

HYDRAULIC MODELLING

**MFG NEWTON HEATH
ST MARYS ROAD
MANCHESTER
M40 3AR**

MARKS HEELEY LTD

MAY 2023

The Stables, Cannons Mill Lane, Bishops Stortford, Hertfordshire, CM23 2BN
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MARKS HEELEY



Project: 1:2 storm.	Date: 06/12/2022	Designed by: J.Kusz	Checked by:	Approved By:
Report Details: Type: Junctions Phase: Phase	Company Address: Nental Hesth.			

Name	Junction Type	Easting (m)	Northing (m)	Cover Level (m)	Depth (m)
Manhole (2)	Manhole	602.944	-1.287	80.00	0.85
Manhole (3)	Manhole	596.30	-3.292	80.00	1.00
Manhole (4)	Manhole	594.351	-6.887	80.30	1.90
Manhole (5)	Manhole	595.313	-8.028	80.30	1.95
Manhole (6)	Manhole	602.673	-18.082	80.23	2.33

Name	Invert Level (m)	Chamber Shape	Diameter (m)	Manhole Locked
Manhole (2)	79.15	Circular	0.90	☒
Manhole (3)	79.00	Circular	0.90	☒
Manhole (4)	78.40	Circular	1.20	☐
Manhole (5)	78.35	Circular	0.90	☒
Manhole (6)	77.90	Circular	1.20	☒

Inlets

Junction	Inlet Name	Incoming Item(s)	Bypass Destination	Capacity Type
Manhole (2)	Inlet (1)	Catchment Area (1)	(None)	No Restriction
	Inlet (2)	Catchment Area (3)	(None)	No Restriction
	Inlet (3)	Catchment Area (2)	(None)	No Restriction
Manhole (3)	Inlet (1)	Pipe (2)	(None)	No Restriction
	Inlet (2)	Catchment Area	(None)	No Restriction
Manhole (4)	Inlet	Pipe (4)	(None)	No Restriction
Manhole (5)	Inlet	Pipe (5)	(None)	No Restriction
Manhole (6)	Inlet	Pipe (6)	(None)	No Restriction

Outlets

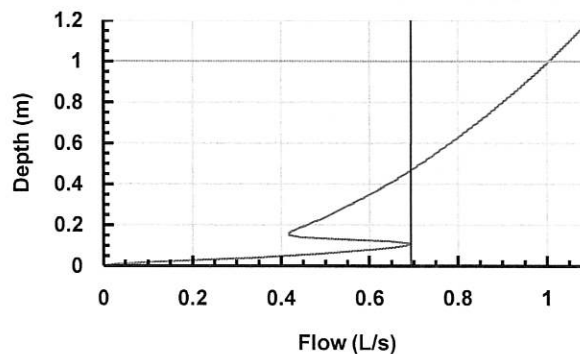
Junction	Outlet Name	Outgoing Connection	Outlet Type
Manhole (2)	Outlet	Pipe (2)	Free Discharge
Manhole (3)	Outlet	Pipe (3)	Free Discharge
	Outlet	Pipe (5)	Hydro-Brake®

Invert Level (m) 78.40
Design Depth (m) 1.00
Design Flow (L/s) 1.0

Objective Minimise Upstream Storage Requirements
Application Surface Water Only
Sump Available ☐

Unit Reference CHE-0045-1000-1000-1000

Manhole (4)



Manhole (5)	Outlet	Pipe (6)	Free Discharge
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Project:	Date: 06/12/2022		
	Designed by: J.Kusz	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Phase: Phase	Company Address:		




Tank

Type : Tank

Dimensions

Exceedence Level (m)	80.30
Depth (m)	1.80
Base Level (m)	78.50
Freeboard (mm)	0
Initial Depth (m)	0.00
Porosity (%)	99
Average Slope (1:x)	0.00
Total Volume (m³)	7.195

Depth (m)	Area (m²)	Volume (m³)
0.00	11.91	0.000
0.50	11.91	13.916

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	Pipe (3)
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	Pipe (4)
Outlet Type	Free Discharge

Advanced

Perimeter	Circular
Length (m)	3.04

Project:	Date: 06/12/2022		
	Designed by: J.Kusz	Checked by:	Approved By:
Report Details: Type: Connections Phase: Phase	Company Address:		



Name	From	To	Length (m)	Connection Type	Slope (1:x)	Manning's n	Colebrook-White Roughness (mm)	Diameter / Base Width (mm)
Pipe (2)	Manhole (2)	Manhole (3)	6.94	Pipe	46.266		0.6	100
Pipe (3)	Manhole (3)	Tank	2.82	Pipe	18.792		0.6	100
Pipe (4)	Tank	Manhole (4)	3.70	Pipe	37.019		0.6	100
Pipe (5)	Manhole (4)	Manhole (5)	1.49	Pipe	29.849		0.6	100
Pipe (6)	Manhole (5)	Manhole (6)	12.46	Pipe	27.688		0.6	100

Name	Upstream Cover Level (m)	Upstream Invert Level (m)	Downstream Cover Level (m)	Downstream Invert Level (m)	Flow Restriction (L/s)
Pipe (2)	80.00	79.15	80.00	79.00	
Pipe (3)	80.00	79.00	80.30	78.85	
Pipe (4)	80.30	78.50	80.30	78.40	
Pipe (5)	80.30	78.40	80.30	78.35	1.10
Pipe (6)	80.30	78.35	80.23	77.90	

Project:	Date: 06/12/2022			
	Designed by: J.Kusz	Checked by:	Approved By:	
Report Details: Type: Area Summary Phase: Phase	Company Address:			

Inflow Label	Connected To	Runoff Method	Area (ha)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analysed (ha)
Catchment Area	Manhole (3)	Time of Concentration	0.005	100	0	100	0.005
Catchment Area (1)	Manhole (2)	Time of Concentration	0.015	100	0	100	0.015
Catchment Area (2)	Manhole (2)	Time of Concentration	0.006	100	0	100	0.006
Catchment Area (3)	Manhole (2)	Time of Concentration	0.003	100	0	100	0.003
TOTAL			0.029				0.029

Project:	Date: 06/12/2022			
	Designed by: J.Kusz	Checked by:	Approved By:	
Report Details: Type: Network Design Criteria Phase: Phase	Company Address:			

Flow Options

Peak Flow Calculation (UK) Modified Rational Method
 Min. Time of Entry (mins) 5
 Max. Travel Time (mins) 30

FSR

Type: FSR

Return Period (years) 2.0
 Region England and Wales
 M5-60 (mm) 18.0
 Ratio R 0.358

Pipe Options

Lock Slope Options None
 Design Level Level Inverts
 Min. Cover Depth (m) 1.20
 Min. Slope (1:x) 500.00
 Max. Slope (1:x) 40.00
 Min. Velocity (m/s) 1.0
 Max. Velocity (m/s) 3.0
 Use Flow Restriction ☐
 Reduce Channel Depths ☐

Pipe Size Library

Default

Add. Increment (mm) 75

Diameter (mm)	Min. Slope (1:x)	Max. Slope (1:x)
100	0.00	0.00
150	0.00	0.00

Project:	Date: 06/12/2022			
	Designed by: J.Kusz	Checked by:	Approved By:	
Report Details: Type: Network Design Criteria Phase: Phase	Company Address:			

Manhole Options

Apply Offset ☐
 Synchronise Manhole Invert Levels ☒

Manhole Size Library

Default

Diameter / Width

Connection (mm)	Diameter / Length (m)	Width (m)
0	1.20	0.00
375	1.35	0.00
500	1.50	0.00
750	1.80	0.00

Additional Sizing

Connection (mm) 900
 Diameter / Length (m) 0.90
 Width (m) 0.00

Depth

Depth (m)	Diameter / Length (m)	Width (m)
0.00	1.05	0.00
1.50	1.20	0.00

Access

Depth (m)	Ladder Protrusion (mm)
0.00	130
3.00	230

Benching Requirements

Landing Width (mm) 500
 Benching Width (mm) 225

Project:	Date: 06/12/2022			
	Designed by: J.Kusz	Checked by:	Approved By:	
Report Details: Type: Outfall Details Phase: Phase	Company Address:			

Outfalls

Outfall	Outfall Type	Fixed Surcharged Level (m)	Level Curve
Manhole (6)	Free Discharge		

Project:	Date: 06/12/2022		
	Designed by: J.Kusz	Checked by:	Approved By:
Report Details: Type: Junctions Phase: Phase (1)	Company Address:		



Name	Junction Type	Easting (m)	Northing (m)	Cover Level (m)	Depth (m)
Manhole	Manhole	586.789	-8.256	80.45	1.00
Manhole (1)	Manhole	602.401	-12.217	79.83	0.44
Manhole (2)	Manhole	601.391	-4.605	80.00	0.85
Manhole (3)	Manhole	599.644	-10.897	80.00	1.00
Manhole (4)	Manhole	598.44	-16.295	80.30	1.90
Manhole (5)	Manhole	599.916	-17.033	80.30	1.95
Manhole (6)	Manhole	602.673	-18.082	80.23	2.33

