Our Reference: 2025-016

Flood Risk and Drainage Solutions Ltd
144 New Lane
Oswaldtwistle
Lancashire
BB5 3QW
Tel: 07961477330
Email: info@floodrisk-drainage.co.uk

Date: 17/03/25

Flood Risk & Drainage Impact Assessment to Support the Proposed Residential Development at Land at Waterfold Lane, Rochdale

Introduction

Flood Risk and Drainage Solutions Ltd have been commissioned by JAH Pulmann to provide a Flood Risk & Drainage Impact Assessment to support the planning application for the proposed residential development at Land at Waterfold Lane, Rochdale.

Existing Site

The existing site currently comprises of an undeveloped parcel of land defined as allotments to the rear (east) of the properties located on Waterfold Lane in Rochdale. The River Roch is the nearest watercourse located approximately 35m to the west of the site.

Proposed Development Site

Development Proposals

Development proposals comprise of the erection of 5No detached residential units with associated access and driveways.

Flood Risk Assessment

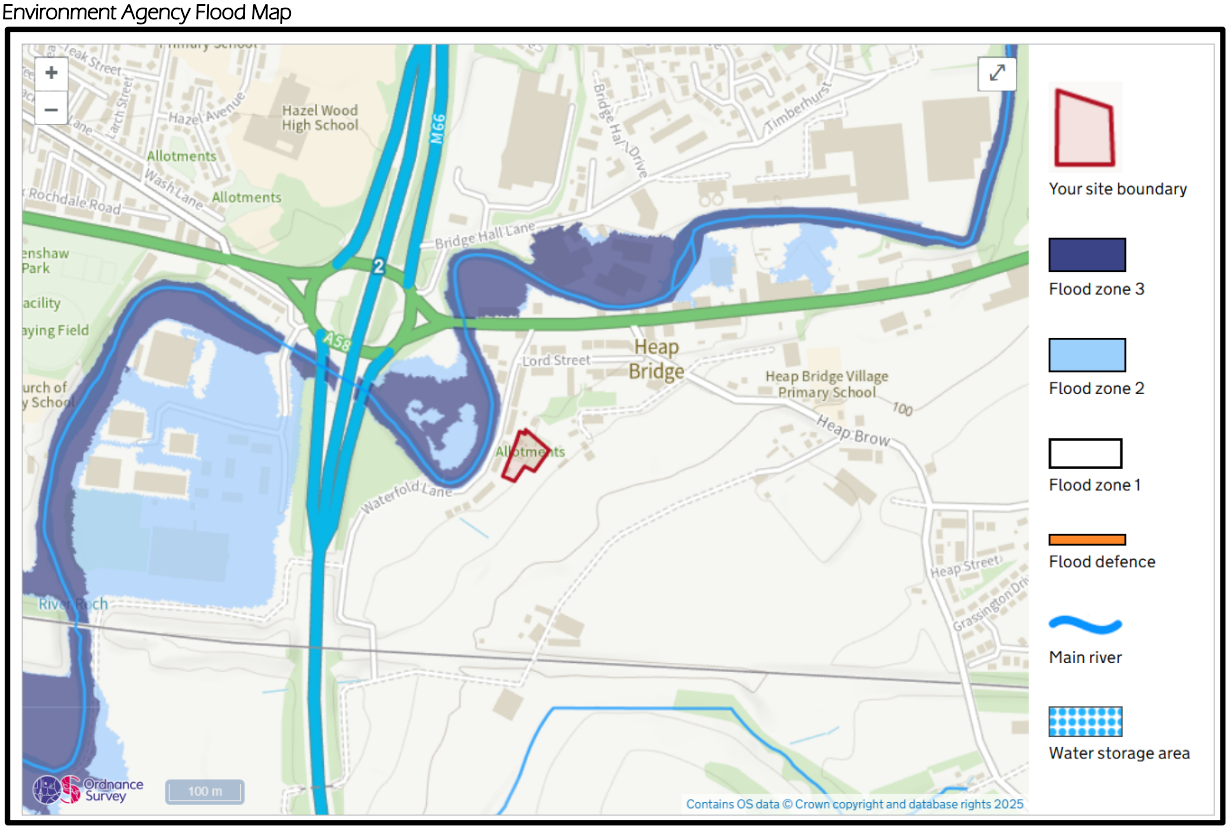
Sources of Flooding

Source/Pathway	Significant?	Comment/Reason
Fluvial	No	Flood Zone 1
Canal	No	Not Applicable
Tidal/Coastal	No	Flood Zone 1
Reservoir	No	EA Map shows that the site is located in an area that may be affected
Pluvial (urban drainage)	Yes	Site will require a new SUDS Strategy
Groundwater	No	EA Map shows that flooding is unlikely within this area.
Surface Water Flooding	No	The application site is considered to have a very low t risk of surface water flooding.
Overland Flow	No	The application site is considered to have a very low t risk of surface water flooding.
Blockage	No	Not Applicable
Infrastructure failure	No	Not Applicable
Rainfall Ponding	No	Risk of ponding considered to be low

Fluvial/Tidal/Coastal Flooding

The application site is located within Flood Zone 1 within close proximity to the River Roch, therefore Environment Agency Flood Data was used to provide a comparison of site levels against river levels.

Environment Agency Flood Map



Historic Flooding

The Environment Agency have provided Historic Flood Maps which identify that the site was not flooded during the most recent recorded flood event associated with the River Roch on 26/12/2015.

Existing Site Levels

Using the topographical survey provided the lowest level on site is 78.130m AOD located at the west of the site.

River Roch Flood Levels

The nearest node to the application site is the upstream Node 2, therefore this node has been used for comparison purposes. It is noted that both the undefended and defended levels are the same.

1 in 100 Year Event

- Node 2 River Roch Flood Level = 76.690m AOD

The lowest level on-site is 1.440m above the 1 in 100 Year Event and therefore the site has a low risk of flooding during this return period.

1 in 100 Year Event + 70% Climate change

- Node 2 River Roch Flood Level = 77.170m AOD

The lowest level on-site is 0.960m above the 1 in 100 Year Event + 70% Climate Change and therefore the site has a low risk of flooding during this return period.

1 in 1000 Year Event

- Node 2 River Roch Flood Level = 77.070m AOD

The lowest level on-site is 1.060m above the 1 in 1000 Year Event and therefore the site has a low risk of flooding during this return period.

1 in 1000 Year Event + 30% Climate change

- Node 2 River Roch Flood Level = 77.410m AOD

The lowest level on-site is 0.720m above the 1 in 100 Year Event + 30% Climate Change and therefore has a low risk of flooding during this return period.

River Roch Fluvial Flooding Conclusion

Following a comparison of levels associated with the River Roch and the lowest site level it is concluded that the site will remain unaffected during all flood events.

As such the proposed development site is located wholly within Flood Zone 1 and concurs with the Environment Agency's Flood Map

- Flood Zone 1 is classified as having less than a 0.1% annual probability of river or sea flooding, equating to less than 1 in 1000 chance.

Reservoir Flooding

The Environment Agency's Flooding from Reservoirs Map identifies the site to be located within the area that will be affected both when river levels are normal and when combined with flooding from rivers.

Without some care and maintenance, dams deteriorate over time. Large reservoirs are regulated to ensure that suitable provisions are made to keep these dams adequately safe from a failure that might cause a flood;

endangering public and property. However, several small reservoirs in the UK have breached in recent times but fortunately there has been no loss of life from reservoir-related flooding for nearly 100 years, largely due to better knowledge and understanding.

Taking the above into consideration the risk of flooding associated with reservoirs is considered to be residual and a low providing reservoirs are maintained.

Pluvial (Urban Drainage)

Following development, the site will require a new SUDS Drainage Strategy which will manage surface water resulting from the site, which will be undertaken by others.

It is noted that the site falls within a Critical Drainage Area therefore flows will have to be restricted in accordance with local guidance.

Groundwater Flooding

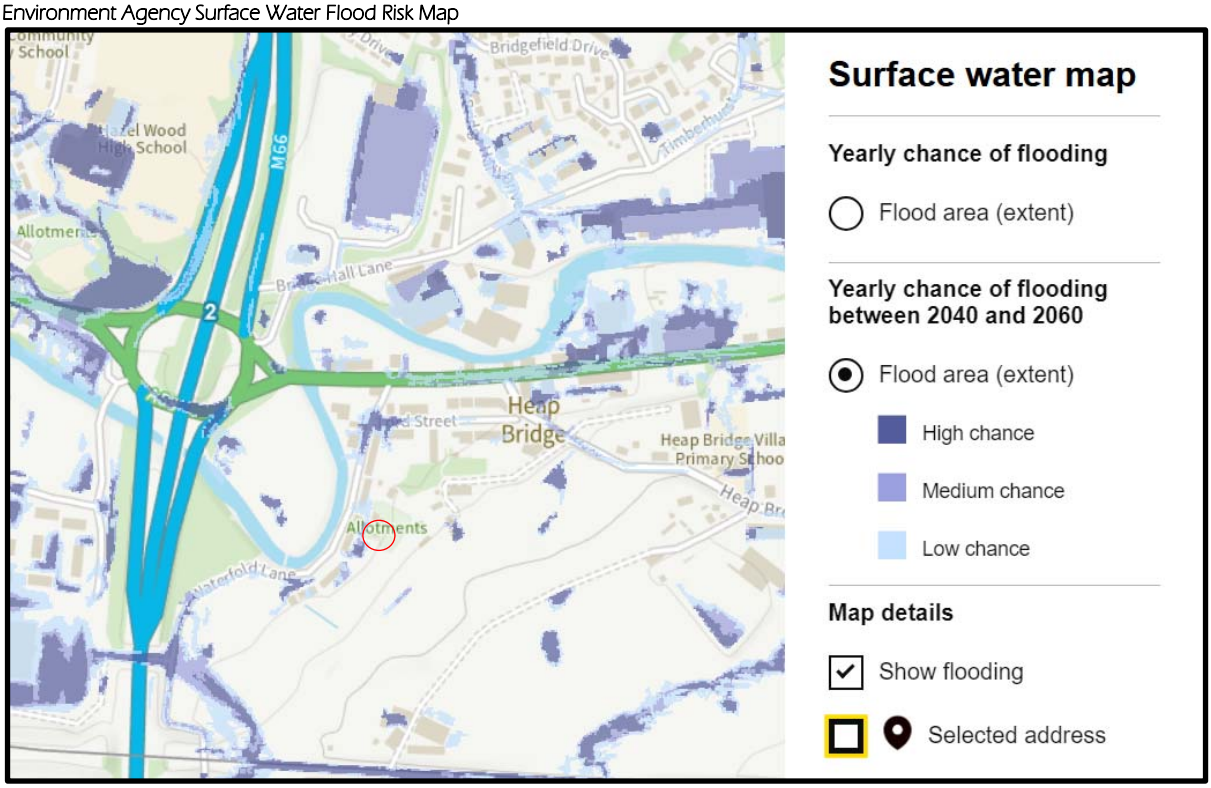
The Environment Agency Flood Website stats that the application site has a low risk of groundwater flooding.

Surface Water Flooding

The Environment Agency's Surface Water Flood Map identifies the proposed development site to be located within a very low surface water flood risk area.

- Very low - each year, the area has a chance of flooding of less than 1 in 1000 (0.1%)

Environment Agency Surface Water Flood Risk Map



The nearest areas of surface water flooding are located to the west and south west of the site and are considered to be as a result of topographical depressions where surface water ponds.

It is noted that both area areas do not encroach the redline boundary of the site and therefore pose a low risk of flooding the proposed development.

Flood Mitigation Measures

Following a review of flooding mechanisms, it is recommended that the finished floor level of the building is elevated a minimum of 150mm above existing ground levels on-site, therefore the risk of flooding can be suitably managed.

- Finished floor levels to be set no less than 150mm above existing ground levels.

Drainage Impact Assessment

Existing Drainage

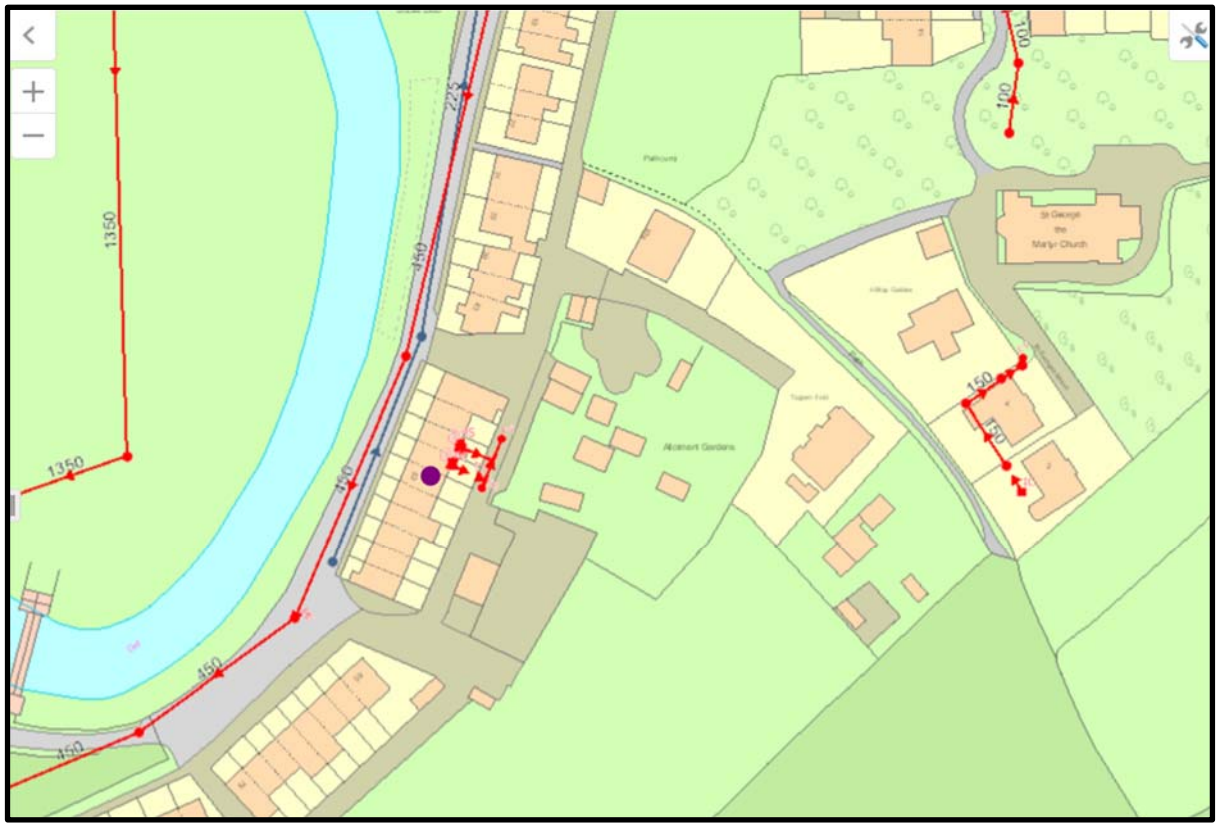
The application site comprises of undeveloped allotment space and therefore is not considered to be positively drained.

