080 min Summer	0.636	0.0	5136
15 min Winter	74.059	0.0	27
30 min Winter	48.833	0.0	38
60 min Winter	30.811	0.0	62
120 min Winter	18.860	0.0	100
180 min Winter	13.992	0.0	138

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A5
Q30



Date 01/08/2018
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Summary of Results for 30 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
240 min Winter	178.668	0.918	6.2	40.3	O K
360 min Winter	178.595	0.845	5.9	35.5	O K
480 min Winter	178.523	0.773	5.6	30.8	O K
600 min Winter	178.458	0.708	5.3	26.5	O K
720 min Winter	178.402	0.652	5.1	22.9	O K
960 min Winter	178.326	0.576	4.6	17.9	O K
1440 min Winter	178.225	0.475	3.6	12.2	O K
2160 min Winter	178.129	0.379	2.8	7.8	O K
2880 min Winter	178.067	0.317	2.3	5.4	O K
4320 min Winter	177.991	0.241	1.7	3.1	O K
5760 min Winter	177.947	0.197	1.3	2.1	O K
7200 min Winter	177.917	0.167	1.1	1.5	O K
8640 min Winter	177.895	0.145	0.9	1.1	O K
10080 min Winter	177.879	0.129	0.8	0.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
240 min Winter	11.265	0.0	174
360 min Winter	8.299	0.0	244
480 min Winter	6.674	0.0	310
600 min Winter	5.632	0.0	374
720 min Winter	4.901	0.0	434
960 min Winter	3.933	0.0	552
1440 min Winter	2.881	0.0	794
2160 min Winter	2.107	0.0	1152
2880 min Winter	1.687	0.0	1504
4320 min Winter	1.231	0.0	2212
5760 min Winter	0.984	0.0	2936
7200 min Winter	0.827	0.0	3672
8640 min Winter	0.717	0.0	4400
10080 min Winter	0.636	0.0	5096

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A5
Q30



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Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.237

Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)
0	4	0.059	4	8	0.059	8	12	0.059	12	16	0.060

Time Area Diagram

Total Area (ha) 0.000

Time (mins) From:	Time (mins) To:	Area (ha)
0	4	0.000

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Date 01/08/2018
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Bristol Airport 12 mppa
Cogloop 2 Car Park- A5
Q30



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Model Details

Storage is Online Cover Level (m) 179.250

Complex Structure

Infiltration Trench

Infiltration Coefficient Base (m/hr)	0.12048	Trench Width (m)	1.8
Infiltration Coefficient Side (m/hr)	0.12048	Trench Length (m)	121.5
Safety Factor	2.0	Slope (1:X)	200.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	177.750	Cap Infiltration Depth (m)	0.000

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.12048	Width (m)	12.5
Membrane Percolation (mm/hr)	1000	Length (m)	121.5
Max Percolation (l/s)	421.9	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	178.800	Membrane Depth (m)	0

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A6
Q30



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Summary of Results for 30 year Return Period

Half Drain Time : 69 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	176.870	0.570	4.4	17.5	O K
30 min Summer	177.001	0.701	4.8	25.2	O K
60 min Summer	177.107	0.807	5.2	31.4	O K
120 min Summer	177.166	0.866	5.5	34.8	O K
180 min Summer	177.177	0.877	5.5	35.5	O K
240 min Summer	177.169	0.869	5.5	35.0	O K
360 min Summer	177.133	0.833	5.3	32.9	O K
480 min Summer	177.088	0.788	5.2	30.2	O K
600 min Summer	177.042	0.742	5.0	27.5	O K
720 min Summer	176.999	0.699	4.8	25.0	O K
960 min Summer	176.924	0.624	4.6	20.7	O K
1440 min Summer	176.825	0.525	4.1	14.9	O K
2160 min Summer	176.740	0.440	3.3	10.5	O K
2880 min Summer	176.680	0.380	2.8	7.8	O K
4320 min Summer	176.602	0.302	2.1	4.9	O K
5760 min Summer	176.552	0.252	1.7	3.4	O K
7200 min Summer	176.516	0.216	1.5	2.5	O K
8640 min Summer	176.489	0.189	1.3	1.9	O K
10080 min Summer	176.469	0.169	1.1	1.5	O K
15 min Winter	176.929	0.629	4.6	21.0	O K
30 min Winter	177.079	0.779	5.1	29.7	O K
60 min Winter	177.201	0.901	5.6	36.9	O K
120 min Winter	177.256	0.956	5.8	40.1	O K
180 min Winter	177.254	0.954	5.8	39.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	74.059	0.0	26
30 min Summer	48.833	0.0	38
60 min Summer	30.811	0.0	62
120 min Summer	18.860	0.0	96
180 min Summer	13.992	0.0	128
240 min Summer	11.265	0.0	162
360 min Summer	8.299	0.0	230
480 min Summer	6.674	0.0	296
600 min Summer	5.632	0.0	360
720 min Summer	4.901	0.0	422
960 min Summer	3.933	0.0	542
1440 min Summer	2.881	0.0	778
2160 min Summer	2.107	0.0	1136
2880 min Summer	1.687	0.0	1500
4320 min Summer	1.231	0.0	2212
5760 min Summer	0.984	0.0	2944
7200 min Summer	0.827	0.0	3672
8640 min Summer	0.717	0.0	4400
10080 min Summer	0.636	0.0	5136
15 min Winter	74.059	0.0	27
30 min Winter	48.833	0.0	38
60 min Winter	30.811	0.0	62
120 min Winter	18.860	0.0	100
180 min Winter	13.992	0.0	138

