STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for N2 SW 17.04.24.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	12.672	0.139	91.2	0.085	5.00	0.0	0.600	o	225	Pipe/Conduit	
2.000	12.781	0.225	56.8	0.154	5.00	0.0	0.600	o	300	Pipe/Conduit	
1.001	12.839	0.233	55.1	0.018	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.002	15.156	0.145	104.5	0.018	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.003	9.818	0.120	81.8	0.036	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.004	9.818	0.117	83.9	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.005	42.654	0.583	73.2	0.061	0.00	0.0	0.600	o	300	Pipe/Conduit	
3.000	39.857	0.775	51.4	0.142	5.00	0.0	0.600	o	225	Pipe/Conduit	
3.001	10.605	0.300	35.4	0.105	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.006	8.434	0.179	47.1	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.007	11.585	0.882	13.1	0.127	0.00	0.0	0.600	o	375	Pipe/Conduit	
4.000	15.943	1.526	10.4	0.182	5.00	0.0	0.600	o	300	Pipe/Conduit	
4.001	28.808	0.116	248.3	0.109	0.00	0.0	0.600	o	375	Pipe/Conduit	
4.002	14.603	0.059	247.5	0.033	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.008	11.439	0.046	250.0	0.000	0.00	0.0	0.600	o	450	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	5.15	99.824	0.085	0.0	0.0	0.0	1.37	54.5	11.5
2.000	50.00	5.10	99.835	0.154	0.0	0.0	0.0	2.09	147.8	20.9
1.001	50.00	5.25	99.610	0.257	0.0	0.0	0.0	2.12	150.0	34.8
1.002	50.00	5.42	99.377	0.275	0.0	0.0	0.0	1.54	108.7	37.2
1.003	50.00	5.51	99.232	0.311	0.0	0.0	0.0	1.74	123.0	42.1
1.004	50.00	5.61	99.112	0.311	0.0	0.0	0.0	1.72	121.4	42.1
1.005	50.00	5.99	98.995	0.372	0.0	0.0	0.0	1.84	130.1	50.4
3.000	50.00	5.36	99.562	0.142	0.0	0.0	0.0	1.83	72.7	19.2
3.001	50.00	5.43	98.712	0.247	0.0	0.0	0.0	2.65	187.5	33.4
1.006	50.00	6.05	98.337	0.619	0.0	0.0	0.0	2.65	292.2	83.8
1.007	50.00	6.09	98.158	0.746	0.0	0.0	0.0	5.02	554.7	101.0
4.000	50.00	5.05	97.876	0.182	0.0	0.0	0.0	4.89	345.7	24.6
4.001	50.00	5.47	96.275	0.291	0.0	0.0	0.0	1.15	126.5	39.4
4.002	50.00	5.69	96.159	0.324	0.0	0.0	0.0	1.15	126.7	43.9
1.008	50.00	6.24	96.025	1.070	0.0	0.0	0.0	1.28	203.8	144.9

