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Link House, St Mary's Way Chesham, Buckinghamshire HP5 1HR	C86354-JNP-XX-XX-CA-C-1005 P01 Eastern Parcel Green Lane, Chesterton	
Date 10/11/2022 File C86354-JNP-XX-XX-CA-	Designed by AS Checked by MAH	
Innovyze	Network 2020.1.3	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD




FEH Rainfall Model

Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 455736 220987 SP 55736 20987
Data Type	Point
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	1.000
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
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


Network Design Table for Storm

« - Indicates pipe capacity < flow

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
1.000	35.091	0.180	195.0	0.182	5.00	0.0	0.600	o	300	Pipe/Conduit	
1.001	10.000	0.300	33.3	0.173	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.002	6.769	0.100	67.7	0.000	0.00	0.0	0.600	o	100	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)
1.000	50.00	5.52	72.830	0.182	0.0	0.0	0.0	1.12	79.3	32.9
1.001	50.00	5.58	72.650	0.355	0.0	0.0	0.0	2.73	193.2	64.1
1.002	50.00	5.70	72.350	0.355	0.0	0.0	0.0	0.94	7.4«	64.1

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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)
1.002		73.300	72.250	72.250	100	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	1.000	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m <sup>3</sup> /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	1
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	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 455736 220987 SP 55736 20987
Data Type	Point
Summer Storms	Yes
Winter Storms	No
Cv (Summer)	1.000
Cv (Winter)	0.840
Storm Duration (mins)	30


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Online Controls for Storm

Orifice Manhole: 3, DS/PN: 1.002, Volume (m<sup>3</sup>): 1.6

Diameter (m) 0.021 Discharge Coefficient 0.600 Invert Level (m) 72.350

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Storage Structures for Storm

Tank or Pond Manhole: 3, DS/PN: 1.002

Invert Level (m) 72.600

Depth (m)	Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )
0.000	995.0	0.500	1197.0

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2 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 \* 10m<sup>3</sup>/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 1  
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 FEH  
FEH Rainfall Version 2013  
Site Location GB 455736 220987 SP 55736 20987  
Data Type Point  
Cv (Summer) 1.000  
Cv (Winter) 1.000

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,  
720, 960, 1440, 2160, 2880, 4320, 5760, 7200,  
8640, 10080  
Return Period(s) (years) 2, 30, 100  
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Water Level (m)
1.000	1	15 Summer	2	+0%	30/15 Summer	100/15 Summer		72.983
1.001	2	15 Summer	2	+0%	30/15 Summer	100/15 Summer		72.799
1.002	3	720 Winter	2	+0%	2/15 Summer			72.691

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m <sup>3</sup> )	Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	-0.147	0.000	0.50		36.8	OK	4
1.001	2	-0.151	0.000	0.48		66.3	OK	1
1.002	3	0.241	0.000	0.08		0.5	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 \* 10m<sup>3</sup>/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 1  
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 FEH  
FEH Rainfall Version 2013  
Site Location GB 455736 220987 SP 55736 20987  
Data Type Point  
Cv (Summer) 1.000  
Cv (Winter) 1.000

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,  
720, 960, 1440, 2160, 2880, 4320, 5760, 7200,  
8640, 10080  
Return Period(s) (years) 2, 30, 100  
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Water Level (m)
1.000	1	15 Summer	30	+0%	30/15 Summer	100/15 Summer		73.380
1.001	2	15 Summer	30	+0%	30/15 Summer	100/15 Summer		73.130
1.002	3	960 Winter	30	+0%	2/15 Summer			72.782

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m <sup>3</sup> )	Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.250	0.000	1.17		85.3	SURCHARGED	4
1.001	2	0.180	0.000	1.22		166.8	SURCHARGED	1
1.002	3	0.332	0.000	0.09		0.6	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 \* 10m<sup>3</sup>/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 1  
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 FEH  
FEH Rainfall Version 2013  
Site Location GB 455736 220987 SP 55736 20987  
Data Type Point  
Cv (Summer) 1.000  
Cv (Winter) 1.000

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,  
720, 960, 1440, 2160, 2880, 4320, 5760, 7200,  
8640, 10080  
Return Period(s) (years) 2, 30, 100  
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	15 Summer	100	+40%	30/15 Summer	100/15 Summer			73.842
1.001	2	15 Summer	100	+40%	30/15 Summer	100/15 Summer			73.650
1.002	3	1440 Winter	100	+40%	2/15 Summer				72.932

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m <sup>3</sup> )	Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.712	12.631	1.88		137.0	FLOOD	4
1.001	2	0.700	0.144	1.81		247.8	FLOOD	1
1.002	3	0.482	0.000	0.10		0.7	FLOOD RISK	