

Pell Frischmann		Page 1								
5 Manchester Square London W1U 3PD										
Date 23/11/2023 13:19 File LONGHURST ROAD DRAINAGE...	Designed by PClark Checked by									
Innovyze	Network 2020.1									
Time Area Diagram for Storm <table><thead><tr><th>Time (mins)</th><th>Area (ha)</th><th>Time (mins)</th><th>Area (ha)</th></tr></thead><tbody><tr><td>0-4</td><td>0.160</td><td>4-8</td><td>0.035</td></tr></tbody></table> Total Area Contributing (ha) = 0.195 Total Pipe Volume (m³) = 29.698			Time (mins)	Area (ha)	Time (mins)	Area (ha)	0-4	0.160	4-8	0.035
Time (mins)	Area (ha)	Time (mins)	Area (ha)							
0-4	0.160	4-8	0.035							
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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
1	85.962	1.875	Open Manhole	1500	1.000	84.087	675				
2	85.999	1.975	Open Manhole	1500	1.001	84.024	675	1.000	84.024	675	
4	85.981	2.020	Open Manhole	1500	1.002	83.961	675	1.001	83.961	675	
5	85.984	1.875	Open Manhole	1500	2.000	84.109	675				
6	85.912	1.981	Open Manhole	1500	1.003	83.931	225	1.002	83.931	675	
								2.000	83.932	675	451
7	85.879	1.999	Open Manhole	1200	1.004	83.880	225	1.003	83.880	225	
	87.720	3.910	Open Manhole	0		OUTFALL		1.004	83.810	225	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
1	384730.617	403964.609	384730.617	403964.609	Required	
2	384754.563	403972.949	384754.563	403972.949	Required	
4	384778.287	403981.451	384778.287	403981.451	Required	
5	384807.499	403991.945	384807.499	403991.945	Required	
6	384789.458	403985.503	384789.458	403985.503	Required	
7	384788.391	403988.624	384788.391	403988.624	Required	
	384779.417	403986.387			No Entry	

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PIPELINE SCHEDULES for Storm

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)
1.000	o	675	1	85.962	84.087	1.200	Open Manhole	1500
1.001	o	675	2	85.999	84.024	1.300	Open Manhole	1500
1.002	o	675	4	85.981	83.961	1.345	Open Manhole	1500
2.000	o	675	5	85.984	84.109	1.200	Open Manhole	1500
1.003	o	225	6	85.912	83.931	1.756	Open Manhole	1500
1.004	o	225	7	85.879	83.880	1.774	Open Manhole	1200

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)
1.000	25.357	400.0	2	85.999	84.024	1.300	Open Manhole	1500
1.001	25.201	400.0	4	85.981	83.961	1.345	Open Manhole	1500
1.002	11.883	400.0	6	85.912	83.931	1.306	Open Manhole	1500
2.000	19.157	108.0	6	85.912	83.932	1.305	Open Manhole	1500
1.003	3.298	65.0	7	85.879	83.880	1.774	Open Manhole	1200
1.004	9.249	132.0		87.720	83.810	3.685	Open Manhole	0

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		87.720	83.810	0.000	0	0

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: 6, DS/PN: 1.003, Volume (m³): 13.5

Unit Reference	MD-SHE-0098-5000-1497-5000
Design Head (m)	1.497
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	98
Invert Level (m)	83.931
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.497	5.0
Flush-Flo™	0.432	4.9
Kick-Flo®	0.878	3.9
Mean Flow over Head Range	-	4.3

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	3.2	1.200	4.5	3.000	6.9	7.000	10.3
0.200	4.4	1.400	4.8	3.500	7.4	7.500	10.7
0.300	4.8	1.600	5.1	4.000	7.9	8.000	11.0
0.400	4.9	1.800	5.4	4.500	8.4	8.500	11.3
0.500	4.9	2.000	5.7	5.000	8.8	9.000	11.6
0.600	4.8	2.200	6.0	5.500	9.2	9.500	11.9
0.800	4.3	2.400	6.2	6.000	9.6		
1.000	4.1	2.600	6.5	6.500	10.0		

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Storage Structures for Storm Tank or Pond Manhole: 6, DS/PN: 1.003 Invert Level (m) 84.720 <table><thead><tr><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th></tr></thead><tbody><tr><td>0.000</td><td>97.5</td><td>0.800</td><td>97.5</td><td>0.801</td><td>0.0</td></tr></tbody></table>			Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	0.000	97.5	0.800	97.5	0.801	0.0
Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)									
0.000	97.5	0.800	97.5	0.801	0.0									
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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

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 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 FSR

