

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm - Road 2

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model		
Return Period (years)		2
FEH Rainfall Version		1999
Site Location	GB 440550 294500 SP 40550 94500	
C (1km)		-0.028
D1 (1km)		0.364
D2 (1km)		0.347
D3 (1km)		0.258
E (1km)		0.307
F (1km)		2.353
Maximum Rainfall (mm/hr)		50
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)		1.500
Min Design Depth for Optimisation (m)		1.200
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 - Road 2

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.681	4-8	0.246

Total Area Contributing (ha) = 0.927

Total Pipe Volume (m³) = 19.859

Network Design Table for Storm - Road 2

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	46.651	0.416	112.1	0.127	4.00	0.0	0.600	o	300	Pipe/Conduit	
S1.001	25.626	0.228	112.4	0.157	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.002	20.220	0.177	114.2	0.082	0.00	0.0	0.600	o	300	Pipe/Conduit	
S2.000	50.646	0.207	244.7	0.160	4.00	0.0	0.600	o	300	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	50.00	5.52	100.555	0.127	0.0	0.0	0.0	1.48	104.9	17.2
S1.001	50.00	5.81	100.139	0.284	0.0	0.0	0.0	1.48	104.8	38.5
S1.002	50.00	6.04	99.911	0.366	0.0	0.0	0.0	1.47	103.9	49.6
S2.000	50.00	4.84	100.025	0.160	0.0	0.0	0.0	1.00	70.7	21.7

Network Design Table for Storm - Road 2

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
S2.001	20.496	0.084	244.0	0.141	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.003	14.221	0.059	241.0	0.033	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.004	17.423	0.072	242.0	0.040	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.005	15.054	0.062	242.8	0.187	0.00	0.0	0.600	o	525	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)
S2.001	50.00	5.18	99.818	0.301	0.0	0.0	0.0	1.00	70.8	40.8
S1.003	50.00	6.22	99.584	0.700	0.0	0.0	0.0	1.31	207.6	94.8
S1.004	50.00	6.45	99.525	0.740	0.0	0.0	0.0	1.30	207.2	100.2
S1.005	50.00	6.62	99.378	0.927	0.0	0.0	0.0	1.43	310.2	125.6

PIPELINE SCHEDULES for Storm - Road 2

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	300	S1	102.560	100.555	1.705	Open Manhole	1200
S1.001	o	300	S2	102.300	100.139	1.861	Open Manhole	1200
S1.002	o	300	S3	102.500	99.911	2.289	Open Manhole	1200
S2.000	o	300	S7	101.350	100.025	1.025	Open Manhole	1200
S2.001	o	300	S8	102.210	99.818	2.092	Open Manhole	1200
S1.003	o	450	S4	102.460	99.584	2.426	Open Manhole	1500
S1.004	o	450	S5	102.425	99.525	2.450	Open Manhole	1500
S1.005	o	525	S6	102.190	99.378	2.287	Open Manhole	1500

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	46.651	112.1	S2	102.300	100.139	1.861	Open Manhole	1200
S1.001	25.626	112.4	S3	102.500	99.911	2.289	Open Manhole	1200
S1.002	20.220	114.2	S4	102.460	99.734	2.426	Open Manhole	1500
S2.000	50.646	244.7	S8	102.210	99.818	2.092	Open Manhole	1200
S2.001	20.496	244.0	S4	102.460	99.734	2.426	Open Manhole	1500
S1.003	14.221	241.0	S5	102.425	99.525	2.450	Open Manhole	1500
S1.004	17.423	242.0	S6	102.190	99.453	2.287	Open Manhole	1500
S1.005	15.054	242.8	S	102.040	99.316	2.199	Open Manhole	0

