L. A. C. E.

L A CONSULTING ENGINEERS LTD

Sherborne Street
Manchester
M8 8LR

Drainage Calculations
Document No: LACE 25-075-CAL001

June 2025

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Registered In England : Number 13294304

	Project			Job Ref.	
L. A. C. E. L A CONSULTING ENGINEERS LTD	Sherborne Street			LACE 25-075	
	Section			Sheet no./rev.	
	Drainage Calculations			i	
	Calc. by	Date	Chk'd by	Date	App'd by	Date
	KA	June 2025	LAA	June 2025		

General Notes

- All setting out and finishes to architect's details.
- The existing site has been previously developed, and the existing slab remains.
- It is proposed to erect twenty single storey units and an amenity block on the existing site.
- The proposed foul water and surface water drainage is to discharge into the existing public combined sewer system in Sherborne Street, as per existing.
- The levels for the existing combined public sewer in Sherborne Street are taken from the United Utilities Asset plans ref: 656005-07-06-2025-10-58-45.
- Proposed levels are to be confirmed prior to the works commencing on site.
- The systems are to be designed as Private with pipe cover of 600mm in footpaths/grassed areas and 900mm in roads.

Design Codes

The Wallingford Procedure - Design and Analysis of Urban Drainage. Volume 1 Principles, Methods and Practice. Volume 4 - Modified Rational Method.
BS EN 12056-2:2000 Gravity drainage systems inside buildings – Part 2: Sanitary pipework, layout and calculation

Design Information

- 2444 SK104 D
- SK104 D
- 135974_FO_2023-SUSTAINABLE_DRAINAGE_STRATEGY-2162582
- 656005-07-06-2025-10-58-45

Cover Sheet

S1 – S16	Surface Water Drainage Design
F1 – F7	Foul Water Drainage Design

Drawings

LACE 25-075-500	Proposed Drainage GA
LACE 25-075-501	Drainage Details

L. A. C. E. L A CONSULTING ENGINEERS LTD	Project: Sherborne Street				Job Ref.: LACE 25-075	
	Section: Drainage Calculations				Sheet no./rev.: S6	
	Calc. by: KA	Date: June 2025	Chk'd by: LAA	Date: June 2025	App'd by:	Date:

Surface Water Drainage Design

Based on the information available, the proposed development surface water drainage should be discharged into the existing combined public sewer system in Sherborne Street with the flows limited to 5.0 l/s.

The drainage system is to be designed as a gravity system designed for 1 in 100 year rainfall event based on the following:
M5-60 = 18.0 mm
Ratio R = 0.35
i = 89 mm/hr
Climate change allowance = 40 %

The drainage system is designed to not be surcharged for 1 in 30 year event and no internal property flooding for a 1 in 100 year event plus 40% allowance for climate change.

Below Ground Attenuation

For a 1 in 100 year event plus 40% allowance for climate change 106 m^3 of below ground storage is required (see page S5), this will be provided using a cellular storage tank and spare capacity within the system.

Wavin AquaCell Core R units or similar are proposed, 15 m x 10 m x 0.8 m (2 units) deep, this provides 114 m^3 of storage (see page S6).

Surface Water Attenuation for 1 Year Rainfall Return Period

L. A. C. E.
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Project Title: Sherborne Street, Manchester				Sheet: S2
LACE 25-075	Prepared By: KA	Date: 06/2025	Checked By: LAA	Date: 06/2025

DESIGN DATA	
Site location =	Manchester
M5-60 rainfall ratio (mm) =	18
60min rainfall ratio to 2 day rainfalls of 5 year return period, r =	0.35
Impemeable area (m²) =	2326
Total site area (m²) =	
Proposed discharge rate (l/s) =	5
Allowance for Climate Change (%) =	40

CALCULATIONS RESULTS	
Required storage volume (m³) =	20

DETAILED CALCULATIONS

Duration, D	15	30	60	120	240	360	600	1440	2880
Z1	0.64	0.79	1.00	1.20	1.44	1.63	1.85	2.35	2.81
M5-D	11.5	14.2	18.0	21.6	25.9	29.3	33.3	42.3	50.6
Z2	0.613	0.618	0.632	0.646	0.664	0.677	0.687	0.705	0.721
M1-D	7.06	8.79	11.38	13.96	17.20	19.87	22.86	29.80	36.46
i (mm/hr)	28.25	17.59	11.38	6.98	4.30	3.31	2.29	1.24	0.76
i + Climate Change %	39.55	24.62	15.93	9.77	6.02	4.64	3.20	1.74	1.06
Area (m²)	2326	2326	2326	2326	2326	2326	2326	2326	2326
Qp (l/s)	25.57	15.92	10.30	6.32	3.89	3.00	2.07	1.12	0.69
Qe (l/s)	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Balancing Q	20.57	10.92	5.30	1.32	-1.11	-2.00	-2.93	-3.88	-4.31
Storage volume (m³)	18.52	19.66	19.07	9.50	-15.94	-43.23	-105.49	-334.87	-745.16

DESIGN NOTES

1. Surface water storage design is in accordance with the Wallingford Procedure - Design and Analysis of Urban Drainage. Volume 1 Principles, Methods and Practice. Volume 4 - Modified Rational Method.

Surface Water Attenuation for 2 Year Rainfall Return Period

L. A. C. E.
L A CONSULTING ENGINEERS LTD

Project Title: Sherborne Street, Manchester				Sheet: S3
LACE 25-075	Prepared By: KA	Date: 06/2025	Checked By: LAA	Date: 06/2025

DESIGN DATA	
Site location =	Manchester
M5-60 rainfall ratio (mm) =	18
60min rainfall ratio to 2 day rainfalls of 5 year return period, r =	0.35
Impemeable area (m²) =	2326
Total site area (m²) =	
Proposed discharge rate (l/s) =	5
Allowance for Climate Change (%) =	40

CALCULATIONS RESULTS	
Required storage volume (m³) =	29

DETAILED CALCULATIONS

Duration, D	15	30	60	120	240	360	600	1440	2880
Z1	0.64	0.79	1.00	1.20	1.44	1.63	1.85	2.35	2.81
M5-D	11.5	14.2	18.0	21.6	25.9	29.3	33.3	42.3	50.6
Z2	0.793	0.798	0.806	0.813	0.822	0.829	0.833	0.842	0.850
M1-D	9.14	11.35	14.51	17.57	21.30	24.31	27.75	35.63	43.02
i (mm/hr)	36.54	22.71	14.51	8.78	5.33	4.05	2.77	1.48	0.90
i + Climate Change %	51.16	31.79	20.31	12.30	7.46	5.67	3.88	2.08	1.25
Area (m²)	2326	2326	2326	2326	2326	2326	2326	2326	2326
Qp (l/s)	33.08	20.56	13.13	7.95	4.82	3.67	2.51	1.34	0.81
Qe (l/s)	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Balancing Q	28.08	15.56	8.13	2.95	-0.18	-1.33	-2.49	-3.66	-4.19
Storage volume (m³)	25.27	28.00	29.28	21.24	-2.58	-28.76	-89.57	-315.88	-723.81

DESIGN NOTES

1. Surface water storage design is in accordance with the Wallingford Procedure - Design and Analysis of Urban Drainage. Volume 1 Principles, Methods and Practice. Volume 4 - Modified Rational Method.

