



Proposed Development –

Stakehill Industrial Estate

Middleton

Manchester

Drainage Strategy

Project No. 1987

October 2025 (Revision A – 08/04/2026)

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Registered in England. Registration Number: 11443830 V.A.T. Registration Number: 302 2744 45

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Drainage Strategy Report

Stakehill Industrial Estate, Middleton, Manchester

Introduction

This drainage strategy has been developed as part of the planning application.

This report is to accompany NC29 Ltd drawings 1987-001 (Proposed Drainage Layout) and 1987-002 (Drainage Details), and its purpose is to support and explain the methodology behind the drainage strategy for the site.

The following sections describes in detail the methods and assumptions behind the drainage strategy.

Site Description

The site is an existing industrial unit located off Bentley Avenue, Middleton. The centre of the site is located at approximately SD 88682 08334.

Development Proposals

The proposals are for the extension and alterations to Unit 32 Stakehill Industrial Unit, Middleton, Manchester, M24 2RW.

Surface Water Drainage

For new developments there is a requirement to apply sustainable drainage principles (SuDS) to the disposal of surface water from the site. Generally, the aim should be to discharge surface water as high up the following hierarchy of drainage options as reasonably practicable:

1. Into the ground (infiltration);
2. To a surface water body;
3. To a surface water sewer or highway drain;
4. To a combined sewer.

Infiltration

Infiltration is the preferred method of water disposal as this reflects the natural ground conditions, recharges aquifers, lowers the risk of flooding as a result of urbanisation and lowers the chance of 'flash flooding'.

Trial holes were undertaken on site in March 2026, with the intention of undertaking percolation testing. However, trial holes indicated clayey ground conditions with groundwater ingress towards the bottom of the excavation. Photographs of the trial holes have been included as **Appendix D**.

Alternative Drainage Options

Discharge options for the proposed building have been assessed in accordance with the hierarchical approach set out in CIRIA's The SuDS Manual and The Building Regulations.

Infiltration is not considered a viable means for disposing of surface water, therefore an alternative method will need to be identified.

A CCTV survey of the existing drainage site drainage has been undertaken, included as **Appendix A**, which shows a separate surface water system that discharges into a surface water sewer. It is therefore proposed that the existing surface water drainage serving the site is utilised for the proposed development.

Surface Water Drainage Design

Surface Water - Roofs

Roof water from the proposed extension will be collected via traditional gutters and directed towards downpipes. The downpipes from the roof water will discharge into raised planters, which will include an overflow into a below ground gravity drainage system to direct flows into geo-cellular attenuation feature and discharge at a restricted rate into the existing surface water site drainage. Drawings including a Proposed Drainage Layout and Construction Details have been included in **Appendix B**.

Surface Water – External Areas

Surface water runoff from demolished buildings will be collected via linear drains, directed towards the below ground surface water drainage network to direct flows into geo-cellular attenuation feature and discharge at a restricted rate into the existing surface water site drainage. Permeable paving has been considered for the areas of demolished buildings, however, the client requirement is for concrete hardstanding due to the number of narrow turning manoeuvres anticipated for the proposed parking areas. Drawings including a Proposed Drainage Layout and Construction Details have been included in **Appendix B**.

Proposed Site Discharge Rates

The two areas of the proposed development have been identified as Network 1 and Network 2 for the proposed extension and areas of demolished buildings respectively. The intention is to restrict discharge rates to provide 50% betterment on existing rates for the 1 in 1 year return period:

Network 1

0.02 Ha

$$2.78 \times 50 \times 0.02 = 2.78 \text{ l/s}$$

$$50\% \text{ betterment} = \mathbf{1.4 \text{ l/s}}$$

Network 2

Discharge from the proposed development, including the building and external areas, is proposed at 50% betterment on the 1 in 1 year return period:

0.0923 Ha

$$2.78 \times 50 \times 0.0923 = 12.83 \text{ l/s}$$

$$50\% \text{ betterment} = \mathbf{6.4 \text{ l/s}}$$

Foul Water Drainage

The CCTV survey of the existing drainage indicates that foul water discharges to a combined drainage network, although there is a separate surface water network so it may be the case that the existing combined network is a separate foul water network.

The existing foul water drainage network discharges to a combined sewer to the south of the site.

The proposed extension and alterations will not require alterations to the existing foul water network and it is not anticipated that foul flows will be increased.

Maintenance

It is crucial that the elements mentioned in the drainage elements and water quality are maintained to a sufficient standard to ensure that the devices can still function. The responsibility for maintaining the proposed drainage network will be the site operator.

Drainage Component	Required Action	Typical Frequency
Pipework, silt traps and chambers	Stabilise adjacent areas	As required
	Remove weeds	As required
	Clear any poor performing structures	As required
	Inspect all structures for poor operation	Three monthly, 48 hours after large storms
	Monitor inspection chambers. Inspect silt accumulation rates and determine silt clearance frequencies.	Annually

Geo-Cellular Attenuation Maintenance

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from pre-treatment structures and/or internal forebays	Annually, or as required
Remedial actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

Figure 1 – Geo-Cellular Attenuation Maintenance Requirements (Source: CIRIA 753)

