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5 Manchester Square London W1U 3PD	Finchley Road Existing Surface Water Discharge Rates	
Date 06/08/2021 14:02 File Existing Network.MDX	Designed by RH Checked by RH	
Innovyze	Network 2020.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	2
FEH Rainfall Version	1999
Site Location GB 526100 184450 TQ 26100 84450	
C (1km)	-0.025
D1 (1km)	0.330
D2 (1km)	0.277
D3 (1km)	0.234
E (1km)	0.332
F (1km)	2.519
Maximum Rainfall (mm/hr)	0
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.000
Maximum Backdrop Height (m)	0.000
Min Design Depth for Optimisation (m)	0.000
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	2.877	4-8	2.198	8-12	0.063

Total Area Contributing (ha) = 5.138


Total Pipe Volume (m³) = 114.498

Network Design Table for Storm

















PN (m)	Length (m)	Fall (1:X)	Slope (ha)	I.Area (mins)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
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Network Results Table

PN (mm/hr)	Rain (mins)	T.C. (m)	US/IL (ha)	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)
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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
S1.000	32.000	0.547	58.5	0.420	5.00	0.0	0.600	o	450	Pipe/Conduit	
S1.001	74.000	0.060	1233.3	0.420	0.00	0.0	0.600	o	525	Pipe/Conduit	
S1.002	54.000	0.130	415.4	0.420	0.00	0.0	0.600	o	525	Pipe/Conduit	
S2.000	88.000	0.440	200.0	0.420	5.00	0.0	0.600	o	375	Pipe/Conduit	
S2.001	36.000	0.030	1200.0	0.420	0.00	0.0	0.600	o	450	Pipe/Conduit	
S2.002	20.000	0.030	666.7	0.420	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.003	15.000	0.490	30.6	0.420	0.00	0.0	0.600	o	600	Pipe/Conduit	
S1.004	38.000	0.200	190.0	0.420	0.00	0.0	0.600	o	600	Pipe/Conduit	
S1.005	3.000	0.490	6.1	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
S3.000	30.000	0.310	96.8	0.254	5.00	0.0	0.600	o	150	Pipe/Conduit	
S3.001	79.000	0.420	188.1	0.254	0.00	0.0	0.600	o	225	Pipe/Conduit	
S3.002	14.000	0.380	36.8	0.254	0.00	0.0	0.600	o	300	Pipe/Conduit	
S4.000	45.000	0.920	48.9	0.254	5.00	0.0	0.600	o	225	Pipe/Conduit	
S5.000	45.000	0.760	59.2	0.254	5.00	0.0	0.600	o	225	Pipe/Conduit	
S3.003	23.000	0.070	328.6	0.254	0.00	0.0	0.600	o	375	Pipe/Conduit	
S3.004	5.000	1.500	3.3	0.254	0.00	0.0	0.600	o	375	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	0.00	5.20	47.000	0.420	0.0	0.0	0.0	2.66	423.4	0.0
S1.001	0.00	7.16	46.450	0.840	0.0	0.0	0.0	0.63	136.2	0.0
S1.002	0.00	7.98	46.390	1.260	0.0	0.0	0.0	1.09	236.5	0.0
S2.000	0.00	6.15	46.760	0.420	0.0	0.0	0.0	1.28	141.1	0.0
S2.001	0.00	7.19	46.320	0.840	0.0	0.0	0.0	0.58	92.0	0.0
S2.002	0.00	7.61	46.290	1.260	0.0	0.0	0.0	0.78	124.0	0.0
S1.003	0.00	8.04	46.260	2.940	0.0	0.0	0.0	4.41	1247.5	0.0
S1.004	0.00	8.40	45.770	3.360	0.0	0.0	0.0	1.76	498.6	0.0
S1.005	0.00	8.41	45.570	3.360	0.0	0.0	0.0	9.88	2794.1	0.0
S3.000	0.00	5.49	48.070	0.254	0.0	0.0	0.0	1.02	18.1	0.0
S3.001	0.00	6.88	47.760	0.508	0.0	0.0	0.0	0.95	37.8	0.0
S3.002	0.00	6.97	47.340	0.762	0.0	0.0	0.0	2.60	183.7	0.0
S4.000	0.00	5.40	47.880	0.254	0.0	0.0	0.0	1.87	74.5	0.0
S5.000	0.00	5.44	47.720	0.254	0.0	0.0	0.0	1.70	67.7	0.0
S3.003	0.00	7.35	46.960	1.524	0.0	0.0	0.0	0.99	109.8	0.0
S3.004	0.00	7.36	46.890	1.778	0.0	0.0	0.0	9.98	1102.5	0.0

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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
S1.006	2.000	0.004	500.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
S1.007	20.000	0.080	250.0	0.000	0.00	0.0	0.600	o	1500	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)
S1.006	0.00	8.44	45.080	5.138	0.0	0.0	0.0	1.08	306.0	0.0
S1.007	0.00	8.56	44.670	5.138	0.0	0.0	0.0	2.71	4786.2	0.0

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	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	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	2
FEH Rainfall Version	1999
Site Location	GB 526100 184450 TQ 26100 84450
C (1km)	-0.025
D1 (1km)	0.330
D2 (1km)	0.277
D3 (1km)	0.234
E (1km)	0.332
F (1km)	2.519
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

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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 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 0
Number of Online Controls 0 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0


Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 1999
Site Location GB 526100 184450 TQ 26100 84450
C (1km) -0.025
D1 (1km) 0.330
D2 (1km) 0.277
D3 (1km) 0.234
E (1km) 0.332
F (1km) 2.519
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
Climate Change (%) 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	15 Winter	1	+0%					47.121
S1.001	S2	15 Winter	1	+0%					46.807
S1.002	S3	15 Winter	1	+0%					46.700
S2.000	S4	15 Winter	1	+0%					46.935
S2.001	S5	15 Winter	1	+0%	1/15 Summer				46.796
S2.002	S6	15 Winter	1	+0%	1/15 Winter				46.748
S1.003	S4	15 Winter	1	+0%					46.541
S1.004	S5	15 Winter	1	+0%					46.191
S1.005	S6	15 Winter	1	+0%					45.974
S3.000	S10	15 Winter	1	+0%	1/15 Summer				48.776
S3.001	S11	15 Winter	1	+0%	1/15 Summer				48.233
S3.002	S12	15 Winter	1	+0%					47.540
S4.000	S13	15 Winter	1	+0%					47.994
S5.000	S14	15 Winter	1	+0%					47.841

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Summary of Critical Results by Maximum Level (Rank 1) for Storm


PN	US/MH Name	Surcharged		Flooded	Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m ³)	Flow / Overflow Cap. (l/s)					
S1.000	S1	-0.329	0.000	0.16			58.9	OK	
S1.001	S2	-0.168	0.000	0.70			97.3	OK	
S1.002	S3	-0.215	0.000	0.63			134.4	OK	
S2.000	S4	-0.200	0.000	0.41			55.6	OK	
S2.001	S5	0.026	0.000	1.29			97.4	SURCHARGED	
S2.002	S6	0.008	0.000	1.79			139.5	SURCHARGED	
S1.003	S4	-0.319	0.000	0.45			313.6	OK	
S1.004	S5	-0.179	0.000	0.83			348.8	OK	
S1.005	S6	-0.196	0.000	0.49			347.1	OK	
S3.000	S10	0.556	0.000	1.32			22.8	SURCHARGED	
S3.001	S11	0.248	0.000	1.24			45.6	SURCHARGED	
S3.002	S12	-0.100	0.000	0.48			73.0	OK	
S4.000	S13	-0.111	0.000	0.49			35.2	OK	
S5.000	S14	-0.104	0.000	0.55			35.2	OK	

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S3.003	S13	15 Winter	1	+0%	1/15 Summer				47.462
S3.004	S14	15 Winter	1	+0%					47.055
S1.006	S7	15 Winter	1	+0%	1/15 Summer				45.920
S1.007	S8	15 Winter	1	+0%					45.125

PN	US/MH Name	Surcharged		Flooded		Half Drain		Pipe	Level Exceeded
		Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	
S3.003	S13	0.127	0.000	1.74			163.5	SURCHARGED	
S3.004	S14	-0.210	0.000	0.40			191.3	OK	
S1.006	S7	0.240	0.000	2.22			518.1	SURCHARGED	
S1.007	S8	-1.045	0.000	0.20			520.3	OK	

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Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	2
FEH Rainfall Version	1999
Site Location GB 526100 184450 TQ 26100 84450	
C (1km)	-0.025
D1 (1km)	0.330
D2 (1km)	0.277
D3 (1km)	0.234
E (1km)	0.332
F (1km)	2.519
Maximum Rainfall (mm/hr)	0
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.000
Maximum Backdrop Height (m)	0.000
Min Design Depth for Optimisation (m)	0.000
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	2.877	4-8	2.198	8-12	0.063

Total Area Contributing (ha) = 5.138


Total Pipe Volume (m³) = 114.498

Network Design Table for Storm

















PN (m)	Length (m)	Fall (1:X)	Slope (ha)	I.Area (mins)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
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Network Results Table

