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FLOOD RISK ASSESSMENT AND DRAINAGE STRATEGY

Client:	**Frank Marshall Estates**
Site Address:	**Globe Mills 2 Bridge Street Slaithwaite HD7 5JN**
Project Number:	**21496**
Report Reference:	**21496-DCE-XX-XX-T-C-001-P01**
Date:	**07/08/2023**

CONTENTS

Revision	Date	Author	Checked by;	Comments
P01	07/08/23	Jonathan Allchin	Andy Walker	

1.0 INTRODUCTION

1.1 Dudleys Consulting Engineers have prepared this site-specific Flood Risk Assessment and Drainage Strategy for the conversion of an existing mill on Bridge Street, Slaithwaite to a multi-storey car park.

1.2 The assessment investigates the potential flood risk impacts of the proposed development in accordance with the National Planning Policy Framework (NPPF) and supporting Planning Practice Guidance. This FRA is considered proportionate to the degree of flood risk and to the scale, nature, and location of the development.

1.3 This Flood Risk Assessment has been carried out generally in accordance with:

- National Planning Policy Framework (July 2021)
- Planning Practice Guidance: Flood Risk and Coastal Change (August 2022)
- BS8533:2017 "Assessing and managing flood risk in development, Code of Practice"
- CIRIA Report C753" The SUDS Manual" 2015
- Environment Agency Report SC030219 Rainfall Runoff Management for Developments.

2.0 CONSULTATION AND EVIDENCE

2.1 The development is situated on Bridge Street, Slaithwaite. Kirklees Council are the Local Planning Authority (LPA) and the Lead Local Flood Authority (LLFA) for the site.

2.2 Planning policy requires that the site be developed in accordance with NPPF requirements in terms of flood risk management, climate change allowances and reduced runoff from the development.

2.3 Advice has been sought from the Environment Agency (EA) due to the site being located within Flood Zone 3. The salient information provided by the EA is included in Appendix D.

3.0 SITE DESCRIPTION

3.1 The proposed works comprise the conversion of an existing mill building to a multi-storey car park.

3.2 The site is situated immediately north of the River Colne, and is located within Flood Zone 3.

3.3 The existing site topographic survey is provided to the rear of this document in Appendix B. The external surface around the perimeter of the building varies between 131.3mAOD and 133.0mAOD.

3.4 The approximate grid reference of the site is E408082, N413981.

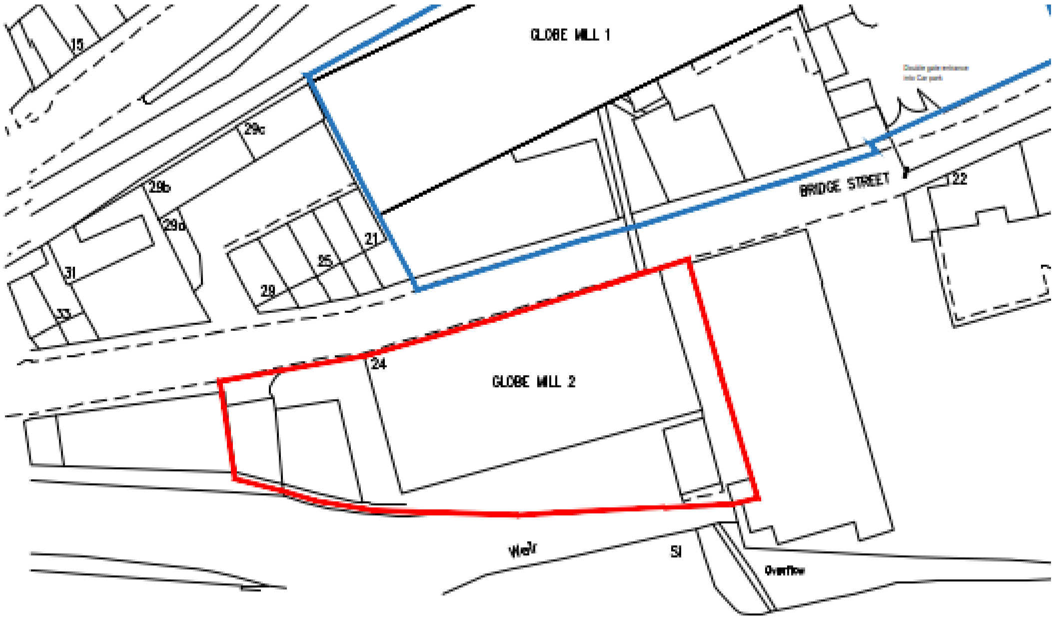


Figure 1: Site Location Plan

4.0 SITE PROPOSALS

4.1 The proposed development layout is shown in Figure 2 below, but can also be found in Appendix C.

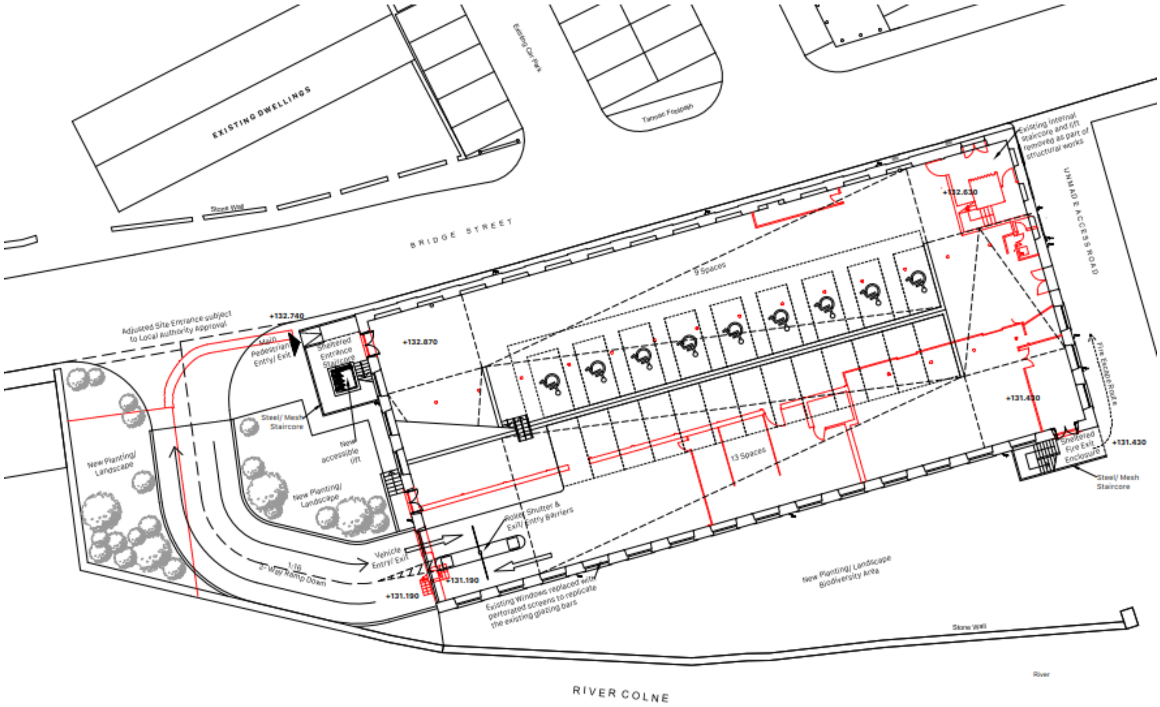


Figure 2: Proposed Development Layout

5.0 FLOOD RISK VULNERABILITY

5.1 The Flood Risk Vulnerability Classification has been determined in accordance with Planning Practice Guidance, Flood Risk and Coastal Change.

5.2 The Flood Risk Vulnerability Classification is ‘Less Vulnerable’. This classification includes, “Buildings used for shops; financial, professional and other services; restaurants, cafes and hot food takeaways; offices; general industry, storage and distribution; non-residential institutions not included in the ‘more vulnerable’ class; and assembly and leisure.” This classification is in accordance with Planning Practice Guidance, Flood Risk and Coastal Change, paragraph 066.

6.0 FLOOD ZONE COMPATIBILITY

6.1 The site is located within Flood Zone 3a as indicated on the Environment Agency Flood Zone map in Appendix D.

6.2 The Flood Zone Compatibility has been reviewed in accordance with Planning Practice Guidance, Flood Risk and Coastal Change, paragraph 067 Table 3. This compatibility is summarised in Table 1 below.

Table 1: Flood Risk Vulnerability Classification

Flood Zones	**Flood Risk Vulnerability Classification**				
	Essential infrastructure	**Highly vulnerable**	**More vulnerable**	**Less vulnerable**	**Water compatible**
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a †	Exception Test required †	✗	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	✗	✗	✗	✓*

Where:

✗ Development should not be permitted.

✓ Development is appropriate

6.3 The vulnerability classification is 'Less Vulnerable'. Therefore, the proposed development is appropriate without an exception test.

7.0 FLUVIAL FLOODING (FLOODING FROM RIVERS AND THE SEA)

7.1 Fluvial flooding occurs when high flows exceed the capacity of the river channel and spill out onto the floodplain, usually after a period of prolonged or heavy rainfall.

7.2 The Environment Agency Flood Map (rivers and sea) shows that the development is located in a high risk area, having an annual probability of river flooding greater than 1 in 100 (1%). This is shown in Figure 3 below. The site benefits from a flood wall adjacent to the river, with a top of wall level of 134.01mAOD.

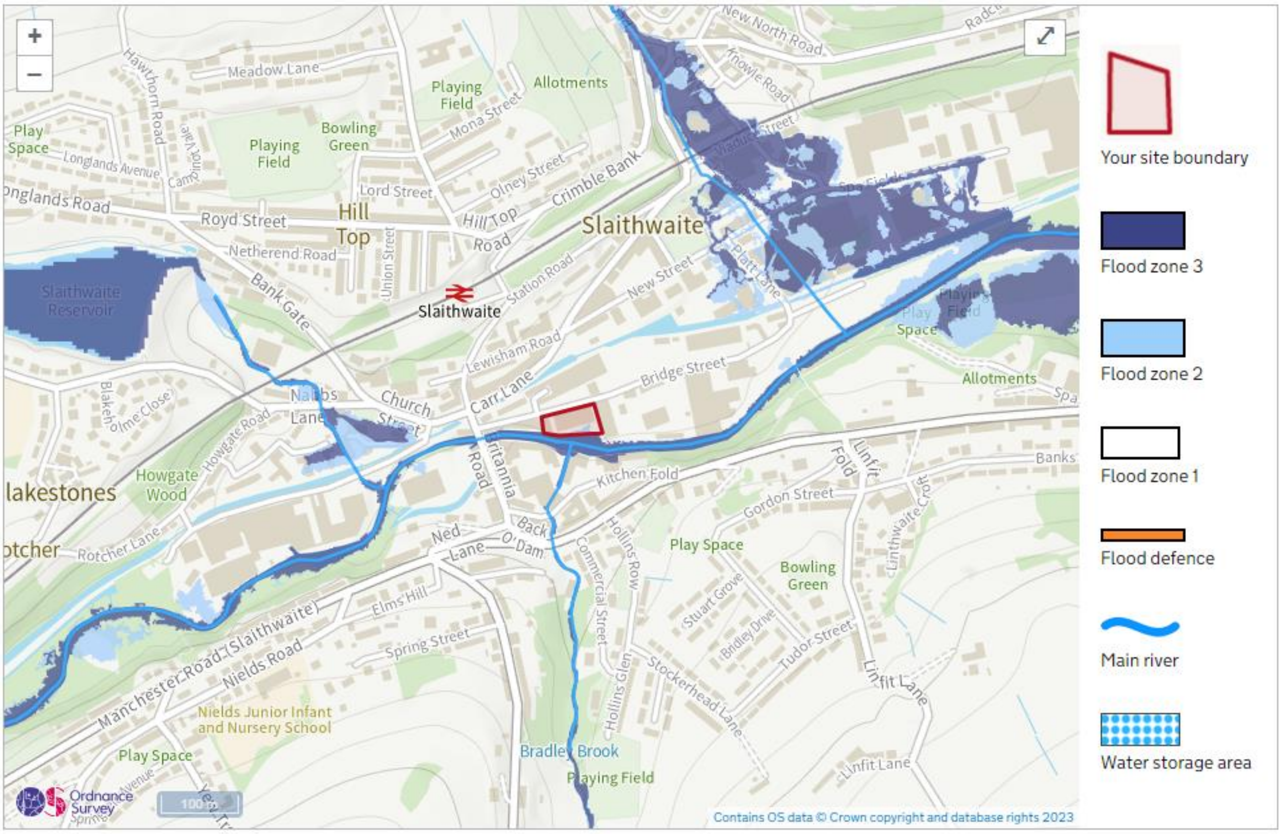


Figure 3: Fluvial Flood Risk Map

7.3 The product 4 information provided by the Environment Agency does not include historic flood maps.

7.4 In the information provided by the EA, the closest node with associated estimated flood levels is node 3 from the 2019 Colne Model. The following table shows the estimated flood levels from this model in different scenarios.

Table 2: Estimated Flood Levels from the EA

Flood Scenario	Estimated Flood Level (mAOD)	Top of Flood Wall Level (mAOD)	Summary
5% AEP (1 in 20 year) Defended	131.02	134.01	OK
2% AEP (1 in 50 year) Defended	131.18	134.01	OK
1.33% AEP (1 in 75 year) Defended	131.26	134.01	OK
1% AEP (1 in 100 year) Defended	131.32	134.01	OK
1% AEP (1 in 100 year) Defences Removed	131.32	134.01	OK
1% AEP (1 in 100 year) + 20% CC Defences Removed	131.49	134.01	OK
1% AEP (1 in 100 year) + 30% CC Defences Removed	131.55	134.01	OK
1% AEP (1 in 100 year) + 50% CC Defences Removed	131.69	134.01	OK
0.5% AEP (1 in 200 year) Defended	131.44	134.01	OK
0.1% AEP (1 in 100 year) Defended	131.75	134.01	OK
0.1% AEP (1 in 1000 year) Defences Removed	131.75	134.01	OK
0.1% AEP (1 in 1000 year) + 20% CC Defences Removed	132.00	134.01	OK

7.5 The data supplied from the EA shows that the site is protected by the flood wall in all modelled scenarios. However, if the defences were removed, e.g. during maintenance works, the site would be at risk of flooding in the 2% AEP flood scenario.

8.0 PLUVIAL FLOODING (FLOODING FROM SURFACE WATER)

8.1 The Environment Agency Flood Map showing Risk of Flooding from Surface Water is shown below. This type of flooding can be difficult to predict, much more so than river or sea flooding as it is hard to forecast exactly where or how much rain will fall in any storm.

