



Proposed On-line Adopted
Attenuation-Detention Basin 6 with
appropriate kerbs on site
Varying 1 in 3 to 1 in 4 side slopes
Base level 77.50m
Min. Crest level 79.00m
Top water level 78.630m (100yr return
period +50% climate change)
Base area 1435.3m²
Crest area 2185.3m²
Storage Volume 1046.5m³ (Max W.L.)
If required, basin to be provided with
Bentobox Liner. Additional Groundwater
monitoring required to confirm Basin
design.

Proposed 150mm RCP
Conversion to Existing 120mm RCP
Sewer at Ex MH 4102.
To be verified on site.

Proposed diversion of Existing
225mm RCP Foul Sewer required -
position to be accurately
determined on site.

Proposed Foul Connection to
Existing 300mm RCP Foul Sewer
at new manhole.
To be verified on site.

Ex MH 4102
To be verified on site.

KEY

- S.W. Foul
- Proposed Sewer
- Proposed Disconnection Manhole
- Proposed Finished Floor Level
- Existing Combined Sewer
- Existing SW Sewer
- Proposed Road Level
- Existing Level
- Site Boundary

A 100/1120 SAP Notes to be amended
Rev Date Initials Details

Drawing Revisions

North Arrow
Marchon, Whitehaven
Persimmon Homes (Lancashire)
UNAS 000 Quality Assurance ISO 9001 ISO Certificate 080254539
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Drawn By: SPRG
Checked By: SPRG
Scale: 1:500
Date: 23 Oct 23
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EDINBURGH BELLSHILL

Drawing No: 30506/100/2
Revision: A

APPENDIX G – DRAINAGE CALCULATIONS

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3 Worsley Court High Street Worsley Manchester	30506 Marchon Whitehaven Existing SW Run Off	
Date 06/10/2023 16:10 File	Designed by SAP Checked by	
Micro Drainage Source Control 2020.1.3		

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.400
Area (ha)	16.700	Urban	0.000
SAAR (mm)	999	Region Number	Region 10

Results l/s

QBAR Rural	86.1
QBAR Urban	86.1
Q100 years	179.2
Q1 year	74.9
Q30 years	146.1
Q100 years	179.2

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Micro Drainage		Network 2018.1

STORM SEWER DESIGN by the Modified Rational Method

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
1.000	60.373	4.200	14.4	0.393	4.00	0.0	0.600	o	300	Pipe/Conduit	
2.000	59.819	1.196	50.0	0.190	4.00	0.0	0.600	o	300	Pipe/Conduit	
1.001	55.431	1.109	50.0	0.148	0.00	0.0	0.600	o	375	Pipe/Conduit	
3.000	26.538	0.300	88.5	0.067	4.00	0.0	0.600	o	300	Pipe/Conduit	
1.002	66.006	3.000	22.0	0.194	0.00	0.0	0.600	o	450	Pipe/Conduit	
4.000	50.073	1.001	50.0	0.263	4.00	0.0	0.600	o	300	Pipe/Conduit	
4.001	15.944	0.159	100.3	0.113	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.003	33.815	0.676	50.0	0.103	0.00	0.0	0.600	o	525	Pipe/Conduit	
1.004	58.289	0.583	100.0	0.306	0.00	0.0	0.600	o	600	Pipe/Conduit	
5.000	12.590	0.230	54.7	0.144	4.00	0.0	0.600	o	300	Pipe/Conduit	
5.001	53.501	1.000	53.5	0.050	0.00	0.0	0.600	o	300	Pipe/Conduit	
5.002	49.405	0.823	60.0	0.395	0.00	0.0	0.600	o	375	Pipe/Conduit	
6.000	34.642	0.753	46.0	0.162	4.00	0.0	0.600	o	300	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	0.00	4.24	97.000	0.393	0.0	0.0	0.0	4.17	294.6	0.0
2.000	0.00	4.45	92.800	0.190	0.0	0.0	0.0	2.23	157.5	0.0
1.001	0.00	4.81	91.529	0.731	0.0	0.0	0.0	2.57	283.6	0.0
3.000	0.00	4.26	91.500	0.067	0.0	0.0	0.0	1.67	118.2	0.0
1.002	0.00	5.06	90.345	0.992	0.0	0.0	0.0	4.35	691.7	0.0
4.000	0.00	4.37	88.300	0.263	0.0	0.0	0.0	2.23	157.5	0.0
4.001	0.00	4.54	87.299	0.376	0.0	0.0	0.0	1.57	111.0	0.0
1.003	0.00	5.24	86.915	1.471	0.0	0.0	0.0	3.17	686.8	0.0
1.004	0.00	5.64	86.164	1.777	0.0	0.0	0.0	2.44	688.7	0.0
5.000	0.00	4.10	93.600	0.144	0.0	0.0	0.0	2.13	150.5	0.0
5.001	0.00	4.51	93.370	0.194	0.0	0.0	0.0	2.15	152.3	0.0
5.002	0.00	4.86	92.295	0.589	0.0	0.0	0.0	2.34	258.7	0.0
6.000	0.00	4.25	92.300	0.162	0.0	0.0	0.0	2.32	164.3	0.0

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Micro Drainage		Network 2018.1

STORM SEWER DESIGN by the Modified Rational Method

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
7.000	28.178	0.470	60.0	0.164	4.00	0.0	0.600	o	300	Pipe/Conduit	
5.003	61.292	1.500	40.9	0.110	0.00	0.0	0.600	o	375	Pipe/Conduit	
8.000	32.861	0.329	99.9	0.120	4.00	0.0	0.600	o	300	Pipe/Conduit	
8.001	58.796	0.588	100.0	0.163	0.00	0.0	0.600	o	375	Pipe/Conduit	
5.004	46.384	1.546	30.0	0.264	0.00	0.0	0.600	o	450	Pipe/Conduit	
5.005	30.839	0.900	34.3	0.150	0.00	0.0	0.600	o	450	Pipe/Conduit	
5.006	34.678	1.156	30.0	0.157	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.005	58.997	0.794	74.3	0.282	0.00	0.0	0.600	o	675	Pipe/Conduit	
9.000	26.287	0.526	50.0	0.135	4.00	0.0	0.600	o	300	Pipe/Conduit	
9.001	21.569	0.216	99.9	0.019	0.00	0.0	0.600	o	300	Pipe/Conduit	
9.002	51.790	0.518	100.0	0.114	0.00	0.0	0.600	o	300	Pipe/Conduit	
9.003	31.660	0.317	99.9	0.173	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.006	37.365	0.474	78.8	0.206	0.00	0.0	0.600	o	750	Pipe/Conduit	
1.007	12.663	0.257	49.3	0.121	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)
7.000	0.00	4.23	92.600	0.164	0.0	0.0	0.0	2.03	143.8	0.0
5.003	0.00	5.22	91.472	1.025	0.0	0.0	0.0	2.84	313.9	0.0
8.000	0.00	4.35	91.200	0.120	0.0	0.0	0.0	1.57	111.2	0.0
8.001	0.00	4.89	90.796	0.283	0.0	0.0	0.0	1.81	200.1	0.0
5.004	0.00	5.43	89.897	1.572	0.0	0.0	0.0	3.72	592.0	0.0
5.005	0.00	5.58	88.351	1.722	0.0	0.0	0.0	3.48	553.9	0.0
5.006	0.00	5.73	87.451	1.879	0.0	0.0	0.0	3.72	592.1	0.0
1.005	0.00	6.06	85.506	3.938	0.0	0.0	0.0	3.04	1088.9	0.0
9.000	0.00	4.20	86.000	0.135	0.0	0.0	0.0	2.23	157.6	0.0
9.001	0.00	4.42	85.474	0.154	0.0	0.0	0.0	1.57	111.2	0.0
9.002	0.00	4.97	85.258	0.268	0.0	0.0	0.0	1.57	111.1	0.0
9.003	0.00	5.31	84.740	0.441	0.0	0.0	0.0	1.57	111.2	0.0
1.006	0.00	6.25	83.973	4.585	0.0	0.0	0.0	3.15	1393.3	0.0
1.007	0.00	6.30	83.349	4.706	0.0	0.0	0.0	4.47	2843.5	0.0

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STORM SEWER DESIGN by the Modified Rational Method