PN (mm/hr)	Rain (mins)	T.C. (m)	US/IL Σ (ha)	I.Area Σ (ha)	Base Flow Σ (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
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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
S1.000	32.000	0.547	58.5	0.420	5.00	0.0	0.600	o	450	Pipe/Conduit	
S1.001	74.000	0.060	1233.3	0.420	0.00	0.0	0.600	o	525	Pipe/Conduit	
S1.002	54.000	0.130	415.4	0.420	0.00	0.0	0.600	o	525	Pipe/Conduit	
S2.000	88.000	0.440	200.0	0.420	5.00	0.0	0.600	o	375	Pipe/Conduit	
S2.001	36.000	0.030	1200.0	0.420	0.00	0.0	0.600	o	450	Pipe/Conduit	
S2.002	20.000	0.030	666.7	0.420	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.003	15.000	0.490	30.6	0.420	0.00	0.0	0.600	o	600	Pipe/Conduit	
S1.004	38.000	0.200	190.0	0.420	0.00	0.0	0.600	o	600	Pipe/Conduit	
S1.005	3.000	0.490	6.1	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
S3.000	30.000	0.310	96.8	0.254	5.00	0.0	0.600	o	150	Pipe/Conduit	
S3.001	79.000	0.420	188.1	0.254	0.00	0.0	0.600	o	225	Pipe/Conduit	
S3.002	14.000	0.380	36.8	0.254	0.00	0.0	0.600	o	300	Pipe/Conduit	
S4.000	45.000	0.920	48.9	0.254	5.00	0.0	0.600	o	225	Pipe/Conduit	
S5.000	45.000	0.760	59.2	0.254	5.00	0.0	0.600	o	225	Pipe/Conduit	
S3.003	23.000	0.070	328.6	0.254	0.00	0.0	0.600	o	375	Pipe/Conduit	
S3.004	5.000	1.500	3.3	0.254	0.00	0.0	0.600	o	375	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	0.00	5.20	47.000	0.420	0.0	0.0	0.0	2.66	423.4	0.0
S1.001	0.00	7.16	46.450	0.840	0.0	0.0	0.0	0.63	136.2	0.0
S1.002	0.00	7.98	46.390	1.260	0.0	0.0	0.0	1.09	236.5	0.0
S2.000	0.00	6.15	46.760	0.420	0.0	0.0	0.0	1.28	141.1	0.0
S2.001	0.00	7.19	46.320	0.840	0.0	0.0	0.0	0.58	92.0	0.0
S2.002	0.00	7.61	46.290	1.260	0.0	0.0	0.0	0.78	124.0	0.0
S1.003	0.00	8.04	46.260	2.940	0.0	0.0	0.0	4.41	1247.5	0.0
S1.004	0.00	8.40	45.770	3.360	0.0	0.0	0.0	1.76	498.6	0.0
S1.005	0.00	8.41	45.570	3.360	0.0	0.0	0.0	9.88	2794.1	0.0
S3.000	0.00	5.49	48.070	0.254	0.0	0.0	0.0	1.02	18.1	0.0
S3.001	0.00	6.88	47.760	0.508	0.0	0.0	0.0	0.95	37.8	0.0
S3.002	0.00	6.97	47.340	0.762	0.0	0.0	0.0	2.60	183.7	0.0
S4.000	0.00	5.40	47.880	0.254	0.0	0.0	0.0	1.87	74.5	0.0
S5.000	0.00	5.44	47.720	0.254	0.0	0.0	0.0	1.70	67.7	0.0
S3.003	0.00	7.35	46.960	1.524	0.0	0.0	0.0	0.99	109.8	0.0
S3.004	0.00	7.36	46.890	1.778	0.0	0.0	0.0	9.98	1102.5	0.0

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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
S1.006	2.000	0.004	500.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
S1.007	20.000	0.080	250.0	0.000	0.00	0.0	0.600	o	1500	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)
S1.006	0.00	8.44	45.080	5.138	0.0	0.0	0.0	1.08	306.0	0.0
S1.007	0.00	8.56	44.670	5.138	0.0	0.0	0.0	2.71	4786.2	0.0

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	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	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	2
FEH Rainfall Version	1999
Site Location	GB 526100 184450 TQ 26100 84450
C (1km)	-0.025
D1 (1km)	0.330
D2 (1km)	0.277
D3 (1km)	0.234
E (1km)	0.332
F (1km)	2.519
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

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5 Manchester Square London W1U 3PD	Finchley Road Existing Surface Water Discharge Rates	
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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 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 0
Number of Online Controls 0 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0


Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 1999
Site Location GB 526100 184450 TQ 26100 84450
C (1km) -0.025
D1 (1km) 0.330
D2 (1km) 0.277
D3 (1km) 0.234
E (1km) 0.332
F (1km) 2.519
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) 2
Climate Change (%) 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	15 Winter	2	+0%					47.140
S1.001	S2	15 Winter	2	+0%					46.871
S1.002	S3	15 Winter	2	+0%					46.760
S2.000	S4	15 Winter	2	+0%					46.987
S2.001	S5	15 Winter	2	+0%	2/15 Summer				46.866
S2.002	S6	15 Winter	2	+0%	2/15 Summer				46.792
S1.003	S4	15 Winter	2	+0%					46.608
S1.004	S5	15 Winter	2	+0%	2/15 Winter				46.461
S1.005	S6	15 Winter	2	+0%	2/15 Winter				46.253
S3.000	S10	15 Winter	2	+0%	2/15 Summer				49.228
S3.001	S11	15 Winter	2	+0%	2/15 Summer				48.575
S3.002	S12	15 Winter	2	+0%	2/15 Winter				47.674
S4.000	S13	15 Winter	2	+0%					48.013
S5.000	S14	15 Winter	2	+0%					47.901

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Summary of Critical Results by Maximum Level (Rank 1) for Storm


PN	US/MH Name	Surcharged		Flooded	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m ³)	Flow / Cap.						
S1.000	S1	-0.310	0.000	0.21				76.1	OK	
S1.001	S2	-0.104	0.000	0.90				125.8	OK	
S1.002	S3	-0.155	0.000	0.81				172.9	OK	
S2.000	S4	-0.148	0.000	0.52				70.6	OK	
S2.001	S5	0.096	0.000	1.65				124.1	SURCHARGED	
S2.002	S6	0.052	0.000	2.31				179.2	SURCHARGED	
S1.003	S4	-0.252	0.000	0.56				391.1	OK	
S1.004	S5	0.091	0.000	1.02				431.8	SURCHARGED	
S1.005	S6	0.083	0.000	0.62				438.1	SURCHARGED	
S3.000	S10	1.008	0.000	1.45				25.0	FLOOD RISK	
S3.001	S11	0.590	0.000	1.47				53.9	SURCHARGED	
S3.002	S12	0.034	0.000	0.59				90.1	SURCHARGED	
S4.000	S13	-0.092	0.000	0.64				45.4	OK	
S5.000	S14	-0.044	0.000	0.67				43.6	OK	

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S3.003	S13	15 Winter	2	+0%	2/15 Summer				47.565
S3.004	S14	15 Winter	2	+0%					47.076
S1.006	S7	15 Winter	2	+0%	2/15 Summer				46.069
S1.007	S8	15 Winter	2	+0%					45.176

