Camden

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1. Project & Site Details	
Project / Site Name (including sub-catchment / stage / phase where appropriate)	Garages to the South of 27a West End Lane
Address & post code	Garages to the South of 27a West End Lane, West Hampstead, NW6 4QJ
OS Grid ref. (Easting, Northing)	E 525487
	N 18841
LPA reference (if applicable)	-
Brief description of proposed work	Proposed demolition of the existing eight garages and the erection of a three storey plus lower ground floor building comprising 3x1 bed units, 3x2 bed units, and 2x3 bed units (Class C3) with associated acess and infrastructure
Total site Area	305 m^2
Total existing impervious area	305 m^2
Total proposed impervious area	305 m^2
Is the site in a surface water flood risk catchment (ref. local Surface Water Management Plan)?	N/A
Existing drainage connection type and location	Assumed connection to Thames Water combined sewer
Designer Name	Elen Wyatt
Designer Position	Water Consultant
Designer Company	Create Consulting Engineers

2. Proposed Discharge Arrangements			
2a. Infiltration Feasibility			
Superficial geology classification	N/A		
Bedrock geology classification	London Clay Formation		
Site infiltration rate	N/A	m/s	
Depth to groundwater level	N/A	m below ground level	
Is infiltration feasible?	No		
2b. Drainage Hierarchy			
		Feasible (Y/N)	*Proposed (Y/N)*
1 store rainwater for later use		Y	N
2 use infiltration techniques, such as porous surfaces in non-clay areas		N	N
3 attenuate rainwater in ponds or open water features for gradual release		N	N
4 attenuate rainwater by storing in tanks or sealed water features for gradual release		Y	Y
5 discharge rainwater direct to a watercourse		N	N
6 discharge rainwater to a surface water sewer/drain		N	N
7 discharge rainwater to the combined sewer.		Y	Y
2c. Proposed Discharge Details			
Proposed discharge location	To Thames Water combined sewer in West End Lane via new connection		
Has the owner/regulator of the discharge location been consulted?	Yes - Pre Dev reponse confirms capacity		

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3. Drainage Strategy

3a. Discharge Rates & Required Storage

	Greenfield (GF) runoff rate (l/s)	*Existing discharge rate (l/s)*	*Required storage for GF rate (m^3)*	*Proposed discharge rate (l/s)*
Qbar	0.12			
1 in 1	0.1	3.5	2	1
1 in 30	0.27	8.57	10	1
1 in 100	0.38	11.05	15.7	1
1 in 100 + CC			25.2	1
Climate change allowance used		40%		
3b. Principal Method of Flow Control		Pump		

3c. Proposed SuDS Measures

	Catchment area (m^2)	*Plan area (m^2)*	*Storage vol. (m^3)*
Rainwater harvesting	0		0
Infiltration systems	0		0
Green roofs	82	82	0
Blue roofs	0	0	0
Filter strips	0	0	0
Filter drains	0	0	0
Bioretention / tree pits	0	0	0
Pervious pavements	305	70	0
Swales	0	0	0
Basins/ponds	0	0	0
Attenuation tanks	305		25.2
Total	**692**	**152**	**25.2**

4. Supporting Information

4a. Discharge & Drainage Strategy	*Page/section of drainage report*
Infiltration feasibility (2a) – geotechnical factual and interpretive reports, including infiltration results	Para 4.14 of FRA and DS
Drainage hierarchy (2b)	Table 4.3 of FRA and DS
Proposed discharge details (2c) – utility plans, correspondence / approval from owner/regulator of discharge location	Section 4 of FRA and DS Appendix C of FRA and DS Drawing 1126/02/001
Discharge rates & storage (3a) – detailed hydrologic and hydraulic calculations	Appendix F and G of FRA and DS Calcs appended to ProForma
Proposed SuDS measures & specifications (3b)	Para 4.16 of FRA and DS Table 4.3 of FRA and DS
4b. Other Supporting Details	*Page/section of drainage report*
Detailed Development Layout	Drawings 0390(20) 105J to 109G
Detailed drainage design drawings, including exceedance flow routes	1126/02/001
Detailed landscaping plans	N/A
Maintenance strategy	Table 4.6 of FRA and DS
Demonstration of how the proposed SuDS measures improve:	
a) water quality of the runoff?	Para 4.18 to 4.24 of FRA and DS
b) biodiversity?	Permeable Paving and Green Roof
c) amenity?	Table 4.3 of FRA and DS

