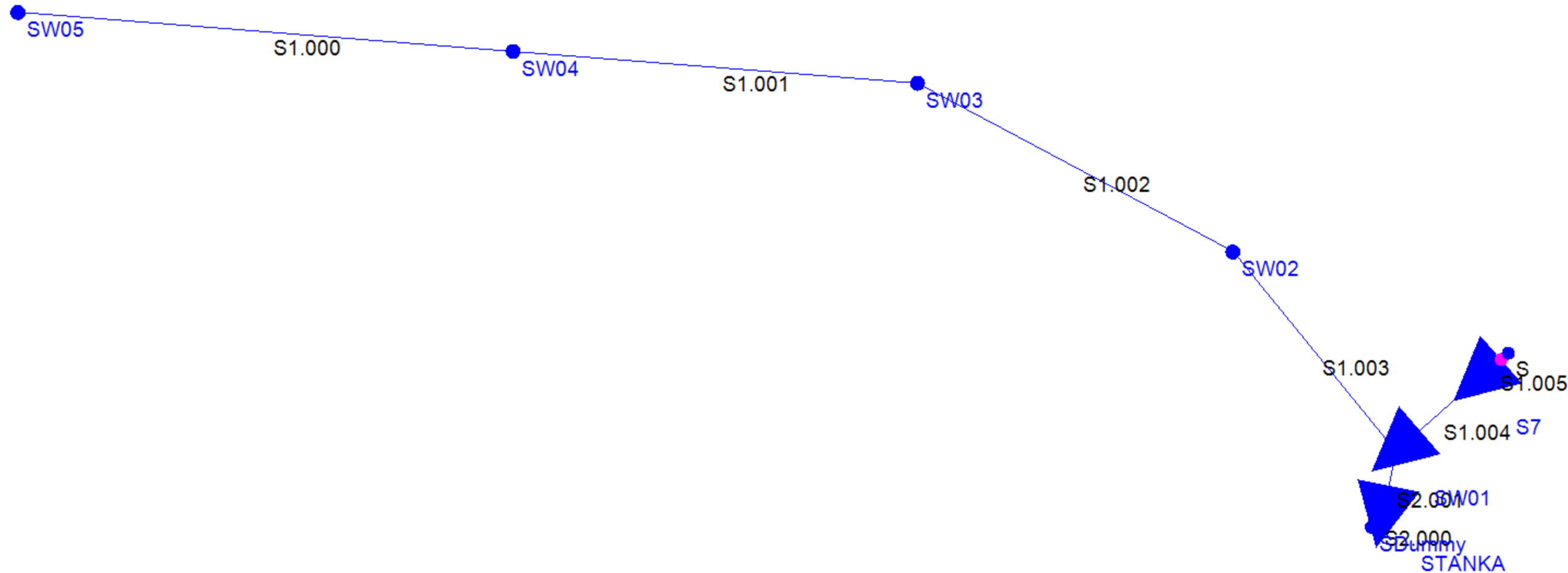
Cambridge Road, Barkway
Surface Water Network



STORM SEWER DESIGN by the Modified Rational Method

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	39.115	0.765	51.1	0.080	5.00	0.0	0.600	o	225	Pipe/Conduit	
S1.001	31.971	0.910	35.1	0.080	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.002	28.161	0.725	38.8	0.058	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.003	20.239	1.850	10.9	0.010	0.00	0.0	0.600	o	225	Pipe/Conduit	
S2.000	1.000#	0.010	100.0	0.000	5.00	0.0	0.600	o	225	Pipe/Conduit	
S2.001	5.285	0.035	151.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.004	8.497	0.085	100.0	0.032	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.005	3.255	0.033	100.0	0.000	0.00	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)
S1.000	70.09	5.36	137.275	0.080	0.0	0.0	0.0	1.83	72.9	15.2
S1.001	68.72	5.60	136.510	0.160	0.0	0.0	0.0	2.21	88.1	29.8
S1.002	67.51	5.82	135.600	0.218	0.0	0.0	0.0	2.11	83.7	39.9
S1.003	67.06	5.90	134.875	0.228	0.0	0.0	0.0	3.98	158.2	41.4
S2.000	72.14	5.01	132.995	0.000	0.0	0.0	0.0	1.31	52.0	0.0
S2.001	71.63	5.10	132.985	0.000	0.0	0.0	0.0	1.06	42.2	0.0
S1.004	66.50	6.01	132.950	0.260	0.0	0.0	0.0	1.31	52.0	46.8
S1.005	66.29	6.05	132.865	0.260	0.0	0.0	0.0	1.31	52.0	46.8

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Manhole Schedules for Storm

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)
SW05	138.860	1.585	Open Manhole	1200	S1.000	137.275	225				
SW04	137.960	1.450	Open Manhole	1200	S1.001	136.510	225	S1.000	136.510	225	
SW03	137.060	1.460	Open Manhole	1200	S1.002	135.600	225	S1.001	135.600	225	
SW02	136.225	1.350	Open Manhole	1200	S1.003	134.875	225	S1.002	134.875	225	
SDummy	135.750	2.755	Open Manhole	1	S2.000	132.995	225				
STANKA	135.750	2.765	Open Manhole	1	S2.001	132.985	225	S2.000	132.985	225	
SW01	135.910	2.960	Open Manhole	1200	S1.004	132.950	225	S1.003	133.025	225	75
								S2.001	132.950	225	
S7	135.750	2.885	Open Manhole	1800	S1.005	132.865	225	S1.004	132.865	225	
S	135.750	2.918	Open Manhole	0		OUTFALL		S1.005	132.832	225	

