APPENDIX E
DRAINAGE CALCULATIONS

FOUL SEWERAGE DESIGN

Design Criteria for Foul - Network A

Pipe Sizes STANDARD Manhole Sizes STANDARD

Industrial Flow (l/s/ha)	0.00	Domestic (l/s/ha)	0.00	Maximum Backdrop Height (m)	1.500
Industrial Peak Flow Factor	0.00	Domestic Peak Flow Factor	3.00	Min Design Depth for Optimisation (m)	1.200
Flow Per Person (l/per/day)	150.00	Add Flow / Climate Change (%)	1	Min Vel for Auto Design only (m/s)	0.75
Persons per House	2.70	Minimum Backdrop Height (m)	0.200	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Foul - Network A

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
A1.000	30.550	0.501	61.0	0.000	303	1.1	1.500	o	225	Pipe/Conduit	
A1.001	28.213	0.463	60.9	0.000	0	0.0	1.500	o	225	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
A1.000	46.349	0.000	1.1	303	0.1	46	0.92	1.47	58.5	5.4
A1.001	45.848	0.000	1.1	303	0.1	46	0.92	1.47	58.5	5.4

Network Design Table for Foul - Network A

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
A1.002	5.352	0.088	60.8	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
A2.000	14.333	0.239	60.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
A1.003	4.436	0.043	103.2	0.000	0	0.0	1.500	o	225	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
A1.002	45.385	0.000	1.1	303	0.1	46	0.92	1.47	58.6	5.4
A2.000	45.575	0.000	0.0	0	0.0	0	0.00	1.48	59.0	0.0
A1.003	45.288	0.000	1.1	303	0.1	53	0.76	1.13	44.9	5.4

Manhole Schedules for Foul - Network A

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
MHA1	47.846	1.497	Open Manhole	1200	A1.000	46.349	225				
MHA2	47.366	1.518	Open Manhole	1200	A1.001	45.848	225	A1.000	45.848	225	
MHA3	47.100	1.715	Open Manhole	1200	A1.002	45.385	225	A1.001	45.385	225	
MHA4	47.183	1.608	Open Manhole	1200	A2.000	45.575	225				
MHA5	47.102	1.814	Open Manhole	1200	A1.003	45.288	225	A1.002	45.297	225	9
								A2.000	45.336	225	48
MHA	47.100	1.855	Open Manhole	0		OUTFALL		A1.003	45.245	225	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
MHA1	710221.073	731575.980	710221.073	731575.980	Required	
MHA2	710245.300	731557.369	710245.300	731557.369	Required	
MHA3	710269.111	731542.237	710269.111	731542.237	Required	

Manhole Schedules for Foul - Network A

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
MHA4	710282.247	731550.080	710282.247	731550.080	Required	
MHA5	710273.289	731538.892	710273.289	731538.892	Required	
MHA	710276.752	731536.119			No Entry	

PIPELINE SCHEDULES for Foul - Network A

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
A1.000	o	225	MHA1	47.846	46.349	1.272	Open Manhole	1200
A1.001	o	225	MHA2	47.366	45.848	1.293	Open Manhole	1200
A1.002	o	225	MHA3	47.100	45.385	1.490	Open Manhole	1200
A2.000	o	225	MHA4	47.183	45.575	1.383	Open Manhole	1200
A1.003	o	225	MHA5	47.102	45.288	1.589	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
A1.000	30.550	61.0	MHA2	47.366	45.848	1.293	Open Manhole	1200
A1.001	28.213	60.9	MHA3	47.100	45.385	1.490	Open Manhole	1200
A1.002	5.352	60.8	MHA5	47.102	45.297	1.580	Open Manhole	1200
A2.000	14.333	60.0	MHA5	47.102	45.336	1.541	Open Manhole	1200
A1.003	4.436	103.2	MHA	47.100	45.245	1.630	Open Manhole	0

FOUL SEWERAGE DESIGN

Design Criteria for Foul - Network B

Pipe Sizes STANDARD Manhole Sizes STANDARD

Industrial Flow (l/s/ha)	0.00	Domestic (l/s/ha)	0.00	Maximum Backdrop Height (m)	1.500
Industrial Peak Flow Factor	0.00	Domestic Peak Flow Factor	3.00	Min Design Depth for Optimisation (m)	1.200
Flow Per Person (l/per/day)	150.00	Add Flow / Climate Change (%)	10	Min Vel for Auto Design only (m/s)	0.75
Persons per House	2.70	Minimum Backdrop Height (m)	0.200	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Foul - Network B

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
B1.000	19.566	0.157	124.6	0.000	133	0.0	1.500	o	225	Pipe/Conduit	
B1.001	6.843	0.055	125.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
B1.000	45.890	0.000	0.0	133	0.2	34	0.53	1.03	40.9	2.1
B1.001	45.733	0.000	0.0	133	0.2	34	0.53	1.03	40.8	2.1

Network Design Table for Foul - Network B

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
B1.002	11.673	0.093	125.5	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
B1.003	9.277	0.074	125.4	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
B1.004	4.659	0.037	125.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
B1.002	45.678	0.000	0.0	133	0.2	35	0.53	1.02	40.7	2.1
B1.003	45.585	0.000	0.0	133	0.2	35	0.53	1.02	40.7	2.1
B1.004	45.511	0.000	0.0	133	0.2	34	0.53	1.03	40.8	2.1

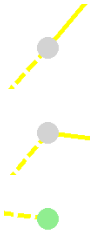
Manhole Schedules for Foul - Network B

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
MHB1	47.500	1.610	Open Manhole	1200	B1.000	45.890	225				
MHB2	47.500	1.767	Open Manhole	1200	B1.001	45.733	225	B1.000	45.733	225	
MHB3	47.400	1.722	Open Manhole	1200	B1.002	45.678	225	B1.001	45.678	225	
MHB4	47.400	1.815	Open Manhole	1200	B1.003	45.585	225	B1.002	45.585	225	
MHB5	47.400	1.889	Open Manhole	1200	B1.004	45.511	225	B1.003	45.511	225	
MHB	47.340	1.866	Open Manhole	0		OUTFALL		B1.004	45.474	225	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
MHB1	710201.632	731472.267	710201.632	731472.267	Required	
MHB2	710221.137	731473.812	710221.137	731473.812	Required	
MHB3	710225.357	731479.199	710225.357	731479.199	Required	

Manhole Schedules for Foul - Network B

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
MHB4	710233.178	731487.864	710233.178	731487.864	Required	
MHB5	710239.122	731494.987	710239.122	731494.987	Required	
MHB	710243.742	731494.384			No Entry	



PIPELINE SCHEDULES for Foul - Network B

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
B1.000	o	225	MHB1	47.500	45.890	1.385	Open Manhole	1200
B1.001	o	225	MHB2	47.500	45.733	1.542	Open Manhole	1200
B1.002	o	225	MHB3	47.400	45.678	1.497	Open Manhole	1200
B1.003	o	225	MHB4	47.400	45.585	1.590	Open Manhole	1200
B1.004	o	225	MHB5	47.400	45.511	1.664	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
B1.000	19.566	124.6	MHB2	47.500	45.733	1.542	Open Manhole	1200
B1.001	6.843	125.0	MHB3	47.400	45.678	1.497	Open Manhole	1200
B1.002	11.673	125.5	MHB4	47.400	45.585	1.590	Open Manhole	1200
B1.003	9.277	125.4	MHB5	47.400	45.511	1.664	Open Manhole	1200
B1.004	4.659	125.0	MHB	47.340	45.474	1.641	Open Manhole	0

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Consulting Engineers

ALLOWABLE OUTFLOW FROM CATCHMENT

If AREA < 50hectares, QBAR = 0.00108 x (AREA)^0.89 x (SAAR)^1.17 x (SOIL)^2.17 (Institute of Hydrology Report No. 124)
Use min AREA 50hectares (GDSDS Volume 2 Section 6.3.1.2.2)

If AREA > 50hectares, QBAR = 0.00066 x (AREA)^0.92 x (SAAR)^1.22 x (SOIL)^2.00 (Flood Studies Supplementary Report No. 6)

Area = 1.29 hectares

Catchment Area m^2	Catchment Area km^2	Catchment Area ha	SAAR mm	SOIL	QBAR m^3/sec	QBAR l/sec	Return Period years	Growth Curve Factor	Modified QBAR l/sec	Allowable Outflow per Hectare l/sec/ha
500,000	0.500	50.000	757.2	0.40	0.1865	186.49	1	0.85	158.52	**3.17**
500,000	0.500	50.000	757.2	0.40	0.1865	186.49	QBAR	1.00	186.49	**3.73**
500,000	0.500	50.000	757.2	0.40	0.1865	186.49	10	1.70	317.03	**6.34**
500,000	0.500	50.000	757.2	0.40	0.1865	186.49	30	2.09	390.57	**7.81**
500,000	0.500	50.000	757.2	0.40	0.1865	186.49	100	2.60	485.23	**9.70**
500,000	0.500	50.000	757.2	0.40	0.1865	186.49	200	2.89	539.73	**10.79**

		INPUT	
Total Area to be Drained		1,318	Sq m
Impermeability Factor		1.00	
Storm Return Period	T	100	Yrs
Allowable Discharge **per hectare**		3.73	l/s
Time of Concentration	TC	5.00	min
2 Day M5 (mm) =		61.20	mm
Ratio 60 Minute M5/2 Day M5	r	0.28	
Impermeable Area		1317.5	Sq m
Allowable Discharge	P	0.03	Cu m/min
60 Minute M5		16.90	mm
Storage Event		Maximum Event	

ROUGHAN & O'DONOVAN
Consulting Engineers

SURFACE WATER ATTENUATION & STORAGE
Version 1.04

Storage C = Q*TS - P*(TS + TC) + P^2*TC/Q

W = LN(1.06 * M5-60/(48*r))
X = LN(721/(1 + 15 * D))
Y = LN(48 * r/1.06)
Z = LN(721/16)
LN(M5-D) = LN(D) + W + (X * Y)/Z

Cr = J0 + J1 * (M5-D) + J2 * (M5-D)^2

LN((MT-D)/M5-D)) = Cr * (LN(T) - 1.5)