Surface Water Attenuation for 30 Year Rainfall Return Period

L. A. C. E.
L A CONSULTING ENGINEERS LTD

Project Title: Sherborne Street, Manchester				Sheet: S4
LACE 25-075	Prepared By: KA	Date: 06/2025	Checked By: LAA	Date: 06/2025

SURFACE WATER ATTENUATION FOR 30 YEAR RAINFALL RETURN PERIOD

DESIGN DATA	
Site location =	Manchester
M5-60 rainfall ratio (mm) =	18
60min rainfall ratio to 2 day rainfalls of 5 year return period, r =	0.35
Impemeable area (m²) =	2326
Total site area (m²) =	
Proposed discharge rate (l/s) =	5
Allowance for Climate Change (%) =	40

CALCULATIONS RESULTS	
Required storage volume (m³) =	72

DETAILED CALCULATIONS

Duration, D	15	30	60	120	240	360	600	1440	2880
Z1	0.64	0.79	1.00	1.20	1.44	1.63	1.85	2.35	2.81
M5-D	11.5	14.2	18.0	21.6	25.9	29.3	33.3	42.3	50.6
Z2	1.501	1.521	1.537	1.540	1.530	1.516	1.498	1.456	1.418
M30-D	17.29	21.63	27.66	33.27	39.65	44.48	49.88	61.59	71.73
i (mm/hr)	69.17	43.26	27.66	16.63	9.91	7.41	4.99	2.57	1.49
i + Climate Change %	96.84	60.56	38.72	23.29	13.88	10.38	6.98	3.59	2.09
Area (m²)	2326	2326	2326	2326	2326	2326	2326	2326	2326
Qp (l/s)	62.62	39.16	25.04	15.06	8.97	6.71	4.52	2.32	1.35
Qe (l/s)	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Balancing Q	57.62	34.16	20.04	10.06	3.97	1.71	-0.48	-2.68	-3.65
Storage volume (m³)	51.86	61.49	72.14	72.42	57.22	36.96	-17.44	-231.29	-630.22

DESIGN NOTES

1. Surface water storage design is in accordance with the Wallingford Procedure - Design and Analysis of Urban Drainage. Volume 1 Principles, Methods and Practice. Volume 4 - Modified Rational Method.

Surface Water Attenuation for 100 Year Rainfall Return Period

L. A. C. E.
L A CONSULTING ENGINEERS LTD

Project Title: Sherborne Street, Manchester				Sheet: S5
LACE 25-075	Prepared By: KA	Date: 06/2025	Checked By: LAA	Date: 06/2025

SURFACE WATER ATTENUATION FOR 100 YEAR RAINFALL RETURN PERIOD

DESIGN DATA	
Site location =	Manchester
M5-60 rainfall ratio (mm) =	18
60min rainfall ratio to 2 day rainfalls of 5 year return period, r =	0.35
Impemeable area (m²) =	2326
Total site area (m²) =	
Proposed discharge rate (l/s) =	5
Allowance for Climate Change (%) =	40

CALCULATIONS RESULTS	
Required storage volume (m³) =	106
Rainfall intensity (mm/hr) =	125

DETAILED CALCULATIONS

Duration, D	15	30	60	120	240	360	600	1440	2880
Z1	0.64	0.79	1.00	1.20	1.44	1.63	1.85	2.35	2.81
M5-D	11.5	14.2	18.0	21.6	25.9	29.3	33.3	42.3	50.6
Z2	1.934	1.978	2.014	2.024	2.003	1.975	1.944	1.872	1.806
M100-D	22.28	28.12	36.25	43.71	51.91	57.95	64.72	79.17	91.35
i (mm/hr)	89.13	56.24	36.25	21.85	12.98	9.66	6.47	3.30	1.90
i + Climate Change %	124.79	78.74	50.75	30.60	18.17	13.52	9.06	4.62	2.66
Area (m²)	2326	2326	2326	2326	2326	2326	2326	2326	2326
Qp (l/s)	80.69	50.91	32.82	19.78	11.75	8.74	5.86	2.99	1.72
Qe (l/s)	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Balancing Q	75.69	45.91	27.82	14.78	6.75	3.74	0.86	-2.01	-3.28
Storage volume (m³)	68.12	82.64	100.15	106.45	97.17	80.87	30.93	-173.99	-566.29

DESIGN NOTES

1. Surface water storage design is in accordance with the Wallingford Procedure - Design and Analysis of Urban Drainage. Volume 1 Principles, Methods and Practice. Volume 4 - Modified Rational Method.

Wavin Stormwater Management

Project Details

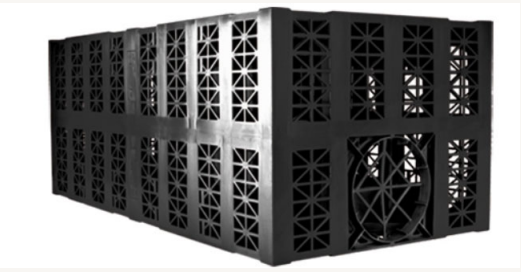
Project Name	LACE 25-075 Sherborne Street	**Produced By**	Katie Abbott
Client Name			
Site Address	Sherborne Street, Manchester, M8 8LR	**Date**	09/06/2025

Modular Units and Tank Details - LACE 25-075

Length	15m	15 units	**Void**	95%	
Width	10m	20 units	**Cover Depth**	1.0m	
Depth	0.8m	2 units	**Installation Depth**	1.8m	
Total Number of Units		**600 units**			

Recommended Unit

Wavin recommend using the following unit for your installation.



AquaCell Core R

Product Number: 6LB150
AquaCell Core R has been designed for use in deep applications, subject to both regular and heavy traffic loadings, such as cars and HGV's (for vehicles up to 44 tonnes).

