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1 Arngrove Court Barrack Road Newcastle upon Tyne NE4 6DB	118620 - TUDOR DRIVE PENLEY	
Date 07/06/2017	Designed by DR	
File DRAINAGE V3.MDX	Checked by SD	
Micro Drainage	Network 2017.1.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Proposed

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	18.000	Add Flow / Climate Change (%)	0
Ratio R	0.351	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	0.600
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)	500

Designed with Level Soffits

Network Design Table for Proposed

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
S1.000	4.692	0.080	58.5	0.002	4.00	0.0	0.600	o	100	Pipe/Conduit	
S1.001	10.379	0.202	51.4	0.001	0.00	0.0	0.600	o	100	Pipe/Conduit	
S2.000	5.264	0.090	58.5	0.006	4.00	0.0	0.600	o	100	Pipe/Conduit	
S3.000	10.322	0.176	58.5	0.004	4.00	0.0	0.600	o	100	Pipe/Conduit	
S2.001	9.209	0.092	100.0	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S1.002	7.585	0.254	29.9	0.003	0.00	0.0	0.600	o	150	Pipe/Conduit	
S4.000	4.258	0.073	58.5	0.006	4.00	0.0	0.600	o	100	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)
S1.000	50.00	4.08	67.900	0.002	0.0	0.0	0.0	1.01	7.9	0.2
S1.001	50.00	4.24	67.820	0.002	0.0	0.0	0.0	1.08	8.5	0.3
S2.000	50.00	4.09	67.800	0.006	0.0	0.0	0.0	1.01	7.9	0.8
S3.000	50.00	4.17	67.900	0.004	0.0	0.0	0.0	1.01	7.9	0.6
S2.001	50.00	4.37	67.710	0.010	0.0	0.0	0.0	0.77	6.0	1.4
S1.002	50.00	4.44	67.568	0.015	0.0	0.0	0.0	1.85	32.7	2.1
S4.000	50.00	4.07	67.800	0.006	0.0	0.0	0.0	1.01	7.9	0.8