Name	Invert Level (m)	Chamber Shape	Diameter (m)	Manhole Locked
Manhole	79.45	Circular	0.90	☒
Manhole (1)	79.39	Circular	1.20	☐
Manhole (2)	79.15	Circular	0.90	☒
Manhole (3)	79.00	Circular	0.90	☒
Manhole (4)	78.40	Circular	1.20	☐
Manhole (5)	78.35	Circular	0.90	☒
Manhole (6)	77.90	Circular	1.20	☒

Inlets

Junction	Inlet Name	Incoming Item(s)	Bypass Destination	Capacity Type
Manhole	Inlet	Catchment Area	(None)	No Restriction
Manhole (1)	Inlet	Catchment Area (2)	(None)	No Restriction
	Inlet	Pipe (1)	(None)	No Restriction
Manhole (2)	Inlet (1)	Catchment Area (1)	(None)	No Restriction
	Inlet (2)	Catchment Area (3)	(None)	No Restriction
Manhole (3)	Inlet	Pipe	(None)	No Restriction
	Inlet (1)	Pipe (2)	(None)	No Restriction
Manhole (4)	Inlet	Pipe (4)	(None)	No Restriction
Manhole (5)	Inlet	Pipe (5)	(None)	No Restriction
Manhole (6)	Inlet	Pipe (6)	(None)	No Restriction

Project:	Date: 06/12/2022		
	Designed by: J.Kusz	Checked by:	Approved By:
Report Details: Type: Junctions Phase: Phase (1)	Company Address:		



Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type
Manhole	Outlet	Pipe	Free Discharge
Manhole (1)	Outlet	Pipe (1)	Free Discharge
Manhole (2)	Outlet	Pipe (2)	Free Discharge
Manhole (3)	Outlet	Pipe (3)	Free Discharge
	Outlet	Pipe (5)	Hydro-Brake®
Invert Level (m) Design Depth (m) Design Flow (L/s) Objective Application Sump Available Unit Reference 78.40 1.00 1.0 Minimise Upstream Storage Requirements Surface Water Only ☐ CHE-0045-1000-1000-1000			
Manhole (4)			
Manhole (5)	Outlet	Pipe (6)	Free Discharge

Project:	Date: 06/12/2022			
	Designed by: J.Kusz	Checked by:	Approved By:	
Report Details: Type: Stormwater Controls Phase: Phase (1)	Company Address:			



Tank

Type : Tank

Dimensions

Exceedence Level (m)	80.30
Depth (m)	1.80
Base Level (m)	78.50
Freeboard (mm)	0
Initial Depth (m)	0.00
Porosity (%)	99
Average Slope (1:x)	0.00
Total Volume (m³)	7.195

Depth (m)	Area (m²)	Volume (m³)
0.00	11.91	0.000
0.50	11.91	5.895

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	Pipe (3)
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	Pipe (4)
Outlet Type	Free Discharge

Advanced

Perimeter	Circular
Length (m)	3.04

Project:	Date: 06/12/2022		
	Designed by: J.Kusz	Checked by:	Approved By:
Report Details: Type: Connections Phase: Phase (1)	Company Address:		



Name	From	To	Length (m)	Connection Type	Slope (1:x)	Manning's n	Colebrook-White Roughness (mm)	Diameter / Base Width (mm)
Pipe	Manhole	Manhole (3)	13.12	Pipe	29.164		0.6	100
Pipe (1)	Manhole (1)	Manhole (2)	7.68	Pipe	31.995		0.6	100
Pipe (2)	Manhole (2)	Manhole (3)	6.53	Pipe	43.533		0.6	100
Pipe (3)	Manhole (3)	Tank	2.52	Pipe	5.030		0.6	100
Pipe (4)	Tank	Manhole (4)	2.21	Pipe	22.141		0.6	100
Pipe (5)	Manhole (4)	Manhole (5)	1.65	Pipe	33.001		0.6	100
Pipe (6)	Manhole (5)	Manhole (6)	2.95	Pipe	6.556		0.6	100

Name	Upstream Cover Level (m)	Upstream Invert Level (m)	Downstream Cover Level (m)	Downstream Invert Level (m)	Flow Restriction (L/s)
Pipe	80.45	79.45	80.00	79.00	
Pipe (1)	79.83	79.39	80.00	79.15	
Pipe (2)	80.00	79.15	80.00	79.00	
Pipe (3)	80.00	79.00	80.30	78.50	
Pipe (4)	80.30	78.50	80.30	78.40	
Pipe (5)	80.30	78.40	80.30	78.35	1.10
Pipe (6)	80.30	78.35	80.23	77.90	

Project:	Date: 06/12/2022		
	Designed by: J.Kusz	Checked by:	Approved By:
Report Details: Type: Area Summary Phase: Phase (1)	Company Address:		



Inflow Label	Connected To	Runoff Method	Area (ha)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analysed (ha)
Catchment Area	Manhole	Time of Concentration	0.005	100	0	100	0.005
Catchment Area (1)	Manhole (2)	Time of Concentration	0.015	100	0	100	0.015
Catchment Area (2)	Manhole (1)	Time of Concentration	0.006	100	0	100	0.006
Catchment Area (3)	Manhole (2)	Time of Concentration	0.003	100	0	100	0.003
TOTAL			0.029				0.029

Project:	Date: 06/12/2022			
	Designed by: J.Kusz	Checked by:	Approved By:	
Report Details: Type: Network Design Criteria Phase: Phase (1)	Company Address:			

Flow Options

Peak Flow Calculation (UK) Modified Rational Method
 Min. Time of Entry (mins) 5
 Max. Travel Time (mins) 30

FSR

Type: FSR

Return Period (years) 2.0
 Region England and Wales
 M5-60 (mm) 18.0
 Ratio R 0.358

Pipe Options

Lock Slope Options None
 Design Level Level Inverts
 Min. Cover Depth (m) 1.20
 Min. Slope (1:x) 500.00
 Max. Slope (1:x) 40.00
 Min. Velocity (m/s) 1.0
 Max. Velocity (m/s) 3.0
 Use Flow Restriction ☐
 Reduce Channel Depths ☐

Pipe Size Library

Default

Add. Increment (mm) 75

Diameter (mm)	Min. Slope (1:x)	Max. Slope (1:x)
100	0.00	0.00
150	0.00	0.00

Project:	Date: 06/12/2022			
	Designed by: J.Kusz	Checked by:	Approved By:	
Report Details: Type: Network Design Criteria Phase: Phase (1)	Company Address:			

Manhole Options

Apply Offset ☐
 Synchronise Manhole Invert Levels ☒

Manhole Size Library

Default

Diameter / Width

Connection (mm)	Diameter / Length (m)	Width (m)
0	1.20	0.00
375	1.35	0.00
500	1.50	0.00
750	1.80	0.00

Additional Sizing

Connection (mm) 900
 Diameter / Length (m) 0.90
 Width (m) 0.00

Depth

Depth (m)	Diameter / Length (m)	Width (m)
0.00	1.05	0.00
1.50	1.20	0.00

Access

Depth (m)	Ladder Protrusion (mm)
0.00	130
3.00	230

Benching Requirements

Landing Width (mm) 500
 Benching Width (mm) 225

Project:	Date: 06/12/2022			
	Designed by: J.Kusz	Checked by:	Approved By:	
Report Details: Type: Outfall Details Phase: Phase (1)	Company Address:			

Outfalls			
Outfall	Outfall Type	Fixed Surcharged Level (m)	Level Curve
Manhole (6)	Free Discharge		

Project:	Date: 06/12/2022			
	Designed by: J.Kusz	Checked by:	Approved By:	
Report Title: Analysis Criteria	Company Address:			

Runoff Type: Dynamic
 Output Interval (mins): 1
 Time Step: Default
 Urban Creep (%): 0
 Junction Flood Risk Margin (mm): 300
 Perform No Discharge Analysis: ☐

Rainfall

FSR Type: FSR

Region: England and Wales
 M5-60 (mm): 18.0
 Ratio R: 0.358
 Summer: ☒
 Winter: ☒

Return Period

Return Period (years): 2.0
 Increase Rainfall (%): 0

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
240	480
360	720
480	960
960	1920
1440	2880

Project:	Date: 06/12/2022			
	Designed by: J.Kusz	Checked by:	Approved By:	
Report Details: Type: Junctions Summary Phase: Phase	Company Address:			



