

Carley Daines and Partners Limited		Page 1
11 Bridgewater Road Worsley Manchester, M28 3JE	12866 ELMP Preliminary Drainage Calcs	
Date 10/11/2021 14:35 File 12866 East Lancs Paper Mill H...	Designed by A Mulligan Checked by D Middleton	
Innovyze	Network 2019.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	PIMP (%)	90
M5-60 (mm)	19.000	Add Flow / Climate Change (%)	0
Ratio R	0.285	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)	1.200
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 Storm

- Indicates pipe length does not match coordinates

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	30.000#	0.300	100.0	0.031	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.001	17.000#	0.170	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S2.000	30.000#	0.300	100.0	0.014	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.002	5.000#	0.050	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S3.000	30.000#	0.300	100.0	0.013	5.00	0.0	0.600	o	150	Pipe/Conduit	
S3.001	8.000#	0.220	36.4	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.003	5.000#	0.050	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S4.000	20.000#	0.200	100.0	0.014	5.00	0.0	0.600	o	150	Pipe/Conduit	
S4.001	20.000#	0.200	100.0	0.009	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	5.50	65.150	0.031	0.0	0.0	0.0	1.00	17.8	4.1
S1.001	50.00	5.78	64.850	0.031	0.0	0.0	0.0	1.00	17.8	4.1
S2.000	50.00	5.50	65.150	0.014	0.0	0.0	0.0	1.00	17.8	1.8
S1.002	50.00	5.86	64.680	0.044	0.0	0.0	0.0	1.00	17.8	6.0
S3.000	50.00	5.50	65.150	0.013	0.0	0.0	0.0	1.00	17.8	1.7
S3.001	50.00	5.58	64.850	0.013	0.0	0.0	0.0	1.67	29.6	1.7
S1.003	50.00	5.95	64.630	0.057	0.0	0.0	0.0	1.00	17.8	7.7
S4.000	50.00	5.33	65.750	0.014	0.0	0.0	0.0	1.00	17.8	1.8
S4.001	50.00	5.66	65.550	0.023	0.0	0.0	0.0	1.00	17.8	3.0

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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
S5.000	15.000#	0.150	100.0	0.009	5.00	0.0	0.600	o	150	Pipe/Conduit	
S5.001	15.000#	0.250	60.0	0.009	0.00	0.0	0.600	o	150	Pipe/Conduit	
S4.002	15.000#	0.100	150.0	0.018	0.00	0.0	0.600	o	150	Pipe/Conduit	
S6.000	5.000#	0.005	1000.0	0.000	5.00	0.0	0.600	o	150	Pipe/Conduit	
S4.003	33.000#	0.150	220.0	0.016	0.00	0.0	0.600	o	300	Pipe/Conduit	
S7.000	8.000#	0.040	200.0	0.011	5.00	0.0	0.600	o	300	Pipe/Conduit	
S4.004	15.000#	0.070	214.3	0.011	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.004	9.000#	0.060	150.0	0.000	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)
S5.000	50.00	5.25	65.750	0.009	0.0	0.0	0.0	1.00	17.8	1.2
S5.001	50.00	5.44	65.600	0.018	0.0	0.0	0.0	1.30	23.0	2.4
S4.002	50.00	5.97	64.550	0.059	0.0	0.0	0.0	0.82	14.5	7.9
S6.000	50.00	5.27	64.850	0.000	0.0	0.0	0.0	0.31	5.5	0.0
S4.003	50.00	6.49	64.300	0.075	0.0	0.0	0.0	1.06	74.6	10.1
S7.000	50.00	5.12	64.190	0.011	0.0	0.0	0.0	1.11	78.3	1.5
S4.004	49.83	6.72	64.150	0.096	0.0	0.0	0.0	1.07	75.6	13.0
S1.004	49.47	6.84	64.080	0.153	0.0	0.0	0.0	1.28	90.6	20.5

