Land off Wakefield Road, Mapplewell, Barnsley

Planning Application Ref 2017/17/16

Discharge of Planning Condition 15

1 Introduction

Planning Condition No 15 stats the following:

> *No development shall take place unless and until full foul and surface water drainage details, including Yorkshire Water Permission to discharge, have been submitted to and approved in writing by the Local Planning Authority. Thereafter no part of the development shall be occupied or brought into use until the approved scheme has been fully implemented. The scheme shall be retained throughout the life of the development unless otherwise agreed in writing with the Local Planning Authority.*

The information contained within this brief report provides sufficient information to allow the condition to be discharged.

The following information is provided:

a) Copy of Yorkshire Water's letter dated 4th August 2017 confirming that the foul flows from both the Lidl development and the Residential development to the north can be discharged to the existing 225mm diameter foul sewer located to the west of Wakefield Road. (Appendix A).
b) Detailed Drainage Plan showing the proposed on plot foul and surface water drainage design for the Lidl store (Appendix B)
c) Detailed Plan and long section plus associated Micro Drainage calculations for the off site foul and surface water sewers. (Appendix C).

2 Off Site Sewer Works

In relation to the off site foul and surface water sewer works these are to be located within Wakefield Road and will be subject to a future Section 104 agreement with Yorkshire Water.

The proposed drainage design is based on the previous information and assessment as contained within the WYG Flood Risk & Drainage Assessment dated 21 Dec 2017 which was submitted to support the planning application.

2.1 Foul Sewer

Within the residential site the foul sewers will drain to a new adoptable pumping station from where they will be pumped through the development and into a new section of adopted gravity foul sewer which will initially drain through the Lidl site and then into Wakefield Road.

The foul drainage from the Lidl site will be drained via a gravity drainage system and discharge into a manhole located on the proposed adoptable section of foul sewer which drains along the western boundary of the site.

The foul sewer will drain south along Wakefield Road for a distance of approximately 120 m where it will connect onto an existing 150mm section of public sewer which in turn drains to the west across

Wakefield Road and into the main Yorkshire Water 225mm diameter foul sewer which drains south within the adjacent rear gardens.

2.2 Surface Water Sewer

Within the residential site to the north, the development will drain to a new adoptable surface water pumping station which shall include a below ground attenuation tank. The pumping station will discharge at 6 l/s (the agreed greenfield run off rate) and pump up through the site and discharge into a manhole located on the proposed adoptable section of foul sewer which drains along the western boundary of the site.

Within the Lidl site, the site will drain by a gravity drainage system to a below ground cellular attenuation tank with the outflow being restricted to 5 l/s (agreed greenfield discharge rate) by means of a hydrobrake flow control device. The sewer will then discharge into a manhole located on the proposed adoptable section of surface water sewer which drains along the western boundary of the site.

Off site a new 150mm diameter surface water sewer is to be laid within Wakefield Road initially draining south to the junction with Bar Lane. At this point the new sewer will increase in size and receive the existing highway drainage from Wakefield Road. The new sewer will then drain to the south down an embankment and along the disused railway line for a distance of 235m, where it will outfall into an existing ditch. Over the section through the disused railway line, it is proposed to follow a similar alignment and use the existing outfall location to the existing highway drain which the new Section 104 sewer will replace.

It should be noted that where the new sewer drains along the old railway embankment the alignment has been retained with land owned by Barnsley MBC.

Appendix A

Yorkshire Water Pre Development Response dated 4th August 2017

YorkshireWater

Mr F Aguilar
WYG Management Services Ltd
Arndale Court
Arndale Otley Road
Headingley
Leeds
LS6 2UJ

Yorkshire Water Services
Developer Services
Sewerage Technical Team
PO BOX 52
Bradford
BD3 7AY

Tel: 0345 120 8482
Fax: (01274) 372 834

Email:
Technical.Sewerage@yorkshirewater.co.uk

For telephone enquiries ring:
Chris Roberts on 0345 120 8482

Your Ref: A104788
Our Ref: T012355

4th August 2017

Dear Mr Aguilar,

Wakefield Road, Mapplewell HU7 3GB - Pre Planning Sewerage Consultation on R649307 - RESIDENTIAL

Thank you for your recent enquiry. Our charge of £153.00 (plus VAT) will be added to your account with us, reference WYG074. You will receive an invoice for your account in due course.

Please find enclosed a complimentary extract from the Statutory Sewer Map which indicates the recorded position of the public sewers. Please note that as of October 2011 and the private to public sewer transfer, there are many uncharted Yorkshire Water assets currently not shown on our records. The following comments reflect our view, with regard to the public sewer network only, based on a 'desk top' study of the site and are valid for a maximum period of twelve months.

Foul Water

Development of the site should take place with separate systems for foul and surface water drainage. The separate systems should extend to the points of discharge to be agreed.

Foul water domestic waste should discharge to the 225 mm diameter public foul sewer recorded in Wakefield Road, at a point to the west of the site.

Surface Water

The developer's attention is drawn to Requirement H3 of the Building Regulations 2000. This establishes a preferred hierarchy for surface water disposal. Consideration should firstly be given to discharge to soakaway, infiltration system and watercourse in that priority order.

Sustainable Drainage Systems (SuDS), for example the use of soakaways and/or permeable hardstanding etc, may be a suitable solution for surface water disposal appropriate in this situation. You are advised to seek comments on the suitability of SuDS in this instance from the appropriate authorities.

Please note further restrictions on surface water disposal from the site may be imposed by other parties. You are strongly advised to seek advice/comments from the Environment Agency/Land Drainage Authority, with regard to surface water disposal from the site.

YorkshireWater

It is understood that a culverted watercourse is located in Wakefield Road to the west of the site. This appears to be the obvious place for surface water disposal (if SuDS are not viable).