Summary of Results for 1 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	31.273	0.073	0.7	1.5	O K
30 min Summer	31.284	0.084	0.8	1.7	O K
60 min Summer	31.289	0.089	0.9	1.8	O K
120 min Summer	31.289	0.089	0.9	1.8	O K
180 min Summer	31.285	0.085	0.9	1.7	O K
240 min Summer	31.281	0.081	0.8	1.6	O K
360 min Summer	31.272	0.072	0.7	1.4	O K
480 min Summer	31.264	0.064	0.6	1.3	O K
600 min Summer	31.258	0.058	0.6	1.2	O K
720 min Summer	31.253	0.053	0.5	1.1	O K
960 min Summer	31.246	0.046	0.5	0.9	O K
1440 min Summer	31.236	0.036	0.4	0.7	O K
2160 min Summer	31.228	0.028	0.3	0.6	O K
2880 min Summer	31.223	0.023	0.2	0.5	O K
4320 min Summer	31.217	0.017	0.2	0.3	O K
5760 min Summer	31.214	0.014	0.1	0.3	O K
7200 min Summer	31.212	0.012	0.1	0.2	O K
8640 min Summer	31.210	0.010	0.1	0.2	O K
10080 min Summer	31.209	0.009	0.1	0.2	O K
15 min Winter	31.281	0.081	0.8	1.6	O K
30 min Winter	31.294	0.094	0.9	1.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	32.914	0.0	2.0	21
30 min Summer	21.228	0.0	2.7	30
60 min Summer	13.233	0.0	3.4	48
120 min Summer	8.073	0.0	4.3	82
180 min Summer	6.014	0.0	4.8	114
240 min Summer	4.874	0.0	5.3	146
360 min Summer	3.603	0.0	5.9	208
480 min Summer	2.900	0.0	6.3	270
600 min Summer	2.450	0.0	6.7	330
720 min Summer	2.134	0.0	7.0	390
960 min Summer	1.717	0.0	7.5	512
1440 min Summer	1.264	0.0	8.2	752
2160 min Summer	0.931	0.0	9.1	1112
2880 min Summer	0.749	0.0	9.7	1476
4320 min Summer	0.551	0.0	10.5	2204
5760 min Summer	0.443	0.0	11.1	2936
7200 min Summer	0.375	0.0	11.6	3608
8640 min Summer	0.326	0.0	12.1	4384
10080 min Summer	0.291	0.0	12.5	5064
15 min Winter	32.914	0.0	2.3	21
30 min Winter	21.228	0.0	3.1	31