8.2 The map below indicates that the site is at a low risk of surface water flooding.

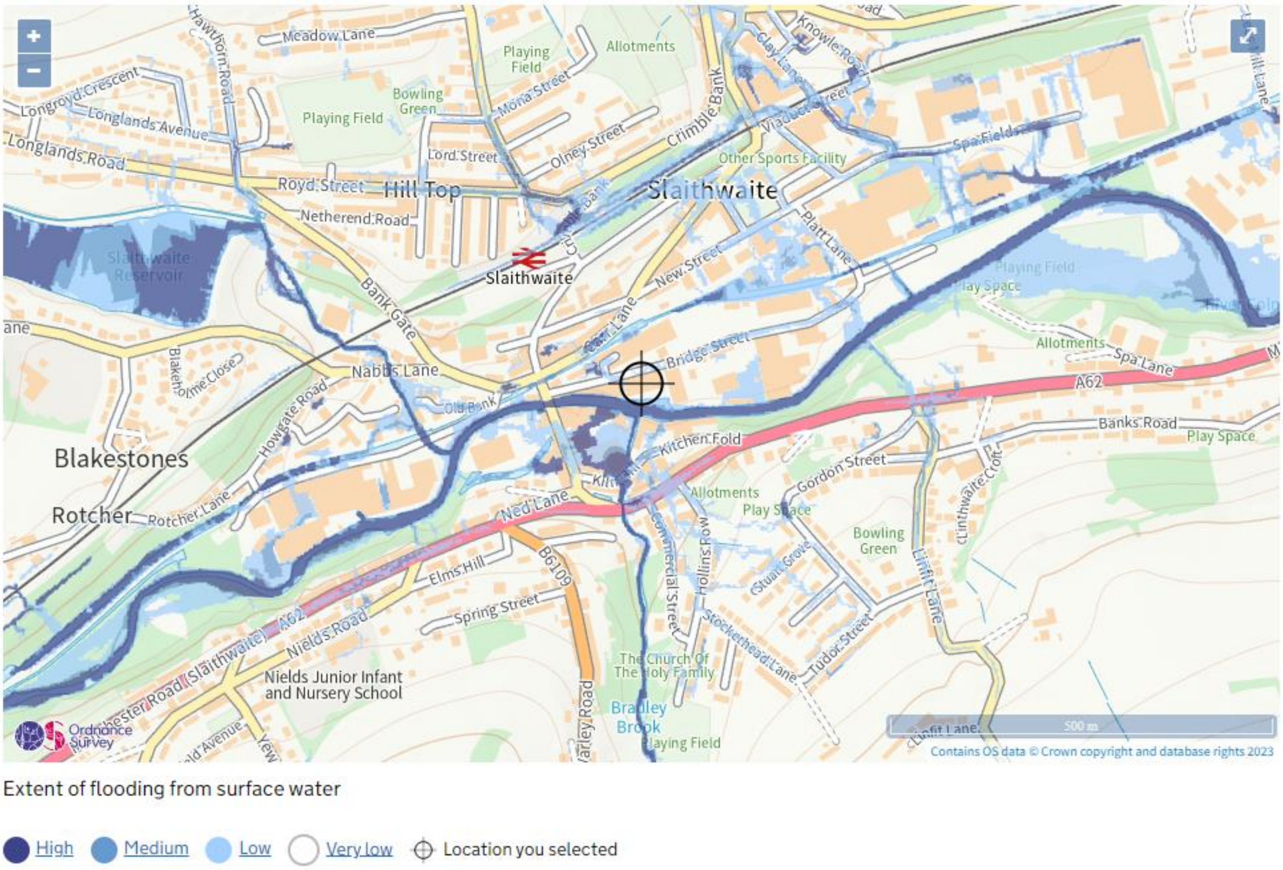


Figure 4: Pluvial Flood Risk Map

9.0 GROUNDWATER FLOODING

9.1 Groundwater flooding occurs when water levels in the ground rise above surface levels, which is more likely to occur in low lying areas.

9.2 There are no reports of groundwater flooding within the existing site, and hence the risk from groundwater flooding is considered low.

10.0 EXISTING SEWERS

10.1 Flooding caused by the existing sewer network occurs when the network is over capacity or there is a blockage in the system.

10.2 We are unaware of any issues with flooding from existing sewers within the development site.

11.0 FLOODING FROM RESERVOIRS

11.1 Reservoir flooding is unlikely to happen. There has been no loss of life in the UK from reservoir flooding since 1925 and even with recent events, measures are in place to monitor and protect reservoirs in event of an unlikely catastrophic event. All large reservoirs must be inspected and supervised by reservoir panel engineers. As the enforcement authority for the Reservoirs Act 1975 in England, the Environment Agency ensure that reservoirs are inspected regularly, and essential safety work is carried out. These laws are being currently reviewed and it is expected that the requirements for monitoring and maintenance will become more stringent.

11.2 However, in the unlikely event that a reservoir dam failed, a large volume of water would escape at once and flooding could happen with little or no warning.

11.3 The Environment Agency Map showing Risk of Flooding from Reservoirs is shown below. The site is within an area of maximum extent of flooding when river levels are normal. Therefore, there is a risk to the development in the event of a reservoir failure.

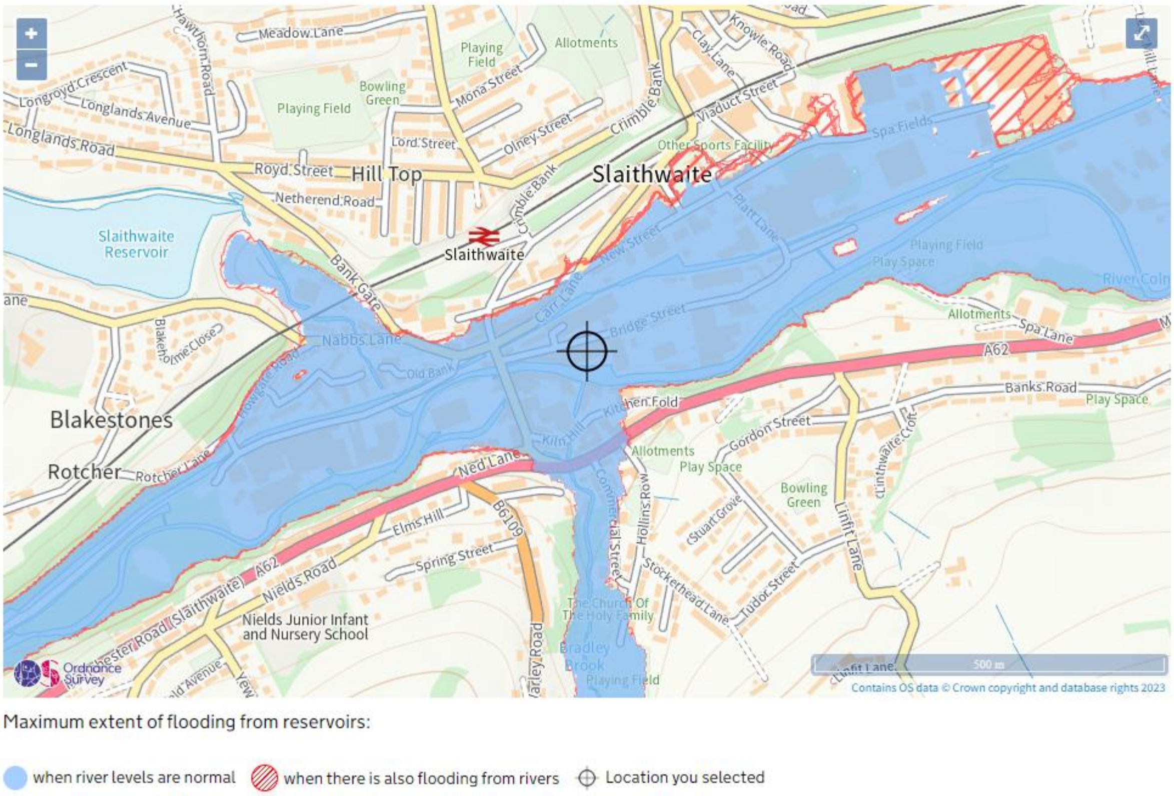


Figure 5: Reservoir Flood Risk Map

12.0 DRAINAGE ASSESSMENT

12.1 The existing building drains to the Yorkshire Water combined sewers running through the site and on Bridge Street. However, following the drainage hierarchy in the Building Regulations, the SuDS Manual and the NPPF, alternative solutions for surface water drainage disposal have been considered.

12.2 Infiltration is not considered viable due to the ground profile, and the risk of increasing pressure on the river wall. Hence discharge to the River Colne is seen as the most suitable location for surface water disposal.

12.3 The proposed impermeable are of the site is 1,775m^2. The discharge to the River Colne has previously been agreed as 18l/s with Kirklees Council as part of the development of Globe 1 Mills the opposite side of Bridge Street, please see Appendix D. A flow control device will be used to restrict the discharge rate to 18l/s.

12.4 The proposed impermeable area and discharge rate lead to a storage requirement of 39.2m^3, which will be provided by a geocellular tank. A Drainage Strategy Plan has been produced on this basis and can be found in Appendix E.

12.5 In the 1 in 30 year scenario, the surface water is contained within the drainage system, and in 1 in 100 year + 45% climate change scenario, there is a small amount of flooding which will be contained within landscaped areas. Please refer to the hydraulic calculations in Appendix E.

12.6 Water quality management has been considered in accordance with the CIRIA SuDS Manual C753. Table 4.3 in the SuDS Manual states for commercial roofs, the simple index approach, as defined in box 26.2, should be followed.

12.7 Following the simple index approach, the pollution hazard indices, taken from Table 26.2, are shown below:

Table 3: Pollution Hazard Indices

		Pollution Hazard Indices		
Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydro-carbons
Other roofs (typically commercial/industrial roofs)	Low	0.3	0.2	0.05

12.8 The proposals include a vortex separator (Aqua Swirl by SDS Ltd) installed on the drainage system before the flow control device. The vortex separator shown in Appendix E has the following SuDS Mitigation Indices.

Table 4: Mitigation indices

Mitigation Indices		
Total Suspended Solids (TSS)	Metals	Hydro-carbons
0.8	0.5	0.7

12.9 As shown in the above table, for each contaminant type, the Mitigation Index is greater than or equal to the Pollution Hazard Index, therefore, through the use of the vortex separator, the development proposals fulfil the requirements of the SuDS Manual for managing water quality.

12.10 There are no alterations to the foul water facilities as part of the proposals.

13.0 FLOOD RISK MITIGATION MEASURES

13.1 As stated in Section 7, the site is at risk from fluvial flooding in the 2% AEP scenario if the flood defences were removed. Therefore, the building management team should ensure regular inspections of the flood defence walls are undertaken to ensure their integrity.

13.2 The building management team will need to sign up for the EA's flood warning service. When a flood warning is issued and the flood defences have been removed (either through maintenance works or damage), the car park should be closed. If for any reason people were present on site during a flood event, the escape route would be via Bridge Street.

14.0 MAINTENANCE STRATEGY

14.1 Maintenance and suitable management of all drainage aspects is required to ensure that the systems are operating correctly to ensure water quality and effluent quality and subsequently reducing the risk of flooding on the site. The maintenance of the existing drainage facilities within the site boundary are the responsibility of the owner/occupier.

14.2 The maintenance of the drainage network is to be linked with the wider site maintenance.

Pipe Network / Flow Controls / Vortex Separator

Operation	Frequency
Inspect and identify any areas that are not operating correctly, if required, take remedial actions.	Monthly for 3 months as a part of normal post completion monitoring, then biannually
Debris removal from manholes (where may cause risk performance)	Monthly
Where rainfall into network from above, check surface or filter for blockage or silt, algae or other matter by jetting	As required, but at least twice a year
Remove sediment from pipework by jetting.	Annually or as required
Repair/check all inlets, outlets and overflow pipes	As required
Inspect/check all inlets, outlets, and overflow pipes to ensure that they are in good condition and operating as designed	Annually and after large storms
Inspect/check flow control and ensure bypass door, linkage chain and all moving parts are in working order without damage and operating as designed.	Annually and after large storms
Desludging of Catchpits and Flow Control Manholes / Vortex Separator	As required, but at least twice a year

14.3 A log of all maintenance activities is to be kept and made available to the LPA and / or the LLFA on request.

15.0 CONCLUSION AND RECOMMENDATIONS

15.1 The site is in Flood Zone 3 but is protected by the existing flood wall above the estimated flood level in the 1% AEP + 23% climate change scenario.

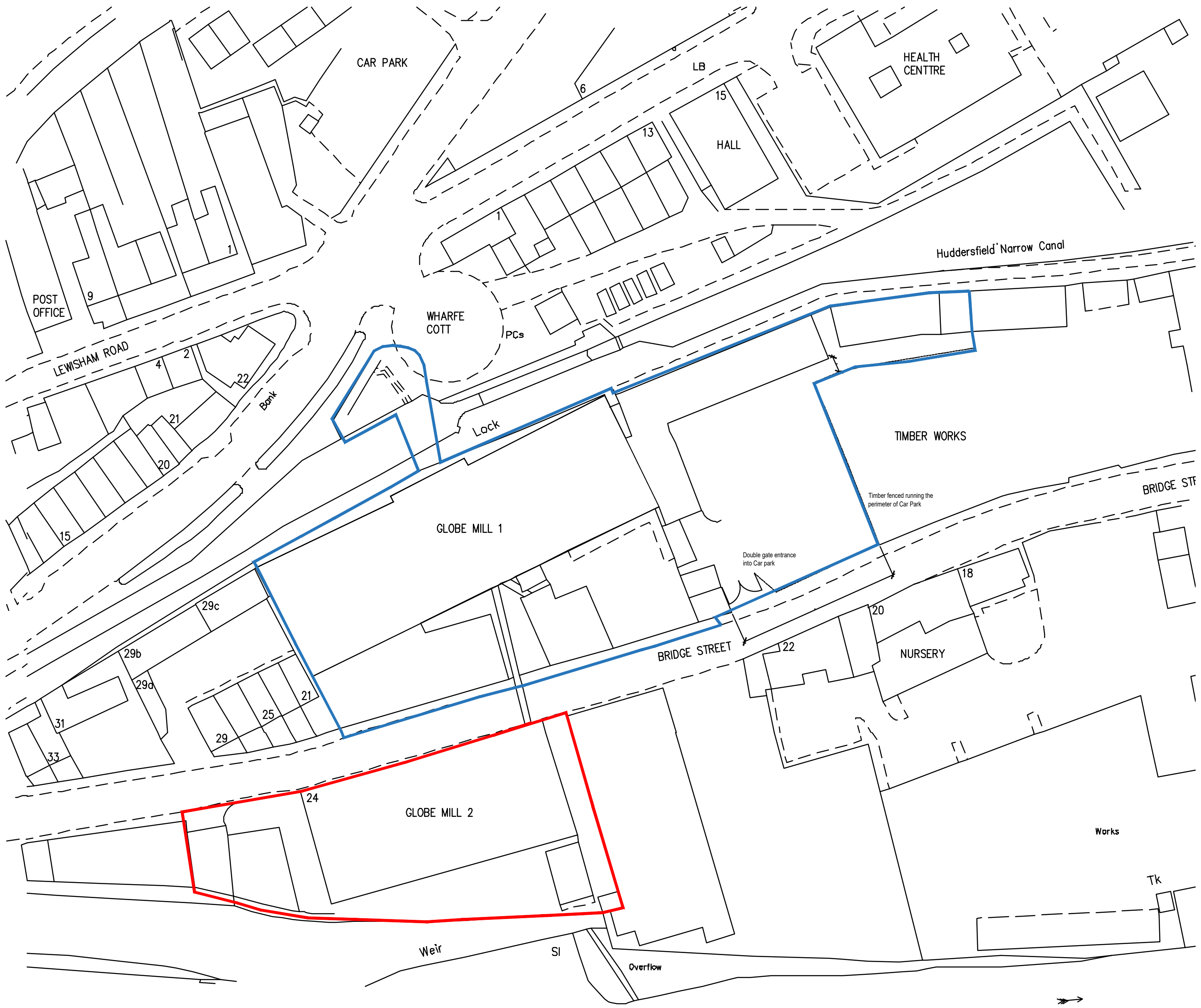
15.2 The surface water drainage system has been designed to accommodate the 1.33% AEP flood scenario within the system, and the 1% AEP + 45% climate change scenario within the site, discharging to the River Colne at the previously approved rate of 18l/s.