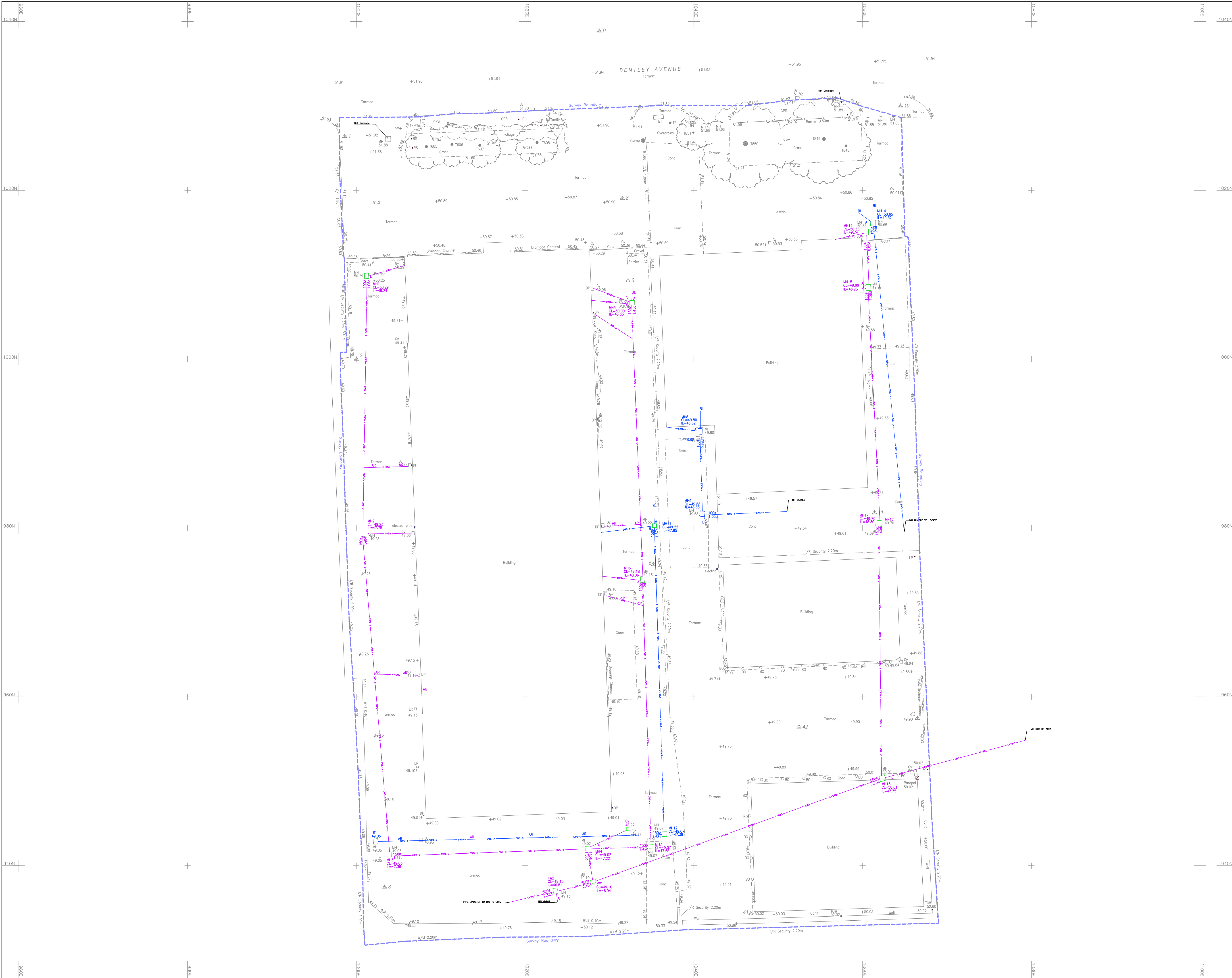
Conclusion

- The proposals do not increase the risk of flooding and are therefore compatible with the requirements of NPPF.
- A proposed drainage layout can be found on NC29 Ltd drawing 1987-001.
- This drainage strategy document demonstrates that the site can be drained appropriately including the use of a Sustainable Drainage System.
- All storm water, up to and including the 1 in 100 year event + 40% climate change events are stored below ground.
- Trial pits have demonstrated that ground conditions are not suitable for infiltration.



Appendices

Appendix A – CCTV Survey



Notes:

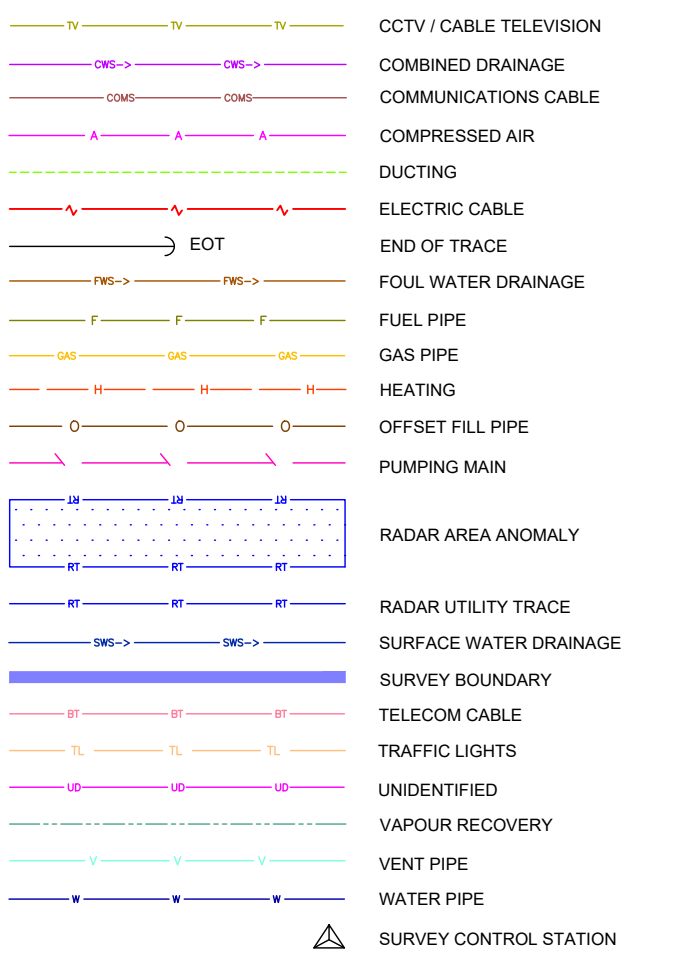
1. Geophysical and/or Ground Penetrating Radar (GPR) has been used to locate underground utilities and features on this drawing. Cadmap Ltd has made every endeavour to make sure that the information contained within this drawing is accurate and of the highest quality. However, the use of geophysical methods is not an exact science and the results are not infallible. Therefore, the information contained in this drawing is not to be relied upon as a substitute for a site visit. The information is provided, at the client's request, at the time of the survey. Any information taken from these drawings or used in any other way without the written consent of Cadmap Ltd is deemed to be incomplete and inaccurate and cannot be relied upon. Cadmap Ltd is not liable for any topographical survey that has not been undertaken by us. Any inaccuracies resulting to topographical information shown on this drawing is the responsibility of the client. The accuracy of the information of the customer. Where quoted, depth information of underground services/features is stated. Depths are given as a guide only and are not to be relied upon. The information is provided as a guide only to assist in the location of services/features. The information is provided as a guide only and is not to be used to justify (in case of drainage channels) unless otherwise stated. At Cadmap Ltd we use skilled staff and modern, calibrated equipment to perform our surveys. However, the completeness of any survey is dependent on the quality of the information provided. The information is not infallible. If the location or depth of services/features is of particular importance to a project then it is recommended that a site visit be made to confirm the information. The information is provided as a guide only and is not to be used to justify (in case of drainage channels) unless otherwise stated. It is also strongly advised that trial excavations should be undertaken to confirm survey results. It cannot be held responsible for any inaccuracies beyond those that could be

