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Chiltern House Thame Road Haddenham Bucks HP17 8BY		
Date 20/11/2024 10:28 File 629-JOHNSON DRIVE.MDX		
Designed by Felice Checked by		
XP Solutions		Network 2015.1

Online Controls for Storm

Complex Manhole: 3, DS/PN: 1.001, Volume (m³): 1.8

Orifice

Diameter (m) 0.120 Discharge Coefficient 0.600 Invert Level (m) 63.270

Weir

Discharge Coef 0.544 Width (m) 0.700 Invert Level (m) 63.720

Hydro-Brake Optimum® Manhole: 4, DS/PN: 1.002, Volume (m³): 1.5

Unit Reference	MD-SHE-0194-1850-0800-1850
Design Head (m)	0.800
Design Flow (l/s)	18.5
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Diameter (mm)	194
Invert Level (m)	63.270
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.800	18.4
Flush-Flo™	0.308	18.4
Kick-Flo®	0.601	16.1
Mean Flow over Head Range	-	15.2

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	6.7	1.200	22.3	3.000	34.7	7.000	52.3
0.200	17.8	1.400	24.1	3.500	37.4	7.500	54.0
0.300	18.4	1.600	25.6	4.000	39.8	8.000	55.8
0.400	18.2	1.800	27.1	4.500	42.2	8.500	57.2
0.500	17.6	2.000	28.5	5.000	44.4	9.000	58.8
0.600	16.1	2.200	29.9	5.500	46.5	9.500	60.5
0.800	18.4	2.400	31.1	6.000	48.5		
1.000	20.5	2.600	32.4	6.500	50.4		

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Storage Structures for Storm

Porous Car Park Manhole: 3, DS/PN: 2.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.7
Membrane Percolation (mm/hr)	1000	Length (m)	250.0
Max Percolation (l/s)	326.4	Slope (1:X)	20.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	64.210	Cap Volume Depth (m)	0.350

Cellular Storage Manhole: 3, DS/PN: 1.001

Invert Level (m)	63.270	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Side (m/hr)	0.00000		

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	168.0	168.0	0.801	0.0	209.6
0.800	168.0	209.6			

Volume Summary (Static)

Length Calculations based on True Length

Storage			
Pipe Number	USMH Name	Structure Volume (m ³)	Total Volume (m ³)
1.000	1	0.000	0.000
2.000	2	0.000	0.000
2.001	3	2.616	2.616
1.001	3	127.733	127.733
1.002	4	0.000	0.000
Total		130.349	130.349

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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

Hot Start (mins) 0

Hot Start Level (mm) 0

Manhole Headloss Coeff (Global) 0.500

Foul Sewage per hectare (l/s) 0.000

Additional Flow - % of Total Flow 0.000

MADD Factor * 10m³/ha Storage 2.000

Inlet Coeffiecient 0.800

Flow per Person per Day (l/per/day) 0.000

Number of Input Hydrographs 0

Number of Online Controls 2

Number of Offline Controls 0

Number of Storage Structures 2

Number of Time/Area Diagrams 0

Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR

Region England and Wales Cv (Summer) 0.750

M5-60 (mm) 18.700

Ratio R 0.400

Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0

Analysis Timestep 2.5 Second Increment (Extended)

DTS Status ON

DVD Status OFF

Inertia 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) 1, 30, 100

Climate Change (%) 0, 0, 40

US/MH

PN

Name

Event

First (X) Surcharge

First (Y) Flood

US/CL (m)

Water Level (m)

1.000

1

15 minute 1 year Winter I+0%

30/15 Summer

64.650

63.920

2.000

2

30 minute 1 year Winter I+0%

100/15 Summer

64.650

64.280

2.001

3

30 minute 1 year Winter I+0%

100/15 Summer

64.650

64.283

1.001

3

240 minute 1 year Winter I+0%

30/30 Winter

64.650

63.445

1.002

4

240 minute 1 year Winter I+0%

100/60 Winter

64.650

63.347

Surcharged Flooded

US/MH

PN

Name

Depth (m)

Volume (m³)

Flow / Overflow Cap. (l/s)

Maximum Vol (m³)

Pipe Flow (l/s)

Status

1.000

1

-0.150

0.000

0.49

0.164

30.5

OK

2.000

2

-0.240

0.000

-0.01

0.062

-0.5

OK

2.001

3

-0.227

0.000

0.13

0.152

7.5

OK

1.001

3

-0.125

0.000

0.07

28.167

4.2

OK

1.002

4

-0.148

0.000

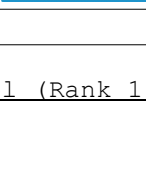
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0.082

4.2

OK

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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 2
Number of Online Controls 2	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 0.400
Region England and Wales Cv (Summer)	0.750	
M5-60 (mm)	18.700 Cv (Winter)	0.840

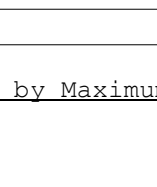
Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep 2.5 Second Increment (Extended)	
DTS Status	ON
DVD Status	OFF
Inertia Status	OFF

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)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Event	First (X) Surge	First (Y) Flood	US/CL (m)	Water Level (m)
1.000	1	15 minute 30 year Winter I+0%	30/15 Summer		64.650	64.087
2.000	2	15 minute 30 year Winter I+0%	100/15 Summer		64.650	64.393
2.001	3	15 minute 30 year Winter I+0%	100/15 Summer		64.650	64.393
1.001	3	120 minute 30 year Winter I+0%	30/30 Winter		64.650	63.661
1.002	4	120 minute 30 year Winter I+0%	100/60 Winter		64.650	63.419

Surcharged Flooded							Pipe	
PN	US/MH Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Maximum Vol (m³)	Flow (l/s)	Status
1.000	1	0.017	0.000	1.19		0.353	74.7	SURCHARGED
2.000	2	-0.127	0.000	-0.04		0.190	-2.6	FLOOD RISK
2.001	3	-0.117	0.000	0.66		0.680	38.1	FLOOD RISK
1.001	3	0.091	0.000	0.22		62.781	12.8	SURCHARGED
1.002	4	-0.076	0.000	0.32		0.166	12.8	OK

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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	2
Number of Online Controls	2	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	0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	18.700	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	OFF
Inertia 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)	1, 30, 100
Climate Change (%)	0, 0, 40

US/MH	First (X)	First (Y)	US/CL	Water Level
PN Name Event	Surcharge	Flood	(m)	(m)
1.000 1 15 minute 100 year Winter I+40%	30/15 Summer		64.650	64.298
2.000 2 15 minute 100 year Winter I+40%	100/15 Summer		64.650	64.556
2.001 3 15 minute 100 year Winter I+40%	100/15 Summer		64.650	64.556
1.001 3 120 minute 100 year Winter I+40%	30/30 Winter		64.650	64.026
1.002 4 120 minute 100 year Winter I+40%	100/60 Winter		64.650	63.643

Surcharged Flooded							Pipe
US/MH	Depth	Volume	Flow /	Overflow	Maximum	Flow	
PN Name	(m)	(m³)	Cap.	(l/s)	Vol (m³)	(l/s)	Status
1.000 1	0.228	0.000	2.16		0.592	135.7	SURCHARGED
2.000 2	0.036	0.000	-0.05		0.374	-3.0	FLOOD RISK
2.001 3	0.046	0.000	1.09		2.075	62.8	FLOOD RISK
1.001 3	0.456	0.000	0.32		121.810	18.5	SURCHARGED
1.002 4	0.148	0.000	0.45		0.423	18.3	SURCHARGED