Summary of Results for 1 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	31.300	0.100	1.0	2.0	O K
120 min Winter	31.296	0.096	1.0	1.9	O K
180 min Winter	31.288	0.088	0.9	1.8	O K
240 min Winter	31.280	0.080	0.8	1.6	O K
360 min Winter	31.267	0.067	0.7	1.3	O K
480 min Winter	31.258	0.058	0.6	1.2	O K
600 min Winter	31.251	0.051	0.5	1.0	O K
720 min Winter	31.245	0.045	0.5	0.9	O K
960 min Winter	31.238	0.038	0.4	0.8	O K
1440 min Winter	31.228	0.028	0.3	0.6	O K
2160 min Winter	31.221	0.021	0.2	0.4	O K
2880 min Winter	31.217	0.017	0.2	0.3	O K
4320 min Winter	31.213	0.013	0.1	0.3	O K
5760 min Winter	31.210	0.010	0.1	0.2	O K
7200 min Winter	31.209	0.009	0.1	0.2	O K
8640 min Winter	31.207	0.007	0.1	0.1	O K
10080 min Winter	31.207	0.007	0.1	0.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	13.233	0.0	3.9	50
120 min Winter	8.073	0.0	4.9	86
180 min Winter	6.014	0.0	5.5	120
240 min Winter	4.874	0.0	5.9	152
360 min Winter	3.603	0.0	6.6	214
480 min Winter	2.900	0.0	7.1	276
600 min Winter	2.450	0.0	7.5	338
720 min Winter	2.134	0.0	7.9	398
960 min Winter	1.717	0.0	8.5	516
1440 min Winter	1.264	0.0	9.3	756
2160 min Winter	0.931	0.0	10.3	1112
2880 min Winter	0.749	0.0	10.9	1480
4320 min Winter	0.551	0.0	11.9	2244
5760 min Winter	0.443	0.0	12.7	2920
7200 min Winter	0.375	0.0	13.2	3744
8640 min Winter	0.326	0.0	13.7	4408
10080 min Winter	0.291	0.0	14.1	5048

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	1	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.600	Shortest Storm (mins)	15
Ratio R	0.437	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.031

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.010	4	8	0.010	8	12	0.010

Green Roof

Area (m³) 82 Evaporation (mm/day) 3
Depression Storage (mm) 5 Decay Coefficient 0.050

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.001490	32	36	0.000301	64	68	0.000061	96	100	0.000012
4	8	0.001220	36	40	0.000246	68	72	0.000050	100	104	0.000010
8	12	0.000999	40	44	0.000202	72	76	0.000041	104	108	0.000008
12	16	0.000818	44	48	0.000165	76	80	0.000033	108	112	0.000007
16	20	0.000670	48	52	0.000135	80	84	0.000027	112	116	0.000006
20	24	0.000548	52	56	0.000111	84	88	0.000022	116	120	0.000005
24	28	0.000449	56	60	0.000091	88	92	0.000018			
28	32	0.000367	60	64	0.000074	92	96	0.000015			

Time Area Diagram

Total Area (ha) 0.000

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

Model Details

Storage is Online Cover Level (m) 33.000

Tank or Pond Structure

Invert Level (m) 31.200

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	20.0	1.300	20.0	1.301	0.0

Pump Outflow Control

Invert Level (m) 31.200

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.0000	1.200	1.0000	3.000	1.0000	7.000	1.0000
0.200	1.0000	1.400	1.0000	3.500	1.0000	7.500	1.0000
0.300	1.0000	1.600	1.0000	4.000	1.0000	8.000	1.0000
0.400	1.0000	1.800	1.0000	4.500	1.0000	8.500	1.0000
0.500	1.0000	2.000	1.0000	5.000	1.0000	9.000	1.0000
0.600	1.0000	2.200	1.0000	5.500	1.0000	9.500	1.0000
0.800	1.0000	2.400	1.0000	6.000	1.0000		
1.000	1.0000	2.600	1.0000	6.500	1.0000		

