Appendix D Drainage Strategy

- 0521-PH9-320 Drainage Strategy Plan
- 0521-PH9-Network 1 1 in 100 Year Plus 30 Summary (A4P)
- 0521-PH9-Network 1 1 in 2 Summary (A4P)
- 0521-PH9-Network 1 1 in 30 (A4P)
- 0521-PH9-Network 1 1 in Details (A4P)
- 0521-PH9-Permeable Paving Cascade Summary (A4P)
- 0521-PH9-Pond 1 in 100 Year Plus 30 Summary (A4P)
- 0521-PH9-Rain Garden 1 Summary (A4P)
- 0521-PH9-Rain Garden 2 Summary (A4P)
- 0521-PH9-Rain Garden 3 Summary (A4P)
- 0521-PH9-Rain Garden 4 Summary (A4P)
- 0521-PH9-Rain Garden 5 Summary (A4P)
- 0521-PH9-Watercourse (Eastern Section) Cascade Summary (A4P)
- 0521-PH9-Watercourse (Western Section) Cascade Summary (A4P)

PHASE 9, HEYFORD PARK, UPPER HEYFORD, BICESTER

DRAINAGE STRATEGY PLAN

Summary of Critical Results by Maximum Level (Rank 1) for 0521-PH9-NETWORK 1.SWS

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	100
Climate Change (%)	30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	1	15 Winter	100	+30%	100/15 Summer	100/15 Summer		
2.000	13	15 Winter	100	+30%	100/15 Summer	100/15 Summer		
2.001	14	15 Winter	100	+30%	100/15 Summer	100/15 Summer		
1.001	2	15 Winter	100	+30%	100/15 Summer	100/15 Summer		
1.002	3	15 Summer	100	+30%	100/15 Summer			
3.000	15	15 Winter	100	+30%	100/15 Summer	100/15 Summer		
1.003	4	15 Winter	100	+30%	100/15 Summer	100/15 Summer		
1.004	5	15 Winter	100	+30%	100/15 Summer	100/15 Summer		
4.000	16	15 Winter	100	+30%	100/15 Summer			
1.005	6	30 Winter	100	+30%	100/15 Summer			
5.000	17	15 Winter	100	+30%	100/15 Summer			
1.006	7	30 Winter	100	+30%	100/15 Summer			
6.000	18	15 Winter	100	+30%	100/15 Summer			
1.007	8	15 Winter	100	+30%	100/15 Summer			
7.000	19	15 Winter	100	+30%	100/15 Summer	100/15 Summer		
8.000	25	15 Winter	100	+30%	100/15 Summer			
8.001	26	15 Winter	100	+30%	100/15 Summer			
7.001	20	15 Winter	100	+30%	100/15 Summer			
7.002	21	15 Winter	100	+30%	100/15 Summer			

Summary of Critical Results by Maximum Level (Rank 1) for 0521-PH9-NETWORK 1.SWS

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	124.048	1.316	16.004	1.88		73.5	FLOOD	5
2.000	13	124.586	1.300	0.072	0.62		25.0	FLOOD	1
2.001	14	124.481	1.305	4.555	0.92		62.3	FLOOD	4
1.001	2	124.001	1.597	0.734	1.31		133.3	FLOOD	2
1.002	3	123.806	1.518	0.000	1.70		163.7	FLOOD RISK	
3.000	15	124.044	1.308	8.297	1.20		58.7	FLOOD	4
1.003	4	123.572	1.359	17.767	2.10		303.4	FLOOD	4
1.004	5	123.413	1.296	10.451	1.97		303.2	FLOOD	4
4.000	16	123.341	0.919	0.000	0.87		50.7	SURCHARGED	
1.005	6	123.123	1.202	0.000	1.93		372.2	SURCHARGED	
5.000	17	123.543	0.599	0.000	0.98		74.7	SURCHARGED	
1.006	7	122.830	1.014	0.000	1.77		497.3	SURCHARGED	
6.000	18	123.046	0.102	0.000	1.04		84.8	SURCHARGED	
1.007	8	122.361	0.714	0.000	0.92		607.1	SURCHARGED	
7.000	19	123.771	1.310	9.719	1.90		73.5	FLOOD	4
8.000	25	124.139	1.126	0.000	0.54		18.8	FLOOD RISK	
8.001	26	124.106	1.170	0.000	1.07		75.4	FLOOD RISK	
7.001	20	123.451	1.345	0.000	1.91		198.0	SURCHARGED	
7.002	21	123.108	1.156	0.000	0.57		186.9	SURCHARGED	

Summary of Critical Results by Maximum Level (Rank 1) for 0521-PH9-NETWORK 1.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
9.000	27	30 Winter	100	+30%	100/15 Summer	100/15 Summer		
9.001	28	15 Winter	100	+30%	100/15 Summer	100/15 Summer		
9.002	29	30 Winter	100	+30%	100/15 Summer			
9.003	30	15 Winter	100	+30%	100/15 Summer	100/15 Summer		
10.000	33	15 Winter	100	+30%	100/15 Summer	100/15 Summer		
9.004	31	15 Winter	100	+30%	100/15 Summer			
9.005	32	15 Winter	100	+30%	100/15 Summer			
7.003	22	15 Winter	100	+30%	100/15 Summer			
11.000	34	15 Winter	100	+30%	100/15 Summer	100/15 Winter		
7.004	23	15 Winter	100	+30%	100/15 Summer			
7.005	24	15 Winter	100	+30%	100/15 Summer			
1.008	9	15 Winter	100	+30%	100/15 Summer			
1.009	10	30 Winter	100	+30%	100/15 Summer			
12.000	35	15 Winter	100	+30%				
1.010	11	30 Winter	100	+30%	100/15 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
9.000	27	122.810	1.034	34.364	0.59		87.5	FLOOD	4
9.001	28	122.845	1.187	1.274	0.99		106.6	FLOOD	4
9.002	29	122.859	1.234	0.000	0.76		112.3	FLOOD RISK	
9.003	30	122.842	1.334	27.380	1.19		184.3	FLOOD	4
10.000	33	122.725	0.992	22.758	1.68		74.5	FLOOD	6
9.004	31	122.940	2.164	0.000	1.72		253.2	FLOOD RISK	
9.005	32	122.925	2.188	0.000	1.38		260.0	SURCHARGED	
7.003	22	122.873	2.220	0.000	2.86		459.6	SURCHARGED	
11.000	34	124.062	1.300	0.156	1.32		86.0	FLOOD	1
7.004	23	122.722	2.095	0.000	2.02		548.6	SURCHARGED	
7.005	24	122.342	1.826	0.000	2.14		582.6	SURCHARGED	
1.008	9	121.844	1.441	0.000	3.38		1186.6	SURCHARGED	
1.009	10	121.265	0.902	0.000	2.84		1197.4	SURCHARGED	
12.000	35	121.832	-0.347	0.000	0.12		58.2	OK	
1.010	11	120.671	0.365	0.000	2.99		1254.3	SURCHARGED	

Summary of Critical Results by Maximum Level (Rank 1) for 0521-PH9-NETWORK 1.SWS

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	2
Climate Change (%)	0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	15 Winter	2	+0%					122.658
2.000	13	15 Winter	2	+0%					123.128
2.001	14	15 Winter	2	+0%					123.052
1.001	2	15 Winter	2	+0%					122.267
1.002	3	15 Winter	2	+0%					122.180
3.000	15	15 Winter	2	+0%					122.642
1.003	4	15 Winter	2	+0%					122.104
1.004	5	15 Winter	2	+0%					122.021
4.000	16	15 Winter	2	+0%					122.288
1.005	6	15 Winter	2	+0%					121.778
5.000	17	15 Winter	2	+0%					122.813
1.006	7	15 Winter	2	+0%					121.593
6.000	18	15 Winter	2	+0%					122.810
1.007	8	15 Winter	2	+0%					121.283
7.000	19	15 Winter	2	+0%					122.401
8.000	25	15 Winter	2	+0%					122.859
8.001	26	15 Winter	2	+0%					122.809
7.001	20	15 Winter	2	+0%					121.984
7.002	21	15 Winter	2	+0%					121.707

Summary of Critical Results by Maximum Level (Rank 1) for 0521-PH9-NETWORK 1.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	-0.074	0.000	0.75		29.3	OK	
2.000	13	-0.158	0.000	0.19		7.7	OK	
2.001	14	-0.124	0.000	0.41		27.6	OK	
1.001	2	-0.137	0.000	0.72		72.5	OK	
1.002	3	-0.108	0.000	0.85		81.5	OK	
3.000	15	-0.094	0.000	0.62		30.5	OK	
1.003	4	-0.109	0.000	0.84		121.5	OK	
1.004	5	-0.096	0.000	0.94		144.1	OK	
4.000	16	-0.134	0.000	0.33		19.5	OK	
1.005	6	-0.143	0.000	0.86		166.3	OK	
5.000	17	-0.131	0.000	0.36		27.3	OK	
1.006	7	-0.223	0.000	0.69		195.6	OK	
6.000	18	-0.134	0.000	0.33		27.3	OK	
1.007	8	-0.364	0.000	0.33		216.7	OK	
7.000	19	-0.060	0.000	0.84		32.5	OK	
8.000	25	-0.154	0.000	0.21		7.4	OK	
8.001	26	-0.127	0.000	0.39		27.2	OK	
7.001	20	-0.122	0.000	0.77		80.1	OK	
7.002	21	-0.246	0.000	0.26		84.4	OK	

Summary of Critical Results by Maximum Level (Rank 1) for 0521-PH9-NETWORK 1.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
9.000	27	15 Winter	2	+0%					121.463
9.001	28	15 Winter	2	+0%					121.396
9.002	29	15 Winter	2	+0%					121.371
9.003	30	15 Winter	2	+0%					121.301
10.000	33	15 Winter	2	+0%					121.658
9.004	31	15 Winter	2	+0%	2/15 Winter				120.778
9.005	32	15 Winter	2	+0%	2/15 Winter				120.746
7.003	22	30 Winter	2	+0%	2/15 Winter				120.656
11.000	34	15 Winter	2	+0%					122.654
7.004	23	30 Winter	2	+0%					120.627
7.005	24	30 Winter	2	+0%					120.516
1.008	9	15 Winter	2	+0%	2/15 Winter				120.418
1.009	10	15 Winter	2	+0%	2/15 Winter				120.365
12.000	35	15 Winter	2	+0%					121.813
1.010	11	30 Winter	2	+0%					120.306

