

The Alan Johnston Partnership		Page 0
1 Dale Street Liverpool L2 2ET	PALGRAVE AVENUE - REV B MANCHESTER 223-150	
Date 01/01/0001 File 223-150 Network Rev B.MDX	Designed by JPR Checked by	
XP Solutions	Network 2019.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for 223-150 SW REV B.SWS

Pipe Sizes 223-150 SW REV B Manhole Sizes 223-150 SW REV B

FSR Rainfall Model - England and Wales

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	18.300	Add Flow / Climate Change (%)	10
Ratio R	0.353	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	0.000
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)	0.75
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for 223-150 SW REV B.SWS

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	10.001	0.167	60.0	0.020	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.001	17.202	0.172	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
2.000	11.488	0.191	60.0	0.019	5.00	0.0	0.600	o	150	Pipe/Conduit	
2.001	10.473	0.148	71.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.002	6.808	0.079	86.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
3.000	18.297	0.305	60.0	0.021	5.00	0.0	0.600	o	150	Pipe/Conduit	
3.001	11.290	0.113	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.003	6.369	0.064	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	E I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.13	63.400	0.020	0.0	0.0	0.3	1.30	23.0	3.0
1.001	50.00	5.41	63.233	0.020	0.0	0.0	0.3	1.00	17.8	3.0
2.000	50.00	5.15	63.400	0.019	0.0	0.0	0.3	1.30	23.0	2.8
2.001	50.00	5.29	63.209	0.019	0.0	0.0	0.3	1.19	21.1	2.8
1.002	50.00	5.52	63.061	0.039	0.0	0.0	0.5	1.08	19.2	5.8
3.000	50.00	5.23	63.400	0.021	0.0	0.0	0.3	1.30	23.0	3.1
3.001	50.00	5.42	63.095	0.021	0.0	0.0	0.3	1.00	17.8	3.1
1.003	50.00	5.62	62.982	0.060	0.0	0.0	0.8	1.00	17.8	8.9

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Network Design Table for 223-150 SW REV B.SWS

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
4.000	11.895	0.476	25.0	0.021	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.004	13.484	0.135	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.005	23.890	0.239	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.006	2.345	0.023	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.007	5.843	0.058	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.008	4.053	0.041	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.009	8.048	0.080	100.0	0.000	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)
4.000	50.00	5.10	63.400	0.021	0.0	0.0	0.3	2.02	35.7	3.1
1.004	50.00	5.85	62.918	0.081	0.0	0.0	1.1	1.00	17.8	12.1
1.005	50.00	6.24	62.783	0.081	0.0	0.0	1.1	1.00	17.8	12.1
1.006	50.00	6.28	62.544	0.081	0.0	0.0	1.1	1.00	17.8	12.1
1.007	50.00	6.38	62.521	0.081	0.0	0.0	1.1	1.00	17.8	12.1
1.008	50.00	6.45	62.463	0.081	0.0	0.0	1.1	1.00	17.8	12.1
1.009	50.00	6.58	62.422	0.081	0.0	0.0	1.1	1.00	17.8	12.1

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Manhole Schedules for 223-150 SW REV B.SWS