United Utilities Sewer Records

United Utilities Sewer Records identify the following sewers within close proximity to the site.

- Nearest public surface water sewer is a 225mm diameter located approximately 25m west within Waterfold Lane flowing north.
- A 450mm diameter public combined sewer is located approximately 25m west within Waterfold Lane flowing south.

United Utilities Sewer Records



Hierarchy of Surface Water Disposal

The hierarchy for disposal of surface water from new developments is outlined within the Building Regulations Approved Document H and specifies the following methods in order of preference:

- Infiltration via soakaway or other suitable infiltration device
- Discharge to watercourse
- Discharge to public surface water sewer
- Discharge to public combined sewer

Infiltration

A review of Soilscape Maps identify that the underlying ground is described as *'Slowly permeable seasonally wet acid loamy and clayey soils'*.

Borehole logs taken from approximately 250m north west of the site show the presence of clay down to depth of 8m BGL.

Taking the above into consideration the use of infiltration methods such as soakaways is not considered to be viable.

Watercourse

The River Roch is considered to be the closest watercourse, however constructing a new outfall into the river would require works to a main river and within Flood Zone 3. Therefore, taking the scale of the development into consideration discharge to watercourse is not considered suitable.

Sewer

Taking the above into consideration, it is proposed that surface water from the proposed development is directed into the public surface water sewer located at the west of the site within Waterfold Lane.

Greenfield Ruoff Rates

Greenfield runoff rates have been calculated using the total proposed impermeable developable area of the site which equates to 790m^2, using the IH124 Method to calculate QBar.

- QBar = 0.06l/s

Restricted Discharge Rates

As the catchment is relatively small, it can be seen that the equivalent greenfield runoff rate is extremely low. It is not practical for a surface water discharge to be restricted to such a low rate due to the increased potential for blockage of the flow control device.

On this basis, it is recommended that the discharge rate from proposed larger development area will be restricted to a maximum of 2l/s using a vortex flow control. And the smaller single unit to the south is restricted using an orifice plate with a diameter of 50mm this is due to the shallow nature of the drainage network.

A shallow drainage system has been used for the single unit to the south, due to the requirement to connect to the larger proportion of the site at the north, before discharging to public sewer, without the requirement for a pumped rising main.

- Restricted Discharge Rate North of the Site = 2l/s (Vortex Flow Control)
- Restricted Discharge Rate Single Unit to the South Site = 4.6l/s (Orifice Aperture 50mm Diameter)

Proposed Surface Water Drainage Strategy

The proposed drainage system essentially includes 2no separate drainage systems linking to a single outlet into the public surface water sewer.

The larger system at the north restricts flows to no more than 2l/s using a vortex flow control chamber, with flows in excess of this attenuated within a geo-cellular tank within the access road.

The smaller system to the south drains the single unit with flows restricted using an orifice chamber (due to the shallow nature of the system), with an aperture of 50mm, attenuation is provided within the piped network.

Flows for the whole site have been restricted to no more than 6.6l/s during the 1 in 100 year + 45% climate change event with the inclusion of 10% urban creep, with no surface flooding.

It is noted that even through runoff rates are above existing QBar, the proposed runoff volumes is 39m^3 and the proposed runoff volume is 29.7m^3 and therefore the proposed system reduces peak discharge volumes by approximately 10m^3.

Exceedance Route Total System Failure

In the event of total system failure surface water flows are expected to follow local topography along the back ally before making its way west where it will be intercepted by highway drainage serving Waterfold Lane. This will result in a low risk to the proposed development and surrounding buildings.

Exceedance Route Total System Failure

Foul Flows

Foul flows from the proposed development have been directed into the 450mm diameter public combined network within Waterfold Lane.

Attachments

- Development Proposals
- Environment Agency Flood Data
- Desk Top Ground Conditions
- Greenfield Ruoff Rates
- Proposed Drainage Layout
- Typical Drainage Details
- Modelled Surfaced Water Calculations
- North West SUDS Proforma
- Maintenance/Management Plan

We trust that the above is acceptable and look forward to hearing from you in due course; however, should you have any queries, please do not hesitate to contact me.

Yours Sincerely,

Chris Vose BSc

Managing Director
Flood Risk and Drainage Solutions Ltd

Development Proposals

PLEASE NOTE

1. DO NOT scale from this drawing, use figured dimensions only.
2. All dimensions to be checked on site by the contractor.
3. Please report any discrepancies to JHA Ltd immediately.
4. All setting out dimensions are approximate. To be marked out on site for approval by JHA Ltd prior to construction.

NOTES:

Ref	Date	Revision	Initial
*	**/**/**	Description of Revision	***

Project / Client:

PROPOSED DEVELOPMENT
LAND AT WATERFOLD LANE,
BURY, BL9 7JY

Issue:

PLANNING ISSUE

Drawing Title:

PROPOSED SITE PLAN

JHA Pulmann,
18A Bridge Street
Milnrow, Rochdale,
OL16 3ND

T 01302 364565
E enquiries@j-h-a.co.uk
W www.j-h-a.co.uk

Scale:	Date:
1:200	JUNE 2024
Drawn By: JW	Checked By: JA
Drawing No: M24-04-102	Sheet Size: A1

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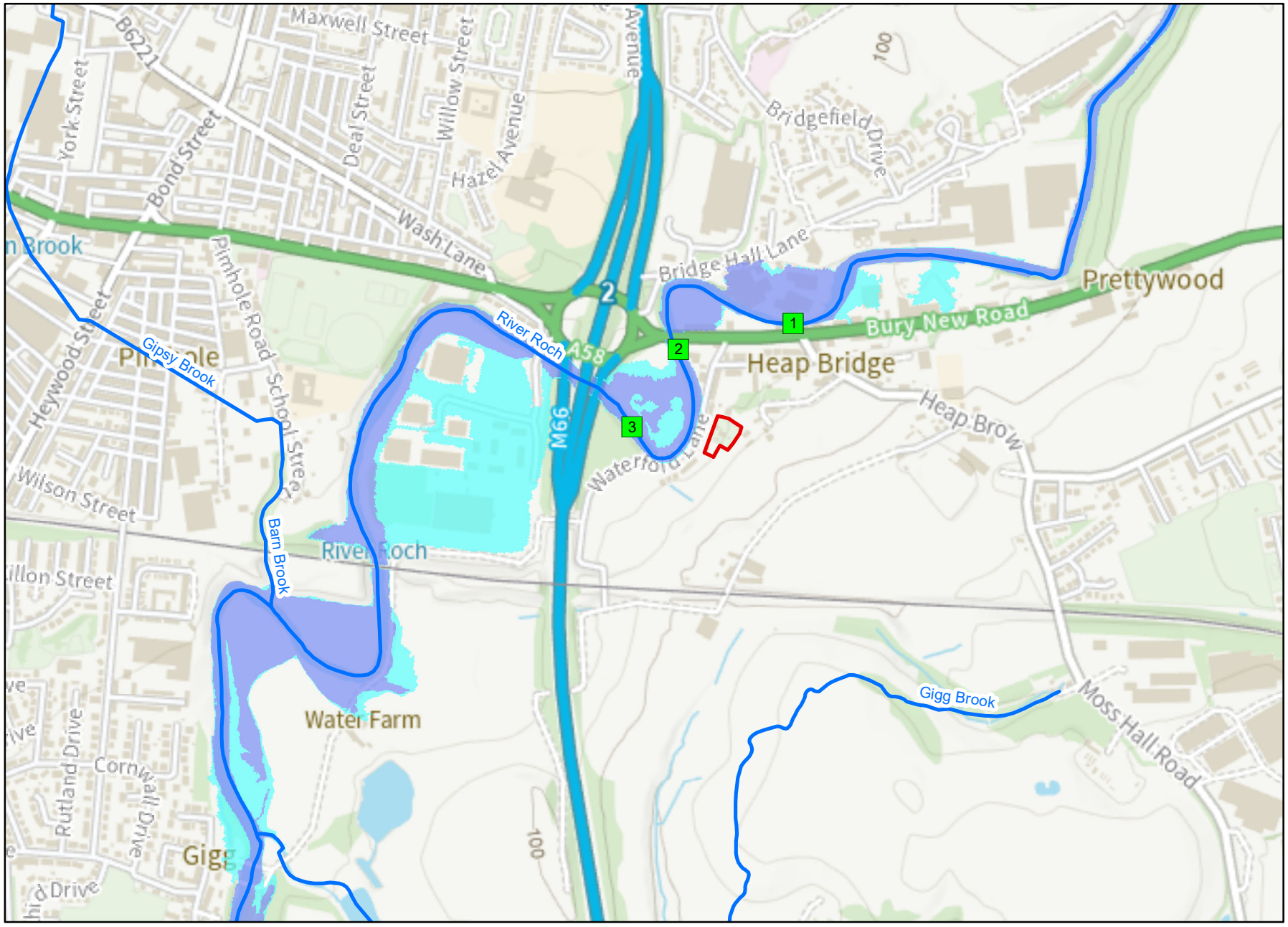
Environment Agency Flood Data

Detailed Flood Map Centred on Waterfold Lane, Bury, BL9 7JY.
Created 27/02/2025 [GMMC399757LB]



Environment Agency

1:10,001

N

Legend

- Site Location
- Model Measurements
- Main River
- Flood Zone 3
- Flood Zone 2

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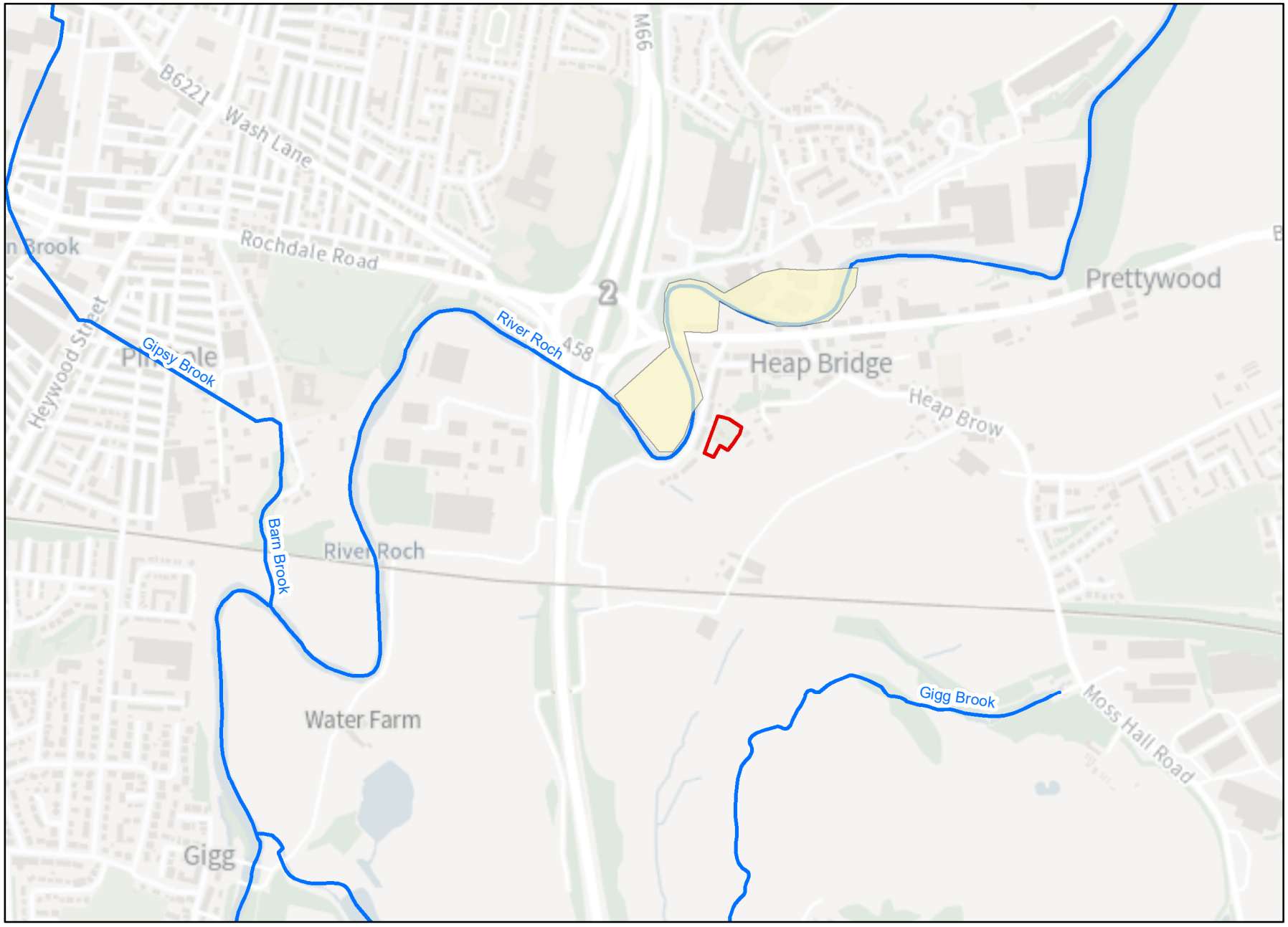
| | | | | | Undefended | | | | |

