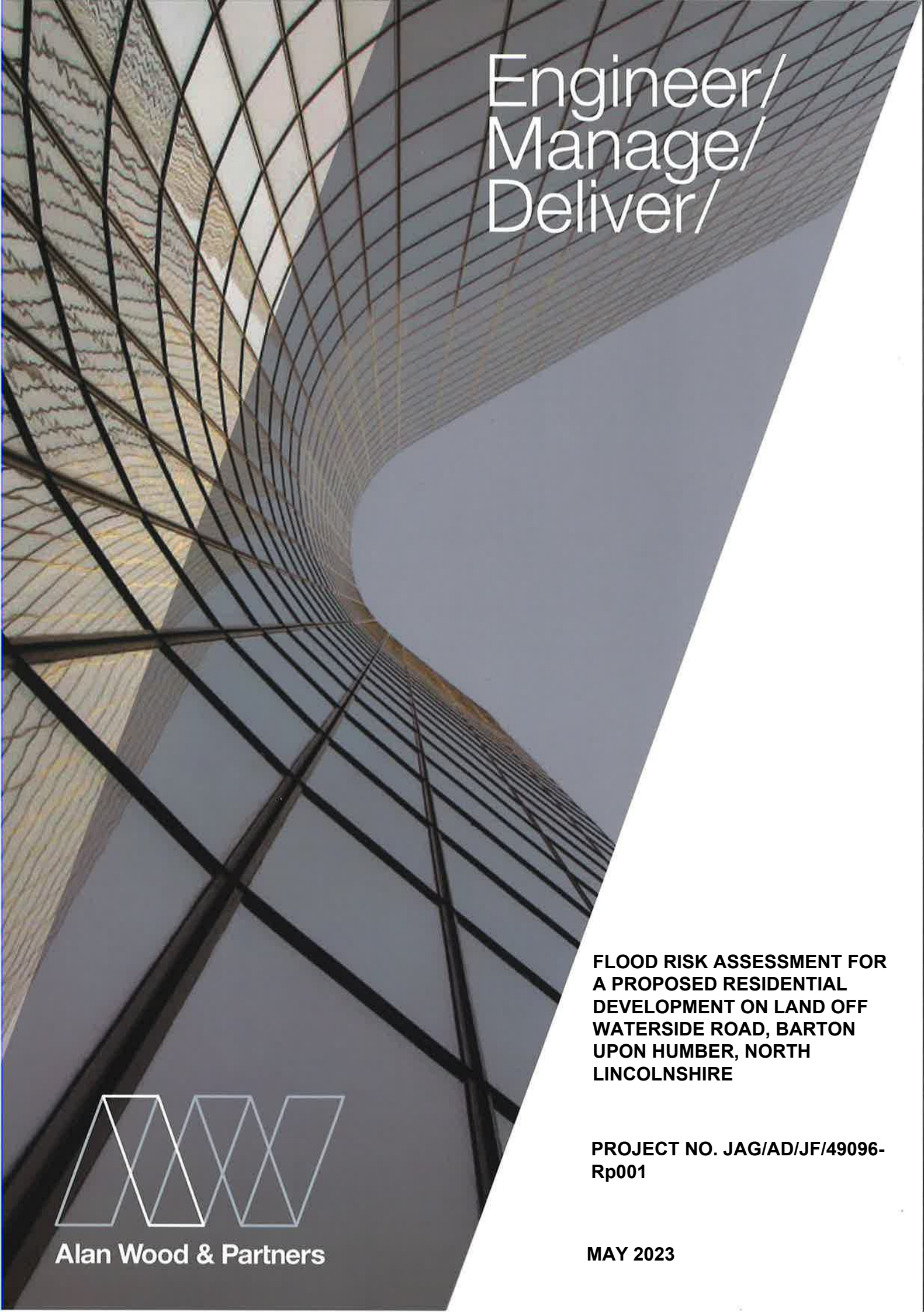

FLOOD RISK ASSESSMENT FOR A PROPOSED RESIDENTIAL DEVELOPMENT ON LAND OFF WATERSIDE ROAD, BARTON UPON HUMBER, NORTH LINCOLNSHIRE

PROJECT NO. JAG/AD/JF/49096-Rp001

MAY 2023

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FLOOD RISK ASSESSMENT FOR A PROPOSED RESIDENTIAL DEVELOPMENT ON LAND OFF WATERSIDE ROAD, BARTON UPON HUMBER, NORTH LINCOLNSHIRE

Prepared by: A Dunn

[redacted]

Signed: ……
Date: 11th May 2023

Approved by: J Gibson, MEng (Hons), CEng, CWEM MCIWEM
Director

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Signed: ……
Date: 11th May 2023

Issue	Revision	Revised by	Approved by	Revised Date

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APPENDICES

1.0 INTRODUCTION

1.1 Background

1.1.1 Alan Wood & Partners were commissioned by Keir Architecture on behalf of Mr and Mrs Chapman to prepare a Flood Risk Assessment for a proposed residential development on land off Waterside Road, Barton Upon Humber in support of an application for planning consent.

1.1.2 A Flood Risk Assessment (FRA) for the proposed development is required to assess the development's risk from flooding.

1.2 Layout of Report

1.2.1 Section 1 provides an introduction to the FRA, explains the layout of this FRA and provides an introduction to flood risk and the latest guidance on development and flood risk in England.

1.2.2 Section 2 provides an introduction to the site. The site description is based upon a desktop study and information provided by the developer. In order to obtain further information on flood risk, consultation was undertaken with the Environment Agency.

1.2.3 Section 3 of this report details the information gathered through the consultation.

1.2.4 Section 4 of this report details the development proposals and considers the development proposals in relation to the current planning policy on development and flood risk in England (and what type of development is considered appropriate in different flood risk zones). National Planning Policy Framework (NPPF): and its associated Technical Guidance (Communities and Local Government, July 2021) is the current planning policy on flood risk in England, and an introduction to NPPF is provided below.

1.2.5 Section 5 of this report considers the flood risk to site, and the potential for the development proposals to impact on flood risk. The assessment of flood risk is based on the latest planning policy and utilises all the information gathered in the preparation of the report.

1.2.6 Section 6 of this report provides details of any recommendations for further work to mitigate against possible flooding.

1.2.7 Section 7 of this report provides a summary of the report.

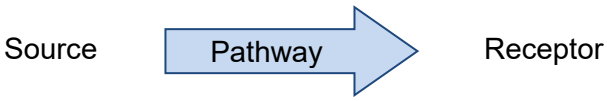
1.3 Flood Risk

1.3.1 Flood risk takes account of both the probability and the consequences of flooding.

1.3.2 Flood risk = probability of flooding x consequences of flooding

1.3.3 Probability is usually interpreted in terms of the return period, e.g. 1 in 100 and 1 in 200 year event, etc. In terms of probability, there is a 1 in 100 (1%) chance of one or more 1 in 100 year floods occurring in a given year. The consequences of flooding depends on how vulnerable a receptor is to flooding.

The components of flood risk can be considered using a source-pathway-receptor model.



1.3.4 Sources constitute flood hazards, which are anything with the potential to cause harm through flooding (e.g. rainfall extreme sea levels, river flows and canals). Pathways represent the mechanism by which the flood hazard would cause harm to a receptor (e.g. overtopping and failure of embankments and flood defences, inadequate drainage and inundation of floodplains). Receptors comprise the people, property, infrastructure and ecosystems that could potentially be affected should a flood occur.

1.4 National Planning Policy Framework

1.4.1 General

1.4.1.1 NPPF and its associated Technical Guidance replaces Planning Policy Statement 25 and provides guidance on how to evaluate sites with respect to flood risk.

1.4.1.2 A summary of the requirements of the NPPF is provided below.

1.4.2 Sources of Flooding

1.4.2.1 The NPPF requires an assessment to flood risk to consider all forms of flooding and lists six forms of flooding that should be considered as part of a flood risk assessment. These forms of flooding are listed in Table 1, along with an explanation of each form of flooding.

Table 1: Forms of flooding

Flooding from Rivers (Fluvial Flooding)
Watercourses flood when the amount of water in them exceeds the flow capacity of the river channel. Flooding can either develop gradually or rapidly, depending on the characteristics of the catchment. Land use, topography and the development can have a strong influence on flooding from rivers.
Flooding from the Sea (Tidal Flooding)
Flooding to low-lying land from the sea and tidal estuaries is caused by storm surges and high tides. Where tidal defences exist, they can be overtopped or breached during a severe storm, which may be more likely with climate change.
Flooding from Land (Pluvial Flooding)
Intense rainfall, often of short duration, that is unable to soak into the ground or enter drainage systems can run quickly off land and result in local flooding. In developed areas this flood water can be polluted with domestic sewage where foul sewers surcharge and overflow. Local topography and built form can have a strong influence on the direction and depth of flow. The design of development down to a micro-level can influence or exacerbate this. Overland flow paths should be taken into account in spatial planning for urban developments. Flooding can be exacerbated if development increases the percentage of impervious area.

Flooding from Groundwater
Groundwater flooding occurs when groundwater levels rise above ground levels (i.e. groundwater issues). Groundwater flooding is most likely to occur in low-lying areas underlain by permeable rocks (aquifers). Chalk is the most extensive source of groundwater flooding.
Flooding from Sewers
In urban areas, rainwater is frequently drained into sewers. Flooding can occur when sewers are overwhelmed by heavy rainfall and become blocked. Sewer flooding continues until the water drains away.
Flooding from Other Artificial Sources (i.e. reservoirs, canals, lakes and ponds)
Non-natural or artificial sources of flooding can include reservoirs, canals and lakes. Reservoir or canal flooding may occur as a result of the facility being overwhelmed and /or as a result of dam or bank failure.

1.4.3 Flood Zones

1.4.3.1 For river and sea flooding, the NPPF uses four Flood Zones to characterise flood risk. These Flood Zones refer to the probability of river and sea flooding, ignoring the presence of defences, and are detailed in Table 2.

Table 2: Flood zones

Flood Zone	Definition
1	Low probability (less than 1 in 1,000 annual probability of river or sea flooding in any year (<0.1%).
2	Medium probability (between 1 in 100 and 1 in 1,000 annual probability of river flooding (1%-0.1%) or between 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5%-0.1%) in any year).
3a	High probability (1 in 100 or greater annual probability of river flooding (>1%) in any year or 1 in 200 or greater annual probability of sea flooding (>0.5%) in any given year).
3b	This zone comprises land where water has to flow or be stored in times flood. Land which would flood with an annual probability of 1 in 20 (5%) or is designed to flood in an extreme flood (0.1%) should provide a starting point for discussions to identify functional floodplain.

1.4.4 Vulnerability

1.4.4.1 NPPF classifies the vulnerability of developments to flooding into five categories. These categories are detailed in Table 3.

Table 3: Flood risk vulnerability classification

Flood Risk Vulnerability Classification	Examples of Development Types
Essential Infrastructure	- Essential utility infrastructure including electricity generating power stations and grid and primary substations - Wind turbines
Highly Vulnerable	- Police stations, ambulance stations, fire stations, command centres and telecommunications installations required to be operational during flooding. - Emergency dispersal points. - Basement dwellings. - Caravans, mobile homes and park homes intended for permanent residential use.
More Vulnerable	- Hospitals. - Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels. - Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels. - Non-residential uses for health services, nurseries and educational establishments. - Sites used for holiday or short-let caravans and camping.
Less Vulnerable	- Building used for shops, financial, professional and other services, restaurants and cafes, hot foot takeaways, offices, general industry, storage and distribution, non-residential institutions not included in "more vulnerable" and assembly and leisure. - Land and buildings used for agriculture and forestry.
Water Compatible	- Docks, marinas and wharves. - Water based recreation (excluding sleeping accommodation). - Lifeguard and coastguard stations. - Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms.

1.4.4.2 Based on the vulnerability of a development, NPPF states within what Flood Zones(s) the development is appropriate. The flood risk vulnerability and Flood Zone 'compatibility' of developments is summarised in Table 4.

Table 4: Flood risk vulnerability and flood zone compatibility

Flood Risk Vulnerability Classification		Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	1	✓	✓	✓	✓	✓
	2	✓	✓	Exception Test	✓	✓
	3a	Exception Test	✓	x	Exception Test	✓
	3b	Exception Test	✓	x	x	x

1.4.5 The Sequential Test, Exception Test and Sequential Approach

1.4.5.1 The Sequential Test is a risk-based test that should be applied at all stages of development and aims to steer new development to areas with the lowest probability of flooding (Zone 1). This is applied by the Local Planning Authority by means of a Strategic Flood Assessment (SFRA).

1.4.5.2 The SFRA and NPPF may require the Exception Test to be applied to certain forms of new development. The test considers the vulnerability of the new development to flood risk and, to be passed, must demonstrate that:

- There are sustainability benefits that outweigh the flood risk and;
- The new development is safe and does not increase flood risk elsewhere.

(See separate documents prepared by Keir Architecture Ltd).

1.4.5.3 The Sequential Approach is also a risk based approach to development. In a development site located in several Flood Zones or with other flood risk, the sequential approach directs the most vulnerable types of development towards areas of least risk within the site. (See separate documents prepared by Keir Architecture Ltd).

1.4.6 Climate Change

1.4.6.1 There is a planning requirement to account for climate change in the proposed design. The recommended allowances should be based on the most relevant guidance from the Environment Agency and the Lead Local Flood Authority.

2.0 EXISTING SITE DESCRIPTION

2.1 Location

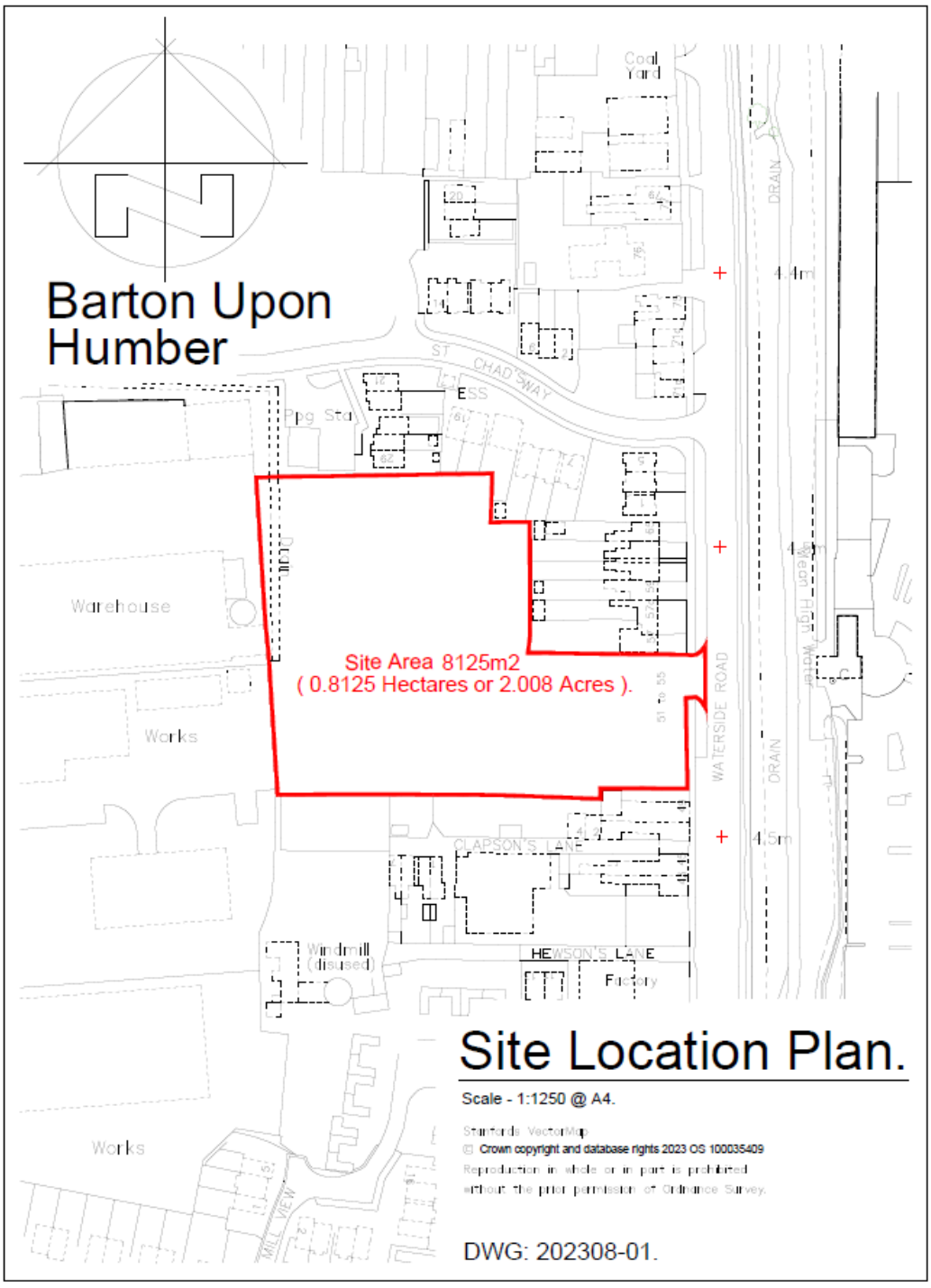
2.1.1 The development site is located on the western side of Waterside Road, Barton Upon Humber.

2.1.2 The site currently comprises an area of vacant land on the site of a former transport depot.

2.1.3 An aerial photograph and location plan is included in Figures 1 and 2 below, which identifies the location of the site.

Figure 1: Aerial Photograph

Figure 2: Location Plan



2.1.4 The Ordnance Survey grid reference for the centre of the site development is approximately 502800, 422745.

2.2 Surrounding Features

2.2.1 The site lies within a mixed-use area of Barton Upon Humber.

2.2.2 To the west of the site is an industrial development and Humber Road with further industrial sites beyond extending to the A15.

2.2.3 To the south of the site is a block of residential apartments with residential properties beyond.

2.2.4 Waterside Road fronts the eastern boundary of the site, beyond which lies an area of vacant land and a supermarket.

2.2.5 To the north of the site lies a residential area of Barton Upon Humber.

2.2.6 There is an open watercourse present along the eastern side of Waterside Road, which outfalls into the River Humber at Barton Haven to the north of the site.

2.2.7 There is a Country Park incorporating a large number of open ponds to the north east of the site.

2.2.8 There is a nature reserve to the north west of the site which incorporates expansive areas of open water.

2.2.9 The south bank of the River Humber is situated approximately 650m to the north of the development site.

2.3 Topography

2.3.1 A topographic survey of the development site has been previously undertaken, which showed that existing ground levels over the area of the development site vary from approximately 3.52m to approximately 4.14m OD(N).

2.3.2 Existing carriageway levels along Waterside Road fronting the site to the east were shown to vary from approximately 4.28m OD(N) in the north to approximately 4.43m OD(N) in the south.

2.3.3 Existing ground levels are shown on the site layout drawings included in Appendix A.

2.4 Ground Conditions

2.4.1 No ground investigation work has been undertaken at this stage of the development.

2.4.2 A desktop study of the British Geological Survey map shows that the local geology comprises superficial deposits of Tidal Flat Deposits – Clay and Silt overlaying bedrock comprising Ferriby Chalk Formation – Chalk.

2.4.3 Local borehole records in the vicinity of the development show boulder clay extending to a depth of 10m below ground level.

2.4.4 The local geology therefore precludes the use of soakaways as a means for disposal of surface water run-off from the development.

2.4.5 To ensure the development meets SuDS requirements, the surface water drainage will need to be attenuated and the developer will be restricting the outfall rate, as agreed with Anglian Water Services and providing appropriate storage within the development.

