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Blays House Wick Road Englefield Green Egham Surrey TW20 0HJ	Haverhill Great Willsey Park Area 5 : FSR Results	
Date 4/7/2019 File HAVERHILL. ALL NETWORKS FOR TENDER.MDX	Designed by RMV Checked by DJ	
Innovyze	Network 2018.1.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for SW 05

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	1	Foul Sewage (l/s/ha)	0.000	Maximum Backdrop Height (m)	1.500
M5-60 (mm)	21.000	Volumetric Runoff Coeff.	0.750	Min Design Depth for Optimisation (m)	1.200
Ratio R	0.423	PIMP (%)	100	Min Vel for Auto Design only (m/s)	1.00
Maximum Rainfall (mm/hr)	50	Add Flow / Climate Change (%)	0	Min Slope for Optimisation (1:X)	500
Maximum Time of Concentration (mins)	30	Minimum Backdrop Height (m)	0.200		

Designed with Level Soffits


Network Design Table for SW 05

« - Indicates pipe capacity < flow






PN	Length	Fall	Slope	I.Area	T.E.	Base	k	n	HYD	DIA	Section	Type	Auto
	(m)	(m)	(1:X)	(ha)	(mins)	Flow (l/s)	(mm)		SECT	(mm)			Design

Network Results Table

PN	Rain	T.C.	US/IL	Σ I.Area	Σ Base	Foul	Add Flow	Vel	Cap	Flow
	(mm/hr)	(mins)	(m)	(ha)	Flow (l/s)	(l/s)	(l/s)	(m/s)	(l/s)	(l/s)


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Network Design Table for SW 05








PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	1.928	0.129	14.9	0.194	7.00	0.0	0.600		o	225	Pipe/Conduit	
2.000	1.956	0.100	19.6	0.180	7.00	0.0	0.600		o	225	Pipe/Conduit	
1.001	8.946	0.760	11.8	0.098	0.00	0.0	0.600		o	450	Pipe/Conduit	
3.000	117.369	0.001	117369.0	0.098	6.00	0.0	0.600			-1	Pipe/Conduit	
1.002	44.172	0.002	22085.9	0.098	0.00	0.0	0.600			-1	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	7.01	91.363	0.194	0.0	0.0	0.0	3.40	135.3	26.3
2.000	50.00	7.01	91.334	0.180	0.0	0.0	0.0	2.97	118.2	24.4
1.001	50.00	7.04	91.234	0.472	0.0	0.0	0.0	5.95	946.5	63.9
3.000	32.39	15.65	90.474	0.098	0.0	0.0	0.0	0.20	1551.2	8.6
1.002	30.60	17.18	90.473	0.668	0.0	0.0	0.0	0.48	3668.9	63.9


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Network Design Table for SW 05







PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k	n	HYD SECT	DIA (mm)	Section Type	Auto Design
4.000	6.903	0.041	170.0	0.098	6.00	0.0	0.600		o	225	Pipe/Conduit	
4.001	74.794	0.305	245.0	0.098	0.00	0.0	0.600		o	300	Pipe/Conduit	
4.002	72.722	0.297	245.0	0.098	0.00	0.0	0.600		o	300	Pipe/Conduit	
5.000	6.772	0.400	16.9	0.982	7.00	0.0	0.600		o	450	Pipe/Conduit	
4.003	30.089	0.080	375.0	0.090	0.00	0.0	0.600		o	450	Pipe/Conduit	
4.004	19.523	0.052	375.0	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
6.000	10.993	0.065	169.1	0.000	7.00	0.0	0.600		o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	E I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
4.000	50.00	6.12	92.532	0.098	0.0	0.0	0.0	1.00	39.8	13.3
4.001	48.96	7.36	92.416	0.196	0.0	0.0	0.0	1.00	70.7	26.0
4.002	45.33	8.57	92.111	0.294	0.0	0.0	0.0	1.00	70.7	36.1
5.000	50.00	7.02	92.064	0.982	0.0	0.0	0.0	4.96	788.8	133.0
4.003	44.07	9.05	91.664	1.366	0.0	0.0	0.0	1.04	166.0	163.0
4.004	43.29	9.37	91.584	1.366	0.0	0.0	0.0	1.04	166.0	163.0
6.000	49.59	7.18	91.792	0.000	0.0	0.0	0.0	1.00	39.9	0.0


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Network Design Table for SW 05









PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
4.005	14.174	0.038	375.0	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
4.006	2.720	0.142	19.2	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
7.000	2.204	0.180	12.2	0.000	7.00	0.0	0.600		o	225	Pipe/Conduit	
4.007	7.911	0.730	10.8	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	
8.000	42.223	0.001	42223.0	0.000	7.00	0.0	0.600			-1	Pipe/Conduit	
8.001	23.241	0.057	407.7	0.000	0.00	0.0	0.600		o	600	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)
4.005	42.75	9.59	91.532	1.366	0.0	0.0	0.0	1.04	166.0	163.0
4.006	42.73	9.60	91.494	1.366	0.0	0.0	0.0	4.66	741.5	163.0
7.000	50.00	7.01	90.532	0.000	0.0	0.0	0.0	3.76	149.5	0.0
4.007	42.68	9.62	91.202	1.366	0.0	0.0	0.0	7.42	2099.3	163.0
8.000	44.09	9.05	91.200	0.000	0.0	0.0	0.0	0.34	2632.0	0.0
8.001	43.29	9.37	91.199	0.000	0.0	0.0	0.0	1.20	339.2	0.0


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Network Design Table for SW 05


PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
8.002	9.592	0.670	14.3	0.000	0.00	0.0	0.600			-1	Pipe/Conduit	
4.008	67.013	0.001	67013.0	0.151	0.00	0.0	0.600			-1	Pipe/Conduit	
1.003	5.492	0.001	5492.0	0.000	0.00	0.0	0.600			-1	Pipe/Conduit	
1.004	54.567	2.070	26.4	0.000	0.00	0.0		0.045	3 \=/	525	1:3 Swale	
1.005	7.033	0.469	15.0	0.000	0.00	0.0	0.600			o 525	Pipe/Conduit	
1.006	27.031	0.120	225.3	0.000	0.00	0.0	0.600			o 525	Pipe/Conduit	
1.007	58.884	1.722	34.2	0.000	0.00	0.0	0.600			o 525	Pipe/Conduit	
1.008	42.319	0.909	46.6	0.000	0.00	0.0	0.600			o 525	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	E I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
8.002	43.27	9.38	91.142	0.000	0.0	0.0	0.0	19.29	147572.8	0.0
4.008	34.98	13.74	90.472	1.517	0.0	0.0	0.0	0.27	2074.4	163.0
1.003	30.50	17.28	90.471	2.185	0.0	0.0	0.0	0.97	7443.4	180.5
1.004	29.48	18.26	90.470	2.185	0.0	0.0	0.0	0.93	135.7	180.5
1.005	29.46	18.28	88.400	2.185	0.0	0.0	0.0	5.81	1256.7	180.5
1.006	29.16	18.58	87.931	2.185	0.0	0.0	0.0	1.49	322.2	180.5
1.007	28.92	18.83	87.811	2.185	0.0	0.0	0.0	3.84	831.2	180.5
1.008	28.71	19.05	86.089	2.185	0.0	0.0	0.0	3.29	712.0	180.5

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Network Design Table for SW 05

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
1.009	27.144	0.090	301.6	0.000	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)
1.009	28.31	19.48	85.180	2.185	0.0	0.0	0.0	1.04	114.6	180.5

Conduit Sections for SW 05

NOTE: Diameters less than 66 refer to section numbers of hydraulic conduits. These conduits are marked by the symbols:- [] box culvert, \ / open channel, oo dual pipe, ooo triple pipe, O egg.


Section numbers < 0 are taken from user conduit table

Section Number	Conduit Type	Major Dimn. (mm)	Minor Dimn. (mm)	Side Slope (Deg)	Corner Splay (mm)	4*Hyd Radius (m)	XSect Area (m ²)
-1		6600	1600			3.619	6.880

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Manhole Schedules for SW 05

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S5.01	92.876	1.513	Junction		1.000	91.363	225				
S5.02	92.812	1.478	Junction		2.000	91.334	225				
S5.03	92.799	1.565	Open Manhole	1350	1.001	91.234	450	1.000	91.234	225	
								2.000	91.234	225	
S5.04	92.150	1.676	Junction		3.000	90.474	-1				
S5.05	92.150	1.677	Junction		1.002	90.473	-1	1.001	90.474	450	
								3.000	90.473	-1	
S5.06	93.957	1.425	Junction		4.000	92.532	225				
S5.07	93.910	1.493	Open Manhole	1200	4.001	92.416	300	4.000	92.491	225	
S5.08	96.561	4.449	Open Manhole	1200	4.002	92.111	300	4.001	92.111	300	
S5.09	95.035	2.971	Junction		5.000	92.064	450				
S5.10	95.085	3.421	Open Manhole	1350	4.003	91.664	450	4.002	91.814	300	
								5.000	91.664	450	
S5.11	94.170	2.586	Open Manhole	1350	4.004	91.584	450	4.003	91.584	450	
S5.12	93.217	1.425	Open Manhole	900	6.000	91.792	225				
S5.13	93.534	2.003	Open Manhole	1350	4.005	91.532	450	4.004	91.532	450	
								6.000	91.727	225	
S5.14	92.857	1.363	Junction		4.006	91.494	450	4.005	91.494	450	