Project No.:	**23.111**
Project:	**Residential Development Long Mile Road (Rain Gardens)**
Date:	**19-Feb-2025**
Designer:	**CMG**

Time of Storm TS	Time of Storm D	Time of Concentration TC	W	X	Y	Z	LN(D)	LN(M5-D)	M5-D	Rainfall Intensity	J0	J1	J2	Cr	M100-D	Rainfall Intensity +20%	Discharge to Storage	Discharge to Storage Q	Storage Required C
Minutes	Hours	Minutes							mm	mm/hr					mm	mm/hr	l/s	Cu.m/min	Cu. m
3	0.050	5.0	0.301	6.021	2.526	3.808	-2.996	1.300	3.668	73.355	0.165	0.008	-0.000305	0.191	6.642	159.413	58.341	3.500	10.27
5	0.083	5.0	0.301	5.770	2.526	3.808	-2.485	1.644	5.174	62.091	0.165	0.008	-0.000305	0.200	9.621	138.539	50.702	3.042	14.92
7	0.117	5.0	0.301	5.569	2.526	3.808	-2.148	1.847	6.341	54.352	0.165	0.008	-0.000305	0.205	11.998	123.409	45.164	2.710	18.62
10	0.167	5.0	0.301	5.328	2.526	3.808	-1.792	2.044	7.719	46.317	0.165	0.008	-0.000305	0.211	14.861	107.002	39.160	2.350	23.06
13	0.217	5.0	0.301	5.134	2.526	3.808	-1.529	2.177	8.823	40.719	0.165	0.008	-0.000305	0.215	17.178	95.137	34.818	2.089	26.63
16	0.267	5.0	0.301	4.971	2.526	3.808	-1.322	2.277	9.749	36.558	0.165	0.008	-0.000305	0.217	19.127	86.073	31.500	1.890	29.62
20	0.333	5.0	0.301	4.789	2.526	3.808	-1.099	2.379	10.798	32.393	0.165	0.008	-0.000305	0.219	21.329	76.784	28.101	1.686	32.99
25	0.417	5.0	0.301	4.600	2.526	3.808	-0.875	2.477	11.905	28.572	0.165	0.008	-0.000305	0.221	23.630	68.055	24.906	1.494	36.48
30	0.500	5.0	0.301	4.441	2.526	3.808	-0.693	2.554	12.855	25.711	0.165	0.008	-0.000305	0.222	25.576	61.382	22.464	1.348	39.41
45	0.750	5.0	0.301	4.075	2.526	3.808	-0.288	2.717	15.132	20.176	0.235	-0.001	-0.000017	0.219	29.895	47.833	17.505	1.050	45.79
60	1.000	5.0	0.301	3.808	2.526	3.808	0.000	2.827	16.900	16.900	0.235	-0.001	-0.000017	0.217	33.147	39.777	14.557	0.873	50.49
75	1.250	5.0	0.301	3.597	2.526	3.808	0.223	2.911	18.371	14.697	0.235	-0.001	-0.000017	0.215	35.806	34.374	12.580	0.755	54.26
90	1.500	5.0	0.301	3.424	2.526	3.808	0.405	2.978	19.644	13.096	0.235	-0.001	-0.000017	0.213	38.072	30.458	11.147	0.669	57.40
105	1.750	5.0	0.301	3.276	2.526	3.808	0.560	3.034	20.774	11.871	0.235	-0.001	-0.000017	0.211	40.056	27.467	10.052	0.603	60.09
120	2.000	5.0	0.301	3.147	2.526	3.808	0.693	3.082	21.796	10.898	0.235	-0.001	-0.000017	0.210	41.825	25.095	9.184	0.551	62.45
135	2.250	5.0	0.301	3.032	2.526	3.808	0.811	3.124	22.731	10.103	0.235	-0.001	-0.000017	0.208	43.426	23.160	8.476	0.509	64.54
150	2.500	5.0	0.301	2.930	2.526	3.808	0.916	3.161	23.597	9.439	0.235	-0.001	-0.000017	0.207	44.890	21.547	7.886	0.473	66.41
165	2.750	5.0	0.301	2.837	2.526	3.808	1.012	3.195	24.405	8.875	0.235	-0.001	-0.000017	0.206	46.241	20.178	7.384	0.443	68.10
180	3.000	5.0	0.301	2.752	2.526	3.808	1.099	3.225	25.163	8.388	0.250	-0.002	0.000012	0.205	47.530	19.012	6.958	0.417	69.70
240	4.000	5.0	0.301	2.470	2.526	3.808	1.386	3.326	27.823	6.956	0.250	-0.002	0.000012	0.201	51.920	15.576	5.700	0.342	74.88
300	5.000	5.0	0.301	2.250	2.526	3.808	1.609	3.403	30.058	6.012	0.250	-0.002	0.000012	0.198	55.548	13.331	4.879	0.293	78.84
360	6.000	5.0	0.301	2.070	2.526	3.808	1.792	3.466	32.008	5.335	0.250	-0.002	0.000012	0.195	58.666	11.733	4.294	0.258	82.01
420	7.000	5.0	0.301	1.917	2.526	3.808	1.946	3.519	33.748	4.821	0.250	-0.002	0.000012	0.193	61.419	10.529	3.853	0.231	84.59
480	8.000	5.0	0.301	1.785	2.526	3.808	2.079	3.565	35.327	4.416	0.250	-0.002	0.000012	0.191	63.894	9.584	3.507	0.210	86.74
540	9.000	5.0	0.301	1.668	2.526	3.808	2.197	3.605	36.778	4.086	0.250	-0.002	0.000012	0.189	66.149	8.820	3.228	0.194	88.54
600	10.000	5.0	0.301	1.563	2.526	3.808	2.303	3.641	38.125	3.812	0.250	-0.002	0.000012	0.187	68.228	8.187	2.996	0.180	90.05
660	11.000	5.0	0.301	1.469	2.526	3.808	2.398	3.673	39.384	3.580	0.250	-0.002	0.000012	0.186	70.159	7.654	2.801	0.168	91.34
720	12.000	5.0	0.301	1.382	2.526	3.808	2.485	3.703	40.568	3.381	0.250	-0.002	0.000012	0.185	71.967	7.197	2.634	0.158	92.43
780	13.000	5.0	0.301	1.303	2.526	3.808	2.565	3.730	41.688	3.207	0.250	-0.002	0.000012	0.183	73.668	6.800	2.489	0.149	93.35
840	14.000	5.0	0.301	1.229	2.526	3.808	2.639	3.755	42.751	3.054	0.250	-0.002	0.000012	0.182	75.277	6.452	2.361	0.142	94.13
900	15.000	5.0	0.301	1.160	2.526	3.808	2.708	3.779	43.765	2.918	0.250	-0.002	0.000012	0.181	76.806	6.144	2.249	0.135	94.78
960	16.000	5.0	0.301	1.096	2.526	3.808	2.773	3.801	44.734	2.796	0.250	-0.002	0.000012	0.180	78.263	5.870	2.148	0.129	95.32
1020	17.000	5.0	0.301	1.035	2.526	3.808	2.833	3.821	45.664	2.686	0.250	-0.002	0.000012	0.179	79.656	5.623	2.058	0.123	95.75
1080	18.000	5.0	0.301	0.979	2.526	3.808	2.890	3.841	46.558	2.587	0.250	-0.002	0.000012	0.178	80.992	5.399	1.976	0.119	96.10
2000	33.333	5.0	0.301	0.364	2.526	3.808	3.507	4.049	57.355	1.721	0.227	-0.001	0.000003	0.169	96.846	3.486	1.276	0.077	94.06
2900	48.333	5.0	0.301	-0.007	2.526	3.808	3.878	4.175	65.024	1.345	0.227	-0.001	0.000003	0.162	107.688	2.674	0.978	0.059	84.68
3700	61.667	5.0	0.301	-0.250	2.526	3.808	4.122	4.257	70.595	1.145	0.227	-0.001	0.000003	0.158	115.365	2.245	0.822	0.049	73.24

MAXIMUM STORAGE REQUIRED (Cu. M) = 96.10

Summary of Results for 100 year Return Period (+20%)

Half Drain Time : 3657 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	77.869	0.024	0.0	0.1	0.1	54.2	O K
30 min Summer	77.878	0.033	0.0	0.2	0.2	74.8	O K
60 min Summer	77.888	0.043	0.0	0.4	0.4	96.6	O K
120 min Summer	77.898	0.053	0.0	0.5	0.5	121.0	O K
180 min Summer	77.905	0.060	0.0	0.5	0.5	136.7	O K
240 min Summer	77.910	0.065	0.0	0.5	0.5	148.5	O K
360 min Summer	77.918	0.073	0.0	0.6	0.6	165.9	O K
480 min Summer	77.924	0.079	0.0	0.6	0.6	178.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	88.836	0.0	10.6	27
30 min Summer	61.376	0.0	16.6	42
60 min Summer	39.777	0.0	40.5	72
120 min Summer	25.097	0.0	54.9	132
180 min Summer	19.014	0.0	63.5	190
240 min Summer	15.579	0.0	69.4	250
360 min Summer	11.736	0.0	77.1	370
480 min Summer	9.586	0.0	81.5	488

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control Σ (l/s)	Max Outflow (l/s)	Max Volume (m³)	Status
600 min Summer	77.928	0.083	0.0	0.6	0.6	188.7	O K
720 min Summer	77.932	0.087	0.0	0.6	0.6	196.9	O K
960 min Summer	77.937	0.092	0.0	0.7	0.7	209.7	O K
1440 min Summer	77.945	0.100	0.0	0.7	0.7	226.4	O K
2160 min Summer	77.950	0.105	0.0	0.7	0.7	239.5	O K
2880 min Summer	77.954	0.109	0.0	0.7	0.7	246.7	O K
4320 min Summer	77.958	0.113	0.0	0.7	0.7	255.9	O K
5760 min Summer	77.960	0.115	0.0	0.8	0.8	260.8	O K
7200 min Summer	77.961	0.116	0.0	0.8	0.8	262.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
600 min Summer	8.190	0.0	84.1	608
720 min Summer	7.199	0.0	85.8	728
960 min Summer	5.872	0.0	87.5	966
1440 min Summer	4.405	0.0	87.0	1444
2160 min Summer	3.302	0.0	176.1	2160
2880 min Summer	2.688	0.0	177.1	2460
4320 min Summer	2.009	0.0	167.9	3204
5760 min Summer	1.633	0.0	312.7	3992
7200 min Summer	1.390	0.0	319.8	4832

