



Drainage Strategy

167 and 169 Rochdale Road, Bury, BL9 7BB

Reference: 709 -Rev - V1

Date: sep-25

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- D Drainage System General Arrangement**

London Office

5th Floor, 167, 169 Great Portland St,
London W1W 5PF

Oxford Office

Oxford Innospace, Old Music Hall, 106-108
Cowley Road, Oxford, OX4 1JE

info@urban-water.co.uk



Drainage Strategy

167 and 169 Rochdale Road, Bury, BL9 7BB

Reference: 709 -Rev - V1

Report Limitations

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Purpose of this report

- 1.1 The purpose of this statement is to accompany the technical drawings and details showing the proposed Surface Water drainage system as part of the planning application for this development.

Scope

- 1.2 This Sustainable Drainage Strategy (SDS) outlines the key drainage principles and requirements for the proposed development at 167 and 169 Rochdale Road, Bury, BL9 7BB. It provides a summary of the sustainable drainage system (SuDS) design, based on the specific site conditions and relevant guidelines, including Building Regulations Approved Document Part H and CIRIA C753: The SuDS Manual 2015. As the project progresses and new information becomes available, this strategy will be updated to reflect ongoing changes and the development of the detailed design.

Site Characteristics

- 2.1 The site background is clearly identified through answers to the questions in table 1 below.

Table 1: Site Characteristics . See appendix B for support documentation

TOPIC	QUESTION	ANSWER
Protected species or habitat	Is the site near to designated sites and priority habitats?	No
Flood Plain	Is the site located in the flood plain?	No
Soils and Geology	Soil permeability? - See appendix B for results	No
Space constraints	Space for SuDS components?	No
Topography	Sited on a flat site?	Yes
	Sited on a steep slope (5-15%)	No
	Sited on a very steep slope (>15%)	No
Groundwater	Is the site at groundwater flood risk?	No
Contaminated land	Are there contaminated soils on site?	Unknown
Source Protection Zone	Is the site within a SPZ 3?	Yes
Runoff characteristics	Is the development in a high risk flooding area?	No

Existing and Proposed Site

- 2.2 The distribution of catchment areas for existing and proposed site is as per table 2 below. See appendix A for details

Table 2 : Existing and Proposed catchment areas in hectares

Description	Existing Site	Proposed Site
Impermeable Areas	0.011	0.011
Permeable Areas	Connected to Drainage	0.000
	Self Draining Areas	0.000
Areas Draining Away from drainage System	0.003	0.003
Total Development Area	0.014	0.014

- 2.3 It has been assumed that the positively drained areas will have different runoff coefficients depending on the type of surface as follow:

Impermeable Surface	1.0
Permeable Surfaces	0.5
Grass Areas	0.3

Evaluation of Discharge Point

3.1 The SuDS design takes into account Building Regulations Section H3 and the National Planning Practice Guidance. The aim is to discharge surface water run-off as high up the drainage hierarchy, as reasonably practicable:

1. into the ground (infiltration);
2. to a surface water body;
3. to a surface water sewer, highway drain, or another drainage system;
4. to a combined sewer.

3.2 The discharge point has been evaluated following the NPPG and Building regulations. The findings are in table 3 below.

Table 3: Drainage Hierarchy evaluation

Superficial geology classification	The British Geological Society records show that the superficial deposits are Till, Devensian - Diamicton.
Bedrock geology classification	The British Geological Society records of the site show that it is located within the Pennine Lower Coal Measures Formation - Mudstone, Siltstone And Sandstone.
Landis Top Soil Infiltration	The SOILSCAPE's records of the site show that it is located within an area of freely draining soils.
Groundwater	The British Geological Survey's flood risk susceptibility maps show that the development has limited susceptibility to ground water flooding. The risk from groundwater flood to the site is considered very low.
Is infiltration feasible?	Infiltration is not possible on this site due to lack of space for SuDS components
Is a discharge to a watercourse feasible?	There is no watercourse near the site.
Is a discharge to a surface water sewer feasible?	There is a surface water sewer in the proximity to the site. It is possible to connect to the surface water sewer, and it is proposed to discharge into this surface water sewer, at the existing pipework of the property.
Is a discharge to a combined sewer feasible?	There is a combined water sewer in the proximity to the site. It is possible to connect to the combined water sewer. It is not proposed to discharge into the combined water sewer.

Existing and Proposed Peak Run-off Calculations

- 4.1 The current site is a Brownfield. The peak runoff rate for the existing site was calculated as per table 4 and discharge rates as per table 5.

Table 4: Peak run-off rate calculation method for existing site

Method Used	Calculation Method
	Report 124 Flood Estimation for Small Catchments method has been used to estimate the site peak flow rates
✗	This is a brownfield site, runoff rates are calculated in accordance with best practice simulation modelling and using the modified rational method
	This is a brownfield site where the pre-development drainage isn't known. The runoff rates are calculated using the Greenfield model with soil type 5

- 4.2 The runoff flow produced by the development will be controlled as per table 5.

Table 5: Runoff discharge rate control

Control Used	Description of runoff discharge
	Water will be discharged into the ground via a SuDS as described in table 6 below
	The peak discharge rate has been reduced to Greenfield Qbar flow
	The peak discharge rate has been taken as 0.7 l/s as it is not possible to reduce it to the Greenfield Qbar rate
	The peak discharge rate has been reduced to Brownfield pre-development 1 in 1 flow
✗	The peak discharge rate has been reduced by 60% from the existing Brownfield pre-development 1 in 2 flow rate

Run-off flows

- 4.3 The size of the SuDS has been calculated for all events up to the 1 in 100 including an allowance for climate change of 45%. As per tables above, it is proposed to discharge at a rate of 0.88 l/s. See table 6 for values and appendix C for calculations.

Table 6: Peak discharge rates for SuDS

Return Period Event	Discharge Rate (l/s)			Infiltration Rate (m/hr)
	Existing Greenfield	Existing Brownfield	Proposed	
Qbar	0.10	N/A	N/A	0.0000
1 in 1	0.10	1.70	0.9	0.0000
1 in 2	0.10	2.20	0.9	0.0000
1 in 30	0.30	4.10	0.9	0.0000
1 in 30 + CC	N/A	N/A	0.9	0.0000
1 in 100	0.40	5.20	0.9	0.0000
1 in 100 + CC	N/A	N/A	0.9	0.0000

Proposed Sustainable Drainage System

5.1 The following sustainable drainage systems have been used for this site. The drainage design uses these drainage system through out the site. See table 7 for details.

Table 7: Evaluation of SuDS and Proposed Drainage System

<i>Most Sustainable</i>	SuDS Technique	Feasible	Proposed	Flood Reduction	Pollution Reduction	Landscape & Wildlife Benefit
	Living Roofs					
	Green Roof	No	No	X	X	X
	Green Blue Roof	No	No	X	X	X
	Basins and Ponds			X	X	X
	Rainwater Gardens	No	No	X	X	X
	Rainwater Planters	No	No	X	X	X
	Constructed Wetlands	No	No	X	X	X
	Balancing Pond	No	No	X	X	X
	Detention Basins	No	No	X	X	X
	Retention Ponds	No	No	X	X	X
	Filters and Swales					
	Filter Strips	No	No	X	X	X
	Swales	No	No	X	X	X
	Infiltration Devices					
	Soakaways Crates	No	No	X	X	X
	Deep Boreholes	No	No	X	X	X
	Infiltration Trenches	No	No	X	X	X
	Infiltration Basin	No	No	X	X	X
	Permeable Surfaces			X	X	
	Permeable Surfaces	No	No	X	X	
	Filter Drains	No	No	X	X	
	Tanked System					
	Storage Crates	Yes	Yes	X		
	Oversized Tanks	No	No	X		
	Oversized Pipes	No	No	X		
	Blue Roof	No	No	X		
	Water Harvesting	No	No	X		
<i>Least Sustainable</i>						

- 5.2 The location and details of the SuDS can be seen drainage layouts in appendix D. Calculations are in appendix C.
- 5.3 The drainage calculations demonstrate:
- No flooding occurs for the 1 in 30 storm events.
 - Any flooding for the 1 in 100 year + 45% climate change event can be safely contained on site
- 5.4 The proposed drainage strategy presents one possible solution to demonstrate that the development can be sustainably drained, to comply with the requirements of the NPPF. Other solutions may be feasible and may prove to be better suited to the site. These will become apparent during the detailed design stage. The strategy above should not therefore be interpreted as the definitive scheme solution.

Management of Exceedance Flows

- 5.5 The drainage network has been designed to attenuate surface runoff for all events up to and including the 1% AEP + CC(1 in 100 years). However consideration has been given to what may happen when the design capacity of the surface water drainage network is exceeded. Surface water will flow to the lowest points within the site. The flood risk to the buildings would therefore remain low. See appendix D.

Maintenance and Management plan responsibility

- 6.1 The SuDS will be maintained by The Owner the property

Maintenance and Management plan for proposed SuDS

- 6.2 The maintenance and Management Plan Guidance from the SuDS Manual, CIRIA C753 (CIRIA, 2015) is to be followed for the effective maintenance of the proposed SuDS techniques outlined above. The maintenance for SuDS structures are as follow:

INLETS, OUTLETS, CONTROLS AND INSPECTION CHAMBERS	
Regular Maintenance	Frequency
Inlets, outlets and surface control structures	
Inspect surface structures removing obstructions and silt as necessary. Check there is no physical damage.	Monthly
Strim vegetation 1m min. surround to structures and keep hard aprons free from silt and debris	Monthly
Inspection chambers and below ground control chambers	
Remove cover and inspect ensuring water is flowing freely and that the exit route for water is unobstructed. Remove debris and silt. Undertake inspection after leaf fall in autumn	Annually
Occasional Maintenance	
Check topsoil levels are 20mm above edges of baskets and chambers to avoid mower damage	As necessary
Remedial work	Frequency
Unpack stone in basket features and unblock or repair and repack stone as design detail as necessary.	As required
Repair physical damage if necessary.	As required

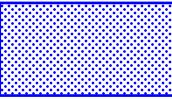
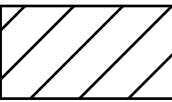
Operation and maintenance requirements for attenuation storage tanks		
Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from 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

Appendix A

Drawing Scale Bar		Drawing Scale Bar	
Drawing scale	Line length	Drawing scale	Line length
1:5	= 0.25 metres	1:200	= 10.0 metres
1:10	= 0.5 metres	1:250	= 12.5 metres
1:20	= 1.0 metres	1:500	= 25.0 metres
1:25	= 1.25 metres	1:1000	= 50.0 metres
1:50	= 2.5 metres	1:1250	= 62.5 metres
1:100	= 5.0 metres	1:2500	= 125 metres
Measure length of line above for checking of scale			
←		→	

