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Bessemer Road Welwyn Garden City Hertfordshire AL7 1HE	Havant Catchment C and D	
Date 06/08/2021 File SW Network 2 (updated).MDX	Designed by sudeep.chongbang Checked by	
XP Solutions	Network 2017.1.2	

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

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m ³ /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 Online Controls	1	Number of Storage Structures	4
		Number of Time/Area Diagrams	0
		Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH	D3 (1km)	0.387
FEH Rainfall Version	1999	E (1km)	0.310
Site Location	GB 472400 107400 SU 72400 07400	F (1km)	2.252
C (1km)	-0.029	Cv (Summer)	0.750
D1 (1km)	0.457	Cv (Winter)	0.840
D2 (1km)	0.295		
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, 180, 240, 360, 480, 600, 720, 960, 1440		
Return Period(s) (years)		1, 30, 100	
Climate Change (%)		0, 0, 20	

									Water Surcharged
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Level (m)
1.000	S24	15 Winter	100	+20%	100/15 Summer	100/15 Winter			15.440
1.001	S25	15 Winter	100	+20%	30/15 Summer	100/15 Winter			15.439
1.002	S26	15 Winter	100	+20%	30/15 Summer				15.342
1.003	S27	15 Winter	100	+20%	30/15 Summer				14.964
2.000	S30	15 Winter	100	+20%	100/15 Summer	100/15 Winter			15.391
2.001	S31	15 Winter	100	+20%	30/15 Summer	100/15 Winter			15.390
2.002	S32	15 Winter	100	+20%	30/15 Summer				15.298
2.003	S33	15 Winter	100	+20%	30/15 Summer				15.011
1.004	S28	30 Winter	100	+20%	30/15 Summer				14.712
3.000	PPIC1	60 Winter	100	+20%	100/15 Summer				14.503
4.000	PPIC8	60 Winter	100	+20%	30/15 Summer	100/15 Summer			14.476
3.001	PPIC2	60 Winter	100	+20%	30/15 Summer				14.501
5.000	S34	60 Winter	100	+20%	100/15 Summer				14.506
5.001	PPIC4	60 Winter	100	+20%	100/15 Summer	100/60 Winter			14.501
3.002	PPIC3	120 Winter	100	+20%	30/15 Summer				14.514
6.000	PPIC15	15 Winter	100	+20%	30/15 Summer	100/15 Summer			14.584
7.000	PPIC16	60 Winter	100	+20%	100/30 Winter				14.532
3.003	PPIC17	60 Winter	100	+20%	30/15 Summer				14.522
8.000	PPIC11	15 Winter	100	+20%	30/15 Summer	100/15 Summer			14.627
8.001	PPIC12	60 Winter	100	+20%	30/15 Summer				14.502
1.005	TANK	30 Winter	100	+20%	100/15 Winter				14.675
1.006	S29	30 Winter	100	+20%	100/15 Winter				14.670

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

PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m³)	Flow / Overflow Cap. (l/s)	Flow (l/s)			
1.000	S24	0.973	0.32	36.9	FLOOD		1
1.001	S25	0.110	0.77	88.7	FLOOD		1
1.002	S26	0.000	1.46	168.1	FLOOD RISK		
1.003	S27	0.000	1.96	228.0	SURCHARGED		
2.000	S30	1.071	0.31	36.9	FLOOD		1
2.001	S31	0.109	0.77	89.3	FLOOD		1
2.002	S32	0.000	1.52	169.3	FLOOD RISK		
2.003	S33	0.000	2.14	246.5	SURCHARGED		
1.004	S28	0.000	3.51	401.1	SURCHARGED		
3.000	PPIC1	0.000	0.11	6.6	SURCHARGED		
4.000	PPIC8	8.596	1.81	30.3	FLOOD		6
3.001	PPIC2	0.000	0.56	35.4	SURCHARGED		
5.000	S34	0.000	0.29	17.0	FLOOD RISK		
5.001	PPIC4	4.939	0.30	30.3	FLOOD		2
3.002	PPIC3	0.000	0.63	40.4	SURCHARGED		
6.000	PPIC15	1.962	1.84	44.0	FLOOD		3
7.000	PPIC16	0.000	0.28	13.7	SURCHARGED		
3.003	PPIC17	0.000	1.89	87.9	SURCHARGED		
8.000	PPIC11	4.679	1.51	95.1	FLOOD		3
8.001	PPIC12	0.000	1.98	60.6	SURCHARGED		
1.005	TANK	0.000	1.56	169.5	SURCHARGED		
1.006	S29	0.000	1.06	139.6	FLOOD RISK		