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
1.008	14.097	0.286	49.3	0.012	0.00	0.0	0.600	o	900	Pipe/Conduit	
1.009	28.027	0.569	49.3	0.154	0.00	0.0	0.600	o	900	Pipe/Conduit	
1.010	33.023	0.670	49.3	0.114	0.00	0.0	0.600	o	900	Pipe/Conduit	
10.000	67.546	2.100	32.2	0.237	4.00	0.0	0.600	o	300	Pipe/Conduit	
11.000	21.403	0.600	35.7	0.153	4.00	0.0	0.600	o	300	Pipe/Conduit	
11.001	31.668	1.000	31.7	0.062	0.00	0.0	0.600	o	375	Pipe/Conduit	
10.001	33.129	1.100	30.1	0.223	0.00	0.0	0.600	o	375	Pipe/Conduit	
10.002	26.947	0.900	29.9	0.149	0.00	0.0	0.600	o	375	Pipe/Conduit	
12.000	72.670	2.000	36.3	0.248	4.00	0.0	0.600	o	300	Pipe/Conduit	
10.003	11.486	0.574	20.0	0.057	0.00	0.0	0.600	o	450	Pipe/Conduit	
10.004	32.761	1.000	32.8	0.046	0.00	0.0	0.600	o	450	Pipe/Conduit	
10.005	41.762	1.000	41.8	0.119	0.00	0.0	0.600	o	450	Pipe/Conduit	
10.006	63.116	1.800	35.1	0.296	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.011	19.398	0.394	49.2	0.125	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)
1.008	0.00	6.35	83.092	4.718	0.0	0.0	0.0	4.47	2843.0	0.0
1.009	0.00	6.46	82.806	4.872	0.0	0.0	0.0	4.47	2844.0	0.0
1.010	0.00	6.58	82.237	4.986	0.0	0.0	0.0	4.47	2843.1	0.0
10.000	0.00	4.40	92.900	0.237	0.0	0.0	0.0	2.78	196.7	0.0
11.000	0.00	4.14	92.400	0.153	0.0	0.0	0.0	2.64	186.7	0.0
11.001	0.00	4.30	91.725	0.215	0.0	0.0	0.0	3.23	356.7	0.0
10.001	0.00	4.57	90.725	0.675	0.0	0.0	0.0	3.31	365.8	0.0
10.002	0.00	4.71	89.625	0.824	0.0	0.0	0.0	3.32	366.9	0.0
12.000	0.00	4.46	90.900	0.248	0.0	0.0	0.0	2.62	185.0	0.0
10.003	0.00	4.75	88.650	1.129	0.0	0.0	0.0	4.56	725.4	0.0
10.004	0.00	4.90	88.076	1.175	0.0	0.0	0.0	3.56	566.5	0.0
10.005	0.00	5.12	87.076	1.294	0.0	0.0	0.0	3.15	501.5	0.0
10.006	0.00	5.43	86.076	1.590	0.0	0.0	0.0	3.44	547.5	0.0
1.011	0.00	6.65	81.567	6.701	0.0	0.0	0.0	4.47	2844.6	0.0

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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
13.000	30.533	0.900	33.9	0.087	4.00	0.0	0.600	o	300	Pipe/Conduit	
13.001	20.410	0.550	37.1	0.019	0.00	0.0	0.600	o	300	Pipe/Conduit	
13.002	22.651	0.500	45.3	0.161	0.00	0.0	0.600	o	300	Pipe/Conduit	
13.003	65.063	0.813	80.0	0.281	0.00	0.0	0.600	o	450	Pipe/Conduit	
13.004	85.568	1.070	80.0	0.140	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.012	73.137	0.800	91.4	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	
14.000	45.246	2.262	20.0	0.115	4.00	0.0	0.600	o	300	Pipe/Conduit	
14.001	95.264	5.200	18.3	0.091	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.013	97.705	1.954	50.0	0.139	0.00	0.0	0.600	o	900	Pipe/Conduit	
1.014	14.943	0.498	30.0	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	
1.015	22.570	1.101	20.5	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
1.016	58.322	2.845	20.5	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
1.017	26.400	1.288	20.5	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
1.018	10.250	0.103	99.5	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
1.019	52.470	3.199	16.4	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.020	82.280	0.549	149.9	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
15.000	27.800	1.900	14.6	0.062	4.00	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)
13.000	0.00	4.19	85.500	0.087	0.0	0.0	0.0	2.71	191.5	0.0
13.001	0.00	4.32	84.600	0.106	0.0	0.0	0.0	2.59	183.0	0.0
13.002	0.00	4.48	84.050	0.267	0.0	0.0	0.0	2.34	165.6	0.0
13.003	0.00	4.96	83.400	0.548	0.0	0.0	0.0	2.27	361.7	0.0
13.004	0.00	5.58	82.587	0.688	0.0	0.0	0.0	2.28	361.8	0.0
1.012	0.00	7.03	81.067	7.389	0.0	0.0	0.0	3.28	2085.3	0.0
14.000	0.00	4.21	89.500	0.115	0.0	0.0	0.0	3.53	249.6	0.0
14.001	0.00	4.64	87.238	0.206	0.0	0.0	0.0	3.69	260.9	0.0
1.013	0.00	7.39	80.267	7.734	0.0	0.0	0.0	4.44	2822.6	0.0
1.014	0.00	7.44	78.313	7.734	0.0	0.0	0.0	5.73	3646.1	0.0
1.015	0.00	7.51	77.500	7.734	0.0	0.0	0.0	4.96	1074.4	0.0
1.016	0.00	7.71	73.750	7.734	0.0	0.0	0.0	4.96	1074.4	0.0
1.017	0.00	7.80	67.988	7.734	0.0	0.0	0.0	4.96	1074.5	0.0
1.018	0.00	7.87	66.500	7.734	0.0	0.0	0.0	2.25	486.1	0.0
1.019	0.00	8.05	66.397	7.734	0.0	0.0	0.0	5.04	801.5	0.0
1.020	0.00	8.87	63.198	7.734	0.0	0.0	0.0	1.66	263.8	0.0
15.000	0.00	4.13	89.700	0.062	0.0	0.0	0.0	3.44	136.7	0.0

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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
15.001	28.873	1.444	20.0	0.072	0.00	0.0	0.600	o	225	Pipe/Conduit	
15.002	61.221	4.900	12.5	0.076	0.00	0.0	0.600	o	225	Pipe/Conduit	
15.003	19.879	1.300	15.3	0.267	0.00	0.0	0.600	o	375	Pipe/Conduit	
15.004	21.114	1.200	17.6	0.146	0.00	0.0	0.600	o	375	Pipe/Conduit	
15.005	26.557	1.600	16.6	0.026	0.00	0.0	0.600	o	375	Pipe/Conduit	
15.006	25.161	1.300	19.4	0.125	0.00	0.0	0.600	o	375	Pipe/Conduit	
16.000	19.258	0.644	29.9	0.153	4.00	0.0	0.600	o	225	Pipe/Conduit	
15.007	20.461	0.800	25.6	0.100	0.00	0.0	0.600	o	375	Pipe/Conduit	
15.008	9.500	0.700	13.6	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
15.009	13.730	1.144	12.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
15.010	15.150	1.056	14.3	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
15.011	9.850	0.394	25.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
15.012	14.975	1.248	12.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
15.013	16.400	1.051	15.6	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
17.000	43.394	3.900	11.1	0.051	4.00	0.0	0.600	o	150	Pipe/Conduit	
17.001	46.105	2.882	16.0	0.044	0.00	0.0	0.600	o	225	Pipe/Conduit	
17.002	87.359	0.874	100.0	0.068	0.00	0.0	0.600	o	300	Pipe/Conduit	
17.003	19.558	0.196	99.8	0.025	0.00	0.0	0.600	o	300	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)
15.001	0.00	4.30	87.800	0.134	0.0	0.0	0.0	2.94	116.9	0.0
15.002	0.00	4.57	86.356	0.210	0.0	0.0	0.0	3.72	148.0	0.0
15.003	0.00	4.64	81.306	0.477	0.0	0.0	0.0	4.65	514.0	0.0
15.004	0.00	4.72	80.006	0.623	0.0	0.0	0.0	4.34	479.1	0.0
15.005	0.00	4.82	78.806	0.649	0.0	0.0	0.0	4.47	493.3	0.0
15.006	0.00	4.93	77.206	0.774	0.0	0.0	0.0	4.14	456.7	0.0
16.000	0.00	4.13	76.700	0.153	0.0	0.0	0.0	2.40	95.5	0.0
15.007	0.00	5.02	74.500	1.027	0.0	0.0	0.0	3.60	397.1	0.0
15.008	0.00	5.06	73.500	1.027	0.0	0.0	0.0	4.29	303.2	0.0
15.009	0.00	5.11	72.800	1.027	0.0	0.0	0.0	4.56	322.5	0.0
15.010	0.00	5.17	71.656	1.027	0.0	0.0	0.0	4.17	294.9	0.0
15.011	0.00	5.22	70.500	1.027	0.0	0.0	0.0	3.16	223.2	0.0
15.012	0.00	5.27	68.449	1.027	0.0	0.0	0.0	4.56	322.6	0.0
15.013	0.00	5.34	67.201	1.027	0.0	0.0	0.0	4.00	282.7	0.0
17.000	0.00	4.24	92.400	0.051	0.0	0.0	0.0	3.04	53.7	0.0
17.001	0.00	4.47	88.425	0.095	0.0	0.0	0.0	3.29	130.7	0.0
17.002	0.00	5.40	85.468	0.163	0.0	0.0	0.0	1.57	111.2	0.0
17.003	0.00	5.60	84.594	0.188	0.0	0.0	0.0	1.57	111.3	0.0