Summary of Results for 30 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	31.458	0.258	1.0	5.2	O K
30 min Summer	31.529	0.329	1.0	6.6	O K
60 min Summer	31.581	0.381	1.0	7.6	O K
120 min Summer	31.629	0.429	1.0	8.6	O K
180 min Summer	31.630	0.430	1.0	8.6	O K
240 min Summer	31.615	0.415	1.0	8.3	O K
360 min Summer	31.569	0.369	1.0	7.4	O K
480 min Summer	31.517	0.317	1.0	6.3	O K
600 min Summer	31.469	0.269	1.0	5.4	O K
720 min Summer	31.425	0.225	1.0	4.5	O K
960 min Summer	31.356	0.156	1.0	3.1	O K
1440 min Summer	31.294	0.094	0.9	1.9	O K
2160 min Summer	31.269	0.069	0.7	1.4	O K
2880 min Summer	31.255	0.055	0.6	1.1	O K
4320 min Summer	31.240	0.040	0.4	0.8	O K
5760 min Summer	31.232	0.032	0.3	0.6	O K
7200 min Summer	31.227	0.027	0.3	0.5	O K
8640 min Summer	31.224	0.024	0.2	0.5	O K
10080 min Summer	31.222	0.022	0.2	0.4	O K
15 min Winter	31.497	0.297	1.0	5.9	O K
30 min Winter	31.578	0.378	1.0	7.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	97.987	0.0	6.8	25
30 min Summer	62.263	0.0	8.7	38
60 min Summer	38.066	0.0	10.7	64
120 min Summer	24.342	0.0	13.9	106
180 min Summer	18.280	0.0	15.7	138
240 min Summer	14.746	0.0	16.9	172
360 min Summer	10.706	0.0	18.4	238
480 min Summer	8.451	0.0	19.4	302
600 min Summer	7.002	0.0	20.1	364
720 min Summer	5.989	0.0	20.6	424
960 min Summer	4.656	0.0	21.3	536
1440 min Summer	3.260	0.0	22.3	750
2160 min Summer	2.290	0.0	23.4	1112
2880 min Summer	1.790	0.0	24.3	1472
4320 min Summer	1.282	0.0	26.0	2204
5760 min Summer	1.022	0.0	27.4	2936
7200 min Summer	0.863	0.0	28.8	3672
8640 min Summer	0.756	0.0	30.1	4384
10080 min Summer	0.679	0.0	31.4	5096
15 min Winter	97.987	0.0	7.6	25
30 min Winter	62.263	0.0	9.8	38

Summary of Results for 30 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	31.640	0.440	1.0	8.8	O K
120 min Winter	31.700	0.500	1.0	10.0	O K
180 min Winter	31.694	0.494	1.0	9.9	O K
240 min Winter	31.671	0.471	1.0	9.4	O K
360 min Winter	31.598	0.398	1.0	8.0	O K
480 min Winter	31.520	0.320	1.0	6.4	O K
600 min Winter	31.447	0.247	1.0	4.9	O K
720 min Winter	31.385	0.185	1.0	3.7	O K
960 min Winter	31.304	0.104	1.0	2.1	O K
1440 min Winter	31.273	0.073	0.7	1.5	O K
2160 min Winter	31.252	0.052	0.5	1.0	O K
2880 min Winter	31.241	0.041	0.4	0.8	O K
4320 min Winter	31.229	0.029	0.3	0.6	O K
5760 min Winter	31.223	0.023	0.2	0.5	O K
7200 min Winter	31.220	0.020	0.2	0.4	O K
8640 min Winter	31.217	0.017	0.2	0.3	O K
10080 min Winter	31.216	0.016	0.2	0.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	38.066	0.0	12.1	64
120 min Winter	24.342	0.0	15.6	116
180 min Winter	18.280	0.0	17.6	148
240 min Winter	14.746	0.0	18.9	184
360 min Winter	10.706	0.0	20.7	256
480 min Winter	8.451	0.0	21.8	324
600 min Winter	7.002	0.0	22.5	384
720 min Winter	5.989	0.0	23.1	440
960 min Winter	4.656	0.0	23.9	526
1440 min Winter	3.260	0.0	25.1	758
2160 min Winter	2.290	0.0	26.4	1112
2880 min Winter	1.790	0.0	27.4	1476
4320 min Winter	1.282	0.0	29.2	2208
5760 min Winter	1.022	0.0	30.9	2944
7200 min Winter	0.863	0.0	32.5	3592
8640 min Winter	0.756	0.0	34.0	4320
10080 min Winter	0.679	0.0	35.5	5120

Rainfall Details

Rainfall Model	FEH
Return Period (years)	30
FEH Rainfall Version	2013
Site Location	GB 525350 183050 TQ 25350 83050
Data Type	Catchment
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.031