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	2
FEH Rainfall Version	1999
Site Location GB 472400 107400 SU 72400 07400	
C (1km)	-0.029
D1 (1km)	0.457
D2 (1km)	0.295
D3 (1km)	0.387
E (1km)	0.310
F (1km)	2.252
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	0.400
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm

« - 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	19.310	0.018	1072.8	0.064	4.00	0.0	0.600	Q90	-7	Pipe/Conduit	
1.001	26.728	0.009	2969.8	0.113	0.00	0.0	0.600	Q90	-7	Pipe/Conduit	
1.002	30.432	0.018	1690.7	0.136	0.00	0.0	0.600	Q90	-7	Pipe/Conduit	
1.003	27.553	0.009	3061.4	0.116	0.00	0.0	0.600	Q90	-7	Pipe/Conduit	
1.004	27.268	0.009	3029.8	0.105	0.00	0.0	0.600	Q90	-7	Pipe/Conduit	
1.005	23.230	0.180	129.1	0.063	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.006	3.495	0.015	233.0	0.038	0.00	0.0	0.600	o	375	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)
1.000	50.00	4.40	13.925	0.064	0.0	0.0	0.0	0.81	334.2	8.7
1.001	46.09	5.33	13.907	0.178	0.0	0.0	0.0	0.48	199.0	22.2
1.002	42.63	6.12	13.898	0.314	0.0	0.0	0.0	0.64	265.2	36.3
1.003	39.24	7.09	13.880	0.430	0.0	0.0	0.0	0.47	195.9	45.7
1.004	36.54	8.04	13.871	0.535	0.0	0.0	0.0	0.48	196.9	52.9
1.005	35.71	8.38	13.700	0.598	0.0	0.0	0.0	1.15	45.7«	57.8
1.006	35.59	8.43	13.520	0.636	0.0	0.0	0.0	1.18	130.6	61.3

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Network Design Table 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)	Section Type	Auto Design
1.007	10.487	0.070	149.8	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.008	13.788	0.034	405.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.009	7.460	0.100	74.6	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
2.000	70.587	0.247	285.8	0.063	4.00	0.0	0.600	Q70	-6	Pipe/Conduit	
2.001	52.733	0.201	262.4	0.088	0.00	0.0	0.600	Q70	-6	Pipe/Conduit	
2.002	26.168	0.680	38.5	0.146	0.00	0.0	0.600	Q70	-6	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)
1.007	35.34	8.53	13.455	0.636	0.0	0.0	0.0	1.66	263.8	61.3
1.008	34.82	8.76	13.385	0.636	0.0	0.0	0.0	1.00	159.7	61.3
1.009	34.70	8.82	13.100	0.636	0.0	0.0	0.0	2.36	374.7	61.3
2.000	48.44	4.88	14.200	0.063	0.0	0.0	0.0	1.34	336.1	8.2
2.001	45.26	5.50	14.200	0.151	0.0	0.0	0.0	1.40	350.9	18.5
2.002	44.72	5.62	14.200	0.297	0.0	0.0	0.0	3.69	921.4	36.0

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Manhole Schedules for Storm

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)
QMAX	15.125	1.200	Open Manhole		1.000	13.925	-7				
QMAX	15.125	1.218	Junction		1.001	13.907	-7	1.000	13.907	-7	
QMAX	15.125	1.227	Junction		1.002	13.898	-7	1.001	13.898	-7	
QMAX	15.125	1.245	Junction		1.003	13.880	-7	1.002	13.880	-7	
QMAX	15.125	1.254	Junction	0	1.004	13.871	-7	1.003	13.871	-7	
QMAX	15.125	1.425	Open Manhole	600 x 600	1.005	13.700	225	1.004	13.862	-7	837
S38	15.304	1.784	Open Manhole	1350	1.006	13.520	375	1.005	13.520	225	
PI	15.266	1.811	Open Manhole	1350	1.007	13.455	450	1.006	13.505	375	
S39	14.867	1.482	Open Manhole	1350	1.008	13.385	450	1.007	13.385	450	
S40	14.784	1.684	Open Manhole	1350	1.009	13.100	450	1.008	13.351	450	251
	14.860	1.860	Open Manhole	1350		OUTFALL		1.009	13.000	450	
QMAX	15.300	1.100	Junction		2.000	14.200	-6				
QMAX	15.300	1.347	Junction		2.001	14.200	-6	2.000	13.953	-6	
QMAX	15.300	1.301	Junction	0	2.002	14.200	-6	2.001	13.999	-6	
S45	15.264	1.744	Open Manhole	1200		OUTFALL		2.002	13.520	-6	