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STORM SEWER DESIGN by the Modified Rational Method

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
17.004	20.477	0.474	43.2	0.021	0.00	0.0	0.600	o	300	Pipe/Conduit	
18.000	55.432	1.600	34.6	0.124	4.00	0.0	0.600	o	225	Pipe/Conduit	
17.005	65.432	4.600	14.2	0.102	0.00	0.0	0.600	o	300	Pipe/Conduit	
17.006	16.589	1.106	15.0	0.244	0.00	0.0	0.600	o	375	Pipe/Conduit	
17.007	44.193	3.683	12.0	0.111	0.00	0.0	0.600	o	375	Pipe/Conduit	
17.008	43.517	3.500	12.4	0.366	0.00	0.0	0.600	o	450	Pipe/Conduit	
17.009	36.014	1.800	20.0	0.140	0.00	0.0	0.600	o	450	Pipe/Conduit	
15.014	10.000	0.100	100.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
15.015	10.200	0.850	12.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
15.016	13.900	0.278	50.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
19.000	49.235	3.200	15.4	0.123	4.00	0.0	0.600	o	225	Pipe/Conduit	
19.001	26.842	2.000	13.4	0.119	0.00	0.0	0.600	o	300	Pipe/Conduit	
20.000	44.500	0.556	80.0	0.076	4.00	0.0	0.600	o	225	Pipe/Conduit	
19.002	53.911	3.823	14.1	0.064	0.00	0.0	0.600	o	300	Pipe/Conduit	
19.003	22.000	1.833	12.0	0.229	0.00	0.0	0.600	o	300	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)
17.004	0.00	5.75	84.398	0.209	0.0	0.0	0.0	2.40	169.6	0.0
18.000	0.00	4.41	85.600	0.124	0.0	0.0	0.0	2.23	88.7	0.0
17.005	0.00	6.01	83.924	0.435	0.0	0.0	0.0	4.19	296.2	0.0
17.006	0.00	6.07	77.900	0.679	0.0	0.0	0.0	4.70	519.0	0.0
17.007	0.00	6.21	76.794	0.790	0.0	0.0	0.0	5.26	580.4	0.0
17.008	0.00	6.33	73.036	1.156	0.0	0.0	0.0	5.79	920.8	0.0
17.009	0.00	6.46	68.000	1.296	0.0	0.0	0.0	4.56	725.5	0.0
15.014	0.00	6.56	66.000	2.323	0.0	0.0	0.0	1.81	200.1	0.0
15.015	0.00	6.59	65.900	2.323	0.0	0.0	0.0	5.25	580.4	0.0
15.016	0.00	6.68	62.928	2.323	0.0	0.0	0.0	2.57	283.6	0.0
19.000	0.00	4.24	77.000	0.123	0.0	0.0	0.0	3.35	133.3	0.0
19.001	0.00	4.35	73.725	0.242	0.0	0.0	0.0	4.31	304.9	0.0
20.000	0.00	4.51	71.550	0.076	0.0	0.0	0.0	1.46	58.2	0.0
19.002	0.00	4.72	70.919	0.382	0.0	0.0	0.0	4.21	297.5	0.0
19.003	0.00	4.80	67.096	0.611	0.0	0.0	0.0	4.56	322.5	0.0

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STORM SEWER DESIGN by the Modified Rational Method

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
19.004	26.000	0.520	50.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.021	7.500	0.075	100.0	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
1.022	90.840	8.500	10.7	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)
19.004	0.00	5.00	63.170	0.611	0.0	0.0	0.0	2.23	157.5	0.0
1.021	0.00	8.92	62.500	10.668	0.0	0.0	0.0	2.80	1236.4	0.0
1.022	0.00	9.19	62.425	10.668	0.0	0.0	0.0	5.57	615.1	0.0

Simulation Criteria for Storm

Volumetric Runoff Coeff	1.000	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	6
Number of Online Controls	3	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)	2	Cv (Summer)	1.000
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	16.000	Storm Duration (mins)	30
Ratio R	0.264		

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: 4, DS/PN: 1.019, Volume (m³): 9.1

Unit Reference	MD-SHE-0390-1000-1350-1000
Design Head (m)	1.350
Design Flow (l/s)	100.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	390
Invert Level (m)	66.397
Minimum Outlet Pipe Diameter (mm)	450
Suggested Manhole Diameter (mm)	Site Specific Design (Contact Hydro International)

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.350	100.0
Flush-Flo™	0.589	99.9
Kick-Flo®	1.047	88.4
Mean Flow over Head Range	-	80.6

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	10.8	1.200	94.4	3.000	147.5	7.000	223.3
0.200	38.6	1.400	101.8	3.500	159.0	7.500	231.0
0.300	74.0	1.600	108.6	4.000	169.7	8.000	238.4
0.400	96.9	1.800	115.0	4.500	179.8	8.500	245.6
0.500	99.3	2.000	121.0	5.000	189.3	9.000	252.6
0.600	99.9	2.200	126.8	5.500	198.4	9.500	259.4
0.800	97.7	2.400	132.3	6.000	207.0		
1.000	91.2	2.600	137.5	6.500	215.3		

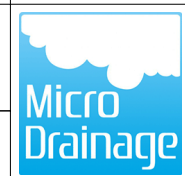
Hydro-Brake® Optimum Manhole: 29, DS/PN: 15.015, Volume (m³): 3.8

Unit Reference	MD-SHE-0213-2500-1450-2500
Design Head (m)	1.450
Design Flow (l/s)	25.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	213
Invert Level (m)	65.900
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1800

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<u>Hydro-Brake® Optimum Manhole: 29, DS/PN: 15.015, Volume (m³): 3.8</u>							
Control Points		Head (m)	Flow (l/s)				
Design Point (Calculated)		1.450	24.9				
Flush-Flo™		0.444	24.9				
Kick-Flo®		0.975	20.7				
Mean Flow over Head Range		-	21.4				
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	7.2	1.200	22.8	3.000	35.3	7.000	53.2
0.200	20.7	1.400	24.5	3.500	38.1	7.500	55.0
0.300	24.3	1.600	26.1	4.000	40.6	8.000	56.8
0.400	24.9	1.800	27.7	4.500	43.0	8.500	58.5
0.500	24.8	2.000	29.1	5.000	45.2	9.000	60.1
0.600	24.6	2.200	30.5	5.500	47.4	9.500	61.7
0.800	23.5	2.400	31.8	6.000	49.4		
1.000	20.9	2.600	33.0	6.500	51.4		
<u>Hydro-Brake® Optimum Manhole: 2, DS/PN: 1.022, Volume (m³): 9.6</u>							
Unit Reference		MD-SHE-0366-8610-1400-8610					
Design Head (m)		1.400					
Design Flow (l/s)		86.1					
Flush-Flo™		Calculated					
Objective		Minimise upstream storage					
Application		Surface					
Sump Available		Yes					
Diameter (mm)		366					
Invert Level (m)		62.425					
Minimum Outlet Pipe Diameter (mm)		450					
Suggested Manhole Diameter (mm)				Site Specific Design (Contact Hydro International)			
Control Points		Head (m)	Flow (l/s)				
Design Point (Calculated)		1.400	86.1				
Flush-Flo™		0.573	86.1				
Kick-Flo®		1.066	75.4				
Mean Flow over Head Range		-	70.4				
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	10.4	0.300	68.7	0.500	85.7	0.800	84.1
0.200	36.7	0.400	84.0	0.600	86.0	1.000	78.8
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Hydro-Brake® Optimum Manhole: 2, DS/PN: 1.022, Volume (m³): 9.6