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	89.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	18.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.350	Preferred Cover Depth (m)	0.600
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Add Inflow (l/s)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S1	0.009	5.00		54.135	450	31.800	27.681	0.750
S2	0.004	5.00		54.135	450	46.941	22.578	1.016
S3	0.019	5.00		54.135	450	43.413	12.110	1.200
S4	0.009	5.00		54.135	600	7.322	35.714	0.825
S5	0.004	5.00		54.135	600	-6.749	40.456	1.072
S6	0.058	5.00		54.135	600	-10.212	30.182	1.253
S7				54.135	600	21.220	19.589	1.816
S8	0.004	5.00		54.135	450	34.867	-13.249	0.750
S9	0.019	5.00		54.135	450	38.014	-3.909	0.914
S10	0.009	5.00		54.135	450	11.627	-6.618	0.750
S11	0.009	5.00		54.135	450	-5.051	-0.998	1.043
S12	0.004	5.00		54.135	450	-19.121	3.744	1.290
S13	0.058	5.00		54.135	600	-15.610	14.163	1.548
S14				54.135	600	15.821	3.570	1.744
S15				54.135	1200	-10.643	20.184	2.956
Tank In 1				54.100		20.125	16.341	2.377
Tank In 2				54.100		16.931	6.865	2.377
Tank Out		5.00		54.100		4.821	14.972	2.377
C1			35.2	54.100	1200	-11.989	22.103	2.999
EXG 1				53.700		-21.548	21.631	4.754

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
4.000	S1	S2	15.978	0.600	53.385	53.119	0.266	60.0	150	5.20	89.0
4.001	S2	S3	11.047	0.600	53.119	52.935	0.184	60.0	150	5.35	89.0
4.002	S3	S7	23.419	0.600	52.935	52.394	0.541	43.3	150	5.60	89.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
4.000	1.301	23.0	2.2	0.600	0.866	0.009	0.0	31	0.823
4.001	1.301	23.0	3.1	0.866	1.050	0.013	0.0	37	0.910
4.002	1.533	27.1	7.7	1.050	1.591	0.032	0.0	55	1.325

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Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
3.000	S4	S5	14.849	0.600	53.310	53.063	0.247	60.0	225	5.15	89.0
3.001	S5	S6	10.842	0.600	53.063	52.882	0.181	60.0	225	5.25	89.0
3.002	S6	S7	33.169	0.600	52.882	52.319	0.563	58.9	225	5.58	89.0
3.003	S7	Tank In 1	3.428	0.600	52.319	52.298	0.021	163.2	225	5.66	89.0
2.000	S8	S9	9.856	0.600	53.385	53.221	0.164	60.0	150	5.13	89.0
2.001	S9	S14	23.419	0.600	53.221	52.466	0.755	31.0	150	5.34	89.0
1.000	S10	S11	17.599	0.600	53.385	53.092	0.293	60.0	150	5.23	89.0
1.001	S11	S12	14.848	0.600	53.092	52.845	0.247	60.0	150	5.42	89.0
1.002	S12	S13	10.995	0.600	52.845	52.662	0.183	60.0	150	5.56	89.0
1.003	S13	S14	33.168	0.600	52.587	52.391	0.196	169.2	225	6.11	89.0
1.004	S14	Tank In 2	3.477	0.600	52.391	52.298	0.093	37.4	225	6.14	89.0
5.000	Tank Out	S15	16.319	0.600	51.723	51.179	0.544	30.0	150	5.15	89.0
5.001	S15	C1	2.344	0.600	51.179	51.101	0.078	30.0	150	5.17	89.0
5.002	C1	EXG 1	9.571	0.600	51.101	48.946	2.155	4.4	150	5.20	89.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
3.000	1.691	67.2	2.2	0.600	0.847	0.009	0.0	28	0.781
3.001	1.691	67.2	3.1	0.847	1.028	0.013	0.0	33	0.871
3.002	1.707	67.9	17.1	1.028	1.591	0.071	0.0	77	1.429
3.003	1.020	40.6	24.8	1.591	1.577	0.103	0.0	127	1.069
2.000	1.301	23.0	1.0	0.600	0.764	0.004	0.0	21	0.639
2.001	1.814	32.1	5.5	0.764	1.519	0.023	0.0	42	1.359
1.000	1.301	23.0	2.2	0.600	0.893	0.009	0.0	31	0.823
1.001	1.301	23.0	4.3	0.893	1.140	0.018	0.0	44	1.003
1.002	1.301	23.0	5.3	1.140	1.323	0.022	0.0	49	1.059
1.003	1.002	39.8	19.3	1.323	1.519	0.080	0.0	110	0.994
1.004	2.146	85.3	24.8	1.519	1.577	0.103	0.0	83	1.868
5.000	1.845	32.6	0.0	2.227	2.806	0.000	0.0	0	0.000
5.001	1.845	32.6	0.0	2.806	2.849	0.000	0.0	0	0.000
5.002	4.815	85.1	35.2	2.849	4.604	0.000	35.2	67	4.588

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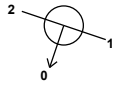
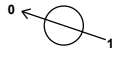
Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
4.000	15.978	60.0	150	Circular	54.135	53.385	0.600	54.135	53.119	0.866
4.001	11.047	60.0	150	Circular	54.135	53.119	0.866	54.135	52.935	1.050
4.002	23.419	43.3	150	Circular	54.135	52.935	1.050	54.135	52.394	1.591
3.000	14.849	60.0	225	Circular	54.135	53.310	0.600	54.135	53.063	0.847
3.001	10.842	60.0	225	Circular	54.135	53.063	0.847	54.135	52.882	1.028
3.002	33.169	58.9	225	Circular	54.135	52.882	1.028	54.135	52.319	1.591
3.003	3.428	163.2	225	Circular	54.135	52.319	1.591	54.100	52.298	1.577
2.000	9.856	60.0	150	Circular	54.135	53.385	0.600	54.135	53.221	0.764
2.001	23.419	31.0	150	Circular	54.135	53.221	0.764	54.135	52.466	1.519
1.000	17.599	60.0	150	Circular	54.135	53.385	0.600	54.135	53.092	0.893
1.001	14.848	60.0	150	Circular	54.135	53.092	0.893	54.135	52.845	1.140
1.002	10.995	60.0	150	Circular	54.135	52.845	1.140	54.135	52.662	1.323
1.003	33.168	169.2	225	Circular	54.135	52.587	1.323	54.135	52.391	1.519
1.004	3.477	37.4	225	Circular	54.135	52.391	1.519	54.100	52.298	1.577
5.000	16.319	30.0	150	Circular	54.100	51.723	2.227	54.135	51.179	2.806
5.001	2.344	30.0	150	Circular	54.135	51.179	2.806	54.100	51.101	2.849
5.002	9.571	4.4	150	Circular	54.100	51.101	2.849	53.700	48.946	4.604