Please note further restrictions on surface water disposal from the site may be imposed by other parties. You are strongly advised to seek advice/comments from the Environment Agency/Land Drainage Authority, with regard to surface water disposal from the site.

Other Observations

Any new connection to an existing public sewer will require the prior approval of Yorkshire Water. You may obtain an application form from our website (www.yorkshirewater.com) or by telephoning 0345 120 84 82.

An off-site foul and surface water sewer may be required which may be provided by the developer and considered for adoption under Section 104 of the Water Industry Act 1991. Please telephone 0345 120 84 82 for advice on sewer adoptions. Alternatively, the developer may in certain circumstances be able to requisition off-site sewers under Section 98 of the Water Industry Act 1991 for which an application must be made in writing. For further information, please telephone 0345 120 84 82.

Prospectively adoptable sewers and pumping stations must be designed and constructed in accordance with the WRc publication "Sewers for Adoption - a design and construction guide for developers" 6th Edition as supplemented by Yorkshire Water's requirements, pursuant to an agreement under Section 104 of the Water Industry Act 1991. An application to enter into a Section 104 agreement must be made in writing prior to any works commencing on site. Please contact our Developer Services Team (telephone 0345 120 84 82) for further information.

The public sewer network is for domestic sewage purposes. This generally means foul water for domestic purposes and, where a suitable surface water or combined sewer is available, surface water from the roofs of buildings together with surface water from paved areas of land appurtenant to those buildings. Land and highway drainage have no right of connection to the public sewer network. No land drainage to be connected/discharged to public sewer.

As a last resort, highway drainage may be accepted under certain circumstances. If it can be demonstrated, through satisfactory evidence, that SUDS are not a viable option, there are no watercourses or highway drains available and if capacity is available within the public sewer network, highway drainage discharges to the public sewer network may be permitted. In this event, the developer may be required to enter into a formal agreement with Yorkshire Water Services under Section 115 Water Industry Act 1991 to discharge non-domestic flows into the public sewer network.

All the above comments are based upon the information and records available at the present time. The information contained in this letter together with that shown on any extract from the Statutory Sewer Map that may be enclosed is believed to be correct and is supplied in good faith. Please note that capacity in the public sewer network is not reserved for specific future development. It is used up on a 'first come, first served' basis. You should visit the site and establish the line and level of any public sewers affecting your proposals before the commencement of any design work.

Yours sincerely

Chris Roberts
Sewerage Technician
Developer Services


WAKEFIELD ROAD
97.9m
Nursery School
Garage
Post
96.0m
Eastfield Arms
(PH)
Path (um)
96.8m
42
30
27
13
16
2
9
3
1

Appendix B

Lidl Foul and Surface Water Drainage Layout

Notes:

1. This drawing is to be read in conjunction with all relevant architect's and engineer's drawings.

2. It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved method statement.

Key:

- EXISTING SURFACE WATER
- PROPOSED SURFACE WATER
- EXISTING FOUL WATER
- PROPOSED FOUL WATER

FFL:98.60

MH104
E:433971.256
N:409850.128
CL:98.653
IL:96.838 (150ø)

MH105
CL.98.525
E:433973.051
N:409849.851
IL.92.026 (150ø)

MH134
E:433989.403
N:409808.249
CL.98.068
IL.96.400 (150ø)

MH124
CL.97.997
E:433991.654
N:409806.038
IL.95.550 (150ø)
IL.95.550 (150ø)

MH135
E:433985.433
N:409796.298
CL.97.966
IL.96.270 (150ø)

MH125
CL.97.853
E:433986.913
N:409789.298
IL.95.350 (150ø)
IL.95.350 (150ø)

97.9m

WAKEFIELD ROAD

STAFF

Nursery School

Drainage layout plan (1:250)

No.	Revision	Date	Drwn
B	Offsite drainage added	22.11.18	TM
A	Levels revised	7.11.18	AD

Status: TENDER

TOPPING ENGINEERS
CONSULTING CIVIL & STRUCTURAL ENGINEERS
Windsor House Cornwall Road
Harrogate HG1 2PW
t: 01423 522 293
w: www.topping-engineers.com
e: info@topping-engineers.com