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
1.200	79.9	2.400	111.8	5.000	160.0	8.000	201.4
1.400	86.1	2.600	116.3	5.500	167.6	8.500	207.4
1.600	91.8	3.000	124.7	6.000	174.9	9.000	213.3
1.800	97.2	3.500	134.4	6.500	181.9	9.500	219.1
2.000	102.3	4.000	143.4	7.000	188.6		
2.200	107.2	4.500	151.9	7.500	195.1		

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1 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 * 10m³/ha Storage 2.000

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 6

Number of Online Controls 3

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 0.264

Region England and Wales Cv (Summer) 1.000

M5-60 (mm) 16.000 Cv (Winter) 1.000

Margin for Flood Risk Warning (mm) 150.0

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, 45, 50

US/MH

PN

Name

Storm

Return Period

Climate Change

First (X) Surcharge

First (Y) Flood

First (Z) Overflow

Overflow Act.

1.000

21 15

Summer

1

+0%

2.000

88 15

Summer

1

+0%

100/15

Summer

1.001

20 15

Summer

1

+0%

30/15

Summer

3.000

87 15

Summer

1

+0%

1.002

19 15

Summer

1

+0%

100/15

Summer

4.000

86 15

Summer

1

+0%

30/15

Summer

100/15

Summer

4.001

85 15

Summer

1

+0%

30/15

Summer

1.003

18 15

Summer

1

+0%

30/15

Summer

1.004

17 15

Summer

1

+0%

30/15

Summer

5.000

80 15

Summer

1

+0%

100/15

Summer

5.001

79 15

Summer

1

+0%

30/15

Summer

5.002

78 15

Summer

1

+0%

30/15

Summer

100/15

Summer

6.000

84 15

Summer

1

+0%

30/15

Summer

100/15

Summer

7.000

83 15

Summer

1

+0%

30/15

Summer

100/15

Summer

5.003

77 15

Summer

1

+0%

30/15

Summer

8.000

82 15

Summer

1

+0%

100/15

Summer

8.001

81 15

Summer

1

+0%

100/15

Summer

5.004

76 15

Summer

1

+0%

30/15

Summer

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

PN	US/MH Name	Water	Surcharged	Flooded	Flow / Cap.	Overflow (l/s)	Pipe	Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m³)			Flow (l/s)		
1.000	21	97.089	-0.211	0.000	0.19		54.5	OK	
2.000	88	92.884	-0.216	0.000	0.17		26.1	OK	
1.001	20	91.685	-0.219	0.000	0.36		94.9	OK	
3.000	87	91.560	-0.240	0.000	0.09		9.3	OK	
1.002	19	90.480	-0.315	0.000	0.19		123.0	OK	
4.000	86	88.400	-0.200	0.000	0.24		36.2	OK	3
4.001	85	87.452	-0.147	0.000	0.51		47.8	OK	
1.003	18	87.117	-0.323	0.000	0.31		181.7	OK	
1.004	17	86.409	-0.355	0.000	0.35		212.9	OK	
5.000	80	93.682	-0.218	0.000	0.17		20.0	OK	
5.001	79	93.454	-0.216	0.000	0.17		24.9	OK	
5.002	78	92.429	-0.241	0.000	0.27		65.1	OK	5
6.000	84	92.377	-0.223	0.000	0.15		22.5	OK	2
7.000	83	92.684	-0.216	0.000	0.18		22.8	OK	1
5.003	77	91.641	-0.206	0.000	0.40		119.1	OK	
8.000	82	91.281	-0.219	0.000	0.16		16.6	OK	
8.001	81	90.903	-0.268	0.000	0.18		33.5	OK	
5.004	76	90.079	-0.268	0.000	0.34		180.5	OK	

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Micro Drainage					Network 2018.1					
<u>1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for Storm</u>										
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.		
5.005	75	15 Summer	1	+0%	30/15 Summer	100/15 Summer				
5.006	74	15 Summer	1	+0%	30/15 Summer	100/15 Summer				
1.005	16	15 Summer	1	+0%	30/15 Summer					
9.000	73	15 Summer	1	+0%	30/15 Summer	100/15 Summer				
9.001	72	15 Summer	1	+0%	30/15 Summer					
9.002	71	15 Summer	1	+0%	30/15 Summer					
9.003	70	15 Summer	1	+0%	30/15 Summer	100/30 Summer				
1.006	15	15 Summer	1	+0%	30/15 Summer					
1.007	14	15 Summer	1	+0%	30/15 Summer					
1.008	13	15 Summer	1	+0%	30/15 Summer					
1.009	12	15 Summer	1	+0%	30/15 Summer					
1.010	11	15 Summer	1	+0%	30/15 Summer					
10.000	67	15 Summer	1	+0%	100/15 Summer					
11.000	69	15 Summer	1	+0%	100/15 Summer					
11.001	68	15 Summer	1	+0%	100/15 Summer					
10.001	66	15 Summer	1	+0%	30/15 Summer					
10.002	65	15 Summer	1	+0%	30/15 Summer	100/15 Summer				
12.000	89	15 Summer	1	+0%	100/15 Summer					
10.003	64	15 Summer	1	+0%	30/15 Summer	100/15 Summer				
10.004	63	15 Summer	1	+0%	30/15 Summer					
10.005	62	15 Summer	1	+0%	30/15 Summer					
10.006	61	15 Summer	1	+0%	30/15 Summer					
1.011	10	15 Summer	1	+0%	30/15 Summer					
13.000	60	15 Summer	1	+0%						
13.001	59	15 Summer	1	+0%						
13.002	58	15 Summer	1	+0%	100/15 Summer					
13.003	57	15 Summer	1	+0%	100/15 Summer					
13.004	56	15 Summer	1	+0%	100/15 Summer					
1.012	9	15 Summer	1	+0%	30/15 Summer					
14.000	55	15 Summer	1	+0%						
14.001	54	15 Summer	1	+0%						
1.013	8	15 Summer	1	+0%	30/15 Summer					
1.014	7	15 Summer	1	+0%	30/15 Summer					
1.015	Headwall	60 Summer	1	+0%	30/15 Summer					
1.016	6	60 Summer	1	+0%	100/30 Summer					
1.017	5	60 Summer	1	+0%	30/30 Summer					
1.018	Hedwall	960 Summer	1	+0%	30/120 Summer					
1.019	4	960 Summer	1	+0%	30/60 Summer					
1.020	3	960 Summer	1	+0%	30/1440 Winter					
15.000	52	15 Summer	1	+0%						
15.001	51	15 Summer	1	+0%						
15.002	50	15 Summer	1	+0%						
15.003	49	15 Summer	1	+0%						
15.004	48	15 Summer	1	+0%	100/15 Summer					
15.005	47	15 Summer	1	+0%	100/15 Summer					
15.006	46	15 Summer	1	+0%	100/15 Summer					
16.000	53	15 Summer	1	+0%	100/15 Summer					
15.007	45	15 Summer	1	+0%	30/15 Summer					
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<u>1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for Storm</u>									