Recorded Flood Outline Map Centred on Waterfold Lane, Bury, BL9 7JY.
Created 27/02/2025 [GMMC399757LB]



Environment Agency

1:10,001

N

Legend

Site Location

Main River

Recorded Flood Outlines

Start Date

26/12/2015

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Desk Top Ground Conditions

Search

Current location:

Get my current location

Search by:

Postcode

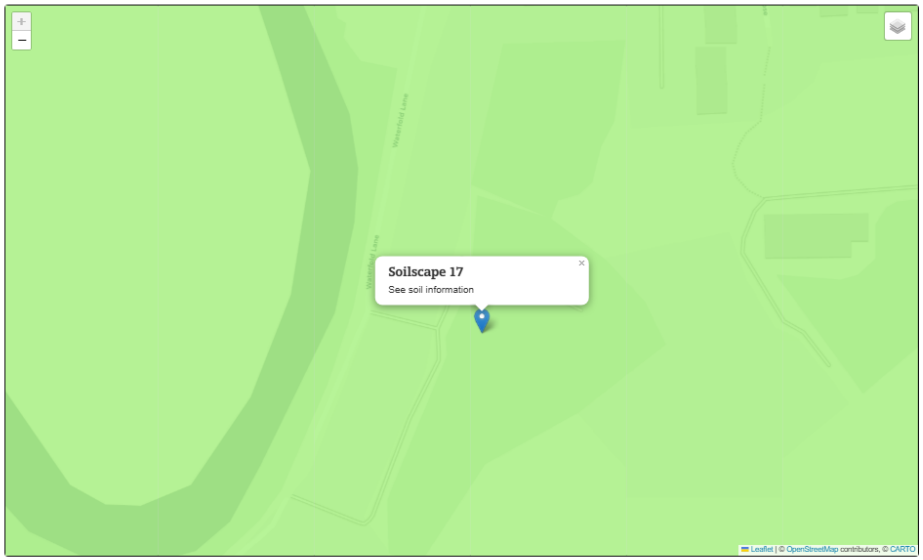
Postcode:

bl9 7jy

Go

Adjust Transparency

Legend



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Soil Information

Soilscape 17:

Slowly permeable seasonally wet acid loamy and clayey soils

Texture:
Loamy and clayey

Coverage:
England: 7.0%,**Wales:** 15.1%,**England & Wales:**8.2%

Drainage:
Impeded drainage

Fertility:
Low

Landcover:
Grassland with some arable and forestry

Habitats:
Seasonally wet pastures and woodlands

Carbon:
Medium

Drains to:
Stream network

Water protection:
Main risks are associated with overland flow from compacted or poached fields. Organic slurry, dirty water, fertiliser, pathogens and fine sediment can all move in suspension or solution with overland flow or drain water

General cropping:
Mostly suited to grass production for dairying or beef; some cereal production often for feed. Timeliness of stocking and fieldwork is important, and wet ground conditions should be avoided at the beginning and end of the growing season to prevent damage to soil structure. Land is tile drained and periodic moling or subsoiling will assist drainage

About Us

Quick Links

Norwest Holst Soil Engineering Ltd.

Borehole No. 1

BOREHOLE LOG

Contract No. F8028
Location: Bridgehall Lane Bury
Client: Bradshaw Buckton & Tonge
Method of Boring: Shell and Auger
Diameter of Borehole: 150mm

SD81SW 186
8219 1061

Sheet 1 of 1
Chainage:
Ground Level: 79.20 m.A.O.D.
Date: 5/9/88

Description of Strata	Depth Below G.L.(m)	O.D. Level (m)	Sampling and Coring	"N"/ R.Q.D.%
MADE GROUND: Clay silt and sand with gravel and brick fragments	1.30	77.9	1.00 (21)	
CONCRETE	1.70	77.5		
MADE GROUND: Firm orange grey mottled very silty clay with gravel	3.95	75.2	2.00 (24); 2.50; 3.00 (21); 3.50	
Dense grey clayey sandy SILT	4.90	74.3	4.00 (34); 4.50	
Stiff grey silty sandy CLAY with gravel	6.80	72.4	5.00 (39); 5.50; 6.00; 6.50; s	"42"
Very stiff grey silty CLAY with mudstone fragments	8.40	70.8	7.50; 8.00; s	"52"
Weathered orange grey sandy micaceaus MUDSTONE	10.00	69.2	9.00; 9.50; s	"50" for 40mm

Type of Sample

- Is S.P.T.
- Ic. C.P.T.
- O Jar
- ● Bulk
- Undisturbed
- × Vane
- Δ Water
- Piezometer

Remarks (Observations of Ground Water etc.) ( ) U100 blows

Chiselling 1.30m to 1.70m 2 hrs
Borehole dry during drilling

Greenfield Ruoff Rates

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Christian vose
Site name:	Waterfold Lane
Site location:	Bury

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.

Site Details

Latitude:	53.58962° N
Longitude:	2.26841° W
Reference:	1990620545
Date:	Mar 14 2025 13:13

Runoff estimation approach

IH124

Site characteristics

Total site area (ha): 0.1

Methodology

Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics

	Default	Edited
SOIL type:	4	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.47

Hydrological characteristics

	Default	Edited
SAAR (mm):	1063	1063
Hydrological region:	10	10
Growth curve factor 1 year:	0.87	0.87
Growth curve factor 30 years:	1.7	1.7
Growth curve factor 100 years:	2.08	2.08
Growth curve factor 200 years:	2.37	2.37

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

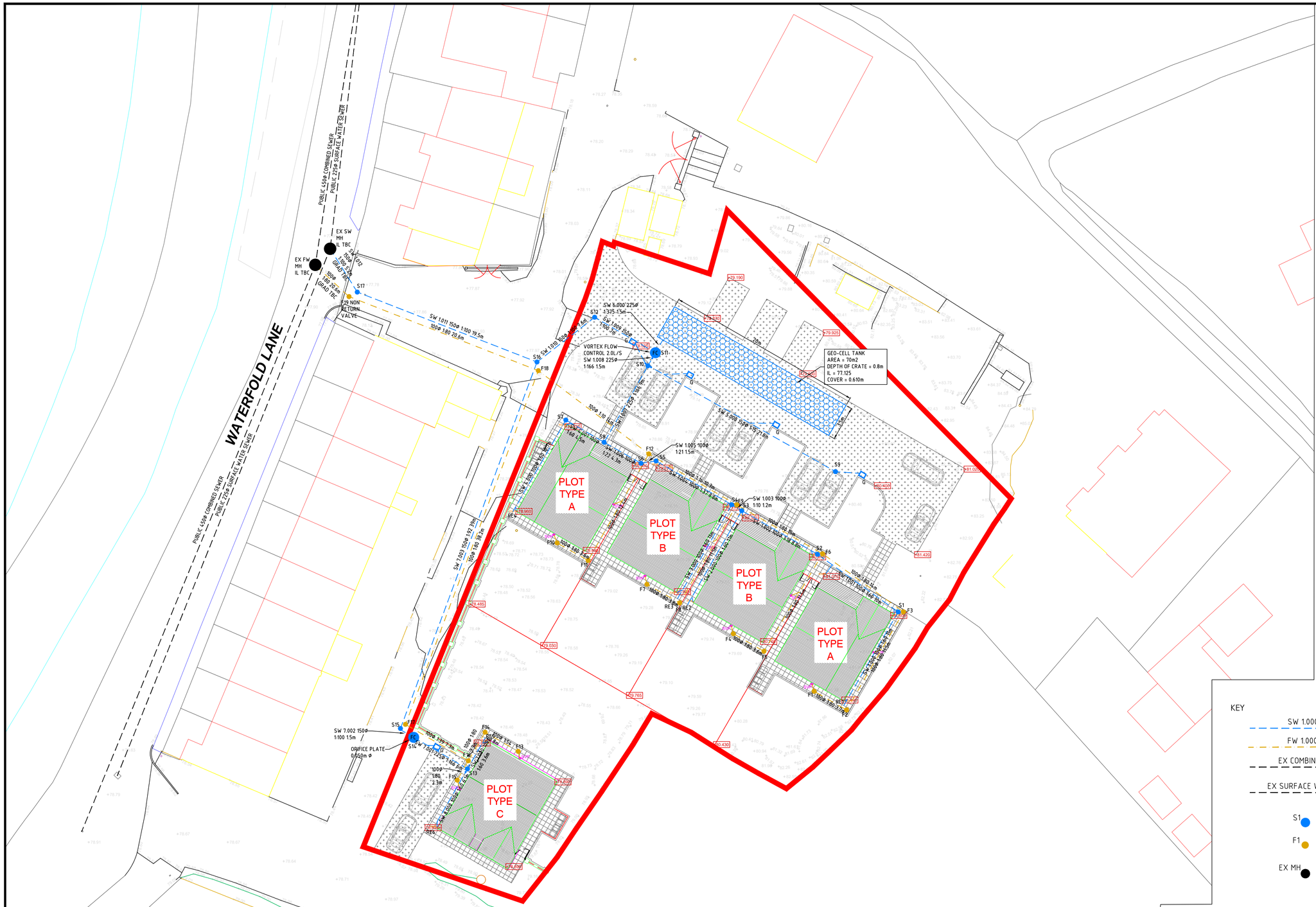
Greenfield runoff rates

	Default	Edited

Q_{BAR} (l/s):	0.79	0.79
1 in 1 year (l/s):	0.68	0.68
1 in 30 years (l/s):	1.34	1.34
1 in 100 year (l/s):	1.64	1.64
1 in 200 years (l/s):	1.87	1.87

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement , which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of 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, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

Proposed Drainage Layout



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5. NO DIMENSIONS TO BE SCALED FROM THIS DRAWING.
6. THE LOCATION AND LEVELS OF EXISTING DRAINAGE PIPES AND CULVERTS MUST BE CHECKED ON-SITE PRIOR TO CONSTRUCTION.
7. PROPOSED FINISHED LEVELS HAVE ONLY BEEN ASSUMED AND SHOULD BE FINALISED BY A CIVIL ENGINEER.
8. POSITION OF RAINWATER DOWN PIPES TO BE CONFIRMED BY THE ARCHITECT.
9. FLOATATION CALCULATIONS OF ANY ATTENUATION STRUCTURES SHOULD BE PROVIDED BY A CIVIL ENGINEER OR MANUFACTURE.

SURFACE WATER

ATTENUATION PROVIDED BY A GEO-CELL TANK FOR THE LARGER DEVELOPMENT AND WITHIN THE PIPED NETWORK FOR THE SINGLE UNIT.

FLOWS CONTROLLED USING FLOW CONTROL CHAMBERS, BEFORE CONNECTING INTO THE PUBLIC SURFACE WATER SEWER WITHIN WATERFOLD LANE.

