Weetwood
Development • Planning • Environment

LAND OFF FALKLAND WAY, BARTON UPON HUMBER,
NORTH LINCOLNSHIRE, DN18 5RP

FLOOD RISK ASSESSMENT

Final Report v1.1
December 2021

Weetwood Services Ltd
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Report Title	**Land off Falkland Way, Barton Upon Humber, North Lincolnshire, DN18 5RP** Flood Risk Assessment Final Report v1.1
Client	Wren Kitchens
Date of issue	9 December 2021

Prepared by	Rebecca Murphy BSc (Hons) Associate Director
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Contents

List of Figures

List of Appendices

1 INTRODUCTION

1.1 Purpose of Report

Weetwood Services Ltd ('Weetwood') has been instructed by Wren Kitchens to prepare a Flood Risk Assessment (FRA) report to accompany a planning application for the proposed development of land off Falkland Way, Barton Upon Humber ("the site").

The assessment has been undertaken in accordance with the requirements of the revised National Planning Policy Framework (NPPF) updated on 27 July 2021 and the National Planning Practice Guidance (NPPG) updated on 24 June 2021.

1.2 Structure of the Report

The report is structured as follows:

Section 1 Introduction and report structure
Section 2 Provides background information relating to the development site
Section 3 Presents national and local flood risk planning policy
Section 4 Assesses the potential sources of flooding to the development site
Section 5 Presents flood risk mitigation measures based on the findings of the assessment
Section 6 Presents a summary of key findings and the recommendations

1.3 Relevant Documents

The assessment has been informed by the following documents:

- Strategic Flood Risk Assessment, North and North East Lincolnshire Council, November 2020
- Local Flood Risk Management Strategy, North Lincolnshire Council, August 2016
- Humber River Basin District Flood Risk Management Plan, Environment Agency, March 2016
- The Humber Flood Risk Management Strategy, Environment Agency, March 2008

2 SITE DETAILS AND PROPOSED DEVELOPMENT

2.1 Site Location

The approximately 2.55 hectare (ha) greenfield site is located to the north-east of Falkland Way at Ordnance Survey National Grid Reference TA 039 226, as shown in **Figure 1**.

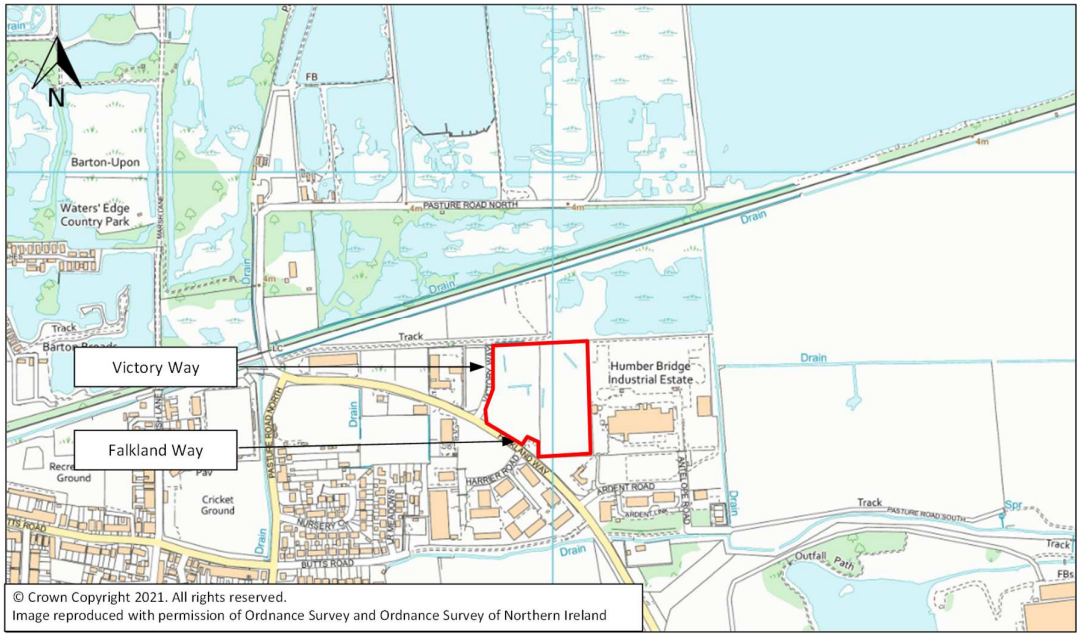

Figure 1: Site Location

2.2 Proposed Development

The development proposals comprise the construction of a lorry park with ancillary car parking (**Appendix A**).

Although not explicitly referenced in Table 2 of the NPPG, lorry parking is expected to be classified as Less Vulnerable to flood risk.

2.3 Surface Waterbodies in the Vicinity of the Site

The River Humber/Humber Estuary is located approximately 1.55 kilometres (km) to the north of the site.

Barton Haven flows in a westerly and then northerly direction approximately 0.36 km to the west of the site, ultimately outfalling to the River Humber/Humber Estuary. Barton Haven is a designated 'main river'. A number of land drains are also located within the vicinity of the site as illustrated in **Figure 2**. The drains to the south/east of the site (reference 16D and 16E) are maintained by North East Lindsey Internal Drainage Board (IDB), whilst the remaining drains may be classified as 'ordinary watercourses'. The topographic survey (**Appendix B**) indicates that there is also an existing ditch along the northern and western boundary of the site.

The surface waterbodies located to the north of the railway line form part of the Pasture Wharf Nature Reserve and Waters Edge Country Park. A surface waterbody is also shown to be located approximately 0.02 km to the north-east of the site; albeit aerial photography indicates that this is predominately dry. The balancing lake located approximately 0.34 km to the south-east of the site is associated with the existing Wren Kitchens facility at this location.

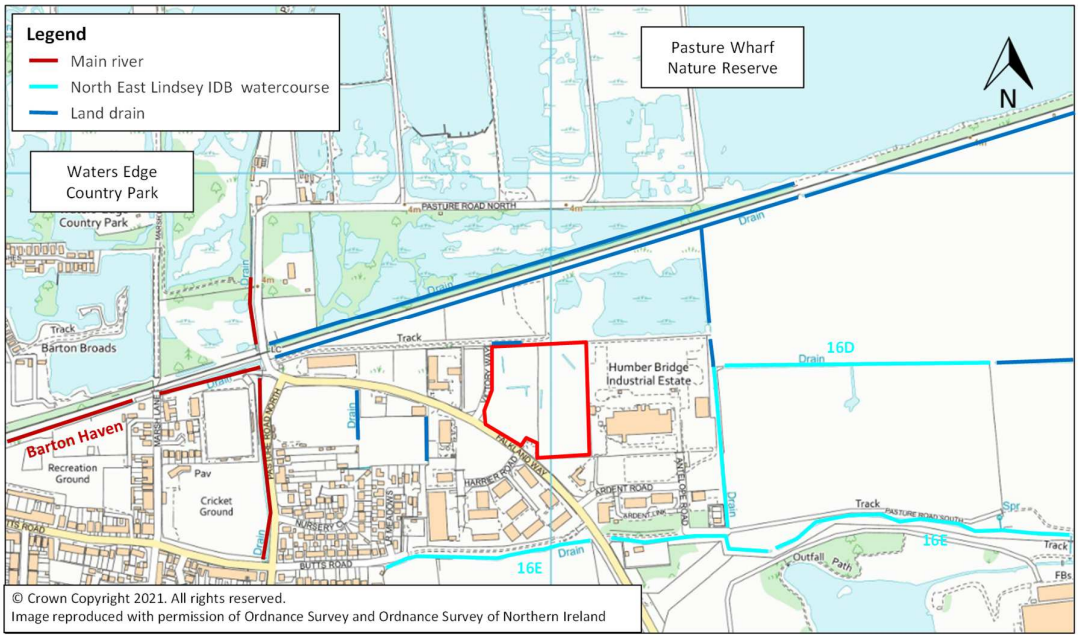

Figure 2: Location of Surface Waterbodies

2.4 Ground Conditions

According to the Soilscapes soils dataset produced by the Cranfield Soil and AgriFood Institute[1], soil conditions at the site and within the surrounding area are loamy and clayey soils of coastal flats with naturally high groundwater.

The National Geoscience Data Centre's Single Onshore Borehole Index[2] holds records of three boreholes located approximately 0.20 km to the south-west of the site. These indicate the presence of silty clay to depths of between 2.90-3.10 m below ground level (bgl), where the trial pits end. A further two borehole records within this vicinity present similar characteristics to 2.40 m bgl; however, this is subsequently underlain by silty gravelly sand, which is commensurate with the closer proximity of these to a land drain.

British Geological Survey mapping of surface geology[3] indicates the underlying bedrock formation comprises Welton Chalk Formation – Chalk, overlain by Tidal Flat Deposits – Clay and Silt superficial deposits.

According to the MAGIC website[4] the Welton Chalk Formation – Chalk bedrock is classified as a Principal aquifer. The site is shown to be located within a Total Catchment designated groundwater source protection zone.

2.5 Site Levels

A topographic survey of the site has been undertaken and is provided in **Appendix B**. Site levels are typically shown to be in the region of 2.70 to 3.30 metres Above Ordnance Datum (m AOD), with an elevated area on the western boundary of the site up to 4.10 m AOD.

LiDAR data has been utilised to develop a digital terrain model of the site and surrounding area as illustrated in **Figure 3**.

1 www.landis.org.uk/soilscapes/
2 https://www.bgs.ac.uk/products/onshore/SOBI.html
3 http://mapapps.bgs.ac.uk/geologyofbritain/home.html
4 https://magic.defra.gov.uk/MagicMap.aspx

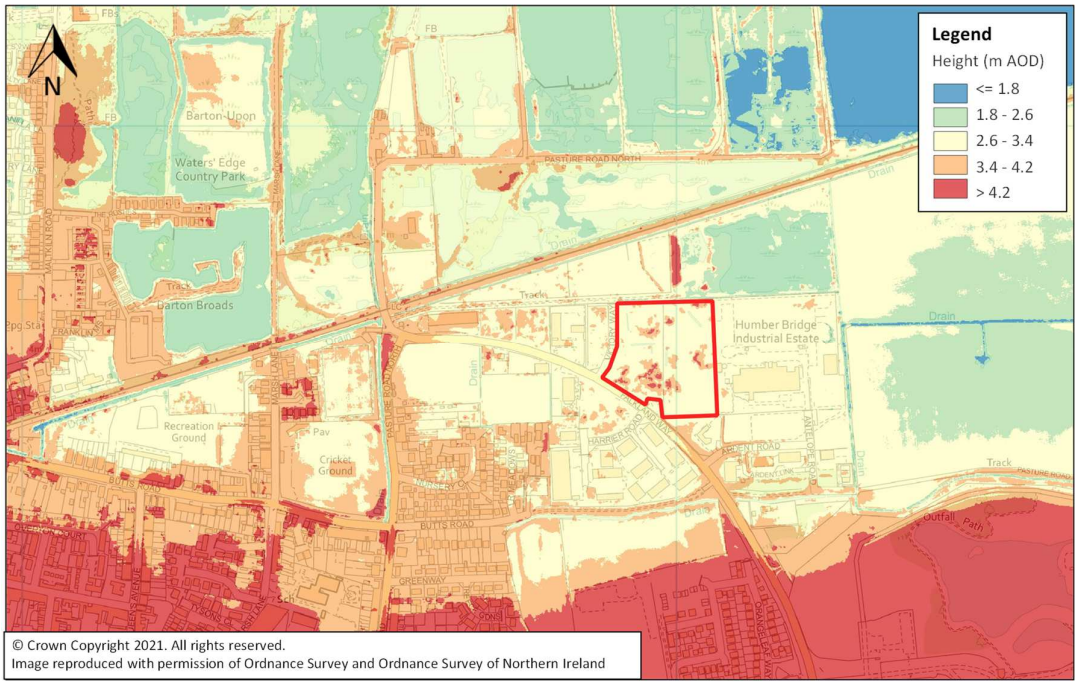

Figure 3: Digital Terrain Model from LiDAR Data

2.6 Access and Egress

Access and egress to the site is provided via Victory Road located off Falkland Way. Levels along Victory Road and Falkland Way are shown to be in the region of 2.80-3.10 m AOD adjacent to the site.

2.7 Flood Zone Designation

The Environment Agency Flood Map for Planning (Rivers and Sea) [5] (**Figure 4**) indicates the site to be located in flood zone 3. Table 1 of the NPPG defines flood zones as follows[6]:

- Flood zone 1: Low Probability. Land having a less than 1 in 1,000 annual probability of river or sea flooding
- Flood zone 2: Medium Probability. Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding
- Flood zone 3a: High Probability. Land having a 1 in 100 or greater annual probability of river flooding or a 1 in 200 or greater annual probability of sea flooding
- Flood zone 3b: Functional Floodplain. Land where water has to flow or be stored in times of flood.