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

PN	US/MH Name	Water	Surcharged	Flooded	Flow / Overflow		Pipe	Level	
		Level (m)	Depth (m)	Volume (m³)			Flow (l/s)	Status	Exceeded
15.007	45	74.652	-0.223	0.000	0.33		111.8	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
15.008	Headwall	60 Summer	1	+0%	100/15 Summer			
15.009	44	60 Summer	1	+0%				
15.010	43	60 Summer	1	+0%				
15.011	Headwall	240 Summer	1	+0%				
15.012	42	240 Summer	1	+0%				
15.013	41	240 Summer	1	+0%				
17.000	39	15 Summer	1	+0%				
17.001	38	15 Summer	1	+0%				
17.002	37	15 Summer	1	+0%				
17.003	36	15 Summer	1	+0%	100/15 Summer			
17.004	35	15 Summer	1	+0%				
18.000	40	15 Summer	1	+0%				
17.005	34	15 Summer	1	+0%				
17.006	33	15 Summer	1	+0%				
17.007	32	15 Summer	1	+0%				
17.008	31	15 Summer	1	+0%				
17.009	30	15 Summer	1	+0%	100/15 Summer			
15.014	Headwall	600 Summer	1	+0%	30/60 Summer			
15.015	29	480 Summer	1	+0%	30/30 Summer			
15.016	28	600 Summer	1	+0%	30/960 Summer			
19.000	26	15 Summer	1	+0%				
19.001	25	15 Summer	1	+0%				
20.000	27	15 Summer	1	+0%				
19.002	24	15 Summer	1	+0%	100/15 Summer			
19.003	23	15 Summer	1	+0%	30/15 Summer			
19.004	22	15 Summer	1	+0%	30/15 Summer			
1.021	Headwall	1440 Summer	1	+0%	30/720 Summer			
1.022	2	960 Summer	1	+0%	1/600 Summer			

PN	US/MH Name	Water Surcharged Flooded			Pipe		Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)		
15.008	Headwall	73.598	-0.202	0.000	0.23	49.1	OK	
15.009	44	72.887	-0.213	0.000	0.18	49.1	OK	
15.010	43	71.746	-0.210	0.000	0.20	49.0	OK	
15.011	Headwall	70.579	-0.221	0.000	0.16	25.0	OK	
15.012	42	68.510	-0.239	0.000	0.09	25.0	OK	
15.013	41	67.265	-0.236	0.000	0.10	25.0	OK	
17.000	39	92.437	-0.113	0.000	0.14	7.1	OK	
17.001	38	88.471	-0.179	0.000	0.09	11.7	OK	
17.002	37	85.552	-0.216	0.000	0.17	17.9	OK	
17.003	36	84.687	-0.207	0.000	0.21	20.4	OK	
17.004	35	84.476	-0.222	0.000	0.15	22.4	OK	
18.000	40	85.668	-0.157	0.000	0.20	17.2	OK	
17.005	34	84.008	-0.216	0.000	0.17	48.8	OK	
17.006	33	78.008	-0.267	0.000	0.18	73.7	OK	

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

PN	US/MH Name	Water		Surcharged		Flooded		Pipe		Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)				
17.007		32 76.895	-0.274	0.000	0.16		85.1			OK	
17.008		31 73.152	-0.334	0.000	0.15		121.9			OK	
17.009		30 68.142	-0.308	0.000	0.21		136.3			OK	
15.014	Headwall	66.178	-0.197	0.000	0.20		24.9			OK	
15.015		29 66.188	-0.087	0.000	0.06		22.9			OK	
15.016		28 63.011	-0.292	0.000	0.11		23.0			OK	
19.000		26 77.054	-0.171	0.000	0.13		17.1			OK	
19.001		25 73.790	-0.235	0.000	0.11		29.5			OK	
20.000		27 71.616	-0.159	0.000	0.19		10.5			OK	
19.002		24 71.001	-0.218	0.000	0.17		46.7			OK	
19.003		23 67.197	-0.199	0.000	0.25		70.4			OK	
19.004		22 63.321	-0.149	0.000	0.49		69.7			OK	
1.021	Headwall	62.804	-0.446	0.000	0.14		85.8			OK	
1.022		2 62.820	0.020	0.000	0.14		82.5			SURCHARGED	

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

PN	US/MH Name	Water		Surcharged		Flooded		Pipe		Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)				
1.000	21	97.181	-0.119	0.000	0.68		190.0		OK		
2.000	88	92.990	-0.110	0.000	0.61		90.7		OK		
1.001	20	92.600	0.696	0.000	1.26		333.4		SURCHARGED		
3.000	87	91.613	-0.187	0.000	0.31		32.4		OK		
1.002	19	90.626	-0.169	0.000	0.69		444.7		OK		
4.000	86	89.095	0.495	0.000	0.75		111.9		SURCHARGED		3
4.001	85	88.737	1.138	0.000	1.53		143.4		SURCHARGED		
1.003	18	88.458	1.018	0.000	1.00		581.8		SURCHARGED		
1.004	17	87.769	1.005	0.000	1.10		676.0		SURCHARGED		
5.000	80	93.798	-0.102	0.000	0.58		69.6		OK		
5.001	79	93.757	0.087	0.000	0.63		90.7		SURCHARGED		
5.002	78	93.567	0.897	0.000	0.86		204.5		SURCHARGED		5
6.000	84	93.151	0.551	0.000	0.49		74.6		SURCHARGED		2
7.000	83	93.118	0.218	0.000	0.59		76.9		SURCHARGED		1
5.003	77	93.010	1.163	0.000	1.14		334.9		SURCHARGED		
8.000	82	91.362	-0.138	0.000	0.57		57.8		OK		
8.001	81	91.158	-0.013	0.000	0.70		131.8		OK		
5.004	76	91.032	0.685	0.000	0.95		505.5		SURCHARGED		