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
8640 min Summer	77.961	0.116	0.0	0.8	0.8	262.8	O K
10080 min Summer	77.960	0.115	0.0	0.8	0.8	261.7	O K
15 min Winter	77.872	0.027	0.0	0.2	0.2	60.7	O K
30 min Winter	77.882	0.037	0.0	0.3	0.3	83.7	O K
60 min Winter	77.893	0.048	0.0	0.4	0.4	108.1	O K
120 min Winter	77.905	0.060	0.0	0.5	0.5	135.6	O K
180 min Winter	77.912	0.067	0.0	0.5	0.5	153.3	O K
240 min Winter	77.918	0.073	0.0	0.6	0.6	166.5	O K
360 min Winter	77.927	0.082	0.0	0.6	0.6	186.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
8640 min Summer	1.219	0.0	317.5	5632
10080 min Summer	1.090	0.0	307.4	6464
15 min Winter	88.836	0.0	12.4	27
30 min Winter	61.376	0.0	19.8	41
60 min Winter	39.777	0.0	47.3	70
120 min Winter	25.097	0.0	62.9	130
180 min Winter	19.014	0.0	71.8	188
240 min Winter	15.579	0.0	77.7	246
360 min Winter	11.736	0.0	84.9	364

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
480 min Winter	77.933	0.088	0.0	0.6	0.6	200.5	O K
600 min Winter	77.938	0.093	0.0	0.7	0.7	211.9	O K
720 min Winter	77.942	0.097	0.0	0.7	0.7	221.2	O K
960 min Winter	77.949	0.104	0.0	0.7	0.7	235.8	O K
1440 min Winter	77.957	0.112	0.0	0.7	0.7	255.2	O K
2160 min Winter	77.964	0.119	0.0	0.8	0.8	271.3	O K
2880 min Winter	77.968	0.123	0.0	0.8	0.8	279.3	O K
4320 min Winter	77.971	0.126	0.0	0.8	0.8	286.9	O K
5760 min Winter	77.973	0.128	0.0	0.8	0.8	290.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
480 min Winter	9.586	0.0	88.8	482
600 min Winter	8.190	0.0	91.5	598
720 min Winter	7.199	0.0	93.2	716
960 min Winter	5.872	0.0	95.0	948
1440 min Winter	4.405	0.0	94.4	1406
2160 min Winter	3.302	0.0	192.2	2076
2880 min Winter	2.688	0.0	192.9	2712
4320 min Winter	2.009	0.0	183.1	3376
5760 min Winter	1.633	0.0	348.1	4320

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
7200 min Winter	77.972	0.127	0.0	0.8	0.8	289.7	O K
8640 min Winter	77.971	0.126	0.0	0.8	0.8	287.1	O K
10080 min Winter	77.970	0.125	0.0	0.8	0.8	283.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
7200 min Winter	1.390	0.0	353.4	5200
8640 min Winter	1.219	0.0	348.7	6136
10080 min Winter	1.090	0.0	337.3	6976

Rainfall Details

Rainfall Model	FSR	Ratio R	0.276	Cv (Winter)	0.840
Return Period (years)	100	Summer Storms	Yes	Shortest Storm (mins)	15
Region	Scotland and Ireland	Winter Storms	Yes	Longest Storm (mins)	10080
M5-60 (mm)	16.900	Cv (Summer)	0.750	Climate Change %	+20

Time Area Diagram

Total Area (ha) 0.326

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.109	4	8	0.109	8	12	0.109

Model Details

Storage is Online Cover Level (m) 78.295

Cellular Storage Structure

Invert Level (m) 77.845 Infiltration Coefficient Side (m/hr) 0.00000 Porosity 0.90
Infiltration Coefficient Base (m/hr) 0.00000 Safety Factor 2.0

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	2525.0	0.0	0.250	2525.0	0.0	0.251	0.0	0.0

Orifice Outflow Control

Diameter (m) 0.034 Discharge Coefficient 0.600 Invert Level (m) 77.845

Summary of Results for 100 year Return Period (+20%)

Half Drain Time : 3942 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	79.020	0.025	0.0	0.1	0.1	19.4	O K
30 min Summer	79.029	0.034	0.0	0.1	0.1	26.8	O K
60 min Summer	79.039	0.044	0.0	0.1	0.1	34.6	O K
120 min Summer	79.050	0.055	0.0	0.2	0.2	43.4	O K
180 min Summer	79.058	0.063	0.0	0.2	0.2	49.0	O K
240 min Summer	79.063	0.068	0.0	0.2	0.2	53.2	O K
360 min Summer	79.071	0.076	0.0	0.2	0.2	59.5	O K
480 min Summer	79.077	0.082	0.0	0.2	0.2	64.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	88.836	0.0	5.8	27
30 min Summer	61.376	0.0	8.7	42
60 min Summer	39.777	0.0	18.5	72
120 min Summer	25.097	0.0	22.4	132
180 min Summer	19.014	0.0	24.3	190
240 min Summer	15.579	0.0	25.7	250
360 min Summer	11.736	0.0	27.5	370
480 min Summer	9.586	0.0	28.6	488

Summary of Results for 100 year Return Period (+20%)

	Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
600	min Summer	79.082	0.087	0.0	0.2	0.2	67.7	O K
720	min Summer	79.085	0.090	0.0	0.2	0.2	70.6	O K
960	min Summer	79.091	0.096	0.0	0.2	0.2	75.3	O K
1440	min Summer	79.099	0.104	0.0	0.2	0.2	81.3	O K
2160	min Summer	79.105	0.110	0.0	0.2	0.2	86.2	O K
2880	min Summer	79.108	0.113	0.0	0.2	0.2	88.6	O K
4320	min Summer	79.112	0.117	0.0	0.2	0.2	91.6	O K
5760	min Summer	79.114	0.119	0.0	0.2	0.2	93.0	O K
7200	min Summer	79.115	0.120	0.0	0.3	0.3	93.6	O K

	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
600	min Summer	8.190	0.0	29.3	608
720	min Summer	7.199	0.0	29.8	728
960	min Summer	5.872	0.0	30.3	966
1440	min Summer	4.405	0.0	30.0	1444
2160	min Summer	3.302	0.0	61.2	2160
2880	min Summer	2.688	0.0	61.3	2576
4320	min Summer	2.009	0.0	58.2	3328
5760	min Summer	1.633	0.0	112.7	4096
7200	min Summer	1.390	0.0	113.1	4904

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
8640 min Summer	79.114	0.119	0.0	0.2	0.2	93.4	O K
10080 min Summer	79.114	0.119	0.0	0.2	0.2	92.9	O K
15 min Winter	79.023	0.028	0.0	0.1	0.1	21.8	O K
30 min Winter	79.033	0.038	0.0	0.1	0.1	30.0	O K
60 min Winter	79.045	0.050	0.0	0.2	0.2	38.8	O K
120 min Winter	79.057	0.062	0.0	0.2	0.2	48.6	O K
180 min Winter	79.065	0.070	0.0	0.2	0.2	55.0	O K
240 min Winter	79.071	0.076	0.0	0.2	0.2	59.7	O K
360 min Winter	79.080	0.085	0.0	0.2	0.2	66.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
8640 min Summer	1.219	0.0	111.2	5720
10080 min Summer	1.090	0.0	107.5	6560
15 min Winter	88.836	0.0	6.8	27
30 min Winter	61.376	0.0	9.6	41
60 min Winter	39.777	0.0	20.5	70
120 min Winter	25.097	0.0	24.3	130
180 min Winter	19.014	0.0	26.4	188
240 min Winter	15.579	0.0	27.8	246
360 min Winter	11.736	0.0	29.6	364

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
480 min Winter	79.087	0.092	0.0	0.2	0.2	71.9	O K
600 min Winter	79.092	0.097	0.0	0.2	0.2	76.0	O K
720 min Winter	79.097	0.102	0.0	0.2	0.2	79.4	O K
960 min Winter	79.103	0.108	0.0	0.2	0.2	84.7	O K
1440 min Winter	79.112	0.117	0.0	0.2	0.2	91.8	O K
2160 min Winter	79.120	0.125	0.0	0.3	0.3	97.8	O K
2880 min Winter	79.124	0.129	0.0	0.3	0.3	100.8	O K
4320 min Winter	79.127	0.132	0.0	0.3	0.3	103.2	O K
5760 min Winter	79.128	0.133	0.0	0.3	0.3	104.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
480 min Winter	9.586	0.0	30.8	482
600 min Winter	8.190	0.0	31.6	598
720 min Winter	7.199	0.0	32.1	716
960 min Winter	5.872	0.0	32.6	950
1440 min Winter	4.405	0.0	32.3	1410
2160 min Winter	3.302	0.0	66.3	2084
2880 min Winter	2.688	0.0	66.3	2740
4320 min Winter	2.009	0.0	62.9	3460
5760 min Winter	1.633	0.0	123.3	4384

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
7200 min Winter	79.128	0.133	0.0	0.3	0.3	104.2	O K
8640 min Winter	79.127	0.132	0.0	0.3	0.3	103.3	O K
10080 min Winter	79.125	0.130	0.0	0.3	0.3	101.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
7200 min Winter	1.390	0.0	123.4	5272
8640 min Winter	1.219	0.0	121.2	6224
10080 min Winter	1.090	0.0	117.0	7152

Rainfall Details

Rainfall Model	FSR	Ratio R	0.276	Cv (Winter)	0.840
Return Period (years)	100	Summer Storms	Yes	Shortest Storm (mins)	15
Region	Scotland and Ireland	Winter Storms	Yes	Longest Storm (mins)	10080
M5-60 (mm)	16.900	Cv (Summer)	0.750	Climate Change %	+20

Time Area Diagram

Total Area (ha) 0.117

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

Model Details

Storage is Online Cover Level (m) 79.445

Cellular Storage Structure

Invert Level (m) 78.995 Infiltration Coefficient Side (m/hr) 0.00000 Porosity 0.90
Infiltration Coefficient Base (m/hr) 0.00000 Safety Factor 2.0