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
4.000	S1	450	Manhole	Plastic	S2	450	Manhole	Plastic
4.001	S2	450	Manhole	Plastic	S3	450	Manhole	Plastic
4.002	S3	450	Manhole	Plastic	S7	600	Manhole	Plastic
3.000	S4	600	Manhole	Plastic	S5	600	Manhole	Plastic
3.001	S5	600	Manhole	Plastic	S6	600	Manhole	Plastic
3.002	S6	600	Manhole	Plastic	S7	600	Manhole	Plastic
3.003	S7	600	Manhole	Plastic	Tank In 1		Junction	
2.000	S8	450	Manhole	Plastic	S9	450	Manhole	Plastic
2.001	S9	450	Manhole	Plastic	S14	600	Manhole	Plastic
1.000	S10	450	Manhole	Plastic	S11	450	Manhole	Plastic
1.001	S11	450	Manhole	Plastic	S12	450	Manhole	Plastic
1.002	S12	450	Manhole	Plastic	S13	600	Manhole	Plastic
1.003	S13	600	Manhole	Plastic	S14	600	Manhole	Plastic
1.004	S14	600	Manhole	Plastic	Tank In 2		Junction	
5.000	Tank Out		Junction		S15	1200	Manhole	Concrete
5.001	S15	1200	Manhole	Concrete	C1	1200	Manhole	Concrete
5.002	C1	1200	Manhole	Concrete	EXG 1		Junction	

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S1	31.800	27.681	54.135	0.750	450				
						0	4.000	53.385	150
S2	46.941	22.578	54.135	1.016	450	1	4.000	53.119	150
									
						0	4.001	53.119	150
S3	43.413	12.110	54.135	1.200	450	 1	4.001	52.935	150
						0	4.002	52.935	150
S4	7.322	35.714	54.135	0.825	600				
						0	3.000	53.310	225
S5	-6.749	40.456	54.135	1.072	600	1	3.000	53.063	225
									
						0	3.001	53.063	225
S6	-10.212	30.182	54.135	1.253	600	 1	3.001	52.882	225
						0	3.002	52.882	225
S7	21.220	19.589	54.135	1.816	600	1	4.002	52.394	150
						2	3.002	52.319	225
									
						0	3.003	52.319	225
S8	34.867	-13.249	54.135	0.750	450				
						0	2.000	53.385	150
S9	38.014	-3.909	54.135	0.914	450	1	2.000	53.221	150
									
						0	2.001	53.221	150
S10	11.627	-6.618	54.135	0.750	450				
						0	1.000	53.385	150
S11	-5.051	-0.998	54.135	1.043	450	1	1.000	53.092	150
									
						0	1.001	53.092	150
S12	-19.121	3.744	54.135	1.290	450	 1	1.001	52.845	150
						0	1.002	52.845	150
S13	-15.610	14.163	54.135	1.548	600	1	1.002	52.662	150
									
						0	1.003	52.587	225

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S14	15.821	3.570	54.135	1.744	600	1	2.001	52.466	150
						2	1.003	52.391	225
						0	1.004	52.391	225
S15	-10.643	20.184	54.135	2.956	1200	1	5.000	51.179	150
						0	5.001	51.179	150
Tank In 1	20.125	16.341	54.100	2.377		1	3.003	52.298	225
Tank In 2	16.931	6.865	54.100	2.377		1	1.004	52.298	225
Tank Out	4.821	14.972	54.100	2.377		0	5.000	51.723	150
C1	-11.989	22.103	54.100	2.999	1200	1	5.001	51.101	150
						0	5.002	51.101	150
EXG 1	-21.548	21.631	53.700	4.754		1	5.002	48.946	150

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Detailed
Rainfall Events	Singular	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	18.000	Additional Storage (m³/ha)	20.0
Ratio-R	0.350	Starting Level (m)	
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
2	0	0	0
30	40	0	0
100	40	0	0

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Node S15 Online Hydro-Brake® Control

Flap Valve	x	Objective	(CL) Minimise blockage risk
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	51.179	Product Number	CTL-SCL-0100-5000-1000-5000
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	5.0	Min Node Diameter (mm)	1200

Node Tank Out Tank Storage Structure

Invert Level (m)	51.723	Time to half empty (mins)	78	Analyse flow through structure	x

Inlets

Tank In 1		Tank In 2	
Depth (m)	**Area (m²)**	**Depth (m)**	**Area (m²)**
0.000	150.0	0.800	150.0

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Results for 1 year Critical Storm Duration. Lowest mass balance: 99.99%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1	10	53.407	0.022	1.1	0.0088	0.0000	OK
15 minute winter	S2	10	53.145	0.026	1.6	0.0063	0.0000	OK
15 minute winter	S3	11	52.974	0.039	3.8	0.0183	0.0000	OK
15 minute winter	S4	10	53.330	0.020	1.1	0.0100	0.0000	OK
15 minute winter	S5	10	53.087	0.024	1.6	0.0084	0.0000	OK
15 minute winter	S6	10	52.935	0.053	8.5	0.0643	0.0000	OK
15 minute winter	S7	11	52.408	0.089	12.1	0.0252	0.0000	OK
15 minute winter	S8	11	53.400	0.015	0.5	0.0041	0.0000	OK
15 minute winter	S9	10	53.251	0.030	2.8	0.0173	0.0000	OK
15 minute winter	S10	10	53.407	0.022	1.1	0.0088	0.0000	OK
15 minute winter	S11	10	53.123	0.031	2.2	0.0102	0.0000	OK
15 minute winter	S12	11	52.880	0.035	2.6	0.0078	0.0000	OK
15 minute winter	S13	10	52.664	0.077	9.6	0.0796	0.0000	OK
15 minute winter	S14	11	52.453	0.062	12.1	0.0174	0.0000	OK
30 minute winter	S15	23	51.798	0.619	9.3	0.7006	0.0000	SURCHARGED
60 minute winter	Tank In 1	48	51.798	0.075	6.8	0.0000	0.0000	OK
60 minute winter	Tank In 2	48	51.798	0.075	6.8	0.0000	0.0000	OK
60 minute winter	Tank Out	48	51.794	0.071	9.7	10.6895	0.0000	OK
60 minute summer	C1	35	51.177	0.076	40.2	0.0862	0.0000	OK
60 minute summer	EXG 1	35	49.018	0.072	40.2	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S1	4.000	S2	1.1	0.584	0.047	0.0295	
15 minute winter	S2	4.001	S3	1.6	0.554	0.068	0.0312	
15 minute winter	S3	4.002	S7	3.8	1.074	0.140	0.0828	
15 minute winter	S4	3.000	S5	1.1	0.552	0.016	0.0290	
15 minute winter	S5	3.001	S6	1.5	0.348	0.023	0.0507	
15 minute winter	S6	3.002	S7	8.4	0.789	0.124	0.3595	
15 minute winter	S7	3.003	Tank In 1	12.2	0.869	0.300	0.0481	
15 minute winter	S8	2.000	S9	0.5	0.299	0.022	0.0171	
15 minute winter	S9	2.001	S14	2.8	1.103	0.086	0.0584	
15 minute winter	S10	1.000	S11	1.1	0.516	0.047	0.0370	
15 minute winter	S11	1.001	S12	2.1	0.745	0.092	0.0423	
15 minute winter	S12	1.002	S13	2.6	0.851	0.114	0.0338	
15 minute winter	S13	1.003	S14	9.4	0.908	0.235	0.3436	
15 minute winter	S14	1.004	Tank In 2	12.2	1.458	0.143	0.0291	
30 minute winter	S15	5.001	C1	5.0	0.730	0.153	0.0161	
60 minute winter	Tank Out	5.000	S15	8.3	0.611	0.255	0.2106	
60 minute summer	C1	5.002	EXG 1	40.2	4.631	0.473	0.0831	649.5