GENERAL NOTES

KEY

-  PERMEABLE AREAS
-  IMPERMEABLE AREAS
-  STUDY AREA

Rev	Details	Date	By	Chd

Drawing Status: **PRELIMINARY**

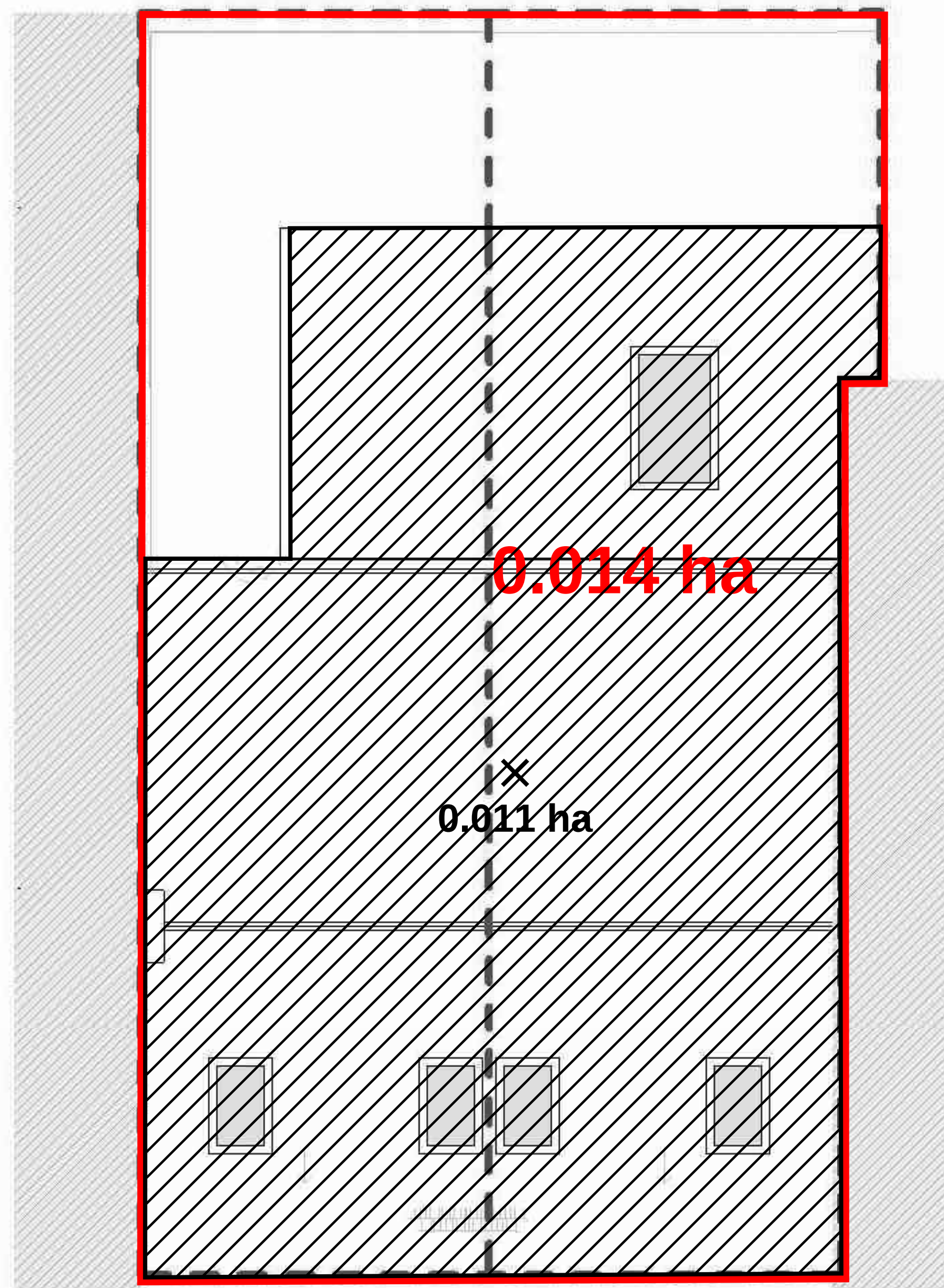


Client: _____

Project: **167 and 169 Rochdale Road, Bury, BL9 7BB**

Drawing: **Existing and Proposed Areas
Permeable and Impermeable**

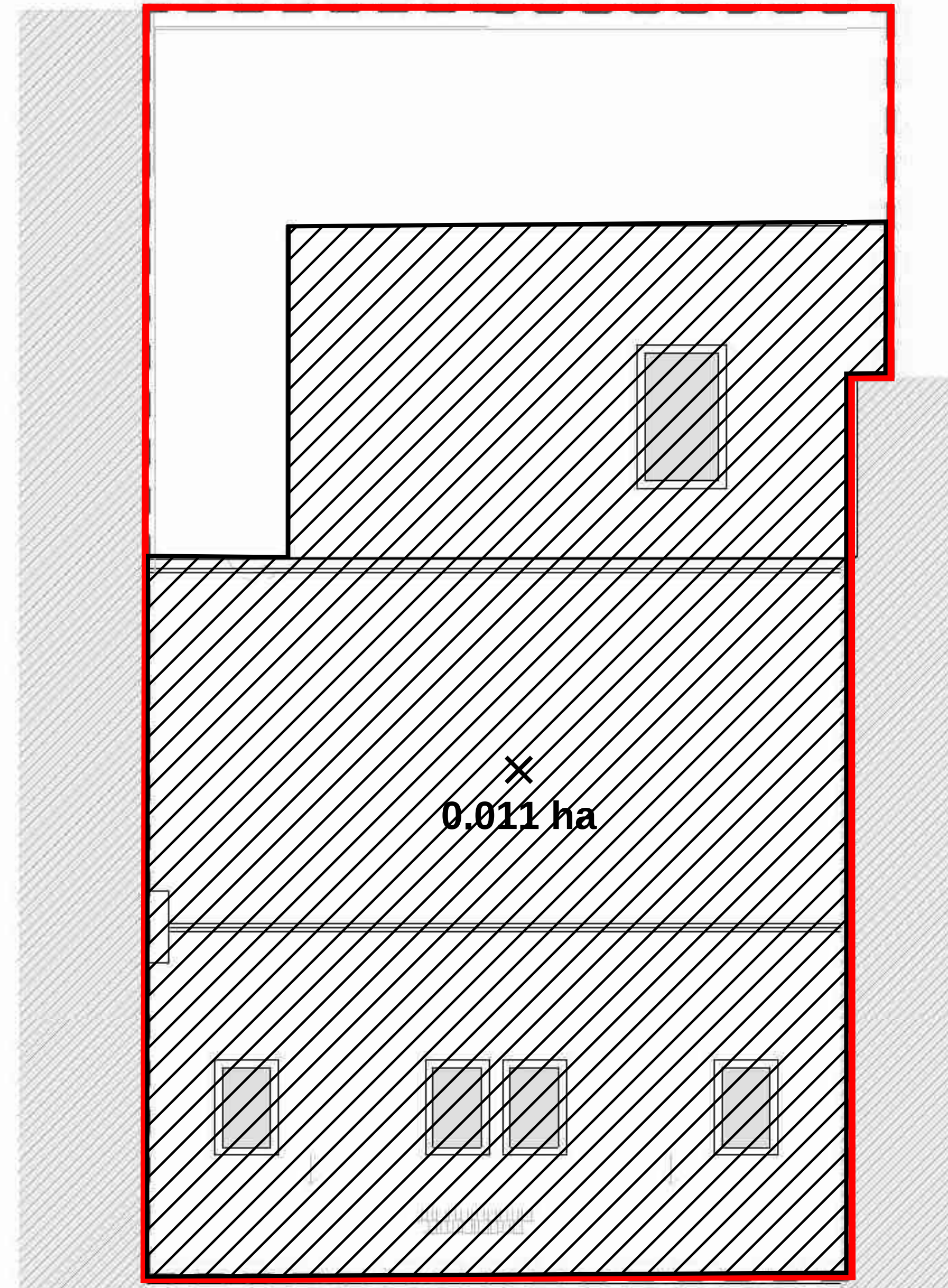
Print: Size:	Project No:	Drawing No:	Revision:
A1	0709	002	P1