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)
1	63.850	0.450	Open Manhole	600	1.000	63.400	150				
2	63.850	0.617	Open Manhole	600	1.001	63.233	150	1.000	63.233	150	
12	63.850	0.450	Open Manhole	600	2.000	63.400	150				
13	63.850	0.641	Open Manhole	600	2.001	63.209	150	2.000	63.209	150	
3	63.850	0.789	Open Manhole	600	1.002	63.061	150	1.001	63.061	150	
								2.001	63.061	150	
14	63.850	0.450	Open Manhole	600	3.000	63.400	150				
15	63.850	0.755	Open Manhole	600	3.001	63.095	150	3.000	63.095	150	
4	63.850	0.868	Open Manhole	600	1.003	62.982	150	1.002	62.982	150	
								3.001	62.982	150	
16	63.850	0.450	Open Manhole	600	4.000	63.400	150				
5	63.850	0.932	Open Manhole	600	1.004	62.918	150	1.003	62.918	150	
								4.000	62.924	150	
6	63.850	1.067	Open Manhole	600	1.005	62.783	150	1.004	62.783	150	
7	63.832	1.288	Open Manhole	1050	1.006	62.544	150	1.005	62.544	150	
8	63.807	1.286	Open Manhole	1200	1.007	62.521	150	1.006	62.521	150	
9	63.850	1.387	Open Manhole	1200	1.008	62.463	150	1.007	62.463	150	
10	63.656	1.234	Open Manhole	1200	1.009	62.422	150	1.008	62.422	150	
11	63.531	1.189	Open Manhole	0		OUTFALL		1.009	62.342	150	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
1	385858.582	400280.131	385858.582	400280.131	Required	
2	385867.370	400284.906	385867.370	400284.906	Required	
12	385855.663	400284.926	385855.663	400284.926	Required	
13	385850.204	400295.033	385850.204	400295.033	Required	
3	385859.355	400300.127	385859.355	400300.127	Required	

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Manhole Schedules for 223-150 SW REV B.SWS

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
14	385841.555	400317.132	385841.555	400317.132	Required	
15	385850.535	400301.190	385850.535	400301.190	Required	
4	385860.293	400306.870	385860.293	400306.870	Required	
16	385851.521	400322.888	385851.521	400322.888	Required	
5	385857.229	400312.453	385857.229	400312.453	Required	
6	385868.821	400319.341	385868.821	400319.341	Required	
7	385857.594	400340.429	385857.594	400340.429	Required	
8	385855.260	400340.213	385855.260	400340.213	Required	
9	385849.816	400338.088	385849.816	400338.088	Required	
10	385846.554	400335.684	385846.554	400335.684	Required	
11	385844.331	400327.949			No Entry	

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PIPELINE SCHEDULES for 223-150 SW REV B.SWS

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., (mm)	L*W
1.000	o	150	1	63.850	63.400	0.300	Open Manhole		600
1.001	o	150	2	63.850	63.233	0.467	Open Manhole		600
2.000	o	150	12	63.850	63.400	0.300	Open Manhole		600
2.001	o	150	13	63.850	63.209	0.491	Open Manhole		600
1.002	o	150	3	63.850	63.061	0.639	Open Manhole		600
3.000	o	150	14	63.850	63.400	0.300	Open Manhole		600
3.001	o	150	15	63.850	63.095	0.605	Open Manhole		600
1.003	o	150	4	63.850	62.982	0.718	Open Manhole		600
4.000	o	150	16	63.850	63.400	0.300	Open Manhole		600
1.004	o	150	5	63.850	62.918	0.782	Open Manhole		600
1.005	o	150	6	63.850	62.783	0.917	Open Manhole		600
1.006	o	150	7	63.832	62.544	1.138	Open Manhole		1050
1.007	o	150	8	63.807	62.521	1.136	Open Manhole		1200
1.008	o	150	9	63.850	62.463	1.237	Open Manhole		1200
1.009	o	150	10	63.656	62.422	1.084	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., (mm)	L*W
1.000	10.001	60.0	2	63.850	63.233	0.467	Open Manhole		600
1.001	17.202	100.0	3	63.850	63.061	0.639	Open Manhole		600
2.000	11.488	60.0	13	63.850	63.209	0.491	Open Manhole		600
2.001	10.473	71.0	3	63.850	63.061	0.639	Open Manhole		600
1.002	6.808	86.0	4	63.850	62.982	0.718	Open Manhole		600
3.000	18.297	60.0	15	63.850	63.095	0.605	Open Manhole		600
3.001	11.290	100.0	4	63.850	62.982	0.718	Open Manhole		600
1.003	6.369	100.0	5	63.850	62.918	0.782	Open Manhole		600
4.000	11.895	25.0	5	63.850	62.924	0.776	Open Manhole		600
1.004	13.484	100.0	6	63.850	62.783	0.917	Open Manhole		600
1.005	23.890	100.0	7	63.832	62.544	1.138	Open Manhole		1050
1.006	2.345	100.0	8	63.807	62.521	1.136	Open Manhole		1200
1.007	5.843	100.0	9	63.850	62.463	1.237	Open Manhole		1200
1.008	4.053	100.0	10	63.656	62.422	1.084	Open Manhole		1200
1.009	8.048	100.0	11	63.531	62.342	1.039	Open Manhole		0