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Network Design Table for Proposed											
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
S5.000	5.144	0.088	58.5	0.004	4.00	0.0	0.600	o	100	Pipe/Conduit	
S4.001	9.940	0.348	28.6	0.003	0.00	0.0	0.600	o	100	Pipe/Conduit	
S1.003	10.248	0.343	29.9	0.001	0.00	0.0	0.600	o	150	Pipe/Conduit	
S6.000	10.485	0.779	13.5	0.002	4.00	0.0	0.600	o	100	Pipe/Conduit	
S1.004	2.497	0.084	29.7	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S7.000	16.618	0.363	45.8	0.006	4.00	0.0	0.600	o	100	Pipe/Conduit	
S1.005	8.931	0.040	225.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.006	8.688	0.039	222.8	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S8.000	5.881	0.414	14.2	0.007	4.00	0.0	0.600	o	100	Pipe/Conduit	
S9.000	9.936	0.414	24.0	0.004	4.00	0.0	0.600	o	100	Pipe/Conduit	
S8.001	4.215	0.028	150.5	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.007	5.765	0.026	221.7	0.024	0.00	0.0	0.600	o	225	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)	
S5.000	50.00	4.08	67.800	0.004	0.0	0.0	0.0	1.01	7.9	0.5	
S4.001	50.00	4.20	67.712	0.012	0.0	0.0	0.0	1.45	11.4	1.7	
S1.003	50.00	4.53	67.314	0.028	0.0	0.0	0.0	1.85	32.7	3.8	
S6.000	50.00	4.08	67.800	0.002	0.0	0.0	0.0	2.12	16.6	0.3	
S1.004	50.00	4.55	66.971	0.031	0.0	0.0	0.0	1.85	32.8	4.2	
S7.000	50.00	4.24	67.300	0.006	0.0	0.0	0.0	1.14	9.0	0.8	
S1.005	50.00	4.72	66.812	0.036	0.0	0.0	0.0	0.87	34.5	4.9	
S1.006	50.00	4.89	66.772	0.036	0.0	0.0	0.0	0.87	34.7	4.9	
S8.000	50.00	4.05	67.300	0.007	0.0	0.0	0.0	2.06	16.2	1.0	
S9.000	50.00	4.10	67.300	0.004	0.0	0.0	0.0	1.58	12.4	0.5	
S8.001	50.00	4.19	66.836	0.011	0.0	0.0	0.0	0.82	14.4	1.5	
S1.007	50.00	5.00	66.733	0.071	0.0	0.0	0.0	0.87	34.8	9.7	
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Network Design Table for Proposed											
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
S10.000	8.758	0.088	99.5	0.000	4.00	0.0	0.600	o	100	Pipe/Conduit	
S10.001	11.410	0.114	100.1	0.008	0.00	0.0	0.600	o	100	Pipe/Conduit	
S1.008	4.842	0.022	220.1	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S11.000	8.521	0.085	100.2	0.003	4.00	0.0	0.600	o	100	Pipe/Conduit	
S11.001	11.412	0.155	73.6	0.005	0.00	0.0	0.600	o	100	Pipe/Conduit	
S1.009	13.519	0.060	224.0	0.003	0.00	0.0	0.600	o	225	Pipe/Conduit	
S12.000	19.893	0.199	100.0	0.012	4.00	0.0	0.600	o	100	Pipe/Conduit	
S1.010	8.461	0.038	222.7	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S13.000	12.404	0.238	52.1	0.003	4.00	0.0	0.600	o	100	Pipe/Conduit	
S14.000	5.736	0.057	100.0	0.004	4.00	0.0	0.600	o	100	Pipe/Conduit	
S14.001	10.404	0.104	100.0	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S14.002	2.897	0.077	37.6	0.005	0.00	0.0	0.600	o	100	Pipe/Conduit	
S13.001	2.556	0.100	25.6	0.004	0.00	0.0	0.600	o	100	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)	
S10.000	50.00	4.19	67.050	0.000	0.0	0.0	0.0	0.77	6.1	0.0	
S10.001	50.00	4.44	66.962	0.008	0.0	0.0	0.0	0.77	6.0	1.1	
S1.008	50.00	5.09	66.707	0.080	0.0	0.0	0.0	0.88	34.9	10.8	
S11.000	50.00	4.18	67.050	0.003	0.0	0.0	0.0	0.77	6.0	0.4	
S11.001	50.00	4.40	66.965	0.008	0.0	0.0	0.0	0.90	7.1	1.1	
S1.009	50.00	5.35	66.685	0.091	0.0	0.0	0.0	0.87	34.6	12.3	
S12.000	50.00	4.43	66.949	0.012	0.0	0.0	0.0	0.77	6.0	1.7	
S1.010	50.00	5.51	66.625	0.103	0.0	0.0	0.0	0.87	34.7	14.0	
S13.000	50.00	4.19	67.050	0.003	0.0	0.0	0.0	1.07	8.4	0.4	
S14.000	50.00	4.12	67.050	0.004	0.0	0.0	0.0	0.77	6.0	0.5	
S14.001	50.00	4.35	66.993	0.004	0.0	0.0	0.0	0.77	6.0	0.5	
S14.002	50.00	4.39	66.889	0.008	0.0	0.0	0.0	1.26	9.9	1.1	
S13.001	50.00	4.42	66.812	0.015	0.0	0.0	0.0	1.53	12.0	2.1	
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Manhole Schedules for Proposed