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for N2 SW 17.04.24.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	20.962	0.764	27.4	0.033	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.010	13.972	0.895	15.6	0.010	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.011	9.455	0.600	15.8	0.014	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.012	9.455	0.600	15.8	0.100	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.013	45.780	2.134	21.5	0.046	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.014	33.592	0.935	35.9	0.165	0.00	0.0	0.600	o	450	Pipe/Conduit	
5.000	63.214	2.546	24.8	0.105	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.015	41.685	5.033	8.3	0.133	0.00	0.0	0.600	o	450	Pipe/Conduit	
6.000	55.506	0.139	399.3	0.119	5.00	0.0	0.600	o	600	Pipe/Conduit	
1.016	51.132	0.263	194.4	0.112	0.00	0.0	0.600	o	600	Pipe/Conduit	
7.000	13.721	0.056	245.0	0.153	5.00	0.0	0.600	o	300	Pipe/Conduit	
7.001	28.700	0.117	245.0	0.030	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.017	73.653	0.184	400.3	0.160	0.00	0.0	0.600	o	900	Pipe/Conduit	
1.018	22.602	0.057	396.5	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	
1.019	15.159	0.288	52.6	0.083	0.00	0.0	0.600	o	900	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	50.00	6.33	95.979	1.103	0.0	0.0	0.0	3.89	619.2	149.4
1.010	50.00	6.37	95.215	1.113	0.0	0.0	0.0	5.17	821.6	150.7
1.011	50.00	6.40	94.320	1.127	0.0	0.0	0.0	5.14	817.7	152.6
1.012	50.00	6.43	93.720	1.227	0.0	0.0	0.0	5.14	817.7	166.2
1.013	50.00	6.60	93.120	1.273	0.0	0.0	0.0	4.40	700.5	172.4
1.014	50.00	6.77	90.986	1.438	0.0	0.0	0.0	3.40	540.8	194.7
5.000	50.00	5.40	92.822	0.105	0.0	0.0	0.0	2.64	104.8	14.2
1.015	50.00	6.87	90.051	1.676	0.0	0.0	0.0	7.10	1128.7	227.0
6.000	50.00	5.76	85.007	0.119	0.0	0.0	0.0	1.21	342.8	16.1
1.016	50.00	7.36	84.868	1.907	0.0	0.0	0.0	1.74	492.8	258.2
7.000	50.00	5.23	85.078	0.153	0.0	0.0	0.0	1.00	70.7	20.7
7.001	50.00	5.71	85.022	0.183	0.0	0.0	0.0	1.00	70.7	24.8
1.017	49.12	8.14	84.305	2.250	0.0	0.0	0.0	1.56	992.3	299.3
1.018	48.44	8.38	84.121	2.250	0.0	0.0	0.0	1.57	997.1	299.3
1.019	48.28	8.44	84.064	2.333	0.0	0.0	0.0	4.32	2750.9	305.0

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for N2 SW 17.04.24.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
1.020	61.666	0.154	400.0	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	
1.021	14.156	0.035	400.0	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	
8.000	17.115	0.990	17.3	0.020	5.00	0.0	0.600	o	225	Pipe/Conduit	
8.001	22.178	1.870	11.9	0.035	0.00	0.0	0.600	o	225	Pipe/Conduit	
8.002	15.035	1.182	12.7	0.054	0.00	0.0	0.600	o	225	Pipe/Conduit	
8.003	13.688	1.128	12.1	0.015	0.00	0.0	0.600	o	225	Pipe/Conduit	
8.004	9.167	0.783	11.7	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
8.005	10.859	0.065	167.1	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
8.006	19.295	0.116	167.0	0.025	0.00	0.0	0.600	o	225	Pipe/Conduit	
8.007	14.741	1.474	10.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.022	19.623	2.622	7.5	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)
1.020	46.53	9.10	83.776	2.333	0.0	0.0	0.0	1.56	992.7	305.0
1.021	46.16	9.25	83.622	2.333	0.0	0.0	0.0	1.56	992.7	305.0
8.000	50.00	5.09	92.947	0.020	0.0	0.0	0.0	3.16	125.7	2.7
8.001	50.00	5.19	91.957	0.055	0.0	0.0	0.0	3.82	151.9	7.4
8.002	50.00	5.25	90.087	0.109	0.0	0.0	0.0	3.69	146.7	14.8
8.003	50.00	5.32	88.905	0.124	0.0	0.0	0.0	3.78	150.2	16.8
8.004	50.00	5.35	87.777	0.124	0.0	0.0	0.0	3.85	152.9	16.8
8.005	50.00	5.53	86.994	0.124	0.0	0.0	0.0	1.01	40.1	16.8
8.006	50.00	5.85	86.929	0.149	0.0	0.0	0.0	1.01	40.1	20.2
8.007	50.00	5.91	86.813	0.149	0.0	0.0	0.0	4.16	165.5	20.2
1.022	50.00	5.09	83.537	0.000	4.0	0.0	0.0	3.71	65.5	4.0