FLOWS CONTROLS

- S11
- TYPE B CHAMBER
- VORTEX FLOW CONTROL
- 1050Ø
- DESIGN HEAD = 1.4m
- DESIGN FLOW = 2L/S

S14

- TYPE B CHAMBER
- ORIFICE FLOW CONTROL
- 900Ø
- APERTURE SIZE = 500mm Ø

FOUL

FOUL TO CONNECT INTO THE PUBLIC COMBINED SEWER WITHIN WATERFOLD LANE

KEY

SW 1.000	PROPOSED SURFACE WATER DRAIN
FW 1.000	PROPOSED FOUL DRAIN
EX COMBINED	EXISTING PUBLIC COMBINED SEWER
EX SURFACE WATER	EXISTING SURFACE WATER SEWER
S1	PROPOSED SURFACE WATER MANHOLE
F1	PROPOSED FOUL MANHOLE
EX MH	EXISTING PUBLIC SEWER MANHOLE

FOUL MANHOLE SCHEDULE

REFERENCE	CL	IL	DEPTH TO IL	MANHOLE DIA	CHAMBER TYPE	COVER TYPE
F1	81.490	80.890	0.600	450	PPIC	A150
F2	81.490	80.844	0.646	450	PPIC	A150
F3	81.600	80.706	0.894	450	PPIC	A150
F4	80.760	80.160	0.600	450	PPIC	A150
F5	80.760	80.115	0.645	450	PPIC	A150
F6	80.870	79.971	0.899	450	PPIC	A150
F7	80.095	79.495	0.600	450	PPIC	A150
F8	80.095	79.447	0.648	450	PPIC	A150
F9	80.205	79.303	0.902	450	PPIC	A150
F10	79.490	78.890	0.600	450	PPIC	A150
F11	79.490	78.845	0.645	450	PPIC	A150
F12	79.600	78.690	0.910	450	PPIC	A150
F13	78.700	78.100	0.600	450	PPIC	A150
F14	78.630	78.030	0.600	450	PPIC	A150
F15	78.630	78.030	0.600	450	PPIC	A150
F16	78.630	77.989	0.641	450	PPIC	A150
F17	78.630	77.800	0.600	450	PPIC	B250
F18	78.100	77.322	0.778	450	PPIC	B250
F19	77.880	77.064	0.816	450	PPIC	B250
EXFWMH	77.840	77.007 TBC ON-SITE	0.833 TBC ON-SITE	EXISTING	EXISTING	EXISTING

SURFACE WATER MANHOLE SCHEDULE

REFERENCE	CL	IL	DEPTH TO IL	MANHOLE DIA	CHAMBER TYPE	COVER TYPE
RE1	81.190	80.590	0.600	-	RODDING EYE	A125
S1	81.600	80.405	1.195	450	PPIC	A125
S2	80.870	80.236	0.634	450	PPIC	A125
RE2	80.225	79.625	0.600	-	RODDING EYE	A125
S3	80.335	79.440	0.895	450	PPIC	A125
RE3	80.095	79.495	0.600	-	RODDING EYE	A125
S4	80.205	79.310	0.895	450	PPIC	A125
S5	79.670	79.070	0.600	450	PPIC	A125
S6	79.600	79.000	0.600	450	PPIC	A125
RE4	78.960	78.360	0.600	-	RODDING EYE	A125
S7	79.070	78.180	0.890	450	PPIC	A125
S8	79.400	BD 78.800, 78.140, 77.184	2.216	450	PPIC	A125
S9	80.150	79.500	0.650	450	PPIC	B250
S10	78.535	BD 77.885, 77.130	1.405	450	PPIC	A125
TANK	78.535	77.125	1.410	-	ATTENUATION	B250
S11	78.535	77.121	1.414	1050	TYPE B VORTEX FLOW CONTROL	B250
S12	78.400	77.055	1.345	450	PPIC	B250
RE5	78.630	78.030	0.600	-	RODDING EYE	A125
RE6	78.630	78.030	0.600	-	RODDING EYE	A125
S13	78.630	BD 77.927, 77.474	1.156	450	PPIC	A125
S14	78.400	77.438	0.962	900	TYPE B ORIFICE FLOW CONTROL	B250
S15	78.400	44.413	0.987	450	PPIC	B250
S16	77.900	76.979	0.921	450	PPIC	B250
S17	77.790	76.785	1.005	450	PPIC	B250
EXSWMH	77.820	76.733 TBC ON-SITE	1.087 TBC ON-SITE	-	EXISTING	EXISTING

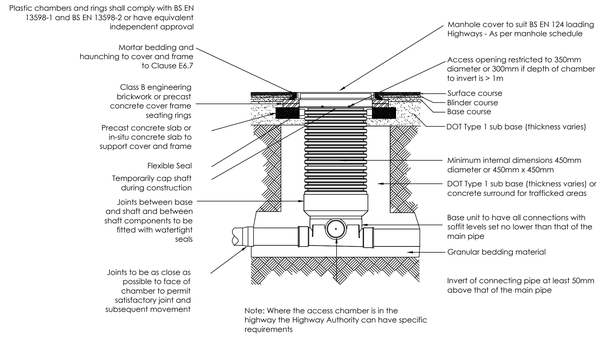
REVISION	COMMENT	DATE	BY

FRDS FLOOD RISK AND DRAINAGE SOLUTIONS

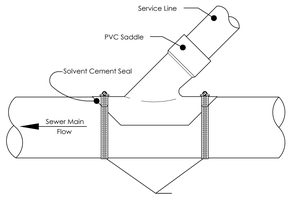
FLOOD RISK AND DRAINAGE SOLUTIONS LTD
144 New Lane, Oswaldtwistle,
Lancashire,
BB5 3QW
WWW.FLOODRISK-DRAINAGE.CO.UK
TEL: 07961477330

CLIENT: JHA PULMANN	DATE: 17/03/2025
	STATUS:
PROJECT: LAND AT WATERFOLD LANE, ROCHDALE	DRAWN BY: CV
	SCALE: 1:200
DRAWING TITLE: PROPOSED SURFACE WATER & FOUL DRAINAGE	SIZE: A1
DRAWING REFERENCE: 2025-016-01	REVISION:

Typical Drainage Details



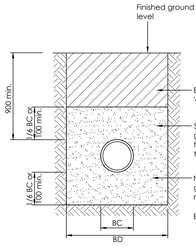
Typical Inspection Chamber Max. 3m Deep Non Entry Scale 1:20



PVC Main

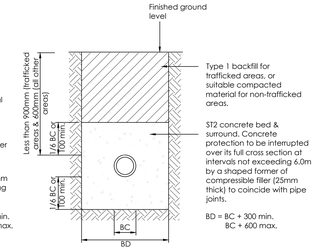
Notes:
1) PVC solvent cement shall be used for saddle.
2) Truss saddle shall be used with truss pipe.
3) li-line WYE fitting to be provided with new construction.

Saddle Connection Scale 1:10



Typical Trench Detail Scale 1:10

NOTE: To be used where cover depth:
- >0.6m fields & gardens
- >0.9m lightly trafficked areas e.g. light roads & drives



Shallow Trench Detail Scale 1:10

NOTE: To be used where cover depth:
- <0.6m fields & gardens
- <0.9m lightly trafficked areas e.g. light roads & drives

Extract from Table A2 WIS 4-08-02

Processed granular bedding & sidefill materials for flexible pipes

Pipe nominal bore (mm) (see note D)	Nominal Maximum particle size (mm)	Materials specified in British Standards (see note A)
100	10	10mm nominal single size
Over 100 to 150	15	10 or 14mm nominal single size or 14mm to 5mm graded
Over 150 to 300	20	10-14mm or 20mm nominal single size or 14-5mm graded or 20-5mm graded
Over 300 to 500	20	14 or 20mm nominal single size or 14-5mm graded or 20-5mm graded
Over 500	40	14 or 20mm or 40mm nominal single size or 14-5mm graded or 20-5mm graded or 40-5mm graded

Notes:
A. Processed granular materials to include aggregates and air cooled blast furnace slag to BS EN 12620:220 + A1:2008; and lightweight aggregates to BS EN 13101:2002.
B. -
C. For the purpose of this table, PE pipe of 630mm OD can be regarded as having nominal bores of over 550mm, irrespective of wall thickness.
D. Nominal bore is used in preference to DN because of the different nominal size classifications for flexible pipes.

Minimum Recommended Trench Widths for Structured Wall Pipes in Poor Ground Conditions.

Native soil modulus between 3 & 4 MPA
Typical soil Classifications: Very loose gravel, loose sand, medium dense clayey silty sand, firm clay

Nominal pipe diameter (mm)	150	225	300	375	450	525	600	750	900
Minimum trench width (mm)*	450	525	600	750	900	1050	1200	1500	1800

* A vertical trench face has been assumed to allow a modulus of 7MPA to be achieved for the pipe bedding and sidefill material.

Other assumed values:
Depth of cover = 6m (max)
Traffic loading = main road
Pipe stiffness = SN8

Note: Where the native soil modulus is below 3MPA or the depth of cover exceeds 6m, guidance should be sought from the pipe manufacturer regarding structural design and installation details.

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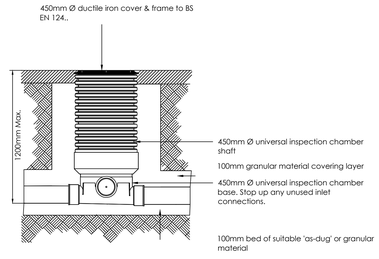
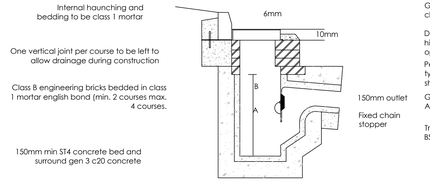
4. ALL DIMENSIONS ARE SHOWN IN MILLIMETRES UNLESS OTHERWISE STATED.
5. NO DIMENSIONS TO BE SCALED FROM THIS DRAWING.
6. THE LOCATION AND LEVELS OF EXISTING DRAINAGE PIPES AND CULVERTS MUST BE CHECKED ON-SITE PRIOR TO CONSTRUCTION.
7. PROPOSED FINISHED LEVELS HAVE ONLY BEEN ASSUMED AND SHOULD BE FINALISED BY A CIVIL ENGINEER.
8. POSITION OF RAINWATER DOWN PIPES TO BE CONFIRMED BY THE ARCHITECT.
9. FLOATATION CALCULATIONS OF ANY ATTENUATION STRUCTURES SHOULD BE PROVIDED BY A CIVIL ENGINEER OR MANUFACTURE.



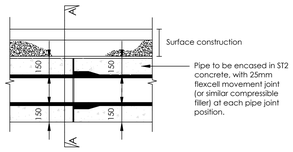
Inlet/Outlet & 4 branch connections for 100Ø pipes
Inlet/Outlet & 2 branch connections for 150Ø pipes
Note: Chambers in lightly trafficked areas to have to have 150mm ST4 concrete surround.

Typical Polypropylene Inspection Chamber Max. 1.2m Deep Scale 1:20

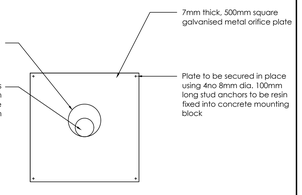
(for use in soft areas, driveways and parking bays only)



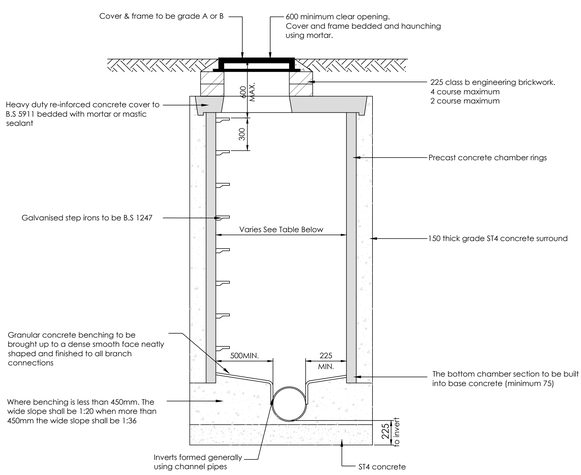
Pre-Cast Concrete Road Gully (1:20)

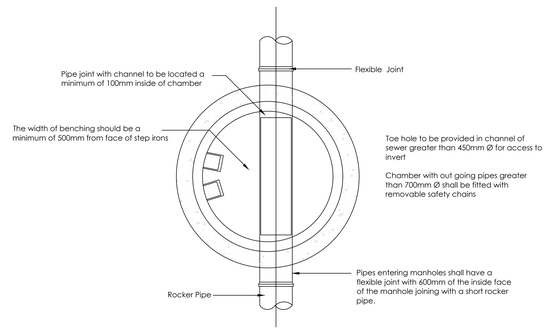


Joints for Concrete Encased Pipes Scale 1:10



Orifice Plate Detail Scale 1:10



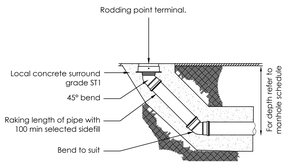


Typical Manhole Detail - Type B Scale 1:20

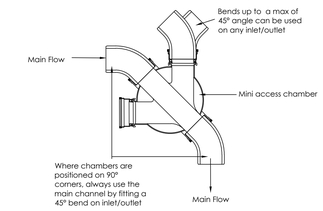
(1.35m - 3m Deep with Step Irons)

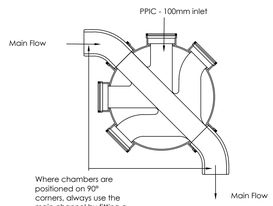
Notes:
Double width step rungs to be Type D Class 1 complying to BS EN 13101:2002 spaced at 250mm centers, cast in vertical alignment.

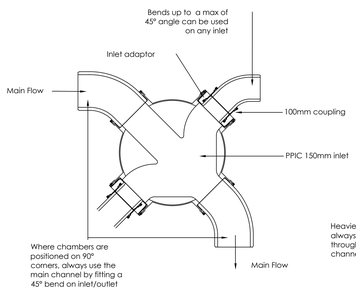
Manhole covers shall/must have a clear opening of 600mm and shall be Class D400 to BS EN 124 with 150mm deep frames in highways.

