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PLOT 3, ASHROYD BUSINESS PARK, HOYLAND, BARNSLEY

NETWORK SPACE DEVELOPMENTS LTD

DRAINAGE STRATEGY

10770-WMS-ZZ-XX-RP-C-39201-S8-P4

JANUARY 2024

DOCUMENT CONTROL

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Contract: Plot 3 Ashroyd Business Park, Hoyland, Barnsley

Document Title: Drainage Strategy

Our Ref: 11770-WMS-ZZ-XX-RP-C-39201-S8-P4-DRAINAGE_STRATEGY

Prepared by: C.Melton IEng MCIHT MICE FIHE **Date:** January 2024

RECORD OF AMENDMENTS TO DOCUMENT

Ref	Description	Date
P1	First issue	September 2021
P2	Revised Architect layout added to Appendix B.	May 2022
P3	Revision of layout. Addition of drainage layout and calculations.	December 2023
P4	Revision to Drainage Layout.	January 2024

Verified by: CEng MICE FCIHT MIRSE **Date:** JANUARY 2024

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C O N T E N T S

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1.0 INTRODUCTION

William Saunders have been instructed by Network Space Developments Ltd to prepare a Drainage Strategy for an industrial development at Plot 3, Ashroyd Business Park, Hoyland, Barnsley.

2.0 PROPOSED DEVELOPMENT

2.1 SITE LOCATION AND DESCRIPTION

The site currently comprises rough grassland and is an un-developed plot of a business park. The business park was initially re-developed in from 2005 to 2006, plateaus were constructed into the pre-existing hillside to allow development. The grid reference for the site is 436564E, 401164N or SE365011. The postcode of the site is S74 9ND. A location plan is given in Appendix A.

To the North is an area of farm buildings with industrial development beyond. To the South and West are residential development, and to the East plots 4 and 5 of Ashroyd Business Park comprising storage and industrial units.

The A6195 is approx. 350m north and the M1 is approx. 1.9km south-west. The centre of Barnsley is approx. 5.5km NNW, Rotherham is approx. 10km south-east, Sheffield is approx. 13km south and Doncaster is approx. 20km east.

The site is a previously levelled plateau which lies at approx. 154mOD. There are earthworks slopes along the North (up to 6.5m below site level), South (up to 6.5m above site level) and West (0 - 5m above site level).

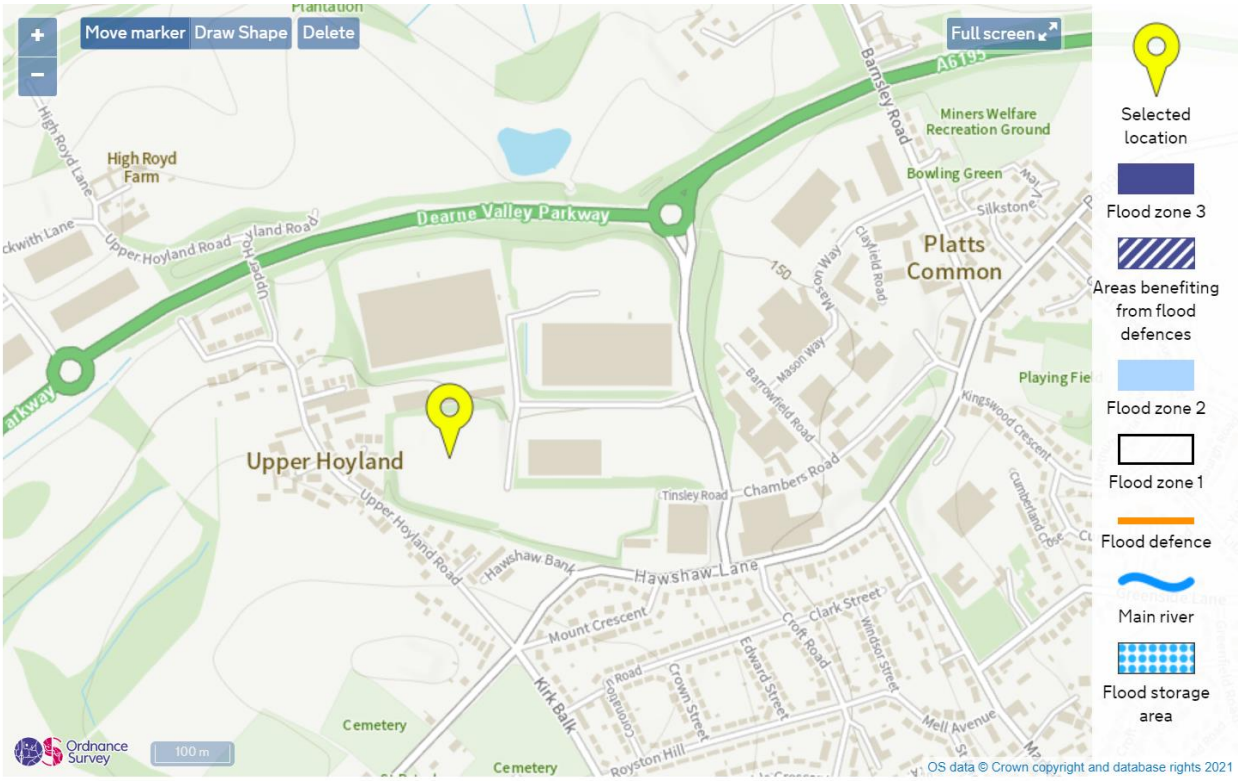
The site has an approximate area of 2.4 hectares.

2.2 DEVELOPMENT PROPOSALS

The proposals are for a new development comprising a single industrial / distribution unit with a service yard and car park. The proposed site layout is shown at Appendix B.

3.0 FLOOD RISK

The current gov.uk Flood Map for Planning records (below) indicate that the proposed development site is wholly within Flood Zone 1 and as such is not located in an area considered to be at risk of flooding from fluvial, tidal or any natural or artificial water bodies.



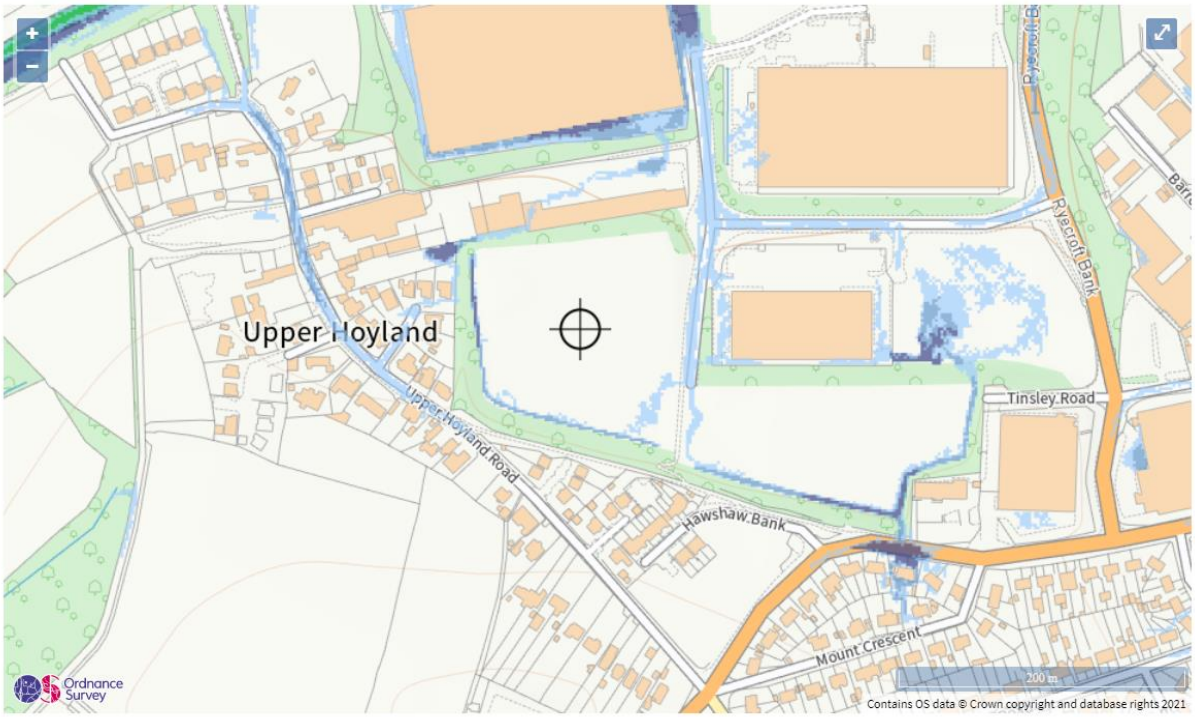
The gov.uk surface water flood map (overleaf) indicates areas of low to high flooding in channels around the perimeter of the site. These are related to the drainage channels that have been constructed at the base of the embankments in order to convey run off to the land drainage system. These channels are to be retained through French drains within the new development. The French drains will be used to direct the surface water runoff from higher levels around the built development away from the buildings.

Flood risk

Extent of flooding

Location

Enter a place or postcode



Extent of flooding from surface water

High Medium Low Very low Location you selected

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4.0 DRAINAGE STRATEGY

Through the initial enabling works for the wider Ashroyd Business Park new infrastructure including adoptable foul and surface water sewers were constructed. The Section 104 sewer layout as built drawings can be found in Appendix C and calculations of maximum flow rates at Appendix D.

4.1 FOUL DRAINAGE

The foul drainage from the development is to be discharged to the 150mm diameter stub to FPN 1.004. The adoptable sewer network installed has been sized up to be able to allow for the future development from Plot 3.

4.2 SURFACE WATER DRAINAGE

The drainage for the business park benefits from an off-site attenuation pond, built specifically for the site.

During the S104 approval process for the wider infrastructure allowable flow rates were determined for the individual plots across the business park. For Plot 3 the allowable discharge rates in each storm period were agreed with Yorkshire Water as the following, from an impermeable area of 19,396m2 (1.94ha):

1 year = 235.8 l/s
30 year = 544.0 l/s
100 year = 683.7 l/s

For the proposed development at Plot 3, it is proposed to achieve the agreed discharge rates with at least an additional 30% reduction, therefore the proposed modelled discharge rates from Plot 3 are not to exceed the following:

1 year = 165.0 l/s
30 year = 380.8 l/s
100 year (+ 30% climate change) = 478.6 l/s

This will be achieved through the use of oversized pipes and an attenuation tank within the service yard, prior to connecting to the surface water sewer which will be through the 450mm diameter stub connected to PN 1.004.

The proposed drainage layout can be found in Appendix E, with the Micro Drainage calculations in Appendix F.

The maximum modelled discharge rates are as follows:

1 year = 154.5 l/s
30 year = 356.0 l/s
100 year (+ 40% climate change) = 400.2 l/s

The discharge rates are controlled by a 300mm diameter throttle pipe prior to connection with the existing 450mm diameter stub pipe.

4.3 FLOOD RISK/DRAINAGE MANAGEMENT STRATEGY

In order to manage the run off from the developed site, and accommodate future climate change, the detailed design of the surface water drainage system will need to include the following: -

- Petrol/Oil Interceptors
  All the service yards are to include a Full Retention petrol interceptor to treat the service yard area before the surface water is connected into the surface water system.