Simulation Criteria for N2 SW 17.04.24.SWS

Volumetric Runoff Coeff	1.000	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	0.000
Hot Start (mins)	0	Inlet Coeffiecient	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	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Simulation Criteria for N2 SW 17.04.24.SWS

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	1.000
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.000	Storm Duration (mins)	30
Ratio R	0.334		

Online Controls for N2 SW 17.04.24.SWS

Hydro-Brake® Optimum Manhole: 60, DS/PN: 1.022, Volume (m³): 22.9

Unit Reference	MD-SHE-0073-3500-2340-3500
Design Head (m)	2.340
Design Flow (l/s)	3.5
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	73
Invert Level (m)	83.537
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.340	3.5
Flush-Flo™	0.320	2.4
Kick-Flo®	0.657	2.0
Mean Flow over Head Range	-	2.6

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	2.0	1.200	2.6	3.000	3.9	7.000	5.8
0.200	2.3	1.400	2.8	3.500	4.2	7.500	6.0
0.300	2.4	1.600	2.9	4.000	4.5	8.000	6.2
0.400	2.4	1.800	3.1	4.500	4.7	8.500	6.4
0.500	2.3	2.000	3.2	5.000	5.0	9.000	6.6
0.600	2.1	2.200	3.4	5.500	5.2	9.500	6.7
0.800	2.1	2.400	3.5	6.000	5.4		
1.000	2.4	2.600	3.7	6.500	5.6		

Storage Structures for N2 SW 17.04.24.SWS

Tank or Pond Manhole: 54, DS/PN: 1.017

Invert Level (m) 84.305

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1100.0	1.500	1100.0	1.501	0.0

Tank or Pond Manhole: 60, DS/PN: 1.022

Invert Level (m) 83.622

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	700.0	2.250	700.0	2.251	0.0

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N2 SW 17.04.24.SWS

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	0.000
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	2
Number of Online Controls	1	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 0.335
Region	England and Wales	Cv (Summer)	1.000
M5-60 (mm)	19.000	Cv (Winter)	1.000

Margin for Flood Risk Warning (mm)	300.0	DVD Status	ON
Analysis Timestep	Fine	Inertia Status	ON
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 45

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	37	30 Summer	1	+0%	100/30 Summer	100/30 Summer		
2.000	63	30 Summer	1	+0%	100/30 Summer			
1.001	38	30 Summer	1	+0%	30/30 Summer	100/30 Summer		
1.002	39	30 Summer	1	+0%	30/30 Summer	100/30 Summer		
1.003	40	30 Summer	1	+0%	30/30 Summer	100/30 Summer		
1.004	41	30 Summer	1	+0%	30/30 Summer			
1.005	42	30 Summer	1	+0%	30/30 Summer			
3.000	64	30 Summer	1	+0%	100/30 Summer	100/30 Summer		
3.001	65	30 Summer	1	+0%	100/30 Summer			
1.006	43	30 Summer	1	+0%	30/30 Summer			
1.007	44	30 Summer	1	+0%	100/30 Summer			
4.000	66	30 Summer	1	+0%	100/30 Summer	100/30 Summer		
4.001	67	30 Summer	1	+0%	30/30 Summer			
4.002	68	30 Summer	1	+0%	30/30 Summer			
1.008	45	30 Summer	1	+0%	30/30 Summer			
1.009	46	30 Summer	1	+0%	100/30 Summer			
1.010	47	30 Summer	1	+0%	100/30 Summer			
1.011	48	30 Summer	1	+0%	100/30 Summer	100/30 Summer		
1.012	49	30 Summer	1	+0%	100/30 Summer			