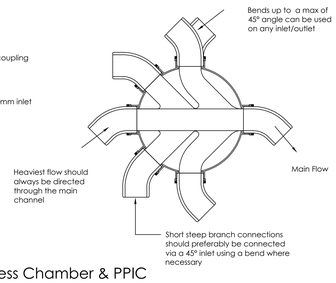


Rodding Eye Scale 1:20

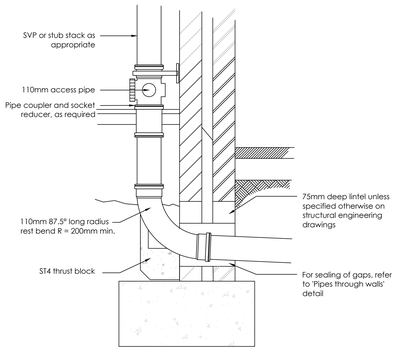




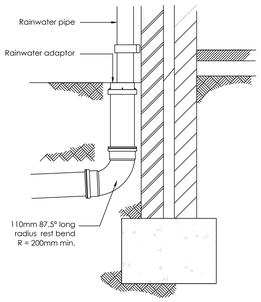




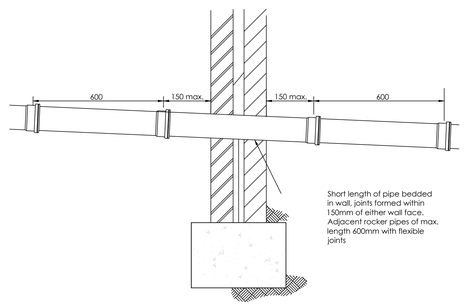
Mini Access Chamber & PPIC Installation Details Scale 1:10



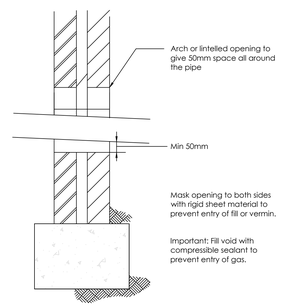
Internal SVP/Stub Stack Connection Through External Wall to Drain Scale 1:10



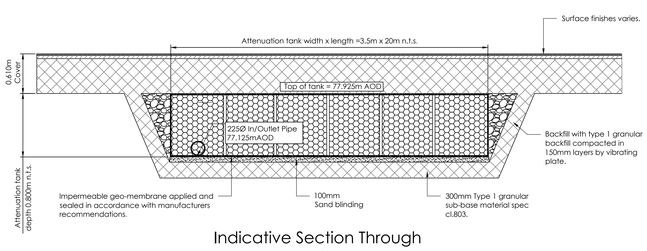
External RWP to Drain Scale 1:10



Pipes Through Walls (a) Scale 1:10



Pipes Through Walls (b) Scale 1:10



Indicative Section Through Attenuation Tank Not to Scale

Installation Method:

- Specialist supplier to prepare and submit appropriate layouts, schedules and details to enable fully compliant installation of geo-cellular units
- Excavate
- Install sub-base
- Install impermeable geomembrane (in accordance with manufacturers recommendations)
- Install crate units + connections (in accordance with manufacturers recommendations)
- Install inspection chambers as required
- Install crate end plates
- Cover sides & top with geotextile membrane (note: care taken not to rip, tear or puncture membrane
- Seal membrane
- Lateral backfilling
- Cover & backfill

SURFACE WATER

ATTENUATION PROVIDED BY A GEO-CELL TANK FOR THE LARGER DEVELOPMENT AND WITHIN THE PIPED NETWORK FOR THE SINGLE UNIT.

FLOWS CONTROLLED USING FLOW CONTROL CHAMBERS, BEFORE CONNECTING INTO THE PUBLIC SURFACE WATER SEWER WITHIN WATERFOLD LANE.

FLOWS CONTROLS
- S11
- TYPE B CHAMBER
- VORTEX FLOW CONTROL
- 1050Ø
- DESIGN HEAD = 1.4m
- DESIGN FLOW = 2L/S

CHAMBER DETAILS TO BE PROVIDED BY CHOSEN MANUFACTURER

S14
- TYPE B CHAMBER
- ORIFICE FLOW CONTROL
- 900Ø
- APERTURE SIZE = 500mm Ø

CHAMBER DETAILS TO BE PROVIDED BY CHOSEN MANUFACTURER

FOUL

FOUL TO CONNECT INTO THE PUBLIC COMBINED SEWER WITHIN WATERFOLD LANE

REVISION	COMMENT	DATE	BY

FLOOD RISK AND DRAINAGE SOLUTIONS LTD
144 New Lane, Oswaldtwistle, Lancashire, BB5 3QW
WWW.FLOODRISK-DRAINAGE.CO.UK
TEL: 07961477330

CLIENT: JHA PULMANN	DATE: 17/03/2025
	STATUS:
PROJECT: LAND AT WATERFOLD LANE, ROCHDALE	DRAWN BY: CV
	SCALE: AS SHOWN
DRAWING TITLE: TYPICAL DRAINAGE DETAILS	SIZE: A0
DRAWING REFERENCE: 2025-016-02	REVISION:

Modelled Surfaced Water Calculations

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	1	Maximum Rainfall (mm/hr)	150.0
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)	0.200
Ratio-R	0.300	Preferred Cover Depth (m)	0.500
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)	Node Type	Manhole Type	Diameter (mm)	Depth (m)	Notes
✓	RE1	0.004	4.00	81.190	Manhole	Adoptable	100	0.600	
✓	S1	0.004	4.00	81.600	Manhole	Adoptable	450	1.195	
✓	S2	0.005	4.00	80.870	Manhole	Adoptable	450	0.634	
✓	RE2	0.003	4.00	80.225	Manhole	Adoptable	100	0.600	
✓	S3	0.005	4.00	80.335	Manhole	Adoptable	450	0.895	
✓	RE3	0.003	4.00	80.095	Manhole	Adoptable	100	0.600	
✓	S4	0.005	4.00	80.205	Manhole	Adoptable	450	0.895	
✓	S5	0.000		79.670	Manhole	Adoptable	450	0.600	
✓	S6	0.002	4.00	79.600	Manhole	Adoptable	450	0.600	
✓	RE4	0.004	4.00	78.960	Manhole	Adoptable	100	0.600	
✓	S7	0.002	4.00	79.070	Manhole	Adoptable	450	0.890	
✓	S8	0.000		79.400	Manhole	Adoptable	450	2.216	
✓	S9	0.033	4.00	80.150	Manhole	Adoptable	450	0.650	
✓	S10	0.009	4.00	78.535	Manhole	Adoptable	450	1.405	
✓	TANK	0.000	4.00	78.535	Manhole	Adoptable	450	1.410	
✓	S11	0.000		78.535	Manhole	Adoptable	1050	1.414	Auto-design is off
✓	S12	0.000		78.400	Manhole	Adoptable	450	1.345	Auto-design is off
✓	RE5	0.003	4.00	78.630	Manhole	Adoptable	100	0.600	
✓	RE6	0.005	4.00	78.630	Manhole	Adoptable	100	0.600	
✓	S13	0.005	4.00	78.630	Manhole	Adoptable	450	1.156	
✓	S14			78.400	Manhole	Adoptable	900	0.962	
✓	S15			78.400	Manhole	Adoptable	450	0.987	
✓	S16			77.900	Manhole	Adoptable	450	0.921	
✓	S17			77.790	Manhole	Adoptable	450	1.005	
✓	EXMH			77.820	Manhole	Adoptable	1200	1.087	

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	11.000	59.5	100	Circular	81.190	80.590	0.500	81.600	80.405	1.095
1.001	10.000	59.2	100	Circular	81.600	80.405	1.095	80.870	80.236	0.534
1.002	8.800	17.6	100	Circular	80.870	80.236	0.534	80.335	79.735	0.500
2.000	11.000	59.5	100	Circular	80.225	79.625	0.500	80.335	79.440	0.795

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	RE1	100	Manhole	Adoptable	S1	450	Manhole	Adoptable
1.001	S1	450	Manhole	Adoptable	S2	450	Manhole	Adoptable
1.002	S2	450	Manhole	Adoptable	S3	450	Manhole	Adoptable
2.000	RE2	100	Manhole	Adoptable	S3	450	Manhole	Adoptable

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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)
1.003	1.200	9.2	100	Circular	80.335	79.440	0.795	80.205	79.310	0.795
3.000	11.000	59.5	100	Circular	80.095	79.495	0.500	80.205	79.310	0.795
1.004	8.800	36.7	100	Circular	80.205	79.310	0.795	79.670	79.070	0.500
1.005	1.500	21.4	100	Circular	79.670	79.070	0.500	79.600	79.000	0.500
1.006	4.300	21.5	100	Circular	79.600	79.000	0.500	79.400	78.800	0.500
4.000	10.700	59.4	100	Circular	78.960	78.360	0.500	79.070	78.180	0.790
4.001	4.500	59.2	100	Circular	79.070	78.180	0.790	79.400	78.104	1.196
1.007	9.000	166.7	225	Circular	79.400	77.184	1.991	78.535	77.130	1.180
5.000	21.800	13.5	150	Circular	80.150	79.500	0.500	78.535	77.885	0.500
1.008	1.500	166.7	225	Circular	78.535	77.130	1.180	78.535	77.121	1.189
6.000	1.500	375.0	225	Circular	78.535	77.125	1.185	78.535	77.121	1.189
1.009	6.600	100.0	150	Circular	78.535	77.121	1.264	78.400	77.055	1.195
1.010	7.600	100.0	150	Circular	78.400	77.055	1.195	77.900	76.979	0.771
7.000	6.100	59.2	100	Circular	78.630	78.030	0.500	78.630	77.927	0.603
8.000	6.100	59.2	100	Circular	78.630	78.030	0.500	78.630	77.927	0.603
7.001	6.000	166.7	225	Circular	78.630	77.474	0.931	78.400	77.438	0.737
7.002	1.500	100.0	150	Circular	78.400	77.438	0.812	78.400	77.423	0.827
7.003	39.000	92.0	150	Circular	78.400	77.413	0.837	77.900	76.989	0.761
1.011	19.500	100.5	150	Circular	77.900	76.979	0.771	77.790	76.785	0.855
1.012	5.200	100.0	150	Circular	77.790	76.785	0.855	77.820	76.733	0.937

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.003	S3	450	Manhole	Adoptable	S4	450	Manhole	Adoptable
3.000	RE3	100	Manhole	Adoptable	S4	450	Manhole	Adoptable
1.004	S4	450	Manhole	Adoptable	S5	450	Manhole	Adoptable
1.005	S5	450	Manhole	Adoptable	S6	450	Manhole	Adoptable
1.006	S6	450	Manhole	Adoptable	S8	450	Manhole	Adoptable
4.000	RE4	100	Manhole	Adoptable	S7	450	Manhole	Adoptable
4.001	S7	450	Manhole	Adoptable	S8	450	Manhole	Adoptable
1.007	S8	450	Manhole	Adoptable	S10	450	Manhole	Adoptable
5.000	S9	450	Manhole	Adoptable	S10	450	Manhole	Adoptable
1.008	S10	450	Manhole	Adoptable	S11	1050	Manhole	Adoptable
6.000	TANK	450	Manhole	Adoptable	S11	1050	Manhole	Adoptable
1.009	S11	1050	Manhole	Adoptable	S12	450	Manhole	Adoptable
1.010	S12	450	Manhole	Adoptable	S16	450	Manhole	Adoptable
7.000	RE5	100	Manhole	Adoptable	S13	450	Manhole	Adoptable
8.000	RE6	100	Manhole	Adoptable	S13	450	Manhole	Adoptable
7.001	S13	450	Manhole	Adoptable	S14	900	Manhole	Adoptable
7.002	S14	900	Manhole	Adoptable	S15	450	Manhole	Adoptable
7.003	S15	450	Manhole	Adoptable	S16	450	Manhole	Adoptable
1.011	S16	450	Manhole	Adoptable	S17	450	Manhole	Adoptable
1.012	S17	450	Manhole	Adoptable	EXMH	1200	Manhole	Adoptable

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	0.300	Starting Level (m)	
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	1.000	Check Discharge Volume	x

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Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	40	10	0
100	45	10	0

Node S11 Online ACO Q-Brake Control

Flap Valve	x	Design Depth (m)	1.400	Min Node Diameter (mm)	1050
Replaces Downstream Link	✓	Design Flow (l/s)	2.0	Orifice Diameter (m)	0.063
Invert Level (m)	77.121	Min Outlet Diameter (m)	0.095		

Node S14 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.600	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Design Flow (l/s)	1.5		
Invert Level (m)	77.438	Diameter (m)	0.050		

Node TANK Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	77.125
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	70.0	0.0	0.800	70.0	0.0	0.801	0.0	0.0