Base Plan - Topographical Survey by Cadmap shown in grey
See drawing CM/25943/T

ABBREVIATIONS (Land & Utilities)

[illegible]

KEY



North:



Grid: Local Grid

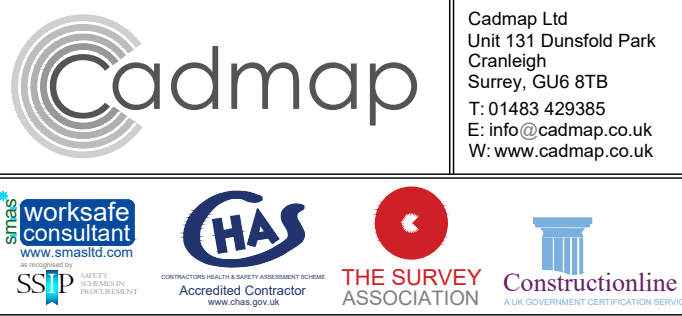
Levelling: Datum based on manhole as shown.
Value used 50.00m

Drawing Title: CCTV Drainage Survey

Site Address: Unit 32 Stakehill Ind. Estate
Bentley Avenue
Manchester
M24 2RW

Client: **Montgomery Transport Ltd**

Surveyor	CP	Drawn By	CP	Verified By	AS	Date	19.08.25
CM No: CM/25943-CCTV				Rev:			
Scale: 1:200m @ A1				Date: August 2025			





CCTV Inspection Report

**AMPLE POWER
BENTLEY AVENUE
MIDDLETON
M24 2GP**

13/03/2026

Job Number: 34668

MPH Drain Services

Unit 7, Sterling Industrial Park, Carr Wood Rd, Castleford, WF10 4PS
Tel: 0808 5015130

Project Information

Job Number
34668Surveyed by (Operator)
HARRY CLARKBase Unit
2NYBBNX723Date
13/03/2026

Client Details:

AMPLE POWER
BENTLEY AVENUE
MIDDLETON
M24 2GP

Site Details:

AMPLE POWER
BENTLEY AVENUE
MIDDLETON
M24 2GP

Contractor Details:

MPH Maintenance Ltd
Unit 7, Sterling Industrial Estate
Castleford
West Yorkshire
WF10 4PS

Office Contact Number: 08000 612572

Purpose of Survey:

RECORDED SURVEY

Contents Page

Job Number 34668	Surveyed by (Operator) HARRY CLARK	Base Unit 2NYBBNX723	Date 13/03/2026
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Report Contents

Page 1	Cover Page
Page 2	Job Overview
Page 3	Contents Page
Page 4	Site Drawings
Page 5	Job Summary
Page 6	Survey Run Sheet(Survey 1 - EX MH TBC(4) to EX MH TBC(2))
Page 8	Survey Run Sheet(Survey 2 - EX MH TBC(4) to MAIN RUN)
Page 11	Survey Run Sheet(Survey 3 - EX MH TBC(2) to EX MH TBC (1))
Page 13	Defect Summary
Page 15	Grade Defect Descriptions

Job Number 34668	Surveyed by (Operator) HARRY CLARK	Base Unit 2NYBBNX723	Date 13/03/2026
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This sketch is not to scale and does not represent the exact routing of the drainage system



Job Number 34668	Surveyed by (Operator) HARRY CLARK	Base Unit 2NYBBNX723	Date 13/03/2026
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Job Information

Total Distance Surveyed: **47.52 meters**
Engineer: **HARRY CLARK**
Number of Surveys: **3**
Number of Surveys grade 4 or above: **0**

Section 1 Overview (13/03/2026)

Manholes: **EX MH TBC(4) to EX MH TBC(2)**
Pipe Length: **24 metres**
Structural Grade: **0**
Service Grade: **3**
Material: **Vitrified clay**
Pipe Size: **225mm**
Use: **Surface water**

ESTIMATED 24M UNABLE TO PASS RUBBLE IN LINE RECOMMEND JETTING THE LINE AND CLEARING ANY RUBBLE IN LINE

Section 2 Overview (13/03/2026)

Manholes: **EX MH TBC(4) to MAIN RUN**
Pipe Length: **7.04 metres**
Structural Grade: **0**
Service Grade: **4**
Material: **Vitrified clay**
Pipe Size: **225mm**
Use: **Surface water**

RECOMMEND MINERAL CUTTING THE ENCRUSTATIONS

Section 3 Overview (13/03/2026)

Manholes: **EX MH TBC(2) to EX MH TBC (1)**
Pipe Length: **16.48 metres**
Structural Grade: **0**
Service Grade: **4**
Material: **Vitrified clay**
Pipe Size: **150mm**
Use: **Surface water**

RECOMMEND JETTING AND MINERAL CUTTING LINE

Job Number 34668	Surveyed by (Operator) HARRY CLARK	Base Unit 2NYBBNX723	Date 13/03/2026
11:27:50 13-03-2026 -0.11m -1.1°  Start node type, manhole, reference EX MH TBC(4)			
11:27:50 13-03-2026 -0.11m -1.1°  Water level 5% height/diameter			
From: EX MH TBC(4) / To: EX MH TBC(2) Size: 225mm 11:27:50 13-03-2026 -0.22m 1.2°  Settled deposits coarse 10% cross-sectional area loss			
From: EX MH TBC(4) / To: EX MH TBC(2) Size: 225mm 11:27:50 13-03-2026 -0.22m 1.1°  Survey abandoned - Remark: UNABLE TO PASS RUBBLE IN PIPE			