.	Bristol Airport 12 mppa	
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.	Q30	
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Summary of Results for 30 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
240 min Winter	177.229	0.929	5.7	38.5	O K
360 min Winter	177.162	0.862	5.4	34.6	O K
480 min Winter	177.090	0.790	5.2	30.3	O K
600 min Winter	177.022	0.722	4.9	26.4	O K
720 min Winter	176.961	0.661	4.7	22.8	O K
960 min Winter	176.864	0.564	4.3	17.2	O K
1440 min Winter	176.762	0.462	3.5	11.5	O K
2160 min Winter	176.667	0.367	2.7	7.3	O K
2880 min Winter	176.606	0.306	2.2	5.0	O K
4320 min Winter	176.532	0.232	1.6	2.9	O K
5760 min Winter	176.488	0.188	1.3	1.9	O K
7200 min Winter	176.459	0.159	1.0	1.4	O K
8640 min Winter	176.438	0.138	0.9	1.0	O K
10080 min Winter	176.422	0.122	0.8	0.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
240 min Winter	11.265	0.0	176
360 min Winter	8.299	0.0	246
480 min Winter	6.674	0.0	314
600 min Winter	5.632	0.0	378
720 min Winter	4.901	0.0	440
960 min Winter	3.933	0.0	558
1440 min Winter	2.881	0.0	792
2160 min Winter	2.107	0.0	1148
2880 min Winter	1.687	0.0	1504
4320 min Winter	1.231	0.0	2212
5760 min Winter	0.984	0.0	2936
7200 min Winter	0.827	0.0	3672
8640 min Winter	0.717	0.0	4400
10080 min Winter	0.636	0.0	5120

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Bristol Airport 12 mppa
 Cogloop 2 Car Park- A6
 Q30



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Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.230

Time (mins) Area	Time (mins) Area	Time (mins) Area	Time (mins) Area
From: To: (ha)	From: To: (ha)	From: To: (ha)	From: To: (ha)
0 4 0.058	4 8 0.058	8 12 0.057	12 16 0.057

Time Area Diagram

Total Area (ha) 0.000

Time (mins) Area
From: To: (ha)
0 4 0.000

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A6
Q30



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Model Details

Storage is Online Cover Level (m) 177.800

Complex Structure

Infiltration Trench

Infiltration Coefficient Base (m/hr) 0.12048 Trench Width (m) 1.8
Infiltration Coefficient Side (m/hr) 0.12048 Trench Length (m) 108.3
Safety Factor 2.0 Slope (1:X) 200.0
Porosity 0.30 Cap Volume Depth (m) 0.000
Invert Level (m) 176.300 Cap Infiltration Depth (m) 0.000

Porous Car Park

Infiltration Coefficient Base (m/hr) 0.12048 Width (m) 20.0
Membrane Percolation (mm/hr) 1000 Length (m) 111.5
Max Percolation (l/s) 619.4 Slope (1:X) 100.0
Safety Factor 2.0 Depression Storage (mm) 5
Porosity 0.30 Evaporation (mm/day) 3
Invert Level (m) 177.350 Membrane Depth (m) 0

