


Curtins		Page 1
40 Compton Street London EC1V 0BD	066571 - Shredded Wheat	
Date 22/02/2019 File SW Network for tender.MDX	Designed by JW Checked by	
Innovyze	Network 2018.1.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm 2

Pipe Sizes BR Manhole Sizes STANDARD











FSR Rainfall Model - England and Wales

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	20.000	Add Flow / Climate Change (%)	0
Ratio R	0.434	Minimum Backdrop Height (m)	19.000
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	20.000
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	250

Designed with Level Soffits

Network Design Table for Storm 2

- Indicates pipe length does not match coordinates
« - Indicates pipe capacity < flow

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	24.942	0.250	99.8	0.051	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.001	36.796	0.220	167.3	0.013	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.002	7.800#	0.039	200.0	0.003	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.003	21.626	0.144	150.0	0.072	0.00	0.0	0.600	o	300	Pipe/Conduit	
2.000	34.518	0.250	138.1	0.063	10.00	0.0	0.600	o	225	Pipe/Conduit	
2.001	9.128	0.061	149.6	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.004	18.658	0.093	200.6	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
3.000	33.369	0.150	222.5	0.164	5.00	0.0	0.600	o	225	Pipe/Conduit	
3.001	8.821	0.365	24.2	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
4.000	40.115	0.250	160.5	0.087	5.00	0.0	0.600	o	150	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	50.00	5.41	84.425	0.051	0.0	0.0	0.0	1.01	17.8	6.9
1.001	50.00	6.02	84.100	0.064	0.0	0.0	0.0	1.01	40.1	8.7
1.002	50.00	6.16	83.880	0.067	0.0	0.0	0.0	0.92	36.6	9.1
1.003	50.00	6.44	83.820	0.139	0.0	0.0	0.0	1.28	90.6	18.8
2.000	50.00	10.52	84.250	0.063	0.0	0.0	0.0	1.11	44.2	8.5
2.001	50.00	10.66	84.000	0.063	0.0	0.0	0.0	1.07	42.4	8.5
1.004	50.00	10.94	83.676	0.202	0.0	0.0	0.0	1.11	78.2	27.3
3.000	50.00	5.64	84.150	0.164	0.0	0.0	0.0	0.87	34.7	22.2
3.001	50.00	5.69	84.000	0.164	0.0	0.0	0.0	2.67	106.3	22.2
4.000	50.00	5.85	83.960	0.087	0.0	0.0	0.0	0.79	14.0	11.7

Curtins		Page 2
40 Compton Street London EC1V 0BD		066571 - Shredded Wheat
Date 22/02/2019 File SW Network for tender.MDX		Designed by JW Checked by
Innovyze		Network 2018.1.1



Network Design Table for Storm 2

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
1.005	35.378	0.350	101.1	0.030	0.00	0.0	0.600	o	300	Pipe/Conduit	
5.000	27.993	0.187	150.0	0.009	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.006	15.840	0.150	105.6	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
6.000	24.176	0.280	86.3	0.001	5.00	0.0	0.600	o	150	Pipe/Conduit	
6.001	11.526	0.080	144.1	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.007	12.834	0.130	98.7	0.033	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.008	24.643	0.120	205.4	0.043	0.00	0.0	0.600	o	300	Pipe/Conduit	
7.000	30.950	0.165	187.6	0.085	5.00	0.0	0.600	o	225	Pipe/Conduit	
7.001	37.070#	0.175	211.8	0.097	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.009	22.240#	0.154	144.4	0.120	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.010	5.060	0.020	253.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.011	3.985	0.340	11.7	0.000	0.00	0.0	0.600	o	150	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)
1.005	50.00	11.32	83.560	0.483	0.0	0.0	0.0	1.56	110.5	65.4
5.000	50.00	5.57	84.350	0.009	0.0	0.0	0.0	0.82	14.5	1.3
1.006	50.00	11.49	83.210	0.492	0.0	0.0	0.0	1.53	108.1	66.6
6.000	50.00	5.37	84.350	0.001	0.0	0.0	0.0	1.08	19.1	0.1
6.001	50.00	5.60	84.070	0.001	0.0	0.0	0.0	0.84	14.8	0.1
1.007	50.00	11.63	82.330	0.526	0.0	0.0	0.0	1.58	111.9	71.3
1.008	50.00	12.00	82.200	0.569	0.0	0.0	0.0	1.09	77.3	77.1
7.000	50.00	5.54	82.570	0.085	0.0	0.0	0.0	0.95	37.8	11.5
7.001	50.00	6.23	82.330	0.182	0.0	0.0	0.0	0.89	35.6	24.6
1.009	50.00	12.29	82.080	0.871	0.0	0.0	0.0	1.31	92.3«	118.0
1.010	50.00	12.42	81.840	0.871	0.0	0.0	0.0	0.63	11.1«	118.0
1.011	50.00	12.44	81.270	0.871	0.0	0.0	0.0	2.96	52.3«	118.0