No. 167

No. 169

EXISTING SITE
1:50



No. 167

No. 169

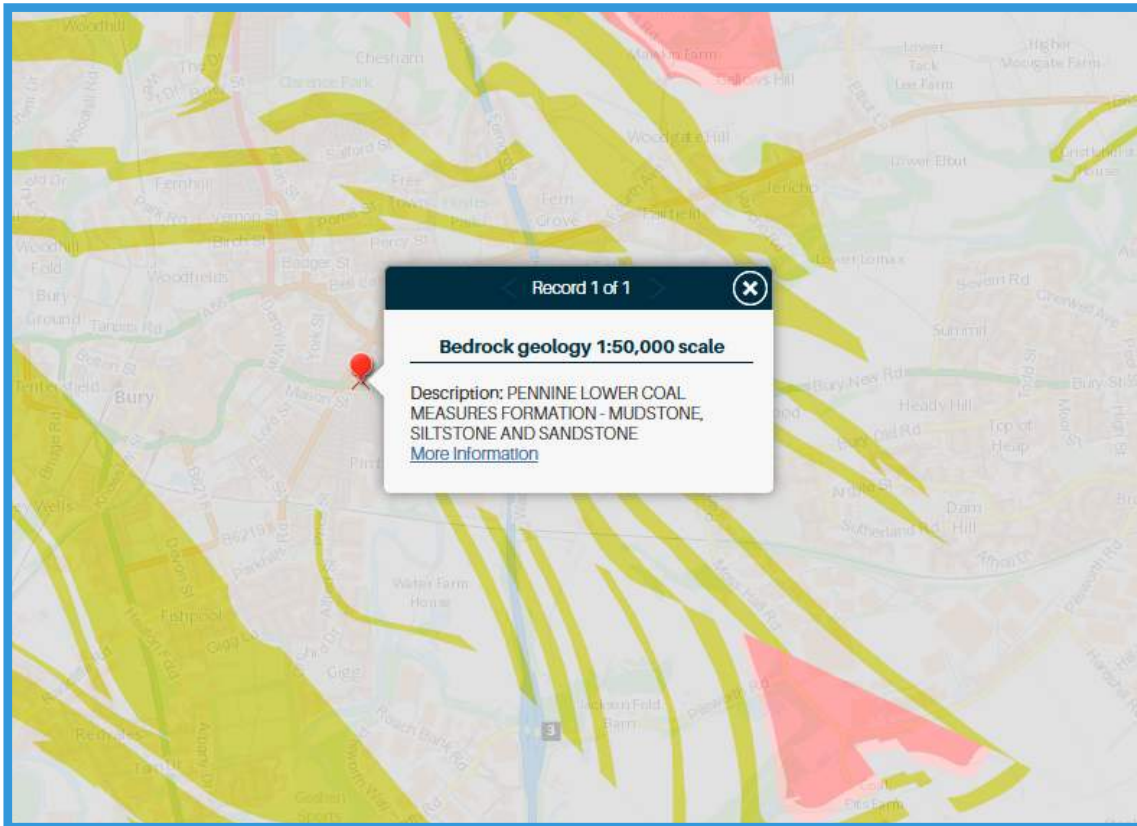
PROPOSED SITE
1:50

Appendix B

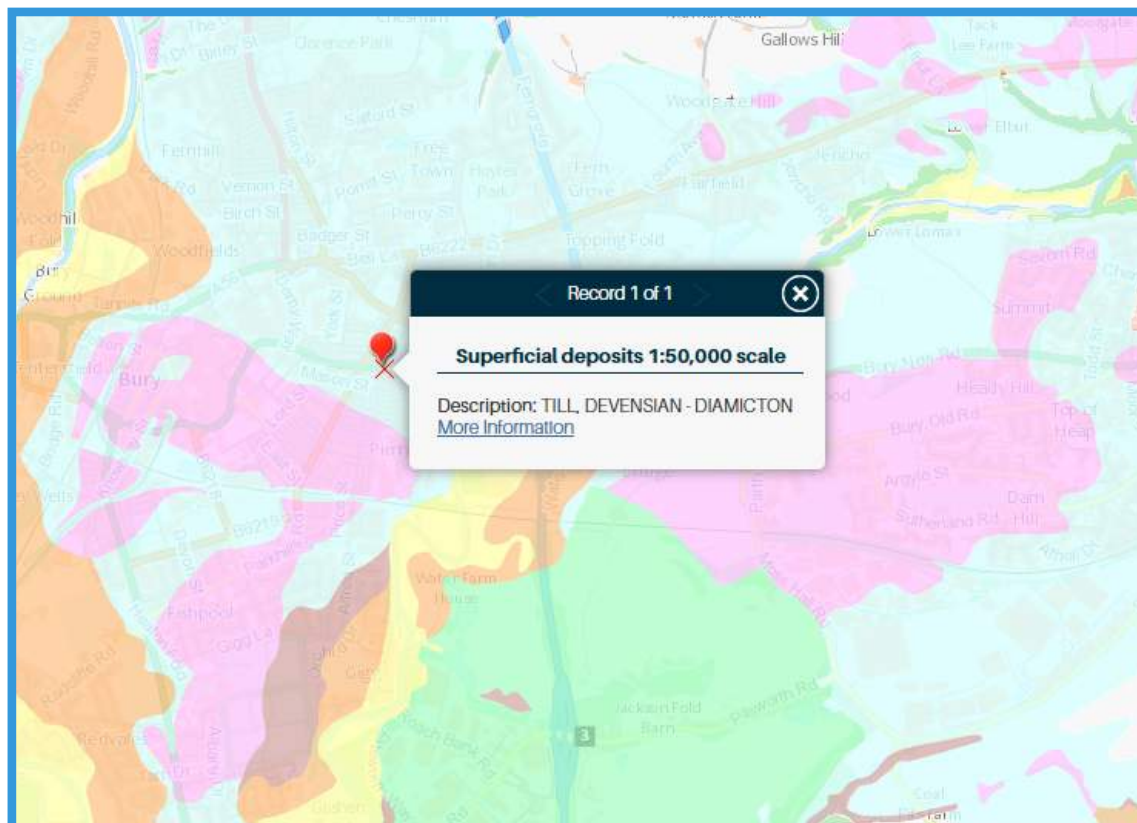
SITE GEOLOGY



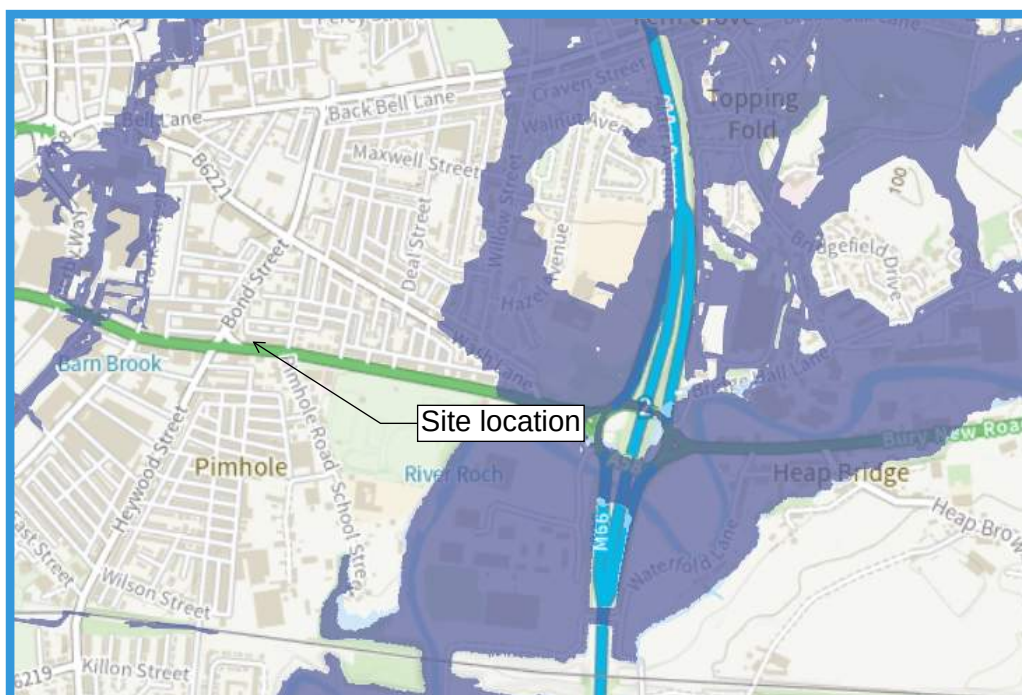
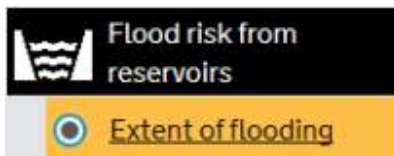
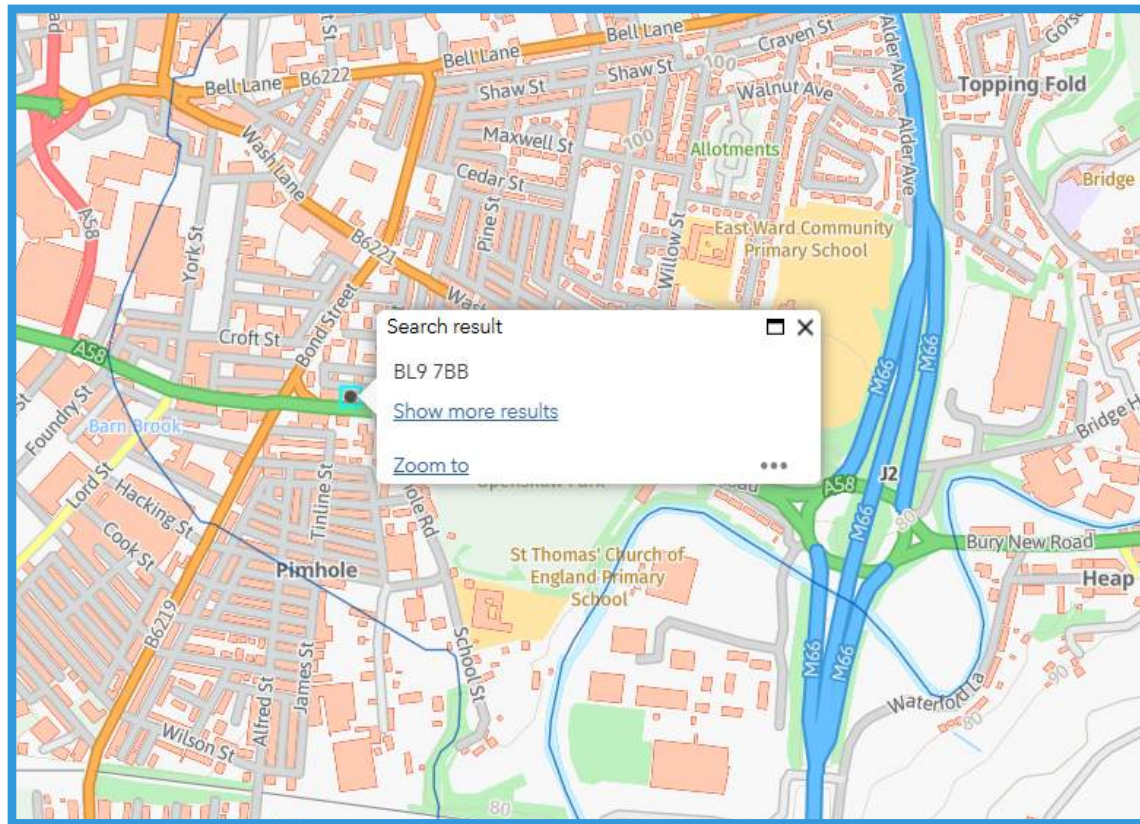
GEOLOGY - BEDROCK - Pennine Lower Coal Measures Formation
- Mudstone, Siltstone And Sandstone.



GEOLOGY - SUPERFICIAL DEPOSITS
Till, Devensian - Diamicton



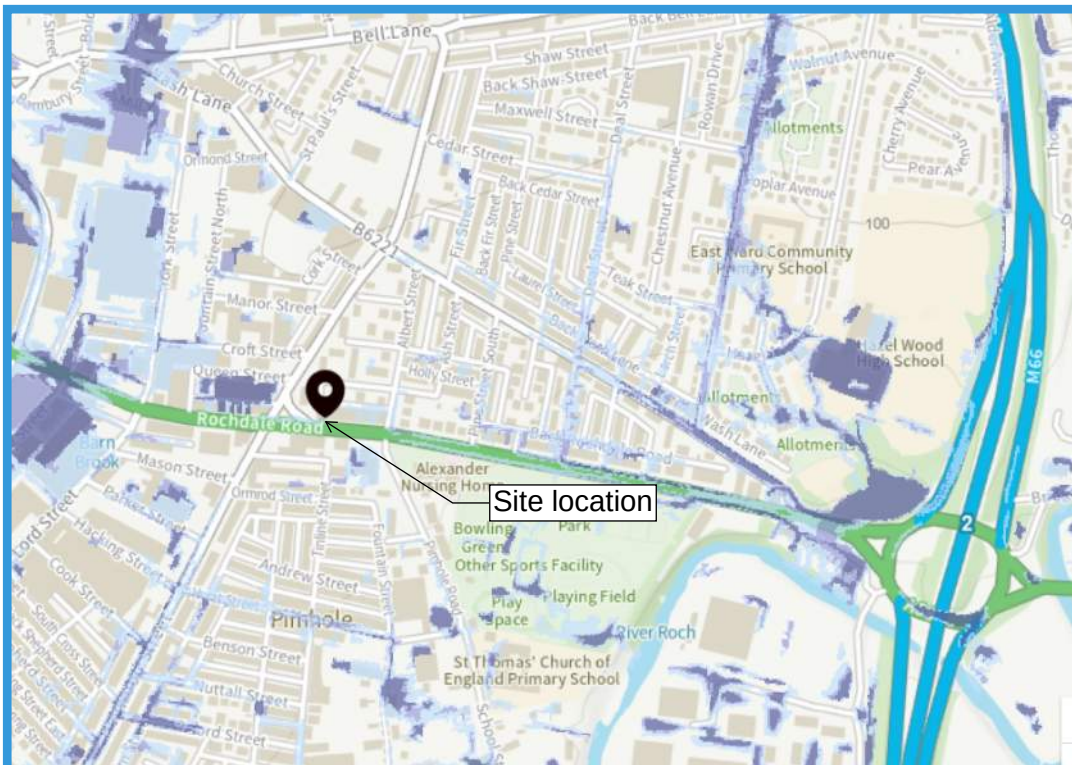
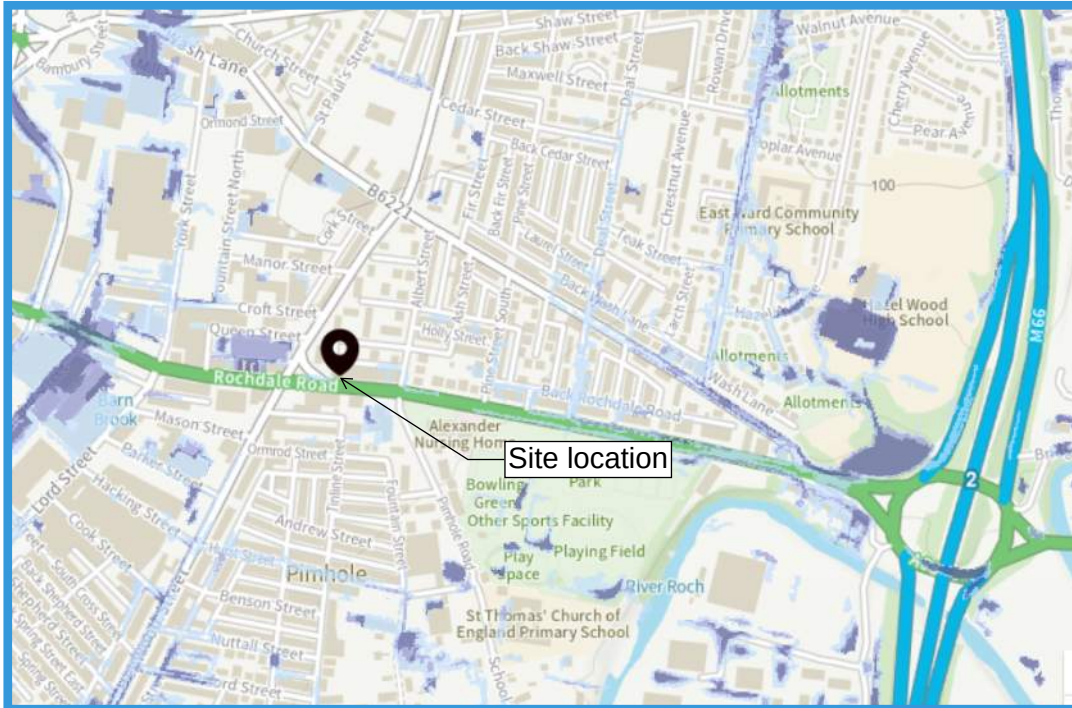
Main River Map



- When river levels are normal
- When there is also flooding from rivers

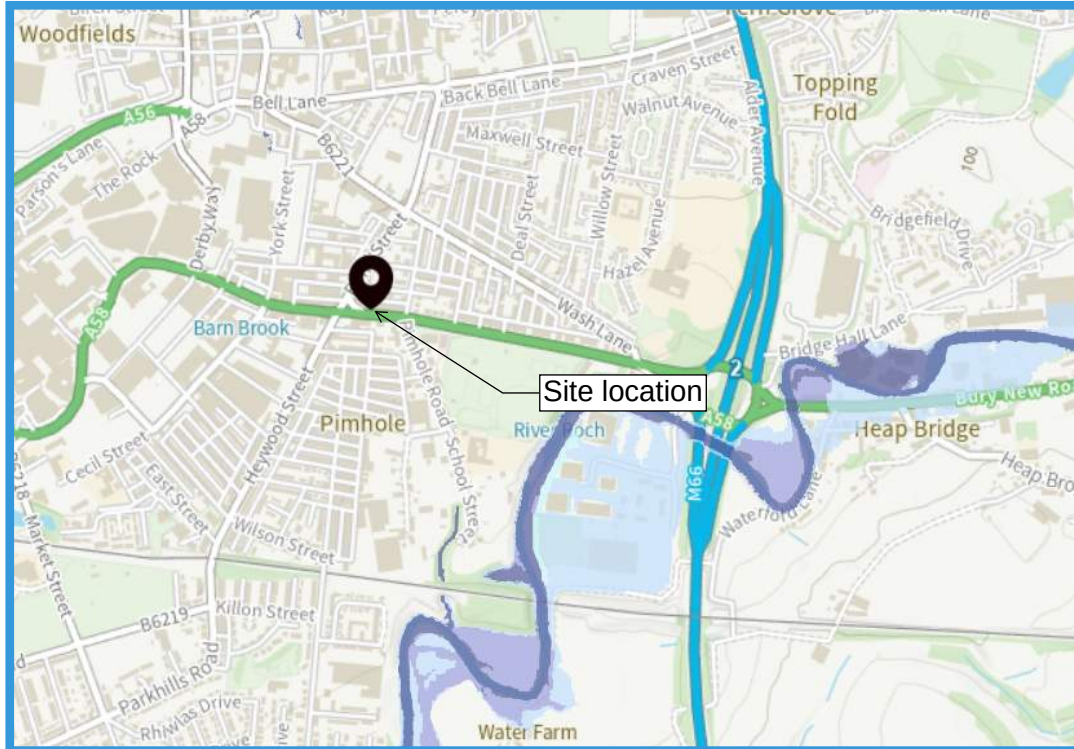
SITE SURFACE WATER FLOOD RISK

High risk means a chance of flooding greater than 3.3% (1:30)
 Medium risk means a chance of flooding of btw 1% (1:100) and 3.3%
 Low risk means a chance of flooding of btw 0.1% (1:1000) and 1%
 Flooding from surface water is difficult to predict as rainfall location and volume are difficult to forecast. In addition, local features can greatly affect the chance and severity of flooding