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A7
Q30



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Summary of Results for 30 year Return Period

Half Drain Time : 70 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	175.133	0.533	3.8	15.1	O K
30 min Summer	175.266	0.666	4.2	21.9	O K
60 min Summer	175.373	0.773	4.6	27.4	O K
120 min Summer	175.433	0.833	4.8	30.5	O K
180 min Summer	175.445	0.845	4.8	31.1	O K
240 min Summer	175.436	0.836	4.8	30.6	O K
360 min Summer	175.400	0.800	4.7	28.8	O K
480 min Summer	175.354	0.754	4.5	26.4	O K
600 min Summer	175.308	0.708	4.4	24.1	O K
720 min Summer	175.263	0.663	4.2	21.8	O K
960 min Summer	175.187	0.587	4.0	17.9	O K
1440 min Summer	175.080	0.480	3.6	12.5	O K
2160 min Summer	175.000	0.400	3.0	8.6	O K
2880 min Summer	174.944	0.344	2.5	6.4	O K
4320 min Summer	174.872	0.272	1.9	4.0	O K
5760 min Summer	174.825	0.225	1.5	2.7	O K
7200 min Summer	174.793	0.193	1.3	2.0	O K
8640 min Summer	174.769	0.169	1.1	1.5	O K
10080 min Summer	174.750	0.150	1.0	1.2	O K
15 min Winter	175.193	0.593	4.0	18.2	O K
30 min Winter	175.345	0.745	4.5	26.0	O K
60 min Winter	175.468	0.868	4.9	32.3	O K
120 min Winter	175.524	0.924	5.1	35.1	O K
180 min Winter	175.523	0.923	5.1	35.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	74.059	0.0	26
30 min Summer	48.833	0.0	38
60 min Summer	30.811	0.0	62
120 min Summer	18.860	0.0	96
180 min Summer	13.992	0.0	130
240 min Summer	11.265	0.0	164
360 min Summer	8.299	0.0	230
480 min Summer	6.674	0.0	296
600 min Summer	5.632	0.0	360
720 min Summer	4.901	0.0	422
960 min Summer	3.933	0.0	544
1440 min Summer	2.881	0.0	776
2160 min Summer	2.107	0.0	1132
2880 min Summer	1.687	0.0	1496
4320 min Summer	1.231	0.0	2212
5760 min Summer	0.984	0.0	2936
7200 min Summer	0.827	0.0	3672
8640 min Summer	0.717	0.0	4400
10080 min Summer	0.636	0.0	5136
15 min Winter	74.059	0.0	27
30 min Winter	48.833	0.0	38
60 min Winter	30.811	0.0	62
120 min Winter	18.860	0.0	102
180 min Winter	13.992	0.0	138

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A7
Q30



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Summary of Results for 30 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
240 min Winter	175.498	0.898	5.0	33.7	O K
360 min Winter	175.430	0.830	4.8	30.3	O K
480 min Winter	175.357	0.757	4.5	26.6	O K
600 min Winter	175.288	0.688	4.3	23.0	O K
720 min Winter	175.226	0.626	4.1	19.9	O K
960 min Winter	175.124	0.524	3.8	14.7	O K
1440 min Winter	175.018	0.418	3.1	9.4	O K
2160 min Winter	174.930	0.330	2.4	5.9	O K
2880 min Winter	174.874	0.274	1.9	4.1	O K
4320 min Winter	174.807	0.207	1.4	2.3	O K
5760 min Winter	174.767	0.167	1.1	1.5	O K
7200 min Winter	174.741	0.141	0.9	1.1	O K
8640 min Winter	174.722	0.122	0.8	0.8	O K
10080 min Winter	174.708	0.108	0.7	0.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
240 min Winter	11.265	0.0	176
360 min Winter	8.299	0.0	246
480 min Winter	6.674	0.0	314
600 min Winter	5.632	0.0	380
720 min Winter	4.901	0.0	442
960 min Winter	3.933	0.0	560
1440 min Winter	2.881	0.0	790
2160 min Winter	2.107	0.0	1148
2880 min Winter	1.687	0.0	1500
4320 min Winter	1.231	0.0	2212
5760 min Winter	0.984	0.0	2936
7200 min Winter	0.827	0.0	3672
8640 min Winter	0.717	0.0	4400
10080 min Winter	0.636	0.0	5136