Critical Storm

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
Manhole (2)	FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Winter	80.00	79.15	79.20	0.05	3.8	0.031	0.000	3.7	1.743	OK
Manhole (3)	FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Winter	80.00	79.00	79.04	0.04	4.6	0.028	0.000	4.5	2.129	OK
Manhole (4)	FSR: 2 years: Increase Rainfall (%): +0: 60 mins: Winter	80.30	78.40	78.66	0.26	0.9	0.290	0.000	0.7	3.092	Surcharged
Manhole (5)	FSR: 2 years: Increase Rainfall (%): +0: 240 mins: Winter	80.30	78.35	78.37	0.02	0.7	0.010	0.000	0.7	5.488	OK
Manhole (6)	FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Summer	80.23	77.90	78.00	0.10	0.6	0.000	0.000	0.6	0.586	OK

Project:	Date: 06/12/2022		
	Designed by: J.Kusz	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Summary Phase: Phase	Company Address:		




Critical Storm

Stormwater Control	Storm Event	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Tank	FSR: 2 years: Increase Rainfall (%): +0: 60 mins: Winter	78.66	0.16	2.4	1.854	0.000	0.000	0.9	3.251	74	OK

Project:	Date: 06/12/2022		
	Designed by: J.Kusz	Checked by:	Approved By:
Report Details: Type: Connections Summary Phase: Phase	Company Address:		



Critical Storm

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
Pipe (2)	FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Winter	Pipe	Manhole (2)	Manhole (3)	80.0	79.20	0.05	1.743	1.1	0.42	3.7	OK
Pipe (3)	FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Winter	Pipe	Manhole (3)	Tank	80.0	79.04	0.06	2.129	1.0	0.32	4.5	OK
Pipe (4)	FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Summer	Pipe	Tank	Manhole (4)	80.3	78.61	0.10	0.852	0.6	0.25	2.5	Surcharged
Pipe (5)	FSR: 2 years: Increase Rainfall (%): +0: 360 mins: Summer	Pipe	Manhole (4)	Manhole (5)	80.3	78.55	0.02	5.525	0.8	0.06	0.7	Surcharged
Pipe (6)	FSR: 2 years: Increase Rainfall (%): +0: 240 mins: Winter	Pipe	Manhole (5)	Manhole (6)	80.3	78.37	0.06	5.488	0.1	0.06	0.7	OK

Project:	Date: 06/12/2022		
	Designed by: J.Kusz	Checked by:	Approved By:
Report Details: Type: Junctions Summary Phase: Phase (1)	Company Address:		



Critical Storm

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
Manhole	FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Winter	80.45	79.45	79.47	0.02	0.8	0.012	0.000	0.8	0.386	OK
Manhole (1)	FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Winter	79.83	79.39	79.41	0.02	1.0	0.023	0.000	1.0	0.466	OK
Manhole (2)	FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Winter	80.00	79.15	79.20	0.05	3.8	0.031	0.000	3.7	1.742	OK
Manhole (3)	FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Winter	80.00	79.00	79.03	0.03	4.6	0.018	0.000	4.6	2.126	OK
Manhole (4)	FSR: 2 years: Increase Rainfall (%): +0: 60 mins: Winter	80.30	78.40	78.66	0.26	1.0	0.289	0.000	0.7	3.108	Surcharged
Manhole (5)	FSR: 2 years: Increase Rainfall (%): +0: 360 mins: Summer	80.30	78.35	78.36	0.01	0.7	0.007	0.000	0.7	5.523	OK
Manhole (6)	FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Summer	80.23	77.90	78.00	0.10	0.6	0.000	0.000	0.6	0.592	OK

Project:	Date: 06/12/2022			
	Designed by: J.Kusz	Checked by:	Approved By:	
Report Details: Type: Connections Summary Phase: Phase (1)	Company Address:			



Critical Storm

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
Pipe	FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Winter	Pipe	Manhole	Manhole (3)	80.5	79.47	0.02	0.386	0.6	0.07	0.8	OK
Pipe (1)	FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Winter	Pipe	Manhole (1)	Manhole (2)	79.8	79.41	0.03	0.466	0.4	0.09	1.0	OK
Pipe (2)	FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Winter	Pipe	Manhole (2)	Manhole (3)	80.0	79.20	0.04	1.742	1.3	0.4	3.7	OK
Pipe (3)	FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Winter	Pipe	Manhole (3)	Tank	80.0	79.03	0.07	2.126	2.3	0.17	4.6	OK
Pipe (4)	FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Summer	Pipe	Tank	Manhole (4)	80.3	78.61	0.10	0.846	0.7	0.2	2.6	Surcharged
Pipe (5)	FSR: 2 years: Increase Rainfall (%): +0: 360 mins: Summer	Pipe	Manhole (4)	Manhole (5)	80.3	78.54	0.01	5.524	0.9	0.07	0.7	Surcharged
Pipe (6)	FSR: 2 years: Increase Rainfall (%): +0: 360 mins: Summer	Pipe	Manhole (5)	Manhole (6)	80.3	78.36	0.06	5.523	0.2	0.03	0.7	OK

Project: 1.30 + CHMATE	Date: 06/12/2022			
Report Details: Type: Junctions Phase: Phase	Designed by: J.Kusz	Checked by:		Approved By:
Company Address:				

Name	Junction Type	Easting (m)	Northing (m)	Cover Level (m)	Depth (m)
Manhole (2)	Manhole	602.944	-1.287	80.00	0.85
Manhole (3)	Manhole	596.30	-3.292	80.00	1.00
Manhole (4)	Manhole	594.351	-6.887	80.30	1.90
Manhole (5)	Manhole	595.313	-8.028	80.30	1.95
Manhole (6)	Manhole	602.673	-18.082	80.23	2.33

Name	Invert Level (m)	Chamber Shape	Diameter (m)	Manhole Locked
Manhole (2)	79.15	Circular	0.90	☒
Manhole (3)	79.00	Circular	0.90	☒
Manhole (4)	78.40	Circular	1.20	☐
Manhole (5)	78.35	Circular	0.90	☒
Manhole (6)	77.90	Circular	1.20	☒

Inlets

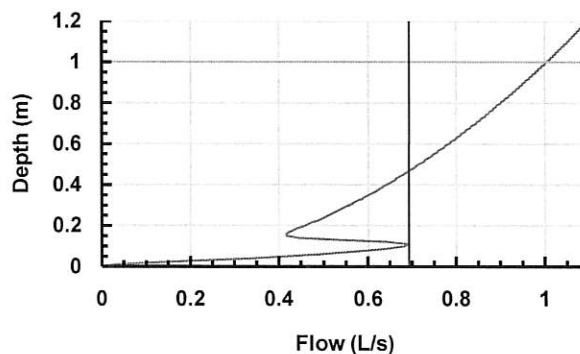
Junction	Inlet Name	Incoming Item(s)	Bypass Destination	Capacity Type
Manhole (2)	Inlet (1)	Catchment Area (1)	(None)	No Restriction
	Inlet (2)	Catchment Area (3)	(None)	No Restriction
	Inlet (3)	Catchment Area (2)	(None)	No Restriction
Manhole (3)	Inlet (1)	Pipe (2)	(None)	No Restriction
	Inlet (2)	Catchment Area	(None)	No Restriction
Manhole (4)	Inlet	Pipe (4)	(None)	No Restriction
Manhole (5)	Inlet	Pipe (5)	(None)	No Restriction
Manhole (6)	Inlet	Pipe (6)	(None)	No Restriction

Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type
Manhole (2)	Outlet	Pipe (2)	Free Discharge
Manhole (3)	Outlet	Pipe (3)	Free Discharge
	Outlet	Pipe (5)	Hydro-Brake®

Invert Level (m)	78.40
Design Depth (m)	1.00
Design Flow (L/s)	1.0
Objective	Minimise Upstream Storage Requirements
Application	Surface Water Only
Sump Available	☐
Unit Reference	CHE-0045-1000-1000-1000

Manhole (4)



Manhole (5)	Outlet	Pipe (6)	Free Discharge
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Project:	Date: 06/12/2022			
	Designed by: J.Kusz	Checked by:	Approved By:	
Report Details: Type: Stormwater Controls Phase: Phase	Company Address:			



Tank

Type : Tank

Dimensions

Exceedence Level (m)	80.30
Depth (m)	1.80
Base Level (m)	78.50
Freeboard (mm)	0
Initial Depth (m)	0.00
Porosity (%)	99
Average Slope (1:x)	0.00
Total Volume (m³)	7.195

Depth (m)	Area (m²)	Volume (m³)
0.00	11.91	0.000
0.50	11.91	13.916

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	Pipe (3)
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	Pipe (4)
Outlet Type	Free Discharge

Advanced

Perimeter	Circular
Length (m)	3.04

Project:	Date: 06/12/2022		
	Designed by: J.Kusz	Checked by:	Approved By:
Report Details: Type: Connections Phase: Phase	Company Address:		