Surveyed by (Operator) HARRY CLARK	Job Number 34668	Pipe Length Reference(PLR) MAIN RUN X	Date 13/03/2026	Pre Cleaned Not Cleaned
Weather 1 - Dry	Customer Present	Service Grade/Structural Grade 4/0	Base Unit 2NYBBNX723	Section Number 2
Road AMPLE POWER Place BENTLEY AVENUE Location MIDDLETON		Division District Location Details		
Purpose Duty Surface water Catchment	Shape/Size 225mm Material Vitrified clay Category		Start Node EX MH TBC(4) End Node MAIN RUN Total length 7.04 metres	

Scale **1:0.37**
Direction **Upstream**

Start Node Ref:EX MH TBC(4) | I/L :1940mm | Depth: 1690mm

Position	Code	Description	Photo	Type/Grade
0.00	MH	Start node type, manhole, reference EX MH TBC(4)	14421706	Comment / 0
0.00	WL	Water level 5% height/diameter	14421707	Comment / 0
1.11	DEE	Attached deposits, encrustation from 7 to 10 o'clock 25% cross-sectional area loss	14421708	Service / 4
3.79	DEE	Attached deposits, encrustation from 1 to 5 o'clock 35% cross-sectional area loss	14421709	Service / 4
4.62	DEE	Attached deposits, encrustation from 7 to 11 o'clock 25% cross-sectional area loss	14421711	Service / 4
5.69	DEE	Attached deposits, encrustation from 12 to 4 o'clock 10% cross-sectional area loss	14421713	Service / 3
6.87	DEE	Attached deposits, encrustation from 6 to 8 o'clock 10% cross-sectional area loss	14421730	Service / 3
7.04	OCF	Finish node type, other special chamber, reference MAIN RUN	14421731	Comment / 0

End Node Ref:MAIN RUN | I/L :mm

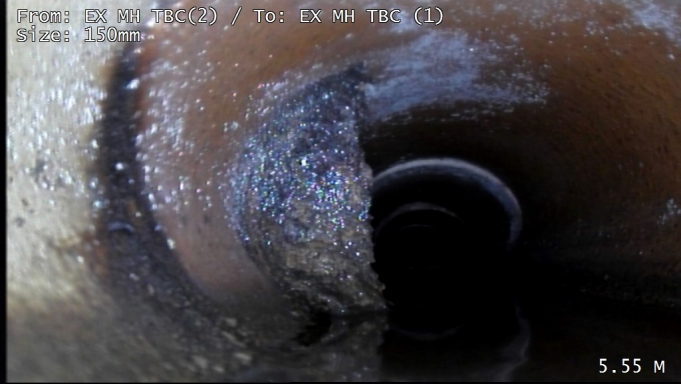
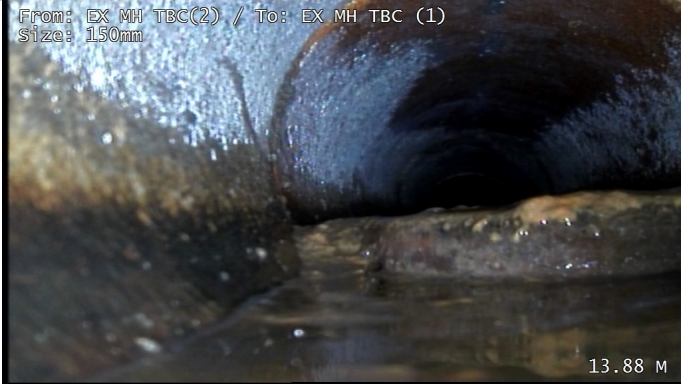
Job Number 34668	Surveyed by (Operator) HARRY CLARK	Base Unit 2NYBBNX723	Date 13/03/2026
11:52:15 13-03-2026 0.00m -2.8°  Start node type, manhole, reference EX MH TBC(4)		11:52:15 13-03-2026 0.00m -2.8°  Water level 5% height/diameter	
From 2: EX MH TBC(4) / To: MAIN RUN 1.09m -8.4° Size: 225mm  Attached deposits, encrustation from 7 to 10 o'clock 25% cross-sectional area loss		From 3: EX MH TBC(4) / To: MAIN RUN 3.78m -6.3° Size: 225mm  Attached deposits, encrustation from 1 to 5 o'clock 35% cross-sectional area loss	
From 3: EX MH TBC(4) / To: MAIN RUN 4.62m -2.7° Size: 225mm  Attached deposits, encrustation from 7 to 11 o'clock 25% cross-sectional area loss		From 4: EX MH TBC(4) / To: MAIN RUN 5.68m -7.2° Size: 225mm  Attached deposits, encrustation from 12 to 4 o'clock 10% cross-sectional area loss	

Job Number 34668	Surveyed by (Operator) HARRY CLARK	Base Unit 2NYBBNX723	Date 13/03/2026
From: EX1MH1BC(4) / To: MAIN RUN 3.87m -11.4° Size: 225mm  Attached deposits, encrustation from 6 to 8 o'clock 10% cross-sectional area loss		From: EX1MH1BC(4) / To: MAIN RUN 7.04m -7.8° Size: 225mm  Finish node type, other special chamber, reference MAIN RUN	

Surveyed by (Operator) HARRY CLARK	Job Number 34668	Pipe Length Reference(PLR) EX MH TBC X	Date 13/03/2026	Pre Cleaned Not Cleaned
Weather 1 - Dry	Customer Present	Service Grade/Structural Grade 4/0	Base Unit 2NYBBNX723	Section Number 3
Road AMPLE POWER Place BENTLEY AVENUE Location MIDDLETON		Division District Location Details		
Purpose Duty Surface water Catchment	Shape/Size 150mm Material Vitrified clay Category		Start Node EX MH TBC(2) End Node EX MH TBC (1) Total length 16.48 metres	