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Manhole Schedules for SW 05

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S5.15	92.757	2.225	Junction		7.000	90.532	225				
S5.16	92.790	2.438	Open Manhole	1500	4.007	91.202	600	4.006	91.352	450	
								7.000	90.352	225	
S5.17	92.265	1.065	Junction		8.000	91.200	-1				
S5.18	92.000	0.801	Junction		8.001	91.199	600	8.000	91.199	-1	
S5.19	92.000	0.858	Junction		8.002	91.142	-1	8.001	91.142	600	
S5.20	92.000	1.528	Junction		4.008	90.472	-1	4.007	90.472	600	
								8.002	90.472	-1	
S5.21	92.000	1.529	Junction		1.003	90.471	-1	1.002	90.471	-1	
								4.008	90.471	-1	
S5.22 FC	92.000	1.530	Junction		1.004	90.470	525	1.003	90.470	-1	
S5.23	89.705	1.305	Junction		1.005	88.400	525	1.004	88.400	525	
S5.24	89.561	1.630	Open Manhole	1500	1.006	87.931	525	1.005	87.931	525	
S5.25	89.668	1.857	Open Manhole	1500	1.007	87.811	525	1.006	87.811	525	
S5.26	87.823	1.734	Open Manhole	1500	1.008	86.089	525	1.007	86.089	525	
S5.27	87.141	1.961	Open Manhole	1200	1.009	85.180	375	1.008	85.180	525	
S5.01	91.000	5.910	Open Manhole	1800		OUTFALL		1.009	85.090	375	

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PIPELINE SCHEDULES for SW 05

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)
1.000	o	225	S5.01	92.876	91.363	1.288	Junction	
2.000	o	225	S5.02	92.812	91.334	1.253	Junction	
1.001	o	450	S5.03	92.799	91.234	1.115	Open Manhole	1350
3.000		-1	S5.04	92.150	90.474	0.176	Junction	

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	1.928	14.9	S5.03	92.799	91.234	1.340	Open Manhole	1350
2.000	1.956	19.6	S5.03	92.799	91.234	1.340	Open Manhole	1350
1.001	8.946	11.8	S5.05	92.150	90.474	1.226	Junction	
3.000	117.369	117369.0	S5.05	92.150	90.473	0.177	Junction	

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PIPELINE SCHEDULES for SW 05

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)
1.002		-1	S5.05	92.150	90.473	0.177	Junction	
4.000	o	225	S5.06	93.957	92.532	1.200	Junction	
4.001	o	300	S5.07	93.910	92.416	1.193	Open Manhole	1200
4.002	o	300	S5.08	96.561	92.111	4.149	Open Manhole	1200
5.000	o	450	S5.09	95.035	92.064	2.521	Junction	

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)
1.002	44.172	22085.9	S5.21	92.000	90.471	0.029	Junction	
4.000	6.903	170.0	S5.07	93.910	92.491	1.193	Open Manhole	1200
4.001	74.794	245.0	S5.08	96.561	92.111	4.149	Open Manhole	1200
4.002	72.722	245.0	S5.10	95.085	91.814	2.970	Open Manhole	1350
5.000	6.772	16.9	S5.10	95.085	91.664	2.971	Open Manhole	1350

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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)
4.003	o	450	S5.10	95.085	91.664	2.971	Open Manhole	1350
4.004	o	450	S5.11	94.170	91.584	2.136	Open Manhole	1350
6.000	o	225	S5.12	93.217	91.792	1.200	Open Manhole	900
4.005	o	450	S5.13	93.534	91.532	1.552	Open Manhole	1350
4.006	o	450	S5.14	92.857	91.494	0.913	Junction	

