

Ardent Consulting Engineers		Page 1
4th Floor, Diamond House 36-38 Hatton Garden London EC1N 8EB		
Date 30/04/2012 16:18	Designed by tseymour	
File Network 1.mdx	Checked by	
Micro Drainage		Network W.12.6

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)
1.000	57.013	0.450	126.7	0.095	5.00	0.0	0.600	o	225
2.000	30.729	0.450	68.3	0.054	5.00	0.0	0.600	o	225
1.001	21.846	0.525	41.6	0.082	5.00	0.0	0.600	o	225
1.002	24.466	0.909	26.9	0.000	0.00	0.0	0.600	o	225
3.000	12.626	0.050	252.5	0.023	5.00	0.0	0.600	o	150
3.001	6.620	0.050	132.4	0.053	0.00	0.0	0.600	o	150
3.002	43.421	0.259	167.6	0.052	0.00	0.0	0.600	o	225
1.003	5.088	0.338	15.1	0.000	0.00	0.0	0.600	o	300
4.000	26.628	0.200	133.1	0.060	5.00	0.0	0.600	o	225
1.004	45.193	0.915	49.4	0.092	0.00	0.0	0.600	o	300
5.000	23.892	0.262	91.2	0.074	5.00	0.0	0.600	o	150
6.000	28.773	0.200	143.9	0.069	5.00	0.0	0.600	o	450
1.005	7.088	0.090	78.8	0.000	0.00	0.0	0.600	oo	450

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.000	18.950	0.095	0.0	1.16	46.1
2.000	18.950	0.054	0.0	1.58	63.0
1.001	18.500	0.231	0.0	2.03	80.9
1.002	17.975	0.231	0.0	2.53	100.7
3.000	17.500	0.023	0.0	0.63	11.1
3.001	17.450	0.076	0.0	0.87	15.4
3.002	17.400	0.128	0.0	1.01	40.0
1.003	16.991	0.359	0.0	4.07	287.9
4.000	17.000	0.060	0.0	1.13	45.0
1.004	16.653	0.511	0.0	2.24	158.5
5.000	16.150	0.074	0.0	1.05	18.6
6.000	14.800	0.069	0.0	1.69	269.3
1.005	14.600	0.654	0.0	2.29	729.3

Ardent Consulting Engineers			Page 2
4th Floor, Diamond House 36-38 Hatton Garden London EC1N 8EB			
Date 30/04/2012 16:18	Designed by tseymour		
File Network 1.mdx	Checked by		
Micro Drainage		Network W.12.6	

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)
1.006	18.375	0.050	367.5	0.088	0.00	0.0	0.600	∞	450
1.007	21.407	0.060	356.8	0.000	0.00	0.0	0.600	∞	450
7.000	5.000	0.100	50.0	0.039	5.00	0.0	0.600	∞	450
1.008	34.957	0.100	349.6	0.000	0.00	0.0	0.600	∞	450
8.000	45.900	0.180	255.0	0.085	5.00	0.0	0.600	∞	450
8.001	25.200	0.070	360.0	0.183	0.00	0.0	0.600	∞	450
9.000	30.000	0.075	400.0	0.000	5.00	0.0	0.600	∞	450
9.001	5.000	0.017	294.1	0.000	0.00	0.0	0.600	∞	450
8.002	26.689	0.068	392.5	0.000	0.00	0.0	0.600	∞	450
8.003	8.221	0.020	411.1	0.083	0.00	0.0	0.600	∞	450
8.004	22.000	0.055	400.0	0.000	0.00	0.0	0.600	∞	450
8.005	23.000	0.057	403.5	0.038	0.00	0.0	0.600	∞	450
8.006	7.372	0.018	409.6	0.042	0.00	0.0	0.600	∞	450
10.000	30.000	0.060	500.0	0.000	5.00	0.0	0.600	∞	450
10.001	1.000	0.008	125.0	0.000	0.00	0.0	0.600	∞	450