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S1	68.600	0.700	Open Manhole	450	S1.000	67.900	100				
S2	68.600	0.780	Open Manhole	450	S1.001	67.820	100	S1.000	67.820	100	
S3	68.500	0.700	Open Manhole		S2.000	67.800	100				
S4	68.600	0.700	Open Manhole		S3.000	67.900	100				
S5	68.600	0.890	Junction	0	S2.001	67.710	100	S2.000	67.710	100	
								S3.000	67.724	100	14
S6	68.600	1.032	Open Manhole		S1.002	67.568	150	S1.001	67.618	100	
								S2.001	67.618	100	
S7	68.500	0.700	Open Manhole		S4.000	67.800	100				
S8	68.500	0.700	Open Manhole		S5.000	67.800	100				
S9	68.500	0.788	Junction		S4.001	67.712	100	S4.000	67.727	100	15
								S5.000	67.712	100	
S10	68.500	1.186	Junction		S1.003	67.314	150	S1.002	67.314	150	
								S4.001	67.364	100	
S11	68.500	0.700	Open Manhole		S6.000	67.800	100				
S12	68.500	1.529	Junction		S1.004	66.971	150	S1.003	66.971	150	
								S6.000	67.021	100	
S13	68.000	0.700	Open Manhole		S7.000	67.300	100				
S14	68.000	1.188	Junction	0	S1.005	66.812	225	S1.004	66.887	150	
								S7.000	66.937	100	
S15	68.000	1.228	Open Manhole	1200	S1.006	66.772	225	S1.005	66.772	225	
S16	68.000	0.700	Open Manhole		S8.000	67.300	100				
S17	68.000	0.700	Open Manhole		S9.000	67.300	100				
S18	68.000	1.164	Junction	0	S8.001	66.836	150	S8.000	66.886	100	
								S9.000	66.886	100	
S19	68.000	1.267	Open Manhole		S1.007	66.733	225	S1.006	66.733	225	
								S8.001	66.808	150	
S20	68.000	0.950	Open Manhole	150	S10.000	67.050	100				
S21	68.000	1.038	Open Manhole		S10.001	66.962	100	S10.000	66.962	100	
S22	68.000	1.293	Junction		S1.008	66.707	225	S1.007	66.707	225	
								S10.001	66.848	100	16
S23	68.000	0.950	Open Manhole	150	S11.000	67.050	100				
S24	68.000	1.035	Open Manhole		S11.001	66.965	100	S11.000	66.965	100	
S25	68.000	1.315	Junction		S1.009	66.685	225	S1.008	66.685	225	
								S11.001	66.810	100	
S26	67.750	0.801	Open Manhole		S12.000	66.949	100				
S27	68.000	1.375	Junction	0	S1.010	66.625	225	S1.009	66.625	225	
								S12.000	66.750	100	

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Manhole Schedules for Proposed

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backd (mm)
S28	67.750	0.700	Open Manhole	150	S13.000	67.050	100				
S29	67.750	0.700	Open Manhole	150	S14.000	67.050	100				
S30	67.750	0.757	Open Manhole	150	S14.001	66.993	100	S14.000	66.993	100	
S31	67.750	0.861	Open Manhole	450	S14.002	66.889	100	S14.001	66.889	100	
S32	67.750	0.938	Open Manhole	450	S13.001	66.812	100	S13.000	66.812	100	
								S14.002	66.812	100	
S35	68.000	1.413	Open Manhole	1200	S1.011	66.587	225	S1.010	66.587	225	
								S13.001	66.712	100	
S36	68.100	1.528	Open Manhole	1200	S1.012	66.572	225	S1.011	66.572	225	
S33	67.750	0.700	Open Manhole	150	S15.000	67.050	100				
S34	67.750	0.806	Open Manhole	450	S15.001	66.944	100	S15.000	66.944	100	
SOUTLET	67.500	1.024	Open Manhole	1200	S1.013	66.476	225	S1.012	66.476	225	
								S15.001	66.870	100	
S	67.750	1.318	Open Manhole	0		OUTFALL		S1.013	66.432	225	

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PIPELINE SCHEDULES for Proposed

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)
S1.000	o	100	S1	68.600	67.900	0.600	Open Manhole	450
S1.001	o	100	S2	68.600	67.820	0.680	Open Manhole	450
S2.000	o	100	S3	68.500	67.800	0.600	Open Manhole	150
S3.000	o	100	S4	68.600	67.900	0.600	Open Manhole	150
S2.001	o	100	S5	68.600	67.710	0.790	Junction	
S1.002	o	150	S6	68.600	67.568	0.882	Open Manhole	450
S4.000	o	100	S7	68.500	67.800	0.600	Open Manhole	150
S5.000	o	100	S8	68.500	67.800	0.600	Open Manhole	150
S4.001	o	100	S9	68.500	67.712	0.688	Junction	
S1.003	o	150	S10	68.500	67.314	1.036	Junction	
S6.000	o	100	S11	68.500	67.800	0.600	Open Manhole	150