The flood zones shown on the flood map in the vicinity of the site are defined by the predicted extent of flooding during the present day 1 in 100 (non-tidal rivers), 1 in 200 (tidal rivers and sea) and 1 in 1,000 (rivers and sea) annual exceedance probability (AEP) events. The zones do not take account of the possible impacts of climate change and consequent changes in the future probability of flooding.

Where an area benefits from formal flood defences providing a minimum standard of protection, the defended area may be indicated as an area benefiting from flood defences. However, not all areas are shown as such, and unless specifically indicated, the Flood Map for Planning conservatively shows land at risk of flooding in the absence of flood defences.

[5] https://flood-map-for-planning.service.gov.uk/
[6] https://www.gov.uk/guidance/flood-risk-and-coastal-change#flood-zone-and-flood-risk-tables

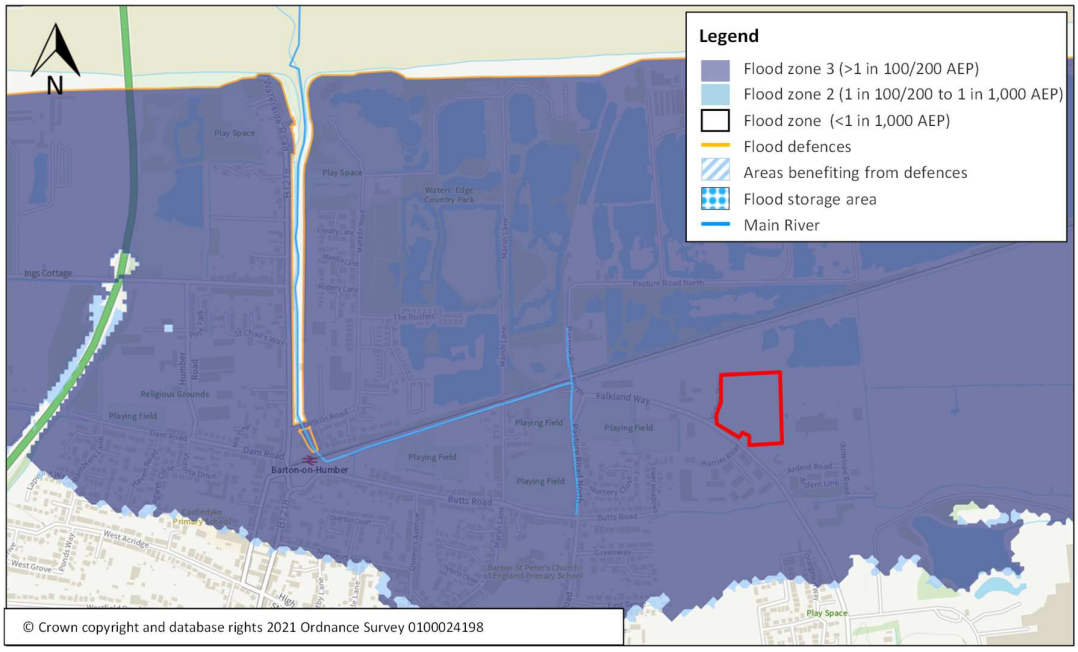

Figure 4: Flood Map for Planning
Source: gov.uk website; Accessed: November 2021

The North Lincolnshire Strategic Flood Risk Assessment (November 2020) online maps indicate that the site is located in 'SFRA Flood Zone 2/3 (a) Tidal' (**Figure 5**).

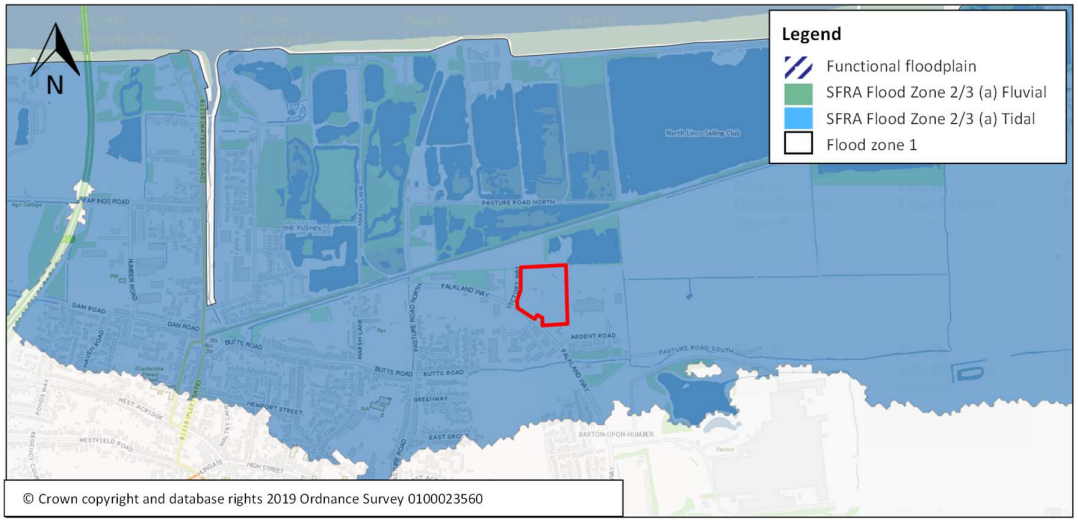

Figure 5: Flood Map from Strategic Flood Risk Assessment
Source: North Lincolnshire Strategic Flood Risk Assessment, November 2020 – Online Maps

3 PLANNING POLICY AND GUIDANCE

3.1 National Planning Policy and Guidance

The NPPF sets out government's planning policies for England and how these are expected to be applied. The NPPF seeks to ensure that flood risk is taken into account at all stages in the planning process and is appropriately addressed.

Footnote 55 of the NPPF states that a site-specific flood risk assessment should be provided for all development in flood zones 2 and 3 [whilst] in flood zone 1, an assessment should accompany all proposals involving: sites of 1 ha or more; land which has been identified by the Environment Agency as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased flood risk in future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.

NPPF paragraph 159 states that inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk but accepts that where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere. The policy of seeking to direct development away from areas at highest risk of flooding is implemented through the application of the sequential test (NPPF paragraph 161).

Paragraph 162 of the NPPF states that if it is not possible for a development to be located in zones 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 flood zone of the site and the vulnerability of the development proposed (as set out in Annex 3 of NPPF and NPPG Tables 2 and 3).

NPPF paragraph 164 states that application of the exception test for development proposals at the application stage should be informed by a site-specific flood risk assessment. For the test to be passed it should be demonstrated that: the development would provide wider sustainability benefits to the community that outweigh the flood risk; and the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

NPPF Paragraph 165 states that both elements of the exception test should be satisfied for development to be permitted.

3.2 Local Planning Policy and Guidance

3.2.1 North Lincolnshire Local Plan; Publication Plan Draft, North Lincolnshire Council, October 2021

North Lincolnshire is in the process of preparing a new single Local Plan for North Lincolnshire. Once formally adopted, it will replace the current North Lincolnshire Core Strategy and the Housing and Employment Land Allocations Development Plan Documents (DPDs).

The following policy is relevant in respect of flood risk:

Draft DQE5: Managing Flood Risk

1. *The risk and impact of flooding will be minimised through:*

    a. *directing new development to areas with the lowest probability of flooding;*
    b. *ensuring that all new development addresses the effective management of all sources of flood risk;*
    c. *ensuring that development does not increase the risk of flooding elsewhere; and*
    d. *ensuring wider environmental benefits of development in relation to flood risk.*

    A site-specific [FRA] should be provided for all development in Flood Zone 2 and 3. In Flood Zone 1 a FRA should accompany all proposals for development of sites of 1 hectare or more or land which has been identified by the Local Lead Flood Authority as having critical drainage problems or land that may be subject to other sources of flooding where development would introduce a more vulnerable use.

2. *The Council will support development proposals within areas at risk of flooding (flood zones 2 and 3 or at risk as shown on the flood hazard maps in the Strategic Flood Risk Assessment), where it meets the following prerequisites:*

    a. *it can be demonstrated that there are no other sites available at a lower risk of flooding (i.e. that the sequential test is passed). The sequential test will be based on a district-wide area of alternative sites unless local circumstances relating to the catchment area for the development justify a reduced search area, i.e. there is a specific need for the development in that location. The sequential test is not required for sites allocated in the Local Plan, for minor development (as defined in Planning Practice Guidance, paragraph 046 (Reference ID:7-046-20140306) or for change of use (except for a change of use to a caravan, camping or chalet site, or to a mobile home or park home site);*
    b. *it can be demonstrated that the development provides wider sustainability benefits to the community and the area, that outweigh flood risk;*
    c. *a [FRA] has demonstrated that the development will be safe for its lifetime, taking into account the latest guidance and allowances for climate change, without increasing flood risk elsewhere, has integrated water management methods into the development, and incorporated mitigation measures in line with the Standing Advice set out in the [Strategic Flood Risk Assessment], which has been agreed between the Council and the Environment Agency;*

3. *All development proposals, including proposals in flood zone 1, will be permitted providing it is demonstrated that:*

    c. *the development incorporates appropriate mitigation so that flooding of property in and adjacent to the development would not occur for 1% [1 in 100] annual probability event, with appropriate allowance for climate change, and exceedance flood flow paths are taken into account;*
    g. *there is a management and maintenance plan for drainage and flood risk management infrastructure where appropriate) for the lifetime of the development, which includes the implementation arrangements for adoption by any public authority, statutory undertaker or management company and any other arrangements to secure the operation and mitigation measures of the scheme throughout its lifetime*

3.2.2 Local Development Framework Core Strategy, North Lincolnshire, June 2011

The North Lincolnshire Local Development Framework Core Strategy was adopted in June 2011. 'The following policy is relevant in respect of flood risk:

CS19: Flood Risk

The council will support development proposals that avoid areas of current or future flood risk, and which do not increase the risk of flooding elsewhere. This will involve a risk based sequential approach to determine the suitability of land for development that uses the principle of locating development, where possible, on land that has a lower flood risk, and relates land use to its vulnerability to flood. Development in areas of high flood risk will only be permitted where it meets the following prerequisites:

1. *It can be demonstrated that the development provides wider sustainability benefits to the community and the area that outweigh flood risk.*
2. *The development should be on previously used land. If not, there must be no reasonable alternative developable sites on previously developed land.*
3. *A flood risk assessment has demonstrated that the development will be safe, without increasing flood risk elsewhere by integrating water management methods into development.*

3.3 Legislation Originating from the European Union

The Water Framework Directive (WFD) provides a legal framework for the protection, improvement and sustainable use of inland surface waters, groundwater, transitional waters, and coastal waters across England, and seeks to:

- Prevent deterioration in the status of aquatic ecosystems, protect them and improve the ecological condition of waters
- Achieve at least 'good' status for all waterbodies by 2015
- Promote the sustainable use of water as a natural resource
- Conserve habitats and species that depend directly on water
- Progressively reduce or phase out the release of individual pollutants or groups of pollutants that present a significant threat to the aquatic environment
- Progressively reduce the pollution of groundwater and prevent or limit the entry of pollutants; and
- Contribute to mitigating the effects of floods and droughts.

The WFD applies to any proposed development which has the potential to impact on a waterbody. Where this is the case, the Environment Agency may require evidence demonstrating that the proposed development does not compromise the aims of the WFD.

3.4 Environmental Permitting and Land Drainage Consent

Under the Environmental Permitting (England and Wales) Regulations 2016 an Environmental Permit for Flood Risk Activities[7] is required from the Environment Agency for any permanent or temporary works, including works:

- In, over or under a designated main river
- Within 8 m of the top of bank of a designated main river or of the landward toe of a flood defence (16 m if it is a tidal main river or a sea defence).

In addition, any permanent or temporary works within the floodplain of a designated main river may also require an Environmental Permit for Flood Risk Activities. A permit is separate to and in addition to any planning permission granted.

Land drainage consent may be required from the lead local flood authority or drainage board for work to an ordinary watercourse.

Undertaking activities controlled by local byelaws also requires the relevant consent.

[7] https://www.gov.uk/guidance/flood-risk-activities-environmental-permits

4 REVIEW OF FLOOD RISK

4.1 Sequential Test and Exception Test

The sequential test has been addressed by Walton & Co and is separately reported.