Client: Lidl UK GmbH

Project: Wakefield Road, Mapplewell

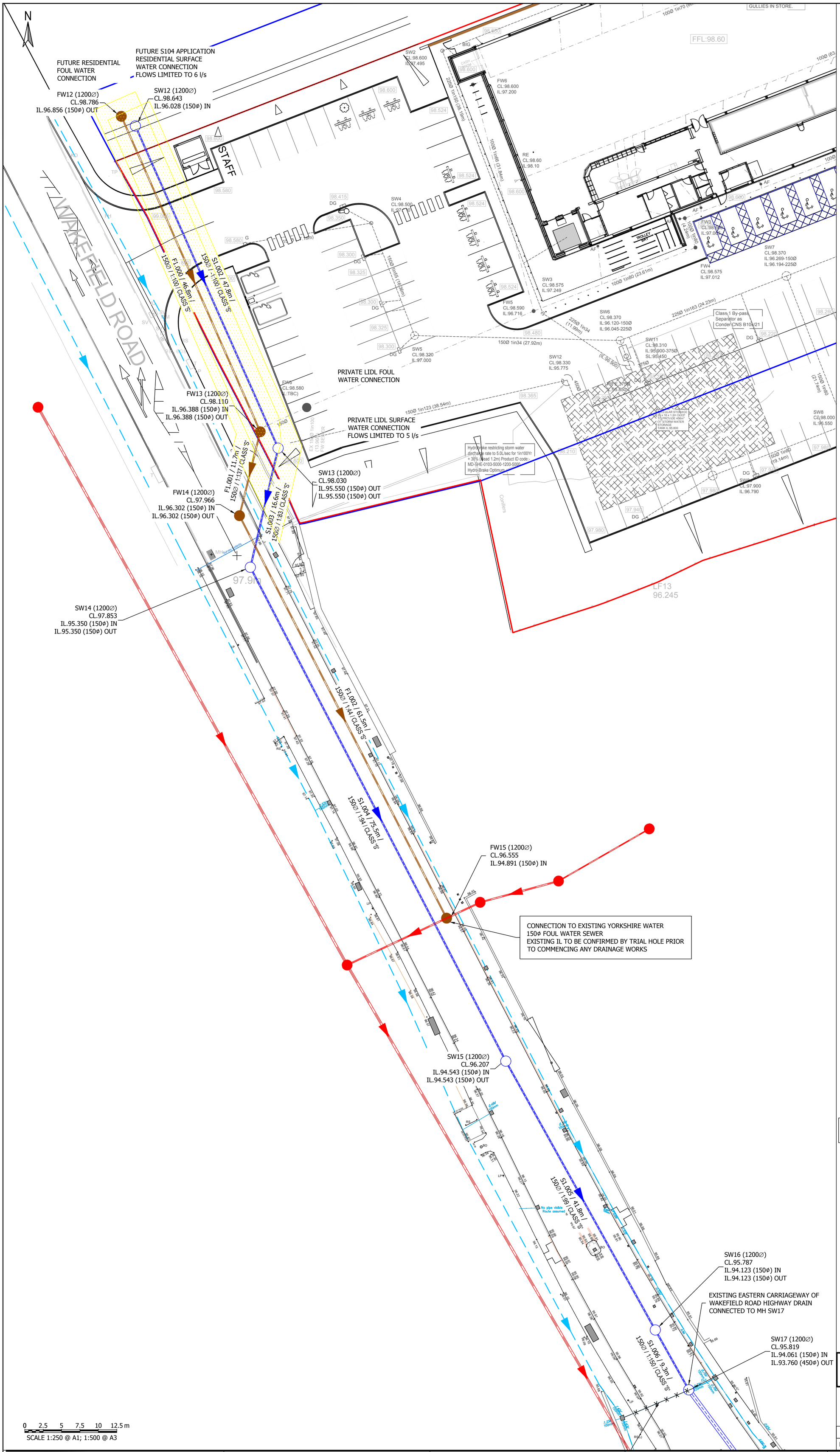
Drawing title: Drainage Layout Alternative Plan (Gullies to Car Park)

Drawn	Chkd	Date	Scale
AD		November 18	1:250

Contract No.	Drg No.	Revision
17466	C-53	B

Appendix C

Off Site Foul and Surface Water Drainage Layout & Calculations



DO NOT SCALE: CONTRACTOR TO CHECK ALL DIMENSIONS AND REPORT ANY OMISSIONS OR ERRORS

NOTES

1. ALL LEVELS GIVEN IN METRES AOD
2. ALL PIPE DIAMETERS GIVEN IN MILLIMETRES
3. SITE TOPOGRAPHIC SURVEY PROVIDED BY LANDFORM SURVEYS, DWG 001, JULY 2015
3. WAKEFIELD ROAD TOPOGRAPHIC AND UTILITIES SURVEY PROVIDED BY CENTARA, DWG 104226, AUGUST 2018
4. LIDL DRAINAGE LAYOUT PROVUDED BY TOPPING ENGINEERING, DWG 1746 C-53 REV A, NOVEMBER 2018
5. COUNCIL BOUNDARY PROVIDED BY BARNSLEY METROPOLITAN BOROUGH COUNCIL, ASSET MANAGEMENT TEAM, NOVEMBER 2018

DEPTH OF ALL UTILITIES TO BE CONFIRMED ON-SITE

KEY

- EXISTING HIGHWAY DRAIN
- EXISTING YORKSHIRE WATER FOUL WATER SEWER
- PROPOSED SURFACE WATER SEWER
- PROPOSED FOUL WATER SEWER
- SEWER EASEMENT

PRELIMINARY ISSUE

REV	DESCRIPTION	BY	CHK	APP	DATE
P1	PRELIMINARY ISSUE	OC	TB	TB	23.11.18

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LIDL UK GmbH
LIDL UK GmbH

Project:
LIDL
MAPPLEWELL

Drawing Title:
S104 DRAINAGE
GENERAL ARRANGEMENT
SHEET 1 OF 3

Scale @ A1	Drawn	Date	Checked	Date	Approved	Date
1:250	OC	NOV 18	TB	NOV 18	TB	NOV 18

Project No.	Office	Type	Drawing No.	Revision
A104788	21	C	D100-1	P1

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NOTES

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5. COUNCIL BOUNDARY PROVIDED BY BARNSLEY METROPOLITAN BOROUGH COUNCIL, ASSET MANAGEMENT TEAM, NOVEMBER 2018

S1.005 / 41.8m / 150∅ / 1:99 / CLASS 'S'

SW16 (1200∅)
CL.95.787
IL.94.123 (150ø) IN
IL.94.123 (150ø) OUT

EXISTING EASTERN CARRIAGEWAY OF WAKEFIELD ROAD HIGHWAY DRAIN CONNECTED TO MH SW17

S1.006 / 9.3m / 150∅ / 1:150 / CLASS 'S'

SW17 (1200∅)
CL.95.819
IL.94.061 (150ø) IN
IL.93.760 (450ø) OUT

EXISTING HIGHWAY DRAIN TO BE ABANDONED

S1.007 / 24.9m / 450∅ / 1:45 / CLASS 'S'