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Results for 2 year Critical Storm Duration. Lowest mass balance: 99.99%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1	10	53.410	0.025	1.4	0.0100	0.0000	OK
15 minute winter	S2	10	53.149	0.030	2.0	0.0070	0.0000	OK
15 minute winter	S3	10	52.979	0.044	5.0	0.0209	0.0000	OK
15 minute winter	S4	10	53.332	0.022	1.4	0.0112	0.0000	OK
15 minute winter	S5	10	53.089	0.026	2.0	0.0094	0.0000	OK
15 minute winter	S6	10	52.943	0.061	11.0	0.0732	0.0000	OK
15 minute winter	S7	11	52.421	0.102	15.7	0.0290	0.0000	OK
15 minute summer	S8	11	53.402	0.017	0.6	0.0045	0.0000	OK
15 minute winter	S9	10	53.255	0.034	3.6	0.0196	0.0000	OK
15 minute winter	S10	10	53.410	0.025	1.4	0.0100	0.0000	OK
15 minute winter	S11	10	53.127	0.035	2.8	0.0116	0.0000	OK
15 minute winter	S12	11	52.885	0.040	3.3	0.0088	0.0000	OK
15 minute winter	S13	10	52.676	0.088	12.3	0.0913	0.0000	OK
15 minute winter	S14	11	52.462	0.071	15.6	0.0200	0.0000	OK
60 minute winter	S15	51	51.817	0.638	9.1	0.7212	0.0000	SURCHARGED
60 minute winter	Tank In 1	50	51.827	0.104	8.4	0.0000	0.0000	OK
60 minute winter	Tank In 2	50	51.827	0.104	8.4	0.0000	0.0000	OK
60 minute winter	Tank Out	51	51.823	0.100	11.5	14.8741	0.0000	OK
60 minute summer	C1	33	51.177	0.076	40.2	0.0862	0.0000	OK
60 minute summer	EXG 1	33	49.018	0.072	40.2	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S1	4.000	S2	1.4	0.632	0.060	0.0349	
15 minute winter	S2	4.001	S3	2.0	0.587	0.085	0.0371	
15 minute winter	S3	4.002	S7	4.8	1.150	0.178	0.0986	
15 minute winter	S4	3.000	S5	1.4	0.600	0.021	0.0342	
15 minute winter	S5	3.001	S6	2.0	0.367	0.029	0.0605	
15 minute winter	S6	3.002	S7	10.8	0.844	0.160	0.4314	
15 minute winter	S7	3.003	Tank In 1	15.6	0.928	0.385	0.0578	
15 minute summer	S8	2.000	S9	0.6	0.315	0.026	0.0196	
15 minute winter	S9	2.001	S14	3.5	1.184	0.110	0.0697	
15 minute winter	S10	1.000	S11	1.4	0.552	0.060	0.0443	
15 minute winter	S11	1.001	S12	2.7	0.799	0.118	0.0506	
15 minute winter	S12	1.002	S13	3.3	0.908	0.144	0.0401	
15 minute winter	S13	1.003	S14	12.1	0.969	0.304	0.4150	
15 minute winter	S14	1.004	Tank In 2	15.6	1.557	0.183	0.0350	
60 minute winter	S15	5.001	C1	5.0	0.732	0.153	0.0161	
60 minute winter	Tank Out	5.000	S15	9.1	0.658	0.278	0.2450	
60 minute summer	C1	5.002	EXG 1	40.2	4.631	0.473	0.0831	654.3

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Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 99.99%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1	10	53.426	0.041	3.7	0.0162	0.0000	OK
15 minute winter	S2	10	53.168	0.049	5.4	0.0117	0.0000	OK
15 minute winter	S3	10	53.008	0.073	13.2	0.0349	0.0000	OK
15 minute winter	S4	10	53.346	0.036	3.7	0.0178	0.0000	OK
15 minute winter	S5	10	53.106	0.043	5.4	0.0152	0.0000	OK
15 minute winter	S6	10	52.984	0.102	29.3	0.1232	0.0000	OK
15 minute winter	S7	11	52.510	0.191	42.0	0.0541	0.0000	OK
15 minute winter	S8	10	53.413	0.028	1.7	0.0073	0.0000	OK
15 minute winter	S9	10	53.278	0.057	9.6	0.0330	0.0000	OK
15 minute winter	S10	10	53.426	0.041	3.7	0.0162	0.0000	OK
15 minute winter	S11	10	53.151	0.059	7.4	0.0197	0.0000	OK
15 minute winter	S12	10	52.913	0.068	9.0	0.0149	0.0000	OK
15 minute winter	S13	10	52.747	0.160	32.9	0.1655	0.0000	OK
15 minute winter	S14	10	52.516	0.125	41.8	0.0354	0.0000	OK
120 minute winter	S15	116	52.091	0.912	7.3	1.0311	0.0000	SURCHARGED
120 minute winter	Tank In 1	114	52.110	0.387	14.6	0.0000	0.0000	OK
120 minute winter	Tank In 2	114	52.110	0.387	14.6	0.0000	0.0000	OK
120 minute winter	Tank Out	116	52.104	0.381	12.6	55.8218	0.0000	SURCHARGED
15 minute summer	C1	131	51.177	0.076	40.2	0.0862	0.0000	OK
240 minute winter	EXG 1	84	49.018	0.072	40.2	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S1	4.000	S2	3.7	0.832	0.160	0.0706	
15 minute winter	S2	4.001	S3	5.3	0.786	0.231	0.0749	
15 minute winter	S3	4.002	S7	13.1	1.264	0.482	0.2714	
15 minute winter	S4	3.000	S5	3.7	0.798	0.055	0.0685	
15 minute winter	S5	3.001	S6	5.3	0.484	0.079	0.1229	
15 minute winter	S6	3.002	S7	28.9	1.058	0.427	0.8857	
15 minute winter	S7	3.003	Tank In 1	41.4	1.211	1.022	0.1170	
15 minute winter	S8	2.000	S9	1.7	0.412	0.073	0.0414	
15 minute winter	S9	2.001	S14	9.4	1.552	0.294	0.1421	
15 minute winter	S10	1.000	S11	3.7	0.716	0.160	0.0907	
15 minute winter	S11	1.001	S12	7.3	1.029	0.317	0.1052	
15 minute winter	S12	1.002	S13	8.9	1.075	0.387	0.0992	
15 minute winter	S13	1.003	S14	32.4	1.221	0.812	0.8780	
15 minute winter	S14	1.004	Tank In 2	41.5	1.981	0.486	0.0728	
120 minute winter	S15	5.001	C1	5.0	0.731	0.153	0.0161	
120 minute winter	Tank Out	5.000	S15	7.3	0.544	0.224	0.2873	
15 minute summer	C1	5.002	EXG 1	40.2	4.631	0.473	0.0831	571.7