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
9.000	27	-0.313	0.000	0.17		24.9	OK	
9.001	28	-0.262	0.000	0.28		29.7	OK	
9.002	29	-0.253	0.000	0.33		47.9	OK	
9.003	30	-0.207	0.000	0.56		87.5	OK	
10.000	33	-0.075	0.000	0.77		34.3	OK	
9.004	31	0.002	0.000	0.81		119.9	SURCHARGED	
9.005	32	0.009	0.000	0.69		130.9	SURCHARGED	
7.003	22	0.003	0.000	1.13		181.1	SURCHARGED	
11.000	34	-0.108	0.000	0.53		34.3	OK	
7.004	23	0.000	0.000	0.76		206.5	OK	
7.005	24	0.000	0.000	0.78		213.3	OK	
1.008	9	0.014	0.000	1.27		445.4	SURCHARGED	
1.009	10	0.002	0.000	1.04		437.8	SURCHARGED	
12.000	35	-0.366	0.000	0.08		38.7	OK	
1.010	11	0.000	0.000	1.08		453.1	OK	

Summary of Critical Results by Maximum Level (Rank 1) for 0521-PH9-NETWORK 1.SWS

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	30
Climate Change (%)	0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	15 Winter	30	+0%	30/15 Summer				123.483
2.000	13	15 Winter	30	+0%	30/15 Winter				123.376
2.001	14	15 Winter	30	+0%	30/15 Summer				123.356
1.001	2	15 Winter	30	+0%	30/15 Summer				123.083
1.002	3	15 Winter	30	+0%	30/15 Summer				122.953
3.000	15	15 Winter	30	+0%	30/15 Summer				123.260
1.003	4	15 Winter	30	+0%	30/15 Summer				122.829
1.004	5	15 Winter	30	+0%	30/15 Summer				122.656
4.000	16	15 Winter	30	+0%					122.329
1.005	6	15 Winter	30	+0%	30/15 Summer				122.168
5.000	17	15 Winter	30	+0%					122.858
1.006	7	15 Winter	30	+0%	30/15 Summer				121.919
6.000	18	15 Winter	30	+0%					122.852
1.007	8	15 Winter	30	+0%					121.385
7.000	19	15 Winter	30	+0%	30/15 Summer				123.064
8.000	25	15 Winter	30	+0%					122.907
8.001	26	15 Winter	30	+0%					122.885
7.001	20	15 Winter	30	+0%	30/15 Summer				122.286
7.002	21	15 Winter	30	+0%					121.765

Summary of Critical Results by Maximum Level (Rank 1) for 0521-PH9-NETWORK 1.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.751	0.000	1.09		42.5	SURCHARGED	
2.000	13	0.090	0.000	0.33		13.2	SURCHARGED	
2.001	14	0.180	0.000	0.82		55.7	SURCHARGED	
1.001	2	0.679	0.000	1.08		109.9	SURCHARGED	
1.002	3	0.665	0.000	1.29		124.6	SURCHARGED	
3.000	15	0.524	0.000	0.92		45.4	SURCHARGED	
1.003	4	0.616	0.000	1.34		193.0	SURCHARGED	
1.004	5	0.539	0.000	1.53		234.6	SURCHARGED	
4.000	16	-0.093	0.000	0.63		36.9	OK	
1.005	6	0.246	0.000	1.47		284.3	SURCHARGED	
5.000	17	-0.086	0.000	0.68		51.5	OK	
1.006	7	0.103	0.000	1.24		349.1	SURCHARGED	
6.000	18	-0.092	0.000	0.64		51.8	OK	
1.007	8	-0.262	0.000	0.60		399.5	OK	
7.000	19	0.603	0.000	1.43		55.4	SURCHARGED	
8.000	25	-0.106	0.000	0.40		13.9	OK	
8.001	26	-0.051	0.000	0.86		60.5	OK	
7.001	20	0.181	0.000	1.48		153.3	SURCHARGED	
7.002	21	-0.188	0.000	0.49		161.4	OK	

Summary of Critical Results by Maximum Level (Rank 1) for 0521-PH9-NETWORK 1.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
9.000	27	15 Winter	30	+0%	30/15 Winter				121.789
9.001	28	15 Winter	30	+0%	30/15 Winter				121.757
9.002	29	15 Winter	30	+0%	30/15 Winter				121.747
9.003	30	15 Winter	30	+0%	30/15 Winter				121.706
10.000	33	15 Winter	30	+0%	30/15 Summer				122.085
9.004	31	15 Winter	30	+0%	30/15 Summer				121.625
9.005	32	15 Winter	30	+0%	30/15 Summer				121.581
7.003	22	15 Winter	30	+0%	30/15 Summer				121.496
11.000	34	15 Winter	30	+0%					122.726
7.004	23	15 Winter	30	+0%	30/15 Summer				121.429
7.005	24	15 Winter	30	+0%	30/15 Summer				121.209
1.008	9	15 Winter	30	+0%	30/15 Summer				120.963
1.009	10	15 Winter	30	+0%	30/15 Summer				120.697
12.000	35	15 Winter	30	+0%					121.822
1.010	11	15 Winter	30	+0%	30/15 Summer				120.428

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
9.000	27	0.013	0.000	0.30		43.7	SURCHARGED	
9.001	28	0.099	0.000	0.44		46.7	SURCHARGED	
9.002	29	0.122	0.000	0.50		74.2	SURCHARGED	
9.003	30	0.198	0.000	0.97		150.4	SURCHARGED	
10.000	33	0.352	0.000	1.26		55.8	SURCHARGED	
9.004	31	0.849	0.000	1.19		175.1	SURCHARGED	
9.005	32	0.844	0.000	0.97		183.4	SURCHARGED	
7.003	22	0.843	0.000	2.03		327.1	SURCHARGED	
11.000	34	-0.036	0.000	1.00		65.1	OK	
7.004	23	0.801	0.000	1.45		392.5	SURCHARGED	
7.005	24	0.694	0.000	1.52		413.1	SURCHARGED	
1.008	9	0.560	0.000	2.30		805.4	SURCHARGED	
1.009	10	0.334	0.000	1.92		809.8	SURCHARGED	
12.000	35	-0.357	0.000	0.10		46.7	OK	
1.010	11	0.122	0.000	2.01		845.4	SURCHARGED	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for 0521-PH9-NETWORK 1.SWS

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	Add Flow / Climate Change (%)	0
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.075
Ratio R	0.400	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	100	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	0.75
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Time Area Diagram for 0521-PH9-NETWORK 1.SWS

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.820	4-8	2.679	8-12	1.000	12-16	0.004

Total Area Contributing (ha) = 4.503

Total Pipe Volume (m³) = 216.488

Network Design Table for 0521-PH9-NETWORK 1.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	53.163	0.328	162.1	0.169	5.00	0.0	0.600	o	225	Pipe/Conduit	
2.000	13.581	0.110	123.5	0.043	5.00	0.0	0.600	o	225	Pipe/Conduit	
2.001	41.049	0.772	53.2	0.131	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	36.299	0.116	312.9	0.116	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.002	23.544	0.075	313.9	0.075	0.00	0.0	0.600	o	375	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	65.52	5.87	122.507	0.169	0.0	0.0	0.0	1.02	40.7	30.0
2.000	69.14	5.19	123.061	0.043	0.0	0.0	0.0	1.18	46.7	8.1
2.001	67.03	5.57	122.951	0.174	0.0	0.0	0.0	1.80	71.5	31.6
1.001	62.67	6.46	122.029	0.459	0.0	0.0	0.0	1.02	112.5	77.9
1.002	60.97	6.84	121.913	0.534	0.0	0.0	0.0	1.02	112.3	88.2

Network Design Table for 0521-PH9-NETWORK 1.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
3.000	54.227	0.523	103.6	0.173	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.003	37.120	0.096	386.7	0.118	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.004	74.922	0.195	384.2	0.239	0.00	0.0	0.600	o	450	Pipe/Conduit	
4.000	34.484	0.491	70.2	0.110	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.005	53.049	0.106	500.5	0.169	0.00	0.0	0.600	o	525	Pipe/Conduit	
5.000	48.256	1.119	43.1	0.154	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.006	84.704	0.169	501.2	0.270	0.00	0.0	0.600	o	600	Pipe/Conduit	
6.000	48.256	1.288	37.5	0.154	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.007	54.199	0.638	85.0	0.173	0.00	0.0	0.600	o	600	Pipe/Conduit	
7.000	59.303	0.355	167.1	0.189	5.00	0.0	0.600	o	225	Pipe/Conduit	
8.000	12.892	0.077	167.0	0.041	5.00	0.0	0.600	o	225	Pipe/Conduit	
8.001	41.146	0.830	49.6	0.131	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
3.000	66.35	5.70	122.511	0.173	0.0	0.0	0.0	1.28	51.1	31.1
1.003	58.51	7.45	121.763	0.825	0.0	0.0	0.0	1.03	163.5	130.7
1.004	54.20	8.66	121.667	1.064	0.0	0.0	0.0	1.03	164.0	156.2
4.000	68.15	5.37	122.197	0.110	0.0	0.0	0.0	1.56	62.1	20.3
1.005	51.52	9.55	121.397	1.343	0.0	0.0	0.0	0.99	215.3	187.4
5.000	67.96	5.40	122.719	0.154	0.0	0.0	0.0	2.00	79.4	28.3
1.006	48.12	10.85	121.216	1.767	0.0	0.0	0.0	1.08	305.6	230.3
6.000	68.11	5.38	122.719	0.154	0.0	0.0	0.0	2.14	85.2	28.4
1.007	47.31	11.19	121.047	2.094	0.0	0.0	0.0	2.64	747.4	268.3
7.000	64.95	5.98	122.236	0.189	0.0	0.0	0.0	1.01	40.1	33.2
8.000	69.02	5.21	122.788	0.041	0.0	0.0	0.0	1.01	40.1	7.7
8.001	66.99	5.58	122.711	0.172	0.0	0.0	0.0	1.86	74.0	31.2