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Results for 1 year Critical Storm Duration. Lowest mass balance: 98.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	RE1	11	80.609	0.019	0.6	0.0026	0.0000	OK
15 minute winter	S1	11	80.432	0.027	1.2	0.0061	0.0000	OK
15 minute winter	S2	10	80.262	0.026	2.0	0.0082	0.0000	OK
15 minute winter	RE2	10	79.642	0.017	0.5	0.0018	0.0000	OK
15 minute winter	S3	10	79.471	0.031	3.3	0.0083	0.0000	OK
15 minute winter	RE3	10	79.512	0.017	0.5	0.0018	0.0000	OK
15 minute winter	S4	10	79.360	0.050	4.6	0.0135	0.0000	OK
15 minute winter	S5	10	79.120	0.050	4.6	0.0079	0.0000	OK
15 minute winter	S6	10	79.046	0.046	4.8	0.0104	0.0000	OK
15 minute winter	RE4	11	78.379	0.019	0.6	0.0026	0.0000	OK
15 minute winter	S7	11	78.204	0.024	0.9	0.0049	0.0000	OK
15 minute winter	S8	9	77.305	0.121	5.7	0.0193	0.0000	OK
15 minute winter	S9	10	79.534	0.034	5.3	0.0399	0.0000	OK
15 minute winter	S10	9	77.301	0.171	13.8	0.0490	0.0000	OK
180 minute winter	TANK	132	77.223	0.098	2.4	6.5420	0.0000	OK
15 minute winter	S11	9	77.297	0.176	15.3	0.1525	0.0000	SURCHARGED
15 minute winter	S12	9	77.088	0.033	1.8	0.0052	0.0000	OK
15 minute winter	RE5	10	78.047	0.017	0.5	0.0019	0.0000	OK
15 minute winter	RE6	10	78.052	0.022	0.8	0.0039	0.0000	OK
15 minute winter	S13	12	77.544	0.070	2.1	0.0171	0.0000	OK
15 minute winter	S14	12	77.545	0.107	2.0	0.0678	0.0000	OK
15 minute winter	S15	12	77.442	0.029	1.5	0.0045	0.0000	OK
15 minute winter	S16	11	77.021	0.042	3.0	0.0066	0.0000	OK
15 minute winter	S17	11	76.829	0.044	2.9	0.0070	0.0000	OK
15 minute winter	EXMH	11	76.774	0.041	2.9	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	RE1	1.000	S1	0.6	0.444	0.076	0.0150	
15 minute winter	S1	1.001	S2	1.2	0.732	0.152	0.0165	
15 minute winter	S2	1.002	S3	2.0	1.274	0.137	0.0138	
15 minute winter	RE2	2.000	S3	0.5	0.348	0.063	0.0160	
15 minute winter	S3	1.003	S4	3.3	1.120	0.164	0.0035	
15 minute winter	RE3	3.000	S4	0.5	0.217	0.063	0.0262	
15 minute winter	S4	1.004	S5	4.6	1.179	0.455	0.0341	
15 minute winter	S5	1.005	S6	4.5	1.230	0.345	0.0055	
15 minute winter	S6	1.006	S8	4.8	1.449	0.366	0.0143	
15 minute winter	RE4	4.000	S7	0.6	0.498	0.076	0.0130	
15 minute winter	S7	4.001	S8	0.9	0.649	0.114	0.0062	
15 minute winter	S8	1.007	S10	7.0	0.440	0.174	0.2434	
15 minute winter	S9	5.000	S10	5.3	1.791	0.109	0.0645	
15 minute winter	S10	1.008	S11	15.3	0.662	0.380	0.0492	
15 minute winter	TANK	6.000	S11	-14.6	-1.132	-0.549	0.0254	
15 minute winter	S11	ACO Q-Brake	S12	1.8				
15 minute winter	S12	1.010	S16	1.8	0.599	0.100	0.0256	
15 minute winter	RE5	7.000	S13	0.5	0.552	0.063	0.0055	
15 minute winter	RE6	8.000	S13	0.8	0.633	0.101	0.0077	
15 minute winter	S13	7.001	S14	2.0	0.367	0.049	0.0868	
15 minute winter	S14	Orifice	S15	1.5				
15 minute winter	S15	7.003	S16	1.5	0.605	0.079	0.0967	
15 minute winter	S16	1.011	S17	2.9	0.713	0.166	0.0808	
15 minute winter	S17	1.012	EXMH	2.9	0.716	0.166	0.0214	6.0

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Results for 30 year +40% CC +10% A Critical Storm Duration. Lowest mass balance: 98.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	RE1	10	80.628	0.038	2.4	0.0059	0.0000	OK
15 minute winter	S1	10	80.465	0.060	4.8	0.0139	0.0000	OK
15 minute winter	S2	10	80.292	0.056	7.8	0.0185	0.0000	OK
15 minute winter	RE2	12	79.799	0.174	2.4	0.0205	0.0000	SURCHARGED
15 minute winter	S3	12	79.792	0.351	12.1	0.0991	0.0000	SURCHARGED
15 minute winter	RE3	12	79.733	0.238	2.2	0.0281	0.0000	SURCHARGED
15 minute winter	S4	12	79.727	0.417	12.9	0.1177	0.0000	SURCHARGED
15 minute winter	S5	12	79.280	0.210	12.2	0.0334	0.0000	SURCHARGED
15 minute winter	S6	12	79.156	0.156	12.8	0.0362	0.0000	SURCHARGED
15 minute winter	RE4	10	78.398	0.038	2.4	0.0059	0.0000	OK
15 minute winter	S7	10	78.232	0.052	3.6	0.0108	0.0000	OK
240 minute winter	S8	232	77.706	0.522	4.7	0.0830	0.0000	SURCHARGED
15 minute winter	S9	10	79.570	0.070	20.1	0.0890	0.0000	OK
240 minute winter	S10	232	77.707	0.577	10.1	0.1731	0.0000	SURCHARGED
240 minute winter	TANK	232	77.705	0.580	7.9	38.6574	0.0000	SURCHARGED
240 minute winter	S11	228	77.704	0.583	10.0	0.5051	0.0000	SURCHARGED
240 minute winter	S12	472	77.090	0.035	2.0	0.0056	0.0000	OK
15 minute winter	RE5	10	78.064	0.034	1.8	0.0040	0.0000	OK
15 minute winter	RE6	10	78.076	0.046	3.0	0.0087	0.0000	OK
15 minute winter	S13	13	78.062	0.588	7.8	0.1493	0.0000	SURCHARGED
15 minute winter	S14	13	78.062	0.624	5.6	0.3968	0.0000	SURCHARGED
15 minute winter	S15	13	77.460	0.047	4.0	0.0076	0.0000	OK
15 minute winter	S16	14	77.040	0.061	6.0	0.0097	0.0000	OK
15 minute winter	S17	14	76.850	0.065	6.0	0.0104	0.0000	OK
15 minute winter	EXMH	14	76.793	0.060	6.0	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	RE1	1.000	S1	2.4	0.634	0.305	0.0418	
15 minute winter	S1	1.001	S2	4.8	1.026	0.609	0.0467	
15 minute winter	S2	1.002	S3	7.8	1.808	0.535	0.0379	
15 minute winter	RE2	2.000	S3	2.2	0.379	0.279	0.0861	
15 minute winter	S3	1.003	S4	9.8	1.246	0.485	0.0094	
15 minute winter	RE3	3.000	S4	2.2	0.289	0.281	0.0861	
15 minute winter	S4	1.004	S5	12.2	1.556	1.213	0.0689	
15 minute winter	S5	1.005	S6	12.0	1.536	0.913	0.0117	
15 minute winter	S6	1.006	S8	12.7	1.697	0.963	0.0336	
15 minute winter	RE4	4.000	S7	2.4	0.710	0.305	0.0364	
15 minute winter	S7	4.001	S8	3.6	0.928	0.456	0.0174	
15 minute winter	S8	1.007	S10	15.5	0.407	0.387	0.3535	
15 minute winter	S9	5.000	S10	20.1	2.568	0.413	0.1707	
15 minute winter	S10	1.008	S11	40.5	1.067	1.008	0.0597	
15 minute winter	TANK	6.000	S11	-38.4	-1.532	-1.445	0.0597	
240 minute summer	S11	ACO Q-Brake	S12	2.0				
180 minute winter	S12	1.010	S16	2.0	0.648	0.113	0.0301	
15 minute winter	RE5	7.000	S13	1.8	0.789	0.229	0.0301	
15 minute winter	RE6	8.000	S13	3.0	0.899	0.381	0.0312	
15 minute winter	S13	7.001	S14	5.6	0.447	0.140	0.2386	
15 minute winter	S14	Orifice	S15	4.0				
15 minute winter	S15	7.003	S16	4.0	0.801	0.218	0.1968	
15 minute winter	S16	1.011	S17	6.0	0.847	0.338	0.1379	
15 minute winter	S17	1.012	EXMH	6.0	0.859	0.337	0.0362	23.4

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Results for 100 year +45% CC +10% A Critical Storm Duration. Lowest mass balance: 98.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	RE1	10	80.635	0.045	3.3	0.0070	0.0000	OK
15 minute winter	S1	10	80.481	0.076	6.6	0.0176	0.0000	OK
15 minute winter	S2	11	80.312	0.076	10.7	0.0252	0.0000	OK
15 minute winter	RE2	12	80.116	0.491	3.1	0.0579	0.0000	FLOOD RISK
15 minute winter	S3	12	80.109	0.669	14.6	0.1886	0.0000	FLOOD RISK
15 minute winter	RE3	12	80.018	0.523	2.4	0.0617	0.0000	FLOOD RISK
15 minute winter	S4	12	80.013	0.703	15.8	0.1984	0.0000	FLOOD RISK
15 minute winter	S5	13	79.417	0.347	14.2	0.0552	0.0000	FLOOD RISK
15 minute winter	S6	13	79.249	0.249	14.7	0.0578	0.0000	SURCHARGED
15 minute winter	RE4	10	78.405	0.045	3.3	0.0070	0.0000	OK
240 minute winter	S7	232	78.387	0.207	1.0	0.0430	0.0000	SURCHARGED
240 minute winter	S8	232	78.387	1.203	6.4	0.1912	0.0000	SURCHARGED
15 minute winter	S9	10	79.583	0.083	26.9	0.1065	0.0000	OK
240 minute winter	S10	232	78.387	1.257	13.5	0.3770	0.0000	FLOOD RISK
240 minute winter	TANK	232	78.387	1.262	11.7	53.4339	0.0000	FLOOD RISK
240 minute winter	S11	232	78.387	1.266	13.3	1.0960	0.0000	FLOOD RISK
60 minute summer	S12	189	77.090	0.035	2.0	0.0056	0.0000	OK
30 minute winter	RE5	22	78.248	0.218	1.9	0.0257	0.0000	SURCHARGED
30 minute winter	RE6	22	78.252	0.222	3.2	0.0424	0.0000	SURCHARGED
30 minute winter	S13	22	78.245	0.771	8.1	0.1959	0.0000	SURCHARGED
30 minute winter	S14	22	78.244	0.806	5.4	0.5129	0.0000	FLOOD RISK
30 minute winter	S15	22	77.464	0.051	4.6	0.0081	0.0000	OK
15 minute winter	S16	14	77.044	0.065	6.6	0.0103	0.0000	OK
15 minute winter	S17	14	76.854	0.069	6.6	0.0110	0.0000	OK
15 minute winter	EXMH	14	76.796	0.063	6.6	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	RE1	1.000	S1	3.3	0.675	0.420	0.0539	
15 minute winter	S1	1.001	S2	6.6	1.095	0.837	0.0606	
15 minute winter	S2	1.002	S3	10.3	1.898	0.709	0.0624	
15 minute winter	RE2	2.000	S3	2.7	0.377	0.349	0.0861	
15 minute winter	S3	1.003	S4	11.6	1.487	0.579	0.0094	
15 minute winter	RE3	3.000	S4	2.9	0.452	0.372	0.0861	
15 minute winter	S4	1.004	S5	14.2	1.817	1.417	0.0689	
15 minute winter	S5	1.005	S6	14.0	1.786	1.062	0.0117	
15 minute winter	S6	1.006	S8	14.7	1.874	1.116	0.0336	
15 minute winter	RE4	4.000	S7	3.3	0.762	0.420	0.0464	
15 minute winter	S7	4.001	S8	4.9	0.993	0.622	0.0222	
15 minute winter	S8	1.007	S10	18.4	0.462	0.458	0.3579	
15 minute winter	S9	5.000	S10	26.9	2.751	0.552	0.2132	
15 minute winter	S10	1.008	S11	49.9	1.254	1.242	0.0597	
15 minute winter	TANK	6.000	S11	-47.0	-1.615	-1.766	0.0597	
240 minute summer	S11	ACO Q-Brake	S12	2.0				
240 minute winter	S12	1.010	S16	2.0	0.623	0.113	0.0298	
15 minute winter	RE5	7.000	S13	2.3	0.842	0.295	0.0477	
15 minute winter	RE6	8.000	S13	4.0	0.958	0.503	0.0477	
15 minute winter	S13	7.001	S14	7.0	0.449	0.175	0.2386	
30 minute winter	S14	Orifice	S15	4.6				
30 minute winter	S15	7.003	S16	4.6	0.845	0.249	0.2138	
15 minute winter	S16	1.011	S17	6.6	0.865	0.371	0.1482	
15 minute winter	S17	1.012	EXMH	6.6	0.879	0.370	0.0389	29.7

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North West SUDS Proforma

NORTH WEST SuDS PRO-FORMA

This pro-forma is a requirement for any planning application for major development[1].

It supports applicants in summarising and confirming how surface water from a development will be managed sustainably under current and future conditions.

Your sustainable drainage system should be designed in accordance with **CIRIA The SuDS Manual C753** and any necessary adoption standards.

HOW TO COMPLETE

Blue Box	Instruction/ Question
Orange Box	Evidence Required
White Box	To be completed by Developer / Consultant

1. Complete ALL white boxes
2. Submit this pro-forma to the Local Planning Authority, along with:
- Sustainable Drainage Strategy
- Site Specific Flood Risk Assessment (if required)
- Minimum supporting evidence, as indicated in orange boxes of this pro-forma.

GUIDANCE TO SUPPORT YOU

The pro-forma should be completed in conjunction with 'Completing your SuDS Pro Forma Guide.'

The pro-forma can be completed using freely available tools such as **Tools for Sustainable Drainage Systems** or appropriate industry standard surface water management design software.