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)
S1.000	4.692	58.5	S2	68.600	67.820	0.680	Open Manhole	450
S1.001	10.379	51.4	S6	68.600	67.618	0.882	Open Manhole	450
S2.000	5.264	58.5	S5	68.600	67.710	0.790	Junction	
S3.000	10.322	58.5	S5	68.600	67.724	0.776	Junction	
S2.001	9.209	100.0	S6	68.600	67.618	0.882	Open Manhole	450
S1.002	7.585	29.9	S10	68.500	67.314	1.036	Junction	
S4.000	4.258	58.5	S9	68.500	67.727	0.673	Junction	
S5.000	5.144	58.5	S9	68.500	67.712	0.688	Junction	
S4.001	9.940	28.6	S10	68.500	67.364	1.036	Junction	
S1.003	10.248	29.9	S12	68.500	66.971	1.379	Junction	
S6.000	10.485	13.5	S12	68.500	67.021	1.379	Junction	

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PIPELINE SCHEDULES for Proposed								
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)
S1.004	o	150	S12	68.500	66.971	1.379	Junction	
S7.000	o	100	S13	68.000	67.300	0.600	Open Manhole	150
S1.005	o	225	S14	68.000	66.812	0.963	Junction	
S1.006	o	225	S15	68.000	66.772	1.003	Open Manhole	1200
S8.000	o	100	S16	68.000	67.300	0.600	Open Manhole	150
S9.000	o	100	S17	68.000	67.300	0.600	Open Manhole	150
S8.001	o	150	S18	68.000	66.836	1.014	Junction	
S1.007	o	225	S19	68.000	66.733	1.042	Open Manhole	1200
S10.000	o	100	S20	68.000	67.050	0.850	Open Manhole	150
S10.001	o	100	S21	68.000	66.962	0.938	Open Manhole	450
S1.008	o	225	S22	68.000	66.707	1.068	Junction	
S11.000	o	100	S23	68.000	67.050	0.850	Open Manhole	150
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)
S1.004	2.497	29.7	S14	68.000	66.887	0.963	Junction	
S7.000	16.618	45.8	S14	68.000	66.937	0.963	Junction	
S1.005	8.931	225.0	S15	68.000	66.772	1.003	Open Manhole	1200
S1.006	8.688	222.8	S19	68.000	66.733	1.042	Open Manhole	1200
S8.000	5.881	14.2	S18	68.000	66.886	1.014	Junction	
S9.000	9.936	24.0	S18	68.000	66.886	1.014	Junction	
S8.001	4.215	150.5	S19	68.000	66.808	1.042	Open Manhole	1200
S1.007	5.765	221.7	S22	68.000	66.707	1.068	Junction	
S10.000	8.758	99.5	S21	68.000	66.962	0.938	Open Manhole	450
S10.001	11.410	100.1	S22	68.000	66.848	1.052	Junction	
S1.008	4.842	220.1	S25	68.000	66.685	1.090	Junction	
S11.000	8.521	100.2	S24	68.000	66.965	0.935	Open Manhole	450
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PIPELINE SCHEDULES for Proposed								
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)
S11.001	o	100	S24	68.000	66.965	0.935	Open Manhole	450
S1.009	o	225	S25	68.000	66.685	1.090	Junction	
S12.000	o	100	S26	67.750	66.949	0.701	Open Manhole	150
S1.010	o	225	S27	68.000	66.625	1.150	Junction	
S13.000	o	100	S28	67.750	67.050	0.600	Open Manhole	150
S14.000	o	100	S29	67.750	67.050	0.600	Open Manhole	150
S14.001	o	100	S30	67.750	66.993	0.657	Open Manhole	150
S14.002	o	100	S31	67.750	66.889	0.761	Open Manhole	450
S13.001	o	100	S32	67.750	66.812	0.838	Open Manhole	450
S1.011	o	225	S35	68.000	66.587	1.188	Open Manhole	1200
S1.012	o	225	S36	68.100	66.572	1.303	Open Manhole	1200
S15.000	o	100	S33	67.750	67.050	0.600	Open Manhole	150
S15.001	o	100	S34	67.750	66.944	0.706	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)
S11.001	11.412	73.6	S25	68.000	66.810	1.090	Junction	
S1.009	13.519	224.0	S27	68.000	66.625	1.150	Junction	
S12.000	19.893	100.0	S27	68.000	66.750	1.150	Junction	
S1.010	8.461	222.7	S35	68.000	66.587	1.188	Open Manhole	1200
S13.000	12.404	52.1	S32	67.750	66.812	0.838	Open Manhole	450
S14.000	5.736	100.0	S30	67.750	66.993	0.657	Open Manhole	150
S14.001	10.404	100.0	S31	67.750	66.889	0.761	Open Manhole	450
S14.002	2.897	37.6	S32	67.750	66.812	0.838	Open Manhole	450
S13.001	2.556	25.6	S35	68.000	66.712	1.188	Open Manhole	1200
S1.011	3.382	225.5	S36	68.100	66.572	1.303	Open Manhole	1200
S1.012	10.600	110.4	SOUTLET	67.500	66.476	0.799	Open Manhole	1200
S15.000	17.888	168.1	S34	67.750	66.944	0.706	Open Manhole	450
S15.001	4.325	58.8	SOUTLET	67.500	66.870	0.530	Open Manhole	1200
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PIPELINE SCHEDULES for Proposed