- Flood Flow Routes
  To address the residual risks of surface water flows and potential infrastructure failure, flow routes for such waters should be analysed and demonstrated to not present a hazard to the development or adjacent properties.

- Floor Levels
  Floor levels to be set a minimum of 150mm above prevailing ground levels in Flood Zone 1 and above adjacent ground levels in areas of flood flow routes and areas at risk from surface water flooding to minimise the flood risk.

- Design/Construction Standard
  All on-site foul and surface water drainage will be designed and constructed in accordance with current Building Regulation Standards.

5.0 CONCLUSIONS

- The proposed development is not at risk of flooding from fluvial, tidal or any natural or artificial water bodies.
- The development will generate quantities of surface water runoff which could pose flood risk to the development itself or to its neighbours, unless appropriate design and management measures are taken.
- The surface water runoff generated by the proposed development will be managed in a manner which will ensure no risk of flooding or increased risk to surrounding properties, at present and taking into account allowances for future climate change.
- The residual risks from surface water and infrastructure failure will be addressed by consideration of flood flow routes through the development.
- Floor levels to be set to minimise the flood risk from adjacent areas at risk from surface water flooding.

APPENDIX A

Site Location Plan

UNIVERSAL COMPONENTS LTD

ASHROYDS WAY

RYECROFT BANK

PLOT 3

STORE FIRST

Unit 4B

Unit 5A

Unit 5B

Unit 5C

Unit 5D

HAWSHAW BANK

PINFOLD CROFT

Hawthorns

ESS

WB

LB

163.1m

164.6m

163.8m

N

Ownership Boundary Line

Plot 3 Application Boundary Line
(6.84 Acres / 2.77 Ha)

0 12.5 25 37.5 50 62.5m

SCALE 1:1250

Rev	Date	Description	Rev By	Chk'd By
A	22.09.2021	Ownership boundary line updated.	AT	MJS

Project Title	Proposed Development Plot 3 Ashroyd Business Park Junction 36 M1 Barnsley S74 9SB
Client	Network Space Ltd
Status	Planning
Scale	1:1250
Drawing Size	A3
Date	Sep 2021
Drawn By	AT
Checked	MJS
Drawing Title	Location Plan - Plot 3
Job-Dwg No	14698A-120
Rev	A

2 St. Johns North, Wakefield, WF1 3QA t. 01924 291800

Carvers Warehouse, 77 Dale Street, Manchester, M1 2HG t. 0161 2388555

The Old Rectory, 79 High Street, Newport Pagnell, MK16 8AB t. 01908 211577

101 London Road, Reading, RG1 5BY t. 0118 9507700

10 Gees Court, St Christophers Place, London, W1U 1JJ t. 0207 4091215

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CAD file reference 14698A \17.0 Drawings\100 Series-Planning

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APPENDIX B

Proposed Site Layout

Note:
Information is based on topographical survey and received information.
Assumed site boundary and site constraints subject to confirmation.
All Legal easements and extent of existing underground services locations are subject to confirmation.

LEVELS

+000.00	Existing levels
+000.00	Proposed levels

Note: For further details regarding levels, refer to Engineer's latest levels layout proposal.

LANDSCAPING

Note: Landscape design shown indicatively, for further details regarding landscaping, refer to Landscape Architect's latest proposal.

BOUNDARIES

Ownership Boundary Line

Plot 3 Application Boundary Line
(6.84 Acres / 2.77 Ha)

N

0 5 10 15 20 25m
SCALE 1:500

Rev	Date	Description	By	Chk'd
D	24-05-2022	Amended GA plan and entry to service yard. Added cycle parking.	TM	JMH
C	20-05-2022	Building moved 5m from residential. Service yard entrance modified.	TM	JMH
B	09-05-2022	Pedestrian crossing removed from Main entrance bell mouth.	EG	JMH
A	23.09.2021	Updated to client's comments.	AT	MJS

Project Title	Proposed Development Plot 3 Ashroyd Business Park Junction 36 M1 Barnsley S74 9SB
Client	Network Space Ltd
Status	Planning
Scale	1:500
Drawing Size	A1
Date	Sep 2021
Drawn By	TM
Checked	JMH
Drawing Title	Proposed Site Plan
Job-Dwg No	14698A-125
Rev	D

2 St. Johns North, Wakefield, WF1 3QA t. 01924 291800
Carvers Warehouse, 77 Dale Street, Manchester, M1 2HG t. 0161 2388555
The Old Rectory, 79 High Street, Newport Pagnell, MK16 8AB t. 01908 211577
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APPENDIX C

S104 As Built Sewer Layout

YWS ref: H-3-261-550

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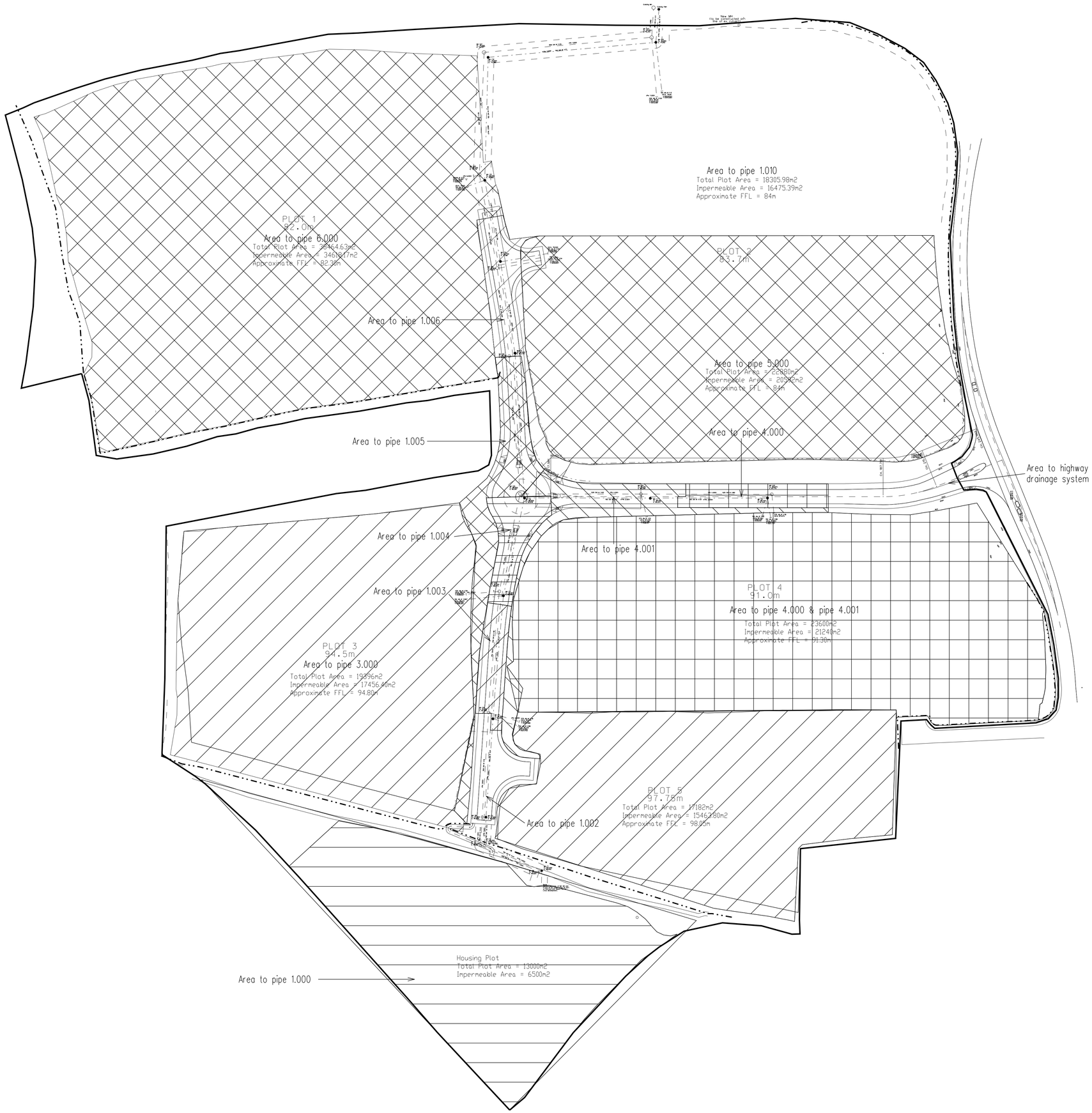
Contractors must verify all dimensions at the site before commencing any work or making any shop drawings: no dimensions to be taken from drawing

In accordance with CDM Regulation 13, residual hazards have been identified and are annotated thus: [I]

Refer to the current designers risk assessments for further details

VERIFICATION STATUS	VERIFIED BY	DATE
INFORMATION		
DESIGN	ACG	09/00
BUILDING CONTROL		
PLANNING	ACG	09/00
MEASUREMENT	ACG	09/00
TENDER		
CONSTRUCTION		
FINAL ISSUE INCORPORATING ALL AUTHORISED VARIATIONS		
RISK ASSESSMENT ck'd		
ACCESS/DDA COMPLIANCE CHECK		DATE

REV	DESCRIPTION	CK'D	DATE
A	Redrawn	ACG	01/05
B	General redesign to SFA 5th	ACG	07/05
C	Plot Areas, Impermeable Areas and FFL added	ACG	08/05
D	Plot Areas& Impermeable Areas amended	ACG	09/05



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Project

Proposed Infrastructure Works,
Ashroyd Business Park,
nr. Barnsley.

Client

Ackroyd & Abbott Ltd.

Title

S.104 Works - Areas

Date Sept '00 Drawing No. SL6924(9)307D

Drawn IB Scale 1:1000 @A1

APPENDIX D

Allowable Discharge Rate Calculations

S104 Storm Sewer
Ashroyd Bus. Park.