Network Design Table for 0521-PH9-NETWORK 1.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
7.001	47.752	0.153	312.1	0.152	0.00	0.0	0.600	o	375	Pipe/Conduit	
7.002	9.875	0.694	14.2	0.031	0.00	0.0	0.600	o	375	Pipe/Conduit	
9.000	45.380	0.118	385.0	0.145	5.00	0.0	0.600	o	450	Pipe/Conduit	
9.001	12.961	0.034	385.0	0.041	0.00	0.0	0.600	o	450	Pipe/Conduit	
9.002	44.897	0.117	385.0	0.143	0.00	0.0	0.600	o	450	Pipe/Conduit	
9.003	93.601	0.243	385.0	0.298	0.00	0.0	0.600	o	450	Pipe/Conduit	
10.000	59.724	0.468	127.6	0.190	5.00	0.0	0.600	o	225	Pipe/Conduit	
9.004	19.651	0.039	503.9	0.062	0.00	0.0	0.600	o	525	Pipe/Conduit	
9.005	42.052	0.084	500.6	0.134	0.00	0.0	0.600	o	525	Pipe/Conduit	
7.003	12.965	0.026	500.0	0.041	0.00	0.0	0.600	o	600	Pipe/Conduit	
11.000	59.972	1.010	59.4	0.191	5.00	0.0	0.600	o	225	Pipe/Conduit	
7.004	55.713	0.111	500.0	0.178	0.00	0.0	0.600	o	600	Pipe/Conduit	
7.005	55.713	0.112	496.6	0.178	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.008	20.245	0.040	500.0	0.064	0.00	0.0	0.600	o	750	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
7.001	61.33	6.76	121.731	0.513	0.0	0.0	0.0	1.02	112.7	85.2
7.002	61.19	6.79	121.578	0.544	0.0	0.0	0.0	4.82	532.9	90.1
9.000	66.19	5.73	121.326	0.145	0.0	0.0	0.0	1.03	163.8	26.0
9.001	65.12	5.94	121.208	0.186	0.0	0.0	0.0	1.03	163.8	32.8
9.002	61.72	6.67	121.174	0.329	0.0	0.0	0.0	1.03	163.8	55.0
9.003	55.80	8.18	121.058	0.627	0.0	0.0	0.0	1.03	163.8	94.7
10.000	65.54	5.86	121.508	0.190	0.0	0.0	0.0	1.16	46.0	33.7
9.004	54.67	8.52	120.251	0.879	0.0	0.0	0.0	0.99	214.5	130.1
9.005	52.47	9.22	120.212	1.013	0.0	0.0	0.0	0.99	215.2	143.9
7.003	51.89	9.42	120.053	1.598	0.0	0.0	0.0	1.08	306.0	224.5
11.000	66.96	5.59	122.537	0.191	0.0	0.0	0.0	1.70	67.6	34.6
7.004	49.55	10.28	120.027	1.967	0.0	0.0	0.0	1.08	306.0	264.0
7.005	47.45	11.13	119.916	2.145	0.0	0.0	0.0	1.09	307.1	275.7
1.008	46.69	11.47	119.653	4.303	0.0	0.0	0.0	1.24	549.9	544.1

Network Design Table for 0521-PH9-NETWORK 1.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.009	28.374	0.057	497.8	0.090	0.00	0.0	0.600	o	750	Pipe/Conduit	
12.000	15.300	0.748	20.5	0.049	5.00	29.9	0.600	o	450	Pipe/Conduit	
1.010	19.220	0.038	500.0	0.061	0.00	0.0	0.600	o	825	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.009	45.86	11.84	119.613	4.393	0.0	0.0	0.0	1.25	551.1	545.6
12.000	69.92	5.06	121.729	0.049	29.9	0.0	0.0	4.51	717.5	39.2
1.010	45.34	12.09	119.481	4.503	29.9	0.0	0.0	1.32	706.1	582.8

Free Flowing Outfall Details for 0521-PH9-NETWORK 1.SWS

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.010	12	122.494	119.443	0.000	0	0

Cascade Summary of Results for 0521-PH9-Permeable Paving.srcx

Upstream Structures	Outflow To	Overflow To
(None)	0521-PH9-Watercourse-Western-Section.srcx	(None)

Half Drain Time : 81 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	0.216	0.216	0.0	15.9	15.9	104.5	Flood Risk
30 min Summer	0.274	0.274	0.0	20.4	20.4	132.4	Flood Risk
60 min Summer	0.314	0.314	0.0	22.9	22.9	151.7	Flood Risk
120 min Summer	0.334	0.334	0.0	23.9	23.9	161.7	Flood Risk
180 min Summer	0.336	0.336	0.0	24.0	24.0	162.2	Flood Risk
240 min Summer	0.329	0.329	0.0	23.7	23.7	159.0	Flood Risk
360 min Summer	0.311	0.311	0.0	22.8	22.8	150.1	Flood Risk
480 min Summer	0.292	0.292	0.0	21.7	21.7	141.0	Flood Risk
600 min Summer	0.274	0.274	0.0	20.5	20.5	132.7	Flood Risk
720 min Summer	0.259	0.259	0.0	19.4	19.4	125.3	Flood Risk
960 min Summer	0.234	0.234	0.0	17.4	17.4	113.2	Flood Risk
1440 min Summer	0.201	0.201	0.0	14.4	14.4	97.0	Flood Risk
2160 min Summer	0.172	0.172	0.0	11.2	11.2	83.2	Flood Risk
2880 min Summer	0.155	0.155	0.0	8.7	8.7	74.9	Flood Risk
4320 min Summer	0.119	0.119	0.0	6.9	6.9	57.4	Flood Risk
5760 min Summer	0.102	0.102	0.0	5.7	5.7	49.4	Flood Risk
7200 min Summer	0.092	0.092	0.0	4.9	4.9	44.3	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	128.285	0.0	110.1	23
30 min Summer	84.226	0.0	148.3	35
60 min Summer	52.662	0.0	190.6	58
120 min Summer	31.800	0.0	232.1	90
180 min Summer	23.353	0.0	256.5	124
240 min Summer	18.644	0.0	273.5	156
360 min Summer	13.543	0.0	298.6	222
480 min Summer	10.792	0.0	317.5	286
600 min Summer	9.043	0.0	332.6	350
720 min Summer	7.823	0.0	345.2	412
960 min Summer	6.219	0.0	365.6	532
1440 min Summer	4.493	0.0	395.1	774
2160 min Summer	3.241	0.0	428.6	1136
2880 min Summer	2.568	0.0	451.0	1528
4320 min Summer	1.847	0.0	481.9	2248
5760 min Summer	1.461	0.0	507.1	2944
7200 min Summer	1.217	0.0	524.1	3680

Cascade Summary of Results for 0521-PH9-Permeable Paving.srcx

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	0.085	0.085	0.0	4.2	4.2	41.0	Flood Risk
10080 min Summer	0.080	0.080	0.0	3.8	3.8	38.7	Flood Risk
15 min Winter	0.244	0.244	0.0	18.2	18.2	117.7	Flood Risk
30 min Winter	0.309	0.309	0.0	22.7	22.7	149.2	Flood Risk
60 min Winter	0.355	0.355	0.0	24.9	24.9	171.7	Flood Risk
120 min Winter	0.372	0.372	0.0	25.6	25.6	179.8	Flood Risk
180 min Winter	0.366	0.366	0.0	25.3	25.3	176.7	Flood Risk
240 min Winter	0.351	0.351	0.0	24.7	24.7	169.5	Flood Risk
360 min Winter	0.318	0.318	0.0	23.2	23.2	153.8	Flood Risk
480 min Winter	0.290	0.290	0.0	21.5	21.5	140.0	Flood Risk
600 min Winter	0.266	0.266	0.0	19.9	19.9	128.5	Flood Risk
720 min Winter	0.246	0.246	0.0	18.4	18.4	119.0	Flood Risk
960 min Winter	0.217	0.217	0.0	15.9	15.9	104.6	Flood Risk
1440 min Winter	0.182	0.182	0.0	12.4	12.4	87.8	Flood Risk
2160 min Winter	0.156	0.156	0.0	8.9	8.9	75.5	Flood Risk
2880 min Winter	0.125	0.125	0.0	7.2	7.2	60.4	Flood Risk
4320 min Winter	0.098	0.098	0.0	5.4	5.4	47.5	Flood Risk
5760 min Winter	0.085	0.085	0.0	4.3	4.3	41.3	Flood Risk
7200 min Winter	0.079	0.079	0.0	3.6	3.6	37.9	Flood Risk
8640 min Winter	0.074	0.074	0.0	3.1	3.1	35.6	O K
10080 min Winter	0.070	0.070	0.0	2.7	2.7	33.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
8640 min Summer	1.048	0.0	537.3	4408
10080 min Summer	0.923	0.0	547.3	5136
15 min Winter	128.285	0.0	124.7	23
30 min Winter	84.226	0.0	167.5	35
60 min Winter	52.662	0.0	214.7	60
120 min Winter	31.800	0.0	261.2	96
180 min Winter	23.353	0.0	288.6	132
240 min Winter	18.644	0.0	307.7	168
360 min Winter	13.543	0.0	335.8	236
480 min Winter	10.792	0.0	357.0	300
600 min Winter	9.043	0.0	374.0	364
720 min Winter	7.823	0.0	388.2	426
960 min Winter	6.219	0.0	411.2	548
1440 min Winter	4.493	0.0	444.5	788
2160 min Winter	3.241	0.0	482.1	1180
2880 min Winter	2.568	0.0	507.5	1540
4320 min Winter	1.847	0.0	542.9	2252
5760 min Winter	1.461	0.0	571.4	2952
7200 min Winter	1.217	0.0	591.2	3672
8640 min Winter	1.048	0.0	606.7	4408
10080 min Winter	0.923	0.0	618.8	5040

Cascade Rainfall Details for 0521-PH9-Permeable Paving.srcx

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

Time Area Diagram

Total Area (ha) 0.509

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.169	4	8	0.170	8	12	0.170

Cascade Model Details for 0521-PH9-Permeable Paving.srcx

Storage is Online Cover Level (m) 0.375

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	322.2
Max Percolation (l/s)	447.5	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	0.000	Membrane Depth (m)	0

Pipe Outflow Control

Diameter (m)	0.150	Entry Loss Coefficient	0.500
Slope (1:X)	150.0	Coefficient of Contraction	0.600
Length (m)	3.300	Upstream Invert Level (m)	0.000
Roughness k (mm)	0.600		