Manhole Schedules for Storm 2

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	Pipe Out		Pipes In			Backdrop (mm)	
					PN	Invert Level (m)	Diameter (mm)	PN	Invert Level (m)		Diameter (mm)
RE	84.800	0.375	Junction		1.000	84.425	150				
SW11	84.800	0.700	Open Manhole	1200	1.001	84.100	225	1.000	84.175	150	
SW12	84.800	0.920	Open Manhole	1200	1.002	83.880	225	1.001	83.880	225	
SW13	84.800	0.980	Open Manhole	1200	1.003	83.820	300	1.002	83.841	225	
RE	85.250	1.000	Junction		2.000	84.250	225				
SW14	85.220	1.220	Open Manhole	450	2.001	84.000	225	2.000	84.000	225	
Junction	84.800	1.124	Junction		1.004	83.676	300	1.003	83.676	300	
								2.001	83.939	225	188
RE	84.800	0.650	Junction		3.000	84.150	225				
SW15	85.220	1.220	Open Manhole	450	3.001	84.000	225	3.000	84.000	225	
RE	84.800	0.840	Junction		4.000	83.960	150				
SW16	84.800	1.240	Open Manhole	1200	1.005	83.560	300	1.004	83.583	300	23
								3.001	83.635	225	
								4.000	83.710	150	
RE	85.000	0.650	Junction		5.000	84.350	150				
SW17	84.800	1.590	Open Manhole	1200	1.006	83.210	300	1.005	83.210	300	
								5.000	84.163	150	803
RE	85.200	0.850	Junction		6.000	84.350	150				
SW41	84.800	0.730	Open Manhole	450	6.001	84.070	150	6.000	84.070	150	
SW18	84.800	2.470	Open Manhole	1200	1.007	82.330	300	1.006	83.060	300	730
								6.001	83.990	150	1510
SW19	84.800	2.600	Open Manhole	1200	1.008	82.200	300	1.007	82.200	300	
RE	85.050	2.480	Junction		7.000	82.570	225				
SW21	85.000	2.670	Open Manhole	1200	7.001	82.330	225	7.000	82.405	225	75
SW20	84.800	2.720	Open Manhole	1200	1.009	82.080	300	1.008	82.080	300	
								7.001	82.155	225	
SW22	84.800	2.960	Open Manhole	1200	1.010	81.840	150	1.009	81.926	300	236
SW23	84.800	3.530	Open Manhole	1200	1.011	81.270	150	1.010	81.820	150	550
Outfall 2	84.650	3.720	Open Manhole	0			OUTFALL	1.011	80.930	150	

Curtins		Page 4
40 Compton Street London EC1V 0BD		
Date 22/02/2019 File SW Network for tender.MDX		
		066571 - Shredded Wheat
		Designed by JW Checked by
Innovyze		Network 2018.1.1

PIPELINE SCHEDULES for Storm 2


Upstream Manhole

- Indicates pipe length does not match coordinates

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	150	RE	84.800	84.425	0.225	Junction	
1.001	o	225	SW11	84.800	84.100	0.475	Open Manhole	1200
1.002	o	225	SW12	84.800	83.880	0.695	Open Manhole	1200
1.003	o	300	SW13	84.800	83.820	0.680	Open Manhole	1200
2.000	o	225	RE	85.250	84.250	0.775	Junction	
2.001	o	225	SW14	85.220	84.000	0.995	Open Manhole	450
1.004	o	300	Junction	84.800	83.676	0.824	Junction	
3.000	o	225	RE	84.800	84.150	0.425	Junction	
3.001	o	225	SW15	85.220	84.000	0.995	Open Manhole	450
4.000	o	150	RE	84.800	83.960	0.690	Junction	
1.005	o	300	SW16	84.800	83.560	0.940	Open Manhole	1200
5.000	o	150	RE	85.000	84.350	0.500	Junction	
1.006	o	300	SW17	84.800	83.210	1.290	Open Manhole	1200
6.000	o	150	RE	85.200	84.350	0.700	Junction	
6.001	o	150	SW41	84.800	84.070	0.580	Open Manhole	450