4.2 Historical Records of Flooding

The Environment Agency historic flood map does not provide any records of flooding at the site; however, land to the north, beyond the railway line, was subject to flooding in December 2013 and January 1953. This is reiterated by the North Lincolnshire Strategic Flood Risk Assessment (November 2020) online maps.

North East Lindsey IDB has advised[8] that localised flooding occurred within the vicinity of the site in 2019 as a result of the Boards watercourses being at or near bank full and thus preventing discharge from surface water systems. The Environment Agency has advised[9] that the eastern half of the site was added to its ground water flood warning area in 2020 due to the vulnerability exposed during the November 2019 Barton ground water incident, where adjacent properties were impacted; however, since then improvements to the drainage system have been made in collaboration by North East Lindsey IDB and Wren Kitchens.

4.3 Tidal / Coastal Flood Risk

The principal source of flood risk to the site is from the Humber Estuary.

The Environment Agency has advised[10] that the existing tidal defences protecting the site consist of earth embankments and concrete floodwalls. The defences are routinely inspected and are reported as being in fair condition. The defences reduce the risk of flooding (at the defence) to a 5% (1 in 20) AEP.

The Environment Agency has provided the following modelled peak still water tidal levels adjacent to the site ('Humber Bridge', ref: HU_0_022):

- Present day 1 in 200 (2021) AEP event 5.70 m AOD
- Present day 1 in 1,000 (2021) AEP event 5.97 m AOD
- 1 in 200 plus climate change (2071); higher central 6.01 m AOD
- 1 in 200 plus climate change (2071); upper end 6.21 m AOD

Tidal hazard mapping has been undertaken by the Environment Agency.

The modelled outputs (**Appendix C**) indicate that no flooding of the site would be expected in a 1 in 200 (2006) and 1 in 1,000 (2006) AEP overtopping event. In a 1 in 200 plus climate change (2115) AEP overtopping event flooding of the site would be expected with depths of greater than 1.60 m and velocities between 0.3-2.5 m/s. Such conditions are also expected on Victory Way and Falkland Way within the vicinity of the site.

In a 1 in 200 (2006) and 1 in 1,000 (2006) AEP breach event (refer to **Appendix D**) some flooding of the site would be expected up to a depth and velocity of 0.5 m and 0.3 m/s respectively; however, parts of the central area of the site are shown to remain dry. In a 1 in 200 plus climate change (2115) AEP breach event flood depths of between 0.5-1.6+ m may be expected, with velocities typically up to 0.3 m/s (with an area of 0.3-1.0 m/s). Again, similar conditions are also expected on Victory Way and Falkland Way within the vicinity of the site.

4.4 Fluvial Flood Risk

The Environment Agency has advised[11] that the site is not at risk of fluvial flooding from main rivers.

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8 Email from North East Lindsey IDB dated 22 October 2021
9 Email from the Environment Agency dated 5 November 2021
10 Reference: CCN-2021-238087, 4 November 2021
11 Refer to Footnote 10

As detailed in **Section 2.3**, there are a number of land drains located within the vicinity of the site, which are maintained by North Lincolnshire Council (as lead local flood authority) and North East Lindsey IDB. No modelled information is available for these watercourses; however, the Flood Risk from Surface Water map (**Figure 6**) may be utilised to assess the risk of flooding from such sources. This indicates that the site is not a risk of flooding from land drains.

4.5 Flood Risk from Surface Water

The Flood Risk from Surface Water map (**Figure 6**) indicates that the site is at 'Very Low' risk of flooding from surface water, with some small areas of isolated 'Low' risk which represent localised depressions within the site topography. Victory Way and Falkland Way are shown to be at 'Low' risk within the vicinity of the site, with potential depths and velocities expected to be between 300-900 mm and 0.25 m/s respectively; however, this is only shown to be over a relatively short section of the road (refer to **Figure 7**). This is reiterated by the North Lincolnshire Strategic Flood Risk Assessment (November 2020) online maps.

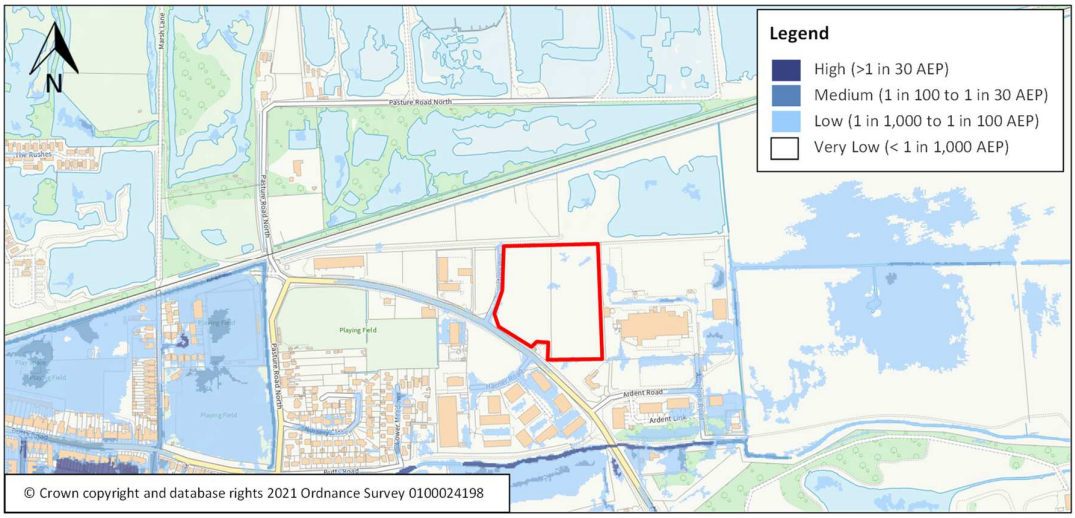


Figure 6: Flood Risk from Surface Water
Source: gov.uk website; Accessed: November 2021

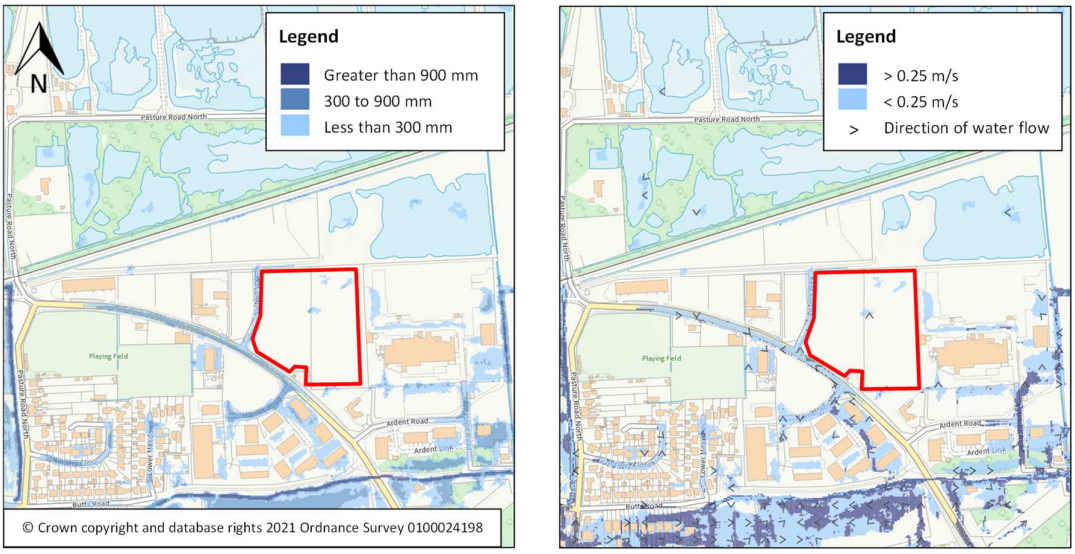


Figure 7: Flood Risk from Surface Water – Depth and Velocity 'Low Risk' Scenario
Source: gov.uk website; Accessed: November 2021

4.6 Flood Risk from Reservoirs, Canals and Other Artificial Sources

There are no canals located within the immediate vicinity of the site. The Flood Risk from Reservoirs map indicates that the site is not at risk of flooding from such sources. The site is therefore not assessed to be at risk of flooding from reservoirs or canals.

As detailed in **Section 2.3**, there are existing surface waterbodies located to the north of the railway line, which form part of the Pasture Wharf Nature Reserve and Waters Edge Country Park. A surface waterbody is also shown to be located approximately 0.02 km to the north-east of the site and a balancing lake approximately 0.34 km to the south-east of the site associated with the existing Wren Kitchens facility at this location.

LiDAR data (**Figure 3**) indicates that the area of land immediately to the north-east of the site is typically at a level below 2.60 m AOD. With existing site levels along the northern/north-eastern boundary of the site typically above 2.90 m AOD this is not expected to pose a risk of flooding to the site. Furthermore, aerial photography indicates that this is predominately dry.

In accordance with technical guidance, the Wren Kitchens balancing lake to the south-east of the site should have been designed to ensure no impact on flood risk elsewhere in up to a 1 in 100 plus climate change AEP event. As such, this is not expected to pose a risk of flooding to the site.

The elevated nature of the railway line (typically above 3.90 m AOD according to LiDAR data) would also be expected to prevent any risk of flooding to the site from the surface water bodies located in the lower-lying area to the north of this.

4.7 Flood Risk from Groundwater

As detailed in **Section 2.4** ground conditions at the site comprise clayey soils of coastal flats with naturally high groundwater. However, the JBA Groundwater Flood Risk Indicator map indicates that the site is at a negligible risk of flooding from this source. The mapping is for a 1 in 100 groundwater flooding event.

The Environment Agency has advised (refer to **Section 4.2**) that the eastern half of the site was added to its ground water flood warning area in 2020 due to the vulnerability exposed during the November 2019 Barton ground water incident. This is understood to have resulted from the local watercourses being at or near bank full and thus preventing discharge from surface water systems. Improvements have since been made to the drainage system within the area.

5 FLOOD RISK MITIGATION MEASURES

Given the proposed use of the site as a lorry park, and the requirement to allow level access from the existing road infrastructure, it is not feasible to raise the site to mitigate the risk of flooding from the River Humber/Humber Estuary.

The primary focus will therefore be the implementation of an appropriate flood warning and evacuation plan, which would be prepared in consultation with the North Lincolnshire Council emergency planning team. The objectives of the plan would be to reduce the risk to property and life by ensuring that all users of the site are aware of the potential risk of flooding and the procedures that should be implemented in the event that flooding is expected or has occurred.

This would be achieved by:

- Setting out the measures that would need to be taken if flooding is forecast (including evacuation of the site), during flooding and following an 'all-clear' notification;
- Summarising the roles and responsibilities for flood response and management; and
- Describing how flood warnings are issued, flood warning codes and what they mean, and other sources of flood information

The site is included in an Environment Agency flood alert and warning area. This provides the opportunity for the relevant response procedures set out in the Flood Plan to be invoked in response to receipt of a flood warning from the Environment Agency.

5.1 Flood Risk Elsewhere

The Environment Agency has confirmed the provision of compensatory storage is not required as this is a coastal location at tidal risk. No significant land reprofiling is proposed as part of the proposed development (with the exception of a localised earthworks exercise to generate a fall for drainage of the site), as such this would not be expected to impact flood flow routes and thus displace floodwater to third parties.

6 SUMMARY AND RECOMMENDATIONS

This report has been prepared on behalf of Wren Kitchens and relates to the proposed development of a site located off Falkland Way, Barton Upon Humber.

According to the Flood Map for Planning the proposed development site is located within flood zone 3.

The sequential test has been addressed by Walton & Co and is separately reported.

Tidal hazard mapping undertaken by the Environment Agency indicates that no flooding of the site would be expected in a 1 in 200 (2006) and 1 in 1,000 (2006) AEP overtopping event. However, when allowing for climate change and in the event of a breach of tidal defences flooding of the site would be expected with depths exceeding 1.6 m.

The site is assessed as not being at risk of flooding from fluvial sources, reservoirs, canals or other artificial sources and groundwater. However, there may be a residual risk associated with the capacity of the local drainage system.

The Flood Risk from Surface Water map indicates that the site is at 'Very Low' risk of flooding from surface water, with some small areas of isolated 'Low' risk.

This report has demonstrated that the proposed development may be completed in accordance with the requirements of planning policy subject to the implementation of a Flood Plan, which would be developed in consultation with North Lincolnshire Council.

The proposal is not expected to impact flood risk elsewhere.