Name	From	To	Length (m)	Connection Type	Slope (1:x)	Manning's n	Colebrook-White Roughness (mm)	Diameter / Base Width (mm)
Pipe (2)	Manhole (2)	Manhole (3)	6.94	Pipe	46.266		0.6	100
Pipe (3)	Manhole (3)	Tank	2.82	Pipe	18.792		0.6	100
Pipe (4)	Tank	Manhole (4)	3.70	Pipe	37.019		0.6	100
Pipe (5)	Manhole (4)	Manhole (5)	1.49	Pipe	29.849		0.6	100
Pipe (6)	Manhole (5)	Manhole (6)	12.46	Pipe	27.688		0.6	100

Name	Upstream Cover Level (m)	Upstream Invert Level (m)	Downstream Cover Level (m)	Downstream Invert Level (m)	Flow Restriction (L/s)
Pipe (2)	80.00	79.15	80.00	79.00	
Pipe (3)	80.00	79.00	80.30	78.85	
Pipe (4)	80.30	78.50	80.30	78.40	
Pipe (5)	80.30	78.40	80.30	78.35	1.10
Pipe (6)	80.30	78.35	80.23	77.90	

Project:	Date: 06/12/2022		
	Designed by: J.Kusz	Checked by:	Approved By:
Report Details: Type: Area Summary Phase: Phase	Company Address:		



Inflow Label	Connected To	Runoff Method	Area (ha)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analysed (ha)
Catchment Area	Manhole (3)	Time of Concentration	0.005	100	0	100	0.005
Catchment Area (1)	Manhole (2)	Time of Concentration	0.015	100	0	100	0.015
Catchment Area (2)	Manhole (2)	Time of Concentration	0.006	100	0	100	0.006
Catchment Area (3)	Manhole (2)	Time of Concentration	0.003	100	0	100	0.003
TOTAL			0.029				0.029

Project:	Date: 06/12/2022			
	Designed by: J.Kusz	Checked by:	Approved By:	
Report Details: Type: Network Design Criteria Phase: Phase	Company Address:			

Flow Options

Peak Flow Calculation	(UK) Modified Rational Method
Min. Time of Entry (mins)	5
Max. Travel Time (mins)	30

FSR	Type: FSR
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Return Period (years)	2.0
Region	England and Wales
M5-60 (mm)	18.0
Ratio R	0.358

Pipe Options

Lock Slope Options	None
Design Level	Level Inverts
Min. Cover Depth (m)	1.20
Min. Slope (1:x)	500.00
Max. Slope (1:x)	40.00
Min. Velocity (m/s)	1.0
Max. Velocity (m/s)	3.0
Use Flow Restriction	☐
Reduce Channel Depths	☐

Pipe Size Library

Default

Add. Increment (mm)	75
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Diameter (mm)	Min. Slope (1:x)	Max. Slope (1:x)
100	0.00	0.00
150	0.00	0.00

Project:	Date: 06/12/2022			
	Designed by: J.Kusz	Checked by:	Approved By:	
Report Details: Type: Network Design Criteria Phase: Phase	Company Address:			

Manhole Options

Apply Offset ☐
 Synchronise Manhole Invert Levels ☒

Manhole Size Library

Default

Diameter / Width

Connection (mm)	Diameter / Length (m)	Width (m)
0	1.20	0.00
375	1.35	0.00
500	1.50	0.00
750	1.80	0.00

Additional Sizing

Connection (mm) 900
 Diameter / Length (m) 0.90
 Width (m) 0.00

Depth

Depth (m)	Diameter / Length (m)	Width (m)
0.00	1.05	0.00
1.50	1.20	0.00

Access

Depth (m)	Ladder Protrusion (mm)
0.00	130
3.00	230

Benching Requirements

Landing Width (mm) 500
 Benching Width (mm) 225

Project:	Date: 06/12/2022			
	Designed by: J.Kusz	Checked by:	Approved By:	
Report Details: Type: Outfall Details Phase: Phase	Company Address:			

Outfalls			
Outfall	Outfall Type	Fixed Surcharged Level (m)	Level Curve
Manhole (6)	Free Discharge		

Project:	Date: 06/12/2022			
	Designed by: J.Kusz	Checked by:	Approved By:	
Report Details: Type: Junctions Phase: Phase (1)	Company Address:			

Name	Junction Type	Easting (m)	Northing (m)	Cover Level (m)	Depth (m)
Manhole	Manhole	586.789	-8.256	80.45	1.00
Manhole (1)	Manhole	602.401	-12.217	79.83	0.44
Manhole (2)	Manhole	601.391	-4.605	80.00	0.85
Manhole (3)	Manhole	599.644	-10.897	80.00	1.00
Manhole (4)	Manhole	598.44	-16.295	80.30	1.90
Manhole (5)	Manhole	599.916	-17.033	80.30	1.95
Manhole (6)	Manhole	602.673	-18.082	80.23	2.33

Name	Invert Level (m)	Chamber Shape	Diameter (m)	Manhole Locked
Manhole	79.45	Circular	0.90	☒
Manhole (1)	79.39	Circular	1.20	☐
Manhole (2)	79.15	Circular	0.90	☒
Manhole (3)	79.00	Circular	0.90	☒
Manhole (4)	78.40	Circular	1.20	☐
Manhole (5)	78.35	Circular	0.90	☒
Manhole (6)	77.90	Circular	1.20	☒

Inlets

Junction	Inlet Name	Incoming Item(s)	Bypass Destination	Capacity Type
Manhole	Inlet	Catchment Area	(None)	No Restriction
Manhole (1)	Inlet	Catchment Area (2)	(None)	No Restriction
	Inlet	Pipe (1)	(None)	No Restriction
Manhole (2)	Inlet (1)	Catchment Area (1)	(None)	No Restriction
	Inlet (2)	Catchment Area (3)	(None)	No Restriction
Manhole (3)	Inlet	Pipe	(None)	No Restriction
	Inlet (1)	Pipe (2)	(None)	No Restriction
Manhole (4)	Inlet	Pipe (4)	(None)	No Restriction
Manhole (5)	Inlet	Pipe (5)	(None)	No Restriction
Manhole (6)	Inlet	Pipe (6)	(None)	No Restriction

Project:	Date: 06/12/2022		
	Designed by: J.Kusz	Checked by:	Approved By:
Report Details: Type: Junctions Phase: Phase (1)	Company Address:		



Outlets

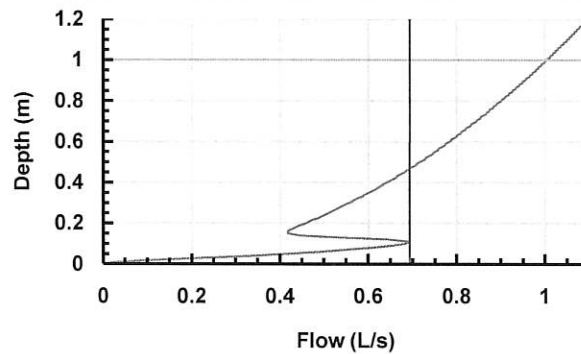
Junction	Outlet Name	Outgoing Connection	Outlet Type
Manhole	Outlet	Pipe	Free Discharge
Manhole (1)	Outlet	Pipe (1)	Free Discharge
Manhole (2)	Outlet	Pipe (2)	Free Discharge
Manhole (3)	Outlet	Pipe (3)	Free Discharge

Outlet
Invert Level (m) 78.40
Design Depth (m) 1.00
Design Flow (L/s) 1.0

Objective Minimise Upstream Storage Requirements
Application Surface Water Only
Sump Available ☐

Unit Reference CHE-0045-1000-1000-1000

Manhole (4)



Manhole (5)	Outlet	Pipe (6)	Free Discharge
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Project:	Date: 06/12/2022			
	Designed by: J.Kusz	Checked by:	Approved By:	
Report Details: Type: Stormwater Controls Phase: Phase (1)	Company Address:			



Tank

Type : Tank

Dimensions

Exceedence Level (m)	80.30
Depth (m)	1.80
Base Level (m)	78.50
Freeboard (mm)	0
Initial Depth (m)	0.00
Porosity (%)	99
Average Slope (1:x)	0.00
Total Volume (m³)	7.195

Depth (m)	Area (m²)	Volume (m³)
0.00	11.91	0.000
0.50	11.91	5.895

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	Pipe (3)
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	Pipe (4)
Outlet Type	Free Discharge

Advanced

Perimeter	Circular
Length (m)	3.04

Project:	Date: 06/12/2022		
	Designed by: J.Kusz	Checked by:	Approved By:
Report Details: Type: Connections Phase: Phase (1)	Company Address:		



