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9 Joyce Way Whitchurch Shropshire SY13 1TZ	Wem School 1 in 100 + 40% Simulation	
Date 14/02/2024 File 1 in 1 year base 2 crat...	Designed by AG Checked by	
Micro Drainage	Network 2018.1.1	

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	k (mm)	HYD SECT	DIA (mm)	Section Type
1.000	10.764	0.071	151.6	0.009	2.00	0.600	o	225	Pipe/Conduit
1.001	23.796	0.059	403.3	0.047	0.00	0.600	[]	-132	Pipe/Conduit
1.002	15.581	0.039	399.5	0.000	0.00	0.600	[]	-131	Pipe/Conduit
2.000	9.366	0.023	407.2	0.009	2.00	0.600	[]	-131	Pipe/Conduit
1.003	13.482	0.054	249.7	0.000	0.00	0.600	o	150	Pipe/Conduit

PN	US/MH Name	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl	US/MH (mm)
1.000	S1	81.200	80.388	0.587	81.150	80.317	0.608		1200
1.001	Attenuation	81.150	80.142	0.608	81.150	80.083	0.667		1200
1.002	Attenuation	81.150	80.083	0.667	81.150	80.044	0.706		1200
2.000	Attenuation	81.150	80.242	0.508	81.150	80.219	0.531		3000
1.003	Outfall	81.150	80.044	0.956	80.620	79.990	0.480	Hydro-Brake®	1200

Conduit Sections for Storm

NOTE: Diameters less than 66 refer to section numbers of hydraulic conduits. These conduits are marked by the symbols:- [] box culvert, \ / open channel, oo dual pipe, ooo triple pipe, O egg.

Section numbers < 0 are taken from user conduit table

Section Number	Conduit Type	Major Dimn. (mm)	Minor Dimn. (mm)	Side Slope (Deg)	Corner Splay (mm)	4*Hyd Radius (m)	XSect Area (m ²)
-131	[]	500	400	90.0		0.444	0.200
-132	[]	1000	400	90.0		0.571	0.400

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	225	S1	81.200	80.388	0.587	Open Manhole	1200
1.001	[]	-132	Attenuation	81.150	80.142	0.608	Open Manhole	1200
1.002	[]	-131	Attenuation	81.150	80.083	0.667	Open Manhole	1200
2.000	[]	-131	Attenuation	81.150	80.242	0.508	Open Manhole	3000
1.003	o	150	Outfall	81.150	80.044	0.956	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	10.764	151.6	Attenuation	81.150	80.317	0.608	Open Manhole	1200
1.001	23.796	403.3	Attenuation	81.150	80.083	0.667	Open Manhole	1200
1.002	15.581	399.5	Outfall	81.150	80.044	0.706	Open Manhole	1200
2.000	9.366	407.2	Outfall	81.150	80.219	0.531	Open Manhole	1200
1.003	13.482	249.7		80.620	79.990	0.480	Open Manhole	1200

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)
1.003		80.620	79.990	0.000	1200	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	0.000
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	0
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 Region England and Wales
Return Period (years) 100 M5-60 (mm) 18.000

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Synthetic Rainfall Details

Ratio R 0.400 Cv (Winter) 0.840
 Profile Type Summer Storm Duration (mins) 30
 Cv (Summer) 0.750

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Online Controls for Storm


Hydro-Brake® Optimum Manhole: Outfall, DS/PN: 1.003, Volume (m³): 5.6

Unit Reference	MD-SHE-0119-5600-0425-5600
Design Head (m)	0.425
Design Flow (l/s)	5.6
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	119
Invert Level (m)	80.044
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.425	5.6
Flush-Flo™	0.180	5.6
Kick-Flo®	0.330	5.0
Mean Flow over Head Range	-	4.5

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	4.2	1.200	9.1	3.000	14.1	7.000	21.2
0.200	5.6	1.400	9.8	3.500	15.1	7.500	22.0
0.300	5.2	1.600	10.4	4.000	16.1	8.000	22.7
0.400	5.4	1.800	11.0	4.500	17.0	8.500	23.4
0.500	6.0	2.000	11.6	5.000	17.9	9.000	24.1
0.600	6.6	2.200	12.1	5.500	18.8	9.500	24.8
0.800	7.5	2.400	12.6	6.000	19.6		
1.000	8.3	2.600	13.1	6.500	20.4		

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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 0.000
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 0
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 0.400
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 18.000 Cv (Winter) 0.840
Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600
Return Period(s) (years) 1, 30, 100
Climate Change (%) 40, 40, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	S1	30 Winter	100	+40%				
1.001	Attenuation	30 Winter	100	+40%				
1.002	Attenuation	30 Winter	100	+40%				
2.000	Attenuation	30 Winter	100	+40%				
1.003	Outfall	30 Winter	100	+40%	30/15 Summer			

PN	US/MH Name	Water			Flooded		Pipe		Level Exceeded
		Level (m)	Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	
1.000	S1	80.471	-0.142	0.000	0.12		4.2	OK	
1.001	Attenuation	80.470	-0.072	0.000	0.07		24.2	OK	
1.002	Attenuation	80.469	-0.014	0.000	0.08		11.3	OK	
2.000	Attenuation	80.467	-0.175	0.000	0.03		3.2	OK	
1.003	Outfall	80.467	0.273	0.000	0.55		5.6	SURCHARGED	