PN	US/MH Name	Surcharged		Flooded		Half Drain		Pipe	Level Exceeded
		Depth (m)	Volume (m³)	Flow / Cap. (l/s)	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	
S3.003	S13	0.230	0.000	2.12			199.3	SURCHARGED	
S3.004	S14	-0.189	0.000	0.49			234.4	OK	
S1.006	S7	0.389	0.000	2.77			646.0	SURCHARGED	
S1.007	S8	-0.994	0.000	0.25			647.0	OK	

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	2
FEH Rainfall Version	1999
Site Location GB 526100 184450 TQ 26100 84450	
C (1km)	-0.025
D1 (1km)	0.330
D2 (1km)	0.277
D3 (1km)	0.234
E (1km)	0.332
F (1km)	2.519
Maximum Rainfall (mm/hr)	0
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.000
Maximum Backdrop Height (m)	0.000
Min Design Depth for Optimisation (m)	0.000
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	2.877	4-8	2.198	8-12	0.063

Total Area Contributing (ha) = 5.138

Total Pipe Volume (m³) = 114.498

Network Design Table for Storm

PN (m)	Length (m)	Fall (1:X)	Slope (ha)	I.Area (mins)	T.E. (Flow (l/s))	Base (mm)	k (SECT)	HYD (mm)	DIA (mm)	Section Type	Auto Design
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Network Results Table

PN (mm/hr)	Rain (mins)	T.C. (m)	US/IL Σ (ha)	I.Area Σ (Flow (l/s))	Base Σ (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
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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
S1.000	32.000	0.547	58.5	0.420	5.00	0.0	0.600	o	450	Pipe/Conduit	
S1.001	74.000	0.060	1233.3	0.420	0.00	0.0	0.600	o	525	Pipe/Conduit	
S1.002	54.000	0.130	415.4	0.420	0.00	0.0	0.600	o	525	Pipe/Conduit	
S2.000	88.000	0.440	200.0	0.420	5.00	0.0	0.600	o	375	Pipe/Conduit	
S2.001	36.000	0.030	1200.0	0.420	0.00	0.0	0.600	o	450	Pipe/Conduit	
S2.002	20.000	0.030	666.7	0.420	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.003	15.000	0.490	30.6	0.420	0.00	0.0	0.600	o	600	Pipe/Conduit	
S1.004	38.000	0.200	190.0	0.420	0.00	0.0	0.600	o	600	Pipe/Conduit	
S1.005	3.000	0.490	6.1	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
S3.000	30.000	0.310	96.8	0.254	5.00	0.0	0.600	o	150	Pipe/Conduit	
S3.001	79.000	0.420	188.1	0.254	0.00	0.0	0.600	o	225	Pipe/Conduit	
S3.002	14.000	0.380	36.8	0.254	0.00	0.0	0.600	o	300	Pipe/Conduit	
S4.000	45.000	0.920	48.9	0.254	5.00	0.0	0.600	o	225	Pipe/Conduit	
S5.000	45.000	0.760	59.2	0.254	5.00	0.0	0.600	o	225	Pipe/Conduit	
S3.003	23.000	0.070	328.6	0.254	0.00	0.0	0.600	o	375	Pipe/Conduit	
S3.004	5.000	1.500	3.3	0.254	0.00	0.0	0.600	o	375	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	0.00	5.20	47.000	0.420	0.0	0.0	0.0	2.66	423.4	0.0
S1.001	0.00	7.16	46.450	0.840	0.0	0.0	0.0	0.63	136.2	0.0
S1.002	0.00	7.98	46.390	1.260	0.0	0.0	0.0	1.09	236.5	0.0
S2.000	0.00	6.15	46.760	0.420	0.0	0.0	0.0	1.28	141.1	0.0
S2.001	0.00	7.19	46.320	0.840	0.0	0.0	0.0	0.58	92.0	0.0
S2.002	0.00	7.61	46.290	1.260	0.0	0.0	0.0	0.78	124.0	0.0
S1.003	0.00	8.04	46.260	2.940	0.0	0.0	0.0	4.41	1247.5	0.0
S1.004	0.00	8.40	45.770	3.360	0.0	0.0	0.0	1.76	498.6	0.0
S1.005	0.00	8.41	45.570	3.360	0.0	0.0	0.0	9.88	2794.1	0.0
S3.000	0.00	5.49	48.070	0.254	0.0	0.0	0.0	1.02	18.1	0.0
S3.001	0.00	6.88	47.760	0.508	0.0	0.0	0.0	0.95	37.8	0.0
S3.002	0.00	6.97	47.340	0.762	0.0	0.0	0.0	2.60	183.7	0.0
S4.000	0.00	5.40	47.880	0.254	0.0	0.0	0.0	1.87	74.5	0.0
S5.000	0.00	5.44	47.720	0.254	0.0	0.0	0.0	1.70	67.7	0.0
S3.003	0.00	7.35	46.960	1.524	0.0	0.0	0.0	0.99	109.8	0.0
S3.004	0.00	7.36	46.890	1.778	0.0	0.0	0.0	9.98	1102.5	0.0

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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
S1.006	2.000	0.004	500.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
S1.007	20.000	0.080	250.0	0.000	0.00	0.0	0.600	o	1500	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)
S1.006	0.00	8.44	45.080	5.138	0.0	0.0	0.0	1.08	306.0	0.0
S1.007	0.00	8.56	44.670	5.138	0.0	0.0	0.0	2.71	4786.2	0.0