RIVER AND SEA FLOOD RISK MAP

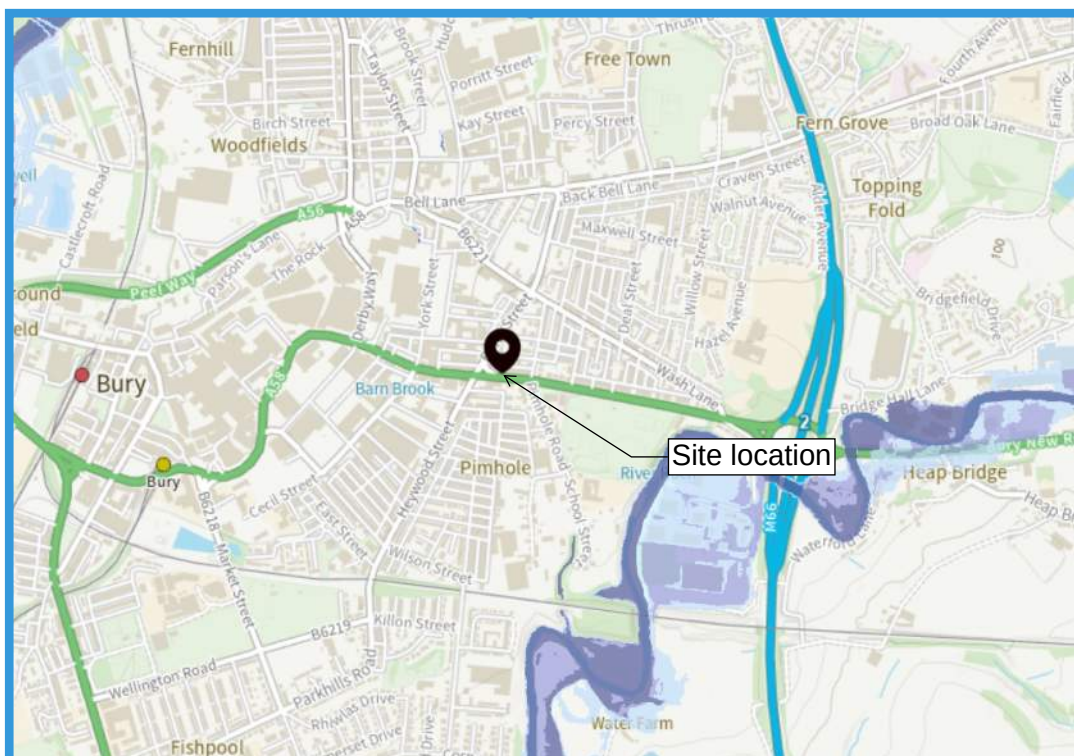
- High - greater than or equal to 1 in 30 (3.3%) chance of flooding in any year
- Medium - Less than 1 in 30 (3.3%) but greater than or equal to 1 in 100 (1%) chance of flooding in any given year
- Low - Less than 1 in 100 (1%) but greater than or equal to 1 in 1000 (0.1%) chance of flooding in any given year
- Very low - less than 1 in 1000 (0.1%) chance of flooding in any given year



Yearly chance of flooding

● Flood area (extent)

- High chance
- Medium chance
- Low chance
- Very low chance

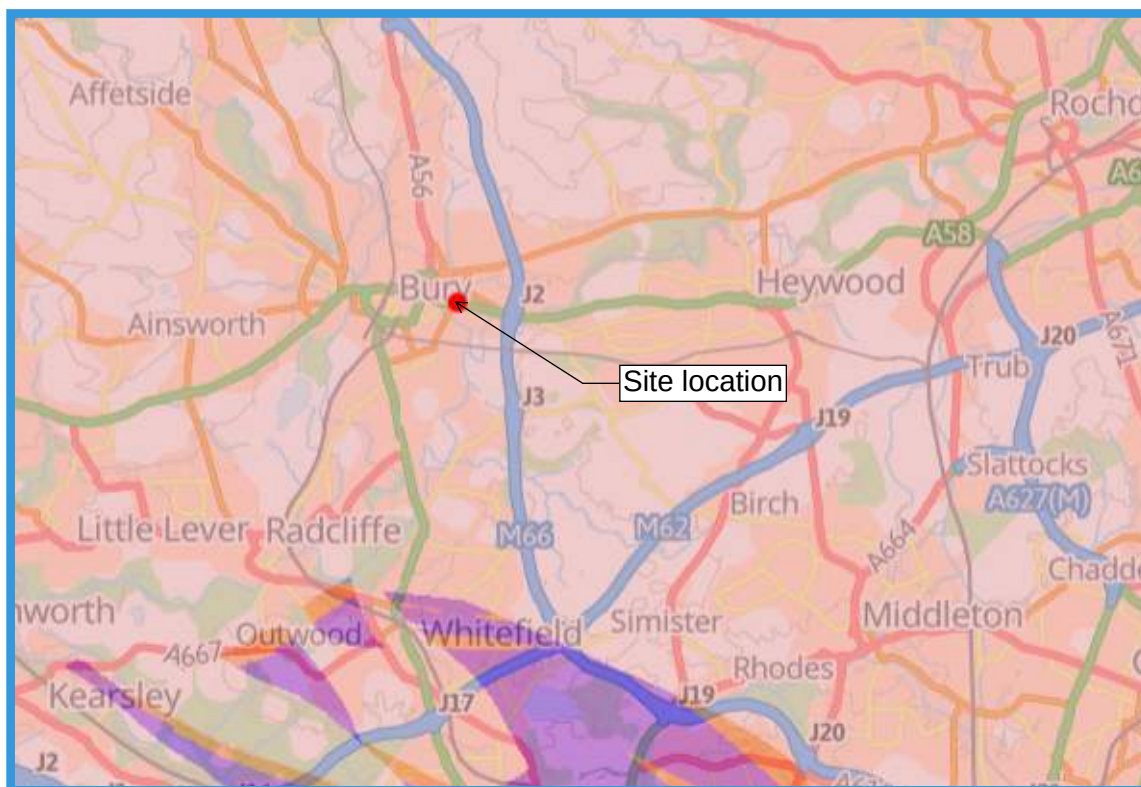


Yearly chance of flooding between 2036 and 2069

● Flood area (extent)

- High chance
- Medium chance
- Low chance
- Very low chance
- No data available

MAGIC RESULTS



Site Check Results

Site Check Report generated on Thu Sep 18 2025

The following features have been found in your search area:

You selected the location: Centroid Grid Ref: SD81311075

Aquifer Designation Map (Superficial Drift) (England)

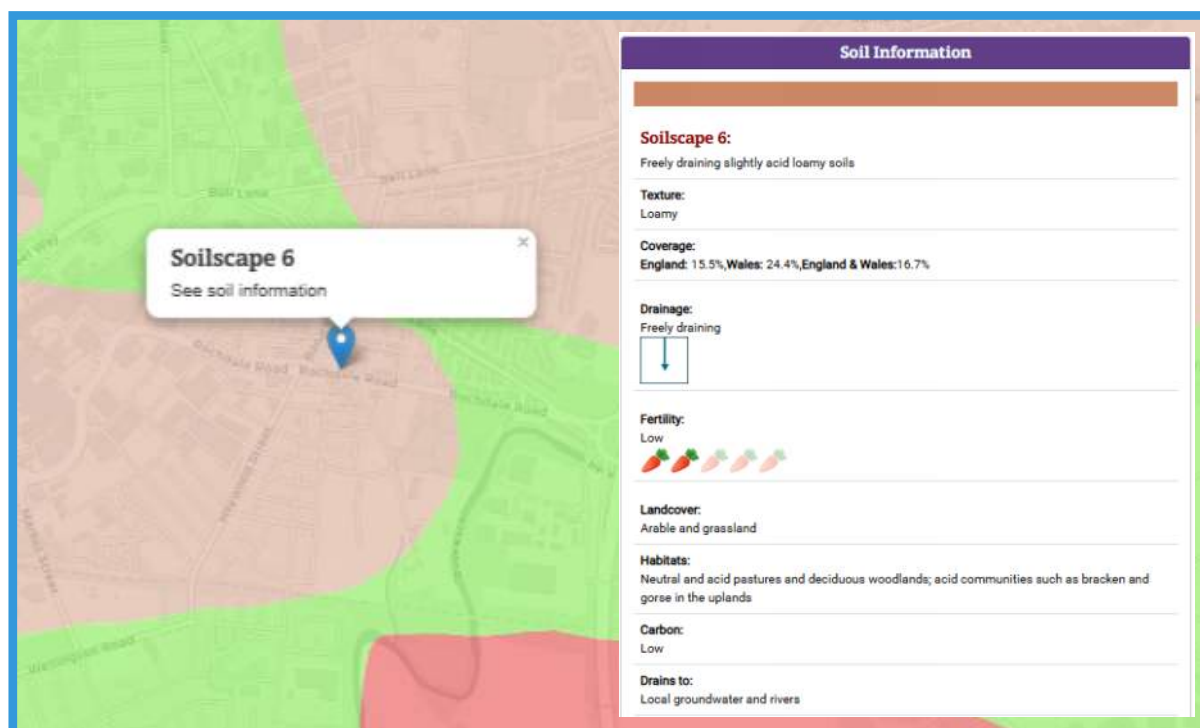
TYPOLOGY Secondary (undifferentiated)

Aquifer Designation Map (Bedrock) (England)

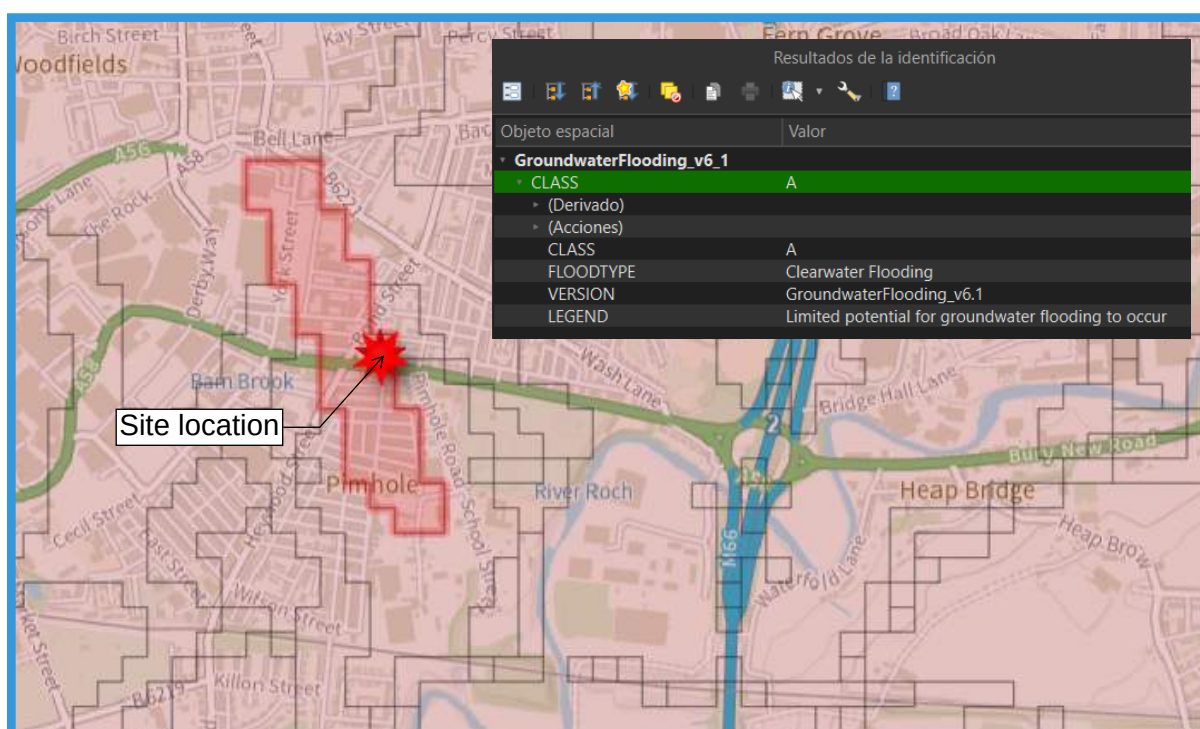
TYPOLOGY Secondary A

Source Protection Zones merged (England)