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	24.942	99.8	SW11	84.800	84.175	0.475	Open Manhole	1200
1.001	36.796	167.3	SW12	84.800	83.880	0.695	Open Manhole	1200
1.002	7.800#	200.0	SW13	84.800	83.841	0.734	Open Manhole	1200
1.003	21.626	150.0	Junction	84.800	83.676	0.824	Junction	
2.000	34.518	138.1	SW14	85.220	84.000	0.995	Open Manhole	450
2.001	9.128	149.6	Junction	84.800	83.939	0.636	Junction	
1.004	18.658	200.6	SW16	84.800	83.583	0.917	Open Manhole	1200
3.000	33.369	222.5	SW15	85.220	84.000	0.995	Open Manhole	450
3.001	8.821	24.2	SW16	84.800	83.635	0.940	Open Manhole	1200
4.000	40.115	160.5	SW16	84.800	83.710	0.940	Open Manhole	1200
1.005	35.378	101.1	SW17	84.800	83.210	1.290	Open Manhole	1200
5.000	27.993	150.0	SW17	84.800	84.163	0.487	Open Manhole	1200
1.006	15.840	105.6	SW18	84.800	83.060	1.440	Open Manhole	1200
6.000	24.176	86.3	SW41	84.800	84.070	0.580	Open Manhole	450
6.001	11.526	144.1	SW18	84.800	83.990	0.660	Open Manhole	1200

Curtins		Page 5
40 Compton Street London EC1V 0BD	066571 - Shredded Wheat	
Date 22/02/2019 File SW Network for tender.MDX	Designed by JW Checked by	
Innovyze	Network 2018.1.1	

PIPELINE SCHEDULES for Storm 2

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.007	o	300	SW18	84.800	82.330	2.170	Open Manhole	1200
1.008	o	300	SW19	84.800	82.200	2.300	Open Manhole	1200
7.000	o	225	RE	85.050	82.570	2.255	Junction	
7.001	o	225	SW21	85.000	82.330	2.445	Open Manhole	1200
1.009	o	300	SW20	84.800	82.080	2.420	Open Manhole	1200
1.010	o	150	SW22	84.800	81.840	2.810	Open Manhole	1200
1.011	o	150	SW23	84.800	81.270	3.380	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.007	12.834	98.7	SW19	84.800	82.200	2.300	Open Manhole	1200
1.008	24.643	205.4	SW20	84.800	82.080	2.420	Open Manhole	1200
7.000	30.950	187.6	SW21	85.000	82.405	2.370	Open Manhole	1200
7.001	37.070#	211.8	SW20	84.800	82.155	2.420	Open Manhole	1200
1.009	22.240#	144.4	SW22	84.800	81.926	2.574	Open Manhole	1200
1.010	5.060	253.0	SW23	84.800	81.820	2.830	Open Manhole	1200
1.011	3.985	11.7	Outfall 2	84.650	80.930	3.570	Open Manhole	0

Area Summary for Storm 2

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.051	0.051	0.051
1.001	-	-	100	0.013	0.013	0.013
1.002	Classification	Default	100	0.003	0.003	0.003
1.003	Classification	Default	100	0.014	0.014	0.014
	Classification	Default	100	0.058	0.058	0.072
2.000	-	-	100	0.063	0.063	0.063
2.001	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.000	0.000	0.000
3.000	-	-	100	0.164	0.164	0.164
3.001	-	-	100	0.000	0.000	0.000
4.000	Classification	Default	100	0.071	0.071	0.071
	Classification	Default	100	0.016	0.016	0.087
1.005	Classification	Default	100	0.030	0.030	0.030
5.000	Classification	Default	100	0.009	0.009	0.009
1.006	-	-	100	0.000	0.000	0.000
6.000	Classification	Default	100	0.001	0.001	0.001
6.001	-	-	100	0.000	0.000	0.000
1.007	Classification	Default	100	0.033	0.033	0.033
1.008	Classification	Default	100	0.029	0.029	0.029
	Classification	Default	100	0.014	0.014	0.043
7.000	Classification	Default	100	0.085	0.085	0.085
7.001	Classification	Default	100	0.097	0.097	0.097
1.009	Classification	Default	100	0.036	0.036	0.036
	Classification	Default	100	0.063	0.063	0.099
	Classification	Default	100	0.022	0.022	0.120
1.010	-	-	100	0.000	0.000	0.000
1.011	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.871	0.871	0.871