Time From: (mins)	To:	Area (ha)	Time From: (mins)	To:	Area (ha)	Time From: (mins)	To:	Area (ha)
0	4	0.010	4	8	0.010	8	12	0.010

Green Roof

Area (m³) 82 Evaporation (mm/day) 3
Depression Storage (mm) 5 Decay Coefficient 0.050

Time From: (mins)	To:	Area (ha)	Time From: (mins)	To:	Area (ha)	Time From: (mins)	To:	Area (ha)	Time From: (mins)	To:	Area (ha)
0	4	0.001490	32	36	0.000301	64	68	0.000061	96	100	0.000012
4	8	0.001220	36	40	0.000246	68	72	0.000050	100	104	0.000010
8	12	0.000999	40	44	0.000202	72	76	0.000041	104	108	0.000008
12	16	0.000818	44	48	0.000165	76	80	0.000033	108	112	0.000007
16	20	0.000670	48	52	0.000135	80	84	0.000027	112	116	0.000006
20	24	0.000548	52	56	0.000111	84	88	0.000022	116	120	0.000005
24	28	0.000449	56	60	0.000091	88	92	0.000018			
28	32	0.000367	60	64	0.000074	92	96	0.000015			

Time Area Diagram

Total Area (ha) 0.000

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

Model Details

Storage is Online Cover Level (m) 33.000

Tank or Pond Structure

Invert Level (m) 31.200

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	20.0	1.300	20.0	1.301	0.0

Pump Outflow Control

Invert Level (m) 31.200

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.0000	1.200	1.0000	3.000	1.0000	7.000	1.0000
0.200	1.0000	1.400	1.0000	3.500	1.0000	7.500	1.0000
0.300	1.0000	1.600	1.0000	4.000	1.0000	8.000	1.0000
0.400	1.0000	1.800	1.0000	4.500	1.0000	8.500	1.0000
0.500	1.0000	2.000	1.0000	5.000	1.0000	9.000	1.0000
0.600	1.0000	2.200	1.0000	5.500	1.0000	9.500	1.0000
0.800	1.0000	2.400	1.0000	6.000	1.0000		
1.000	1.0000	2.600	1.0000	6.500	1.0000		

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	31.738	0.538	1.0	10.8	O K
30 min Summer	31.901	0.701	1.0	14.0	O K
60 min Summer	32.038	0.838	1.0	16.8	O K
120 min Summer	32.213	1.013	1.0	20.3	O K
180 min Summer	32.266	1.066	1.0	21.3	O K
240 min Summer	32.268	1.068	1.0	21.4	O K
360 min Summer	32.228	1.028	1.0	20.6	O K
480 min Summer	32.164	0.964	1.0	19.3	O K
600 min Summer	32.094	0.894	1.0	17.9	O K
720 min Summer	32.023	0.823	1.0	16.5	O K
960 min Summer	31.888	0.688	1.0	13.8	O K
1440 min Summer	31.654	0.454	1.0	9.1	O K
2160 min Summer	31.420	0.220	1.0	4.4	O K
2880 min Summer	31.311	0.111	1.0	2.2	O K
4320 min Summer	31.275	0.075	0.7	1.5	O K
5760 min Summer	31.259	0.059	0.6	1.2	O K
7200 min Summer	31.249	0.049	0.5	1.0	O K
8640 min Summer	31.242	0.042	0.4	0.8	O K
10080 min Summer	31.237	0.037	0.4	0.7	O K
15 min Winter	31.810	0.610	1.0	12.2	O K
30 min Winter	31.997	0.797	1.0	15.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	182.560	0.0	13.0	27
30 min Summer	117.600	0.0	16.8	41
60 min Summer	71.820	0.0	20.7	70
120 min Summer	46.270	0.0	26.7	124
180 min Summer	35.180	0.0	30.6	180
240 min Summer	28.665	0.0	33.2	212
360 min Summer	21.093	0.0	36.7	274
480 min Summer	16.740	0.0	38.9	340
600 min Summer	13.901	0.0	40.3	406
720 min Summer	11.900	0.0	41.4	472
960 min Summer	9.258	0.0	43.0	602
1440 min Summer	6.428	0.0	44.7	850
2160 min Summer	4.445	0.0	46.2	1188
2880 min Summer	3.424	0.0	47.4	1496
4320 min Summer	2.380	0.0	49.2	2204
5760 min Summer	1.848	0.0	50.7	2936
7200 min Summer	1.528	0.0	52.3	3664
8640 min Summer	1.315	0.0	53.8	4400
10080 min Summer	1.163	0.0	55.3	5112
15 min Winter	182.560	0.0	14.6	27
30 min Winter	117.600	0.0	18.9	41

