LAND ADJACENT VICTORIA SPRING BUSINESS PARK (PROVIDENCE PLACE) WORMALD STREET HECKMONDWIKE WF15 7JY

Flood Risk Assessment & Drainage Strategy

(Rev C)

11th March 2026

25048-DOC-001-C

Issue Sheet.

Prepared	Date		Checked	Date
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Revisions	Comment	Date
A	Initial Issue	23.01.26
B	Updated to Client comments	12.02.26
C	Layout Updated	11.03.26

The report is based on the information that has been acquired and / or made available to Advant Engineers via the various searches and consultations undertaken as part of the Flood Risk Assessment. In some cases, anecdotal information has been relied upon, where documented evidence has been lacking.

The conclusions drawn in the following report are considered correct although any subsequent additional information may allow refinement of the conclusions.

All work carried out in preparing this report has utilised and is based upon Advant Engineers current professional knowledge and understanding of current UK standards and codes, technology, and legislation. Changes in this legislation and guidance may occur at any time in the future and cause any conclusions to become inappropriate or incorrect.

This report has been prepared using information contained in maps and documents prepared by others. Advant Engineers can accept no responsibility for the accuracy of such information.

EXECUTIVE SUMMARY

Site Description

Site Area	-
Existing Use	Existing Building and concrete yard
Proposed Use	Light industrial units and access road

Flood Risk

Flood Zone	3 (three)
Surface Water	Medium Risk
Reservoirs	Risk in conjunction with River flooding
Sewers	None known.
Ground Water	Low Risk

Drainage Strategy

Existing Impermeable Area	7,054m² (0.70ha)
Proposed Impermeable Area	5,621 (0.56ha)
Proposed Discharge Rate	49 l/s
Proposed Outfall	River Spen via existing connection

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1 Introduction

1.1 Advant Engineers has been commissioned by Barnes Homes Ltd, to undertake a Flood Risk Assessment (FRA) and Drainage Strategy (DS) for the proposed development located at the land south of Victoria Springs Business Park.

1.2 The site consists of an existing warehouse building and a large yard area with the whole of the site being covered in concrete slabs. The proposal is for the renovation of the existing building and then the construction of 2 new build industrial units with a new access road through the site. (see Appendix A for layout).

1.3 This FRA has been produced to demonstrate how risk from all sources of flooding to the site itself and risk to others will be managed, in order to satisfy the requirements, set out in the NPPF – National Planning Policy Framework.

2 Site Description

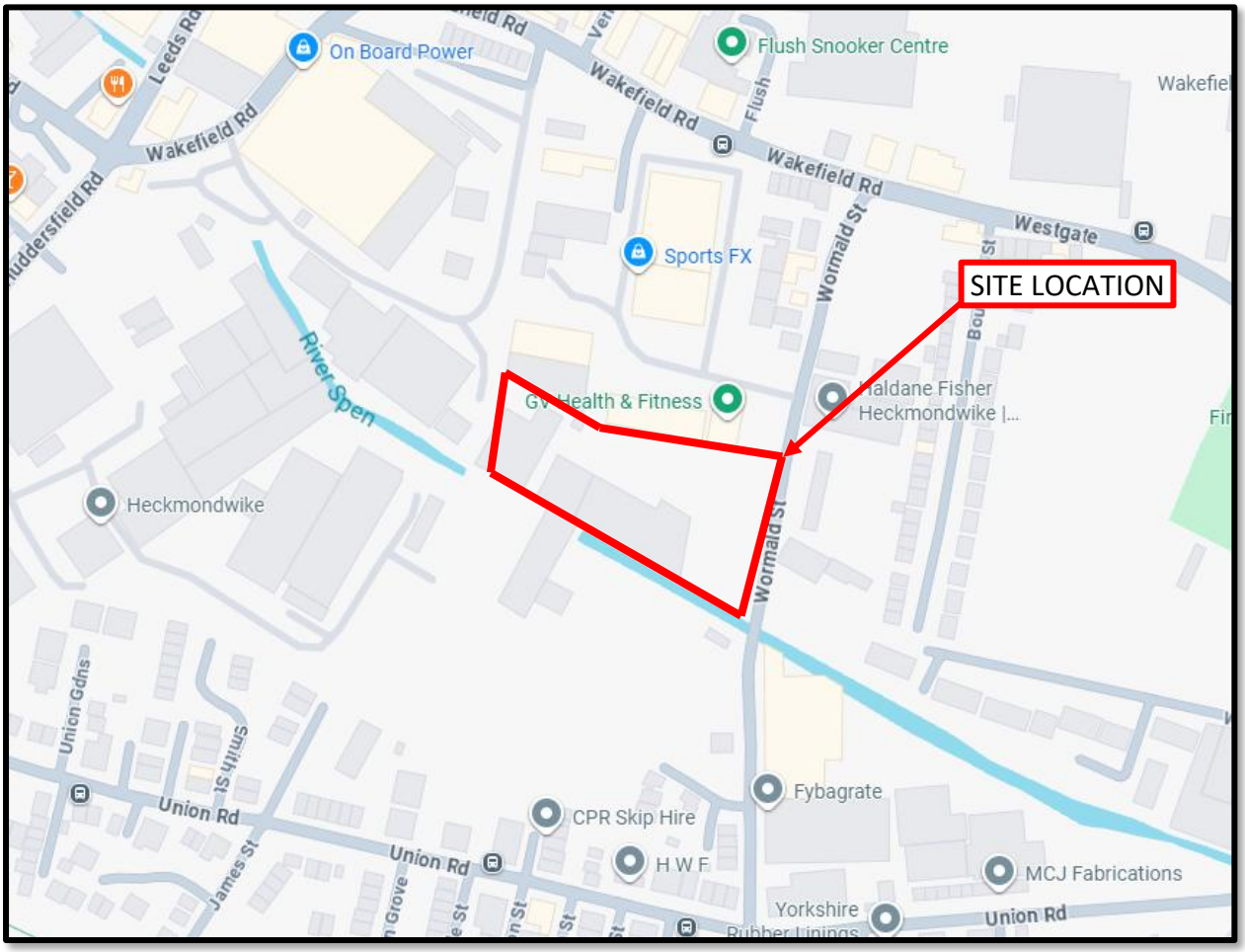
2.1 The site is located off Wormald Street in Heckmondwike, at the following co-ordinates 420966E, 423527N and the nearest postcode is WF15 7JY.

2.2 The building is located within an industrial / commercial area, to the northern, western and southern boundaries are existing industrial / commercial units, and to the east of the site is Wormald Street from which the site is access and beyond which are further industrial / commercial units.

3 Site Levels

3.1 A topographical survey has been undertaken, and the site is fairly flat with levels ranging between 57.50m and 58.30m with a fall from the south to the north. (See Appendix B for topographical survey).

4 Site Location



5 Aerial Photograph



6 Existing Flood Risk.

6.1 National Planning Policy Framework (NPPF) Paragraphs 170-182 refers to the risk based Sequential Test aiming to steer new development to areas at the lowest probability of flooding (Zone 1).

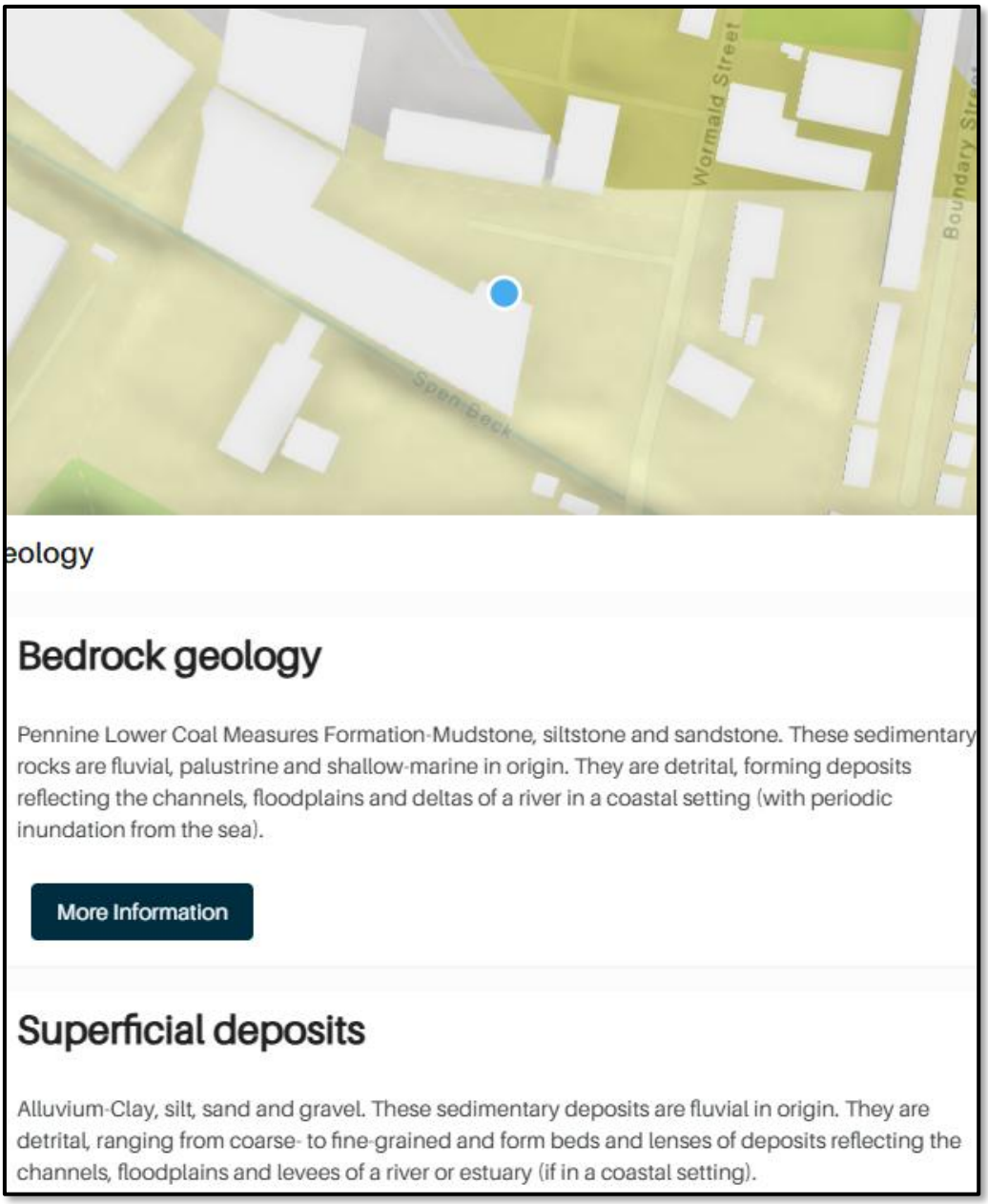
6.2 Paragraph's 170 & 177 of the NPPF states that

> *"170. Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere.."*

> *"177. Having applied the sequential test, if it is not possible for development to be located in areas with a lower risk of flooding (taking into account wider sustainable development objectives), the exception test may have to be applied. The need for the exception test will depend on the potential vulnerability of the site and of the development proposed, in line with the Flood Risk Vulnerability Classification set out in Annex 3."*

7 Existing Geology / Hydrogeology

7.1 At the time of writing this report a ground investigation had not been undertaken, we have therefore referred to the BGS website to determine what the expected ground condition should be as shown below.


Wormald Street
Boundary Str
Spen Beck
eology
Bedrock geology
Pennine Lower Coal Measures Formation-Mudstone, siltstone and sandstone. These sedimentary rocks are fluvial, palustrine and shallow-marine in origin. They are detrital, forming deposits reflecting the channels, floodplains and deltas of a river in a coastal setting (with periodic inundation from the sea).
More Information
Superficial deposits
Alluvium-Clay, silt, sand and gravel. These sedimentary deposits are fluvial in origin. They are detrital, ranging from coarse- to fine-grained and form beds and lenses of deposits reflecting the channels, floodplains and levees of a river or estuary (if in a coastal setting).

8 Environment Agency Consultation

8.1 Consultation has been had with the Environment Agency (EA), and they have provided the flood risk and modelled flood data for this development. The full correspondence can be found in Appendix C however we have extracted the relevant points and detailed them below.

- The site is located in Flood Zone 3 and benefits from Flood Defences.
- There are no known flood events on the site.

FLOOD MODELLED DATA

- Defences Removed with climate change modelled fluvial extent
  - The site would flood in the 1 in 100 year +20% climate change rainfall event.
  - Node 3 = 58.33m AOD
  - Node 4 = 57.78m AOD
  - Node 5 = 57.18m AOD
  - Modelled depth = 0.03m to 0.66m
- Defences removed modelled fluvial extent
  - The site would be subject to flooding in the 1 in 20 year rainfall event, with small areas affected in the 1 in 75 and 1 in 100 rainfall events.
  - Node 3 = 56.88m (20%) 57.45m (4%) 57.93m (1%) 58.95m (0.1%)
  - Node 4 = 56.84m (20%) 57.21m (4%) 57.44m (1%) 58.57m (0.1%)
  - Node 5 = 56.46m (20%) 56.72m (4%) 56.92m (1%) 58.47m (0.1%)
  - The modelled depths range across the different return periods as per below:
    - 1 in 50 (20%) = 0.00m – 0.00m
    - 1 in 75 (1.33%) = 0.11m – 0.39m
    - 1 in 100 (1%) = 0.03m – 0.45m
    - 1 in 1000 (0.1%) = 0.10m – 1.36m
- Defended modelled fluvial extent
  - Approximately 50% of the site is subject to flooding in the 1 in 100 year rainfall event.
  - Node 3 = 57.87m AOD
  - Node 4 = 57.46m AOD
  - Node 5 = 57.05m AOD
  - Modelled depth = 0.00m to 0.00m

9 Sewerage Undertaker Consultation.

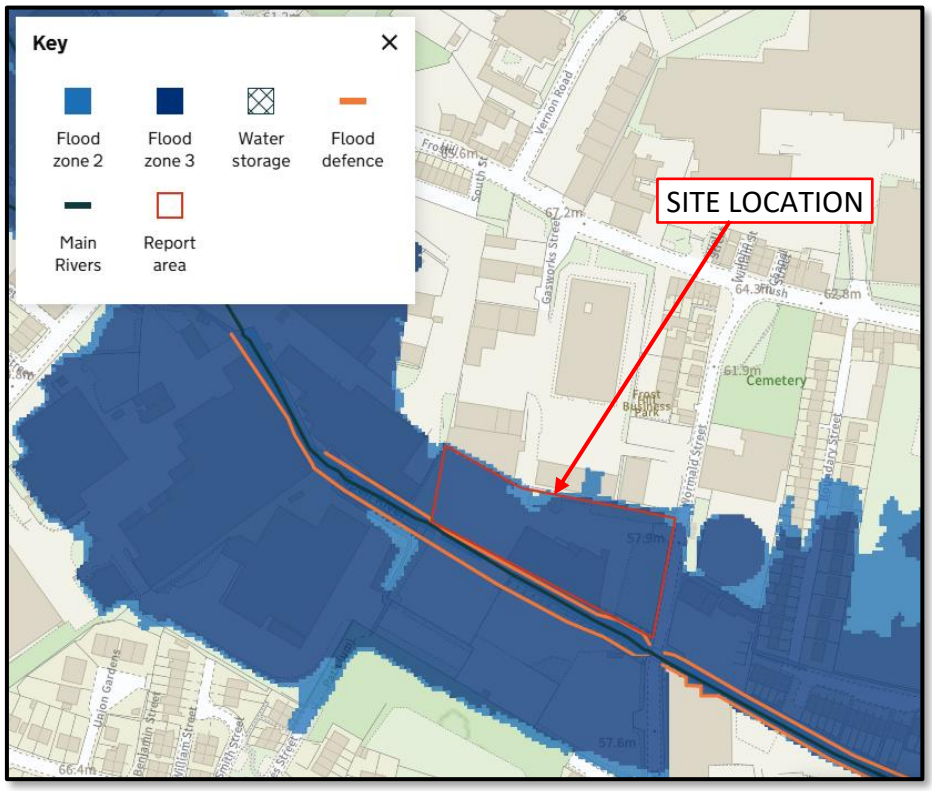
9.1 Yorkshire Water is the sewerage undertaker in this location, the sewer records have been obtained and there are combined sewers running to the north, east and west of the site, and then there is a surface water sewer that crosses through the site before discharging into the River Spen. (See Appendix D)

10 Flood Risk Assessment

10.1 The National Planning Policy Framework (NPPF) aims to avoid inappropriate development in areas at risk of flooding, directing development away from high-risk areas and avoiding increasing or reducing the risk of flooding elsewhere.

10.2 The flood risk assessment will use a sequential approach to assess the site to avoid development in flood risk areas and to manage the residual risks and take into account the effect of climate change. The 'Sequential Test' will start with consideration of the Flood Zones in the vicinity of the site. Where development is proposed within a flood zone an 'Exception Test' may also be necessary in accordance with the National Planning Policy Framework guidance.

10.3 As per the Environment Agency (EA) flood map below, the proposed developed area of the site is in **Flood Zone 3.**



10.4 These flood zones refer to the probability of river and sea flooding, ignoring the presence of defences. They are shown on the Environment Agency's Flood map for planning (River and Seas) available on the Environment Agency's website.

11 Sequential Test

11.1 This risk-based test has the aim of steering new development to area at the lowest probability of flooding, it is broken down into 3 tables, the first of which identifies the risk based on Flood zone as per below, of which this site is within **FLOOD ZONE 3**.

Flood Zone	Definition
Zone 1 Low Probability	Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map – all land outside Zones 2 and 3)
Zone 2 Medium Probability	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. (Land shown in light blue on the Flood Map)
Zone 3a High Probability	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding.(Land shown in dark blue on the Flood Map)
Zone 3b The Functional Floodplain	This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)

11.2 The second table then identifies the vulnerability class of the site dependant on the sites proposed used, and within this table this site falls into the **LESS VULNERABLE DEVELOPMENT** classification as shown below:

Less vulnerable

- Police, ambulance and fire stations which are not required to be operational during flooding.
- 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.
- Land and buildings used for agriculture and forestry.
- Waste treatment (except landfill* and hazardous waste facilities).
- Minerals working and processing (except for sand and gravel working).
- Water treatment works which do not need to remain operational during times of flood.
- Sewage treatment works, if adequate measures to control pollution and manage sewage during flooding events are in place.
- Car parks.

11.3 Finally, Table 3 determines the need for the Exception test based upon the results from tables 1 and 2 previously identified, in this instance the development **IS** appropriate and there **IS NOT** a need for an exception test.

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 *	✗	✗	✗	✓*

Key:

✓ Development is appropriate

✗ Development should not be permitted.

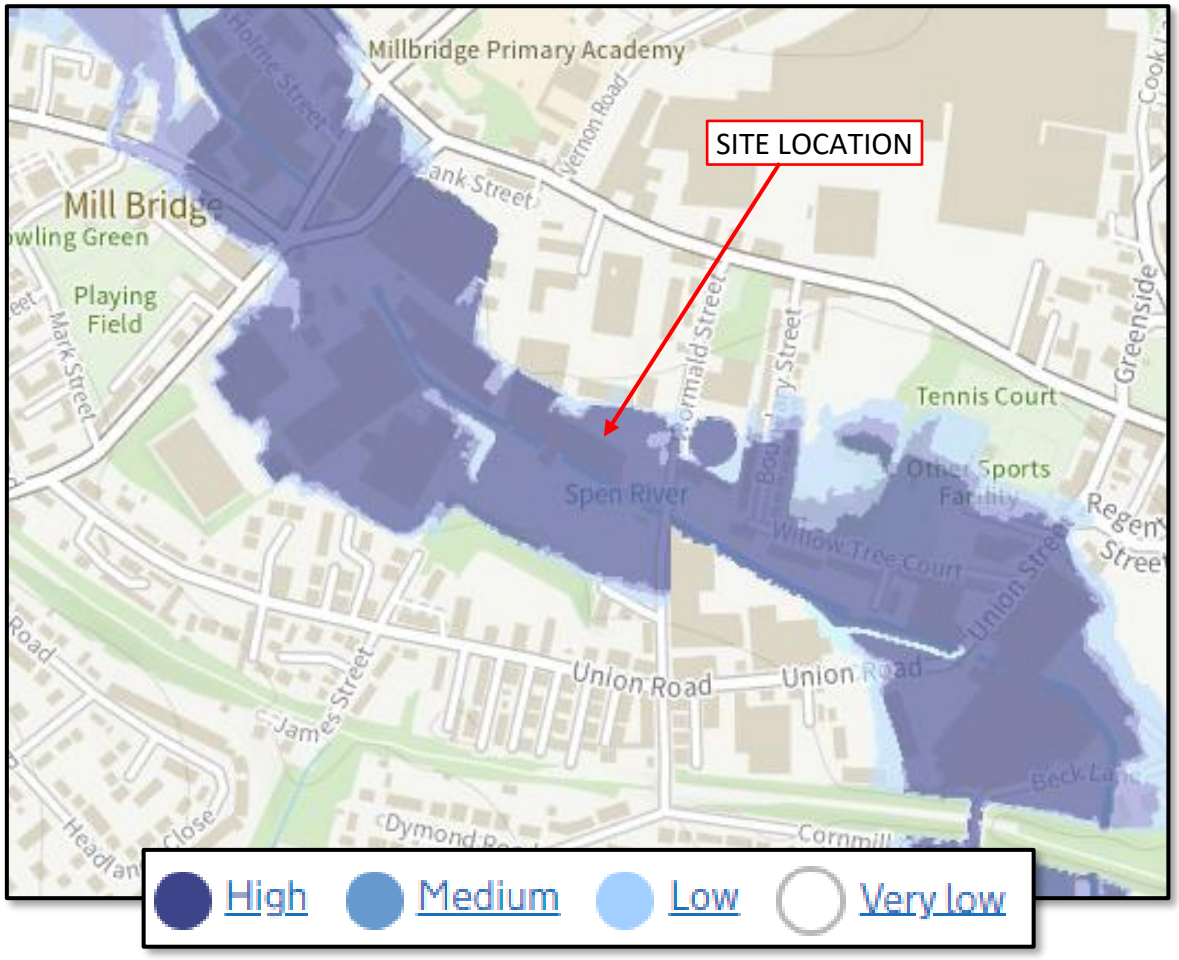
12 Exception Test

12.1 The sequential test has been passed and therefore the exception test is not required.

13 Sources of Potential Flooding

SOURCE OF FLOODING	POTENTIAL RISK				DESCRIPTION
	HIGH	MEDIUM	LOW	NONE	
Fluvial		X			See paragraph 13.1
Pluvial		X			See paragraph 13.7
Reservoirs		X			See paragraph 13.8
Sewers				X	We have not been made aware of any issues with the sewers flooding.
Groundwater				X	Due to the urbanised nature of the area then it wouldn't be expected that ground water would an issue.
Proposed Development				x	See Paragraph 13.9

13.1 The (EA) flood mapping service on their website identifies the areas at risk of flooding from rivers and seas, it can be seen from the below map that the site is at a **Medium** risk of flooding.