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Manhole Schedules for Storm

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	66.000	0.850	Open Manhole	450	S1.000	65.150	150				
S2	66.000	1.150	Open Manhole	450	S1.001	64.850	150	S1.000	64.850	150	
S3	66.000	0.850	Open Manhole	450	S2.000	65.150	150				
S3	66.000	1.320	Open Manhole	450	S1.002	64.680	150	S1.001	64.680	150	
								S2.000	64.850	150	170
S5	66.000	0.850	Open Manhole	450	S3.000	65.150	150				
S6	66.000	1.150	Open Manhole	450	S3.001	64.850	150	S3.000	64.850	150	
S4	66.000	1.370	Open Manhole	450	S1.003	64.630	150	S1.002	64.630	150	
								S3.001	64.630	150	
S8	66.500	0.750	Open Manhole	1350	S4.000	65.750	150				
S9	66.500	0.950	Open Manhole	1350	S4.001	65.550	150	S4.000	65.550	150	
S10	66.500	0.750	Open Manhole	450	S5.000	65.750	150				
S11	66.500	0.900	Open Manhole	450	S5.001	65.600	150	S5.000	65.600	150	
S10	66.350	1.800	Open Manhole	1350	S4.002	64.550	150	S4.001	65.350	150	800
								S5.001	65.350	150	800
S13	66.500	1.650	Open Manhole	1200	S6.000	64.850	150				
S8	66.350	2.050	Open Manhole	1350	S4.003	64.300	300	S4.002	64.450	150	
								S6.000	64.845	150	395
S15	66.000	1.810	Open Manhole	1350	S7.000	64.190	300				
S9	66.000	1.850	Open Manhole	1350	S4.004	64.150	300	S4.003	64.150	300	
								S7.000	64.150	300	
S5	66.000	1.920	Open Manhole	1350	S1.004	64.080	300	S1.003	64.580	150	350
								S4.004	64.080	300	
S	66.000	1.980	Open Manhole	0		OUTFALL		S1.004	64.020	300	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S1	200.328	45.750	200.328	45.750	Required	
S2	200.594	7.234	200.594	7.234	Required	
S3	224.500	41.500	224.500	41.500	Required	
S3	226.094	7.766	226.094	7.766	Required	
S5	251.328	42.031	251.328	42.031	Required	
S6	252.125	13.875	252.125	13.875	Required	

Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S4	237.516	6.438	237.516	6.438	Required	
S8	326.500	85.063	326.500	85.063	Required	
S9	305.516	84.797	305.516	84.797	Required	
S10	343.234	61.953	343.234	61.953	Required	
S11	342.969	51.859	342.969	51.859	Required	
S10	305.250	55.313	305.250	55.313	Required	
S13	284.000	64.078	284.000	64.078	Required	
S8	284.000	51.594	284.000	51.594	Required	
S15	285.328	-29.688	285.328	-29.688	Required	
S9	283.734	-9.500	283.734	-9.500	Required	
S5	238.047	-10.297	238.047	-10.297	Required	
S	222.641	-20.656			No Entry	

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PIPELINE SCHEDULES for Storm

Upstream Manhole

- Indicates pipe length does not match coordinates

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	150	S1	66.000	65.150	0.700	Open Manhole	450
S1.001	o	150	S2	66.000	64.850	1.000	Open Manhole	450
S2.000	o	150	S3	66.000	65.150	0.700	Open Manhole	450
S1.002	o	150	S3	66.000	64.680	1.170	Open Manhole	450
S3.000	o	150	S5	66.000	65.150	0.700	Open Manhole	450
S3.001	o	150	S6	66.000	64.850	1.000	Open Manhole	450
S1.003	o	150	S4	66.000	64.630	1.220	Open Manhole	450
S4.000	o	150	S8	66.500	65.750	0.600	Open Manhole	1350
S4.001	o	150	S9	66.500	65.550	0.800	Open Manhole	1350
S5.000	o	150	S10	66.500	65.750	0.600	Open Manhole	450
S5.001	o	150	S11	66.500	65.600	0.750	Open Manhole	450
S4.002	o	150	S10	66.350	64.550	1.650	Open Manhole	1350
S6.000	o	150	S13	66.500	64.850	1.500	Open Manhole	1200
S4.003	o	300	S8	66.350	64.300	1.750	Open Manhole	1350