Scale **1:0.87**
Direction **Upstream**

Start Node Ref:EX MH TBC(2) I/L :1350mm Depth: 1140mm					Photo	Type/Grade
Position	Code	Description				
	0.00	MH	Start node type, manhole, reference EX MH TBC(2)			14422392 Comment / 0
	0.00	WL	Water level 5% height/diameter			14422393 Comment / 0
	5.55	DEE	Attached deposits, encrustation from 6 to 11 o'clock 35% cross-sectional area loss			14422408 Service / 4
	13.88	DEE	Attached deposits, encrustation from 4 to 8 o'clock 25% cross-sectional area loss			14422419 Service / 4
	15.48	SA	Survey abandoned - Remark: LOSS OF VISION			14422423 Comment / 0
End Node Ref:EX MH TBC (1) I/L :mm						

Job Number 34668	Surveyed by (Operator) HARRY CLARK	Base Unit 2NYBBNX723	Date 13/03/2026
 0.00 M Start node type, manhole, reference EX MH TBC(2)		 0.00 M Water level 5% height/diameter	
From: EX MH TBC(2) / To: EX MH TBC (1) Size: 150mm  5.55 M Attached deposits, encrustation from 6 to 11 o'clock 35% cross-sectional area loss		From: EX MH TBC(2) / To: EX MH TBC (1) Size: 150mm  13.88 M Attached deposits, encrustation from 4 to 8 o'clock 25% cross-sectional area loss	
From: EX MH TBC(2) / To: EX MH TBC (1) Size: 150mm  15.48 M Survey abandoned - Remark: LOSS OF VISION			

Structural Defects (SRM 4)

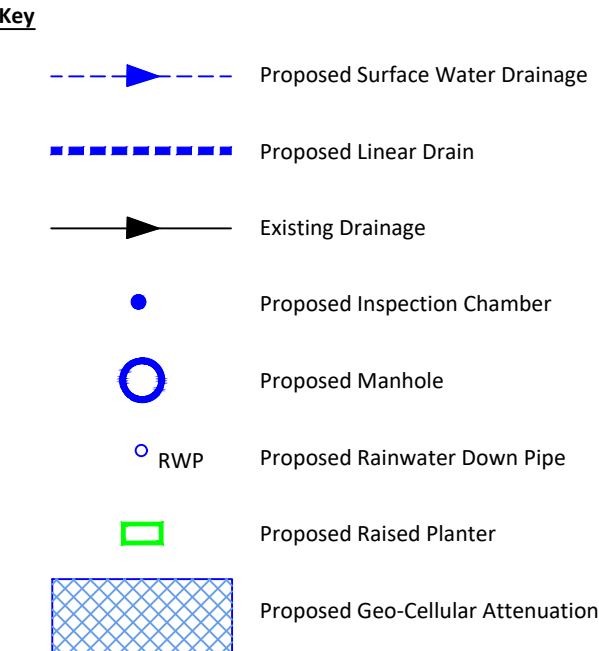
Job Number 34668				Surveyed by (Operator) HARRY CLARK			Base Unit 2NYBBNX723			Date 13/03/2026			
No.	PLR	Dir.	Use	Shape/Size	Date	Mat.	Total Length	Inspection Length	Cat.	Peak Score	Grade	Mean Score	Total Score
1	EX MH TBC(X	U	S	225	13/03/2026	Vitrified clay	24 metres	0.2		0	1	0	0
2	MAIN RUN X	U	S	225	13/03/2026	Vitrified clay	7.04 metres	7.04		0	1	0	0
3	EX MH TBC X	U	S	150	13/03/2026	Vitrified clay	16.48 metres	15.48		0	1	0	0

Service Defects (SRM 4)

Job Number 34668				Surveyed by (Operator) HARRY CLARK			Base Unit 2NYBBNX723			Date 13/03/2026			
No.	PLR	Dir.	Use	Shape/Size	Date	Mat.	Total Length	Inspection Length	Cat.	Peak Score	Grade	Mean Score	Total Score
1	EX MH TBC(X	U	S	225	13/03/2026	Vitrified clay	24 metres	0.2		2	3	10.00	2
2	MAIN RUN X	U	S	225	13/03/2026	Vitrified clay	7.04 metres	7.04		5	4	2.70	19
3	EX MH TBC X	U	S	150	13/03/2026	Vitrified clay	16.48 metres	15.48		5	4	0.65	10

Job Number 34668	Surveyed by (Operator) HARRY CLARK	Base Unit 2NYBBNX723	Date 13/03/2026
1: Occurences without damage. For example, laterals, joints,etc. NO DEFECTS WERE DETECTED.			
2: Constructional deficiencies or occurences with insignificant influence to tightness, hydraulic or static pressure or pipe: Eg. wide joints, badly torched intakes, minor deformation of plastic pipes, minor erosions etc. REHABILITATION CAN BE SCHEDULED LONG-TERM.			
3: Constructional deficiencies diminishing static, hydraulic and tightness: Eg. untorched intakes, cracks, minor drainage obstructions such as calcite build ups, protruding laterals, minor damages to pipe wall, individual root penetrations, corroded pipe walls etc. REHABILITATION IS NECESSARY MEDIUM-TERM WITHIN 3 TO 5 YEARS.			
4: Constructional damages with insufficient static safety, hydraulic or tightness: Eg. axial/radial pipe bursts, pipe deformations, visually noticeable infiltration/exfiltration, cavities, in pipe-wall, severe protruding, laterals severe root penetrations, severe corrosion of pipe wall etc. REHABILITATION PROCEDURE IS URGENT AND HAS TO BE COMPLETED WITHIN 1 TO 2 YEARS. NECESSITY FOR EMERGENCY OPERATIONS HAS TO BE EXAMINED.			
5: Pipe is already or will shortly be impermeable: Eg. collapsed pipe, deeply rooted pipe or other drainage obstructions. Pipe loses water or danger of backwater in basements etc. REHABILITATION IS URGENT AND SHORT-TERM. IN ORDER TO PREVENT FURTHER DAMAGE, NECESSARY TEMPORARY SPOT REPAIR HAS TO BE CONDUCTED ON EMERGENCY LEVEL.			