13.2 In addition to the above we have the modelled flood data received from the (EA) (See chapter 8) in this we have 3 scenarios, two of which are undefended scenarios, and the site benefits from flood defences and should be able to rely on those flood defences.

13.3 In the defended scenario the modelled flood level is 57.87m (Node 3) at the western end of the site, which is the upstream part of the River Spen, and then 57.05m (Node 5) at the eastern end of the site which is downstream.

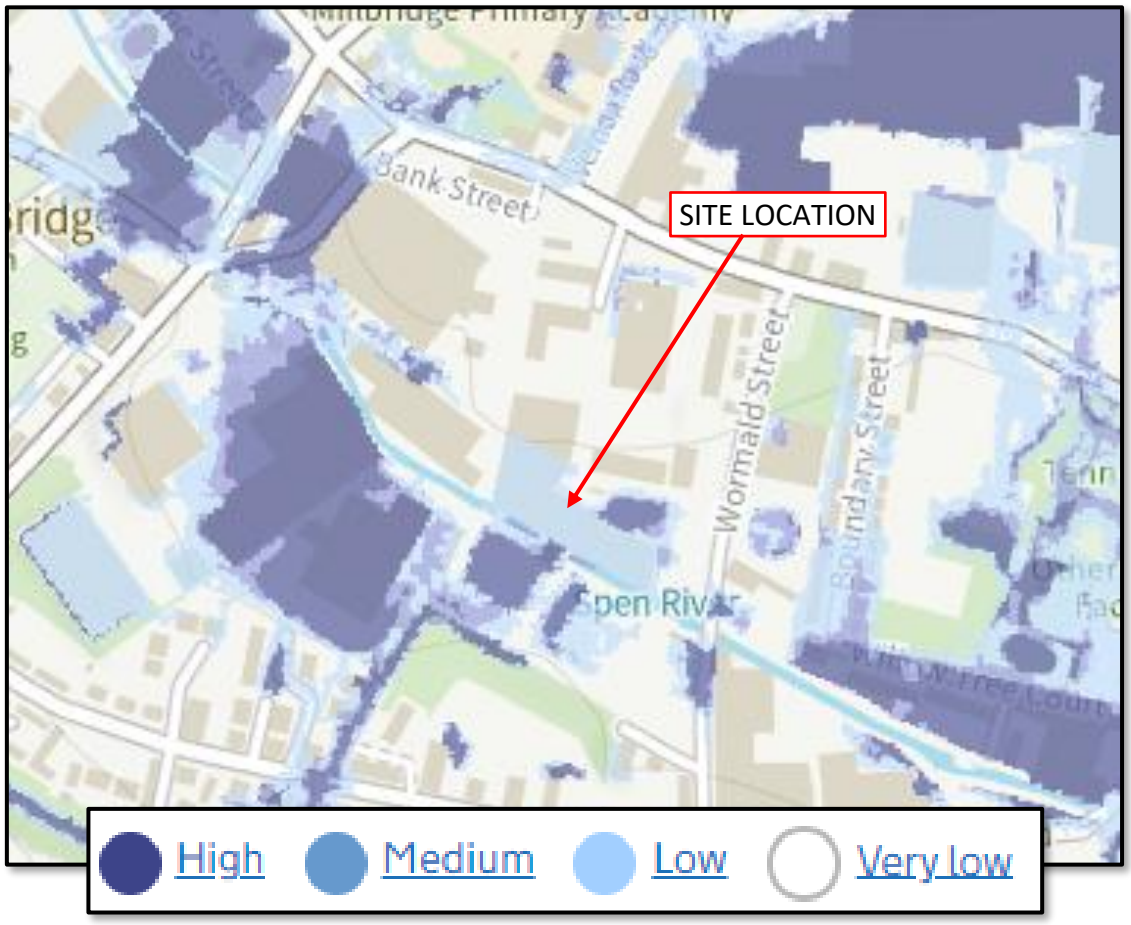
13.4 Along the River Spen is a flood wall with a minimum height of 58.00m and therefore any flood levels up to this height will be retained in the river, it would therefore be prudent to set a minimum FFL of 57.20 on the eastern side of the site and 58.02m on the western side of the site.

13.5 However, even though the site benefits from Flood defences it should be considered what happens in the event of a failure and to what extent the site could flood, from the modelled (EA) data we can establish that the following levels:

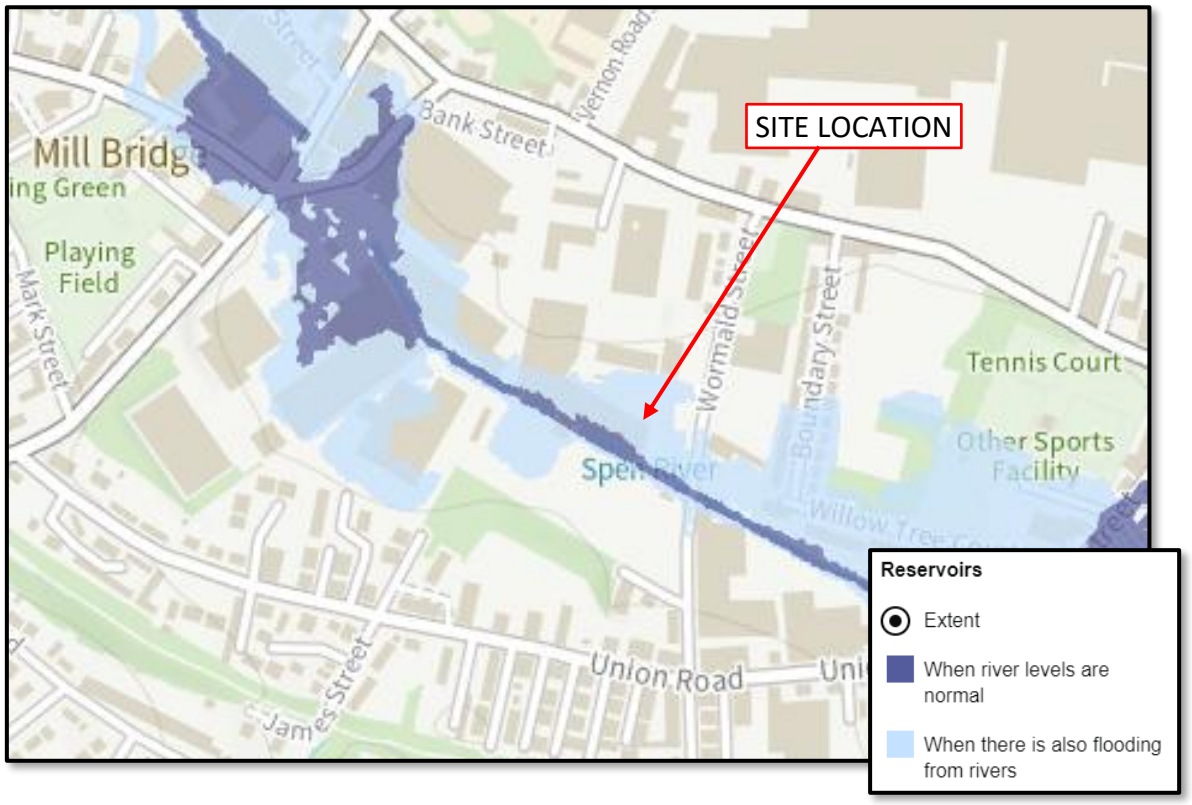
1 in 100 year level (Node 3)	=	57.93m
1 in 100 year + 20% (Node 3)	=	58.33m
1 in 100 year (Node 5)	=	56.92m
1 in 100 year +20% (Node 5)	=	57.18m

13.6 The level in which the river breach and enters the site with the lack of flood defences is 57.50m, so this effects the node along the western side of the site and potentially floods up to 58.33m, therefore it would be prudent to incorporate some Flood Mitigation measures into the site and a Flood emergency evacuation plan for those rare occasions that the site may be occupied at the same time the flood defences fail and a flood event occurs. (See Chapter 14).

13.7 The (EA) flood mapping service on their website identifies the areas at risk from surface water flooding, it can be seen from the below map that the site is not at risk, but the roads along the northern and eastern boundaries are at a **Medium** risk of surface water flooding.



13.8 The (EA) flood mapping service on their website identifies the areas at risk from reservoirs flooding through failure to the reservoir or over topping, as per the map below the site will be at risk of flooding should the reservoir breach when there is also flooding from the river.



13.9 The proposed development needs to be considered when looking at the risks of flooding both on site and also the surrounding areas and downstream of the proposed outfall to ensure that the development does not create flooding elsewhere, the proposed surface water strategy is to restrict the flows and provide attenuation on site so as to manage the flows and as such does not increase the flood risk either on site or elsewhere.

14 Flood Mitigation / Evacuation Plan

14.1 There are certain measure that can be incorporated into the construction of the buildings as well as flood evacuation plans put into place to minimise any damage should the site suffer from a flood event.

Flood resistance measures

14.2 These strategies are designed to prevent floodwater from entering the building.

For doors and windows

- Flood-resistant doors: Replace standard external doors with dedicated flood-resistant versions that have watertight seals.
- Put ACO drains across all the thresholds.

For walls and floors

- Tanking and sealing: Apply a waterproof coating, or "tanking," to internal walls and floors to prevent water from rising up from the ground.
- Seal gaps: Use waterproof sealant to fill any gaps around pipes or cables entering the building.
- Repoint brickwork: Check and repair any gaps in external brickwork with a water-resistant mortar.

For airbricks and pipes

- Automatic airbricks: Replace standard airbricks with "SMART" versions that automatically close when they come into contact with floodwater.
- Non-return valves: Fit these to drains and waste pipes to prevent sewage and floodwater from backing up into the unit. For low-level flooding, a temporary toilet bung can prevent backflow from the toilet.

Flood resilience measures

14.3 These actions minimize damage and speed up recovery if water does enter your home.

Internal fittings

- Raised electrics and utilities: Move electrical sockets, wiring, fuse boxes, and utility meters to at least 1.5 metres above floor level. For boilers and other appliances, consider installing them on an upper floor.
- Water-resistant kitchens: Use materials like stainless steel, solid wood, or plastic for kitchen units, as chipboard and MDF will disintegrate when wet. Raising fridges and freezers on plinths can also help.

- Wall-mounted storage: Fix televisions and shelving units high on walls to keep valuable items and documents away from floodwater.

Preparatory actions

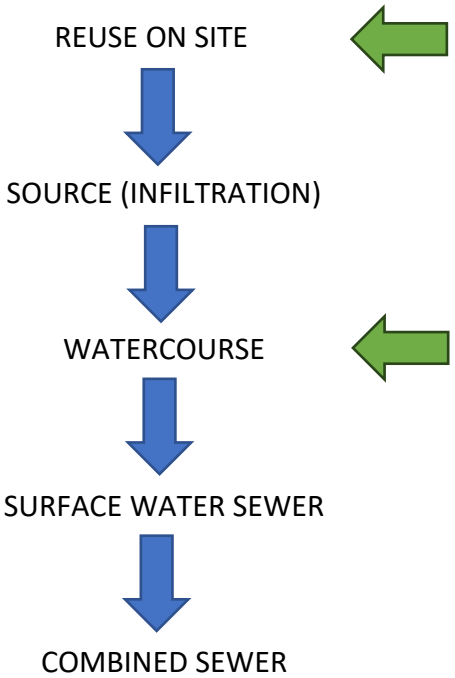
14.4 Taking these steps in advance will help you act quickly and effectively during a flood event.

- Create a flood plan: A flood plan should include essential contacts, where to find and install your flood protection, and how to safely shut off your utilities.
- Sign up for warnings: Register for flood alert messages from the government's Flood Warning Service.

15 Drainage Strategy

Surface Water

15.1 In accordance with the SUDS hierarchy when considering surface water drainage then consideration to each of the below discharge options should be considered in sequence:



15.2 In the first instance the reuse of water on site should be implemented, due to the industrial nature of the site then we don't see a practical way of doing this.

15.3 Based on the above we would consider that the ground would be unsuitable for infiltration therefore we have discounted the use of soakaways.

15.4 Next in the SUDS hierarchy would be to discharge to a water course, the River Spen runs along the southern boundary of the site.

15.5 The site is a brownfield site with an existing dwelling on site, however the surface water discharge should be returned to greenfield rates wherever practically possible, which for this site are as follows: (see appendix E for greenfield calc):

Q Bar = 3.6 l/s
1 in 1Year = 3.1 l/s
1 in 30 Year = 6.3 l/s
1 in 100 Year = 7.5 l/s

15.6 It is considered that the above rates are too small to be achieved due to the mass storage requirements, the existing site is 100% concrete and has 100% impermeable area that all flows into the River Spen.

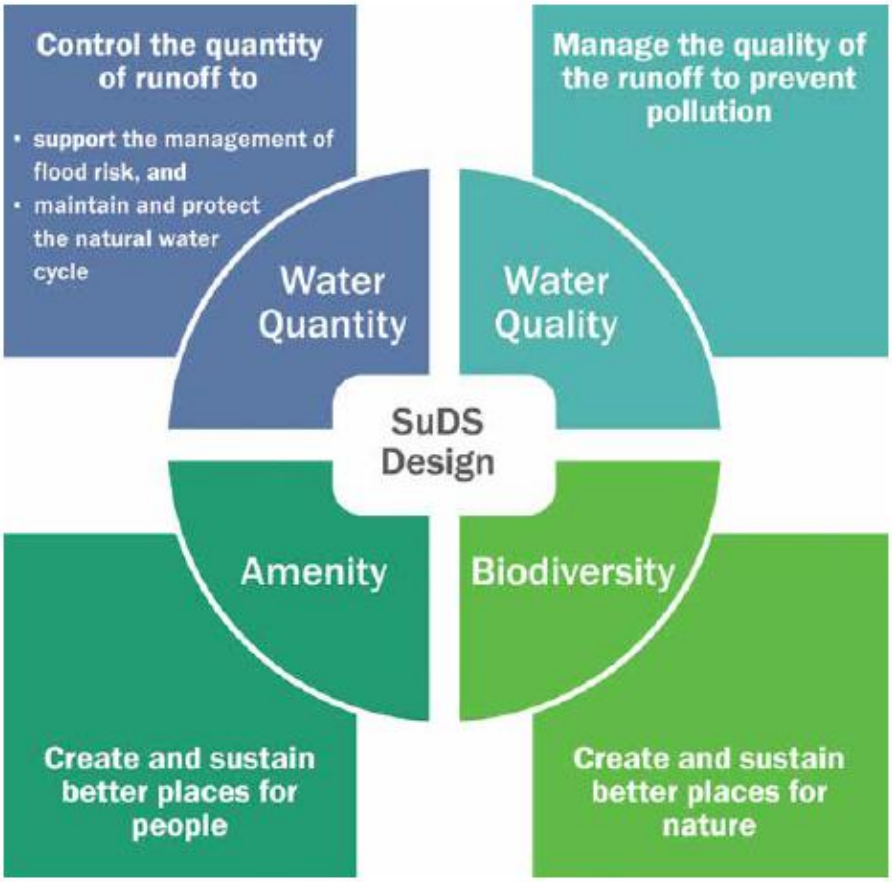
15.7 We have therefore proposed that a fair discharge rate and would be 50% of the Brownfield rate of runoff which equates to:

2.78 x 0.71 x 50 = 98.7 l/s
98.7 x 0.5 = **49 l/s**

15.8 It is therefore proposed to restrict the flow from site to **49 l/s** with attenuation provided on site in the form of cellular attenuation tanks sized to accommodate the **1 in 100 year + 40%** rainfall event**.** (See Appendix F for the drainage layout and Appendix G for the calcs).

16 SUDS

16.1 All new surface water should be designed in accordance with 'The SUDS Manual' which identifies 4 pillars of a sustainable drainage solution, these four elements are shown as:



16.2 **WATER QUANTITY:** The surface water from the site is being restricted to 49.0 l/s which is a 50% reduction on the existing discharge rate, with attenuation on site sized to accommodate the 1 in 100 year + 40% climate change rainfall event.

16.3 **WATER QUALITY:** Permeable paving may be possible in the parking bays in which HGV's would not be trafficked.

16.4 **AMENITY AND BIODIVERSITY:** New landscaped areas are being included into the layout that were not previously there.

16.5 All new surface water drainage systems should implement SUDS features where reasonably possible, these features are incorporated to offer benefits in Water Quality, Water Quantity, Amenity and Biodiversity. Below we have considered each SUDS element and determined it use within this particular development.

COMPONENT	SUITABILITY	REASON
Rainwater Harvesting	✓	Rainwater Harvesting units are being proposed.
Green Roof	X	Roofs are pitched and not suitable for green roofs
Blue Roof	X	Roofs are pitched and not suitable for blue roofs
Infiltration Systems	X	Infiltration is not suitable on this site.
Proprietary Treatment Systems	✓	Flow control device to be used.
Filter Strips	X	Infiltration is not suitable on this site.
Filter Drains	X	Infiltration is not suitable on this site.
Swales	X	Infiltration is not suitable on this site nor is there sufficient land.
Bioretention Systems	X	Insufficient land available.
Trees	✓	New trees are being proposed in the new landscaped areas
Pervious Pavements	✓	Potential for some parking bays to be permeable
Attenuation Storage Tanks	✓	Cellular attenuation tanks proposed
Detention Basins	X	Insufficient land available.
Ponds and Wetlands	X	Insufficient land available.

17 Proposed Foul Drainage

17.1 The new foul drainage is proposed to discharge to the public combined sewer located north of the site.

18 SUDS Operations and Maintenance Plan

18.1 The proposed drainage strategy consists of several SUDS elements which can have different responsibilities on the operation and maintenance, and each one will require routine checks and repairs, these different SUDS elements and their require maintenance are as outlined in the table below.

ELEMENT	RESPONSIBILITY		
	PUBLIC	PRIVATE	MANAGEMENT COMPANY
RAINWATER HARVESTING			✓
ATTENUATION TANK			✓
PERMEABLE PAVING			✓
FLOW CONTROL			✓

18.2 RAINWATER HARVESTING

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspection of the tank for debris and sediment build-up, inlets/outlets/withdrawal devices, overflow areas, pumps, filters	Annually (and following poor performance)
	Cleaning of tank, inlets, outlets, gutters, withdrawal devices and roof drain filters of silts and other debris	Annually (and following poor performance)
Occasional maintenance	Cleaning and/or replacement of any filters	Three monthly (or as required)
Remedial actions	Repair of overflow erosion damage or damage to tank	As required
	Pump repairs	As required

18.3 ATTENUATION TANK

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

18.4 PERMEABLE PAVING MAINTENANCE

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment
Occasional maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphospate applied directly into the weeds by an applicator rather than spraying	As required – once per year on less frequently used pavements
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving	As required
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	Three-monthly, 48 h after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

18.5 FLOW CONTROL DEVICE MAINTENANCE

Maintenance schedule	Required action	Typical frequency
Routine maintenance	Remove litter and debris and inspect for sediment, oil and grease accumulation	Six monthly
	Change the filter media	As recommended by manufacturer
	Remove sediment, oil, grease and floatables	As necessary – indicated by system inspections or immediately following significant spill
Remedial actions	Replace malfunctioning parts or structures	As required
Monitoring	Inspect for evidence of poor operation	Six monthly
	Inspect filter media and establish appropriate replacement frequencies	Six monthly
	Inspect sediment accumulation rates and establish appropriate removal frequencies	Monthly during first half year of operation, then every six months

19 Flood Exceedance Event

19.1 Although the drainage has been designed to accommodate the 1 in 100 year + 40%cc rainfall event consideration has to be given to the exceedance event to the drainage, this is the event where the surface water system is pushed to such a point that it is forced to flood so that the resultant flow paths can be identified on a plan. (See Appendix H for plan).

19.2 As demonstrated on the flood exceedance plan, any flows would head towards the River Spen just as they would have done pre-development.

20 Conclusion

20.1 Advant Engineers has been commissioned by Barnes Homes Ltd, to undertake a Flood Risk Assessment (FRA) and Drainage Strategy (DS) for a proposed development located off Wormald Street in Heckmondwike.

20.2 The proposed developed is located in **Flood Zone 3** and is at a **Medium** risk of flooding from rivers and watercourses and a **Medium** risk of flooding from surface water.

20.3 The site is at a risk of flooding from reservoirs when in conjunction with river flooding.

20.4 The sequential test was undertaken, and the site was deemed that the exception test was NOT required.

20.5 The product 4 data as received from the (EA) and it was deemed the site was safe from flooding with the benefits of flood defences, however in the event of the defences failing then the site could flood and Flood mitigation measures and evacuation plans should be implemented.

20.6 The surface water is to discharge to the watercourse at a restricted rate of 49.0 l/s with attenuation on site size to accommodate the 1 in 100 +40% rainfall event.

20.7 The foul drainage is proposed to connect to the public combined sewer located just north of the site.

20.8 All private surface water and surface water/foul water drainage should be designed in accordance with the current Building Regulations Part H.

20.9 This Flood Risk Assessment and Drainage Strategy has confirmed that subject to the details in this report, the proposed development is appropriate and sustainable in the terms as set out in NPPF.

Appendix A
Proposed Layout Plans

CLIENT

Barnes Homes Yorkshire Ltd

PROJECT

Land Adj. Victoria Spring Business Park
Wormald St.
Liversedge
WF15 9EU

DRAWING TITLE

Site Plan - Drainage/Utilities

STATUS

D2 - Tender

DRAFT

Proj Ref	Origin	Zone	Level	Type	Role	Num	Status	Rev
90102	- BAS	- 00	-00	- DR	- A	-01250	-D2	- P1

Sheet	Scale	Issue Date	Drwn by	Ckd by
A1	1 : 200	13-02-26	AB	AB

North

W E

S

REV	DESCRIPTION	DATE	DRAWN
P1	Drawing updated for Michael.	09-03-26	AB
P0	First Issue	19-02-26	AB

ISSUE/REVISION HISTORY

bas architects

Unit 9, Victoria Spring Business Park
Liversedge, West Yorkshire WF15 6BU

NOTES
Do not scale from this drawing. Only figured dimensions are to be taken from this drawing. Contractor must verify all dimensions on site before commencing any work or shop drawings. Report any discrepancies to the architect before commencing work. If this drawing exceeds the quantities taken in any way the architects are to be informed before the work is initiated. Work within the Construction (Design & Management) Regulations 2015 is not to start until a Health and Safety Plan has been produced. This drawing is copyright and must not be reproduced without consent of BAS Architects Ltd.