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	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	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	2
FEH Rainfall Version	1999
Site Location	GB 526100 184450 TQ 26100 84450
C (1km)	-0.025
D1 (1km)	0.330
D2 (1km)	0.277
D3 (1km)	0.234
E (1km)	0.332
F (1km)	2.519
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

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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 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 0
Number of Online Controls 0 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0


Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 1999
Site Location GB 526100 184450 TQ 26100 84450
C (1km) -0.025
D1 (1km) 0.330
D2 (1km) 0.277
D3 (1km) 0.234
E (1km) 0.332
F (1km) 2.519
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) 30
Climate Change (%) 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	15 Winter	30	+0%	30/15 Summer	30/15 Summer			48.191
S1.001	S2	15 Summer	30	+0%	30/15 Summer				48.964
S1.002	S3	15 Winter	30	+0%	30/15 Summer	30/15 Summer			49.196
S2.000	S4	15 Winter	30	+0%	30/15 Summer	30/15 Summer			49.310
S2.001	S5	15 Winter	30	+0%	30/15 Summer	30/15 Summer			49.472
S2.002	S6	15 Winter	30	+0%	30/15 Summer	30/15 Summer			49.434
S1.003	S4	15 Winter	30	+0%	30/15 Summer				49.231
S1.004	S5	15 Winter	30	+0%	30/15 Summer				48.860
S1.005	S6	15 Winter	30	+0%	30/15 Summer				48.004
S3.000	S10	30 Winter	30	+0%	30/15 Summer	30/15 Summer			49.341
S3.001	S11	15 Winter	30	+0%	30/15 Summer	30/15 Summer			49.290
S3.002	S12	15 Winter	30	+0%	30/15 Summer	30/15 Summer			49.178
S4.000	S13	15 Winter	30	+0%	30/15 Summer	30/15 Summer			49.452
S5.000	S14	15 Winter	30	+0%	30/15 Summer	30/15 Summer			49.364

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Summary of Critical Results by Maximum Level (Rank 1) for Storm


PN	US/MH Name	Surcharged Flooded		Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m³)						
S1.000	S1	0.741	140.798	0.95			347.6	FLOOD	5
S1.001	S2	1.989	0.000	2.26			316.1	FLOOD RISK	
S1.002	S3	2.281	6.826	1.54			327.3	FLOOD	2
S2.000	S4	2.175	51.042	1.76			236.6	FLOOD	4
S2.001	S5	2.702	12.152	3.34			251.5	FLOOD	2
S2.002	S6	2.694	3.977	4.56			354.3	FLOOD	2
S1.003	S4	2.371	0.000	0.98			685.7	FLOOD RISK	
S1.004	S5	2.490	0.000	1.99			839.2	SURCHARGED	
S1.005	S6	1.834	0.000	1.21			846.6	SURCHARGED	
S3.000	S10	1.121	41.225	2.10			36.4	FLOOD	8
S3.001	S11	1.305	29.554	2.00			73.4	FLOOD	5
S3.002	S12	1.538	8.160	1.01			153.4	FLOOD	2
S4.000	S13	1.347	12.458	1.31			93.3	FLOOD	4
S5.000	S14	1.419	14.207	1.40			90.5	FLOOD	4

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S3.003	S13	15 Winter	30	+0%	30/15 Summer				49.103
S3.004	S14	15 Winter	30	+0%	30/15 Summer				48.454
S1.006	S7	15 Winter	30	+0%	30/15 Summer				47.264
S1.007	S8	15 Summer	30	+0%					45.404

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S3.003	S13	1.768	0.000	3.58		336.0	FLOOD RISK	
S3.004	S14	1.189	0.000	0.88		421.4	SURCHARGED	
S1.006	S7	1.584	0.000	5.44		1268.3	SURCHARGED	
S1.007	S8	-0.766	0.000	0.48		1240.0	OK	

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	2
FEH Rainfall Version	1999
Site Location GB 526100 184450 TQ 26100 84450	
C (1km)	-0.025
D1 (1km)	0.330
D2 (1km)	0.277
D3 (1km)	0.234
E (1km)	0.332
F (1km)	2.519
Maximum Rainfall (mm/hr)	0
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.000
Maximum Backdrop Height (m)	0.000
Min Design Depth for Optimisation (m)	0.000
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	2.877	4-8	2.198	8-12	0.063

Total Area Contributing (ha) = 5.138

Total Pipe Volume (m³) = 114.498

Network Design Table for Storm

PN (m)	Length (m)	Fall (1:X)	Slope (ha)	I.Area (mins)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
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Network Results Table