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Network Classifications for 223-150 SW REV B.SWS

PN	USMH Name	Pipe Dia (mm)	Min Cover Depth (m)	Max Cover Depth (m)	Pipe Type	MH Dia (mm)	MH Width (mm)	MH Ring Depth (m)	MH Type
1.000	1	150	0.145	0.467	Unclassified	600	0	0.300	Unclassified
1.001	2	150	0.467	0.647	Unclassified	600	0	0.467	Unclassified
2.000	12	150	0.300	0.491	Unclassified	600	0	0.300	Unclassified
2.001	13	150	0.384	0.639	Unclassified	600	0	0.491	Unclassified
1.002	3	150	0.639	1.010	Unclassified	600	0	0.639	Unclassified
3.000	14	150	0.028	0.605	Unclassified	600	0	0.300	Unclassified
3.001	15	150	0.568	0.805	Unclassified	600	0	0.605	Unclassified
1.003	4	150	0.718	1.088	Unclassified	600	0	0.718	Unclassified
4.000	16	150	0.300	0.776	Unclassified	600	0	0.300	Unclassified
1.004	5	150	0.782	1.212	Unclassified	600	0	0.782	Unclassified
1.005	6	150	0.917	1.226	Unclassified	600	0	0.917	Unclassified
1.006	7	150	1.135	1.138	Unclassified	1050	0	1.138	Unclassified
1.007	8	150	1.127	1.237	Unclassified	1200	0	1.136	Unclassified
1.008	9	150	1.084	1.237	Unclassified	1200	0	1.237	Unclassified
1.009	10	150	1.039	1.123	Unclassified	1200	0	1.084	Unclassified

Free Flowing Outfall Details for 223-150 SW REV B.SWS

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
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1.009	11	63.531	62.342	56.914	0	0
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Simulation Criteria for 223-150 SW REV B.SWS

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	10.000
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)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.300	Storm Duration (mins)	30
Ratio R	0.353		

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Online Controls for 223-150 SW REV B.SWS

Hydro-Brake® Optimum Manhole: 10, DS/PN: 1.009, Volume (m³): 1.4

Unit Reference	MD-SHE-0100-5000-1350-5000
Design Head (m)	1.350
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	100
Invert Level (m)	62.422
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.350	5.0
Flush-Flo™	0.400	5.0
Kick-Flo®	0.829	4.0
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)
0.100	3.3	1.200	4.7	3.000	7.3	7.000	10.9
0.200	4.6	1.400	5.1	3.500	7.8	7.500	11.2
0.300	4.9	1.600	5.4	4.000	8.3	8.000	11.6
0.400	5.0	1.800	5.7	4.500	8.8	8.500	11.9
0.500	5.0	2.000	6.0	5.000	9.2	9.000	12.2
0.600	4.8	2.200	6.3	5.500	9.7	9.500	12.6
0.800	4.2	2.400	6.5	6.000	10.1		
1.000	4.4	2.600	6.8	6.500	10.5		