Area Summary for Storm - Road 2

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.127	0.127	0.127
1.001	User	-	100	0.009	0.009	0.009
	User	-	100	0.004	0.004	0.013
	User	-	100	0.025	0.025	0.038
	User	-	100	0.026	0.026	0.064
	User	-	100	0.015	0.015	0.080
	User	-	100	0.028	0.028	0.108
	User	-	100	0.005	0.005	0.113
	User	-	100	0.044	0.044	0.157
1.002	User	-	100	0.019	0.019	0.019
	User	-	100	0.005	0.005	0.025
	User	-	100	0.009	0.009	0.034
	User	-	100	0.009	0.009	0.043
	User	-	100	0.012	0.012	0.055
	User	-	100	0.027	0.027	0.082
2.000	-	-	100	0.160	0.160	0.160
2.001	User	-	100	0.020	0.020	0.020
	User	-	100	0.022	0.022	0.042
	User	-	100	0.023	0.023	0.065
	User	-	100	0.025	0.025	0.090
	User	-	100	0.017	0.017	0.107
	User	-	100	0.034	0.034	0.141
1.003	User	-	100	0.014	0.014	0.014
	User	-	100	0.000	0.000	0.014
	User	-	100	0.019	0.019	0.033
1.004	User	-	100	0.028	0.028	0.028
	User	-	100	0.012	0.012	0.040
1.005	User	-	100	0.013	0.013	0.013
	User	-	100	0.015	0.015	0.029
	User	-	100	0.121	0.121	0.150
	User	-	100	0.016	0.016	0.166
	User	-	100	0.021	0.021	0.187
				Total	Total	Total
				0.927	0.927	0.927

Free Flowing Outfall Details for Storm - Road 2

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
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S1.005 S 102.040 99.316 99.316 0 0

Simulation Criteria for Storm - Road 2

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	0.000
Hot Start (mins)	0	Inlet Coeffiecient	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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 0 Number of Storage Structures 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Jelson Limited		Page 5
370 Loughborough Road Leicester LE4 5PR	Normandy Fields Hinckley SW Roads 2 & 5	
Date 15/08/2025	Designed by EG	
File 2024-02-02 network.MDX	Checked by EG	
Micro Drainage	Network 2019.1	

Synthetic Rainfall Details

Rainfall Model	FEH	E (1km)	0.307
Return Period (years)	2	F (1km)	2.353
FEH Rainfall Version	1999	Summer Storms	Yes
Site Location	GB 440550 294500 SP 40550 94500	Winter Storms	No
C (1km)	-0.028	Cv (Summer)	0.750
D1 (1km)	0.364	Cv (Winter)	0.840
D2 (1km)	0.347	Storm Duration (mins)	30
D3 (1km)	0.258		

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm - Road 2

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

Synthetic Rainfall Details

Rainfall Model FEH D3 (1km) 0.258
FEH Rainfall Version 1999 E (1km) 0.307
Site Location GB 440550 294500 SP 40550 94500 F (1km) 2.353
C (1km) -0.028 Cv (Summer) 0.750
D1 (1km) 0.364 Cv (Winter) 0.840
D2 (1km) 0.347

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, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

US/MH		Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level	Surcharged Depth
PN	Name								(m)	(m)
S1.000	S1 15 Winter	1	+0%	100/15 Summer					100.632	-0.223
S1.001	S2 15 Winter	1	+0%	30/15 Summer					100.253	-0.186
S1.002	S3 15 Winter	1	+0%	30/15 Summer					100.044	-0.167
S2.000	S7 15 Winter	1	+0%	30/15 Summer	100/15 Summer				100.134	-0.191
S2.001	S8 15 Winter	1	+0%	30/15 Summer					99.968	-0.150
S1.003	S4 15 Winter	1	+0%	30/15 Summer					99.793	-0.241
S1.004	S5 15 Winter	1	+0%	30/15 Summer					99.735	-0.240
S1.005	S6 15 Winter	1	+0%	30/15 Summer					99.605	-0.298

PN	US/MH Name	Flooded		Pipe		Level Exceeded
		Volume (m³)	Flow / Cap. (l/s)	Flow (l/s)	Status	
S1.000	S1	0.000	0.14	14.2	OK	
S1.001	S2	0.000	0.31	28.8	OK	
S1.002	S3	0.000	0.40	36.2	OK	
S2.000	S7	0.000	0.27	18.1	OK	2
S2.001	S8	0.000	0.49	30.4	OK	
S1.003	S4	0.000	0.44	69.6	OK	
S1.004	S5	0.000	0.44	72.0	OK	
S1.005	S6	0.000	0.38	87.6	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm -
Road 2