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	869.0	0.0	0.250	869.0	0.0	0.251	0.0	0.0

Orifice Outflow Control

Diameter (m) 0.019 Discharge Coefficient 0.600 Invert Level (m) 78.995

Summary of Results for 100 year Return Period (+20%)

Half Drain Time : 3936 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	67.787	0.022	0.0	0.1	0.1	40.9	O K
30 min Summer	67.795	0.030	0.0	0.2	0.2	56.4	O K
60 min Summer	67.804	0.039	0.0	0.3	0.3	72.9	O K
120 min Summer	67.814	0.049	0.0	0.3	0.3	91.4	O K
180 min Summer	67.821	0.056	0.0	0.4	0.4	103.3	O K
240 min Summer	67.825	0.060	0.0	0.4	0.4	112.2	O K
360 min Summer	67.833	0.068	0.0	0.4	0.4	125.4	O K
480 min Summer	67.838	0.073	0.0	0.4	0.4	135.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	88.836	0.0	8.0	27
30 min Summer	61.376	0.0	12.7	42
60 min Summer	39.777	0.0	30.7	72
120 min Summer	25.097	0.0	41.1	132
180 min Summer	19.014	0.0	47.1	190
240 min Summer	15.579	0.0	51.1	250
360 min Summer	11.736	0.0	55.9	370
480 min Summer	9.586	0.0	58.6	488

Summary of Results for 100 year Return Period (+20%)

	Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
600	min Summer	67.842	0.077	0.0	0.4	0.4	142.9	O K
720	min Summer	67.845	0.080	0.0	0.5	0.5	149.2	O K
960	min Summer	67.851	0.086	0.0	0.5	0.5	159.0	O K
1440	min Summer	67.858	0.093	0.0	0.5	0.5	172.1	O K
2160	min Summer	67.863	0.098	0.0	0.5	0.5	182.8	O K
2880	min Summer	67.866	0.101	0.0	0.5	0.5	188.3	O K
4320	min Summer	67.870	0.105	0.0	0.5	0.5	195.5	O K
5760	min Summer	67.872	0.107	0.0	0.5	0.5	199.4	O K
7200	min Summer	67.873	0.108	0.0	0.5	0.5	201.2	O K

	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
600	min Summer	8.190	0.0	60.3	608
720	min Summer	7.199	0.0	61.4	728
960	min Summer	5.872	0.0	62.5	966
1440	min Summer	4.405	0.0	62.0	1444
2160	min Summer	3.302	0.0	126.9	2160
2880	min Summer	2.688	0.0	127.2	2568
4320	min Summer	2.009	0.0	120.3	3292
5760	min Summer	1.633	0.0	231.3	4088
7200	min Summer	1.390	0.0	234.2	4904

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
8640 min Summer	67.874	0.109	0.0	0.5	0.5	201.6	O K
10080 min Summer	67.873	0.108	0.0	0.5	0.5	201.1	O K
15 min Winter	67.790	0.025	0.0	0.1	0.1	45.8	O K
30 min Winter	67.799	0.034	0.0	0.2	0.2	63.2	O K
60 min Winter	67.809	0.044	0.0	0.3	0.3	81.6	O K
120 min Winter	67.820	0.055	0.0	0.4	0.4	102.4	O K
180 min Winter	67.827	0.062	0.0	0.4	0.4	115.8	O K
240 min Winter	67.833	0.068	0.0	0.4	0.4	125.8	O K
360 min Winter	67.841	0.076	0.0	0.4	0.4	140.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
8640 min Summer	1.219	0.0	230.5	5712
10080 min Summer	1.090	0.0	222.5	6560
15 min Winter	88.836	0.0	9.3	27
30 min Winter	61.376	0.0	15.1	41
60 min Winter	39.777	0.0	35.8	70
120 min Winter	25.097	0.0	46.7	130
180 min Winter	19.014	0.0	52.7	188
240 min Winter	15.579	0.0	56.5	246
360 min Winter	11.736	0.0	60.9	364

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
480 min Winter	67.847	0.082	0.0	0.5	0.5	151.7	O K
600 min Winter	67.851	0.086	0.0	0.5	0.5	160.4	O K
720 min Winter	67.855	0.090	0.0	0.5	0.5	167.6	O K
960 min Winter	67.861	0.096	0.0	0.5	0.5	178.8	O K
1440 min Winter	67.869	0.104	0.0	0.5	0.5	194.0	O K
2160 min Winter	67.876	0.111	0.0	0.5	0.5	207.0	O K
2880 min Winter	67.880	0.115	0.0	0.6	0.6	213.7	O K
4320 min Winter	67.883	0.118	0.0	0.6	0.6	219.6	O K
5760 min Winter	67.885	0.120	0.0	0.6	0.6	222.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
480 min Winter	9.586	0.0	63.6	482
600 min Winter	8.190	0.0	65.4	598
720 min Winter	7.199	0.0	66.6	716
960 min Winter	5.872	0.0	67.7	950
1440 min Winter	4.405	0.0	67.2	1410
2160 min Winter	3.302	0.0	138.1	2080
2880 min Winter	2.688	0.0	138.3	2736
4320 min Winter	2.009	0.0	130.9	3424
5760 min Winter	1.633	0.0	255.9	4336

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
7200 min Winter	67.885	0.120	0.0	0.6	0.6	222.9	O K
8640 min Winter	67.884	0.119	0.0	0.6	0.6	221.4	O K
10080 min Winter	67.883	0.118	0.0	0.6	0.6	218.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
7200 min Winter	1.390	0.0	257.0	5264
8640 min Winter	1.219	0.0	252.5	6216
10080 min Winter	1.090	0.0	243.6	7064

Rainfall Details

Rainfall Model	FSR	Ratio R	0.276	Cv (Winter)	0.840
Return Period (years)	100	Summer Storms	Yes	Shortest Storm (mins)	15
Region	Scotland and Ireland	Winter Storms	Yes	Longest Storm (mins)	10080
M5-60 (mm)	16.900	Cv (Summer)	0.750	Climate Change %	+20

Time Area Diagram

Total Area (ha) 0.246

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.082	4	8	0.082	8	12	0.082

Model Details

Storage is Online Cover Level (m) 68.215

Cellular Storage Structure

Invert Level (m) 67.765 Infiltration Coefficient Side (m/hr) 0.00000 Porosity 0.90
Infiltration Coefficient Base (m/hr) 0.00000 Safety Factor 2.0

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	2064.0	0.0	0.250	2064.0	0.0	0.251	0.0	0.0

Orifice Outflow Control

Diameter (m) 0.029 Discharge Coefficient 0.600 Invert Level (m) 67.765

Summary of Results for 100 year Return Period (+20%)

Half Drain Time : 3845 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	48.149	0.024	0.0	0.1	0.1	41.9	O K
30 min Summer	48.158	0.033	0.0	0.2	0.2	57.8	O K
60 min Summer	48.167	0.042	0.0	0.3	0.3	74.6	O K
120 min Summer	48.178	0.053	0.0	0.3	0.3	93.6	O K
180 min Summer	48.185	0.060	0.0	0.4	0.4	105.7	O K
240 min Summer	48.190	0.065	0.0	0.4	0.4	114.8	O K
360 min Summer	48.198	0.073	0.0	0.4	0.4	128.3	O K
480 min Summer	48.203	0.078	0.0	0.4	0.4	138.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	88.836	0.0	8.8	27
30 min Summer	61.376	0.0	14.1	42
60 min Summer	39.777	0.0	33.4	72
120 min Summer	25.097	0.0	44.0	132
180 min Summer	19.014	0.0	50.0	190
240 min Summer	15.579	0.0	54.0	250
360 min Summer	11.736	0.0	58.6	370
480 min Summer	9.586	0.0	61.3	488

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
600 min Summer	48.208	0.083	0.0	0.5	0.5	146.1	O K
720 min Summer	48.211	0.086	0.0	0.5	0.5	152.5	O K
960 min Summer	48.217	0.092	0.0	0.5	0.5	162.5	O K
1440 min Summer	48.225	0.100	0.0	0.5	0.5	175.7	O K
2160 min Summer	48.231	0.106	0.0	0.5	0.5	186.3	O K
2880 min Summer	48.234	0.109	0.0	0.5	0.5	191.8	O K
4320 min Summer	48.238	0.113	0.0	0.6	0.6	198.9	O K
5760 min Summer	48.240	0.115	0.0	0.6	0.6	202.7	O K
7200 min Summer	48.241	0.116	0.0	0.6	0.6	204.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
600 min Summer	8.190	0.0	63.1	608
720 min Summer	7.199	0.0	64.2	728
960 min Summer	5.872	0.0	65.4	966
1440 min Summer	4.405	0.0	64.9	1444
2160 min Summer	3.302	0.0	132.3	2160
2880 min Summer	2.688	0.0	132.6	2516
4320 min Summer	2.009	0.0	125.6	3252
5760 min Summer	1.633	0.0	240.4	4040
7200 min Summer	1.390	0.0	243.3	4896

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
8640 min Summer	48.241	0.116	0.0	0.6	0.6	204.4	O K
10080 min Summer	48.240	0.115	0.0	0.6	0.6	203.7	O K
15 min Winter	48.152	0.027	0.0	0.1	0.1	46.9	O K
30 min Winter	48.162	0.037	0.0	0.2	0.2	64.7	O K
60 min Winter	48.172	0.047	0.0	0.3	0.3	83.6	O K
120 min Winter	48.184	0.059	0.0	0.4	0.4	104.8	O K
180 min Winter	48.192	0.067	0.0	0.4	0.4	118.5	O K
240 min Winter	48.198	0.073	0.0	0.4	0.4	128.7	O K
360 min Winter	48.207	0.082	0.0	0.5	0.5	143.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
8640 min Summer	1.219	0.0	239.7	5712
10080 min Summer	1.090	0.0	231.6	6552
15 min Winter	88.836	0.0	10.3	27
30 min Winter	61.376	0.0	16.6	41
60 min Winter	39.777	0.0	38.6	70
120 min Winter	25.097	0.0	49.7	130
180 min Winter	19.014	0.0	55.6	188
240 min Winter	15.579	0.0	59.3	246
360 min Winter	11.736	0.0	63.7	364