PN (mm/hr)	Rain (mins)	T.C. (m)	US/IL (ha)	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)
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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
S1.000	32.000	0.547	58.5	0.420	5.00	0.0	0.600	o	450	Pipe/Conduit	
S1.001	74.000	0.060	1233.3	0.420	0.00	0.0	0.600	o	525	Pipe/Conduit	
S1.002	54.000	0.130	415.4	0.420	0.00	0.0	0.600	o	525	Pipe/Conduit	
S2.000	88.000	0.440	200.0	0.420	5.00	0.0	0.600	o	375	Pipe/Conduit	
S2.001	36.000	0.030	1200.0	0.420	0.00	0.0	0.600	o	450	Pipe/Conduit	
S2.002	20.000	0.030	666.7	0.420	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.003	15.000	0.490	30.6	0.420	0.00	0.0	0.600	o	600	Pipe/Conduit	
S1.004	38.000	0.200	190.0	0.420	0.00	0.0	0.600	o	600	Pipe/Conduit	
S1.005	3.000	0.490	6.1	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
S3.000	30.000	0.310	96.8	0.254	5.00	0.0	0.600	o	150	Pipe/Conduit	
S3.001	79.000	0.420	188.1	0.254	0.00	0.0	0.600	o	225	Pipe/Conduit	
S3.002	14.000	0.380	36.8	0.254	0.00	0.0	0.600	o	300	Pipe/Conduit	
S4.000	45.000	0.920	48.9	0.254	5.00	0.0	0.600	o	225	Pipe/Conduit	
S5.000	45.000	0.760	59.2	0.254	5.00	0.0	0.600	o	225	Pipe/Conduit	
S3.003	23.000	0.070	328.6	0.254	0.00	0.0	0.600	o	375	Pipe/Conduit	
S3.004	5.000	1.500	3.3	0.254	0.00	0.0	0.600	o	375	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	0.00	5.20	47.000	0.420	0.0	0.0	0.0	2.66	423.4	0.0
S1.001	0.00	7.16	46.450	0.840	0.0	0.0	0.0	0.63	136.2	0.0
S1.002	0.00	7.98	46.390	1.260	0.0	0.0	0.0	1.09	236.5	0.0
S2.000	0.00	6.15	46.760	0.420	0.0	0.0	0.0	1.28	141.1	0.0
S2.001	0.00	7.19	46.320	0.840	0.0	0.0	0.0	0.58	92.0	0.0
S2.002	0.00	7.61	46.290	1.260	0.0	0.0	0.0	0.78	124.0	0.0
S1.003	0.00	8.04	46.260	2.940	0.0	0.0	0.0	4.41	1247.5	0.0
S1.004	0.00	8.40	45.770	3.360	0.0	0.0	0.0	1.76	498.6	0.0
S1.005	0.00	8.41	45.570	3.360	0.0	0.0	0.0	9.88	2794.1	0.0
S3.000	0.00	5.49	48.070	0.254	0.0	0.0	0.0	1.02	18.1	0.0
S3.001	0.00	6.88	47.760	0.508	0.0	0.0	0.0	0.95	37.8	0.0
S3.002	0.00	6.97	47.340	0.762	0.0	0.0	0.0	2.60	183.7	0.0
S4.000	0.00	5.40	47.880	0.254	0.0	0.0	0.0	1.87	74.5	0.0
S5.000	0.00	5.44	47.720	0.254	0.0	0.0	0.0	1.70	67.7	0.0
S3.003	0.00	7.35	46.960	1.524	0.0	0.0	0.0	0.99	109.8	0.0
S3.004	0.00	7.36	46.890	1.778	0.0	0.0	0.0	9.98	1102.5	0.0

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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
S1.006	2.000	0.004	500.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
S1.007	20.000	0.080	250.0	0.000	0.00	0.0	0.600	o	1500	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)
S1.006	0.00	8.44	45.080	5.138	0.0	0.0	0.0	1.08	306.0	0.0
S1.007	0.00	8.56	44.670	5.138	0.0	0.0	0.0	2.71	4786.2	0.0

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	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	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	2
FEH Rainfall Version	1999
Site Location	GB 526100 184450 TQ 26100 84450
C (1km)	-0.025
D1 (1km)	0.330
D2 (1km)	0.277
D3 (1km)	0.234
E (1km)	0.332
F (1km)	2.519
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

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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 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 0
Number of Online Controls 0 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0


Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 1999
Site Location GB 526100 184450 TQ 26100 84450
C (1km) -0.025
D1 (1km) 0.330
D2 (1km) 0.277
D3 (1km) 0.234
E (1km) 0.332
F (1km) 2.519
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) 100
Climate Change (%) 40


PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S1 15	Winter	100	+40%	100/15 Summer	100/15 Summer		
S1.001	S2 15	Winter	100	+40%	100/15 Summer	100/15 Summer		
S1.002	S3 15	Winter	100	+40%	100/15 Summer	100/15 Summer		
S2.000	S4 30	Winter	100	+40%	100/15 Summer	100/15 Summer		
S2.001	S5 15	Winter	100	+40%	100/15 Summer	100/15 Summer		
S2.002	S6 15	Winter	100	+40%	100/15 Summer	100/15 Summer		
S1.003	S4 15	Winter	100	+40%	100/15 Summer	100/15 Summer		
S1.004	S5 15	Winter	100	+40%	100/15 Summer	100/15 Summer		
S1.005	S6 15	Summer	100	+40%	100/15 Summer			
S3.000	S10 60	Winter	100	+40%	100/15 Summer	100/15 Summer		
S3.001	S11 30	Winter	100	+40%	100/15 Summer	100/15 Summer		
S3.002	S12 15	Winter	100	+40%	100/15 Summer	100/15 Summer		
S4.000	S13 15	Winter	100	+40%	100/15 Summer	100/15 Summer		
S5.000	S14 15	Winter	100	+40%	100/15 Summer	100/15 Summer		

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S1	48.544	1.094	496.354	0.99			362.6	FLOOD
S1.001	S2	49.072	2.097	51.903	2.55			356.4	FLOOD
S1.002	S3	49.309	2.394	119.256	1.67			355.1	FLOOD
S2.000	S4	49.477	2.342	217.268	1.88			254.0	FLOOD
S2.001	S5	49.559	2.789	98.576	5.77			435.0	FLOOD
S2.002	S6	49.521	2.781	91.352	6.22			483.6	FLOOD
S1.003	S4	49.355	2.495	44.727	1.06			746.3	FLOOD
S1.004	S5	49.185	2.815	0.000	2.10			885.8	FLOOD RISK
S1.005	S6	48.383	2.213	0.000	1.26			885.9	SURCHARGED
S3.000	S10	49.423	1.203	122.559	2.13			36.9	FLOOD
S3.001	S11	49.365	1.380	104.744	2.04			75.0	FLOOD
S3.002	S12	49.281	1.641	112.650	1.43			218.2	FLOOD
S4.000	S13	49.520	1.415	79.530	1.36			97.0	FLOOD
S5.000	S14	49.434	1.489	84.132	1.46			94.5	FLOOD