Free Flowing Outfall Details for Storm 2

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.011	Outfall 2	84.650	80.930	80.930	0	0


Simulation Criteria for Storm 2

Volumetric Runoff Coeff	0.750	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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 10 Number of Real Time Controls 0


Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	20.000
Return Period (years)	100	Ratio R	0.434
Region England and Wales Profile Type Summer			

Curtins		Page 7
40 Compton Street London EC1V 0BD	066571 - Shredded Wheat	
Date 22/02/2019 File SW Network for tender.MDX	Designed by JW Checked by	
Innovyze	Network 2018.1.1	

Synthetic Rainfall Details

Cv (Summer) 0.750 Storm Duration (mins) 30
Cv (Winter) 0.840

Curtins		Page 8
40 Compton Street London EC1V 0BD	066571 - Shredded Wheat	
Date 22/02/2019 File SW Network for tender.MDX	Designed by JW Checked by	
Innovyze	Network 2018.1.1	

Online Controls for Storm 2


Hydro-Brake® Optimum Manhole: SW22, DS/PN: 1.010, Volume (m³): 4.8

Unit Reference	MD-SHE-0100-5900-2000-5900
Design Head (m)	2.000
Design Flow (l/s)	5.9
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	100
Invert Level (m)	81.840
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.000	5.9	Kick-Flo®	0.890	4.0
Flush-Flo™	0.435	5.1	Mean Flow over Head Range	-	4.7

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	3.3	1.200	4.6	3.000	7.1	7.000	10.6
0.200	4.6	1.400	5.0	3.500	7.7	7.500	11.0
0.300	5.0	1.600	5.3	4.000	8.2	8.000	11.3
0.400	5.1	1.800	5.6	4.500	8.6	8.500	11.7
0.500	5.1	2.000	5.9	5.000	9.1	9.000	12.0
0.600	5.0	2.200	6.2	5.500	9.5	9.500	12.3
0.800	4.5	2.400	6.4	6.000	9.9		
1.000	4.3	2.600	6.7	6.500	10.3		

Curtins		Page 9
40 Compton Street London EC1V 0BD	066571 - Shredded Wheat	
Date 22/02/2019 File SW Network for tender.MDX	Designed by JW Checked by	
Innovyze	Network 2018.1.1	

Storage Structures for Storm 2

Porous Car Park Manhole: RE, DS/PN: 1.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	32.0
Max Percolation (l/s)	44.4	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	84.425	Cap Volume Depth (m)	0.450

Porous Car Park Manhole: SW11, DS/PN: 1.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	50.0
Max Percolation (l/s)	69.4	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	84.100	Cap Volume Depth (m)	0.450

Porous Car Park Manhole: SW13, DS/PN: 1.003

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	24.0
Max Percolation (l/s)	33.3	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	83.820	Cap Volume Depth (m)	0.450

Porous Car Park Manhole: Junction, DS/PN: 1.004

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	16.0
Max Percolation (l/s)	22.2	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	83.676	Cap Volume Depth (m)	0.450

Porous Car Park Manhole: SW16, DS/PN: 1.005

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	35.5
Max Percolation (l/s)	98.6	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	83.560	Cap Volume Depth (m)	0.450

Porous Car Park Manhole: RE, DS/PN: 5.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.0
Membrane Percolation (mm/hr)	1000	Length (m)	7.0
Max Percolation (l/s)	7.8	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	84.350	Cap Volume Depth (m)	0.450

Complex Manhole: SW18, DS/PN: 1.007

Tank or Pond

Invert Level (m) 83.500

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	0.0	1.500	250.0

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	8.4
Max Percolation (l/s)	11.7	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	82.330	Cap Volume Depth (m)	0.450

Complex Manhole: SW19, DS/PN: 1.008

Cellular Storage

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

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	96.0	0.0	2.001	0.0	0.0
2.000	96.0	0.0			


Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	18.0
Max Percolation (l/s)	25.0	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	82.200	Cap Volume Depth (m)	0.450

