

FLOOD RISK ASSESSMENT

Site Address

21 and 23 Boston Road
Holbeach
PE12 7LR

Client

Mr Andrew Bennett

Date

17/04/2020



**CONSULTING GEO-ENVIRONMENTAL
ENGINEERS AND SCIENTISTS**

Phase 1 Contaminated Land Desk Studies, Geo-Environmental Site Investigations, Environmental Due Diligence, Flood Risk Assessments, Surface Water Management Strategies (SuDS), Ecology, Noise and Air Quality Assessments, Environmental Management Systems, GIS & Data Management Systems

1 Document Control



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2 Abbreviations

Abbreviation	Description
STM	STM Environmental Consultants Limited
BGS	British Geological Survey
EA	Environment Agency
OS	Ordnance Survey of Great Britain
FRA	Flood Risk Assessment
NPPF	National Planning Policy Framework
FWD	Floodline Warning Direct
FRMS	Flood Risk Management Strategy
LCC	Lincolnshire County Council
SHDC	South Holland District Council
SWMP	Surface Water Management Plan
SFRA	Strategic Flood Risk Assessment
CDA	Critical Drainage Area
SuDS	Sustainable Drainage Systems
GWSPZ	Groundwater Source Protection Zone
LLFA	Lead Local Flood Authority
mbgl	metres below ground level
DCLG	Department for Communities and Local Government
PPGPS	Planning practice guidance and Planning system

3 Disclaimer

This report and any information or advice which it contains, is provided by STM Environmental Consultants Ltd (STM) and is solely for use by Mr Andrew Bennett (Client).

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4 Executive Summary

Location	21 and 23 Boston Road, Holbeach, PE12 7LR Grid reference: 535807, 324991
Proposed Development	Change of use from veterinary surgery (D1) to two residential flats.
Flood Zone	Flood Zone 3.
Topography	N.A.
Sequential and Exception Tests	Development is non-minor and more vulnerable so Sequential and Exception Tests may be required. LLFA to decide.
Main Sources of Flooding	Tidal.
Flood Defences	Earth embankments.
Records of Historic Flooding	None.
Fluvial (River) and Tidal (Sea) Flood Risk	Low – Site benefits from flood defences; No significant fluvial/tidal flooding incidents identified.
Pluvial (Surface Water) Flood Risk	Low – Site will remain dry during all modelled scenarios. No significant surface water flooding incidents identified.
Flood Risk from Artificial (Canals and Reservoirs) Sources	Low – No significant artificial sources identified.
Groundwater Flood Risk	Low – Site is not potentially susceptible to groundwater flooding; no recorded incidents have been identified.
Development Impacts on Local Flood Risk	The development is internal and therefore will not increase the site impermeable area. As such it will have no adverse impact on local flood storage capacity nor surface water runoff rates.
Proposed Flood Risk Mitigation Measures	- Finished floor levels will be set 300mm above general ground levels; - Construction will utilise flood resistant materials and services will be placed as high as practicable to reduce impact of flooding; - Occupants will sign up for EA Emergency Flood Warning Direct Service; - Safe egress to flood zone 1 is a 1-minute walk away; however, safe refuge is not available on upper floors for the ground floor flats.
Surface Water Management (SuDS)	SuDS would reduce current surface water run off rates however given the small size of the site, there is limited potential for implementation. Consideration should be given to rainwater harvesting and permeable paving where possible.
Conclusions	The site is considered to be at low overall risk of flooding. No previous records of fluvial, tidal, groundwater or surface water flooding incidents were found and the proposed development is unlikely to significantly impact local flood risk.

5 Introduction

STM Environmental Consultants Limited (STM) has been appointed by Mr Andrew Bennett (Client) to provide a Flood Risk Assessment (FRA) at a site located at 21 and 23 Boston Road, Holbeach, PE12 7LR.

6 Development Proposal

The FRA is required to support a planning application for the change of use from veterinary surgery (D1) to two residential flats.

Further details including drawings of the development plans are available in [Appendix 2](#).

7 Report Aims and Objectives

The purpose of this report is to establish the flood risk to the site from all potential sources and, where possible, to propose suitable mitigation methods to reduce any risks to an acceptable level. It aims to make an assessment of whether the development will be safe for its lifetime, taking into account climate change and the vulnerability of its users, without increasing flood risk elsewhere.