No Features found



GROUND WATER FLOOD RISK



Flood map for planning

Your reference	Location (easting/northing)	Created
Unspecified	381318/410757	18 September 2025 17:34

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)

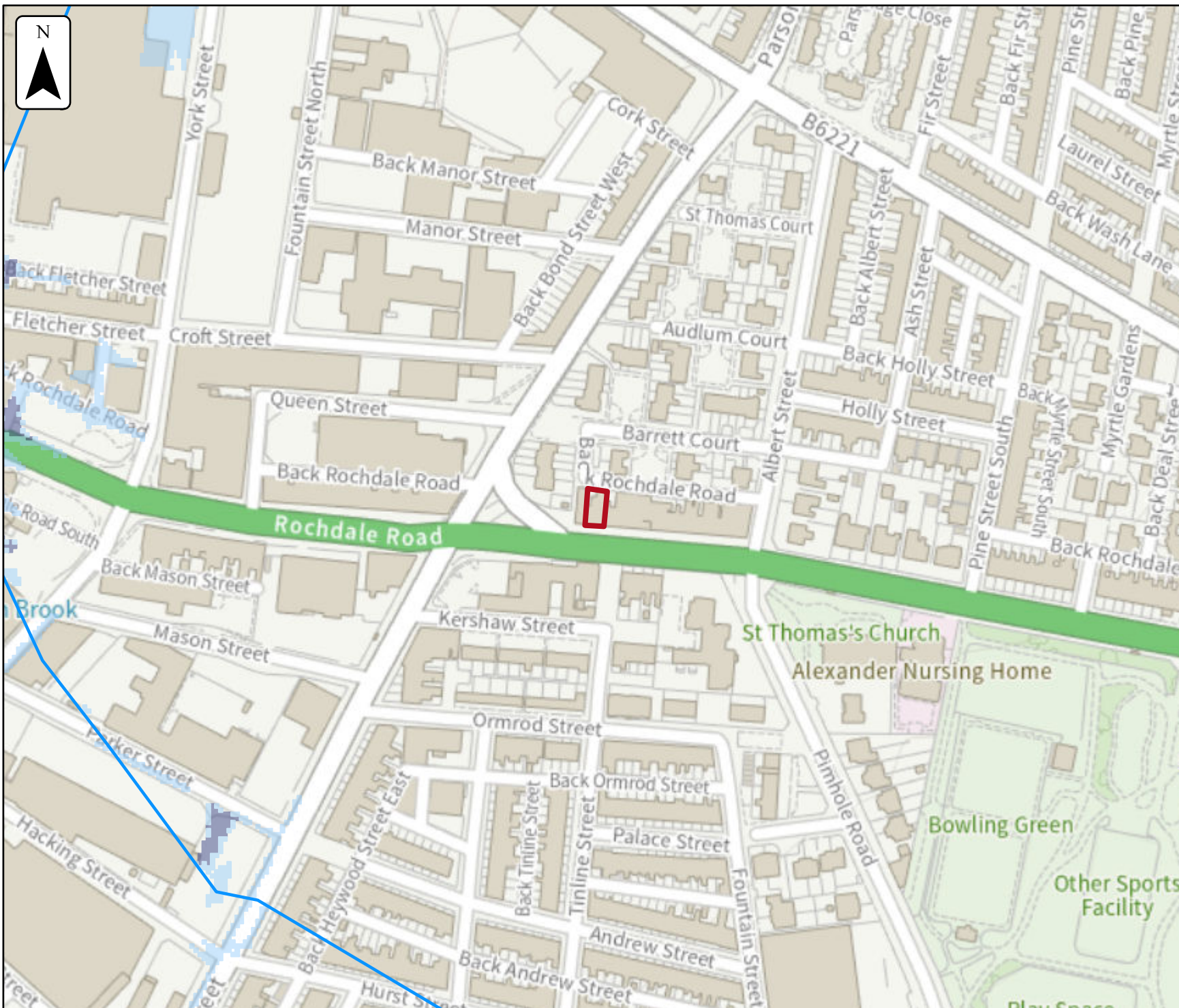
Notes

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 2025 AC0000807064. <https://flood-map-for-planning.service.gov.uk/os-terms>



Flood map for planning

Your reference

Unspecified

Location (easting/northing)
381318/410757

Scale
1:2,500

Created
18 Sep 2025 17:34

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


0 20 40 60m

Site Check Report generated on Thu Sep 18 2025

The following features have been found in your search area:

You selected the location: Centroid Grid Ref: SD81311075

Soilscape (England)

ID

6

SOIL_COND

FREELY DRAINING SLIGHTLY ACID LOAMY SOILS

MAIN_SURFA

LOAMY

NAT_DRAIN

FREELY DRAINING

NAT_FERT

LOW

SEM_NAT_HA

NEUTRAL AND ACID PASTURES AND DECIDUOUS WOODLANDS; ACID COMMUNITIES SUCH AS
BRACKEN AND GORSE IN THE UPLANDS

M_LANDCOV

ARABLE AND GRASSLAND

HYPERLINK

[/Metadata_for_magic/soilscape_summary.pdf](#)

Aquifer Designation Map (Superficial Drift) (England)

TYPOLOGY

Secondary (undifferentiated)

Aquifer Designation Map (Bedrock) (England)

TYPOLOGY

Secondary A

Source Protection Zones merged (England)

No Features found

Wild Bird General Licence Protected Sites Condition Zone (England)

No Features found

Nitrate Vulnerable Zones 2017 Designations (England)

No Features found

Less Favoured Areas (England)

No Features found

Biosphere Reserves (England)

No Features found

Biosphere Reserves (England) - points

No Features found

Potential Special Protection Areas (England)

No Features found

Potential Special Protection Areas (England) - points

No Features found

Special Protection Areas (England)

No Features found

Special Protection Areas (England) - points

No Features found

Possible Special Areas of Conservation (England)

No Features found

Possible Special Areas of Conservation (England) - points

No Features found

Special Areas of Conservation (England)

No Features found

Special Areas of Conservation (England) - points

No Features found
Sites of Special Scientific Interest (England)
No Features found
Sites of Special Scientific Interest (England) - points
No Features found
Sites of Special Scientific Interest Units (England)
No Features found
Sites of Special Scientific Interest Units (England) - points
No Features found
Proposed Ramsar Sites (England)
No Features found
Proposed Ramsar Sites (England) - points
No Features found
Ramsar Sites (England)
No Features found
Ramsar Sites (England) - points
No Features found
National Parks (England)
No Features found
National Nature Reserves (England)
No Features found
National Nature Reserves (England) - points
No Features found
Moorland Line (England)
No Features found
Local Nature Reserves (England)
No Features found
Local Nature Reserves (England) - points
No Features found
Limestone Pavement Orders (England)
No Features found
Areas of Outstanding Natural Beauty (England)
No Features found

Rida Reports

4
Beanacre Road,
Hook Norton,
OX15 5UA

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: [U0709] 167 and 169 Rochdale Road, Bury
Our Ref: UUPS-ORD-678878
Date: 19/09/2025

Dear Sirs

Location: THE FRIERY 167 ROCHDALE ROAD, BURY, BL9 7BB

I acknowledge with thanks your request dated 19/09/2025 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

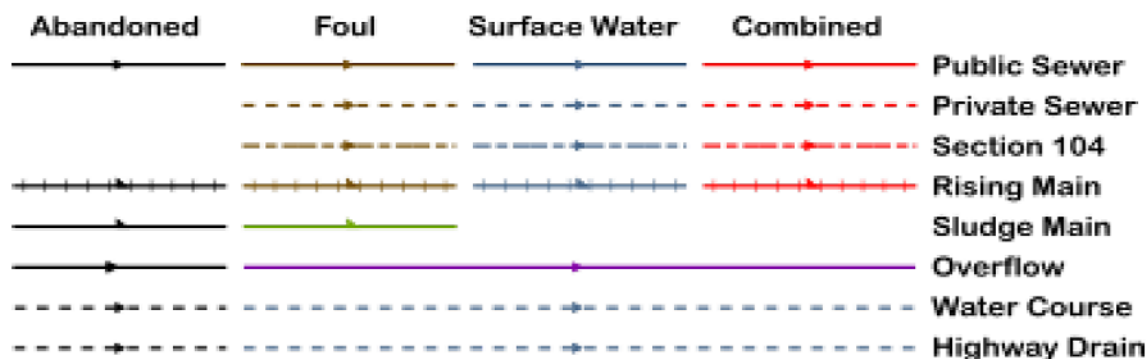
TERMS AND CONDITIONS - WASTEWATER AND WATER DISTRIBUTION PLANS

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)".

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- 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	

SEWER RECORDS

Address or Site Reference

THE FRIERY 167 ROCHDALE
ROAD,
BURY,
BL9 7BB

Scale: 1:1250
Date: 19/09/2025

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 C



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 Inverts
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.300	Preferred Cover Depth (m)	0.500
CV	1.000	Include Intermediate Ground	✓
Time of Entry (mins)	6.00	Enforce best practice design rules	✓

Simulation Settings

Rainfall Methodology	FSR	Drain Down Time (mins)	240
Rainfall Events	Singular	Additional Storage (m³/ha)	0.0
FSR Region	England and Wales	Starting Level (m)	
M5-60 (mm)	20.000	Check Discharge Rate(s)	✓
Ratio-R	0.300	1 year (l/s)	0.1
Summer CV	1.000	2 year (l/s)	0.1
Winter CV	1.000	30 year (l/s)	0.3
Analysis Speed	Normal	100 year (l/s)	0.4
Skip Steady State	x	Check Discharge Volume	x

Storm Durations

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

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
2	0	0	0
30	0	0	0
30	40	0	0
100	0	0	0
100	45	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 30 year	1.95
Greenfield Method	IH124	Growth Factor 100 year	2.48
Positively Drained Area (ha)	0.014	Betterment (%)	0
SAAR (mm)	1063	QBar	0.1
Soil Index	5	Q 1 year (l/s)	0.1
SPR	0.53	Q 2 year (l/s)	0.1
Region	10	Q 30 year (l/s)	0.3
Growth Factor 1 year	0.85	Q 100 year (l/s)	0.4
Growth Factor 2 year	0.93		



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 Inverts
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.300	Preferred Cover Depth (m)	0.500
CV	1.000	Include Intermediate Ground	✓
Time of Entry (mins)	6.00	Enforce best practice design rules	✓

Simulation Settings

Rainfall Methodology	FSR	Drain Down Time (mins)	240
Rainfall Events	Singular	Additional Storage (m³/ha)	0.0
FSR Region	England and Wales	Starting Level (m)	
M5-60 (mm)	20.000	Check Discharge Rate(s)	✓
Ratio-R	0.300	1 year (l/s)	1.7
Summer CV	1.000	2 year (l/s)	2.2
Winter CV	1.000	30 year (l/s)	4.1
Analysis Speed	Normal	100 year (l/s)	5.2
Skip Steady State	x	Check Discharge Volume	x

Storm Durations

15

30

60

120

180

240

360

480

600

720

960

1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
2	0	0	0
30	0	0	0
30	40	0	0
100	0	0	0
100	45	0	0

Pre-development Discharge Rate

Site Makeup	Brownfield	Betterment (%)	0
Brownfield Method	MRM	Q 1 year (l/s)	1.7
Contributing Area (ha)	0.011	Q 2 year (l/s)	2.2
PIMP (%)	100	Q 30 year (l/s)	4.1
CV	1.000	Q 100 year (l/s)	5.2
Time of Concentration (mins)	6.00		

