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Date 22/08/2023 16:15 File MD CALCS.MDX	Designed by p.allan Checked by	
Micro Drainage Network 2020.1.3		

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)
1.004	OUTFALL	7.270	4.925	0.000	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 Offline Controls	0	Number of Time/Area Diagrams	0
Number of Online Controls	1	Number of Storage Structures	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	16.000	Storm Duration (mins)	30
Ratio R	0.259		

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: SW07, DS/PN: 1.004, Volume (m³): 156.3

Unit Reference	MD-SHE-0081-3100-1200-3100
Design Head (m)	1.200
Design Flow (l/s)	3.1
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	81
Invert Level (m)	4.950
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	3.1	Kick-Flo®	0.723	2.5
Flush-Flo™	0.356	3.1	Mean Flow over Head Range	-	2.7

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)
0.100	2.3	1.200	3.1	3.000	4.7	7.000	7.1
0.200	2.9	1.400	3.3	3.500	5.1	7.500	7.3
0.300	3.0	1.600	3.5	4.000	5.4	8.000	7.5
0.400	3.0	1.800	3.7	4.500	5.7	8.500	7.7
0.500	3.0	2.000	3.9	5.000	6.0	9.000	7.9
0.600	2.8	2.200	4.1	5.500	6.3	9.500	8.2
0.800	2.6	2.400	4.3	6.000	6.6		
1.000	2.8	2.600	4.4	6.500	6.8		

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm									
Simulation Criteria									
Volumetric Runoff Coeff 0.750 Foul Sewage per hectare (l/s) 0.000									
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									
Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0									
Number of Online Controls 1 Number of Storage Structures 0 Number of Real Time Controls 0									
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									
Return Period(s) (years) 1, 30, 100									
Climate Change (%) 0, 50, 50									
Water									
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Level (m)
1.000	SW04	240 Winter	1	+0%					5.347
1.001	SW03	240 Winter	1	+0%					5.347
2.000	SW01	240 Winter	1	+0%					5.347
1.002	SW02	240 Winter	1	+0%					5.347
3.000	SW06	240 Winter	1	+0%					5.347
1.003	SW05	240 Winter	1	+0%					5.347
4.000	SW11	240 Winter	1	+0%					5.347
4.001	SW10	240 Winter	1	+0%					5.347
1.004	SW07	240 Winter	1	+0%	1/15 Summer				5.348
Surcharged Flooded Half Drain Pipe									
PN	US/MH Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Level Exceeded
1.000	SW04	-1.153	0.000	0.00			1.8	OK	
1.001	SW03	-1.053	0.000	0.00			2.2	OK	
2.000	SW01	-1.153	0.000	0.00			1.8	OK	
1.002	SW02	-1.028	0.000	0.00			4.4	OK	
3.000	SW06	-1.003	0.000	0.00			2.3	OK	
1.003	SW05	-0.928	0.000	0.00			6.6	OK	
4.000	SW11	-1.078	0.000	0.00			1.0	OK	
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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for <u>Storm</u>									
		Surcharged	Flooded			Half Drain	Pipe		
	US/MH	Depth	Volume	Flow /	Overflow	Time	Flow		Level
PN	Name	(m)	(m³)	Cap.	(l/s)	(mins)	(l/s)	Status	Exceeded
4.001	SW10	-1.003	0.000	0.00			2.2	OK	
1.004	SW07	0.248	0.000	0.43			3.0	SURCHARGED	

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

PN	US/MH Name	Surcharged		Flooded		Half Drain		Pipe	Status	Level Exceeded
		Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Flow		
4.001	SW10	-0.438	0.000	0.00			3.2		OK	
1.004	SW07	0.812	0.000	0.43			3.0		SURCHARGED	

for Storm

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
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
Number of Input Hydrographs	0	Number of Offline Controls	0
Number of Online Controls	1	Number of Storage Structures	0
		Number of Time/Area Diagrams	0
		Number of Real Time Controls	0
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
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 50, 50

									Water
	US/MH			Return	Climate	First (X)	First (Y)	First (Z)	Overflow
PN	Name	Storm	Period	Change		Surcharge	Flood	Overflow	Act.
1.000	SW04	720	Winter	100	+50%				
1.001	SW03	720	Winter	100	+50%				6.191
2.000	SW01	720	Winter	100	+50%				6.191
1.002	SW02	720	Winter	100	+50%				6.191
3.000	SW06	720	Winter	100	+50%				6.191
1.003	SW05	720	Winter	100	+50%				6.191
4.000	SW11	720	Winter	100	+50%				6.191
4.001	SW10	720	Winter	100	+50%				6.191
1.004	SW07	720	Winter	100	+50%	1/15 Summer			6.191

PN	US/MH Name	Surcharged Flooded			Half Drain	Pipe	Status	Level Exceeded
		Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Time (mins)		
1.000	SW04	-0.309	0.000	0.00			3.7	OK
1.001	SW03	-0.209	0.000	0.00			2.5	OK
2.000	SW01	-0.309	0.000	0.00			3.5	OK
1.002	SW02	-0.184	0.000	0.00			4.9	OK
3.000	SW06	-0.159	0.000	0.00			5.1	OK
1.003	SW05	-0.084	0.000	0.00			8.4	OK
4.000	SW11	-0.234	0.000	0.00			2.2	OK

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

		Surcharged	Flooded			Half Drain	Pipe		
PN	US/MH Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Level Exceeded
4.001	SW10	-0.159	0.000	0.00			4.0		OK
1.004	SW07	1.091	0.000	0.44			3.1	SURCHARGED	