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.006	14.510	0.742	0.0	1.05	335.4
1.007	14.460	0.742	0.0	1.07	340.5
7.000	14.500	0.039	0.0	2.88	916.3
1.008	14.300	0.781	0.0	1.08	344.0
8.000	14.600	0.085	0.0	1.27	403.5
8.001	14.420	0.268	0.0	1.07	339.0
9.000	14.410	0.000	0.0	1.01	321.4
9.001	14.335	0.000	0.0	1.18	375.4
8.002	14.318	0.268	0.0	1.02	324.5
8.003	14.250	0.351	0.0	1.00	317.0
8.004	14.230	0.351	0.0	1.01	321.4
8.005	14.175	0.389	0.0	1.01	320.0
8.006	14.118	0.431	0.0	1.00	317.6
10.000	14.168	0.000	0.0	0.90	287.0
10.001	14.108	0.000	0.0	1.82	578.0

Ardent Consulting Engineers		Page 3
4th Floor, Diamond House 36-38 Hatton Garden London EC1N 8EB		
Date 30/04/2012 16:18	Designed by tseymour	
File Network 1.mdx	Checked by	
Micro Drainage		Network W.12.6

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)
1.009	30.961	0.077	402.1	0.068	0.00	0.0	0.600	oo	450
1.010	4.835	0.000	0.0	0.023	0.00	0.0	0.600	oo	450
1.011	16.431	0.004	4107.8	0.000	0.00	0.0	0.600	o	450

Network Results Table

PN	US/IL (m)	E I.Area (ha)	E Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.009	14.100	1.280	0.0	1.01	320.5
1.010	14.085	1.303	0.0	0.00	0.0
1.011	14.035	1.303	0.0	0.31	48.9

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs 0 Number of Storage Structures 2
 Number of Online Controls 3 Number of Time/Area Diagrams 0
 Number of Offline Controls 2 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Storm Duration (mins)	30
Ratio R	0.400		

Ardent Consulting Engineers		Page 4					
4th Floor, Diamond House 36-38 Hatton Garden London EC1N 8EB							
Date 30/04/2012 16:18	Designed by tseymour						
File Network 1.mdx	Checked by						
Micro Drainage	Network W.12.6						
<u>Online Controls for Storm</u>							
<u>Non Return Valve Manhole: SWM9.1, DS/PN: 9.001, Volume (m³): 10.9</u>							
<u>Non Return Valve Manhole: SWMH10.1, DS/PN: 10.001, Volume (m³): 11.5</u>							
<u>Hydro-Brake® Manhole: SW MH 1.11, DS/PN: 1.011, Volume (m³): 5.5</u>							
Design Head (m) 1.000 Hydro-Brake® Type Md4 Invert Level (m) 14.035 Design Flow (l/s) 220.0 Diameter (mm) 418							
Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.2	1.200	201.3	3.000	235.9	7.000	360.2
0.200	25.0	1.400	188.8	3.500	254.7	7.500	372.9
0.300	58.0	1.600	185.8	4.000	272.3	8.000	385.1
0.400	99.2	1.800	189.1	4.500	288.8	8.500	397.0
0.500	142.1	2.000	195.6	5.000	304.5	9.000	408.5
0.600	180.4	2.200	203.4	5.500	319.3	9.500	419.7
0.800	222.3	2.400	211.6	6.000	333.5		
1.000	220.0	2.600	219.8	6.500	347.1		
©1982-2011 Micro Drainage Ltd							

Ardent Consulting Engineers		Page 5
4th Floor, Diamond House 36-38 Hatton Garden London EC1N 8EB		
Date 30/04/2012 16:18 File Network 1.mdx	Designed by tseymour Checked by	
Micro Drainage	Network W.12.6	
<u>Offline Controls for Storm</u> <u>Weir Manhole: SW MH 3.2, DS/PN: 8.002, Loop to PN: 9.000</u> Discharge Coef 0.544 Width (m) 2.000 Invert Level (m) 14.900 <u>Weir Manhole: 16.15, DS/PN: 1.009, Loop to PN: 10.000</u> Discharge Coef 0.544 Width (m) 2.000 Invert Level (m) 14.970		
©1982-2011 Micro Drainage Ltd		

Ardent Consulting Engineers		Page 6
4th Floor, Diamond House 36-38 Hatton Garden London EC1N 8EB		
Date 30/04/2012 16:18	Designed by tseymour	
File Network 1.mdx	Checked by	
Micro Drainage		Network W.12.6