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)
4.003	30.089	375.0	S5.11	94.170	91.584	2.136	Open Manhole	1350
4.004	19.523	375.0	S5.13	93.534	91.532	1.553	Open Manhole	1350
6.000	10.993	169.1	S5.13	93.534	91.727	1.582	Open Manhole	1350
4.005	14.174	375.0	S5.14	92.857	91.494	0.913	Junction	
4.006	2.720	19.2	S5.16	92.790	91.352	0.988	Open Manhole	1500

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PIPELINE SCHEDULES for SW 05

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)
7.000	o	225	S5.15	92.757	90.532	2.000	Junction	
4.007	o	600	S5.16	92.790	91.202	0.988	Open Manhole	1500
8.000		-1	S5.17	92.265	91.200	-0.535	Junction	
8.001	o	600	S5.18	92.000	91.199	0.201	Junction	
8.002		-1	S5.19	92.000	91.142	-0.642	Junction	

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)
7.000	2.204	12.2	S5.16	92.790	90.352	2.213	Open Manhole	1500
4.007	7.911	10.8	S5.20	92.000	90.472	0.928	Junction	
8.000	42.223	42223.0	S5.18	92.000	91.199	-0.799	Junction	
8.001	23.241	407.7	S5.19	92.000	91.142	0.258	Junction	
8.002	9.592	14.3	S5.20	92.000	90.472	0.028	Junction	

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PIPELINE SCHEDULES for SW 05

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)
4.008		-1	S5.20	92.000	90.472	0.028	Junction	
1.003		-1	S5.21	92.000	90.471	0.029	Junction	
1.004	3 \=/	525	S5.22 FC	92.000	90.470	1.380	Junction	
1.005	o	525	S5.23	89.705	88.400	0.780	Junction	
1.006	o	525	S5.24	89.561	87.931	1.105	Open Manhole	1500
1.007	o	525	S5.25	89.668	87.811	1.332	Open Manhole	1500
1.008	o	525	S5.26	87.823	86.089	1.209	Open Manhole	1500

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)
4.008	67.013	67013.0	S5.21	92.000	90.471	0.029	Junction	
1.003	5.492	5492.0	S5.22 FC	92.000	90.470	0.030	Junction	
1.004	54.567	26.4	S5.23	89.705	88.400	1.155	Junction	
1.005	7.033	15.0	S5.24	89.561	87.931	1.105	Open Manhole	1500
1.006	27.031	225.3	S5.25	89.668	87.811	1.332	Open Manhole	1500
1.007	58.884	34.2	S5.26	87.823	86.089	1.209	Open Manhole	1500
1.008	42.319	46.6	S5.27	87.141	85.180	1.436	Open Manhole	1200

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PIPELINE SCHEDULES for SW 05

Upstream Manhole

PN	Hyd Diam Sect (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.009	o 375	S5.27	87.141	85.180	1.586	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)
1.009	27.144	301.6	S5.01	91.000	85.090	5.535	Open Manhole	1800

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Area Summary for SW 05

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.194	0.194	0.194
2.000	-	-	100	0.180	0.180	0.180
1.001	-	-	100	0.098	0.098	0.098
3.000	-	-	100	0.098	0.098	0.098
1.002	-	-	100	0.098	0.098	0.098
4.000	-	-	100	0.098	0.098	0.098
4.001	-	-	100	0.098	0.098	0.098
4.002	-	-	100	0.098	0.098	0.098
5.000	-	-	100	0.982	0.982	0.982
4.003	-	-	100	0.090	0.090	0.090
4.004	-	-	100	0.000	0.000	0.000
6.000	-	-	100	0.000	0.000	0.000
4.005	-	-	100	0.000	0.000	0.000
4.006	-	-	100	0.000	0.000	0.000
7.000	-	-	100	0.000	0.000	0.000
4.007	-	-	100	0.000	0.000	0.000
8.000	-	-	100	0.000	0.000	0.000
8.001	-	-	100	0.000	0.000	0.000
8.002	-	-	100	0.000	0.000	0.000
4.008	-	-	100	0.151	0.151	0.151
1.003	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.000	0.000	0.000
1.005	-	-	100	0.000	0.000	0.000
1.006	-	-	100	0.000	0.000	0.000
1.007	-	-	100	0.000	0.000	0.000
1.008	-	-	100	0.000	0.000	0.000

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Area Summary for SW 05

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.009	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				2.185	2.185	2.185

Free Flowing Outfall Details for SW 05


Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
1.009	S5.01	91.000	85.090	0.000	1800	0