Appendix B – Proposed Drainage Drawings



CDM Requirements
Risk - Deep excavation
Control method - Contractor to design trench support to depths shown on drawings and in the manhole schedule, appropriate to the ground conditions.
Risk - Water ingress into excavations, including ground water
Control method - Contractor to specify method of dealing with ingress of water into excavations, in particular if ground water is experienced. Contractor to undertake trench inspections prior to entry into any excavation, and again if left overnight or if conditions change.

A	Drainage layout amended	08/04/2026
Revision	Details	Date

NC

29 Ltd

Newstead House, Pelham Road
Nottingham, NG5 1AP
Tel: 07753 168226
Email: info@nc29.co.uk

Web: www.nc29.co.uk

Project	Proposed Extension & Alterations Unit 32, Stakehill Industrial Estate		
Client	Ballyvesey Holdings Ltd		
Title	Proposed Drainage Layout		
Drawn	CC	Checked	CC
Date	October 2025	Scale	1:250
Number	1987/001 A	Status	Preliminary





Appendix C – United Utilities Sewer Maps

NC29 Ltd**269
Lincoln Road, North Hykeham
Lincoln, Lincolnshire
LN6 8NH****FAO:****How to contact us:****United Utilities Water Limited
Property Searches
Haweswater House
Lingley Mere Business Park
Great Sankey
Warrington
WA5 3LP****Telephone: 0370 7510101****E-mail: propertysearches@uuplc.co.uk****Your Ref: Stakehill
Our Ref: UUPS-ORD-686291
Date: 22/10/2025****Dear Sirs****Location: LEE HEALEY CO LTD UNIT 1 BENTLEY AVENUE, MIDDLETON, MANCHESTER, M24 2GP**

I acknowledge with thanks your request dated 21/10/2025 for information on the location of our services.

Please find enclosed plans showing the approximate position of United Utilities' apparatus known to be in the vicinity of this site.

The enclosed plans are being provided to you subject to the United Utilities terms and conditions for both the wastewater and water distribution plans which are shown attached.

If you are planning works anywhere in the North West, please read United Utilities' access statement before you start work to check how it will affect our network. <http://www.unitedutilities.com/work-near-asset.aspx>.

I trust the above meets with your requirements and look forward to hearing from you should you need anything further.

If you have any queries regarding this matter please [contact us](#).

Yours Faithfully,



Karen McCormack
Property Searches Manager

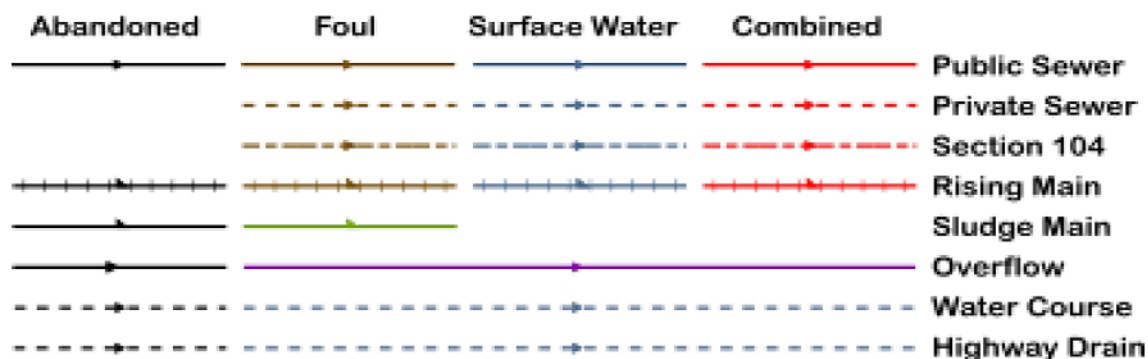
TERMS AND CONDITIONS - WASTEWATER AND WATER DISTRIBUTION PLANS

These provisions apply to the public sewerage, water distribution and telemetry systems (including sewers which are the subject of an agreement under Section 104 of the Water Industry Act 1991 and mains installed in accordance with the agreement for the self construction of water mains) (UUWL apparatus) of United Utilities Water Limited "(UUWL)".

TERMS AND CONDITIONS:

- This Map and any information supplied with it is issued subject to the provisions contained below, to the exclusion of all others and no party relies upon any representation, warranty, collateral contract or other assurance of any person (whether party to this agreement or not) that is not set out in this agreement or the documents referred to in it.
- This Map and any information supplied with it is provided for general guidance only and no representation, undertaking or warranty as to its accuracy, completeness or being up to date is given or implied.
- In particular, the position and depth of any UUWL apparatus shown on the Map are approximate only. UUWL strongly recommends that a comprehensive survey is undertaken in addition to reviewing this Map to determine and ensure the precise location of any UUWL apparatus. The exact location, positions and depths should be obtained by excavation trial holes.
- The location and position of private drains, private sewers and service pipes to properties are not normally shown on this Map but their presence must be anticipated and accounted for and you are strongly advised to carry out your own further enquiries and investigations in order to locate the same.
- The position and depth of UUWL apparatus is subject to change and therefore this Map is issued subject to any removal or change in location of the same. The onus is entirely upon you to confirm whether any changes to the Map have been made subsequent to issue and prior to any works being carried out.
- This Map and any information shown on it or provided with it must not be relied upon in the event of any development, construction or other works (including but not limited to any excavations) in the vicinity of UUWL apparatus or for the purpose of determining the suitability of a point of connection to the sewerage or other distribution systems.
- No person or legal entity, including any company shall be relieved from any liability howsoever and whensoever arising for any damage caused to UUWL apparatus by reason of the actual position and/or depths of UUWL apparatus being different from those shown on the Map and any information supplied with it.
- If any provision contained herein is or becomes legally invalid or unenforceable, it will be taken to be severed from the remaining provisions which shall be unaffected and continue in full force and affect.
- This agreement shall be governed by English law and all parties submit to the exclusive jurisdiction of the English courts, save that nothing will prevent UUWL from bringing proceedings in any other competent jurisdiction, whether concurrently or otherwise.