Storage Structures for Storm

Cellular Storage Manhole: SWMH9.0, DS/PN: 9.000

Invert Level (m) 14.420 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	80.0	0.0	1.300	0.0	0.0
0.100	80.0	0.0	1.400	0.0	0.0
0.200	80.0	0.0	1.500	0.0	0.0
0.300	80.0	0.0	1.600	0.0	0.0
0.400	80.0	0.0	1.700	0.0	0.0
0.500	80.0	0.0	1.800	0.0	0.0
0.600	0.0	0.0	1.900	0.0	0.0
0.700	0.0	0.0	2.000	0.0	0.0
0.800	0.0	0.0	2.100	0.0	0.0
0.900	0.0	0.0	2.200	0.0	0.0
1.000	0.0	0.0	2.300	0.0	0.0
1.100	0.0	0.0	2.400	0.0	0.0
1.200	0.0	0.0	2.500	0.0	0.0

Cellular Storage Manhole: SWMH10.0, DS/PN: 10.000

Invert Level (m) 14.168 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	80.0	0.0	1.300	0.0	0.0
0.100	80.0	0.0	1.400	0.0	0.0
0.200	80.0	0.0	1.500	0.0	0.0
0.300	80.0	0.0	1.600	0.0	0.0
0.400	80.0	0.0	1.700	0.0	0.0
0.500	80.0	0.0	1.800	0.0	0.0
0.600	0.0	0.0	1.900	0.0	0.0
0.700	0.0	0.0	2.000	0.0	0.0
0.800	0.0	0.0	2.100	0.0	0.0
0.900	0.0	0.0	2.200	0.0	0.0
1.000	0.0	0.0	2.300	0.0	0.0
1.100	0.0	0.0	2.400	0.0	0.0
1.200	0.0	0.0	2.500	0.0	0.0

©1982-2011 Micro Drainage Ltd

Ardent Consulting Engineers		Page 7
4th Floor, Diamond House 36-38 Hatton Garden London EC1N 8EB		
Date 30/04/2012 16:18	Designed by tseymour	
File Network 1.mdx	Checked by	
Micro Drainage		Network W.12.6

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Storm

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 600, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 30

PN	Storm	Return Period	Climate Change	First X Surchage	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	1	0%	100/15 Summer				
2.000	15 Winter	1	0%	100/15 Summer				
1.001	15 Winter	1	0%	100/15 Summer				
1.002	15 Winter	1	0%	100/15 Summer				
3.000	15 Winter	1	0%	30/15 Summer	100/15 Winter			1
3.001	15 Winter	1	0%	30/15 Summer				
3.002	15 Winter	1	0%	30/15 Summer				
1.003	15 Winter	1	0%	100/15 Summer				
4.000	15 Winter	1	0%	100/15 Summer				
1.004	15 Winter	1	0%	30/15 Summer				
5.000	15 Winter	1	0%	30/15 Summer				
6.000	15 Winter	1	0%	100/15 Summer				
1.005	15 Winter	1	0%	30/15 Winter				
1.006	15 Winter	1	0%	30/15 Winter				
1.007	15 Winter	1	0%	30/15 Winter				
7.000	30 Winter	1	0%	100/15 Summer				
1.008	15 Winter	1	0%	30/15 Summer				
8.000	15 Winter	1	0%	100/15 Summer				
8.001	30 Winter	1	0%	30/30 Winter				
9.000	120 Winter	1	0%	100/15 Winter				
9.001	120 Winter	1	0%	100/15 Winter				
8.002	30 Winter	1	0%	30/15 Summer		100/15 Summer		8
8.003	30 Winter	1	0%	30/15 Summer				
8.004	30 Winter	1	0%	30/15 Summer				
8.005	30 Winter	1	0%	30/15 Summer				
8.006	30 Winter	1	0%	30/15 Summer				
10.000	120 Winter	1	0%					
10.001	120 Winter	1	0%					
1.009	15 Winter	1	0%	30/15 Summer		100/15 Summer		7
1.010	15 Winter	1	0%	30/15 Summer				
1.011	15 Winter	1	0%	30/15 Summer				

