Manhole Schedules for X_PROP_DRAINAGE GROUND 160308.SWS

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
SSW01	32.800	0.800	Open Manhole	450	S1.000	32.000	150				
SSW02	32.600	0.800	Open Manhole	450	S2.000	31.800	150				
SSW03	32.550	1.125	Open Manhole	1200	S1.001	31.425	225	S1.000	31.500	150	
								S2.000	31.500	150	
SSW04	32.800	1.000	Open Manhole	450	S3.000	31.800	150				
SSW05	32.800	1.000	Open Manhole	450	S4.000	31.800	150				
SSW06	32.550	1.270	Open Manhole	1200	S1.002	31.280	225	S1.001	31.280	225	
								S3.000	31.355	150	
								S4.000	31.355	150	
SSW07	32.550	1.295	Open Manhole	1200	S1.003	31.255	225	S1.002	31.255	225	
SEXG	32.550	1.350	Open Manhole	1200		OUTFALL		S1.003	31.200	225	

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PIPELINE SCHEDULES for X_PROP_DRAINAGE GROUND 160308.SWS

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	150	SSW01	32.800	32.000	0.650	Open Manhole	450
S2.000	o	150	SSW02	32.600	31.800	0.650	Open Manhole	450
S1.001	o	225	SSW03	32.550	31.425	0.900	Open Manhole	1200
S3.000	o	150	SSW04	32.800	31.800	0.850	Open Manhole	450
S4.000	o	150	SSW05	32.800	31.800	0.850	Open Manhole	450
S1.002	o	225	SSW06	32.550	31.280	1.045	Open Manhole	1200
S1.003	o	225	SSW07	32.550	31.255	1.070	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	12.957	25.9	SSW03	32.550	31.500	0.900	Open Manhole	1200
S2.000	8.338	27.8	SSW03	32.550	31.500	0.900	Open Manhole	1200
S1.001	24.294	167.5	SSW06	32.550	31.280	1.045	Open Manhole	1200
S3.000	3.994	9.0	SSW06	32.550	31.355	1.045	Open Manhole	1200
S4.000	12.181	27.4	SSW06	32.550	31.355	1.045	Open Manhole	1200
S1.002	3.964	158.6	SSW07	32.550	31.255	1.070	Open Manhole	1200
S1.003	9.404	171.0	SEXG	32.550	31.200	1.125	Open Manhole	1200

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Area Summary for X_PROP_DRAINAGE GROUND 160308.SWS

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.036	0.036	0.036
2.000	-	-	100	0.032	0.032	0.032
1.001	-	-	100	0.029	0.029	0.029
3.000	-	-	100	0.014	0.014	0.014
4.000	-	-	100	0.009	0.009	0.009
1.002	-	-	100	0.024	0.024	0.024
1.003	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.144	0.144	0.144

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Online Controls for X_PROP_DRAINAGE GROUND 160308.SWS

Hydro-Brake Optimum® Manhole: SSW06, DS/PN: S1.002, Volume (m³): 2.6

Unit Reference	MD-SHE-0101-5000-1270-5000
Design Head (m)	1.270
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Diameter (mm)	101
Invert Level (m)	31.280
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)	1.270	5.0	Kick-Flo®	0.777	4.0
Flush-Flo™	0.374	4.9	Mean Flow over Head Range	-	4.3

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake Optimum® as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.4	0.800	4.0	2.000	6.1	4.000	8.5	7.000	11.1
0.200	4.6	1.000	4.4	2.200	6.4	4.500	9.0	7.500	11.4
0.300	4.9	1.200	4.8	2.400	6.7	5.000	9.4	8.000	11.8
0.400	4.9	1.400	5.2	2.600	6.9	5.500	9.9	8.500	12.1
0.500	4.8	1.600	5.5	3.000	7.4	6.000	10.3	9.000	12.5
0.600	4.7	1.800	5.8	3.500	8.0	6.500	10.7	9.500	12.8

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Storage Structures for X_PROP_DRAINAGE GROUND 160308.SWS

Cellular Storage Manhole: SSW06, DS/PN: S1.002

Invert Level (m) 31.280 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	40.0	40.0	1.000	40.0	60.0	1.001	0.0	60.0

Time Area Diagram at Pipe Number S1.000 for X_PROP_DRAINAGE GROUND 160308.SWS

Total Area (ha) 0.033

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.032	4	8	0.001

Time Area Diagram at Pipe Number S2.000 for X_PROP_DRAINAGE GROUND 160308.SWS

Total Area (ha) 0.031

Time From:	(mins) To:	Area (ha)
0	4	0.031

Time Area Diagram at Pipe Number S3.000 for X_PROP_DRAINAGE GROUND 160308.SWS

Total Area (ha) 0.013

Time From:	(mins) To:	Area (ha)
0	4	0.013

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for X_PROP_DRAINAGE GROUND 160308.SWS