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 Inverts
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.300	Preferred Cover Depth (m)	0.500
CV	1.000	Include Intermediate Ground	✓
Time of Entry (mins)	6.00	Enforce best practice design rules	✓

Adoptable Manhole Type

Max Width (mm)	Diameter (mm)	Max Width (mm)	Diameter (mm)
374	1200	749	1500
499	1350	900	1800

>900 Link+900 mm

Max Depth (m)	Diameter (mm)	Max Depth (m)	Diameter (mm)
1.500	1050	99.999	1200

Circular Link Type

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

Available Diameters (mm)

100 | 150

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
Development	0.011	6.00	95.500	450	-10.033	52.922	0.400
Tank			95.500		44.378	52.710	0.570
Outfall			95.500	450	114.940	52.072	1.760

Links (Results)

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	1.314	23.2	2.0	0.250	0.420	0.011	0.0	30	0.804
1.001	3.497	61.8	2.0	0.420	1.610	0.011	0.0	18	1.603

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	10.000	58.8	150	Circular	95.500	95.100	0.250	95.500	94.930	0.420
1.001	10.000	8.4	150	Circular	95.500	94.930	0.420	95.500	93.740	1.610

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	Development	450	Manhole	Adoptable	Tank		Junction	
1.001	Tank		Junction		Outfall	450	Manhole	Adoptable

Simulation Settings

Rainfall Methodology	FSR	Drain Down Time (mins)	240
Rainfall Events	Singular	Additional Storage (m³/ha)	0.0
FSR Region	England and Wales	Starting Level (m)	
M5-60 (mm)	20.000	Check Discharge Rate(s)	✓
Ratio-R	0.300	1 year (l/s)	1.7
Summer CV	1.000	2 year (l/s)	2.2
Winter CV	1.000	30 year (l/s)	4.1
Analysis Speed	Normal	100 year (l/s)	5.2
Skip Steady State	x	Check Discharge Volume	x

Storm Durations

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

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
2	0	0	0
30	0	0	0
30	40	0	0
100	0	0	0
100	45	0	0

Pre-development Discharge Rate

Site Makeup	Brownfield	Betterment (%)	0
Brownfield Method	MRM	Q 1 year (l/s)	1.7
Contributing Area (ha)	0.011	Q 2 year (l/s)	2.2
PIMP (%)	100	Q 30 year (l/s)	4.1
CV	1.000	Q 100 year (l/s)	5.2
Time of Concentration (mins)	6.00		

Node Tank Online Orifice Control

Flap Valve	x	Invert Level (m)	94.930	Diameter (m)	0.026
Downstream Link	1.001	Design Depth (m)	0.400	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	0.9		

Node Tank Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	94.930
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	106

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)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	14.0	14.0	0.420	14.0	19.6	0.421	0.0	19.6	2.000	0.0	19.6

Approval Settings

Node Size	x	Coordinates	x	Full Bore Velocity	x	Time to Half Empty	✓
Node Losses	x	Crossings	x	Proportional Velocity	x	Return Period (years)	10
Link Size	x	Cover Depth	x	Surcharged Depth	x	Discharge Rates	x
Link Length	x	Backdrops	x	Flooding	x	Discharge Volume	x

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
1 year 15 minute summer	99.562	28.172	2 year 600 minute winter	9.048	3.622
1 year 15 minute winter	69.868	28.172	2 year 720 minute summer	11.973	3.209
1 year 30 minute summer	67.776	19.178	2 year 720 minute winter	8.047	3.209
1 year 30 minute winter	47.562	19.178	2 year 960 minute summer	10.067	2.651
1 year 60 minute summer	48.435	12.800	2 year 960 minute winter	6.669	2.651
1 year 60 minute winter	32.179	12.800	2 year 1440 minute summer	7.548	2.023
1 year 120 minute summer	31.831	8.412	2 year 1440 minute winter	5.073	2.023
1 year 120 minute winter	21.148	8.412	30 year 15 minute summer	243.818	68.992
1 year 180 minute summer	25.499	6.562	30 year 15 minute winter	171.101	68.992
1 year 180 minute winter	16.575	6.562	30 year 30 minute summer	166.387	47.082
1 year 240 minute summer	20.693	5.468	30 year 30 minute winter	116.763	47.082
1 year 240 minute winter	13.748	5.468	30 year 60 minute summer	116.589	30.811
1 year 360 minute summer	16.369	4.212	30 year 60 minute winter	77.459	30.811
1 year 360 minute winter	10.640	4.212	30 year 120 minute summer	73.902	19.530
1 year 480 minute summer	13.246	3.501	30 year 120 minute winter	49.099	19.530
1 year 480 minute winter	8.801	3.501	30 year 180 minute summer	57.313	14.749
1 year 600 minute summer	11.089	3.033	30 year 180 minute winter	37.255	14.749
1 year 600 minute winter	7.577	3.033	30 year 240 minute summer	45.598	12.050
1 year 720 minute summer	10.069	2.699	30 year 240 minute winter	30.295	12.050
1 year 720 minute winter	6.767	2.699	30 year 360 minute summer	35.178	9.053
1 year 960 minute summer	8.526	2.245	30 year 360 minute winter	22.867	9.053
1 year 960 minute winter	5.648	2.245	30 year 480 minute summer	27.920	7.379
1 year 1440 minute summer	6.448	1.728	30 year 480 minute winter	18.550	7.379
1 year 1440 minute winter	4.334	1.728	30 year 600 minute summer	23.001	6.291
2 year 15 minute summer	128.797	36.445	30 year 600 minute winter	15.716	6.291
2 year 15 minute winter	90.384	36.445	30 year 720 minute summer	20.598	5.520
2 year 30 minute summer	87.307	24.705	30 year 720 minute winter	13.843	5.520
2 year 30 minute winter	61.268	24.705	30 year 960 minute summer	17.043	4.488
2 year 60 minute summer	61.301	16.200	30 year 960 minute winter	11.289	4.488
2 year 60 minute winter	40.727	16.200	30 year 1440 minute summer	12.485	3.346
2 year 120 minute summer	39.487	10.435	30 year 1440 minute winter	8.390	3.346
2 year 120 minute winter	26.234	10.435	30 year +40% CC 15 minute summer	341.346	96.589
2 year 180 minute summer	31.221	8.034	30 year +40% CC 15 minute winter	239.541	96.589
2 year 180 minute winter	20.295	8.034	30 year +40% CC 30 minute summer	232.942	65.915
2 year 240 minute summer	25.171	6.652	30 year +40% CC 30 minute winter	163.468	65.915
2 year 240 minute winter	16.723	6.652	30 year +40% CC 60 minute summer	163.225	43.136
2 year 360 minute summer	19.759	5.085	30 year +40% CC 60 minute winter	108.443	43.136
2 year 360 minute winter	12.844	5.085	30 year +40% CC 120 minute summer	103.463	27.342
2 year 480 minute summer	15.896	4.201	30 year +40% CC 120 minute winter	68.738	27.342
2 year 480 minute winter	10.561	4.201	30 year +40% CC 180 minute summer	80.238	20.648
2 year 600 minute summer	13.242	3.622	30 year +40% CC 180 minute winter	52.157	20.648

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
30 year +40% CC 240 minute summer	63.838	16.870	100 year 600 minute winter	20.008	8.010
30 year +40% CC 240 minute winter	42.412	16.870	100 year 720 minute summer	26.115	6.999
30 year +40% CC 360 minute summer	49.250	12.674	100 year 720 minute winter	17.551	6.999
30 year +40% CC 360 minute winter	32.014	12.674	100 year 960 minute summer	21.458	5.650
30 year +40% CC 480 minute summer	39.088	10.330	100 year 960 minute winter	14.214	5.650
30 year +40% CC 480 minute winter	25.969	10.330	100 year 1440 minute summer	15.553	4.168
30 year +40% CC 600 minute summer	32.201	8.808	100 year 1440 minute winter	10.453	4.168
30 year +40% CC 600 minute winter	22.002	8.808	100 year +45% CC 15 minute summer	457.253	129.387
30 year +40% CC 720 minute summer	28.837	7.729	100 year +45% CC 15 minute winter	320.879	129.387
30 year +40% CC 720 minute winter	19.380	7.729	100 year +45% CC 30 minute summer	315.333	89.228
30 year +40% CC 960 minute summer	23.860	6.283	100 year +45% CC 30 minute winter	221.286	89.228
30 year +40% CC 960 minute winter	15.805	6.283	100 year +45% CC 60 minute summer	222.268	58.739
30 year +40% CC 1440 minute summer	17.478	4.684	100 year +45% CC 60 minute winter	147.669	58.739
30 year +40% CC 1440 minute winter	11.747	4.684	100 year +45% CC 120 minute summer	140.640	37.167
100 year 15 minute summer	315.347	89.232	100 year +45% CC 120 minute winter	93.438	37.167
100 year 15 minute winter	221.296	89.232	100 year +45% CC 180 minute summer	108.352	27.883
100 year 30 minute summer	217.471	61.537	100 year +45% CC 180 minute winter	70.431	27.883
100 year 30 minute winter	152.611	61.537	100 year +45% CC 240 minute summer	85.732	22.657
100 year 60 minute summer	153.288	40.510	100 year +45% CC 240 minute winter	56.959	22.657
100 year 60 minute winter	101.841	40.510	100 year +45% CC 360 minute summer	65.640	16.891
100 year 120 minute summer	96.993	25.632	100 year +45% CC 360 minute winter	42.668	16.891
100 year 120 minute winter	64.440	25.632	100 year +45% CC 480 minute summer	51.792	13.687
100 year 180 minute summer	74.725	19.229	100 year +45% CC 480 minute winter	34.409	13.687
100 year 180 minute winter	48.573	19.229	100 year +45% CC 600 minute summer	42.461	11.614
100 year 240 minute summer	59.126	15.625	100 year +45% CC 600 minute winter	29.012	11.614
100 year 240 minute winter	39.282	15.625	100 year +45% CC 720 minute summer	37.866	10.149
100 year 360 minute summer	45.269	11.649	100 year +45% CC 720 minute winter	25.448	10.149
100 year 360 minute winter	29.426	11.649	100 year +45% CC 960 minute summer	31.114	8.193
100 year 480 minute summer	35.719	9.439	100 year +45% CC 960 minute winter	20.610	8.193
100 year 480 minute winter	23.731	9.439	100 year +45% CC 1440 minute summer	22.552	6.044
100 year 600 minute summer	29.283	8.010	100 year +45% CC 1440 minute winter	15.157	6.044

Results for 1 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	Development	10	95.128	0.028	1.6	0.0045	0.0000	OK
120 minute summer	Tank	78	94.997	0.067	0.9	0.8865	0.0000	OK
120 minute summer	Outfall	78	93.748	0.008	0.3	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	Development	1.000	Tank	1.6	0.986	0.070	0.0273	
120 minute summer	Tank	1.001	Outfall	0.3	0.918	0.005	0.0036	1.8

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	Development	10	95.131	0.031	2.1	0.0050	0.0000	OK
120 minute summer	Tank	78	95.019	0.089	1.2	1.1813	0.0000	OK
120 minute summer	Outfall	78	93.749	0.009	0.4	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)
15 minute summer	Development	1.000	Tank	2.1	1.030	0.091	0.0374	
120 minute summer	Tank	1.001	Outfall	0.4	0.967	0.006	0.0040	2.3

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	Development	11	95.142	0.042	3.9	0.0066	0.0000	OK
120 minute summer	Tank	82	95.105	0.175	2.2	2.3223	0.0000	SURCHARGED
120 minute summer	Outfall	82	93.750	0.010	0.6	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	Development	1.000	Tank	3.9	1.069	0.168	0.0793	
120 minute summer	Tank	1.001	Outfall	0.6	1.087	0.009	0.0052	4.2

Results for 30 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
120 minute summer	Development	84	95.180	0.080	3.0	0.0127	0.0000	OK
120 minute summer	Tank	84	95.180	0.250	3.0	3.3251	0.0000	SURCHARGED
120 minute summer	Outfall	84	93.751	0.011	0.7	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)
120 minute summer	Development	1.000	Tank	3.0	0.766	0.129	0.1358	
120 minute summer	Tank	1.001	Outfall	0.7	1.152	0.011	0.0060	6.0

Results for 100 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
120 minute summer	Development	82	95.163	0.063	2.8	0.0100	0.0000	OK
120 minute summer	Tank	82	95.163	0.233	2.8	3.0971	0.0000	SURCHARGED
120 minute summer	Outfall	82	93.751	0.011	0.7	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)
120 minute summer	Development	1.000	Tank	2.8	0.766	0.121	0.1231	
120 minute summer	Tank	1.001	Outfall	0.7	1.139	0.011	0.0058	5.6

Results for 100 year +45% 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
120 minute summer	Development	86	95.283	0.183	4.1	0.0291	0.0000	FLOOD RISK
120 minute summer	Tank	86	95.283	0.353	4.1	4.6937	0.0000	FLOOD RISK
120 minute summer	Outfall	86	93.752	0.012	0.8	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)
120 minute summer	Development	1.000	Tank	4.1	0.827	0.176	0.1760	
120 minute summer	Tank	1.001	Outfall	0.8	1.219	0.013	0.0067	8.1

Appendix D

Drawing Scale Bar			
Drawing scale	Line length	Drawing scale	Line length
1:5	= 0.25 metres	1:200	= 10.0 metres
1:10	= 0.5 metres	1:250	= 12.5 metres
1:20	= 1.0 metres	1:500	= 25.0 metres
1:25	= 1.25 metres	1:1000	= 50.0 metres
1:50	= 2.5 metres	1:1250	= 62.5 metres
1:100	= 5.0 metres	1:2500	= 125 metres
Measure length of line above for checking of scale			

- GENERAL NOTES
1. All dimensions are in millimetres and levels in m AOD unless stated otherwise.
 2. Do not scale. If in any doubt, consult Engineer.
 3. Read in conjunction with the architects and engineers schedule drawings.
 4. Check inverts and sizes of existing pipes prior to the commencement of any work. Report any discrepancies to the engineer and await instructions.
 5. The location of services is shown as indicative. This drawing should be read in conjunction with the utilities drawings. No warranty to their accuracy can be given. The contractor shall take all necessary measures to satisfy himself as to the location of the existing services and connection points. Excavation should be undertaken in compliance with HSG47.