Simulation Criteria for SW 05

Volumetric Runoff Coeff	0.840	Manhole Headloss Coeff (Global)	0.500	Inlet Coefficient	0.800
Areal Reduction Factor	1.000	Foul Sewage per hectare (l/s)	0.000	Flow per Person per Day (l/per/day)	0.000
Hot Start (mins)	0	Additional Flow - % of Total Flow	0.000	Run Time (mins)	10080
Hot Start Level (mm)	0	MADD Factor * 10m ³ /ha Storage	4.000	Output Interval (mins)	2


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 0 Number of Real Time Controls 0


Synthetic Rainfall Details

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Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	21.000	Cv (Summer)	0.750
Return Period (years)	100	Ratio R	0.430	Cv (Winter)	0.840
Region		England and Wales	Profile Type	Winter Storm Duration (mins)	360

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<p><u>Online Controls for SW 05</u></p> <p><u>Complex Manhole: S5.22 FC, DS/PN: 1.004, Volume (m³): 37.8</u></p> <p><u>Orifice</u></p> <p>Diameter (m) 0.060 Discharge Coefficient 0.600 Invert Level (m) 90.470</p> <p><u>Orifice</u></p> <p>Diameter (m) 0.060 Discharge Coefficient 0.600 Invert Level (m) 91.170</p>		
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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW 05

Simulation Criteria

Areal Reduction Factor 1.000 Manhole Headloss Coeff (Global) 0.500 MADD Factor * 10m³/ha Storage 4.000
Hot Start (mins) 0 Foul Sewage per hectare (l/s) 0.000 Inlet Coefficient 0.800
Hot Start Level (mm) 0 Additional Flow - % of Total Flow 0.000 Flow per Person per Day (l/per/day) 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 0 Number of Real Time Controls 0


Synthetic Rainfall Details


Rainfall Model FSR M5-60 (mm) 21.000 Cv (Summer) 0.750
Region England and Wales Ratio R 0.430 Cv (Winter) 0.840

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

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, 30


PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Surcharged Flooded			Pipe		
									Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (1/s)	Flow (1/s)
1.000	S5.01	15 Winter	1	+0%					91.475	-0.113	0.000	0.49	24.7	OK*

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	US/MH	Level									
PN	Name	Exceeded									
1.000	S5.01										
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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW 05

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Surcharged Flooded			Pipe Flow (l/s)	
									Level (m)	Depth (m)	Volume (m ³)		Flow / Cap.
2.000	S5.02	15 Winter	1	+0%					91.449	-0.110	0.000	0.51	22.9
1.001	S5.03	15 Winter	1	+0%	100/60 Winter				91.338	-0.346	0.000	0.12	59.6
3.000	S5.04	480 Winter	1	+0%					91.103	-0.971	0.000	0.00	1.6
1.002	S5.05	480 Winter	1	+0%					91.103	-0.970	0.000	0.00	2.9
4.000	S5.06	15 Winter	1	+0%					92.638	-0.119	0.000	0.45	13.6
4.001	S5.07	15 Winter	1	+0%	30/15 Summer	100/15 Summer			92.545	-0.172	0.000	0.36	24.5
4.002	S5.08	15 Winter	1	+0%	30/15 Summer				92.266	-0.145	0.000	0.50	34.1
5.000	S5.09	15 Winter	1	+0%					92.249	-0.265	0.000	0.35	125.6
4.003	S5.10	15 Winter	1	+0%	1/15 Summer				92.154	0.040	0.000	1.11	158.8
4.004	S5.11	15 Winter	1	+0%	1/15 Summer				92.056	0.022	0.000	1.18	157.4
6.000	S5.12	15 Summer	1	+0%	30/15 Summer				91.982	-0.035	0.000	0.02	0.6
4.005	S5.13	15 Summer	1	+0%	30/15 Summer				91.982	0.000	0.000	1.27	142.6
4.006	S5.14	15 Winter	1	+0%					91.783	-0.161	0.000	0.74	157.2
7.000	S5.15	60 Winter	1	+0%					90.757	0.000	0.000	0.00	0.2
4.007	S5.16	15 Winter	1	+0%	100/30 Summer				91.375	-0.427	0.000	0.18	156.2
8.000	S5.17	60 Winter	1	+0%					91.200	-1.600	0.000	0.00	0.0
8.001	S5.18	60 Winter	1	+0%	100/120 Winter				91.199	-0.600	0.000	0.00	0.0
8.002	S5.19	60 Winter	1	+0%					91.142	-1.600	0.000	0.00	0.0
4.008	S5.20	480 Winter	1	+0%					91.103	-0.969	0.000	0.00	25.6
1.003	S5.21	480 Winter	1	+0%					91.104	-0.967	0.000	0.00	10.9
1.004	S5.22	FC 480 Winter	1	+0%					91.109	-0.891	0.000	0.00	5.8
1.005	S5.23	480 Winter	1	+0%					88.428	-0.497	0.000	0.01	5.8
1.006	S5.24	480 Winter	1	+0%					87.984	-0.472	0.000	0.02	5.8
1.007	S5.25	480 Winter	1	+0%					87.830	-0.506	0.000	0.01	5.8

