

Architecture Unknown

Middleton Conservative Club

Flood Risk Assessment & Drainage Strategy

FINAL
March 2025



Revision Schedule

Middleton Conservative Club

Flood Risk Assessment & Drainage Strategy

March 2025

Doc Ref: AU-1817-01-DS-001

REV	DATE	STATUS	PREPARED BY	REVIEWED BY	APPROVED BY
-	28 th March 2025	First Issue	Calum Reford, BSc (Hons), MSc.	Lee Barnes, BSc (Hons), MCIHT	Lee Barnes, BSc (Hons), MCIHT

REVISION NOTES	

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1.0 INTRODUCTION

Instructions

- 1.1 This Flood Risk Assessment and Drainage Strategy has been prepared in accordance with instructions from Architecture Unknown, on behalf of their client, Mr M. Suleman, to support a full planning application to Rochdale Borough Council for the change of use of the former Middleton Conservative Club into a new community and events space.
- 1.2 This Flood Risk Assessment and Drainage Strategy will assess flood risk for the proposed development in accordance with the National Planning Policy Framework (NPPF) and associated PPG *Flood Risk and Coastal Change*. It will also set out how the proposed development will manage surface water runoff. It does not purport to be a detailed design for approval and/or construction purposes, rather it aims to set the strategy which will be adopted at detailed design.

Technical Information

National Planning Policy Framework (NPPF)

- 1.3 The NPPF and associated PPG explains how flood risk should be taken into consideration during the planning and development process. It categorises flood risk by *Flood Zone* and defines the types of development *appropriate* to each of the flood zones according to *vulnerability*. The Flood Zones are defined as:
- Zone 1: Areas with a Low Probability of flooding (annual probability less than 0.1% or 1 in 1000-years).
 - Zone 2: Areas with a Medium Probability of flooding (annual probability between 0.1% (1 in 1000-years) and 1.0% (1 in 100-years) for rivers, 0.1%-0.5% (1 in 200-years) for coastal areas).
 - Zone 3a: Areas with a High Probability of flooring (annual probability greater than 1.0% (1 in 100-years) for rivers, 0.5% (1 in 200-years) for coastal area).
 - Zone 3b: The Functional Floodplain (probability as Zone 3a).

Environment Agency Flood Maps

- 1.4 The Environment Agency (EA) predicts the likelihood of flooding via a national series of indicative flood maps, available via the GOV.UK website. The *Flood Map for Planning* shows the flood zones, describes above, coloured in different shades of blue. The *Flood Risk from Surface Water Map* from the Long-Term Flood Risk Information on the GOV.UK website shows the potential overland flow routes and accumulation of runoff

resulting from rainstorm events based on topography, divided into low, medium, and high-risk scenarios.

Bury, Rochdale, and Oldham Strategic Flood Risk Assessment

- 1.5 Local Planning Authorities are required to produce a Strategic Flood Risk Assessment (SFRA) which sets the scene for flood risk in their areas. The Greater Manchester Combined Authority published their Strategic Flood Risk Assessment in 2009

Data Sources

- 1.6 The Environment Agency *Flood Map for Planning*, downloaded on 18th March 2025, is available in Appendix A.
- 1.7 The *Long-Term Flood Risk* maps, including *Flood Risk from Rivers and the Sea*, and *Flood Risk from Surface Water*, downloaded on 18th March 2025, are available in Appendix A.
- 1.8 The *Greater Manchester Strategic Flood Risk Assessment* is available via the internet.
- 1.9 United Utilities (UU) sewer records are available within Appendix C of this report.

2.0 SITE INFORMATION

Existing Site

- 2.1 The site comprises the former Middleton Conservative Club, located on the west side of Long Street in Middleton Town Centre, M24 6UN. The site has a total area of approximately 0.3ha, as shown on the drawing 23.150.204 P1 *Proposed Block Plan*, attached in Appendix B of this report.
- 2.2 The site includes the existing former Middleton Conservative Club building, a small car park to the front of the building for approximately 15no. cars, and a derelict and disused bowling green to the rear of the building. The site is bound to all sides by existing mixed-use development.

Topography

- 2.3 The site is of a tiered arrangement with levels of approximately +87.8m AOD at the site access off Long Street, rising to +90.3m AOD at the existing building, before rising to +95.3mAOD at the disused bowling green. A retaining wall exists between the bowling green and the existing building.
- 2.4 The site is approximately 50% hard surfaced, with the remaining 50% comprising vegetated areas, including the overgrown bowling green.

Watercourses

- 2.5 According to OS data, the nearest watercourse is the River Irk, a main river, located 245m to the southeast of the development site.

Sewerage

- 2.6 According to sewer records from United Utilities, available in Appendix C of this report, there is a 1000mm public combined sewer flowing south under Long Street (MH0101 to MH0001). Invert levels are provided at upstream manhole MH0101 (+84.4m) and the downstream manhole MH0001 (+78.9m).

Ground Conditions

- 2.7 According to BGS data, the site lies within the Pennine Lower Coal Measures geological formation, with bedrock geology of mudstone, siltstone and sandstone. There are

superficial deposits of Devensian sand and gravel. There is also the possibility of some Made Ground being present at or near the surface.

Development Proposals

- 2.8 The proposed development seeks full planning permission to convert the existing Middleton Conservative Club into a new multi-use function space for events such as weddings, ceremonial gatherings, and other community and cultural events. A new two-storey side extension will be constructed to the north elevation of the existing building.
- 2.9 A new car park is proposed to the rear of the building, on the land of the disused and overgrown bowling green. The car park will be accessed via a new access ramp which will connect to the existing front car park. The proposed car park is proposed to utilise permeable surfacing and include above-ground sustainable drainage techniques including raingardens and swales. Peripheral areas of mature trees and vegetation are to remain as existing as far as reasonably practicable in order to provide ecological enhancements and reduce the overall impermeable area.
- 2.10 Further details are shown on the Architecture Unknown drawing 23.150.204 P1 *Proposed Block Plan*, attached within Appendix B. The proposed development will have an approximate impermeable area of 75% of the total site area.

3.0 FLOOD RISK ASSESSMENT

Potential for Fluvial Flooding

- 3.1 The *Flood Map for Planning* shows the site to be located in Flood Zone 1 (Low Probability), as shown in Appendix A. Consequently, there is no significant risk of fluvial flooding on the site, and therefore no need to satisfy the NPPF Sequential and Exception Tests or consider flood resilient construction or emergency evacuation.
- 3.2 As the site is located within Flood Zone 1, and has an area of less than 1ha, there is no requirement within the NPPF for a site-specific Flood Risk Assessment to accompany the planning application. However, in order to mitigate against surface water flooding, the new development will need to be properly drained in accordance with the principles of the Drainage Strategy, set out within Section 4 of this report.

Potential for Surface Water

- 3.3 The *EA Flood Risk from Surface Water* map shows the site to be at *Very Low* risk of surface water flooding.
- 3.4 While it is acknowledged that the overall impermeable area of the site will increase as a result of the development, any potential increase in surface water flooding will be fully mitigated by the proposed permanent Drainage Strategy, outlined in the following chapters.