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
480 min Winter	48.213	0.088	0.0	0.5	0.5	155.2	O K
600 min Winter	48.218	0.093	0.0	0.5	0.5	164.0	O K
720 min Winter	48.222	0.097	0.0	0.5	0.5	171.3	O K
960 min Winter	48.228	0.103	0.0	0.5	0.5	182.7	O K
1440 min Winter	48.237	0.112	0.0	0.5	0.5	198.1	O K
2160 min Winter	48.245	0.120	0.0	0.6	0.6	211.0	O K
2880 min Winter	48.248	0.123	0.0	0.6	0.6	217.6	O K
4320 min Winter	48.252	0.127	0.0	0.6	0.6	223.5	O K
5760 min Winter	48.253	0.128	0.0	0.6	0.6	226.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
480 min Winter	9.586	0.0	66.5	482
600 min Winter	8.190	0.0	68.3	598
720 min Winter	7.199	0.0	69.6	716
960 min Winter	5.872	0.0	70.8	950
1440 min Winter	4.405	0.0	70.2	1408
2160 min Winter	3.302	0.0	143.9	2080
2880 min Winter	2.688	0.0	144.1	2720
4320 min Winter	2.009	0.0	136.6	3420
5760 min Winter	1.633	0.0	265.7	4328

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
7200 min Winter	48.253	0.128	0.0	0.6	0.6	226.2	O K
8640 min Winter	48.252	0.127	0.0	0.6	0.6	224.5	O K
10080 min Winter	48.251	0.126	0.0	0.6	0.6	221.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
7200 min Winter	1.390	0.0	266.9	5264
8640 min Winter	1.219	0.0	262.5	6152
10080 min Winter	1.090	0.0	253.4	7064

Rainfall Details

Rainfall Model	FSR	Ratio R	0.276	Cv (Winter)	0.840
Return Period (years)	100	Summer Storms	Yes	Shortest Storm (mins)	15
Region	Scotland and Ireland	Winter Storms	Yes	Longest Storm (mins)	10080
M5-60 (mm)	16.900	Cv (Summer)	0.750	Climate Change %	+20

Time Area Diagram

Total Area (ha) 0.252

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

Model Details

Storage is Online Cover Level (m) 48.575

Cellular Storage Structure

Invert Level (m) 48.125 Infiltration Coefficient Side (m/hr) 0.00000 Porosity 0.90
Infiltration Coefficient Base (m/hr) 0.00000 Safety Factor 2.0

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	1962.0	0.0	0.250	1962.0	0.0	0.251	0.0	0.0

Orifice Outflow Control

Diameter (m) 0.029 Discharge Coefficient 0.600 Invert Level (m) 48.125

Summary of Results for 100 year Return Period (+20%)

Half Drain Time : 3754 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	51.597	0.022	0.0	0.1	0.1	31.4	O K
30 min Summer	51.605	0.030	0.0	0.2	0.2	43.3	O K
60 min Summer	51.614	0.039	0.0	0.2	0.2	55.9	O K
120 min Summer	51.623	0.048	0.0	0.3	0.3	70.1	O K
180 min Summer	51.630	0.055	0.0	0.3	0.3	79.2	O K
240 min Summer	51.634	0.059	0.0	0.3	0.3	86.1	O K
360 min Summer	51.641	0.066	0.0	0.3	0.3	96.1	O K
480 min Summer	51.647	0.072	0.0	0.3	0.3	103.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	88.836	0.0	6.8	27
30 min Summer	61.376	0.0	11.0	42
60 min Summer	39.777	0.0	25.7	72
120 min Summer	25.097	0.0	33.8	132
180 min Summer	19.014	0.0	38.4	190
240 min Summer	15.579	0.0	41.4	250
360 min Summer	11.736	0.0	45.0	370
480 min Summer	9.586	0.0	47.0	488

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
600 min Summer	51.651	0.076	0.0	0.4	0.4	109.4	O K
720 min Summer	51.654	0.079	0.0	0.4	0.4	114.2	O K
960 min Summer	51.659	0.084	0.0	0.4	0.4	121.6	O K
1440 min Summer	51.666	0.091	0.0	0.4	0.4	131.3	O K
2160 min Summer	51.671	0.096	0.0	0.4	0.4	139.0	O K
2880 min Summer	51.674	0.099	0.0	0.4	0.4	143.1	O K
4320 min Summer	51.677	0.102	0.0	0.4	0.4	148.2	O K
5760 min Summer	51.679	0.104	0.0	0.4	0.4	150.9	O K
7200 min Summer	51.680	0.105	0.0	0.4	0.4	151.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
600 min Summer	8.190	0.0	48.4	608
720 min Summer	7.199	0.0	49.3	728
960 min Summer	5.872	0.0	50.2	966
1440 min Summer	4.405	0.0	49.8	1444
2160 min Summer	3.302	0.0	101.2	2160
2880 min Summer	2.688	0.0	101.6	2488
4320 min Summer	2.009	0.0	96.3	3244
5760 min Summer	1.633	0.0	182.5	4040
7200 min Summer	1.390	0.0	185.3	4840

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
8640 min Summer	51.680	0.105	0.0	0.4	0.4	151.9	O K
10080 min Summer	51.679	0.104	0.0	0.4	0.4	151.2	O K
15 min Winter	51.599	0.024	0.0	0.1	0.1	35.2	O K
30 min Winter	51.609	0.034	0.0	0.2	0.2	48.5	O K
60 min Winter	51.618	0.043	0.0	0.2	0.2	62.7	O K
120 min Winter	51.629	0.054	0.0	0.3	0.3	78.6	O K
180 min Winter	51.636	0.061	0.0	0.3	0.3	88.8	O K
240 min Winter	51.642	0.067	0.0	0.3	0.3	96.5	O K
360 min Winter	51.649	0.074	0.0	0.3	0.3	107.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
8640 min Summer	1.219	0.0	182.8	5704
10080 min Summer	1.090	0.0	176.8	6472
15 min Winter	88.836	0.0	8.0	27
30 min Winter	61.376	0.0	12.9	41
60 min Winter	39.777	0.0	29.7	70
120 min Winter	25.097	0.0	38.1	130
180 min Winter	19.014	0.0	42.7	188
240 min Winter	15.579	0.0	45.5	246
360 min Winter	11.736	0.0	48.9	364

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
480 min Winter	51.655	0.080	0.0	0.4	0.4	116.2	O K
600 min Winter	51.660	0.085	0.0	0.4	0.4	122.8	O K
720 min Winter	51.664	0.089	0.0	0.4	0.4	128.2	O K
960 min Winter	51.669	0.094	0.0	0.4	0.4	136.7	O K
1440 min Winter	51.677	0.102	0.0	0.4	0.4	148.0	O K
2160 min Winter	51.684	0.109	0.0	0.4	0.4	157.5	O K
2880 min Winter	51.687	0.112	0.0	0.4	0.4	162.2	O K
4320 min Winter	51.690	0.115	0.0	0.5	0.5	166.5	O K
5760 min Winter	51.691	0.116	0.0	0.5	0.5	168.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
480 min Winter	9.586	0.0	51.0	482
600 min Winter	8.190	0.0	52.5	598
720 min Winter	7.199	0.0	53.4	716
960 min Winter	5.872	0.0	54.3	948
1440 min Winter	4.405	0.0	54.0	1406
2160 min Winter	3.302	0.0	110.1	2080
2880 min Winter	2.688	0.0	110.4	2716
4320 min Winter	2.009	0.0	104.7	3412
5760 min Winter	1.633	0.0	202.0	4328

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
7200 min Winter	51.691	0.116	0.0	0.5	0.5	168.1	O K
8640 min Winter	51.690	0.115	0.0	0.5	0.5	166.6	O K
10080 min Winter	51.688	0.113	0.0	0.4	0.4	164.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
7200 min Winter	1.390	0.0	203.4	5256
8640 min Winter	1.219	0.0	200.2	6144
10080 min Winter	1.090	0.0	193.5	7064

Rainfall Details

Rainfall Model	FSR	Ratio R	0.276	Cv (Winter)	0.840
Return Period (years)	100	Summer Storms	Yes	Shortest Storm (mins)	15
Region	Scotland and Ireland	Winter Storms	Yes	Longest Storm (mins)	10080
M5-60 (mm)	16.900	Cv (Summer)	0.750	Climate Change %	+20

Time Area Diagram

Total Area (ha) 0.189

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

Model Details

Storage is Online Cover Level (m) 52.025

Cellular Storage Structure

Invert Level (m) 51.575 Infiltration Coefficient Side (m/hr) 0.00000 Porosity 0.90
Infiltration Coefficient Base (m/hr) 0.00000 Safety Factor 2.0

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	1609.0	0.0	0.250	1609.0	0.0	0.251	0.0	0.0

Orifice Outflow Control

Diameter (m) 0.026 Discharge Coefficient 0.600 Invert Level (m) 51.575

Summary of Results for 30 year Return Period (+20%)

Half Drain Time : 3418 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	77.863	0.018	0.0	0.1	0.1	41.8	O K
30 min Summer	77.870	0.025	0.0	0.2	0.2	57.3	O K
60 min Summer	77.878	0.033	0.0	0.2	0.2	74.5	O K
120 min Summer	77.886	0.041	0.0	0.3	0.3	94.1	O K
180 min Summer	77.892	0.047	0.0	0.4	0.4	106.9	O K
240 min Summer	77.896	0.051	0.0	0.4	0.4	116.6	O K
360 min Summer	77.903	0.058	0.0	0.5	0.5	131.0	O K
480 min Summer	77.907	0.062	0.0	0.5	0.5	141.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	68.467	0.0	6.6	27
30 min Summer	47.008	0.0	11.4	42
60 min Summer	30.633	0.0	28.3	72
120 min Summer	19.493	0.0	39.1	132
180 min Summer	14.859	0.0	46.6	190
240 min Summer	12.232	0.0	52.3	250
360 min Summer	9.279	0.0	60.4	370
480 min Summer	7.619	0.0	65.7	488