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N2 SW 17.04.24.SWS

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	37	99.902	-0.147	0.000	0.27			12.5	OK	1
2.000	63	99.923	-0.212	0.000	0.19			22.6	OK	
1.001	38	99.724	-0.186	0.000	0.31			37.4	OK	2
1.002	39	99.516	-0.161	0.000	0.43			39.7	OK	2
1.003	40	99.384	-0.148	0.000	0.51			43.8	OK	1
1.004	41	99.266	-0.146	0.000	0.52			44.2	OK	
1.005	42	99.132	-0.163	0.000	0.43			51.6	OK	
3.000	64	99.646	-0.141	0.000	0.30			20.8	OK	1
3.001	65	98.813	-0.199	0.000	0.25			34.2	OK	
1.006	43	98.528	-0.184	0.000	0.51			84.8	OK	
1.007	44	98.291	-0.242	0.000	0.27			100.4	OK	
4.000	66	97.937	-0.239	0.000	0.09			26.7	OK	1
4.001	67	96.450	-0.200	0.000	0.36			40.0	OK	
4.002	68	96.404	-0.130	0.000	0.41			41.5	OK	
1.008	45	96.376	-0.099	0.000	0.96			141.0	OK	
1.009	46	96.146	-0.283	0.000	0.29			144.9	OK	
1.010	47	95.376	-0.289	0.000	0.27			146.6	OK	
1.011	48	94.501	-0.269	0.000	0.34			148.3	OK	1
1.012	49	93.908	-0.262	0.000	0.37			159.4	OK	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N2 SW 17.04.24.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.013	50	30 Summer	1	+0%	100/30 Summer			
1.014	51	30 Summer	1	+0%	100/30 Summer			
5.000	69	30 Summer	1	+0%				
1.015	52	30 Summer	1	+0%				
6.000	81	30 Summer	1	+0%	30/30 Summer			
1.016	53	30 Summer	1	+0%	30/30 Summer			
7.000	70	30 Summer	1	+0%	100/30 Summer			
7.001	71	30 Summer	1	+0%	100/30 Summer			
1.017	54	120 Summer	1	+0%	100/480 Summer			
1.018	56	2880 Winter	1	+0%	100/180 Summer	30/7200 Winter		
1.019	57	5760 Summer	1	+0%	30/7200 Winter	30/5760 Summer		
1.020	58	2880 Winter	1	+0%	30/480 Summer			
1.021	59	5760 Summer	1	+0%	30/180 Summer			
8.000	72	30 Summer	1	+0%				
8.001	73	30 Summer	1	+0%				
8.002	74	30 Summer	1	+0%				
8.003	75	30 Summer	1	+0%				
8.004	76	30 Summer	1	+0%	100/30 Summer			
8.005	77	30 Summer	1	+0%	30/30 Summer			
8.006	78	30 Summer	1	+0%	30/30 Summer			
8.007	79	30 Summer	1	+0%				
1.022	60	5760 Summer	1	+0%	1/30 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.013	50	93.276	-0.294	0.000	0.26			164.4	OK
1.014	51	91.181	-0.255	0.000	0.39			182.4	OK
5.000	69	92.880	-0.167	0.000	0.15			15.4	OK
1.015	52	90.191	-0.310	0.000	0.21			209.8	OK
6.000	81	85.192	-0.415	0.000	0.05			16.0	OK
1.016	53	85.184	-0.284	0.000	0.54			235.1	OK
7.000	70	85.206	-0.172	0.000	0.38			22.4	OK
7.001	71	85.155	-0.167	0.000	0.41			26.1	OK
1.017	54	84.480	-0.725	0.000	0.08			67.2	OK
1.018	56	84.414	-0.607	0.000	0.02			13.9	OK
1.019	57	84.413	-0.551	0.000	0.01			13.7	OK
1.020	58	84.413	-0.262	0.000	0.02			14.2	OK
1.021	59	84.413	-0.108	0.000	0.02			12.7	OK
8.000	72	92.971	-0.201	0.000	0.03			2.9	OK
8.001	73	91.990	-0.192	0.000	0.05			7.4	OK
8.002	74	90.137	-0.175	0.000	0.11			14.3	OK
8.003	75	88.958	-0.172	0.000	0.12			16.2	OK
8.004	76	87.831	-0.171	0.000	0.13			16.1	OK
8.005	77	87.104	-0.115	0.000	0.48			16.2	OK
8.006	78	87.046	-0.108	0.000	0.53			19.3	OK