DRAWING STATUS/TYPE KEY

S0	Feasibility	**S2**	Sketch
L	Landscape	**D4**	Construction
S4	Planning	**Z**	Marketing
B	Building Survey	**B3**	As Built
D2	Tender	**Z**	Tenant
OS	Ordnance Survey		

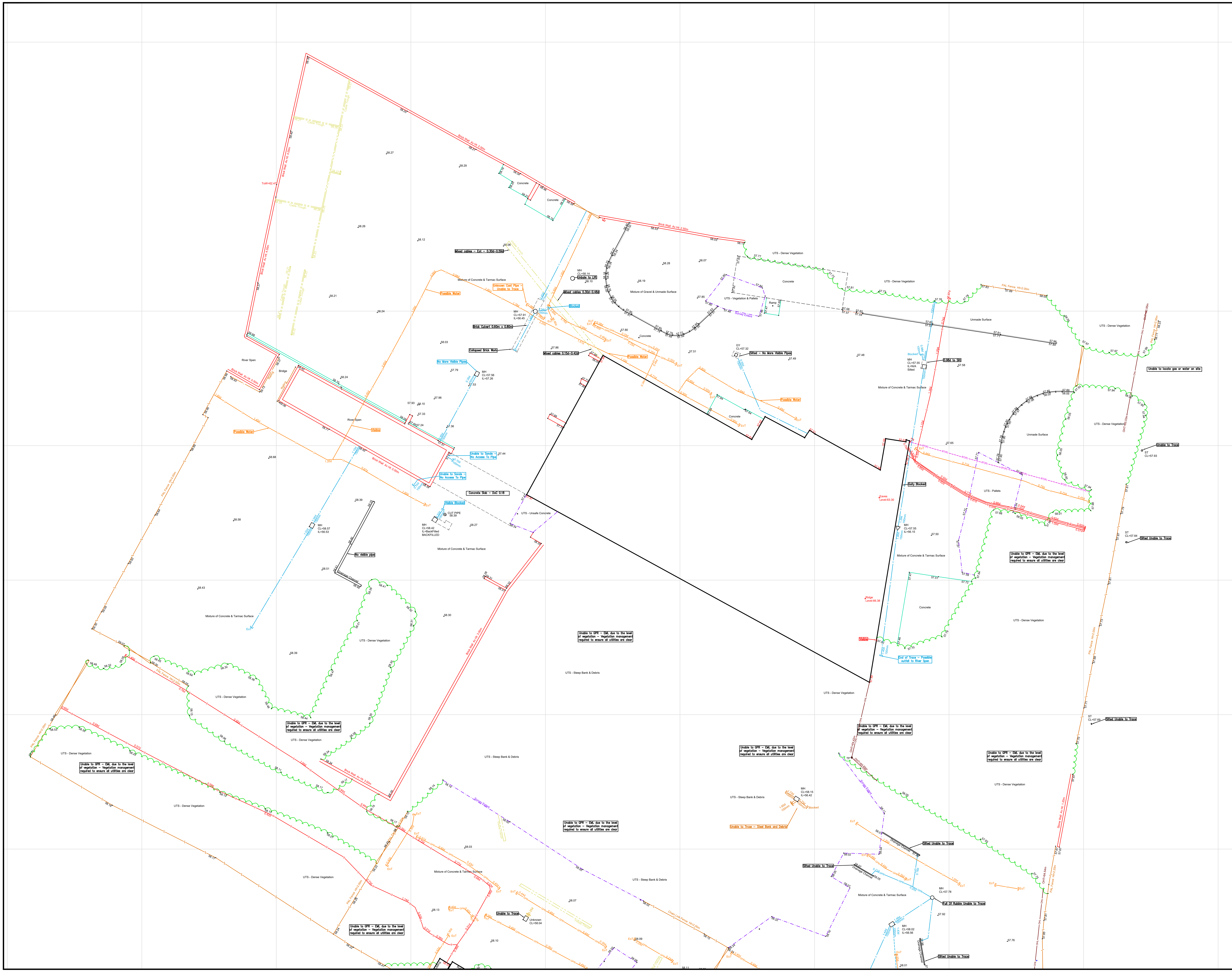
Proposed Site Plan - Utilities

1 : 200

SCALE 1:200

0 2m 4m 6m 8m 10m

Appendix B
Topographical Survey



NORTH

Topographic Legend

Bottom of Bank | OH Electric
Top of Banking | Railway Line
Building | Road Centre
Building Canopy | Road Markings
Concrete Base | SC Hard:Hard
Contour Major | SC Hard:Soft
Contour Minor | SC Soft:Soft
Fences | Steps
General | Tree Canopy
Kerb Bottom | Vegetation
Kerb Drop | Visible Trench
Kerb Top | Walls
OH Comms | Water Edge

Topographic Abbreviations

AV	Air Valve	PB	Pedestrian Beacon
BH	Borehole	PBox	Post Box
BO(IL)	Bollard (Illuminated)	PGR	Pedestrian Guard Rail
BS	Bus Stop	PM	Parking Meter
Cab	Cabinet	PO	Post
CL=	Cover Level	RE	Rodding Eye
COL	Column	RS(IL)	Road Sign (Illuminated)
Conc	Concrete	RWP	Rain Water Pipe
DC	Drainage Channel	SP(IL)	Sign Post (Illuminated)
DFBin	Dog Foul Bin	SPCam	Speed Camera
DP	Down Pipe	ST	Stop Tap
EP	Electricity Pole	SV	Sluice Valve
ER	Earth Rod	SVP	Soil Vent Pipe
FFL=	Finished Floor Level	TBox	Telephone Box
FH	Fire Hydrant	TL	Traffic Light
FP	Flag Pole	TOF=	Top of Fence Level
GP	Gate Post	TOW=	Top of Wall Level
GV	Gas Valve	TP	Telecoms Pole
GY	Gully	VP	Vent Pipe
IC	Inspection Cover	WB	Waste Bin
KO	Kerb Outlet	WB=	Window Bottom Level
LP	Lamp Post	WM	Water Meter
MH	Manhole	WO	Wash Out
Mkr	Marker	WT=	Window Top Level
MP	Marker Post	WV	Water Valve
		MW	Monitoring Well

Measured Building Legend

External Building Line
Internal Building Line
Building Overheads
Stairs/Steps
Doors
Windows
Sanitaryware
Kitchen Furniture
Direction of Stairs (Arrow points up)
Direction of Sloped Ceiling (Arrow points down)
Sill=0.00 Head=0.00 Window Sill and Head Height
Double door | CH=0.00 Ceiling Height
Single door | FCH=0.00 False Ceiling Height
Window | FFL=0.00 Finished Floor Level

Utility Legend

Air Line | SWD Sewer
Alarm Cable | Survey Extents
BT Cable | Heating Pipe
CATV Cable | HV Electric Cable
Chamber Extent | Kingston Comms
Comms Cable | Oil Pipe
CWD Sewer | Rising Main
Earth Wire/Tape | Traffic Control
Electric Cable | Unknown Detection
Fibre Optic Cable | Vent Pipe
Fuel Line | GPR Detection
FWD Sewer | Assumed Route
Gas Pipe | Records Route
Band of Cables | Cable Riser
Empty Service Duct | Drainage Backdrop

Utility Abbreviations

CP	Cathodic Protection	LoS	Loss of Signal
Cut	Disconnected Utility	MDPE	Middle Density PE
DI	Ductile Iron	SI	Spun Iron
DoB	Depth of Bottom	TLC	Traffic Light Control
DoC	Depth of Cover	UDI	Unreliable Depth Info
ED	Empty Duct	uPVC	Unplasticised Polyvinyl Chloride
EoT	End of Trace	UTR	Unable to Raise
PE	Polyethylene	VC	Vitrified Clay
HDPE	High Density PE		

Manufacturer Stated Depths

Detected Using Electromagnetic Location Methods e.g. Any metallic pipe/cable. Accuracy ± 2.5% of depth reading.

Detected Using Electromagnetic Location Methods eg. Using a Sonde to locate drainage pipework Accuracy ± 2.5% of depth reading.

Detected Using Ground Penetrating Radar e.g. A plastic pipe or service not located by other means. Accuracy depends on ground conditions.

CAUTION LIVE SERVICES PRESENT - EXTREME CARE SHOULD BE TAKEN WHEN EXCAVATING

ZS Surveys Ltd., and their agents or partners, are not responsible for any situation, incident or loss resulting from actions or planning resulting from total reliance upon this drawing or accompanying information. The completeness of the underground network information cannot be wholly guaranteed and as such no guarantees or warranties are provided or implied.The location and/or identification of a service will not positively indicate whether it is live or dead. A service indicated from records that has not been located or identified on site does not necessarily imply that it does not exist or is dead, however, its presence should be anticipated.
The results of Electro Magnetic and GPR detection techniques are not infallible and ground proofing for the actual position and depth of services should be established.

If this drawing and any associated drawings should be used in relation to works, we advise that the users of this information follow the principles detailed by the Health and Safety Executive guidance directive HS(G) 47, "Avoiding Danger from Underground Services". Further details of this directive are available at www.hse.gov.uk <http://www.hse.gov.uk/>

Notes

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ALL LEVELS RELATED OSTN15 GRID PROJECTION.

ALL DIMENSIONS SHOULD BE VERIFIED ON SITE PRIOR TO CONSTRUCTION.

ALL HATCHING IS FOR PRESENTATIONAL PURPOSES ONLY.

UNABLE TO LOCATE GAS AND WATER ON SITE.

Client	BARNES homes		
Site Location:	WORMALD STREET/UNION ROAD LIVERSEDGE WF15 7JE		
Drawing Type:	TOPOGRAPHICAL & UTILITY SURVEY		
Surveyed:	PR,CR	Drawn:	PR,CR
Checked:	ZS	Authorised:	ZS
Date:	01,08,25	Scale:	1:250@A1

ZS Surveys Ltd
Land, Building & Engineering Surveyors
www.zssurveys.com
info@zssurveys.com

Project Number:	4431
Sheet Number:	1 of 2

Appendix C
EA Data

The Flood Map for Planning

The Flood Map for Planning (Rivers and Sea) can be viewed and downloaded as a PDF file on GOV.UK by following this link: https://flood-map-for-planning.service.gov.uk **or downloaded in GIS format under an open data licence from the following address**: https://environment.data.gov.uk/
Please type Flood Map for Planning in the search box.

What is the Flood Map for Planning?

The Flood Map for Planning provides information on flooding from rivers and the sea for England and Wales. The Flood Map also has information on flood defences and the areas benefiting from those flood defences.

The Flood Map for Planning shows the following:

1. Flood Zone 3 (dark blue area on the enclosed map): natural flood plain area that could be affected by flooding from rivers and/or the sea – not taking into account the presence of any flood defences
   - For flooding from rivers the map indicates the extent of a flood with a 1% (1 in 100) chance of happening each year;
   - For flooding from the sea the map shows the extent of a flood with a 0.5% (1 in 200) chance of happening each year.

2. Flood Zone 2 (light blue area): natural flood plain area that could be affected by flooding from rivers and/or the sea – not taking into account the presence of any flood defences. Flood Zone 2:
   - indicates the extent of a flood with a 0.1% (1 in 1000) chance of happening each year.
   - and/or indicates the greatest recorded historic flood, whichever is greater.

3. Flood defences built in the last five years to protect against river floods with a 1% (1 in 100) chance of happening each year, together with some natural or constructed entities which retain, store or channel water and which may protect against smaller floods.

Flood History (if applicable)

See the attached map showing the flood history for this site. The extent of flooding, and/or flood level information is only shown for those watercourses surveyed after the flood. Other flooding may have occurred which is not shown. This is the best information currently available. Please note that for this reason, we are unable to confirm if flooding has occurred at a property scale. The Flood History Map PDF we have provided shows the area of land that has flooded rather than any individual property.
Please refer to the attached table detailing the causes of those past floods.

In the attached list, there may be outlines which have not been included; these have a Flood Map or Historical Flood Map status of "Considered and Rejected". This could be for various reasons, including but not limited to the outline consisting of flooding from surface water, overland flow or sewage. It could also be a result of the data being of very poor quality, or in some cases, where changes in the area make a historical flood outline no longer representative of the flood risk, e.g. ground raising or flow path changes.

Water causing flooding can come from different places, for example from rivers or the sea; surface water (i.e. rainwater flowing over or accumulating on the ground before it is able to enter rivers or the drainage system); overflowing or backing up of sewers or drainage systems which have been overwhelmed or from groundwater rising from underground aquifers.

Please note that this record doesn't include all of the flooding that may have occurred including and since 1st November 2023.Given the process of recording, verifying and updating our record from major floods is extensive and may take a considerable amount of time.

Assets (if applicable)

Asset Location Map
Please find attached asset map(s) showing the location of all (Agency and non-Agency maintained) flood defences.

Description of Works
See attached table with description of the defences shown on the above drawing, including condition ratings, upstream and downstream crest levels, where available.

Risk of Flooding – Environment Agency Defences
The risk of flooding in this area is now reduced by the presence of flood defences that we maintain, but there still is a residual risk of flooding if these were to breach or be overtopped by a flood greater than that for which they were designed.

Risk of Flooding – Privately Maintained Defences
You will see that the Environment Agency does not maintain any of those defences. However, we undertake regular risk based visual inspections. We do not hold design levels and have no height information on these defences.

Asset Condition Ratings
The performance of a flood defence asset is recorded as the condition of the asset. Our asset inspectors subjectively assess the conditions of assets (during visual inspection site visits) with reference to a national standard template. Each asset is given a rating between one and five with one being very good condition and five being very poor. A condition rating of 3, or 'fair' is the minimal acceptable standard for a critical asset, such as a defence wall that protects properties. We are striving to improve all assets below 'fair' to an acceptable standard.
Asset inspections are done on average every six months, although some critical assets are assessed on a more regular basis. It is possible that adjacent assets are inspected on different dates, which may result in two assets of a similar state of repair having different condition ratings.
Condition ratings of assets may also be affected by the time of year the surveys are conducted, as vegetation may obscure the asset in the summer months, or accessibility may be an issue during winter months. These factors would not usually affect the recorded condition rating of an asset unless the asset is on a borderline between two ratings.

Asset Standard of Protection
Please note that the provided Design Standard of Protection is an estimate and should not be relied on. Please note that where available the defended flood extents provide more reliable information relating to the protection offered by the defence (i.e. at which return period the water levels are likely to overtop the defence). If available and required, the defended flood extents can be provided on request.

Modelling
Please note that whilst the information provided is our best available data, we do not guarantee that is sufficient for land use planning or other such purposes. It is the applicant’s responsibility to assess the suitability of the provided model/data for their purposes.

Climate Change

Updated guidance on how climate change could affect flood risk to new development - 'Flood risk assessments: climate change allowances' was published on gov.uk on 19 February 2016. You should confirm the flood risk vulnerability classification and lifetime of your proposed development in line with NPPF and apply the appropriate climate change allowances.

Bespoke Flood Risk Assessment (FRA) advice:

If the pre-application advice is required with regards the preparation of a site-specific Flood Risk Assessment, this can be requested via the Yorkshire Sustainable Places team (email: sp-yorkshire@environment-agency.gov.uk). Charges may apply for any advice that is provided, this currently stands at £100 per hour per person. The .gov.uk pages provide a good starting point on what to include within a site-specific Flood Risk Assessment and can be accessed via https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications. A site-specific Flood Risk Assessment will need to consider flood risks from all sources, including those associated with defence failure (e.g. breach) and accounting for the predicted impacts as a result of climate change. Please contact the Sustainable Places team if you require advice on how to include these within a Flood Risk Assessment.

Other

Surface Water Map

Lead Local Flood Authorities (LLFA) are responsible for managing local flood risk from surface water flooding and groundwater flooding. You should check with the LLFA as they may have more up to date information regarding this type of flooding.

The Risk of Flooding from Surface Water Flood Map can be viewed and downloaded as a PDF file on GOV.UK by following this link: https://flood-warning-information.service.gov.uk/long-term-flood-risk

Surface Water Drainage

The Lead Local Flood Authority is the statutory consultee for planning matters relating to surface water drainage, therefore it is recommended they should be consulted separately regarding this.

Surface water discharge from new development should ideally 'mimic' the pre-development situation using a sustainable drainage system so that the flow and volume of water in watercourses is not increased.

A permit may be required, under the Environmental Permitting Regulations 2016 from the Environment Agency for any proposed works or structures in, under, over or within eight metres of a 'main river' (e.g., a new outfall). A permit is separate to and in addition to any planning permission granted. Further details and guidance are available on the GOV.UK website: https://www.gov.uk/guidance/flood-risk-activities-environmental-permits

Risk of Flooding from Reservoirs Map

Outlines and simplified depth and velocity maps can be viewed on our website:

https://flood-warning-information.service.gov.uk/long-term-flood-risk/#x=438988&y=406600&scale=2

Please, zoom into the location of interest, and then click on the inundated location for details. As a result a list of reservoirs will be provided with supporting information and a links to other data, such as estimated depths and speed of flooding, at the bottom of the result page.
A map of showing the outlines can also be provided on request.

Flood Warning

The site may be covered by a Flood Warning. To register to receive this service, you can call Floodline 24 hours a day on 0845 988 1188.

LIDAR Data

Please note that our LiDAR data is now available free of charge (Open Data) from https://environment.data.gov.uk/survey (once zoomed to the relevant location the available LiDAR products will be listed below the map).

Two LIDAR products are available:

1. Tiled LIDAR data - The full tiled dataset consists of historic LIDAR data which has been gathered since 1998. For some areas we have carried out repeat surveys and data is available in a range of resolutions.
2. Composite LIDAR data - The composite dataset is derived from a combination of our full tiled dataset which has been merged and re-sampled to give the best possible spatial coverage.

Light Detection and Ranging (LIDAR) is an airborne mapping technique, which uses a laser to measure the distance between the aircraft and the ground. This technique results in the production of an accurate, cost-effective terrain model suitable for assessing flood risk and other environmental applications.
The Environment Agency owns two LIDAR systems, which are installed in a survey aircraft along with its other operational remote sensing instruments.
The aircraft is positioned and navigated using Global Positioning System (GPS) corrected to known ground reference points. The aircraft typically flies at a height of about 800 metres above ground level and a scanning mirror allows a swath width of about 600 metres to be surveyed during a flight.

The Rights & Responsibilities of a Riverside Owner

The owner of property adjacent to a watercourse is usually deemed to be the riparian owner and, as such, has both riparian rights and responsibilities with regard to the watercourse within their ownership.

For more information on Rights and Responsibilities of a riverside owner, you can visit our website at:

Your Watercourse: Rights and Roles,

Ordnance Survey Data

Under the terms of our licence agreement with the Ordnance Survey, we are unable to supply the OS data. Under this agreement we can only supply OS data to consultants/contractors carrying out work on our behalf.

Did you know?

You can now request flood risk assessment data (also known as a Product 4) online at https://flood-map-for-planning.service.gov.uk/

Flood risk assessment data

Location of site: 420955 / 423488 (shown as easting and northing coordinates)
Document created on: 3 July 2025
This information was previously known as a product 4.
Customer reference number: 1H9RAH11C15H

Map showing the location that flood risk assessment data has been requested for.



How to use this information

You can use this information as part of a flood risk assessment for a planning application. To do this, you should include it in the appendix of your flood risk assessment.

We recommend that you work with a flood risk consultant to get your flood risk assessment.

Included in this document

In this document you'll find:

- how to find information about surface water and other sources of flooding
- information on the models used
- definitions for the terminology used throughout
- flood map for planning (rivers and the sea)
- past floods
- flood defences and attributes
- information to help you assess if there is a reduced flood risk from rivers and the sea because of defences
- modelled data
- information about strategic flood risk assessments
- information about this data
- information about flood risk activity permits
- help and advice

Surface water and other sources of flooding

When using the surface water map on the check your long term flood risk service the following considerations apply:

- surface water extents are suitable for use in planning
- surface water climate change scenarios may help to inform risk assessments, but the available data fall short of what is required to assess planned development
- surface water depth information should not be used for planning purposes

To find out about other factors that might affect the flood risk of this location, you should also check:

- reservoir flood risk
- groundwater flood risk - you could use the British Geological Survey groundwater flooding data, groundwater: current status and flood risk and the guide on mining and groundwater constraints for development - further information may be available from the lead local flood authority (LLFA)
- your local planning authority's SFRA, which includes future flood risk

Your Lead Local Flood Authority is Kirklees District.

For information about sewer flooding, contact the relevant water company for the area.

About the models used

Model name: 2009 FIM River Spen
Scenario(s): Defended fluvial, defences removed fluvial, defences removed climate change fluvial
Date: 1 March 2009

This model contains the most relevant data for your area of interest.

Terminology used

Annual exceedance probability (AEP)

This refers to the probability of a flood event occurring in any year. The probability is expressed as a percentage. For example, a large flood which is calculated to have a 1% chance of occuring in any one year, is described as 1% AEP.

Metres above ordnance datum (mAOD)

All flood levels are given in metres above ordnance datum which is defined as the mean sea level at Newlyn, Cornwall.

Flood map for planning (rivers and the sea)

Your selected location is in flood zone 3.