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	32.158	0.958	1.0	19.2	O K
120 min Winter	32.372	1.172	1.0	23.4	O K
180 min Winter	32.448	1.248	1.0	25.0	O K
240 min Winter	32.458	1.258	1.0	25.2	O K
360 min Winter	32.399	1.199	1.0	24.0	O K
480 min Winter	32.312	1.112	1.0	22.2	O K
600 min Winter	32.211	1.011	1.0	20.2	O K
720 min Winter	32.108	0.908	1.0	18.2	O K
960 min Winter	31.909	0.709	1.0	14.2	O K
1440 min Winter	31.572	0.372	1.0	7.4	O K
2160 min Winter	31.303	0.103	1.0	2.1	O K
2880 min Winter	31.278	0.078	0.8	1.6	O K
4320 min Winter	31.255	0.055	0.5	1.1	O K
5760 min Winter	31.243	0.043	0.4	0.8	O K
7200 min Winter	31.235	0.035	0.4	0.7	O K
8640 min Winter	31.230	0.030	0.3	0.6	O K
10080 min Winter	31.227	0.027	0.3	0.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	71.820	0.0	23.2	68
120 min Winter	46.270	0.0	30.0	124
180 min Winter	35.180	0.0	34.3	178
240 min Winter	28.665	0.0	37.3	232
360 min Winter	21.093	0.0	41.2	294
480 min Winter	16.740	0.0	43.6	368
600 min Winter	13.901	0.0	45.2	442
720 min Winter	11.900	0.0	46.5	514
960 min Winter	9.258	0.0	48.2	650
1440 min Winter	6.428	0.0	50.1	890
2160 min Winter	4.445	0.0	51.9	1132
2880 min Winter	3.424	0.0	53.2	1476
4320 min Winter	2.380	0.0	55.3	2200
5760 min Winter	1.848	0.0	57.0	2928
7200 min Winter	1.528	0.0	58.8	3600
8640 min Winter	1.315	0.0	60.5	4336
10080 min Winter	1.163	0.0	62.2	5120

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 525350 183050 TQ 25350 83050
Data Type	Catchment
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.031

Time From: (mins)	To:	Area (ha)	Time From: (mins)	To:	Area (ha)	Time From: (mins)	To:	Area (ha)
0	4	0.010	4	8	0.010	8	12	0.010

Green Roof

Area (m³) 82 Evaporation (mm/day) 3
Depression Storage (mm) 5 Decay Coefficient 0.050

Time From: (mins)	To:	Area (ha)	Time From: (mins)	To:	Area (ha)	Time From: (mins)	To:	Area (ha)	Time From: (mins)	To:	Area (ha)
0	4	0.001490	32	36	0.000301	64	68	0.000061	96	100	0.000012
4	8	0.001220	36	40	0.000246	68	72	0.000050	100	104	0.000010
8	12	0.000999	40	44	0.000202	72	76	0.000041	104	108	0.000008
12	16	0.000818	44	48	0.000165	76	80	0.000033	108	112	0.000007
16	20	0.000670	48	52	0.000135	80	84	0.000027	112	116	0.000006
20	24	0.000548	52	56	0.000111	84	88	0.000022	116	120	0.000005
24	28	0.000449	56	60	0.000091	88	92	0.000018			
28	32	0.000367	60	64	0.000074	92	96	0.000015			