Summary of Results for 30 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
600 min Summer	77.911	0.066	0.0	0.5	0.5	150.2	O K
720 min Summer	77.914	0.069	0.0	0.6	0.6	157.1	O K
960 min Summer	77.919	0.074	0.0	0.6	0.6	168.0	O K
1440 min Summer	77.925	0.080	0.0	0.6	0.6	182.2	O K
2160 min Summer	77.930	0.085	0.0	0.6	0.6	193.6	O K
2880 min Summer	77.933	0.088	0.0	0.6	0.6	200.9	O K
4320 min Summer	77.938	0.093	0.0	0.7	0.7	210.5	O K
5760 min Summer	77.940	0.095	0.0	0.7	0.7	215.8	O K
7200 min Summer	77.941	0.096	0.0	0.7	0.7	218.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
600 min Summer	6.535	0.0	69.4	608
720 min Summer	5.764	0.0	72.0	726
960 min Summer	4.727	0.0	74.6	966
1440 min Summer	3.573	0.0	74.9	1442
2160 min Summer	2.699	0.0	148.8	2060
2880 min Summer	2.210	0.0	152.5	2392
4320 min Summer	1.667	0.0	146.3	3120
5760 min Summer	1.363	0.0	261.8	3928
7200 min Summer	1.167	0.0	271.5	4760

Summary of Results for 30 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
8640 min Summer	77.942	0.097	0.0	0.7	0.7	219.3	O K
10080 min Summer	77.941	0.096	0.0	0.7	0.7	219.0	O K
15 min Winter	77.866	0.021	0.0	0.1	0.1	46.8	O K
30 min Winter	77.873	0.028	0.0	0.2	0.2	64.2	O K
60 min Winter	77.882	0.037	0.0	0.3	0.3	83.4	O K
120 min Winter	77.891	0.046	0.0	0.4	0.4	105.4	O K
180 min Winter	77.898	0.053	0.0	0.5	0.5	119.8	O K
240 min Winter	77.902	0.057	0.0	0.5	0.5	130.6	O K
360 min Winter	77.910	0.065	0.0	0.5	0.5	146.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
8640 min Summer	1.027	0.0	274.0	5616
10080 min Summer	0.922	0.0	268.6	6448
15 min Winter	68.467	0.0	8.3	27
30 min Winter	47.008	0.0	13.3	42
60 min Winter	30.633	0.0	33.0	70
120 min Winter	19.493	0.0	45.6	130
180 min Winter	14.859	0.0	54.1	188
240 min Winter	12.232	0.0	60.1	246
360 min Winter	9.279	0.0	68.4	364

Summary of Results for 30 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
480 min Winter	77.915	0.070	0.0	0.6	0.6	159.0	O K
600 min Winter	77.919	0.074	0.0	0.6	0.6	168.6	O K
720 min Winter	77.923	0.078	0.0	0.6	0.6	176.5	O K
960 min Winter	77.928	0.083	0.0	0.6	0.6	188.9	O K
1440 min Winter	77.935	0.090	0.0	0.7	0.7	205.5	O K
2160 min Winter	77.942	0.097	0.0	0.7	0.7	219.5	O K
2880 min Winter	77.945	0.100	0.0	0.7	0.7	226.6	O K
4320 min Winter	77.949	0.104	0.0	0.7	0.7	235.3	O K
5760 min Winter	77.950	0.105	0.0	0.7	0.7	239.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
480 min Winter	7.619	0.0	73.7	480
600 min Winter	6.535	0.0	77.1	598
720 min Winter	5.764	0.0	79.2	714
960 min Winter	4.727	0.0	81.3	946
1440 min Winter	3.573	0.0	81.6	1402
2160 min Winter	2.699	0.0	164.5	2060
2880 min Winter	2.210	0.0	166.9	2680
4320 min Winter	1.667	0.0	160.0	3328
5760 min Winter	1.363	0.0	293.4	4264

Summary of Results for 30 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
7200 min Winter	77.950	0.105	0.0	0.7	0.7	239.5	O K
8640 min Winter	77.950	0.105	0.0	0.7	0.7	237.9	O K
10080 min Winter	77.948	0.103	0.0	0.7	0.7	235.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
7200 min Winter	1.167	0.0	302.8	5184
8640 min Winter	1.027	0.0	303.6	6056
10080 min Winter	0.922	0.0	295.7	6960

Rainfall Details

Rainfall Model	FSR	Ratio R	0.276	Cv (Winter)	0.840
Return Period (years)	30	Summer Storms	Yes	Shortest Storm (mins)	15
Region	Scotland and Ireland	Winter Storms	Yes	Longest Storm (mins)	10080
M5-60 (mm)	16.900	Cv (Summer)	0.750	Climate Change %	+20

Time Area Diagram

Total Area (ha) 0.326

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.109	4	8	0.109	8	12	0.109

Model Details

Storage is Online Cover Level (m) 78.295

Cellular Storage Structure

Invert Level (m) 77.845 Infiltration Coefficient Side (m/hr) 0.00000 Porosity 0.90
Infiltration Coefficient Base (m/hr) 0.00000 Safety Factor 2.0

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	2525.0	0.0	0.250	2525.0	0.0	0.251	0.0	0.0

Orifice Outflow Control

Diameter (m) 0.034 Discharge Coefficient 0.600 Invert Level (m) 77.845

Summary of Results for 30 year Return Period (+20%)

Half Drain Time : 3608 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	79.014	0.019	0.0	0.1	0.1	15.0	O K
30 min Summer	79.021	0.026	0.0	0.1	0.1	20.5	O K
60 min Summer	79.029	0.034	0.0	0.1	0.1	26.6	O K
120 min Summer	79.038	0.043	0.0	0.1	0.1	33.7	O K
180 min Summer	79.044	0.049	0.0	0.1	0.1	38.3	O K
240 min Summer	79.048	0.053	0.0	0.2	0.2	41.7	O K
360 min Summer	79.055	0.060	0.0	0.2	0.2	46.9	O K
480 min Summer	79.060	0.065	0.0	0.2	0.2	50.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	68.467	0.0	4.0	27
30 min Summer	47.008	0.0	6.3	42
60 min Summer	30.633	0.0	14.0	72
120 min Summer	19.493	0.0	18.0	130
180 min Summer	14.859	0.0	20.2	190
240 min Summer	12.232	0.0	21.6	250
360 min Summer	9.279	0.0	23.3	370
480 min Summer	7.619	0.0	24.4	488

Summary of Results for 30 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
600 min Summer	79.064	0.069	0.0	0.2	0.2	53.8	O K
720 min Summer	79.067	0.072	0.0	0.2	0.2	56.3	O K
960 min Summer	79.072	0.077	0.0	0.2	0.2	60.2	O K
1440 min Summer	79.079	0.084	0.0	0.2	0.2	65.3	O K
2160 min Summer	79.084	0.089	0.0	0.2	0.2	69.5	O K
2880 min Summer	79.087	0.092	0.0	0.2	0.2	71.8	O K
4320 min Summer	79.091	0.096	0.0	0.2	0.2	74.9	O K
5760 min Summer	79.093	0.098	0.0	0.2	0.2	76.5	O K
7200 min Summer	79.094	0.099	0.0	0.2	0.2	77.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
600 min Summer	6.535	0.0	25.2	608
720 min Summer	5.764	0.0	25.7	726
960 min Summer	4.727	0.0	26.3	966
1440 min Summer	3.573	0.0	26.2	1444
2160 min Summer	2.699	0.0	53.1	2148
2880 min Summer	2.210	0.0	53.6	2460
4320 min Summer	1.667	0.0	51.3	3204
5760 min Summer	1.363	0.0	97.2	4032
7200 min Summer	1.167	0.0	98.7	4832

Summary of Results for 30 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
8640 min Summer	79.094	0.099	0.0	0.2	0.2	77.4	O K
10080 min Summer	79.094	0.099	0.0	0.2	0.2	77.1	O K
15 min Winter	79.016	0.021	0.0	0.1	0.1	16.8	O K
30 min Winter	79.024	0.029	0.0	0.1	0.1	23.0	O K
60 min Winter	79.033	0.038	0.0	0.1	0.1	29.8	O K
120 min Winter	79.043	0.048	0.0	0.1	0.1	37.7	O K
180 min Winter	79.050	0.055	0.0	0.2	0.2	42.9	O K
240 min Winter	79.055	0.060	0.0	0.2	0.2	46.8	O K
360 min Winter	79.062	0.067	0.0	0.2	0.2	52.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
8640 min Summer	1.027	0.0	97.7	5704
10080 min Summer	0.922	0.0	94.9	6464
15 min Winter	68.467	0.0	4.7	27
30 min Winter	47.008	0.0	7.3	41
60 min Winter	30.633	0.0	15.9	70
120 min Winter	19.493	0.0	20.0	130
180 min Winter	14.859	0.0	22.1	188
240 min Winter	12.232	0.0	23.5	246
360 min Winter	9.279	0.0	25.3	364

Summary of Results for 30 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
480 min Winter	79.068	0.073	0.0	0.2	0.2	57.0	O K
600 min Winter	79.072	0.077	0.0	0.2	0.2	60.4	O K
720 min Winter	79.076	0.081	0.0	0.2	0.2	63.2	O K
960 min Winter	79.082	0.087	0.0	0.2	0.2	67.7	O K
1440 min Winter	79.089	0.094	0.0	0.2	0.2	73.7	O K
2160 min Winter	79.096	0.101	0.0	0.2	0.2	78.8	O K
2880 min Winter	79.099	0.104	0.0	0.2	0.2	81.5	O K
4320 min Winter	79.103	0.108	0.0	0.2	0.2	84.2	O K
5760 min Winter	79.104	0.109	0.0	0.2	0.2	85.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
480 min Winter	7.619	0.0	26.5	480
600 min Winter	6.535	0.0	27.2	598
720 min Winter	5.764	0.0	27.8	716
960 min Winter	4.727	0.0	28.4	948
1440 min Winter	3.573	0.0	28.3	1406
2160 min Winter	2.699	0.0	57.7	2076
2880 min Winter	2.210	0.0	58.1	2712
4320 min Winter	1.667	0.0	55.6	3376
5760 min Winter	1.363	0.0	107.0	4320