Name	From	To	Length (m)	Connection Type	Slope (1:x)	Manning's n	Colebrook-White Roughness (mm)	Diameter / Base Width (mm)
Pipe	Manhole	Manhole (3)	13.12	Pipe	29.164		0.6	100
Pipe (1)	Manhole (1)	Manhole (2)	7.68	Pipe	31.995		0.6	100
Pipe (2)	Manhole (2)	Manhole (3)	6.53	Pipe	43.533		0.6	100
Pipe (3)	Manhole (3)	Tank	2.52	Pipe	5.030		0.6	100
Pipe (4)	Tank	Manhole (4)	2.21	Pipe	22.141		0.6	100
Pipe (5)	Manhole (4)	Manhole (5)	1.65	Pipe	33.001		0.6	100
Pipe (6)	Manhole (5)	Manhole (6)	2.95	Pipe	6.556		0.6	100

Name	Upstream Cover Level (m)	Upstream Invert Level (m)	Downstream Cover Level (m)	Downstream Invert Level (m)	Flow Restriction (L/s)
Pipe	80.45	79.45	80.00	79.00	
Pipe (1)	79.83	79.39	80.00	79.15	
Pipe (2)	80.00	79.15	80.00	79.00	
Pipe (3)	80.00	79.00	80.30	78.50	
Pipe (4)	80.30	78.50	80.30	78.40	
Pipe (5)	80.30	78.40	80.30	78.35	1.10
Pipe (6)	80.30	78.35	80.23	77.90	

Project:	Date: 06/12/2022		
	Designed by: J.Kusz	Checked by:	Approved By:
Report Details: Type: Area Summary Phase: Phase (1)	Company Address:		



Inflow Label	Connected To	Runoff Method	Area (ha)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analysed (ha)
Catchment Area	Manhole	Time of Concentration	0.005	100	0	100	0.005
Catchment Area (1)	Manhole (2)	Time of Concentration	0.015	100	0	100	0.015
Catchment Area (2)	Manhole (1)	Time of Concentration	0.006	100	0	100	0.006
Catchment Area (3)	Manhole (2)	Time of Concentration	0.003	100	0	100	0.003
TOTAL			0.029				0.029

Project:	Date: 06/12/2022		
	Designed by: J.Kusz	Checked by:	Approved By:
Report Details: Type: Network Design Criteria Phase: Phase (1)	Company Address:		



Flow Options

Peak Flow Calculation (UK) Modified Rational Method
 Min. Time of Entry (mins) 5
 Max. Travel Time (mins) 30

FSR

Type: FSR

Return Period (years) 2.0
 Region England and Wales
 M5-60 (mm) 18.0
 Ratio R 0.358

Pipe Options

Lock Slope Options None
 Design Level Level Inverts
 Min. Cover Depth (m) 1.20
 Min. Slope (1:x) 500.00
 Max. Slope (1:x) 40.00
 Min. Velocity (m/s) 1.0
 Max. Velocity (m/s) 3.0
 Use Flow Restriction ☐
 Reduce Channel Depths ☐

Pipe Size Library

Default

Add. Increment (mm) 75

Diameter (mm)	Min. Slope (1:x)	Max. Slope (1:x)
100	0.00	0.00
150	0.00	0.00

Project:	Date: 06/12/2022			
	Designed by: J.Kusz	Checked by:	Approved By:	
Report Details: Type: Network Design Criteria Phase: Phase (1)	Company Address:			

Manhole Options

Apply Offset ☐
 Synchronise Manhole Invert Levels ☒

Manhole Size Library

Default

Diameter / Width

Connection (mm)	Diameter / Length (m)	Width (m)
0	1.20	0.00
375	1.35	0.00
500	1.50	0.00
750	1.80	0.00

Additional Sizing

Connection (mm)	900
Diameter / Length (m)	0.90
Width (m)	0.00

Depth

Depth (m)	Diameter / Length (m)	Width (m)
0.00	1.05	0.00
1.50	1.20	0.00

Access

Depth (m)	Ladder Protrusion (mm)
0.00	130
3.00	230

Benching Requirements

Landing Width (mm)	500
Benching Width (mm)	225

Project:	Date: 06/12/2022			
	Designed by: J.Kusz	Checked by:	Approved By:	
Report Details: Type: Outfall Details Phase: Phase (1)	Company Address:			

Outfalls

Outfall	Outfall Type	Fixed Surcharged Level (m)	Level Curve
Manhole (6)	Free Discharge		

Project:	Date: 06/12/2022			
	Designed by: J.Kusz	Checked by:	Approved By:	
Report Title: Analysis Criteria	Company Address:			

Runoff Type: Dynamic
 Output Interval (mins): 1
 Time Step: Default
 Urban Creep (%): 0
 Junction Flood Risk Margin (mm): 300
 Perform No Discharge Analysis: ☐

Rainfall

1:30 Type: FSR

Region: England and Wales
 M5-60 (mm): 18.0
 Ratio R: 0.359
 Summer: ☒
 Winter: ☒

Return Period

Return Period (years): 30.0
 Increase Rainfall (%): 0

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
240	480
360	720
480	960
960	1920
1440	2880

Project:	Date: 06/12/2022			
	Designed by: J.Kusz	Checked by:	Approved By:	
Report Details: Type: Junctions Summary Phase: Phase		Company Address:		



Critical Storm

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
Manhole (2)	FSR: 30 years: Increase Rainfall (%): +0: 15 mins: Winter	80.00	79.15	79.22	0.07	7.2	0.047	0.000	7.1	3.299	OK
Manhole (3)	FSR: 30 years: Increase Rainfall (%): +0: 15 mins: Winter	80.00	79.00	79.07	0.07	8.7	0.044	0.000	8.6	4.029	OK
Manhole (4)	FSR: 30 years: Increase Rainfall (%): +0: 60 mins: Winter	80.30	78.40	78.87	0.47	0.9	0.530	0.000	0.7	4.011	Surcharged
Manhole (5)	FSR: 30 years: Increase Rainfall (%): +0: 960 mins: Summer	80.30	78.35	78.37	0.02	0.7	0.010	0.000	0.7	12.845	OK
Manhole (6)	FSR: 30 years: Increase Rainfall (%): +0: 15 mins: Summer	80.23	77.90	78.00	0.10	0.6	0.000	0.000	0.6	0.747	OK

Project:	Date: 06/12/2022		
	Designed by: J.Kusz	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Summary Phase: Phase	Company Address:		




Critical Storm

Stormwater Control	Storm Event	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Tank	FSR: 30 years: Increase Rainfall (%): +0: 60 mins: Winter	78.87	0.37	4.6	4.352	0.000	0.000	0.9	4.380	40	OK

Project:	Date: 06/12/2022		
	Designed by: J.Kusz	Checked by:	Approved By:
Report Details: Type: Junctions Summary Phase: Phase (1)	Company Address:		




Critical Storm

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
Manhole	FSR: 30 years: Increase Rainfall (%): +0: 15 mins: Winter	80.45	79.45	79.48	0.03	1.6	0.016	0.000	1.6	0.730	OK
Manhole (1)	FSR: 30 years: Increase Rainfall (%): +0: 15 mins: Winter	79.83	79.39	79.42	0.03	1.9	0.032	0.000	1.9	0.885	OK
Manhole (2)	FSR: 30 years: Increase Rainfall (%): +0: 15 mins: Winter	80.00	79.15	79.22	0.07	7.1	0.047	0.000	7.1	3.298	OK
Manhole (3)	FSR: 30 years: Increase Rainfall (%): +0: 15 mins: Winter	80.00	79.00	79.04	0.04	8.6	0.025	0.000	8.6	4.023	OK
Manhole (4)	FSR: 30 years: Increase Rainfall (%): +0: 60 mins: Winter	80.30	78.40	78.87	0.47	0.9	0.528	0.000	0.7	4.017	Surcharged
Manhole (5)	FSR: 30 years: Increase Rainfall (%): +0: 480 mins: Winter	80.30	78.35	78.36	0.01	0.7	0.007	0.000	0.7	12.075	OK
Manhole (6)	FSR: 30 years: Increase Rainfall (%): +0: 15 mins: Summer	80.23	77.90	78.00	0.10	0.6	0.000	0.000	0.6	0.752	OK

Project:	Date: 06/12/2022			
	Designed by: J.Kusz	Checked by:	Approved By:	
Report Details: Type: Stormwater Controls Summary Phase: Phase (1)	Company Address:			



Critical Storm

Stormwater Control	Storm Event	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Tank	FSR: 30 years: Increase Rainfall (%): +0: 60 mins: Winter	78.87	0.37	4.6	4.335	0.000	0.000	0.9	4.379	40	OK

Project:	Date: 06/12/2022		
	Designed by: J.Kusz	Checked by:	Approved By:
Report Details: Type: Connections Summary Phase: Phase (1)	Company Address:		