15.3 The proposed development is wholly suitable for the proposed site on the basis of national and local planning policy and will not have any implications on neighbouring properties in terms of flood risk.

Jonathan Allchin IEng MICE

On behalf of Dudleys Consulting Engineers

APPENDIX A – SITE LOCATION PLAN



Location Plan

Scale 1:1250

0 10 20 50 100m

NOTES

Key:

Application Site Boundary

Globe 1 Site Boundary

REVISION - DATE	DRWN	CHKD
0 - May 2023 INITIAL ISSUE	JI	RJW

FOR APPROVAL

Globe 2
Bridge Street
Slaithwaite
Huddersfield HD7 5JN
FOR
Hartley Property Group

Location Plan

Scale **1:1250@A3**

HALLIDAY CLARK
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Dwg. No. **333.19(1-)001** Rev.

APPENDIX B – TOPOGRAPHICAL SURVEY

STATION CO-ORDINATES

Reference	East	North	Elevation
ST01	408050.573	413996.089	132.82
ST02	408005.052	413987.892	134.03
ST03	408108.959	414003.814	131.95
ST04	408113.099	413980.106	131.50
ST05	408128.251	414028.216	132.03
ST06	408143.544	414025.000	131.72
ST07	408097.807	414027.730	132.06
ST08	408147.675	414052.608	131.87
ST09	408102.486	413976.427	131.59
ST10	408058.898	414058.521	135.04
ST11	408104.886	414076.987	134.52
ST12	408163.217	414088.895	131.62

N
Indicative

Abbreviation & Symbol Key.

B	Bollard	RSC	Rolled Steel Column
BB	Belisha Beacon	RSJ	Rolled Steel Joist
BT	British Telecom Cover	RWP	Rain Water Pipe
BM	Bench Mark	SC	Stop Cock
CL	Cover Level	SP	Sign Post
DK	Drop Kerb	STP	Stand Pipe
EL	Electricity Cover	SV	Stop Valve
EP	Electricity Pole	SVP	Soil Vent Pipe
FH	Fire Hydrant	SWG	Storm Water Gully
FFP	Flagged Footpath	SW	Storm water
G	Gully	TFP	Tarmac Footpath
GM	Gas Meter	TL	Traffic Light
GV	Gas Valve	TP	Telegraph Pole
IC	Inspection Cover	UTL	Unable To Lift
IL	Invert Level	VP	Vent Pipe
LB	Letter Box	WM	Water Meter
LP	Lamp Post	WP	Waste Pipe
MB	Multi Bole		
MH	Man Hole	Fences & Walls	
Mkr	Marker Post	Ret	Retaining Wall
MS	Mile Stone	B/W	Barbed Wire
MT	Mercury Telecommunications	C/B	Close Boarded
NB	Notice Board	C/I	Corrugated Iron
NFI	No Further Information	C/L	Chain Link
OSBM	Ordnance Survey BM	C/P	Chestnut Paling
P	Post	I/R	Iron Railing
PB	Post Box	Lat	Lattice
RE	Rodding Eye	P/C	Post & Chain
RL	RootLine	P/R	Post & Rail
RS	Road Sign	P/W	Post & Wire
SS	Street Name Sign		

Trees
0.25/10/10/Syc
Diameter/Height/Spread/Species

Control & Datum Information

- Station ST01 Coordinates are OS GPS RTK All other Stations are relative to this in Plane Grid Projection and Grid North

Datum - OS Level Datum. Using OS GPS RTK Network

OS Grid @ 50m to cover Site

General

Details or services hidden or obscured by vegetation, debris or vehicles at survey dates may be omitted. Hedge & Vegetation details are outline

REV. DESCRIPTION DATE

measured ltd
59 Lee Lane West
Horsforth
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LS18 5RJ

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Project
GLOBE MILLS, BRIDGE STREET, SLAITHWAITE

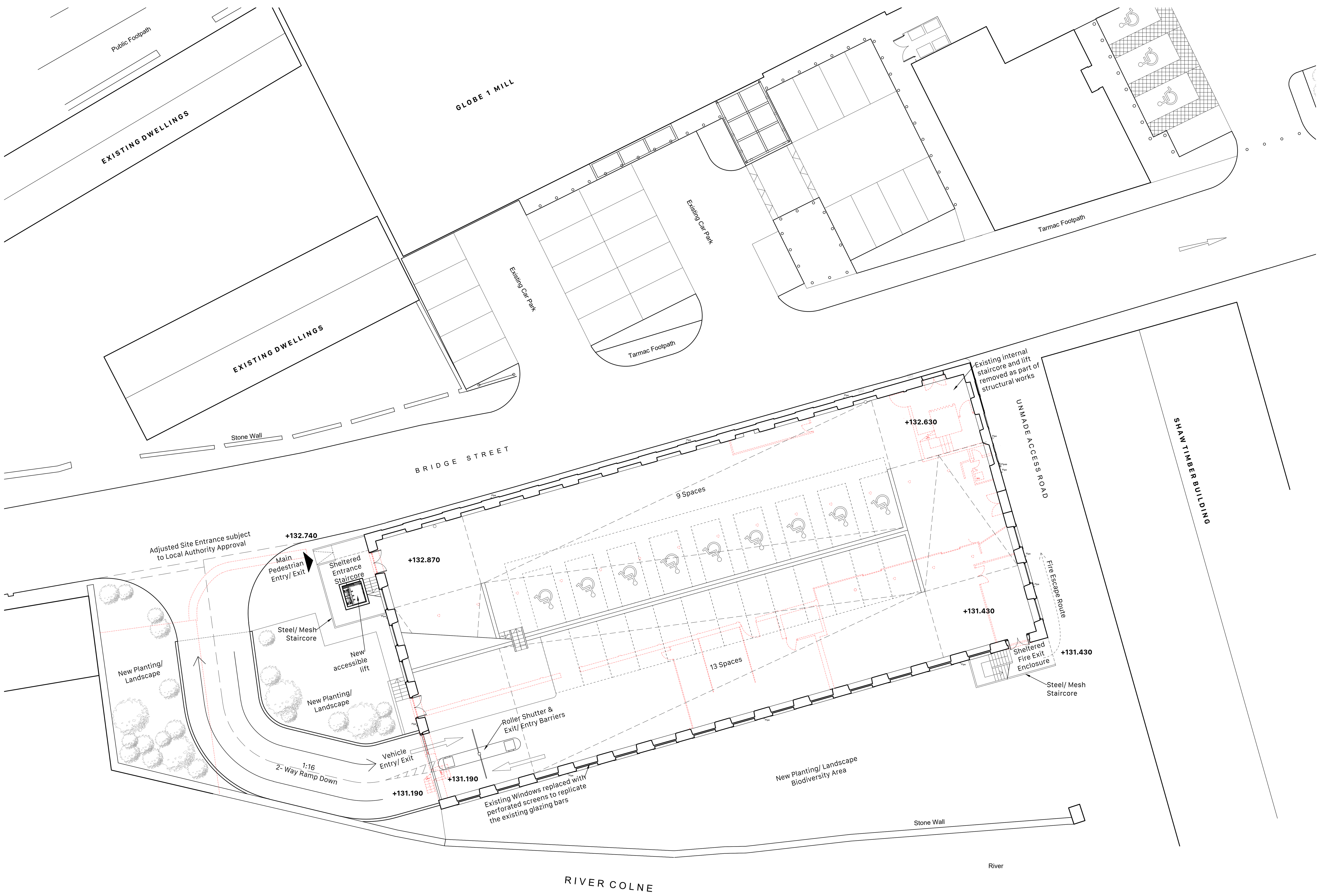
Title
TOPOGRAPHICAL SURVEY

Client
HARTLEY INVESTMENT TRUST

Job No.	Dwg. No.	Scale	Date
M453	T_01	1:200	JAN 2012

This drawing is to be read in conjunction with all related drawings.
Do not scale from this drawing. All dimensions must be checked and verified on site before commencing any work or producing shop drawings. This office should be notified immediately of any discrepancy.

APPENDIX C – PROPOSED ARCHITECT'S LAYOUT



Proposed Site Plan
1:200

NOTES

Drawing based on survey information provided by third party measured surveys. Any discrepancies to be reported to the architect.

Scale 1:200
0 2000 5000 10000 15000mm

REVISION - DATE	DRWN	CHKD
A - 17.05.2023 Vehicle access altered. Levels information added.	JI	
- May 2023 **INITIAL ISSUE**	JI	RJW

FOR COMMENT

Globe 2
Bridge Street
Slaithwaite
Huddersfield HD7 5JN

FOR
Hartley Property Group

Proposed Site Plan

Scale **1:200@A1**

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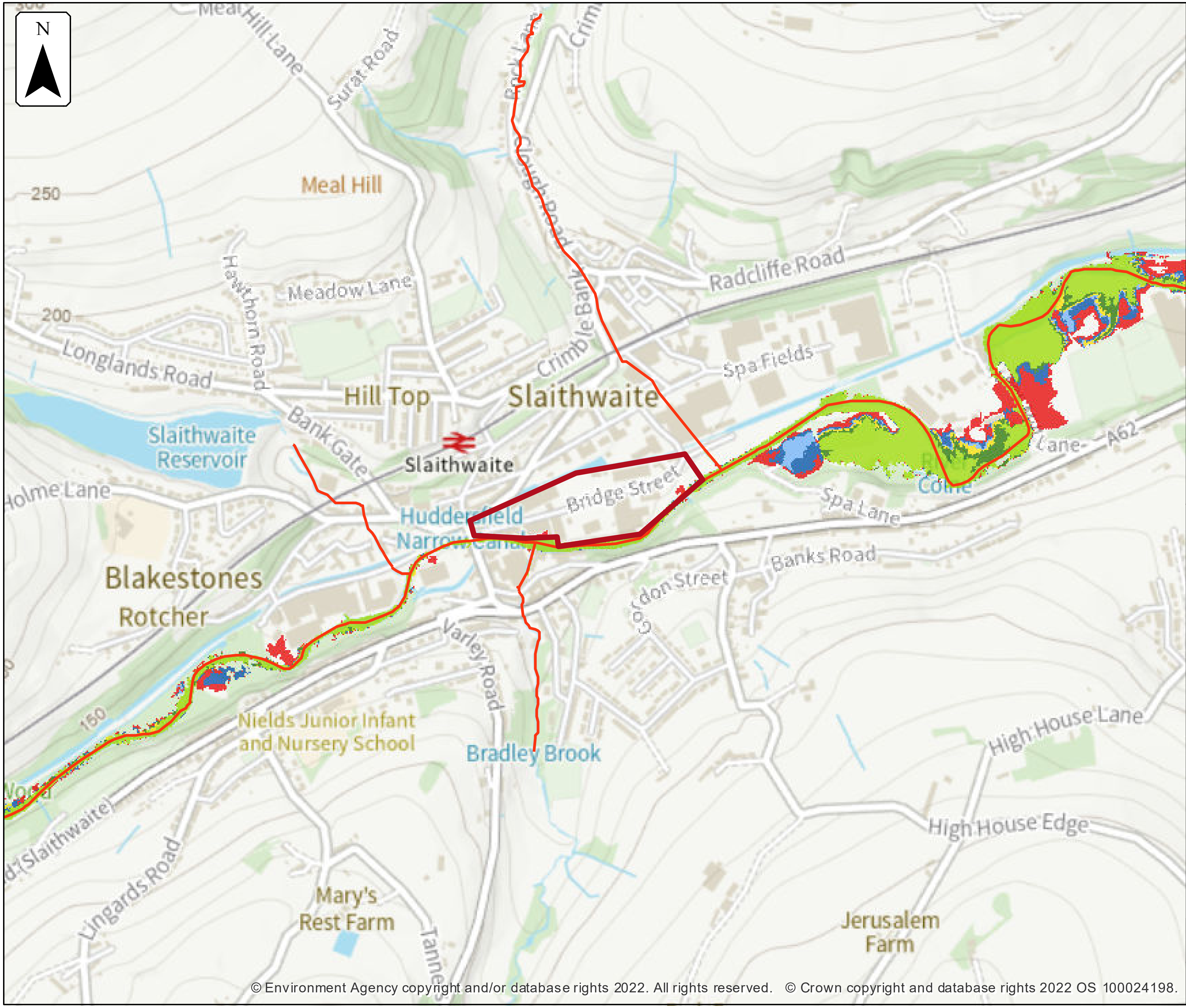
Dwg. No. **333.19(1-)005** Rev. **A**