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	30.000#	100.0	S2	66.000	64.850	1.000	Open Manhole	450
S1.001	17.000#	100.0	S3	66.000	64.680	1.170	Open Manhole	450
S2.000	30.000#	100.0	S3	66.000	64.850	1.000	Open Manhole	450
S1.002	5.000#	100.0	S4	66.000	64.630	1.220	Open Manhole	450
S3.000	30.000#	100.0	S6	66.000	64.850	1.000	Open Manhole	450
S3.001	8.000#	36.4	S4	66.000	64.630	1.220	Open Manhole	450
S1.003	5.000#	100.0	S5	66.000	64.580	1.270	Open Manhole	1350
S4.000	20.000#	100.0	S9	66.500	65.550	0.800	Open Manhole	1350
S4.001	20.000#	100.0	S10	66.350	65.350	0.850	Open Manhole	1350
S5.000	15.000#	100.0	S11	66.500	65.600	0.750	Open Manhole	450
S5.001	15.000#	60.0	S10	66.350	65.350	0.850	Open Manhole	1350
S4.002	15.000#	150.0	S8	66.350	64.450	1.750	Open Manhole	1350
S6.000	5.000#	1000.0	S8	66.350	64.845	1.355	Open Manhole	1350
S4.003	33.000#	220.0	S9	66.000	64.150	1.550	Open Manhole	1350

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd	Diam	MH	C.Level	I.Level	D.Depth	MH	MH DIAM., L*W
	Sect	(mm)	Name	(m)	(m)	(m)	Connection	(mm)
S7.000	o	300	S15	66.000	64.190	1.510	Open Manhole	1350
S4.004	o	300	S9	66.000	64.150	1.550	Open Manhole	1350
S1.004	o	300	S5	66.000	64.080	1.620	Open Manhole	1350

Downstream Manhole

PN	Length	Slope	MH	C.Level	I.Level	D.Depth	MH	MH DIAM., L*W
	(m)	(1:X)	Name	(m)	(m)	(m)	Connection	(mm)
S7.000	8.000#	200.0	S9	66.000	64.150	1.550	Open Manhole	1350
S4.004	15.000#	214.3	S5	66.000	64.080	1.620	Open Manhole	1350
S1.004	9.000#	150.0	S	66.000	64.020	1.680	Open Manhole	0

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Setting Out Information - Site Coordinates (Storm)

- Indicates pipe length does not match coordinates

PN	USMH Name	Dia/Len (mm)	Width (mm)	US Easting (m)	US Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Layout (North)
S1.000	S1	450		200.328 #	45.750 #	200.328	45.750	
S1.001	S2	450		200.594 #	7.234 #	200.594	7.234	
S2.000	S3	450		224.500 #	41.500 #	224.500	41.500	
S1.002	S3	450		226.094 #	7.766 #	226.094	7.766	
S3.000	S5	450		251.328 #	42.031 #	251.328	42.031	
S3.001	S6	450		252.125 #	13.875 #	252.125	13.875	
S1.003	S4	450		237.516 #	6.438 #	237.516	6.438	
S4.000	S8	1350		326.500 #	85.063 #	326.500	85.063	
S4.001	S9	1350		305.516 #	84.797 #	305.516	84.797	
S5.000	S10	450		343.234 #	61.953 #	343.234	61.953	
S5.001	S11	450		342.969 #	51.859 #	342.969	51.859	
S4.002	S10	1350		305.250 #	55.313 #	305.250	55.313	
S6.000	S13	1200		284.000 #	64.078 #	284.000	64.078	
S4.003	S8	1350		284.000 #	51.594 #	284.000	51.594	
S7.000	S15	1350		285.328 #	-29.688 #	285.328	-29.688	
S4.004	S9	1350		283.734 #	-9.500 #	283.734	-9.500	
S1.004	S5	1350		238.047 #	-10.297 #	238.047	-10.297	