PN	US/MH Name	Level Exceeded
S1.000	S1	9
S1.001	S2	4
S1.002	S3	5
S2.000	S4	7
S2.001	S5	5
S2.002	S6	5
S1.003	S4	3
S1.004	S5	
S1.005	S6	
S3.000	S10	13
S3.001	S11	9
S3.002	S12	6
S4.000	S13	7
S5.000	S14	7


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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.
S3.003	S13	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
S3.004	S14	15 Summer	100	+40%	100/15 Summer			
S1.006	S7	15 Summer	100	+40%	100/15 Summer			
S1.007	S8	15 Winter	100	+40%				

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S3.003	S13	49.316	1.981	15.870	3.93		369.7	FLOOD
S3.004	S14	49.040	1.775	0.000	1.01		484.8	FLOOD RISK
S1.006	S7	47.558	1.878	0.000	5.87		1367.3	SURCHARGED
S1.007	S8	45.447	-0.723	0.000	0.52		1368.3	OK

PN	US/MH Name	Level Exceeded
S3.003	S13	2
S3.004	S14	
S1.006	S7	
S1.007	S8	

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	2
FEH Rainfall Version	1999
Site Location GB 526100 184450 TQ 26100 84450	
C (1km)	-0.025
D1 (1km)	0.330
D2 (1km)	0.277
D3 (1km)	0.234
E (1km)	0.332
F (1km)	2.519
Maximum Rainfall (mm/hr)	0
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.000
Maximum Backdrop Height (m)	0.000
Min Design Depth for Optimisation (m)	0.000
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	2.877	4-8	2.198	8-12	0.063

Total Area Contributing (ha) = 5.138


Total Pipe Volume (m³) = 114.498

Network Design Table for Storm

















PN (m)	Length (m)	Fall (1:X)	Slope (ha)	I.Area (mins)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT (mm)	DIA (mm)	Section Type	Auto Design
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Network Results Table

PN (mm/hr)	Rain (mins)	T.C. (m)	US/IL (ha)	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)
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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
S1.000	32.000	0.547	58.5	0.420	5.00	0.0	0.600	o	450	Pipe/Conduit	
S1.001	74.000	0.060	1233.3	0.420	0.00	0.0	0.600	o	525	Pipe/Conduit	
S1.002	54.000	0.130	415.4	0.420	0.00	0.0	0.600	o	525	Pipe/Conduit	
S2.000	88.000	0.440	200.0	0.420	5.00	0.0	0.600	o	375	Pipe/Conduit	
S2.001	36.000	0.030	1200.0	0.420	0.00	0.0	0.600	o	450	Pipe/Conduit	
S2.002	20.000	0.030	666.7	0.420	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.003	15.000	0.490	30.6	0.420	0.00	0.0	0.600	o	600	Pipe/Conduit	
S1.004	38.000	0.200	190.0	0.420	0.00	0.0	0.600	o	600	Pipe/Conduit	
S1.005	3.000	0.490	6.1	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
S3.000	30.000	0.310	96.8	0.254	5.00	0.0	0.600	o	150	Pipe/Conduit	
S3.001	79.000	0.420	188.1	0.254	0.00	0.0	0.600	o	225	Pipe/Conduit	
S3.002	14.000	0.380	36.8	0.254	0.00	0.0	0.600	o	300	Pipe/Conduit	
S4.000	45.000	0.920	48.9	0.254	5.00	0.0	0.600	o	225	Pipe/Conduit	
S5.000	45.000	0.760	59.2	0.254	5.00	0.0	0.600	o	225	Pipe/Conduit	
S3.003	23.000	0.070	328.6	0.254	0.00	0.0	0.600	o	375	Pipe/Conduit	
S3.004	5.000	1.500	3.3	0.254	0.00	0.0	0.600	o	375	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	0.00	5.20	47.000	0.420	0.0	0.0	0.0	2.66	423.4	0.0
S1.001	0.00	7.16	46.450	0.840	0.0	0.0	0.0	0.63	136.2	0.0
S1.002	0.00	7.98	46.390	1.260	0.0	0.0	0.0	1.09	236.5	0.0
S2.000	0.00	6.15	46.760	0.420	0.0	0.0	0.0	1.28	141.1	0.0
S2.001	0.00	7.19	46.320	0.840	0.0	0.0	0.0	0.58	92.0	0.0
S2.002	0.00	7.61	46.290	1.260	0.0	0.0	0.0	0.78	124.0	0.0
S1.003	0.00	8.04	46.260	2.940	0.0	0.0	0.0	4.41	1247.5	0.0
S1.004	0.00	8.40	45.770	3.360	0.0	0.0	0.0	1.76	498.6	0.0
S1.005	0.00	8.41	45.570	3.360	0.0	0.0	0.0	9.88	2794.1	0.0
S3.000	0.00	5.49	48.070	0.254	0.0	0.0	0.0	1.02	18.1	0.0
S3.001	0.00	6.88	47.760	0.508	0.0	0.0	0.0	0.95	37.8	0.0
S3.002	0.00	6.97	47.340	0.762	0.0	0.0	0.0	2.60	183.7	0.0
S4.000	0.00	5.40	47.880	0.254	0.0	0.0	0.0	1.87	74.5	0.0
S5.000	0.00	5.44	47.720	0.254	0.0	0.0	0.0	1.70	67.7	0.0
S3.003	0.00	7.35	46.960	1.524	0.0	0.0	0.0	0.99	109.8	0.0
S3.004	0.00	7.36	46.890	1.778	0.0	0.0	0.0	9.98	1102.5	0.0