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	0.495	0.495	12.8	1070.7	O K
30 min Summer	0.648	0.648	12.9	1402.1	O K
60 min Summer	0.806	0.806	12.9	1742.1	O K
120 min Summer	0.961	0.961	12.9	2078.4	O K
180 min Summer	1.047	1.047	12.9	2263.4	O K
240 min Summer	1.102	1.102	12.9	2383.4	O K
360 min Summer	1.177	1.177	12.9	2544.7	O K
480 min Summer	1.227	1.227	12.9	2653.3	O K
600 min Summer	1.261	1.261	12.9	2727.6	O K
720 min Summer	1.285	1.285	12.9	2779.3	O K
960 min Summer	1.313	1.313	12.9	2838.8	O K
1440 min Summer	1.322	1.322	12.9	2859.5	O K
2160 min Summer	1.284	1.284	12.9	2777.5	O K
2880 min Summer	1.235	1.235	12.9	2670.6	O K
4320 min Summer	1.127	1.127	12.9	2437.6	O K
5760 min Summer	1.030	1.030	12.9	2227.4	O K
7200 min Summer	0.941	0.941	12.9	2035.3	O K
8640 min Summer	0.859	0.859	12.9	1857.5	O K
10080 min Summer	0.783	0.783	12.9	1693.6	O K
15 min Winter	0.555	0.555	12.9	1200.5	O K
30 min Winter	0.727	0.727	12.9	1572.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	128.285	0.0	897.0	26
30 min Summer	84.226	0.0	1047.6	41
60 min Summer	52.662	0.0	1673.0	70
120 min Summer	31.800	0.0	1964.8	130
180 min Summer	23.353	0.0	2068.4	190
240 min Summer	18.644	0.0	2083.7	248
360 min Summer	13.543	0.0	2057.5	368
480 min Summer	10.792	0.0	2010.0	488
600 min Summer	9.043	0.0	1964.6	606
720 min Summer	7.823	0.0	1924.8	726
960 min Summer	6.219	0.0	1857.1	966
1440 min Summer	4.493	0.0	1750.0	1444
2160 min Summer	3.241	0.0	3694.5	2060
2880 min Summer	2.568	0.0	3639.8	2396
4320 min Summer	1.847	0.0	3458.9	3036
5760 min Summer	1.461	0.0	4709.7	3808
7200 min Summer	1.217	0.0	4900.5	4608
8640 min Summer	1.048	0.0	5056.8	5368
10080 min Summer	0.923	0.0	5180.3	6152
15 min Winter	128.285	0.0	975.2	26
30 min Winter	84.226	0.0	1074.6	41

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	0.904	0.904	12.9	1955.1	O K
120 min Winter	1.080	1.080	12.9	2336.4	O K
180 min Winter	1.179	1.179	12.9	2548.9	O K
240 min Winter	1.243	1.243	12.9	2688.5	O K
360 min Winter	1.330	1.330	12.9	2876.2	O K
480 min Winter	1.388	1.388	12.9	3001.5	O K
600 min Winter	1.428	1.428	12.9	3088.6	O K
720 min Winter	1.457	1.457	12.9	3150.9	O K
960 min Winter	1.492	1.492	12.9	3227.7	O K
1440 min Winter	1.514	1.514	12.9	3273.6	O K
2160 min Winter	1.487	1.487	12.9	3215.7	O K
2880 min Winter	1.430	1.430	12.9	3092.0	O K
4320 min Winter	1.309	1.309	12.9	2829.9	O K
5760 min Winter	1.170	1.170	12.9	2531.0	O K
7200 min Winter	1.027	1.027	12.9	2221.4	O K
8640 min Winter	0.898	0.898	12.9	1943.1	O K
10080 min Winter	0.783	0.783	12.9	1692.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	52.662	0.0	1853.0	70
120 min Winter	31.800	0.0	2085.5	128
180 min Winter	23.353	0.0	2087.4	186
240 min Winter	18.644	0.0	2053.7	246
360 min Winter	13.543	0.0	1990.2	364
480 min Winter	10.792	0.0	1940.9	480
600 min Winter	9.043	0.0	1901.9	598
720 min Winter	7.823	0.0	1869.9	714
960 min Winter	6.219	0.0	1818.9	946
1440 min Winter	4.493	0.0	1748.4	1402
2160 min Winter	3.241	0.0	3785.5	2060
2880 min Winter	2.568	0.0	3662.8	2684
4320 min Winter	1.847	0.0	3381.3	3336
5760 min Winter	1.461	0.0	5272.4	4256
7200 min Winter	1.217	0.0	5486.2	5048
8640 min Winter	1.048	0.0	5660.6	5800
10080 min Winter	0.923	0.0	5801.3	6560

Rainfall Details

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

Time Area Diagram

Total Area (ha) 4.503

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	0.820	4	8	2.679	8	12	1.000	12	16	0.004

Model Details

Storage is Online Cover Level (m) 1.992

Tank or Pond Structure

Invert Level (m) 0.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	2162.6	1.992	2162.6

Hydro-Brake Optimum® Outflow Control

Unit Reference	MD-SHE-0149-1290-1992-1290
Design Head (m)	1.992
Design Flow (l/s)	12.9
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	149
Invert Level (m)	0.000
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.992	12.9
Flush-Flo™	0.584	12.9
Kick-Flo®	1.212	10.2
Mean Flow over Head Range	-	11.3

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.4	1.200	10.4	3.000	15.7	7.000	23.5
0.200	10.8	1.400	10.9	3.500	16.8	7.500	24.3
0.300	12.0	1.600	11.6	4.000	18.0	8.000	25.0
0.400	12.6	1.800	12.3	4.500	19.0	8.500	25.8
0.500	12.8	2.000	12.9	5.000	20.0	9.000	26.5
0.600	12.9	2.200	13.5	5.500	20.9	9.500	27.2
0.800	12.6	2.400	14.1	6.000	21.8		
1.000	12.0	2.600	14.6	6.500	22.7		

Cascade Summary of Results for 0521-PH9-Rain-Garden-1.srcx

Upstream Structures	Outflow To	Overflow To
(None)	0521-PH9-Rain-Garden-2.srcx	(None)

Half Drain Time : 6 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	0.195	0.195	0.0	13.2	13.2	5.8	Flood Risk
30 min Summer	0.204	0.204	0.0	14.1	14.1	6.3	Flood Risk
60 min Summer	0.195	0.195	0.0	13.2	13.2	5.8	Flood Risk
120 min Summer	0.174	0.174	0.0	10.8	10.8	4.6	Flood Risk
180 min Summer	0.158	0.158	0.0	8.5	8.5	3.8	Flood Risk
240 min Summer	0.137	0.137	0.0	7.2	7.2	2.9	Flood Risk
360 min Summer	0.110	0.110	0.0	5.9	5.9	1.8	Flood Risk
480 min Summer	0.094	0.094	0.0	4.8	4.8	1.4	Flood Risk
600 min Summer	0.085	0.085	0.0	4.3	4.3	1.1	Flood Risk
720 min Summer	0.080	0.080	0.0	3.7	3.7	1.0	Flood Risk
960 min Summer	0.073	0.073	0.0	3.0	3.0	0.8	Flood Risk
1440 min Summer	0.062	0.062	0.0	2.2	2.2	0.6	Flood Risk
2160 min Summer	0.052	0.052	0.0	1.6	1.6	0.4	Flood Risk
2880 min Summer	0.047	0.047	0.0	1.3	1.3	0.3	Flood Risk
4320 min Summer	0.039	0.039	0.0	0.9	0.9	0.2	Flood Risk
5760 min Summer	0.035	0.035	0.0	0.7	0.7	0.2	Flood Risk
7200 min Summer	0.032	0.032	0.0	0.6	0.6	0.2	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	128.285	0.0	14.2	19
30 min Summer	84.226	0.0	18.6	26
60 min Summer	52.662	0.0	23.3	42
120 min Summer	31.800	0.0	28.1	72
180 min Summer	23.353	0.0	31.0	102
240 min Summer	18.644	0.0	33.0	134
360 min Summer	13.543	0.0	36.0	192
480 min Summer	10.792	0.0	38.2	252
600 min Summer	9.043	0.0	40.0	310
720 min Summer	7.823	0.0	41.5	370
960 min Summer	6.219	0.0	44.0	490
1440 min Summer	4.493	0.0	47.7	734
2160 min Summer	3.241	0.0	51.6	1088
2880 min Summer	2.568	0.0	54.5	1472
4320 min Summer	1.847	0.0	58.9	2196
5760 min Summer	1.461	0.0	62.1	2872
7200 min Summer	1.217	0.0	64.6	3672

Cascade Summary of Results for 0521-PH9-Rain-Garden-1.srcx

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	0.029	0.029	0.0	0.5	0.5	0.1	Flood Risk
10080 min Summer	0.027	0.027	0.0	0.4	0.4	0.1	Flood Risk
15 min Winter	0.207	0.207	0.0	14.4	14.4	6.5	Flood Risk
30 min Winter	0.214	0.214	0.0	15.0	15.0	6.9	Flood Risk
60 min Winter	0.196	0.196	0.0	13.3	13.3	5.8	Flood Risk
120 min Winter	0.165	0.165	0.0	9.6	9.6	4.2	Flood Risk
180 min Winter	0.138	0.138	0.0	7.2	7.2	2.9	Flood Risk
240 min Winter	0.115	0.115	0.0	6.2	6.2	2.0	Flood Risk
360 min Winter	0.090	0.090	0.0	4.7	4.7	1.2	Flood Risk
480 min Winter	0.080	0.080	0.0	3.8	3.8	1.0	Flood Risk
600 min Winter	0.074	0.074	0.0	3.1	3.1	0.8	Flood Risk
720 min Winter	0.070	0.070	0.0	2.7	2.7	0.8	Flood Risk
960 min Winter	0.062	0.062	0.0	2.2	2.2	0.6	Flood Risk
1440 min Winter	0.052	0.052	0.0	1.6	1.6	0.4	Flood Risk
2160 min Winter	0.044	0.044	0.0	1.1	1.1	0.3	Flood Risk
2880 min Winter	0.039	0.039	0.0	0.9	0.9	0.2	Flood Risk
4320 min Winter	0.033	0.033	0.0	0.7	0.7	0.2	Flood Risk
5760 min Winter	0.029	0.029	0.0	0.5	0.5	0.1	Flood Risk
7200 min Winter	0.027	0.027	0.0	0.4	0.4	0.1	Flood Risk
8640 min Winter	0.025	0.025	0.0	0.4	0.4	0.1	Flood Risk
10080 min Winter	0.023	0.023	0.0	0.3	0.3	0.1	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
8640 min Summer	1.048	0.0	66.8	4264
10080 min Summer	0.923	0.0	68.6	5136
15 min Winter	128.285	0.0	15.9	18
30 min Winter	84.226	0.0	20.9	26
60 min Winter	52.662	0.0	26.1	42
120 min Winter	31.800	0.0	31.5	72
180 min Winter	23.353	0.0	34.7	106
240 min Winter	18.644	0.0	37.0	134
360 min Winter	13.543	0.0	40.3	188
480 min Winter	10.792	0.0	42.8	248
600 min Winter	9.043	0.0	44.8	310
720 min Winter	7.823	0.0	46.5	370
960 min Winter	6.219	0.0	49.3	492
1440 min Winter	4.493	0.0	53.4	740
2160 min Winter	3.241	0.0	57.8	1104
2880 min Winter	2.568	0.0	61.1	1456
4320 min Winter	1.847	0.0	65.9	2168
5760 min Winter	1.461	0.0	69.5	2856
7200 min Winter	1.217	0.0	72.4	3504
8640 min Winter	1.048	0.0	74.8	4344
10080 min Winter	0.923	0.0	76.9	5088