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N2 SW 17.04.24.SWS

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
8.007	79	86.868	-0.171	0.000	0.13			19.2	OK
1.022	60	84.413	0.726	0.000	0.04			2.4	SURCHARGED

PN	US/MH Name	Level Exceeded
1.013	50	
1.014	51	
5.000	69	
1.015	52	
6.000	81	
1.016	53	
7.000	70	
7.001	71	
1.017	54	
1.018	56	
1.019	57	
1.020	58	
1.021	59	
8.000	72	
8.001	73	
8.002	74	
8.003	75	
8.004	76	
8.005	77	
8.006	78	
8.007	79	
1.022	60	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N2 SW 17.04.24.SWS

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	0.000
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	2
Number of Online Controls	1	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	0.335
Region	England and Wales	Cv (Summer)	1.000
M5-60 (mm)	19.000	Cv (Winter)	1.000

Margin for Flood Risk Warning (mm)	300.0	DVD Status	ON
Analysis Timestep	Fine	Inertia Status	ON
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 45

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	37	30 Summer	30	+0%	100/30 Summer	100/30 Summer		
2.000	63	30 Summer	30	+0%	100/30 Summer			
1.001	38	30 Summer	30	+0%	30/30 Summer	100/30 Summer		
1.002	39	30 Summer	30	+0%	30/30 Summer	100/30 Summer		
1.003	40	30 Summer	30	+0%	30/30 Summer	100/30 Summer		
1.004	41	30 Summer	30	+0%	30/30 Summer			
1.005	42	30 Summer	30	+0%	30/30 Summer			
3.000	64	30 Summer	30	+0%	100/30 Summer	100/30 Summer		
3.001	65	30 Summer	30	+0%	100/30 Summer			
1.006	43	30 Summer	30	+0%	30/30 Summer			
1.007	44	30 Summer	30	+0%	100/30 Summer			
4.000	66	30 Summer	30	+0%	100/30 Summer	100/30 Summer		
4.001	67	30 Summer	30	+0%	30/30 Summer			
4.002	68	30 Summer	30	+0%	30/30 Summer			
1.008	45	30 Summer	30	+0%	30/30 Summer			
1.009	46	30 Summer	30	+0%	100/30 Summer			
1.010	47	30 Summer	30	+0%	100/30 Summer			
1.011	48	30 Summer	30	+0%	100/30 Summer	100/30 Summer		
1.012	49	30 Summer	30	+0%	100/30 Summer			

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N2 SW 17.04.24.SWS

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	37	99.999	-0.050	0.000	0.65			30.4	OK
2.000	63	99.989	-0.146	0.000	0.47			55.4	OK
1.001	38	99.948	0.038	0.000	0.71			85.4	SURCHARGED
1.002	39	99.782	0.105	0.000	0.98			89.0	SURCHARGED
1.003	40	99.658	0.126	0.000	1.15			99.5	SURCHARGED
1.004	41	99.495	0.083	0.000	1.18			100.9	SURCHARGED
1.005	42	99.341	0.046	0.000	0.97			117.8	SURCHARGED
3.000	64	99.707	-0.080	0.000	0.74			51.0	OK
3.001	65	98.911	-0.101	0.000	0.65			89.6	OK
1.006	43	98.786	0.074	0.000	1.23			202.9	SURCHARGED
1.007	44	98.384	-0.149	0.000	0.66			244.3	OK
4.000	66	97.972	-0.204	0.000	0.22			65.5	OK
4.001	67	97.020	0.370	0.000	0.94			104.2	SURCHARGED
4.002	68	96.916	0.382	0.000	1.15			115.5	SURCHARGED
1.008	45	96.827	0.352	0.000	2.44			358.4	SURCHARGED
1.009	46	96.275	-0.155	0.000	0.75			370.9	OK
1.010	47	95.496	-0.169	0.000	0.70			375.4	OK
1.011	48	94.647	-0.124	0.000	0.87			380.3	OK
1.012	49	94.068	-0.102	0.000	0.94			410.7	OK