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Setting Out Information - Site Coordinates (Storm)

- Indicates pipe length does not match coordinates

PN	DSMH	Dia/Len	Width	DS	Easting	DS	Northing	Layout
Name		(mm)	(mm)		(m)		(m)	(North)
S1.004	S	0			222.641 #		-20.656 #	

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	90	0.034	0.031	0.031
1.001	-	-	90	0.000	0.000	0.000
2.000	-	-	90	0.015	0.014	0.014
1.002	-	-	90	0.000	0.000	0.000
3.000	-	-	90	0.014	0.013	0.013
3.001	-	-	90	0.000	0.000	0.000
1.003	-	-	90	0.000	0.000	0.000
4.000	-	-	90	0.015	0.014	0.014
4.001	-	-	90	0.010	0.009	0.009
5.000	-	-	90	0.010	0.009	0.009
5.001	-	-	90	0.010	0.009	0.009
4.002	-	-	90	0.020	0.018	0.018
6.000	-	-	90	0.000	0.000	0.000
4.003	-	-	90	0.018	0.016	0.016
7.000	-	-	90	0.012	0.011	0.011
4.004	-	-	90	0.012	0.011	0.011
1.004	-	-	90	0.000	0.000	0.000
				Total	Total	Total
				0.170	0.153	0.153

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
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S1.004	S	66.000	64.020	0.000	0	0
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Simulation Criteria for Storm

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 Offline Controls	0	Number of Time/Area Diagrams	0
Number of Online Controls	1	Number of Storage Structures	1	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.000	Storm Duration (mins)	30
Ratio R	0.285		

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: S5, DS/PN: S1.004, Volume (m³): 3.8

Unit Reference	MD-SHE-0103-5000-1200-5000
Design Head (m)	1.200
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	103
Invert Level (m)	64.080
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	5.0	Kick-Flo®	0.745	4.0
Flush-Flo™	0.354	5.0	Mean Flow over Head Range	-	4.4

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)	Depth (m)	Flow (l/s)
0.100	3.4	0.800	4.1	2.000	6.3	4.000	8.8	7.000	11.5
0.200	4.7	1.000	4.6	2.200	6.6	4.500	9.3	7.500	11.8
0.300	5.0	1.200	5.0	2.400	6.9	5.000	9.8	8.000	12.2
0.400	5.0	1.400	5.4	2.600	7.2	5.500	10.2	8.500	12.6
0.500	4.9	1.600	5.7	3.000	7.7	6.000	10.7	9.000	12.9
0.600	4.7	1.800	6.0	3.500	8.3	6.500	11.1	9.500	13.3

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Storage Structures for Storm

Tank or Pond Manhole: S13, DS/PN: S6.000

Invert Level (m) 64.850

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	135.0	0.400	135.0	0.401	0.0

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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 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 Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 19.000 Cv (Summer) 0.750
 Region England and Wales Ratio R 0.280 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) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 600, 720, 960, 1440, 2160
 Return Period(s) (years) 1, 2, 30, 100
 Climate Change (%) 0, 0, 0, 40