Time Area Diagram

Total Area (ha) 0.000

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

Model Details

Storage is Online Cover Level (m) 33.000

Tank or Pond Structure

Invert Level (m) 31.200

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	20.0	1.300	20.0	1.301	0.0

Pump Outflow Control

Invert Level (m) 31.200

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.0000	1.200	1.0000	3.000	1.0000	7.000	1.0000
0.200	1.0000	1.400	1.0000	3.500	1.0000	7.500	1.0000
0.300	1.0000	1.600	1.0000	4.000	1.0000	8.000	1.0000
0.400	1.0000	1.800	1.0000	4.500	1.0000	8.500	1.0000
0.500	1.0000	2.000	1.0000	5.000	1.0000	9.000	1.0000
0.600	1.0000	2.200	1.0000	5.500	1.0000	9.500	1.0000
0.800	1.0000	2.400	1.0000	6.000	1.0000		
1.000	1.0000	2.600	1.0000	6.500	1.0000		

Summary of Results for 100 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	31.564	0.364	1.0	7.3	O K
30 min Summer	31.674	0.474	1.0	9.5	O K
60 min Summer	31.757	0.557	1.0	11.1	O K
120 min Summer	31.854	0.654	1.0	13.1	O K
180 min Summer	31.873	0.673	1.0	13.5	O K
240 min Summer	31.868	0.668	1.0	13.4	O K
360 min Summer	31.829	0.629	1.0	12.6	O K
480 min Summer	31.772	0.572	1.0	11.4	O K
600 min Summer	31.713	0.513	1.0	10.3	O K
720 min Summer	31.654	0.454	1.0	9.1	O K
960 min Summer	31.548	0.348	1.0	7.0	O K
1440 min Summer	31.390	0.190	1.0	3.8	O K
2160 min Summer	31.296	0.096	1.0	1.9	O K
2880 min Summer	31.275	0.075	0.8	1.5	O K
4320 min Summer	31.253	0.053	0.5	1.1	O K
5760 min Summer	31.242	0.042	0.4	0.8	O K
7200 min Summer	31.235	0.035	0.3	0.7	O K
8640 min Summer	31.230	0.030	0.3	0.6	O K
10080 min Summer	31.226	0.026	0.3	0.5	O K
15 min Winter	31.616	0.416	1.0	8.3	O K
30 min Winter	31.741	0.541	1.0	10.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	130.400	0.0	9.1	26
30 min Summer	84.000	0.0	11.9	40
60 min Summer	51.300	0.0	14.6	66
120 min Summer	33.050	0.0	19.0	120
180 min Summer	25.129	0.0	21.7	154
240 min Summer	20.475	0.0	23.6	186
360 min Summer	15.067	0.0	26.1	252
480 min Summer	11.957	0.0	27.6	318
600 min Summer	9.929	0.0	28.7	384
720 min Summer	8.500	0.0	29.4	448
960 min Summer	6.613	0.0	30.5	572
1440 min Summer	4.592	0.0	31.7	798
2160 min Summer	3.175	0.0	32.8	1108
2880 min Summer	2.446	0.0	33.6	1476
4320 min Summer	1.700	0.0	34.8	2204
5760 min Summer	1.320	0.0	35.8	2936
7200 min Summer	1.092	0.0	36.9	3640
8640 min Summer	0.939	0.0	37.9	4400
10080 min Summer	0.831	0.0	38.9	5136
15 min Winter	130.400	0.0	10.3	26
30 min Winter	84.000	0.0	13.4	40