Potential for Reservoir Flooding

- 3.5 The *EA Flood Risk from Reservoirs* map shows no risk of reservoir flooding within the vicinity of the site.

Potential for Groundwater Flooding

- 3.6 According to the *EA Long Term Flood Risk Information* for the site, there is no risk of groundwater flooding at the site. In view of the relatively low permeability of Coal Measures geology, flood risk from groundwater is considered to be low.

4.0 DRAINAGE STRATEGY

Existing Drainage

- 4.1 Although no details are available of the present roof water and surface water sewerage at the site, it is likely that the existing former Conservative Club and front car park drains to the combined sewer under Long Street.
- 4.2 The drainage to these areas will be unaltered, and only the proposed car park and ramp area will be considered 'new' drainage as part of the proposed development. The proposed building extension will replace existing hardstanding, which could be considered previously developed land, and therefore subject to a brownfield runoff rate.

Sustainable Drainage Assessment

- 4.3 The proposed drainage system will be based on SUDS principles for the attenuation and treatment of the surface water runoff, as shown on the drawings AU-1817-01-DR-001 *Greenfield and Brownfield Calculation Rates*, AU-1817-01-DR-002 *Drainage Strategy* (Appendix D) and is described below.
- 4.4 The first consideration in the SUDS hierarchy is infiltration to ground. According to BGS data, there are relatively impermeable Pennine Lower Coal Measure and Devensian Glacial Till at or near the surface. While BRE 365 soakaway testing has not been undertaken at the site, it is unlikely that infiltration to ground would be feasible.
- 4.5 The second consideration in the SUDS hierarchy is disposal to a watercourse. As the nearest watercourse is remote from the site, 245m to the southeast across a large built-up urban area, discharge to the watercourse would not be a feasible option.
- 4.6 The third consideration in the SUDS hierarchy is disposal to the sewer. The nearest public sewer is the 1000mm diameter public combined sewer which flows under Long Street, adjacent to the site access, and is believed to be the current discharge method on the site. Discharge to the public combined sewer is therefore feasible, and the only option, based on current information, and consequently forms the basis for this drainage strategy.

Proposed Surface Water Drainage

- 4.7 The proposed surface water drainage system will collect future runoff from the site and discharge the outflow to the 1000mm diameter public combined sewer under Long

Street at the proposed site access, as shown on the drawing AU-1817-01-DR-001 *Drainage Strategy*.

- 4.8 Based on its current brownfield status, the site would normally be subject to a discharge rate based on the *status quo* with a 50% betterment reduction to allow for climate change. As part of the site is considered brownfield, with the bowling green area considered to drain as a 'greenfield', an assessment of discharge rates has been calculated within the drawing AU-1817-01-DR-001 *Greenfield and Brownfield Calculation Rates*.
- 4.9 Such an approach aligns with the policies outlined within the NPPF, i.e., to reduce flood risk overall where possible. In this case, the reduction in runoff and hence flood risk elsewhere will be significant.
- 4.10 The new system will collect surface water runoff from the proposed rear car parking area, the access ramp, and the roof of the extended building. Surface water from the rear car park will be collected via permeable surfacing and raingardens where it will be treated and conveyed via a central swale to the underground pipes towards the access ramp. Surface water from the access ramp will be collected via a channel drain at the bottom of the ramp, where it will be conveyed to a raingarden at the front of the proposed building extension for additional treatment.
- 4.11 Hydraulic calculations are available in Appendix E of this report. The attenuated flow will be discharged to the public combined sewer at the rate of 2.5l/s via a flow control device at the practical minimum rate. This peak outflow rate will be a considerable improvement on the existing unknown and unlimited brownfield runoff rate for the whole site.
- 4.12 As shown in the UK SUDS *Surface Water Storage Estimation Tool*, the proposed storage volume of 128m³ will be sufficient to cater for the 1 in 100-year rainfall event with 45% climate change allowance in accordance with the EA Guidance *Flood Risk Assessments: Climate Change Allowances*, May 2022.
- 4.13 As parts of the site will be soft landscaped, this will offer significant bioretention through shallow infiltration into topsoil and evapotranspiration of the vegetation.
- 4.14 In the unlikely event of a storm exceeding the design event, the drainage system will surcharge and may cause minor localised flooding on the site. Any overland flow will be directed by the ground levels away from the buildings towards the landscaped areas with any flood water confined to the site.

Treatment

- 4.15 Surface water will be collected via permeable paving located under the parking areas and will be conveyed to raingardens which will provide adequate treatment. Areas of soft landscaping will also provide a degree of bioretention and amenity value.
- 4.16 To ensure the appropriate SUDS measures used to treat surface water and prevent the risk of pollution from the discharging runoff, the CIRIA SUDS Manual's *Simple Index Approach* has been used. A summary of the *Simple Index Approach Tool* is supplied within Appendix F of this report.

Surface Water Approvals

- 4.17 At the detailed design stage, an application will be made to United Utilities under Section 106 of the Water Industry Act 1991 for consent to discharge surface water from the site to the public sewer system.
- 4.18 All relevant authorities will be kept fully informed regarding the detailed design of the surface water system. It is normal practice for detailed surface water drainage design to be subject to the approval of the Local Planning Authority subsequent to the grant of planning permission and this will be sought from Rochdale Borough Council at the appropriate time.

Foul Drainage

- 4.19 While there are no details available of the present foul sewerage at the site, it is highly likely that foul sewage from the existing former Conservative Club building drains to the combined sewer under Long Street. Therefore, the foul sewage will continue to drain this way in the post-development scenario. The proposed building extension will include a new accessible toilet and dressing rooms, which will be connected to the existing foul drainage system.

Operation and Maintenance

- 4.20 The completed development will be operated by the landowner, who may employ an operation and maintenance team to maintain the proposed drainage system to a standardised procedure and ensure that all features of the drainage system are regularly and adequately managed and maintained.
- 4.21 A detailed Management and Maintenance Plan may be provided at the detailed design stage, as and when required.

5.0 CONCLUSIONS AND RECOMMENDATIONS

- 5.1 This Flood Risk Assessment and Drainage Strategy has been prepared to support a full planning application to Rochdale Borough Council for the change of use of the former Middleton Conservative Club into a new community and cultural events space.
- 5.2 The site is not a risk of flooding from any source and there is no need to consider the NPPF Sequential or Exception Tests.
- 5.3 The proposed development areas will be drained via a new connection to the public sewer system using above-ground SUDS techniques, including permeable surfacing, raingardens, and a swale, which will provide flow attenuation to a greenfield runoff rate of 1.5l/s and provide sufficient treatment of surface water runoff.
- 5.4 The proposed drainage system will be sufficient to cater for the 1 in 100-year rainfall event with 45% climate change allowance in accordance with the EA Guidance *Flood Risk Assessments: Climate Change Allowances*, May 2022.
- 5.5 Following implementation of the surface water drainage system, there will be no significant risk of surface water flooding at the site.
- 5.6 Surface water drainage and foul sewerage will be disposed to the public combined sewer under Long Street. No changes are proposed to the existing foul connections.
- 5.7 With regard to flood risk and drainage, therefore, the site is suitable for the proposed use. Subject to the implementation of this Drainage Strategy, the development may be occupied safely and adequately drained while reducing flood risk overall.