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<u>30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for Storm</u>							
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
5.005	75	15 Summer	30	+45%	30/15 Summer	100/15 Summer	
5.006	74	30 Summer	30	+45%	30/15 Summer	100/15 Summer	
1.005	16	30 Summer	30	+45%	30/15 Summer		
9.000	73	15 Summer	30	+45%	30/15 Summer	100/15 Summer	
9.001	72	15 Summer	30	+45%	30/15 Summer		
9.002	71	15 Summer	30	+45%	30/15 Summer		
9.003	70	30 Summer	30	+45%	30/15 Summer	100/30 Summer	
1.006	15	30 Summer	30	+45%	30/15 Summer		
1.007	14	30 Summer	30	+45%	30/15 Summer		
1.008	13	30 Summer	30	+45%	30/15 Summer		
1.009	12	30 Summer	30	+45%	30/15 Summer		
1.010	11	30 Summer	30	+45%	30/15 Summer		
10.000	67	15 Summer	30	+45%	100/15 Summer		
11.000	69	15 Summer	30	+45%	100/15 Summer		
11.001	68	15 Summer	30	+45%	100/15 Summer		
10.001	66	15 Summer	30	+45%	30/15 Summer		
10.002	65	15 Summer	30	+45%	30/15 Summer	100/15 Summer	
12.000	89	15 Summer	30	+45%	100/15 Summer		
10.003	64	15 Summer	30	+45%	30/15 Summer	100/15 Summer	
10.004	63	15 Summer	30	+45%	30/15 Summer		
10.005	62	15 Summer	30	+45%	30/15 Summer		
10.006	61	15 Summer	30	+45%	30/15 Summer		
1.011	10	30 Summer	30	+45%	30/15 Summer		
13.000	60	15 Summer	30	+45%			
13.001	59	15 Summer	30	+45%			
13.002	58	15 Summer	30	+45%	100/15 Summer		
13.003	57	15 Summer	30	+45%	100/15 Summer		
13.004	56	15 Summer	30	+45%	100/15 Summer		
1.012	9	30 Summer	30	+45%	30/15 Summer		
14.000	55	15 Summer	30	+45%			
14.001	54	15 Summer	30	+45%			
1.013	8	30 Summer	30	+45%	30/15 Summer		
1.014	7	30 Summer	30	+45%	30/15 Summer		
1.015	Headwall	60 Summer	30	+45%	30/15 Summer		
1.016	6	60 Summer	30	+45%	100/30 Summer		
1.017	5	60 Summer	30	+45%	30/30 Summer		
1.018	Hedwall	960 Summer	30	+45%	30/120 Summer		
1.019	4	720 Summer	30	+45%	30/60 Summer		
1.020	3	1440 Winter	30	+45%	30/1440 Winter		
15.000	52	15 Summer	30	+45%			
15.001	51	15 Summer	30	+45%			
15.002	50	15 Summer	30	+45%			
15.003	49	15 Summer	30	+45%			
15.004	48	15 Summer	30	+45%	100/15 Summer		
15.005	47	15 Summer	30	+45%	100/15 Summer		
15.006	46	15 Summer	30	+45%	100/15 Summer		
16.000	53	15 Summer	30	+45%	100/15 Summer		
15.007	45	15 Summer	30	+45%	30/15 Summer		
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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm									
PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
5.005	75		89.630	0.829	0.000	1.13		542.0	SURCHARGED
5.006	74		88.494	0.593	0.000	1.12		582.0	SURCHARGED
1.005	16		87.097	0.916	0.000	1.38		1314.9	SURCHARGED
9.000	73		86.666	0.366	0.000	0.44		62.8	SURCHARGED
9.001	72		86.522	0.748	0.000	0.58		56.4	SURCHARGED
9.002	71		86.397	0.839	0.000	0.82		85.8	SURCHARGED
9.003	70		86.137	1.097	0.000	1.40		141.6	SURCHARGED
1.006	15		85.732	1.009	0.000	1.32		1424.5	SURCHARGED
1.007	14		84.931	0.682	0.000	1.25		1425.1	SURCHARGED
1.008	13		84.536	0.544	0.000	1.19		1430.2	SURCHARGED
1.009	12		84.136	0.430	0.000	0.88		1492.1	SURCHARGED
1.010	11		83.718	0.581	0.000	0.85		1561.1	SURCHARGED
10.000	67		93.069	-0.131	0.000	0.61		114.0	OK
11.000	69		92.541	-0.159	0.000	0.45		74.0	OK
11.001	68		91.872	-0.228	0.000	0.33		104.0	OK
10.001	66		91.326	0.226	0.000	0.89		291.2	SURCHARGED
10.002	65		90.593	0.593	0.000	1.05		336.6	SURCHARGED
12.000	89		91.081	-0.119	0.000	0.67		118.6	OK
10.003	64		89.672	0.572	0.000	1.04		443.2	SURCHARGED
10.004	63		89.074	0.548	0.000	0.91		450.0	SURCHARGED
10.005	62		88.240	0.714	0.000	1.09		487.0	SURCHARGED
10.006	61		87.063	0.537	0.000	1.14		576.2	SURCHARGED
1.011	10		83.288	0.821	0.000	1.45		2055.1	SURCHARGED
13.000	60		85.599	-0.201	0.000	0.24		42.1	OK
13.001	59		84.716	-0.184	0.000	0.32		51.3	OK
13.002	58		84.270	-0.080	0.000	0.88		129.3	OK
13.003	57		83.703	-0.147	0.000	0.77		259.2	OK
13.004	56		82.998	-0.039	0.000	0.89		304.3	OK
1.012	9		82.462	0.495	0.000	1.26		2265.8	SURCHARGED
14.000	55		89.599	-0.201	0.000	0.24		55.6	OK
14.001	54		87.368	-0.170	0.000	0.39		99.6	OK
1.013	8		81.253	0.086	0.000	0.90		2261.8	SURCHARGED
1.014	7		79.679	0.466	0.000	1.42		2261.6	SURCHARGED
1.015	Headwall		78.324	0.299	0.000	1.14		916.0	SURCHARGED
1.016	6		74.152	-0.123	0.000	0.94		915.9	OK
1.017	5		68.624	0.111	0.000	1.05		915.7	SURCHARGED
1.018	Hedwall		67.232	0.207	0.000	0.44		109.4	SURCHARGED
1.019	4		67.227	0.380	0.000	0.14		99.9	SURCHARGED
1.020	3		63.688	0.040	0.000	0.40		99.9	SURCHARGED
15.000	52		89.774	-0.151	0.000	0.24		30.0	OK
15.001	51		87.925	-0.100	0.000	0.60		64.8	OK
15.002	50		86.497	-0.084	0.000	0.71		101.6	OK
15.003	49		81.502	-0.179	0.000	0.54		230.8	OK
15.004	48		80.248	-0.133	0.000	0.74		301.1	OK
15.005	47		79.045	-0.136	0.000	0.73		312.8	OK
15.006	46		77.494	-0.087	0.000	0.94		371.4	OK
16.000	53		76.861	-0.064	0.000	0.86		74.0	OK
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<u>30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for Storm</u>									
PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
15.007	45		75.848	0.973	0.000	1.45		483.6	SURCHARGED

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<u>30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for Storm</u>																										
	<table> <tr> <th>PN</th><th>US/MH Name</th><th>Level Exceeded</th></tr> <tr> <td>15.002</td><td>50</td><td></td></tr> <tr> <td>15.003</td><td>49</td><td></td></tr> <tr> <td>15.004</td><td>48</td><td></td></tr> <tr> <td>15.005</td><td>47</td><td></td></tr> <tr> <td>15.006</td><td>46</td><td></td></tr> <tr> <td>16.000</td><td>53</td><td></td></tr> <tr> <td>15.007</td><td>45</td><td></td></tr> </table>	PN	US/MH Name	Level Exceeded	15.002	50		15.003	49		15.004	48		15.005	47		15.006	46		16.000	53		15.007	45		
PN	US/MH Name	Level Exceeded																								
15.002	50																									
15.003	49																									
15.004	48																									
15.005	47																									
15.006	46																									
16.000	53																									
15.007	45																									
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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
15.008	Headwall	30 Summer	30	+45%	100/15 Summer			
15.009	44	30 Summer	30	+45%				
15.010	43	30 Summer	30	+45%				
15.011	Headwall	120 Summer	30	+45%				
15.012	42	120 Summer	30	+45%				
15.013	41	120 Summer	30	+45%				
17.000	39	15 Summer	30	+45%				
17.001	38	15 Summer	30	+45%				
17.002	37	15 Summer	30	+45%				
17.003	36	15 Summer	30	+45%	100/15 Summer			
17.004	35	15 Summer	30	+45%				
18.000	40	15 Summer	30	+45%				
17.005	34	15 Summer	30	+45%				
17.006	33	15 Summer	30	+45%				
17.007	32	15 Summer	30	+45%				
17.008	31	15 Summer	30	+45%				
17.009	30	15 Summer	30	+45%	100/15 Summer			
15.014	Headwall	720 Summer	30	+45%	30/60 Summer			
15.015	29	720 Summer	30	+45%	30/30 Summer			
15.016	28	1440 Winter	30	+45%	30/960 Summer			
19.000	26	15 Summer	30	+45%				
19.001	25	15 Summer	30	+45%				
20.000	27	15 Summer	30	+45%				
19.002	24	15 Summer	30	+45%	100/15 Summer			
19.003	23	15 Summer	30	+45%	30/15 Summer			
19.004	22	15 Summer	30	+45%	30/15 Summer			
1.021	Headwall	1440 Winter	30	+45%	30/720 Summer			
1.022	2	1440 Winter	30	+45%	1/600 Summer			

PN	US/MH Name	Water Surcharged			Flooded		Pipe		Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)			
15.008	Headwall	73.759	-0.041	0.000	1.00		209.6		OK	
15.009	44	73.001	-0.099	0.000	0.79		209.6		OK	
15.010	43	71.868	-0.088	0.000	0.85		209.6		OK	
15.011	Headwall	70.703	-0.097	0.000	0.79		124.7		OK	
15.012	42	68.592	-0.157	0.000	0.46		124.7		OK	
15.013	41	67.355	-0.146	0.000	0.52		124.7		OK	
17.000	39	92.473	-0.077	0.000	0.47		24.7		OK	
17.001	38	88.519	-0.131	0.000	0.37		45.9		OK	
17.002	37	85.660	-0.108	0.000	0.68		73.4		OK	
17.003	36	84.816	-0.078	0.000	0.88		85.2		OK	
17.004	35	84.574	-0.124	0.000	0.64		94.3		OK	
18.000	40	85.739	-0.086	0.000	0.70		59.6		OK	
17.005	34	84.113	-0.111	0.000	0.69		194.4		OK	
17.006	33	78.150	-0.125	0.000	0.75		309.1		OK	

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

PN	US/MH Name	Water		Surcharged		Flooded		Pipe		Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)				
17.007		32 77.026	-0.143	0.000	0.68		359.0			OK	
17.008		31 73.304	-0.182	0.000	0.64		531.4			OK	
17.009		30 68.349	-0.101	0.000	0.93		593.7			OK	
15.014	Headwall	66.807	0.432	0.000	0.27		33.1			SURCHARGED	
15.015	29	66.803	0.528	0.000	0.07		24.8			SURCHARGED	
15.016	28	63.550	0.247	0.000	0.12		24.7			SURCHARGED	
19.000	26	77.108	-0.117	0.000	0.47		59.5			OK	
19.001	25	73.861	-0.164	0.000	0.43		117.0			OK	
20.000	27	71.684	-0.091	0.000	0.65		36.2			OK	
19.002	24	71.096	-0.123	0.000	0.65		184.0			OK	
19.003	23	67.495	0.099	0.000	1.01		287.0			SURCHARGED	
19.004	22	65.133	1.663	0.000	2.04		288.5			SURCHARGED	
1.021	Headwall	63.537	0.287	0.000	0.16		99.4			SURCHARGED	
1.022	2	63.536	0.736	0.000	0.15		86.0			SURCHARGED	