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.	Cogloop 2 Car Park- A7
.	Q30
Date 01/08/2018	Designed by RJH
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Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.203

Time (mins) Area	Time (mins) Area	Time (mins) Area	Time (mins) Area
From: To: (ha)	From: To: (ha)	From: To: (ha)	From: To: (ha)
0 4 0.051	4 8 0.051	8 12 0.051	12 16 0.050

Time Area Diagram

Total Area (ha) 0.000

Time (mins) Area
From: To: (ha)
0 4 0.000

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A7
Q30



Date 01/08/2018
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Model Details

Storage is Online Cover Level (m) 176.100

Complex Structure

Infiltration Trench

Infiltration Coefficient Base (m/hr)	0.12048	Trench Width (m)	1.8
Infiltration Coefficient Side (m/hr)	0.12048	Trench Length (m)	94.5
Safety Factor	2.0	Slope (1:X)	200.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	174.600	Cap Infiltration Depth (m)	0.000

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.12048	Width (m)	21.5
Membrane Percolation (mm/hr)	1000	Length (m)	94.5
Max Percolation (l/s)	564.4	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	175.650	Membrane Depth (m)	0

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A8
Q30



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Summary of Results for 30 year Return Period

Half Drain Time : 43 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	173.990	0.390	2.9	8.2	O K
30 min Summer	174.064	0.464	3.4	11.6	O K
60 min Summer	174.116	0.516	3.6	14.1	O K
120 min Summer	174.143	0.543	3.7	15.4	O K
180 min Summer	174.140	0.540	3.7	15.3	O K
240 min Summer	174.128	0.528	3.6	14.7	O K
360 min Summer	174.094	0.494	3.5	13.1	O K
480 min Summer	174.061	0.461	3.4	11.5	O K
600 min Summer	174.034	0.434	3.3	10.2	O K
720 min Summer	174.011	0.411	3.1	9.1	O K
960 min Summer	173.971	0.371	2.7	7.4	O K
1440 min Summer	173.912	0.312	2.2	5.3	O K
2160 min Summer	173.854	0.254	1.8	3.5	O K
2880 min Summer	173.815	0.215	1.5	2.5	O K
4320 min Summer	173.766	0.166	1.1	1.5	O K
5760 min Summer	173.735	0.135	0.9	1.0	O K
7200 min Summer	173.714	0.114	0.7	0.7	O K
8640 min Summer	173.699	0.099	0.6	0.5	O K
10080 min Summer	173.688	0.088	0.6	0.4	O K
15 min Winter	174.027	0.427	3.2	9.8	O K
30 min Winter	174.109	0.509	3.6	13.8	O K
60 min Winter	174.168	0.568	3.8	16.7	O K
120 min Winter	174.186	0.586	3.8	17.5	O K
180 min Winter	174.171	0.571	3.8	16.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	74.059	0.0	26
30 min Summer	48.833	0.0	36
60 min Summer	30.811	0.0	56
120 min Summer	18.860	0.0	90
180 min Summer	13.992	0.0	124
240 min Summer	11.265	0.0	156
360 min Summer	8.299	0.0	220
480 min Summer	6.674	0.0	282
600 min Summer	5.632	0.0	342
720 min Summer	4.901	0.0	404
960 min Summer	3.933	0.0	524
1440 min Summer	2.881	0.0	764
2160 min Summer	2.107	0.0	1124
2880 min Summer	1.687	0.0	1480
4320 min Summer	1.231	0.0	2208
5760 min Summer	0.984	0.0	2936
7200 min Summer	0.827	0.0	3672
8640 min Summer	0.717	0.0	4368
10080 min Summer	0.636	0.0	5136
15 min Winter	74.059	0.0	26
30 min Winter	48.833	0.0	37
60 min Winter	30.811	0.0	60
120 min Winter	18.860	0.0	96
180 min Winter	13.992	0.0	132