Critical Storm

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
Pipe	FSR: 30 years: Increase Rainfall (%): +0: 15 mins: Winter	Pipe	Manhole	Manhole (3)	80.5	79.48	0.03	0.730	0.7	0.14	1.6	OK
Pipe (1)	FSR: 30 years: Increase Rainfall (%): +0: 15 mins: Winter	Pipe	Manhole (1)	Manhole (2)	79.8	79.42	0.05	0.885	0.5	0.18	1.9	OK
Pipe (2)	FSR: 30 years: Increase Rainfall (%): +0: 15 mins: Winter	Pipe	Manhole (2)	Manhole (3)	80.0	79.22	0.06	3.298	1.6	0.77	7.1	OK
Pipe (3)	FSR: 30 years: Increase Rainfall (%): +0: 15 mins: Winter	Pipe	Manhole (3)	Tank	80.0	79.04	0.10	4.023	2.5	0.31	8.6	OK
Pipe (4)	FSR: 30 years: Increase Rainfall (%): +0: 15 mins: Winter	Pipe	Tank	Manhole (4)	80.3	78.76	0.10	1.222	0.8	0.22	2.8	Surcharged
Pipe (5)	FSR: 30 years: Increase Rainfall (%): +0: 480 mins: Winter	Pipe	Manhole (4)	Manhole (5)	80.3	78.71	0.01	12.075	0.9	0.07	0.7	Surcharged
Pipe (6)	FSR: 30 years: Increase Rainfall (%): +0: 360 mins: Winter	Pipe	Manhole (5)	Manhole (6)	80.3	78.36	0.06	11.238	0.2	0.03	0.7	OK

Project: 1:100 + CHIMAB.	Date: 06/12/2022			
Report Details: Type: Junctions Phase: Phase	Designed by: J.Kusz	Checked by:		Approved By:
Company Address:				

Name	Junction Type	Easting (m)	Northing (m)	Cover Level (m)	Depth (m)
Manhole (2)	Manhole	602.944	-1.287	80.00	0.85
Manhole (3)	Manhole	596.30	-3.292	80.00	1.00
Manhole (4)	Manhole	594.351	-6.887	80.30	1.90
Manhole (5)	Manhole	595.313	-8.028	80.30	1.95
Manhole (6)	Manhole	602.673	-18.082	80.23	2.33

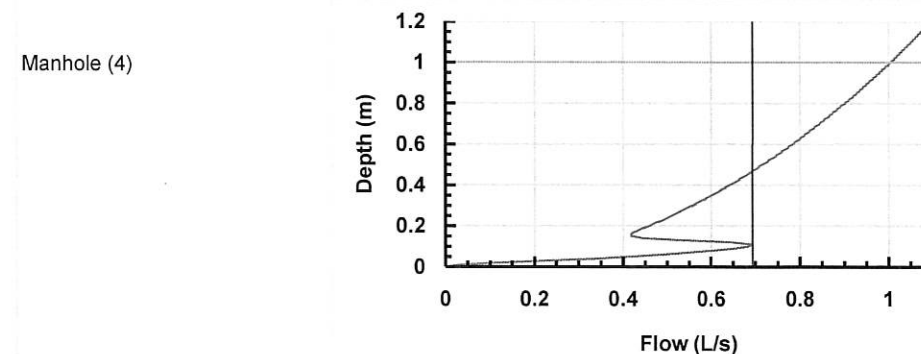
Name	Invert Level (m)	Chamber Shape	Diameter (m)	Manhole Locked
Manhole (2)	79.15	Circular	0.90	☒
Manhole (3)	79.00	Circular	0.90	☒
Manhole (4)	78.40	Circular	1.20	☐
Manhole (5)	78.35	Circular	0.90	☒
Manhole (6)	77.90	Circular	1.20	☒

Inlets

Junction	Inlet Name	Incoming Item(s)	Bypass Destination	Capacity Type
Manhole (2)	Inlet (1)	Catchment Area (1)	(None)	No Restriction
	Inlet (2)	Catchment Area (3)	(None)	No Restriction
	Inlet (3)	Catchment Area (2)	(None)	No Restriction
Manhole (3)	Inlet (1)	Pipe (2)	(None)	No Restriction
	Inlet (2)	Catchment Area	(None)	No Restriction
Manhole (4)	Inlet	Pipe (4)	(None)	No Restriction
Manhole (5)	Inlet	Pipe (5)	(None)	No Restriction
Manhole (6)	Inlet	Pipe (6)	(None)	No Restriction

Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type
Manhole (2)	Outlet	Pipe (2)	Free Discharge
Manhole (3)	Outlet	Pipe (3)	Free Discharge
	Outlet	Pipe (5)	Hydro-Brake®
	Invert Level (m)	78.40	
	Design Depth (m)	1.00	
	Design Flow (L/s)	1.0	
	Objective	Minimise Upstream Storage Requirements	
	Application	Surface Water Only	
	Sump Available	☐	
	Unit Reference	CHE-0045-1000-1000-1000	



Manhole (5)	Outlet	Pipe (6)	Free Discharge
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Project:	Date: 06/12/2022			
	Designed by: J.Kusz	Checked by:	Approved By:	
Report Details: Type: Stormwater Controls Phase: Phase	Company Address:			



Tank

Type : Tank

Dimensions

Exceedence Level (m)	80.30
Depth (m)	1.80
Base Level (m)	78.50
Freeboard (mm)	0
Initial Depth (m)	0.00
Porosity (%)	99
Average Slope (1:x)	0.00
Total Volume (m³)	7.195

Depth (m)	Area (m²)	Volume (m³)
0.00	11.91	0.000
0.50	11.91	13.916

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	Pipe (3)
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	Pipe (4)
Outlet Type	Free Discharge

Advanced

Perimeter	Circular
Length (m)	3.04

Project:	Date: 06/12/2022		
	Designed by: J.Kusz	Checked by:	Approved By:
Report Details: Type: Connections Phase: Phase	Company Address:		



Name	From	To	Length (m)	Connection Type	Slope (1:x)	Manning's n	Colebrook-White Roughness (mm)	Diameter / Base Width (mm)
Pipe (2)	Manhole (2)	Manhole (3)	6.94	Pipe	46.266		0.6	100
Pipe (3)	Manhole (3)	Tank	2.82	Pipe	18.792		0.6	100
Pipe (4)	Tank	Manhole (4)	3.70	Pipe	37.019		0.6	100
Pipe (5)	Manhole (4)	Manhole (5)	1.49	Pipe	29.849		0.6	100
Pipe (6)	Manhole (5)	Manhole (6)	12.46	Pipe	27.688		0.6	100

Name	Upstream Cover Level (m)	Upstream Invert Level (m)	Downstream Cover Level (m)	Downstream Invert Level (m)	Flow Restriction (L/s)
Pipe (2)	80.00	79.15	80.00	79.00	
Pipe (3)	80.00	79.00	80.30	78.85	
Pipe (4)	80.30	78.50	80.30	78.40	
Pipe (5)	80.30	78.40	80.30	78.35	1.10
Pipe (6)	80.30	78.35	80.23	77.90	

Project:	Date: 06/12/2022		
	Designed by: J.Kusz	Checked by:	Approved By:
Report Details: Type: Area Summary Phase: Phase	Company Address:		



Inflow Label	Connected To	Runoff Method	Area (ha)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analysed (ha)
Catchment Area	Manhole (3)	Time of Concentration	0.005	100	0	100	0.005
Catchment Area (1)	Manhole (2)	Time of Concentration	0.015	100	0	100	0.015
Catchment Area (2)	Manhole (2)	Time of Concentration	0.006	100	0	100	0.006
Catchment Area (3)	Manhole (2)	Time of Concentration	0.003	100	0	100	0.003
TOTAL			0.029				0.029

Project:	Date: 06/12/2022			
	Designed by: J.Kusz	Checked by:	Approved By:	
Report Details: Type: Network Design Criteria Phase: Phase	Company Address:			

Flow Options

Peak Flow Calculation (UK) Modified Rational Method
 Min. Time of Entry (mins) 5
 Max. Travel Time (mins) 30

FSR

Type: FSR

Return Period (years) 2.0
 Region England and Wales
 M5-60 (mm) 18.0
 Ratio R 0.358

Pipe Options

Lock Slope Options None
 Design Level Level Inverts
 Min. Cover Depth (m) 1.20
 Min. Slope (1:x) 500.00
 Max. Slope (1:x) 40.00
 Min. Velocity (m/s) 1.0
 Max. Velocity (m/s) 3.0
 Use Flow Restriction ☐
 Reduce Channel Depths ☐

Pipe Size Library

Default

Add. Increment (mm) 75

Diameter (mm)	Min. Slope (1:x)	Max. Slope (1:x)
100	0.00	0.00
150	0.00	0.00

Project:	Date: 06/12/2022		
	Designed by: J.Kusz	Checked by:	
Report Details: Type: Network Design Criteria Phase: Phase		Company Address:	