KEY

- Proposed Surface Water Sewer Pipe
- Exceedance Flows
- Silt Trap
- SW — Existing Surface Water Sewer Pipe

Rev	Details	Date	By	Chd

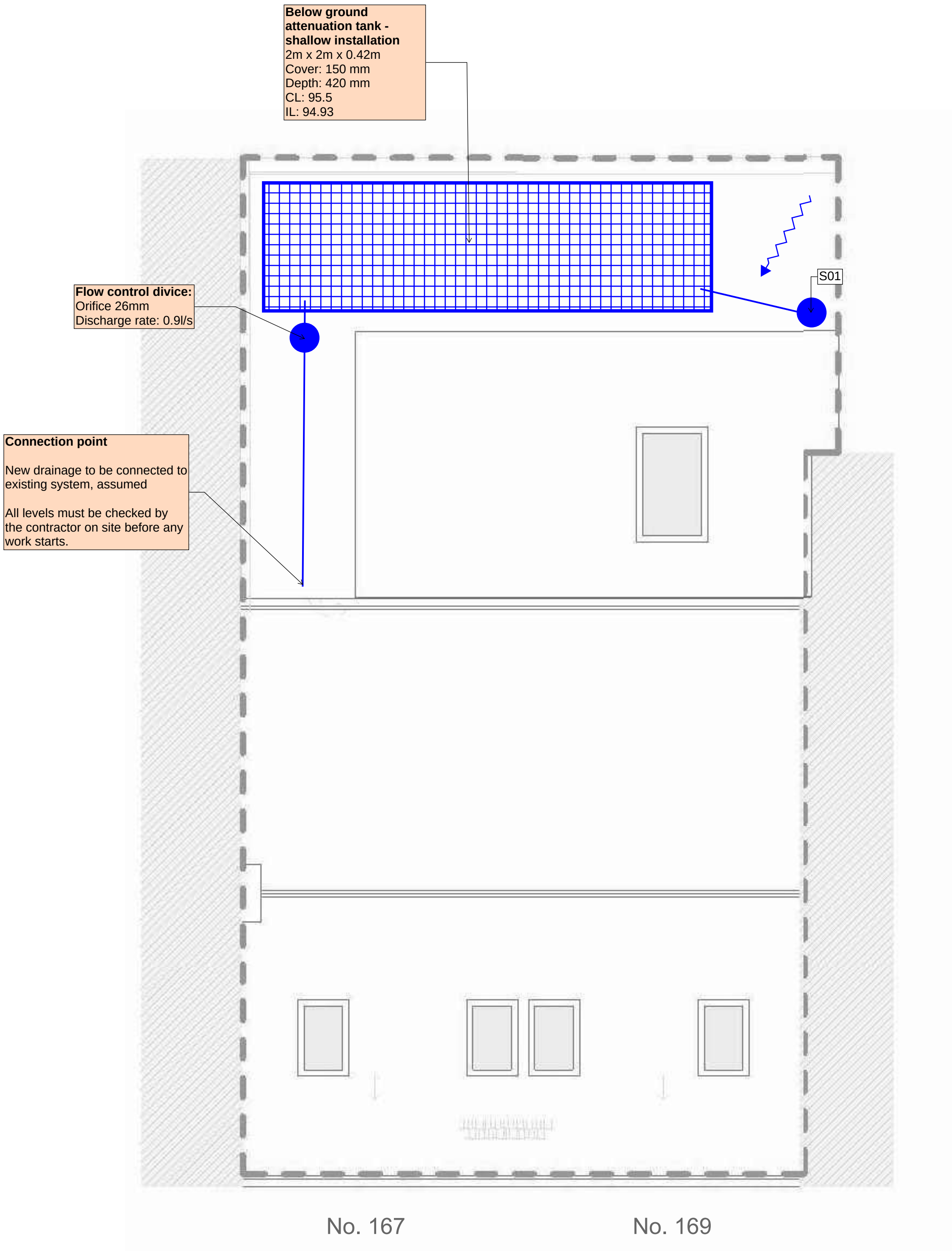
Drawing Status: **PRELIMINARY**



Client:

Project:
167 and 169 Rochdale Road, Bury, BL9 7BB

Drawing:
Proposed Drainage Strategy

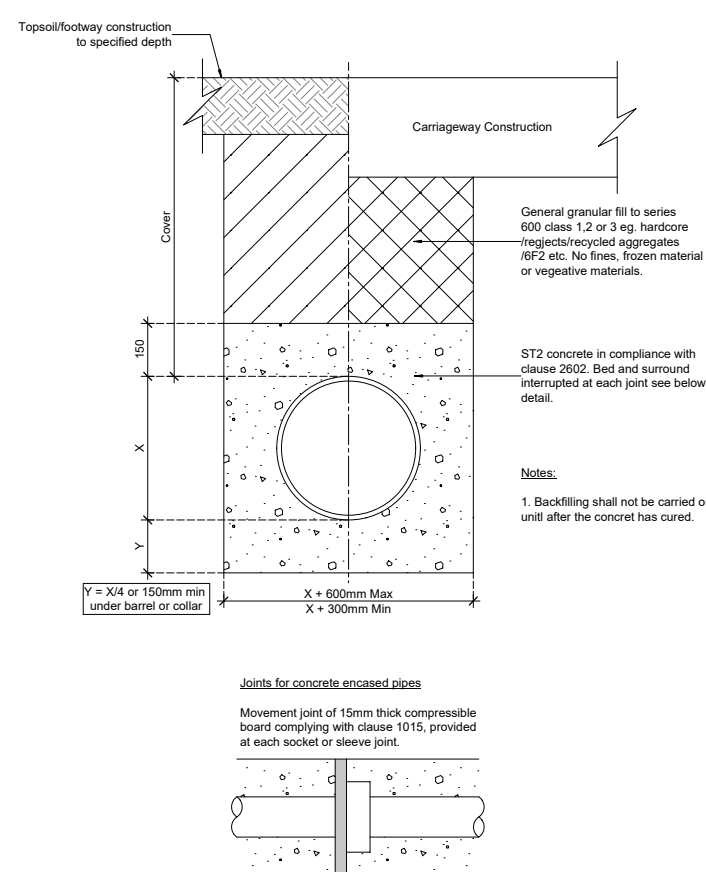


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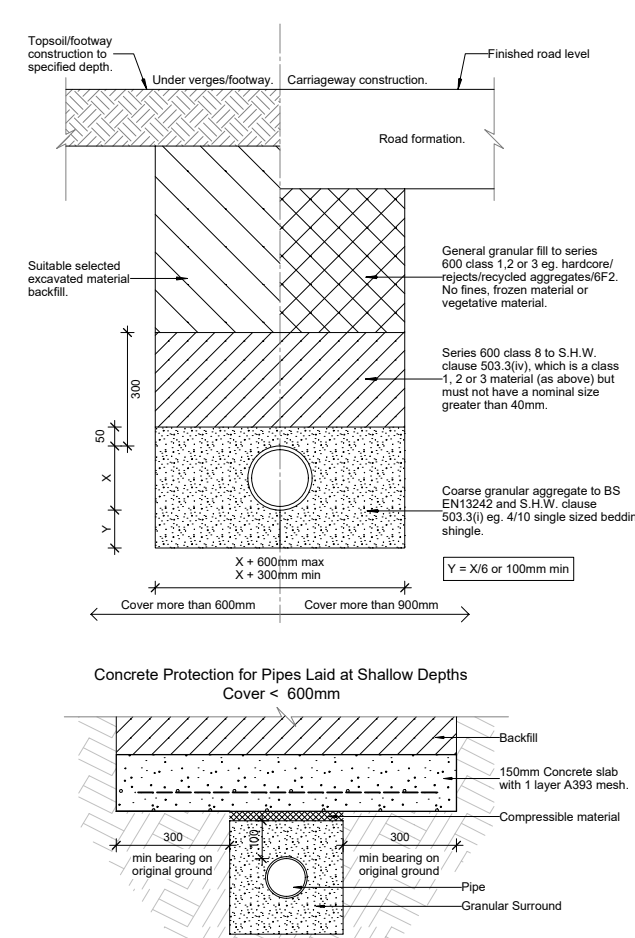
Drawing Scale Bar			
Drawing scale	Line length	Drawing scale	Line length
1:5	= 0.25 metres	1:200	= 10.0 metres
1:10	= 0.5 metres	1:250	= 12.5 metres
1:20	= 1.0 metres	1:500	= 25.0 metres
1:25	= 1.25 metres	1:1000	= 50.0 metres
1:50	= 2.5 metres	1:1250	= 62.5 metres
1:100	= 5.0 metres	1:2500	= 125 metres