SW18 (1200∅)
CL.95.712
IL.93.207 (450ø) IN
IL.93.207 (450ø) OUT

EXISTING WESTERN CARRIAGEWAY OF WAKEFIELD ROAD HIGHWAY DRAIN CONNECTED TO MH SW19

S1.008 / 22.8m / 450∅ / 1:43 / CLASS 'S'

SW19 (1500∅)
CL.95.558
IL.92.681 (450ø) IN
IL.92.681 (450ø) OUT

S1.009 / 10.8m / 450∅ / 1:45 / CLASS 'S'

SW20 (1500∅)
CL.94.852
IL.92.442 (450ø) IN
IL.92.442 (450ø) OUT

S1.010 / 7.1m / 450∅ / 1:45 / CLASS 'S'

SW21 (1500∅)
CL.94.656
IL.92.284 (450ø) IN
IL.92.284 (450ø) OUT

S1.011 / 14.1m / 450∅ / 1:18 / CLASS 'S'

SW22 (1500∅)
CL.93.130
IL.91.480 (450ø) IN
IL.91.480 (450ø) OUT

BOUNDARY OF BARNSLEY METROPOLITAN BOROUGH COUNCIL

S1.012 / 90.7m / 450∅ / 1:62 / CLASS 'S'

INDICATIVE ALIGNMENT OF EXISTING HIGHWAY DRAINAGE OUTFALL

SW23 (1500∅)
CL.91.655
IL.90.005 (450ø) IN
IL.90.005 (450ø) OUT

DEPTH OF ALL UTILITIES TO BE CONFIRMED ON-SITE

KEY

- EXISTING HIGHWAY DRAIN
- EXISTING YORKSHIRE WATER FOUL WATER SEWER
- PROPOSED SURFACE WATER SEWER
- PROPOSED FOUL WATER SEWER
- SEWER EASEMENT

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P1	PRELIMINARY ISSUE	OC	TB	TB	23.11.18

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Project:
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MAPPLEWELL

Drawing Title:
S104 DRAINAGE
GENERAL ARRANGEMENT
SHEET 2 OF 3

Scale @ A1	Drawn	Date	Checked	Date	Approved	Date
1:250	OC	NOV 18	TB	NOV 18	TB	NOV 18

Project No.	Office	Type	Drawing No.	Revision
A104788	21	C	D100-2	P1

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5. COUNCIL BOUNDARY PROVIDED BY BARNSLEY METROPOLITAN BOROUGH COUNCIL, ASSET MANAGEMENT TEAM, NOVEMBER 2018

BOUNDARY OF BARNSLEY METROPOLITAN BOROUGH COUNCIL

S1.012 / 90.7m / 450∅ / 1:62 / CLASS 'S'

INDICATIVE ALIGNMENT OF EXISTING HIGHWAY DRAINAGE OUTFALL

SW23 (1500∅)
CL.91.655
IL.90.005 (450ø) IN
IL.90.005 (450ø) OUT

S1.013 / 90.0m / 450∅ / 1:27 / CLASS 'S'

SW24 (1500∅)
CL.88.332
IL.86.682 (450ø) IN
IL.86.682 (450ø) OUT

S1.014 / 29.9m / 450∅ / 1:13 / CLASS 'S'

SW25 (1500∅)
CL.86.054
IL.84.404 (450ø) IN

EXISTING SURFACE WATER OUTFALL TO BE CONFIRMED ON-SITE ONCE VEGETATION CLEARED

EXISTING DITCH

DEPTH OF ALL UTILITIES TO BE CONFIRMED ON-SITE

KEY

- EXISTING HIGHWAY DRAIN
- EXISTING YORKSHIRE WATER FOUL WATER SEWER
- PROPOSED SURFACE WATER SEWER
- PROPOSED FOUL WATER SEWER
- SEWER EASEMENT