Wastewater Symbolology



All point assets follow the standard colour convention: **red** – combined **brown** - foul
blue – surface water **purple** - overflow

Manhole	Side Entry Manhole
Head of System	Outfall
Extent of Survey	Screen Chamber
Rodding Eye	Inspection Chamber
Inlet	Bifurcation Chamber
Discharge Point	Lamp Hole
Vortex	T Junction / Saddle
Penstock	Catchpit
Washout Chamber	Valve Chamber
Valve	Vent Column
Air Valve	Vortex Chamber
Non Return Valve	Penstock Chamber
Soakaway	Network Storage Tank
Gully	Sewer Overflow
Cascade	Ww Treatment Works
Flow Meter	Ww Pumping Station
Hatch Box	Septic Tank
Oil Interceptor	Control Kiosk
Summit	DNM Network Monitoring Point
Drop Shaft	Change of Characteristic
Orifice Plate	



Water for the North West

SEWER RECORDS

Address or Site Reference

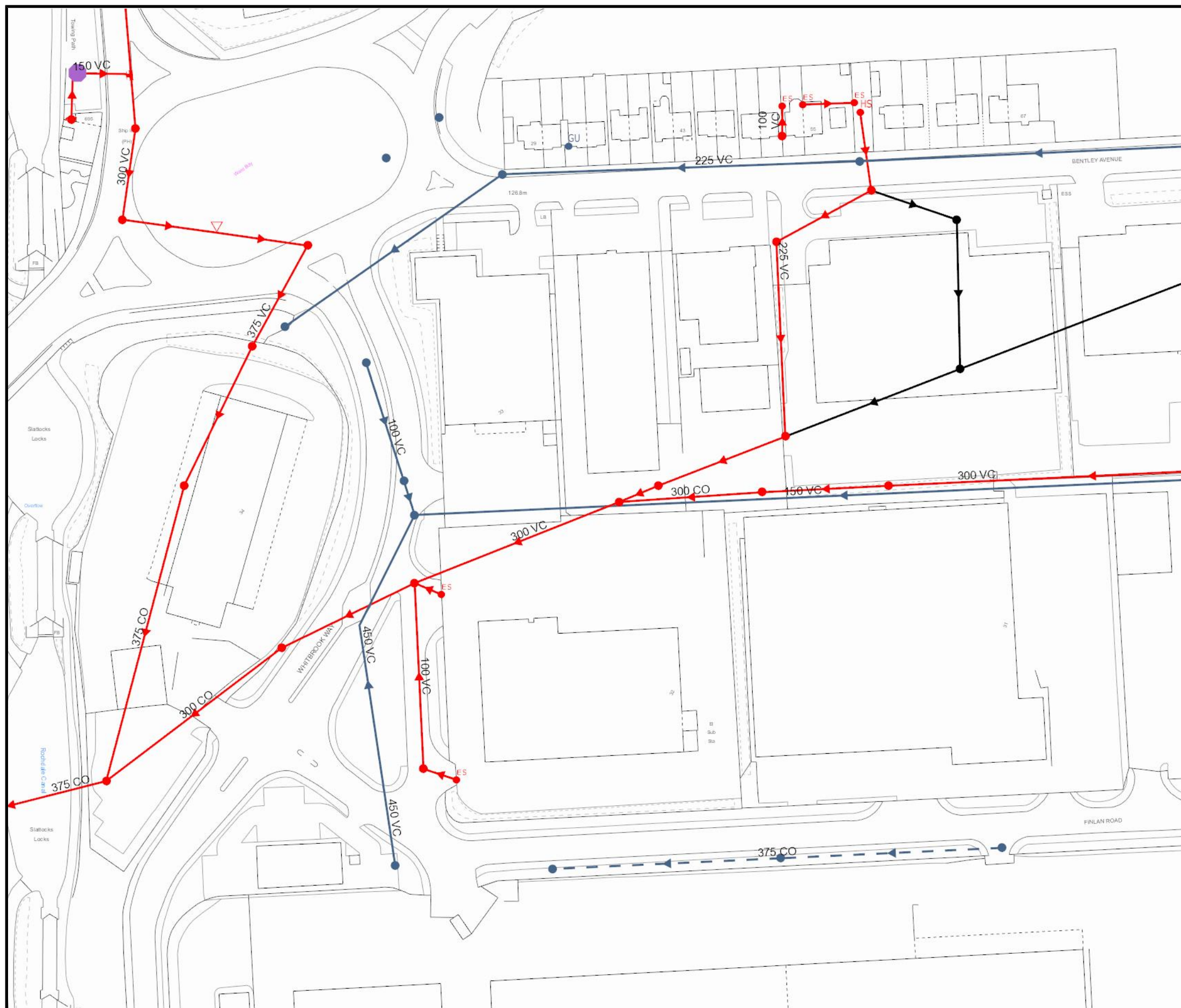
LEE HEALEY CO LTD UNIT 1
BENTLEY AVENUE,
MIDDLETON,
MANCHESTER,
M24 2GP

Scale: 1:1250
Date: 22/10/2025

Printed by: Property Searches

The position of the underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. United Utilities Water will not accept liability for any loss or damage caused by the actual position being different from those shown.

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Appendix D – Trial Pit Photographs





Appendix E – Modelled Outputs

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	2.000
Ratio-R	0.400	Preferred Cover Depth (m)	0.600
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	4.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Depth (m)	Invert Level (m)
S1	0.010	4.00	49.150	450	0.750	48.400
S2	0.010	4.00	49.150	450	0.968	48.182
S3			49.000	1200	1.050	47.950
EX			49.000		1.067	47.933

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	S1	S2	32.700	0.600	48.400	48.182	0.218	150.0	150	4.67	50.0
1.001	S2	S3	11.700	0.600	48.182	47.950	0.232	50.4	150	4.80	50.0
1.002	S3	EX	1.700	0.600	47.950	47.933	0.017	100.0	150	4.83	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	0.818	14.5	1.4	0.600	0.818	0.010	0.0	31	0.511
1.001	1.420	25.1	2.7	0.818	0.900	0.020	0.0	33	0.929
1.002	1.005	17.8	2.7	0.900	0.917	0.020	0.0	40	0.727

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	32.700	150.0	150	Circular	49.150	48.400	0.600	49.150	48.182	0.818
1.001	11.700	50.4	150	Circular	49.150	48.182	0.818	49.000	47.950	0.900
1.002	1.700	100.0	150	Circular	49.000	47.950	0.900	49.000	47.933	0.917