The FRA assesses flood risk to the site from tidal, fluvial, surface water, groundwater, sewers and artificial sources. The FRA has been produced in accordance with the National Planning Policy Framework (NPPF) and its supporting guidance.

8 Summary of Data Review Undertaken

The following research has been undertaken as part of the FRA:

- Desktop assessment of topographical, hydrological and hydrogeological settings through review of the information sourced from the British Geological Survey (BGS), the Environment Agency (EA) and the Ordnance Survey (OS);
- Review of publicly available flood risk mapping provided by the EA;
- Review of the Preliminary Flood Risk Assessment (PFRA) and Level 1 Strategic Flood Risk Assessment (SFRA) produced by the LLFA outlining flood risk from various sources within the borough.

9 Legislative and Policy Context

9.1 Legislative Context

The Flood and Water Management Act was introduced in 2010. The Act defines the role of lead local flood authority (LLFA) for an area. All LLFA are required to develop, maintain, apply and monitor a strategy for local flood risk management in its area, called “local flood risk management strategy”.

Alongside the Act, Flood Risk Regulations (2009) outline the roles and responsibilities of the various authorities, which include preparing Flood Risk Management Plans and identifying how significant flood risks are to be mitigated.

9.2 Policy Context

9.2.1 National Planning Policy Framework (NPPF)

The NPPF sets out the government’s planning policies for England and how these are expected to be applied. It also provides a set of guidelines and philosophy with which local planning authorities (LPAs) can build their own unique policies to appropriately regulate development within their jurisdictions.

Section 14 entitled “Meeting the challenge of climate change, flooding and coastal change” deals specifically with flood risk. Among other things it states that LPAs

should try to ensure that “Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere”. It further states that when determining planning application, LPAs should “ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment⁵⁰. Development should only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:

-  within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;
-  development is appropriately flood resilient and resistant;
-  it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;
-  any residual risk can be safely managed; and
-  safe access and escape routes are included where appropriate, as part of an agreed emergency plan.

Applications for minor development and changes of use should not be subject to the Sequential or Exception Tests but should still meet the requirements for site-specific flood risk assessments set out in footnote 50.

Footnote 50 states: “A site-specific flood risk assessment should be provided for all development in Flood Zones 2 and 3. In Flood Zone 1, an assessment should accompany all proposals involving: sites of 1 hectare 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.”

The NPPF also lays out requirements for how LPAs should deal with planning applications in coastal areas. They should ensure that should they “reduce risk from coastal change by avoiding inappropriate development in vulnerable areas or adding to the impacts of physical changes to the coast.”

Developments in Coastal Change Management Areas should only be considered appropriate where it is demonstrated that:

-  it will be safe over its planned lifetime and will not have an unacceptable impact on coastal change;
-  the character of the coast including designations is not compromised;
-  the development provides wider sustainability benefits;
-  the development does not hinder the creation and maintenance of a continuous signed and managed route around the coast.

9.2.2 Local Planning Policy

Policy 4 of the South East Lincolnshire Local Plan approaches Flood Risk. Development proposed within an area at risk of flooding (Flood Zones 2 and 3 of the Environment Agency’s flood map or at risk during a breach or overtopping scenario as shown on the flood hazard and depths maps in the Strategic Flood Risk Assessment) will be permitted, where:

-  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 Borough or District wide search area of alternative sites within the defined settlement boundaries, 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, minor development or 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).

- It can be demonstrated that essential infrastructure in FZ3a & FZ3b, highly vulnerable development in FZ2 and more vulnerable development in FZ3 provide wider sustainability benefits to the community that outweigh flood risk.

Additionally, the application must be supported with a site-specific flood risk assessment, covering risk from all sources of flooding including the impacts of climate change and which:

- demonstrate that the vulnerability of the proposed use is compatible with the flood zone;
- identify the relevant predicted flood risk (breach/overtopping) level, and mitigation measures that demonstrate how the development will be made safe and that occupants will be protected from flooding from any source;
- propose appropriate flood resistance and resilience measures (following the guidance outlined in the Strategic Flood Risk Assessment), maximising the use of passive resistance measures (measures that do not require human intervention to be deployed), to ensure the development maintains an appropriate level of safety for its lifetime;
- include appropriate flood warning and evacuation procedures where necessary (referring to the County's evacuation routes plan), which have been undertaken in consultation with the authority's emergency planning staff;
- incorporates the use of Sustainable Drainage Systems (SuDS) (unless it is demonstrated that this is not technically feasible) and confirms how these will be maintained/managed for the lifetime of development (surface water connections to the public sewerage network will only be permitted in exceptional circumstances where it is demonstrated that there are no feasible alternatives);
- demonstrates that the proposal will not increase risk elsewhere and that opportunities through layout, form of development and green infrastructure have been considered as a way of providing flood betterment and reducing flood risk overall;
- demonstrates that adequate foul water treatment and disposal already exists or can be provided in time to serve the development;