©1982-2011 Micro Drainage Ltd

Ardent Consulting Engineers		Page 9
4th Floor, Diamond House 36-38 Hatton Garden London EC1N 8EB		
Date 30/04/2012 16:18	Designed by tseymour	
File Network 1.mdx	Checked by	
Micro Drainage	Network W.12.6	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Storm

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 600, 960,
 1440
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 30

PN	Storm	Return Climate Period Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Lvl Act. Exc.
1.000	15 Winter	30	0% 100/15 Summer			
2.000	15 Winter	30	0% 100/15 Summer			
1.001	15 Winter	30	0% 100/15 Summer			
1.002	15 Winter	30	0% 100/15 Summer			
3.000	15 Winter	30	0% 30/15 Summer	100/15 Winter		1
3.001	15 Winter	30	0% 30/15 Summer			
3.002	15 Winter	30	0% 30/15 Summer			
1.003	15 Winter	30	0% 100/15 Summer			
4.000	15 Winter	30	0% 100/15 Summer			
1.004	15 Winter	30	0% 30/15 Summer			
5.000	15 Winter	30	0% 30/15 Summer			
6.000	15 Winter	30	0% 100/15 Summer			
1.005	15 Winter	30	0% 30/15 Winter			
1.006	30 Winter	30	0% 30/15 Winter			
1.007	15 Winter	30	0% 30/15 Winter			
7.000	15 Winter	30	0% 100/15 Summer			
1.008	15 Winter	30	0% 30/15 Summer			
8.000	30 Winter	30	0% 100/15 Summer			
8.001	30 Winter	30	0% 30/30 Winter			
9.000	120 Winter	30	0% 100/15 Winter			
9.001	120 Winter	30	0% 100/15 Winter			
8.002	30 Winter	30	0% 30/15 Summer		100/15 Summer	8
8.003	30 Winter	30	0% 30/15 Summer			
8.004	30 Winter	30	0% 30/15 Summer			
8.005	30 Winter	30	0% 30/15 Summer			
8.006	30 Winter	30	0% 30/15 Summer			
10.000	120 Winter	30	0%			
10.001	120 Winter	30	0%			
1.009	30 Winter	30	0% 30/15 Summer		100/15 Summer	7
1.010	30 Winter	30	0% 30/15 Summer			
1.011	30 Winter	30	0% 30/15 Summer			

Ardent Consulting Engineers		Page 11
4th Floor, Diamond House 36-38 Hatton Garden London EC1N 8EB		
Date 30/04/2012 16:18	Designed by tseymour	
File Network 1.mdx	Checked by	
Micro Drainage	Network W.12.6	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 600, 960, 1440
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 30

PN	Storm	Return Period	Climate Change	First X Surchage	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	100	+30%	100/15 Summer				
2.000	15 Winter	100	+30%	100/15 Summer				
1.001	15 Winter	100	+30%	100/15 Summer				
1.002	15 Winter	100	+30%	100/15 Summer				
3.000	15 Winter	100	+30%	30/15 Summer	100/15 Winter			1
3.001	15 Winter	100	+30%	30/15 Summer				
3.002	15 Winter	100	+30%	30/15 Summer				
1.003	15 Winter	100	+30%	100/15 Summer				
4.000	15 Winter	100	+30%	100/15 Summer				
1.004	15 Winter	100	+30%	30/15 Summer				
5.000	15 Winter	100	+30%	30/15 Summer				
6.000	15 Winter	100	+30%	100/15 Summer				
1.005	15 Winter	100	+30%	30/15 Winter				
1.006	15 Winter	100	+30%	30/15 Winter				
1.007	15 Winter	100	+30%	30/15 Winter				
7.000	15 Winter	100	+30%	100/15 Summer				
1.008	15 Winter	100	+30%	30/15 Summer				
8.000	30 Summer	100	+30%	100/15 Summer				
8.001	30 Winter	100	+30%	30/30 Winter				
9.000	30 Winter	100	+30%	100/15 Winter				
9.001	30 Winter	100	+30%	100/15 Winter				
8.002	30 Winter	100	+30%	30/15 Summer		100/15 Summer		8
8.003	30 Winter	100	+30%	30/15 Summer				
8.004	30 Winter	100	+30%	30/15 Summer				
8.005	15 Winter	100	+30%	30/15 Summer				
8.006	15 Winter	100	+30%	30/15 Summer				
10.000	30 Winter	100	+30%					
10.001	30 Winter	100	+30%					
1.009	15 Winter	100	+30%	30/15 Summer		100/15 Summer		7
1.010	30 Summer	100	+30%	30/15 Summer				
1.011	30 Summer	100	+30%	30/15 Summer				