APPENDIX A FLOOD RISK INFORMATION

Flood map for planning

Your reference
Long Street

Location (easting/northing)
387011/406117

Created
18 Mar 2025 14:01

Your selected location is in flood zone 1, an area with a low probability of flooding.

You will need to do a flood risk assessment if your site is **any of the following:**

- bigger than 1 hectare (ha)
- In an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Flood risk data is covered by the Open Government Licence **which** sets out the terms and conditions for using government data. <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2024 OS AC0000807064. <https://flood-map-for-planning.service.gov.uk/os-terms>

Flood map for planning

Your reference
Long Street

Location (easting/northing)
387011/406117

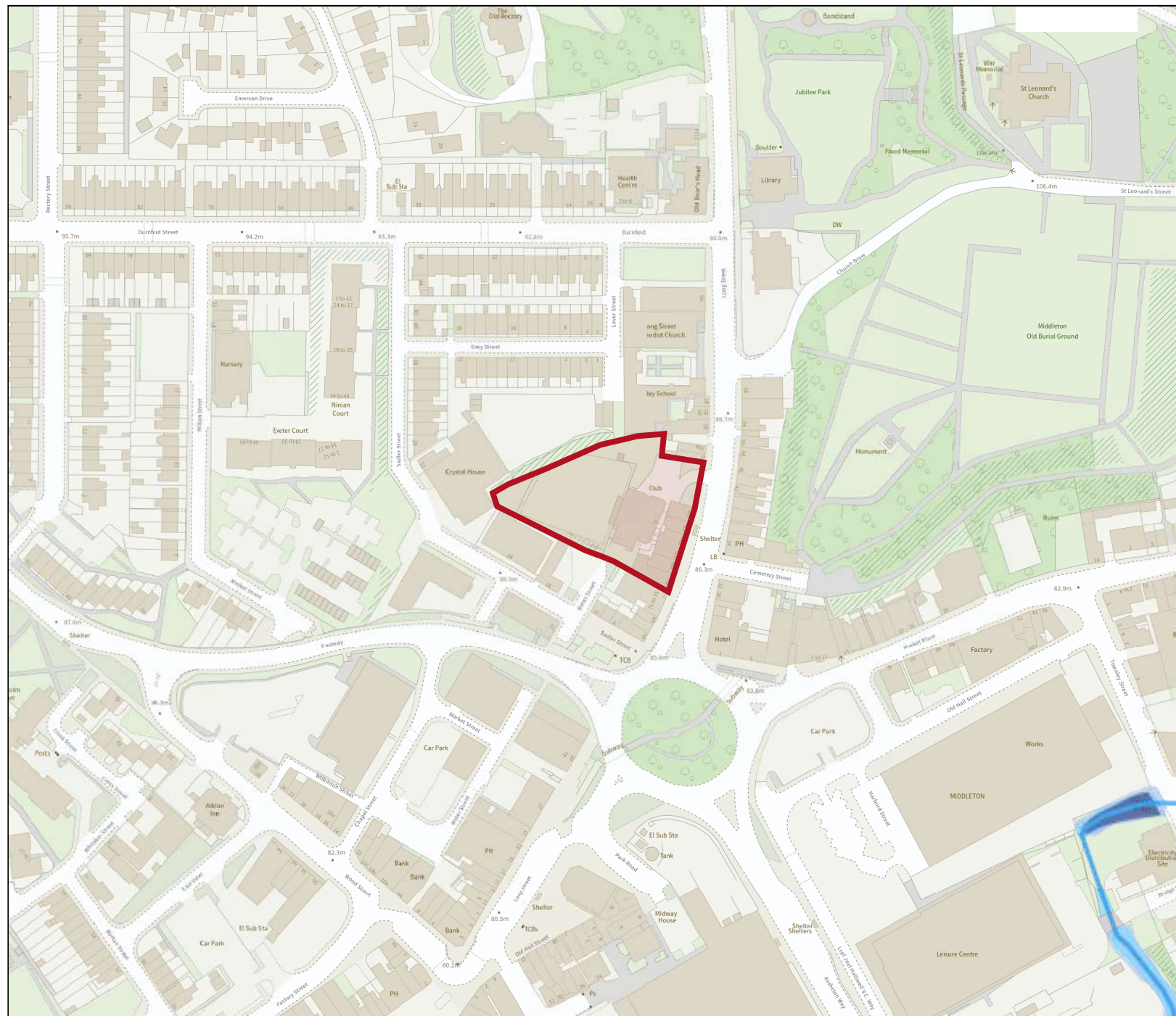
Scale
1:2500

Created
18 Mar 2025 14:01

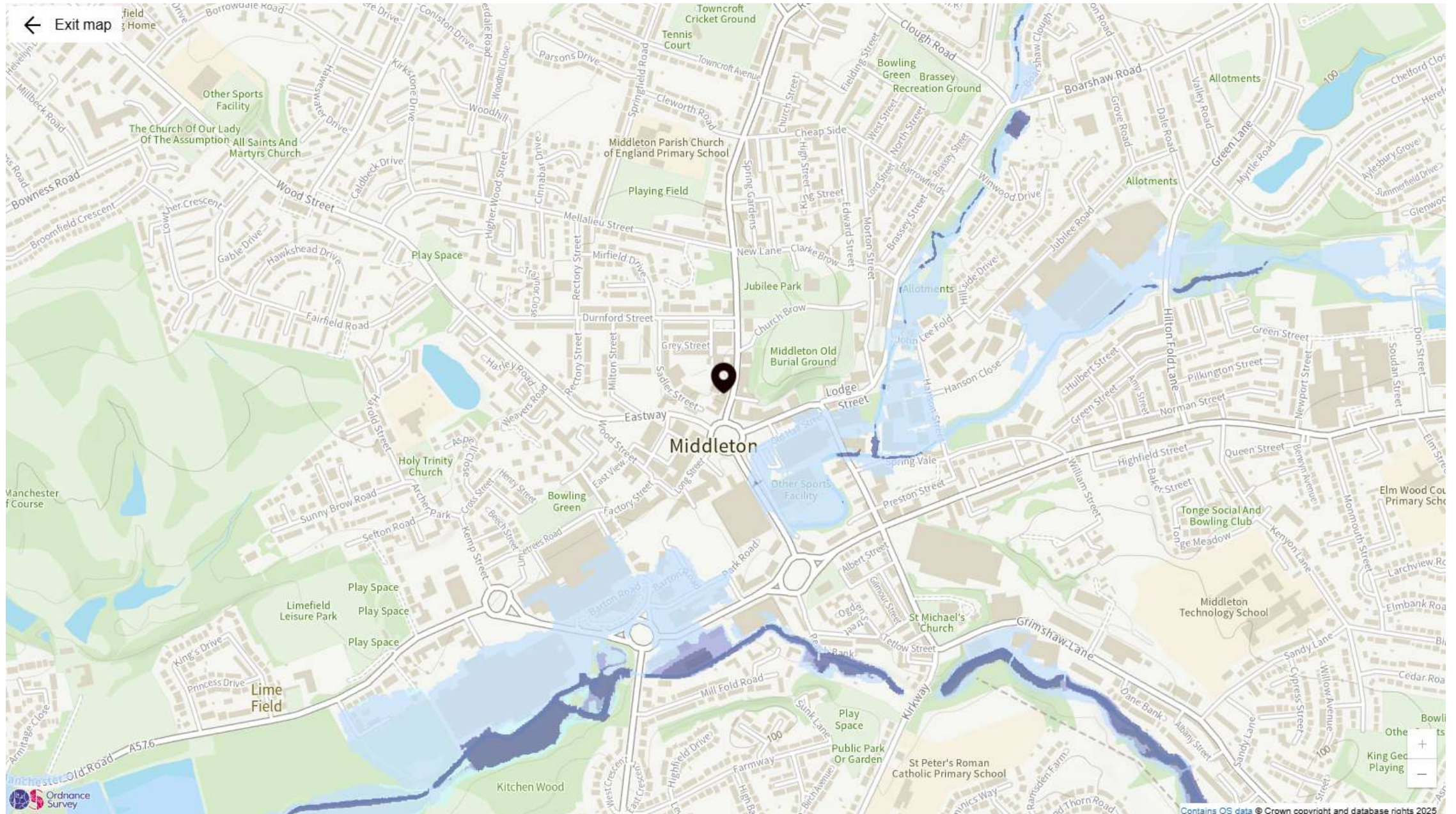
-  Selected area
-  Flood zone 3
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Water storage area