APPENDIX A

Proposed Site Plan

Built Environment Design Partnership
Fernwood business park, 14 Halifax Court, Newark, Nottinghamshire, NG24 3JP
t: +44 (0) 1636 850500 www.bedesign.co.uk

NOTES:

1. If this drawing has been received electronically it is the recipients responsibility to print the document to the correct scale.
2. All dimensions are in millimetres unless stated otherwise. It is recommended that information is not scaled off this drawing.
3. This drawing should be read in conjunction with all other relevant drawings and specifications.
4. Drawing is not reflective of the latest design layout

N

Key
- Planning Boundary (6.30 Ac. / 2.55 Ha.)

Note
Lorry Parking Space size is 3.2m x 18.75m

Proposed Site Plan
(Scale 1:500)

10m SCALE 1:500

Planning

P01	RB	SJP	SJP	04/11/2021
	First Issue			

Rev	Drawn By:	Checked By:	Approved By:	Date:
	Amendments			

Project: Falklands Way Logistics Park

Title: Proposed Site Plan

Drawing Number:

Identification / Location:					Sheet Number:
Project Code:	Originator Code:	Vol / Area:	Level:	Type:	Role:	Number:
WREN2	BED	ST	ZZ	DR	A	0111

Rev Description:	Status Code:	Model Ref:	Rev No:
Preliminary	S0	ACAD	P01

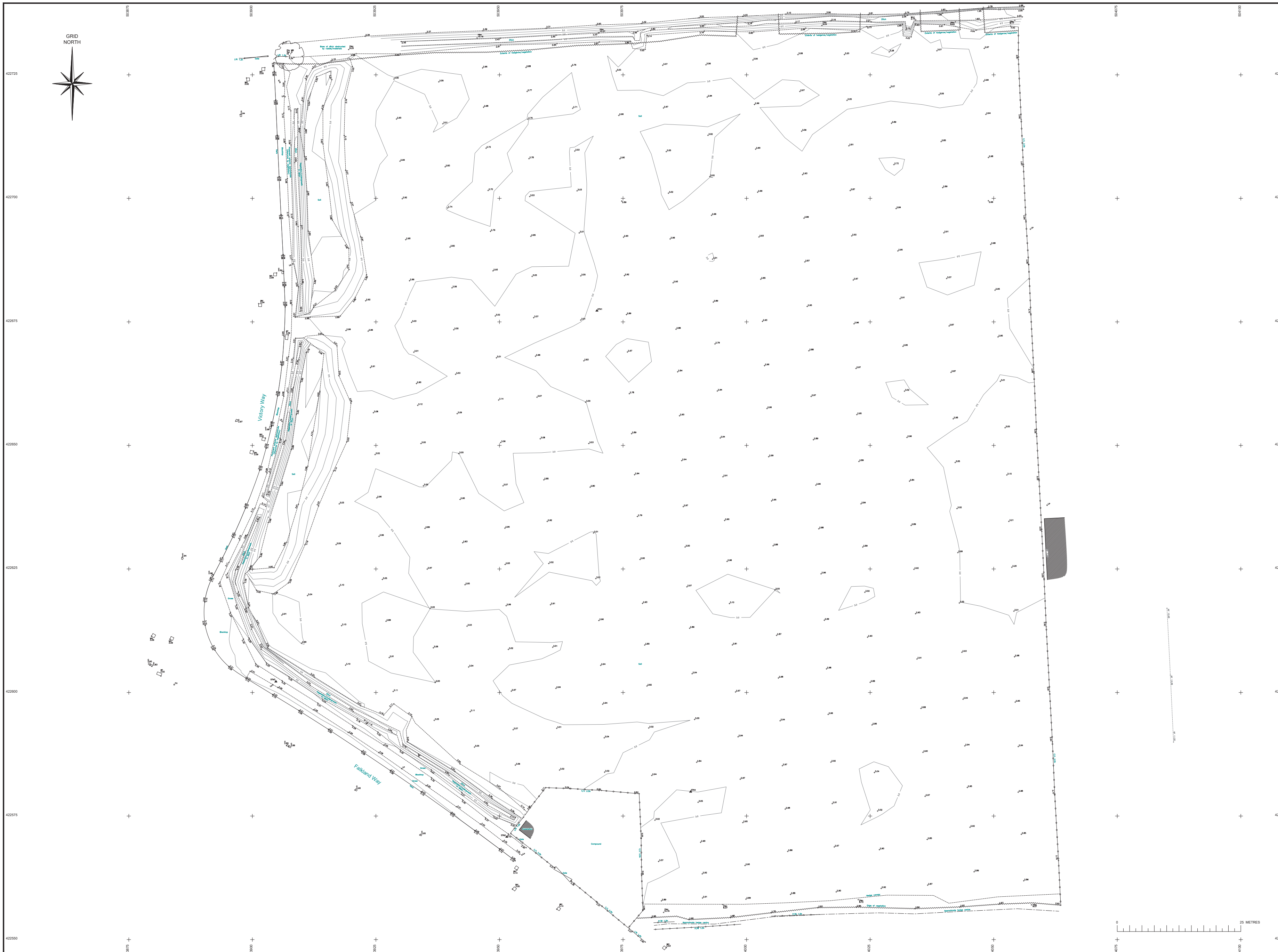
Scale:	Sheet:	Discipline:	BED Project Number:
1:500	A1	Architectural	NWK 210085

Client: Wren Kitchens

BE design

APPENDIX B

Topographic Survey



NOTES

A0

1. SURVEY CONTROL

A) SURVEY GRID (HORIZONTAL):

THIS SURVEY IS ORIENTATED TO ORDNANCE SURVEY GRID NORTH. THE SURVEY IS TO A PLANE GRID. HORIZONTAL MEASUREMENTS TAKEN FROM THIS SURVEY WILL BE GROUND DISTANCE.

FULL ORDNANCE SURVEY CO-ORDINATES CAN BE CALCULATED BY SCALING THE SURVEY ABOUT THE SURVEY STATION NAMED STN1, WITH CO-ORDINATES E 503969.73 N 422677.27 AS FOLLOWS:

SHIFT: NOT REQUIRED
SCALE: LSF = 0.99973
ROTATION: NOT REQUIRED.

THE LOCAL SCALE FACTOR (LSF) APPLICABLE TO THIS SITE IS 0.99973, CALCULATED USING STANDARD TABULATED DATA.

THE CONTROL HAS BEEN ESTABLISHED BY TYING INTO THE ACTIVE ORDNANCE SURVEY CONTROL NETWORK. SEE NOTE C. BELOW.

(FOR THIS RELATIVELY LOW LEVEL SITE, MEAN SEA LEVEL CORRECTIONS (MSL) ARE DEEMED TO BE INSIGNIFICANT AND HAVE THEREFORE NOT BEEN APPLIED.)

B) VERTICAL DATUM:

ALTITUDES FOR THE CONTROL HAVE BEEN CALCULATED FROM GNSS DERIVED HEIGHTS AND CONVERTED TO ORTHOMETRIC HEIGHTS (ORDNANCE DATUM NEWLYN - ODN) USING OSGM15 TRANSFORMATION PARAMETERS.

C) GNSS CONTROL:

THE CO-ORDINATE SYSTEM USED FOR THE PRIMARY CONTROL IS OSGB36; THIS HAS BEEN CALCULATED FROM ETRS89 USING OSTN15 TRANSFORMATION PARAMETERS.

METHOD: FOR THIS PARTICULAR PROJECT, THE "TRIMBLE VRS NOW" NETWORK RTK SYSTEM HAS BEEN USED. OBSERVATIONS HAVE BEEN TAKEN ON THE FOLLOWING DATE (S): 15/11/2021

MANUFACTURERS QUOTED ACCURACY IS RMSE 10 – 20 mm IN PLAN AND 20 – 30 mm IN HEIGHT. HOWEVER, RESULTS MAY VARY DURING THE DAY AND CERTAIN CONDITIONS COULD CAUSE DEGRADATION TO THE FINAL SOLUTIONS. FOR SALIENT CONTROL AND WHEREVER POSSIBLE AND PRACTICAL, TOWER SURVEYORS HAVE USED AN OPEN SKY WITH GOOD SATELLITE GEOMETRY SO AS TO MAINTAIN THE HIGHEST ACCURACY POSSIBLE.

2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS/DOCUMENTATION.
   NAMELY: J-00326_201 - TOPOGRAPHICAL SURVEY
   J-00326_101 - UTILITIES SURVEY
3. CHECK SCALE BAR AND GRID BEFORE TAKING NON-FIGURED DIMENSIONS FROM THIS DRAWING.
4. IF IN DOUBT ASK.
5. DRAWING PRESENTED AS 2D, WITH 3D VERSION IN FROZEN LAYERS.
6. OS COPYRIGHT ORDNANCE SURVEY © CROWN COPYRIGHT 2021. ALL RIGHTS RESERVED. LICENCE NUMBER 100059995

LEGEND

30.29 SPOT LEVEL
STN/4 SURVEY STATION
SAPLING
BUSHES/SHRUB
HEDGE/AREA OF UNDERGROWTH
TREE (INDICATIVE ONLY)
BUILDING
99.90 CONTOUR
R/W RETAINING WALL
BANKING
OVERHEAD CABLE
FENCE WITH DESCRIPTION

C/P	CHESTNUT PALING	Iwn	INTERWOVEN
C/B	CLOSE BOARDED	O/L	OVERLAP
C/I	CORRUGATED IRON	Pal	PALLING
C/L	CHAIN LINK	P/W	POST AND WIRE
CBr	CRASH BARRIER	P/R	POST AND RAIL
Con/P	CONCRETE PANEL	P/C	POST AND CHAIN
Elc	ELECTRIC	P/Bw	POST AND BARBED WIRE
Hrd	HOARDING	P/S	POST AND STRING
H/M	HIT AND MISS	W/M	WIRE MESH
I/R	IRON RAILING		

ABBREVIATIONS

AC	AIRCON		
B	BOLLARD	LB	LITTER BIN
BB	BELISHA BEACON	LP	LAMP POST
BL	BED LEVEL	L/W	LIGHTWELL
BOP	BACK OF PATH	MKR	MARKER POST
BP	BOUNDARY POST	MH	MANHOLE
BS	BUS STOP	PB	PILLAR BOX
BT	BRITISH TELECOM IC	PI	PIPE
CATV	CABLE TELEVISION IC	PM	PARKING METER
CC	CONTROL CABINET	P	POST
CL	COVER LEVEL	RE	RODDING EYE
COL	COLUMN	RF/RG	ROOF/RIDGE LEVEL
CTV	CABLE TELEVISION POINT	RNP	ROAD NAME PLATE
DK	DROP KERB	RS	ROAD SIGN
DRN	DRAIN	RWP	RAINWATER PIPE
DWP	DOWN WATER PIPE	SC	STOP COCK
DP	DOWN PIPE	SOF	SOFFIT LEVEL
EV	EAVES LEVEL	SGY	STRIP GULLY
EP	ELECTRICITY POLE	SP/B	SIGN POST/BOARD
ER	EARTH ROD	ST	STOP TAP
FFL	FINISHED FLOOR LEVEL	SV	STOP VALVE
FH	FIRE HYDRANT	SW	STORM WATER
FL	FLOOD LIGHT	TAP	WATER TAP
FW	FOUL WATER	TCB	TELEPHONE CALL BOX
G	GULLY	THL	THRESHOLD LEVEL
GV	GAS VALVE	TL	TRAFFIC LIGHT
GP	GATE POST	TOF	TOP OF FENCE
GUT	GUTTER LEVEL	TP	TELEPHONE POLE
Hlev	TOP OF HEDGE LEVEL	TWL	TOP OF WALL
IC	INSPECTION COVER	US	UNDERSIDE LEVEL
IL	INVERT LEVEL	VP	VENT PIPE
KB	KERB	WLV	WATER LEVEL
KO	KERB OUTLET GULLY	WM	WATER METER
		WO	WASH OUT

TREE NOTES

A) MB "X" NO – MULTIPLE BOLES FOLLOWED BY NUMBER OF.
B) DIA – TRUNK DIAMETER MEASURED AT APPROX 1.5M ABOVE GROUND LEVEL.
C) SPREAD – DIAMETER OF CANOPY. (TREE SPREADS ARE INDICATIVE ONLY AND ARE REPRESENTATIVE OF THE GENERALISED CANOPY SIZE, AND MAY NOT REPRESENT THE TRUE CANOPY POSITION AS OUTLINED ON SITE – TREE BOLES MAY NOT SIT CENTRALLY TO THE CANOPY).
D) HEIGHT – APPROXIMATE HEIGHT TO TOP OF CANOPY – ESTIMATED FROM GROUND LEVEL.
E) ATTENTION SHOULD BE PAID TO THE ORIGINAL TOPOGRAPHICAL BRIEF AS TO WHAT TREES HAVE ACTUALLY BEEN SCHEDULED; I.E. THOSE "TREES LARGER THAN DIAMETER "X" OR "ONLY TREES WITHIN THE IMMEDIATE SURVEY LIMITS". (THIS IS NORMALLY THE CASE UNLESS OTHERWISE SPECIFIED AS INCLUDING "OFF SITE" TREES).