PN	US/MH Name	Level Exceeded
1.000	37	1
2.000	63	
1.001	38	2
1.002	39	2
1.003	40	1
1.004	41	
1.005	42	
3.000	64	1
3.001	65	
1.006	43	
1.007	44	
4.000	66	1
4.001	67	
4.002	68	
1.008	45	
1.009	46	
1.010	47	
1.011	48	1
1.012	49	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N2 SW 17.04.24.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.013	50	30 Summer	30	+0%	100/30 Summer			
1.014	51	30 Summer	30	+0%	100/30 Summer			
5.000	69	30 Summer	30	+0%				
1.015	52	30 Summer	30	+0%				
6.000	81	30 Summer	30	+0%	30/30 Summer			
1.016	53	30 Summer	30	+0%	30/30 Summer			
7.000	70	30 Summer	30	+0%	100/30 Summer			
7.001	71	30 Summer	30	+0%	100/30 Summer			
1.017	54	4320 Winter	30	+0%	100/480 Summer			
1.018	56	4320 Winter	30	+0%	100/180 Summer	30/7200 Winter		
1.019	57	7200 Winter	30	+0%	30/7200 Winter	30/5760 Summer		
1.020	58	7200 Winter	30	+0%	30/480 Summer			
1.021	59	2160 Summer	30	+0%	30/180 Summer			
8.000	72	30 Summer	30	+0%				
8.001	73	30 Summer	30	+0%				
8.002	74	30 Summer	30	+0%				
8.003	75	30 Summer	30	+0%				
8.004	76	30 Summer	30	+0%	100/30 Summer			
8.005	77	30 Summer	30	+0%	30/30 Summer			
8.006	78	30 Summer	30	+0%	30/30 Summer			
8.007	79	30 Summer	30	+0%				
1.022	60	4320 Winter	30	+0%	1/30 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.013	50	93.393	-0.177	0.000	0.67			424.3	OK
1.014	51	91.397	-0.039	0.000	1.00			470.8	OK
5.000	69	92.917	-0.130	0.000	0.37			37.8	OK
1.015	52	90.290	-0.211	0.000	0.54			547.9	OK
6.000	81	85.745	0.138	0.000	0.13			38.5	SURCHARGED
1.016	53	85.733	0.265	0.000	1.43			620.6	SURCHARGED
7.000	70	85.332	-0.046	0.000	0.92			54.0	OK
7.001	71	85.284	-0.038	0.000	1.00			64.0	OK
1.017	54	84.913	-0.292	0.000	0.02			15.4	OK
1.018	56	84.913	-0.108	0.000	0.02			14.8	OK
1.019	57	85.497	0.533	12.201	0.01			14.5	FLOOD
1.020	58	85.540	0.865	0.000	0.02			15.1	SURCHARGED
1.021	59	85.023	0.502	0.000	0.06			30.2	SURCHARGED
8.000	72	92.984	-0.188	0.000	0.06			7.2	OK
8.001	73	92.015	-0.167	0.000	0.15			20.4	OK
8.002	74	90.175	-0.137	0.000	0.32			41.0	OK
8.003	75	88.999	-0.131	0.000	0.35			46.3	OK
8.004	76	87.873	-0.129	0.000	0.37			46.7	OK
8.005	77	87.418	0.199	0.000	1.37			46.3	SURCHARGED
8.006	78	87.300	0.146	0.000	1.51			54.5	SURCHARGED

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N2 SW 17.04.24.SWS

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
8.007	79	86.910	-0.129	0.000	0.38			54.8	OK
1.022	60	84.912	1.225	0.000	0.04			2.7	SURCHARGED