0 20 40 60m

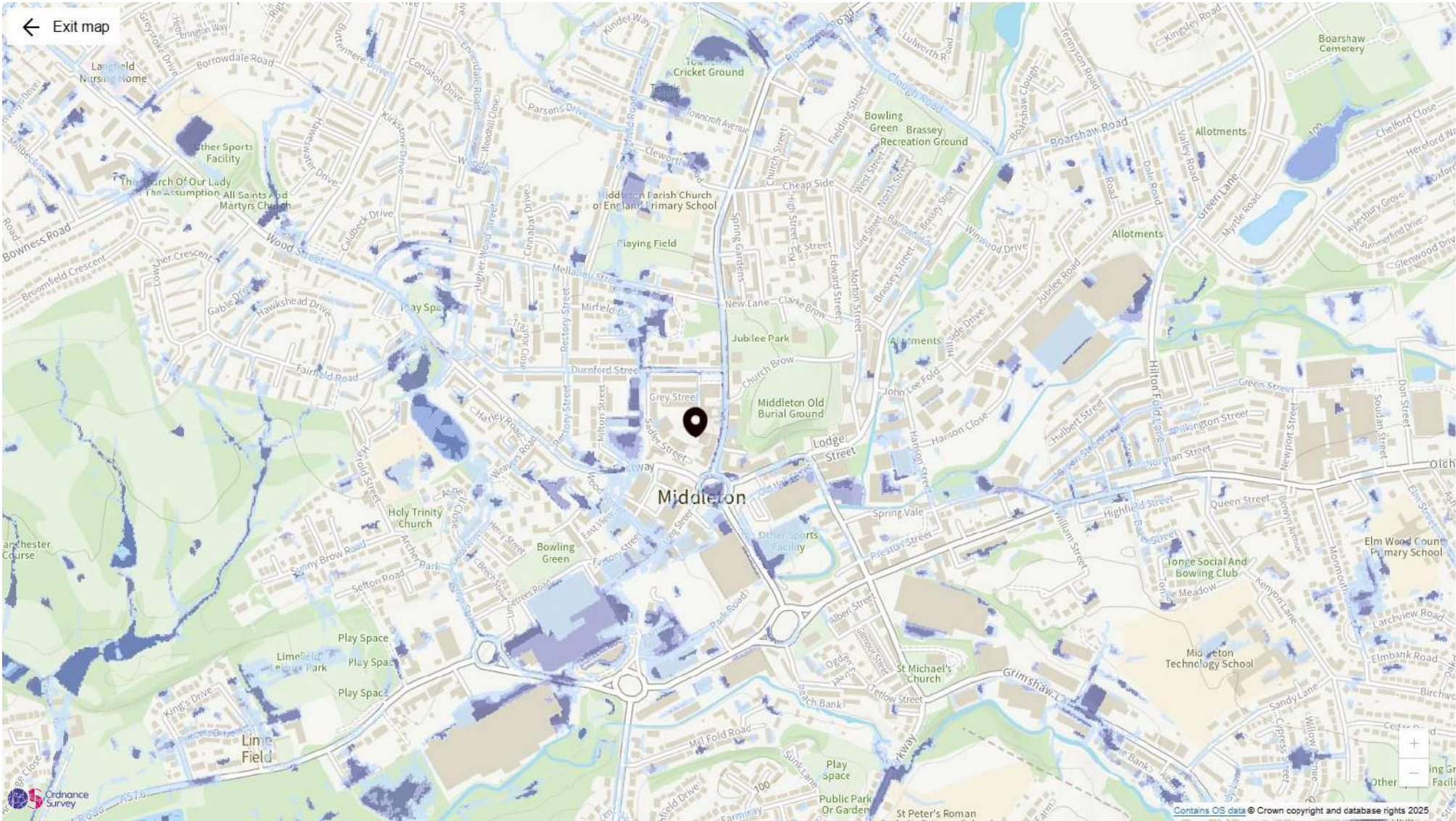
Page 2 of 2



Flood Risk from Rivers and the Sea



Flood Risk from Surface Water



Surface water map

Yearly chance of flooding

☒ Flood area (extent)