STATION CO-ORDINATES

STATION	EASTING	NORTHING	LEVEL	DESCRIPTION
STN1	503969.73	422677.27	3.02	PEG & NAIL
STN2	503951.50	422570.80	3.39	SURVEY NAIL
STN3	503904.77	422602.23	3.33	SURVEY NAIL
STN4	503988.69	422579.93	2.99	PEG & NAIL

UNLESS OTHERWISE STATED THE SURVEY STATIONS LISTED ABOVE ARE ONLY INTENDED TO BE USED FOR TOPOGRAPHICAL SURVEYS AT THE STATED SCALE. DUE CONSIDERATION SHOULD BE GIVEN TO LONG-TERM STABILITY OF SURVEY STATION MARKERS.

GENERAL

- NO ALLOWANCE HAS BEEN MADE FOR SUB SURFACE ENTRY INTO MANHOLES OR OTHER CHAMBERS OR VOIDS BELOW GROUND LEVEL. THEREFORE ANY DETAILS RELATING TO DEPTHS, SIZES ETC. ARE TAKEN FROM ABOVE GROUND AND AS SUCH WILL BE APPROXIMATE ONLY.
- THE CONTRACTOR IS TO CHECK AND VERIFY ALL CRITICAL DIMENSIONS AND LEVELS BEFORE WORK STARTS.
- BURIED SERVICES SHOWN ON THIS DRAWING MAY BE ASSUMED ROUTES AND WILL NORMALLY BE OF UNKNOWN CONDITION, CONTRACTORS SHOULD UNDERTAKE SUITABLE VALIDATION WORK AND TAKE PARTICULAR CARE DURING EXCAVATION WORK; SAFE DIGGING PRACTICES SHOULD BE FOLLOWED.
- SHOULD THERE BE ANY CONFLICT BETWEEN THE DETAILS INDICATED ON THIS DRAWING AND THOSE INDICATED ON OTHER DRAWINGS, THEN TOWER SURVEYORS SHOULD BE INFORMED PRIOR TO CONSTRUCTION ON SITE.
- IT IS IMPORTANT TO NOTE THAT THE SAME ACCURACIES IMPLIED BY THE PLOTTING SCALE ARE EQUALLY APPLICABLE TO DIGITAL DATA SUPPLIED FOR CAD.
- EVERY EFFORT IS MADE TO IDENTIFY ALL VISIBLE ABOVE GROUND FEATURES. HOWEVER, IT SHOULD BE BORNE IN MIND THAT THERE MAY BE ITEMS OBSCURED AT THE TIME OF SURVEY.
- VISIBLE FEATURES IN THE VICINITY OF THE BOUNDARIES, AS SHOWN ON THIS SURVEY, MAY NOT REPRESENT THE EXTENT OF LEGALLY CONVEYED OWNERSHIP.
- UNLESS OTHERWISE SPECIFIED FEATURES SHOWN USING LINE STYLES OR HATCHING ARE INDICATIVE ONLY, SUCH AS; ROAD MARKINGS, HEDGE CENTRELINES, BRICK HATCHING AND GLAZING DETAIL.

DESCRIPTION	REV	DATE	DRWN	CHKD	APPR

DRAWING STATUS

INFORMATION

Tower Surveys
Chartered Surveyors
Geomatics - Land, Utilities, Engineering & Building
RICS
SUITE 1826, 109 VERNON HOUSE,
FRIAR LANE, NOTTINGHAM, NG1 6DQ
TEL: +44 (0)7786560451 / 01158088224
info@towersurveyors.co.uk
https://towersurveys.associates/associates/
Regulated by RICS

CLIENT
WREN KITCHENS
(CONSULTANT: BUILT ENVIRONMENT DESIGN PARTNERSHIP LIMITED)

PROJECT TITLE what3words ///tender.corals.lighters
PROPOSED LORRY PARK, FALKLAND WAY / VICTORY WAY, BARTON-UPON-HUMBER, DN18 5XY

DRAWING DETAIL
TOPOGRAPHICAL SURVEY AS OF 15/11/21

DRAWN	EPB	DATE	NOVEMBER 2021
PROJECT ENGINEER	ATM		
CHECKED	NJR	SCALE	1:250 (WHEN PLOTTED @ A0)
APPROVED	ATM		

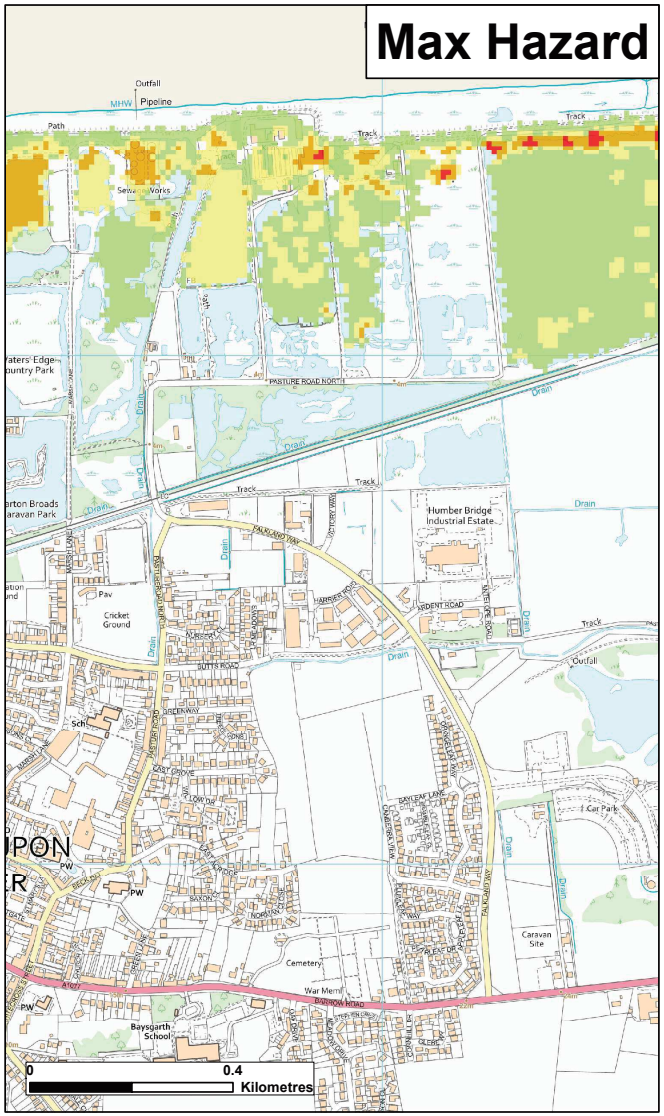
DRAWING NUMBER	REVISION
J-00326 / 201	

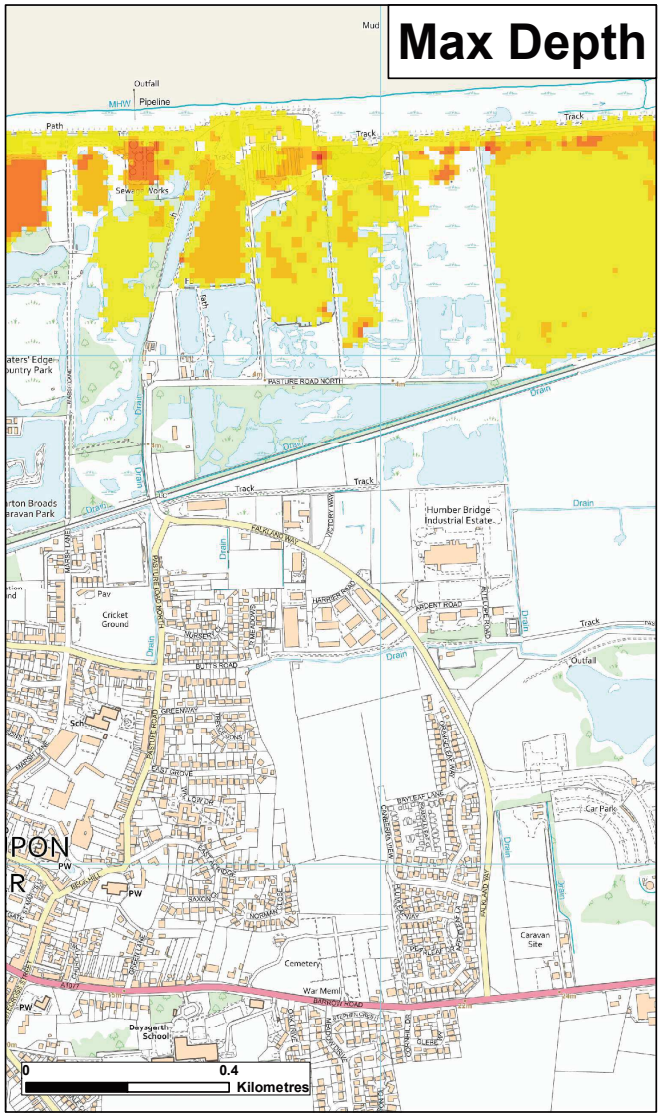
CAD REFERENCE
\\2021Projects\J-00326\J-00326_201_Issue01

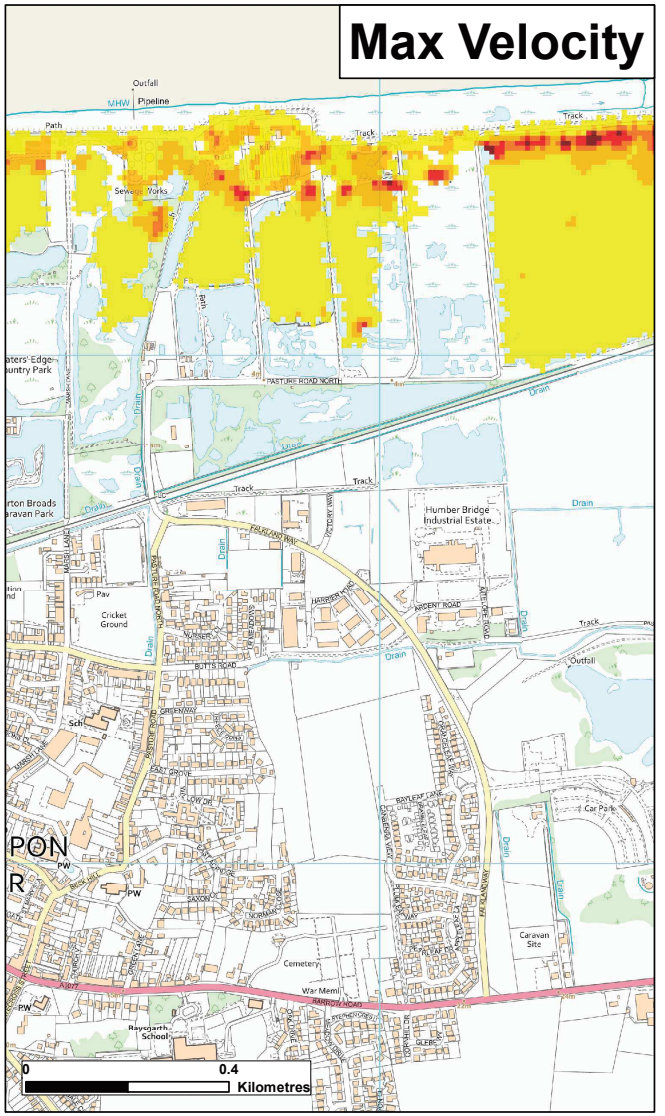
CTB REFERENCE
\\CTB-files\TS-Topo-v01.ctb

APPENDIX C

Environment Agency Tidal Hazard Mapping - Overtopping







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	October 2021	Scenario year	2006	Scenario Annual Chance	0.5% (1 in 200)	CCN Number	CCN-2021-238087

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.