PN	US/MH		Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level	Surcharged Depth
	Name	Storm							(m)	(m)
S1.000	S1	15 Winter	1	+0%	100/15 Summer				65.197	-0.103
S1.001	S2	15 Winter	1	+0%	30/15 Summer				64.897	-0.103
S2.000	S3	15 Winter	1	+0%	100/15 Summer				65.181	-0.119
S1.002	S3	15 Winter	1	+0%	30/15 Summer				64.743	-0.087
S3.000	S5	15 Winter	1	+0%	100/15 Summer				65.180	-0.120
S3.001	S6	15 Winter	1	+0%	30/15 Summer				64.873	-0.127
S1.003	S4	15 Winter	1	+0%	30/15 Summer				64.702	-0.078
S4.000	S8	15 Winter	1	+0%					65.781	-0.119
S4.001	S9	15 Winter	1	+0%	100/15 Winter				65.588	-0.112
S5.000	S10	15 Winter	1	+0%					65.775	-0.125
S5.001	S11	15 Winter	1	+0%					65.631	-0.119
S4.002	S10	15 Winter	1	+0%	2/30 Winter				64.621	-0.079
S6.000	S13	120 Winter	1	+0%	100/15 Winter				64.850	-0.150
S4.003	S8	30 Winter	1	+0%	2/15 Winter				64.494	-0.106
S7.000	S15	30 Winter	1	+0%	1/30 Winter				64.490	0.000
S4.004	S9	30 Winter	1	+0%	1/30 Winter				64.490	0.040
S1.004	S5	30 Winter	1	+0%	1/15 Summer 100/360 Summer				64.487	0.107

PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m³)	Flow / Cap. (l/s)	Flow (l/s)	Overflow (l/s)		
S1.000	S1	0.000	0.21	3.5		OK	
S1.001	S2	0.000	0.21	3.5		OK	
S2.000	S3	0.000	0.09	1.6		OK	
S1.002	S3	0.000	0.37	5.1		OK	
S3.000	S5	0.000	0.09	1.4		OK	
S3.001	S6	0.000	0.06	1.5		OK	
S1.003	S4	0.000	0.47	6.6		OK	
S4.000	S8	0.000	0.09	1.6		OK	

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1 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)		
S4.001	S9	0.000	0.15	2.5	OK	
S5.000	S10	0.000	0.06	1.1	OK	
S5.001	S11	0.000	0.09	1.9	OK	
S4.002	S10	0.000	0.46	6.1	OK	
S6.000	S13	0.000	0.00	0.0	OK	
S4.003	S8	0.000	0.09	6.4	OK	
S7.000	S15	0.000	0.01	0.6	SURCHARGED	
S4.004	S9	0.000	0.07	4.2	SURCHARGED	
S1.004	S5	0.000	0.08	5.0	SURCHARGED	

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2 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 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 Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 19.000 Cv (Summer) 0.750
 Region England and Wales Ratio R 0.280 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) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 600, 720, 960, 1440, 2160
 Return Period(s) (years) 1, 2, 30, 100
 Climate Change (%) 0, 0, 0, 40

PN	US/MH		Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level	Surcharged Depth
	Name	Storm							(m)	(m)
S1.000	S1	15 Winter	2	+0%	100/15 Summer				65.203	-0.097
S1.001	S2	15 Winter	2	+0%	30/15 Summer				64.904	-0.096
S2.000	S3	15 Winter	2	+0%	100/15 Summer				65.185	-0.115
S1.002	S3	30 Winter	2	+0%	30/15 Summer				64.776	-0.054
S3.000	S5	15 Winter	2	+0%	100/15 Summer				65.183	-0.117
S3.001	S6	15 Winter	2	+0%	30/15 Summer				64.877	-0.123
S1.003	S4	30 Winter	2	+0%	30/15 Summer				64.774	-0.006
S4.000	S8	15 Winter	2	+0%					65.785	-0.115
S4.001	S9	15 Winter	2	+0%	100/15 Winter				65.594	-0.106
S5.000	S10	15 Winter	2	+0%					65.779	-0.121
S5.001	S11	15 Winter	2	+0%					65.634	-0.116
S4.002	S10	30 Winter	2	+0%	2/30 Winter				64.783	0.083
S6.000	S13	120 Winter	2	+0%	100/15 Winter				64.850	-0.150
S4.003	S8	30 Winter	2	+0%	2/15 Winter				64.776	0.176
S7.000	S15	30 Winter	2	+0%	1/30 Winter				64.773	0.283
S4.004	S9	30 Winter	2	+0%	1/30 Winter				64.774	0.324
S1.004	S5	30 Winter	2	+0%	1/15 Summer 100/360 Summer				64.771	0.391

PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m³)	Flow / Cap. (l/s)	Flow (l/s)	Overflow (l/s)		
S1.000	S1	0.000	0.27	4.6		OK	
S1.001	S2	0.000	0.28	4.6		OK	
S2.000	S3	0.000	0.12	2.0		OK	
S1.002	S3	0.000	0.39	5.4		OK	
S3.000	S5	0.000	0.11	1.9		OK	
S3.001	S6	0.000	0.07	1.9		OK	
S1.003	S4	0.000	0.50	7.0		OK	
S4.000	S8	0.000	0.12	2.0		OK	

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2 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)		
S4.001	S9	0.000	0.19	3.2	OK	
S5.000	S10	0.000	0.08	1.4	OK	
S5.001	S11	0.000	0.12	2.5	OK	
S4.002	S10	0.000	0.52	6.9	SURCHARGED	
S6.000	S13	0.000	0.00	0.0	OK	
S4.003	S8	0.000	0.11	7.8	SURCHARGED	
S7.000	S15	0.000	0.01	0.8	SURCHARGED	
S4.004	S9	0.000	0.07	4.4	SURCHARGED	
S1.004	S5	0.000	0.08	5.0	SURCHARGED	

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30 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 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 Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 19.000 Cv (Summer) 0.750
 Region England and Wales Ratio R 0.280 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) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 600, 720, 960, 1440, 2160
 Return Period(s) (years) 1, 2, 30, 100
 Climate Change (%) 0, 0, 0, 40

PN	US/MH		Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level	Surcharged Depth
	Name	Storm							(m)	(m)
S1.000	S1	30 Winter	30	+0%	100/15 Summer				65.251	-0.049
S1.001	S2	30 Winter	30	+0%	30/15 Summer				65.220	0.220
S2.000	S3	30 Winter	30	+0%	100/15 Summer				65.210	-0.090
S1.002	S3	30 Winter	30	+0%	30/15 Summer				65.196	0.366
S3.000	S5	30 Winter	30	+0%	100/15 Summer				65.201	-0.099
S3.001	S6	30 Winter	30	+0%	30/15 Summer				65.187	0.187
S1.003	S4	30 Winter	30	+0%	30/15 Summer				65.181	0.401
S4.000	S8	15 Winter	30	+0%					65.799	-0.101
S4.001	S9	15 Winter	30	+0%	100/15 Winter				65.616	-0.084
S5.000	S10	15 Winter	30	+0%					65.790	-0.110
S5.001	S11	15 Winter	30	+0%					65.651	-0.099
S4.002	S10	30 Winter	30	+0%	2/30 Winter				65.198	0.498
S6.000	S13	60 Winter	30	+0%	100/15 Winter				64.943	-0.057
S4.003	S8	30 Winter	30	+0%	2/15 Winter				65.127	0.527
S7.000	S15	30 Winter	30	+0%	1/30 Winter				65.150	0.660
S4.004	S9	30 Winter	30	+0%	1/30 Winter				65.149	0.699
S1.004	S5	360 Winter	30	+0%	1/15 Summer 100/360 Summer				65.186	0.806

PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m³)	Flow / Cap. (l/s)	Flow (l/s)	Overflow (l/s)		
S1.000	S1	0.000	0.42	7.2		OK	
S1.001	S2	0.000	0.41	6.8		SURCHARGED	
S2.000	S3	0.000	0.19	3.2		OK	
S1.002	S3	0.000	0.62	8.7		SURCHARGED	
S3.000	S5	0.000	0.17	3.0		OK	
S3.001	S6	0.000	0.11	2.7		SURCHARGED	
S1.003	S4	0.000	0.78	10.9		SURCHARGED	
S4.000	S8	0.000	0.23	3.8		OK	