APPENDIX D – ENVIRONMENT AGENCY DATA & PREVIOUS CONSULTATION



Environment Agency

Defended modelled fluvial extent

Location (easting/northing)
408196/414028

Scale
1:10,000

Created
26 Sep 2022

Model name
2019 Colne Model

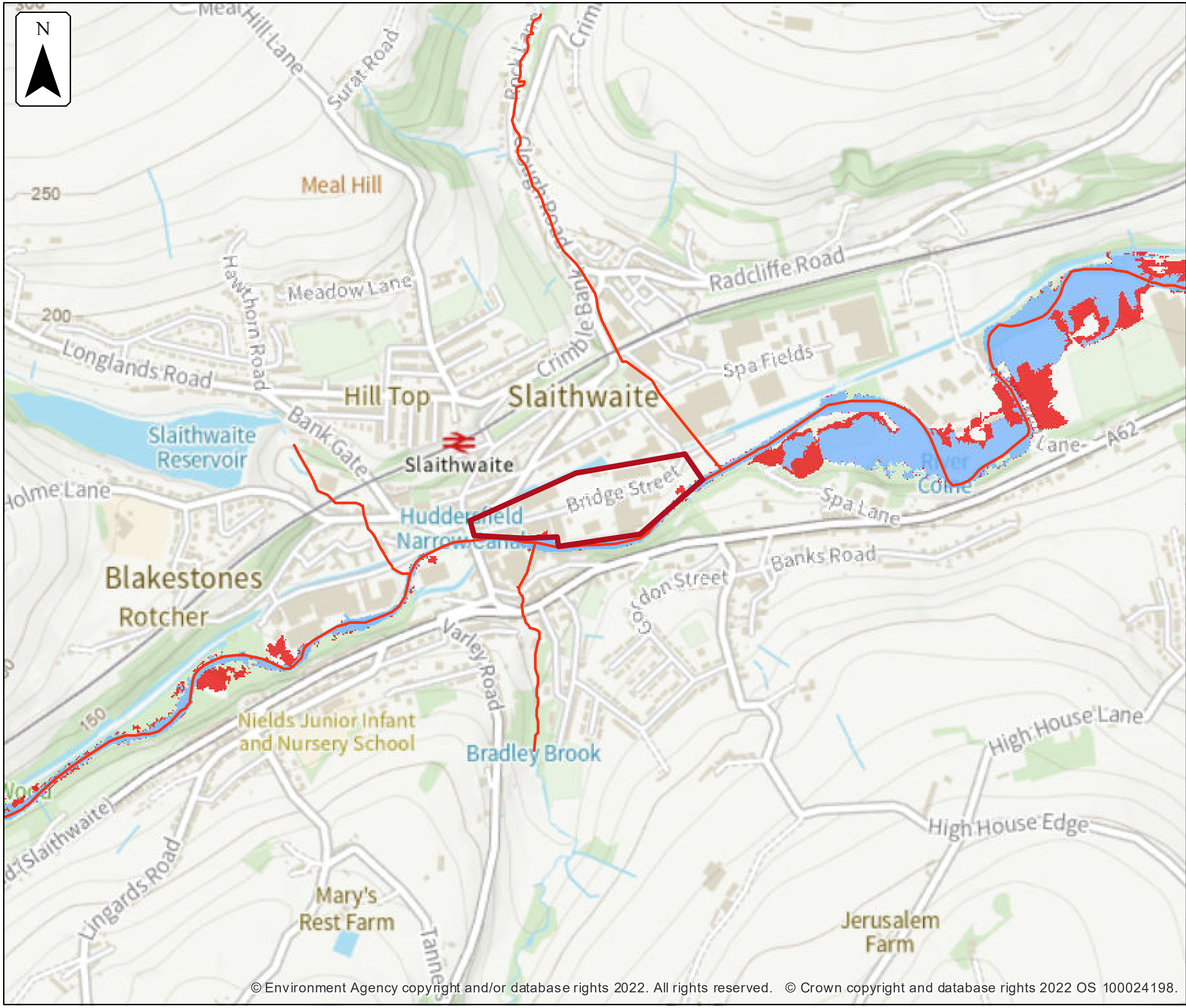
Selected area
Main river

Modelled flood extent

5% AEP
2% AEP
1.33% AEP
1% AEP
0.5% AEP
0.1% AEP

Flood extents may not be visible where they overlap other return periods

0 100 200 300 400 500
metres



Environment Agency

Defences removed modelled fluvial extent

Location (easting/northing)
408196/414028

Scale
1:10,000

Created
26 Sep 2022

Model name
2019 Colne Model

Selected area

Main river

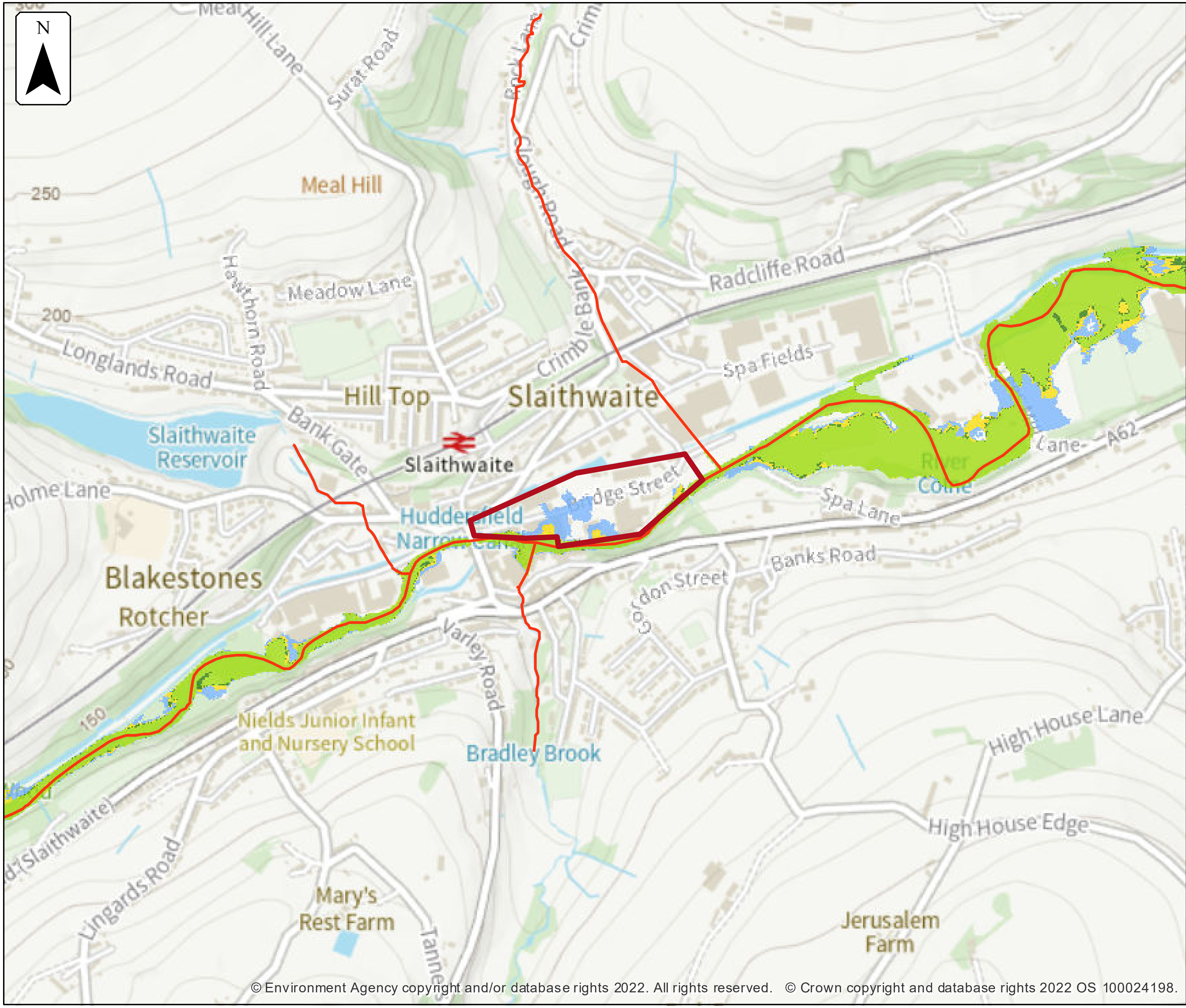
Modelled flood extent

1% AEP

0.1% AEP

Flood extents may not be visible where they overlap other return periods

0 100 200 300 400 500
metres



Environment Agency

Defences removed climate change modelled fluvial extent

Location (easting/northing)
408196/414028

Scale
1:10,000

Created
26 Sep 2022

Model name
2019 Colne Model

Selected area

Main river

Modelled flood extent

1.0% AEP (+20%)

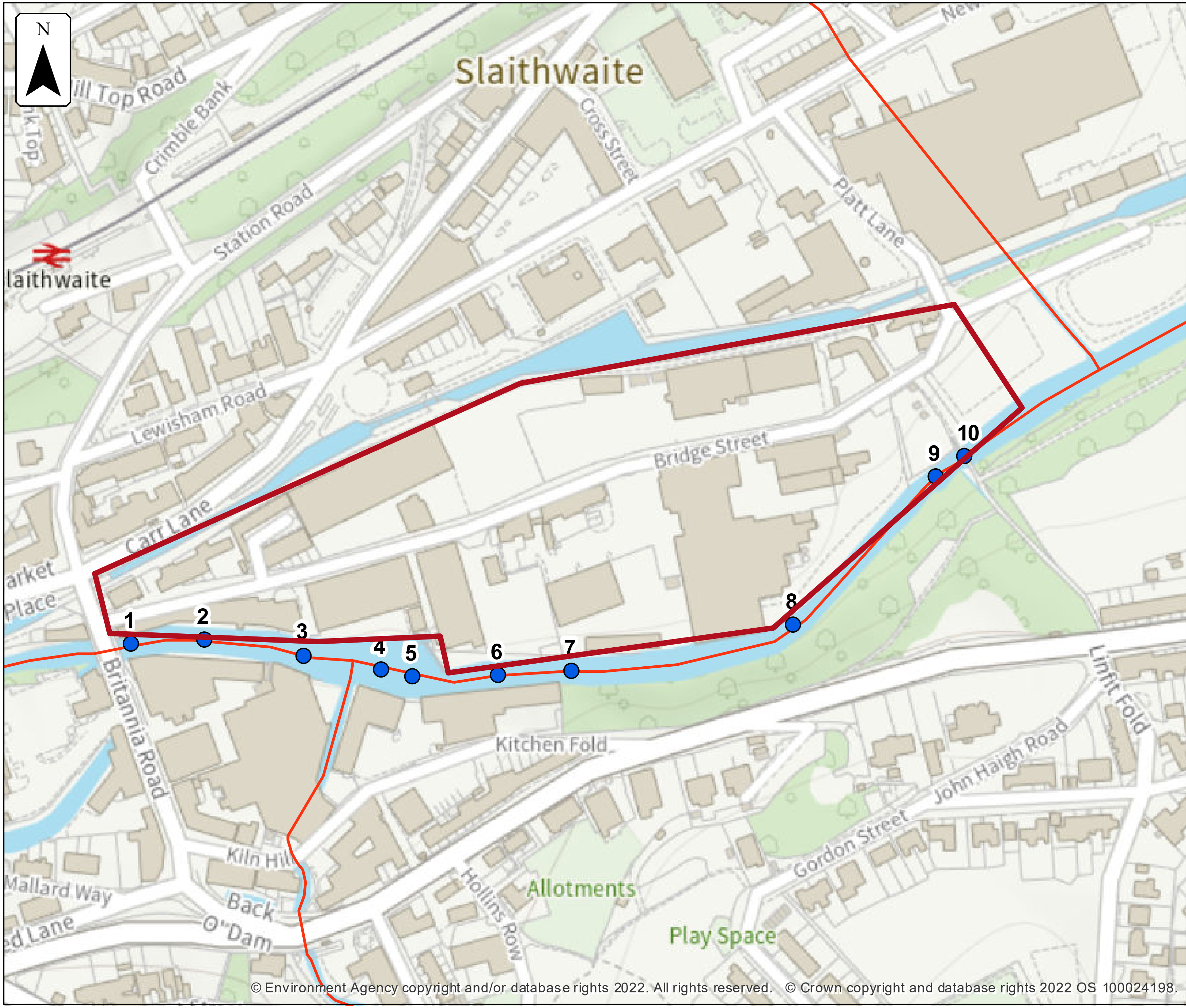
1.0% AEP (+30%)

1.0% AEP (+50%)

0.1% AEP (+20%)

Flood extents may not be visible where they overlap other return periods

0 100 200 300 400 500
metres



Environment Agency

Defended modelled fluvial node locations

Location (easting/northing)
408196/414028

Scale
1:2,500

Created
26 Sep 2022

Model name
2019 Colne Model

Selected area

Modelled location

Main river

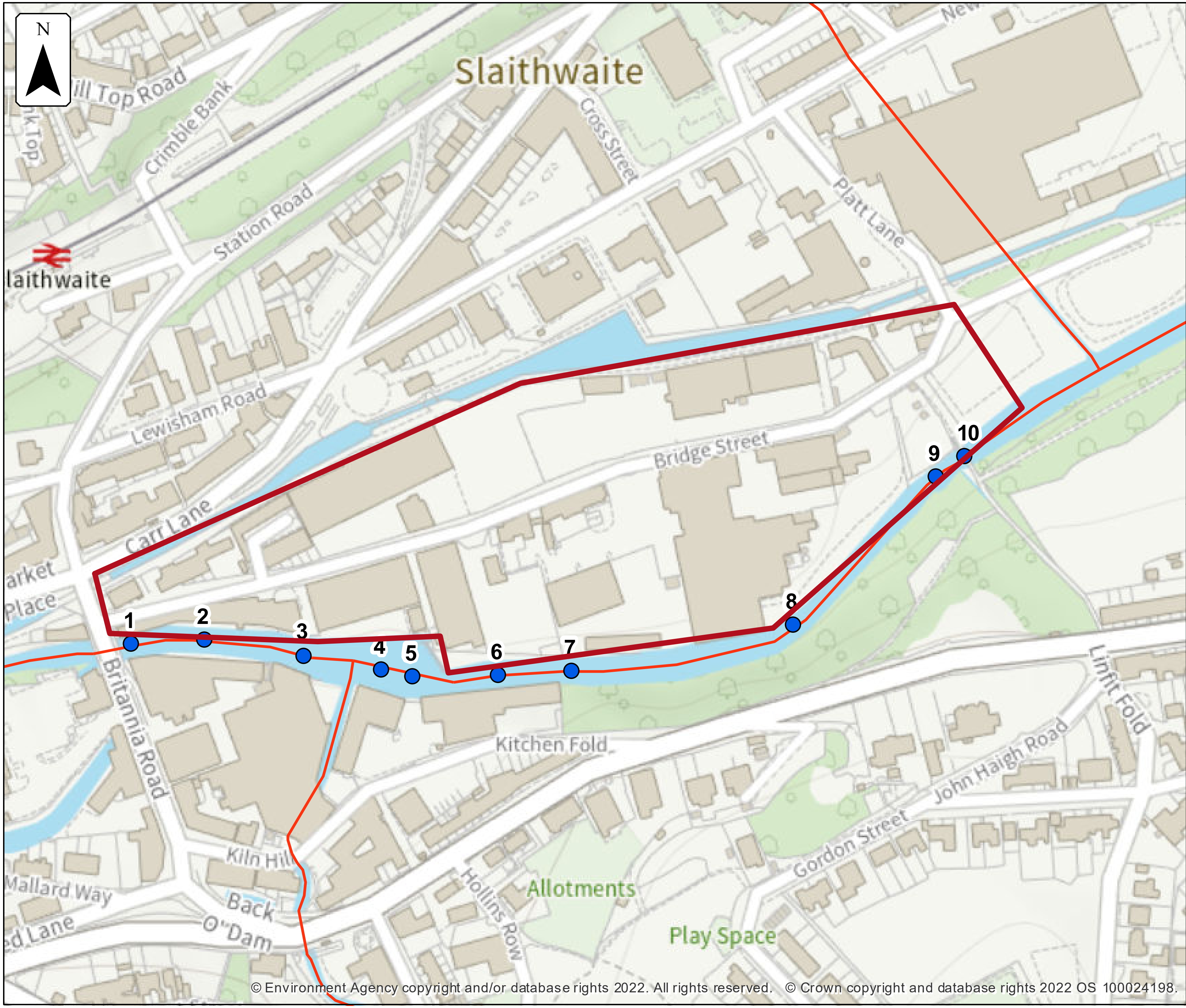
0 25 50 75 100
metres

Modelled node locations data

Defended

Label	Modelled location ID	Easting	Northing	5% AEP		2% AEP		1.33% AEP		1% AEP		0.5% AEP		0.1% AEP	
				Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow
1	1198066	407970	413959	131.37	44.10	131.55	55.55	131.64	61.49	131.71	66.15	131.85	76.04	132.13	102.10
2	1197783	408006	413961	131.21	44.10	131.39	55.55	131.48	61.49	131.55	66.15	131.69	76.04	132.04	102.20
3	1198098	408054	413954	131.02	44.10	131.18	55.55	131.26	61.49	131.32	66.15	131.44	76.04	131.75	102.29
4	1198099	408092	413946	130.70	44.10	130.80	55.55	130.85	61.49	130.93	66.15	131.13	76.04	131.66	102.37
5	1198191	408107	413944	130.24	44.10	130.53	55.55	130.68	61.49	130.79	66.15	131.02	76.04	131.59	102.37
6	1198039	408149	413944	130.04	45.49	130.33	57.27	130.48	63.37	130.60	68.17	130.84	78.45	131.46	106.68
7	1197978	408185	413946	129.77	45.49	130.06	57.27	130.21	63.37	130.32	68.17	130.55	78.45	131.09	106.58
8	1198270	408292	413968	128.82	45.48	129.06	57.27	129.19	63.37	129.29	68.17	129.50	78.45	129.95	106.76
9	1198236	408362	414041	127.77	45.48	128.06	57.27	128.20	63.37	128.29	68.17	128.51	78.45	128.96	106.53
10	1198050	408375	414050	127.77	45.48	128.06	57.27	128.20	63.37	128.29	68.17	128.51	78.45	128.96	106.53

Data in this table comes from the 2019 Colne Model model.
Level values are shown in mAOD, and flow values are shown in cubic metres per second.
Any blank cells show where a particular scenario has not been modelled for this location.