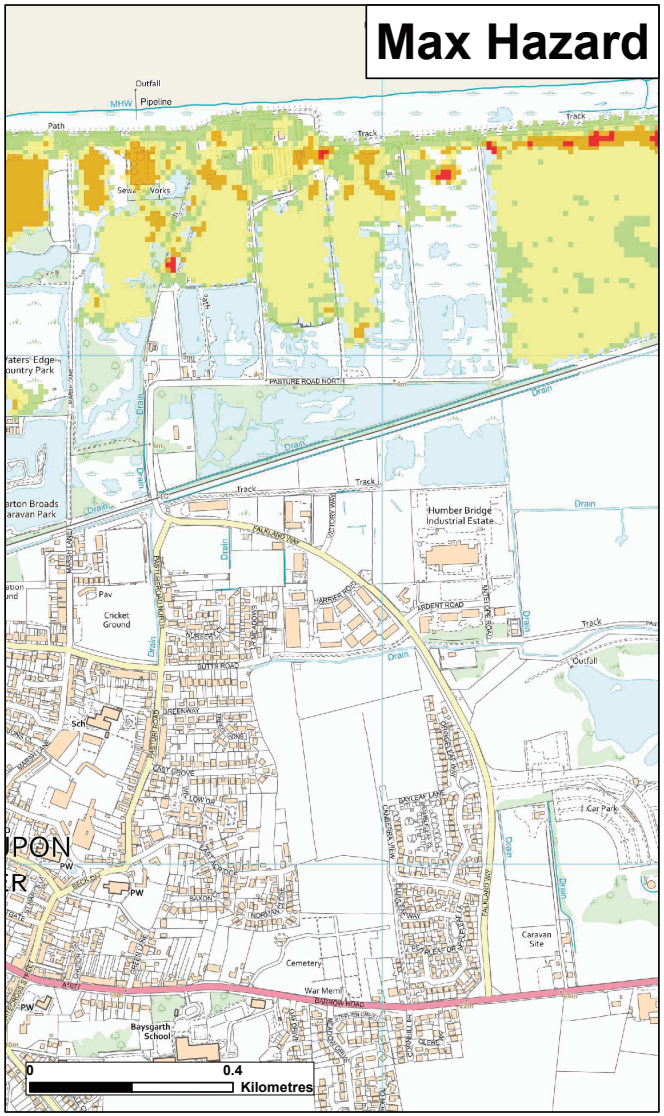
For future climate change scenarios it is assumed that defences remain at 2006 heights.

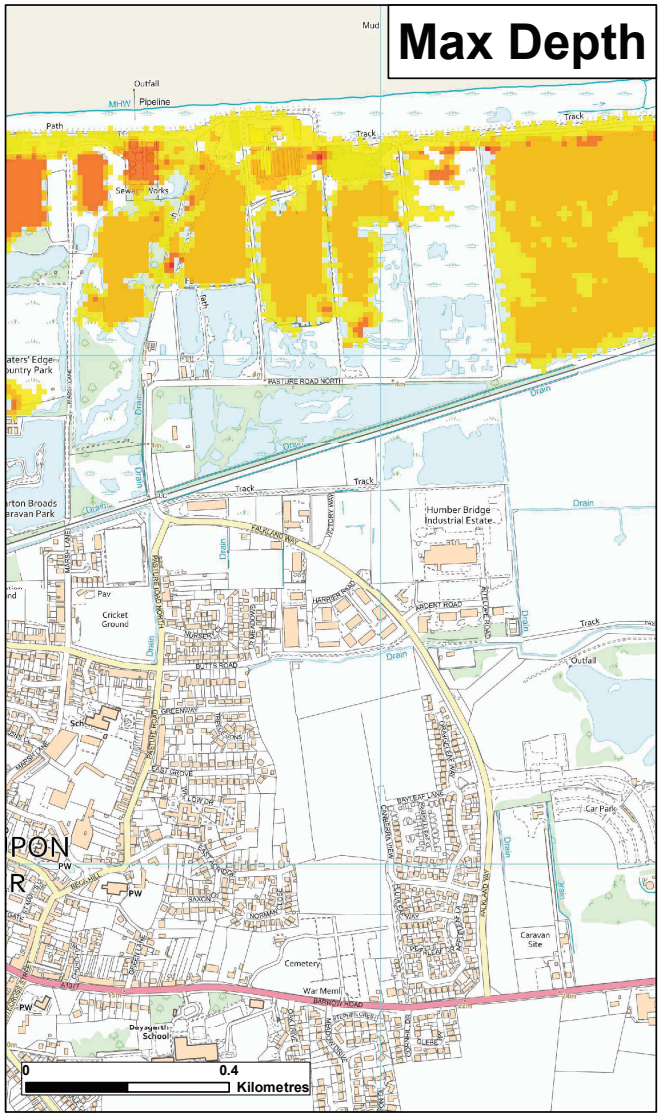
These maps do not replace the flood zone maps used in the National Planning Policy Framework (NPPF)

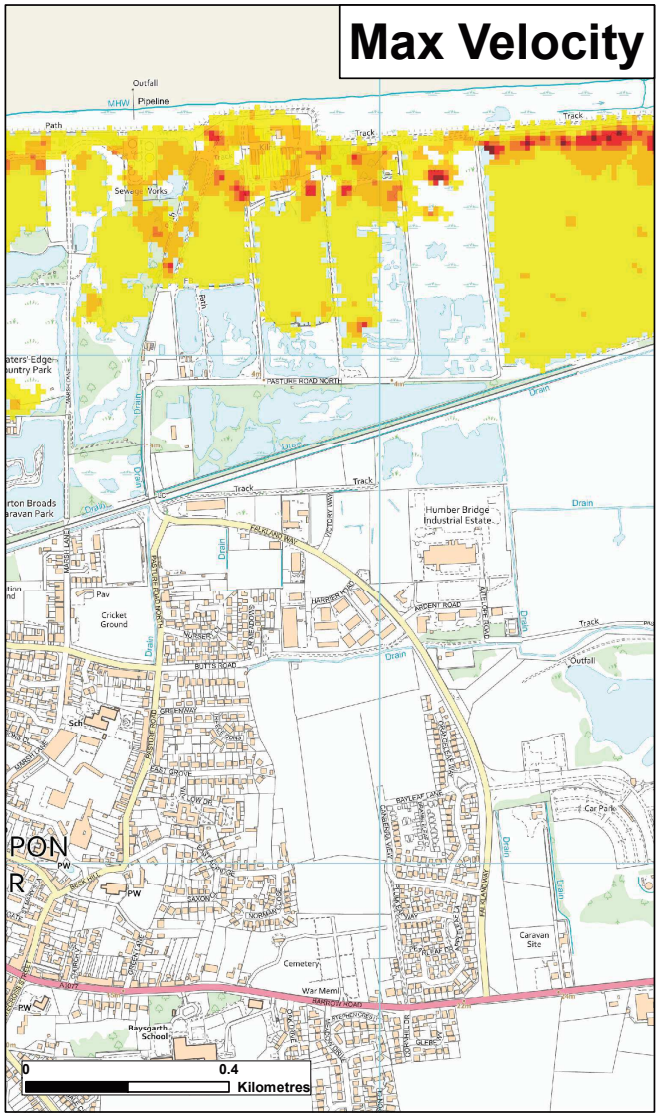
Environment Agency

Lincolnshire and Northamptonshire Overtopping Hazard Mapping

Map Centred on TA 03900 22600







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- 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	October 2021	Scenario year	2006	Scenario Annual Chance	0.1% (1 in 1000)	CCN Number	CCN-2021-238087

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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.

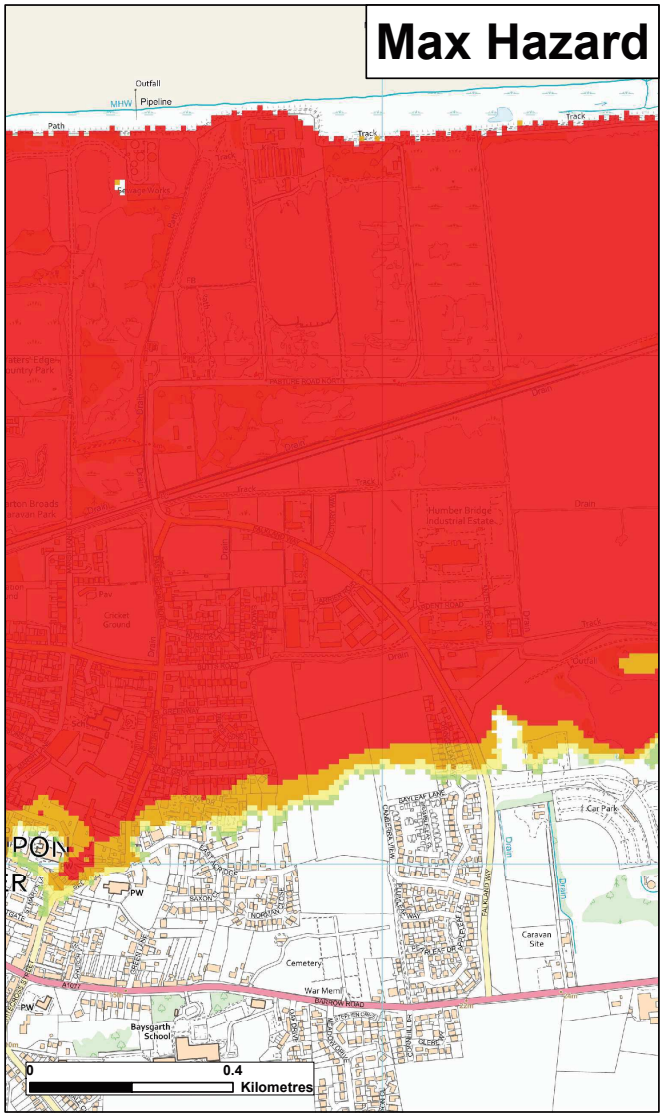
These maps do not replace the flood zone maps used in the National Planning Policy Framework (NPPF)

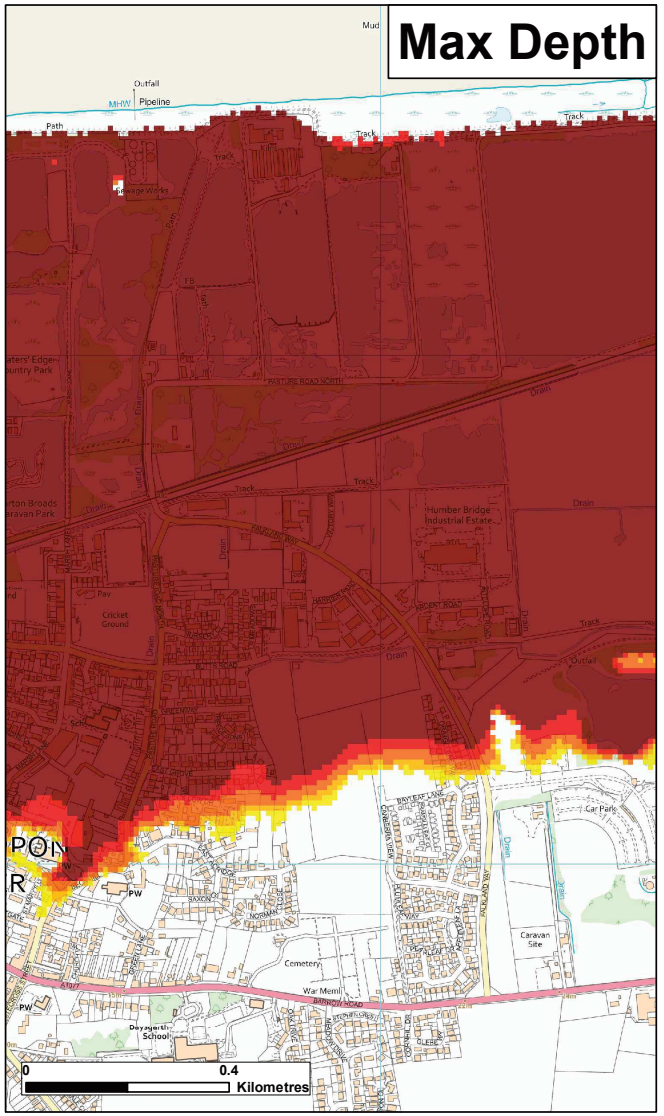
General Enquiries No: 03708 506 506. Weekday Daytime calls cost 5p plus up to 6p per minute from BT Weekend Unlimited. Mobile and other providers' charges may vary