Flood zone 3 shows the area at risk of flooding for an undefended flood event with a:

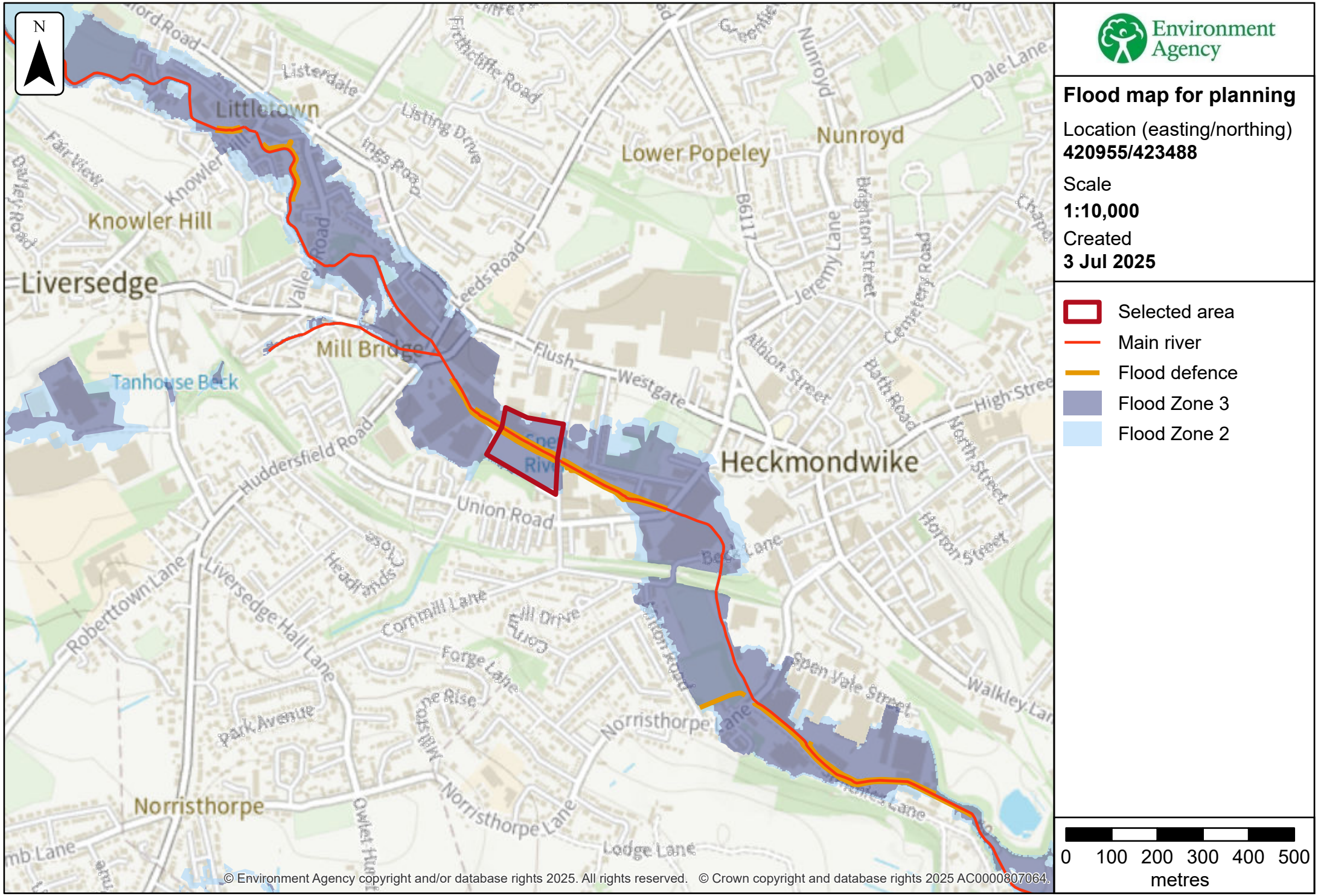
- 0.5% or greater probability of occurring in any year for flooding from the sea
- 1% or greater probability of occurring in any year for fluvial (river) flooding

Flood zone 2 shows the area at risk of flooding for an undefended flood event with:

- between a 0.1% and 0.5% probability of occurring in any year for flooding from the sea
- between a 0.1% and 1% probability of occurring in any year for fluvial (river) flooding

It's important to remember that the flood zones on this map:

- refer to the land at risk of flooding and do not refer to individual properties
- refer to the probability of river and sea flooding, ignoring the presence of defences
- do not take into account potential impacts of climate change



Environment Agency

Flood map for planning

Location (easting/northing)
420955/423488

Scale
1:10,000

Created
3 Jul 2025

- Selected area
- Main river
- Flood defence
- Flood Zone 3
- Flood Zone 2

0 100 200 300 400 500
metres

Past floods

Past flood events included in this document

The recorded flood outlines included in this document are for areas of land local to your site location that have been flooded by any of these sources:

- ephemeral water
- main rivers
- ordinary watercourses
- the sea
- unknown

Data limitations

The outlines do not include flooding from:

- drainage where rainfall has led to surface water ponding or overland runoff
- artificial, water-bearing sewer, water supply and wastewater treatment pipelines

Changes to flood defences

The defences (also known as assets) that were in place may also have changed. For example, assets may have been built more recently than the last recorded flood outline.

What the recorded flood outlines dataset is

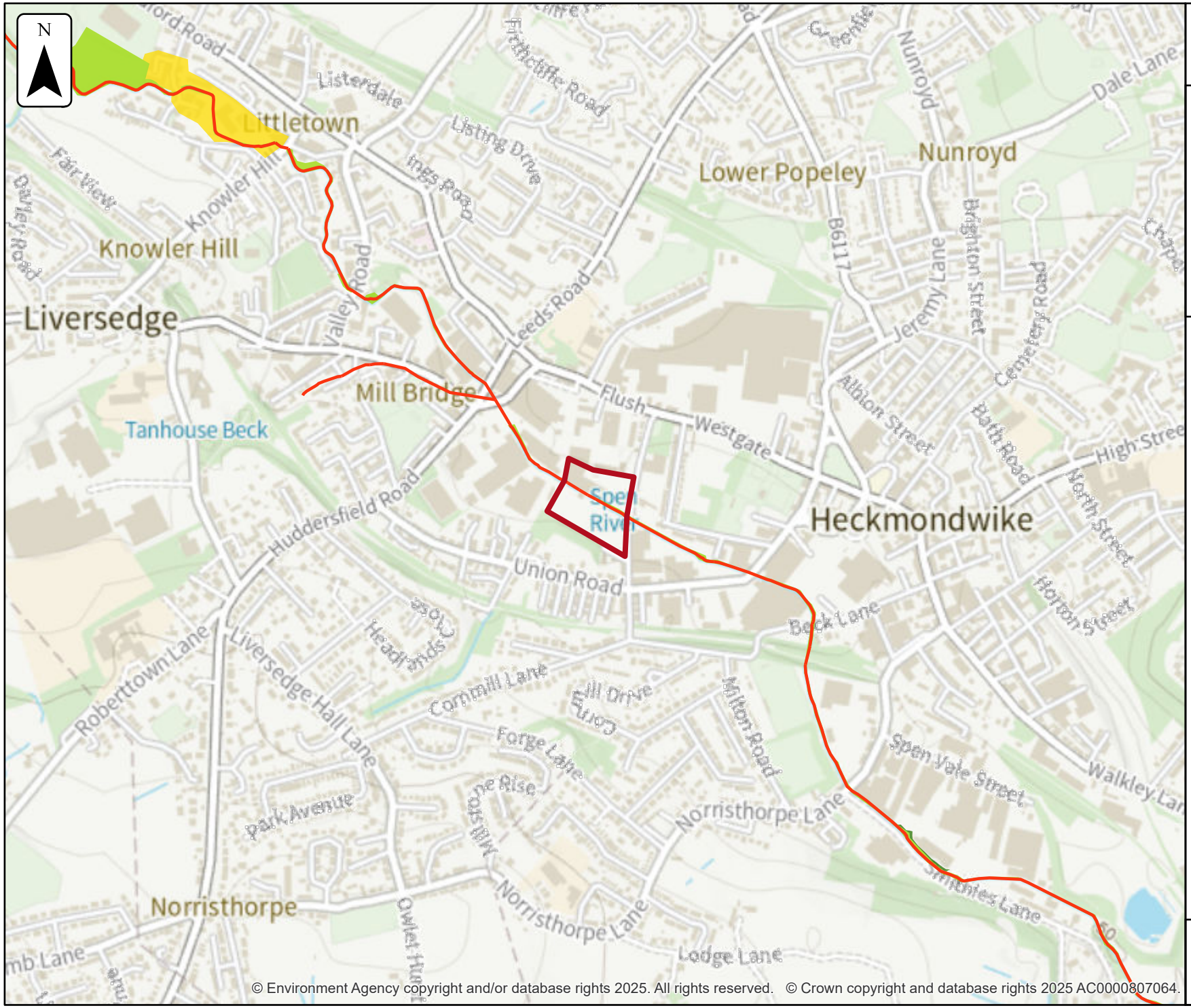
The recorded flood outlines are a geographical information system (GIS) data layer that show our verified records of areas that have flooded in the past from:

- rivers
- the sea
- groundwater
- surface water

Download the complete recorded flood outlines dataset, which includes data quality flags for outlines recorded after April 2020. This indicates the confidence we have in an outline.

Get flood information from other organisations

Contact Kirklees District Lead Local Flood Authority (LLFA) and your drainage board to get information about past flooding caused by surface water or drainage systems.



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Environment Agency

Past floods

Location (easting/northing)
420955/423488

Scale
1:10,000

Created
3 Jul 2025

Selected area

Main river

Date of flood event

- February, 2020
- November, 2019
- June, 2007

0 100 200 300 400 500
metres

Data on past flood events

Start date	End date	Source of flood	Cause of flood	Affects location
8 February 2020	19 March 2020	main river	channel capacity exceeded (no raised defences)	Yes
7 November 2019	8 November 2019	main river	channel capacity exceeded (no raised defences)	No
25 June 2007	26 June 2007	main river	unknown	No

Flood defences and attributes

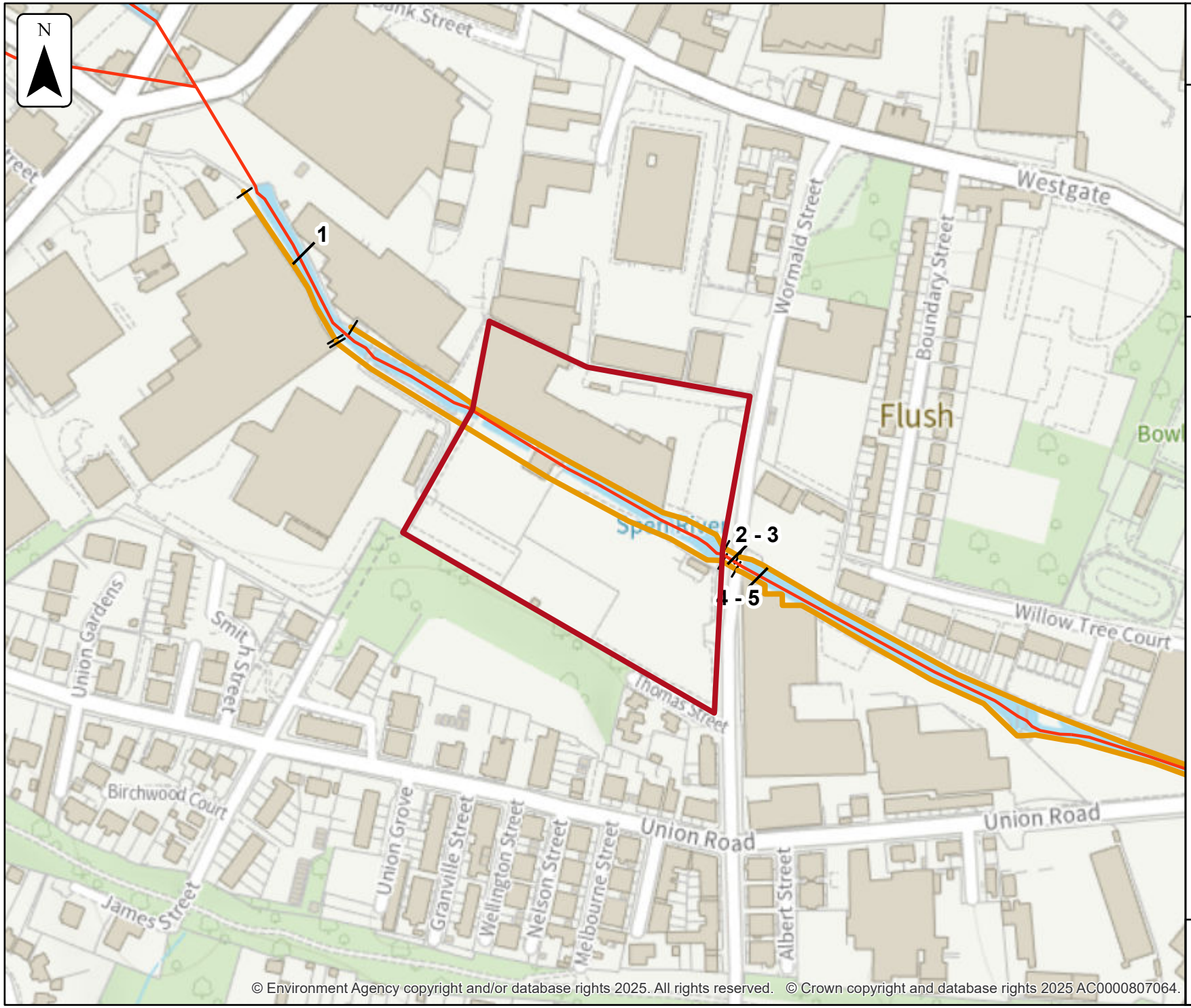
The flood defences map shows the location of the flood defences present.

The flood defences data table shows the type of defences, their condition and the standard of protection. It shows the height above sea level of the top of the flood defence (crest level). The height is In mAOD which is the metres above the mean sea level at Newlyn, Cornwall.

It's important to remember that flood defence data may not be updated on a regular basis. The information here is based on the best available data.

Use this information:

- to help you assess if there is a reduced flood risk for this location because of defences
- with any information in the modelled data section to find out the impact of defences on flood risk



Environment Agency

Flood defences

Location (easting/northing)
420955/423488

Scale
1:2,500

Created
3 Jul 2025

- Selected area
- Main river
- Flood defence

0 25 50 75 100
metres

Flood defences data

Label	Asset ID	Asset Type	Standard of protection (years)	Current condition	Downstream actual crest level (mAOD)	Upstream actual crest level (mAOD)	Effective crest level (mAOD)
1	27840	Wall	50		58.56	58.43	
2	408235	Bridge Abutment					
3	408233	Bridge Abutment					
4	52204	Wall	50	Fair	57.08	58.56	
5	50692	Wall	50	Good	57.07	57.60	

Any blank cells show where a particular value has not been recorded for an asset.

Modelled data

This section provides details of different scenarios we have modelled and includes the following (where available):

- outline maps showing the area at risk from flooding in different modelled scenarios
- modelled node point map(s) showing the points used to get the data to model the scenarios and table(s) providing details of the flood risk for different return periods
- map(s) showing the approximate water levels for the return period with the largest flood extent for a scenario and table(s) of sample points providing details of the flood risk for different return periods

Climate change

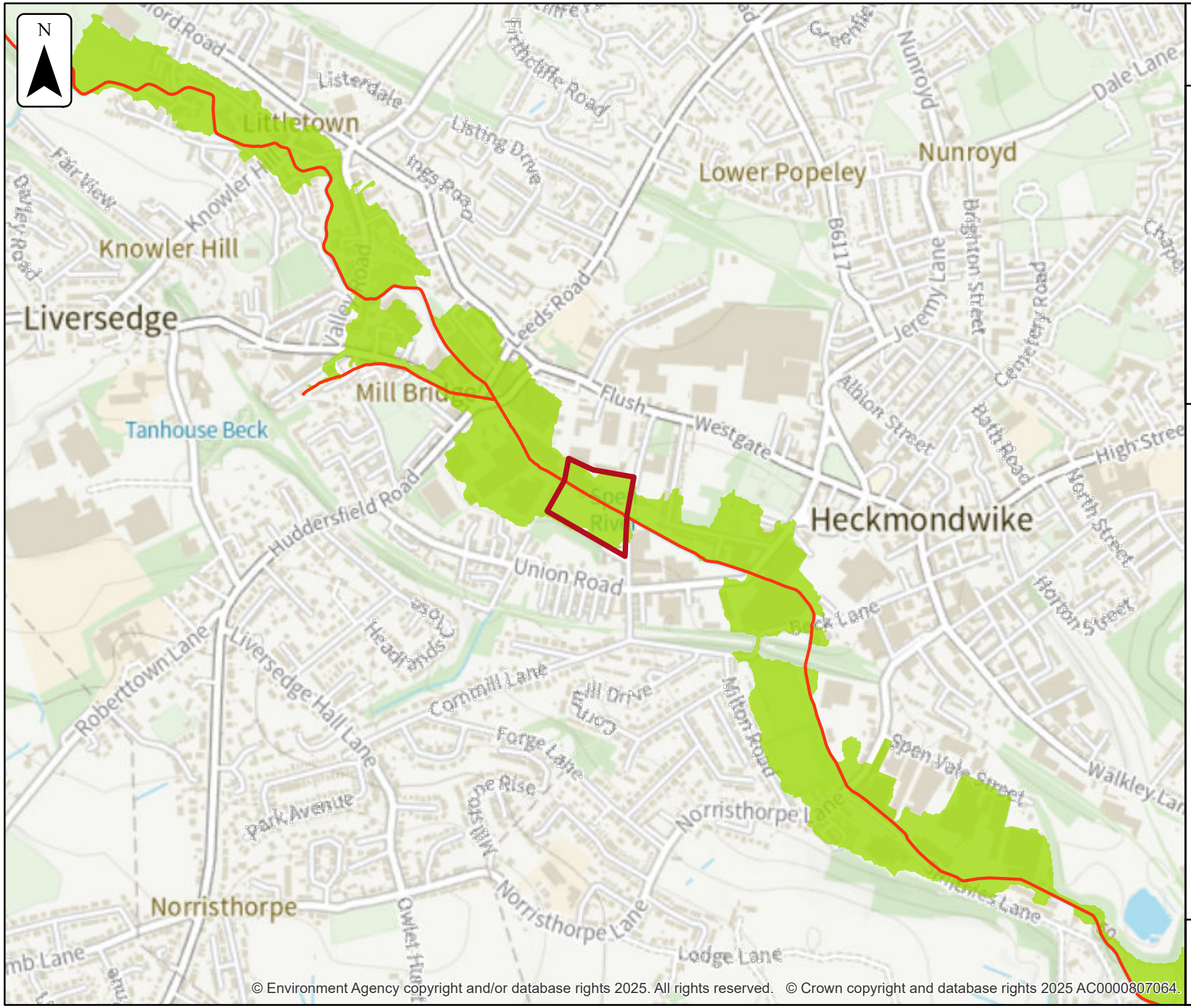
The climate change data included in the models may not include the latest flood risk assessment climate change allowances. Where the new allowances are not available you will need to consider this data and factor in the new allowances to demonstrate the development will be safe from flooding.

The Environment Agency will incorporate the new allowances into future modelling studies. For now, it's your responsibility to demonstrate that new developments will be safe in flood risk terms for their lifetime.

Modelled scenarios

The following scenarios are included:

- Defended modelled fluvial: risk of flooding from rivers where there are flood defences
- Defences removed modelled fluvial: risk of flooding from rivers where flood defences have been removed
- Defences removed climate change modelled fluvial: risk of flooding from rivers where flood defences have been removed, including estimated impact of climate change



Environment Agency

Defences removed climate change modelled fluvial extent

Location (easting/northing)
420955/423488

Scale
1:10,000

Created
3 Jul 2025

Model name
2009 FIM River Spen

Selected area

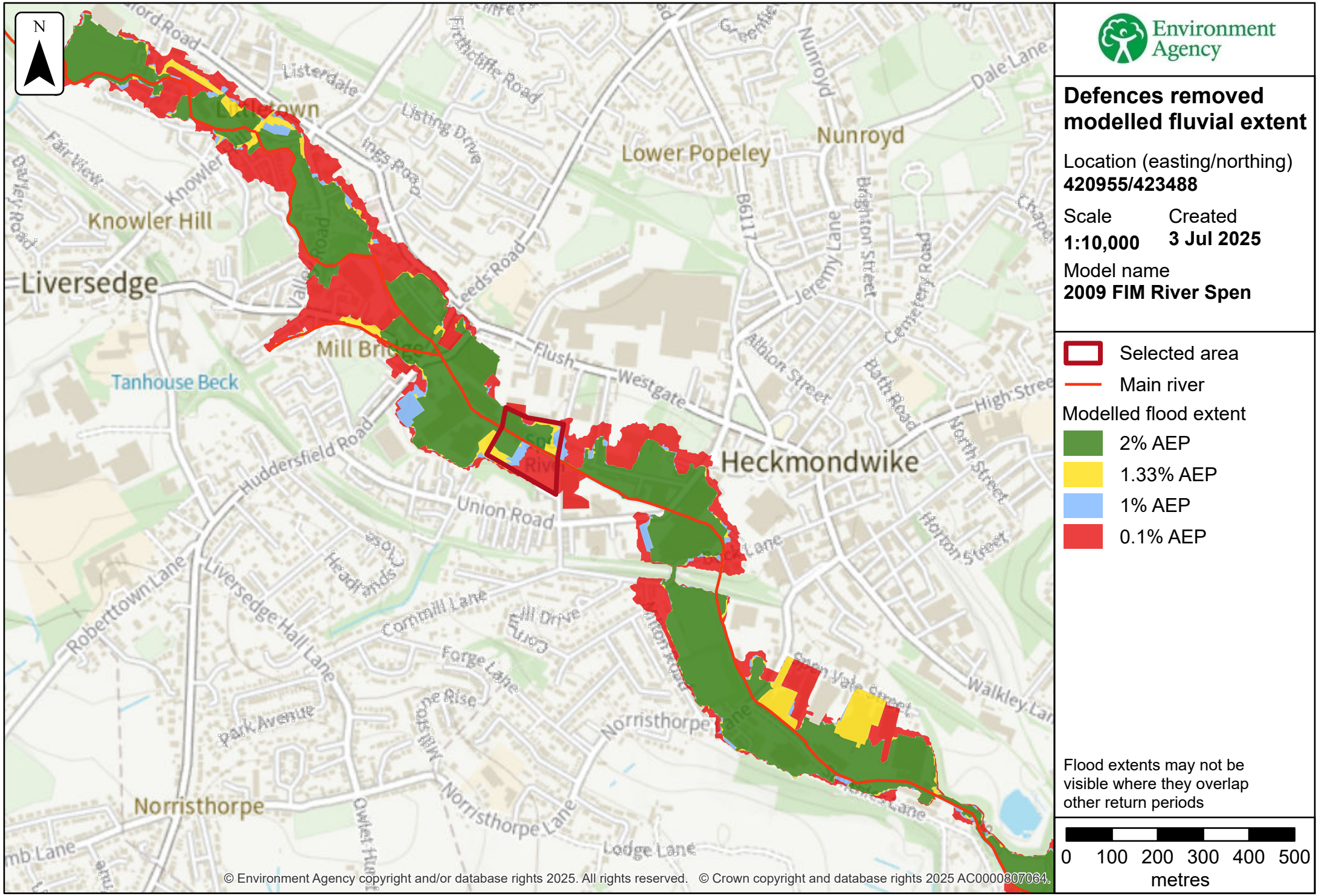
Main river

Modelled flood extent

1% AEP (+20%)

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

0 100 200 300 400 500
metres


N
Environment Agency
Defences removed modelled fluvial extent
Location (easting/northing)
420955/423488
Scale
1:10,000
Created
3 Jul 2025
Model name
2009 FIM River Spen
Selected area
Main river
Modelled flood extent
2% AEP
1.33% AEP
1% AEP
0.1% AEP
Flood extents may not be visible where they overlap other return periods
0 100 200 300 400 500
metres
Liversedge
Knowler Hill
Lower Popeley
Nunroyd
Heckmondwike
Norristhorpe
Tanhouse Beck
Mill Bridge
Leeds Road
Flush
Westgate
Huddersfield Road
Union Road
Roberttown Lane
Liversedge Hall Lane
Park Avenue
Forge Lane
Norristhorpe Lane
Lodge Lane
Jeremy Lane
Brighton Street
Albion Street
Cemetery Road
Path Road
North Street
Horton Street
Walkley Lane
Dale Lane
B6117
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Environment Agency