3.0 CONSULTATION

3.1 Consultation has taken place with the Architect in order to obtain relevant details of the proposed development.

3.2 Consultation has taken place with the Environment Agency in order to obtain relevant information in respect of flood mapping and flood data, details of which are included within this report.

3.3 Consultation has taken place with North Lincolnshire Council in respect of the document “North and North East Lincolnshire Strategic Flood Risk Assessment”. Relevant details are incorporated within this report.

4.0 PROPOSED DEVELOPMENT

4.1 The Development

4.1.1 The proposed development involves the construction of a residential development to include the following:-

- The construction of 38 residential dwellings.
- The construction of site roadways, driveways and footpaths.
- New service installation works to serve the development.
- Residential gardens.
- Non-habitable accommodation (garage space) is to be provided at ground floor level in order to minimise flood damage, should flood waters enter the buildings.
- Sleeping accommodation will be on the second floor level of the new dwellings.

4.1.2 Copies of the layout drawings showing details of the proposed development are included in Appendix A.

4.2 Flood Risk

4.2.1 In terms of flood risk vulnerability, the construction of buildings for residential use is classed as ‘More Vulnerable’ development (Table 3).

4.2.2 In terms of flood zone compatibility, the development will require a Sequential Test and an Exception Test to justify the construction of ‘More Vulnerable’ development in Flood Zone 3 (Table 4).

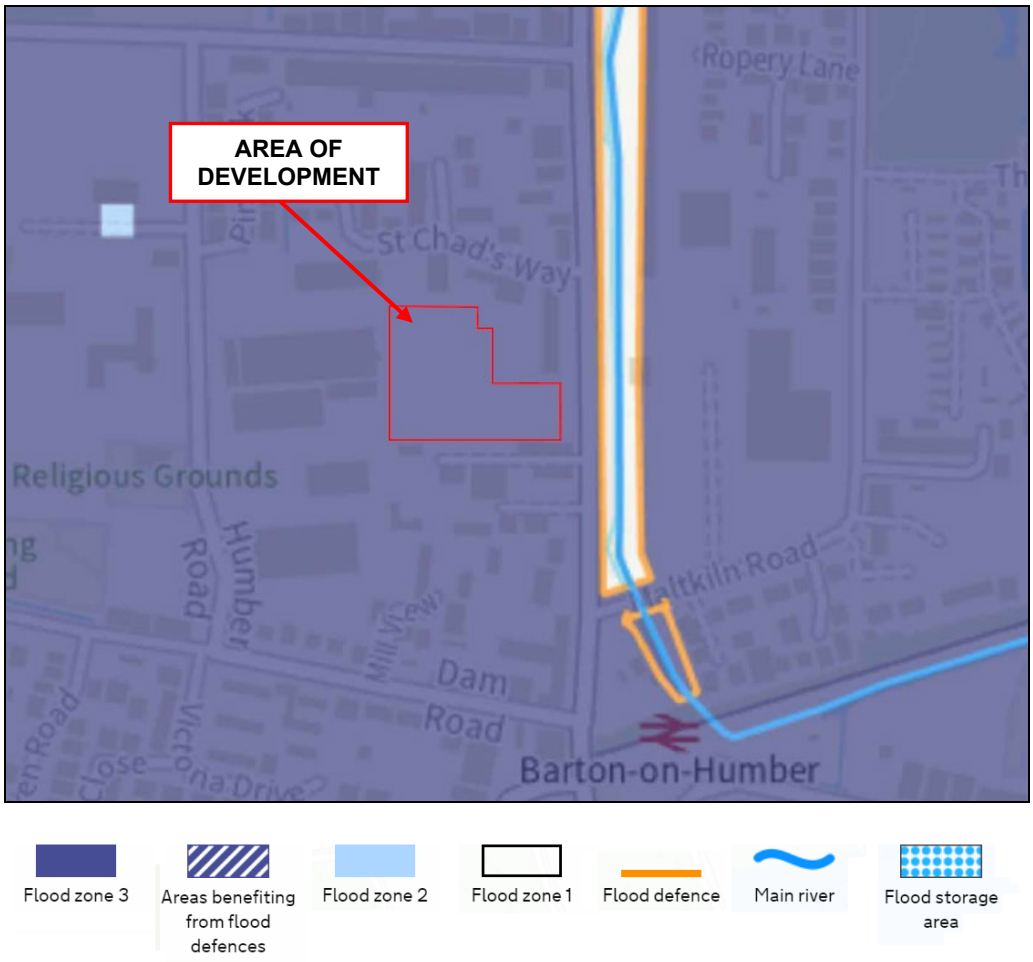
4.2.3 This report demonstrates that the development will be safe and will not increase the risk of flooding to other parties in compliance with the requirement of North Lincolnshire Core Strategy CS19 Flood Risk Policy.

5.0 FLOOD RISK ASSESSMENT

5.1 Flood Zone

5.1.1 A copy of the Environment Agency Flood Map for Planning is included in Figure 3 below, which identifies the development site to be located within an area designated as Flood Zone 3, (high probability of flooding), comprising land assessed as having a 1 in 100 or greater annual probability of river flooding or a 1 in 200 year or greater annual probability of flooding from the sea.

Figure 3: Environment Agency Flood map for planning dated May 2023



5.1.2 The site is not shown to benefit from flood defences.

5.2 Historical Flooding

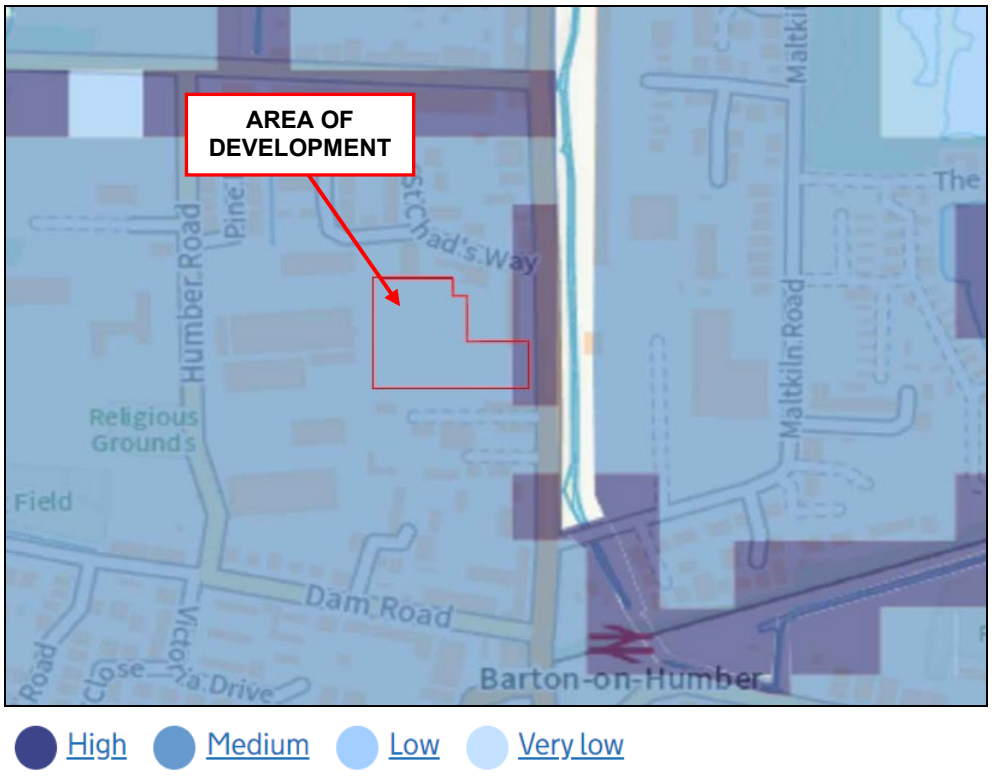
5.2.1 The data received from The Environment Agency shows that there is no record of historical flooding in the area of the development.

5.3 Tidal Flooding

5.3.1 The site is located at a distance of approximately 650m from the southern bank of the River Humber, which is the main potential source of flooding to the development.

5.3.2 A copy of the flood map produced from the Environment Agency showing the extent of flooding from rivers or the sea is included in Figure 4 below.

Figure 4: Environment Agency map dated May 2023 showing the extent of Flooding from Rivers or the Sea



5.3.3 The map shows that the area of the new development is considered to be at 'Medium Risk' of flooding.

5.3.4 Flood risk data has been obtained from the Environment Agency in respect of potential flood risk to the development.

5.3.5 The flood hazard mapping data received from the Environment Agency shows that for a 1 in 200 tidal breach scenario the maximum flood depth over the development site would be above 1.6m, with a flood velocity of 0.3-1.0m/s and a hazard rating greater than 2.0 (Danger for All).

5.3.6 The flood hazard mapping shows that for a 1 in 200 annual probability plus climate change tidal overtopping scenario, the maximum hazard rating is greater than 2.0 (Danger for All).

5.3.7 The flood velocity over the development site is shown to vary from 0.3–1.0m/s up to 1.5 – 2.5m/s.

5.3.8 A copy of the flood risk data received from the Environment Agency is included in Appendix B.

5.3.9 Flood mitigation measures will consequently need to be incorporated within the design of the development. Details of such measures are incorporated in Section 6 of this report.

5.4 Fluvial Flooding

5.4.1 The main potential source of fluvial flooding in the region is the River Ancholme. However, at a distance of approximately 6km from the site, it is not considered that this watercourse will pose any risk of flooding to the development.

5.4.2 There is a small open watercourse situated on the eastern side of Waterside Road. This watercourse outfalls into the River Humber at Barton Haven at its junction with the river.

5.4.3 The River Humber is tidal and consequently the watercourse discharges at low tidal levels via sluice gates.

5.4.4 The catchment area of the watercourse is small and is not shown to pose any risk of flooding to the development.

5.4.5 The risk of fluvial flooding to the development is considered to be low and acceptable.

5.5 Flooding from Open Drainage Ditches

5.5.1 There is a small open drain located along the western boundary of the development site.

5.5.2 There are open drainage ditches to the east of Waterside Road and to the north Far Ings Road.

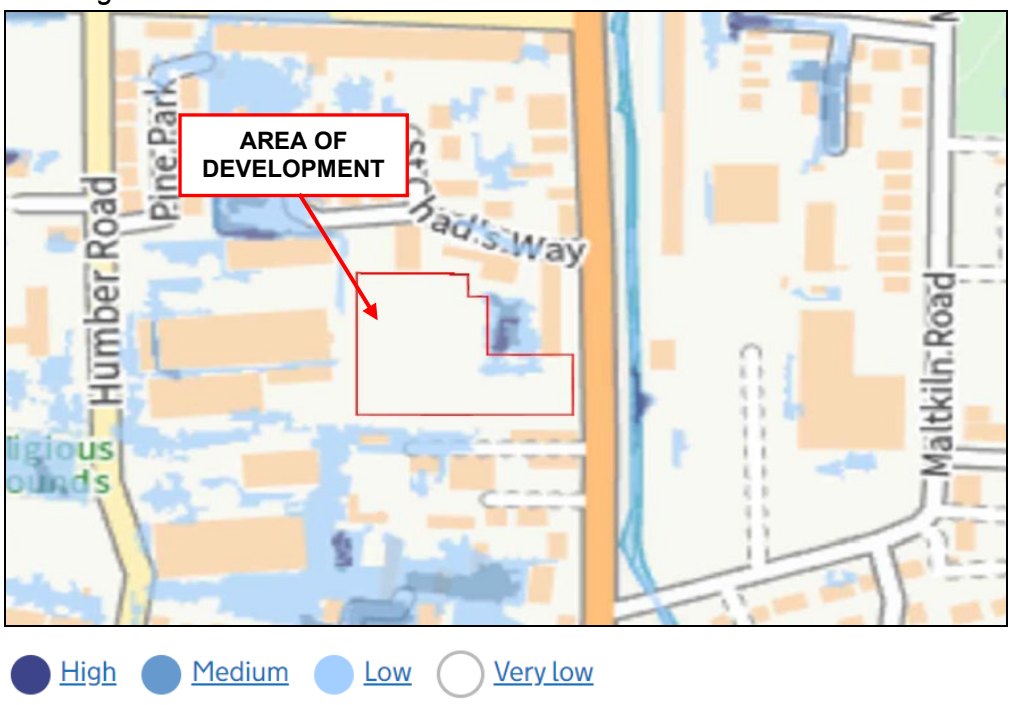
5.5.3 These open drainage ditches are not shown to pose any risk of flooding to the site.

5.5.4 The risk to the development from this potential flood source is considered to be low and acceptable.

5.6 Surface Water Flooding

5.6.1 A copy of the Environment Agency map showing the extent of flooding from surface water is included in Figure 5 below.

Figure 5: Environment Agency map dated May 2023 showing the extent of flooding from surface water



5.6.2 The map shows that a small area of the site is considered to be at risk from overland surface water flooding.

5.6.3 The maps produced by the Environment Agency showing the anticipated flood depths for low, medium and high risk flooding scenarios are included in Figures 6, 7 and 8 below.

Figure 6: Environment Agency map dated May 2023 showing the anticipated flood depth from surface water – low risk

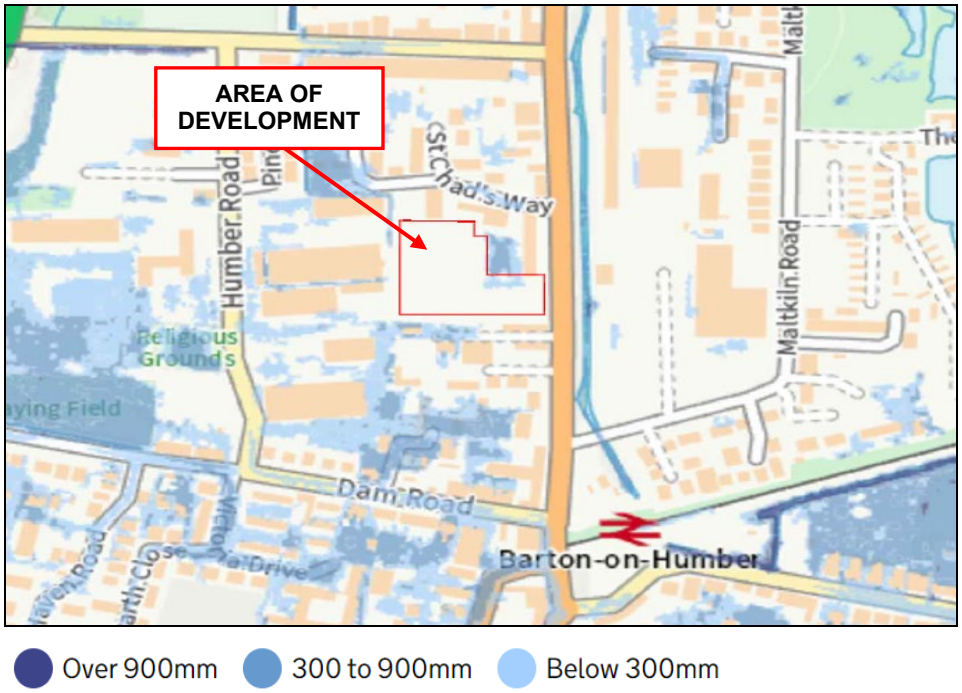


Figure 7: Environment Agency map dated May 2023 showing the anticipated flood depth from surface water – medium risk

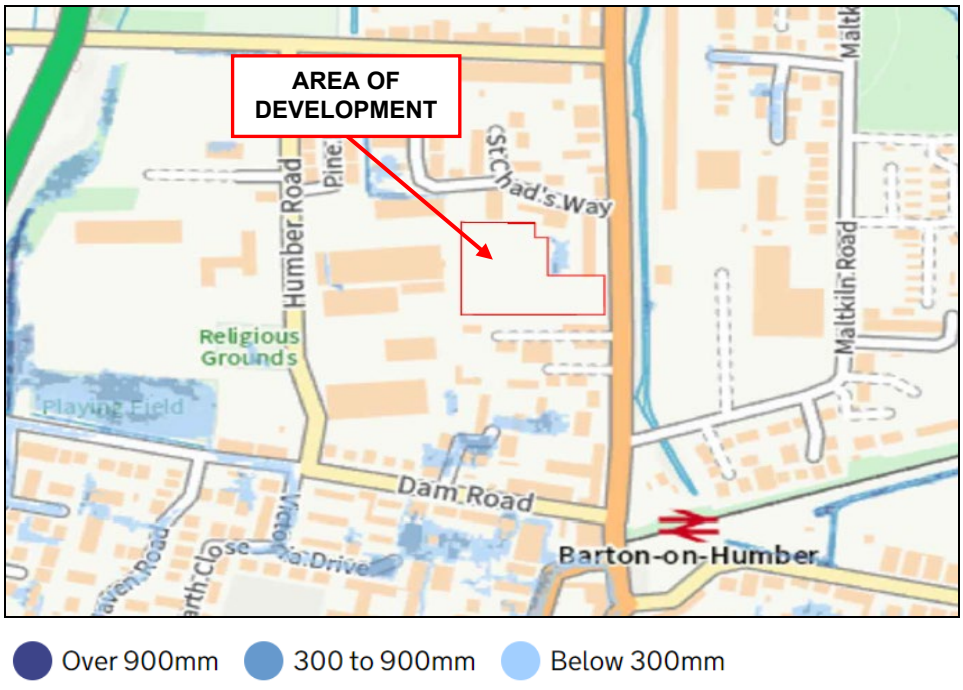
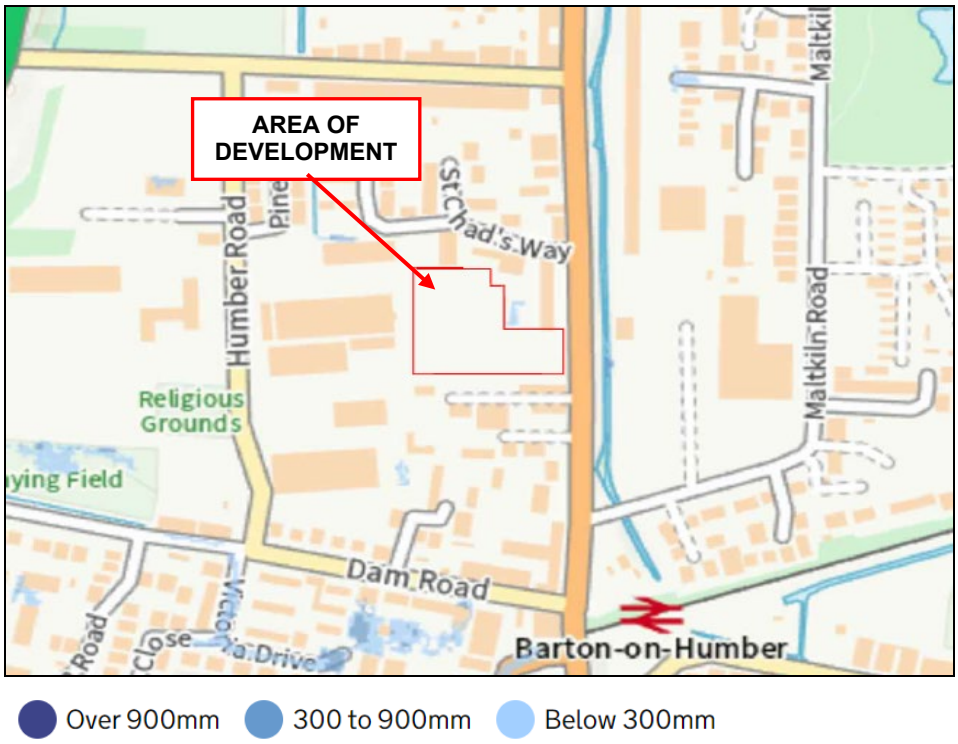


Figure 8: Environment Agency map dated May 2023 showing the anticipated flood depth from surface water – high risk



5.6.4 The maps show that for a 'low risk' scenario, the eastern area of the site is prone to flooding to a depth varying from 300mm to 900mm.