Environment Agency

Defences removed modelled fluvial node locations

Location (easting/northing)
408196/414028

Scale
1:2,500

Created
26 Sep 2022

Model name
2019 Colne Model

Selected area
Modelled location
Main river

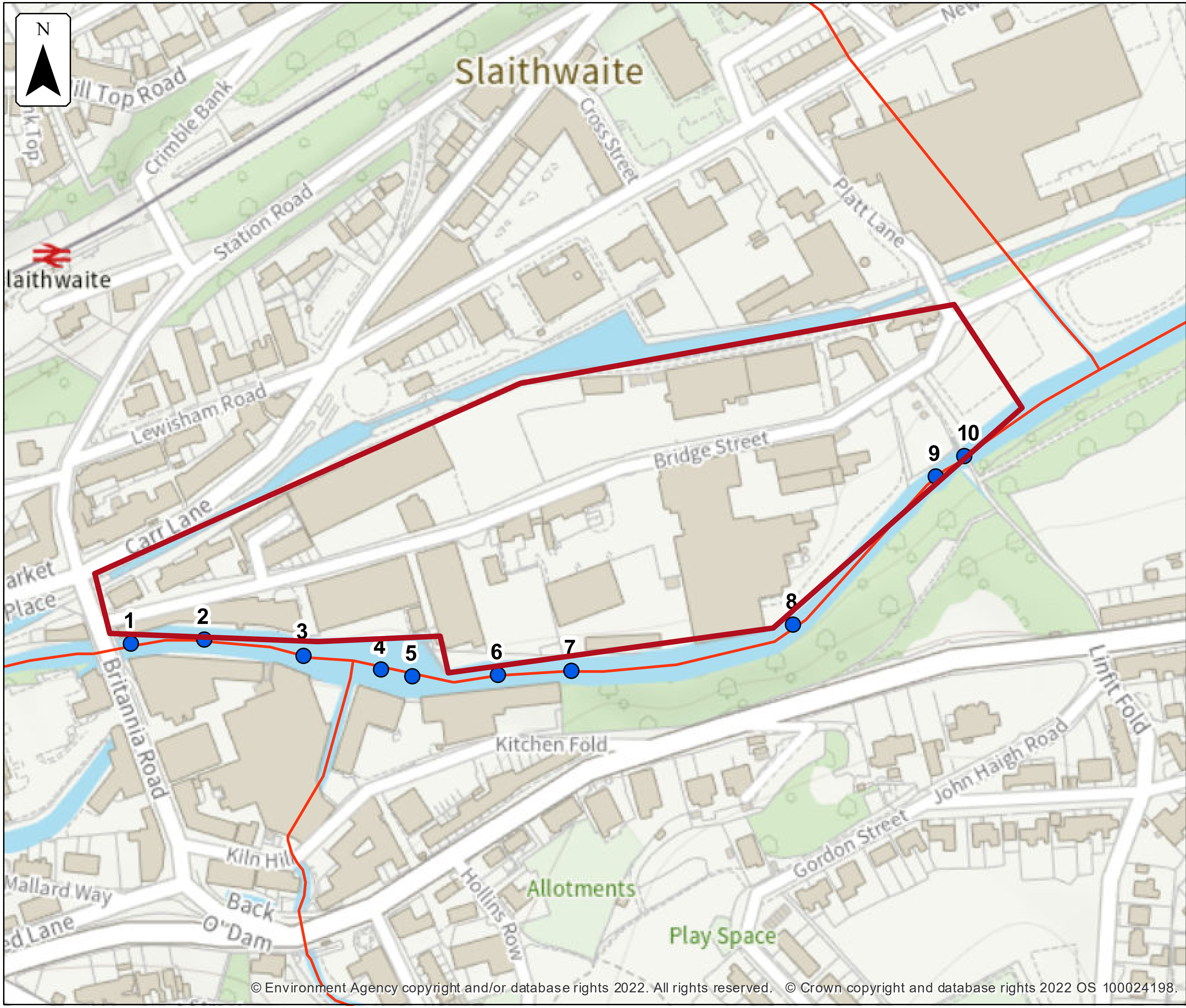
0 25 50 75 100
metres

Modelled node locations data

Defences removed

Label	Modelled location ID	Easting	Northing	5% AEP		2% AEP		1.33% AEP		1% AEP		0.5% AEP		0.1% AEP	
				Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow
1	1198066	407970	413959							131.71	66.15			132.13	102.11
2	1197783	408006	413961							131.55	66.15			132.04	102.21
3	1198098	408054	413954							131.32	66.15			131.75	102.30
4	1198099	408092	413946							130.93	66.15			131.66	102.39
5	1198191	408107	413944							130.79	66.15			131.59	102.39
6	1198039	408149	413944							130.60	68.17			131.46	106.71
7	1197978	408185	413946							130.32	68.17			131.09	106.60
8	1198270	408292	413968							129.29	68.17			129.96	106.78
9	1198236	408362	414041							128.29	68.17			128.96	106.55
10	1198050	408375	414050							128.29	68.17			128.96	106.55

Data in this table comes from the 2019 Colne Model model.
Level values are shown in mAOD, and flow values are shown in cubic metres per second.
Any blank cells show where a particular scenario has not been modelled for this location.



Environment Agency

Defences removed climate change modelled fluvial node locations

Location (easting/northing)
408196/414028

Scale	Created
1:2,500	**26 Sep 2022**

Model name
2019 Colne Model

Selected area
Modelled location
Main river

0 25 50 75 100
metres

Modelled node locations data

Defences removed climate change

Label	Modelled location ID	Easting	Northing	1.0% AEP (+20%)		1.0% AEP (+30%)		1.0% AEP (+50%)		0.1% AEP (+20%)	
				Level	Flow	Level	Flow	Level	Flow	Level	Flow
1	1198066	407970	413959	131.89	79.32	131.97	85.93	132.09	99.06	132.26	122.31
2	1197783	408006	413961	131.74	79.32	131.82	85.93	131.99	99.06	132.26	122.31
3	1198098	408054	413954	131.49	79.32	131.55	85.93	131.69	99.06	132.0	122.30
4	1198099	408092	413946	131.20	79.32	131.32	85.93	131.58	99.06	132.01	122.30
5	1198191	408107	413944	131.08	79.32	131.22	85.93	131.50	99.06	131.96	122.30
6	1198039	408149	413944	130.91	81.73	131.06	88.54	131.36	102.04	131.86	126.78
7	1197978	408185	413946	130.61	81.73	130.75	88.54	131.01	102.04	131.50	126.77
8	1198270	408292	413968	129.55	81.73	129.67	88.54	129.88	102.04	130.22	126.76
9	1198236	408362	414041	128.57	81.73	128.68	88.54	128.89	102.04	129.20	126.76
10	1198050	408375	414050	128.57	81.73	128.68	88.54	128.89	102.04	129.18	126.76

Data in this table comes from the 2019 Colne Model model.
Level values are shown in mAOD, and flow values are shown in cubic metres per second.
Any blank cells show where a particular scenario has not been modelled for this location.

Andy Walker

From:	Paul Farndale <Paul.Farndale@kirklees.gov.uk>
Sent:	04 November 2014 16:13
To:	Tim Brook
Cc:	Bill Topping
Subject:	RE: 12174 Globe Mills
Attachments:	12174 Globe 1 SW Calculations Rev3.pdf; 12174 Globe 2 SW Calculations Rev2.pdf; 12174-102(P4) Proposed Drainage Plan.pdf; RE: Globe Mills, Slaithwaite - Planning 5 to 8 Listed documents copied below

Hello Tim,

All the above will be enough to discharge conditions 5,6,7 as far as I'm concerned. There is a fats oils and grease condition (8) as the site has a café which needs to be looked at. I think a formal DOC application is required however. I've copied in the planning officer concerned for info.

Kind regards,

Paul Farndale
Principal Engineer
Flood Management & Drainage
Investment & Regeneration Service
Kirklees Council
01484 225377

-----Original Message-----
From: Tim Brook [mailto:tim.brook@dudleys.org.uk]
Sent: 23 October 2014 14:36
To: Paul Farndale
Subject: FW: 12174 Globe Mills

Afternoon Paul,

Please find below confirmation from Yorkshire Water of their response regarding drainage proposals to the LPA. Also attached is the latest Proposed Drainage Layout, drawing 12174-102(P4).

We have agreed a set flow rate and location for surface water discharge from Globe 1 into the public sewer system in Bridge Street - as detailed on the attached drawing.

Can you please confirm your acceptance of our proposal to discharge 18.0l/s of surface water into the River Colne - as detailed within the attached email trail.

Thanks.

Regards

Tim Brook

E: tim.brook@dudleys.org.uk
T: 0113 258 3611
P: Dudleys 5 Feast Field Horsforth Leeds LS18 4TJ
W: www.dudleys.org.uk

-----Original Message-----
From: john.wellham@yorkshirewater.co.uk [mailto:john.wellham@yorkshirewater.co.uk]
Sent: 23 October 2014 13:30
To: Tim Brook
Subject: RE: 12174 Globe Mills

Good afternoon Tim

I thought I'd send you a copy of the comments I have made to the LPA (below).

Regards

John Wellham
Developer Services Technician
Yorkshire Water
0345 120 8482 (08:00 - 17:00)

Yorkshire Water has no objection in principle to:

1) The proposed separate systems of drainage on site and off site
2) The anticipated amount of domestic foul water to be discharged to the public combined water sewer
3) The proposed amount of curtilage surface water to be discharged to the public combined sewers (at a total restricted rate of 31.6 (thirty one point six) litres/second - breakdown: 15.4 (fifteen point four) litres/second to 525mm combined sewer and 16.2 (sixteen point two) litres/second to 450mm combined sewer. Remaining surface water of 18
(eighteen) litres/second to river)
4) The proposed points of discharge of foul and surface water to the respective public sewers
5) The proposed use of the petrol/oil/grit separator/interceptor

submitted on drawing 12174/102 (revision P4) dated 20/10/2014 that has been prepared by Dudleys.

The submitted drawing shows partial surface water proposed to be drained to watercourse.

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

The developer should also note that the site drainage details submitted have not been approved for the purposes of adoption or diversion. If the developer wishes to have the sewers included in a sewer adoption/diversion

agreement with Yorkshire Water (under Sections 104 and 185 of the Water Industry Act 1991), they should contact our Developer Services Team (tel
0345 120 84 82, Fax 01274 303 047) at the earliest opportunity. Sewers intended for adoption and diversion should be designed and constructed in accordance with the WRc publication 'Sewers for Adoption - a design and construction guide for developers' 6th Edition, as supplemented by Yorkshire Water's requirements.

No land drainage to be connected / discharged to public sewer.

|------------>
| From: |
|------------>
>--|
|Tim Brook <tim.brook@dudleys.org.uk> |
>--|
|------------>
| To: |
|------------>
>--|
|"john.wellham@yorkshirewater.co.uk" <john.wellham@yorkshirewater.co.uk>,
|
>--|
|------------>
| Date: |
|------------>
>--|
|20/10/2014 16:04 |
>--|
|------------>
| Subject: |
|------------>
>--|
|RE: 12174 Globe Mills |
>--|

Afternoon John,

Thanks for your call earlier.

As discussed, please find attached our latest Proposed Drainage Layout for the Globe Mills scheme. This drawing details the flow rates into the public sewer and the River Colne with specifications for flow control devices, etc.

As noted on the drawing (note 7.), total proposed flow into the public sewer system will equate to 31.6l/s; 15.4l/s will discharge into the existing 525Ø sewer in Bridge Street, 13.7l/s from the existing Globe 1 roof and 2.5l/s from the existing Globe 2 roof.

We look forward to receiving written confirmation from yourselves that our proposals are acceptable.

Regards

Tim Brook
(Embedded image moved to file: pic07684.gif)dudleys logo small icon
E: tim.brook@dudleys.org.uk
T: 0113 258 3611
P: Dudleys 5 Feast Field Horsforth Leeds LS18 4TJ
W: www.dudleys.org.uk

From: Tim Brook
Sent: 15 October 2014 15:02
To: 'john.wellham@yorkshirewater.co.uk'
Subject: 12174 Globe Mills [Filed 15 Oct 2014 15:02]

Afternoon John,

Thank you for your telephone call earlier today.

As requested please find attached an email from Paul Farndale of Kirklees Council's Flood Management and Drainage department. Paul confirms in the last paragraph that the planning department, in consultation with various statutory bodies, would be strongly opposed to any pumping of surface water due to the risks involved.

To confirm, the existing connection from Globe 1 to the river is too shallow to be utilised. A new car park is being formed for Globe 1 which will be heavily trafficked, thus requiring a minimum cover depth of 900mm to any drainage. A depth of 900mm is also required in order to avoid any new service connections. The existing depth of the boundary manhole is 800mm which is obviously too shallow to enable upstream drainage to connect to due to acceptable gradients and manhole depths, etc.