PRELIMINARY ISSUE

REV	DESCRIPTION	BY	CHK	APP	DATE
P1	PRELIMINARY ISSUE	OC	TB	TB	23.11.18

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LIDL UK GmbH

Project:
LIDL
MAPPLEWELL

Drawing Title:
S104 DRAINAGE
GENERAL ARRANGEMENT
SHEET 3 OF 3

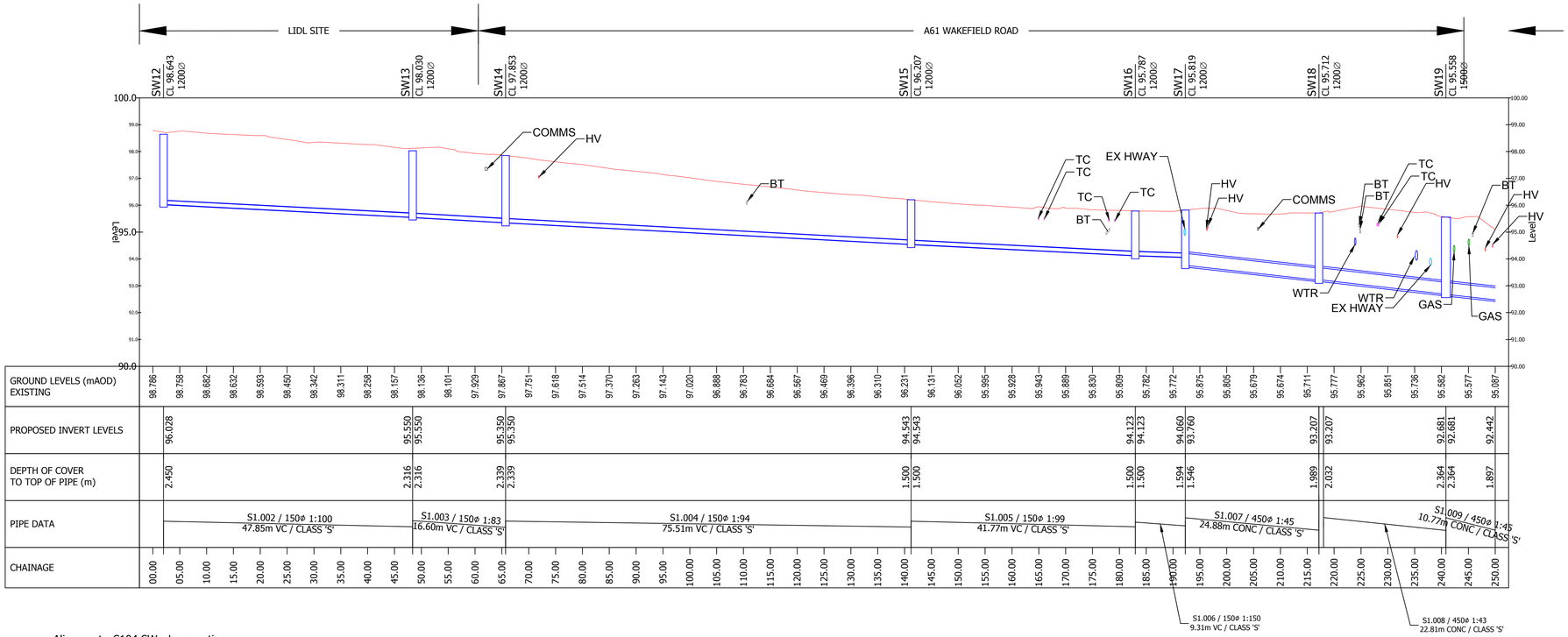
Scale @ A1	Drawn	Date	Checked	Date	Approved	Date
1:250	OC	NOV 18	TB	NOV 18	TB	NOV 18

Project No.	Office	Type	Drawing No.	Revision
A104788	21	C	D100-3	P1

DO NOT SCALE: CONTRACTOR TO CHECK ALL DIMENSIONS AND REPORT ANY OMISSIONS OR ERRORS

NOTES

1. UTILITY DEPTHS AND ALIGNMENTS PROVIDED BY CENTARA, DWG 104226, AUG 18



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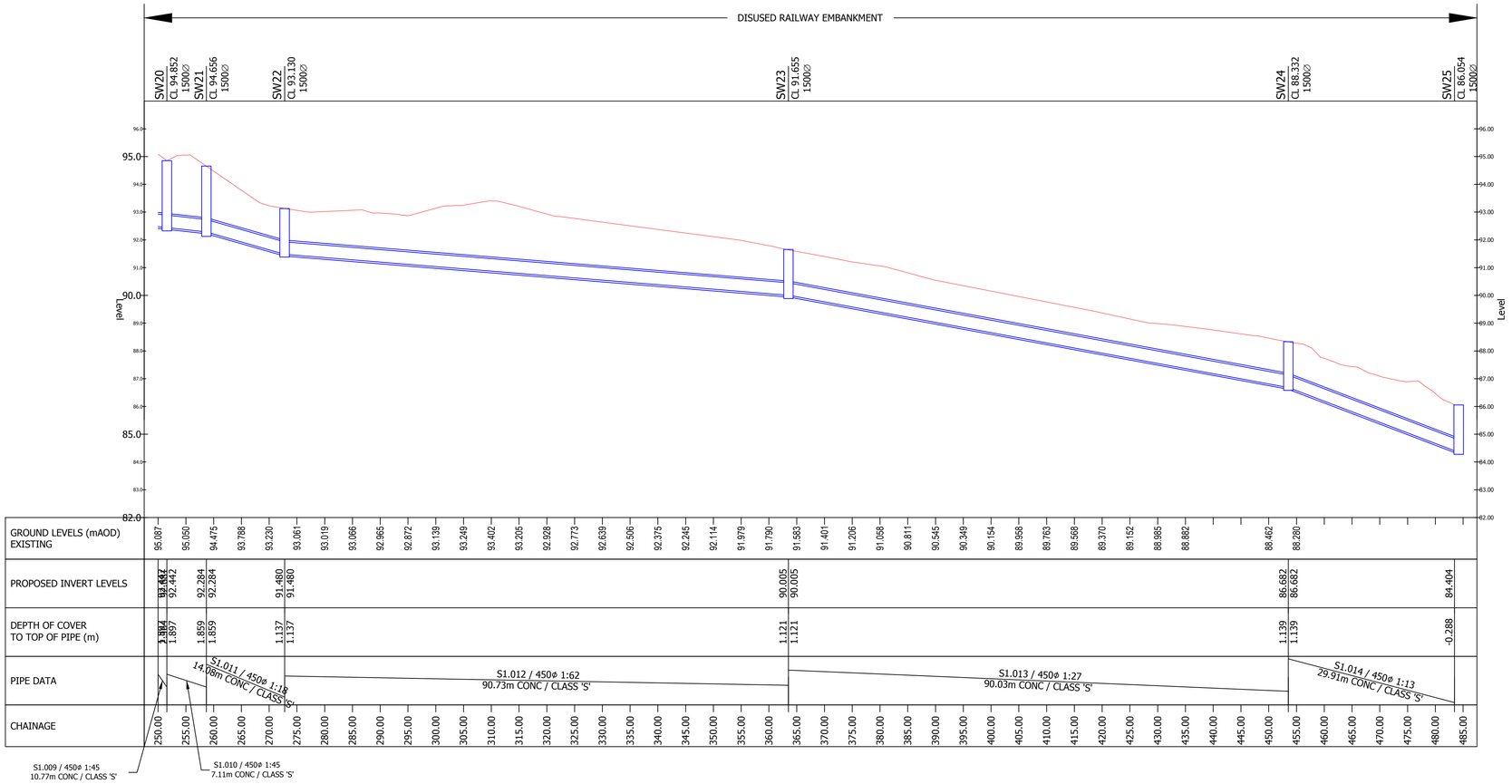