Cascade Rainfall Details for 0521-PH9-Rain-Garden-1.srcx

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

Time Area Diagram

Total Area (ha) 0.059

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.020	4	8	0.020	8	12	0.019

Cascade Model Details for 0521-PH9-Rain-Garden-1.srcx

Storage is Online Cover Level (m) 0.300

Infiltration Trench Structure

Infiltration Coefficient Base (m/hr)	0.00000	Trench Width (m)	5.1
Infiltration Coefficient Side (m/hr)	0.00000	Trench Length (m)	37.2
Safety Factor	2.0	Slope (1:X)	200.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	0.000	Cap Infiltration Depth (m)	0.000

Pipe Outflow Control

Diameter (m)	0.150	Entry Loss Coefficient	0.500
Slope (1:X)	200.0	Coefficient of Contraction	0.600
Length (m)	4.000	Upstream Invert Level (m)	0.000
Roughness k (mm)	0.600		

Cascade Summary of Results for 0521-PH9-Rain-Garden-2.srcx

Upstream Structures	Outflow To	Overflow To
0521-PH9-Rain-Garden-1.srcx	0521-PH9-Rain-Garden-3.srcx	(None)

Half Drain Time : 10 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	0.305	0.305	0.0	21.7	21.7	17.4	FLOOD
30 min Summer	0.308	0.308	0.0	21.9	21.9	21.1	FLOOD
60 min Summer	0.308	0.308	0.0	21.9	21.9	20.8	FLOOD
120 min Summer	0.303	0.303	0.0	21.6	21.6	16.1	FLOOD
180 min Summer	0.295	0.295	0.0	21.1	21.1	12.1	Flood Risk
240 min Summer	0.260	0.260	0.0	18.7	18.7	10.2	Flood Risk
360 min Summer	0.218	0.218	0.0	15.4	15.4	7.9	Flood Risk
480 min Summer	0.193	0.193	0.0	13.0	13.0	6.4	Flood Risk
600 min Summer	0.178	0.178	0.0	11.2	11.2	5.6	Flood Risk
720 min Summer	0.167	0.167	0.0	9.9	9.9	5.0	Flood Risk
960 min Summer	0.151	0.151	0.0	7.4	7.4	4.1	Flood Risk
1440 min Summer	0.109	0.109	0.0	5.8	5.8	2.1	Flood Risk
2160 min Summer	0.085	0.085	0.0	4.3	4.3	1.3	Flood Risk
2880 min Summer	0.077	0.077	0.0	3.4	3.4	1.1	Flood Risk
4320 min Summer	0.066	0.066	0.0	2.4	2.4	0.8	Flood Risk
5760 min Summer	0.058	0.058	0.0	1.9	1.9	0.6	Flood Risk
7200 min Summer	0.053	0.053	0.0	1.6	1.6	0.5	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	128.285	4.7	38.7	21
30 min Summer	84.226	8.2	50.9	30
60 min Summer	52.662	7.9	63.6	46
120 min Summer	31.800	3.4	76.8	78
180 min Summer	23.353	0.0	84.6	106
240 min Summer	18.644	0.0	90.1	136
360 min Summer	13.543	0.0	98.1	194
480 min Summer	10.792	0.0	104.3	254
600 min Summer	9.043	0.0	109.2	314
720 min Summer	7.823	0.0	113.4	374
960 min Summer	6.219	0.0	120.1	504
1440 min Summer	4.493	0.0	130.2	738
2160 min Summer	3.241	0.0	140.9	1088
2880 min Summer	2.568	0.0	148.8	1440
4320 min Summer	1.847	0.0	160.6	2184
5760 min Summer	1.461	0.0	169.3	2928
7200 min Summer	1.217	0.0	176.3	3664

Cascade Summary of Results for 0521-PH9-Rain-Garden-2.srcx

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	0.049	0.049	0.0	1.4	1.4	0.4	Flood Risk
10080 min Summer	0.046	0.046	0.0	1.2	1.2	0.4	Flood Risk
15 min Winter	0.307	0.307	0.0	21.9	21.9	20.3	FLOOD
30 min Winter	0.312	0.312	0.0	22.1	22.1	24.8	FLOOD
60 min Winter	0.310	0.310	0.0	22.0	22.0	23.2	FLOOD
120 min Winter	0.302	0.302	0.0	21.5	21.5	15.0	FLOOD
180 min Winter	0.267	0.267	0.0	19.2	19.2	10.6	Flood Risk
240 min Winter	0.230	0.230	0.0	16.4	16.4	8.5	Flood Risk
360 min Winter	0.188	0.188	0.0	12.5	12.5	6.2	Flood Risk
480 min Winter	0.169	0.169	0.0	10.1	10.1	5.1	Flood Risk
600 min Winter	0.157	0.157	0.0	8.5	8.5	4.5	Flood Risk
720 min Winter	0.138	0.138	0.0	7.2	7.2	3.4	Flood Risk
960 min Winter	0.109	0.109	0.0	5.9	5.9	2.1	Flood Risk
1440 min Winter	0.085	0.085	0.0	4.3	4.3	1.3	Flood Risk
2160 min Winter	0.074	0.074	0.0	3.1	3.1	1.0	Flood Risk
2880 min Winter	0.067	0.067	0.0	2.5	2.5	0.8	Flood Risk
4320 min Winter	0.055	0.055	0.0	1.8	1.8	0.5	Flood Risk
5760 min Winter	0.049	0.049	0.0	1.4	1.4	0.4	Flood Risk
7200 min Winter	0.045	0.045	0.0	1.2	1.2	0.4	Flood Risk
8640 min Winter	0.042	0.042	0.0	1.0	1.0	0.3	Flood Risk
10080 min Winter	0.039	0.039	0.0	0.9	0.9	0.3	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
8640 min Summer	1.048	0.0	182.2	4328
10080 min Summer	0.923	0.0	187.3	4984
15 min Winter	128.285	7.5	43.4	21
30 min Winter	84.226	11.7	57.0	32
60 min Winter	52.662	10.2	71.2	50
120 min Winter	31.800	2.4	86.0	80
180 min Winter	23.353	0.0	94.7	108
240 min Winter	18.644	0.0	100.9	136
360 min Winter	13.543	0.0	109.9	194
480 min Winter	10.792	0.0	116.8	252
600 min Winter	9.043	0.0	122.3	316
720 min Winter	7.823	0.0	127.0	384
960 min Winter	6.219	0.0	134.6	490
1440 min Winter	4.493	0.0	145.8	728
2160 min Winter	3.241	0.0	157.8	1108
2880 min Winter	2.568	0.0	166.7	1464
4320 min Winter	1.847	0.0	179.9	2140
5760 min Winter	1.461	0.0	189.7	2936
7200 min Winter	1.217	0.0	197.5	3664
8640 min Winter	1.048	0.0	204.1	4384
10080 min Winter	0.923	0.0	209.8	5072

Cascade Rainfall Details for 0521-PH9-Rain-Garden-2.srcx

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

Time Area Diagram

Total Area (ha) 0.102

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

Cascade Model Details for 0521-PH9-Rain-Garden-2.srcx

Storage is Online Cover Level (m) 0.300

Infiltration Trench Structure

Infiltration Coefficient Base (m/hr)	0.00000	Trench Width (m)	6.0
Infiltration Coefficient Side (m/hr)	0.00000	Trench Length (m)	31.1
Safety Factor	2.0	Slope (1:X)	200.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	0.000	Cap Infiltration Depth (m)	0.000

Pipe Outflow Control

Diameter (m)	0.150	Entry Loss Coefficient	0.500
Slope (1:X)	200.0	Coefficient of Contraction	0.600
Length (m)	4.000	Upstream Invert Level (m)	0.000
Roughness k (mm)	0.600		

Cascade Summary of Results for 0521-PH9-Rain-Garden-3.srcx

Upstream Structures	Outflow To	Overflow To
0521-PH9-Rain-Garden-2.srcx 0521-PH9-Rain-Garden-1.srcx	0521-PH9-Rain-Garden-4.srcx	(None)

Half Drain Time : 12 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	0.307	0.307	0.0	21.8	21.8	18.9	FLOOD
30 min Summer	0.312	0.312	0.0	22.2	22.2	24.3	FLOOD
60 min Summer	0.316	0.316	0.0	22.4	22.4	28.0	FLOOD
120 min Summer	0.314	0.314	0.0	22.3	22.3	26.5	FLOOD
180 min Summer	0.310	0.310	0.0	22.0	22.0	22.5	FLOOD
240 min Summer	0.306	0.306	0.0	21.8	21.8	17.8	FLOOD
360 min Summer	0.298	0.298	0.0	21.3	21.3	11.5	Flood Risk
480 min Summer	0.255	0.255	0.0	18.3	18.3	9.3	Flood Risk
600 min Summer	0.226	0.226	0.0	16.0	16.0	7.9	Flood Risk
720 min Summer	0.205	0.205	0.0	14.2	14.2	6.8	Flood Risk
960 min Summer	0.177	0.177	0.0	11.1	11.1	5.4	Flood Risk
1440 min Summer	0.158	0.158	0.0	8.5	8.5	4.4	Flood Risk
2160 min Summer	0.117	0.117	0.0	6.3	6.3	2.4	Flood Risk
2880 min Summer	0.095	0.095	0.0	5.0	5.0	1.6	Flood Risk
4320 min Summer	0.079	0.079	0.0	3.7	3.7	1.1	Flood Risk
5760 min Summer	0.072	0.072	0.0	2.9	2.9	0.9	Flood Risk
7200 min Summer	0.066	0.066	0.0	2.4	2.4	0.8	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	128.285	6.9	57.5	26
30 min Summer	84.226	12.1	75.5	40
60 min Summer	52.662	15.7	94.4	64
120 min Summer	31.800	14.2	114.0	92
180 min Summer	23.353	10.3	125.6	120
240 min Summer	18.644	5.9	133.7	148
360 min Summer	13.543	0.0	145.7	200
480 min Summer	10.792	0.0	154.8	260
600 min Summer	9.043	0.0	162.1	318
720 min Summer	7.823	0.0	168.3	378
960 min Summer	6.219	0.0	178.3	496
1440 min Summer	4.493	0.0	193.3	738
2160 min Summer	3.241	0.0	209.2	1100
2880 min Summer	2.568	0.0	221.0	1448
4320 min Summer	1.847	0.0	238.4	2172
5760 min Summer	1.461	0.0	251.4	2936
7200 min Summer	1.217	0.0	261.8	3664