5.6.5 For a 'medium risk' scenario, the area of the site is not shown to be at risk from overland surface water flooding.

5.6.6 For a 'high risk' scenario, the area of the site is not shown to be at risk from overland surface water flooding.

5.6.7 Mitigation measures to address the risk of surface water flooding to the development will therefore need to be considered. Details of such measures are set out in Section 6 of this report.

5.7 Groundwater Flooding

5.7.1 Groundwater flooding can occur when the sub-surface water levels are high and emerges above ground level.

5.7.2 There are no proposals to create any basements within the development.

5.7.3 The construction works will not involve deep excavation works and consequently the risk to the development from this potential flood source is considered to be low and acceptable.

5.8 Flood Risk from Existing Water Mains

5.8.1 There are likely to be existing water mains present in the adjacent public highway and serving the adjacent residential properties, which will be domestic in nature.

5.8.2 There are no known issues with regard to the condition of any such water mains.

5.8.3 The risk to the development from this potential flood source is considered to be low and acceptable.

5.9 Flood Risk from Existing Drainage Services

5.9.1 There are likely to be existing drainage services present in the adjacent public highway and serving the adjacent residential properties, which will be domestic in nature.

5.9.2 There are no known issues with regard to the condition of any such drainage services.

5.9.3 The risk to the development from this potential flood source is considered to be low and acceptable.

5.10 Flood Risk from New Drainage Services

5.10.1 In order to ensure the development does not increase the risk of flooding to adjacent developments resulting from the creation of new impermeable areas within the development, adequate control measures will need to be provided in the design of the surface water drainage network.

5.10.2 In accordance with current requirements the new drainage will need to be designed to the required critical 100 year storm event including an allowance of 40% for climate change, together with an approved restricted discharge rate and adequate storage provided within the confines of the site.

5.10.3 On this basis the risk of flooding from this potential flood source will be adequately addressed.

5.11 Flooding from Reservoirs, Canals and Other Artificial Sources

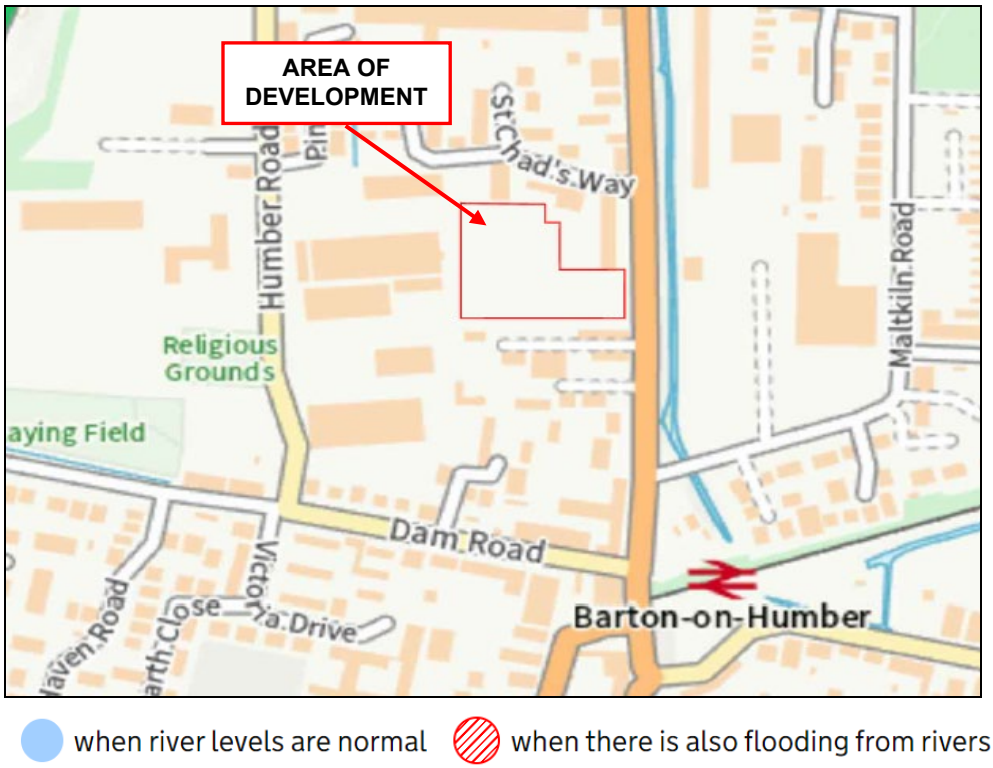
5.11.1 A study of the local area shows that there are a number of feature lakes located to the north of the development.

5.11.2 These lakes are shallow and were created to provide habitat for wildlife at local nature reserves.

5.11.3 Whilst there is a risk that they could overtop during an extreme rainfall event, the elevated access road to the south of these water features would prevent any localised flooding from flowing southward towards the development site.

5.11.4 A copy of the map produced by the Environment Agency showing the extent of flooding from reservoirs is included in Figure 9 below.

Figure 9: Environment Agency map dated May 2023 showing the extent of flooding from reservoirs



5.11.5 The map shows that the development site is not considered to be at risk from reservoir flooding.

5.11.6 The risk to the development from any such potential flood source is considered to be low and acceptable.

6.0 FLOOD MITIGATION MEASURES

6.1 Management

6.1.1 The development should be connected to the Environment Agency's early 'Flood Direct' warning service to ensure there is sufficient time available for ground floor accommodation to be vacated should the need arise.

6.1.2 Each dwelling within the development should have a Flood Risk Evacuation Plan in place to ensure all occupants understand the procedures in place in the event of a flood situation and where to escape to safety, should this prove necessary.

6.2 Passive Flood Protection Works

6.2.1 Due to the predicted depth of flooding, it will not be practical to elevate the ground floor construction level of the properties above the predicted flood level.

6.2.2 It is therefore proposed that the ground floor levels be set at traditional levels of construction, which will result in ground floor levels ranging from approximately 3.65m to 4.00m OD(N) as shown on the drainage strategy drawing included in Appendix B.

6.2.3 The ground floor accommodation within the dwellings will be designed to flood, with all habitable accommodation provided on the upper floor levels.

6.2.4 Flood Risk Standing Advice states that the maximum depth of flood water which could affect a building without causing instability to the structure is 600mm.

6.2.5 It will therefore be necessary for each building to incorporate an appropriate opening within the front and rear walls of the building which would allow flood waters to enter and exit the buildings. Final details of this requirement will need to be resolved at the detailed design stage.

6.2.6 The first floor construction level of the dwellings will be above the predicted flood level of 5.28m OD(N) which will provide the required level of flood protection to the habitable accommodation.

6.3 Flood Resilience

6.3.1 The ground floor accommodation to the dwellings should incorporate finishes which can be readily cleaned/replaced should a major flood situation occur and flood waters affect the buildings.

6.3.2 The ground floor electric circuits should be suitably isolated such that the upper floors of the development can remain in operation should the ground floor electrical installation become damaged by flood waters.

6.4 Safe Refuge

6.4.1 It is a requirement for safe refuge to be provided within new developments above the predicted flood level to ensure that there will be no requirement for evacuation measures by the emergency services.

6.4.2 The development incorporates accommodation at first floor and second floor level and consequently safe refuge will be available on the upper floors of the dwellings, which can be accessed by the internal staircases should the need arise.

6.4.3 The requirement for safe refuge provision has therefore been satisfied.

6.5 Access/Egress

6.5.1 Safe access or egress from the development could be restricted during the peak time of a major flood scenario. However, adequate warning will be given and the timescale of the flood should be limited due to tidal conditions. Safe access and egress will therefore be predominantly available.

6.5.2 Safe refuge is provided and there should therefore be no requirements for evacuation of occupants of the development by the Emergency Services during a major flood situation.

6.6 Surface Water Management

6.6.1 In compliance with CS19: Flood Risk Requirements, surface water drainage management should be incorporated within the design of the development to ensure the development does not increase the risk of flooding to other parties.

6.6.2 This can be achieved by incorporating a suitable SuDS design, details of which will need to be approved by the Lead Local Flood Authority at the detailed design stage of the project.

7.0 SUMMARY

7.1 The report has been prepared to assess the flood risk implications for a proposed residential development on land to the west of Waterside Road, Barton Upon Humber, North Lincolnshire.

7.2 The site falls in Flood Zone 3a (high probability of flooding) on the maps produced by the Environment Agency.

7.3 The proposals are considered to be 'More Vulnerable' development in terms of flood risk vulnerability.

7.4 This report has considered potential sources of flooding to the site, including fluvial, tidal, groundwater, surface water, existing sewers, water mains and other artificial sources.

7.5 The primary risk to the site is from tidal flooding from the River Humber resulting from the river defences being breached or overtopped during an extreme flood event.

7.6 The primary focus for flood risk assessment is to protect life, then consideration should be given to buildings, contents, operation and re-use. As the scheme is progressed the design should consider exceedance and routing of flows away from the buildings.

7.7 Mitigation works are proposed which we consider will reduce the risk to the development from flooding down to an acceptable level.

7.8 Overall, this report demonstrates that the flood risk to the development is reasonable and acceptable providing the recommended mitigation measures are adopted and demonstrates that the dwellings will be safe for the lifetime of the development and will not increase flood risk elsewhere.

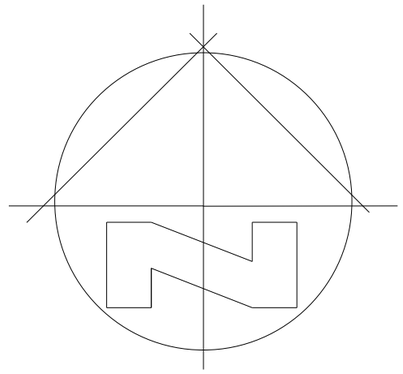
7.9 On this basis, it is considered that approval of the application can be granted in terms of the flood risk implications of the application.

APPENDIX A

Site Layout Drawings

Existing Site, Block, Landscape Drainage & Levels Plan.

Scale - 1:500 @ A3.



Existing Services:-

Foul Water: - Existing Foul Water services do exist on site, close to the entrance gates onto the site off Waterside Road, but are not suitable for proposed development and are thus not shown on this drawing.

Surface Water: - Existing Surface Water services do exist on site but are not suitable for proposed development and are thus not shown on this drawing. Note - All existing SW drains dispense into the existing Open Drain / Ditch on the West Boundary of the Site.

Note - Any Dimensions or Levels shown on this drawing are approximate.

	Date	Drawn	Revision
J			
H			
G			
F			
E			
D			
C			
B			
A	-	-	-

Keir Architecture

No.6, Orchard Fields, Healing, N.E.Lincs, DN41 7AF.

Tel: 07813 006079

Proposed Housing Site at: Land Off Waterside Rd, Barton Upon Humber, North Lincs, DN18 5BG.

For:- Mr & Mrs Chapman.

EXISTING SITE, BLOCK, LANDSCAPE, DRAINAGE & LEVELS PLAN.

Drawn: Keir Taylor	Date: 10.04.23	Scale: 1:500 @ A3
Checked:	Drawing No. 202308-02	Revision: -
Approved:		

Warehouse

Pump Station

ST Chad's Way

Waterside Road

Works Yard

Clapson's Lane

Concrete Surface

Tarmac / Stone Surface

Concrete Surface

Concrete Surface

Stone / Rough Grass Surface

Stone / Rough Grass Surface

1.8M Brick Wall

2.4M Steel Palisade Fence

3.61m

Ditch Invert = 2.16m

3.66m

Open Drain / Ditch

Open Drain / Ditch

Ditch Invert = 2.31m

3.84m

3.78m

1.8M Harris Fence

2.4M Steel Palisade Fence

1.2M Privet Hedge

3.73m

1.8M Steel Palisade Gates

4.5m

4.5m

1.8M Steel PalisadeFence

3.69m

3.75m

3.95m

2.1M Steel Palisade Fence

1.8M Harris Fence

2.7M Steel Palisade Fence

Ivy

1.8M Brick & Timber Wall

19

29

07

05

01

65

57

59

49

45

43

42

Proposed Indicative Site, Block, Landscape, Drainage & Levels Plan.

Scale - 1:500 @ A3.

Proposed Services:-

Foul Water:- To be collected into pump station and pumped off site to nearest Anglian Water approved gravity sewer.

Surface Water: - To be collected into attenuation device under roads and then discharged into the existing open drain / ditch on west side of Site at agreed discharge rate and with requisite permissions and improvements.

Open Space:-

This indicative layout proposes that an off site contribution is made for open space.

House Type & Mix:-

This indicative layout proposes a house mix of 2,3 & 4 Bed 3 storey and four storey in roof void All dwellings to have garages and utilities on ground floor and all other accommodation on 2nd, 3rd & 4th floors.

J			
H			
G			
F			
E			
D			
C			
B			
A	-	-	-
	Date	Drawn	Revision

Keir Architecture

No.6, Orchard Fields, Healing, N.E.Lincs, DN41 7AF.

Tel: 07813 006079

Proposed Housing Site at: Land Off Waterside Rd, Barton Upon Humber, North Lincs, DN18 5BG.

For:- Mr & Mrs Chapman.

PROPOSED INDICATIVE SITE, BLOCK, LANDSCAPE, DRAINAGE & LEVELS PLAN.

Drawn: Keir Taylor	Date: 10.04.23	Scale: 1:500 @ A3
Checked:	Drawing No. 202308-03	Revision: -
Approved:		

Note - Any Dimensions shown on this drawing are approximate.

Key:-

- New Silver Birch Trees.
- New Landscaped Boarders.
- New 215mm Thick, 1.8m High Screen Brick Walls.
- New 1.8M High Timber Feather Edge Boarded Screen Fence.

Warehouse

Pump Station

Works Yard

ST Chad's Way

Waterside Road

Clarkson's Lane

Turning Head

New Foul Pump Station

Reinforced Grass

Gate

3.61m

1.861m

Open Drain / Ditch

4M Access to Drain

Compact Gravel Path

Typ. Grassed Rear Gardens

Typ. Permeable Block Paved Driveways with Parking Bays Demarcated

Typ. 2m Wide Tarmac Footpath

5m Wide Tarmac Road

3.80M

3.66m

Typ. 2m Wide Tarmac Footpath

Typ. Grassed Rear Gardens

Compact Gravel Path

Typ. Grassed Rear Gardens

Typ. Permeable Block Paved Driveways with Parking Bays Demarcated

6m Wide Tarmac Road

3.80m

Typ. 2m Wide Tarmac Footpath

Typ. Permeable Block Paved Driveways with Parking Bays Demarcated

Block Paved Private Drive / Courtyard

Block Paved Rear Car Park

Typ. Grassed Rear Gardens

Typ. Grassed Rear Gardens

Compact Gravel Path

3.69m

3.75m

4.5m

4.5m

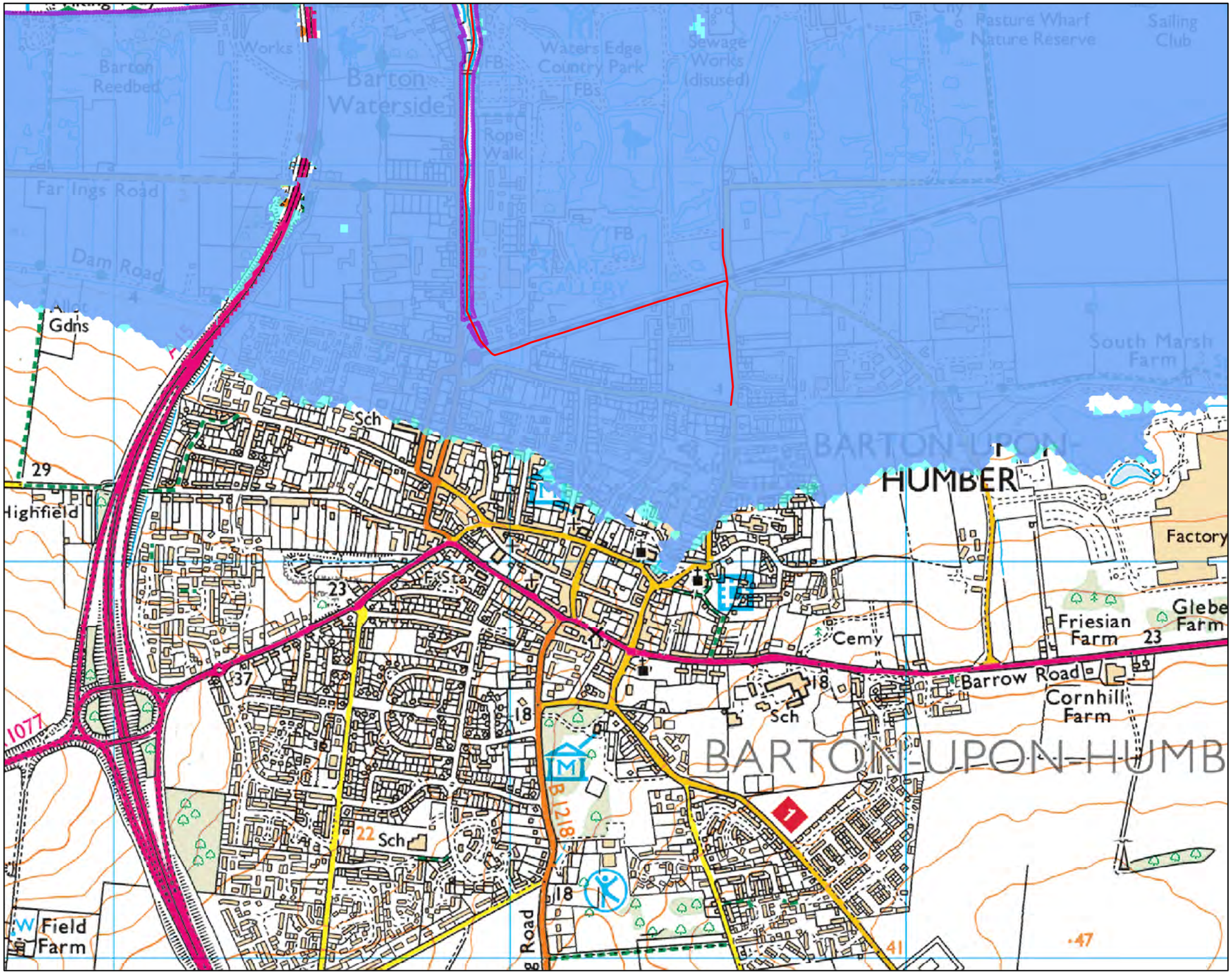
Gate

Footpath

APPENDIX B

Environment Agency Flood Risk Data

Flood Map centred on TA 03269 22187 - created July 2017 [Ref: CCN-2017- 51161]



Environment Agency

Scale 1:10,000

N W E S

- Main River
- Raised Defences
- Area at Risk of Flooding from Rivers or The Sea
- Extreme Flood Outline

Dark blue shows the area that could be affected by flooding, either from rivers or the sea, if there were no flood defences. This area could be flooded:

- from the sea by a flood that has a 0.5% (1 in 200) or greater chance of happening each year.

- or from a river by a flood that has a 1% (1 in 100) or greater chance of happening each year.

Light blue shows the extent of the Extreme Flood Outline, which represents the extent of a flood event with a 0.1% chance of occurring in any year, or the highest recorded historic extent if greater.

These two colours show the extent of the natural floodplain if there were no flood defences or certain other manmade structures and channel improvements. Sites outside the two extents, but behind raised defences, may be affected by flooding if the defences are overtopped or fail.