Ironside Farrar Ltd

3 Worsley Court

High Street Worsley

Manchester

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Whitehaven

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

Simulation Criteria

Areal Reduction Factor 1.000

Hot Start (mins) 0

Hot Start Level (mm) 0

Manhole Headloss Coeff (Global) 0.500

Foul Sewage per hectare (l/s) 0.000

Additional Flow - % of Total Flow 0.000

MADD Factor * 10m³/ha Storage 2.000

Inlet Coeffiecient 0.800

Flow per Person per Day (l/per/day) 0.000

Number of Input Hydrographs 0

Number of Online Controls 3

Number of Offline Controls 0

Number of Storage Structures 6

Number of Time/Area Diagrams 0

Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model

M5-60 (mm)

FSR

16.000

Ratio R 0.264

Cv (Summer) 1.000

Cv (Winter) 1.000

Margin for Flood Risk Warning (mm)

Analysis Timestep 2.5 Second Increment (Extended)

DTS Status

DVD Status

Inertia Status

150.0

ON

ON

ON

Profile(s)

Duration(s) (mins)

Return Period(s) (years)

Climate Change (%)

Summer and Winter

15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440

1, 30, 100

0, 45, 50

US/MH

PN

Name

Storm

Return Period

Climate Change

First (X) Surge

First (Y) Flood

First (Z) Overflow

Overflow Act.

1.000

21 15

Summer

100

+50%

2.000

88 15

Summer

100

+50%

100/15

Summer

1.001

20 15

Summer

100

+50%

30/15

Summer

3.000

87 15

Summer

100

+50%

1.002

19 30

Summer

100

+50%

100/15

Summer

4.000

86 30

Summer

100

+50%

30/15

Summer

100/15

Summer

4.001

85 30

Summer

100

+50%

30/15

Summer

1.003

18 30

Summer

100

+50%

30/15

Summer

1.004

17 30

Summer

100

+50%

30/15

Summer

5.000

80 15

Summer

100

+50%

100/15

Summer

5.001

79 15

Summer

100

+50%

30/15

Summer

5.002

78 30

Summer

100

+50%

30/15

Summer

100/15

Summer

6.000

84 15

Summer

100

+50%

30/15

Summer

100/15

Summer

7.000

83 15

Summer

100

+50%

30/15

Summer

100/15

Summer

5.003

77 30

Summer

100

+50%

30/15

Summer

8.000

82 15

Summer

100

+50%

100/15

Summer

8.001

81 15

Summer

100

+50%

100/15

Summer

5.004

76 15

Summer

100

+50%

30/15

Summer

</

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

PN	US/MH Name	Water		Surcharged		Flooded		Pipe		Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)				
1.000	21	97.221	-0.079	0.000	0.90		251.1		OK		
2.000	88	94.087	0.987	0.000	0.68		101.5		SURCHARGED		
1.001	20	93.579	1.675	0.000	1.50		396.8		SURCHARGED		
3.000	87	91.632	-0.168	0.000	0.40		42.8		OK		
1.002	19	91.374	0.579	0.000	0.77		495.3		SURCHARGED		
4.000	86	90.012	1.412	11.983	0.91		134.9		FLOOD		3
4.001	85	89.980	2.381	0.000	1.90		178.7		FLOOD RISK		
1.003	18	89.898	2.458	0.000	1.08		630.8		SURCHARGED		
1.004	17	89.258	2.494	0.000	1.22		749.8		SURCHARGED		
5.000	80	94.653	0.753	0.000	0.69		82.4		SURCHARGED		
5.001	79	94.491	0.821	0.000	0.67		96.3		SURCHARGED		
5.002	78	94.025	1.355	25.687	0.96		229.4		FLOOD		5
6.000	84	94.001	1.401	0.954	0.52		78.1		FLOOD		2
7.000	83	94.100	1.200	0.016	0.65		84.2		FLOOD		1
5.003	77	93.905	2.058	0.000	1.17		345.7		FLOOD RISK		
8.000	82	92.454	0.954	0.000	0.69		70.5		SURCHARGED		
8.001	81	92.350	1.179	0.000	0.76		142.7		FLOOD RISK		
5.004	76	92.145	1.798	0.000	1.00		535.9		FLOOD RISK		