Measure length of line above for checking of scale

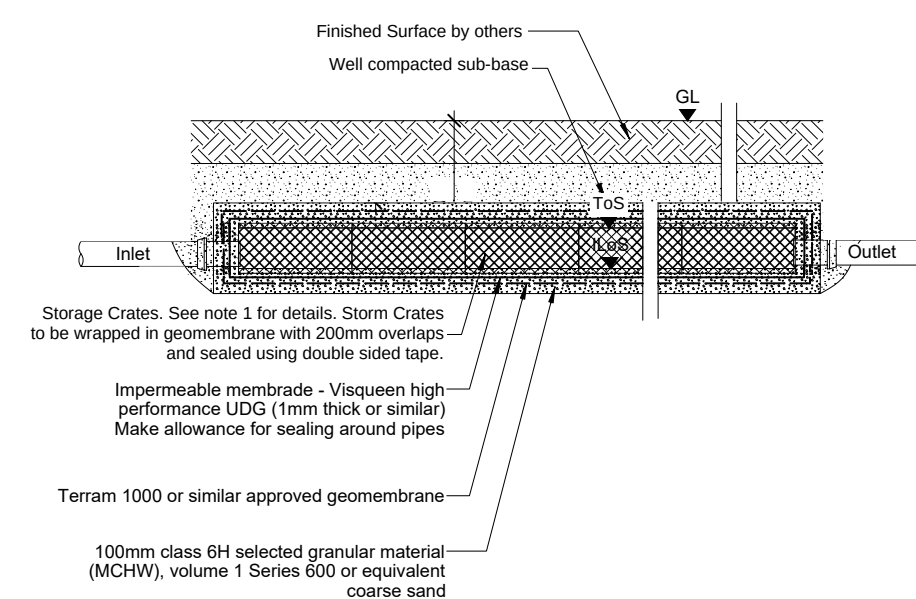
GENERAL NOTES



Pipe Bedding Detail Type Z



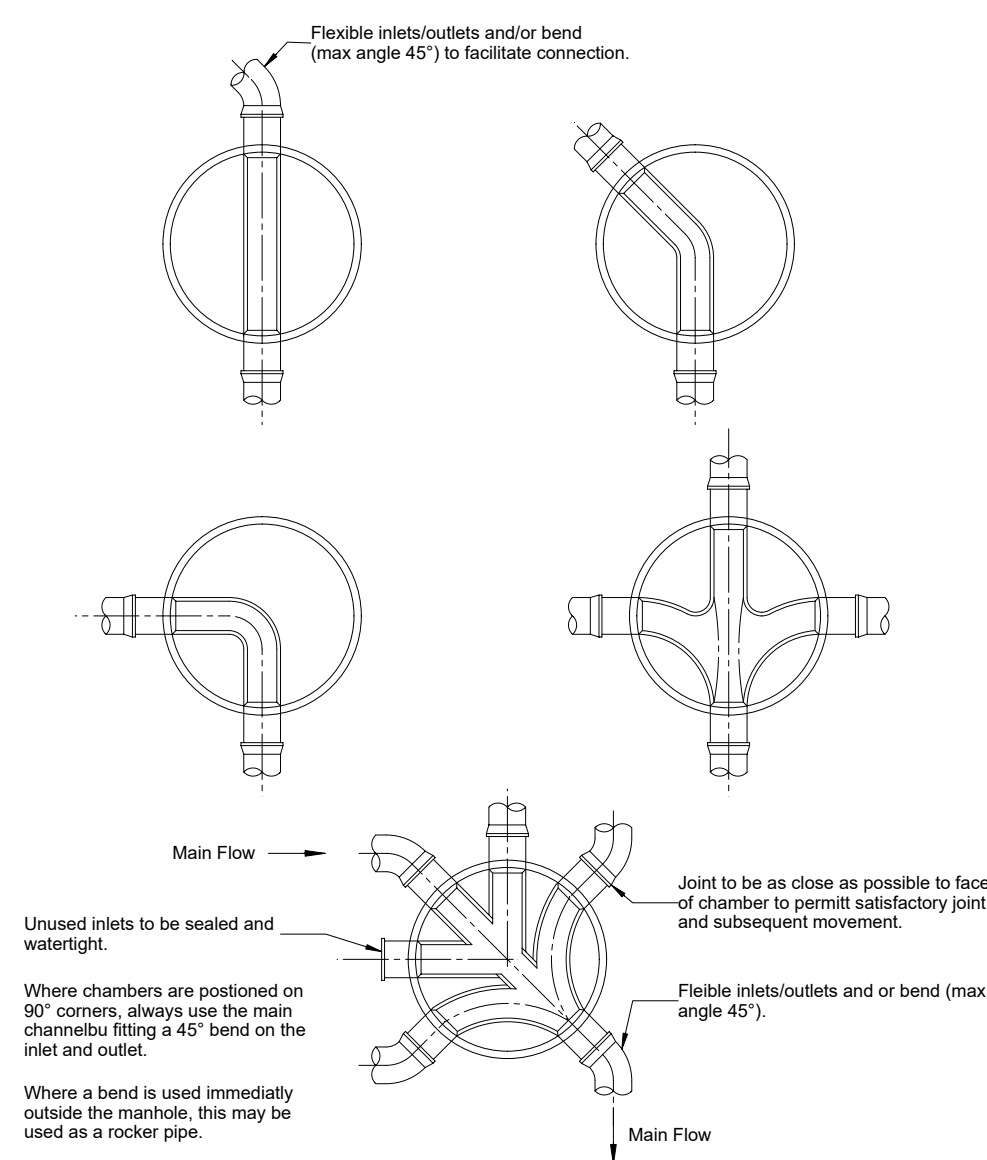
Pipe Bedding Detail Type S



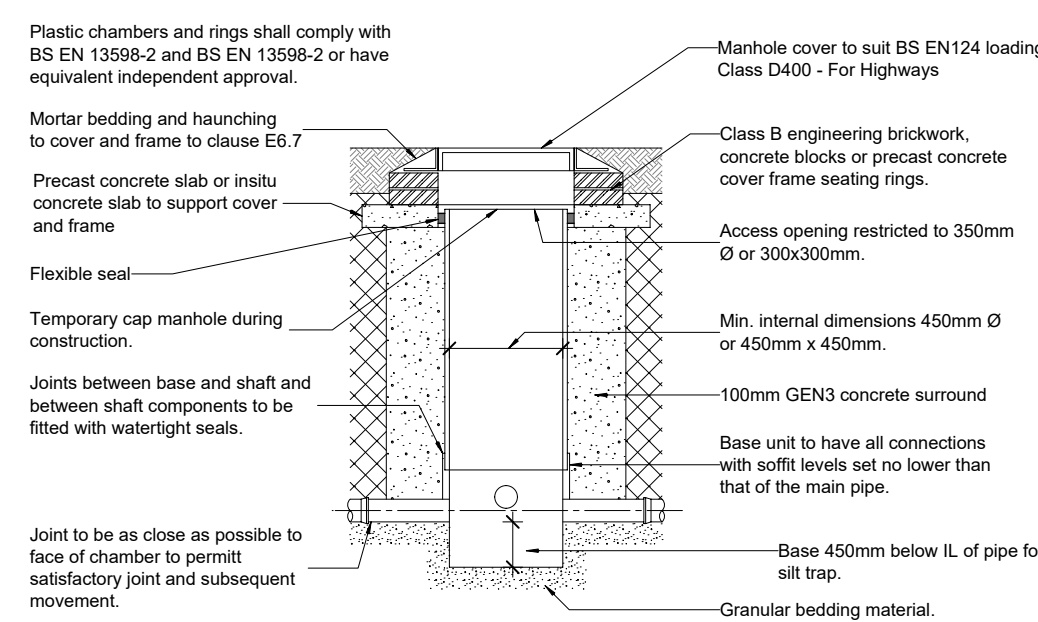
Cellular Attenuation System - Shallow Installation

NOTES:

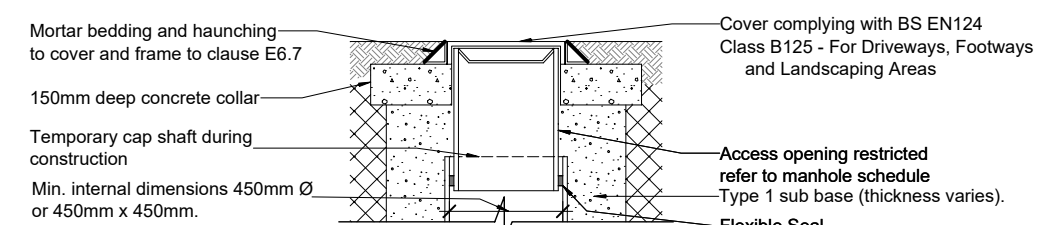
1. Permeable material to be used as follows. The use depends on the depth given on the GA drawing.
Polystyrene Xtra PSM3 - 210mm depth x 500mm wide x 1000mm length, 800Knm2, Void 94%
Permavoid 85 - 85mm depth x 354mm wide x 708mm length, 700Knm2, Void 92%
Permavoid 150 - 150mm depth x 354mm wide x 708mm length, 700 Knm2, Void 95%
2. Dimensions as applicable to the manufacturers recommendations for given storage requirement UNO.
3. Air Vents should be provided as per suppliers recommendations
4. See GA drgs for pipe sizes and layout and IL, LLoS, ToS, GL levels.



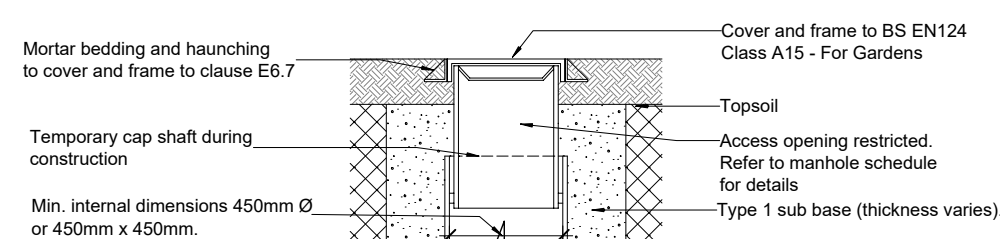
Chamber Type 3 Base Layouts



Typical Section in areas subject to vehicle loading



Sited in domestic driveways or footways

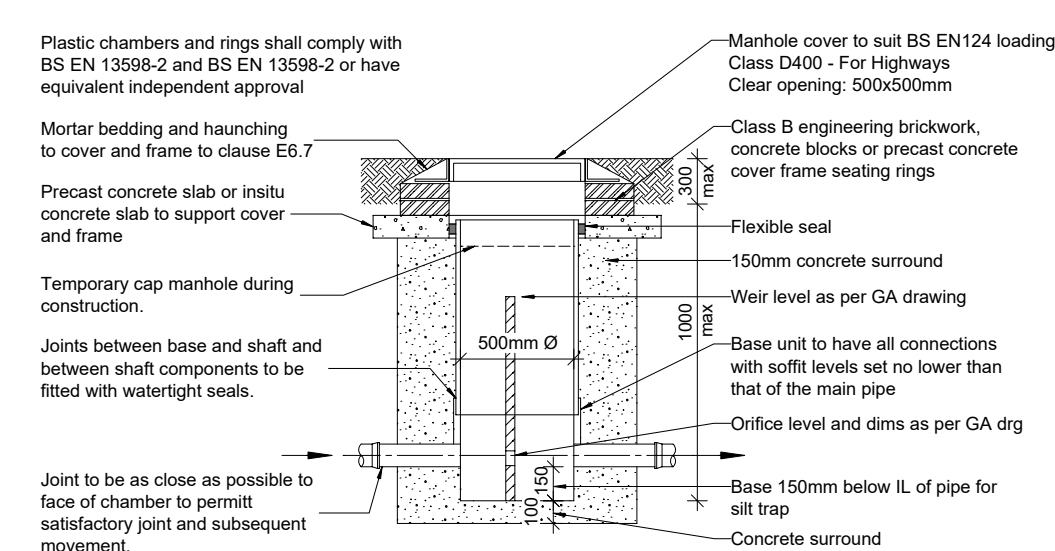


Sited in private garden - No loading

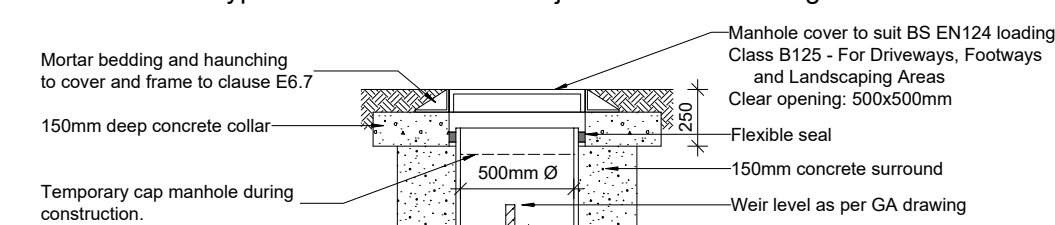
Notes:

1. Refer to drawing 8193 for base layouts.

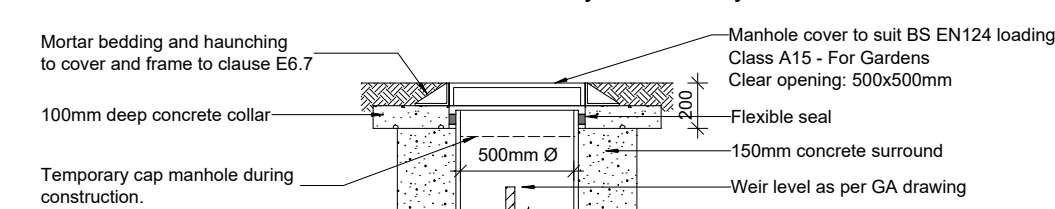
Silt Trap Plastic



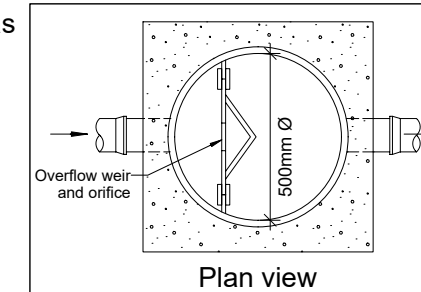
Typical Section in areas subject to vehicle loading



Sited in domestic driveways or footways



Sited in soft landscaped areas



Plan view

Flow Control -Orifice Plate - Plastic - Type 3

NOTES:

- NOTES:
1. Refer to GA drg for pipe layout.
 2. Chamber can be fabricated by Seel Environmental UK

Rev	Details	Date	By	Cr/Dr
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Drawing Status:

PRELIMINARY



Client

Project:

167 and 169 Rochdale Road, Bury, BL9 7BB

Drawing

Standard Details

Print Size:	Scale:	Project No:	Drawing No:	Revision:
A1	NTS	0709	006	P1