Porous Car Park Manhole: RE, DS/PN: 7.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	12.6
Max Percolation (l/s)	17.5	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	82.570	Cap Volume Depth (m)	0.450

Complex Manhole: SW20, DS/PN: 1.009

Curtins		Page 11
40 Compton Street London EC1V 0BD	066571 - Shredded Wheat	
Date 22/02/2019 File SW Network for tender.MDX	Designed by JW Checked by	
Innovyze	Network 2018.1.1	


Cellular Storage

Invert Level (m) 82.080 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	2.001	0.0	0.0
2.000	80.0	0.0			

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	15.0
Membrane Percolation (mm/hr)	1000	Length (m)	30.0
Max Percolation (l/s)	125.0	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	82.080	Cap Volume Depth (m)	0.450

Curtins		Page 12
40 Compton Street London EC1V 0BD	066571 - Shredded Wheat	
Date 22/02/2019 File SW Network for tender.MDX	Designed by JW Checked by	
Innovyze	Network 2018.1.1	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm 2

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 Coefficient 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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 10 Number of Real Time Controls 0

Synthetic Rainfall Details


Rainfall Model FSR M5-60 (mm) 20.000 Cv (Summer) 0.750
Region England and Wales Ratio R 0.434 Cv (Winter) 0.840

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, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40


PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
1.000	RE	30 Winter	1	+0%					84.464	-0.111
1.001	SW11	120 Winter	1	+0%					84.129	-0.196
1.002	SW12	120 Winter	1	+0%	100/30 Winter				83.913	-0.192
1.003	SW13	30 Winter	1	+0%					83.875	-0.245
2.000	RE	15 Winter	1	+0%					84.306	-0.169
2.001	SW14	15 Winter	1	+0%					84.063	-0.162
1.004	Junction	30 Winter	1	+0%	100/15 Summer				83.752	-0.224
3.000	RE	15 Winter	1	+0%					84.286	-0.089
3.001	SW15	15 Winter	1	+0%	100/15 Winter				84.079	-0.146
4.000	RE	15 Winter	1	+0%					84.070	-0.040
1.005	SW16	30 Winter	1	+0%	100/15 Summer				83.666	-0.194
5.000	RE	15 Winter	1	+0%					84.374	-0.126
1.006	SW17	30 Winter	1	+0%	100/15 Summer				83.324	-0.186
6.000	RE	15 Winter	1	+0%					84.355	-0.145
6.001	SW41	15 Winter	1	+0%					84.077	-0.143
1.007	SW18	30 Winter	1	+0%	30/60 Summer				82.449	-0.181
1.008	SW19	240 Winter	1	+0%	30/30 Summer				82.347	-0.153
7.000	RE	15 Winter	1	+0%	30/120 Winter				82.652	-0.143
7.001	SW21	15 Winter	1	+0%	30/15 Summer				82.461	-0.094
1.009	SW20	240 Winter	1	+0%	30/15 Summer				82.343	-0.037
1.010	SW22	240 Winter	1	+0%	1/15 Summer				82.344	0.354
1.011	SW23	360 Winter	1	+0%					81.307	-0.113

PN	US/MH Name	Flooded Volume (m ³)	Flow / Cap. (l/s)	Pipe Overflow Flow (l/s)	Pipe Status	Level Exceeded
1.000	RE	0.000	0.15	2.8	OK*	

Curtins		Page 13
40 Compton Street London EC1V 0BD	066571 - Shredded Wheat	
Date 22/02/2019 File SW Network for tender.MDX	Designed by JW Checked by	
Innovyze	Network 2018.1.1	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm 2

PN	US/MH Name	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.001	SW11	0.000	0.04		1.5	OK	
1.002	SW12	0.000	0.05		1.6	OK	
1.003	SW13	0.000	0.08		6.0	OK	
2.000	RE	0.000	0.14		6.2	OK*	
2.001	SW14	0.000	0.18		6.2	OK	
1.004	Junction	0.000	0.15		11.2	OK*	
3.000	RE	0.000	0.66		22.8	OK*	
3.001	SW15	0.000	0.27		22.8	OK	
4.000	RE	0.000	0.88		12.3	OK*	
1.005	SW16	0.000	0.27		27.7	OK	
5.000	RE	0.000	0.06		0.9	OK*	
1.006	SW17	0.000	0.31		28.3	OK	
6.000	RE	0.000	0.01		0.1	OK*	
6.001	SW41	0.000	0.01		0.1	OK	
1.007	SW18	0.000	0.33		30.0	OK	
1.008	SW19	0.000	0.19		12.8	OK	
7.000	RE	0.000	0.28		10.5	OK*	
7.001	SW21	0.000	0.63		21.1	OK	
1.009	SW20	0.000	0.09		7.4	OK	
1.010	SW22	0.000	0.56		5.1	SURCHARGED	
1.011	SW23	0.000	0.14		5.1	OK	