Cascade Summary of Results for 0521-PH9-Rain-Garden-3.srcx

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	0.060	0.060	0.0	2.1	2.1	0.7	Flood Risk
10080 min Summer	0.056	0.056	0.0	1.8	1.8	0.6	Flood Risk
15 min Winter	0.309	0.309	0.0	22.0	22.0	21.2	FLOOD
30 min Winter	0.315	0.315	0.0	22.3	22.3	27.4	FLOOD
60 min Winter	0.320	0.320	0.0	22.6	22.6	32.1	FLOOD
120 min Winter	0.317	0.317	0.0	22.5	22.5	29.8	FLOOD
180 min Winter	0.310	0.310	0.0	22.0	22.0	21.7	FLOOD
240 min Winter	0.303	0.303	0.0	21.6	21.6	14.3	FLOOD
360 min Winter	0.252	0.252	0.0	18.1	18.1	9.2	Flood Risk
480 min Winter	0.212	0.212	0.0	14.8	14.8	7.1	Flood Risk
600 min Winter	0.188	0.188	0.0	12.5	12.5	6.0	Flood Risk
720 min Winter	0.173	0.173	0.0	10.7	10.7	5.2	Flood Risk
960 min Winter	0.159	0.159	0.0	8.7	8.7	4.5	Flood Risk
1440 min Winter	0.117	0.117	0.0	6.3	6.3	2.5	Flood Risk
2160 min Winter	0.090	0.090	0.0	4.7	4.7	1.5	Flood Risk
2880 min Winter	0.079	0.079	0.0	3.7	3.7	1.1	Flood Risk
4320 min Winter	0.069	0.069	0.0	2.6	2.6	0.9	Flood Risk
5760 min Winter	0.060	0.060	0.0	2.1	2.1	0.7	Flood Risk
7200 min Winter	0.055	0.055	0.0	1.7	1.7	0.5	Flood Risk
8640 min Winter	0.051	0.051	0.0	1.5	1.5	0.5	Flood Risk
10080 min Winter	0.048	0.048	0.0	1.3	1.3	0.4	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
8640 min Summer	1.048	0.0	270.5	4384
10080 min Summer	0.923	0.0	278.0	5032
15 min Winter	128.285	9.1	64.4	26
30 min Winter	84.226	15.0	84.5	40
60 min Winter	52.662	19.5	105.7	66
120 min Winter	31.800	17.4	127.7	96
180 min Winter	23.353	9.6	140.6	124
240 min Winter	18.644	2.5	149.7	150
360 min Winter	13.543	0.0	163.1	202
480 min Winter	10.792	0.0	173.3	260
600 min Winter	9.043	0.0	181.5	322
720 min Winter	7.823	0.0	188.5	384
960 min Winter	6.219	0.0	199.7	496
1440 min Winter	4.493	0.0	216.5	742
2160 min Winter	3.241	0.0	234.2	1116
2880 min Winter	2.568	0.0	247.5	1472
4320 min Winter	1.847	0.0	267.0	2144
5760 min Winter	1.461	0.0	281.5	2912
7200 min Winter	1.217	0.0	293.2	3608
8640 min Winter	1.048	0.0	302.9	4392
10080 min Winter	0.923	0.0	311.4	5136

Cascade Rainfall Details for 0521-PH9-Rain-Garden-3.srcx

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

Time Area Diagram

Total Area (ha) 0.078

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

Cascade Model Details for 0521-PH9-Rain-Garden-3.srcx

Storage is Online Cover Level (m) 0.300

Infiltration Trench Structure

Infiltration Coefficient Base (m/hr)	0.00000	Trench Width (m)	6.0
Infiltration Coefficient Side (m/hr)	0.00000	Trench Length (m)	28.1
Safety Factor	2.0	Slope (1:X)	200.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	0.000	Cap Infiltration Depth (m)	0.000

Pipe Outflow Control

Diameter (m)	0.150	Entry Loss Coefficient	0.500
Slope (1:X)	200.0	Coefficient of Contraction	0.600
Length (m)	4.000	Upstream Invert Level (m)	0.000
Roughness k (mm)	0.600		

Cascade Summary of Results for 0521-PH9-Rain-Garden-4.srcx

Upstream Structures	Outflow To	Overflow To
0521-PH9-Rain-Garden-3.srcx 0521-PH9-Rain-Garden-2.srcx 0521-PH9-Rain-Garden-1.srcx	0521-PH9-Rain-Garden-5.srcx	(None)

Half Drain Time : 10 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	0.305	0.305	0.0	21.7	21.7	13.2	FLOOD
30 min Summer	0.310	0.310	0.0	22.0	22.0	17.4	FLOOD
60 min Summer	0.313	0.313	0.0	22.2	22.2	21.2	FLOOD
120 min Summer	0.315	0.315	0.0	22.3	22.3	22.5	FLOOD
180 min Summer	0.313	0.313	0.0	22.2	22.2	20.9	FLOOD
240 min Summer	0.311	0.311	0.0	22.1	22.1	19.1	FLOOD
360 min Summer	0.306	0.306	0.0	21.8	21.8	13.5	FLOOD
480 min Summer	0.300	0.300	0.0	21.4	21.4	7.9	FLOOD
600 min Summer	0.268	0.268	0.0	19.3	19.3	6.4	Flood Risk
720 min Summer	0.239	0.239	0.0	17.1	17.1	5.4	Flood Risk
960 min Summer	0.200	0.200	0.0	13.7	13.7	4.1	Flood Risk
1440 min Summer	0.172	0.172	0.0	10.5	10.5	3.1	Flood Risk
2160 min Summer	0.153	0.153	0.0	7.7	7.7	2.5	Flood Risk
2880 min Summer	0.114	0.114	0.0	6.2	6.2	1.4	Flood Risk
4320 min Summer	0.087	0.087	0.0	4.5	4.5	0.8	Flood Risk
5760 min Summer	0.078	0.078	0.0	3.5	3.5	0.6	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	128.285	5.5	71.0	35
30 min Summer	84.226	9.6	93.2	51
60 min Summer	52.662	13.3	116.5	72
120 min Summer	31.800	14.5	140.7	118
180 min Summer	23.353	13.0	155.0	144
240 min Summer	18.644	11.3	165.0	168
360 min Summer	13.543	5.8	179.8	216
480 min Summer	10.792	0.4	191.0	266
600 min Summer	9.043	0.0	200.1	322
720 min Summer	7.823	0.0	207.7	384
960 min Summer	6.219	0.0	220.1	498
1440 min Summer	4.493	0.0	238.6	740
2160 min Summer	3.241	0.0	258.2	1108
2880 min Summer	2.568	0.0	272.7	1468
4320 min Summer	1.847	0.0	294.3	2176
5760 min Summer	1.461	0.0	310.3	2888

Cascade Summary of Results for 0521-PH9-Rain-Garden-4.srcx

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 Summer	0.073	0.073	0.0	3.0	3.0	0.6	Flood Risk
8640 min Summer	0.068	0.068	0.0	2.6	2.6	0.5	Flood Risk
10080 min Summer	0.063	0.063	0.0	2.3	2.3	0.4	Flood Risk
15 min Winter	0.307	0.307	0.0	21.9	21.9	14.8	FLOOD
30 min Winter	0.312	0.312	0.0	22.1	22.1	19.6	FLOOD
60 min Winter	0.316	0.316	0.0	22.4	22.4	24.1	FLOOD
120 min Winter	0.318	0.318	0.0	22.5	22.5	26.2	FLOOD
180 min Winter	0.316	0.316	0.0	22.4	22.4	23.8	FLOOD
240 min Winter	0.312	0.312	0.0	22.2	22.2	20.0	FLOOD
360 min Winter	0.301	0.301	0.0	21.4	21.4	8.1	FLOOD
480 min Winter	0.252	0.252	0.0	18.1	18.1	5.8	Flood Risk
600 min Winter	0.217	0.217	0.0	15.3	15.3	4.6	Flood Risk
720 min Winter	0.195	0.195	0.0	13.2	13.2	3.9	Flood Risk
960 min Winter	0.174	0.174	0.0	10.8	10.8	3.2	Flood Risk
1440 min Winter	0.153	0.153	0.0	7.8	7.8	2.5	Flood Risk
2160 min Winter	0.107	0.107	0.0	5.8	5.8	1.2	Flood Risk
2880 min Winter	0.087	0.087	0.0	4.5	4.5	0.8	Flood Risk
4320 min Winter	0.075	0.075	0.0	3.2	3.2	0.6	Flood Risk
5760 min Winter	0.068	0.068	0.0	2.6	2.6	0.5	Flood Risk
7200 min Winter	0.061	0.061	0.0	2.1	2.1	0.4	Flood Risk
8640 min Winter	0.057	0.057	0.0	1.9	1.9	0.3	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
7200 min Summer	1.217	0.0	323.1	3576
8640 min Summer	1.048	0.0	333.9	4320
10080 min Summer	0.923	0.0	343.2	5096
15 min Winter	128.285	7.1	79.5	39
30 min Winter	84.226	11.8	104.4	56
60 min Winter	52.662	16.1	130.5	76
120 min Winter	31.800	18.1	157.6	122
180 min Winter	23.353	15.8	173.6	148
240 min Winter	18.644	12.1	184.8	170
360 min Winter	13.543	0.6	201.4	212
480 min Winter	10.792	0.0	213.9	264
600 min Winter	9.043	0.0	224.1	324
720 min Winter	7.823	0.0	232.6	380
960 min Winter	6.219	0.0	246.6	498
1440 min Winter	4.493	0.0	267.2	734
2160 min Winter	3.241	0.0	289.1	1096
2880 min Winter	2.568	0.0	305.5	1468
4320 min Winter	1.847	0.0	329.6	2200
5760 min Winter	1.461	0.0	347.5	2920
7200 min Winter	1.217	0.0	361.9	3592
8640 min Winter	1.048	0.0	373.9	4352

Cascade Summary of Results for 0521-PH9-Rain-Garden-4.srcx

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
10080 min Winter	0.053	0.053	0.0	1.6	1.6	0.3	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
10080 min Winter	0.923	0.0	384.3	5120