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30 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 / Cap.	Overflow (l/s)		
S4.001	S9	0.000	0.39		6.4	OK
S5.000	S10	0.000	0.16		2.6	OK
S5.001	S11	0.000	0.25		5.3	OK
S4.002	S10	0.000	0.87		11.6	SURCHARGED
S6.000	S13	0.000	0.42		3.8	OK
S4.003	S8	0.000	0.16		10.8	SURCHARGED
S7.000	S15	0.000	0.03		2.0	SURCHARGED
S4.004	S9	0.000	0.06		4.0	SURCHARGED
S1.004	S5	0.000	0.08		5.0	SURCHARGED

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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 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 Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 19.000 Cv (Summer) 0.750
 Region England and Wales Ratio R 0.280 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) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 600, 720, 960, 1440, 2160
 Return Period(s) (years) 1, 2, 30, 100
 Climate Change (%) 0, 0, 0, 40

PN	US/MH		Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Surcharged	
	Name	Storm							Level (m)	Depth (m)
S1.000	S1	30 Winter	100	+40%	100/15 Summer				65.956	0.656
S1.001	S2	30 Winter	100	+40%	30/15 Summer				65.833	0.833
S2.000	S3	30 Winter	100	+40%	100/15 Summer				65.789	0.489
S1.002	S3	30 Winter	100	+40%	30/15 Summer				65.760	0.930
S3.000	S5	30 Winter	100	+40%	100/15 Summer				65.739	0.439
S3.001	S6	30 Winter	100	+40%	30/15 Summer				65.712	0.712
S1.003	S4	30 Winter	100	+40%	30/15 Summer				65.699	0.919
S4.000	S8	15 Winter	100	+40%					65.818	-0.082
S4.001	S9	30 Winter	100	+40%	100/15 Winter				65.750	0.050
S5.000	S10	15 Winter	100	+40%					65.805	-0.095
S5.001	S11	30 Winter	100	+40%					65.736	-0.014
S4.002	S10	30 Winter	100	+40%	2/30 Winter				65.712	1.012
S6.000	S13	120 Winter	100	+40%	100/15 Winter				65.172	0.172
S4.003	S8	30 Winter	100	+40%	2/15 Winter				65.518	0.918
S7.000	S15	30 Winter	100	+40%	1/30 Winter				65.575	1.085
S4.004	S9	30 Winter	100	+40%	1/30 Winter				65.573	1.123
S1.004	S5	360 Winter	100	+40%	1/15 Summer 100/360 Summer				65.628	1.248

PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m³)	Flow / Cap. (l/s)	Flow (l/s)	Overflow (l/s)		
S1.000	S1	0.000	0.64	10.9	FLOOD RISK		
S1.001	S2	0.000	0.65	10.8	FLOOD RISK		
S2.000	S3	0.000	0.28	4.7	FLOOD RISK		
S1.002	S3	0.000	1.10	15.4	FLOOD RISK		
S3.000	S5	0.000	0.26	4.5	FLOOD RISK		
S3.001	S6	0.000	0.17	4.4	FLOOD RISK		
S1.003	S4	0.000	1.41	19.8	SURCHARGED		
S4.000	S8	0.000	0.41	6.9	OK		

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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 / Cap.	Overflow (l/s)		
S4.001	S9	0.000	0.56		9.4	SURCHARGED
S5.000	S10	0.000	0.28		4.7	OK
S5.001	S11	0.000	0.37		7.8	OK
S4.002	S10	0.000	1.41		18.8	SURCHARGED
S6.000	S13	0.000	0.62		5.6	SURCHARGED
S4.003	S8	0.000	0.15		10.3	SURCHARGED
S7.000	S15	0.000	0.06		3.8	SURCHARGED
S4.004	S9	0.000	0.09		5.9	SURCHARGED
S1.004	S5	0.000	0.08		5.1	SURCHARGED