Created by the Partnerships and Strategic Overview Team, Lincoln

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

History of Flooding Map centred on TA 03269 22187 - created July 2017 [Ref: CCN-2017- 51161]

Environment Agency

Scale 1:10,000

N W E S

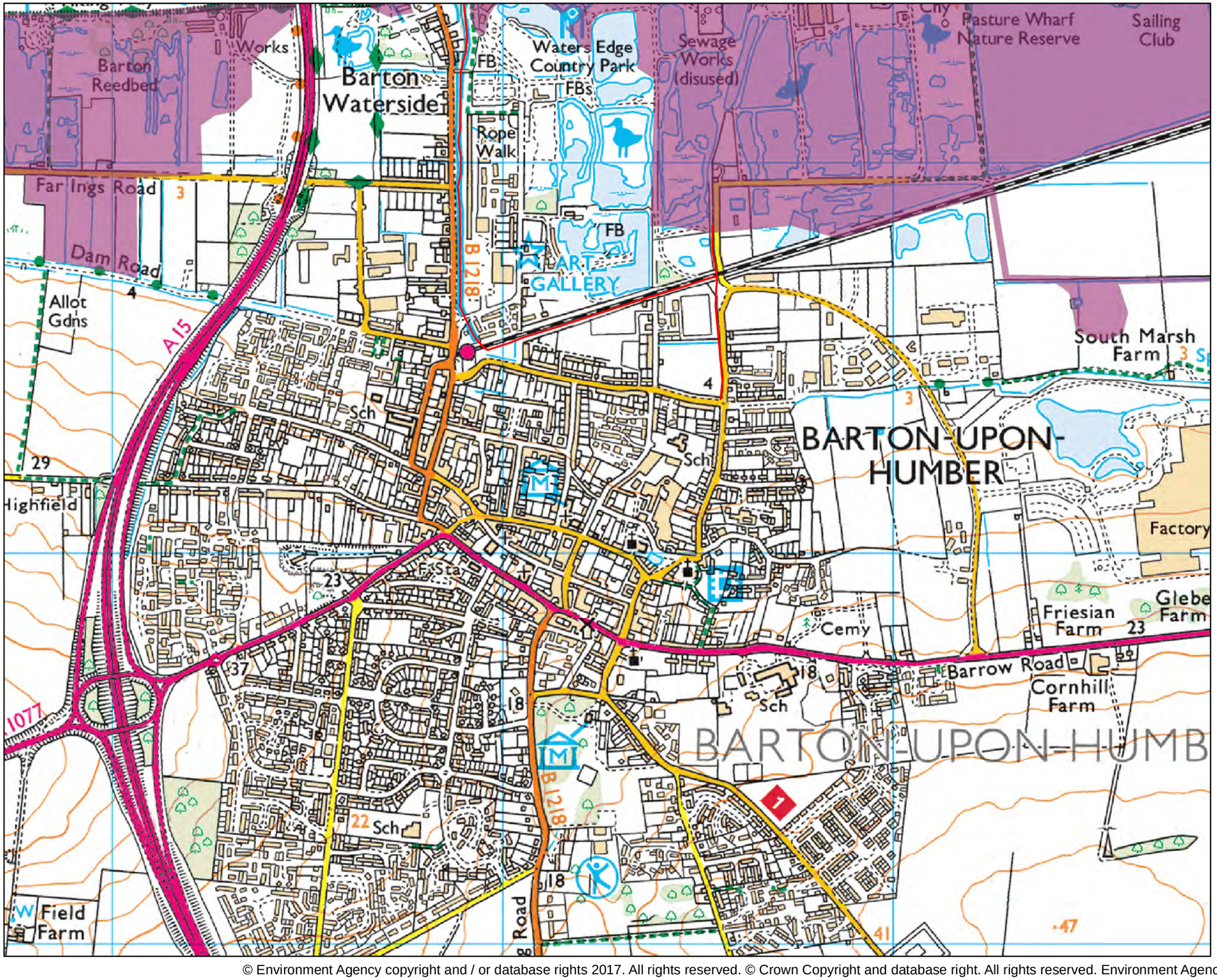
Main River

January 1953 along the Lincolnshire Coastline

Created by the Partnerships and Strategic Overview Team, Lincoln

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

History of Flooding Map centred on TA 03269 22187 - created July 2017 [Ref: CCN-2017- 51161]



Environment Agency

Scale 1:10,000

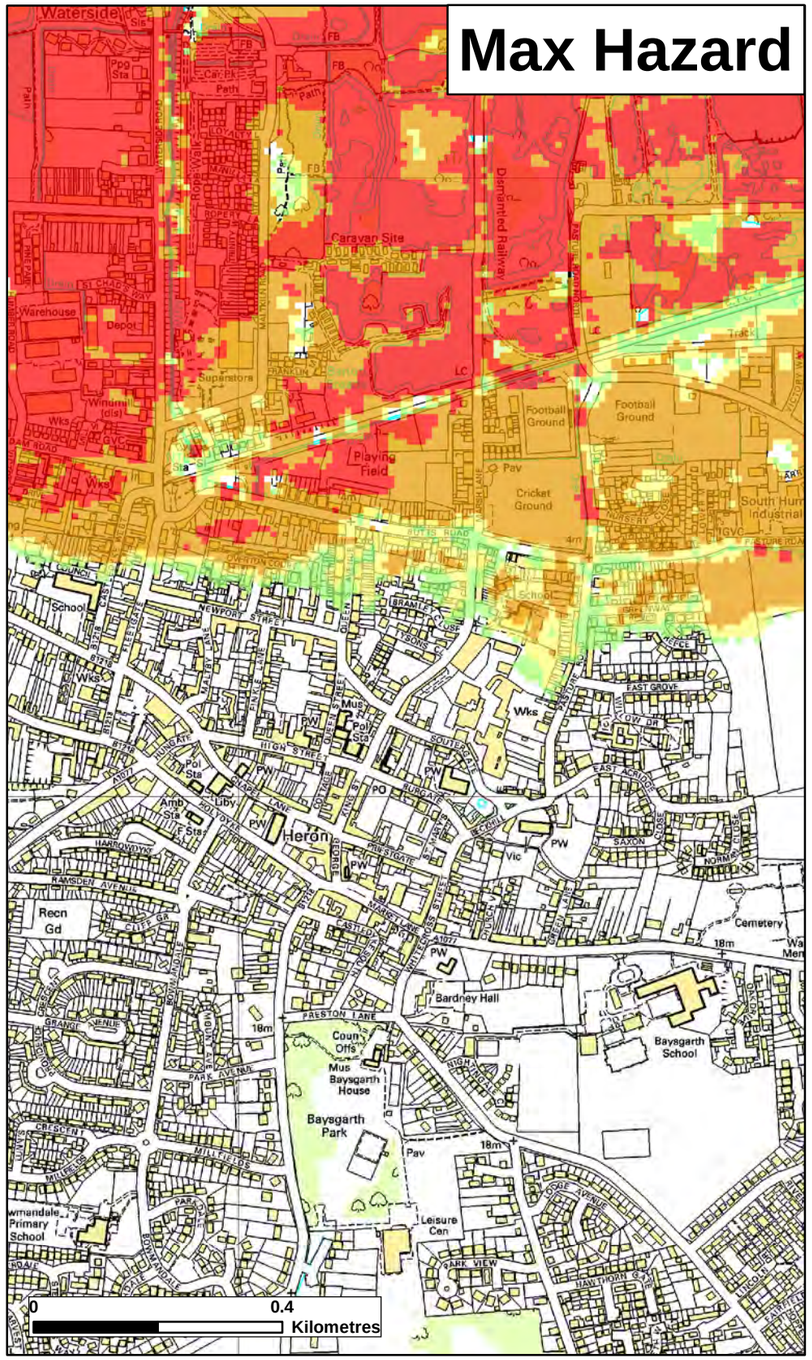
N W E S

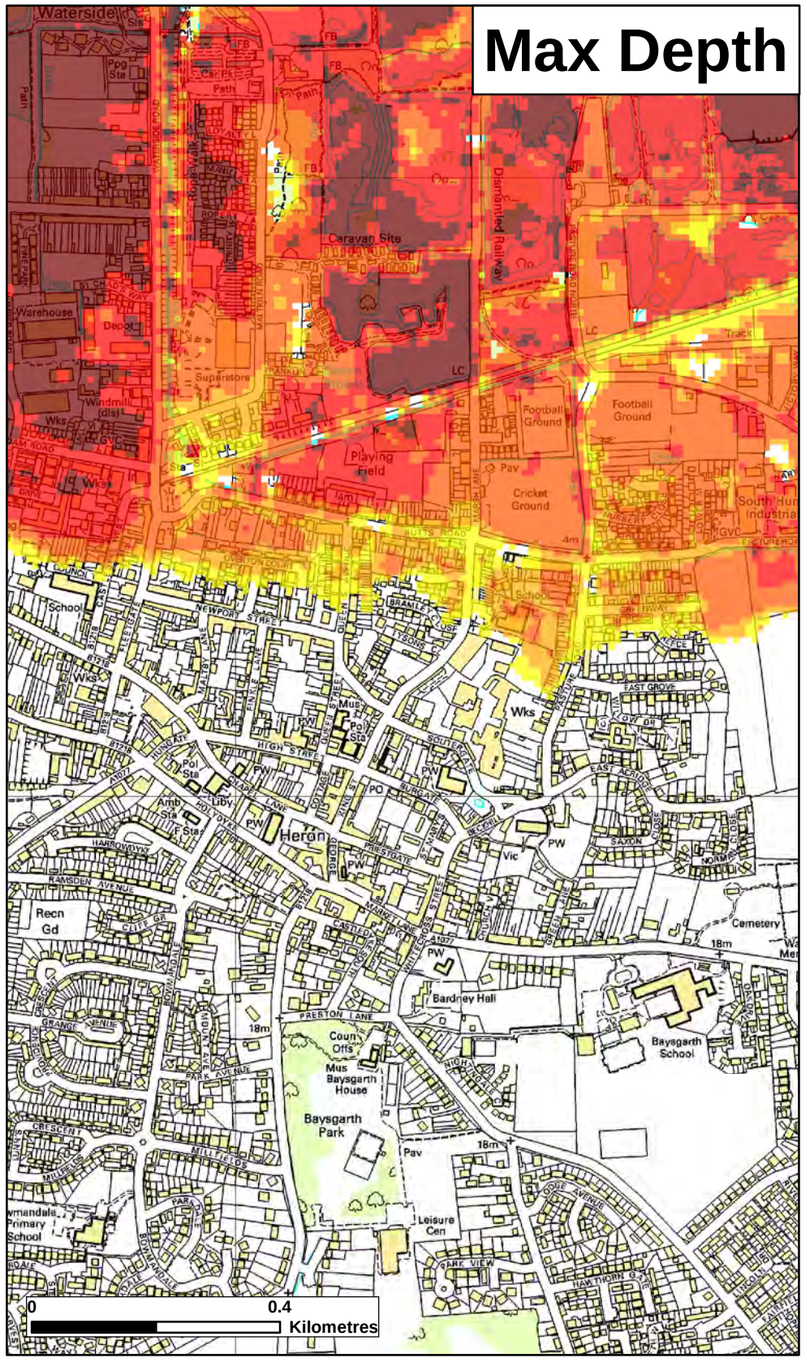
Main River

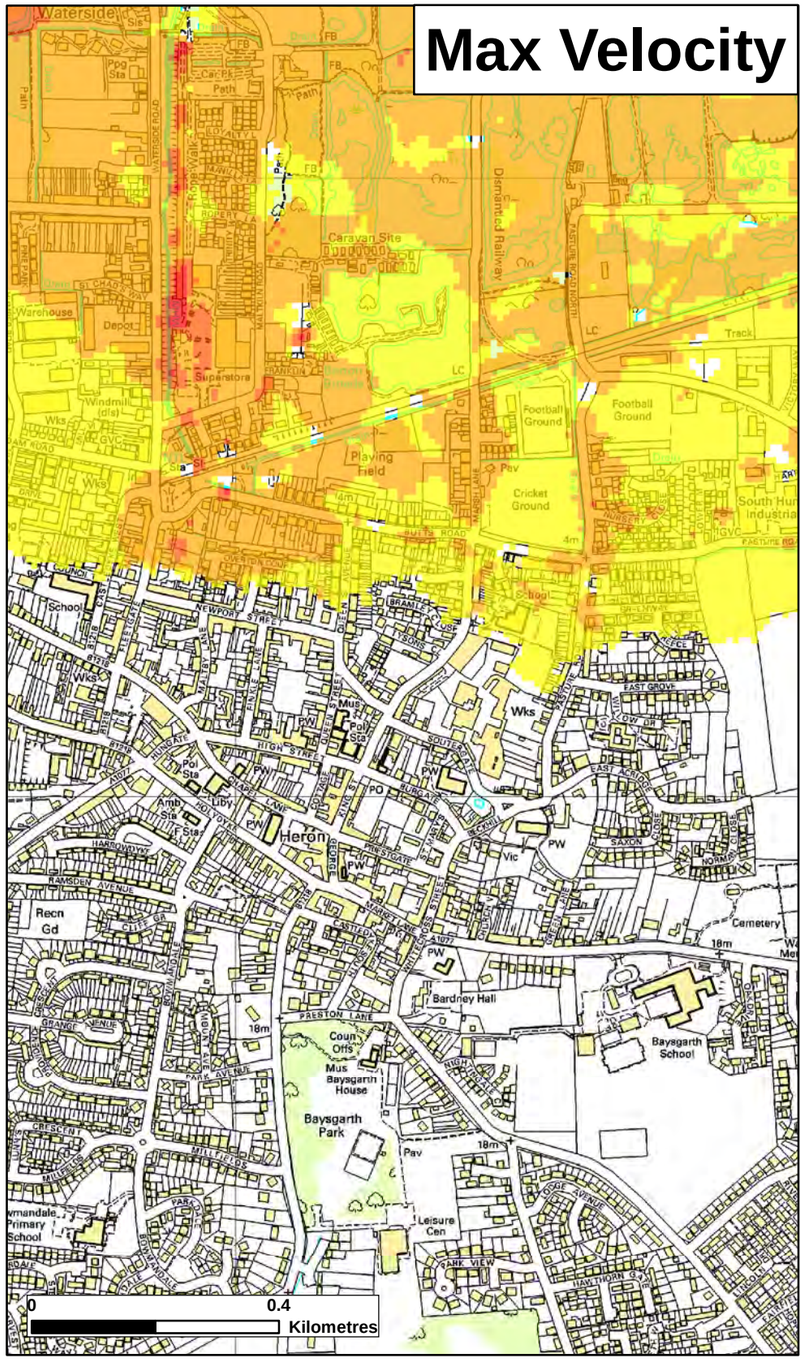
December 2013 Tidal Surge

Created by the Partnerships and Strategic Overview Team, Lincoln

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk







★ **Modelled Breach Locations** - see also the accompanying plan "Location of Modelled Breaches"

Max Hazard
(Flood Risk to People : FD2320)

- Less than 0.75 (Low Hazard)
- Between 0.75 and 1.25 (Danger for Some)
- Between 1.25 and 2.0 (Danger for Most)
- Greater than 2.0 (Danger for All)

Max Depth (m)

- 0 - 0.25
- 0.25 - 0.50
- 0.50 - 1.0
- 1.0 - 1.6
- 1.6 +

Max Velocity (m/s)

- 0 - 0.3
- 0.3 - 1.0
- 1.0 - 1.5
- 1.5 - 2.5
- 2.5 +

Date Printed	July 2017	Scenario year	2006	Scenario Annual Chance	0.5% (1 in 200)	CCN Number	CCN-2017-51161

This map shows the level of flood hazard to people (called a hazard rating) if our flood defences are breached at certain locations, for a range of scenarios. The hazard rating depends on the depth and velocity of floodwater, and maximum values of these are also mapped.

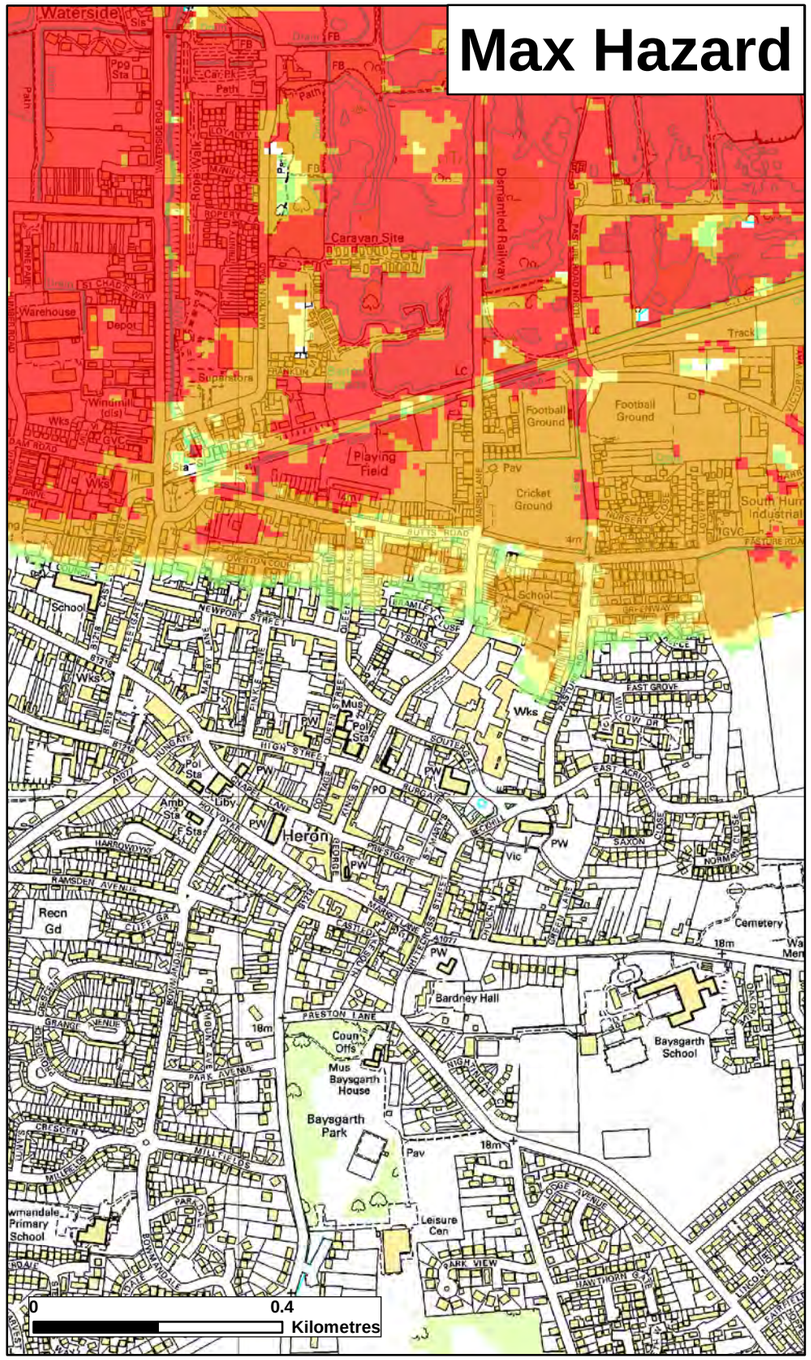
The map is based on computer modelling of simulated breaches at specific locations. Each breach has been modelled individually and the results combined to create this map. Multiple breaches, other combinations of breaches, different sized tidal surges or flood flows may all give different results.