Summary of Results for 30 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
7200 min Winter	79.104	0.109	0.0	0.2	0.2	85.6	O K
8640 min Winter	79.104	0.109	0.0	0.2	0.2	85.0	O K
10080 min Winter	79.102	0.107	0.0	0.2	0.2	84.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
7200 min Winter	1.167	0.0	108.1	5256
8640 min Winter	1.027	0.0	106.8	6144
10080 min Winter	0.922	0.0	103.7	7056

Rainfall Details

Rainfall Model	FSR	Ratio R	0.276	Cv (Winter)	0.840
Return Period (years)	30	Summer Storms	Yes	Shortest Storm (mins)	15
Region	Scotland and Ireland	Winter Storms	Yes	Longest Storm (mins)	10080
M5-60 (mm)	16.900	Cv (Summer)	0.750	Climate Change %	+20

Time Area Diagram

Total Area (ha) 0.117

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

Model Details

Storage is Online Cover Level (m) 79.445

Cellular Storage Structure

Invert Level (m) 78.995 Infiltration Coefficient Side (m/hr) 0.00000 Porosity 0.90
Infiltration Coefficient Base (m/hr) 0.00000 Safety Factor 2.0

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	869.0	0.0	0.250	869.0	0.0	0.251	0.0	0.0

Orifice Outflow Control

Diameter (m) 0.019 Discharge Coefficient 0.600 Invert Level (m) 78.995

Summary of Results for 30 year Return Period (+20%)

Half Drain Time : 3673 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	67.782	0.017	0.0	0.1	0.1	31.5	O K
30 min Summer	67.788	0.023	0.0	0.1	0.1	43.2	O K
60 min Summer	67.795	0.030	0.0	0.2	0.2	56.2	O K
120 min Summer	67.803	0.038	0.0	0.3	0.3	71.0	O K
180 min Summer	67.808	0.043	0.0	0.3	0.3	80.7	O K
240 min Summer	67.812	0.047	0.0	0.3	0.3	88.0	O K
360 min Summer	67.818	0.053	0.0	0.3	0.3	99.0	O K
480 min Summer	67.823	0.058	0.0	0.4	0.4	107.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	68.467	0.0	5.2	27
30 min Summer	47.008	0.0	8.6	42
60 min Summer	30.633	0.0	21.4	72
120 min Summer	19.493	0.0	29.7	132
180 min Summer	14.859	0.0	35.3	190
240 min Summer	12.232	0.0	39.3	250
360 min Summer	9.279	0.0	44.8	370
480 min Summer	7.619	0.0	48.4	488

Summary of Results for 30 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
600 min Summer	67.826	0.061	0.0	0.4	0.4	113.7	O K
720 min Summer	67.829	0.064	0.0	0.4	0.4	119.0	O K
960 min Summer	67.834	0.069	0.0	0.4	0.4	127.4	O K
1440 min Summer	67.840	0.075	0.0	0.4	0.4	138.6	O K
2160 min Summer	67.845	0.080	0.0	0.4	0.4	147.8	O K
2880 min Summer	67.848	0.083	0.0	0.5	0.5	153.3	O K
4320 min Summer	67.851	0.086	0.0	0.5	0.5	160.6	O K
5760 min Summer	67.854	0.089	0.0	0.5	0.5	164.9	O K
7200 min Summer	67.855	0.090	0.0	0.5	0.5	167.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
600 min Summer	6.535	0.0	50.7	608
720 min Summer	5.764	0.0	52.1	728
960 min Summer	4.727	0.0	53.5	966
1440 min Summer	3.573	0.0	53.6	1444
2160 min Summer	2.699	0.0	108.6	2144
2880 min Summer	2.210	0.0	110.0	2456
4320 min Summer	1.667	0.0	105.1	3204
5760 min Summer	1.363	0.0	195.1	3992
7200 min Summer	1.167	0.0	200.9	4832

Summary of Results for 30 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
8640 min Summer	67.855	0.090	0.0	0.5	0.5	168.1	O K
10080 min Summer	67.855	0.090	0.0	0.5	0.5	168.1	O K
15 min Winter	67.784	0.019	0.0	0.1	0.1	35.3	O K
30 min Winter	67.791	0.026	0.0	0.1	0.1	48.4	O K
60 min Winter	67.799	0.034	0.0	0.2	0.2	62.9	O K
120 min Winter	67.808	0.043	0.0	0.3	0.3	79.5	O K
180 min Winter	67.814	0.049	0.0	0.3	0.3	90.4	O K
240 min Winter	67.818	0.053	0.0	0.3	0.3	98.7	O K
360 min Winter	67.825	0.060	0.0	0.4	0.4	111.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
8640 min Summer	1.027	0.0	200.9	5632
10080 min Summer	0.922	0.0	195.2	6464
15 min Winter	68.467	0.0	6.4	27
30 min Winter	47.008	0.0	10.1	42
60 min Winter	30.633	0.0	25.1	70
120 min Winter	19.493	0.0	34.6	130
180 min Winter	14.859	0.0	40.6	188
240 min Winter	12.232	0.0	44.8	246
360 min Winter	9.279	0.0	50.3	364

Summary of Results for 30 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
480 min Winter	67.830	0.065	0.0	0.4	0.4	120.3	O K
600 min Winter	67.834	0.069	0.0	0.4	0.4	127.6	O K
720 min Winter	67.837	0.072	0.0	0.4	0.4	133.7	O K
960 min Winter	67.842	0.077	0.0	0.4	0.4	143.2	O K
1440 min Winter	67.849	0.084	0.0	0.5	0.5	156.2	O K
2160 min Winter	67.855	0.090	0.0	0.5	0.5	167.4	O K
2880 min Winter	67.858	0.093	0.0	0.5	0.5	173.4	O K
4320 min Winter	67.862	0.097	0.0	0.5	0.5	179.9	O K
5760 min Winter	67.864	0.099	0.0	0.5	0.5	183.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
480 min Winter	7.619	0.0	53.6	480
600 min Winter	6.535	0.0	55.5	598
720 min Winter	5.764	0.0	56.8	716
960 min Winter	4.727	0.0	58.2	948
1440 min Winter	3.573	0.0	58.2	1406
2160 min Winter	2.699	0.0	119.0	2076
2880 min Winter	2.210	0.0	120.1	2708
4320 min Winter	1.667	0.0	114.7	3372
5760 min Winter	1.363	0.0	217.7	4280

Summary of Results for 30 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
7200 min Winter	67.864	0.099	0.0	0.5	0.5	184.1	O K
8640 min Winter	67.864	0.099	0.0	0.5	0.5	183.4	O K
10080 min Winter	67.863	0.098	0.0	0.5	0.5	181.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
7200 min Winter	1.167	0.0	222.8	5200
8640 min Winter	1.027	0.0	221.0	6136
10080 min Winter	0.922	0.0	214.4	6976

Rainfall Details

Rainfall Model	FSR	Ratio R	0.276	Cv (Winter)	0.840
Return Period (years)	30	Summer Storms	Yes	Shortest Storm (mins)	15
Region	Scotland and Ireland	Winter Storms	Yes	Longest Storm (mins)	10080
M5-60 (mm)	16.900	Cv (Summer)	0.750	Climate Change %	+20

Time Area Diagram

Total Area (ha) 0.246

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.082	4	8	0.082	8	12	0.082

Model Details

Storage is Online Cover Level (m) 68.215

Cellular Storage Structure

Invert Level (m) 67.765 Infiltration Coefficient Side (m/hr) 0.00000 Porosity 0.90
Infiltration Coefficient Base (m/hr) 0.00000 Safety Factor 2.0

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	2064.0	0.0	0.250	2064.0	0.0	0.251	0.0	0.0

Orifice Outflow Control

Diameter (m) 0.029 Discharge Coefficient 0.600 Invert Level (m) 67.765

Summary of Results for 30 year Return Period (+20%)

Half Drain Time : 3453 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	51.592	0.017	0.0	0.1	0.1	24.2	O K
30 min Summer	51.598	0.023	0.0	0.1	0.1	33.2	O K
60 min Summer	51.605	0.030	0.0	0.2	0.2	43.1	O K
120 min Summer	51.613	0.038	0.0	0.2	0.2	54.5	O K
180 min Summer	51.618	0.043	0.0	0.2	0.2	61.9	O K
240 min Summer	51.622	0.047	0.0	0.3	0.3	67.5	O K
360 min Summer	51.627	0.052	0.0	0.3	0.3	75.9	O K
480 min Summer	51.632	0.057	0.0	0.3	0.3	82.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	68.467	0.0	4.7	27
30 min Summer	47.008	0.0	7.4	42
60 min Summer	30.633	0.0	18.1	72
120 min Summer	19.493	0.0	24.9	130
180 min Summer	14.859	0.0	29.3	190
240 min Summer	12.232	0.0	32.4	250
360 min Summer	9.279	0.0	36.6	370
480 min Summer	7.619	0.0	39.3	488

Summary of Results for 30 year Return Period (+20%)

	Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
600	min Summer	51.635	0.060	0.0	0.3	0.3	87.0	O K
720	min Summer	51.638	0.063	0.0	0.3	0.3	91.0	O K
960	min Summer	51.642	0.067	0.0	0.3	0.3	97.3	O K
1440	min Summer	51.648	0.073	0.0	0.3	0.3	105.6	O K
2160	min Summer	51.652	0.077	0.0	0.4	0.4	112.2	O K
2880	min Summer	51.655	0.080	0.0	0.4	0.4	116.3	O K
4320	min Summer	51.659	0.084	0.0	0.4	0.4	121.7	O K
5760	min Summer	51.661	0.086	0.0	0.4	0.4	124.7	O K
7200	min Summer	51.662	0.087	0.0	0.4	0.4	126.0	O K

	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
600	min Summer	6.535	0.0	41.0	608
720	min Summer	5.764	0.0	42.0	726
960	min Summer	4.727	0.0	43.1	966
1440	min Summer	3.573	0.0	43.1	1442
2160	min Summer	2.699	0.0	86.8	2100
2880	min Summer	2.210	0.0	87.9	2404
4320	min Summer	1.667	0.0	84.2	3156
5760	min Summer	1.363	0.0	153.9	3976
7200	min Summer	1.167	0.0	158.9	4824