XP Solutions Network 2017.1.2 ©1982-2017 XP Solutions

Pipe Number	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Infiltration Flow (l/s)	Infiltration Vol (m³)	Maximum Vol (m³)	Discharge Vol (m³)	Pipe Flow (l/s)	Status
1.000	6	15 minute 1 year Winter I+0%	101.200	99.788	-0.137	0.000	0.57				0.178	47.057	93.1	OK
1.001	7	15 minute 1 year Winter I+0%	100.400	98.975	-0.206	0.000	0.22				0.133	47.057	93.1	OK
1.002	8	15 minute 1 year Winter I+0%	97.800	96.028	-0.171	0.000	0.38				0.148	53.590	104.7	OK
2.000	9	15 minute 1 year Winter I+0%	97.750	93.178	-0.102	0.000	0.87				0.384	98.045	208.9	OK
1.003	10	15 minute 1 year Winter I+0%	94.100	92.659	-0.241	0.000	0.43				0.335	157.089	320.2	OK
3.000	11	15 minute 1 year Winter I+0%	94.500	89.477	-0.152	0.000	0.76				0.419	110.665	235.8	OK
1.004	12	15 minute 1 year Winter I+0%	90.700	89.116	-0.359	0.000	0.33				0.897	281.834	579.9	OK
4.000	13	15 minute 1 year Winter I+0%	89.875	87.377	-0.323	0.000	0.31				0.348	72.616	165.0	OK
4.001	14	15 minute 1 year Winter I+0%	89.015	86.594	-0.270	0.000	0.47				1.336	144.660	281.2	OK
1.005	15	15 minute 1 year Winter I+0%	88.600	85.668	-0.219	0.000	0.72				1.979	434.741	880.2	OK
1.006	16	15 minute 1 year Winter I+0%	85.100	83.208	-0.326	0.000	0.43				0.904	439.245	888.2	OK
5.000	17	15 minute 1 year Winter I+0%	83.700	79.742	-0.208	0.000	0.56				0.340	130.579	278.6	OK
1.007	18	15 minute 1 year Winter I+0%	82.850	78.949	-0.365	0.000	0.66				2.135	574.516	1162.0	OK
6.000	19	15 minute 1 year Winter I+0%	82.000	79.020	0.145	0.000	1.28				1.175	216.645	483.9	SURCHARGED
1.008	20	15 minute 1 year Winter I+0%	82.000	78.188	-0.443	0.000	0.51				4.338	791.167	1633.6	OK
1.009	21	15 minute 1 year Winter I+0%	79.500	76.122	-0.505	0.000	0.40				2.486	791.176	1628.2	OK
7.000	22	15 minute 1 year Winter I+0%	83.700	80.118	-0.332	0.000	0.16				0.162	104.527	239.5	OK
1.010	23	15 minute 1 year Winter I+0%	74.800	72.579	-0.256	0.000	0.86				4.662	895.714	1833.0	OK

PLOT 5
PLOT 3
PLOT 4B

Agreed discharge rates from plots

File: C:\Users\ChrisM\Desktop\ashroyd.mdx : 1 year return period Critical Summary of Results by Maximum Level (Rank 1)

XP Solutions Network 2017.1.2 ©1982-2017 XP Solutions

Pipe Number	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Infiltration Flow (l/s)	Infiltration Vol (m³)	Maximum Vol (m³)	Discharge Vol (m³)	Pipe Flow (l/s)	Status
1.000	6	15 minute 30 year Winter I+0%	101.200	100.380	0.455	0.000	1.27				0.849	115.400	208.1	SURCHARGED
1.001	7	15 minute 30 year Winter I+0%	100.400	99.028	-0.153	0.000	0.48				0.259	115.400	207.6	OK
1.002	8	15 minute 30 year Winter I+0%	97.800	96.115	-0.084	0.000	0.85				0.262	131.420	231.1	OK
2.000	9	15 minute 30 year Winter I+0%	97.750	94.581	1.301	0.000	2.01				2.392	240.440	485.4	SURCHARGED
1.003	10	15 minute 30 year Winter I+0%	94.100	93.173	0.273	0.000	0.96				2.346	385.236	714.9	SURCHARGED
3.000	11	15 minute 30 year Winter I+0%	94.500	90.835	1.206	0.000	1.75				2.363	271.389	544.0	SURCHARGED
1.004	12	15 minute 30 year Winter I+0%	90.700	90.071	0.596	0.000	0.72				6.850	691.152	1256.4	SURCHARGED
4.000	13	15 minute 30 year Winter I+0%	89.875	89.198	1.498	0.000	0.68				3.566	178.074	359.9	SURCHARGED
4.001	14	15 minute 30 year Winter I+0%	89.015	89.016	2.152	0.594	1.09				19.444	354.658	643.1	FLOOD
1.005	15	15 minute 30 year Winter I+0%	88.600	88.339	2.452	0.000	1.43				29.059	1066.030	1743.5	FLOOD RISK
1.006	16	15 minute 30 year Winter I+0%	85.100	83.362	-0.172	0.000	0.85				1.929	1077.075	1757.1	OK
5.000	17	15 minute 30 year Winter I+0%	83.700	81.057	1.107	0.000	1.25				2.222	320.224	624.4	SURCHARGED
1.007	18	15 minute 30 year Winter I+0%	82.850	80.021	0.707	0.000	1.32				11.571	1408.889	2326.4	SURCHARGED
6.000	19	15 minute 30 year Winter I+0%	82.000	80.823	1.948	0.000	2.93				4.361	531.278	1111.3	SURCHARGED
1.008	20	15 minute 30 year Winter I+0%	82.000	78.950	0.319	0.000	1.02				31.240	1940.177	3254.4	SURCHARGED
1.009	21	15 minute 30 year Winter I+0%	79.500	76.880	0.253	0.000	0.81				18.067	1940.188	3259.0	SURCHARGED
7.000	22	15 minute 30 year Winter I+0%	83.700	80.193	-0.257	0.000	0.38				0.269	256.336	587.4	OK
1.010	23	15 minute 30 year Winter I+0%	74.800	74.454	1.619	0.000	1.68				35.920	2196.539	3595.1	FLOOD RISK

Pipe Number	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Infiltration Flow (l/s)	Infiltration Vol (m³)	Maximum Vol (m³)	Discharge Vol (m³)	Pipe Flow (l/s)	Status
1.000	6	15 minute 100 year Winter I+0%	101.200	101.059	1.134	0.000	1.57				1.617	149.631	257.2	FLOOD RISK
1.001	7	15 minute 100 year Winter I+0%	100.400	99.049	-0.132	0.000	0.60				0.314	149.632	257.9	OK
1.002	8	15 minute 100 year Winter I+0%	97.800	97.591	1.392	0.000	1.02				2.396	170.403	279.0	FLOOD RISK
2.000	9	15 minute 100 year Winter I+0%	97.750	96.498	3.218	0.000	2.43				5.135	311.764	587.2	SURCHARGED
1.003	10	15 minute 100 year Winter I+0%	94.100	94.121	1.221	21.141	1.02				25.790	499.510	753.3	FLOOD
3.000	11	15 minute 100 year Winter I+0%	94.500	92.302	2.673	0.000	2.20				4.463	351.893	683.7	SURCHARGED
1.004	12	15 minute 100 year Winter I+0%	90.700	90.720	1.245	21.210	0.77				29.906	896.173	1346.1	FLOOD
4.000	13	15 minute 100 year Winter I+0%	89.875	89.718	2.018	0.000	0.85				4.486	230.881	447.1	FLOOD RISK
4.001	14	15 minute 100 year Winter I+0%	89.015	89.099	2.235	83.922	1.61				102.785	460.003	952.1	FLOOD
1.005	15	15 minute 100 year Winter I+0%	88.600	88.623	2.736	23.683	1.47				53.378	1382.394	1792.8	FLOOD
1.006	16	15 minute 100 year Winter I+0%	85.100	84.211	0.677	0.000	0.89				10.320	1396.715	1836.0	SURCHARGED
5.000	17	15 minute 100 year Winter I+0%	83.700	82.885	2.935	0.000	1.45				4.838	415.214	724.4	SURCHARGED
1.007	18	15 minute 100 year Winter I+0%	82.850	81.222	1.908	0.000	1.38				17.950	1826.871	2421.5	SURCHARGED
6.000	19	15 minute 100 year Winter I+0%	82.000	82.022	3.147	21.873	3.36				28.138	688.873	1272.5	FLOOD
1.008	20	15 minute 100 year Winter I+0%	82.000	80.066	1.435	0.000	1.10				37.090	2515.756	3501.6	SURCHARGED
1.009	21	15 minute 100 year Winter I+0%	79.500	77.659	1.032	0.000	0.87				36.946	2515.770	3494.2	SURCHARGED
7.000	22	15 minute 100 year Winter I+0%	83.700	80.224	-0.226	0.000	0.50				0.314	332.374	761.6	OK
1.010	23	15 minute 100 year Winter I+0%	74.800	74.817	1.982	17.801	1.80				58.557	2848.162	3856.5	FLOOD

YWS ref: H-3-261-550



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MEASUREMENT	ACG	09/00
TENDER		
CONSTRUCTION		
FINAL ISSUE INCORPORATING ALL AUTHORISED VARIATIONS		
RISK ASSESSMENT ck'd		
ACCESS/DDA COMPLIANCE CHECK		DATE

REV	DESCRIPTION	CK'D	DATE
A	Redrawn	ACG	01/05
B	General redesign to SFA 5th	ACG	07/05
C	Plot Areas, Impermeable Areas and FFL added	ACG	08/05
D	Plot Areas& Impermeable Areas amended	ACG	09/05

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website: www.wm-saunders.co.uk

Project

Proposed Infrastructure Works,
Ashroyd Business Park,
nr. Barnsley.

Client

Ackroyd & Abbott Ltd.

Title

S.104 Works - Areas

Date Sept '00 Drawing No. SL6924(9)307D

Drawn IB Scale 1:1000 @A1

APPENDIX E

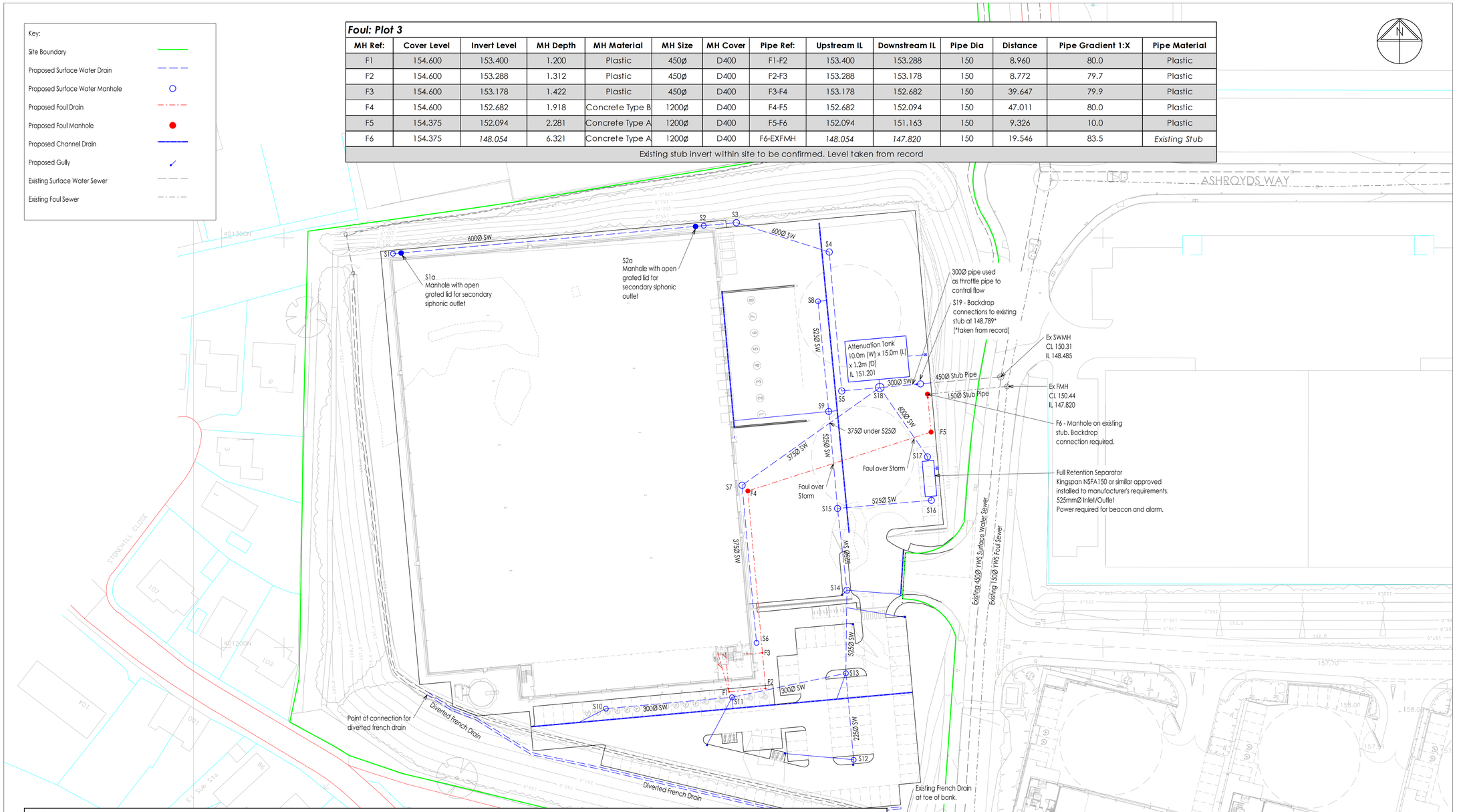
Drainage Layout

Key:

- Site Boundary
- Proposed Surface Water Drain
- Proposed Surface Water Manhole
- Proposed Foul Drain
- Proposed Foul Manhole
- Proposed Channel Drain
- Proposed Gully
- Existing Surface Water Sewer
- Existing Foul Sewer

Foul: Plot 3

MH Ref:	Cover Level	Invert Level	MH Depth	MH Material	MH Size	MH Cover	Pipe Ref:	Upstream IL	Downstream IL	Pipe Dia	Distance	Pipe Gradient 1:X	Pipe Material
F1	154.600	153.400	1.200	Plastic	450Ø	D400	F1-F2	153.400	153.288	150	8.960	80.0	Plastic
F2	154.600	153.288	1.312	Plastic	450Ø	D400	F2-F3	153.288	153.178	150	8.772	79.7	Plastic
F3	154.600	153.178	1.422	Plastic	450Ø	D400	F3-F4	153.178	152.682	150	39.647	79.9	Plastic
F4	154.600	152.682	1.918	Concrete Type B	1200Ø	D400	F4-F5	152.682	152.094	150	47.011	80.0	Plastic
F5	154.375	152.094	2.281	Concrete Type A	1200Ø	D400	F5-F6	152.094	151.163	150	9.326	10.0	Plastic
F6	154.375	*148.054*	6.321	Concrete Type A	1200Ø	D400	F6-EXFMH	*148.054*	*147.820*	150	19.546	83.5	*Existing Stub*
Existing stub invert within site to be confirmed. Level taken from record													



Surface Water : Plot 3

MH Ref:	Cover Level	Invert Level	MH Depth	MH Material	MH Size	MH Cover	Pipe Ref:	Upstream IL	Downstream IL	Pipe Dia	Distance	Pipe Gradient 1:X	Pipe Material
S1	154.600	153.100	1.500	Siphonic Break	1500Ø	D400	S1-S1a	153.100	153.080	600	2.00	100.0	Plastic
S1a	154.600	153.080	1.520	Concrete Type B	1500Ø	D400	S1a-S2a	153.080	152.364	600	72.20	100.8	Plastic
S2a	154.600	152.364	2.236	Concrete Type B	1500Ø	D400	S2a-S2	152.364	152.345	600	2.00	105.3	Plastic
S2	154.600	152.345	2.255	Siphonic Break	1500Ø	D400	S2-S3	152.345	152.266	600	8.00	101.3	Plastic
S3	154.600	152.266	2.334	Concrete Type B	1500Ø	D400	S3-S4	152.266	152.030	600	23.80	100.8	Plastic
S4	154.600	152.030	2.570	Concrete Type B	1500Ø	D400	S4-S5	152.030	151.692	600	34.07	100.8	Plastic
S5	154.550	151.692	2.858	Concrete Type B	1500Ø	D400	S5-S18	151.692	151.201	600	9.32	19.0	Plastic
S6	154.550	153.000	1.550	Siphonic Break	1500Ø	D400	S6-S7	153.000	151.338	375	48.20	29.0	Plastic
S7	154.550	151.338	3.212	Concrete Type B	1500Ø	D400	S7-S18	151.338	151.201	375	41.22	300.9	Plastic
S8	154.125	152.000	2.125	Concrete Type B	1500Ø	D400	S8-S9	152.000	151.946	525	27.03	500.6	Plastic
S9	154.725	151.946	2.779	Concrete Type B	1500Ø	D400	S9-S15	151.946	151.405	525	23.77	43.9	Plastic
S10	154.725	152.223	2.502	Concrete Type B	1200Ø	D400	S10-S11	152.223	152.055	300	30.94	184.2	Plastic
S11	154.625	152.055	2.570	Concrete Type B	1200Ø	D400	S11-S13	152.055	151.711	300	28.41	82.6	Plastic
S12	154.425	152.197	2.228	Concrete Type B	1200Ø	D400	S12-S13	152.197	151.786	225	21.20	51.6	Plastic
S13	154.325	151.486	2.839	Concrete Type B	1500Ø	D400	S13-S14	151.486	151.445	525	20.29	494.8	Plastic
S14	154.125	151.445	2.680	Concrete Type B	1500Ø	D400	S14-S15	151.445	151.405	525	20.10	502.4	Plastic
S15	154.375	151.405	2.970	Concrete Type B	1500Ø	D400	S15-S16	151.405	151.359	525	23.01	500.2	Plastic
S16	154.375	151.359	3.016	Concrete Type A	1500Ø	D400	S16-PI	151.359	151.349	525	1.00	100.0	Plastic
S17	154.375	151.239	3.136	Concrete Type B	1500Ø	D400	S17-S18	151.239	151.201	600	19.18	504.6	Plastic
S18	154.375	151.201	3.174	Concrete Type A	1500Ø	D400	S18-S19	151.201	149.201	300	10.00	5.0	Plastic
S19	154.375	148.789	5.586	Concrete Type A	1500Ø	D400	S19-EXSW MH	148.789	148.485	450	*19.68*	64.7	*Existing Stub*
Existing stub invert within site to be confirmed. Level taken from record													

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Contractors must verify all dimensions, levels and co-ordinates at the site before commencing any work or making any shop drawings; no dimensions to be taken from drawing.

Notes:

1 - Do not scale this drawing. If in any doubt ask.

2 - This drawing is to be read in conjunction with all relevant engineers and specialists drawings and specifications.

3 - All setting out is to be checked on site prior to any works commencing. Any discrepancies are to be reported to the Engineer immediately.

4 - All dimensions are shown in millimetres unless otherside noted. All levels are shown in metres unless otherwise noted.

5 - All works to be carried out in accordance with the current British Standards, Codes of Practice, Building Regulations and Design and Construction Guidance Sewage Sector Guidance.

6 - Allowable discharge rates to Yorkshire Water Surface Water Sewer less 30%:
1 year = 165.1 l/s
30 year = 380.8 l/s
100 year = 478.6 l/s

Maximum modelled discharge rates are:
1 year = 156.4 l/s
30 year = 356.8 l/s
100 year + 40% c/c = 404.6 l/s

Rev	Description	Drn	Vf'd	Date
P2	Amendment to drainage layout following Architect's comments.	CM		15/01/24
P1	Issued for Planning	CM	AG	21/12/23

As outlined in section 2.3 of the CITB Industry Guidance to Designers, insignificant risks can usually be ignored, as can risks arising from routine construction activities, unless the design compounds or significantly alters these risks. In accordance with CDM Regulations 8, 9 and 11, any significant risks relating to the design features shown on this drawing have been identified and are annotated thus: [I]

☒ No significant risks have been identified.

☐ Significant risks have been identified - refer to notes on drawing for information on residual risks and any controll measures to be employed.

Refer to the current Designer's Risk Assessment sheets for further details.

Designer's Signature | Date 12/23

Drawing Status: PLANNING

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Project
Plot 3
Ashroyd Business Park
Ashroyds Way,
Hoyland, Barnsley,
S74 9SB

Client
Network Space Ltd

Title
Drainage Layout

WmS Project Ref.	Drawn	Date	Scale
10770	CM	12/12/23	1:500 @ A1

Drawing/Document Reference
Project Originator Zone Level Type Role Number Status Rev.
10770 - WMS - ZZ - XX - DR - C - 39201 - S8 - P2

APPENDIX F

Micro Drainage Calculations

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	2
FEH Rainfall Version	1999
Site Location	GB 436500 402000 SE 36500 02000
C (1km)	-0.025
D1 (1km)	0.365
D2 (1km)	0.443
D3 (1km)	0.228
E (1km)	0.296
F (1km)	2.386
Maximum Rainfall (mm/hr)	100
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.000
Maximum Backdrop Height (m)	0.000
Min Design Depth for Optimisation (m)	0.900
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm

- Indicates pipe length does not match coordinates

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	38.639	1.662	23.2	0.046	4.00	0.0	0.600	o	375	Pipe/Conduit	
S1.001	41.223	0.137	300.9	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S2.000	27.033	0.054	500.6	0.090	4.00	0.0	0.600	o	525	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	75.98	4.17	153.000	0.046	0.0	0.0	0.0	3.77	416.6	9.5
S1.001	69.02	4.83	151.338	0.046	0.0	0.0	0.0	1.04	114.8	9.5
S2.000	72.80	4.45	152.000	0.090	0.0	0.0	0.0	0.99	215.2	17.8