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A8
Q30



Date 01/08/2018
File Cog A8.SRCX

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Summary of Results for 30 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
240 min Winter	174.144	0.544	3.7	15.5	O K
360 min Winter	174.089	0.489	3.5	12.8	O K
480 min Winter	174.044	0.444	3.3	10.6	O K
600 min Winter	174.009	0.409	3.0	9.0	O K
720 min Winter	173.979	0.379	2.8	7.7	O K
960 min Winter	173.930	0.330	2.4	5.9	O K
1440 min Winter	173.863	0.263	1.8	3.7	O K
2160 min Winter	173.802	0.202	1.4	2.2	O K
2880 min Winter	173.766	0.166	1.1	1.5	O K
4320 min Winter	173.723	0.123	0.8	0.8	O K
5760 min Winter	173.698	0.098	0.6	0.5	O K
7200 min Winter	173.682	0.082	0.5	0.4	O K
8640 min Winter	173.671	0.071	0.4	0.3	O K
10080 min Winter	173.663	0.063	0.4	0.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
240 min Winter	11.265	0.0	166
360 min Winter	8.299	0.0	232
480 min Winter	6.674	0.0	292
600 min Winter	5.632	0.0	356
720 min Winter	4.901	0.0	416
960 min Winter	3.933	0.0	538
1440 min Winter	2.881	0.0	774
2160 min Winter	2.107	0.0	1128
2880 min Winter	1.687	0.0	1480
4320 min Winter	1.231	0.0	2204
5760 min Winter	0.984	0.0	2936
7200 min Winter	0.827	0.0	3672
8640 min Winter	0.717	0.0	4408
10080 min Winter	0.636	0.0	5112

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A8
Q30



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Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.115

Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)
0	4	0.029	4	8	0.029	8	12	0.029	12	16	0.028

Time Area Diagram

Total Area (ha) 0.000

Time (mins) From:	Time (mins) To:	Area (ha)
0	4	0.000

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A8
Q30



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Model Details

Storage is Online Cover Level (m) 175.100

Complex Structure

Infiltration Trench

Infiltration Coefficient Base (m/hr)	0.12048	Trench Width (m)	1.8
Infiltration Coefficient Side (m/hr)	0.12048	Trench Length (m)	90.0
Safety Factor	2.0	Slope (1:X)	200.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	173.600	Cap Infiltration Depth (m)	0.000

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.12048	Width (m)	12.8
Membrane Percolation (mm/hr)	1000	Length (m)	90.0
Max Percolation (l/s)	320.0	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	174.650	Membrane Depth (m)	0

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A9
Q30



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Source Control 2018.1

Summary of Results for 30 year Return Period

Half Drain Time : 52 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	173.352	0.452	3.3	11.0	O K
30 min Summer	173.412	0.512	3.5	13.9	O K
60 min Summer	173.444	0.544	3.6	15.4	O K
120 min Summer	173.443	0.543	3.6	15.3	O K
180 min Summer	173.424	0.524	3.6	14.4	O K
240 min Summer	173.401	0.501	3.5	13.4	O K
360 min Summer	173.361	0.461	3.4	11.4	O K
480 min Summer	173.329	0.429	3.2	9.9	O K
600 min Summer	173.303	0.403	3.0	8.8	O K
720 min Summer	173.281	0.381	2.8	7.8	O K
960 min Summer	173.243	0.343	2.5	6.4	O K
1440 min Summer	173.188	0.288	2.0	4.5	O K
2160 min Summer	173.134	0.234	1.6	3.0	O K
2880 min Summer	173.099	0.199	1.3	2.1	O K
4320 min Summer	173.054	0.154	1.0	1.3	O K
5760 min Summer	173.026	0.126	0.8	0.9	O K
7200 min Summer	173.007	0.107	0.7	0.6	O K
8640 min Summer	172.994	0.094	0.6	0.5	O K
10080 min Summer	172.984	0.084	0.5	0.4	O K
15 min Winter	173.383	0.483	3.4	12.5	O K
30 min Winter	173.452	0.552	3.6	15.8	O K
60 min Winter	173.490	0.590	3.8	17.6	O K
120 min Winter	173.481	0.581	3.7	17.1	O K
180 min Winter	173.450	0.550	3.6	15.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	74.059	0.0	25
30 min Summer	48.833	0.0	35
60 min Summer	30.811	0.0	54
120 min Summer	18.860	0.0	88
180 min Summer	13.992	0.0	122
240 min Summer	11.265	0.0	154
360 min Summer	8.299	0.0	218
480 min Summer	6.674	0.0	280
600 min Summer	5.632	0.0	342
720 min Summer	4.901	0.0	402
960 min Summer	3.933	0.0	522
1440 min Summer	2.881	0.0	764
2160 min Summer	2.107	0.0	1120
2880 min Summer	1.687	0.0	1476
4320 min Summer	1.231	0.0	2204
5760 min Summer	0.984	0.0	2936
7200 min Summer	0.827	0.0	3672
8640 min Summer	0.717	0.0	4400
10080 min Summer	0.636	0.0	5104
15 min Winter	74.059	0.0	26
30 min Winter	48.833	0.0	36
60 min Winter	30.811	0.0	58
120 min Winter	18.860	0.0	94
180 min Winter	13.992	0.0	130