Summary of Results for 30 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
8640 min Summer	51.662	0.087	0.0	0.4	0.4	126.5	O K
10080 min Summer	51.662	0.087	0.0	0.4	0.4	126.2	O K
15 min Winter	51.594	0.019	0.0	0.1	0.1	27.1	O K
30 min Winter	51.601	0.026	0.0	0.1	0.1	37.2	O K
60 min Winter	51.608	0.033	0.0	0.2	0.2	48.3	O K
120 min Winter	51.617	0.042	0.0	0.2	0.2	61.0	O K
180 min Winter	51.623	0.048	0.0	0.3	0.3	69.4	O K
240 min Winter	51.627	0.052	0.0	0.3	0.3	75.7	O K
360 min Winter	51.634	0.059	0.0	0.3	0.3	85.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
8640 min Summer	1.027	0.0	159.3	5624
10080 min Summer	0.922	0.0	155.1	6456
15 min Winter	68.467	0.0	5.6	27
30 min Winter	47.008	0.0	8.7	41
60 min Winter	30.633	0.0	21.1	70
120 min Winter	19.493	0.0	28.7	130
180 min Winter	14.859	0.0	33.4	188
240 min Winter	12.232	0.0	36.6	246
360 min Winter	9.279	0.0	40.8	364

Summary of Results for 30 year Return Period (+20%)

	Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
480	min Winter	51.639	0.064	0.0	0.3	0.3	92.1	O K
600	min Winter	51.642	0.067	0.0	0.3	0.3	97.7	O K
720	min Winter	51.646	0.071	0.0	0.3	0.3	102.3	O K
960	min Winter	51.651	0.076	0.0	0.4	0.4	109.5	O K
1440	min Winter	51.657	0.082	0.0	0.4	0.4	119.1	O K
2160	min Winter	51.663	0.088	0.0	0.4	0.4	127.3	O K
2880	min Winter	51.666	0.091	0.0	0.4	0.4	131.4	O K
4320	min Winter	51.669	0.094	0.0	0.4	0.4	136.3	O K
5760	min Winter	51.671	0.096	0.0	0.4	0.4	138.4	O K

	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
480	min Winter	7.619	0.0	43.2	480
600	min Winter	6.535	0.0	44.7	598
720	min Winter	5.764	0.0	45.7	714
960	min Winter	4.727	0.0	46.8	946
1440	min Winter	3.573	0.0	46.8	1404
2160	min Winter	2.699	0.0	94.9	2064
2880	min Winter	2.210	0.0	96.0	2684
4320	min Winter	1.667	0.0	91.9	3332
5760	min Winter	1.363	0.0	171.8	4272

Summary of Results for 30 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
7200 min Winter	51.671	0.096	0.0	0.4	0.4	138.6	O K
8640 min Winter	51.670	0.095	0.0	0.4	0.4	137.7	O K
10080 min Winter	51.669	0.094	0.0	0.4	0.4	136.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
7200 min Winter	1.167	0.0	176.2	5192
8640 min Winter	1.027	0.0	175.2	6056
10080 min Winter	0.922	0.0	170.3	6960

Rainfall Details

Rainfall Model	FSR	Ratio R	0.276	Cv (Winter)	0.840
Return Period (years)	30	Summer Storms	Yes	Shortest Storm (mins)	15
Region	Scotland and Ireland	Winter Storms	Yes	Longest Storm (mins)	10080
M5-60 (mm)	16.900	Cv (Summer)	0.750	Climate Change %	+20

Time Area Diagram

Total Area (ha) 0.189

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

Model Details

Storage is Online Cover Level (m) 52.025

Cellular Storage Structure

Invert Level (m) 51.575 Infiltration Coefficient Side (m/hr) 0.00000 Porosity 0.90
Infiltration Coefficient Base (m/hr) 0.00000 Safety Factor 2.0

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	1609.0	0.0	0.250	1609.0	0.0	0.251	0.0	0.0

Orifice Outflow Control

Diameter (m) 0.026 Discharge Coefficient 0.600 Invert Level (m) 51.575

Summary of Results for 30 year Return Period (+20%)

Half Drain Time : 3579 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	48.143	0.018	0.0	0.1	0.1	32.3	O K
30 min Summer	48.150	0.025	0.0	0.1	0.1	44.3	O K
60 min Summer	48.158	0.033	0.0	0.2	0.2	57.5	O K
120 min Summer	48.166	0.041	0.0	0.3	0.3	72.7	O K
180 min Summer	48.172	0.047	0.0	0.3	0.3	82.6	O K
240 min Summer	48.176	0.051	0.0	0.3	0.3	90.1	O K
360 min Summer	48.182	0.057	0.0	0.4	0.4	101.3	O K
480 min Summer	48.187	0.062	0.0	0.4	0.4	109.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	68.467	0.0	6.0	27
30 min Summer	47.008	0.0	9.5	42
60 min Summer	30.633	0.0	23.4	72
120 min Summer	19.493	0.0	32.2	130
180 min Summer	14.859	0.0	38.0	190
240 min Summer	12.232	0.0	42.2	250
360 min Summer	9.279	0.0	47.7	370
480 min Summer	7.619	0.0	51.2	488

Summary of Results for 30 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
600 min Summer	48.191	0.066	0.0	0.4	0.4	116.2	O K
720 min Summer	48.194	0.069	0.0	0.4	0.4	121.6	O K
960 min Summer	48.199	0.074	0.0	0.4	0.4	130.1	O K
1440 min Summer	48.205	0.080	0.0	0.5	0.5	141.4	O K
2160 min Summer	48.210	0.085	0.0	0.5	0.5	150.5	O K
2880 min Summer	48.213	0.088	0.0	0.5	0.5	156.0	O K
4320 min Summer	48.218	0.093	0.0	0.5	0.5	163.3	O K
5760 min Summer	48.220	0.095	0.0	0.5	0.5	167.5	O K
7200 min Summer	48.221	0.096	0.0	0.5	0.5	169.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
600 min Summer	6.535	0.0	53.4	608
720 min Summer	5.764	0.0	54.7	726
960 min Summer	4.727	0.0	56.1	966
1440 min Summer	3.573	0.0	56.1	1444
2160 min Summer	2.699	0.0	113.5	2136
2880 min Summer	2.210	0.0	114.9	2432
4320 min Summer	1.667	0.0	109.8	3168
5760 min Summer	1.363	0.0	203.0	3984
7200 min Summer	1.167	0.0	209.1	4832

Summary of Results for 30 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
8640 min Summer	48.221	0.096	0.0	0.5	0.5	170.3	O K
10080 min Summer	48.221	0.096	0.0	0.5	0.5	170.1	O K
15 min Winter	48.145	0.020	0.0	0.1	0.1	36.2	O K
30 min Winter	48.153	0.028	0.0	0.2	0.2	49.6	O K
60 min Winter	48.161	0.036	0.0	0.2	0.2	64.4	O K
120 min Winter	48.171	0.046	0.0	0.3	0.3	81.4	O K
180 min Winter	48.177	0.052	0.0	0.3	0.3	92.5	O K
240 min Winter	48.182	0.057	0.0	0.4	0.4	101.0	O K
360 min Winter	48.189	0.064	0.0	0.4	0.4	113.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
8640 min Summer	1.027	0.0	209.1	5624
10080 min Summer	0.922	0.0	203.3	6456
15 min Winter	68.467	0.0	7.2	27
30 min Winter	47.008	0.0	11.2	41
60 min Winter	30.633	0.0	27.3	70
120 min Winter	19.493	0.0	37.3	130
180 min Winter	14.859	0.0	43.4	188
240 min Winter	12.232	0.0	47.7	246
360 min Winter	9.279	0.0	53.1	364

Summary of Results for 30 year Return Period (+20%)

	Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
480	min Winter	48.195	0.070	0.0	0.4	0.4	123.0	O K
600	min Winter	48.199	0.074	0.0	0.4	0.4	130.5	O K
720	min Winter	48.202	0.077	0.0	0.4	0.4	136.6	O K
960	min Winter	48.208	0.083	0.0	0.5	0.5	146.3	O K
1440	min Winter	48.215	0.090	0.0	0.5	0.5	159.4	O K
2160	min Winter	48.222	0.097	0.0	0.5	0.5	170.6	O K
2880	min Winter	48.225	0.100	0.0	0.5	0.5	176.4	O K
4320	min Winter	48.229	0.104	0.0	0.5	0.5	183.0	O K
5760	min Winter	48.230	0.105	0.0	0.5	0.5	186.1	O K

	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
480	min Winter	7.619	0.0	56.3	480
600	min Winter	6.535	0.0	58.2	598
720	min Winter	5.764	0.0	59.5	714
960	min Winter	4.727	0.0	60.9	948
1440	min Winter	3.573	0.0	61.0	1404
2160	min Winter	2.699	0.0	124.1	2076
2880	min Winter	2.210	0.0	125.3	2692
4320	min Winter	1.667	0.0	119.8	3368
5760	min Winter	1.363	0.0	226.4	4272

Summary of Results for 30 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
7200 min Winter	48.231	0.106	0.0	0.5	0.5	186.7	O K
8640 min Winter	48.230	0.105	0.0	0.5	0.5	185.7	O K
10080 min Winter	48.229	0.104	0.0	0.5	0.5	183.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
7200 min Winter	1.167	0.0	231.6	5192
8640 min Winter	1.027	0.0	229.8	6136
10080 min Winter	0.922	0.0	223.1	6968

Rainfall Details

Rainfall Model	FSR	Ratio R	0.276	Cv (Winter)	0.840
Return Period (years)	30	Summer Storms	Yes	Shortest Storm (mins)	15
Region	Scotland and Ireland	Winter Storms	Yes	Longest Storm (mins)	10080
M5-60 (mm)	16.900	Cv (Summer)	0.750	Climate Change %	+20

Time Area Diagram

Total Area (ha) 0.252

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

Model Details

Storage is Online Cover Level (m) 48.575

Cellular Storage Structure

Invert Level (m) 48.125 Infiltration Coefficient Side (m/hr) 0.00000 Porosity 0.90
Infiltration Coefficient Base (m/hr) 0.00000 Safety Factor 2.0

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	1962.0	0.0	0.250	1962.0	0.0	0.251	0.0	0.0

Orifice Outflow Control

Diameter (m) 0.029 Discharge Coefficient 0.600 Invert Level (m) 48.125