Summary of Results for 100 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	31.841	0.641	1.0	12.8	O K
120 min Winter	31.962	0.762	1.0	15.2	O K
180 min Winter	31.987	0.787	1.0	15.7	O K
240 min Winter	31.975	0.775	1.0	15.5	O K
360 min Winter	31.916	0.716	1.0	14.3	O K
480 min Winter	31.832	0.632	1.0	12.6	O K
600 min Winter	31.742	0.542	1.0	10.8	O K
720 min Winter	31.654	0.454	1.0	9.1	O K
960 min Winter	31.499	0.299	1.0	6.0	O K
1440 min Winter	31.307	0.107	1.0	2.1	O K
2160 min Winter	31.272	0.072	0.7	1.4	O K
2880 min Winter	31.256	0.056	0.6	1.1	O K
4320 min Winter	31.239	0.039	0.4	0.8	O K
5760 min Winter	31.230	0.030	0.3	0.6	O K
7200 min Winter	31.225	0.025	0.3	0.5	O K
8640 min Winter	31.222	0.022	0.2	0.4	O K
10080 min Winter	31.219	0.019	0.2	0.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	51.300	0.0	16.4	66
120 min Winter	33.050	0.0	21.3	120
180 min Winter	25.129	0.0	24.4	172
240 min Winter	20.475	0.0	26.5	200
360 min Winter	15.067	0.0	29.3	272
480 min Winter	11.957	0.0	31.0	346
600 min Winter	9.929	0.0	32.2	414
720 min Winter	8.500	0.0	33.0	480
960 min Winter	6.613	0.0	34.3	602
1440 min Winter	4.592	0.0	35.6	780
2160 min Winter	3.175	0.0	36.8	1116
2880 min Winter	2.446	0.0	37.7	1480
4320 min Winter	1.700	0.0	39.1	2204
5760 min Winter	1.320	0.0	40.3	2864
7200 min Winter	1.092	0.0	41.5	3632
8640 min Winter	0.939	0.0	42.7	4416
10080 min Winter	0.831	0.0	43.9	5112

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 525350 183050 TQ 25350 83050
Data Type	Catchment
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.031

Time From: (mins)	To:	Area (ha)	Time From: (mins)	To:	Area (ha)	Time From: (mins)	To:	Area (ha)
0	4	0.010	4	8	0.010	8	12	0.010

Green Roof

Area (m^3) 82 Evaporation (mm/day) 3
Depression Storage (mm) 5 Decay Coefficient 0.050

Time From: (mins)	To:	Area (ha)	Time From: (mins)	To:	Area (ha)	Time From: (mins)	To:	Area (ha)	Time From: (mins)	To:	Area (ha)
0	4	0.001490	32	36	0.000301	64	68	0.000061	96	100	0.000012
4	8	0.001220	36	40	0.000246	68	72	0.000050	100	104	0.000010
8	12	0.000999	40	44	0.000202	72	76	0.000041	104	108	0.000008
12	16	0.000818	44	48	0.000165	76	80	0.000033	108	112	0.000007
16	20	0.000670	48	52	0.000135	80	84	0.000027	112	116	0.000006
20	24	0.000548	52	56	0.000111	84	88	0.000022	116	120	0.000005
24	28	0.000449	56	60	0.000091	88	92	0.000018			
28	32	0.000367	60	64	0.000074	92	96	0.000015			

Time Area Diagram

Total Area (ha) 0.000

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

Model Details

Storage is Online Cover Level (m) 33.000

Tank or Pond Structure

Invert Level (m) 31.200

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	20.0	1.300	20.0	1.301	0.0

Pump Outflow Control

Invert Level (m) 31.200

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.0000	1.200	1.0000	3.000	1.0000	7.000	1.0000
0.200	1.0000	1.400	1.0000	3.500	1.0000	7.500	1.0000
0.300	1.0000	1.600	1.0000	4.000	1.0000	8.000	1.0000
0.400	1.0000	1.800	1.0000	4.500	1.0000	8.500	1.0000
0.500	1.0000	2.000	1.0000	5.000	1.0000	9.000	1.0000
0.600	1.0000	2.200	1.0000	5.500	1.0000	9.500	1.0000
0.800	1.0000	2.400	1.0000	6.000	1.0000		
1.000	1.0000	2.600	1.0000	6.500	1.0000		