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CHAINAGE: 250.000 - 485.000
SCALE: H 1:500, V 1:100

VERTICAL SCALE
0 1000 2000 3000 4000 5000 mm
SCALE 1:100

HORIZONTAL SCALE
0 5 10 15 20 25 m
SCALE 1:500

DEPTH AND ALIGNMENT OF ALL UTILITIES TO BE CONFIRMED ON SITE

PRELIMINARY ISSUE

REV	DESCRIPTION	BY	CHK	APP	DATE
P1	PRELIMINARY ISSUE	OC	TB	TB	23.11.18

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FAX: +44 (0)113 278 3487
e-mail: leeds@wyg.com

Project:
LIDL
MAPPLEWELL

Drawing Title:
S104 SURFACE WATER
LONG SECTION

Scale @ A1	Drawn	Date	Checked	Date	Approved	Date
AS SHOWN	OC	NOV 18	TB	NOV 18	TB	NOV 18

Project No.	Office	Type	Drawing No.	Revision
A104788	21	C	D400	P1

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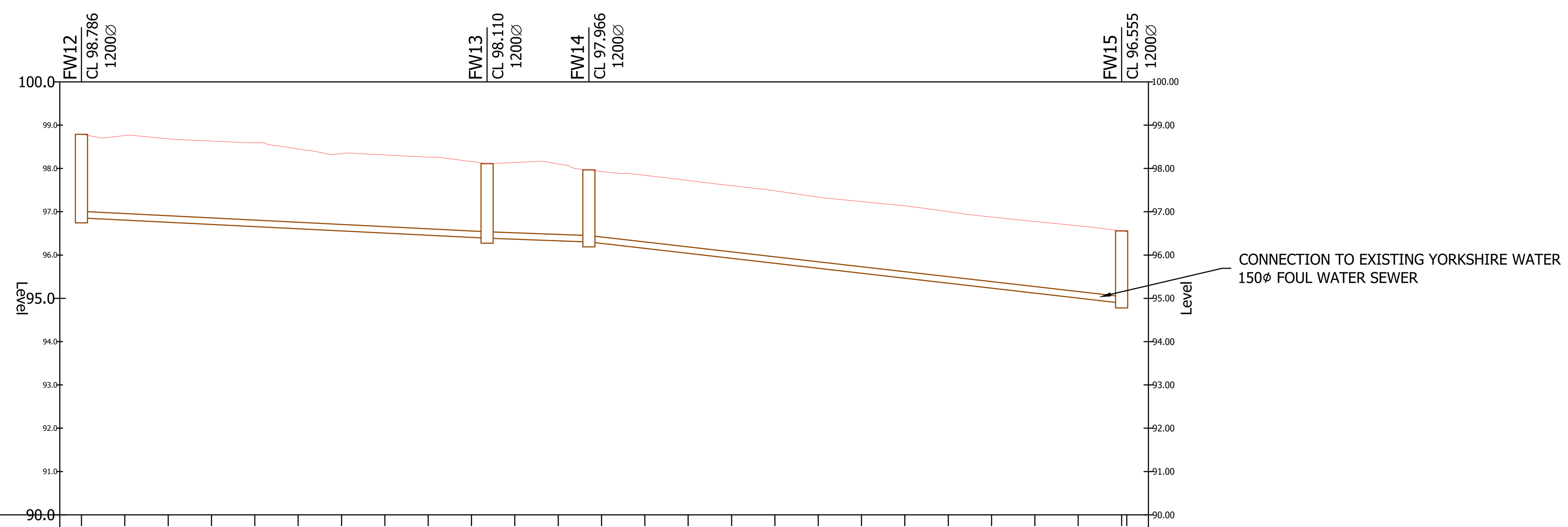
NOTES

1. UTILITY DEPTHS AND ALIGNMENTS PROVIDED BY CENTARA, DWG 104226, AUG 18



GROUND LEVELS (mAOD) EXISTING	98.786, 98.758, 98.682, 98.632, 98.593, 98.450, 98.342, 98.311, 98.258, 98.157, 98.136, 98.101, 97.927, 97.840, 97.723, 97.602, 97.484, 97.339, 97.236, 97.138, 97.003, 96.879, 96.775, 96.676, 96.555, 96.540
PROPOSED INVERT LEVELS	96.856 (FW12); 96.388 / 96.388 (FW13); 96.302 / 96.302 (FW14); 94.891 (FW15)
DEPTH OF COVER TO TOP OF PIPE (m)	1.765 (FW12); 1.557 / 1.558 (FW13); 1.500 / 1.500 (FW14); 1.500 (FW15)
PIPE DATA	F1.000 / 150ϕ 1:100 46.80m VC / CLASS 'S'; F1.001 / 150ϕ 1:137 11.75m VC / CLASS 'S'; F1.002 / 150ϕ 1:44 61.47m VC / CLASS 'S'
CHAINAGE	00.00, 05.00, 10.00, 15.00, 20.00, 25.00, 30.00, 35.00, 40.00, 45.00, 50.00, 55.00, 60.00, 65.00, 70.00, 75.00, 80.00, 85.00, 90.00, 95.00, 100.00, 105.00, 110.00, 115.00, 120.00, 120.59

Alignment - S104 FW - Longsection
CHAINAGE: 0.000 - 120.591
SCALE: H 1:500, V 1:100

DEPTH AND ALIGNMENT OF ALL UTILITIES TO BE CONFIRMED ON SITE

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P1	PRELIMINARY ISSUE	OC	TB	TB	23.11.18