Defended modelled fluvial extent

Location (easting/northing)
420955/423488

Scale
1:10,000

Created
3 Jul 2025

Model name
2009 FIM River Spen

Selected area

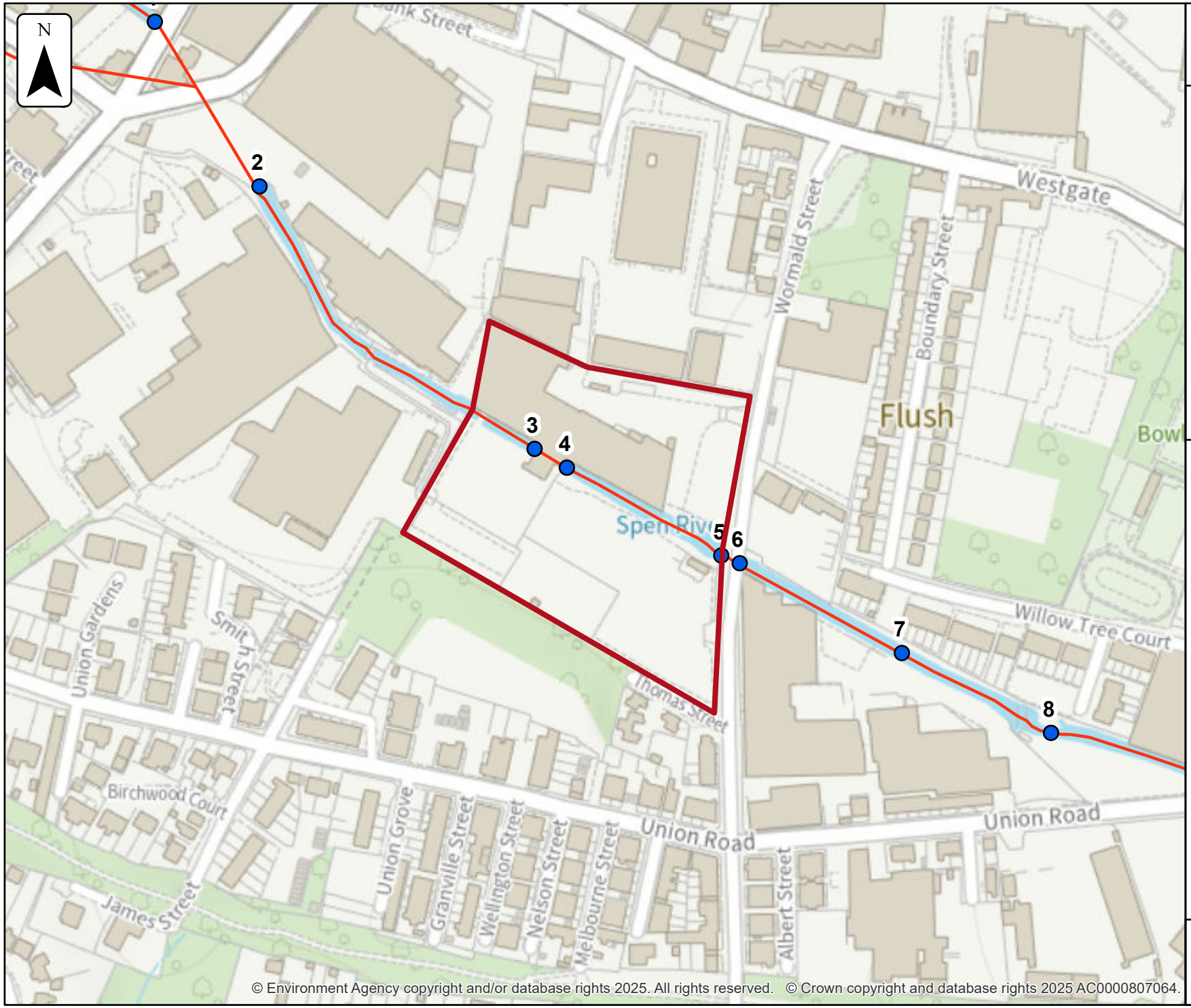
Main river

Modelled flood extent

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 node locations

Location (easting/northing)
420955/423488

Scale
1:2,500

Created
3 Jul 2025

Model name
2009 FIM River Spen

- Selected area
- Modelled location
- Main river

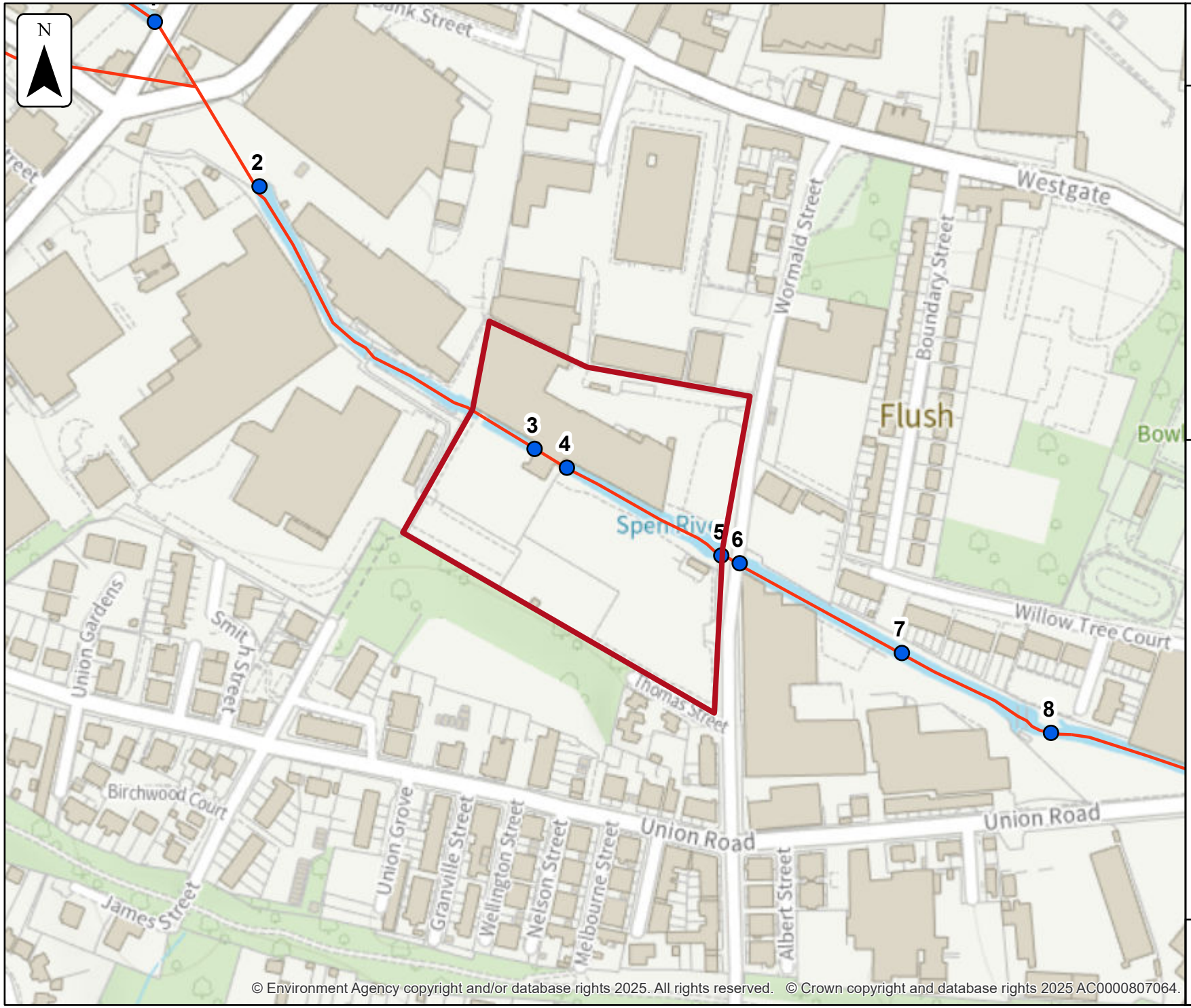
0 25 50 75 100
metres

Modelled node locations data

Defences removed climate change

Label	Modelled location ID	Easting	Northing	1% AEP (+20%)	1% AEP (+20%)
				Level	Flow
1	164986	420740	423723	59.84	16.07
2	98373	420791	423643	58.99	17.48
3	276504	420925	423515	58.33	31.65
4	202785	420941	423506	57.78	31.65
5	99825	421016	423463	57.18	37.43
6	67057	421025	423459	57.05	37.43
7	106179	421104	423416	56.71	35.42
8	63509	421177	423377	56.67	34.28

Data in this table comes from the 2009 FIM River Spen 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)
420955/423488

Scale
1:2,500

Created
3 Jul 2025

Model name
2009 FIM River Spen

- Selected area
- Modelled location
- Main river

0 25 50 75 100
metres

Modelled node locations data

Defences removed

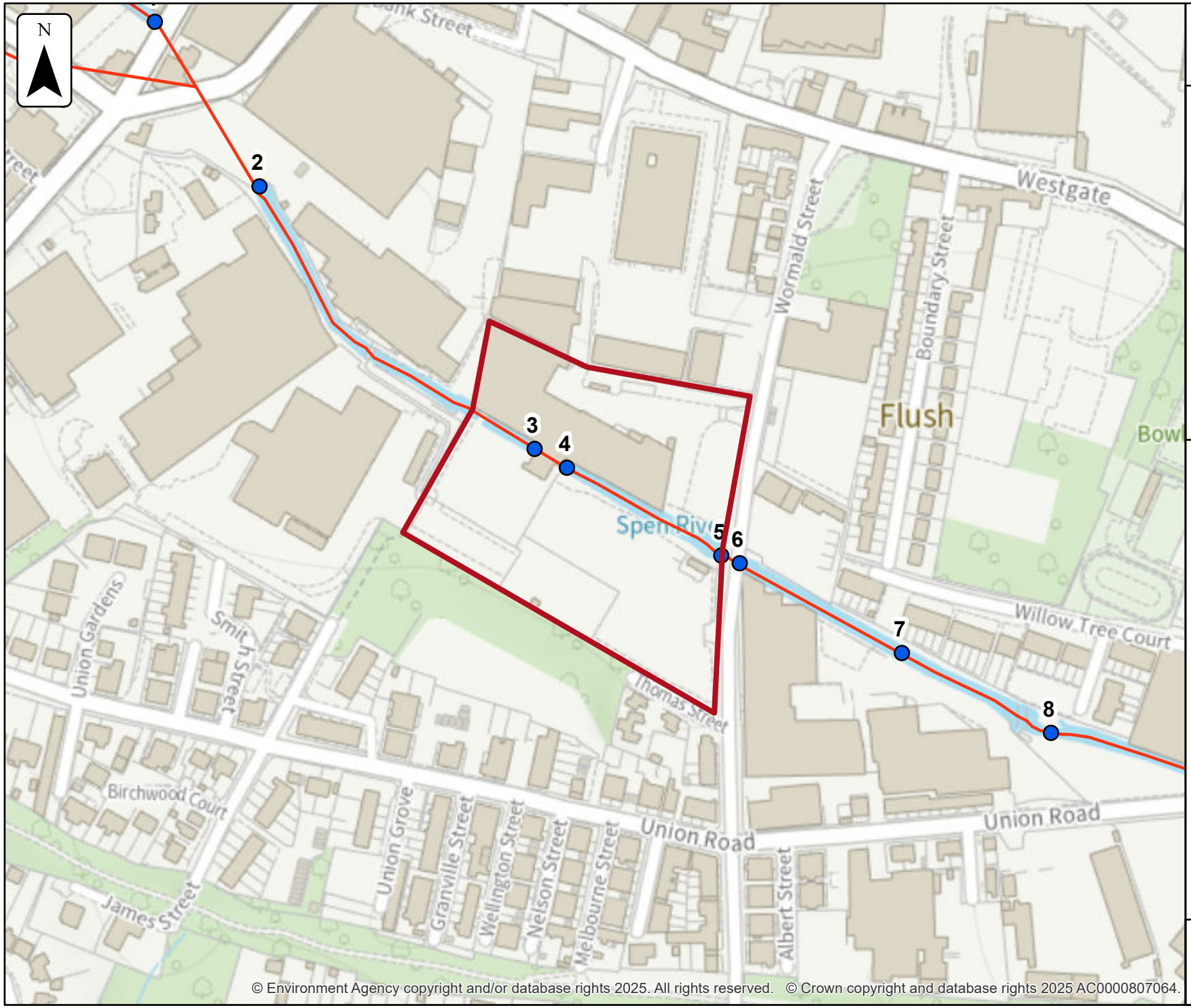
Label	Modelled location ID	Easting	Northing	20% AEP	10% AEP	4% AEP	2% AEP	1.33% AEP	1% AEP	0.1% AEP
				Level	Level	Level	Level	Level	Level	Level
1	164986	420740	423723	59.10	59.32	59.52	59.63	59.68	59.71	60.24
2	98373	420791	423643	57.82	58.04	58.39	58.62	58.71	58.77	59.64
3	276504	420925	423515	56.88	57.08	57.45	57.70	57.83	57.93	58.95
4	202785	420941	423506	56.84	56.98	57.21	57.33	57.39	57.44	58.57
5	99825	421016	423463	56.46	56.57	56.72	56.82	56.87	56.92	58.47
6	67057	421025	423459	56.44	56.56	56.72	56.81	56.85	56.89	57.84
7	106179	421104	423416	56.12	56.26	56.42	56.51	56.54	56.58	57.31
8	63509	421177	423377	56.03	56.18	56.36	56.44	56.47	56.50	57.15

Data in this table comes from the 2009 FIM River Spen 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.

Defences removed

Label	Modelled location ID	Easting	Northing	20% AEP	10% AEP	4% AEP	2% AEP	1.33% AEP	1% AEP	0.1% AEP
				Flow	Flow	Flow	Flow	Flow	Flow	Flow
1	164986	420740	423723	14.78	15.16	15.44	15.60	15.71	15.77	16.51
2	98373	420791	423643	16.83	17.12	17.33	17.39	17.40	17.44	17.65
3	276504	420925	423515	19.60	22.20	26.13	28.74	29.96	30.82	32.09
4	202785	420941	423506	19.60	22.20	26.13	28.74	29.96	30.82	32.09
5	99825	421016	423463	19.59	22.19	26.11	28.68	29.94	30.99	46.59
6	67057	421025	423459	19.59	22.19	26.11	28.68	29.94	30.99	46.59
7	106179	421104	423416	19.45	22.0	25.75	28.37	29.32	30.31	56.56
8	63509	421177	423377	18.29	19.81	22.61	25.11	26.52	27.99	62.02

Data in this table comes from the 2009 FIM River Spen 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

Defended modelled fluvial node locations

Location (easting/northing)
420955/423488

Scale
1:2,500

Created
3 Jul 2025

Model name
2009 FIM River Spen

Selected area
Modelled location
Main river

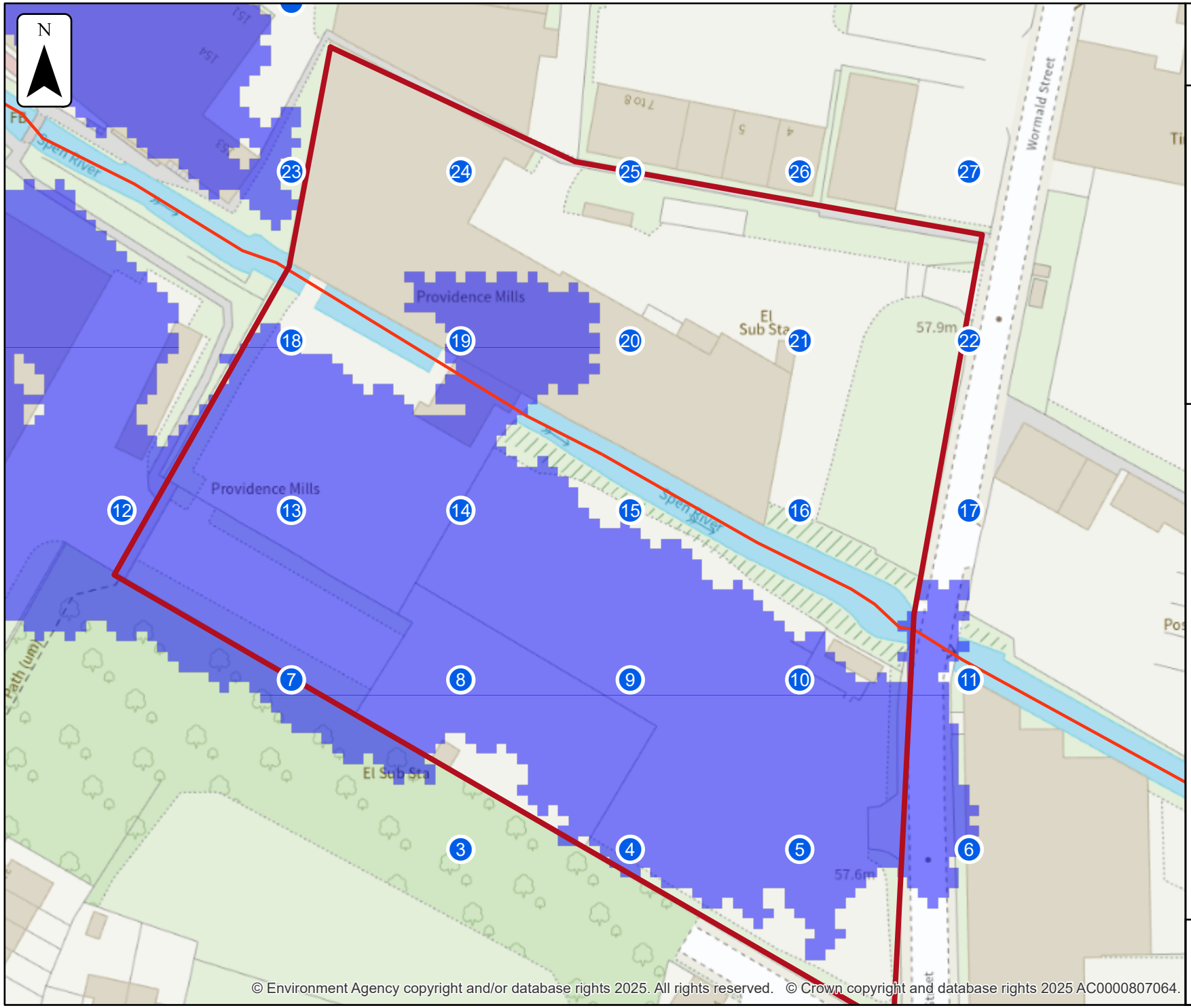
0 25 50 75 100
metres

Modelled node locations data

Defended

Label	Modelled location ID	Easting	Northing	1% AEP	1% AEP
				Level	Flow
1	164986	420740	423723	59.65	15.78
2	98373	420791	423643	58.66	17.97
3	276504	420925	423515	57.87	28.35
4	202785	420941	423506	57.46	28.35
5	99825	421016	423463	57.05	29.54
6	67057	421025	423459	56.99	29.54
7	106179	421104	423416	56.74	29.77
8	63509	421177	423377	56.66	29.76

Data in this table comes from the 2009 FIM River Spen 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.



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Environment Agency

Defended modelled fluvial extent and depth

Location (easting/northing)
420955/423488

Scale
1:1,000

Created
3 Jul 2025

Model name
2009 FIM River Spen

- Selected area
- Main river

Modelled 2D grid
Water level in mAOD

- 0 - 31
- 31 - 31.5
- 31.5 - 32
- 32 - 32.5
- 32.5 - 33
- 33 - 33.5
- 33.5 - 34
- 34 - 34.5
- 34.5 - 35

This map shows the 1% AEP depth data

0 10 20 30 40
metres

Sample point data

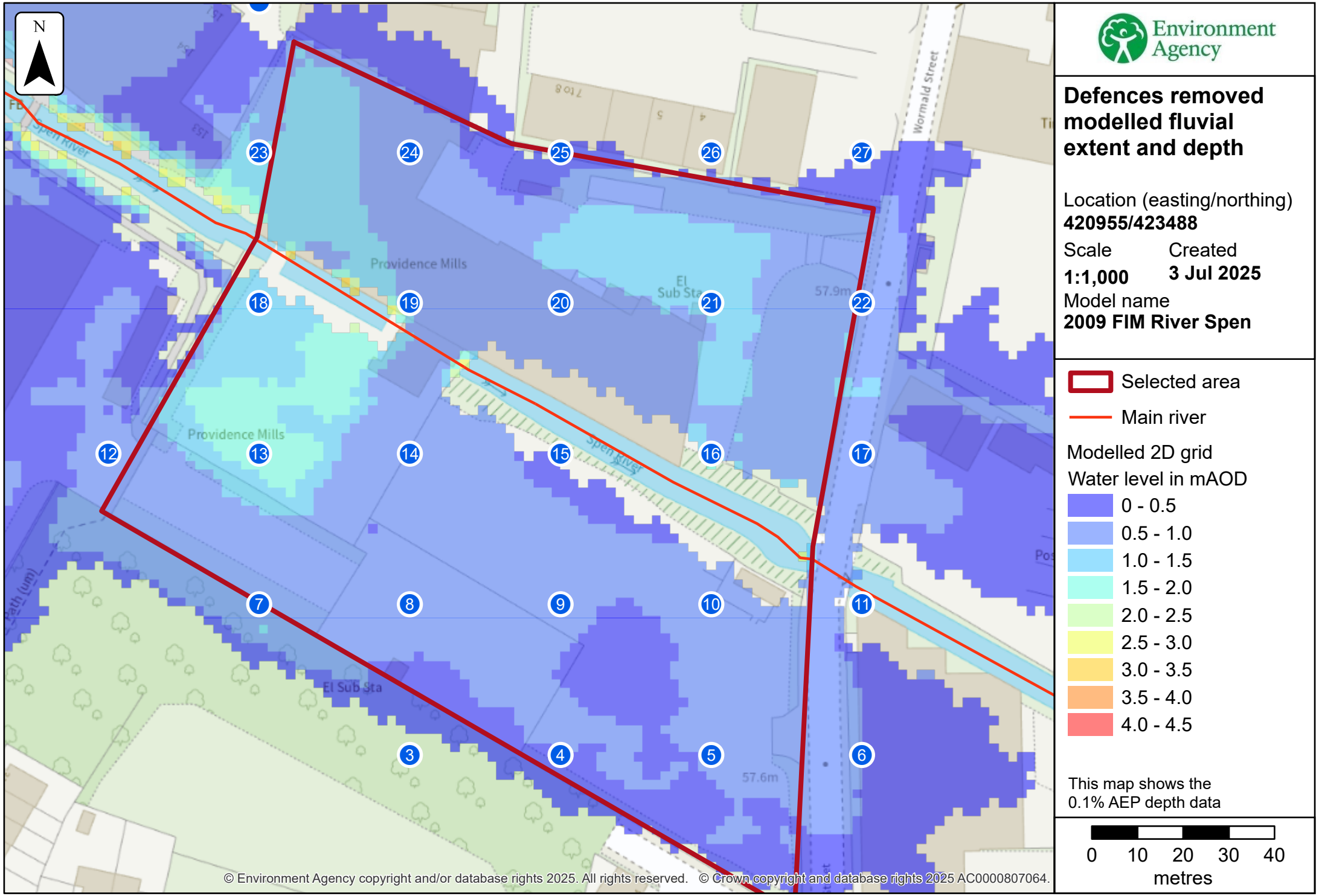
Defended

Label	Easting	Northing	1% AEP
			Depth
1	420995	423388	NoData
2	421028	423388	NoData
3	420929	423421	NoData
4	420962	423421	0.08
5	420995	423421	0.05
6	421028	423421	NoData
7	420896	423454	0.19
8	420929	423454	0.33
9	420962	423454	0.17
10	420995	423454	0.03
11	421028	423454	NoData
12	420863	423487	0.14

Label	Easting	Northing	1% AEP
			Depth
13	420896	423487	1.04
14	420929	423487	0.26
15	420962	423487	NoData
16	420995	423487	NoData
17	421028	423487	NoData
18	420896	423520	NoData
19	420929	423520	0.00
20	420962	423520	NoData
21	420995	423520	NoData
22	421028	423520	NoData
23	420896	423553	NoData
24	420929	423553	NoData

Label	Easting	Northing	1% AEP
			Depth
25	420962	423553	NoData
26	420995	423553	NoData
27	421028	423553	NoData
28	420896	423586	NoData
Max value in selected area:			2.09

Data in this table comes from the 2009 FIM River Spen model. Height values are shown in mAOD, and depth values are shown in metres.
Any blank cells show where a particular scenario has not been modelled for this location.
Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.
'Max value in selected area' is the deepest depth or highest height at any location within your drawn boundary.