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1	10	53.431	0.046	4.8	0.0185	0.0000	OK
15 minute winter	S2	10	53.176	0.057	6.9	0.0135	0.0000	OK
15 minute winter	S3	10	53.021	0.085	17.0	0.0407	0.0000	OK
15 minute winter	S4	10	53.350	0.040	4.8	0.0203	0.0000	OK
15 minute winter	S5	10	53.111	0.048	6.9	0.0172	0.0000	OK
15 minute winter	S6	10	53.000	0.118	37.8	0.1430	0.0000	OK
15 minute winter	S7	10	52.558	0.239	54.2	0.0676	0.0000	SURCHARGED
15 minute winter	S8	10	53.416	0.031	2.1	0.0081	0.0000	OK
15 minute winter	S9	10	53.286	0.065	12.3	0.0373	0.0000	OK
15 minute winter	S10	10	53.431	0.046	4.8	0.0185	0.0000	OK
15 minute winter	S11	10	53.161	0.069	9.6	0.0229	0.0000	OK
15 minute winter	S12	10	52.924	0.079	11.5	0.0174	0.0000	OK
15 minute winter	S13	10	52.787	0.200	42.5	0.2060	0.0000	OK
15 minute winter	S14	11	52.539	0.148	53.4	0.0419	0.0000	OK
120 minute winter	S15	118	52.250	1.071	7.8	1.2117	0.0000	SURCHARGED
120 minute winter	Tank In 1	118	52.273	0.550	19.0	0.0000	0.0000	OK
120 minute winter	Tank In 2	118	52.273	0.550	19.0	0.0000	0.0000	OK
120 minute winter	Tank Out	118	52.266	0.543	15.7	79.3726	0.0000	SURCHARGED
120 minute winter	C1	118	51.177	0.076	40.3	0.0862	0.0000	OK
120 minute winter	EXG 1	118	49.018	0.072	40.3	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S1	4.000	S2	4.8	0.891	0.207	0.0855	
15 minute winter	S2	4.001	S3	6.8	0.826	0.295	0.0909	
15 minute winter	S3	4.002	S7	16.8	1.289	0.621	0.3276	
15 minute winter	S4	3.000	S5	4.8	0.865	0.071	0.0819	
15 minute winter	S5	3.001	S6	6.8	0.510	0.101	0.1481	
15 minute winter	S6	3.002	S7	37.4	1.119	0.551	1.0101	
15 minute winter	S7	3.003	Tank In 1	53.6	1.369	1.320	0.1299	
15 minute winter	S8	2.000	S9	2.1	0.435	0.091	0.0486	
15 minute winter	S9	2.001	S14	12.2	1.608	0.381	0.1834	
15 minute winter	S10	1.000	S11	4.8	0.763	0.207	0.1102	
15 minute winter	S11	1.001	S12	9.4	1.097	0.410	0.1283	
15 minute winter	S12	1.002	S13	11.5	1.084	0.502	0.1375	
15 minute winter	S13	1.003	S14	41.6	1.264	1.043	1.0766	
15 minute winter	S14	1.004	Tank In 2	53.6	2.096	0.628	0.0888	
120 minute winter	S15	5.001	C1	5.1	0.737	0.155	0.0162	
120 minute winter	Tank Out	5.000	S15	7.8	0.580	0.241	0.2873	
120 minute winter	C1	5.002	EXG 1	40.3	4.632	0.473	0.0832	3401.9

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Foul Water Drainage Design

The drainage system is to be designed as a gravity system collecting foul water from both properties and discharging into the existing combined public sewer system in Sherborne Street.

As the foul water requirements for each unit are still to be confirmed the drainage design has been based a public amenity block and each unit having the following:

1 x WC
1 x Hand Basin
1 x Kitchen Sink
1 x Dishwasher

Foul Water Flows Calculation sheet

L. A. C. E.
L A CONSULTING ENGINEERS LTD

Project Title: Sherbourne Street, Manchester — **Sheet: F1**

Project No: LACE 25-075 — **Prepared By: KA** — **Date: June 2025** — **Checked By: LA** — **Date: June 2025**

Appliance	DU (l/s) System I,II,III,IV	MH Ref and Gulley Ref																					Total
		F1	F2	F3	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	F15	F16	F17	F18	F19	F20	F21	F22	
Wash basin, Bidet	0.5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3		24
Shower without plug	0.6																							0
Shower with plug	1.3																							0
Single urinal with cistern	0.8																							0
Urinal with flushing valve	0.5																							0
Slab urinal (per person)	0.2																							0
Bath	1.3																							0
Kitchen Sink	1.3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3		24
Fridge	0.2																							0
Dishwasher	0.8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3		24
Washing MC up to 6kg	0.8																							0
Washing MC up to 12kg	1.5																							0
WC (4L)	1.8																							0
WC (6L)	2.0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3		24
WC (7.5L)	2.0																							0
Cleaners Sink	1.5																							0
Floor gully	0.2	1										1	1											3
Industrial Fridges (allow)	5.0																							0
Total l/s		4.80	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.80	4.80	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.60	13.80	0.00	111
K Usage Factor		0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	
Pipe flow Qww = K√∑DU		1.53	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.53	1.53	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	2.60	0.00	34.2