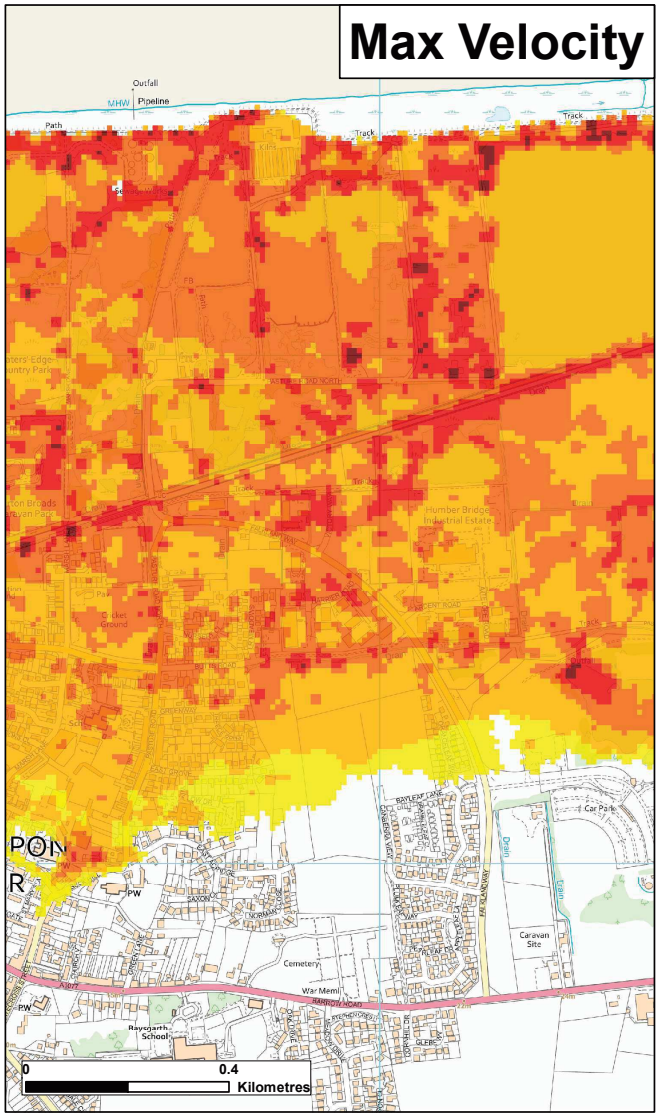
Environment Agency

Lincolnshire and Northamptonshire Overtopping Hazard Mapping

Map Centred on TA 03900 22600







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- 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	October 2021	Scenario year	2115	Scenario Annual Chance	0.5% (1 in 200)	CCN Number	CCN-2021-238087

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.

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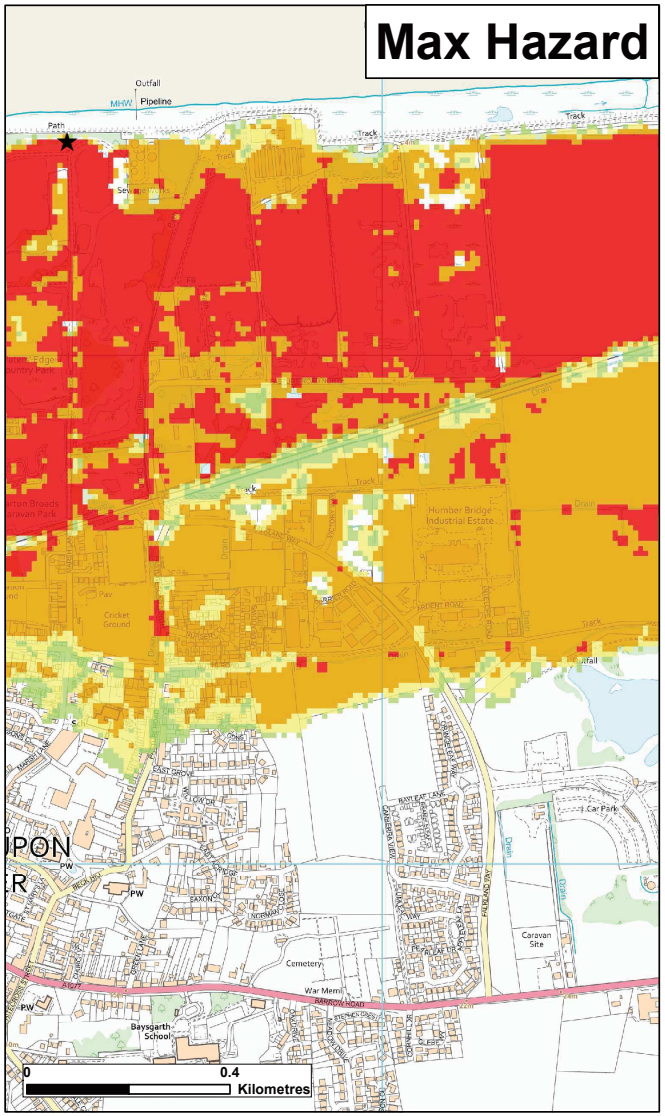
Environment Agency

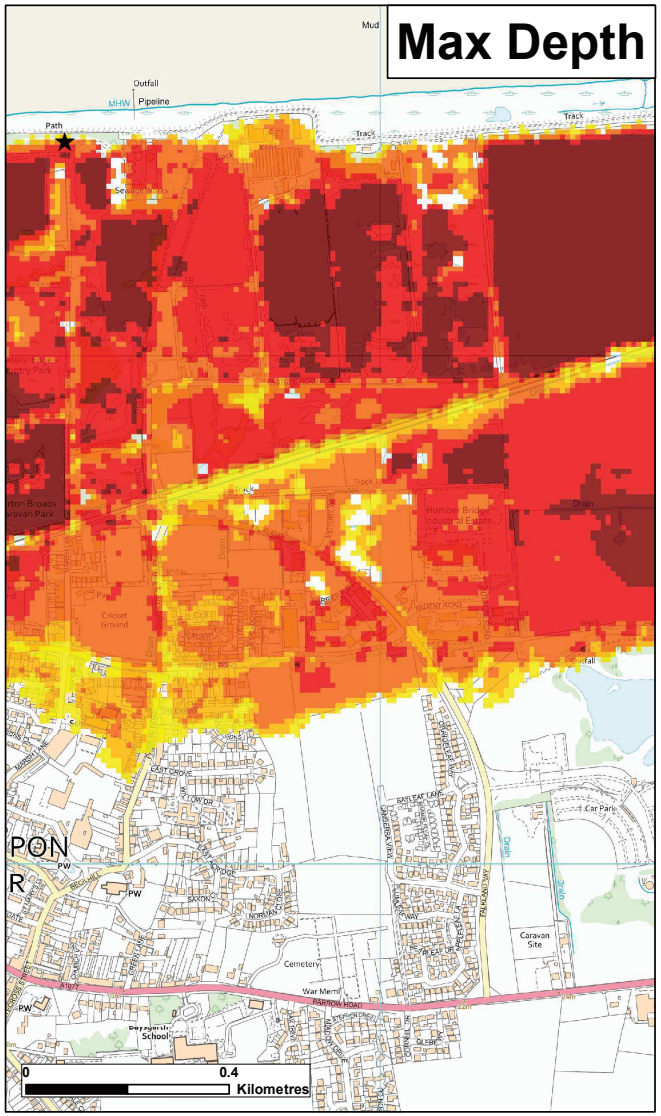
Lincolnshire and Northamptonshire Overtopping Hazard Mapping

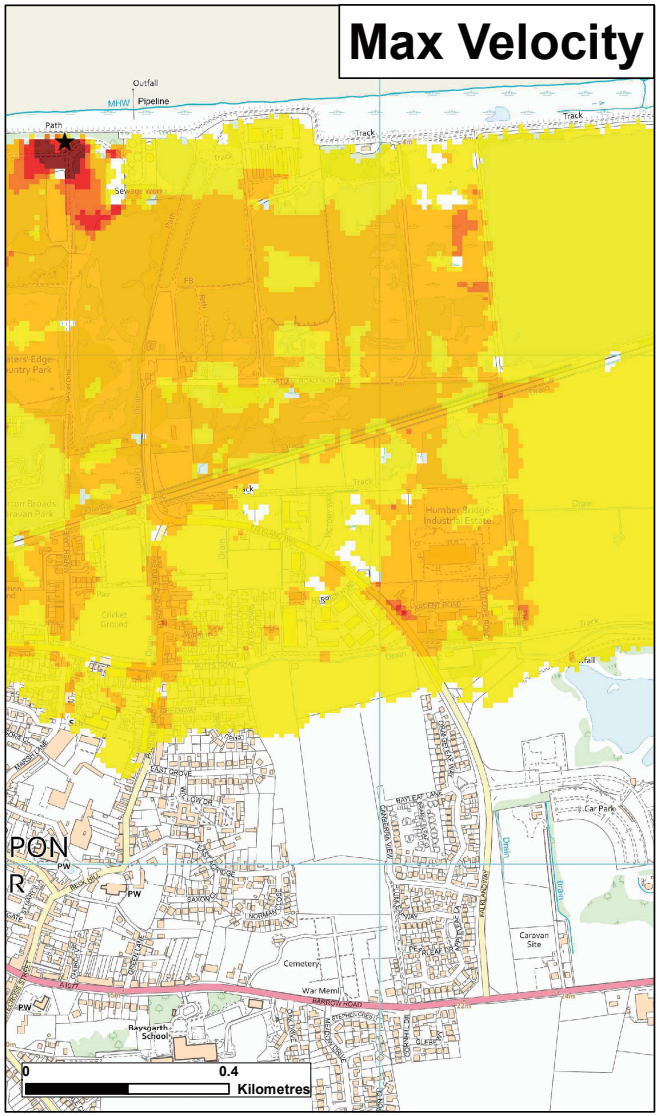
Map Centred on TA 03900 22600

APPENDIX D

Environment Agency Tidal Hazard Mapping - Breach







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

Max Hazard
(Flood Risk to People : FD2320)

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- 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	October 2021	Scenario year	2006	Scenario Annual Chance	0.5% (1 in 200)	CCN Number	CCN-2021-238087

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.

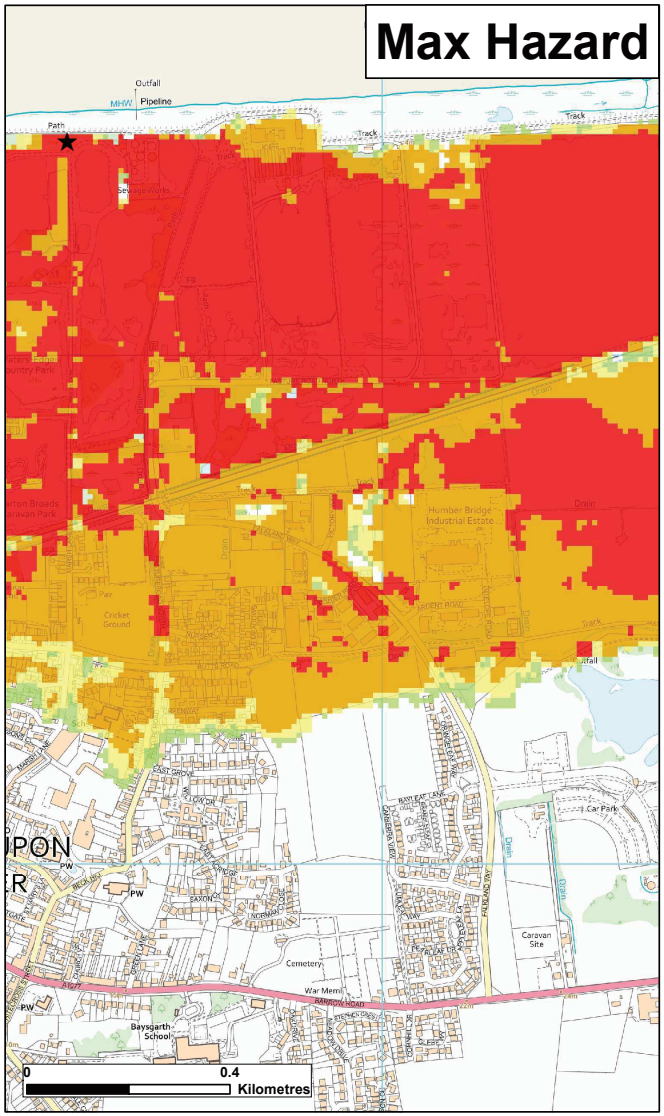
The map only considers the consequences of a breach, it does not make any assumption about the likelihood of a breach occurring. The likelihood of a breach occurring will depend on a number of different factors, including the construction and condition of the defences in the area. A breach is less likely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