- High chance
- Medium chance
- Low chance

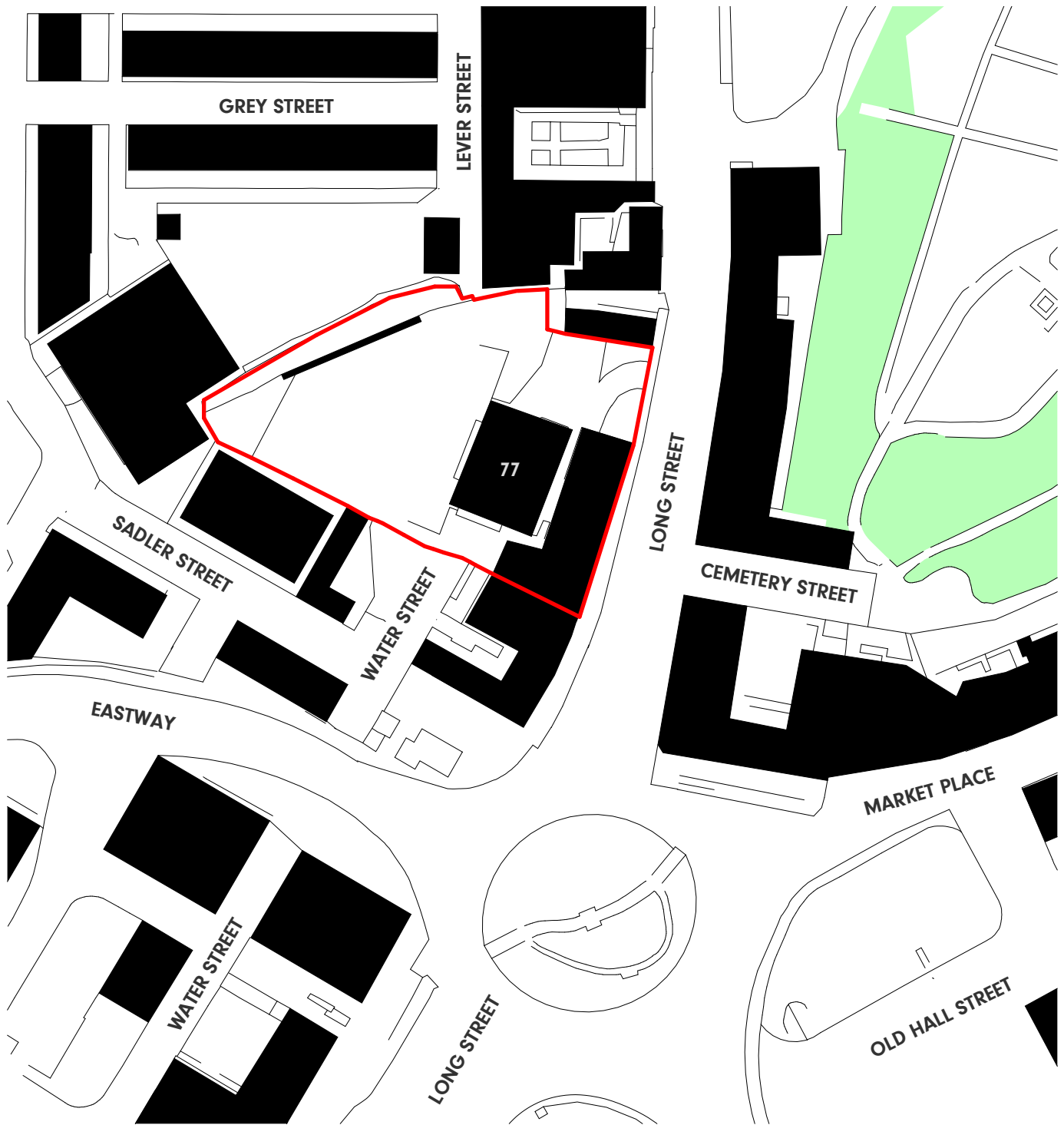
Yearly chance of flooding between 2040 and 2060

☐ Flood area (extent)

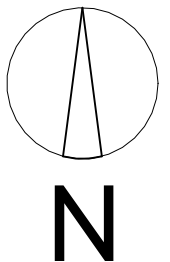
Map details

- ☒ Show flooding
- ☒ Selected address

APPENDIX B SITE PLAN



0 25 50 75
SCALE 1 : 1250



Architecture Unknown?

The Shed, Manchester, M1 5GD
architectureunknown.co.uk
info@architectureunknown.co.uk

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Client:
MOHAMMED SULEMAN

Project:
MIDDLETON CONSERVATIVE CLUB, 77 LONG STREET

Sheet:
LOCATION PLAN

Drawing no.
23.150.201

Date:
NOV 23

Drawn by:
PS

Scale:
1 : 1250

Size:
A4

P1 FIRST ISSUE
Ref Revision

CSB ---
By Date

Rev:
P1

APPENDIX C UNITED UTILITIES SEWER RECORDS

Inspire Design And Development

Unit 2a, Church View Business Park
Coney Green Rd, Inspire Design And Development
Clay Cross, Chesterfield,
S45 9HA

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: 1817 Middleton Conservative Cub
Our Ref: UUPS-ORD-637108
Date: 12/03/2025

Dear Sirs

Location: 77C LONG STREET, MIDDLETON, MANCHESTER, M24 6UN

I acknowledge with thanks your request dated 05/03/2025 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.

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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LEGEND

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

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

MANHOLE FUNCTION

- FO Foul
- SW Surface Water
- CO Combined
- OV Overflow

SEWER SHAPE

- CI Circular
- TR Trapezoidal
- EG Egg
- AR Arch
- OV Oval
- BA Barrel
- FT Flat
- HO HorseShoe
- RE Rectangular
- UN Unspecified
- SQ Square

SEWER MATERIAL

- AC Asbestos Cement
- BR Brick
- PE Polyethylene
- RP Reinforced Plastic Matrix
- CO Concrete
- CSB Concrete Segment Bolted
- CSU Concrete Segment Unbolted
- CC Concrete Box Culverted
- PSC Plastic / Steel Composite
- GRC Glass Reinforced Plastic
- DI Ductile Iron
- PVC Polyvinyl Chloride
- CI Cast Iron
- SI Steel Iron
- ST Steel
- VC Vitrified Clay
- PP Polypropylene
- PF Pitch Fibre
- MAR Masonry, Coursed
- MAS Masonry, Random
- U Unspecified

Address or Site Reference:

77C LONG STREET,
MIDDLETON,
MANCHESTER,
M24 6UN

Scale: 1:1250 Date: 12/03/2021

Sheet: 1 of 1

Printed by: Property Searches

SEWER Unit

APPENDIX D DRAINAGE STRATEGY DRAWING



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CLIENT:
ARCHITECTURE UNKNOWN
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CONSERVATIVE CLUB