Calculations based on BS EN 12056:Part 2

Design Settings

Frequency of use (kDU)	0.70	Minimum Velocity (m/s)	1.00
Flow per dwelling per day (l/day)	0	Connection Type	Level Soffits
Domestic Flow (l/s/ha)	0.0	Minimum Backdrop Height (m)	0.200
Industrial Flow (l/s/ha)	0.0	Preferred Cover Depth (m)	0.600
Additional Flow (%)	100	Include Intermediate Ground	x

Nodes

Name	Area (ha)	Add Inflow (l/s)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
F1	0.001	1.5	54.135	450	38.757	13.254	0.736
F2		1.5	54.135	450	36.898	13.880	0.785
F3		1.5	54.135	450	31.123	15.826	0.987
F4		1.5	54.135	450	30.009	16.202	1.007
F5		1.5	54.135	450	19.573	19.719	1.191
F6		1.5	54.135	450	18.459	20.094	1.211
F7		1.5	54.135	600	8.022	23.612	1.470
F8		1.5	54.135	600	7.003	23.955	1.488
F9		1.5	54.135	600	-3.529	27.504	1.673
F10	0.001	1.5	54.135	600	-5.370	28.125	1.705
F11	0.001	1.5	54.135	450	34.572	-2.263	0.700
F12		1.5	54.135	450	31.772	-1.319	0.774
F13		1.5	54.135	450	25.997	0.627	0.976
F14		1.5	54.135	450	24.883	1.002	0.996
F15		1.5	54.135	450	14.446	4.520	1.180
F16		1.5	54.135	450	13.332	4.895	1.200
F17		1.5	54.135	600	2.895	8.412	1.459
F18		1.5	54.135	600	1.782	8.788	1.479
F19		1.5	54.135	600	-8.655	12.305	1.663
F20		1.5	54.135	600	-10.389	12.889	1.693
F21		2.6	54.135	600	-11.029	15.364	1.736
F22			54.100	1200	-9.087	21.125	1.802

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)
2.000	F1	F2	1.962	1.500	53.399	53.350	0.049	40.0	100
2.001	F2	F3	6.094	1.500	53.350	53.198	0.152	40.0	100
2.002	F3	F4	1.176	1.500	53.148	53.128	0.020	60.0	150
2.003	F4	F5	11.013	1.500	53.128	52.944	0.184	60.0	150
2.004	F5	F6	1.175	1.500	52.944	52.924	0.020	60.0	150
2.005	F6	F7	11.014	1.500	52.924	52.740	0.184	60.0	150

Name	Pro Vel @ 1/3 Q (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Dwellings (ha)	Σ Units (ha)	Σ Add Inflow (ha)	Pro Depth (mm)	Pro Velocity (m/s)
2.000	0.706	1.054	8.3	3.0	0.636	0.685	0.001	0	0.0	1.5	42	0.969
2.001	0.858	1.054	8.3	6.0	0.685	0.837	0.001	0	0.0	3.0	63	1.150
2.002	0.812	1.132	20.0	9.0	0.837	0.857	0.001	0	0.0	4.5	71	1.102
2.003	0.879	1.132	20.0	12.0	0.857	1.041	0.001	0	0.0	6.0	83	1.182
2.004	0.940	1.132	20.0	15.0	1.041	1.061	0.001	0	0.0	7.5	97	1.243
2.005	0.990	1.132	20.0	18.0	1.061	1.245	0.001	0	0.0	9.0	111	1.281

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Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)
2.006	F7	F8	1.075	1.500	52.665	52.647	0.018	59.0	225
2.007	F8	F9	11.114	1.500	52.647	52.462	0.185	60.0	225
2.008	F9	F10	1.943	1.500	52.462	52.430	0.032	60.0	225
2.009	F10	F22	7.926	1.500	52.430	52.298	0.132	60.0	225
1.000	F11	F12	2.955	1.500	53.435	53.361	0.074	40.0	100
1.001	F12	F13	6.094	1.500	53.361	53.209	0.152	40.0	100
1.002	F13	F14	1.175	1.500	53.159	53.139	0.020	60.0	150
1.003	F14	F15	11.014	1.500	53.139	52.955	0.184	60.0	150
1.004	F15	F16	1.175	1.500	52.955	52.935	0.020	60.0	150
1.005	F16	F17	11.014	1.500	52.935	52.751	0.184	60.0	150
1.006	F17	F18	1.175	1.500	52.676	52.656	0.020	59.0	225
1.007	F18	F19	11.014	1.500	52.656	52.472	0.184	60.0	225
1.008	F19	F20	1.830	1.500	52.472	52.442	0.030	60.0	225
1.009	F20	F21	2.556	1.500	52.442	52.399	0.043	60.0	225
1.010	F21	F22	6.080	1.500	52.399	52.298	0.101	60.0	225

Name	Pro Vel @ 1/3 Q (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Dwellings (ha)	Σ Units (ha)	Σ Add Inflow (ha)	Pro Depth (mm)	Pro Velocity (m/s)
2.006	1.003	1.496	59.5	21.0	1.245	1.263	0.001	0	0.0	10.5	93	1.370
2.007	1.034	1.483	59.0	24.0	1.263	1.448	0.001	0	0.0	12.0	100	1.406
2.008	1.071	1.483	59.0	27.0	1.448	1.480	0.001	0	0.0	13.5	107	1.450
2.009	1.106	1.483	59.0	30.0	1.480	1.577	0.002	0	0.0	15.0	114	1.490
1.000	0.706	1.054	8.3	3.0	0.600	0.674	0.001	0	0.0	1.5	42	0.969
1.001	0.858	1.054	8.3	6.0	0.674	0.826	0.001	0	0.0	3.0	63	1.150
1.002	0.812	1.132	20.0	9.0	0.826	0.846	0.001	0	0.0	4.5	71	1.102
1.003	0.879	1.132	20.0	12.0	0.846	1.030	0.001	0	0.0	6.0	83	1.182
1.004	0.940	1.132	20.0	15.0	1.030	1.050	0.001	0	0.0	7.5	97	1.243
1.005	0.990	1.132	20.0	18.0	1.050	1.234	0.001	0	0.0	9.0	111	1.281
1.006	1.003	1.496	59.5	21.0	1.234	1.254	0.001	0	0.0	10.5	93	1.370
1.007	1.034	1.483	59.0	24.0	1.254	1.438	0.001	0	0.0	12.0	100	1.406
1.008	1.071	1.483	59.0	27.0	1.438	1.468	0.001	0	0.0	13.5	107	1.450
1.009	1.106	1.483	59.0	30.0	1.468	1.511	0.001	0	0.0	15.0	114	1.490
1.010	1.157	1.483	59.0	35.2	1.511	1.577	0.001	0	0.0	17.6	125	1.548