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S2.001	23.771	0.541	43.9	0.150	0.00	0.0	0.600	o	525	Pipe/Conduit	
S3.000	30.943	0.168	184.2	0.022	4.00	0.0	0.600	o	300	Pipe/Conduit	
S3.001	28.407	0.344	82.6	0.036	0.00	0.0	0.600	o	300	Pipe/Conduit	
S4.000	21.200	0.411	51.6	0.031	4.00	0.0	0.600	o	225	Pipe/Conduit	
S3.002	20.285	0.041	494.8	0.155	0.00	0.0	0.600	o	525	Pipe/Conduit	
S3.003	20.097	0.040	502.4	0.118	0.00	0.0	0.600	o	525	Pipe/Conduit	
S2.002	23.008	0.046	500.2	0.135	0.00	0.0	0.600	o	525	Pipe/Conduit	
S2.003	1.000#	0.010	100.0	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
S2.004	8.675#	0.100	86.8	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
S2.005	1.000#	0.010	100.0	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
S2.006	19.176	0.038	504.6	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
S5.000	76.198	0.755	100.9	0.410	4.00	0.0	0.600	o	600	Pipe/Conduit	
S5.001	8.002	0.079	101.3	0.410	0.00	0.0	0.600	o	600	Pipe/Conduit	
S5.002	23.796	0.236	100.8	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
S5.003	34.065	0.338	100.8	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
S5.004	9.322	0.491	19.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S2.001	71.58	4.57	151.946	0.241	0.0	0.0	0.0	3.39	733.0	46.7
S3.000	72.87	4.45	152.223	0.022	0.0	0.0	0.0	1.16	81.7	4.3
S3.001	70.09	4.72	152.055	0.058	0.0	0.0	0.0	1.73	122.4	10.9
S4.000	75.71	4.19	152.197	0.031	0.0	0.0	0.0	1.83	72.6	6.3
S3.002	67.00	5.06	151.486	0.244	0.0	0.0	0.0	1.00	216.5	44.2
S3.003	64.23	5.40	151.445	0.362	0.0	0.0	0.0	0.99	214.8	63.0
S2.002	61.40	5.78	151.405	0.737	0.0	0.0	0.0	0.99	215.3	122.6
S2.003	61.35	5.79	151.359	0.737	0.0	0.0	0.0	2.24	484.9	122.6
S2.004	60.94	5.85	151.349	0.737	0.0	0.0	0.0	2.41	520.8	122.6
S2.005	60.89	5.86	151.249	0.737	0.0	0.0	0.0	2.24	484.9	122.6
S2.006	58.96	6.15	151.239	0.737	0.0	0.0	0.0	1.08	304.6	122.6
S5.000	72.05	4.52	153.100	0.410	0.0	0.0	0.0	2.42	685.4	80.0
S5.001	71.49	4.58	152.345	0.820	0.0	0.0	0.0	2.42	684.2	158.8
S5.002	69.87	4.74	152.266	0.820	0.0	0.0	0.0	2.43	685.7	158.8
S5.003	67.71	4.98	152.030	0.820	0.0	0.0	0.0	2.43	685.9	158.8
S5.004	67.46	5.00	151.692	0.820	0.0	0.0	0.0	5.61	1585.1	158.8

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.002	10.000	2.000	5.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.003	19.677	0.304	64.7	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.002	58.81	6.18	151.201	1.603	0.0	0.0	0.0	7.08	500.2	255.4
S1.003	58.02	6.31	148.789	1.603	0.0	0.0	0.0	2.53	402.4	255.4

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdro (mm)
S6	154.550	1.550	Open Manhole	1500	S1.000	153.000	375				
S7	154.550	3.212	Open Manhole	1500	S1.001	151.338	375	S1.000	151.338	375	
S8	154.125	2.125	Open Manhole	1500	S2.000	152.000	525				
S9	154.125	2.179	Open Manhole	1500	S2.001	151.946	525	S2.000	151.946	525	
S10	154.725	2.502	Open Manhole	1200	S3.000	152.223	300				
S11	154.725	2.670	Open Manhole	1200	S3.001	152.055	300	S3.000	152.055	300	
S12	154.625	2.428	Open Manhole	1200	S4.000	152.197	225				
S13	154.425	2.939	Open Manhole	1500	S3.002	151.486	525	S3.001	151.711	300	
								S4.000	151.786	225	
S14	154.325	2.880	Open Manhole	1500	S3.003	151.445	525	S3.002	151.445	525	
S15	154.125	2.720	Open Manhole	1500	S2.002	151.405	525	S2.001	151.405	525	
								S3.003	151.405	525	
S16	154.375	3.016	Open Manhole	1500	S2.003	151.359	525	S2.002	151.359	525	
SPI In	154.375	3.026	Open Manhole	1500	S2.004	151.349	525	S2.003	151.349	525	
SPI Out	154.375	3.126	Open Manhole	1500	S2.005	151.249	525	S2.004	151.249	525	
S17	154.375	3.136	Open Manhole	1500	S2.006	151.239	600	S2.005	151.239	525	
S1	154.600	1.500	Open Manhole	1500	S5.000	153.100	600				
S2	154.600	2.255	Open Manhole	1500	S5.001	152.345	600	S5.000	152.345	600	
S3	154.500	2.234	Open Manhole	1500	S5.002	152.266	600	S5.001	152.266	600	
S4	154.125	2.095	Open Manhole	1500	S5.003	152.030	600	S5.002	152.030	600	
S5	154.125	2.433	Open Manhole	1500	S5.004	151.692	600	S5.003	151.692	600	
S18	154.375	3.174	Open Manhole	1500	S1.002	151.201	300	S1.001	151.201	375	
								S2.006	151.201	600	
								S5.004	151.201	600	
S18	154.343	5.554	Open Manhole	1500	S1.003	148.789	450	S1.002	149.201	300	2
S	154.310	5.825	Open Manhole	0		OUTFALL		S1.003	148.485	450	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S6	436415.414	401201.120	436415.414	401201.120	Required	
S7	436411.888	401239.598	436411.888	401239.598	Required	
S8	436430.440	401284.515	436430.440	401284.515	Required	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S9	436433.045	401257.609	436433.045	401257.609	Required	
S10	436378.621	401185.051	436378.621	401185.051	Required	
S11	436409.439	401187.828	436409.439	401187.828	Required	
S12	436439.139	401172.572	436439.139	401172.572	Required	
S13	436437.236	401193.686	436437.236	401193.686	Required	
S14	436437.485	401213.969	436437.485	401213.969	Required	
S15	436435.200	401233.936	436435.200	401233.936	Required	
S16	436458.123	401235.910	436458.123	401235.910	Required	
SPI In	436457.852	401238.964	436457.852	401238.964	Required	
SPI Out	436457.581	401242.018	436457.581	401242.018	Required	
S17	436457.040	401248.127	436457.040	401248.127	Required	
S1	436326.618	401296.136	436326.618	401296.136	Required	
S2	436402.508	401302.977	436402.508	401302.977	Required	
S3	436410.477	401303.707	436410.477	401303.707	Required	
S4	436433.168	401296.540	436433.168	401296.540	Required	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S5	436436.225	401262.612	436436.225	401262.612	Required	
S18	436445.510	401263.449	436445.510	401263.449	Required	
S18	436455.470	401264.346	436455.470	401264.346	Required	
S	436475.074	401266.037			No Entry	

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PIPELINE SCHEDULES for Storm

Upstream Manhole

- Indicates pipe length does not match coordinates

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	375	S6	154.550	153.000	1.175	Open Manhole	1500
S1.001	o	375	S7	154.550	151.338	2.837	Open Manhole	1500
S2.000	o	525	S8	154.125	152.000	1.600	Open Manhole	1500
S2.001	o	525	S9	154.125	151.946	1.654	Open Manhole	1500
S3.000	o	300	S10	154.725	152.223	2.202	Open Manhole	1200
S3.001	o	300	S11	154.725	152.055	2.370	Open Manhole	1200
S4.000	o	225	S12	154.625	152.197	2.203	Open Manhole	1200
S3.002	o	525	S13	154.425	151.486	2.414	Open Manhole	1500
S3.003	o	525	S14	154.325	151.445	2.355	Open Manhole	1500
S2.002	o	525	S15	154.125	151.405	2.195	Open Manhole	1500
S2.003	o	525	S16	154.375	151.359	2.491	Open Manhole	1500
S2.004	o	525	SPI In	154.375	151.349	2.501	Open Manhole	1500
S2.005	o	525	SPI Out	154.375	151.249	2.601	Open Manhole	1500
S2.006	o	600	S17	154.375	151.239	2.536	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	38.639	23.2	S7	154.550	151.338	2.837	Open Manhole	1500
S1.001	41.223	300.9	S18	154.375	151.201	2.799	Open Manhole	1500
S2.000	27.033	500.6	S9	154.125	151.946	1.654	Open Manhole	1500
S2.001	23.771	43.9	S15	154.125	151.405	2.195	Open Manhole	1500
S3.000	30.943	184.2	S11	154.725	152.055	2.370	Open Manhole	1200
S3.001	28.407	82.6	S13	154.425	151.711	2.414	Open Manhole	1500
S4.000	21.200	51.6	S13	154.425	151.786	2.414	Open Manhole	1500
S3.002	20.285	494.8	S14	154.325	151.445	2.355	Open Manhole	1500
S3.003	20.097	502.4	S15	154.125	151.405	2.195	Open Manhole	1500
S2.002	23.008	500.2	S16	154.375	151.359	2.491	Open Manhole	1500
S2.003	1.000#	100.0	SPI In	154.375	151.349	2.501	Open Manhole	1500
S2.004	8.675#	86.8	SPI Out	154.375	151.249	2.601	Open Manhole	1500
S2.005	1.000#	100.0	S17	154.375	151.239	2.611	Open Manhole	1500
S2.006	19.176	504.6	S18	154.375	151.201	2.574	Open Manhole	1500

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S5.000	o	600	S1	154.600	153.100	0.900	Open Manhole	1500
S5.001	o	600	S2	154.600	152.345	1.655	Open Manhole	1500
S5.002	o	600	S3	154.500	152.266	1.634	Open Manhole	1500
S5.003	o	600	S4	154.125	152.030	1.495	Open Manhole	1500
S5.004	o	600	S5	154.125	151.692	1.833	Open Manhole	1500
S1.002	o	300	S18	154.375	151.201	2.874	Open Manhole	1500
S1.003	o	450	S18	154.343	148.789	5.104	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S5.000	76.198	100.9	S2	154.600	152.345	1.655	Open Manhole	1500
S5.001	8.002	101.3	S3	154.500	152.266	1.634	Open Manhole	1500
S5.002	23.796	100.8	S4	154.125	152.030	1.495	Open Manhole	1500
S5.003	34.065	100.8	S5	154.125	151.692	1.833	Open Manhole	1500
S5.004	9.322	19.0	S18	154.375	151.201	2.574	Open Manhole	1500
S1.002	10.000	5.0	S18	154.343	149.201	4.842	Open Manhole	1500
S1.003	19.677	64.7	S	154.310	148.485	5.375	Open Manhole	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.003	S	154.310	148.485	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

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Simulation Criteria for Storm

Rainfall Model	FEH
Return Period (years)	2
FEH Rainfall Version	1999
Site Location	GB 436500 402000 SE 36500 02000
C (1km)	-0.025
D1 (1km)	0.365
D2 (1km)	0.443
D3 (1km)	0.228
E (1km)	0.296
F (1km)	2.386
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

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Storage Structures for Storm

Cellular Storage Manhole: S18, DS/PN: S1.002

Invert Level (m) 151.201 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	150.0	150.0	1.201	0.0	210.0
1.200	150.0	210.0			

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

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.355
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	450.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	OFF
Inertia Status	OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S6	15 Summer	1	+0%				
S1.001	S7	15 Winter	1	+0%	100/15 Summer			
S2.000	S8	15 Winter	1	+0%	100/15 Summer			
S2.001	S9	15 Winter	1	+0%	100/15 Summer			
S3.000	S10	15 Winter	1	+0%	100/15 Summer			
S3.001	S11	15 Winter	1	+0%	100/15 Summer			
S4.000	S12	15 Winter	1	+0%	100/15 Summer			
S3.002	S13	15 Winter	1	+0%	100/15 Summer			
S3.003	S14	15 Winter	1	+0%	30/15 Summer			
S2.002	S15	15 Winter	1	+0%	30/15 Summer			
S2.003	S16	15 Winter	1	+0%	30/15 Winter			
S2.004	SPI In	15 Winter	1	+0%	30/15 Winter			
S2.005	SPI Out	15 Winter	1	+0%	30/15 Winter			
S2.006	S17	15 Winter	1	+0%	100/15 Summer			
S5.000	S1	15 Winter	1	+0%				
S5.001	S2	15 Winter	1	+0%	100/15 Summer			
S5.002	S3	15 Winter	1	+0%				
S5.003	S4	15 Winter	1	+0%				
S5.004	S5	15 Winter	1	+0%				