Ardent Consulting Engineers		Page 12
4th Floor, Diamond House 36-38 Hatton Garden London EC1N 8EB		
Date 30/04/2012 16:18	Designed by tseymour	
File Network 1.mdx	Checked by	
Micro Drainage		Network W.12.6

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'd Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	SW MH 12	19.963	0.788	0.000	0.91	0.0	40.5	FLOOD RISK
2.000	SM MH 13	19.707	0.532	0.000	0.47	0.0	27.6	FLOOD RISK
1.001	SW MH 1.0	19.653	0.928	0.000	1.25	0.0	92.0	SURCHARGED
1.002	SW MH 1.1	18.840	0.640	0.000	0.99	0.0	91.5	SURCHARGED
3.000	SW MH14	18.700	1.050	0.116	1.15	0.0	11.6	FLOOD
3.001	SW MH 15	18.673	1.073	0.000	2.29	0.0	29.8	FLOOD RISK
3.002	SW MH 16	18.408	0.783	0.000	1.35	0.0	51.4	FLOOD RISK
1.003	SW MH 1.2	17.985	0.694	0.000	0.99	0.0	143.7	SURCHARGED
4.000	SW MH 17	17.768	0.543	0.000	0.67	0.0	27.9	SURCHARGED
1.004	SW MH 1.3	17.678	0.725	0.000	1.33	0.0	198.1	SURCHARGED
5.000	SW MH 2.0	17.209	0.909	0.000	2.10	0.0	37.1	FLOOD RISK
6.000	SWMH 18	15.481	0.231	0.000	0.16	0.0	36.6	SURCHARGED
1.005	SW M H 1.5	15.404	0.354	0.000	0.78	0.0	265.0	SURCHARGED
1.006	SW MH 1.6	15.310	0.350	0.000	1.09	0.0	291.4	SURCHARGED
1.007	SW MH 1.7	15.263	0.353	0.000	1.04	0.0	290.4	SURCHARGED
7.000	SW MH 19	15.216	0.266	0.000	0.05	0.0	19.1	SURCHARGED
1.008	SW MH 1.8	15.213	0.463	0.000	1.00	0.0	301.7	SURCHARGED
8.000	SW MH 3.0	15.177	0.127	0.000	0.10	0.0	35.3	SURCHARGED
8.001	SW MH 3.1	15.171	0.301	0.000	0.39	0.0	111.6	SURCHARGED
9.000	SWMH9.0	15.116	0.256	0.000	0.25	0.0	68.7	SURCHARGED
9.001	SWM9.1	15.113	0.328	0.000	0.17	0.0	39.1	SURCHARGED
8.002	SW MH 3.2	15.113	0.345	0.000	0.26	161.2	70.3	SURCHARGED
8.003	SW MH 3.3	15.108	0.408	0.000	0.39	0.0	69.6	SURCHARGED
8.004	SW MH 3.4	15.102	0.422	0.000	0.26	0.0	68.2	FLOOD RISK
8.005	SW MH 3.5	15.096	0.471	0.000	0.29	0.0	77.5	FLOOD RISK
8.006	SW MH 3.6	15.111	0.543	0.000	0.39	0.0	74.9	FLOOD RISK
10.000	SWMH10.0	14.549	-0.069	0.000	0.17	0.0	41.0	OK
10.001	SWMH10.1	14.549	-0.009	0.000	0.09	0.0	23.1	OK
1.009	16.15	15.114	0.564	0.000	0.83	140.1	229.4	FLOOD RISK
1.010	SW MH 1.10	15.088	0.553	0.000	0.97	0.0	225.2	SURCHARGED
1.011	SW MH 1.11	15.074	0.589	0.000	4.04	0.0	222.3	SURCHARGED



Designed by tseymour

Checked by _____

Network W.12.6