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Environment Agency

Defences removed modelled fluvial extent and depth

Location (easting/northing)
420955/423488

Scale
1:1,000

Created
3 Jul 2025

Model name
2009 FIM River Spen

Selected area

Main river

Modelled 2D grid
Water level in mAOD

- 0 - 0.5
- 0.5 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- 2.0 - 2.5
- 2.5 - 3.0
- 3.0 - 3.5
- 3.5 - 4.0
- 4.0 - 4.5

This map shows the 0.1% AEP depth data

0 10 20 30 40
metres

Sample point data

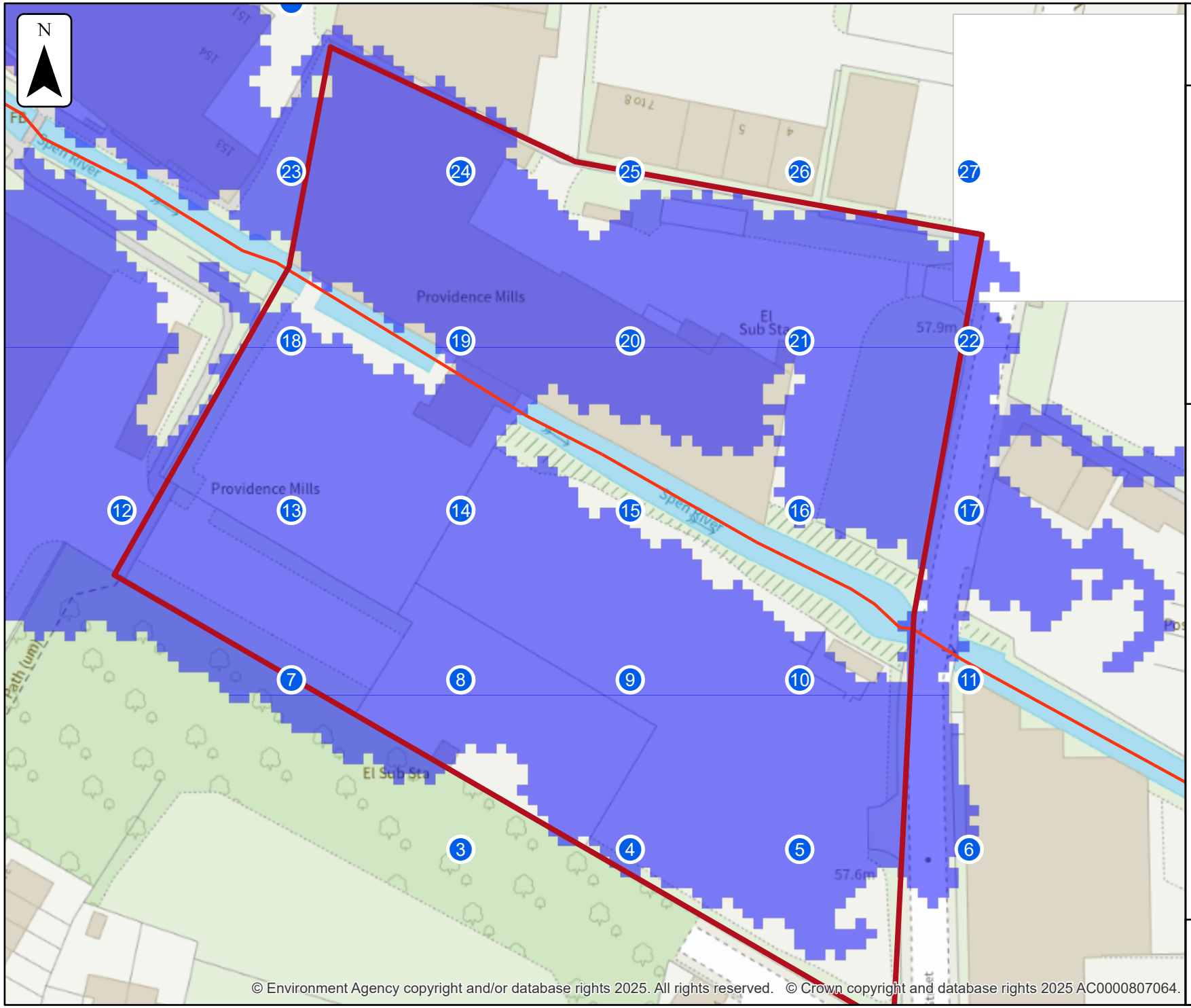
Defences removed

Label	Easting	Northing	20% AEP	10% AEP	4% AEP	2% AEP	1.33% AEP	1% AEP	0.1% AEP
			Depth	Depth	Depth	Depth	Depth	Depth	Depth
1	420995	423388	NoData	NoData	NoData	NoData	NoData	NoData	NoData
2	421028	423388	NoData	NoData	NoData	NoData	NoData	NoData	NoData
3	420929	423421	NoData	NoData	NoData	NoData	NoData	NoData	NoData
4	420962	423421	NoData	NoData	NoData	NoData	NoData	NoData	0.46
5	420995	423421	NoData	NoData	NoData	NoData	NoData	NoData	0.54
6	421028	423421	NoData	NoData	NoData	NoData	NoData	NoData	0.37
7	420896	423454	NoData	NoData	NoData	NoData	0.05	0.08	0.78
8	420929	423454	NoData	NoData	NoData	NoData	NoData	0.08	0.80
9	420962	423454	NoData	NoData	NoData	NoData	NoData	NoData	0.57
10	420995	423454	NoData	NoData	NoData	NoData	NoData	NoData	0.60
11	421028	423454	NoData	NoData	NoData	NoData	NoData	NoData	NoData
12	420863	423487	NoData	NoData	NoData	NoData	0.06	0.09	0.57

Label	Easting	Northing	20% AEP	10% AEP	4% AEP	2% AEP	1.33% AEP	1% AEP	0.1% AEP
			Depth	Depth	Depth	Depth	Depth	Depth	Depth
13	420896	423487	NoData	NoData	NoData	0.46	0.60	0.85	1.69
14	420929	423487	NoData	NoData	NoData	NoData	NoData	0.06	0.71
15	420962	423487	NoData	NoData	NoData	NoData	NoData	NoData	NoData
16	420995	423487	NoData	NoData	NoData	NoData	0.35	0.36	1.36
17	421028	423487	NoData	NoData	NoData	NoData	NoData	0.03	0.87
18	420896	423520	NoData	NoData	NoData	0.19	0.32	0.50	1.28
19	420929	423520	NoData	NoData	NoData	0.00	0.02	0.08	0.97
20	420962	423520	NoData	NoData	NoData	NoData	NoData	0.00	0.64
21	420995	423520	NoData	NoData	NoData	0.08	0.21	0.27	1.05
22	421028	423520	NoData	NoData	NoData	NoData	NoData	0.10	0.94
23	420896	423553	NoData	NoData	NoData	0.34	0.39	0.45	1.11
24	420929	423553	NoData	NoData	NoData	0.06	0.11	0.19	0.85

Label	Easting	Northing	20% AEP	10% AEP	4% AEP	2% AEP	1.33% AEP	1% AEP	0.1% AEP
			Depth	Depth	Depth	Depth	Depth	Depth	Depth
25	420962	423553	NoData	NoData	NoData	NoData	NoData	NoData	0.10
26	420995	423553	NoData	NoData	NoData	NoData	NoData	NoData	NoData
27	421028	423553	NoData	NoData	NoData	NoData	NoData	NoData	NoData
28	420896	423586	NoData	NoData	NoData	NoData	NoData	NoData	NoData
Max value in selected area:			NoData	NoData	NoData	2.15	2.28	2.40	3.14

Data in this table comes from the 2009 FIM River Spen model. Height values are shown in mAOD, and depth values are shown in metres.
Any blank cells show where a particular scenario has not been modelled for this location.
Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.
'Max value in selected area' is the deepest depth or highest height at any location within your drawn boundary.



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Environment Agency

Defences removed climate change modelled fluvial extent and depth

Location (easting/northing)
420955/423488

Scale
1:1,000

Created
3 Jul 2025

Model name
2009 FIM River Spen

Selected area

Main river

Modelled 2D grid
Water level in mAOD

- 0 - 31
- 31 - 31.5
- 31.5 - 32
- 32 - 32.5
- 32.5 - 33
- 33 - 33.5
- 33.5 - 34
- 34 - 34.5
- 34.5 - 35

This map shows the
1% AEP +20% depth data

0 10 20 30 40
metres

Sample point data

Defences removed climate change

Label	Easting	Northing	1% AEP (+20%)
			Depth
1	420995	423388	NoData
2	421028	423388	NoData
3	420929	423421	NoData
4	420962	423421	0.10
5	420995	423421	0.06
6	421028	423421	NoData
7	420896	423454	0.31
8	420929	423454	0.38
9	420962	423454	0.19
10	420995	423454	0.05
11	421028	423454	NoData
12	420863	423487	0.16

Label	Easting	Northing	1% AEP (+20%)
			Depth
13	420896	423487	1.17
14	420929	423487	0.27
15	420962	423487	NoData
16	420995	423487	0.36
17	421028	423487	0.15
18	420896	423520	0.80
19	420929	423520	0.42
20	420962	423520	0.03
21	420995	423520	0.40
22	421028	423520	0.23
23	420896	423553	0.66
24	420929	423553	0.42

Label	Easting	Northing	1% AEP (+20%)
			Depth
25	420962	423553	NoData
26	420995	423553	NoData
27	421028	423553	NoData
28	420896	423586	NoData
Max value in selected area:			2.67

Data in this table comes from the 2009 FIM River Spen model. Height values are shown in mAOD, and depth values are shown in metres.
Any blank cells show where a particular scenario has not been modelled for this location.
Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.
'Max value in selected area' is the deepest depth or highest height at any location within your drawn boundary.

Strategic flood risk assessments

We recommend that you check the relevant local authority's strategic flood risk assessment (SFRA) as part of your work to prepare a site specific flood risk assessment.

This should give you information about:

- the potential impacts of climate change in this catchment
- areas defined as functional floodplain
- flooding from other sources, such as surface water, ground water and reservoirs

Your Lead Local Flood Authority is Kirklees District.

About this data

This data has been generated by strategic scale flood models and is not intended for use at the individual property scale. If you're intending to use this data as part of a flood risk assessment, please include an appropriate modelling tolerance as part of your assessment. The Environment Agency regularly updates its modelling. We recommend that you check the data provided is the most recent, before submitting your flood risk assessment.

Flood risk activity permits

Under the Environmental Permitting (England and Wales) Regulations 2016 some developments may require an environmental permit for flood risk activities from the Environment Agency. This includes any permanent or temporary works that are in, over, under, or nearby a designated main river or flood defence structure.

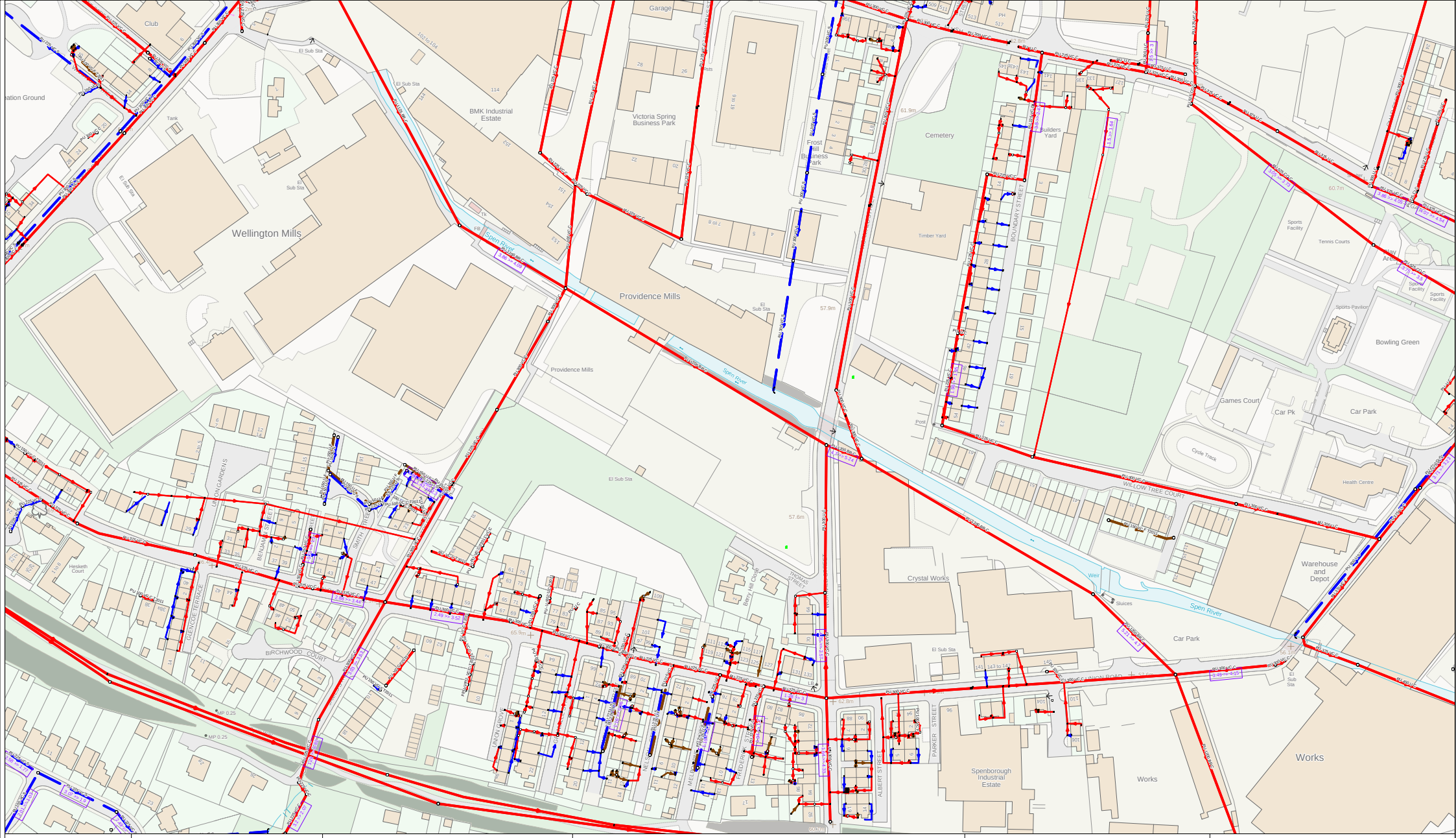
Find out more about flood risk activity permits

Help and advice

Contact the Yorkshire Environment Agency team at neyorkshire@environment-agency.gov.uk for:

- more information about getting a product 5, 6, 7 or 8
- general help and advice about the site you're requesting data for

Appendix D
Sewer Records



420772 : 423353	Map Name : SE2023SE	Title	Partial Key
Yorkshire Water, PO Box 500, Halifax Road, Bradford BD6 2LZ Contact Name : Sarah Chamberlain Contact Tel :		Notes	Foul Sewer = F Combined Sewer = C Surface Water Sewer = SW Trade Sewer = TD Partially Separate = PS
		(Ody) COPYRIGHT STATEMENTS: Reproduced by permission of Ordnance Survey on behalf of HMSO © Crown copyright and database 2024. All rights reserved Ordnance Survey Licence number AC0000813445	This plan is furnished as a general guide only and no warranty as to its correctness is given or implied. This plan must not be relied upon in the event of excavations or other works made in the vicinity of public sewers. No house or property connections are shown.
			Date Req : 05/01/2026, 08:38:50
			Date Gen : 05/01/2026, 08:39:19
			Source : Sewer Network Enquiry

UPN: Undefined Originator: Sarah Chamberlain, SafeMove,

Appendix E
Greenfield Calcs

Greenfield runoff rate estimation tool

www.uksuds.com | Greenfield runoff rate estimation tool (https://www.uksuds.com/)

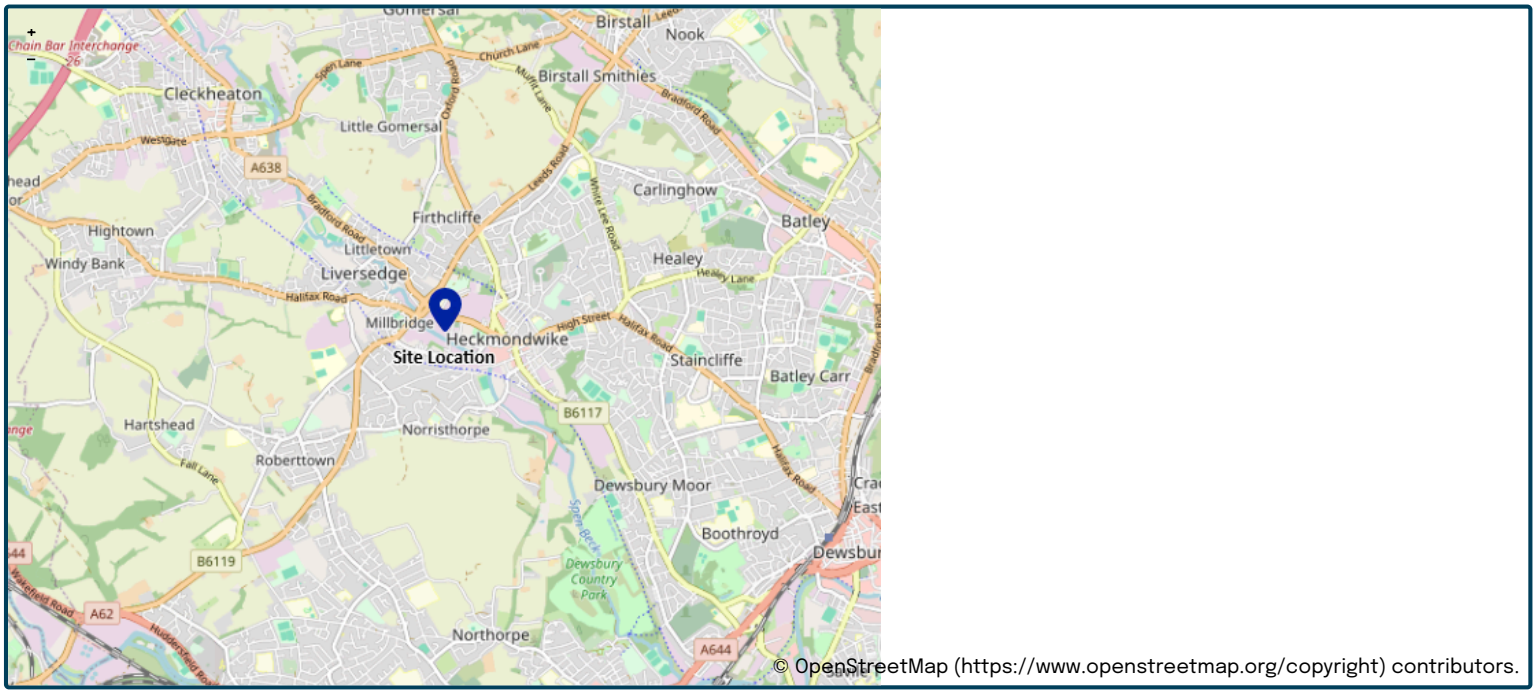
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015).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

Project details

Date	23/12/2025
Calculated by	Michael Micklethwaite
Reference	25048
Model version	2.2.2

Location

Site name	Victoria Spring
Site location	Zone 1



Site easting (British National Grid)	420973
Site northing (British National Grid)	423384

Site details

Total site area (ha)	0.705 ha

Greenfield runoff

Method

Method	IH124

IH124

	My value		Map value
SAAR (mm)	737 mm		737
How should SPR be derived?	WRAP soil type		
WRAP soil type	4		4
SPR	0.47		
QBar (IH124) (l/s)	3.6 l/s		

Growth curve factors

	My value		Map value
Hydrological region	3		3
1 year growth factor	0.86		
2 year growth factor	0.94		
10 year growth factor	1.45		
30 year growth factor	1.75		
100 year growth factor	2.08		
200 year growth factor	2.37		

Results

Method	IH124
Flow rate 1 year (l/s)	3.1 l/s
Flow rate 2 year (l/s)	3.4 l/s
Flow rate 10 years (l/s)	5.2 l/s
Flow rate 30 years (l/s)	6.3 l/s
Flow rate 100 years (l/s)	7.5 l/s
Flow rate 200 years (l/s)	8.6 l/s

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent 'zero' figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.2.2) developed by HR Wallingford and available at uksuds.com (https://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 uksuds.com/terms-conditions (https://www.uksuds.com/terms-conditions). The outputs from this tool have been used to estimate Greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

Appendix F
Drainage Layout

N

COVER AND INVERTS OF EXISTING SEWERS SHOULD BE CHECKED ON SITE PRIOR TO CONSTRUCTION

ALL RWP AND SVP'S TO BE CHECKED AGAINST ARCHITECTS LAYOUT PLANS

EXISTING Ø225 COMBINED SEWER

EXISTING Ø300 COMBINED SEWER

EXISTING Ø225 COMBINED SEWER

EXISTING Ø300 SURFACE WATER SEWER

EXISTING 1200mm COMBINED SEWER

EXISTING Ø300 COMBINED SEWER

EXISTING 1200mm COMBINED SEWER

PROVIDENCE PLACE

Road 3

Road 4

FFL 58.200

EXISTING YARD

FFL 57.750

FFL 57.750

UNIT 1
627.7 m²
5844.2 Sf

Spen River

FOUL DRAINAGE

METER ROOM

SUB

Tank 3
Storage: 57.095m³
Water Level: 56.87m
Max Water Level: 56.87m
Min Water Level: 54.47m

Tank 2
Storage: 59.402m³
Water Level: 56.19m
Max Water Level: 56.76m
Min Water Level: 54.09m

Tank 1
Storage: 49.253m³
Water Level: 56.76m
Max Water Level: 56.36m
Min Water Level: 56.06m

Brick Culvert 0.60m x 0.87m

Collapsed Brick Work

Lined - No More Visible Pipes

Lined cables 0.30C=0.45S

Lined cables 0.15C=0.42S

Lined cables = 0.6C=0.75S

Unable to Trace

Silted Unable To Trace

Fall Kf Rubble Unable To Trace

Unable to Sonde – Concrete Slab – DOC 0.18

Unable to Sonde – No Access To Pipe

Unable to GPR – EML due to the level of vegetation – Vegetation management required to ensure all utilities are clear

Knotweed

Mixture of Concrete & Tarmac Surface

UTS - Dense Vegetation

UTS - Steep Bank & Debris

Possible Water

River Level 48.39

NEW CONNECTION ON EXISTING MANHOLE

NEW SURFACE WATER MANHOLE SW1 TO BE RECONSTRUCTED

NEW FOUL MANHOLE FW1 TO BE RECONSTRUCTED

NEW COMBINED MANHOLE MCO1 TO BE RECONSTRUCTED

NOTES

1. THIS DRAWING IS PRODUCED FOR USE IN THIS PROJECT ONLY AND MAY NOT BE USED FOR ANY OTHER PURPOSE. THE CONSULTING ENGINEERS ACCEPT NO LIABILITY FOR THE USE OF THIS DRAWING OTHER THAN THE PURPOSE FOR WHICH IT WAS INTENDED IN CONNECTION WITH THIS PROJECT AS RECORDED ON THE TITLE BLOCK FIELDS 'PURPOSE FOR ISSUE' AND 'FILE STATUS CODE'.
2. THIS DRAWING MAY NOT BE REPRODUCED IN ANY FORM WITHOUT PRIOR WRITTEN AGREEMENT FROM ADVANT ENGINEERS.
3. DO NOT SCALE FROM THE DRAWING, USE WRITTEN DIMENSIONS ONLY.
4. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
5. DISCREPANCIES MUST BE REPORTED BACK TO THE ENGINEER PRIOR TO CONSTRUCTION.
6. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ADVANT ENGINEERS DRAWINGS AND SPECIFICATIONS.