Regards

Tim Brook
(Embedded image moved to file: pic28226.gif)dudleys logo small icon
E: tim.brook@dudleys.org.uk
T: 0113 258 3611
P: Dudleys 5 Feast Field Horsforth Leeds LS18 4TJ
W: www.dudleys.org.uk

[attachment "12174-102(P4) Proposed Drainage Plan.pdf" deleted by John Wellham/Water Business Unit/YWS/Yorkshire Water]

Land Use Planning
Yorkshire Water Services Ltd
Midway
Western Way
Halifax Road
Bradford
BD6 2LZ

Tel: (01274) 691111
Fax:
For telephone enquiries ring:
Z Fayyaz on (01274) 692072

E-mail Zaffer.Fayyaz@yorkshirewater.co.uk

Head of Planning Services
Kirklees Metropolitan District Council
P.O. Box B93
Civic Centre
Huddersfield
HD1 2JR

Your Ref: 2014/44/91151/W
Our Ref: Q006064

13th November 2014

Dear Sir/Madam,

Globe Mills, Bridge Street, Slaithwaite - Discharge Conditions 3 (landscaping), 5 (drainage), 6 (surface water, 7 (surface water), 8 (drainage), 14 (lighting), 28 (car park elevations), 30 (crime) on previous permission 2013/91452 for demolition of outbuildings and refurbishment/redevelopment of Globe Mills to - Globe 1- doctors surgery; retail unit; Artisan hall; cafe; offices and innovation office space - Globe 2- D1/D2 use; nursery; offices; gallery space, erection of new parking deck, formation of external parking area; pedestrian footbridge linking Globe 1 and Globe 2 and new pedestrian footbridge over the Huddersfield Canal

Thank you for consulting Yorkshire Water regarding the above proposed development. We have the following comments:

Yorkshire Water has no objection in principle to:

i) The proposed separate systems of drainage on site and off site.
ii) The anticipated amount of domestic foul water to be discharged to the public combined water sewer.
iii) The proposed amount of curtilage surface water to be discharged to the public combined sewers (at a total restricted rate of 31.6 (thirty one point six) litres/second - breakdown: 15.4 (fifteen point four) litres/second to 525mm combined sewer and 16.2 (sixteen point two) litres/second to 450mm combined sewer. Remaining surface water of 18 (eighteen) litres/second to river).
iv) The proposed points of discharge of foul and surface water to the respective public sewers.
v) The proposed use of the petrol/oil/grit separator/interceptor.

as submitted on drawing 12174/102 (revision P4) dated 20/10/2014 that has been prepared by Dudleys.

It is noted that the submitted drawing shows partial surface water proposed to be drained to watercourse.

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

The developer should also note that the site drainage details submitted have not been approved for the purposes of adoption or diversion. If the developer wishes to have the sewers included in a sewer adoption/diversion agreement with Yorkshire Water (under Sections 104 and 185 of the Water Industry Act 1991), they should contact our Developer Services Team (tel 0345 120 84 82, Fax 01274 303 047) at the earliest opportunity.

Sewers intended for adoption and diversion should be designed and constructed in accordance with the WRc publication 'Sewers for Adoption - a design and construction guide for developers' 6th Edition, as supplemented by Yorkshire Water's requirements.

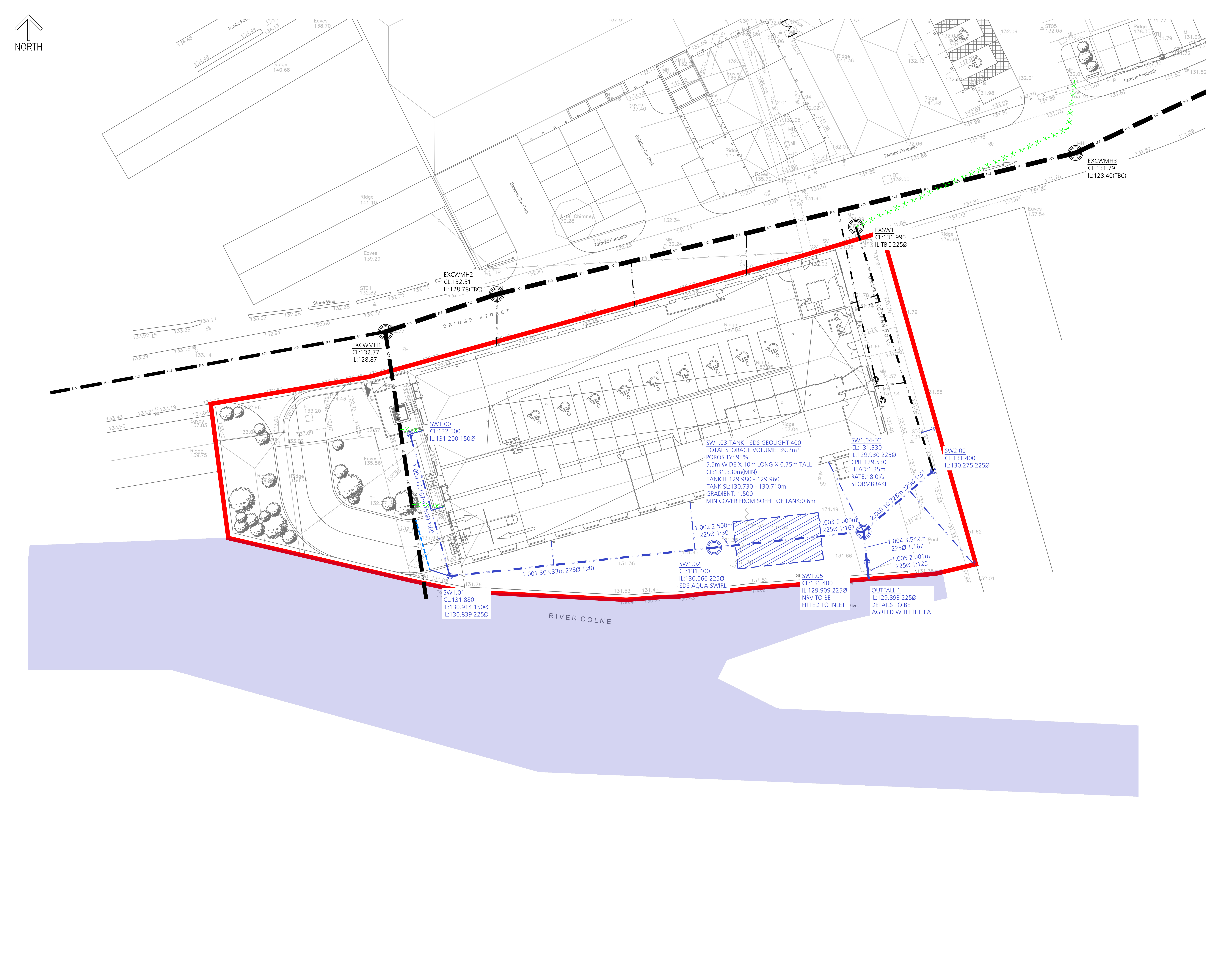
No land drainage to be connected / discharged to public sewer.

Yours faithfully

Zaffer Fayyaz
Planning & Development

c.c. Tim Brook <tim.brook@dudleys.org.uk>

APPENDIX E – DRAINAGE STRATEGY AND HYDRAULIC CALCULATIONS



DO NOT SCALE

DESIGNERS HAZARD IDENTIFICATION

IT IS ASSUMED THAT ALL WORKS WILL BE UNDERTAKEN BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT. IN ADDITION TO THE HAZARDS TYPICALLY ASSOCIATED WITH THE TYPES OF CONSTRUCTION DETAILED ON THIS DRAWING, ANY KNOWN ABNORMAL HAZARDS SPECIFIC TO THIS SCHEME HAVE BEEN IDENTIFIED.

ABNORMAL HAZARD REFERENCE

NOTES:

1. DO NOT SCALE FROM THIS DRAWING.
2. THIS DRAWING IS TO BE REPRODUCED IN COLOUR.
3. IF ANY DISCREPANCIES ARE FOUND, PLEASE INFORM DUDLEYS CONSULTING ENGINEERS.
4. THIS DRAWING HAS BEEN PRODUCED TO OS COORDINATES.
5. THIS DRAWING IS BASED ON THE FOLLOWING:
   a. 333.19(1-)005 REV A PROPOSED SITE PLAN BY HALLIDAY CLARK ARCHITECTS DATED MAY 2023,
   b. M453-T_01 TOPOGRAPHICAL SURVEY BY MEASURED LTD DATED JANUARY 2012.
6. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH21496-DCE-XX-XX-T-C-001 FLOOD RISK ASSESSMENT AND DRAINAGE STRATEGY.
7. DETAILS ON THE OUTFALL TO THE RIVER COLNE TO BE AGREED WITH THE ENVIRONMENT AGENCY.
8. CONFIRMATION OF THE EXISTING DRAINAGE FACILITIES SERVING THE BUILDING TO BE CONFIRMED BEFORE THE COMMENCEMENT OF CONSTRUCTION.
9. NO TREES TO BE LOCATED WITHIN 5m OF THE EXISTING YORKSHIRE WATER COMBINED SEWER CROSSING THE SITE.
10. NON RETURN VALVE TO BE FITTED TO PPIC SW1.05 TO PREVENT SURCHAGE FROM THE RIVER COLNE DURING HIGH RIVER LEVEL EVENTS.
11. ALL PPIC's TO BE 450mm DIAMETER UNLESS OTHERWISE SPECIFIED. ALL MANHOLES TO BE 1200mm DIAMETER PRECAST CONCRETE UNLESS OTHERWISE SPECIFIED.

KEY

- PROPOSED PRIVATE SURFACE WATER DRAIN
- PROPOSED PRIVATE SURFACE WATER MANHOLE
- PROPOSED PRIVATE SURFACE WATER PPIC
- PROPOSED PRIVATE ATTENUATION TANK
- PROPOSED PRIVATE CHANNEL DRAIN
- PROPOSED PRIVATE SURFACE WATER GULLY
- EXISTING PRIVATE SURFACE WATER DRAIN TO BE ABANDONED
- EXISTING PRIVATE SURFACE WATER DRAIN
- EXISTING PRIVATE FOUL WATER DRAIN
- EXISTING ADOPTED COMBINED SEWER
- EXISTING WATERCOURSE

DATE	REVISION DESCRIPTION	BY	CHK.	REV.
07.08.23	PRELIMINARY ISSUE	JA	AW	P01

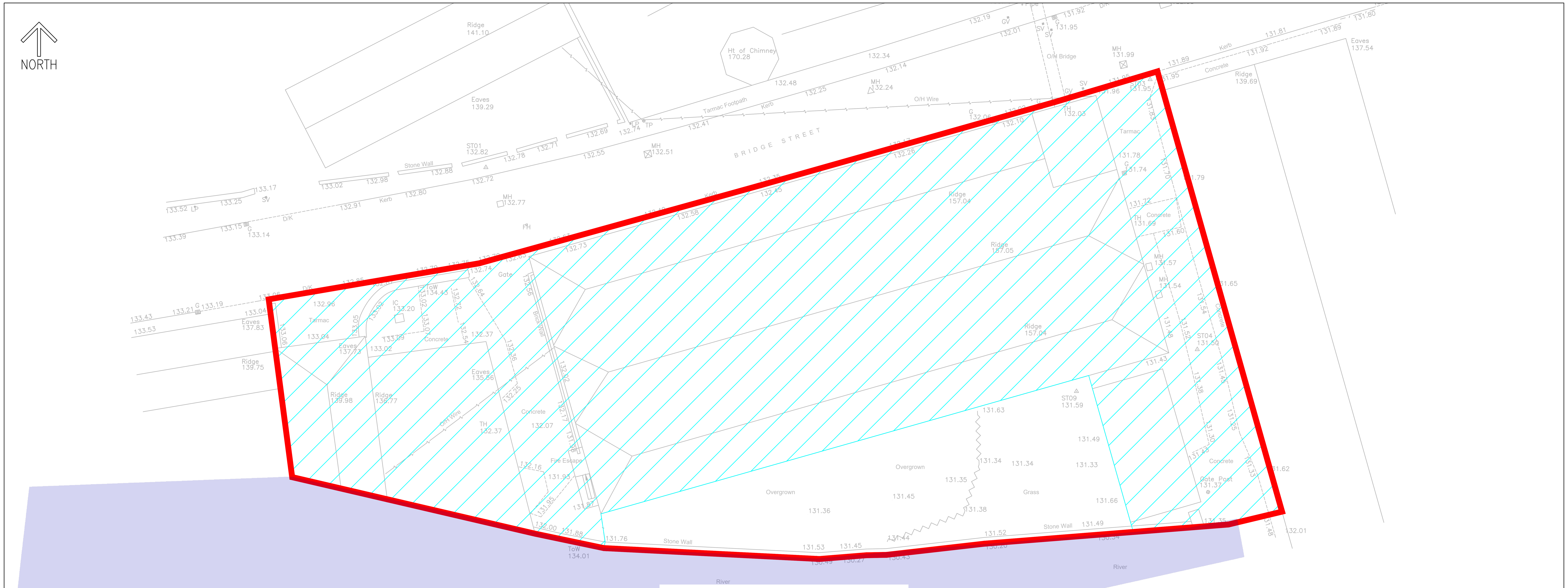
dudleys
Structural & Civil Consultants
Tithe House
35 Town Street
Leeds, LS18 5LJ
0113 258 3611
info@dudleys.co.uk

PROJECT
GLOBE MILLS 2
BRIDGE STREET SLAITHWAITE

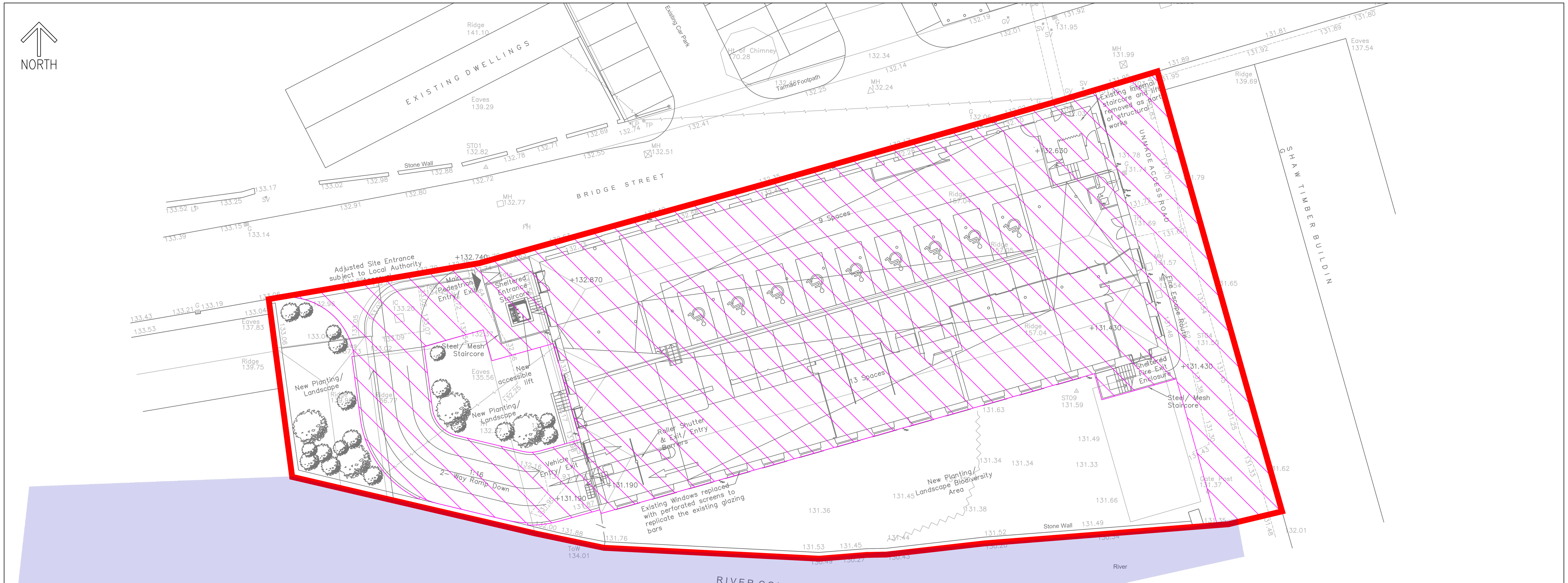
TITLE
DRAINAGE STRATEGY

SCALE	PAPER	STATUS
1:200	A1	PRELIMINARY

DRAWING NO.	REV.
21496-DCE-XX-XX-D-C-100	P01



EXISTING IMPERMEABLE AREAS



PROPOSED IMPERMEABLE AREAS

DO NOT SCALE

DESIGNERS HAZARD IDENTIFICATION

IT IS ASSUMED THAT ALL WORKS WILL BE UNDERTAKEN BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT. IN ADDITION TO THE HAZARDS TYPICALLY ASSOCIATED WITH THE TYPES OF CONSTRUCTION DETAILED ON THIS DRAWING, ANY KNOWN ABNORMAL HAZARDS SPECIFIC TO THIS SCHEME HAVE BEEN IDENTIFIED.