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<u>Storage Structures for 223-150 SW REV B.SWS</u> <u>Tank or Pond Manhole: 9, DS/PN: 1.008</u> Invert Level (m) 62.463 <table><thead><tr><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th></tr></thead><tbody><tr><td>0.000</td><td>26.0</td><td>0.400</td><td>26.0</td><td>0.800</td><td>26.0</td><td>0.801</td><td>0.0</td></tr></tbody></table>				Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	0.000	26.0	0.400	26.0	0.800	26.0	0.801	0.0
Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)												
0.000	26.0	0.400	26.0	0.800	26.0	0.801	0.0												
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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for 223-150 SW REV B.SWS

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	10.000
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	0.353
Region England and Wales	Cv (Summer)		0.750
M5-60 (mm)	18.200	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 2, 30, 100
Climate Change (%)	0, 0, 0, 45

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	1 15	Winter	1	+0%	100/15	Summer		
1.001	2 15	Winter	1	+0%	30/15	Winter		
2.000	12 15	Winter	1	+0%	100/15	Summer		
2.001	13 15	Winter	1	+0%	30/15	Summer		
1.002	3 15	Winter	1	+0%	30/15	Summer		
3.000	14 15	Winter	1	+0%	100/15	Summer	100/15	Summer
3.001	15 15	Winter	1	+0%	30/15	Summer		
1.003	4 15	Winter	1	+0%	30/15	Summer		
4.000	16 15	Winter	1	+0%	100/15	Summer		
1.004	5 15	Winter	1	+0%	30/15	Summer		
1.005	6 15	Winter	1	+0%	30/15	Summer		
1.006	7 15	Winter	1	+0%	2/15	Summer		
1.007	8 15	Winter	1	+0%	30/15	Summer		
1.008	9 30	Winter	1	+0%	30/15	Summer		
1.009	10 30	Winter	1	+0%	2/15	Summer		

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for 223-150 SW REV B.SWS

PN	US/MH Name	Water		Surcharged		Flooded		Pipe	
		Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)	Status	Level Exceeded
1.000	1	63.436	-0.114	0.000	0.13		2.7	OK	4
1.001	2	63.274	-0.110	0.000	0.16		2.6	OK	
2.000	12	63.435	-0.115	0.000	0.12		2.5	OK	4
2.001	13	63.245	-0.113	0.000	0.13		2.5	OK	
1.002	3	63.119	-0.092	0.000	0.32		5.2	OK	4
3.000	14	63.436	-0.114	0.000	0.13		2.8	OK	
3.001	15	63.137	-0.108	0.000	0.17		2.8	OK	
1.003	4	63.060	-0.072	0.000	0.53		8.0	OK	
4.000	16	63.430	-0.120	0.000	0.09		2.8	OK	
1.004	5	63.007	-0.061	0.000	0.66		10.7	OK	
1.005	6	62.870	-0.063	0.000	0.62		10.5	OK	
1.006	7	62.663	-0.032	0.000	0.98		10.6	OK	
1.007	8	62.615	-0.056	0.000	0.72		10.6	OK	
1.008	9	62.570	-0.043	0.000	0.34		4.3	OK	
1.009	10	62.563	-0.009	0.000	0.27		4.2	OK	

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for 223-150 SW REV B.SWS

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	10.000
Hot Start (mins)	0	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coefficient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of 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	0.353
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	18.200	Cv (Winter)	0.840

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

Profile(s)

Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 2, 30, 100
Climate Change (%)	0, 0, 0, 45

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	1	15 Winter	2	+0%	100/15 Summer	100/15 Summer		
1.001	2	15 Winter	2	+0%	30/15 Winter			
2.000	12	15 Winter	2	+0%	100/15 Summer	100/15 Summer		
2.001	13	15 Winter	2	+0%	30/15 Summer			
1.002	3	15 Winter	2	+0%	30/15 Summer			
3.000	14	15 Winter	2	+0%	100/15 Summer	100/15 Summer		
3.001	15	15 Winter	2	+0%	30/15 Summer			
1.003	4	15 Winter	2	+0%	30/15 Summer			
4.000	16	15 Winter	2	+0%	100/15 Summer			
1.004	5	15 Winter	2	+0%	30/15 Summer			
1.005	6	15 Winter	2	+0%	30/15 Summer			
1.006	7	15 Winter	2	+0%	2/15 Summer			
1.007	8	15 Winter	2	+0%	30/15 Summer			
1.008	9	30 Winter	2	+0%	30/15 Summer			
1.009	10	30 Winter	2	+0%	2/15 Summer			