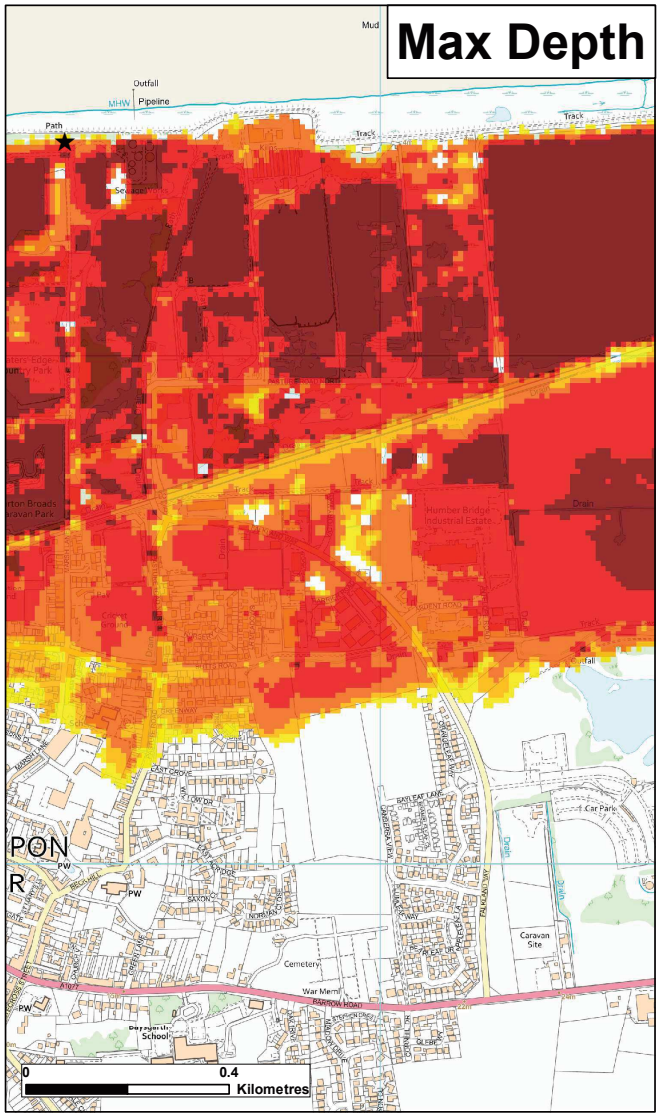
General Enquiries No: 03708 506 506. Weekday Daytime calls cost 5p plus up to 6p per minute from BT Weekend Unlimited. Mobile and other providers' charges may vary

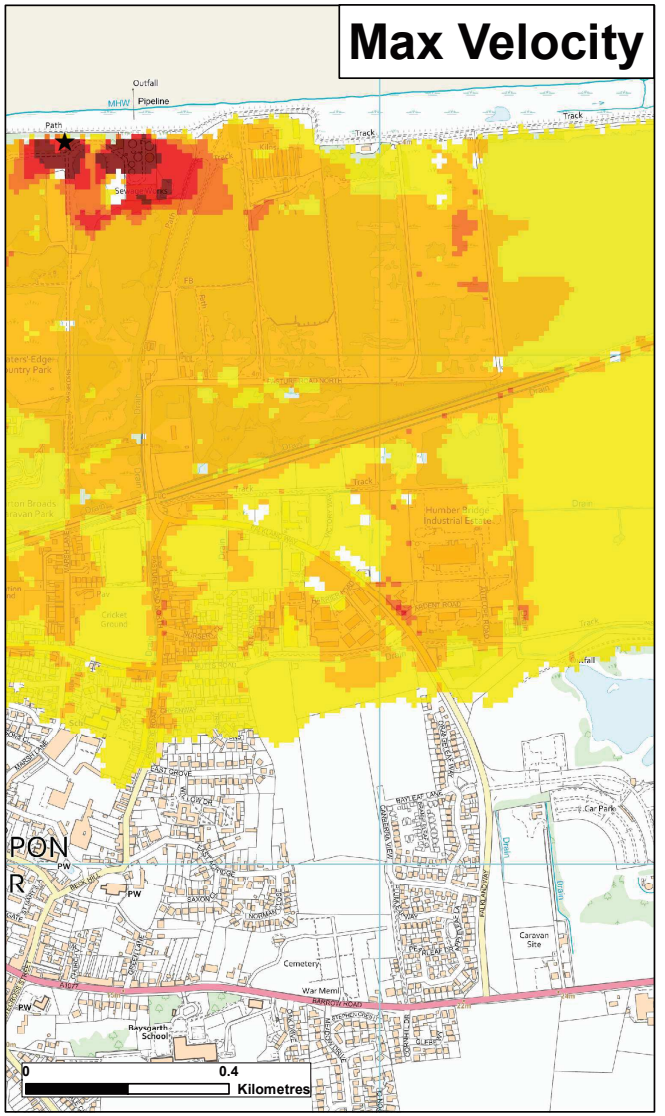
Environment Agency

Lincolnshire and Northamptonshire Hazard mapping

Map Centred on TA 03900 22600







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

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Date Printed	October 2021	Scenario year	2006	Scenario Annual Chance	0.1% (1 in 1000)	CCN Number	CCN-2021-238087

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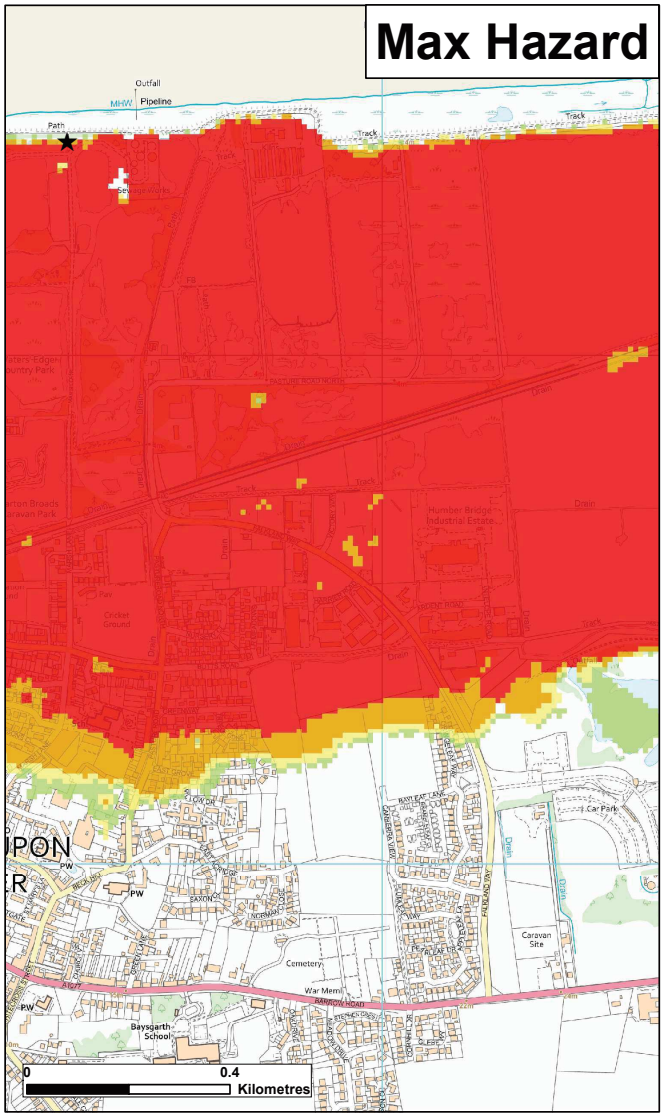
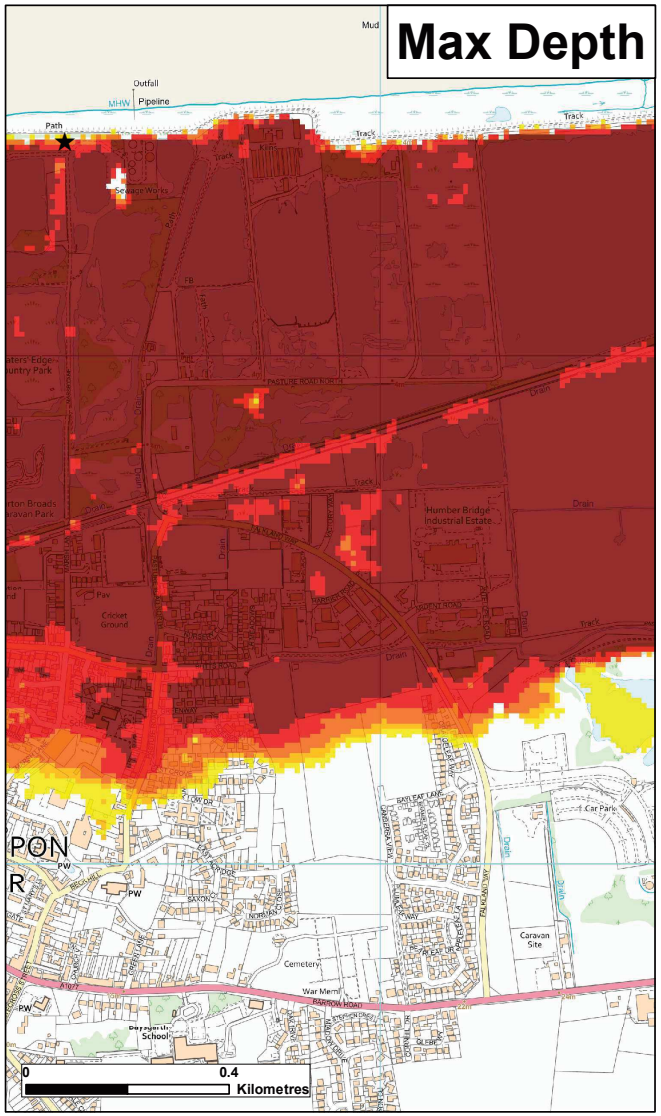
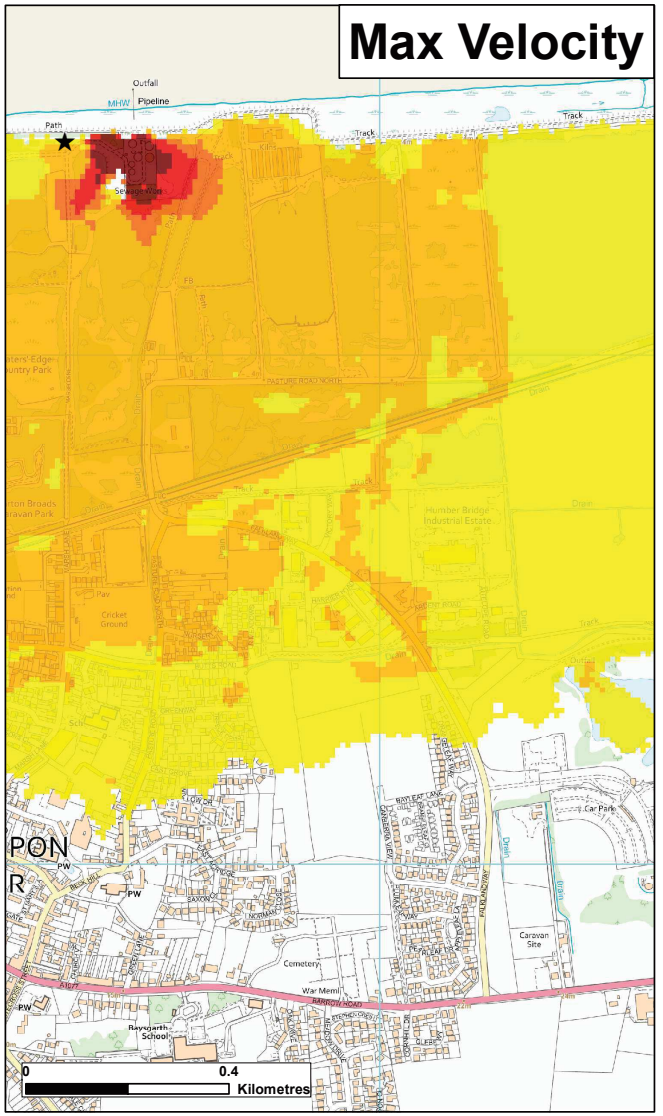
Environment Agency

Lincolnshire and Northamptonshire Hazard mapping

Map Centred on TA 03900 22600







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- 1.6 +

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- 0.3 - 1.0
- 1.0 - 1.5
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Date Printed	October 2021	Scenario year	2115	Scenario Annual Chance	0.5% (1 in 200)	CCN Number	CCN-2021-238087

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Environment Agency

Lincolnshire and Northamptonshire Hazard mapping

Map Centred on TA 03900 22600

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Flood Consequences Assessments
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Foul Water Drainage
Environmental Impact Assessments
River Realignment and Restoration
Water Framework Directive Assessments
Environmental Permit and Land Drainage Applications
Sequential, Justification and Exception Tests
Utility Assessments
Expert Witness and Planning Appeals
Discharge of Planning Conditions

www.weetwood.net