KEY

- EXISTING COMBINED SEWER
- EXISTING SURFACE WATER SEWER
- EXISTING FOUL SEWER
- PROP SURFACE WATER SEWER
- PROP FOUL SEWER
- SITE BOUNDARY
- SEWER EASEMENT
- ATTENUATION TANK
- RWH — RAINWATER HARVESTING

REV	AMENDMENTS	BY	DATE
C	LAYOUT UPDATED	MJM	11.03.26
B	RWH UNITS ADDED	MJM	13.02.26
A	INITIAL ISSUE	MJM	05.01.26

FOR COMMENT

STATUS		CHK'D
PRELIMINARY	/	MJM
FOR COMMENT	/	MJM
FOR APPROVAL		
FOR CONSTRUCTION		
AS BUILT		

advant ENGINEERS
Unit 6 Benton Office Park, Bennett Avenue
Horbury, Wakefield, West Yorkshire, WF4 5RA
01924 654108
wakefield@advantengineers.co.uk

CLIENT
BARNES HOMES

CONTRACT
PROVIDENCE PLACE,
WORMALD ST.
LIVERSEDGE, WF15 8EU

TITLE
DRAINAGE LAYOUT PLAN

DRAWN	MJM	CHK'D	MJM
SCALE	1:250 @ A1	DATE	05.01.26

JOB No	DRG No	REV
25048	102	C

Appendix G
Drainage Calcs

Network Details

Manhole Schedule

Manhole	Catchment Area (ha)	Size (mm)	Type	CL (m)	IL (m)	Depth To Soffit (m)	Easting (m)	Northing (m)
S11	0.179	2100	Type C	57.820	56.480	1.040	420936.840	423527.998
S12	0.000	1350	Type C	58.061	56.470	1.291	420937.480	423543.703
S13	0.027	1200	Unknown	57.957	56.440	1.217	420942.920	423539.478
S14	0.000	1350	Type C	57.929	56.400	1.229	420954.265	423544.605
S15	0.048	1350	Type C	57.607	56.360	0.947	420975.066	423531.345
S16	0.227	1350	Type C	57.544	56.330	0.914	420976.777	423540.615
S17	0.029	1350	Type C	57.700	56.350	1.050	421014.550	423519.697
S18	0.013	1350	Type C	57.835	56.300	1.235	421016.475	423533.579
S19	0.078	1350	Type C	57.747	56.250	1.197	421004.329	423535.732
S20	0.000	2700	Type C	57.685	56.188	1.198	421000.840	423516.363
S21	0.000	1350	Type C	57.650	56.150	1.200	420992.772	423507.742

Pipe Schedule

Pipe Number	US Manhole	US IL (m)	DS Manhole	DS IL (m)	Shape	Dimension (mm)	Length (m)	Gradient (1:x)	Roughness (mm)	US Depth To Soffit (m)	DS Depth To Soffit (m)
1.000	S11	56.480	S13	56.440	Circ	300	12.991	325	0.600	1.040	1.217
2.000	S12	56.470	S13	56.440	Circ	300	6.888	230	0.600	1.291	1.217
1.001	S13	56.440	S14	56.400	Circ	300	12.450	311	0.600	1.217	1.229
1.002	S14	56.400	S16	56.330	Circ	300	22.863	327	0.600	1.229	0.914
3.000	S15	56.360	S16	56.330	Circ	300	9.426	314	0.600	0.947	0.914
1.003	S16	56.330	S19	56.250	Circ	300	27.981	350	0.600	0.914	1.197
4.000	S17	56.350	S18	56.300	Circ	300	14.015	280	0.600	1.050	1.235
4.001	S18	56.300	S19	56.250	Circ	300	12.335	247	0.600	1.235	1.197
1.004	S19	56.250	S20	56.188	Circ	300	19.681	316	0.600	1.197	1.198
1.005	S20	56.188	S21	56.150	Circ	300	11.807	313	0.600	1.198	1.200

Outfall Details

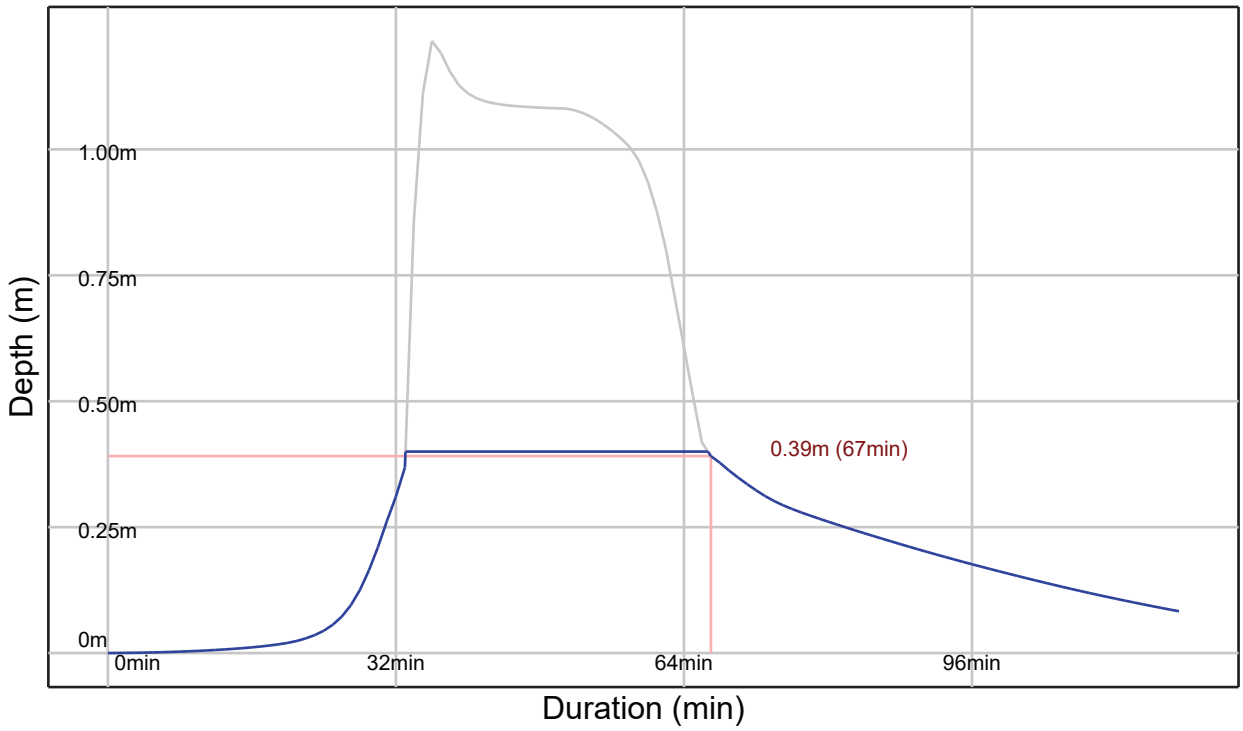
Outfall Manhole S21 : Free Discharge

Flow Control Details

Tank Structure at Manhole S12

Tank Invert (m)	Tank Height (m)	Porosity Ratio (%)	Area (m2)	Effective Area (m2) Area x Porosity Ratio	Max Storage (m3) Effective Area x Height	Infil Base (m/hr)	Infil Side (m/hr)	Safety Factor
56.470	0.400	95.00	150.000	142.500	57.000	0.00000000	0.00000000	2.00

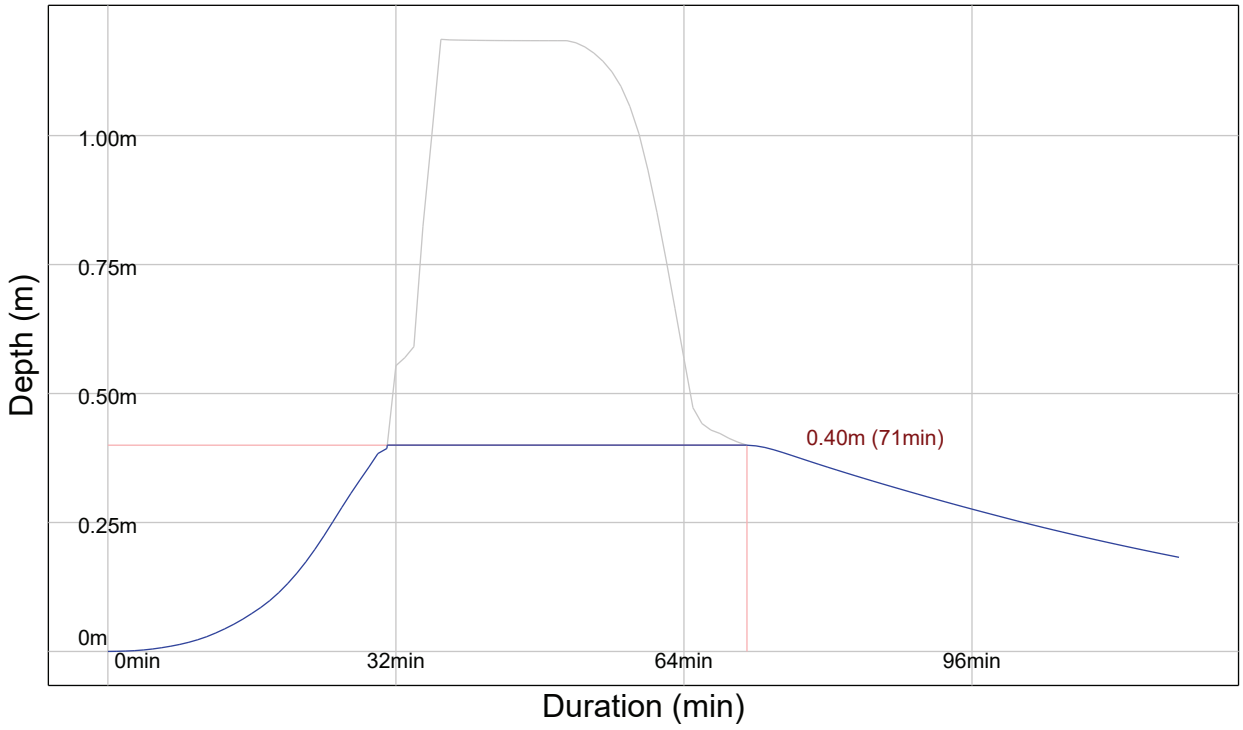
Tank 3 at S12 (1000Yr 60Min Summer)



Tank Structure at Manhole S15

Tank Invert (m)	Tank Height (m)	Porosity Ratio (%)	Area (m2)	Effective Area (m2) Area x Porosity Ratio	Max Storage (m3) Effective Area x Height	Infil Base (m/hr)	Infil Side (m/hr)	Safety Factor
56.360	0.400	95.00	156.000	148.200	59.280	0.00000000	0.00000000	2.00

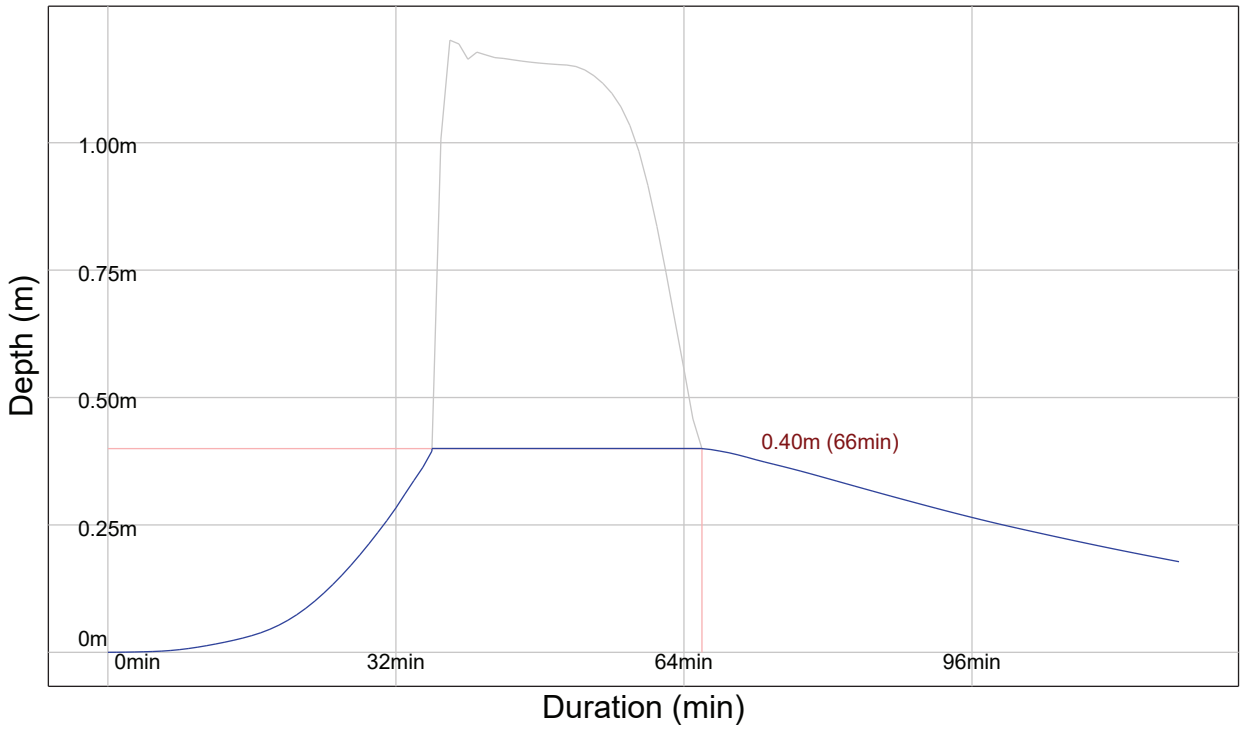
Tank 2 at S15 (1000Yr 60Min Winter)



Tank Structure at Manhole S17

Tank Invert (m)	Tank Height (m)	Porosity Ratio (%)	Area (m2)	Effective Area (m2) Area x Porosity Ratio	Max Storage (m3) Effective Area x Height	Infil Base (m/hr)	Infil Side (m/hr)	Safety Factor
56.360	0.400	95.00	182.000	172.900	69.160	0.00000000	0.00000000	2.00

Tank 1 at S17 (1000Yr 60Min Winter)

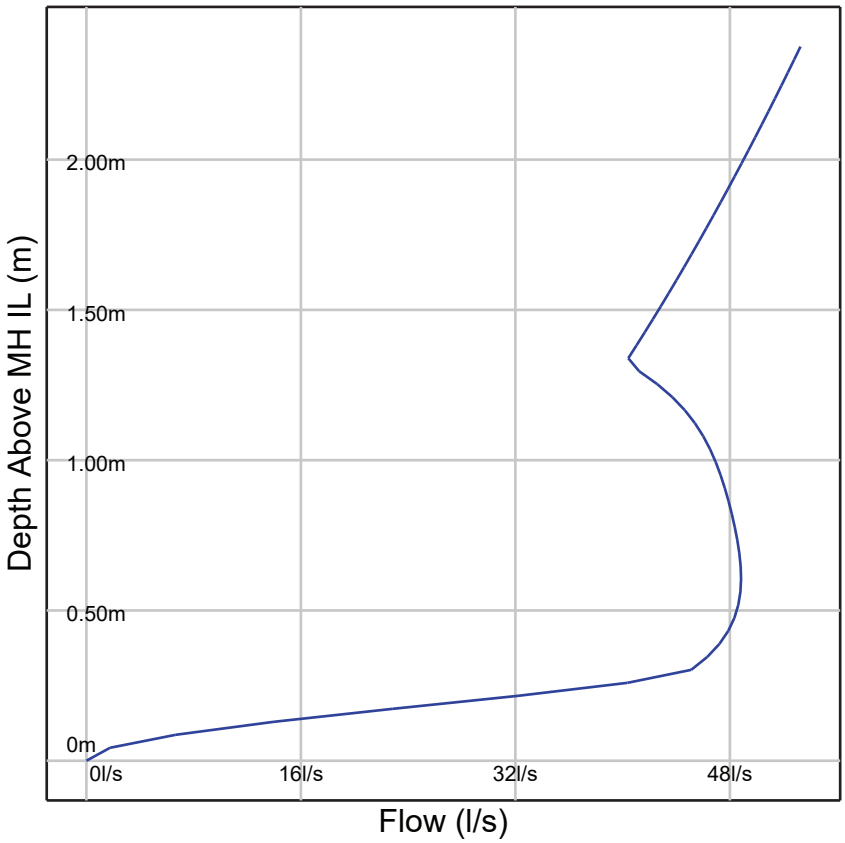


Controls within Manhole S20

Hydro-Brake® Optimum Control

Model Ref	Design Depth (m)	Design Flow (l/s)	Invert Offset (m)	FF Head (m)	FF Flow (l/s)	KF Head (m)	KF Flow (l/s)
SHE-0279-4900-2000-4900	2.000	49.000	0.000	0.607	48.835	1.323	40.180

Hydro-Brake® Optimum Control from S20 to S21



Simulation Settings

FSR: M5-60=19.00, R=0.35, Locale=England and Wales

Summer (Cv: 1.00), Winter (Cv: 1.00)

Global Time of Entry: 5.0 mins

Durations (mins): 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080

Return Periods (yrs) + Climate Change: (1, +0%), (30, +0%), (100, +0%), (100, +40%), (1000, +0%)

Manhole Flood Risk Freeboard: 0.300m

Simulated Rainfall Events

Storm	Average Intensity (mm/hr)	Runoff Continuity %	Flow Continuity %	Item Volume Continuity Errors
1Yr 15Min Winter	33.289	0.00	0.00	
1Yr 15Min Summer	33.289	0.00	0.00	
1Yr 30Min Winter	21.560	0.00	0.00	
1Yr 30Min Summer	21.560	0.00	0.00	
1Yr 60Min Summer	13.523	0.00	0.00	
1Yr 60Min Winter	13.523	0.00	0.00	
1Yr 120Min Winter	8.362	0.00	0.00	
1Yr 120Min Summer	8.362	0.00	0.00	
1Yr 180Min Winter	6.304	0.00	0.00	
1Yr 180Min Summer	6.304	0.00	0.00	
1Yr 240Min Summer	5.165	0.00	0.00	
1Yr 240Min Winter	5.165	0.00	0.00	
1Yr 360Min Summer	3.897	0.00	0.00	
1Yr 360Min Winter	3.897	0.00	0.00	
1Yr 480Min Winter	3.187	0.00	0.00	
1Yr 480Min Summer	3.187	0.00	0.00	
1Yr 600Min Summer	2.727	0.00	0.00	
1Yr 600Min Winter	2.727	0.00	0.00	
1Yr 720Min Summer	2.401	0.00	0.00	
1Yr 720Min Winter	2.401	0.00	0.00	
1Yr 960Min Summer	1.963	0.00	0.00	
1Yr 960Min Winter	1.963	0.00	0.00	
1Yr 1440Min Summer	1.479	0.00	0.00	
1Yr 1440Min Winter	1.479	0.00	0.00	
1Yr 2160Min Summer	1.115	0.00	0.00	
1Yr 2160Min Winter	1.115	0.00	0.00	
1Yr 2880Min Summer	0.913	0.00	0.00	
1Yr 2880Min Winter	0.913	0.00	0.00	
1Yr 4320Min Summer	0.689	0.00	0.00	
1Yr 4320Min Winter	0.689	0.00	0.00	
1Yr 5760Min Summer	0.565	0.00	0.00	
1Yr 5760Min Winter	0.565	0.00	0.00	
1Yr 7200Min Summer	0.484	0.00	0.00	
1Yr 7200Min Winter	0.484	0.00	0.00	
1Yr 8640Min Summer	0.427	0.00	0.00	
1Yr 8640Min Winter	0.427	0.00	0.00	
1Yr 10080Min Summer	0.383	0.00	0.00	
1Yr 10080Min Winter	0.383	0.00	0.00	
30Yr 15Min Winter	68.836	0.00	-0.05	
30Yr 15Min Summer	68.836	0.00	-0.04	
30Yr 30Min Summer	45.828	0.00	-0.05	
30Yr 30Min Winter	45.828	0.00	-0.05	
30Yr 60Min Summer	29.238	0.00	-0.04	
30Yr 60Min Winter	29.238	0.00	-0.04	
30Yr 120Min Winter	18.112	0.00	0.00	
30Yr 120Min Summer	18.112	0.00	0.00	
30Yr 180Min Summer	13.534	0.00	0.00	
30Yr 180Min Winter	13.534	0.00	0.00	
30Yr 240Min Summer	10.952	0.00	0.00	
30Yr 240Min Winter	10.952	0.00	0.00	
30Yr 360Min Summer	8.106	0.00	0.00	
30Yr 360Min Winter	8.106	0.00	0.00	
30Yr 480Min Summer	6.544	0.00	0.00	
30Yr 480Min Winter	6.544	0.00	0.00	