Curtins		Page 14
40 Compton Street London EC1V 0BD	066571 - Shredded Wheat	
Date 22/02/2019 File SW Network for tender.MDX	Designed by JW Checked by	
Innovyze	Network 2018.1.1	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm 2

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 Coefficient 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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 10 Number of Real Time Controls 0

Synthetic Rainfall Details


Rainfall Model FSR M5-60 (mm) 20.000 Cv (Summer) 0.750
Region England and Wales Ratio R 0.434 Cv (Winter) 0.840

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, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40


PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
1.000	RE	15 Winter	30	+0%					84.505	-0.070
1.001	SW11	60 Winter	30	+0%					84.165	-0.160
1.002	SW12	60 Winter	30	+0%	100/30 Winter				83.955	-0.150
1.003	SW13	15 Winter	30	+0%					83.930	-0.190
2.000	RE	15 Winter	30	+0%					84.341	-0.134
2.001	SW14	15 Winter	30	+0%					84.104	-0.121
1.004	Junction	15 Winter	30	+0%	100/15 Summer				83.820	-0.156
3.000	RE	15 Winter	30	+0%					84.375	0.000
3.001	SW15	15 Winter	30	+0%	100/15 Winter				84.128	-0.097
4.000	RE	15 Winter	30	+0%					84.110	0.000
1.005	SW16	15 Winter	30	+0%	100/15 Summer				83.775	-0.085
5.000	RE	15 Winter	30	+0%					84.395	-0.105
1.006	SW17	15 Winter	30	+0%	100/15 Summer				83.447	-0.063
6.000	RE	15 Winter	30	+0%					84.361	-0.139
6.001	SW41	15 Winter	30	+0%					84.085	-0.135
1.007	SW18	360 Winter	30	+0%	30/60 Summer				83.019	0.389
1.008	SW19	360 Winter	30	+0%	30/30 Summer				83.017	0.517
7.000	RE	360 Winter	30	+0%	30/120 Winter				83.014	0.219
7.001	SW21	360 Winter	30	+0%	30/15 Summer				83.020	0.465
1.009	SW20	360 Winter	30	+0%	30/15 Summer				83.017	0.637
1.010	SW22	360 Winter	30	+0%	1/15 Summer				83.181	1.191
1.011	SW23	60 Summer	30	+0%					81.307	-0.113

PN	US/MH Name	Flooded Volume (m³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Level Exceeded
1.000	RE	0.000	0.56	9.9	FLOOD RISK*

Curtins		Page 15
40 Compton Street London EC1V 0BD	066571 - Shredded Wheat	
Date 22/02/2019 File SW Network for tender.MDX	Designed by JW Checked by	
Innovyze	Network 2018.1.1	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm 2

PN	US/MH Name	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.001	SW11	0.000	0.18	7.0	OK	
1.002	SW12	0.000	0.25	7.2	OK	
1.003	SW13	0.000	0.28	22.3	OK	
2.000	RE	0.000	0.34	15.2	OK*	
2.001	SW14	0.000	0.43	15.1	OK	
1.004	Junction	0.000	0.45	34.2	OK*	
3.000	RE	0.000	1.52	52.6	SURCHARGED*	
3.001	SW15	0.000	0.62	52.7	OK	
4.000	RE	0.000	1.75	24.5	SURCHARGED*	
1.005	SW16	0.000	0.86	87.4	OK	
5.000	RE	0.000	0.20	2.8	OK*	
1.006	SW17	0.000	0.97	89.0	OK	
6.000	RE	0.000	0.02	0.3	OK*	
6.001	SW41	0.000	0.02	0.3	OK	
1.007	SW18	0.000	0.25	22.9	SURCHARGED	
1.008	SW19	0.000	0.28	19.6	SURCHARGED	
7.000	RE	0.000	0.10	3.9	SURCHARGED*	
7.001	SW21	0.000	0.24	8.1	SURCHARGED	
1.009	SW20	0.000	0.08	6.3	SURCHARGED	
1.010	SW22	0.000	0.56	5.1	SURCHARGED	
1.011	SW23	0.000	0.14	5.1	OK	