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Cogloop 2 Car Park- A9
Q30



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Summary of Results for 30 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
240 min Winter	173.414	0.514	3.5	14.0	O K
360 min Winter	173.354	0.454	3.3	11.1	O K
480 min Winter	173.312	0.412	3.1	9.2	O K
600 min Winter	173.278	0.378	2.8	7.7	O K
720 min Winter	173.249	0.349	2.5	6.6	O K
960 min Winter	173.204	0.304	2.1	5.0	O K
1440 min Winter	173.141	0.241	1.7	3.1	O K
2160 min Winter	173.087	0.187	1.2	1.9	O K
2880 min Winter	173.053	0.153	1.0	1.3	O K
4320 min Winter	173.015	0.115	0.7	0.7	O K
5760 min Winter	172.993	0.093	0.6	0.5	O K
7200 min Winter	172.979	0.079	0.5	0.3	O K
8640 min Winter	172.969	0.069	0.4	0.3	O K
10080 min Winter	172.961	0.061	0.4	0.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
240 min Winter	11.265	0.0	164
360 min Winter	8.299	0.0	228
480 min Winter	6.674	0.0	292
600 min Winter	5.632	0.0	354
720 min Winter	4.901	0.0	414
960 min Winter	3.933	0.0	534
1440 min Winter	2.881	0.0	772
2160 min Winter	2.107	0.0	1124
2880 min Winter	1.687	0.0	1480
4320 min Winter	1.231	0.0	2208
5760 min Winter	0.984	0.0	2904
7200 min Winter	0.827	0.0	3672
8640 min Winter	0.717	0.0	4376
10080 min Winter	0.636	0.0	5024

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A9
Q30



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Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.102

Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)
0	4	0.026	4	8	0.026	8	12	0.025	12	16	0.025

Time Area Diagram

Total Area (ha) 0.000

Time (mins) From:	Time (mins) To:	Area (ha)
0	4	0.000

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A9
Q30



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Source Control 2018.1

Model Details

Storage is Online Cover Level (m) 174.400

Infiltration Trench Structure

Infiltration Coefficient Base (m/hr) 0.12048 Trench Width (m) 1.8
Infiltration Coefficient Side (m/hr) 0.12048 Trench Length (m) 87.7
Safety Factor 2.0 Slope (1:X) 200.0
Porosity 0.30 Cap Volume Depth (m) 0.000
Invert Level (m) 172.900 Cap Infiltration Depth (m) 0.000

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A10
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Source Control 2018.1