Manhole Options

Apply Offset ☐

Synchronise Manhole Invert Levels ☒

Manhole Size Library

Default

Diameter / Width

Connection (mm)	Diameter / Length (m)	Width (m)
0	1.20	0.00
375	1.35	0.00
500	1.50	0.00
750	1.80	0.00

Additional Sizing

Connection (mm) 900

Diameter / Length (m) 0.90

Width (m) 0.00

Depth

Depth (m)	Diameter / Length (m)	Width (m)
0.00	1.05	0.00
1.50	1.20	0.00

Access

Depth (m)	Ladder Protrusion (mm)
0.00	130
3.00	230

Benching Requirements

Landing Width (mm) 500

Benching Width (mm) 225

Project:	Date: 06/12/2022			
	Designed by: J.Kusz	Checked by:	Approved By:	
Report Details: Type: Outfall Details Phase: Phase	Company Address:			

Outfalls

Outfall	Outfall Type	Fixed Surcharged Level (m)	Level Curve
Manhole (6)	Free Discharge		

Project:	Date: 06/12/2022			
	Designed by: J.Kusz	Checked by:	Approved By:	
Report Details: Type: Junctions Phase: Phase (1)	Company Address:			

Name	Junction Type	Easting (m)	Northing (m)	Cover Level (m)	Depth (m)
Manhole	Manhole	586.789	-8.256	80.45	1.00
Manhole (1)	Manhole	602.401	-12.217	79.83	0.44
Manhole (2)	Manhole	601.391	-4.605	80.00	0.85
Manhole (3)	Manhole	599.644	-10.897	80.00	1.00
Manhole (4)	Manhole	598.44	-16.295	80.30	1.90
Manhole (5)	Manhole	599.916	-17.033	80.30	1.95
Manhole (6)	Manhole	602.673	-18.082	80.23	2.33

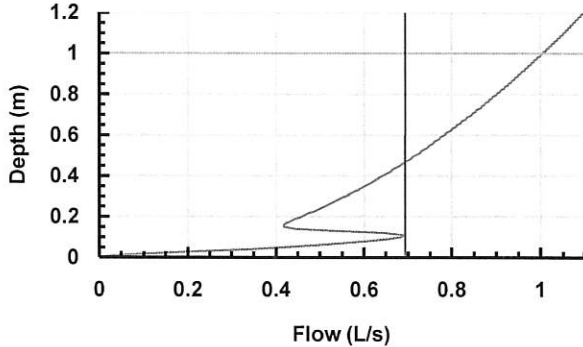
Name	Invert Level (m)	Chamber Shape	Diameter (m)	Manhole Locked
Manhole	79.45	Circular	0.90	☒
Manhole (1)	79.39	Circular	1.20	☐
Manhole (2)	79.15	Circular	0.90	☒
Manhole (3)	79.00	Circular	0.90	☒
Manhole (4)	78.40	Circular	1.20	☐
Manhole (5)	78.35	Circular	0.90	☒
Manhole (6)	77.90	Circular	1.20	☒

Inlets

Junction	Inlet Name	Incoming Item(s)	Bypass Destination	Capacity Type
Manhole	Inlet	Catchment Area	(None)	No Restriction
Manhole (1)	Inlet	Catchment Area (2)	(None)	No Restriction
	Inlet	Pipe (1)	(None)	No Restriction
Manhole (2)	Inlet (1)	Catchment Area (1)	(None)	No Restriction
	Inlet (2)	Catchment Area (3)	(None)	No Restriction
Manhole (3)	Inlet	Pipe	(None)	No Restriction
	Inlet (1)	Pipe (2)	(None)	No Restriction
Manhole (4)	Inlet	Pipe (4)	(None)	No Restriction
Manhole (5)	Inlet	Pipe (5)	(None)	No Restriction
Manhole (6)	Inlet	Pipe (6)	(None)	No Restriction

Project:	Date: 06/12/2022			
	Designed by: J.Kusz	Checked by:	Approved By:	
Report Details: Type: Junctions Phase: Phase (1)	Company Address:			

Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type
Manhole	Outlet	Pipe	Free Discharge
Manhole (1)	Outlet	Pipe (1)	Free Discharge
Manhole (2)	Outlet	Pipe (2)	Free Discharge
Manhole (3)	Outlet	Pipe (3)	Free Discharge
	Outlet	Pipe (5)	Hydro-Brake®
	Invert Level (m)	78.40	
	Design Depth (m)	1.00	
	Design Flow (L/s)	1.0	
	Objective	Minimise Upstream Storage Requirements	
	Application	Surface Water Only	
	Sump Available	☐	
	Unit Reference	CHE-0045-1000-1000-1000	
Manhole (4)			
Manhole (5)	Outlet	Pipe (6)	Free Discharge

Project:	Date: 06/12/2022			
	Designed by: J.Kusz	Checked by:	Approved By:	
Report Details: Type: Stormwater Controls Phase: Phase (1)	Company Address:			



Tank

Type : Tank

Dimensions

Exceedence Level (m)	80.30
Depth (m)	1.80
Base Level (m)	78.50
Freeboard (mm)	0
Initial Depth (m)	0.00
Porosity (%)	99
Average Slope (1:x)	0.00
Total Volume (m³)	7.195

Depth (m)	Area (m²)	Volume (m³)
0.00	11.91	0.000
0.50	11.91	5.895

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	Pipe (3)
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	Pipe (4)
Outlet Type	Free Discharge

Advanced

Perimeter	Circular
Length (m)	3.04

Project:	Date: 06/12/2022		
	Designed by: J.Kusz	Checked by:	Approved By:
Report Details: Type: Connections Phase: Phase (1)	Company Address:		



Name	From	To	Length (m)	Connection Type	Slope (1:x)	Manning's n	Colebrook-White Roughness (mm)	Diameter / Base Width (mm)
Pipe	Manhole	Manhole (3)	13.12	Pipe	29.164		0.6	100
Pipe (1)	Manhole (1)	Manhole (2)	7.68	Pipe	31.995		0.6	100
Pipe (2)	Manhole (2)	Manhole (3)	6.53	Pipe	43.533		0.6	100
Pipe (3)	Manhole (3)	Tank	2.52	Pipe	5.030		0.6	100
Pipe (4)	Tank	Manhole (4)	2.21	Pipe	22.141		0.6	100
Pipe (5)	Manhole (4)	Manhole (5)	1.65	Pipe	33.001		0.6	100
Pipe (6)	Manhole (5)	Manhole (6)	2.95	Pipe	6.556		0.6	100

Name	Upstream Cover Level (m)	Upstream Invert Level (m)	Downstream Cover Level (m)	Downstream Invert Level (m)	Flow Restriction (L/s)
Pipe	80.45	79.45	80.00	79.00	
Pipe (1)	79.83	79.39	80.00	79.15	
Pipe (2)	80.00	79.15	80.00	79.00	
Pipe (3)	80.00	79.00	80.30	78.50	
Pipe (4)	80.30	78.50	80.30	78.40	
Pipe (5)	80.30	78.40	80.30	78.35	1.10
Pipe (6)	80.30	78.35	80.23	77.90	

Project:	Date: 06/12/2022		
	Designed by: J.Kusz	Checked by:	Approved By:
Report Details: Type: Area Summary Phase: Phase (1)	Company Address:		



Inflow Label	Connected To	Runoff Method	Area (ha)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analysed (ha)
Catchment Area	Manhole	Time of Concentration	0.005	100	0	100	0.005
Catchment Area (1)	Manhole (2)	Time of Concentration	0.015	100	0	100	0.015
Catchment Area (2)	Manhole (1)	Time of Concentration	0.006	100	0	100	0.006
Catchment Area (3)	Manhole (2)	Time of Concentration	0.003	100	0	100	0.003
TOTAL			0.029				0.029

Project:	Date: 06/12/2022			
	Designed by: J.Kusz	Checked by:	Approved By:	
Report Details: Type: Network Design Criteria Phase: Phase (1)	Company Address:			

Flow Options

Peak Flow Calculation (UK) Modified Rational Method
 Min. Time of Entry (mins) 5
 Max. Travel Time (mins) 30

FSR

Type: FSR

Return Period (years) 2.0
 Region England and Wales
 M5-60 (mm) 18.0
 Ratio R 0.358

Pipe Options

Lock Slope Options None
 Design Level Level Inverts
 Min. Cover Depth (m) 1.20
 Min. Slope (1:x) 500.00
 Max. Slope (1:x) 40.00
 Min. Velocity (m/s) 1.0
 Max. Velocity (m/s) 3.0
 Use Flow Restriction ☐
 Reduce Channel Depths ☐