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S1	450	Manhole	Adoptable	S2	450	Manhole	Adoptable
1.001	S2	450	Manhole	Adoptable	S3	1200	Manhole	Adoptable
1.002	S3	1200	Manhole	Adoptable	EX		Junction	

Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
S1	49.150	0.750	450					
				0	1.000	48.400	150	
S2	49.150	0.968	450		1	1.000	48.182	150
				0	1.001	48.182	150	
S3	49.000	1.050	1200		1	1.001	47.950	150
				0	1.002	47.950	150	
EX	49.000	1.067			1	1.002	47.933	150

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
Rainfall Events	Singular	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	20.000	Additional Storage (m³/ha)	20.0
Ratio-R	0.400	Starting Level (m)	
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

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

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

Node S3 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	47.950	Product Number	CTL-SHE-0055-1400-1050-1400
Design Depth (m)	1.050	Min Outlet Diameter (m)	0.075
Design Flow (l/s)	1.4	Min Node Diameter (mm)	1200

Node S3 Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	47.950	Depth (m)	0.400
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	32	Inf Depth (m)	
Safety Factor	2.0	Pit Width (m)	2.000	Number Required	1
Porosity	0.95	Pit Length (m)	4.000		

Results for 2 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1	10	48.437	0.037	1.9	0.0156	0.0000	OK
15 minute winter	S2	10	48.221	0.039	3.8	0.0144	0.0000	OK
30 minute winter	S3	24	48.083	0.133	2.8	1.1603	0.0000	OK
30 minute winter	EX	25	47.958	0.025	1.1	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S1	1.000	S2	1.9	0.542	0.131	0.1143	
15 minute winter	S2	1.001	S3	3.8	0.956	0.150	0.0995	
30 minute winter	S3	1.002	EX	1.1	0.543	0.061	0.0034	2.2

Results for 30 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	48.452	0.052	3.7	0.0221	0.0000	OK
15 minute winter	S2	10	48.238	0.056	7.4	0.0204	0.0000	OK
30 minute winter	S3	27	48.235	0.285	5.4	2.4848	0.0000	SURCHARGED
30 minute winter	EX	23	47.960	0.027	1.2	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S1	1.000	S2	3.7	0.652	0.256	0.1856	
15 minute winter	S2	1.001	S3	7.4	1.072	0.294	0.1366	
30 minute winter	S3	1.002	EX	1.2	0.560	0.069	0.0037	4.1

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.47%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	S1	49	48.962	0.562	4.3	0.2392	0.0000	FLOOD RISK
60 minute winter	S2	49	48.961	0.779	6.6	0.2851	0.0000	FLOOD RISK
60 minute winter	S3	49	48.960	1.010	5.8	4.1862	0.0000	FLOOD RISK
60 minute winter	EX	49	47.961	0.028	1.4	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute winter	S1	1.000	S2	3.3	0.610	0.226	0.5757	
60 minute winter	S2	1.001	S3	5.8	0.918	0.232	0.2060	
60 minute winter	S3	1.002	EX	1.4	0.577	0.077	0.0040	9.5

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	2.000
Ratio-R	0.400	Preferred Cover Depth (m)	0.600
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	4.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Depth (m)	Invert Level (m)
S4	0.093	4.00	49.400	450	0.750	48.650
S5			49.200	1200	1.050	48.150
EX			49.200	450	1.060	48.140

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	S4	S5	1.000	0.600	48.650	48.150	0.500	2.0	150	4.00	50.0
1.001	S5	EX	1.000	0.600	48.150	48.140	0.010	100.0	150	4.02	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	7.182	126.9	12.6	0.600	0.900	0.093	0.0	32	4.617
1.001	1.005	17.8	12.6	0.900	0.910	0.093	0.0	93	1.089

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	1.000	2.0	150	Circular	49.400	48.650	0.600	49.200	48.150	0.900
1.001	1.000	100.0	150	Circular	49.200	48.150	0.900	49.200	48.140	0.910

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S4	450	Manhole	Adoptable	S5	1200	Manhole	Adoptable
1.001	S5	1200	Manhole	Adoptable	EX	450	Manhole	Adoptable

Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S4	49.400	0.750	450				
				0	1.000	48.650	150
S5	49.200	1.050	1200				
				1	1.000	48.150	150
				0	1.001	48.150	150

Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
EX	49.200	1.060	450	1	1.001	48.140	150

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
Rainfall Events	Singular	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	20.000	Additional Storage (m³/ha)	20.0
Ratio-R	0.400	Starting Level (m)	
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

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

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

Node S5 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	48.150	Product Number	CTL-SHE-0118-6400-1050-6400
Design Depth (m)	1.050	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	6.4	Min Node Diameter (mm)	1200

Node S5 Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	48.150	Depth (m)	0.400
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	40	Inf Depth (m)	
Safety Factor	2.0	Pit Width (m)	5.000	Number Required	1
Porosity	0.95	Pit Length (m)	15.000		

Results for 2 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S4	9	48.703	0.053	17.9	0.1394	0.0000	OK
60 minute winter	S5	45	48.271	0.121	8.7	8.7935	0.0000	OK
60 minute winter	EX	46	48.180	0.040	2.8	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S4	1.000	S5	18.0	4.203	0.142	0.0057	
60 minute winter	S5	1.001	EX	2.8	0.660	0.155	0.0042	11.3

Results for 30 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S4	9	48.727	0.077	34.0	0.2024	0.0000	OK
60 minute winter	S5	45	48.364	0.214	16.6	15.5054	0.0000	SURCHARGED
60 minute winter	EX	45	48.199	0.059	5.8	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S4	1.000	S5	34.1	4.199	0.269	0.0112	
60 minute winter	S5	1.001	EX	5.8	0.804	0.327	0.0072	22.6

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

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	S4	50	49.189	0.539	30.5	1.4219	0.0000	FLOOD RISK
60 minute winter	S5	50	49.184	1.034	30.4	29.7056	0.0000	FLOOD RISK
120 minute winter	EX	76	48.202	0.062	6.4	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute winter	S4	1.000	S5	30.4	3.646	0.239	0.0176	
60 minute winter	S5	1.001	EX	6.4	0.824	0.359	0.0077	42.4