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S6	153.030	-0.345	0.000	0.02			6.3	OK
S1.001	S7	151.397	-0.316	0.000	0.06			6.0	OK
S2.000	S8	152.096	-0.429	0.000	0.07			12.0	OK
S2.001	S9	152.022	-0.449	0.000	0.05			28.0	OK
S3.000	S10	152.261	-0.262	0.000	0.04			2.9	OK
S3.001	S11	152.103	-0.252	0.000	0.06			6.7	OK
S4.000	S12	152.234	-0.188	0.000	0.06			4.2	OK
S3.002	S13	151.701	-0.310	0.000	0.17			26.7	OK
S3.003	S14	151.685	-0.285	0.000	0.25			37.3	OK
S2.002	S15	151.662	-0.268	0.000	0.46			75.8	OK
S2.003	S16	151.594	-0.290	0.000	0.41			74.9	OK
S2.004	SPI In	151.547	-0.327	0.000	0.30			75.3	OK
S2.005	SPI Out	151.497	-0.277	0.000	0.41			75.3	OK
S2.006	S17	151.494	-0.345	0.000	0.37			74.3	OK
S5.000	S1	153.220	-0.480	0.000	0.09			54.6	OK
S5.001	S2	152.564	-0.381	0.000	0.28			98.3	OK
S5.002	S3	152.449	-0.417	0.000	0.20			98.8	OK
S5.003	S4	152.197	-0.433	0.000	0.17			98.7	OK
S5.004	S5	151.841	-0.451	0.000	0.14			97.9	OK

PN	US/MH Name	Level Exceeded
S1.000	S6	
S1.001	S7	
S2.000	S8	
S2.001	S9	
S3.000	S10	
S3.001	S11	
S4.000	S12	
S3.002	S13	
S3.003	S14	
S2.002	S15	
S2.003	S16	
S2.004	SPI In	
S2.005	SPI Out	
S2.006	S17	
S5.000	S1	
S5.001	S2	
S5.002	S3	
S5.003	S4	
S5.004	S5	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.002	S18	15 Winter	1	+0%	30/15 Winter				151.341
S1.003	S18	15 Winter	1	+0%	30/15 Summer				149.016

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.002	S18	-0.160	0.000	0.44		9	156.0	OK	
S1.003	S18	-0.223	0.000	0.50			156.4	OK	

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

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.355
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	450.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	OFF
Inertia Status	OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S6	15 Winter	30	+0%				
S1.001	S7	15 Winter	30	+0%	100/15 Summer			
S2.000	S8	15 Winter	30	+0%	100/15 Summer			
S2.001	S9	15 Winter	30	+0%	100/15 Summer			
S3.000	S10	15 Winter	30	+0%	100/15 Summer			
S3.001	S11	15 Winter	30	+0%	100/15 Summer			
S4.000	S12	15 Winter	30	+0%	100/15 Summer			
S3.002	S13	15 Winter	30	+0%	100/15 Summer			
S3.003	S14	15 Winter	30	+0%	30/15 Summer			
S2.002	S15	15 Winter	30	+0%	30/15 Summer			
S2.003	S16	15 Winter	30	+0%	30/15 Winter			
S2.004	SPI In	15 Winter	30	+0%	30/15 Winter			
S2.005	SPI Out	15 Winter	30	+0%	30/15 Winter			
S2.006	S17	15 Winter	30	+0%	100/15 Summer			
S5.000	S1	15 Winter	30	+0%				
S5.001	S2	15 Winter	30	+0%	100/15 Summer			
S5.002	S3	15 Winter	30	+0%				
S5.003	S4	15 Winter	30	+0%				
S5.004	S5	15 Winter	30	+0%				

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S6	153.048	-0.327	0.000	0.04			15.3	OK
S1.001	S7	151.521	-0.192	0.000	0.14			14.2	OK
S2.000	S8	152.152	-0.373	0.000	0.17			29.6	OK
S2.001	S9	152.077	-0.394	0.000	0.14			79.3	OK
S3.000	S10	152.285	-0.238	0.000	0.10			7.2	OK
S3.001	S11	152.138	-0.217	0.000	0.17			18.9	OK
S4.000	S12	152.256	-0.166	0.000	0.16			10.3	OK
S3.002	S13	152.001	-0.010	0.000	0.47			72.4	OK
S3.003	S14	151.982	0.012	0.000	0.70			105.8	SURCHARGED
S2.002	S15	151.954	0.024	0.000	1.28			212.5	SURCHARGED
S2.003	S16	151.895	0.011	0.000	1.12			204.4	SURCHARGED
S2.004	SPI In	151.874	0.000	0.000	0.82			204.8	SURCHARGED
S2.005	SPI Out	151.842	0.068	0.000	1.10			201.2	SURCHARGED
S2.006	S17	151.819	-0.020	0.000	1.00			197.7	OK
S5.000	S1	153.289	-0.411	0.000	0.21			134.2	OK
S5.001	S2	152.746	-0.199	0.000	0.76			265.0	OK
S5.002	S3	152.586	-0.280	0.000	0.54			264.6	OK
S5.003	S4	152.320	-0.310	0.000	0.47			267.6	OK
S5.004	S5	151.948	-0.344	0.000	0.38			267.6	OK

PN	US/MH Name	Level Exceeded
S1.000	S6	
S1.001	S7	
S2.000	S8	
S2.001	S9	
S3.000	S10	
S3.001	S11	
S4.000	S12	
S3.002	S13	
S3.003	S14	
S2.002	S15	
S2.003	S16	
S2.004	SPI In	
S2.005	SPI Out	
S2.006	S17	
S5.000	S1	
S5.001	S2	
S5.002	S3	
S5.003	S4	
S5.004	S5	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.002	S18	15 Winter	30	+0%	30/15 Winter				151.516
S1.003	S18	15 Winter	30	+0%	30/15 Summer				149.313

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.002	S18	0.015	0.000	1.01		6	356.9	SURCHARGED	
S1.003	S18	0.074	0.000	1.15			356.8	SURCHARGED	

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

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.355
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	450.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	OFF
Inertia Status	OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S6	15 Winter	100	+40%				
S1.001	S7	15 Winter	100	+40%	100/15 Summer			
S2.000	S8	15 Winter	100	+40%	100/15 Summer			
S2.001	S9	15 Winter	100	+40%	100/15 Summer			
S3.000	S10	15 Winter	100	+40%	100/15 Summer			
S3.001	S11	15 Winter	100	+40%	100/15 Summer			
S4.000	S12	15 Winter	100	+40%	100/15 Summer			
S3.002	S13	15 Winter	100	+40%	100/15 Summer			
S3.003	S14	15 Winter	100	+40%	30/15 Summer			
S2.002	S15	15 Winter	100	+40%	30/15 Summer			
S2.003	S16	15 Winter	100	+40%	30/15 Winter			
S2.004	SPI In	15 Winter	100	+40%	30/15 Winter			
S2.005	SPI Out	15 Winter	100	+40%	30/15 Winter			
S2.006	S17	15 Winter	100	+40%	100/15 Summer			
S5.000	S1	15 Winter	100	+40%				
S5.001	S2	15 Winter	100	+40%	100/15 Summer			
S5.002	S3	15 Winter	100	+40%				
S5.003	S4	15 Winter	100	+40%				
S5.004	S5	15 Winter	100	+40%				

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S6	153.067	-0.308	0.000	0.07			27.8	OK
S1.001	S7	152.102	0.389	0.000	0.23			24.2	SURCHARGED
S2.000	S8	152.650	0.125	0.000	0.27			47.2	SURCHARGED
S2.001	S9	152.637	0.166	0.000	0.19			109.8	SURCHARGED
S3.000	S10	152.721	0.198	0.000	0.16			11.8	SURCHARGED
S3.001	S11	152.710	0.355	0.000	0.22			24.9	SURCHARGED
S4.000	S12	152.709	0.287	0.000	0.25			16.5	SURCHARGED
S3.002	S13	152.680	0.669	0.000	0.71			109.4	SURCHARGED
S3.003	S14	152.650	0.680	0.000	1.09			163.0	SURCHARGED
S2.002	S15	152.605	0.675	0.000	1.97			325.3	SURCHARGED
S2.003	S16	152.439	0.555	0.000	1.78			326.2	SURCHARGED
S2.004	SPI In	152.294	0.420	0.000	1.31			326.1	SURCHARGED
S2.005	SPI Out	152.182	0.408	0.000	1.77			324.2	SURCHARGED
S2.006	S17	152.137	0.298	0.000	1.60			316.9	SURCHARGED
S5.000	S1	153.361	-0.339	0.000	0.39			243.3	OK
S5.001	S2	153.075	0.130	0.000	1.36			472.4	SURCHARGED
S5.002	S3	152.746	-0.120	0.000	0.98			478.1	OK
S5.003	S4	152.453	-0.177	0.000	0.84			479.8	OK
S5.004	S5	152.115	-0.177	0.000	0.67			471.8	OK

PN	US/MH Name	Level Exceeded
S1.000	S6	
S1.001	S7	
S2.000	S8	
S2.001	S9	
S3.000	S10	
S3.001	S11	
S4.000	S12	
S3.002	S13	
S3.003	S14	
S2.002	S15	
S2.003	S16	
S2.004	SPI In	
S2.005	SPI Out	
S2.006	S17	
S5.000	S1	
S5.001	S2	
S5.002	S3	
S5.003	S4	
S5.004	S5	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.002	S18	15 Winter	100	+40%	30/15 Winter				152.097
S1.003	S18	15 Winter	100	+40%	30/15 Summer				149.429

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.002	S18	0.596	0.000	1.14		8	404.3	SURCHARGED	
S1.003	S18	0.190	0.000	1.30			404.6	SURCHARGED	

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	2
FEH Rainfall Version	1999
Site Location	GB 436500 402000 SE 36500 02000
C (1km)	-0.025
D1 (1km)	0.365
D2 (1km)	0.443
D3 (1km)	0.228
E (1km)	0.296
F (1km)	2.386
Maximum Rainfall (mm/hr)	100
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.000
Maximum Backdrop Height (m)	0.000
Min Design Depth for Optimisation (m)	0.900
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm

- Indicates pipe length does not match coordinates

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	38.639	1.662	23.2	0.046	4.00	0.0	0.600	o	375	Pipe/Conduit	
S1.001	41.223	0.137	300.9	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S2.000	27.033	0.054	500.6	0.090	4.00	0.0	0.600	o	525	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	75.98	4.17	153.000	0.046	0.0	0.0	0.0	3.77	416.6	9.5
S1.001	69.02	4.83	151.338	0.046	0.0	0.0	0.0	1.04	114.8	9.5
S2.000	72.80	4.45	152.000	0.090	0.0	0.0	0.0	0.99	215.2	17.8