Summary of Results for 30 year Return Period

Half Drain Time : 57 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	180.866	0.366	0.9	3.8	O K
30 min Summer	180.946	0.446	1.0	4.7	O K
60 min Summer	180.988	0.488	1.0	5.2	O K
120 min Summer	180.989	0.489	1.0	5.3	O K
180 min Summer	180.965	0.465	1.0	5.0	O K
240 min Summer	180.936	0.436	1.0	4.6	O K
360 min Summer	180.881	0.381	0.9	3.9	O K
480 min Summer	180.832	0.332	0.9	3.4	O K
600 min Summer	180.789	0.289	0.9	2.8	O K
720 min Summer	180.752	0.252	0.8	2.4	O K
960 min Summer	180.692	0.192	0.8	1.7	O K
1440 min Summer	180.621	0.121	0.7	0.8	O K
2160 min Summer	180.592	0.092	0.6	0.5	O K
2880 min Summer	180.575	0.075	0.5	0.3	O K
4320 min Summer	180.556	0.056	0.4	0.2	O K
5760 min Summer	180.547	0.047	0.3	0.1	O K
7200 min Summer	180.544	0.044	0.2	0.1	O K
8640 min Summer	180.541	0.041	0.2	0.1	O K
10080 min Summer	180.538	0.038	0.2	0.1	O K
15 min Winter	180.910	0.410	1.0	4.3	O K
30 min Winter	181.004	0.504	1.0	5.4	O K
60 min Winter	181.054	0.554	1.1	6.0	O K
120 min Winter	181.049	0.549	1.1	6.0	O K
180 min Winter	181.011	0.511	1.0	5.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	74.059	0.0	19
30 min Summer	48.833	0.0	32
60 min Summer	30.811	0.0	52
120 min Summer	18.860	0.0	86
180 min Summer	13.992	0.0	120
240 min Summer	11.265	0.0	154
360 min Summer	8.299	0.0	222
480 min Summer	6.674	0.0	286
600 min Summer	5.632	0.0	348
720 min Summer	4.901	0.0	408
960 min Summer	3.933	0.0	526
1440 min Summer	2.881	0.0	752
2160 min Summer	2.107	0.0	1104
2880 min Summer	1.687	0.0	1468
4320 min Summer	1.231	0.0	2192
5760 min Summer	0.984	0.0	2936
7200 min Summer	0.827	0.0	3672
8640 min Summer	0.717	0.0	4384
10080 min Summer	0.636	0.0	5024
15 min Winter	74.059	0.0	20
30 min Winter	48.833	0.0	32
60 min Winter	30.811	0.0	56
120 min Winter	18.860	0.0	92
180 min Winter	13.992	0.0	130

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A10
Q30



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Summary of Results for 30 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
240 min Winter	180.967	0.467	1.0	5.0	O K
360 min Winter	180.884	0.384	0.9	4.0	O K
480 min Winter	180.813	0.313	0.9	3.1	O K
600 min Winter	180.753	0.253	0.8	2.4	O K
720 min Winter	180.703	0.203	0.8	1.8	O K
960 min Winter	180.631	0.131	0.7	0.9	O K
1440 min Winter	180.592	0.092	0.6	0.5	O K
2160 min Winter	180.569	0.069	0.4	0.3	O K
2880 min Winter	180.555	0.055	0.3	0.2	O K
4320 min Winter	180.545	0.045	0.3	0.1	O K
5760 min Winter	180.540	0.040	0.2	0.1	O K
7200 min Winter	180.537	0.037	0.2	0.1	O K
8640 min Winter	180.534	0.034	0.1	0.1	O K
10080 min Winter	180.532	0.032	0.1	0.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
240 min Winter	11.265	0.0	166
360 min Winter	8.299	0.0	236
480 min Winter	6.674	0.0	302
600 min Winter	5.632	0.0	364
720 min Winter	4.901	0.0	424
960 min Winter	3.933	0.0	530
1440 min Winter	2.881	0.0	748
2160 min Winter	2.107	0.0	1100
2880 min Winter	1.687	0.0	1468
4320 min Winter	1.231	0.0	2184
5760 min Winter	0.984	0.0	2888
7200 min Winter	0.827	0.0	3584
8640 min Winter	0.717	0.0	4344
10080 min Winter	0.636	0.0	4960

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A10
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Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.370	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.035

Time (mins)		Area	Time (mins)		Area
From:	To:	(ha)	From:	To:	(ha)
0	4	0.018	4	8	0.017

Time Area Diagram

Total Area (ha) 0.000

Time (mins)		Area
From:	To:	(ha)
0	4	0.000

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A10
Q30



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Model Details

Storage is Online Cover Level (m) 182.000

Complex Structure

Infiltration Trench

Infiltration Coefficient Base (m/hr) 0.12048 Trench Width (m) 1.8
Infiltration Coefficient Side (m/hr) 0.12048 Trench Length (m) 22.5
Safety Factor 2.0 Slope (1:X) 200.0
Porosity 0.30 Cap Volume Depth (m) 0.000
Invert Level (m) 180.500 Cap Infiltration Depth (m) 0.000

Porous Car Park

Infiltration Coefficient Base (m/hr) 0.12048 Width (m) 3.5
Membrane Percolation (mm/hr) 1000 Length (m) 22.5
Max Percolation (l/s) 21.9 Slope (1:X) 100.0
Safety Factor 2.0 Depression Storage (mm) 5
Porosity 0.30 Evaporation (mm/day) 3
Invert Level (m) 181.550 Membrane Depth (m) 0

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Bristol Airport 12 mppa
Cogloop 2 Car Park- A11
Q30