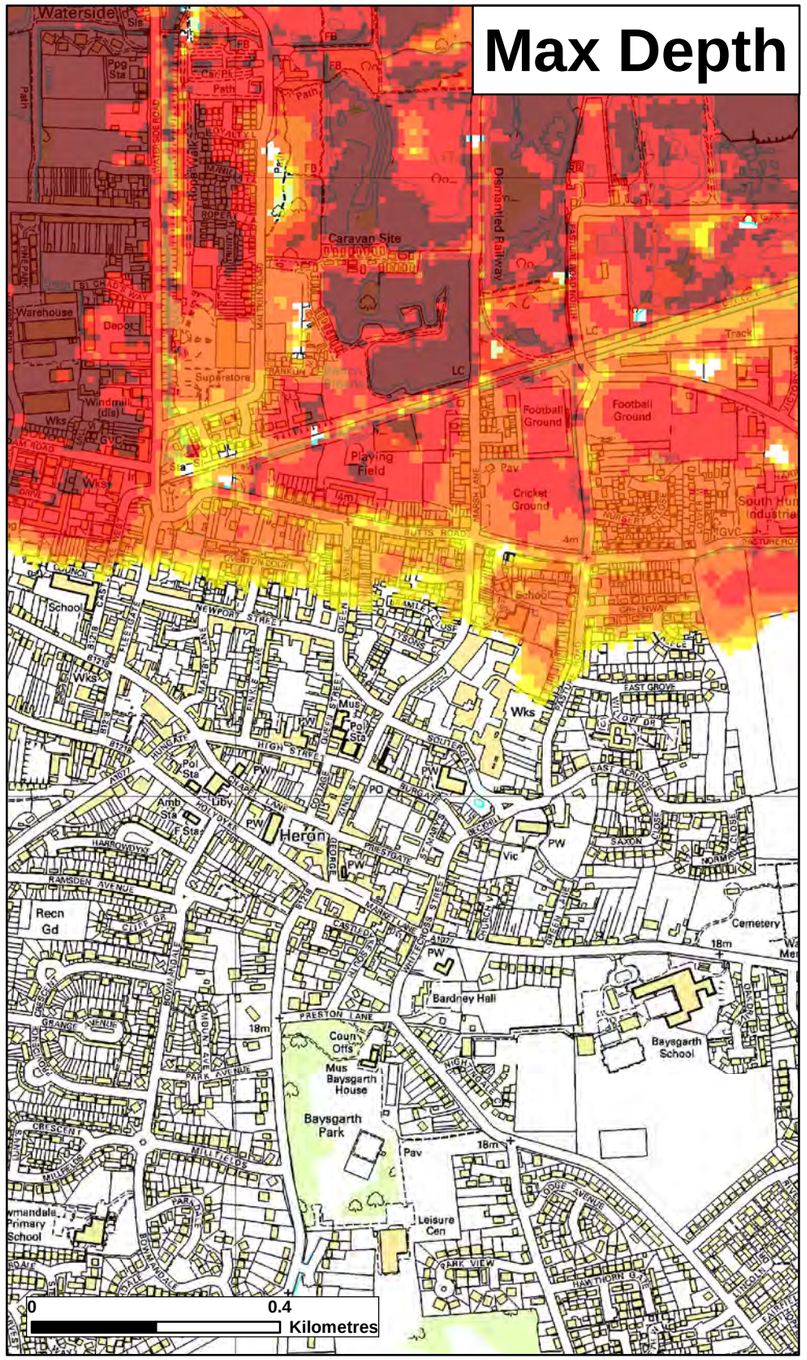
The map only considers the consequences of a breach, it does not make any assumption about the likelihood of a breach occurring. The likelihood of a breach occurring will depend on a number of different factors, including the construction and condition of the defences in the area. A breach is less likely where defences are of a good standard, but a risk of breaching remains.

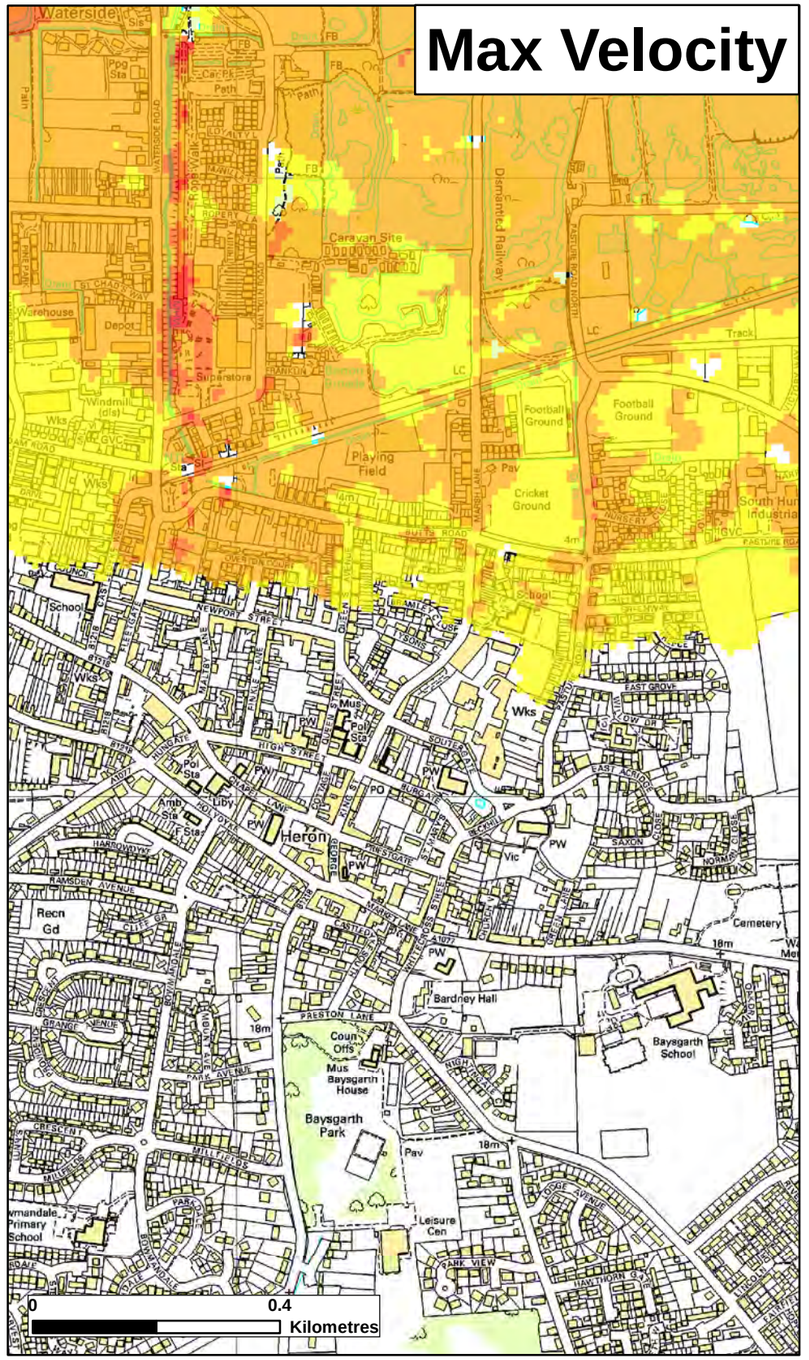
Environment Agency

Lincolnshire and Northamptonshire Breach Hazard mapping

Map Centred on TA 03269 22187







★ **Modelled Breach Locations** - see also the accompanying plan "Location of Modelled Breaches"

Max Hazard
(Flood Risk to People : FD2320)

- Less than 0.75 (Low Hazard)
- Between 0.75 and 1.25 (Danger for Some)
- Between 1.25 and 2.0 (Danger for Most)
- Greater than 2.0 (Danger for All)

Max Depth (m)

- 0 - 0.25
- 0.25 - 0.50
- 0.50 - 1.0
- 1.0 - 1.6
- 1.6 +

Max Velocity (m/s)

- 0 - 0.3
- 0.3 - 1.0
- 1.0 - 1.5
- 1.5 - 2.5
- 2.5 +

Date Printed	July 2017	Scenario year	2006	Scenario Annual Chance	0.1% (1 in 1000)	CCN Number	CCN-2017-51161

This map shows the level of flood hazard to people (called a hazard rating) if our flood defences are breached at certain locations, for a range of scenarios. The hazard rating depends on the depth and velocity of floodwater, and maximum values of these are also mapped.

The map is based on computer modelling of simulated breaches at specific locations. Each breach has been modelled individually and the results combined to create this map. Multiple breaches, other combinations of breaches, different sized tidal surges or flood flows may all give different results.

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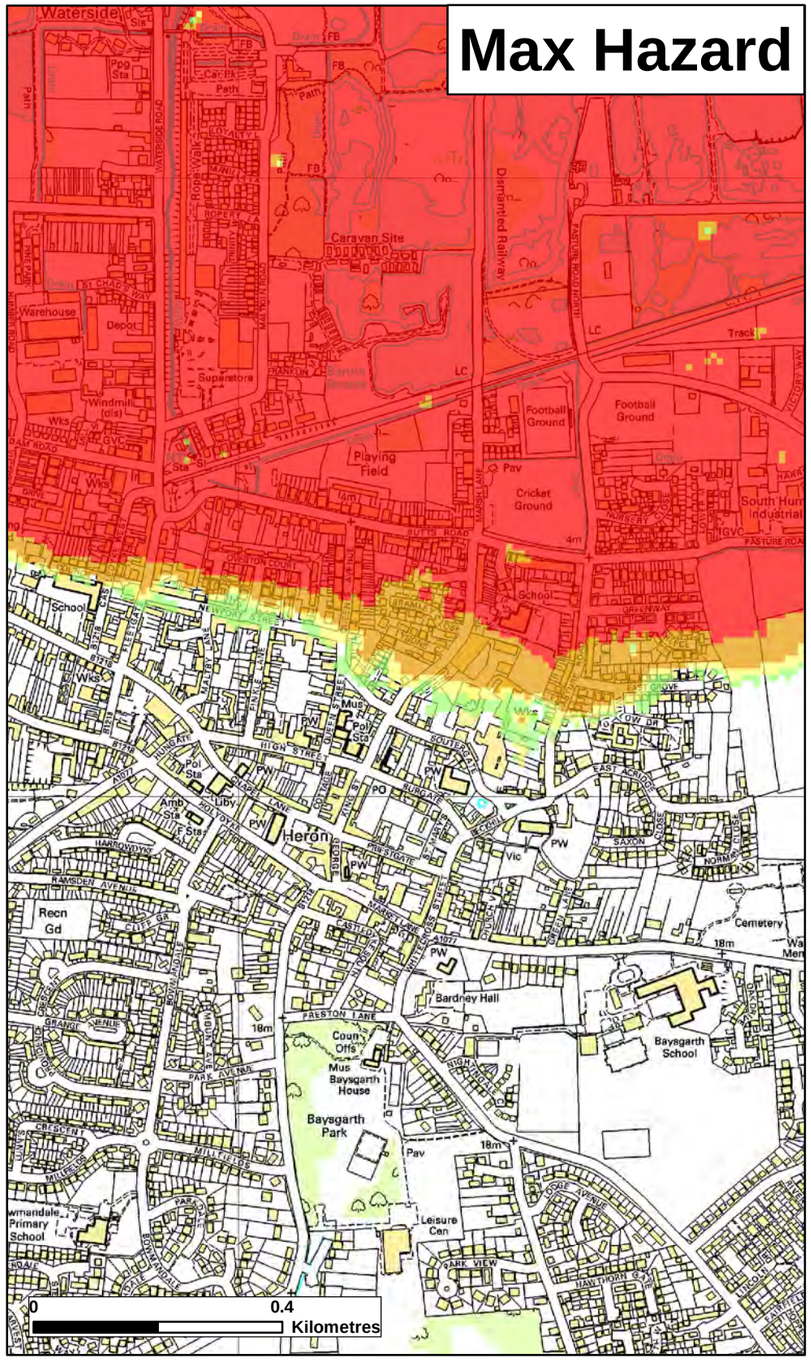
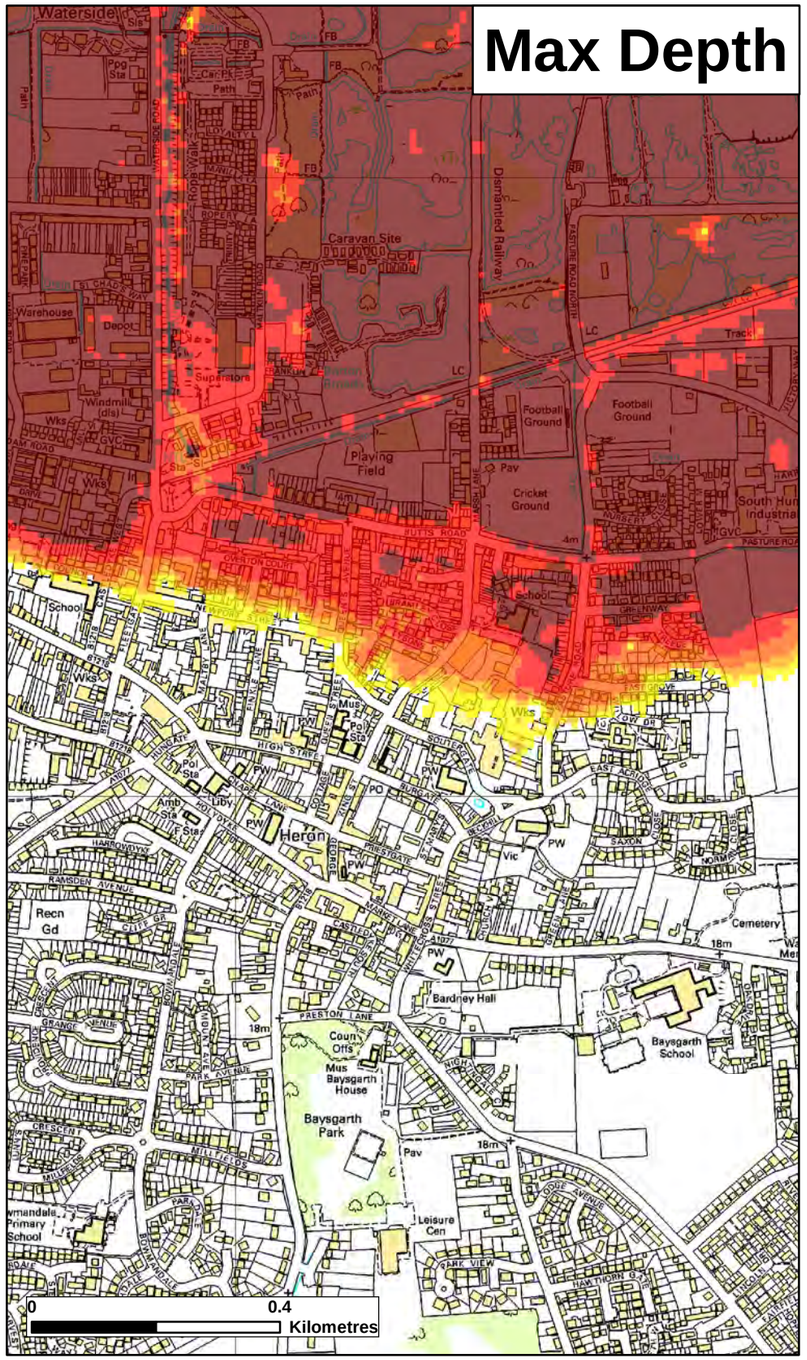
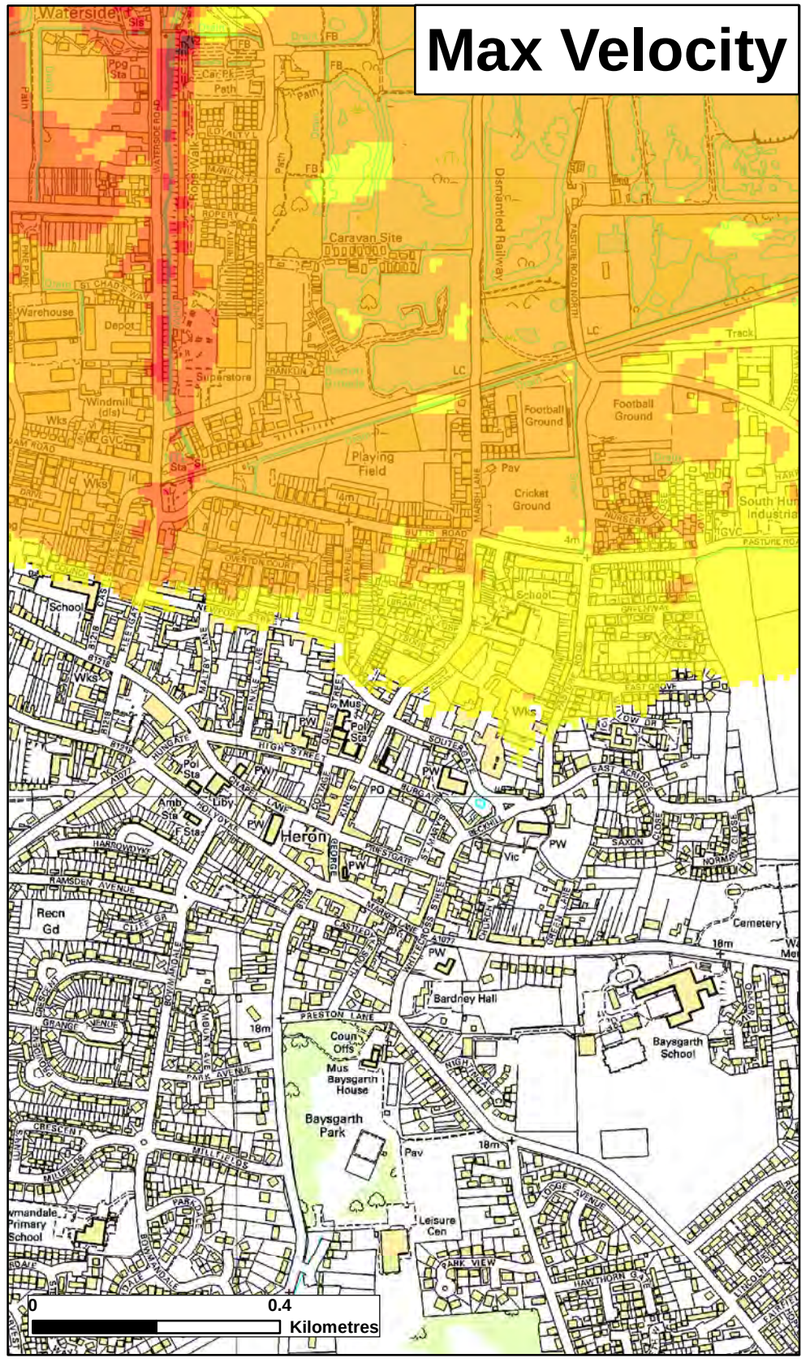
Environment Agency

Lincolnshire and Northamptonshire Breach Hazard mapping

Map Centred on TA 03269 22187







★ **Modelled Breach Locations** - see also the accompanying plan "Location of Modelled Breaches"

Max Hazard
(Flood Risk to People : FD2320)

- Less than 0.75 (Low Hazard)
- Between 0.75 and 1.25 (Danger for Some)
- Between 1.25 and 2.0 (Danger for Most)
- Greater than 2.0 (Danger for All)

Max Depth (m)

- 0 - 0.25
- 0.25 - 0.50
- 0.50 - 1.0
- 1.0 - 1.6
- 1.6 +

Max Velocity (m/s)

- 0 - 0.3
- 0.3 - 1.0
- 1.0 - 1.5
- 1.5 - 2.5
- 2.5 +

Date Printed	July 2017	Scenario year	2115	Scenario Annual Chance	0.5% (1 in 200)	CCN Number	CCN-2017-51161

This map shows the level of flood hazard to people (called a hazard rating) if our flood defences are breached at certain locations, for a range of scenarios. The hazard rating depends on the depth and velocity of floodwater, and maximum values of these are also mapped.