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S2.001	23.771	0.541	43.9	0.150	0.00	0.0	0.600	o	525	Pipe/Conduit	
S3.000	30.943	0.168	184.2	0.022	4.00	0.0	0.600	o	300	Pipe/Conduit	
S3.001	28.407	0.344	82.6	0.036	0.00	0.0	0.600	o	300	Pipe/Conduit	
S4.000	21.200	0.411	51.6	0.031	4.00	0.0	0.600	o	225	Pipe/Conduit	
S3.002	20.285	0.041	494.8	0.155	0.00	0.0	0.600	o	525	Pipe/Conduit	
S3.003	20.097	0.040	502.4	0.118	0.00	0.0	0.600	o	525	Pipe/Conduit	
S2.002	23.008	0.046	500.2	0.135	0.00	0.0	0.600	o	525	Pipe/Conduit	
S2.003	1.000#	0.010	100.0	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
S2.004	8.675#	0.100	86.8	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
S2.005	1.000#	0.010	100.0	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
S2.006	19.176	0.038	504.6	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
S5.000	76.198	0.755	100.9	0.410	4.00	0.0	0.600	o	600	Pipe/Conduit	
S5.001	8.002	0.079	101.3	0.410	0.00	0.0	0.600	o	600	Pipe/Conduit	
S5.002	23.796	0.236	100.8	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
S5.003	34.065	0.338	100.8	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
S5.004	9.322	0.491	19.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S2.001	71.58	4.57	151.946	0.241	0.0	0.0	0.0	3.39	733.0	46.7
S3.000	72.87	4.45	152.223	0.022	0.0	0.0	0.0	1.16	81.7	4.3
S3.001	70.09	4.72	152.055	0.058	0.0	0.0	0.0	1.73	122.4	10.9
S4.000	75.71	4.19	152.197	0.031	0.0	0.0	0.0	1.83	72.6	6.3
S3.002	67.00	5.06	151.486	0.244	0.0	0.0	0.0	1.00	216.5	44.2
S3.003	64.23	5.40	151.445	0.362	0.0	0.0	0.0	0.99	214.8	63.0
S2.002	61.40	5.78	151.405	0.737	0.0	0.0	0.0	0.99	215.3	122.6
S2.003	61.35	5.79	151.359	0.737	0.0	0.0	0.0	2.24	484.9	122.6
S2.004	60.94	5.85	151.349	0.737	0.0	0.0	0.0	2.41	520.8	122.6
S2.005	60.89	5.86	151.249	0.737	0.0	0.0	0.0	2.24	484.9	122.6
S2.006	58.96	6.15	151.239	0.737	0.0	0.0	0.0	1.08	304.6	122.6
S5.000	72.05	4.52	153.100	0.410	0.0	0.0	0.0	2.42	685.4	80.0
S5.001	71.49	4.58	152.345	0.820	0.0	0.0	0.0	2.42	684.2	158.8
S5.002	69.87	4.74	152.266	0.820	0.0	0.0	0.0	2.43	685.7	158.8
S5.003	67.71	4.98	152.030	0.820	0.0	0.0	0.0	2.43	685.9	158.8
S5.004	67.46	5.00	151.692	0.820	0.0	0.0	0.0	5.61	1585.1	158.8

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.002	10.000	2.000	5.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.003	19.677	0.304	64.7	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.002	58.81	6.18	151.201	1.603	0.0	0.0	0.0	7.08	500.2	255.4
S1.003	58.02	6.31	148.789	1.603	0.0	0.0	0.0	2.53	402.4	255.4

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdro (mm)
S6	154.550	1.550	Open Manhole	1500	S1.000	153.000	375				
S7	154.550	3.212	Open Manhole	1500	S1.001	151.338	375	S1.000	151.338	375	
S8	154.125	2.125	Open Manhole	1500	S2.000	152.000	525				
S9	154.125	2.179	Open Manhole	1500	S2.001	151.946	525	S2.000	151.946	525	
S10	154.725	2.502	Open Manhole	1200	S3.000	152.223	300				
S11	154.725	2.670	Open Manhole	1200	S3.001	152.055	300	S3.000	152.055	300	
S12	154.625	2.428	Open Manhole	1200	S4.000	152.197	225				
S13	154.425	2.939	Open Manhole	1500	S3.002	151.486	525	S3.001	151.711	300	
								S4.000	151.786	225	
S14	154.325	2.880	Open Manhole	1500	S3.003	151.445	525	S3.002	151.445	525	
S15	154.125	2.720	Open Manhole	1500	S2.002	151.405	525	S2.001	151.405	525	
								S3.003	151.405	525	
S16	154.375	3.016	Open Manhole	1500	S2.003	151.359	525	S2.002	151.359	525	
SPI In	154.375	3.026	Open Manhole	1500	S2.004	151.349	525	S2.003	151.349	525	
SPI Out	154.375	3.126	Open Manhole	1500	S2.005	151.249	525	S2.004	151.249	525	
S17	154.375	3.136	Open Manhole	1500	S2.006	151.239	600	S2.005	151.239	525	
S1	154.600	1.500	Open Manhole	1500	S5.000	153.100	600				
S2	154.600	2.255	Open Manhole	1500	S5.001	152.345	600	S5.000	152.345	600	
S3	154.500	2.234	Open Manhole	1500	S5.002	152.266	600	S5.001	152.266	600	
S4	154.125	2.095	Open Manhole	1500	S5.003	152.030	600	S5.002	152.030	600	
S5	154.125	2.433	Open Manhole	1500	S5.004	151.692	600	S5.003	151.692	600	
S18	154.375	3.174	Open Manhole	1500	S1.002	151.201	300	S1.001	151.201	375	
								S2.006	151.201	600	
								S5.004	151.201	600	
S18	154.343	5.554	Open Manhole	1500	S1.003	148.789	450	S1.002	149.201	300	2
S	154.310	5.825	Open Manhole	0		OUTFALL		S1.003	148.485	450	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S6	436415.414	401201.120	436415.414	401201.120	Required	
S7	436411.888	401239.598	436411.888	401239.598	Required	
S8	436430.440	401284.515	436430.440	401284.515	Required	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S9	436433.045	401257.609	436433.045	401257.609	Required	
S10	436378.621	401185.051	436378.621	401185.051	Required	
S11	436409.439	401187.828	436409.439	401187.828	Required	
S12	436439.139	401172.572	436439.139	401172.572	Required	
S13	436437.236	401193.686	436437.236	401193.686	Required	
S14	436437.485	401213.969	436437.485	401213.969	Required	
S15	436435.200	401233.936	436435.200	401233.936	Required	
S16	436458.123	401235.910	436458.123	401235.910	Required	
SPI In	436457.852	401238.964	436457.852	401238.964	Required	
SPI Out	436457.581	401242.018	436457.581	401242.018	Required	
S17	436457.040	401248.127	436457.040	401248.127	Required	
S1	436326.618	401296.136	436326.618	401296.136	Required	
S2	436402.508	401302.977	436402.508	401302.977	Required	
S3	436410.477	401303.707	436410.477	401303.707	Required	
S4	436433.168	401296.540	436433.168	401296.540	Required	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S5	436436.225	401262.612	436436.225	401262.612	Required	
S18	436445.510	401263.449	436445.510	401263.449	Required	
S18	436455.470	401264.346	436455.470	401264.346	Required	
S	436475.074	401266.037			No Entry	

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PIPELINE SCHEDULES for Storm

Upstream Manhole

- Indicates pipe length does not match coordinates

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	375	S6	154.550	153.000	1.175	Open Manhole	1500
S1.001	o	375	S7	154.550	151.338	2.837	Open Manhole	1500
S2.000	o	525	S8	154.125	152.000	1.600	Open Manhole	1500
S2.001	o	525	S9	154.125	151.946	1.654	Open Manhole	1500
S3.000	o	300	S10	154.725	152.223	2.202	Open Manhole	1200
S3.001	o	300	S11	154.725	152.055	2.370	Open Manhole	1200
S4.000	o	225	S12	154.625	152.197	2.203	Open Manhole	1200
S3.002	o	525	S13	154.425	151.486	2.414	Open Manhole	1500
S3.003	o	525	S14	154.325	151.445	2.355	Open Manhole	1500
S2.002	o	525	S15	154.125	151.405	2.195	Open Manhole	1500
S2.003	o	525	S16	154.375	151.359	2.491	Open Manhole	1500
S2.004	o	525	SPI In	154.375	151.349	2.501	Open Manhole	1500
S2.005	o	525	SPI Out	154.375	151.249	2.601	Open Manhole	1500
S2.006	o	600	S17	154.375	151.239	2.536	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	38.639	23.2	S7	154.550	151.338	2.837	Open Manhole	1500
S1.001	41.223	300.9	S18	154.375	151.201	2.799	Open Manhole	1500
S2.000	27.033	500.6	S9	154.125	151.946	1.654	Open Manhole	1500
S2.001	23.771	43.9	S15	154.125	151.405	2.195	Open Manhole	1500
S3.000	30.943	184.2	S11	154.725	152.055	2.370	Open Manhole	1200
S3.001	28.407	82.6	S13	154.425	151.711	2.414	Open Manhole	1500
S4.000	21.200	51.6	S13	154.425	151.786	2.414	Open Manhole	1500
S3.002	20.285	494.8	S14	154.325	151.445	2.355	Open Manhole	1500
S3.003	20.097	502.4	S15	154.125	151.405	2.195	Open Manhole	1500
S2.002	23.008	500.2	S16	154.375	151.359	2.491	Open Manhole	1500
S2.003	1.000#	100.0	SPI In	154.375	151.349	2.501	Open Manhole	1500
S2.004	8.675#	86.8	SPI Out	154.375	151.249	2.601	Open Manhole	1500
S2.005	1.000#	100.0	S17	154.375	151.239	2.611	Open Manhole	1500
S2.006	19.176	504.6	S18	154.375	151.201	2.574	Open Manhole	1500

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S5.000	o	600	S1	154.600	153.100	0.900	Open Manhole	1500
S5.001	o	600	S2	154.600	152.345	1.655	Open Manhole	1500
S5.002	o	600	S3	154.500	152.266	1.634	Open Manhole	1500
S5.003	o	600	S4	154.125	152.030	1.495	Open Manhole	1500
S5.004	o	600	S5	154.125	151.692	1.833	Open Manhole	1500
S1.002	o	300	S18	154.375	151.201	2.874	Open Manhole	1500
S1.003	o	450	S18	154.343	148.789	5.104	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S5.000	76.198	100.9	S2	154.600	152.345	1.655	Open Manhole	1500
S5.001	8.002	101.3	S3	154.500	152.266	1.634	Open Manhole	1500
S5.002	23.796	100.8	S4	154.125	152.030	1.495	Open Manhole	1500
S5.003	34.065	100.8	S5	154.125	151.692	1.833	Open Manhole	1500
S5.004	9.322	19.0	S18	154.375	151.201	2.574	Open Manhole	1500
S1.002	10.000	5.0	S18	154.343	149.201	4.842	Open Manhole	1500
S1.003	19.677	64.7	S	154.310	148.485	5.375	Open Manhole	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.003	S	154.310	148.485	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

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Simulation Criteria for Storm