Pipe Size Library

Default

Add. Increment (mm) 75

Diameter (mm)	Min. Slope (1:x)	Max. Slope (1:x)
100	0.00	0.00
150	0.00	0.00

Project:	Date: 06/12/2022			
	Designed by: J.Kusz	Checked by:	Approved By:	
Report Details: Type: Network Design Criteria Phase: Phase (1)	Company Address:			

Manhole Options

Apply Offset ☐

Synchronise Manhole Invert Levels ☒

Manhole Size Library

Default

Diameter / Width

Connection (mm)	Diameter / Length (m)	Width (m)
0	1.20	0.00
375	1.35	0.00
500	1.50	0.00
750	1.80	0.00

Additional Sizing

Connection (mm)	900
Diameter / Length (m)	0.90
Width (m)	0.00

Depth

Depth (m)	Diameter / Length (m)	Width (m)
0.00	1.05	0.00
1.50	1.20	0.00

Access

Depth (m)	Ladder Protrusion (mm)
0.00	130
3.00	230

Benching Requirements

Landing Width (mm)	500
Benching Width (mm)	225

Project:	Date: 06/12/2022			
	Designed by: J.Kusz	Checked by:	Approved By:	
Report Details: Type: Outfall Details Phase: Phase (1)	Company Address:			

Outfalls

Outfall	Outfall Type	Fixed Surcharged Level (m)	Level Curve
Manhole (6)	Free Discharge		

Project:	Date: 06/12/2022			
	Designed by: J.Kusz	Checked by:	Approved By:	
Report Title: Analysis Criteria	Company Address:			

Runoff Type	Dynamic
Output Interval (mins)	1
Time Step	Default
Urban Creep (%)	0
Junction Flood Risk Margin (mm)	300
Perform No Discharge Analysis	☐

Rainfall

1:100 PLUS CLIMATE

Type: FSR

Region	England and Wales
M5-60 (mm)	18.0
Ratio R	0.360
Summer	☒
Winter	☒

Return Period

Return Period (years)	Increase Rainfall (%)
100.0	40

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
240	480
360	720
480	960
960	1920
1440	2880

Project:	Date: 06/12/2022		
	Designed by: J.Kusz	Checked by:	Approved By:
Report Details: Type: Junctions Summary Phase: Phase	Company Address:		




Critical Storm

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
Manhole (2)	FSR: 100 years: Increase Rainfall (%): +40: 120 mins: Winter	80.00	79.15	79.87	0.72	4.4	0.457	0.000	4.4	12.680	Flood Risk
Manhole (3)	FSR: 100 years: Increase Rainfall (%): +40: 120 mins: Winter	80.00	79.00	79.87	0.87	5.4	0.551	0.000	5.5	15.481	Flood Risk
Manhole (4)	FSR: 100 years: Increase Rainfall (%): +40: 120 mins: Winter	80.30	78.40	79.86	1.46	2.3	1.656	0.000	1.1	11.428	Surcharged
Manhole (5)	FSR: 100 years: Increase Rainfall (%): +40: 60 mins: Winter	80.30	78.35	78.37	0.02	1.1	0.013	0.000	1.1	5.931	OK
Manhole (6)	FSR: 100 years: Increase Rainfall (%): +40: 15 mins: Summer	80.23	77.90	78.00	0.10	0.7	0.000	0.000	0.7	0.962	OK

Project:	Date: 06/12/2022			
	Designed by: J.Kusz	Checked by:	Approved By:	
Report Details: Type: Stormwater Controls Summary Phase: Phase	Company Address:			



Critical Storm

Stormwater Control	Storm Event	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Tank	FSR: 100 years: Increase Rainfall (%): +40: 120 mins: Winter	79.87	1.37	5.5	6.756	0.000	0.000	2.3	11.912	6	OK

Project:	Date: 06/12/2022		
	Designed by: J.Kusz	Checked by:	Approved By:
Report Details: Type: Connections Summary Phase: Phase	Company Address:		



Critical Storm

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
Pipe (2)	FSR: 100 years: Increase Rainfall (%): +40: 15 mins: Winter	Pipe	Manhole (2)	Manhole (3)	80.0	79.49	0.10	5.968	1.5	1.33	11.8	Surcharged
Pipe (3)	FSR: 100 years: Increase Rainfall (%): +40: 15 mins: Winter	Pipe	Manhole (3)	Tank	80.0	79.18	0.10	7.280	1.8	1.01	14.3	Surcharged
Pipe (4)	FSR: 100 years: Increase Rainfall (%): +40: 30 mins: Winter	Pipe	Tank	Manhole (4)	80.3	79.47	0.10	3.584	0.7	0.35	3.5	Surcharged
Pipe (5)	FSR: 100 years: Increase Rainfall (%): +40: 60 mins: Winter	Pipe	Manhole (4)	Manhole (5)	80.3	79.77	0.02	5.950	0.9	0.1	1.1	Surcharged
Pipe (6)	FSR: 100 years: Increase Rainfall (%): +40: 60 mins: Winter	Pipe	Manhole (5)	Manhole (6)	80.3	78.37	0.06	5.931	0.2	0.1	1.1	OK

Project:	Date: 06/12/2022		
	Designed by: J.Kusz	Checked by:	Approved By:
Report Details: Type: Junctions Summary Phase: Phase (1)	Company Address:		




Critical Storm

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
Manhole	FSR: 100 years: Increase Rainfall (%): +40: 120 mins: Winter	80.45	79.45	79.71	0.26	1.0	0.164	0.000	1.0	2.804	Surcharged
Manhole (1)	FSR: 100 years: Increase Rainfall (%): +40: 120 mins: Winter	79.83	79.39	79.71	0.32	1.2	0.361	0.000	1.2	3.400	Flood Risk
Manhole (2)	FSR: 100 years: Increase Rainfall (%): +40: 120 mins: Winter	80.00	79.15	79.71	0.56	4.4	0.356	0.000	4.4	12.674	Flood Risk
Manhole (3)	FSR: 100 years: Increase Rainfall (%): +40: 120 mins: Winter	80.00	79.00	79.71	0.71	5.4	0.450	0.000	5.4	15.474	Flood Risk
Manhole (4)	FSR: 100 years: Increase Rainfall (%): +40: 120 mins: Winter	80.30	78.40	79.71	1.31	2.4	1.476	0.000	1.1	11.403	Surcharged
Manhole (5)	FSR: 100 years: Increase Rainfall (%): +40: 60 mins: Winter	80.30	78.35	78.36	0.01	1.1	0.009	0.000	1.1	5.902	OK
Manhole (6)	FSR: 100 years: Increase Rainfall (%): +40: 15 mins: Summer	80.23	77.90	78.00	0.10	0.7	0.000	0.000	0.7	0.968	OK

Project:	Date: 06/12/2022		
	Designed by: J.Kusz	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Summary Phase: Phase (1)	Company Address:		




Critical Storm

Stormwater Control	Storm Event	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Tank	FSR: 100 years: Increase Rainfall (%): +40: 120 mins: Winter	79.71	1.21	5.4	6.599	0.000	0.000	2.4	11.881	8	OK

Project:	Date: 06/12/2022		
	Designed by: J.Kusz	Checked by:	Approved By:
Report Details: Type: Connections Summary Phase: Phase (1)	Company Address:		



Critical Storm

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
Pipe	FSR: 100 years: Increase Rainfall (%): +40: 15 mins: Winter	Pipe	Manhole	Manhole (3)	80.5	79.48	0.04	1.318	0.9	0.25	2.8	OK
Pipe (1)	FSR: 100 years: Increase Rainfall (%): +40: 15 mins: Winter	Pipe	Manhole (1)	Manhole (2)	79.8	79.46	0.10	1.598	0.5	0.31	3.4	OK
Pipe (2)	FSR: 100 years: Increase Rainfall (%): +40: 15 mins: Winter	Pipe	Manhole (2)	Manhole (3)	80.0	79.44	0.10	5.966	1.6	1.25	11.5	Surcharged
Pipe (3)	FSR: 100 years: Increase Rainfall (%): +40: 15 mins: Winter	Pipe	Manhole (3)	Tank	80.0	79.05	0.10	7.277	2.8	0.52	14.2	OK
Pipe (4)	FSR: 100 years: Increase Rainfall (%): +40: 30 mins: Winter	Pipe	Tank	Manhole (4)	80.3	79.44	0.10	3.558	0.8	0.25	3.3	Surcharged
Pipe (5)	FSR: 100 years: Increase Rainfall (%): +40: 60 mins: Winter	Pipe	Manhole (4)	Manhole (5)	80.3	79.64	0.02	5.915	1.1	0.1	1.1	Surcharged
Pipe (6)	FSR: 100 years: Increase Rainfall (%): +40: 60 mins: Winter	Pipe	Manhole (5)	Manhole (6)	80.3	78.36	0.06	5.902	0.2	0.05	1.1	OK