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Summary of Results for 30 year Return Period

Half Drain Time : 69 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	180.659	0.659	5.0	23.2	O K
30 min Summer	180.797	0.797	5.5	31.9	O K
60 min Summer	180.906	0.906	6.0	38.7	O K
120 min Summer	180.960	0.960	6.2	42.2	O K
180 min Summer	180.966	0.966	6.2	42.6	O K
240 min Summer	180.952	0.952	6.1	41.7	O K
360 min Summer	180.908	0.908	6.0	38.9	O K
480 min Summer	180.857	0.857	5.8	35.7	O K
600 min Summer	180.807	0.807	5.6	32.5	O K
720 min Summer	180.761	0.761	5.4	29.6	O K
960 min Summer	180.682	0.682	5.1	24.6	O K
1440 min Summer	180.576	0.576	4.6	17.9	O K
2160 min Summer	180.485	0.485	3.7	12.7	O K
2880 min Summer	180.422	0.422	3.1	9.6	O K
4320 min Summer	180.337	0.337	2.4	6.1	O K
5760 min Summer	180.283	0.283	2.0	4.3	O K
7200 min Summer	180.244	0.244	1.7	3.2	O K
8640 min Summer	180.215	0.215	1.5	2.5	O K
10080 min Summer	180.192	0.192	1.3	2.0	O K
15 min Winter	180.722	0.722	5.2	27.1	O K
30 min Winter	180.879	0.879	5.9	37.0	O K
60 min Winter	181.003	1.003	6.3	44.9	O K
120 min Winter	181.055	1.055	6.6	48.2	O K
180 min Winter	181.048	1.048	6.5	47.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	74.059	0.0	26
30 min Summer	48.833	0.0	38
60 min Summer	30.811	0.0	62
120 min Summer	18.860	0.0	96
180 min Summer	13.992	0.0	130
240 min Summer	11.265	0.0	164
360 min Summer	8.299	0.0	230
480 min Summer	6.674	0.0	296
600 min Summer	5.632	0.0	360
720 min Summer	4.901	0.0	424
960 min Summer	3.933	0.0	544
1440 min Summer	2.881	0.0	780
2160 min Summer	2.107	0.0	1136
2880 min Summer	1.687	0.0	1500
4320 min Summer	1.231	0.0	2212
5760 min Summer	0.984	0.0	2944
7200 min Summer	0.827	0.0	3672
8640 min Summer	0.717	0.0	4408
10080 min Summer	0.636	0.0	5136
15 min Winter	74.059	0.0	27
30 min Winter	48.833	0.0	38
60 min Winter	30.811	0.0	62
120 min Winter	18.860	0.0	100
180 min Winter	13.992	0.0	138

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Cogloop 2 Car Park- A11
Q30



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Summary of Results for 30 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
240 min Winter	181.017	1.017	6.4	45.8	O K
360 min Winter	180.942	0.942	6.1	41.0	O K
480 min Winter	180.863	0.863	5.8	36.1	O K
600 min Winter	180.790	0.790	5.5	31.5	O K
720 min Winter	180.726	0.726	5.2	27.4	O K
960 min Winter	180.622	0.622	4.8	20.8	O K
1440 min Winter	180.510	0.510	4.0	14.1	O K
2160 min Winter	180.408	0.408	3.0	9.0	O K
2880 min Winter	180.342	0.342	2.5	6.3	O K
4320 min Winter	180.261	0.261	1.8	3.7	O K
5760 min Winter	180.213	0.213	1.4	2.5	O K
7200 min Winter	180.181	0.181	1.2	1.8	O K
8640 min Winter	180.158	0.158	1.0	1.3	O K
10080 min Winter	180.140	0.140	0.9	1.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
240 min Winter	11.265	0.0	176
360 min Winter	8.299	0.0	246
480 min Winter	6.674	0.0	314
600 min Winter	5.632	0.0	380
720 min Winter	4.901	0.0	444
960 min Winter	3.933	0.0	562
1440 min Winter	2.881	0.0	796
2160 min Winter	2.107	0.0	1152
2880 min Winter	1.687	0.0	1508
4320 min Winter	1.231	0.0	2216
5760 min Winter	0.984	0.0	2944
7200 min Winter	0.827	0.0	3648
8640 min Winter	0.717	0.0	4400
10080 min Winter	0.636	0.0	5112