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e-mail: leeds@wyg.com

Project:
LIDL
MAPPLEWELL

Drawing Title:
S104 FOUL WATER
LONG SECTION

VERTICAL SCALE
0 1000 2000 3000 4000 5000 mm
SCALE 1:100

HORIZONTAL SCALE
0 5 10 15 20 25 m
SCALE 1:500

Scale @ A1	Drawn	Date	Checked	Date	Approved	Date
AS SHOWN	OC	NOV 18	TB	NOV 18	TB	NOV 18

Project No.	Office	Type	Drawing No.	Revision
A104788	21	C	D401	P1

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	30	PIMP (%)	100
M5-60 (mm)	19.000	Add Flow / Climate Change (%)	0
Ratio R	0.355	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm

« - Indicates pipe capacity < flow

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
1.000	8.693	0.087	100.0	1.496	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.001	8.275	0.083	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.002	47.848	0.478	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
2.000	13.552	0.110	123.0	0.904	5.00	0.0	0.600	o	150	Pipe/Conduit	
2.001	6.910	0.056	123.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.003	16.605	0.200	83.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.004	75.513	0.807	93.6	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.005	41.767	0.420	99.4	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.006	9.309	0.062	150.0	0.000	0.00	0.0	0.600	o	150	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)
1.000	50.00	5.14	96.198	1.496	0.0	0.0	0.0	1.00	17.8«	202.6
1.001	50.00	5.28	96.111	1.496	0.0	0.0	0.0	1.00	17.8«	202.6
1.002	50.00	6.08	96.028	1.496	0.0	0.0	0.0	1.00	17.8«	202.6
2.000	50.00	5.25	95.716	0.904	0.0	0.0	0.0	0.90	16.0«	122.4
2.001	50.00	5.38	95.606	0.904	0.0	0.0	0.0	0.90	16.0«	122.4
1.003	50.00	6.33	95.550	2.400	0.0	0.0	0.0	1.10	19.5«	325.0
1.004	50.00	7.54	95.350	2.400	0.0	0.0	0.0	1.04	18.4«	325.0
1.005	50.00	8.23	94.543	2.400	0.0	0.0	0.0	1.01	17.8«	325.0
1.006	50.00	8.42	94.123	2.400	0.0	0.0	0.0	0.82	14.5«	325.0

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
1.007	24.879	0.553	45.0	0.580	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.008	23.658	0.526	45.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.009	10.768	0.239	45.0	0.690	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.010	7.110	0.158	45.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.011	14.081	0.804	17.5	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.012	90.726	1.475	61.5	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.013	90.026	3.323	27.1	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.014	29.915	2.278	13.1	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)
1.007	50.00	8.55	93.760	2.980	0.0	0.0	0.0	3.04	483.0	403.5
1.008	50.00	8.68	93.207	2.980	0.0	0.0	0.0	3.04	483.0	403.5
1.009	50.00	8.74	92.681	3.670	0.0	0.0	0.0	3.04	483.0«	497.0
1.010	50.00	8.78	92.442	3.670	0.0	0.0	0.0	3.04	483.0«	497.0
1.011	50.00	8.83	92.284	3.670	0.0	0.0	0.0	4.88	775.5	497.0
1.012	50.00	9.41	91.480	3.670	0.0	0.0	0.0	2.60	412.9«	497.0
1.013	50.00	9.80	90.005	3.670	0.0	0.0	0.0	3.92	623.1	497.0
1.014	50.00	9.88	86.682	3.670	0.0	0.0	0.0	5.63	895.9	497.0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.014		86.054	84.404	0.000	1500	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	2
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Region	England and Wales
Return Period (years)	30	M5-60 (mm)	19.000

Synthetic Rainfall Details

Ratio R	0.355	Cv (Winter)	0.840
Profile Type	Summer	Storm Duration (mins)	30
Cv (Summer)	0.750		

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	2
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

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

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	1	480 Winter	1	+0%	1/15 Summer	100/240 Winter		
1.001	2	1440 Winter	1	+0%	1/15 Summer	100/240 Winter		
1.002	12	1440 Winter	1	+0%				
2.000	2	360 Winter	1	+0%	1/30 Winter	100/240 Winter		
2.001	3	480 Winter	1	+0%	1/15 Summer	100/240 Winter		
1.003	13	120 Winter	1	+0%				
1.004	14	120 Winter	1	+0%				
1.005	15	120 Winter	1	+0%	100/15 Summer			
1.006	16	120 Winter	1	+0%	100/15 Summer			
1.007	17	15 Winter	1	+0%	100/15 Summer			
1.008	18	15 Winter	1	+0%	100/15 Summer			
1.009	19	15 Winter	1	+0%	30/15 Summer			
1.010	20	15 Winter	1	+0%	30/15 Summer			
1.011	14	15 Winter	1	+0%	100/15 Summer			
1.012	21	15 Winter	1	+0%	100/15 Summer			
1.013	22	15 Winter	1	+0%				
1.014	23	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)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	96.816	0.468	0.000	0.38		5.9	SURCHARGED	8
1.001	2	97.160	0.899	0.000	0.27		4.2	SURCHARGED	8
1.002	12	96.080	-0.098	0.000	0.24		4.2	OK	
2.000	2	95.970	0.104	0.000	0.35		5.1	SURCHARGED	5
2.001	3	96.056	0.300	0.000	0.36		4.9	SURCHARGED	5
1.003	13	95.627	-0.073	0.000	0.52		9.5	OK	
1.004	14	95.427	-0.073	0.000	0.52		9.5	OK	
1.005	15	94.622	-0.071	0.000	0.55		9.5	OK	
1.006	16	94.219	-0.054	0.000	0.74		9.5	OK	
1.007	17	93.879	-0.331	0.000	0.16		62.8	OK	
1.008	18	93.326	-0.331	0.000	0.16		63.0	OK	
1.009	19	92.901	-0.230	0.000	0.47		130.7	OK	
1.010	20	92.691	-0.201	0.000	0.59		131.3	OK	
1.011	14	92.439	-0.295	0.000	0.26		131.4	OK	
1.012	21	91.659	-0.271	0.000	0.33		129.9	OK	
1.013	22	90.148	-0.307	0.000	0.22		130.2	OK	
1.014	23	86.805	-0.327	0.000	0.17		130.1	OK	