The map is based on computer modelling of simulated breaches at specific locations. Each breach has been modelled individually and the results combined to create this map. Multiple breaches, other combinations of breaches, different sized tidal surges or flood flows may all give different results.

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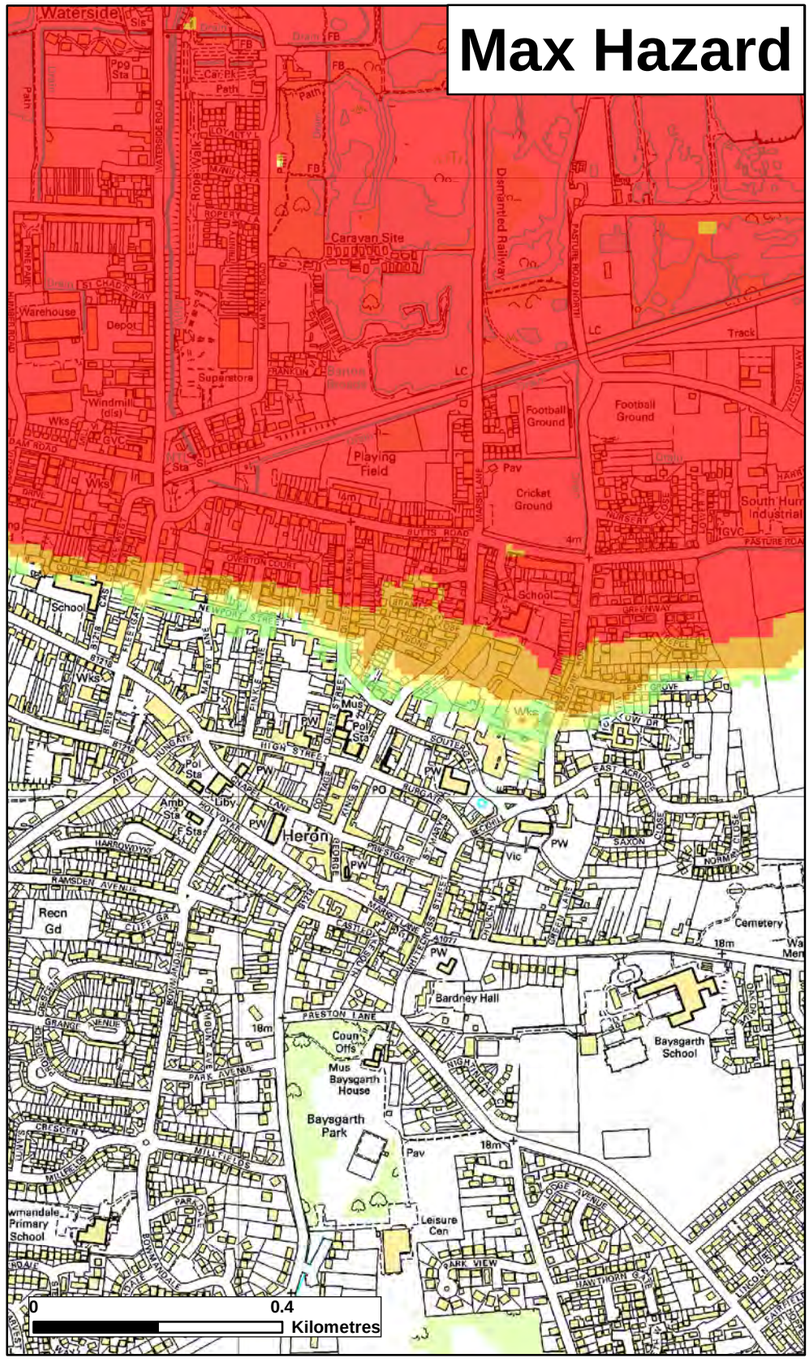
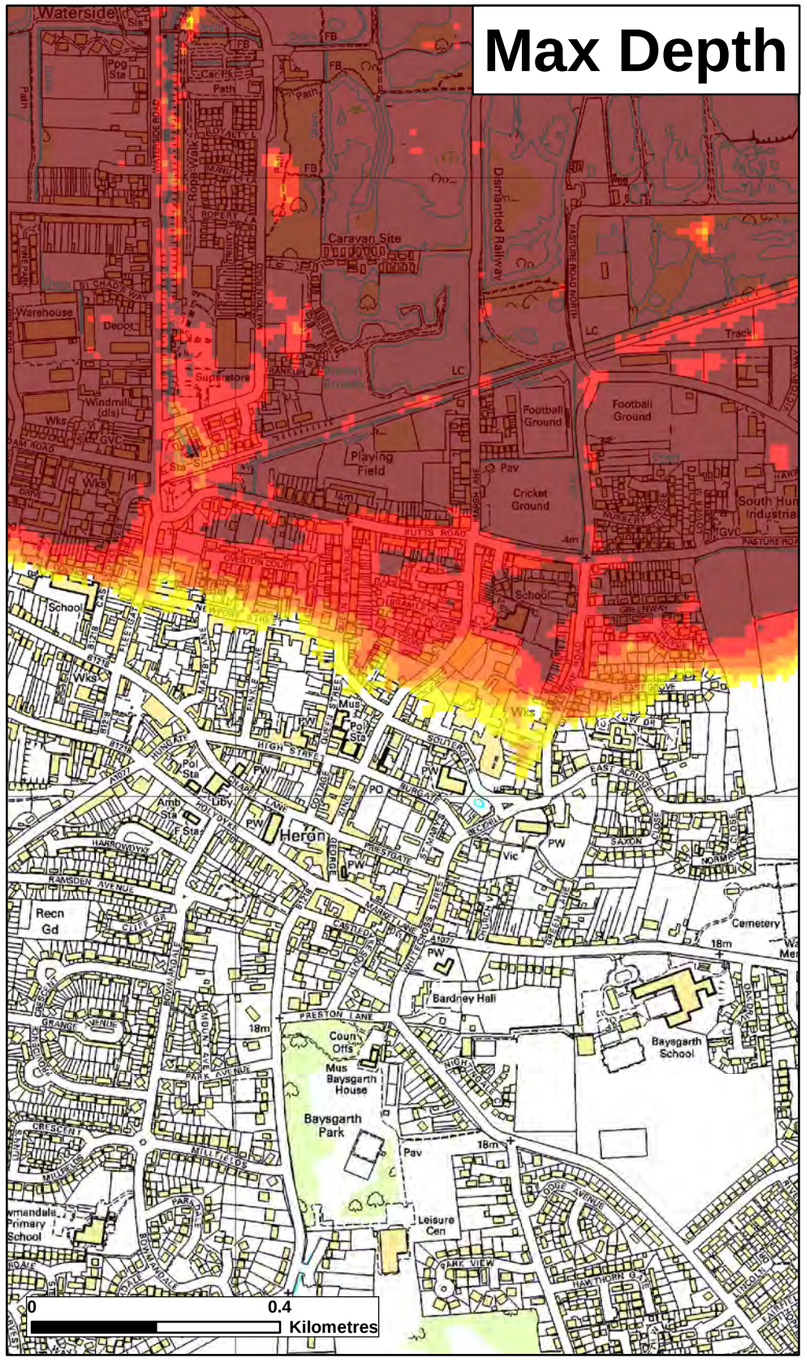
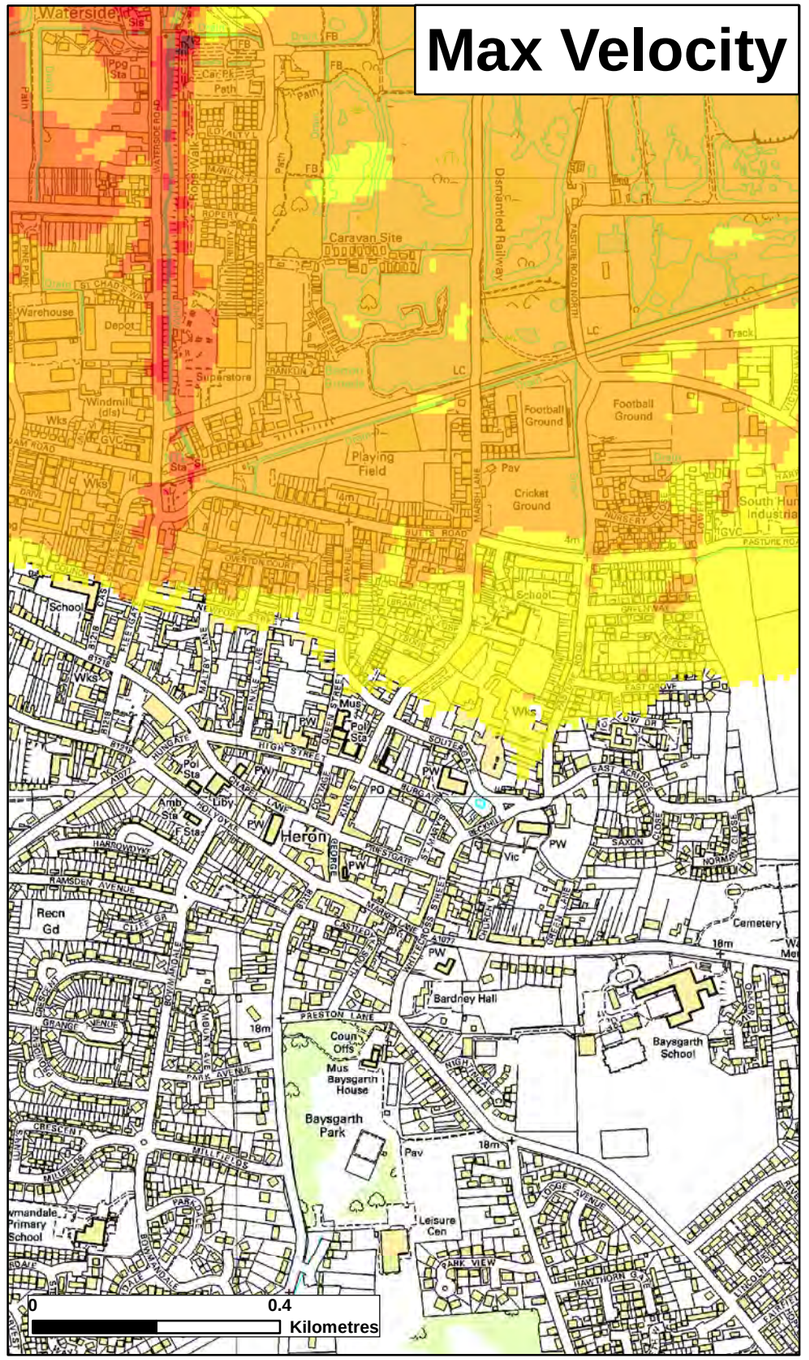
Environment Agency

Lincolnshire and Northamptonshire Breach Hazard mapping

Map Centred on TA 03269 22187







★ **Modelled Breach Locations** - see also the accompanying plan "Location of Modelled Breaches"

Max Hazard
(Flood Risk to People : FD2320)

- Less than 0.75 (Low Hazard)
- Between 0.75 and 1.25 (Danger for Some)
- Between 1.25 and 2.0 (Danger for Most)
- Greater than 2.0 (Danger for All)

Max Depth (m)

- 0 - 0.25
- 0.25 - 0.50
- 0.50 - 1.0
- 1.0 - 1.6
- 1.6 +

Max Velocity (m/s)

- 0 - 0.3
- 0.3 - 1.0
- 1.0 - 1.5
- 1.5 - 2.5
- 2.5 +

Date Printed	July 2017	Scenario year	2115	Scenario Annual Chance	0.1% (1 in 1000)	CCN Number	CCN-2017-51161

This map shows the level of flood hazard to people (called a hazard rating) if our flood defences are breached at certain locations, for a range of scenarios. The hazard rating depends on the depth and velocity of floodwater, and maximum values of these are also mapped.

The map is based on computer modelling of simulated breaches at specific locations. Each breach has been modelled individually and the results combined to create this map. Multiple breaches, other combinations of breaches, different sized tidal surges or flood flows may all give different results.

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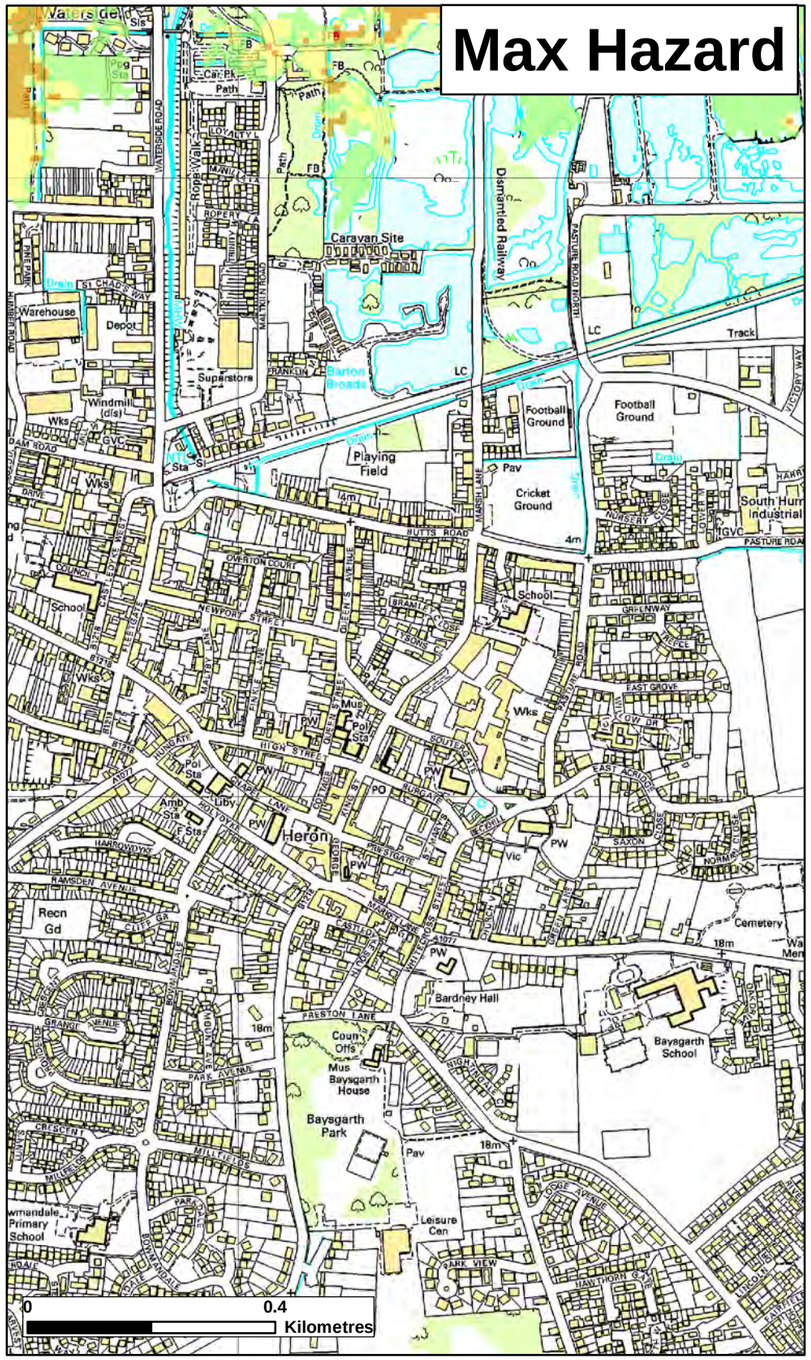
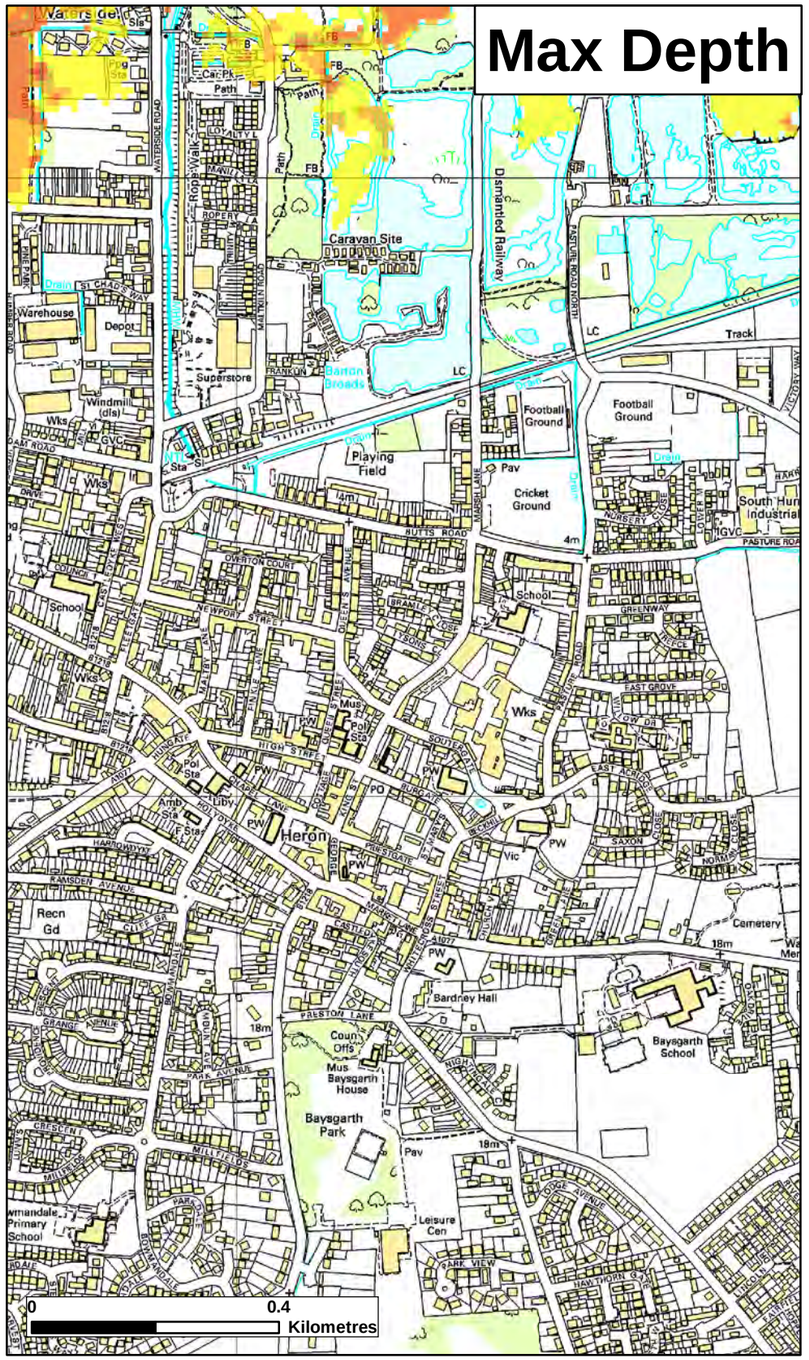
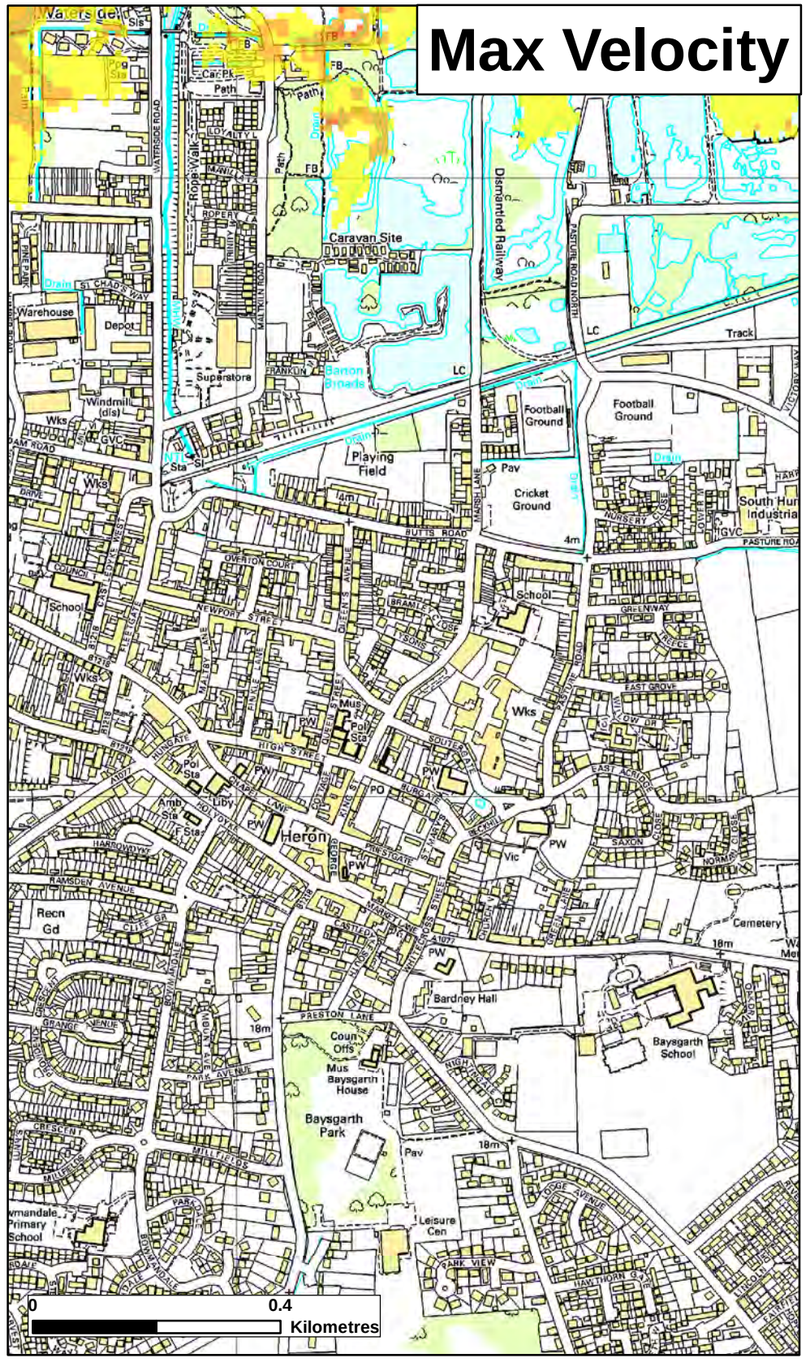
Environment Agency