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

Synthetic Rainfall Details

Rainfall Model FEH D3 (1km) 0.258
FEH Rainfall Version 1999 E (1km) 0.307
Site Location GB 440550 294500 SP 40550 94500 F (1km) 2.353
C (1km) -0.028 Cv (Summer) 0.750
D1 (1km) 0.364 Cv (Winter) 0.840
D2 (1km) 0.347

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, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

US/MH		Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level	Surcharged Depth
PN	Name								(m)	(m)
S1.000	S1 15 Winter	30	+0%	100/15 Summer					100.701	-0.154
S1.001	S2 15 Winter	30	+0%	30/15 Summer					100.591	0.152
S1.002	S3 15 Winter	30	+0%	30/15 Summer					100.421	0.210
S2.000	S7 15 Winter	30	+0%	30/15 Summer	100/15 Summer				100.418	0.093
S2.001	S8 15 Winter	30	+0%	30/15 Summer					100.340	0.222
S1.003	S4 15 Winter	30	+0%	30/15 Summer					100.186	0.152
S1.004	S5 15 Winter	30	+0%	30/15 Summer					100.067	0.092
S1.005	S6 15 Winter	30	+0%	30/15 Summer					99.935	0.032

PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m³)	Flow / Cap. (l/s)	Flow (l/s)	Overflow (l/s)		
S1.000	S1	0.000	0.47	45.9		OK	
S1.001	S2	0.000	0.88	82.6		SURCHARGED	
S1.002	S3	0.000	1.15	104.0		SURCHARGED	
S2.000	S7	0.000	0.69	45.8		SURCHARGED	2
S2.001	S8	0.000	1.32	82.0		SURCHARGED	
S1.003	S4	0.000	1.24	195.2		SURCHARGED	
S1.004	S5	0.000	1.26	205.2		SURCHARGED	
S1.005	S6	0.000	1.12	255.2		SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm -
Road 2

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

Synthetic Rainfall Details

Rainfall Model	FEH	D3 (1km)	0.258
FEH Rainfall Version	1999	E (1km)	0.307
Site Location	GB 440550 294500 SP 40550 94500	F (1km)	2.353
C (1km)	-0.028	Cv (Summer)	0.750
D1 (1km)	0.364	Cv (Winter)	0.840
D2 (1km)	0.347		

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, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
S1.000	S1 15 Winter		100	+40%	100/15 Summer				102.296	1.441
S1.001	S2 15 Winter		100	+40%	30/15 Summer				102.087	1.648
S1.002	S3 15 Winter		100	+40%	30/15 Summer				101.592	1.381
S2.000	S7 15 Winter		100	+40%	30/15 Summer	100/15 Summer			101.359	1.034
S2.001	S8 15 Winter		100	+40%	30/15 Summer				101.327	1.209
S1.003	S4 15 Winter		100	+40%	30/15 Summer				100.934	0.900
S1.004	S5 15 Winter		100	+40%	30/15 Summer				100.594	0.619
S1.005	S6 15 Winter		100	+40%	30/15 Summer				100.205	0.302

Flooded			Pipe			Status	Level Exceeded
PN	US/MH Name	Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)		
S1.000	S1	0.000	0.73		71.4	FLOOD RISK	
S1.001	S2	0.000	1.51		141.9	FLOOD RISK	
S1.002	S3	0.000	1.99		180.6	SURCHARGED	
S2.000	S7	8.730	1.41		94.2	FLOOD	2
S2.001	S8	0.000	2.19		135.8	SURCHARGED	
S1.003	S4	0.000	2.09		328.4	SURCHARGED	
S1.004	S5	0.000	2.15		351.9	SURCHARGED	
S1.005	S6	0.000	2.06		469.0	SURCHARGED	