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW 05

PN	US/MH Name	Status	Level Exceeded
2.000	S5.02	OK*	
1.001	S5.03	OK	
3.000	S5.04	OK	
1.002	S5.05	OK	
4.000	S5.06	OK*	
4.001	S5.07	OK	6
4.002	S5.08	OK	
5.000	S5.09	OK*	
4.003	S5.10	SURCHARGED	
4.004	S5.11	SURCHARGED	
6.000	S5.12	OK	
4.005	S5.13	OK	
4.006	S5.14	OK*	
7.000	S5.15	SURCHARGED*	
4.007	S5.16	OK	
8.000	S5.17	OK	
8.001	S5.18	OK*	
8.002	S5.19	OK	
4.008	S5.20	OK	
1.003	S5.21	OK	
1.004	S5.22 FC	OK	
1.005	S5.23	OK*	
1.006	S5.24	OK	

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW 05


PN	US/MH Name	Status	Level Exceeded
1.007	S5.25	OK	

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW 05

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Surcharged Flooded			Pipe Flow (l/s)	Status	
									Level (m)	Depth (m)	Volume (m ³)			
1.008	S5.26	480	Winter	1	+0%				86.112	-0.502	0.000	0.01	5.8	OK
1.009	S5.27	480	Winter	1	+0%				85.238	-0.317	0.000	0.06	5.8	OK

PN	US/MH Name	Level Exceeded
1.008	S5.26	
1.009	S5.27	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW 05

Simulation Criteria

Areal Reduction Factor 1.000 Manhole Headloss Coeff (Global) 0.500 MADD Factor * 10m³/ha Storage 4.000
Hot Start (mins) 0 Foul Sewage per hectare (l/s) 0.000 Inlet Coefficient 0.800
Hot Start Level (mm) 0 Additional Flow - % of Total Flow 0.000 Flow per Person per Day (l/per/day) 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 0 Number of Real Time Controls 0


Synthetic Rainfall Details


Rainfall Model FSR M5-60 (mm) 21.000 Cv (Summer) 0.750
Region England and Wales Ratio R 0.430 Cv (Winter) 0.840

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

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, 30


US/MH	Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Water	Surcharged	Flooded	Pipe	Status	
PN	Name	Storm	Period	Change	Surcharge	Flood	Level	Depth	Volume	Flow /	Overflow	Flow
							(m)	(m)	(m³)	Cap.	(l/s)	(l/s)
1.000	S5.01	15 Winter	30	+0%			91.588	0.000	0.000	1.20		60.5 SURCHARGED*

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	US/MH	Level									
PN	Name	Exceeded									
1.000	S5.01										
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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW 05