Lincolnshire and Northamptonshire Breach Hazard mapping

Map Centred on TA 03269 22187







Max Hazard
(Flood Risk to People : FD2320)

- Less than 0.75 (Low Hazard)
- Between 0.75 and 1.25 (Danger for Some)
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Max Depth (m)

- 0 - 0.25
- 0.25 - 0.50
- 0.50 - 1.0
- 1.0 - 1.6
- 1.6 +

Max Velocity (m/s)

- 0 - 0.3
- 0.3 - 1.0
- 1.0 - 1.5
- 1.5 - 2.5
- 2.5 +

Date Printed	July 2017	Scenario year	2006	Scenario Annual Chance	0.5% (1 in 200)	CCN Number	CCN-2017-51161

The map is based on computer modelling of simulated overtopping of the main coastal defences for specific tidal scenarios. It does not include overtopping along the following tidal rivers which are currently being investigated: Witham Haven (upstream of Hobhole), and Welland (upstream of Fosdyke Bridge)

The map only considers the consequences of overtopping of the defences, and does not show the possible consequences of breaches of the tidal defences. Separate maps of the flood extent from just breaching of the defences are available.

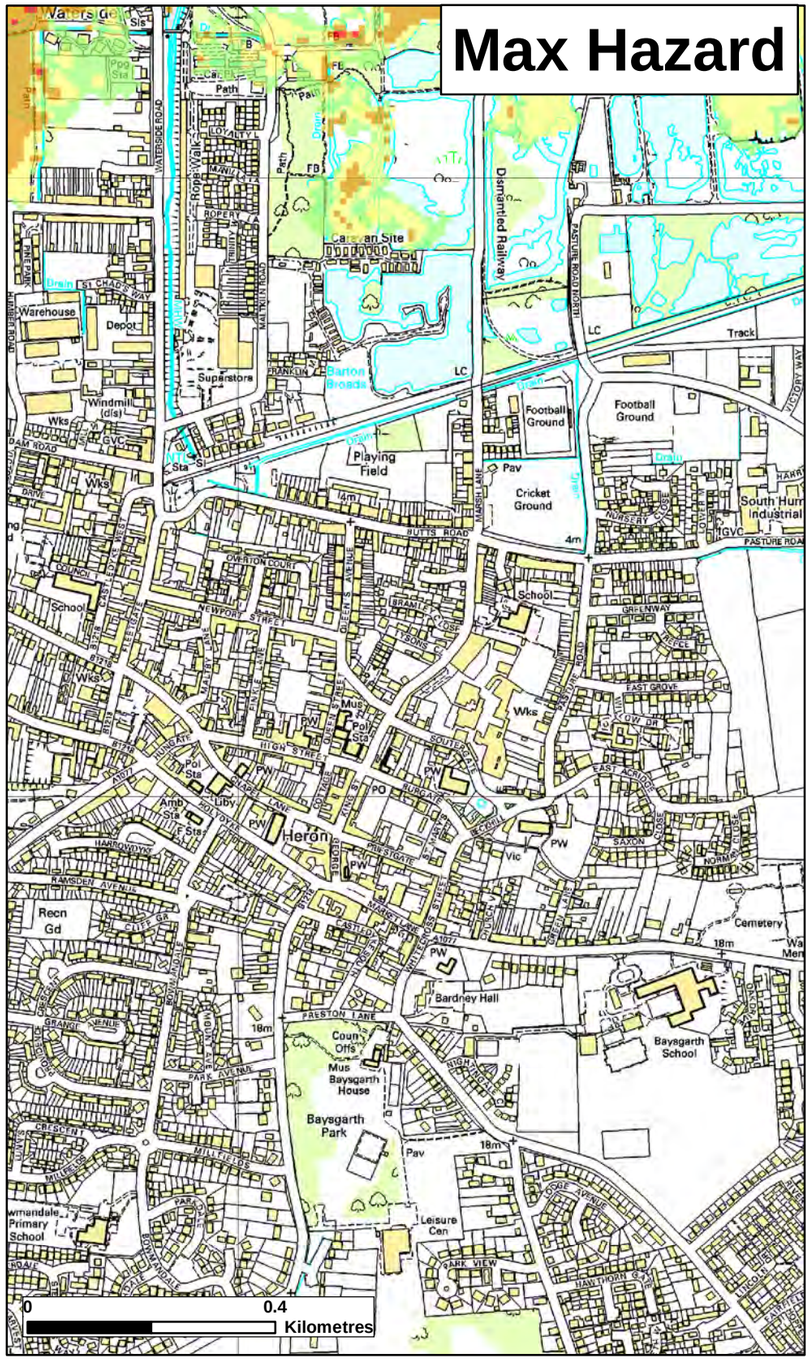
For future climate change scenarios it is assumed that defences remain at 2006 heights.

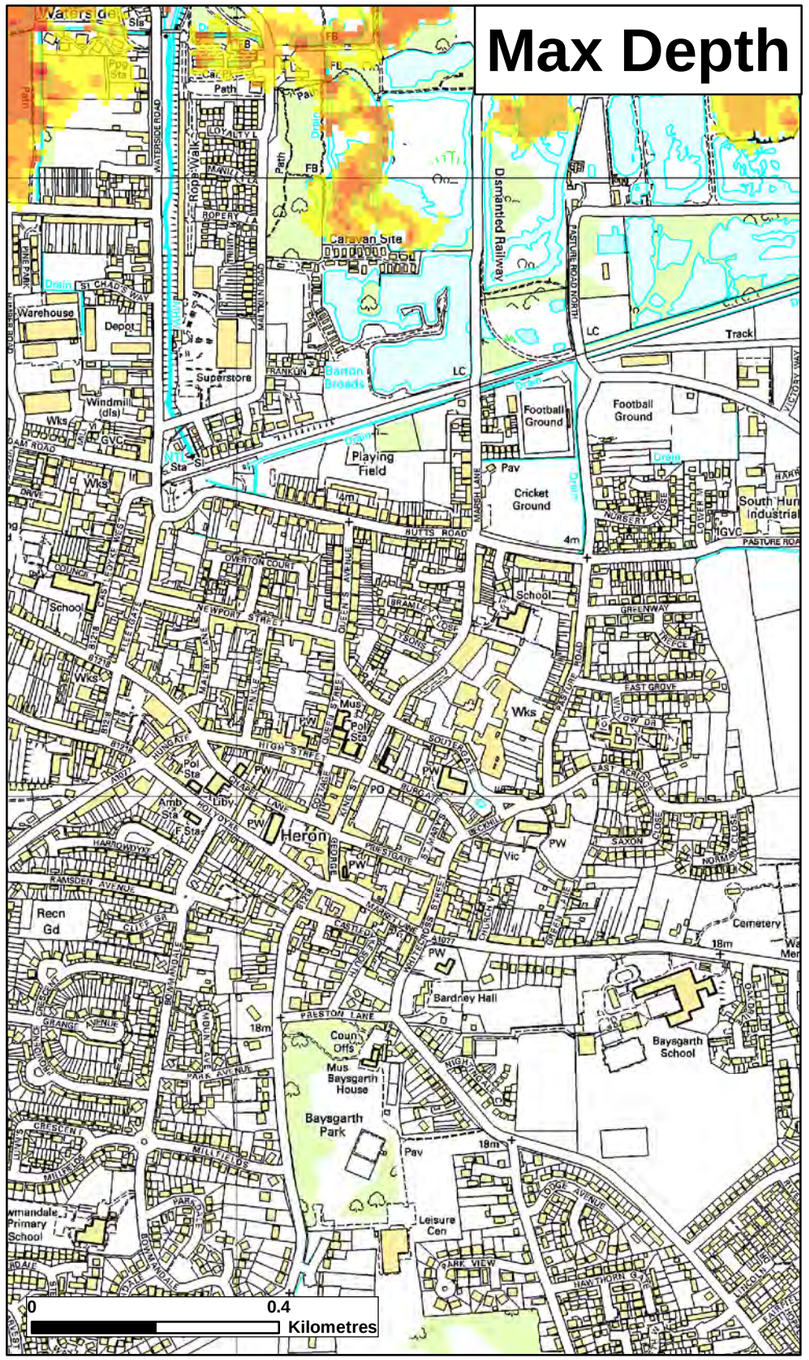
These maps do not replace the flood zone maps used in the National Planning Policy Framework (NPPF)

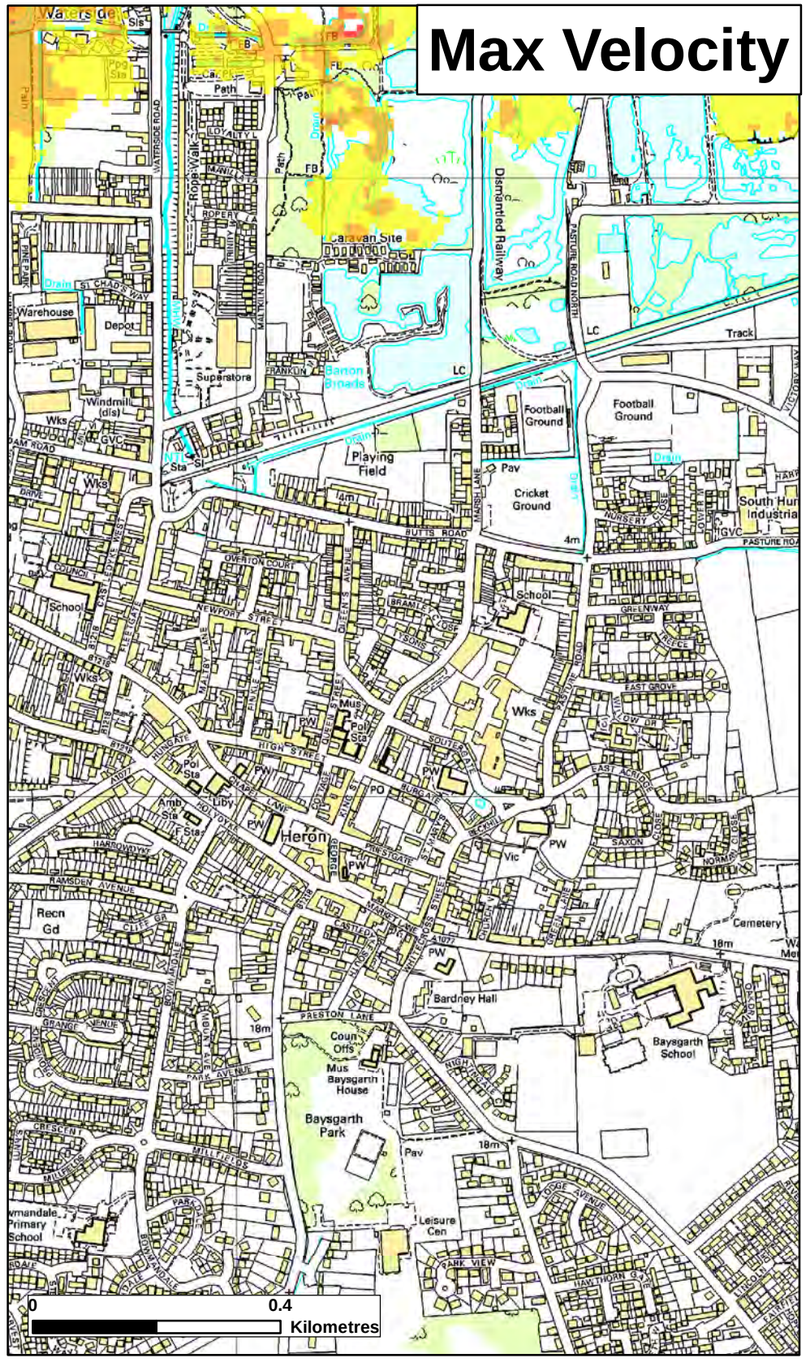
Environment Agency

Lincolnshire and Northamptonshire Overtopping Hazard Mapping

Map Centred on TA 03269 22187







Max Hazard
(Flood Risk to People : FD2320)

- Less than 0.75 (Low Hazard)
- Between 0.75 and 1.25 (Danger for Some)
- Between 1.25 and 2.0 (Danger for Most)
- Greater than 2.0 (Danger for All)

Max Depth (m)

- 0 - 0.25
- 0.25 - 0.50
- 0.50 - 1.0
- 1.0 - 1.6
- 1.6 +

Max Velocity (m/s)

- 0 - 0.3
- 0.3 - 1.0
- 1.0 - 1.5
- 1.5 - 2.5
- 2.5 +

Date Printed	July 2017	Scenario year	2006	Scenario Annual Chance	0.1% (1 in 1000)	CCN Number	CCN-2017-51161

The map is based on computer modelling of simulated overtopping of the main coastal defences for specific tidal scenarios. It does not include overtopping along the following tidal rivers which are currently being investigated: Witham Haven (upstream of Hobhole), and Welland (upstream of Fosdyke Bridge)

The map only considers the consequences of overtopping of the defences, and does not show the possible consequences of breaches of the tidal defences. Separate maps of the flood extent from just breaching of the defences are available.

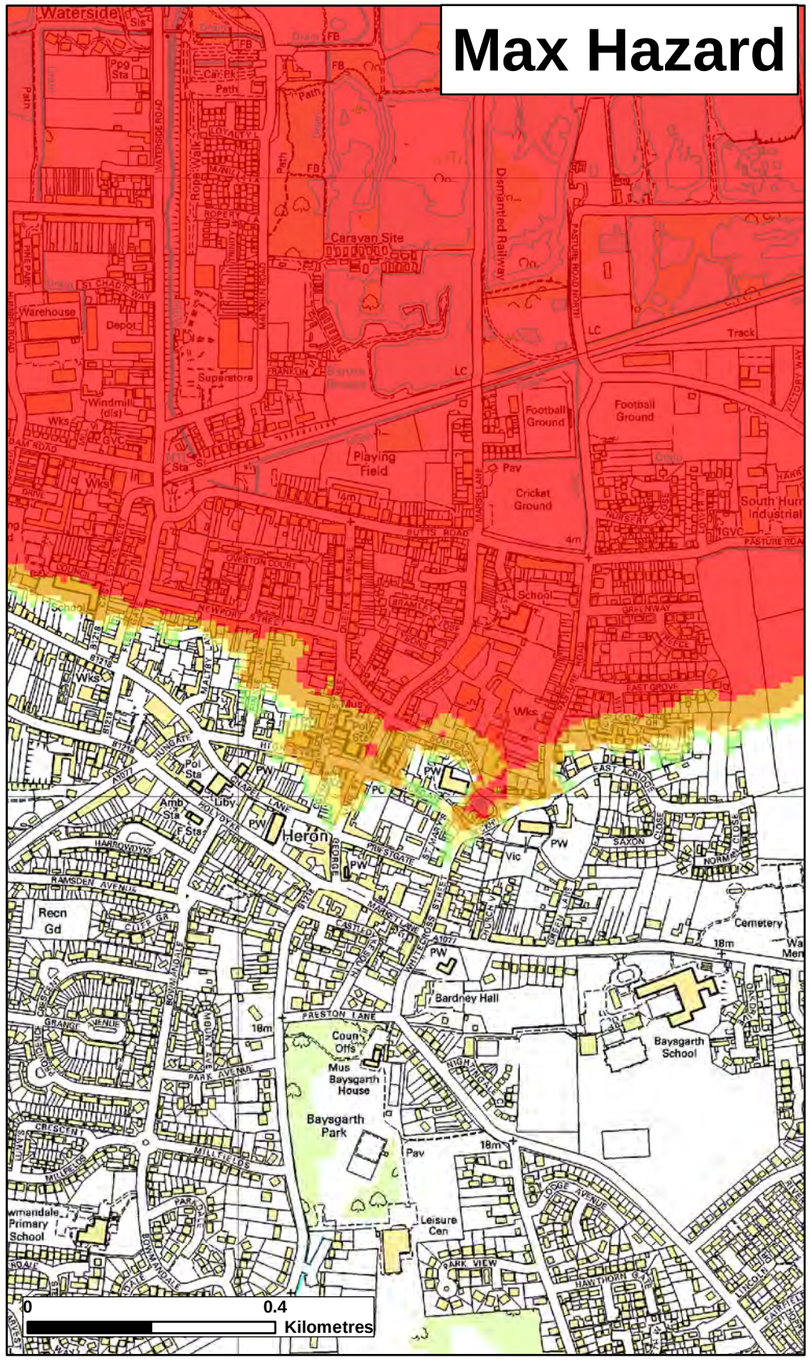
For future climate change scenarios it is assumed that defences remain at 2006 heights.