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	2
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

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

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	1	960 Winter	30	+0%	1/15 Summer	100/240 Winter		
1.001	2	480 Winter	30	+0%	1/15 Summer	100/240 Winter		
1.002	12	480 Winter	30	+0%				
2.000	2	360 Winter	30	+0%	1/30 Winter	100/240 Winter		
2.001	3	1440 Winter	30	+0%	1/15 Summer	100/240 Winter		
1.003	13	1440 Winter	30	+0%				
1.004	14	1440 Winter	30	+0%				
1.005	15	960 Winter	30	+0%	100/15 Summer			
1.006	16	1440 Winter	30	+0%	100/15 Summer			
1.007	17	15 Winter	30	+0%	100/15 Summer			
1.008	18	15 Winter	30	+0%	100/15 Summer			
1.009	19	15 Winter	30	+0%	30/15 Summer			
1.010	20	15 Winter	30	+0%	30/15 Summer			
1.011	14	15 Winter	30	+0%	100/15 Summer			
1.012	21	15 Winter	30	+0%	100/15 Summer			
1.013	22	15 Winter	30	+0%				
1.014	23	15 Winter	30	+0%				

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)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	97.865	1.517	0.000	0.35		5.5	SURCHARGED	8
1.001	2	98.021	1.760	0.000	0.32		5.0	SURCHARGED	8
1.002	12	96.084	-0.094	0.000	0.29		5.0	OK	
2.000	2	96.441	0.575	0.000	0.36		5.3	SURCHARGED	5
2.001	3	96.665	0.909	0.000	0.35		4.8	SURCHARGED	5
1.003	13	95.629	-0.071	0.000	0.53		9.6	OK	
1.004	14	95.429	-0.071	0.000	0.53		9.6	OK	
1.005	15	94.624	-0.069	0.000	0.56		9.7	OK	
1.006	16	94.221	-0.052	0.000	0.75		9.6	OK	
1.007	17	93.957	-0.253	0.000	0.39		157.7	OK	
1.008	18	93.482	-0.175	0.000	0.39		155.0	OK	
1.009	19	93.404	0.273	0.000	1.18		326.6	SURCHARGED	
1.010	20	93.057	0.165	0.000	1.47		328.5	SURCHARGED	
1.011	14	92.549	-0.185	0.000	0.65		329.0	OK	
1.012	21	91.796	-0.134	0.000	0.83		324.5	OK	
1.013	22	90.245	-0.210	0.000	0.55		325.1	OK	
1.014	23	86.885	-0.247	0.000	0.42		324.7	OK	

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	2
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

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

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	1	960 Winter	100	+30%	1/15 Summer	100/240 Winter		
1.001	2	1440 Winter	100	+30%	1/15 Summer	100/240 Winter		
1.002	12	1440 Summer	100	+30%				
2.000	2	480 Winter	100	+30%	1/30 Winter	100/240 Winter		
2.001	3	480 Winter	100	+30%	1/15 Summer	100/240 Winter		
1.003	13	360 Winter	100	+30%				
1.004	14	960 Winter	100	+30%				
1.005	15	15 Winter	100	+30%	100/15 Summer			
1.006	16	15 Winter	100	+30%	100/15 Summer			
1.007	17	15 Winter	100	+30%	100/15 Summer			
1.008	18	15 Winter	100	+30%	100/15 Summer			
1.009	19	15 Winter	100	+30%	30/15 Summer			
1.010	20	15 Winter	100	+30%	30/15 Summer			
1.011	14	15 Winter	100	+30%	100/15 Summer			
1.012	21	15 Winter	100	+30%	100/15 Summer			
1.013	22	15 Winter	100	+30%				
1.014	23	15 Winter	100	+30%				

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)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	99.389	3.041	108.629	0.80		12.5	FLOOD	8
1.001	2	99.365	3.104	64.688	0.43		6.7	FLOOD	8
1.002	12	96.093	-0.085	0.000	0.39		6.7	OK	
2.000	2	98.390	2.524	17.926	0.68		10.0	FLOOD	5
2.001	3	98.348	2.592	18.400	0.53		7.2	FLOOD	5
1.003	13	95.649	-0.051	0.000	0.77		13.9	OK	
1.004	14	95.450	-0.050	0.000	0.77		13.9	OK	
1.005	15	95.132	0.439	0.000	0.91		15.8	SURCHARGED	
1.006	16	95.036	0.763	0.000	1.85		23.6	SURCHARGED	
1.007	17	95.044	0.834	0.000	0.54		219.1	SURCHARGED	
1.008	18	94.813	1.156	0.000	0.53		212.0	SURCHARGED	
1.009	19	94.565	1.434	0.000	1.72		473.0	SURCHARGED	
1.010	20	93.878	0.986	0.000	2.09		468.2	SURCHARGED	
1.011	14	93.197	0.463	0.000	0.92		464.8	SURCHARGED	
1.012	21	92.518	0.588	0.000	1.18		462.2	SURCHARGED	
1.013	22	90.307	-0.148	0.000	0.78		462.2	OK	
1.014	23	86.933	-0.199	0.000	0.60		461.9	OK	