Curtins		Page 16
40 Compton Street London EC1V 0BD	066571 - Shredded Wheat	
Date 22/02/2019 File SW Network for tender.MDX	Designed by JW Checked by	
Innovyze	Network 2018.1.1	

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

2

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 Coefficient 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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 10 Number of Real Time Controls 0


Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 20.000 Cv (Summer) 0.750
Region England and Wales Ratio R 0.434 Cv (Winter) 0.840

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, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
1.000	RE	15 Winter	100	+40%					84.564	-0.011
1.001	SW11	30 Winter	100	+40%					84.206	-0.119
1.002	SW12	30 Winter	100	+40%	100/30 Winter				84.118	0.013
1.003	SW13	30 Winter	100	+40%					84.101	-0.019
2.000	RE	15 Winter	100	+40%					84.379	-0.096
2.001	SW14	15 Winter	100	+40%					84.152	-0.073
1.004	Junction	480 Winter	100	+40%	100/15 Summer				84.059	0.083
3.000	RE	60 Winter	100	+40%					84.375	0.000
3.001	SW15	15 Winter	100	+40%	100/15 Winter				84.255	0.030
4.000	RE	120 Winter	100	+40%					84.110	0.000
1.005	SW16	480 Winter	100	+40%	100/15 Summer				84.057	0.197
5.000	RE	15 Winter	100	+40%					84.414	-0.086
1.006	SW17	480 Winter	100	+40%	100/15 Summer				84.052	0.542
6.000	RE	15 Winter	100	+40%					84.367	-0.133
6.001	SW41	15 Winter	100	+40%					84.089	-0.131
1.007	SW18	480 Winter	100	+40%	30/60 Summer				84.049	1.419
1.008	SW19	480 Winter	100	+40%	30/30 Summer				84.046	1.546
7.000	RE	60 Winter	100	+40%	30/120 Winter				83.020	0.225
7.001	SW21	480 Winter	100	+40%	30/15 Summer				84.048	1.493
1.009	SW20	480 Winter	100	+40%	30/15 Summer				84.045	1.665
1.010	SW22	480 Winter	100	+40%	1/15 Summer				84.184	2.194
1.011	SW23	480 Winter	100	+40%					81.312	-0.108

Curtins		Page 17
40 Compton Street London EC1V 0BD	066571 - Shredded Wheat	
Date 22/02/2019 File SW Network for tender.MDX	Designed by JW Checked by	
Innovyze	Network 2018.1.1	

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

2

PN	US/MH Name	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	RE	0.000	1.00	17.8	FLOOD RISK*	
1.001	SW11	0.000	0.45	17.0	OK	
1.002	SW12	0.000	0.56	16.4	SURCHARGED	
1.003	SW13	0.000	0.48	38.4	OK	
2.000	RE	0.000	0.62	27.6	OK*	
2.001	SW14	0.000	0.79	27.5	OK	
1.004	Junction	0.000	0.17	13.1	SURCHARGED*	
3.000	RE	0.000	1.50	52.1	SURCHARGED*	
3.001	SW15	0.000	1.00	85.0	SURCHARGED	
4.000	RE	0.000	1.20	16.8	SURCHARGED*	
1.005	SW16	0.000	0.31	31.5	SURCHARGED	
5.000	RE	0.000	0.38	5.5	OK*	
1.006	SW17	0.000	0.35	32.1	SURCHARGED	
6.000	RE	0.000	0.03	0.5	OK*	
6.001	SW41	0.000	0.04	0.5	OK	
1.007	SW18	0.000	0.37	33.6	SURCHARGED	
1.008	SW19	0.000	0.27	18.9	SURCHARGED	
7.000	RE	0.000	0.51	19.5	SURCHARGED*	
7.001	SW21	0.000	0.32	10.7	SURCHARGED	
1.009	SW20	0.000	0.09	7.7	SURCHARGED	
1.010	SW22	0.000	0.68	6.1	SURCHARGED	
1.011	SW23	0.000	0.17	6.1	OK	