Ratio R 0.348

Region England and Wales Cv (Summer) 0.750

M5-60 (mm) 18.600 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0

DVD Status ON

Analysis Timestep Fine

Inertia Status ON

DTS Status ON

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, 2, 30, 100

Climate Change (%) 0, 0, 0, 40

PN	US/MH	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1 30	Winter	1	+0%	100/15	Summer			84.235
1.001	2 30	Winter	1	+0%	100/15	Summer			84.235
1.002	4 30	Winter	1	+0%	30/60	Winter			84.235
2.000	5 30	Winter	1	+0%	100/15	Winter			84.235
1.003	6 30	Winter	1	+0%	1/15	Summer			84.235
1.004	7 30	Winter	1	+0%					83.933

PN	US/MH	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	-0.527	0.000	0.00			0.6	OK	
1.001	2	-0.464	0.000	0.01			2.3	OK	
1.002	4	-0.401	0.000	0.01			2.9	OK	
2.000	5	-0.549	0.000	0.01			6.7	OK	
1.003	6	0.079	0.000	0.15			4.8	SURCHARGED	
1.004	7	-0.172	0.000	0.13			4.8	OK	

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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 * 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 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 FSR

Ratio R 0.348

Region England and Wales Cv (Summer) 0.750

M5-60 (mm) 18.600 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0

DVD Status ON

Analysis Timestep Fine

Inertia Status ON

DTS Status ON

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

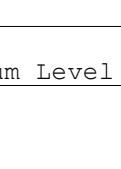
Return Period(s) (years) 1, 2, 30, 100

Climate Change (%) 0, 0, 0, 40

PN	US/MH	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1 60	Winter	2	+0%	100/15	Summer			84.300
1.001	2 60	Winter	2	+0%	100/15	Summer			84.300
1.002	4 60	Winter	2	+0%	30/60	Winter			84.300
2.000	5 60	Winter	2	+0%	100/15	Winter			84.299
1.003	6 60	Winter	2	+0%	1/15	Summer			84.299
1.004	7 60	Winter	2	+0%					83.934

PN	US/MH	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	-0.462	0.000	0.00			0.5	OK	
1.001	2	-0.399	0.000	0.01			1.9	OK	
1.002	4	-0.336	0.000	0.01			2.9	OK	
2.000	5	-0.485	0.000	0.01			5.6	OK	
1.003	6	0.144	0.000	0.15			4.8	SURCHARGED	
1.004	7	-0.171	0.000	0.13			4.8	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 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	FSR	Ratio R	0.348
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	18.600	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	ON
Analysis Timestep	Fine	Inertia Status	ON
DTS Status	ON		

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, 2, 30, 100
Climate Change (%)	0, 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)
1.000	1	60 Winter	30	+0%	100/15 Summer				84.647
1.001	2	60 Winter	30	+0%	100/15 Summer				84.647
1.002	4	60 Winter	30	+0%	30/60 Winter				84.647
2.000	5	60 Winter	30	+0%	100/15 Winter				84.646
1.003	6	60 Winter	30	+0%	1/15 Summer				84.646
1.004	7	15 Summer	30	+0%					83.934

PN	US/MH Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflood (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	-0.115	0.000	0.00			0.9	OK	
1.001	2	-0.052	0.000	0.01			1.9	OK	
1.002	4	0.011	0.000	0.01			3.2	SURCHARGED	
2.000	5	-0.138	0.000	0.02			10.5	OK	
1.003	6	0.490	0.000	0.15			4.9	SURCHARGED	
1.004	7	-0.171	0.000	0.13			4.9	OK	

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<u>100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm</u>									
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		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		FSR		Ratio R		0.348			
Region England and Wales		Cv (Summer)		0.750					
M5-60 (mm)		18.600		Cv (Winter)		0.840			
Margin for Flood Risk Warning (mm)		300.0		DVD Status		ON			
Analysis Timestep		Fine		Inertia Status		ON			
DTS Status		ON							
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, 2, 30, 100							
Climate Change (%)		0, 0, 0, 40							
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	1	120 Winter	100	+40%	100/15	Summer			85.107
1.001	2	120 Winter	100	+40%	100/15	Summer			85.107
1.002	4	120 Winter	100	+40%	30/60	Winter			85.107
2.000	5	120 Winter	100	+40%	100/15	Winter			85.107
1.003	6	120 Winter	100	+40%	1/15	Summer			85.107
1.004	7	15 Summer	100	+40%					83.934
Surcharged Flooded									
PN	US/MH Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.345	0.000	0.00			1.5	SURCHARGED	
1.001	2	0.408	0.000	0.02			8.3	SURCHARGED	
1.002	4	0.471	0.000	0.07			16.8	SURCHARGED	
2.000	5	0.323	0.000	0.02			13.1	SURCHARGED	
1.003	6	0.951	0.000	0.15			4.9	SURCHARGED	
1.004	7	-0.171	0.000	0.13			4.9	OK	
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