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<u>100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm</u>							
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
5.005	75	30 Summer	100	+50%	30/15 Summer	100/15 Summer	
5.006	74	30 Summer	100	+50%	30/15 Summer	100/15 Summer	
1.005	16	30 Summer	100	+50%	30/15 Summer		
9.000	73	30 Summer	100	+50%	30/15 Summer	100/15 Summer	
9.001	72	15 Summer	100	+50%	30/15 Summer		
9.002	71	30 Summer	100	+50%	30/15 Summer		
9.003	70	30 Summer	100	+50%	30/15 Summer	100/30 Summer	
1.006	15	30 Summer	100	+50%	30/15 Summer		
1.007	14	30 Summer	100	+50%	30/15 Summer		
1.008	13	30 Summer	100	+50%	30/15 Summer		
1.009	12	30 Summer	100	+50%	30/15 Summer		
1.010	11	30 Summer	100	+50%	30/15 Summer		
10.000	67	15 Summer	100	+50%	100/15 Summer		
11.000	69	15 Summer	100	+50%	100/15 Summer		
11.001	68	15 Summer	100	+50%	100/15 Summer		
10.001	66	15 Summer	100	+50%	30/15 Summer		
10.002	65	30 Summer	100	+50%	30/15 Summer	100/15 Summer	
12.000	89	15 Summer	100	+50%	100/15 Summer		
10.003	64	15 Summer	100	+50%	30/15 Summer	100/15 Summer	
10.004	63	15 Summer	100	+50%	30/15 Summer		
10.005	62	15 Summer	100	+50%	30/15 Summer		
10.006	61	15 Summer	100	+50%	30/15 Summer		
1.011	10	30 Summer	100	+50%	30/15 Summer		
13.000	60	15 Summer	100	+50%			
13.001	59	15 Summer	100	+50%			
13.002	58	15 Summer	100	+50%	100/15 Summer		
13.003	57	30 Summer	100	+50%	100/15 Summer		
13.004	56	30 Summer	100	+50%	100/15 Summer		
1.012	9	30 Summer	100	+50%	30/15 Summer		
14.000	55	15 Summer	100	+50%			
14.001	54	15 Summer	100	+50%			
1.013	8	30 Summer	100	+50%	30/15 Summer		
1.014	7	30 Summer	100	+50%	30/15 Summer		
1.015	Headwall	60 Summer	100	+50%	30/15 Summer		
1.016	6	60 Summer	100	+50%	100/30 Summer		
1.017	5	60 Summer	100	+50%	30/30 Summer		
1.018	Hedwall	960 Summer	100	+50%	30/120 Summer		
1.019	4	960 Summer	100	+50%	30/60 Summer		
1.020	3	1440 Winter	100	+50%	30/1440 Winter		
15.000	52	15 Summer	100	+50%			
15.001	51	15 Summer	100	+50%			
15.002	50	15 Summer	100	+50%			
15.003	49	15 Summer	100	+50%			
15.004	48	15 Summer	100	+50%	100/15 Summer		
15.005	47	15 Summer	100	+50%	100/15 Summer		
15.006	46	15 Summer	100	+50%	100/15 Summer		
16.000	53	15 Summer	100	+50%	100/15 Summer		
15.007	45	15 Summer	100	+50%	30/15 Summer		
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<u>100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm</u>									
PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
5.005	75		90.467	1.666	17.303	1.29		614.4	FLOOD
5.006	74		89.508	1.607	7.850	1.23		634.6	FLOOD
1.005	16		88.497	2.316	0.000	1.45		1384.3	SURCHARGED
9.000	73		87.656	1.356	6.008	0.50		71.2	FLOOD
9.001	72		87.656	1.882	0.000	0.61		60.0	SURCHARGED
9.002	71		87.618	2.060	0.000	0.91		95.9	SURCHARGED
9.003	70		87.422	2.382	1.615	1.63		165.6	FLOOD
1.006	15		87.079	2.356	0.000	1.46		1569.8	FLOOD RISK
1.007	14		86.238	1.989	0.000	1.38		1573.2	FLOOD RISK
1.008	13		85.805	1.813	0.000	1.28		1538.9	SURCHARGED
1.009	12		85.370	1.664	0.000	0.93		1574.7	SURCHARGED
1.010	11		84.909	1.772	0.000	0.86		1593.2	SURCHARGED
10.000	67		93.304	0.104	0.000	0.77		143.8	SURCHARGED
11.000	69		92.901	0.201	0.000	0.60		97.6	SURCHARGED
11.001	68		92.704	0.604	0.000	0.41		129.4	SURCHARGED
10.001	66		92.432	1.332	0.000	0.96		313.1	FLOOD RISK
10.002	65		91.359	1.359	8.741	1.16		371.5	FLOOD
12.000	89		91.499	0.299	0.000	0.82		146.2	SURCHARGED
10.003	64		90.551	1.451	1.081	1.08		460.9	FLOOD
10.004	63		89.973	1.447	0.000	0.99		485.1	SURCHARGED
10.005	62		89.132	1.606	0.000	1.17		523.8	SURCHARGED
10.006	61		87.772	1.246	0.000	1.28		649.8	SURCHARGED
1.011	10		84.424	1.957	0.000	1.60		2257.2	SURCHARGED
13.000	60		85.616	-0.184	0.000	0.32		55.6	OK
13.001	59		84.736	-0.164	0.000	0.42		67.8	OK
13.002	58		84.558	0.208	0.000	1.09		159.2	SURCHARGED
13.003	57		84.180	0.330	0.000	0.89		297.9	SURCHARGED
13.004	56		83.959	0.922	0.000	0.94		319.3	SURCHARGED
1.012	9		83.447	1.480	0.000	1.39		2497.5	SURCHARGED
14.000	55		89.615	-0.185	0.000	0.31		73.5	OK
14.001	54		87.392	-0.146	0.000	0.52		131.7	OK
1.013	8		81.967	0.800	0.000	1.02		2561.8	SURCHARGED
1.014	7		79.963	0.750	0.000	1.61		2555.6	SURCHARGED
1.015	Headwall		78.636	0.611	0.000	1.26		1010.9	SURCHARGED
1.016	6		74.481	0.206	0.000	1.04		1010.7	SURCHARGED
1.017	5		68.937	0.424	0.000	1.16		1010.6	SURCHARGED
1.018	Hedwall		67.526	0.501	0.000	0.44		109.8	SURCHARGED
1.019	4		67.512	0.665	0.000	0.14		99.9	SURCHARGED
1.020	3		63.983	0.335	0.000	0.40		99.9	SURCHARGED
15.000	52		89.786	-0.139	0.000	0.31		39.6	OK
15.001	51		87.951	-0.074	0.000	0.79		85.6	OK
15.002	50		86.528	-0.053	0.000	0.94		134.3	OK
15.003	49		81.541	-0.140	0.000	0.71		305.0	OK
15.004	48		80.500	0.119	0.000	0.95		382.5	SURCHARGED
15.005	47		79.455	0.274	0.000	0.89		384.1	SURCHARGED
15.006	46		78.216	0.635	0.000	1.13		447.3	SURCHARGED
16.000	53		77.190	0.265	0.000	1.03		89.0	SURCHARGED
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	<table> <tr> <th>PN</th><th>US/MH Name</th><th>Level Exceeded</th></tr> <tr> <td>15.002</td><td>50</td><td></td></tr> <tr> <td>15.003</td><td>49</td><td></td></tr> <tr> <td>15.004</td><td>48</td><td></td></tr> <tr> <td>15.005</td><td>47</td><td></td></tr> <tr> <td>15.006</td><td>46</td><td></td></tr> <tr> <td>16.000</td><td>53</td><td></td></tr> <tr> <td>15.007</td><td>45</td><td></td></tr> </table>	PN	US/MH Name	Level Exceeded	15.002	50		15.003	49		15.004	48		15.005	47		15.006	46		16.000	53		15.007	45		
PN	US/MH Name	Level Exceeded																								
15.002	50																									
15.003	49																									
15.004	48																									
15.005	47																									
15.006	46																									
16.000	53																									
15.007	45																									
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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) SurchARGE	First (Y) Flood	First (Z) Overflow	Overflow Act.
15.008	Headwall	60 Summer	100	+50%	100/15 Summer			
15.009	44	60 Summer	100	+50%				
15.010	43	60 Summer	100	+50%				
15.011	Headwall	120 Summer	100	+50%				
15.012	42	180 Summer	100	+50%				
15.013	41	180 Summer	100	+50%				
17.000	39	15 Summer	100	+50%				
17.001	38	15 Summer	100	+50%				
17.002	37	15 Summer	100	+50%				
17.003	36	15 Summer	100	+50%	100/15 Summer			
17.004	35	15 Summer	100	+50%				
18.000	40	15 Summer	100	+50%				
17.005	34	15 Summer	100	+50%				
17.006	33	15 Summer	100	+50%				
17.007	32	15 Summer	100	+50%				
17.008	31	15 Summer	100	+50%				
17.009	30	15 Summer	100	+50%	100/15 Summer			
15.014	Headwall	720 Winter	100	+50%	30/60 Summer			
15.015	29	720 Winter	100	+50%	30/30 Summer			
15.016	28	1440 Winter	100	+50%	30/960 Summer			
19.000	26	15 Summer	100	+50%				
19.001	25	15 Summer	100	+50%				
20.000	27	15 Summer	100	+50%				
19.002	24	15 Summer	100	+50%	100/15 Summer			
19.003	23	15 Summer	100	+50%	30/15 Summer			
19.004	22	15 Summer	100	+50%	30/15 Summer			
1.021	Headwall	1440 Winter	100	+50%	30/720 Summer			
1.022	2	1440 Winter	100	+50%	1/600 Summer			

PN	US/MH Name	Water			Flooded		Pipe		Level Exceeded
		Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)	Status	
15.008	Headwall	73.862	0.062	0.000	1.05		220.8	SURCHARGED	
15.009	44	73.009	-0.091	0.000	0.83		220.8	OK	
15.010	43	71.877	-0.079	0.000	0.89		220.8	OK	
15.011	Headwall	70.758	-0.042	0.000	1.00		157.2	OK	
15.012	42	68.613	-0.136	0.000	0.58		157.2	OK	
15.013	41	67.378	-0.123	0.000	0.66		157.2	OK	
17.000	39	92.486	-0.064	0.000	0.63		32.6	OK	
17.001	38	88.536	-0.114	0.000	0.49		60.7	OK	
17.002	37	85.726	-0.042	0.000	0.90		97.1	OK	
17.003	36	84.941	0.047	0.000	1.13		109.3	SURCHARGED	
17.004	35	84.608	-0.090	0.000	0.80		118.5	OK	
18.000	40	85.770	-0.055	0.000	0.92		78.8	OK	
17.005	34	84.148	-0.076	0.000	0.89		251.2	OK	
17.006	33	78.200	-0.075	0.000	0.98		404.2	OK	

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

PN	US/MH Name	Water		Surcharged		Flooded		Pipe		Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)				
17.007	32	77.073	-0.096	0.000	0.89		471.2			OK	
17.008	31	73.360	-0.126	0.000	0.85		699.8			OK	
17.009	30	69.493	1.043	0.000	1.22		774.7			SURCHARGED	
15.014	Headwall	67.129	0.754	0.000	0.23		28.0			SURCHARGED	
15.015	29	67.122	0.847	0.000	0.07		24.6			SURCHARGED	
15.016	28	63.844	0.541	0.000	0.12		24.8			SURCHARGED	
19.000	26	77.128	-0.097	0.000	0.62		78.6			OK	
19.001	25	73.886	-0.139	0.000	0.56		154.7			OK	
20.000	27	71.713	-0.062	0.000	0.86		47.8			OK	
19.002	24	71.271	0.052	0.000	0.84		234.9			SURCHARGED	
19.003	23	68.852	1.456	0.000	1.23		348.5			SURCHARGED	
19.004	22	66.099	2.629	0.000	2.45		345.5			SURCHARGED	
1.021	Headwall	63.833	0.583	0.000	0.16		99.8			SURCHARGED	
1.022	2	63.835	1.035	0.000	0.15		86.1			SURCHARGED	