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
2.000	1.962	40.0	100	Circular	54.135	53.399	0.636	54.135	53.350	0.685
2.001	6.094	40.0	100	Circular	54.135	53.350	0.685	54.135	53.198	0.837
2.002	1.176	60.0	150	Circular	54.135	53.148	0.837	54.135	53.128	0.857
2.003	11.013	60.0	150	Circular	54.135	53.128	0.857	54.135	52.944	1.041

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
2.000	F1	450	Manhole	Plastic	F2	450	Manhole	Plastic
2.001	F2	450	Manhole	Plastic	F3	450	Manhole	Plastic
2.002	F3	450	Manhole	Plastic	F4	450	Manhole	Plastic
2.003	F4	450	Manhole	Plastic	F5	450	Manhole	Plastic

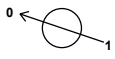
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Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
2.004	1.175	60.0	150	Circular	54.135	52.944	1.041	54.135	52.924	1.061
2.005	11.014	60.0	150	Circular	54.135	52.924	1.061	54.135	52.740	1.245
2.006	1.075	59.0	225	Circular	54.135	52.665	1.245	54.135	52.647	1.263
2.007	11.114	60.0	225	Circular	54.135	52.647	1.263	54.135	52.462	1.448
2.008	1.943	60.0	225	Circular	54.135	52.462	1.448	54.135	52.430	1.480
2.009	7.926	60.0	225	Circular	54.135	52.430	1.480	54.100	52.298	1.577
1.000	2.955	40.0	100	Circular	54.135	53.435	0.600	54.135	53.361	0.674
1.001	6.094	40.0	100	Circular	54.135	53.361	0.674	54.135	53.209	0.826
1.002	1.175	60.0	150	Circular	54.135	53.159	0.826	54.135	53.139	0.846
1.003	11.014	60.0	150	Circular	54.135	53.139	0.846	54.135	52.955	1.030
1.004	1.175	60.0	150	Circular	54.135	52.955	1.030	54.135	52.935	1.050
1.005	11.014	60.0	150	Circular	54.135	52.935	1.050	54.135	52.751	1.234
1.006	1.175	59.0	225	Circular	54.135	52.676	1.234	54.135	52.656	1.254
1.007	11.014	60.0	225	Circular	54.135	52.656	1.254	54.135	52.472	1.438
1.008	1.830	60.0	225	Circular	54.135	52.472	1.438	54.135	52.442	1.468
1.009	2.556	60.0	225	Circular	54.135	52.442	1.468	54.135	52.399	1.511
1.010	6.080	60.0	225	Circular	54.135	52.399	1.511	54.100	52.298	1.577

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
2.004	F5	450	Manhole	Plastic	F6	450	Manhole	Plastic
2.005	F6	450	Manhole	Plastic	F7	600	Manhole	Plastic
2.006	F7	600	Manhole	Plastic	F8	600	Manhole	Plastic
2.007	F8	600	Manhole	Plastic	F9	600	Manhole	Plastic
2.008	F9	600	Manhole	Plastic	F10	600	Manhole	Plastic
2.009	F10	600	Manhole	Plastic	F22	1200	Manhole	Concrete
1.000	F11	450	Manhole	Plastic	F12	450	Manhole	Plastic
1.001	F12	450	Manhole	Plastic	F13	450	Manhole	Plastic
1.002	F13	450	Manhole	Plastic	F14	450	Manhole	Plastic
1.003	F14	450	Manhole	Plastic	F15	450	Manhole	Plastic
1.004	F15	450	Manhole	Plastic	F16	450	Manhole	Plastic
1.005	F16	450	Manhole	Plastic	F17	600	Manhole	Plastic
1.006	F17	600	Manhole	Plastic	F18	600	Manhole	Plastic
1.007	F18	600	Manhole	Plastic	F19	600	Manhole	Plastic
1.008	F19	600	Manhole	Plastic	F20	600	Manhole	Plastic
1.009	F20	600	Manhole	Plastic	F21	600	Manhole	Plastic
1.010	F21	600	Manhole	Plastic	F22	1200	Manhole	Concrete

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
F1	38.757	13.254	54.135	0.736	450				
						0	2.000	53.399	100
F2	36.898	13.880	54.135	0.785	450	1	2.000	53.350	100
									
						0	2.001	53.350	100

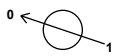
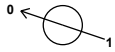
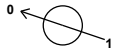
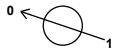
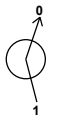
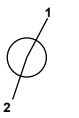
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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
F3	31.123	15.826	54.135	0.987	450	1	2.001	53.198	100
						0	2.002	53.148	150
F4	30.009	16.202	54.135	1.007	450	1	2.002	53.128	150
						0	2.003	53.128	150
F5	19.573	19.719	54.135	1.191	450	1	2.003	52.944	150
						0	2.004	52.944	150
F6	18.459	20.094	54.135	1.211	450	1	2.004	52.924	150
						0	2.005	52.924	150
F7	8.022	23.612	54.135	1.470	600	1	2.005	52.740	150
						0	2.006	52.665	225
F8	7.003	23.955	54.135	1.488	600	1	2.006	52.647	225
						0	2.007	52.647	225
F9	-3.529	27.504	54.135	1.673	600	1	2.007	52.462	225
						0	2.008	52.462	225
F10	-5.370	28.125	54.135	1.705	600	1	2.008	52.430	225
						0	2.009	52.430	225
F11	34.572	-2.263	54.135	0.700	450	0	1.000	53.435	100
F12	31.772	-1.319	54.135	0.774	450	1	1.000	53.361	100
						0	1.001	53.361	100
F13	25.997	0.627	54.135	0.976	450	1	1.001	53.209	100
						0	1.002	53.159	150
F14	24.883	1.002	54.135	0.996	450	1	1.002	53.139	150
						0	1.003	53.139	150
F15	14.446	4.520	54.135	1.180	450	1	1.003	52.955	150
						0	1.004	52.955	150

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
F16	13.332	4.895	54.135	1.200	450	1	1.004	52.935	150
									
						0	1.005	52.935	150
F17	2.895	8.412	54.135	1.459	600	1	1.005	52.751	150
									
						0	1.006	52.676	225
F18	1.782	8.788	54.135	1.479	600	1	1.006	52.656	225
									
						0	1.007	52.656	225
F19	-8.655	12.305	54.135	1.663	600	1	1.007	52.472	225
									
						0	1.008	52.472	225
F20	-10.389	12.889	54.135	1.693	600	1	1.008	52.442	225
									
						0	1.009	52.442	225
F21	-11.029	15.364	54.135	1.736	600	1	1.009	52.399	225
									
						0	1.010	52.399	225
F22	-9.087	21.125	54.100	1.802	1200	1	2.009	52.298	225
									
						2	1.010	52.298	225

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