PROJECT:
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CONSERVATIVE CLUB

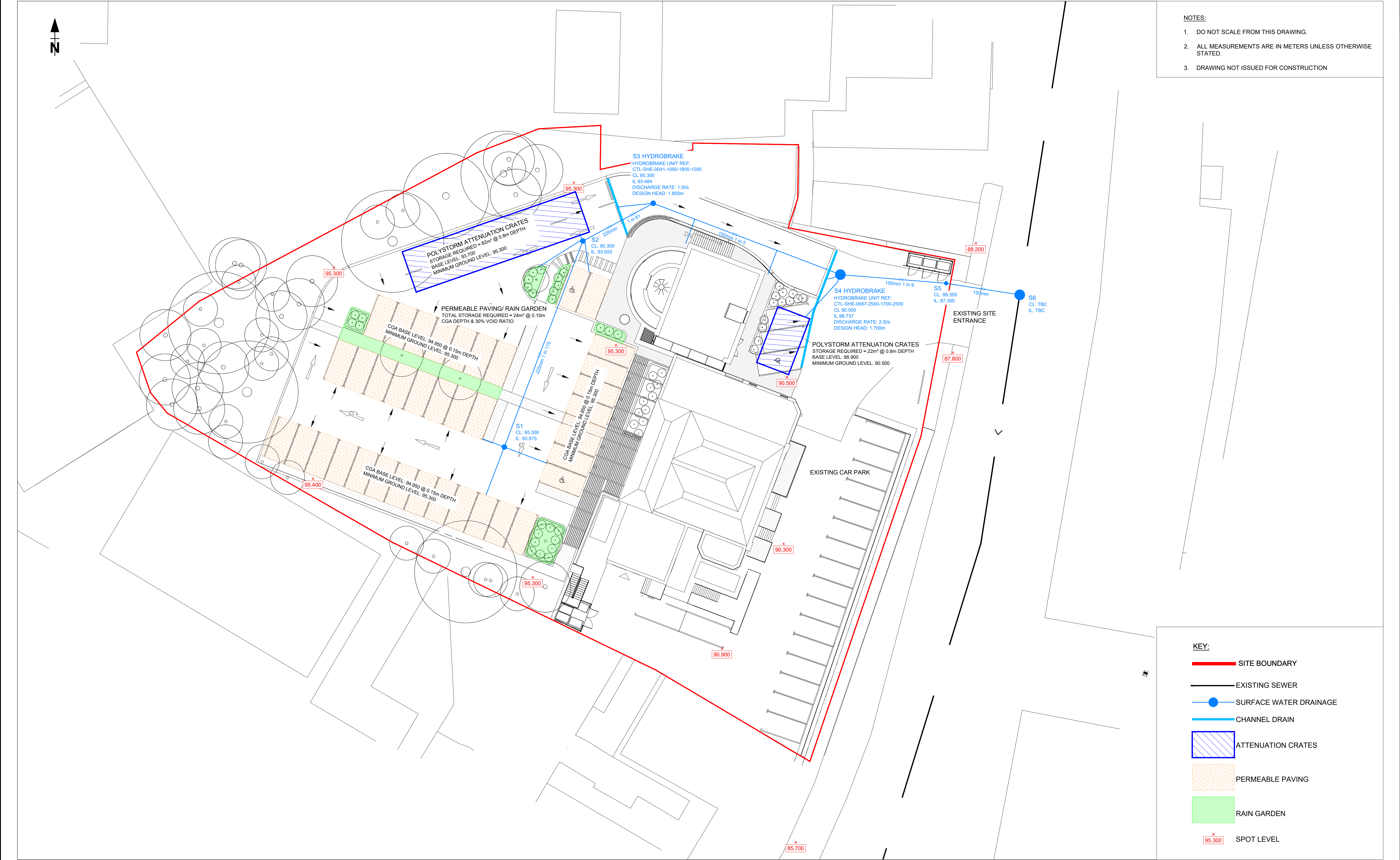
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GREENFIELD &
BROWNFIELD RUNOFF
DISCHARGE RATE

DRAWING STATUS:
FOR APPROVAL

DRAWN: NGP
CHECKED: CGR
APPROVED: CR

DATE: 28/03/25
SCALE @ A1: 1:200
DRAWING No.: AU-1817-01-DR-001
REVISION No.:

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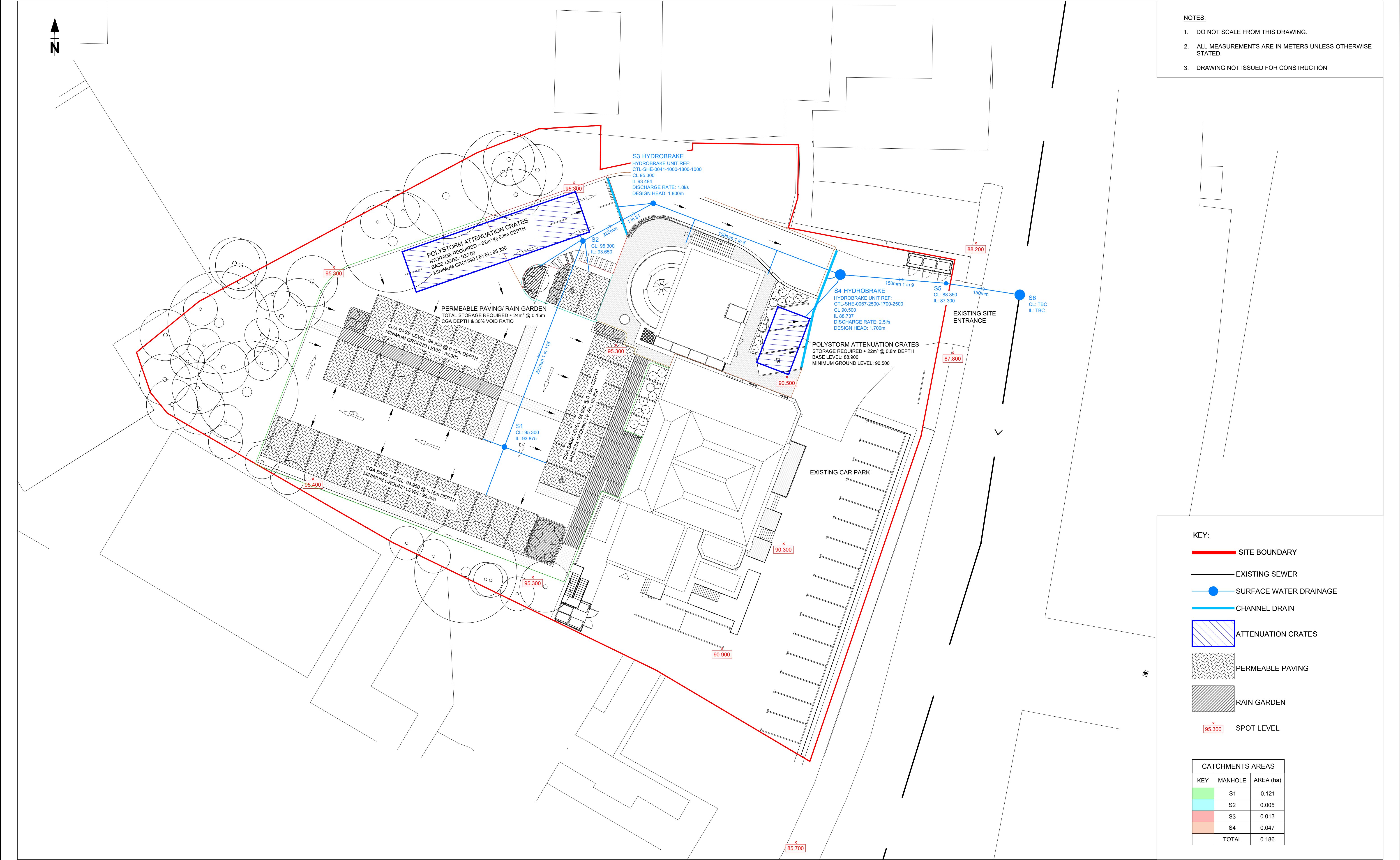
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DRAWING STATUS:
FOR APPROVAL

DRAWN:	CHECKED:	APPROVED:
NGP	CGR	CR

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DRAWING No.: AU-1817-01-DR-002	REVISION No.:

REV	DATE	NAME	CHECK	NOTE
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ARCHITECTURE UNKNOWN

PROJECT:
MIDDLETON
CONSERVATIVE CLUB

DRAWING TITLE:
CATCHMENT AREAS

DRAWING STATUS:
FOR APPROVAL

DRAWN: NGP
CHECKED: CGR
APPROVED: CR

DATE: 28/03/25
SCALE @ A1: 1:200
DRAWING No.: AU-1817-01-DR-003
REVISION No.:

REV DATE NAME CHECK NOTE

APPENDIX E HYDRAULIC CALCULATIONS

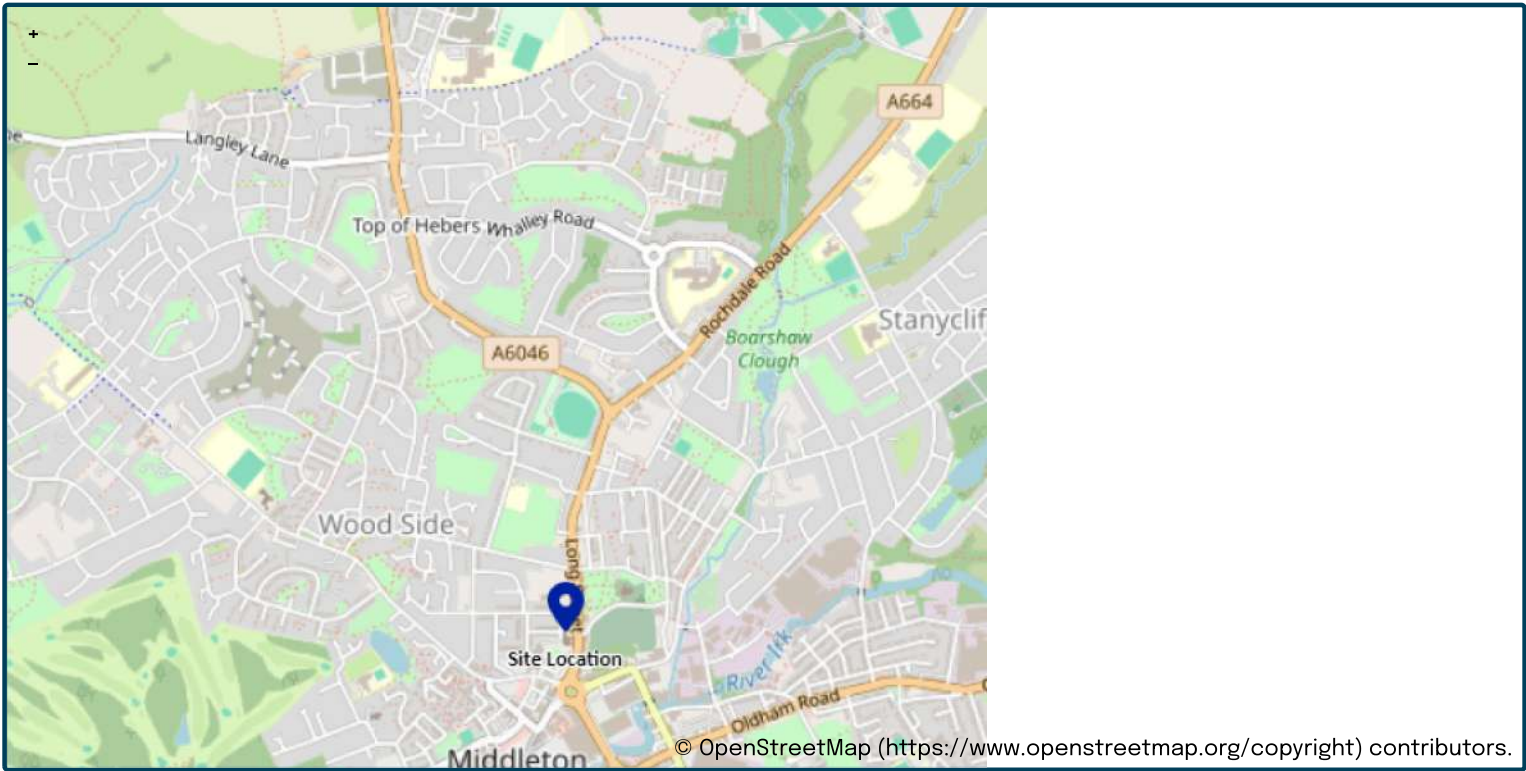
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Project details

Date	2 /03/2025
Calculated by	IC O AS ATSA OS
Reference	1 17
Model version	0. .5

Location

Site name	Middleton Conservative Club
Site location	ong Street, Middleton



Site easting	3 7029
Site northing	0 131

Site details

Total site area (ha)	0.1	ha
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MORE I FO

Greenfield runoff

Method

Method	IH124
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IH124

	<u>My value</u>		<u>Map value</u>
SAAR (mm)	1 4 mm		1 4
How should SPR be derived?	WRA soil type		
WRAP soil type	4		4
SPR	4		4
QBar (IH124) (l/s)	1 2 l/s		

Growth curve factors

	<u>My value</u>		<u>Map value</u>
Hydrological region	1		1
1 year growth factor			
2 year growth factor			
10 year growth factor	1		
30 year growth factor	1		
100 year growth factor	2		
200 year growth factor	2		

Results

Method	IH124
Flow rate 1 year (l/s)	1 1 l/s
Flow rate 2 year (l/s)	1 2 l/s
Flow rate 10 years (l/s)	1 l/s
Flow rate 30 years (l/s)	2 1 l/s
Flow rate 100 years (l/s)	2 6 l/s
Flow rate 200 years (l/s)	l/s

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (6 5) developed by HR Wallingford and available at uksuds.com (<https://www.uknuts.com/>)

The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at [uksuds.com/terms-conditions](https://www.uknuts.com/terms-conditions) (<https://www.uknuts.com/terms-conditions>) The outputs from this tool have been used to estimate Greenfield runoff rates The use of these results is the responsibility of the users of this tool No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	40	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)	0.900
CV	1.000	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	x

Circular Link Type

Shape	Circular	Auto Increment (mm)	75
Barrels	1	Follow Ground	x

Available Diameters (mm)

100 | 150

2 X 600 Link Type

Shape	Circular	Auto Increment (mm)	75
Barrels	2	Follow Ground	x

Available Diameters (mm)

600

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S1	0.121	5.00	95.300	600	387006.383	406118.101	1.425
S2	0.005	5.00	95.300	600	387015.597	406142.274	1.650
S3	0.013	5.00	95.300	1200	387023.852	406146.697	1.816
S4	0.047	5.00	90.500	1200	387045.796	406138.332	1.763
S5	0.000		88.350	450	387058.200	406137.309	1.050

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	25.870	0.600	93.875	93.650	0.225	115.0	225	5.35	50.0
1.001	S2	S3	9.365	0.600	93.650	93.534	0.116	80.7	225	5.46	50.0
1.002	S3	S4	23.484	0.600	93.484	88.787	4.697	5.0	150	5.55	50.0
1.003	S4	S5	12.446	0.600	88.737	87.300	1.437	8.7	150	5.61	50.0

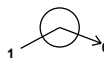
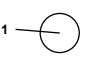
Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.218	48.4	30.6	1.200	1.425	0.121	0.0	130	1.286
1.001	1.456	57.9	31.9	1.425	1.541	0.126	0.0	119	1.490
1.002	4.537	80.2	35.2	1.666	1.563	0.139	0.0	69	4.390
1.003	3.444	121.7	47.1	1.613	0.900	0.186	0.0	65	3.229