Rainfall Model	FEH
Return Period (years)	2
FEH Rainfall Version	1999
Site Location	GB 436500 402000 SE 36500 02000
C (1km)	-0.025
D1 (1km)	0.365
D2 (1km)	0.443
D3 (1km)	0.228
E (1km)	0.296
F (1km)	2.386
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

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Storage Structures for Storm

Cellular Storage Manhole: S18, DS/PN: S1.002

Invert Level (m) 151.201 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	150.0	150.0	1.201	0.0	210.0
1.200	150.0	210.0			

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

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	1999
Site Location	GB 436500 402000 SE 36500 02000
C (1km)	-0.025
D1 (1km)	0.365
D2 (1km)	0.443
D3 (1km)	0.228
E (1km)	0.296
F (1km)	2.386
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	450.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	OFF
Inertia Status	OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S6	60 Summer	1	+0%					153.017
S1.001	S7	60 Summer	1	+0%	100/60 Summer				151.383
S2.000	S8	60 Summer	1	+0%					152.073
S2.001	S9	60 Summer	1	+0%					152.007
S3.000	S10	60 Summer	1	+0%					152.254
S3.001	S11	60 Summer	1	+0%	100/60 Summer				152.093
S4.000	S12	60 Summer	1	+0%					152.225
S3.002	S13	60 Summer	1	+0%	100/60 Summer				151.653
S3.003	S14	60 Summer	1	+0%	100/60 Summer				151.636

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S6	-0.358	0.000	0.01			3.6	OK	
S1.001	S7	-0.330	0.000	0.03			3.6	OK	
S2.000	S8	-0.452	0.000	0.04			7.1	OK	
S2.001	S9	-0.464	0.000	0.03			17.8	OK	
S3.000	S10	-0.269	0.000	0.02			1.7	OK	
S3.001	S11	-0.262	0.000	0.04			4.3	OK	
S4.000	S12	-0.197	0.000	0.04			2.5	OK	
S3.002	S13	-0.358	0.000	0.11			17.4	OK	
S3.003	S14	-0.334	0.000	0.17			25.1	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S2.002	S15	60 Summer	1	+0%	100/60 Summer			
S2.003	S16	60 Summer	1	+0%	100/60 Summer			
S2.004	SPI In	60 Summer	1	+0%	100/60 Summer			
S2.005	SPI Out	60 Summer	1	+0%	100/60 Summer			
S2.006	S17	60 Summer	1	+0%	100/60 Summer			
S5.000	S1	60 Summer	1	+0%				
S5.001	S2	60 Summer	1	+0%				
S5.002	S3	60 Summer	1	+0%				
S5.003	S4	60 Summer	1	+0%				
S5.004	S5	60 Summer	1	+0%				
S1.002	S18	60 Summer	1	+0%	100/60 Summer			
S1.003	S18	60 Summer	1	+0%	100/60 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S2.002	S15	151.614	-0.316	0.000	0.31			51.1	OK
S2.003	S16	151.547	-0.337	0.000	0.28			51.0	OK
S2.004	SPI In	151.510	-0.364	0.000	0.20			50.9	OK
S2.005	SPI Out	151.447	-0.327	0.000	0.28			50.9	OK
S2.006	S17	151.445	-0.394	0.000	0.26			50.8	OK
S5.000	S1	153.188	-0.512	0.000	0.05			32.3	OK
S5.001	S2	152.514	-0.431	0.000	0.18			61.4	OK
S5.002	S3	152.407	-0.459	0.000	0.13			61.1	OK
S5.003	S4	152.161	-0.469	0.000	0.11			61.4	OK
S5.004	S5	151.811	-0.481	0.000	0.09			61.5	OK
S1.002	S18	151.314	-0.187	0.000	0.30		15	107.4	OK
S1.003	S18	148.972	-0.267	0.000	0.35			107.6	OK

PN	US/MH Name	Level Exceeded
S2.002	S15	
S2.003	S16	
S2.004	SPI In	
S2.005	SPI Out	
S2.006	S17	
S5.000	S1	
S5.001	S2	
S5.002	S3	
S5.003	S4	
S5.004	S5	
S1.002	S18	
S1.003	S18	

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

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	1999
Site Location	GB 436500 402000 SE 36500 02000
C (1km)	-0.025
D1 (1km)	0.365
D2 (1km)	0.443
D3 (1km)	0.228
E (1km)	0.296
F (1km)	2.386
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	450.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	OFF
Inertia Status	OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S6	60 Summer	30	+0%					153.041
S1.001	S7	60 Summer	30	+0%	100/60 Summer				151.438
S2.000	S8	60 Summer	30	+0%					152.123
S2.001	S9	60 Summer	30	+0%					152.053
S3.000	S10	60 Summer	30	+0%					152.272
S3.001	S11	60 Summer	30	+0%	100/60 Summer				152.122
S4.000	S12	60 Summer	30	+0%					152.245
S3.002	S13	60 Summer	30	+0%	100/60 Summer				151.835
S3.003	S14	60 Summer	30	+0%	100/60 Summer				151.822

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S6	-0.334	0.000	0.03			10.0	OK	
S1.001	S7	-0.275	0.000	0.09			9.7	OK	
S2.000	S8	-0.402	0.000	0.11			19.3	OK	
S2.001	S9	-0.418	0.000	0.09			51.4	OK	
S3.000	S10	-0.251	0.000	0.06			4.7	OK	
S3.001	S11	-0.233	0.000	0.11			12.3	OK	
S4.000	S12	-0.177	0.000	0.10			6.7	OK	
S3.002	S13	-0.176	0.000	0.33			50.9	OK	
S3.003	S14	-0.148	0.000	0.49			73.7	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S2.002	S15	60 Summer	30	+0%	100/60 Summer			
S2.003	S16	60 Summer	30	+0%	100/60 Summer			
S2.004	SPI In	60 Summer	30	+0%	100/60 Summer			
S2.005	SPI Out	60 Summer	30	+0%	100/60 Summer			
S2.006	S17	60 Summer	30	+0%	100/60 Summer			
S5.000	S1	60 Summer	30	+0%				
S5.001	S2	60 Summer	30	+0%				
S5.002	S3	60 Summer	30	+0%				
S5.003	S4	60 Summer	30	+0%				
S5.004	S5	60 Summer	30	+0%				
S1.002	S18	60 Summer	30	+0%	100/60 Summer			
S1.003	S18	60 Summer	30	+0%	100/60 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S2.002	S15	151.799	-0.131	0.000	0.91			149.9	OK
S2.003	S16	151.721	-0.163	0.000	0.82			149.0	OK
S2.004	SPI In	151.665	-0.209	0.000	0.60			148.5	OK
S2.005	SPI Out	151.641	-0.133	0.000	0.81			148.8	OK
S2.006	S17	151.627	-0.212	0.000	0.74			147.8	OK
S5.000	S1	153.250	-0.450	0.000	0.14			87.8	OK
S5.001	S2	152.649	-0.296	0.000	0.51			175.8	OK
S5.002	S3	152.515	-0.351	0.000	0.36			175.9	OK
S5.003	S4	152.257	-0.373	0.000	0.31			175.4	OK
S5.004	S5	151.895	-0.397	0.000	0.25			175.1	OK
S1.002	S18	151.421	-0.080	0.000	0.88		11	312.4	OK
S1.003	S18	149.232	-0.007	0.000	1.00			310.9	OK

PN	US/MH Name	Level Exceeded
S2.002	S15	
S2.003	S16	
S2.004	SPI In	
S2.005	SPI Out	
S2.006	S17	
S5.000	S1	
S5.001	S2	
S5.002	S3	
S5.003	S4	
S5.004	S5	
S1.002	S18	
S1.003	S18	

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

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	1999
Site Location	GB 436500 402000 SE 36500 02000
C (1km)	-0.025
D1 (1km)	0.365
D2 (1km)	0.443
D3 (1km)	0.228
E (1km)	0.296
F (1km)	2.386
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	450.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	OFF
Inertia Status	OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S6	60 Summer	100	+40%					153.055
S1.001	S7	60 Summer	100	+40%	100/60 Summer				151.979
S2.000	S8	60 Summer	100	+40%					152.318
S2.001	S9	60 Summer	100	+40%					152.308
S3.000	S10	60 Summer	100	+40%					152.372
S3.001	S11	60 Summer	100	+40%	100/60 Summer				152.363
S4.000	S12	60 Summer	100	+40%					152.365
S3.002	S13	60 Summer	100	+40%	100/60 Summer				152.341
S3.003	S14	60 Summer	100	+40%	100/60 Summer				152.318

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S6	-0.320	0.000	0.05			20.0	OK	
S1.001	S7	0.266	0.000	0.16			17.0	SURCHARGED	
S2.000	S8	-0.207	0.000	0.21			37.3	OK	
S2.001	S9	-0.163	0.000	0.17			94.6	OK	
S3.000	S10	-0.151	0.000	0.13			9.3	OK	
S3.001	S11	0.008	0.000	0.23			25.9	SURCHARGED	
S4.000	S12	-0.057	0.000	0.20			13.4	OK	
S3.002	S13	0.330	0.000	0.55			83.9	SURCHARGED	
S3.003	S14	0.348	0.000	0.87			130.0	SURCHARGED	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S2.002	S15	60 Summer	100	+40%	100/60 Summer			
S2.003	S16	60 Summer	100	+40%	100/60 Summer			
S2.004	SPI In	60 Summer	100	+40%	100/60 Summer			
S2.005	SPI Out	60 Summer	100	+40%	100/60 Summer			
S2.006	S17	60 Summer	100	+40%	100/60 Summer			
S5.000	S1	60 Summer	100	+40%				
S5.001	S2	60 Summer	100	+40%				
S5.002	S3	60 Summer	100	+40%				
S5.003	S4	60 Summer	100	+40%				
S5.004	S5	60 Summer	100	+40%				
S1.002	S18	60 Summer	100	+40%	100/60 Summer			
S1.003	S18	60 Summer	100	+40%	100/60 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S2.002	S15	152.284	0.354	0.000	1.54			255.4	SURCHARGED
S2.003	S16	152.190	0.306	0.000	1.39			254.5	SURCHARGED
S2.004	SPI In	152.093	0.219	0.000	1.02			254.2	SURCHARGED
S2.005	SPI Out	152.036	0.262	0.000	1.39			253.6	SURCHARGED
S2.006	S17	152.011	0.172	0.000	1.27			252.7	SURCHARGED
S5.000	S1	153.318	-0.382	0.000	0.28			176.1	OK
S5.001	S2	152.841	-0.104	0.000	1.00			347.0	OK
S5.002	S3	152.642	-0.224	0.000	0.71			346.9	OK
S5.003	S4	152.368	-0.262	0.000	0.61			347.0	OK
S5.004	S5	151.995	-0.297	0.000	0.49			347.2	OK
S1.002	S18	151.972	0.471	0.000	1.11		9	395.0	SURCHARGED
S1.003	S18	149.404	0.165	0.000	1.27			394.8	SURCHARGED

PN	US/MH Name	Level Exceeded
S2.002	S15	
S2.003	S16	
S2.004	SPI In	
S2.005	SPI Out	
S2.006	S17	
S5.000	S1	
S5.001	S2	
S5.002	S3	
S5.003	S4	
S5.004	S5	
S1.002	S18	
S1.003	S18	

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