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water	Surcharged	Flooded	Pipe Flow (l/s)	
									Level (m)	Depth (m)	Volume (m ³)		Flow / Cap.
2.000	S5.02	15 Winter	30	+0%					91.559	0.000	0.000	1.26	56.3
1.001	S5.03	480 Winter	30	+0%	100/60 Winter				91.515	-0.169	0.000	0.04	18.1
3.000	S5.04	480 Winter	30	+0%					91.514	-0.560	0.000	0.00	3.5
1.002	S5.05	480 Winter	30	+0%					91.514	-0.559	0.000	0.00	5.3
4.000	S5.06	15 Winter	30	+0%					92.757	0.000	0.000	0.85	25.4
4.001	S5.07	15 Winter	30	+0%	30/15 Summer	100/15 Summer			93.491	0.775	0.000	0.68	46.2
4.002	S5.08	15 Winter	30	+0%	30/15 Summer				93.400	0.989	0.000	0.90	60.8
5.000	S5.09	15 Winter	30	+0%					92.514	0.000	0.000	0.74	263.4
4.003	S5.10	15 Winter	30	+0%	1/15 Summer				93.227	1.113	0.000	2.31	330.4
4.004	S5.11	15 Winter	30	+0%	1/15 Summer				92.798	0.764	0.000	2.45	327.3
6.000	S5.12	15 Winter	30	+0%	30/15 Summer				92.455	0.438	0.000	0.04	1.4
4.005	S5.13	15 Winter	30	+0%	30/15 Summer				92.455	0.473	0.000	2.92	327.8
4.006	S5.14	15 Winter	30	+0%					91.944	0.000	0.000	1.54	327.5
7.000	S5.15	60 Winter	30	+0%					90.757	0.000	0.000	0.00	0.2
4.007	S5.16	480 Winter	30	+0%	100/30 Summer				91.516	-0.286	0.000	0.06	52.3
8.000	S5.17	480 Winter	30	+0%					91.515	-1.285	0.000	0.00	0.0
8.001	S5.18	480 Winter	30	+0%	100/120 Winter				91.515	-0.284	0.000	0.00	1.0
8.002	S5.19	480 Winter	30	+0%					91.515	-1.227	0.000	0.00	1.2
4.008	S5.20	480 Winter	30	+0%					91.516	-0.556	0.000	0.00	53.5
1.003	S5.21	480 Winter	30	+0%					91.515	-0.556	0.000	0.00	14.1
1.004	S5.22	FC 480 Winter	30	+0%					91.515	-0.485	0.000	0.00	11.8
1.005	S5.23	480 Winter	30	+0%					88.453	-0.472	0.000	0.02	11.8
1.006	S5.24	480 Winter	30	+0%					88.002	-0.454	0.000	0.04	11.8
1.007	S5.25	480 Winter	30	+0%					87.850	-0.486	0.000	0.02	11.8

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW 05

PN	US/MH Name	Status	Level Exceeded
2.000	S5.02	SURCHARGED*	
1.001	S5.03	OK	
3.000	S5.04	OK	
1.002	S5.05	OK	
4.000	S5.06	SURCHARGED*	
4.001	S5.07	SURCHARGED	6
4.002	S5.08	SURCHARGED	
5.000	S5.09	SURCHARGED*	
4.003	S5.10	SURCHARGED	
4.004	S5.11	SURCHARGED	
6.000	S5.12	SURCHARGED	
4.005	S5.13	SURCHARGED	
4.006	S5.14	SURCHARGED*	
7.000	S5.15	SURCHARGED*	
4.007	S5.16	OK	
8.000	S5.17	OK	
8.001	S5.18	OK*	
8.002	S5.19	OK	
4.008	S5.20	OK	
1.003	S5.21	OK	
1.004	S5.22 FC	OK	
1.005	S5.23	OK*	
1.006	S5.24	OK	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW 05


PN	US/MH Name	Status	Level Exceeded
1.007	S5.25	OK	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW 05

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Surcharged Flooded			Pipe Flow (l/s)	Status	
									Level (m)	Depth (m)	Volume (m ³)			
1.008	S5.26	480	Winter	30	+0%				86.136	-0.478	0.000	0.02	11.8	OK
1.009	S5.27	480	Winter	30	+0%				85.265	-0.290	0.000	0.12	11.8	OK

PN	US/MH Name	Level Exceeded
1.008	S5.26	
1.009	S5.27	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW 05

Simulation Criteria

Areal Reduction Factor 1.000 Manhole Headloss Coeff (Global) 0.500 MADD Factor * 10m³/ha Storage 4.000
Hot Start (mins) 0 Foul Sewage per hectare (l/s) 0.000 Inlet Coefficient 0.800
Hot Start Level (mm) 0 Additional Flow - % of Total Flow 0.000 Flow per Person per Day (l/per/day) 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 0 Number of Real Time Controls 0


Synthetic Rainfall Details


Rainfall Model FSR M5-60 (mm) 21.000 Cv (Summer) 0.750
Region England and Wales Ratio R 0.430 Cv (Winter) 0.840

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

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, 30


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)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S5.01	60 Winter	100	+30%					91.588	0.000	0.000	1.19		60.0	SURCHARGED*

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<u>100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW 05</u>											
<table> <thead> <tr> <th></th> <th>US/MH</th> <th>Level</th> </tr> <tr> <th>PN</th> <th>Name</th> <th>Exceeded</th> </tr> </thead> <tbody> <tr> <td>1.000</td> <td>S5.01</td> <td></td> </tr> </tbody> </table>				US/MH	Level	PN	Name	Exceeded	1.000	S5.01	
	US/MH	Level									
PN	Name	Exceeded									
1.000	S5.01										
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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW 05