[1] *as defined in Section 2 of **Statutory Instrument 2015 No. 595** or on sites of 0.5 hectares in Critical Drainage Areas.*

SECTION 1. APPLICATION & DEVELOPMENT DETAILS

Planning Application Reference *(if available)*	
State type of planning application *i.e. Pre-application, Outline, Full, Hybrid, Reserved Matters** **Information only required if drainage is to be considered as part of reserved matters application*	Full
Developer(s) Name:	-
Consultant(s) Name:	FRDS
Development Address *(including postcode)*	WATERFOLD LANE
Development Grid Reference *(Eastings/Northings)*	382311,410363
Total Development Site Area (Ha)	0.234
Drained Area (Ha)* of Development	-
Please indicate the flood zone that your development is in. Tick all that apply. *Based on the Environment Agency Flood Map for Planning and the relevant Local Authority Strategic Flood Risk Assessment (to identify Flood Zones 3a/3b).*	Flood Zone 1 ☑ Flood Zone 2 ☐ Flood Zone 3a ☐ Flood Zone 3b ☐
What is the surface water risk of the site? Tick all that apply. *Based on the Environment Agency Surface Water Flood Map.*	High ☐ Medium ☐ Low ☑
Have you submitted a Site Specific Flood Risk Assessment (FRA)? *See separate guidance notes for clarification on when a FRA is required*	Yes ☑ No ☐
Have you submitted a Sustainable Drainage Strategy?	Yes ☑ No ☐
Does your drainage proposal provide multi-functional benefits via SuDS?	Yes ☐ No ☑
Expected Lifetime of Development *(years)* *Refer to Planning Practice Guidance "Flood Risk and Coastal Change" Paragraph 026*	100

RESIDENTIAL PROPERTIES **Development Type:**		**State Proposed Number of Residential Units / Quantum of commercial floorspace**
Greenfield Site • *Site is wholly undeveloped, and a new drainage system will be installed*	☑	
Previously Developed/ Brownfield Site • *Site is already developed, and the entirety of the existing surface water drainage system will be used to serve the new development (evidence must be provided to prove existing surface water drainage system is reusable);* ***OR*** • *Where records of the previously developed system are not available so that the hydraulic characteristics of the system cannot be determined or where the drainage system is not in reasonable working order i.e. broken, blocked or no longer operational for other reasons, then one of the approaches outlined in Section 24.5 of The SuDS Manual (C753) should be adopted.*	☐	

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 1.	

SECTION 2: IMPERMEABLE AREA AND EXISTING DRAINAGE

	Existing (E)	Proposed (P)	Change (P – E)
State Impermeable Area (Ha)	0	0.079	
Evidence Required: Plans showing development layout of site with existing and proposed impermeable areas.			☐

Are there existing sewers, watercourses, water bodies, highway drains, soakaways or filter drains on the site?	Yes ☑ No ☐ Don't Know ☐
Evidence Required: Plan(s) showing existing layout to include all: • Watercourses, open and culverted • Water bodies – ponds, swales etc. • Sewers, including manholes • Highway drains, include manholes, gullies etc. • Infiltration features - soakaways, filter drains etc.	☑

Drainage Design *Outline planning applications should be able to demonstrate that a suitable drainage system is achievable.* *All other type of planning application should provide full details or reference to previous planning application where drainage details have been submitted or approved.*	
Select which design approach you are taking to manage water quantity *(refer to Section 3.3 SuDS Manual)* **Approach 1 – Volume control / Long Term Storage (Technical Standards S2/3, S4/5)** • *The attenuated runoff volume for the 1 in 100 year 6 hour event (plus climate change allowance) is limited to the greenfield runoff volume for the 1 in 100 year 6 hour event, with any additional runoff volume utilising long term storage and either infiltrated or released at 2 l/s/ha* • *The discharge rate for the critical duration 1 in 1 year event is restricted to the 1 in 1 year greenfield runoff rate* • *The discharge rate for the critical duration 1 in 100 year event (plus climate change allowance) is restricted to the 1 in 100 year greenfield runoff rate* **Approach 2 – Qbar (Technical Standards S6)** • *Justification has been provided that the provision of volume control/long term storage is not appropriate and an attenuation only approach is proposed. All events up to the critical duration 1 in 100 year event (plus climate change allowance) are limited to Qbar (1 in 2 year greenfield rate) or 2 l/s/ha, whichever is greater.*	☑ ☐
Evidence Required: Plans showing: • Existing flow routes and flood risks • Modified flow routes • Contributing and impermeable areas • Current (if any) and proposed 'source control' and 'management train' locations of sustainable drainage components (C753 Chapter 7) • Details of drainage ownership • Details of exceedance routes (Technical Standards S9) • Topographic survey • Locations and number of existing and proposed discharge points	☑

Note consideration should be given to manage surface water from both impermeable and permeable surfaces (including gardens and verges) likely to enter the drainage system.	

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 2.	FRDIA

SECTION 3: PEAK RUNOFF RATES – TECHNICAL STANDARDS S2, S3 AND S6 (UNLESS S1 APPLIES)

Rainfall Event	Existing Rate (l/s)	Greenfield Rate (l/s)	Proposed Rate (l/s) *Previously developed sites - In line with S3 should be equivalent to Greenfield runoff rates – discuss with LLFA if this is not achievable pre-application*
Qbar *(Approach 2)*	0.06		
1 in 1 Year Event *(Approach 1)*			2.9
1 in 30 Year Event			6.0
1 in 100 Year Event* *(Approach 1)*			6.6
** Total discharge at the 1 in 100 year rate should be restricted to the greenfield runoff volume for the 1 in 100 Year 6 hour event with additional volumes (long-term storage volume) released at a rate no greater than 2 l/s/ha where infiltration is not possible. The climate change allowance should only be applied to the proposed rate and not the existing or greenfield rate.*			

Evidence Required: Methodology used to calculate peak runoff rate clearly stated and justified.	☑
Impermeable areas plan, supported by topographical survey confirming positive drainage.	☑
Hydraulic calculations and details of software used.	☑

State the hydraulic method used in your calculations *(Refer to Table 24.1 of The SuDS Manual)*	IH124

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 3.	FRDIA

SECTION 4: DISCHARGE VOLUME – TECHNICAL STANDARDS S4, S5 AND S6 (UNLESS S1 APPLIES)

Rainfall Event	Existing Volume (m^3)	Greenfield Volume (m^3)	Proposed Volume (m^3)
1 in 100 Year 6 Hour Event *(Approach 1)*		39	29.7
Does the below statement apply to your development proposal? Long term storage is not achievable on this site and, in accordance with S6 of the Non Statutory Technical Standards for SuDS, the surface water discharge rates for events up to and including the 1 in 100 year critical event are limited to Qbar (Approach 2)			Yes ☐ No ☑
Evidence Required: Approach to managing the quantity of surface water leaving the site clearly stated and justified			☑
Methodology used to calculate discharge volume clearly stated and justified.			☑
Hydraulic calculations and details of software used.			☑

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 4.	FRDIA

SECTION 5: STORAGE – TECHNICAL STANDARDS S7 AND S8

State climate change allowance used (%)	45
State housing density (houses per ha)	
State urban creep allowance used (%)	
Evidence Required: State / used in appropriate industry standard surface water management design software.	☑

State storage volume required (m^3) *(excluding non-void spaces)* *Must include an allowance for climate change and urban creep*	
Have you incorporated interception into your design? *(Refer to Chapter 24 of The SuDS Manual C753)* *Where possible, infiltration or other techniques are to be used to try and achieve zero discharge to receiving waters for rainfall depths up to 5mm.*	Yes ☑ No ☐
Evidence Required: Drainage plans showing location of attenuation and all flow control devices and supporting calculations.	☑

Summarise how storage will be provided for 1 in 30 year event on site. *Storage must be designed to ensure that at no flooding occurs onsite in a 1 in 30 year event except in designed areas **and** no flooding occurs offsite in a 1 in 100 year (plus climate change allowance) event.*	GEO-CELL TANK
Summarise how storage will be provided for 1 in 100 year (plus climate change) event on site. *Where storage above the 1 in 30 year rainfall event is provided in designated areas designed to accommodate excess surface water volumes, plans showing storage locations and surface water depths and supported by calculations used in appropriate industry standard surface water management design software. It is important to run a range of duration events to ensure the worst case condition is found for each drainage element on the site*	GEO-CELL TANK
Evidence Required: Plans showing size and location of storage and supporting calculations. Where there is controlled flooding, extents and depths must be indicated.	☑

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 5.	FRDIA

SECTION 6: WATER QUALITY PROTECTION

Contaminated surface water run-off can have negative impacts on the quality of receiving water bodies. The potential level of contamination will influence final the design of an appropriate treatment train as part of your sustainable drainage system.

Is the proposal site known to be or potentially contaminated?	Yes ☐ No☑
• *If the site is contaminated, it should be demonstrated that the sustainable drainage system will not increase the risk of pollution to controlled waters though the mobilisation of contaminants and/or creation of new pollution pathways.*	

Confirm the *Pollution Hazard Level* of the proposed development - Tick ALL that apply

Refer to Pollution Hazard Indices for different Land Use Classifications in Table 26.2 of The SuDS Manual C753 for further guidance.

Pollution Hazard Level *Tick ALL that apply*		**Surface water run-off from the proposed development will drain from:**
VERY LOW	☐	• Residential roofs
LOW	☑	• Other roofs (typically commercial/industrial roofs) • Individual property driveways, residential car parks, low traffic roads (e.g. cul de sacs, home-zones and general access roads) • Non-residential car parking with infrequent change (e.g. schools, offices) i.e. < 300 traffic movements/day
MEDIUM	☐	• Commercial yard and delivery areas • Non-residential car parking with frequent change (e.g. hospitals, retail) • All roads except low traffic roads and trunk roads/motorways[2]
HIGH	☐	• Sites with heavy pollution (e.g. haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites) • Sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured • Industrial sites • Trunk roads and motorways[1]

If the development's Pollution Hazard Level is 'Very Low' or 'Low', has the sustainable drainage design been risk assessed and appropriate mitigation measures included?	Yes ☑ No☐
• *If the proposed development has a very low or low polluting potential, you should design your sustainable drainage system to include an appropriate treatment train in accordance with The SuDS Manual (C753).*	

If the development's Pollution Hazard Level is 'Medium' or 'High', is the application supported by a detailed water quality risk assessment?	Yes ☐ No☑
• *If the proposed development has a high polluting potential, a detailed risk assessment will be required to identify an appropriate SuDS treatment train and ensure compliance with Paragraph 170 of the National Planning Policy Framework.* • *If the proposed development has a medium polluting potential, a detailed risk assessment may be required depending on the nature, scale and location of the development.*	

Has pre-application advice on water quality been obtained from the Environment Agency?	Yes ☐ No☑
If YES, provide details:	

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 6.	FRDIA

[2] Motorways and trunk roads should follow the guidance and risk assessment process set out in Highways Agency (2009).

SECTION 7: DETAILS OF YOUR SUSTAINABLE DRAINAGE SYSTEM

a) Function of your Sustainable Drainage System

Do your proposals store rainwater for later use (as a resource)?	Yes ☐ No ☑
Evidence Required: Please provide a brief sentence in the adjacent white box to describe how this function has been achieved.	

Do your proposals promote source control to manage rainfall close to where it falls? (e.g. promoting natural losses through soakage, infiltration and evapotranspiration)	Yes ☐ No ☑
Evidence Required: Please provide a brief sentence in the adjacent white box to describe how this function has been achieved.	

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 7a.	FRDIA

b) Hierarchy of Drainage Options – Planning Practice Guidance

The proposed method of discharge are set out within order of priority. Generally, the aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable.

Proposed method of surface water discharge		**Is this proposed?**	
Hierarchy Level 1: Into the ground (via infiltration)		Yes ☐ No ☑	
If YES - Evidence Required		**If NO – Evidence Required** **Tick ALL that apply**	
☐	**A.** Completed Infiltration Checklist from The SuDS Manual (C753) Appendix B *An editable version of this form is available on SusDrain website.*	☐	A. Site investigation to demonstrate that the ground is not free draining. Test results to be provided in accordance with: • The methodology within BRE 365 (2016), ***OR*** • Falling head permeability tests BS EN ISO 22282-2: 2012
☐	**B.** British Geological Survey (BGS) Infiltration SuDS Map	☑	B. NOTE: where an applicant is unable to access a site to undertake testing, e.g. where unable to access a site for an outline application, they can submit a *SuDS GeoReport or similar.*
☐	**C.** Infiltration testing to BRE 365 (2016) or falling head permeability tests to BS EN ISO 2228-2: 2012 ***(optional for outline)***	☐	C. Evidence to confirm that infiltration to ground would result in a risk of deterioration to ground water quality.
☐	'Plan B' sustainable drainage plan and statement of approach with an alternative discharge method, in case infiltration proposals are proven not feasible upon further site specific ground investigation e.g. to consider seasonal variations to groundwater.	☐	D. Geotechnical advice from a competent person* which determines that infiltration of water to ground would pose an unacceptable risk of geohazards to the site and/or local area. **Note: Competent person may include a Chartered Engineer, Chartered Geologists, Registered Ground Engineering Professionals (RoGEP).*

Proposed method of surface water discharge	Is this proposed?
Hierarchy Level 2: To a surface water body *(select type)* ***NOTE:*** *Consent from LLFA or Permit from Environment Agency may be required – refer to guidance*	Yes No ✔ N/A ☐ Main river ☐ Canal ☐ Ordinary watercourse ☐ Other water body

If YES - Evidence Required		If NO – Evidence Required **Tick ALL that apply**	
☐	Surface water body / watercourse survey and report	☑ ☑	Plan showing nearby watercourses and waterbodies **AND** Statement providing justification in your Sustainable Drainage Strategy ***Note:*** *Where third party land is cited as a barrier, you should provide visibility of discussions held to date with the riparian landowner of the waterbody.*

Proposed method of surface water discharge	Is this proposed?
Hierarchy Level 3: To a surface water sewer. N.B. Trafford will not accept surface water drainage to a highway drain	Yes ✔ No N/A ☐ Surface water sewer

If YES - Evidence Required		If NO – Evidence Required **Tick ALL that apply**	
☐	Written correspondence from Water and Sewerage Company regarding proposed connection.	☐ ☐	Plan showing nearby sewers **AND** Statement providing justification in your Sustainable Drainage Strategy

Proposed method of surface water discharge	Is this proposed?
Hierarchy Level 4: To combined sewer	Yes ☐ No ☑ N/A ☐

If YES - Evidence Required		If NO – Evidence Required
☐	Written correspondence from Water and Sewerage Company	N/A

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 7b.	FRDIA

c) Proposed SuDS Component Types

	Tick ALL that apply				
Within property boundary	☐ Rainwater harvesting	☐ Green/ blue roofs	☐ Pervious pavements *[**Type:** A ☐ B ☐ C ☑]*	☐ Soakaway	☐ Bio retention systems

	Tick ALL that apply				
Within development site boundary *(not property)*	☐ Infiltration system *[**Type:** ☐ Surface level ☐ Below ground]*		☐ Filter strips	☐ Filter drains	☐ Swales
	☐ Bio retention system	☐ Detention basins	☐ Ponds and wetlands	☑ Attenuation tanks/ Oversized pipes	☐ Other (state below)
	If 'Other' please state:				

Off site *(not within the boundary of the proposed development)*	***Please state:***

I confirm that the above selected components have been designed in accordance with The SuDS Manual (C753).	I confirm ☑
I confirm that the management of flows resulting from rainfall in excess of a 1 in 100 year plus climate change rainfall event, and their exceedance route(s), has been fully considered in order to minimise the risks to people, property (new and existing) and infrastructure.	I confirm ☑

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 7c.	FRDIA

SECTION 8: OPERATION AND MAINTENANCE – TECHNICAL STANDARD S12 AND NATIONAL PLANNING POLICY FRAMEWORK

The applicant is responsible for ensuring that ALL components selected in Section 7 can be maintained for the lifetime of the development. The information required below will enable the developer to demonstrate the maintenance arrangements to the Local Planning Authority and will allow the Local Planning Authority to consider how it will be secured (e.g. via planning condition or planning obligation).