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)
S1.013	o 225	SOUTLET	67.500	66.476	0.799	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)
S1.013	10.000	227.3	S	67.750	66.432	1.093	Open Manhole	0

Free Flowing Outfall Details for Proposed

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.013	S	67.750	66.432	0.000	0	0

Simulation Criteria for Proposed

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1
Number of Input Hydrographs	0	Number of Storage Structures	1
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	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	30
Ratio R	0.351		

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Online Controls for Proposed

Hydro-Brake® Optimum Manhole: SOUTLET, DS/PN: S1.013, Volume (m³): 1.6

Unit Reference	MD-SHE-0109-5000-0750-5000
Design Head (m)	0.750
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	109
Invert Level (m)	66.476
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.750	5.0
Flush-Flo™	0.226	5.0
Kick-Flo®	0.509	4.2
Mean Flow over Head Range	-	4.3

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	3.8	1.200	6.2	3.000	9.6	7.000	14.3
0.200	5.0	1.400	6.7	3.500	10.3	7.500	14.8
0.300	4.9	1.600	7.1	4.000	11.0	8.000	15.2
0.400	4.8	1.800	7.5	4.500	11.6	8.500	15.7
0.500	4.3	2.000	7.9	5.000	12.2	9.000	16.2
0.600	4.5	2.200	8.3	5.500	12.8	9.500	16.6
0.800	5.1	2.400	8.6	6.000	13.3		
1.000	5.7	2.600	8.9	6.500	13.8		

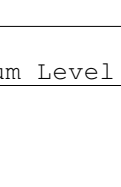
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Storage Structures for Proposed

Tank or Pond Manhole: SOUTLET, DS/PN: S1.013

Invert Level (m) 66.476

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	14.0	0.700	77.0	1.400	0.0	2.100	0.0
0.100	23.0	0.800	86.0	1.500	0.0	2.200	0.0
0.200	32.0	0.900	95.0	1.600	0.0	2.300	0.0
0.300	41.0	1.000	104.0	1.700	0.0	2.400	0.0
0.400	50.0	1.100	0.0	1.800	0.0	2.500	0.0
0.500	59.0	1.200	0.0	1.900	0.0		
0.600	68.0	1.300	0.0	2.000	0.0		

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

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 Storage Structures	1
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	0.351
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	18.000	Cv (Winter)	0.840

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

Profile(s)

Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440	Summer and Winter
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)
S1.000	S1	15 Winter	30	+0%					67.918
S1.001	S2	15 Summer	30	+0%					67.840
S2.000	S3	15 Winter	30	+0%					67.835
S3.000	S4	15 Winter	30	+0%					67.929
S2.001	S5	15 Summer	30	+0%					67.763
S1.002	S6	15 Summer	30	+0%					67.610
S4.000	S7	15 Winter	30	+0%					67.835
S5.000	S8	15 Winter	30	+0%					67.827
S4.001	S9	15 Summer	30	+0%					67.752
S1.003	S10	15 Summer	30	+0%					67.367
S6.000	S11	15 Winter	30	+0%					67.814
S1.004	S12	15 Winter	30	+0%					67.049
S7.000	S13	15 Winter	30	+0%					67.331
S1.005	S14	15 Winter	30	+0%					66.950
S1.006	S15	15 Winter	30	+0%	100/15 Summer				66.940
S8.000	S16	15 Winter	30	+0%					67.326
S9.000	S17	15 Winter	30	+0%					67.321
S8.001	S18	15 Winter	30	+0%					66.932
S1.007	S19	15 Winter	30	+0%	100/15 Summer				66.928
S10.000	S20	60 Winter	30	+0%	100/15 Summer				67.050
S10.001	S21	15 Summer	30	+0%	100/15 Summer				67.009