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for 223-150 SW REV B.SWS

PN	US/MH Name	Water		Surcharged		Flooded		Pipe		Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)				
1.000	1	63.441	-0.109	0.000	0.17		3.4	OK			4
1.001	2	63.280	-0.103	0.000	0.21		3.4	OK			
2.000	12	63.440	-0.110	0.000	0.16		3.3	OK			4
2.001	13	63.251	-0.108	0.000	0.17		3.2	OK			
1.002	3	63.128	-0.083	0.000	0.41		6.7	OK			
3.000	14	63.441	-0.109	0.000	0.17		3.6	OK			4
3.001	15	63.144	-0.101	0.000	0.22		3.6	OK			
1.003	4	63.074	-0.058	0.000	0.69		10.4	OK			
4.000	16	63.433	-0.117	0.000	0.11		3.6	OK			
1.004	5	63.025	-0.043	0.000	0.85		13.9	OK			
1.005	6	62.887	-0.046	0.000	0.81		13.6	OK			
1.006	7	62.715	0.021	0.000	1.28		13.9	SURCHARGED			
1.007	8	62.635	-0.036	0.000	0.93		13.8	OK			
1.008	9	62.610	-0.003	0.000	0.37		4.6	OK			
1.009	10	62.602	0.030	0.000	0.29		4.5	SURCHARGED			

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for 223-150 SW REV B.SWS

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	10.000
Hot Start (mins)	0	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coefficient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of 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	0.353
Region	England and Wales Cv (Summer)		0.750
M5-60 (mm)	18.200 Cv (Winter)		0.840

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

Profile(s)

Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440	Summer and Winter
Return Period(s) (years)		1, 2, 30, 100
Climate Change (%)		0, 0, 0, 45

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	1	15 Winter	30	+0%	100/15 Summer	100/15 Summer		
1.001	2	15 Winter	30	+0%	30/15 Winter			
2.000	12	15 Winter	30	+0%	100/15 Summer	100/15 Summer		
2.001	13	15 Winter	30	+0%	30/15 Summer			
1.002	3	15 Winter	30	+0%	30/15 Summer			
3.000	14	15 Winter	30	+0%	100/15 Summer	100/15 Summer		
3.001	15	15 Winter	30	+0%	30/15 Summer			
1.003	4	15 Winter	30	+0%	30/15 Summer			
4.000	16	15 Winter	30	+0%	100/15 Summer			
1.004	5	15 Winter	30	+0%	30/15 Summer			
1.005	6	15 Winter	30	+0%	30/15 Summer			
1.006	7	30 Winter	30	+0%	2/15 Summer			
1.007	8	30 Winter	30	+0%	30/15 Summer			
1.008	9	30 Winter	30	+0%	30/15 Summer			
1.009	10	30 Winter	30	+0%	2/15 Summer			