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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
S1.006	2.000	0.004	500.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
S1.007	20.000	0.080	250.0	0.000	0.00	0.0	0.600	o	1500	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)
S1.006	0.00	8.44	45.080	5.138	0.0	0.0	0.0	1.08	306.0	0.0
S1.007	0.00	8.56	44.670	5.138	0.0	0.0	0.0	2.71	4786.2	0.0

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	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	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	2
FEH Rainfall Version	1999
Site Location	GB 526100 184450 TQ 26100 84450
C (1km)	-0.025
D1 (1km)	0.330
D2 (1km)	0.277
D3 (1km)	0.234
E (1km)	0.332
F (1km)	2.519
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

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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 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 0
Number of Online Controls 0 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0


Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 1999
Site Location GB 526100 184450 TQ 26100 84450
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E (1km) 0.332
F (1km) 2.519
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) 100
Climate Change (%) 0


PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S1 15	Winter	100	+0%	100/15 Summer	100/15 Summer		
S1.001	S2 15	Winter	100	+0%	100/15 Summer	100/15 Summer		
S1.002	S3 15	Winter	100	+0%	100/15 Summer	100/15 Summer		
S2.000	S4 15	Winter	100	+0%	100/15 Summer	100/15 Summer		
S2.001	S5 15	Winter	100	+0%	100/15 Summer	100/15 Summer		
S2.002	S6 15	Winter	100	+0%	100/15 Summer	100/15 Summer		
S1.003	S4 15	Summer	100	+0%	100/15 Summer	100/15 Summer		
S1.004	S5 15	Summer	100	+0%	100/15 Summer			
S1.005	S6 15	Summer	100	+0%	100/15 Summer			
S3.000	S10 30	Winter	100	+0%	100/15 Summer	100/15 Summer		
S3.001	S11 15	Winter	100	+0%	100/15 Summer	100/15 Summer		
S3.002	S12 15	Winter	100	+0%	100/15 Summer	100/15 Summer		
S4.000	S13 15	Winter	100	+0%	100/15 Summer	100/15 Summer		
S5.000	S14 15	Winter	100	+0%	100/15 Summer	100/15 Summer		

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Level (m)	Water		Flow / Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
			Surcharged (m)	Flooded Volume (m³)				
S1.000	S1	48.366	0.916	317.189	1.00		365.6	FLOOD
S1.001	S2	49.031	2.056	11.389	2.49		348.3	FLOOD
S1.002	S3	49.251	2.336	61.716	1.62		345.0	FLOOD
S2.000	S4	49.399	2.264	141.212	1.97		265.8	FLOOD
S2.001	S5	49.509	2.739	49.400	4.80		361.7	FLOOD
S2.002	S6	49.469	2.729	39.034	5.61		436.4	FLOOD
S1.003	S4	49.317	2.457	8.305	1.01		705.1	FLOOD
S1.004	S5	49.088	2.718	0.000	2.06		869.5	FLOOD RISK
S1.005	S6	48.292	2.122	0.000	1.25		873.6	SURCHARGED
S3.000	S10	49.378	1.158	77.968	2.11		36.5	FLOOD
S3.001	S11	49.325	1.340	64.591	2.02		74.4	FLOOD
S3.002	S12	49.222	1.582	52.274	1.42		216.0	FLOOD
S4.000	S13	49.483	1.378	42.577	1.36		96.8	FLOOD
S5.000	S14	49.396	1.451	45.613	1.46		94.2	FLOOD


PN	US/MH Name	Level Exceeded
S1.000	S1	7
S1.001	S2	2
S1.002	S3	4
S2.000	S4	6
S2.001	S5	5
S2.002	S6	4
S1.003	S4	2
S1.004	S5	
S1.005	S6	
S3.000	S10	9
S3.001	S11	7
S3.002	S12	5
S4.000	S13	6
S5.000	S14	6

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S3.003	S13	15 Summer	100	+0%	100/15 Summer				49.278
S3.004	S14	15 Summer	100	+0%	100/15 Summer				48.897
S1.006	S7	15 Summer	100	+0%	100/15 Summer				47.510
S1.007	S8	15 Summer	100	+0%					45.438

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S3.003	S13	1.943	0.000	3.86		362.9	FLOOD RISK	
S3.004	S14	1.632	0.000	0.96		459.2	SURCHARGED	
S1.006	S7	1.830	0.000	5.74		1338.9	SURCHARGED	
S1.007	S8	-0.732	0.000	0.51		1337.7	OK	

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Rainfall profile

Storm duration (mins) 360

	FEH Data	
FEH Rainfall Version		1999
Site Location	GB 526100 184450 TQ 26100 84450	
C (1km)		-0.025
D1 (1km)		0.330
D2 (1km)		0.277
D3 (1km)		0.234
E (1km)		0.332
F (1km)		2.519
Peak Intensity (mm/hr)		54.916
Ave. Intensity (mm/hr)		14.009
Return Period (years)		100.0