PN	US/MH Name	Level Exceeded
1.013	50	
1.014	51	
5.000	69	
1.015	52	
6.000	81	
1.016	53	
7.000	70	
7.001	71	
1.017	54	
1.018	56	
1.019	57	
1.020	58	
1.021	59	
8.000	72	
8.001	73	
8.002	74	
8.003	75	
8.004	76	
8.005	77	
8.006	78	
8.007	79	
1.022	60	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N2 SW 17.04.24.SWS

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	0.000
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	2
Number of Online Controls	1	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	0.335
Region	England and Wales	Cv (Summer)	1.000
M5-60 (mm)	19.000	Cv (Winter)	1.000

Margin for Flood Risk Warning (mm)	300.0	DVD Status	ON
Analysis Timestep	Fine	Inertia Status	ON
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 45

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	37	30 Summer	100	+45%	100/30 Summer	100/30 Summer		
2.000	63	30 Summer	100	+45%	100/30 Summer			
1.001	38	30 Summer	100	+45%	30/30 Summer	100/30 Summer		
1.002	39	30 Summer	100	+45%	30/30 Summer	100/30 Summer		
1.003	40	30 Summer	100	+45%	30/30 Summer	100/30 Summer		
1.004	41	30 Summer	100	+45%	30/30 Summer			
1.005	42	30 Summer	100	+45%	30/30 Summer			
3.000	64	30 Summer	100	+45%	100/30 Summer	100/30 Summer		
3.001	65	30 Summer	100	+45%	100/30 Summer			
1.006	43	30 Summer	100	+45%	30/30 Summer			
1.007	44	30 Summer	100	+45%	100/30 Summer			
4.000	66	30 Summer	100	+45%	100/30 Summer	100/30 Summer		
4.001	67	30 Summer	100	+45%	30/30 Summer			
4.002	68	30 Summer	100	+45%	30/30 Summer			
1.008	45	30 Summer	100	+45%	30/30 Summer			
1.009	46	30 Summer	100	+45%	100/30 Summer			
1.010	47	30 Summer	100	+45%	100/30 Summer			
1.011	48	30 Summer	100	+45%	100/30 Summer	100/30 Summer		
1.012	49	30 Summer	100	+45%	100/30 Summer			

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N2 SW 17.04.24.SWS

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	37	101.250	1.201	1.332	0.99			46.3	FLOOD
2.000	63	101.322	1.187	0.000	0.89			105.4	FLOOD RISK
1.001	38	101.118	1.208	7.843	0.98			118.5	FLOOD
1.002	39	100.925	1.248	3.352	1.28			116.9	FLOOD
1.003	40	100.735	1.203	3.272	1.67			144.5	FLOOD
1.004	41	100.594	1.182	0.000	1.74			148.8	FLOOD RISK
1.005	42	100.449	1.154	0.000	1.31			159.4	FLOOD RISK
3.000	64	100.988	1.201	0.658	1.25			86.4	FLOOD
3.001	65	100.058	1.046	0.000	1.05			143.5	FLOOD RISK
1.006	43	99.770	1.058	0.000	1.69			280.0	FLOOD RISK
1.007	44	99.309	0.776	0.000	0.95			350.9	SURCHARGED
4.000	66	99.376	1.200	0.031	0.37			109.1	FLOOD
4.001	67	99.012	2.362	0.000	1.53			169.8	FLOOD RISK
4.002	68	98.768	2.234	0.000	1.80			181.4	FLOOD RISK
1.008	45	98.566	2.091	0.000	3.46			507.4	SURCHARGED
1.009	46	97.743	1.314	0.000	1.06			524.2	SURCHARGED
1.010	47	96.863	1.198	0.000	0.99			529.1	FLOOD RISK
1.011	48	95.972	1.201	1.715	1.23			536.5	FLOOD
1.012	49	95.187	1.017	0.000	1.30			567.4	FLOOD RISK