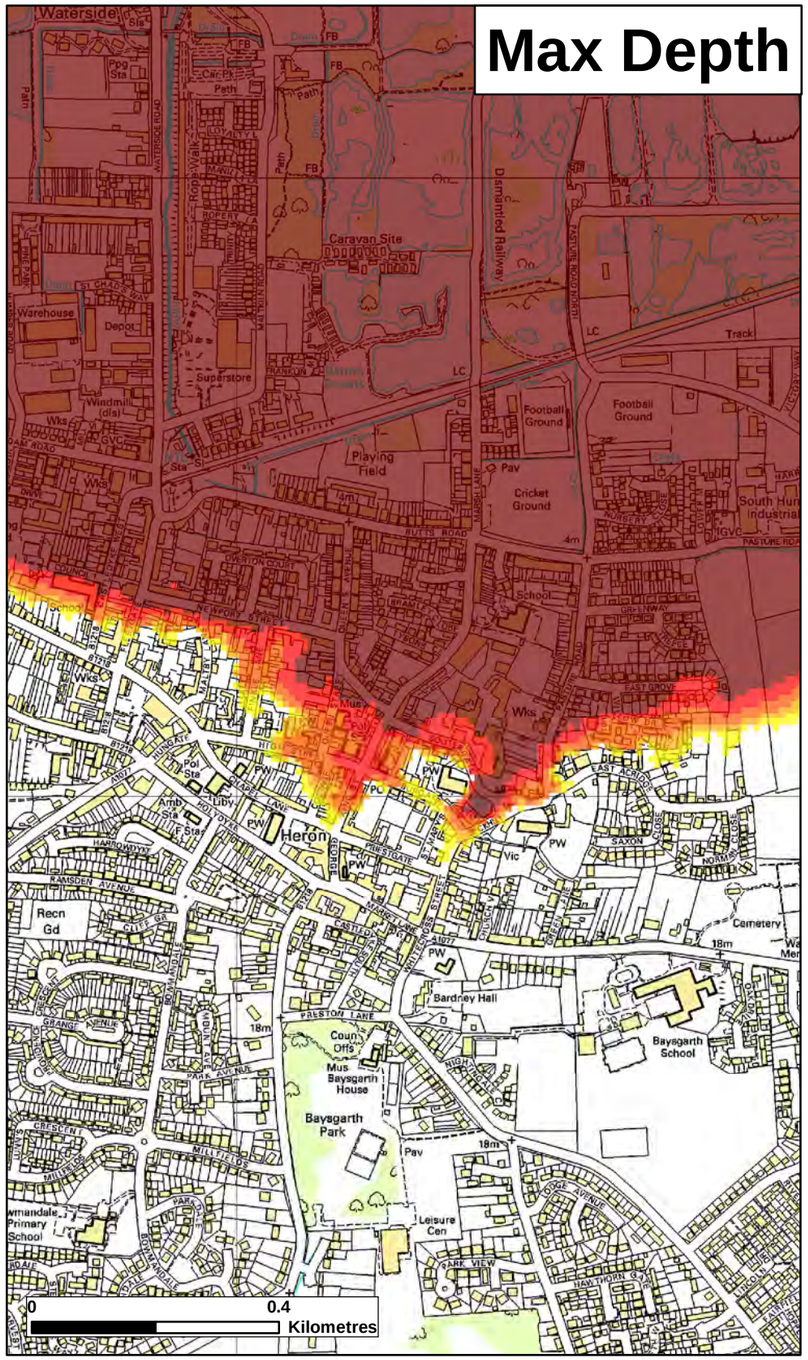
These maps do not replace the flood zone maps used in the National Planning Policy Framework (NPPF)

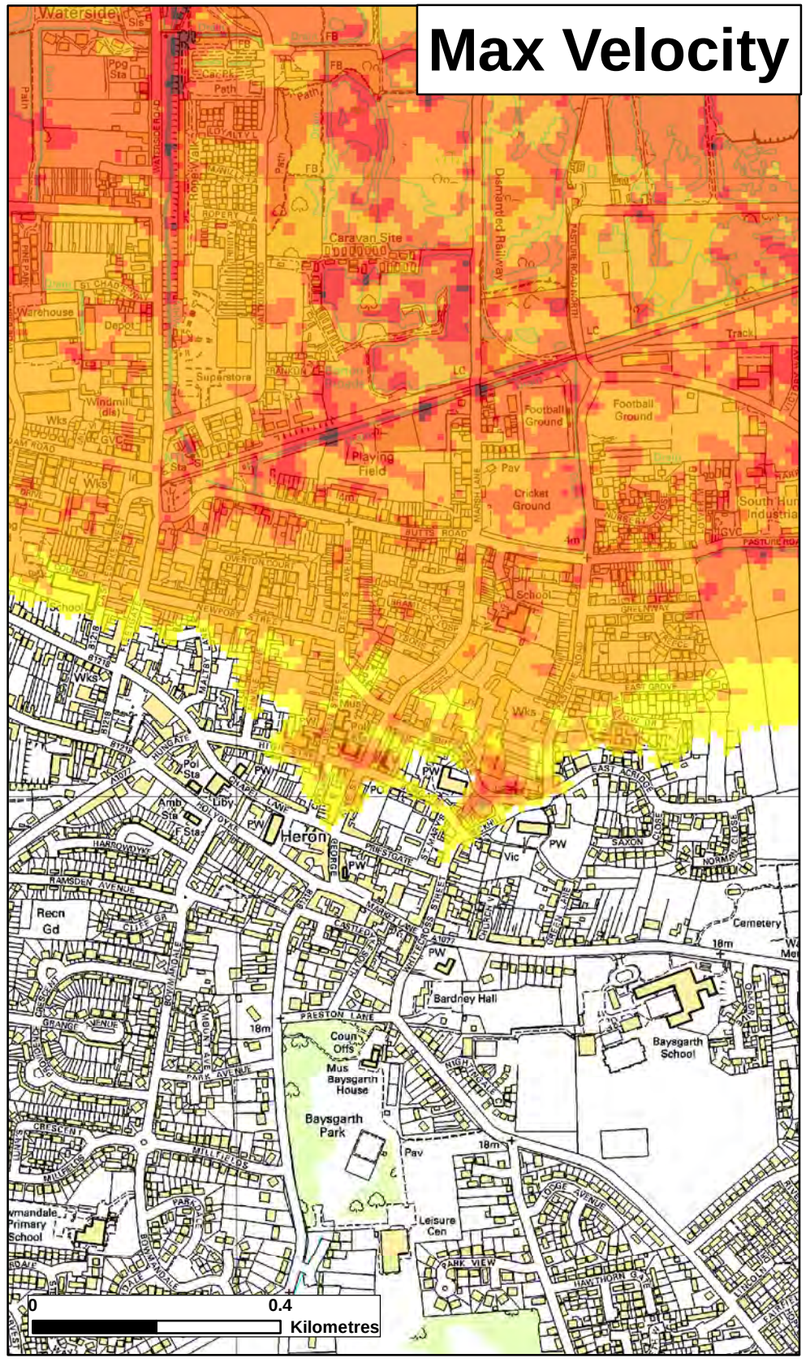
Environment Agency

Lincolnshire and Northamptonshire Overtopping Hazard Mapping

Map Centred on TA 03269 22187







Max Hazard
(Flood Risk to People : FD2320)

- Less than 0.75 (Low Hazard)
- Between 0.75 and 1.25 (Danger for Some)
- Between 1.25 and 2.0 (Danger for Most)
- Greater than 2.0 (Danger for All)

Max Depth (m)

- 0 - 0.25
- 0.25 - 0.50
- 0.50 - 1.0
- 1.0 - 1.6
- 1.6 +

Max Velocity (m/s)

- 0 - 0.3
- 0.3 - 1.0
- 1.0 - 1.5
- 1.5 - 2.5
- 2.5 +

Date Printed	July 2017	Scenario year	2115	Scenario Annual Chance	0.5% (1 in 200)	CCN Number	CCN-2017-51161

The map is based on computer modelling of simulated overtopping of the main coastal defences for specific tidal scenarios. It does not include overtopping along the following tidal rivers which are currently being investigated: Witham Haven (upstream of Hobhole), and Welland (upstream of Fosdyke Bridge)

The map only considers the consequences of overtopping of the defences, and does not show the possible consequences of breaches of the tidal defences. Separate maps of the flood extent from just breaching of the defences are available.

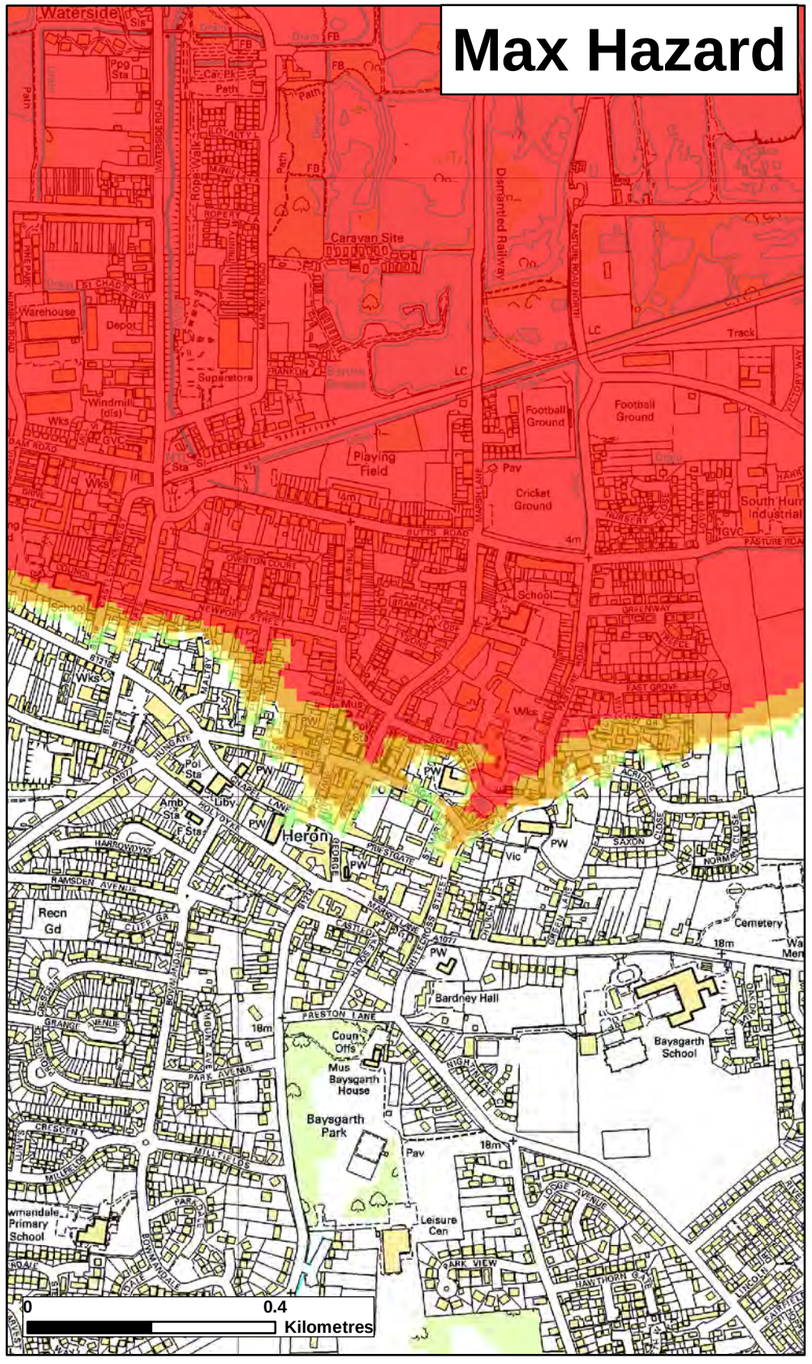
For future climate change scenarios it is assumed that defences remain at 2006 heights.

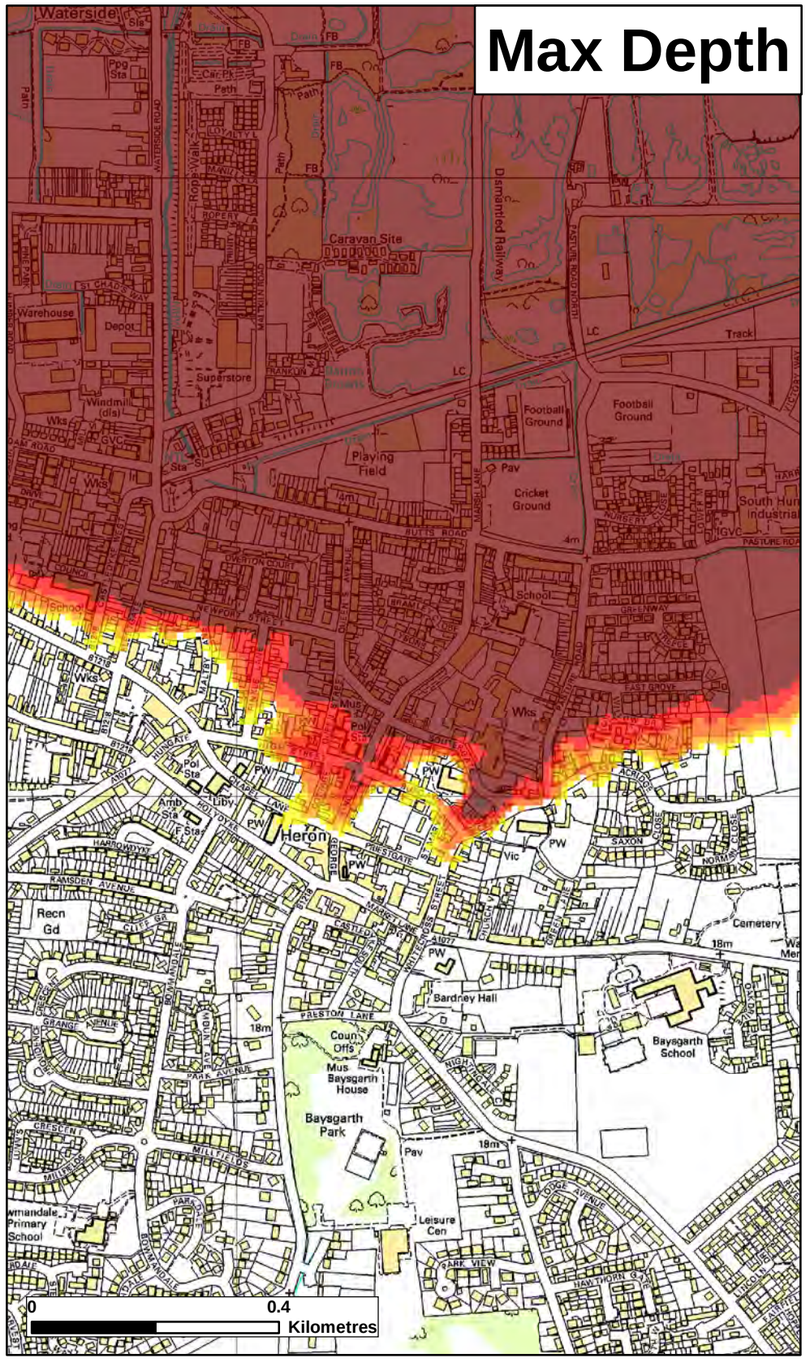
These maps do not replace the flood zone maps used in the National Planning Policy Framework (NPPF)

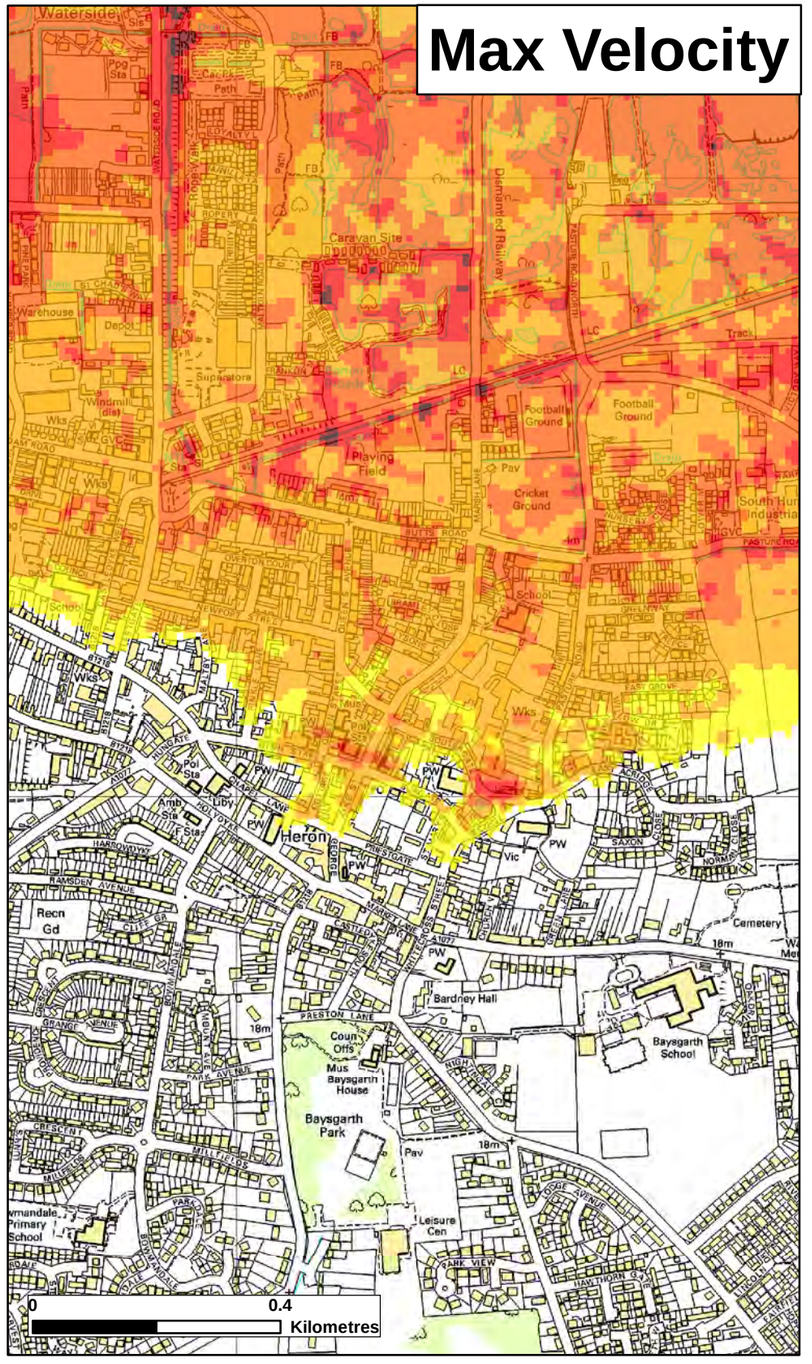
Environment Agency

Lincolnshire and Northamptonshire Overtopping Hazard Mapping

Map Centred on TA 03269 22187







Max Hazard
(Flood Risk to People : FD2320)

- Less than 0.75 (Low Hazard)
- Between 0.75 and 1.25 (Danger for Some)
- Between 1.25 and 2.0 (Danger for Most)
- Greater than 2.0 (Danger for All)

Max Depth (m)

- 0 - 0.25
- 0.25 - 0.50
- 0.50 - 1.0
- 1.0 - 1.6
- 1.6 +

Max Velocity (m/s)

- 0 - 0.3
- 0.3 - 1.0
- 1.0 - 1.5
- 1.5 - 2.5
- 2.5 +

Date Printed	July 2017	Scenario year	2115	Scenario Annual Chance	0.1% (1 in 1000)	CCN Number	CCN-2017-51161

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General Enquiries No: 03708 506 506. Weekday Daytime calls cost 5p plus up to 6p per minute from BT Weekend Unlimited. Mobile and other providers' charges may vary

Environment Agency

Lincolnshire and Northamptonshire Overtopping Hazard Mapping

Map Centred on TA 03269 22187

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