ABNORMAL HAZARD REFERENCE

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6. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH21496-DCE-XX-XX-T-C-001 FLOOD RISK ASSESSMENT AND DRAINAGE STRATEGY.

KEY

EXISTING IMPERMEABLE AREA: 2,106m^2

PROPOSED IMPERMEABLE AREA: 1,775m^2

DATE	REVISION DESCRIPTION	BY	CHK.	REV.
07.08.23	PRELIMINARY ISSUE	JA	AW	P01

dudleys
Structural & Civil Consultants

Tithe House
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Leeds, LS18 5LJ
0113 258 3611
info@dudleys.co.uk

PROJECT
GLOBE MILLS 2
BRIDGE STREET SLAITHWAITE

TITLE
IMPERMEABLE AREAS

SCALE	PAPER	STATUS
1:200	A1	PRELIMINARY

DRAWING NO.	REV.
21496-DCE-XX-XX-D-C-102	P01

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	1	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.600
Ratio-R	0.200	Preferred Cover Depth (m)	0.900
CV	1.000	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
SW1.03-TANK			131.330		408097.539	413968.582	1.370
SW1.04-FC	0.074	5.00	131.330	1200	408107.481	413969.655	1.800
Outfall 1			131.400		408108.076	413964.144	1.507
SW1.00	0.041	5.00	132.500	450	408054.686	413980.985	1.300
SW1.01	0.039	5.00	131.880	450	408059.328	413964.458	1.041
SW1.02			131.400	1200	408090.082	413967.778	1.336
SW2.00		5.00	131.400	450	408115.565	413976.705	1.125
SW1.05			131.400	450	408107.861	413966.133	1.491

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.003	SW1.03-TANK	SW1.04-FC	5.000	0.600	129.960	129.930	0.030	167.0	225	5.57	37.2
1.004	SW1.04-FC	SW1.05	3.542	0.600	129.930	129.909	0.021	167.0	225	5.63	37.0
1.000	SW1.00	SW1.01	17.167	0.600	131.200	130.914	0.286	60.0	150	5.22	38.0
1.002	SW1.02	SW1.03-TANK	2.500	0.600	130.064	129.980	0.084	29.8	225	5.49	37.4
1.001	SW1.01	SW1.02	30.933	0.600	130.839	130.066	0.773	40.0	225	5.47	37.4
2.000	SW2.00	SW1.04-FC	10.726	0.600	130.275	129.930	0.345	31.1	225	5.08	38.4

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)
1.003	1.009	40.1	10.7	1.145	1.175	0.080	0.0	80	0.858
1.004	1.009	40.1	20.6	1.175	1.266	0.154	0.0	115	1.017
1.000	1.301	23.0	5.6	1.150	0.816	0.041	0.0	51	1.079
1.002	2.407	95.7	10.8	1.111	1.125	0.080	0.0	51	1.603
1.001	2.074	82.5	10.8	0.816	1.109	0.080	0.0	55	1.448
2.000	2.354	93.6	0.0	0.900	1.175	0.000	0.0	0	0.000

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.005	SW1.05	Outfall 1	2.001	0.600	129.909	129.893	0.016	125.0	225	5.66	37.0

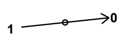
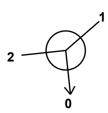
Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.005	1.168	46.4	20.6	1.266	1.282	0.154	0.0	105	1.134

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	5.000	167.0	225	Circular	131.330	129.960	1.145	131.330	129.930	1.175
1.004	3.542	167.0	225	Circular	131.330	129.930	1.175	131.400	129.909	1.266
1.000	17.167	60.0	150	Circular	132.500	131.200	1.150	131.880	130.914	0.816
1.002	2.500	29.8	225	Circular	131.400	130.064	1.111	131.330	129.980	1.125
1.001	30.933	40.0	225	Circular	131.880	130.839	0.816	131.400	130.066	1.109
2.000	10.726	31.1	225	Circular	131.400	130.275	0.900	131.330	129.930	1.175
1.005	2.001	125.0	225	Circular	131.400	129.909	1.266	131.400	129.893	1.282

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.003	SW1.03-TANK		Junction		SW1.04-FC	1200	Manhole	Adoptable
1.004	SW1.04-FC	1200	Manhole	Adoptable	SW1.05	450	Manhole	Adoptable
1.000	SW1.00	450	Manhole	Adoptable	SW1.01	450	Manhole	Adoptable
1.002	SW1.02	1200	Manhole	Adoptable	SW1.03-TANK		Junction	
1.001	SW1.01	450	Manhole	Adoptable	SW1.02	1200	Manhole	Adoptable
2.000	SW2.00	450	Manhole	Adoptable	SW1.04-FC	1200	Manhole	Adoptable
1.005	SW1.05	450	Manhole	Adoptable	Outfall 1		Junction	

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections		Link	IL (m)	Dia (mm)
SW1.03-TANK	408097.539	413968.582	131.330	1.370			1	1.002	129.980	225
							0	1.003	129.960	225
SW1.04-FC	408107.481	413969.655	131.330	1.800	1200		1	2.000	129.930	225
							2	1.003	129.930	225
							0	1.004	129.930	225
Outfall 1	408108.076	413964.144	131.400	1.507			1	1.005	129.893	225

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
SW1.00	408054.686	413980.985	132.500	1.300	450	0	1.000	131.200	150
SW1.01	408059.328	413964.458	131.880	1.041	450	1	1.000	130.914	150
						0	1.001	130.839	225
SW1.02	408090.082	413967.778	131.400	1.336	1200	1	1.001	130.066	225
						0	1.002	130.064	225
SW2.00	408115.565	413976.705	131.400	1.125	450	0	2.000	130.275	225
SW1.05	408107.861	413966.133	131.400	1.491	450	1	1.004	129.909	225
						0	1.005	129.909	225

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Detailed
FSR Region	England and Wales	Skip Steady State	✓
M5-60 (mm)	20.000	Drain Down Time (mins)	240
Ratio-R	0.200	Additional Storage (m^3/ha)	0.0
Summer CV	1.000	Check Discharge Rate(s)	x
Winter CV	1.000	Check Discharge Volume	x

Storm Durations

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

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
100	20	0	0
100	45	0	0

Node SW1.04-FC Online StormBrake™ Control

Flap Valve	x	Design Flow (l/s)	18.0
Downstream Link	1.004	Product Code	FPM-SB1-01350-01800-1100
Replaces Downstream Link	✓	Min Outlet Diameter (m)	0.225
Invert Level (m)	129.930	Min Node Diameter (mm)	1200
Design Depth (m)	1.350		

Node SW1.03-TANK Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	129.960
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	45

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	55.0	0.0	0.750	55.0	0.0	0.751	0.0	0.0

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.14%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	SW1.03-TANK	39	130.105	0.145	11.4	7.5744	0.0000	OK
60 minute summer	SW1.04-FC	39	130.105	0.175	9.7	0.1975	0.0000	OK
60 minute summer	Outfall 1	38	129.961	0.068	9.4	0.0000	0.0000	OK
30 minute summer	SW1.00	18	131.253	0.053	5.8	0.0084	0.0000	OK
30 minute summer	SW1.01	18	130.896	0.057	11.3	0.0091	0.0000	OK
30 minute summer	SW1.02	19	130.122	0.058	11.3	0.0656	0.0000	OK
15 minute summer	SW2.00	1	130.275	0.000	0.0	0.0000	0.0000	OK
60 minute summer	SW1.05	39	129.983	0.073	9.4	0.0117	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	SW1.03-TANK	1.003	SW1.04-FC	6.4	0.439	0.159	0.1503	
60 minute summer	SW1.04-FC	StormBrake™	SW1.05	9.4				
30 minute summer	SW1.00	1.000	SW1.01	5.8	1.066	0.252	0.0934	
30 minute summer	SW1.01	1.001	SW1.02	11.3	1.445	0.137	0.2416	
30 minute summer	SW1.02	1.002	SW1.03-TANK	11.2	1.506	0.118	0.0298	
15 minute summer	SW2.00	2.000	SW1.04-FC	0.0	0.000	0.000	0.1313	
60 minute summer	SW1.05	1.005	Outfall 1	9.4	0.877	0.202	0.0214	19.6

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.14%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	SW1.03-TANK	40	130.339	0.379	27.8	19.8073	0.0000	SURCHARGED
60 minute summer	SW1.04-FC	40	130.337	0.407	21.5	0.4601	0.0000	SURCHARGED
60 minute summer	Outfall 1	40	129.987	0.094	17.3	0.0000	0.0000	OK
30 minute summer	SW1.00	18	131.290	0.090	14.2	0.0143	0.0000	OK
15 minute summer	SW1.01	10	130.929	0.090	27.5	0.0144	0.0000	OK
60 minute summer	SW1.02	40	130.341	0.277	23.2	0.3129	0.0000	SURCHARGED
60 minute summer	SW2.00	40	130.337	0.062	1.2	0.0099	0.0000	OK
60 minute summer	SW1.05	40	130.012	0.103	17.3	0.0163	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	SW1.03-TANK	1.003	SW1.04-FC	12.7	0.439	0.316	0.1989	
60 minute summer	SW1.04-FC	StormBrake™	SW1.05	17.3				
30 minute summer	SW1.00	1.000	SW1.01	14.2	1.329	0.618	0.1835	
15 minute summer	SW1.01	1.001	SW1.02	27.6	1.774	0.334	0.5841	
60 minute summer	SW1.02	1.002	SW1.03-TANK	22.2	1.100	0.233	0.0994	
60 minute summer	SW2.00	2.000	SW1.04-FC	-1.2	-0.049	-0.012	0.2610	
60 minute summer	SW1.05	1.005	Outfall 1	17.3	1.034	0.372	0.0334	47.4

Results for 100 year +20% CC Critical Storm Duration. Lowest mass balance: 99.14%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute summer	SW1.03-TANK	78	130.663	0.703	29.4	36.7210	0.0000	SURCHARGED
120 minute summer	SW1.04-FC	78	130.661	0.731	24.4	0.8262	0.0000	SURCHARGED
60 minute summer	Outfall 1	63	129.989	0.096	18.0	0.0000	0.0000	OK
30 minute summer	SW1.00	18	131.333	0.133	22.3	0.0211	0.0000	OK
30 minute summer	SW1.01	18	130.954	0.115	43.5	0.0183	0.0000	OK
120 minute summer	SW1.02	78	130.665	0.600	26.3	0.6791	0.0000	SURCHARGED
120 minute summer	SW2.00	78	130.661	0.386	1.1	0.0613	0.0000	SURCHARGED
60 minute summer	SW1.05	34	130.014	0.105	18.0	0.0167	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	SW1.03-TANK	1.003	SW1.04-FC	14.4	0.438	0.359	0.1989	
120 minute summer	SW1.04-FC	StormBrake™	SW1.05	18.0				
30 minute summer	SW1.00	1.000	SW1.01	22.3	1.422	0.969	0.2840	
30 minute summer	SW1.01	1.001	SW1.02	43.5	1.648	0.527	0.9316	
120 minute summer	SW1.02	1.002	SW1.03-TANK	25.0	1.039	0.261	0.0994	
120 minute summer	SW2.00	2.000	SW1.04-FC	-1.1	-0.035	-0.012	0.4266	
60 minute summer	SW1.05	1.005	Outfall 1	18.0	1.045	0.387	0.0344	74.8

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.14%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute summer	SW1.03-TANK	70	131.330	1.370	39.6	39.2136	6.5576	FLOOD
120 minute summer	SW1.04-FC	70	131.330	1.400	29.4	1.5834	1.3805	FLOOD
240 minute winter	Outfall 1	132	129.989	0.096	18.0	0.0000	0.0000	OK
30 minute summer	SW1.00	18	131.508	0.308	26.9	0.0490	0.0000	SURCHARGED
60 minute summer	SW1.01	39	131.408	0.569	44.2	0.0904	0.0000	SURCHARGED
60 minute summer	SW1.02	39	131.341	1.277	43.8	1.4438	0.0000	FLOOD RISK
120 minute summer	SW2.00	70	131.343	1.068	5.4	0.1698	0.0000	FLOOD RISK
240 minute winter	SW1.05	132	130.014	0.105	18.0	0.0167	0.0000	OK

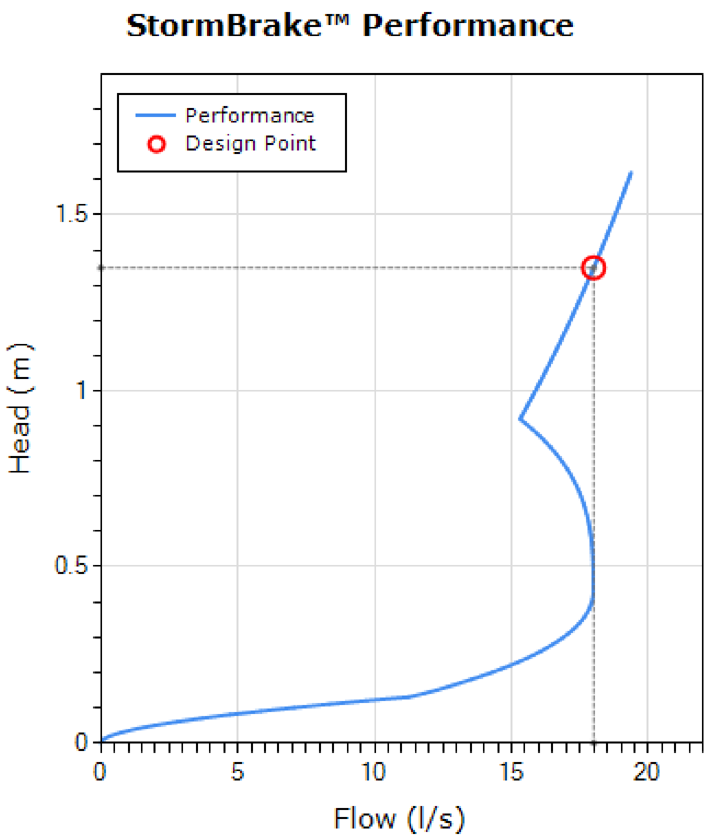
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
120 minute summer	SW1.03-TANK	1.003	SW1.04-FC	16.0	0.439	0.399	0.1989	
120 minute summer	SW1.04-FC	StormBrake™	SW1.05	18.0				
30 minute summer	SW1.00	1.000	SW1.01	26.6	1.512	1.158	0.2983	
60 minute summer	SW1.01	1.001	SW1.02	43.8	1.520	0.532	1.2302	
60 minute summer	SW1.02	1.002	SW1.03-TANK	40.9	1.234	0.428	0.0994	
120 minute summer	SW2.00	2.000	SW1.04-FC	-5.4	-0.135	-0.057	0.4266	
240 minute winter	SW1.05	1.005	Outfall 1	18.0	1.045	0.387	0.0344	156.9