Cascade Rainfall Details for 0521-PH9-Rain-Garden-4.srcx

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

Time Area Diagram

Total Area (ha) 0.056

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.019	4	8	0.019	8	12	0.018

Cascade Model Details for 0521-PH9-Rain-Garden-4.srcx

Storage is Online Cover Level (m) 0.300

Infiltration Trench Structure

Infiltration Coefficient Base (m/hr)	0.00000	Trench Width (m)	3.5
Infiltration Coefficient Side (m/hr)	0.00000	Trench Length (m)	32.6
Safety Factor	2.0	Slope (1:X)	200.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	0.000	Cap Infiltration Depth (m)	0.000

Pipe Outflow Control

Diameter (m)	0.150	Entry Loss Coefficient	0.500
Slope (1:X)	200.0	Coefficient of Contraction	0.600
Length (m)	4.000	Upstream Invert Level (m)	0.000
Roughness k (mm)	0.600		

Cascade Summary of Results for 0521-PH9-Rain-Garden-5.srcx

Upstream Structures	Outflow To	Overflow To
0521-PH9-Rain-Garden-4.srcx 0521-PH9-Rain-Garden-3.srcx 0521-PH9-Rain-Garden-2.srcx 0521-PH9-Rain-Garden-1.srcx	0521-PH9-Watercourse-Eastern-Section.srcx	(None)

Half Drain Time : 14 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	0.292	0.292	0.0	20.9	20.9	18.7	Flood Risk
30 min Summer	0.301	0.301	0.0	21.5	21.5	21.1	FLOOD
60 min Summer	0.306	0.306	0.0	21.8	21.8	25.6	FLOOD
120 min Summer	0.309	0.309	0.0	21.9	21.9	29.3	FLOOD
180 min Summer	0.309	0.309	0.0	21.9	21.9	29.5	FLOOD
240 min Summer	0.308	0.308	0.0	21.9	21.9	28.5	FLOOD
360 min Summer	0.306	0.306	0.0	21.8	21.8	26.0	FLOOD
480 min Summer	0.302	0.302	0.0	21.5	21.5	21.7	FLOOD
600 min Summer	0.282	0.282	0.0	20.2	20.2	17.5	Flood Risk
720 min Summer	0.256	0.256	0.0	18.4	18.4	14.6	Flood Risk
960 min Summer	0.219	0.219	0.0	15.4	15.4	10.6	Flood Risk
1440 min Summer	0.184	0.184	0.0	12.0	12.0	7.5	Flood Risk
2160 min Summer	0.160	0.160	0.0	8.9	8.9	5.7	Flood Risk
2880 min Summer	0.135	0.135	0.0	7.1	7.1	4.0	Flood Risk
4320 min Summer	0.099	0.099	0.0	5.2	5.2	2.2	Flood Risk
5760 min Summer	0.084	0.084	0.0	4.1	4.1	1.6	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	128.285	0.0	83.0	56
30 min Summer	84.226	1.5	109.0	77
60 min Summer	52.662	5.5	136.3	98
120 min Summer	31.800	8.8	164.6	132
180 min Summer	23.353	9.0	181.3	168
240 min Summer	18.644	8.0	193.0	192
360 min Summer	13.543	5.8	210.3	240
480 min Summer	10.792	2.0	223.4	284
600 min Summer	9.043	0.0	234.0	338
720 min Summer	7.823	0.0	242.9	396
960 min Summer	6.219	0.0	257.4	512
1440 min Summer	4.493	0.0	279.0	750
2160 min Summer	3.241	0.0	301.9	1112
2880 min Summer	2.568	0.0	319.0	1476
4320 min Summer	1.847	0.0	344.1	2208
5760 min Summer	1.461	0.0	362.9	2928

Cascade Summary of Results for 0521-PH9-Rain-Garden-5.srcx

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 Summer	0.077	0.077	0.0	3.4	3.4	1.3	Flood Risk
8640 min Summer	0.073	0.073	0.0	3.0	3.0	1.2	Flood Risk
10080 min Summer	0.069	0.069	0.0	2.6	2.6	1.1	Flood Risk
15 min Winter	0.299	0.299	0.0	21.3	21.3	19.4	Flood Risk
30 min Winter	0.303	0.303	0.0	21.6	21.6	23.1	FLOOD
60 min Winter	0.308	0.308	0.0	21.9	21.9	28.5	FLOOD
120 min Winter	0.312	0.312	0.0	22.2	22.2	33.0	FLOOD
180 min Winter	0.313	0.313	0.0	22.2	22.2	33.8	FLOOD
240 min Winter	0.311	0.311	0.0	22.1	22.1	31.9	FLOOD
360 min Winter	0.305	0.305	0.0	21.7	21.7	25.0	FLOOD
480 min Winter	0.277	0.277	0.0	19.9	19.9	16.9	Flood Risk
600 min Winter	0.241	0.241	0.0	17.3	17.3	12.9	Flood Risk
720 min Winter	0.216	0.216	0.0	15.2	15.2	10.4	Flood Risk
960 min Winter	0.188	0.188	0.0	12.4	12.4	7.8	Flood Risk
1440 min Winter	0.161	0.161	0.0	9.1	9.1	5.8	Flood Risk
2160 min Winter	0.122	0.122	0.0	6.6	6.6	3.3	Flood Risk
2880 min Winter	0.100	0.100	0.0	5.3	5.3	2.2	Flood Risk
4320 min Winter	0.081	0.081	0.0	3.8	3.8	1.4	Flood Risk
5760 min Winter	0.073	0.073	0.0	3.0	3.0	1.2	Flood Risk
7200 min Winter	0.067	0.067	0.0	2.5	2.5	1.0	Flood Risk
8640 min Winter	0.062	0.062	0.0	2.2	2.2	0.8	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
7200 min Summer	1.217	0.0	377.9	3584
8640 min Summer	1.048	0.0	390.5	4288
10080 min Summer	0.923	0.0	401.3	5104
15 min Winter	128.285	0.0	92.9	62
30 min Winter	84.226	3.2	122.0	82
60 min Winter	52.662	8.1	152.6	106
120 min Winter	31.800	12.2	184.3	138
180 min Winter	23.353	12.8	203.0	178
240 min Winter	18.644	11.2	216.1	198
360 min Winter	13.543	5.0	235.5	232
480 min Winter	10.792	0.0	250.2	282
600 min Winter	9.043	0.0	262.1	340
720 min Winter	7.823	0.0	272.0	396
960 min Winter	6.219	0.0	288.3	508
1440 min Winter	4.493	0.0	312.5	748
2160 min Winter	3.241	0.0	338.1	1108
2880 min Winter	2.568	0.0	357.2	1476
4320 min Winter	1.847	0.0	385.4	2204
5760 min Winter	1.461	0.0	406.4	2872
7200 min Winter	1.217	0.0	423.2	3600
8640 min Winter	1.048	0.0	437.3	4408

Cascade Summary of Results for 0521-PH9-Rain-Garden-5.srcx

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
10080 min Winter	0.057	0.057	0.0	1.9	1.9	0.7	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
10080 min Winter	0.923	0.0	449.5	4984

Cascade Rainfall Details for 0521-PH9-Rain-Garden-5.srcx

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

Time Area Diagram

Total Area (ha) 0.050

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.020	4	8	0.020	8	12	0.010

Cascade Model Details for 0521-PH9-Rain-Garden-5.srcx

Storage is Online Cover Level (m) 0.300

Infiltration Trench Structure

Infiltration Coefficient Base (m/hr)	0.00000	Trench Width (m)	7.4
Infiltration Coefficient Side (m/hr)	0.00000	Trench Length (m)	50.9
Safety Factor	2.0	Slope (1:X)	200.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	0.000	Cap Infiltration Depth (m)	0.000

Pipe Outflow Control

Diameter (m)	0.150	Entry Loss Coefficient	0.500
Slope (1:X)	200.0	Coefficient of Contraction	0.600
Length (m)	4.000	Upstream Invert Level (m)	0.000
Roughness k (mm)	0.600		

Cascade Summary of Results for 0521-PH9-Watercourse-Eastern-Section.srcx

Upstream Structures	Outflow To	Overflow To
0521-PH9-Rain-Garden-5.srcx	(None)	(None)
0521-PH9-Rain-Garden-4.srcx		
0521-PH9-Rain-Garden-3.srcx		
0521-PH9-Rain-Garden-2.srcx		
0521-PH9-Rain-Garden-1.srcx		
0521-PH9-Watercourse-Western-Section.srcx		
0521-PH9-Permeable Paving.srcx		

Half Drain Time : 0 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	0.224	0.224	0.0	49.4	49.4	1.6	O K
30 min Summer	0.234	0.234	0.0	54.8	54.8	1.7	O K
60 min Summer	0.236	0.236	0.0	56.1	56.1	1.8	O K
120 min Summer	0.236	0.236	0.0	55.8	55.8	1.8	O K
180 min Summer	0.233	0.233	0.0	54.2	54.2	1.7	O K
240 min Summer	0.231	0.231	0.0	53.4	53.4	1.7	O K
360 min Summer	0.226	0.226	0.0	50.7	50.7	1.6	O K
480 min Summer	0.223	0.223	0.0	49.1	49.1	1.6	O K
600 min Summer	0.217	0.217	0.0	45.9	45.9	1.5	O K
720 min Summer	0.212	0.212	0.0	42.9	42.9	1.4	O K
960 min Summer	0.197	0.197	0.0	37.3	37.3	1.2	O K
1440 min Summer	0.173	0.173	0.0	29.8	29.8	0.9	O K
2160 min Summer	0.150	0.150	0.0	22.7	22.7	0.7	O K
2880 min Summer	0.134	0.134	0.0	17.9	17.9	0.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	128.285	0.0	216.6	18
30 min Summer	84.226	0.0	288.2	26
60 min Summer	52.662	0.0	365.6	44
120 min Summer	31.800	0.0	443.4	74
180 min Summer	23.353	0.0	489.3	108
240 min Summer	18.644	0.0	521.3	142
360 min Summer	13.543	0.0	568.6	212
480 min Summer	10.792	0.0	604.4	268
600 min Summer	9.043	0.0	633.1	346
720 min Summer	7.823	0.0	657.2	394
960 min Summer	6.219	0.0	696.3	514
1440 min Summer	4.493	0.0	753.4	764
2160 min Summer	3.241	0.0	816.2	1120
2880 min Summer	2.568	0.0	860.5	1496