PN	US/MH Name	Level Exceeded
1.000	37	1
2.000	63	
1.001	38	2
1.002	39	2
1.003	40	1
1.004	41	
1.005	42	
3.000	64	1
3.001	65	
1.006	43	
1.007	44	
4.000	66	1
4.001	67	
4.002	68	
1.008	45	
1.009	46	
1.010	47	
1.011	48	1
1.012	49	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N2 SW 17.04.24.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.013	50	30 Summer	100	+45%	100/30 Summer			
1.014	51	30 Summer	100	+45%	100/30 Summer			
5.000	69	30 Summer	100	+45%				
1.015	52	30 Summer	100	+45%				
6.000	81	30 Summer	100	+45%	30/30 Summer			
1.016	53	30 Summer	100	+45%	30/30 Summer			
7.000	70	5760 Winter	100	+45%	100/30 Summer			
7.001	71	5760 Winter	100	+45%	100/30 Summer			
1.017	54	5760 Winter	100	+45%	100/480 Summer			
1.018	56	5760 Winter	100	+45%	100/180 Summer	30/7200 Winter		
1.019	57	5760 Winter	100	+45%	30/7200 Winter	30/5760 Summer		
1.020	58	5760 Winter	100	+45%	30/480 Summer			
1.021	59	5760 Winter	100	+45%	30/180 Summer			
8.000	72	30 Summer	100	+45%				
8.001	73	30 Summer	100	+45%				
8.002	74	30 Summer	100	+45%				
8.003	75	30 Summer	100	+45%				
8.004	76	30 Summer	100	+45%	100/30 Summer			
8.005	77	30 Summer	100	+45%	30/30 Summer			
8.006	78	30 Summer	100	+45%	30/30 Summer			
8.007	79	30 Summer	100	+45%				
1.022	60	5760 Winter	100	+45%	1/30 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.013	50	94.212	0.642	0.000	0.93			585.2	SURCHARGED
1.014	51	92.377	0.941	0.000	1.41			663.3	FLOOD RISK
5.000	69	92.962	-0.085	0.000	0.70			71.4	OK
1.015	52	90.361	-0.140	0.000	0.80			806.8	OK
6.000	81	86.506	0.899	0.000	0.25			75.7	SURCHARGED
1.016	53	86.485	1.017	0.000	2.21			956.2	SURCHARGED
7.000	70	85.867	0.489	0.000	0.03			2.0	SURCHARGED
7.001	71	85.867	0.545	0.000	0.04			2.4	SURCHARGED
1.017	54	85.867	0.662	0.000	0.02			19.6	SURCHARGED
1.018	56	85.867	0.846	0.000	0.03			19.7	SURCHARGED
1.019	57	85.867	0.903	0.000	0.02			19.7	SURCHARGED
1.020	58	85.867	1.191	0.000	0.02			19.0	SURCHARGED
1.021	59	85.867	1.346	0.000	0.04			18.4	SURCHARGED
8.000	72	92.999	-0.173	0.000	0.12			13.6	OK
8.001	73	92.038	-0.144	0.000	0.28			38.7	OK
8.002	74	90.215	-0.097	0.000	0.60			77.6	OK
8.003	75	89.048	-0.082	0.000	0.67			87.7	OK
8.004	76	88.585	0.583	0.000	0.67			83.1	SURCHARGED
8.005	77	88.241	1.022	0.000	2.44			82.5	FLOOD RISK
8.006	78	87.862	0.708	0.000	2.66			96.4	SURCHARGED

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N2 SW 17.04.24.SWS

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
8.007	79	86.948	-0.090	0.000	0.66			95.9	OK
1.022	60	85.868	2.181	0.000	0.06			3.5	SURCHARGED

PN	US/MH Name	Level Exceeded
1.013	50	
1.014	51	
5.000	69	
1.015	52	
6.000	81	
1.016	53	
7.000	70	
7.001	71	
1.017	54	
1.018	56	
1.019	57	
1.020	58	
1.021	59	
8.000	72	
8.001	73	
8.002	74	
8.003	75	
8.004	76	
8.005	77	
8.006	78	
8.007	79	
1.022	60	