StormBrake™
Performance Report

StormBrake™ Performance Report

PT/398/0217

Contractor:	Dudleys Consulting Engineers	Head(m):	1.35
Site:	21496-Globe Mills	Flow(l/s):	18
Date:	29/06/2023	Chamber Ref:	SW1.04-FC
Created By:	Jonathan Allchin	Mounting Style:	LUGS (Default)
Device Ref:	FPM-SB1-01350-01800-0100		



Head (m)	Flow (l/s)
0	0.00
0.06	2.45
0.11	8.59
0.17	13.03
0.22	15.05
0.28	16.50
0.34	17.42
0.39	17.89
0.45	17.99
0.5	17.98
0.56	17.94
0.61	17.84
0.67	17.67
0.73	17.40
0.78	17.00
0.84	16.45
0.89	15.72
0.95	15.52
1.01	15.91
1.06	16.28
1.12	16.64
1.17	16.98
1.23	17.32
1.28	17.64
1.34	17.95
1.4	18.25
1.45	18.54
1.51	18.83
1.56	19.10
1.62	19.37

	Head (m)	Flow (l/s)
Design Point	1.35	18.00
Flush Flow	0.43	17.99
Kick Back	0.92	15.31

	Dims (mm)
Min. Chamber Diameter	1200
Min. Outlet Pipe Diameter	225
Min. Sump Depth	400

The unique performance characteristics of this StormBrake™ are derived from extensive dynamic modelling using parametric experimental testing and computational fluid dynamics.

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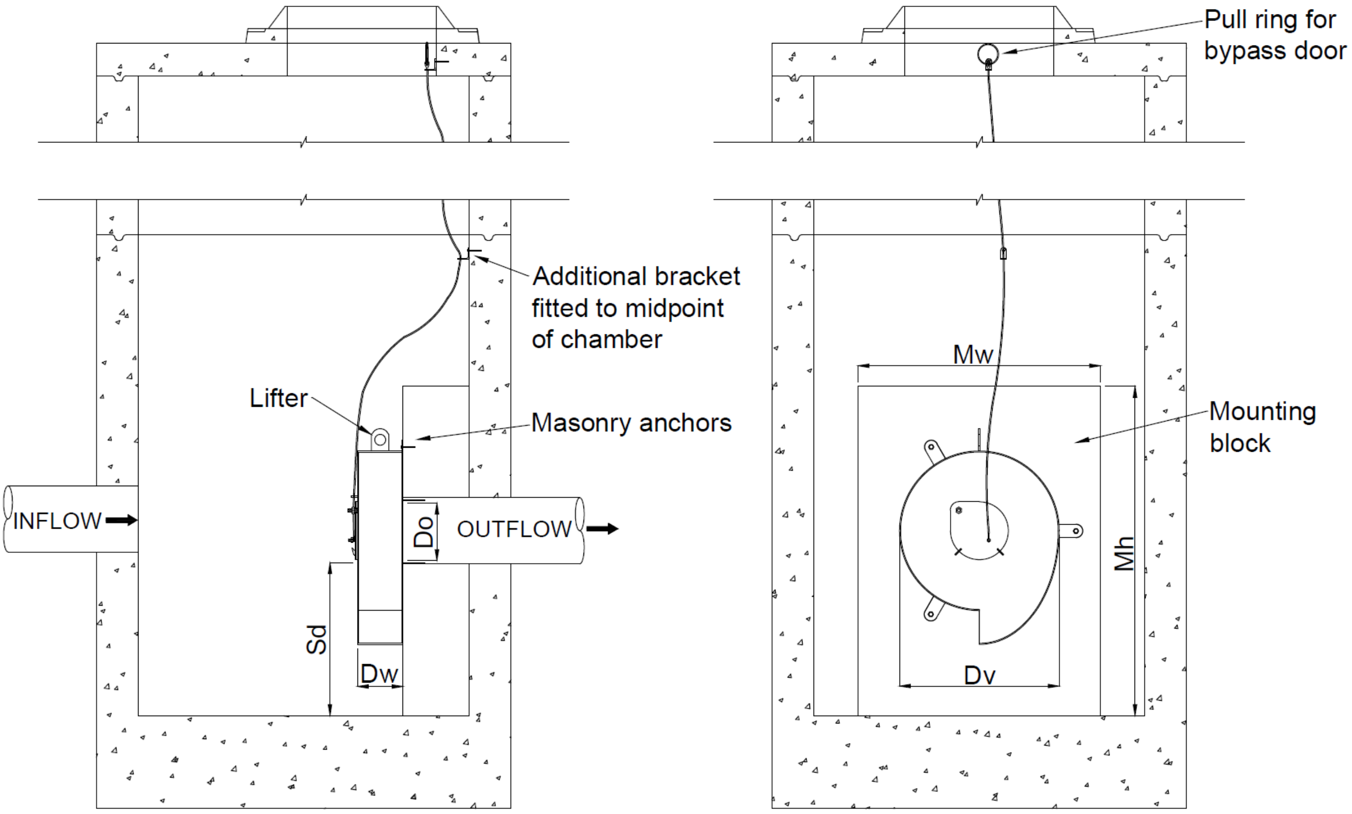
fpmccann

StormBrake™
Performance Report

wrc approved™ PT/398/0217

INSTALLATION INSTRUCTIONS

1. Position the StormBrake™ so that the inlet is at the bottom and the device outlet is in line with the chamber outlet pipe.
2. Mark the locations of the mounting points on the chamber/mounting wall.
3. Using the marked locations, drill holes to the required thickness and depth for the supplied masonry anchors (M10 throughbolts require 11 mm holes). Fit the bolts to the holes.
4. Attach the StormBrake™ to the anchor points, ensuring the neoprene gasket is flush with the chamber wall, and fasten the device by tightening the bolts. This will compress the neoprene gasket to provide a watertight seal between the StormBrake™ and the wall.
5. Fix the stainless steel wire cable from the front bypass door to the underside of the manhole cover, vertically above the device. A secondary bracket is supplied and should be fitted halfway up the chamber to guide the bypass door cable to the top.
6. Adjust the length of the bypass door cable accordingly, so that it reaches the ground level whilst ensuring the bypass door can open if required. Ensure the bypass door is closed for normal operating conditions.



Geometry	Annotation	(mm)
Device Vortex Diameter	Dv	647
Device Width	Dw	181
Device Orifice	Do	176
Sump Depth (outlet Ø225mm)	Sd	400
Mounting Block Width	Mw	890
Mounting Block Height	Mh	1010

Dimensions quoted are minimum values based on the geometry of this unique StormBrake™ unit. These ensure the device can be fitted to the flow control chamber without restriction and meet the performance specification.

SDS

Water Infrastructure Systems

SDS GEOlight®

Stormwater Management System

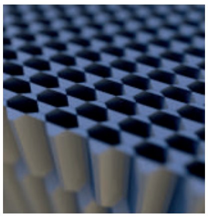
Product Profile

SDS GEOlight® is an ultra lightweight honeycombed modular structure made from recycled PVC. The ready to install units are preformed to provide an underground stormwater storage facility, for the application of stormwater attenuation or infiltration.

The high void rate (>95%), high compressive strength (to 1000KN/m^2) and low resistance to water flow makes SDS GEOlight® an ideal material for cost efficient and maintainable underground water storage during storm conditions.

SDS GEOlight® Benefits

- High compressive strength – can be located under all roads, car parks and amenity area surfaces.
- Reduced excavation costs – the very high void rate (95%) minimises the required volume of earthworks.
- Speed of installation – 1000m^3 reservoir, completed in one week.
- Light and easy to handle.
- Excellent hydraulic characteristics.
- The honeycomb structure is highly permeable, offering low resistance to water flow.
- SDS GEOlight®'s unique lateral and vertical filling arrangement requires a minimum amount of pipework and stone.
- Depth of tank invert reduced by using patented lateral supply.
- Simplified distribution pipe network, easy maintenance – dispensing with costly and complicated pipework configurations.
- Modular format offers design flexibility to overcome topographical contraints and architectural requirements.
- Greatly reduces the risk of flooding when used as stormwater storage.
- Can also be used for water recycling and combining with irrigation systems.
- Can virtually eliminate pollution when used in combination with specialist separation and filtration technology such as SDS Aqua-Swirl™ and SDS Aqua-Filter™.
- Design service available, including calculations.



APPLICATIONS

RETAIL

INFRASTRUCTURE

INDUSTRIAL

RESIDENTIAL

COMMERCIAL

PUBLIC SECTOR

SDS Ltd, Clearwater House, Castlemills, Biddisham, Somerset, BS26 2RE

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	SDS GEOlight® 400	SDS GEOlight® 600	SDS GEOlight® 800
	APPLICATIONS		
	Stormwater Management		
	Attenuation / Infiltration		
	Bacterial filter-bed for biological treatment		
	Hydrocarbon Separation		
	Filtration and Separation Units		
	SPECIFICATIONS		
Material	Recycled Rigid PVC		
Colour	Dark grey to black		
Standard length of a block	2000 mm	2000 mm	2000 mm
Standard width of a block	500 mm	500 mm	500 mm
Standard height of a block*	750 mm	750 mm	750 mm
	*Other block sizes available on request		
Void Ratio	> 95%	> 95%	> 95%
Compressive Strength	420 kN/m²	610 kN/m²	800 kN/m²
	ADVANTAGES		
	Highly cost effective		
	Reduced excavation costs		
	High void capacity		
	Good UV resistance		
	Good hydrocarbon resistance		

GEO DS/1021

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STORMWATER TREATMENT

SDS

Water Infrastructure Systems

SDS Aqua-Swirl®

Hydrodynamic Vortex Separator

SDS Aqua-Swirl® is a custom engineered, flow-through water quality device that utilises hydrodynamic separation technology to maximise the removal of coarse sediment, debris and free-floating oil from surface water runoff.

SYMBiotIC™

When connected to a SDS SYMBiotIC™ system, SDS Aqua-Swirl® provides real time data on a broad range of key operating factors such as pollutant loads and silt capture level.

- → ***BBA HAPAS approved***
- → ***HDPE plastic modular construction***
- → ***No moving parts***
- → ***Sealed baffle***
- → ***Large debris storage chamber***
- → ***Lifting supports***
- → ***Compact dimensions***
- → ***Available in 9 different sizes***
- → ***Bespoke sizing available***

SDS Aqua-Swirl® is supplied in the standard version when sizing to its water quality treatment flow rate according to OK-110 (coarse) test sediment. 'XC' versions are also available when sizing according to the NJDEP (finer) test sediment.

SDS Aqua-Swirl® is sized according to water quality treatment flow rates which are based on the initial movement of pollutants into the storm drainage system. This flow rate typically represents approximately 90% to 95% of the total pollutants in the runoff volume.

The treatment flow rate of the SDS Aqua-Swirl® system is engineered to meet or exceed the local water quality treatment criteria and form an intrinsic part of the SuDS solution.

sdslimited.com

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Features	Benefits
Performance monitoring available via SDS SYMBiotIC™.	Provides bespoke suite of operating data, such as silt levels and pollutants, viewable via a secure web portal dashboard with live notifications via email and text.
BBA HAPAS certified.	Approved for installation under roads and pavements; adoptable by National Highways.
NJCAT/NJDEP-verified performance for sediment removal and retention.	Verification accepted by the Environment Agency (as cited in the CIRIA C753 SuDS Manual).
'XC' models meet NJDEP testing protocol.	Ensures that particulates and adhered pollutants are not mobilised during major storm events, maximising the capture of floating debris, oil and hydrocarbons.
Manufactured from HDPE high strength plastic Weholite.	Offers a durable, light weight and low-cost alternative to concrete. Easy and quick to install resulting in substantial cost savings.
Bespoke construction.	No on-site assembly required.
Specialised sealed baffle.	Prevents captured floatables from escaping.
Internal bypass with pollution retention.	Able to treat localised rain and larger storm events while retaining captured pollutants.
Single easy-access chamber for pollutant removal and storage.	Simplifies inspection and maintenance facilities with no special equipment required.
Compact dimensions.	Reduces ground excavation and product installation costs.
Small footprint design.	Can be retro-fitted with minimal disruption to existing infrastructure utilities or surface features, extending the ability to meet new regulations.
Certified installation lifting supports.	Easy installation without the need for large, expensive cranes.
Suitable for use during site construction programme.	Can be put into operation prior to completion of the site build, with the inclusion of a planned maintenance schedule.
Available in 9 different standard sizes and also bespoke.	Provides greater design flexibility and assists the removal of sediments at a greater rate than comparable systems.

SPECIFICATIONS

Aqua-Swirl® Model No.	Maximum ID Pipe Connection (mm) BYP[1]	Chamber Internal Diameter (mm)	Water Quality Treatment Flow Rate OK-110 Coarse (l/s) Model AS-[2]	Water Quality Treatment Flow Rate NJDEP Fine (l/s) Model XC-	Oil/ Debris Storage Capacity (litres)	Sediment Storage Capacity (m^3)	Aqua-Swirl® Weight (kg)
AS-2/XC-2	375	750	30	16	136	0.3	300
AS-3/XC-3	500	1050	53	31	416	0.6	700
AS-4/XC-4	600	1200	77	40	644	0.8	1000
AS-5/XC-5	750	1500	120	63	1382	1.3	1100
AS-6/XC-6	900	1800	173	91	1439	1.8	1400
AS-7/XC-7	1050	2100	235	123	1987	2.5	1700
AS-8/XC-8	1200	2400	307	161	2612	3.3	2200
AS-9/XC-9	1350	2800	418	220	3596	4.4	2600
AS-10/XC-10	1500	3000	480	252	4164	5.1	3100

[1] BYP (Internal Bypass) provides full treatment of the first flush of water while the peak design storm is diverted and channelled through the main conveyance pipe.
[2] Based on the Tennessee Tech University 'Laboratory Evaluation of TSS Removal Efficiency for the Aqua-Swirl® Concentrator Stormwater Treatment System'.

Notes:
Details of pollution mitigation indices, head loss and CAD details, standard drawings and Installation Guides available upon request.
The sediment storage capacity has been calculated in accordance with the relevant test protocol and is not a physical maximum; any additional sediment capacity required is achieved with bespoke deeper units.
For assistance in design and specific sizing using historical rainfall data, please contact SDS.

A-S DS/0822

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