Cascade Summary of Results for 0521-PH9-Watercourse-Eastern-Section.srcx

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
4320 min Summer	0.117	0.117	0.0	14.1	14.1	0.4	O K
5760 min Summer	0.108	0.108	0.0	11.9	11.9	0.3	O K
7200 min Summer	0.101	0.101	0.0	10.4	10.4	0.3	O K
8640 min Summer	0.089	0.089	0.0	8.2	8.2	0.2	O K
10080 min Summer	0.087	0.087	0.0	7.9	7.9	0.2	O K
15 min Winter	0.232	0.232	0.0	53.7	53.7	1.7	O K
30 min Winter	0.241	0.241	0.0	58.8	58.8	1.8	O K
60 min Winter	0.242	0.242	0.0	59.3	59.3	1.9	O K
120 min Winter	0.239	0.239	0.0	57.5	57.5	1.8	O K
180 min Winter	0.235	0.235	0.0	55.3	55.3	1.7	O K
240 min Winter	0.232	0.232	0.0	53.7	53.7	1.7	O K
360 min Winter	0.226	0.226	0.0	50.7	50.7	1.6	O K
480 min Winter	0.220	0.220	0.0	47.5	47.5	1.5	O K
600 min Winter	0.210	0.210	0.0	41.8	41.8	1.4	O K
720 min Winter	0.197	0.197	0.0	37.5	37.5	1.2	O K
960 min Winter	0.179	0.179	0.0	31.6	31.6	1.0	O K
1440 min Winter	0.157	0.157	0.0	24.7	24.7	0.7	O K
2160 min Winter	0.133	0.133	0.0	17.6	17.6	0.5	O K
2880 min Winter	0.120	0.120	0.0	14.6	14.6	0.4	O K
4320 min Winter	0.104	0.104	0.0	11.0	11.0	0.3	O K
5760 min Winter	0.094	0.094	0.0	9.0	9.0	0.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
4320 min Summer	1.847	0.0	923.8	2184
5760 min Summer	1.461	0.0	972.5	2904
7200 min Summer	1.217	0.0	1009.0	3648
8640 min Summer	1.048	0.0	1038.4	4328
10080 min Summer	0.923	0.0	1062.4	5064
15 min Winter	128.285	0.0	244.1	18
30 min Winter	84.226	0.0	324.2	28
60 min Winter	52.662	0.0	410.7	42
120 min Winter	31.800	0.0	497.9	82
180 min Winter	23.353	0.0	549.3	118
240 min Winter	18.644	0.0	585.2	142
360 min Winter	13.543	0.0	638.2	220
480 min Winter	10.792	0.0	678.4	284
600 min Winter	9.043	0.0	710.6	328
720 min Winter	7.823	0.0	737.6	420
960 min Winter	6.219	0.0	781.5	500
1440 min Winter	4.493	0.0	845.8	784
2160 min Winter	3.241	0.0	916.2	1136
2880 min Winter	2.568	0.0	966.2	1472
4320 min Winter	1.847	0.0	1037.8	2268
5760 min Winter	1.461	0.0	1092.8	2920

Cascade Summary of Results for 0521-PH9-Watercourse-Eastern-Section.srcx

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	0.085	0.085	0.0	7.5	7.5	0.2	O K
8640 min Winter	0.078	0.078	0.0	6.3	6.3	0.2	O K
10080 min Winter	0.075	0.075	0.0	5.8	5.8	0.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
7200 min Winter	1.217	0.0	1134.3	3544
8640 min Winter	1.048	0.0	1167.9	4328
10080 min Winter	0.923	0.0	1195.8	5120

Cascade Rainfall Details for 0521-PH9-Watercourse-Eastern-Section.srcx

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

Time Area Diagram

Total Area (ha) 0.049

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.016	4	8	0.016	8	12	0.017

Cascade Model Details for 0521-PH9-Watercourse-Eastern-Section.srcx

Storage is Online Cover Level (m) 1.050

Swale Structure

Infiltration Coefficient Base (m/hr)	0.00000	Length (m)	96.9
Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	1.0
Safety Factor	2.0	Slope (1:X)	59.6
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	0.000	Cap Infiltration Depth (m)	0.000
Base Width (m)	0.9		

Pipe Outflow Control

Diameter (m)	0.450	Entry Loss Coefficient	0.500
Slope (1:X)	20.5	Coefficient of Contraction	0.600
Length (m)	15.300	Upstream Invert Level (m)	0.000
Roughness k (mm)	0.600		

Cascade Summary of Results for 0521-PH9-Watercourse-Western-Section.srcx

Upstream Structures	Outflow To	Overflow To
0521-PH9-Permeable Paving.srcx	0521-PH9-Watercourse-Eastern-Section.srcx	(None)

Half Drain Time : 4 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	0.153	0.153	0.0	19.5	19.5	5.9	O K
30 min Summer	0.173	0.173	0.0	24.4	24.4	7.6	O K
60 min Summer	0.183	0.183	0.0	27.1	27.1	8.6	O K
120 min Summer	0.187	0.187	0.0	27.1	27.1	8.9	O K
180 min Summer	0.184	0.184	0.0	27.1	27.1	8.6	O K
240 min Summer	0.181	0.181	0.0	27.1	27.1	8.3	O K
360 min Summer	0.179	0.179	0.0	27.1	27.1	8.1	O K
480 min Summer	0.169	0.169	0.0	24.4	24.4	7.3	O K
600 min Summer	0.168	0.168	0.0	24.4	24.4	7.2	O K
720 min Summer	0.157	0.157	0.0	21.9	21.9	6.2	O K
960 min Summer	0.144	0.144	0.0	19.5	19.5	5.2	O K
1440 min Summer	0.133	0.133	0.0	17.2	17.2	4.4	O K
2160 min Summer	0.114	0.114	0.0	13.2	13.2	3.2	O K
2880 min Summer	0.093	0.093	0.0	9.8	9.8	2.1	O K
4320 min Summer	0.085	0.085	0.0	8.3	8.3	1.7	O K
5760 min Summer	0.077	0.077	0.0	6.9	6.9	1.4	O K
7200 min Summer	0.073	0.073	0.0	6.9	6.9	1.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	128.285	0.0	121.9	21
30 min Summer	84.226	0.0	163.7	31
60 min Summer	52.662	0.0	210.0	48
120 min Summer	31.800	0.0	255.5	84
180 min Summer	23.353	0.0	282.3	118
240 min Summer	18.644	0.0	300.9	144
360 min Summer	13.543	0.0	328.4	224
480 min Summer	10.792	0.0	349.2	274
600 min Summer	9.043	0.0	365.8	344
720 min Summer	7.823	0.0	379.7	400
960 min Summer	6.219	0.0	402.2	524
1440 min Summer	4.493	0.0	434.7	806
2160 min Summer	3.241	0.0	471.5	1168
2880 min Summer	2.568	0.0	496.3	1524
4320 min Summer	1.847	0.0	530.8	2316
5760 min Summer	1.461	0.0	558.3	2976
7200 min Summer	1.217	0.0	577.6	3616

Cascade Summary of Results for 0521-PH9-Watercourse-Western-Section.srcx

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	0.064	0.064	0.0	4.6	4.6	1.1	O K
10080 min Summer	0.062	0.062	0.0	4.6	4.6	1.0	O K
15 min Winter	0.167	0.167	0.0	21.9	21.9	7.0	O K
30 min Winter	0.185	0.185	0.0	27.1	27.1	8.7	O K
60 min Winter	0.195	0.195	0.0	29.9	29.9	9.6	O K
120 min Winter	0.195	0.195	0.0	29.9	29.9	9.6	O K
180 min Winter	0.193	0.193	0.0	29.9	29.9	9.5	O K
240 min Winter	0.187	0.187	0.0	27.1	27.1	8.9	O K
360 min Winter	0.179	0.179	0.0	27.1	27.1	8.1	O K
480 min Winter	0.169	0.169	0.0	24.4	24.4	7.2	O K
600 min Winter	0.158	0.158	0.0	21.9	21.9	6.3	O K
720 min Winter	0.156	0.156	0.0	21.9	21.9	6.2	O K
960 min Winter	0.140	0.140	0.0	17.2	17.2	4.9	O K
1440 min Winter	0.121	0.121	0.0	15.1	15.1	3.7	O K
2160 min Winter	0.093	0.093	0.0	9.8	9.8	2.1	O K
2880 min Winter	0.087	0.087	0.0	8.3	8.3	1.8	O K
4320 min Winter	0.073	0.073	0.0	6.9	6.9	1.2	O K
5760 min Winter	0.066	0.066	0.0	5.7	5.7	1.2	O K
7200 min Winter	0.060	0.060	0.0	4.6	4.6	1.0	O K
8640 min Winter	0.051	0.051	0.0	3.7	3.7	0.6	O K
10080 min Winter	0.049	0.049	0.0	3.7	3.7	0.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
8640 min Summer	1.048	0.0	592.6	4464
10080 min Summer	0.923	0.0	604.2	5288
15 min Winter	128.285	0.0	137.9	22
30 min Winter	84.226	0.0	184.8	32
60 min Winter	52.662	0.0	236.4	48
120 min Winter	31.800	0.0	287.4	84
180 min Winter	23.353	0.0	317.4	138
240 min Winter	18.644	0.0	338.4	168
360 min Winter	13.543	0.0	369.2	218
480 min Winter	10.792	0.0	392.6	288
600 min Winter	9.043	0.0	411.2	370
720 min Winter	7.823	0.0	426.9	432
960 min Winter	6.219	0.0	452.2	564
1440 min Winter	4.493	0.0	488.9	804
2160 min Winter	3.241	0.0	530.1	1224
2880 min Winter	2.568	0.0	558.2	1524
4320 min Winter	1.847	0.0	597.7	2324
5760 min Winter	1.461	0.0	628.9	2912
7200 min Winter	1.217	0.0	651.2	3736
8640 min Winter	1.048	0.0	668.6	4432
10080 min Winter	0.923	0.0	682.5	5264

Cascade Rainfall Details for 0521-PH9-Watercourse-Western-Section.srcx

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

Time Area Diagram

Total Area (ha) 0.049

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.016	4	8	0.016	8	12	0.017

Cascade Model Details for 0521-PH9-Watercourse-Western-Section.srcx

Storage is Online Cover Level (m) 1.050

Swale Structure

Infiltration Coefficient Base (m/hr)	0.00000	Length (m)	85.1
Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	1.0
Safety Factor	2.0	Slope (1:X)	500.0
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	0.000	Cap Infiltration Depth (m)	0.000
Base Width (m)	0.9		

Pipe Outflow Control

Diameter (m)	0.900	Entry Loss Coefficient	0.500
Slope (1:X)	500.0	Coefficient of Contraction	0.600
Length (m)	3.690	Upstream Invert Level (m)	0.000
Roughness k (mm)	0.600		