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	25.870	115.0	225	Circular	95.300	93.875	1.200	95.300	93.650	1.425
1.001	9.365	80.7	225	Circular	95.300	93.650	1.425	95.300	93.534	1.541
1.002	23.484	5.0	150	Circular	95.300	93.484	1.666	90.500	88.787	1.563
1.003	12.446	8.7	150	2 X 600	90.500	88.737	1.613	88.350	87.300	0.900

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S1	600	Manhole	Adoptable	S2	600	Manhole	Adoptable
1.001	S2	600	Manhole	Adoptable	S3	1200	Manhole	Adoptable
1.002	S3	1200	Manhole	Adoptable	S4	1200	Manhole	Adoptable
1.003	S4	1200	Manhole	Adoptable	S5	450	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
S1	387006.383	406118.101	95.300	1.425	600		0	1.000	93.875	225
S2	387015.597	406142.274	95.300	1.650	600		1	1.000	93.650	225
							0	1.001	93.650	225
S3	387023.852	406146.697	95.300	1.816	1200		1	1.001	93.534	225
							0	1.002	93.484	150
S4	387045.796	406138.332	90.500	1.763	1200		1	1.002	88.787	150
							0	1.003	88.737	150
S5	387058.200	406137.309	88.350	1.050	450		1	1.003	87.300	150

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	20.000	Drain Down Time (mins)	240
Ratio-R	0.400	Additional Storage (m³/ha)	0.0
Summer CV	1.000	Check Discharge Rate(s)	x
Winter CV	1.000	Check Discharge Volume	x

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440
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Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	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	✓	Sump Available	✓
Invert Level (m)	93.484	Product Number	CTL-SHE-0041-1000-1800-1000
Design Depth (m)	1.800	Min Outlet Diameter (m)	0.075
Design Flow (l/s)	1.0	Min Node Diameter (mm)	1200

Node S4 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	88.737	Product Number	CTL-SHE-0067-2500-1700-2500
Design Depth (m)	1.700	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	2.5	Min Node Diameter (mm)	1200

Node S1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	94.950
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	500.0	0.0	0.150	500.0	0.0	0.151	0.0	0.0

Node S2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	93.700
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	102.0	0.0	0.800	102.0	0.0	0.801	0.0	0.0

Node S2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	94.950
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	36.0	0.0	0.150	36.0	0.0	0.151	0.0	0.0

Node S4 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	88.900
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	242

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	27.0	0.0	0.800	27.0	0.0	0.801	0.0	0.0

Approval Settings

Node Size	✓	Minimum Full Bore Velocity (m/s)	
Node Losses	✓	Maximum Full Bore Velocity (m/s)	3.000
Link Size	✓	Proportional Velocity	✓
Minimum Diameter (mm)	150	Return Period (years)	
Link Length	✓	Minimum Proportional Velocity (m/s)	0.750
Maximum Length (m)	100.000	Maximum Proportional Velocity (m/s)	3.000
Coordinates	✓	Surcharged Depth	✓
Accuracy (m)	1.000	Return Period (years)	
Crossings	✓	Maximum Surcharged Depth (m)	0.100
Cover Depth	✓	Flooding	✓
Minimum Cover Depth (m)		Return Period (years)	30
Maximum Cover Depth (m)	3.000	Time to Half Empty	x
Backdrops	✓	Discharge Rates	✓
Minimum Backdrop Height (m)		Discharge Volume	✓
Maximum Backdrop Height (m)	1.500	100 year 360 minute (m ³)	
Full Bore Velocity	✓		

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.02%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	93.986	0.111	21.6	0.0313	0.0000	OK
240 minute winter	S2	236	93.875	0.225	4.3	17.9790	0.0000	SURCHARGED
240 minute winter	S3	236	93.875	0.391	1.9	0.4424	0.0000	SURCHARGED
30 minute summer	S4	26	88.991	0.254	8.1	2.7710	0.0000	SURCHARGED
15 minute summer	S5	1	87.300	0.000	1.9	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	21.5	1.308	0.443	0.4675	
240 minute winter	S2	1.001	S3	1.8	0.452	0.031	0.3723	
240 minute winter	S3	Hydro-Brake®	S4	0.6				
30 minute summer	S4	Hydro-Brake®	S5	1.9				13.8

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.02%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
480 minute winter	S1	464	94.204	0.329	5.4	0.0931	0.0000	SURCHARGED
480 minute winter	S2	464	94.204	0.554	5.5	51.6093	0.0000	SURCHARGED
480 minute winter	S3	464	94.204	0.720	1.9	0.8142	0.0000	SURCHARGED
60 minute winter	S4	60	89.256	0.519	10.4	10.2141	0.0000	SURCHARGED
15 minute summer	S5	1	87.300	0.000	1.9	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)
480 minute winter	S1	1.000	S2	5.3	0.481	0.109	1.0289	
480 minute winter	S2	1.001	S3	1.8	0.402	0.031	0.3725	
480 minute winter	S3	Hydro-Brake®	S4	0.7				
60 minute winter	S4	Hydro-Brake®	S5	1.9				25.0

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.02%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
600 minute winter	S1	585	95.099	1.224	8.2	22.7745	0.0000	FLOOD RISK
600 minute winter	S2	585	95.099	1.449	8.6	83.7259	0.0000	FLOOD RISK
600 minute winter	S3	585	95.099	1.615	1.8	1.8264	0.0000	FLOOD RISK
120 minute winter	S4	116	90.395	1.658	11.7	23.5018	0.0000	FLOOD RISK
15 minute summer	S5	1	87.300	0.000	1.9	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)
600 minute winter	S1	1.000	S2	8.1	0.498	0.168	1.0289	
600 minute winter	S2	1.001	S3	1.6	0.159	0.027	0.3725	
600 minute winter	S3	Hydro-Brake®	S4	1.0				
120 minute winter	S4	Hydro-Brake®	S5	2.5				38.5

APPENDIX F CIRIA SIMPLE INDEX APPROACH SUMMARY

SUMMARY TABLE		DESIGN CONDITIONS			
		1	2	3	4
Land Use Type Pollution Hazard Level Pollution Hazard Indices TSS Metals Hydrocarbons	Non-residential parking with infrequent change (e.g. schools, offices, < 300 traffic movements a day) Low 0.5 0.4 0.4				
SuDS components proposed		SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B			
Component 1	Pervious pavement (where the pavement is not designed as an infiltration component)				
Component 2	Bioretention system (where the system is not designed as an infiltration component)				
Component 3	None				
SuDS Pollution Mitigation Indices TSS Metals Hydrocarbons	>0.95 >0.95 >0.95				
Groundwater protection type Groundwater protection Pollution Mitigation Indices TSS Metals Hydrocarbons	None 0 0 0				
Combined Pollution Mitigation Indices TSS Metals Hydrocarbons Acceptability of Pollution Mitigation TSS Metals Hydrocarbons	>0.95 >0.95 >0.95 Sufficient Sufficient Sufficient	Reference to local planning documents should also be made to identify any additional protection required for sites due to habitat conservation (see Chapter 7 The SuDS design process). The implications of developments on or within close proximity to an area with an environmental designation, such as a Site of Special Scientific Interest (SSSI), should be considered via consultation with relevant conservation bodies such as Natural England			