	Information Provided?
Management Plan	Yes ☐ No ☑
Evidence Required: **Plan/ drawing provided to show the position of the different SuDS components with:** • Key included to identify any of the adopting bodies that you will be offering your sustainable drainage components for adoption *(relates to maintenance and management arrangements below).* • Plan/ drawing to identify any areas where certain activities are prohibited, detailing reasons why. **Action plan for accidental pollutant spillages.**	☐ ☐

	Information Provided?
Maintenance Schedule	Yes ☑ No ☐
Evidence Required: A copy of the maintenance schedule including: 1. **Proactive and preventative maintenance** Detailing regular, occasional and remedial maintenance activities including recommendations for inspection and monitoring. This should include recommended frequencies, advice on plant/ machinery required and an explanation of the objectives for the maintenance proposed and potential implications of not meeting them. 2. **Reactive and corrective maintenance** (e.g. product repair and replacement). Including advice on excavations, or similar works, in locations that could affect the SuDS components/ adjacent structures.	☑

	Information Provided?
Maintenance and Management Arrangements	Yes ☐ No ☑
Evidence Required: Evidence of formal agreement with the party responsible for undertaking maintenance. Please select any of the adopting bodies that you will be offering your sustainable drainage components for adoption. Tick all that apply. ☐ **Water and Sewerage Company** *Section 104 agreement (Water Industry Act 1991)* ☐ **Local Authority Public Open Space** *[Refer to local authority policy & check with local authority first]* Please select the arrangement(s) for all non-adopted sustainable drainage components. Tick all that apply. ☐ **Management Company** ☑ **Property Owner** *(for SuDS components within property boundary only)* ☐ **Other** (please state)	☐

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 8.	

DECLARATION AND SUBMISSION

This pro-forma has been completed using evidence from information which has been submitted with the planning application.

The information submitted in the Sustainable Drainage Strategy and site-specific Flood Risk Assessment (FRA), where submitted, is proportionate to the site conditions, flood risks and magnitude of development and I agree that this information can be used as evidence to this sustainable drainage approach.

Agent Details			
Completed by	CV	**Email Address**	INFO@FLOODRISK-DRAINAGE.CO.UK
		Telephone Number(s)	07961477330
Signed off by		**Accreditation(s) and/or Qualification(s) of Signatory**	BSc Sustainable Construction Methods
Date *(dd/mm/yyyy)*	17/03/2025	**Company**	FRDS

Client Details			
Name		**Company**	-

Maintenance/Management Plan

Drainage Maintenance Strategy.

Waterfold Lane, Rochdale

FRDS

FLOOD RISK AND
DRAINAGE SOLUTIONS

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1.0 Maintenance

1.1.1 A suitable maintenance strategy should be adopted to ensure the drainage network is cleaned regularly and the routine maintenance and cleansing regime should be documented.

1.1.2 It is recommended that the drainage system is inspected as a minimum twice a year, with the system also being inspected after any major storm event. Significant sediment deposition is likely in areas used for storage, so a post clean-up operation may be required including the removal of litter, vegetation, sewerage debris and larger objects.

1.1.3 A management company may be required for maintenance of attenuation facilities.

1.1.4 This section is intended to give an overview of the operation and maintenance for the drainage features included with the drainage strategy and in relation to typical details. Where proprietary products are specified, the manufacturer's instructions and recommendations should be followed in priority to this document unless specifically noted otherwise due to project constraints.

1.1.5 The recommended operations and frequencies are typical only and should be more frequent initially to ensure that there are no unforeseen issues with the operation and then adjusted to suit the site requirements.

1.1.6 The surface water network has been designed to accommodate the 1 in 100-year storm rainfall event plus an allowance for climate change particular to the requirements of the site. It may be that the exceedance flows above the 1 in 30-year storm rainfall event are stored within the site partially above ground, on non-habitable external landscaping, parking or other space. As the flows are generally being attenuated on site and within SuDS features there will be a period after storm events where the network is still partially or fully surcharged and is draining down. Where this surcharging is still present after 48hrs appropriate action should be taken as noted in this section.

1.2 Components

1.2.1 The following components have been included within the drainage design for the proposed development:

- Inspection, Manhole and Catchpit Chambers
- Pipes
- Drainage Channels and Gullies
- Flow Control Unit
- Attenuation Tasks

1.2.2 A suitable maintenance strategy should be adopted to ensure the drainage network is cleaned regularly and the routine maintenance and cleansing regime should be documented.

1.2.3 It is assumed that the maintenance of the drainage network will be the responsibility of an on-site facilities management team.

1.2.4 A copy of the final construction drainage layout along with supplier information should be provided in the final Operations and Maintenance Manual.

1.2.5 It is recommended that the drainage system is inspected as a minimum twice a year, with the system also being inspected after any major storm event.

1.2.6 Significant sediment deposition is likely in areas used for storage, so a post clean-up operation may be required including the removal of litter, vegetation, sewerage debris and larger objects.

1.2.7 Long-term management practices include monthly sweeping of external paved areas. The sweeping program will remove sand and contaminants directly from paved surfaces before they become mobilised during storm events and transported to the drainage system.

1.2.8 During the winter months, drainage features such as gullies and channels should be cleared of ice, snow, debris or litter

1.2.9 Sediment/material removal should be undertaken in consultation with the environmental regulator to confirm appropriate protocols; especially where run-off is taken from potentially contaminated areas such as the filter drains and the upstream/downstream chambers.

1.3 Inspection, Manhole and Catchpit Chambers

1.3.1 Access points have been located at the head of each run, at a change in direction and at a change of pipe size in accordance with Building Regulations Part H.

1.3.2 The appropriate health and safety equipment must be used when accessing manholes. Confined space certificates must be held by any personnel entering a manhole and the appropriate permits should be obtained from the Maintenance Manager prior to any access.

1.4 Pipes

1.4.1 Pipes are proprietary products and the materials can vary across the site and as such where used the manufacture's recommendations should be followed. Regardless of the product used the pipes will be fully compliant with the FRDS drainage specification.

1.4.2 Pipes are intended to be the main conveyance across the development and where oversized they form the attenuation volume required by the limitation of the discharge rate. They are intended to be dry except for during rainfall events. These have been designed to be self-cleaning where possible for smaller diameter pipes, and for larger diameters the risk is reduced due to the overall pipe size.

1.4.3 Access for maintenance is provided through access chambers and manholes.

1.4.4 Regular inspection and maintenance is important to identify areas which may have been obstructed/clogged and may not be drainage correctly thus exposing the development to a greater level of flood risk.

Maintenance Schedule	Required Action	Frequency
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required).	Initial Inspection should be provided as post construction CCTV survey.	N/A
Regular maintenance\ inspection	Inspect for evidence of poor operation via water level in chambers. If required, take remedial action.	3-monthly, 48 hours after large storms.
	Check and remove large vegetation growth near pipe runs.	Monthly or as required
Remedial Action	Rod through poorly performing runs as initial remediation.	As required.
	If continued poor performance jet and CCTV survey poorly performing runs.	As required.
	Seek advice as to remediation techniques suitable for the type of performance issue and location.	As required If above does not improve performance.

1.5 Drainage Channels and Gullies

1.5.1 Channels and gullies should be inspected and cleaned in accordance with the manufacturer's details. Channel units can be cleaned through the use of a high-pressure hose; this can be fed into the channel system through access units strategically placed along the channel run. The throat section of channel units should be kept clear at all times to ensure uninterrupted flow of surface water into the drainage channel and any debris within the throat should be removed.

1.5.2 Locking bolts should be replaced and sufficiently tightened, taking care that the bolt heads do not stand above the top surface of the cover or grate. If covers are allowed to move within their frame, this may cause damage to the frame or seating.

1.5.3 Sediment\material removal should be undertaken in consultation with the environmental regulator to confirm appropriate protocols; especially where run-off is taken from potentially contaminated areas such as the car park channels.

Maintenance Schedule	Required Action	Frequency
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required).	Initial Inspection including channel outlet boxes.	Half yearly and after large storms.
Regular maintenance\ inspection	Litter and debris removal	Monthly or as required.
	Check and remove large vegetation growth near channel runs.	Monthly or as required
	Inspect for evidence of poor operation and/or weed growth. If required take remedial action. Inspect silt accumulation rates and establish appropriate brushing frequencies. Silt can also be caused by adjacent landscaping areas which should be reprofiled to provide a flat area or berm adjacent to the paving.	3-monthly, 48 hours after large storms.
Remedial Action	Inspect access/outlet boxes and rod through poorly performing channels and outlets as initial remediation.	As required.

1.6 Flow Control Unit

1.6.1 The flow control units are intended for flood control and flow restriction. The flow control specification is subject to detailed design. The manufacturer's recommendations should also be taken in to consideration.

1.6.2 Access for maintenance has been provided by locating within manhole chambers.

Maintenance Schedule	Required Action	Frequency
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required).	Inspect inlets for blockages, and clear if required. If faults persist jetting and CCTV survey may be required.	Monthly and after large storms.
Regular maintenance\ inspection	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then six monthly.
	Debris removal from catchment surface (where may cause risks to performance).	Monthly
	Remove sediment from pre-treatment structures and flow control chambers.	Annually (or as required after heavy rainfall events)
Remedial Actions	Repair/rehabilitation of inlets.	As required.

1.7 Attenuation Tanks

1.7.1 The attenuation tanks are currently specified as geocellular units and are intended for storage of surface water run-off from the site up to and including the 1 in 100 year event plus an allowance for climate to reduce the rate of run-off into the downstream network and to minimise flood risk.

1.7.2 The geocellular units are proprietary products and therefore manufacturer's recommendations should also be taken in to consideration.

1.7.3 Access for maintenance has been provided by an access opening located on the tank and from the inspection chambers downstream of the tank.

1.7.4 Geocellular units are proprietary products and therefore manufacturer's recommendations should also be taken in to consideration. Additionally, different manufacturers may have different connection types and arrangements which will need to be taken in to consideration.

1.7.5 Regular inspection and maintenance is important for the effective operation of attenuation tanks as designed. As the feature is buried, a regular inspection regime is very important to ensure the correction functionality of the surface water drainage network.

Maintenance Schedule	Required Action	Frequency
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required).	Inspect inlets, outlets and overflows for blockages, and clear if required. If faults persist jetting and CCTV survey may be required.	Monthly and after large storms.
Regular maintenance\ inspection	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then six monthly.
	Debris removal from catchment surface (where may cause risks to performance).	Monthly
	Remove sediment from pre-treatment structures.	Annually (or as required after heavy rainfall events)
Remedial Actions	Repair/rehabilitation of inlets, outlets and overflows.	As required.

2.0 Typical Inspection Regime Summary

Activity	Indicative frequency	Typical tasks
Routine/regular maintenance	Monthly (for normal care of SuDS)	litter picking grass cutting inspection of inlets, outlets and control structures.
Occasional maintenance	Annually	silt control around components vegetation management around components suction sweeping of permeable paving silt removal from catchpits, soakways and cellular storage
Remedial maintenance	As required (tasks to repair problems due to damage or vandalism)	inlet/outlet repair erosion repairs reinstatement of edgings reinstatement following pollution removal of silt build up

Inspections

As part of the on-going management of most SuDS components there is a need for regular inspections to ensure that blockages, silt and excess litter are not adversely affecting the component or scheme.

Routine inspection

Routine inspections should be carried out once a month for most components, although some, such as infiltration devices, require less frequent visits. Site managers and/or landscape contractors should be used to inspect the SuDS.

Recurring attendance ensures monitoring of the drainage system, a rapid response to problems and “ownership” of the SuDS components. The inspections should be recorded on a maintenance record.

Waste management

SuDS generate waste - they are designed to intercept silt and allow the natural breakdown of organic pollutants. Regular maintenance of SuDS, including occasional removal of silt and vegetation that gathers in SuDS, is required to ensure long term performance.

Removal of silt from surface water runoff is important because a large proportion of pollutants are attached to silt particles. If the silt is removed, then most of the pollution will be dealt with.

Organic waste should be used around the SuDS components or schemes to form wildlife piles. If this is not practical it should be composted or, as a last resort, removed to a licensed landfill site