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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	225	SW05	138.860	137.275	1.360	Open Manhole	1200
S1.001	o	225	SW04	137.960	136.510	1.225	Open Manhole	1200
S1.002	o	225	SW03	137.060	135.600	1.235	Open Manhole	1200
S1.003	o	225	SW02	136.225	134.875	1.125	Open Manhole	1200
S2.000	o	225	SDummy	135.750	132.995	2.530	Open Manhole	1
S2.001	o	225	STANKA	135.750	132.985	2.540	Open Manhole	1
S1.004	o	225	SW01	135.910	132.950	2.735	Open Manhole	1200
S1.005	o	225	S7	135.750	132.865	2.660	Open Manhole	1800

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	39.115	51.1	SW04	137.960	136.510	1.225	Open Manhole	1200
S1.001	31.971	35.1	SW03	137.060	135.600	1.235	Open Manhole	1200
S1.002	28.161	38.8	SW02	136.225	134.875	1.125	Open Manhole	1200
S1.003	20.239	10.9	SW01	135.910	133.025	2.660	Open Manhole	1200
S2.000	1.000#	100.0	STANKA	135.750	132.985	2.540	Open Manhole	1
S2.001	5.285	151.0	SW01	135.910	132.950	2.735	Open Manhole	1200
S1.004	8.497	100.0	S7	135.750	132.865	2.660	Open Manhole	1800
S1.005	3.255	100.0	S	135.750	132.832	2.693	Open Manhole	0

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)
S1.005	S	135.750	132.832	0.000	0	0

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Online Controls for Storm

Weir Manhole: S7, DS/PN: S1.005, Volume (m³): 0.3

Discharge Coef 0.544 Width (m) 1.800 Invert Level (m) 135.749

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Storage Structures for Storm

Cellular Storage Manhole: STANKA, DS/PN: S2.001

Invert Level (m) 132.985 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)
0.000	35.0	35.0	2.001	0.0	83.0
2.000	35.0	83.0			

Cellular Storage Manhole: SW01, DS/PN: S1.004

Invert Level (m) 132.950 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)
0.000	45.0	45.0	2.001	0.0	103.0
2.000	45.0	103.0			

Deep Bore Soakaway Manhole: S7, DS/PN: S1.005

Chamber Invert Level (m) 120.750 Infiltration Coefficient Base (m/hr) 2.00000
Chamber Diameter/Length (m) 1.800 Safety Factor 2.0
Borehole Diameter (m) 0.150
Borehole Depth (m) 11.815

Depth (m)	Side Infil. Coef. (m/hr)	Depth (m)	Side Infil. Coef. (m/hr)
0.000	2.00000	11.815	2.00000

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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	3
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	0.428
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
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, 2160, 2880
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	Event	US/CL (m)	Water Level (m)	Flooded Volume (m³)	Pipe Flow (l/s)	Status
S1.000	15 minute 1 year Winter I+0%	138.860	137.336	0.000	11.2	OK
S1.001	15 minute 1 year Winter I+0%	137.960	136.587	0.000	20.8	OK
S1.002	15 minute 1 year Winter I+0%	137.060	135.694	0.000	27.9	OK
S1.003	15 minute 1 year Winter I+0%	136.225	134.944	0.000	29.2	OK
S2.000	120 minute 1 year Winter I+0%	135.750	133.247	0.000	0.0	SURCHARGED
S2.001	120 minute 1 year Winter I+0%	135.750	133.247	0.000	0.7	SURCHARGED
S1.004	120 minute 1 year Winter I+0%	135.910	133.247	0.000	3.9	SURCHARGED
S1.005	120 minute 1 year Winter I+0%	135.750	133.245	0.000	0.0	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 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	3
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	0.428
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
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, 2160, 2880
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	Event	US/CL (m)	Water Level (m)	Flooded Volume (m³)	Pipe Flow (l/s)	Status
S1.000	15 minute 30 year Winter I+0%	138.860	137.375	0.000	27.5	OK
S1.001	15 minute 30 year Winter I+0%	137.960	136.650	0.000	57.0	OK
S1.002	15 minute 30 year Winter I+0%	137.060	135.801	0.000	77.6	OK
S1.003	15 minute 30 year Winter I+0%	136.225	134.997	0.000	81.0	OK
S2.000	240 minute 30 year Winter I+0%	135.750	133.839	0.000	0.0	SURCHARGED
S2.001	240 minute 30 year Winter I+0%	135.750	133.839	0.000	0.7	SURCHARGED
S1.004	240 minute 30 year Winter I+0%	135.910	133.839	0.000	2.8	SURCHARGED
S1.005	240 minute 30 year Winter I+0%	135.750	133.837	0.000	0.0	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 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	3
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	0.428
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
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, 2160, 2880
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	Event	US/CL (m)	Water Level (m)	Flooded Volume (m³)	Pipe Flow (l/s)	Status
S1.000	15 minute 100 year Winter I+40%	138.860	137.884	0.000	44.5	SURCHARGED
S1.001	15 minute 100 year Winter I+40%	137.960	137.587	0.000	83.3	SURCHARGED
S1.002	15 minute 100 year Winter I+40%	137.060	136.647	0.000	112.7	SURCHARGED
S1.003	15 minute 100 year Winter I+40%	136.225	135.032	0.000	117.4	OK
S2.000	360 minute 100 year Winter I+40%	135.750	134.820	0.000	0.0	SURCHARGED
S2.001	360 minute 100 year Winter I+40%	135.750	134.820	0.000	0.8	SURCHARGED
S1.004	360 minute 100 year Winter I+40%	135.910	134.820	0.000	3.4	SURCHARGED
S1.005	360 minute 100 year Winter I+40%	135.750	134.818	0.000	0.0	SURCHARGED

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