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
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PN	US/MH Name	Surcharged Flooded			Pipe		Status	Level Exceeded
		Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)		
S1.000	S1	-0.082	0.000	0.08		0.5	OK	
S1.001	S2	-0.080	0.000	0.09		0.7	OK	
S2.000	S3	-0.065	0.000	0.26		1.8	OK	
S3.000	S4	-0.071	0.000	0.19		1.4	OK	
S2.001	S5	-0.047	0.000	0.54		3.2	OK*	
S1.002	S6	-0.108	0.000	0.17		4.8	OK	
S4.000	S7	-0.065	0.000	0.27		1.8	OK	
S5.000	S8	-0.073	0.000	0.17		1.2	OK	
S4.001	S9	-0.060	0.000	0.34		3.8	OK*	
S1.003	S10	-0.097	0.000	0.27		8.8	OK*	
S6.000	S11	-0.086	0.000	0.05		0.8	OK	
S1.004	S12	-0.072	0.000	0.52		9.5	OK*	
S7.000	S13	-0.069	0.000	0.21		1.8	OK	
S1.005	S14	-0.087	0.000	0.36		10.7	OK*	
S1.006	S15	-0.057	0.000	0.36		10.1	OK	
S8.000	S16	-0.074	0.000	0.16		2.3	OK	
S9.000	S17	-0.079	0.000	0.10		1.2	OK	
S8.001	S18	-0.054	0.000	0.29		3.2	OK*	
S1.007	S19	-0.030	0.000	0.69		18.0	OK	
S10.000	S20	-0.100	0.000	0.00		0.0	OK	
S10.001	S21	-0.053	0.000	0.46		2.6	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.008	S22	60 Winter	30	+0%	100/15 Summer			
S11.000	S23	15 Winter	30	+0%	100/15 Summer			
S11.001	S24	15 Winter	30	+0%	100/15 Summer			
S1.009	S25	60 Winter	30	+0%				
S12.000	S26	15 Winter	30	+0%	100/15 Summer			
S1.010	S27	15 Winter	30	+0%				
S13.000	S28	15 Winter	30	+0%	100/30 Winter			
S14.000	S29	15 Winter	30	+0%	100/15 Winter			
S14.001	S30	15 Winter	30	+0%	100/15 Winter			
S14.002	S31	15 Summer	30	+0%	100/15 Summer			
S13.001	S32	60 Winter	30	+0%	100/15 Summer			
S1.011	S35	60 Winter	30	+0%	30/15 Summer			
S1.012	S36	60 Winter	30	+0%	30/15 Summer			
S15.000	S33	15 Winter	30	+0%	100/60 Winter			
S15.001	S34	15 Winter	30	+0%	100/30 Summer			
S1.013	SOUTLET	60 Winter	30	+0%	30/15 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Pipe Flow / Cap. (l/s)	Overflow Flow (l/s)	Status	Level Exceeded
S1.008	S22	66.922	-0.010	0.000	0.39	11.8	OK*	
S11.000	S23	67.078	-0.072	0.000	0.17	1.0	OK	
S11.001	S24	67.008	-0.057	0.000	0.39	2.6	OK	
S1.009	S25	66.910	0.000	0.000	0.38	13.1	SURCHARGED*	
S12.000	S26	67.008	-0.041	0.000	0.65	3.8	OK	
S1.010	S27	66.850	0.000	0.000	0.86	25.7	SURCHARGED*	
S13.000	S28	67.074	-0.076	0.000	0.13	1.0	OK	
S14.000	S29	67.081	-0.069	0.000	0.22	1.2	OK	
S14.001	S30	67.024	-0.069	0.000	0.21	1.2	OK	
S14.002	S31	66.929	-0.060	0.000	0.34	2.6	OK	
S13.001	S32	66.912	0.000	0.000	0.28	2.4	OK	
S1.011	S35	66.910	0.098	0.000	0.64	16.9	SURCHARGED	
S1.012	S36	66.908	0.111	0.000	0.39	16.4	SURCHARGED	
S15.000	S33	67.098	-0.052	0.000	0.47	2.1	OK	
S15.001	S34	66.982	-0.062	0.000	0.31	2.1	OK	
S1.013	SOUTLET	66.901	0.200	0.000	0.17	5.0	SURCHARGED	