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 Offline Controls 0 Number of Time/Area Diagrams 3
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) 21.000 Cv (Summer) 0.750
Region England and Wales Ratio R 0.438 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, 240, 360, 480, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
S1.000	SSW01	15 Winter	1	+0%	100/15 Summer				32.040	-0.110
S2.000	SSW02	15 Winter	1	+0%	100/15 Summer				31.841	-0.109
S1.001	SSW03	15 Winter	1	+0%	30/15 Summer	100/30 Winter			31.521	-0.129
S3.000	SSW04	15 Winter	1	+0%	100/15 Summer				31.821	-0.129
S4.000	SSW05	15 Winter	1	+0%	100/15 Summer				31.820	-0.130
S1.002	SSW06	60 Winter	1	+0%	30/15 Summer	100/60 Winter			31.483	-0.022
S1.003	SSW07	60 Winter	1	+0%					31.309	-0.171

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SSW01	0.000	0.16		5.2	OK	
S2.000	SSW02	0.000	0.17		5.0	OK	
S1.001	SSW03	0.000	0.37		13.8	OK	3
S3.000	SSW04	0.000	0.05		2.1	OK	
S4.000	SSW05	0.000	0.04		1.4	OK	
S1.002	SSW06	0.000	0.15		4.2	OK	2
S1.003	SSW07	0.000	0.13		4.2	OK	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for X_PROP_DRAINAGE GROUND 160308.SWS

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 Offline Controls 0 Number of Time/Area Diagrams 3
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) 21.000	Cv (Summer) 0.750
Region England and Wales		Ratio R 0.438	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, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
S1.000	SSW01	15 Winter	30	+0%	100/15 Summer				32.066	-0.084
S2.000	SSW02	60 Winter	30	+0%	100/15 Summer				31.881	-0.069
S1.001	SSW03	60 Winter	30	+0%	30/15 Summer	100/30 Winter			31.877	0.227
S3.000	SSW04	60 Winter	30	+0%	100/15 Summer				31.870	-0.080
S4.000	SSW05	60 Winter	30	+0%	100/15 Summer				31.870	-0.080
S1.002	SSW06	60 Winter	30	+0%	30/15 Summer	100/60 Winter			31.869	0.364
S1.003	SSW07	30 Summer	30	+0%					31.313	-0.167

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SSW01	0.000	0.40		12.9	OK	
S2.000	SSW02	0.000	0.20		5.8	OK	
S1.001	SSW03	0.000	0.43		16.0	SURCHARGED	3
S3.000	SSW04	0.000	0.06		2.4	OK	
S4.000	SSW05	0.000	0.05		1.6	OK	
S1.002	SSW06	0.000	0.17		4.9	SURCHARGED	2
S1.003	SSW07	0.000	0.15		4.9	OK	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for X_PROP_DRAINAGE GROUND 160308.SWS

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 Offline Controls 0 Number of Time/Area Diagrams 3
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)	21.000
Region	England and Wales	Ratio R	0.438
Cv (Summer)	0.750		
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, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
S1.000	SSW01	60 Winter	100	+30%	100/15 Summer				32.573	0.423
S2.000	SSW02	60 Winter	100	+30%	100/15 Summer				32.567	0.617
S1.001	SSW03	60 Winter	100	+30%	30/15 Summer	100/30 Winter			32.555	0.905
S3.000	SSW04	60 Winter	100	+30%	100/15 Summer				32.554	0.604
S4.000	SSW05	60 Winter	100	+30%	100/15 Summer				32.557	0.607
S1.002	SSW06	60 Winter	100	+30%	30/15 Summer	100/60 Winter			32.550	1.045
S1.003	SSW07	30 Winter	100	+30%					31.313	-0.167

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SSW01	0.000	0.33		10.5	FLOOD RISK	
S2.000	SSW02	0.000	0.30		8.9	FLOOD RISK	
S1.001	SSW03	4.966	0.71		26.2	FLOOD	3
S3.000	SSW04	0.000	0.09		4.0	FLOOD RISK	
S4.000	SSW05	0.000	0.09		2.6	FLOOD RISK	
S1.002	SSW06	0.253	0.17		4.9	FLOOD	2
S1.003	SSW07	0.000	0.15		4.9	OK	

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