Simulated Rainfall Events

Storm	Average Intensity (mm/hr)	Runoff Continuity %	Flow Continuity %	Item Volume Continuity Errors
30Yr 600Min Summer	5.539	0.00	0.00	
30Yr 600Min Winter	5.539	0.00	0.00	
30Yr 720Min Summer	4.832	0.00	0.00	
30Yr 720Min Winter	4.832	0.00	0.00	
30Yr 960Min Summer	3.892	0.00	0.00	
30Yr 960Min Winter	3.892	0.00	0.00	
30Yr 1440Min Summer	2.866	0.00	0.00	
30Yr 1440Min Winter	2.866	0.00	0.00	
30Yr 2160Min Summer	2.108	0.00	0.00	
30Yr 2160Min Winter	2.108	0.00	0.00	
30Yr 2880Min Summer	1.693	0.00	0.00	
30Yr 2880Min Winter	1.693	0.00	0.00	
30Yr 4320Min Summer	1.242	0.00	0.00	
30Yr 4320Min Winter	1.242	0.00	0.00	
30Yr 5760Min Summer	0.996	0.00	0.00	
30Yr 5760Min Winter	0.996	0.00	0.00	
30Yr 7200Min Summer	0.839	0.00	0.00	
30Yr 7200Min Winter	0.839	0.00	0.00	
30Yr 8640Min Summer	0.730	0.00	0.00	
30Yr 8640Min Winter	0.730	0.00	0.00	
30Yr 10080Min Summer	0.648	0.00	0.00	
30Yr 10080Min Winter	0.648	0.00	0.00	
100Yr 15Min Summer	89.024	0.00	-0.05	
100Yr 15Min Winter	89.024	0.00	-0.06	
100Yr 30Min Summer	59.849	0.00	-0.05	
100Yr 30Min Winter	59.849	0.00	-0.06	
100Yr 60Min Summer	38.413	0.00	-0.04	
100Yr 60Min Winter	38.413	0.00	-0.04	
100Yr 120Min Summer	23.812	0.00	0.00	
100Yr 120Min Winter	23.812	0.00	0.00	
100Yr 180Min Summer	17.737	0.00	0.00	
100Yr 180Min Winter	17.737	0.00	0.00	
100Yr 240Min Summer	14.290	0.00	0.00	
100Yr 240Min Winter	14.290	0.00	0.00	
100Yr 360Min Summer	10.505	0.00	0.00	
100Yr 360Min Winter	10.505	0.00	0.00	
100Yr 480Min Summer	8.441	0.00	0.00	
100Yr 480Min Winter	8.441	0.00	0.00	
100Yr 600Min Summer	7.118	0.00	0.00	
100Yr 600Min Winter	7.118	0.00	0.00	
100Yr 720Min Summer	6.190	0.00	0.00	
100Yr 720Min Winter	6.190	0.00	0.00	
100Yr 960Min Summer	4.959	0.00	0.00	
100Yr 960Min Winter	4.959	0.00	0.00	
100Yr 1440Min Summer	3.622	0.00	0.00	
100Yr 1440Min Winter	3.622	0.00	0.00	
100Yr 2160Min Summer	2.640	0.00	0.00	
100Yr 2160Min Winter	2.640	0.00	0.00	
100Yr 2880Min Summer	2.107	0.00	0.00	
100Yr 2880Min Winter	2.107	0.00	0.00	
100Yr 4320Min Summer	1.530	0.00	0.00	
100Yr 4320Min Winter	1.530	0.00	0.00	
100Yr 5760Min Summer	1.218	0.00	0.00	
100Yr 5760Min Winter	1.218	0.00	0.00	
100Yr 7200Min Summer	1.019	0.00	0.00	
100Yr 7200Min Winter	1.019	0.00	0.00	
100Yr 8640Min Summer	0.882	0.00	0.00	
100Yr 8640Min Winter	0.882	0.00	0.00	
100Yr 10080Min Summer	0.781	0.00	0.00	
100Yr 10080Min Winter	0.781	0.00	0.00	
100Yr+40% 15Min Summer	124.633	0.00	0.32	
100Yr+40% 15Min Winter	124.633	0.00	0.00	
100Yr+40% 30Min Summer	83.789	0.00	-0.05	
100Yr+40% 30Min Winter	83.789	0.00	0.77	
100Yr+40% 60Min Summer	53.779	0.00	0.54	
100Yr+40% 60Min Winter	53.779	0.00	1.60	
100Yr+40% 120Min Summer	33.337	0.00	0.92	
100Yr+40% 120Min Winter	33.337	0.00	1.56	

Simulated Rainfall Events

Storm	Average Intensity (mm/hr)	Runoff Continuity %	Flow Continuity %	Item Volume Continuity Errors
100Yr+40% 180Min Summer	24.832	0.00	2.22	
100Yr+40% 180Min Winter	24.832	0.00	0.51	
100Yr+40% 240Min Summer	20.006	0.00	0.46	
100Yr+40% 240Min Winter	20.006	0.00	0.00	
100Yr+40% 360Min Summer	14.706	0.00	0.00	
100Yr+40% 360Min Winter	14.706	0.00	0.00	
100Yr+40% 480Min Summer	11.818	0.00	0.00	
100Yr+40% 480Min Winter	11.818	0.00	0.00	
100Yr+40% 600Min Summer	9.966	0.00	0.00	
100Yr+40% 600Min Winter	9.966	0.00	0.00	
100Yr+40% 720Min Summer	8.665	0.00	0.00	
100Yr+40% 720Min Winter	8.665	0.00	0.00	
100Yr+40% 960Min Summer	6.943	0.00	0.00	
100Yr+40% 960Min Winter	6.943	0.00	0.00	
100Yr+40% 1440Min Summer	5.071	0.00	0.00	
100Yr+40% 1440Min Winter	5.071	0.00	0.00	
100Yr+40% 2160Min Summer	3.696	0.00	0.00	
100Yr+40% 2160Min Winter	3.696	0.00	0.00	
100Yr+40% 2880Min Summer	2.949	0.00	0.00	
100Yr+40% 2880Min Winter	2.949	0.00	0.00	
100Yr+40% 4320Min Summer	2.142	0.00	0.00	
100Yr+40% 4320Min Winter	2.142	0.00	0.00	
100Yr+40% 5760Min Summer	1.705	0.00	0.00	
100Yr+40% 5760Min Winter	1.705	0.00	0.00	
100Yr+40% 7200Min Summer	1.427	0.00	0.00	
100Yr+40% 7200Min Winter	1.427	0.00	0.00	
100Yr+40% 8640Min Summer	1.235	0.00	0.00	
100Yr+40% 8640Min Winter	1.235	0.00	0.00	
100Yr+40% 10080Min Summer	1.093	0.00	0.00	
100Yr+40% 10080Min Winter	1.093	0.00	0.00	
1000Yr 15Min Summer	145.581	0.00	6.16	
1000Yr 15Min Winter	145.581	0.00	6.36	
1000Yr 30Min Summer	99.717	0.00	0.40	
1000Yr 30Min Winter	99.717	0.00	6.90	
1000Yr 60Min Summer	64.742	0.00	2.17	
1000Yr 60Min Winter	64.742	0.00	0.29	
1000Yr 120Min Summer	40.184	0.00	1.03	
1000Yr 120Min Winter	40.184	0.00	0.03	
1000Yr 180Min Summer	29.751	0.00	-0.26	
1000Yr 180Min Winter	29.751	0.00	0.64	
1000Yr 240Min Summer	23.769	0.00	1.13	
1000Yr 240Min Winter	23.769	0.00	0.17	
1000Yr 360Min Summer	17.247	0.00	0.18	
1000Yr 360Min Winter	17.247	0.00	0.00	
1000Yr 480Min Summer	13.738	0.00	0.00	
1000Yr 480Min Winter	13.738	0.00	0.00	
1000Yr 600Min Summer	11.501	0.00	0.00	
1000Yr 600Min Winter	11.501	0.00	0.00	
1000Yr 720Min Summer	9.939	0.00	0.00	
1000Yr 720Min Winter	9.939	0.00	0.00	
1000Yr 960Min Summer	7.882	0.00	0.00	
1000Yr 960Min Winter	7.882	0.00	0.00	
1000Yr 1440Min Summer	5.669	0.00	0.00	
1000Yr 1440Min Winter	5.669	0.00	0.00	
1000Yr 2160Min Summer	4.062	0.00	0.00	
1000Yr 2160Min Winter	4.062	0.00	0.00	
1000Yr 2880Min Summer	3.200	0.00	0.00	
1000Yr 2880Min Winter	3.200	0.00	0.00	
1000Yr 4320Min Summer	2.279	0.00	0.00	
1000Yr 4320Min Winter	2.279	0.00	0.00	
1000Yr 5760Min Summer	1.788	0.00	0.00	
1000Yr 5760Min Winter	1.788	0.00	0.00	
1000Yr 7200Min Summer	1.479	0.00	0.00	
1000Yr 7200Min Winter	1.479	0.00	0.00	
1000Yr 8640Min Summer	1.268	0.00	0.00	
1000Yr 8640Min Winter	1.268	0.00	0.00	
1000Yr 10080Min Winter	1.115	0.00	0.00	
1000Yr 10080Min Summer	1.115	0.00	0.00	

Simulation Results

Return Period (yrs) + Climate Change (%):

1yr+0%

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S11	15 min Summer	9	56.657	0.177	33.864		OK
S12	120 min Summer	77	56.500	0.030	0.053		OK
S13	15 min Summer	9	56.627	0.187	39.982		OK
S14	15 min Summer	8	56.616	0.216	30.813		OK
S15	60 min Summer	38	56.483	0.123	2.306		OK
S16	15 min Summer	8	56.596	0.266	74.020		OK
S17	60 min Winter	50	56.446	0.086	0.486		OK
S18	15 min Summer	8	56.571	0.271	18.679		OK
S19	15 min Summer	8	56.575	0.325	50.866		Surcharged
S20	15 min Summer	8	56.558	0.370	34.039		Surcharged
S21	15 min Summer	8	56.289	0.139	32.735		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	15 min Summer	9	S11	S13	0.182	0.817	34.855	0.570	OK
2.000	15 min Summer	17	S12	S13	0.097	0.288	0.594	0.008	OK
1.001	15 min Summer	9	S13	S14	0.202	0.819	33.315	0.533	OK
1.002	15 min Summer	9	S14	S16	0.241	0.671	35.283	0.578	OK
3.000	15 min Summer	18	S15	S16	0.154	0.576	11.814	0.190	OK
1.003	15 min Summer	8	S16	S19	0.283	0.736	41.031	0.697	OK
4.000	15 min Summer	26	S17	S18	0.143	0.458	5.296	0.080	OK
4.001	15 min Summer	26	S18	S19	0.286	0.266	5.488	0.078	OK
1.004	15 min Summer	8	S19	S20	0.300	0.772	34.039	0.549	Surcharged
1.005	15 min Summer	8	S20	S21	0.145	0.971	32.735	0.525	OK

Return Period (yrs) + Climate Change (%):

30yr+0%

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S11	15 min Summer	8	56.879	0.399	72.972		Surcharged
S12	60 min Summer	41	56.609	0.139	1.551		OK
S13	15 min Summer	8	56.808	0.368	86.950		Surcharged
S14	15 min Summer	8	56.776	0.376	53.310		Surcharged
S15	30 min Summer	20	56.620	0.260	6.801		OK
S16	15 min Summer	7	56.720	0.390	132.675		Surcharged
S17	120 min Summer	78	56.582	0.222	1.465		OK
S18	15 min Summer	7	56.649	0.349	35.384		Surcharged
S19	15 min Summer	7	56.662	0.412	78.986		Surcharged
S20	15 min Summer	8	56.636	0.448	38.274		Surcharged
S21	15 min Summer	8	56.309	0.159	42.332		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	15 min Summer	9	S11	S13	0.300	1.125	76.668	1.253	Surcharged
2.000	15 min Summer	18	S12	S13	0.161	0.557	11.083	0.152	OK
1.001	15 min Summer	8	S13	S14	0.300	0.812	53.310	0.853	Surcharged
1.002	15 min Summer	8	S14	S16	0.300	0.797	56.320	0.923	Surcharged
3.000	60 min Summer	39	S15	S16	0.273	0.439	17.382	0.279	OK
1.003	30 min Summer	21	S16	S19	0.300	0.711	49.723	0.844	Surcharged
4.000	120 min Summer	126	S17	S18	0.252	0.464	9.403	0.143	OK
4.001	15 min Summer	25	S18	S19	0.300	0.214	9.956	0.142	Surcharged
1.004	15 min Summer	7	S19	S20	0.300	0.893	45.874	0.740	Surcharged
1.005	15 min Summer	8	S20	S21	0.166	1.055	42.332	0.679	OK

Return Period (yrs) + Climate Change (%):

100yr+0%

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S11	15 min Summer	7	56.993	0.513	89.988		Surcharged
S12	60 min Summer	40	56.697	0.227	1.978		OK
S13	15 min Summer	7	56.904	0.464	96.968		Surcharged
S14	15 min Summer	7	56.863	0.463	58.718		Surcharged
S15	60 min Summer	36	56.692	0.332	9.151		Surcharged
S16	15 min Summer	7	56.794	0.464	169.568		Surcharged
S17	120 min Summer	80	56.656	0.296	1.658		Surcharged
S18	15 min Summer	7	56.678	0.378	53.614		Surcharged
S19	15 min Summer	7	56.708	0.458	97.901		Surcharged
S20	15 min Summer	8	56.673	0.486	41.216		Surcharged
S21	15 min Summer	8	56.314	0.164	45.252		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	15 min Winter	8	S11	S13	0.300	1.309	92.494	1.512	Surcharged
2.000	60 min Summer	63	S12	S13	0.242	0.471	12.747	0.175	OK
1.001	15 min Winter	7	S13	S14	0.300	0.805	55.464	0.887	Surcharged
1.002	15 min Winter	7	S14	S16	0.300	0.775	54.758	0.898	Surcharged
3.000	30 min Winter	23	S15	S16	0.300	0.320	22.461	0.361	Surcharged
1.003	30 min Summer	20	S16	S19	0.300	0.822	58.115	0.987	Surcharged
4.000	120 min Summer	126	S17	S18	0.298	0.464	10.131	0.154	OK
4.001	60 min Winter	65	S18	S19	0.300	0.197	11.712	0.167	Surcharged
1.004	15 min Winter	6	S19	S20	0.300	0.906	45.866	0.739	Surcharged
1.005	15 min Summer	8	S20	S21	0.173	1.076	45.252	0.726	OK

Return Period (yrs) + Climate Change (%):

100yr+40%

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S11	120 min Summer	80	57.219	0.739	14.391		Surcharged
S12	120 min Summer	80	57.217	0.747	0.000		Surcharged
S13	120 min Summer	80	57.217	0.777	16.716		Surcharged
S14	120 min Summer	80	57.213	0.813	16.795		Surcharged
S15	120 min Summer	80	57.208	0.848	3.818		Surcharged
S16	120 min Summer	80	57.208	0.878	38.913		Surcharged
S17	120 min Summer	80	57.173	0.813	2.323		Surcharged
S18	120 min Summer	80	57.173	0.873	3.355		Surcharged
S19	120 min Summer	80	57.173	0.923	48.615		Surcharged
S20	120 min Summer	80	57.134	0.946	48.614		Surcharged
S21	120 min Summer	88	56.321	0.171	48.826		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	15 min Winter	8	S11	S13	0.300	1.801	127.299	2.081	Surcharged
2.000	60 min Summer	63	S12	S13	0.300	0.441	28.944	0.397	Surcharged
1.001	15 min Winter	7	S13	S14	0.300	0.843	59.566	0.953	Surcharged
1.002	15 min Winter	7	S14	S16	0.300	0.857	60.568	0.993	Surcharged
3.000	15 min Winter	14	S15	S16	0.300	0.520	36.766	0.591	Surcharged
1.003	30 min Summer	18	S16	S19	0.300	1.301	91.970	1.561	Surcharged
4.000	60 min Summer	65	S17	S18	0.300	0.220	15.526	0.236	Surcharged
4.001	60 min Summer	65	S18	S19	0.300	0.223	15.759	0.224	Surcharged
1.004	60 min Summer	41	S19	S20	0.300	0.948	66.979	1.080	Surcharged
1.005	120 min Summer	88	S20	S21	0.180	1.101	48.826	0.783	OK

Return Period (yrs) + Climate Change (%):

1000yr+0%

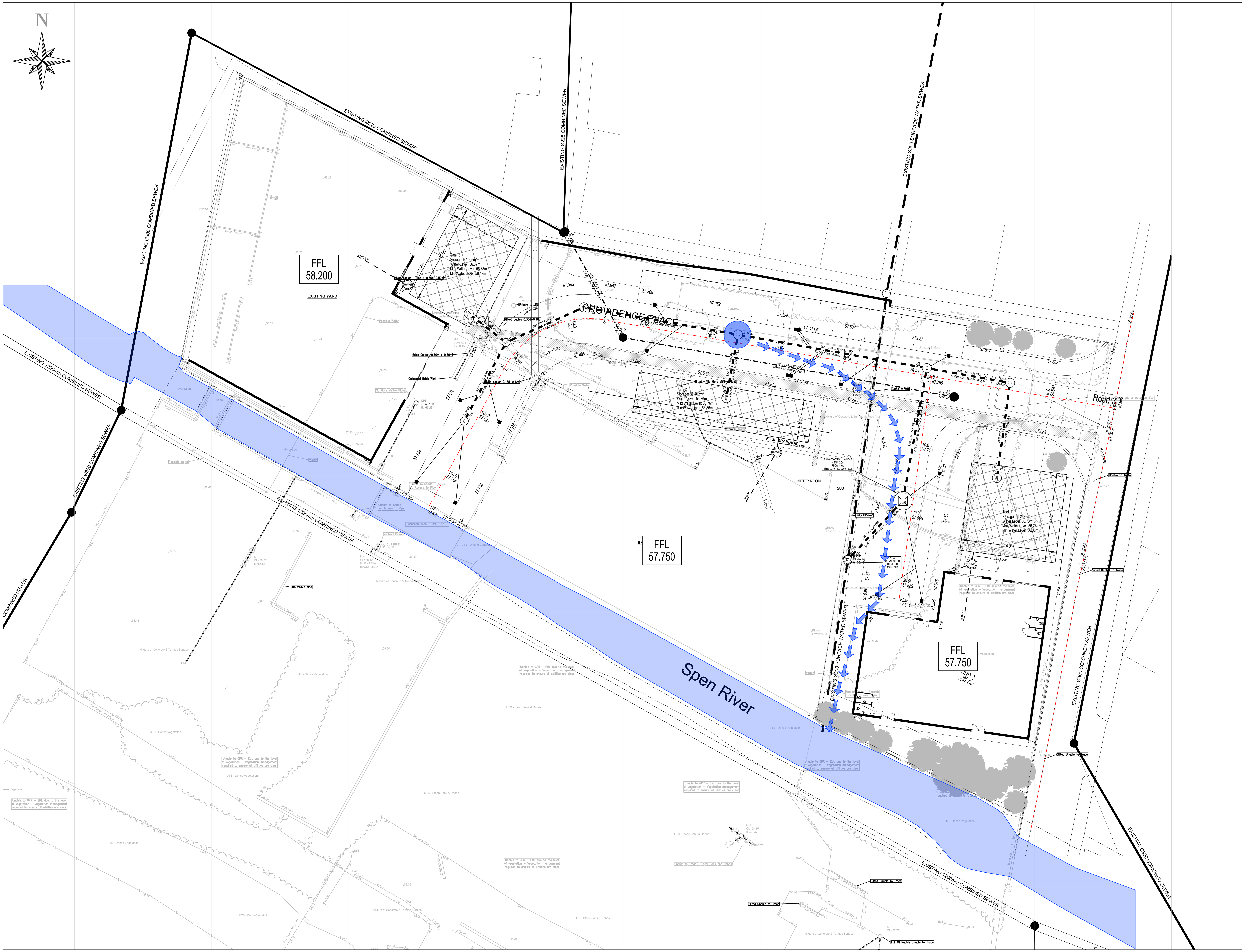
Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S11	60 min Summer	36	57.726	1.246	58.339		Flood Risk
S12	60 min Summer	36	57.685	1.215	0.003		Surcharged
S13	60 min Summer	36	57.686	1.246	66.551		Flood Risk
S14	60 min Summer	36	57.633	1.233	65.670		Flood Risk
S15	60 min Winter	37	57.547	1.187	15.396		Surcharged
S16	120 min Winter	71	57.544	1.214	111.610	52.415	Flood
S17	60 min Winter	38	57.561	1.201	8.566		Surcharged
S18	60 min Winter	38	57.561	1.261	12.006		Flood Risk
S19	120 min Summer	68	57.557	1.307	36.325		Flood Risk
S20	120 min Summer	68	57.533	1.345	41.010		Flood Risk
S21	240 min Winter	183	56.321	0.171	48.834		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	15 min Winter	8	S11	S13	0.300	2.082	147.168	2.406	Surcharged
2.000	60 min Summer	68	S12	S13	0.300	0.528	37.348	0.512	Surcharged
1.001	60 min Summer	36	S13	S14	0.300	0.929	65.670	1.051	Surcharged
1.002	60 min Summer	36	S14	S16	0.300	0.922	65.144	1.068	Surcharged
3.000	15 min Winter	12	S15	S16	0.300	0.527	37.238	0.599	Surcharged
1.003	60 min Summer	35	S16	S19	0.300	2.019	142.717	2.423	Surcharged
4.000	120 min Winter	121	S17	S18	0.300	0.463	15.117	0.229	Surcharged
4.001	120 min Winter	121	S18	S19	0.300	0.253	15.352	0.218	Surcharged
1.004	60 min Summer	36	S19	S20	0.300	1.513	106.918	1.724	Surcharged
1.005	240 min Summer	171	S20	S21	0.180	1.101	48.829	0.783	OK

Appendix H
Flood Exceedance Plan



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KEY

FLOOD EXCEEDANCE EVENT

FLOOD FLOW PATH

REV	AMENDMENTS	BY	DATE
B	LAYOUT UPDATED	MJM	11.03.26
A	INITIAL ISSUE	MJM	26.01.26

FOR COMMENT

STATUS		CHK'D
PRELIMINARY	/	MJM
FOR COMMENT	/	MJM
FOR APPROVAL		
FOR CONSTRUCTION		
AS BUILT		

advant ENGINEERS

Unit 6 Benton Office Park, Bennett Avenue
Horbury, Wakefield, West Yorkshire, WF4 5RA
01924 654108
wakefield@advantengineers.co.uk

CLIENT
BARNES HOMES

CONTRACT
PROVIDENCE PLACE,
WORMALD ST.
LIVERSEDGE, WF15 8EU

TITLE
FLOOD EXCEEDANCE
LAYOUT PLAN

DRAWN	MJM	CHK'D	MJM
SCALE	1:250 @ A1	DATE	26.01.26

JOB No	DRG No	REV
25048	108	B



Unit 6
Benton Office Park
Bennett Avenue
Horbury, Wakefield
West Yorkshire
WF4 5RA
01924 654108
mail@advantengineers.co.uk
www.advantengineers.co.uk