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Surcharged Flooded			Pipe Flow (l/s)	
									Level (m)	Depth (m)	Volume (m ³)		Flow / Cap. (l/s)
2.000	S5.02	60 Winter	100	+30%					91.559	0.000	0.000	1.25	55.8
1.001	S5.03	480 Winter	100	+30%	100/60 Winter				91.916	0.232	0.000	0.06	28.7
3.000	S5.04	480 Winter	100	+30%					91.915	-0.159	0.000	0.00	6.0
1.002	S5.05	480 Winter	100	+30%					91.915	-0.158	0.000	0.00	6.6
4.000	S5.06	15 Winter	100	+30%					92.757	0.000	0.000	1.88	56.1
4.001	S5.07	15 Winter	100	+30%	30/15 Summer	100/15 Summer			93.963	1.247	53.401	1.36	92.5
4.002	S5.08	15 Winter	100	+30%	30/15 Summer				94.541	2.130	0.000	1.37	92.9
5.000	S5.09	15 Winter	100	+30%					92.514	0.000	0.000	1.27	453.6
4.003	S5.10	15 Winter	100	+30%	1/15 Summer				94.667	2.553	0.000	3.28	469.0
4.004	S5.11	15 Winter	100	+30%	1/15 Summer				93.831	1.797	0.000	3.49	466.3
6.000	S5.12	15 Winter	100	+30%	30/15 Summer				93.149	1.132	0.000	0.10	3.3
4.005	S5.13	15 Winter	100	+30%	30/15 Summer				93.150	1.168	0.000	4.14	465.2
4.006	S5.14	15 Winter	100	+30%					91.944	0.000	0.000	2.19	465.6
7.000	S5.15	60 Winter	100	+30%					90.757	0.000	0.000	0.02	1.1
4.007	S5.16	240 Winter	100	+30%	100/30 Summer				92.101	0.299	0.000	0.18	151.5
8.000	S5.17	480 Winter	100	+30%					91.925	-0.875	0.000	0.00	0.0
8.001	S5.18	480 Winter	100	+30%	100/120 Winter				91.925	0.126	0.000	0.01	2.5
8.002	S5.19	480 Winter	100	+30%					91.925	-0.817	0.000	0.00	2.6
4.008	S5.20	480 Winter	100	+30%					91.925	-0.147	0.000	0.00	78.0
1.003	S5.21	480 Winter	100	+30%					91.915	-0.156	0.000	0.00	16.9
1.004	S5.22	FC 480 Winter	100	+30%					91.914	-0.086	0.000	0.00	15.3
1.005	S5.23	480 Winter	100	+30%					88.459	-0.466	0.000	0.03	15.3
1.006	S5.24	480 Winter	100	+30%					88.012	-0.444	0.000	0.06	15.3
1.007	S5.25	480 Winter	100	+30%					87.861	-0.475	0.000	0.02	15.3

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW 05

PN	US/MH Name	Status	Level Exceeded
2.000	S5.02	SURCHARGED*	
1.001	S5.03	SURCHARGED	
3.000	S5.04	FLOOD RISK*	
1.002	S5.05	FLOOD RISK*	
4.000	S5.06	SURCHARGED*	
4.001	S5.07	FLOOD	6
4.002	S5.08	SURCHARGED	
5.000	S5.09	SURCHARGED*	
4.003	S5.10	SURCHARGED	
4.004	S5.11	SURCHARGED	
6.000	S5.12	FLOOD RISK	
4.005	S5.13	SURCHARGED	
4.006	S5.14	SURCHARGED*	
7.000	S5.15	SURCHARGED*	
4.007	S5.16	SURCHARGED	
8.000	S5.17	OK	
8.001	S5.18	FLOOD RISK*	
8.002	S5.19	FLOOD RISK*	
4.008	S5.20	FLOOD RISK*	
1.003	S5.21	FLOOD RISK*	
1.004	S5.22 FC	FLOOD RISK*	
1.005	S5.23	OK*	
1.006	S5.24	OK	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW 05

PN	US/MH Name	Status	Level Exceeded
1.007	S5.25	OK	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW 05

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Surcharged Flooded			Pipe Flow (l/s)	Status	
									Level (m)	Depth (m)	Volume (m ³)			
1.008	S5.26	480 Winter	100	+30%					86.144	-0.470	0.000	0.02	15.3	OK
1.009	S5.27	480 Winter	100	+30%					85.277	-0.278	0.000	0.15	15.3	OK

PN	US/MH Name	Level Exceeded
1.008	S5.26	
1.009	S5.27	