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for 223-150 SW REV B.SWS

		Water	Surcharged	Flooded		Pipe			
PN	US/MH Name	Level (m)	Depth (m)	Volume (m ³)	Flow / Overflow Cap. (l/s)	Flow (l/s)	Status	Level Exceeded	
1.000	1	63.458	-0.092	0.000	0.32	6.5	OK	4	
1.001	2	63.406	0.023	0.000	0.38	6.4	SURCHARGED		
2.000	12	63.456	-0.094	0.000	0.30	6.2	OK	4	
2.001	13	63.401	0.042	0.000	0.31	5.9	SURCHARGED		
1.002	3	63.384	0.173	0.000	0.59	9.6	SURCHARGED		
3.000	14	63.458	-0.092	0.000	0.32	6.8	OK	4	
3.001	15	63.375	0.130	0.000	0.36	5.7	SURCHARGED		
1.003	4	63.358	0.226	0.000	0.97	14.5	SURCHARGED		
4.000	16	63.447	-0.103	0.000	0.21	6.8	OK		
1.004	5	63.299	0.231	0.000	1.20	19.5	SURCHARGED		
1.005	6	63.105	0.172	0.000	1.14	19.3	SURCHARGED		
1.006	7	62.853	0.158	0.000	1.50	16.3	SURCHARGED		
1.007	8	62.816	0.145	0.000	1.08	15.9	SURCHARGED		
1.008	9	62.797	0.184	0.000	0.42	5.3	SURCHARGED		
1.009	10	62.789	0.217	0.000	0.32	5.0	SURCHARGED		

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 223-150 SW REV B.SWS

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	10.000
Hot Start (mins)	0	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coefficient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of 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	0.353
Region England and Wales Cv (Summer)	0.750		
M5-60 (mm)	18.200	Cv (Winter)	0.840

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

Profile(s)

Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440	Summer and Winter
Return Period(s) (years)	1, 2, 30, 100	
Climate Change (%)	0, 0, 0, 45	

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	1 15	Winter	100	+45%	100/15 Summer	100/15 Summer		
1.001	2 15	Summer	100	+45%	30/15 Winter			
2.000	12 15	Winter	100	+45%	100/15 Summer	100/15 Summer		
2.001	13 15	Winter	100	+45%	30/15 Summer			
1.002	3 15	Winter	100	+45%	30/15 Summer			
3.000	14 15	Winter	100	+45%	100/15 Summer	100/15 Summer		
3.001	15 15	Summer	100	+45%	30/15 Summer			
1.003	4 15	Summer	100	+45%	30/15 Summer			
4.000	16 15	Winter	100	+45%	100/15 Summer			
1.004	5 15	Summer	100	+45%	30/15 Summer			
1.005	6 30	Winter	100	+45%	30/15 Summer			
1.006	7 60	Winter	100	+45%	2/15 Summer			
1.007	8 60	Winter	100	+45%	30/15 Summer			
1.008	9 60	Winter	100	+45%	30/15 Summer			
1.009	10 60	Winter	100	+45%	2/15 Summer			

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 223-150 SW REV B.SWS

PN	US/MH Name	Water	Surcharged	Flooded	Pipe		Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m³)	Flow / Overflow Cap. (l/s)	Flow (l/s)		
1.000	1	63.851	0.301	1.105	0.44	9.0	FLOOD	4
1.001	2	63.843	0.460	0.000	0.46	7.7	FLOOD RISK	
2.000	12	63.851	0.301	0.891	0.41	8.6	FLOOD	4
2.001	13	63.845	0.487	0.000	0.39	7.4	FLOOD RISK	
1.002	3	63.829	0.618	0.000	0.95	15.5	FLOOD RISK	
3.000	14	63.851	0.301	0.674	0.44	9.5	FLOOD	4
3.001	15	63.831	0.586	0.000	0.49	7.8	FLOOD RISK	
1.003	4	63.813	0.681	0.000	1.25	18.7	FLOOD RISK	
4.000	16	63.823	0.273	0.000	0.34	11.1	FLOOD RISK	
1.004	5	63.746	0.678	0.000	1.53	24.9	FLOOD RISK	
1.005	6	63.487	0.554	0.000	1.39	23.4	SURCHARGED	
1.006	7	63.279	0.584	0.000	1.81	19.6	SURCHARGED	
1.007	8	63.273	0.602	0.000	1.29	19.0	SURCHARGED	
1.008	9	63.262	0.650	0.000	0.44	5.5	SURCHARGED	
1.009	10	63.264	0.692	0.000	0.32	5.0	SURCHARGED	