- ensures suitable access is safeguarded for the maintenance of water resources, drainage and flood risk management infrastructure.

9.3 EA Standing Advice on Flood Risk

The Environment Agency's [standing advice](#) lays out the process that must be followed when carrying out flood risk assessments for developments.

Flood risk assessments are required for developments within one of the flood zones. This includes developments:

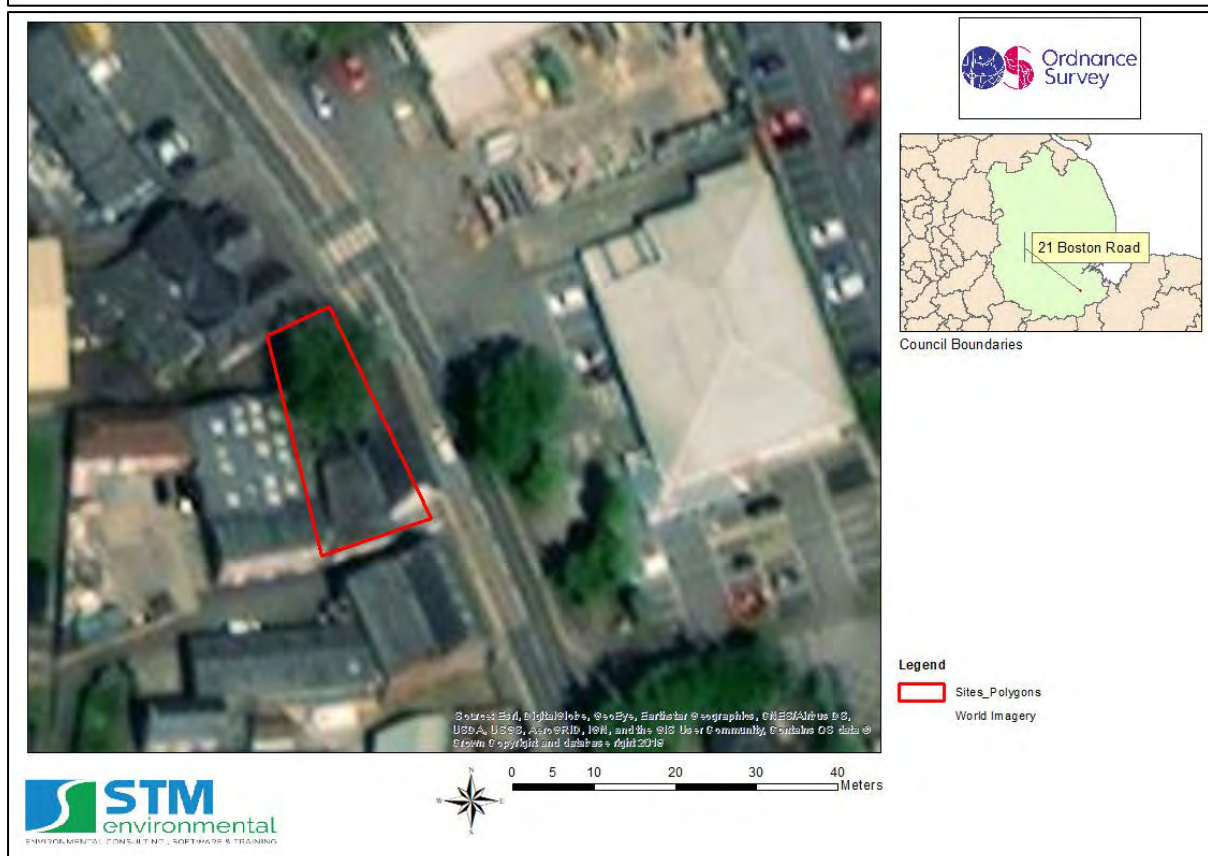
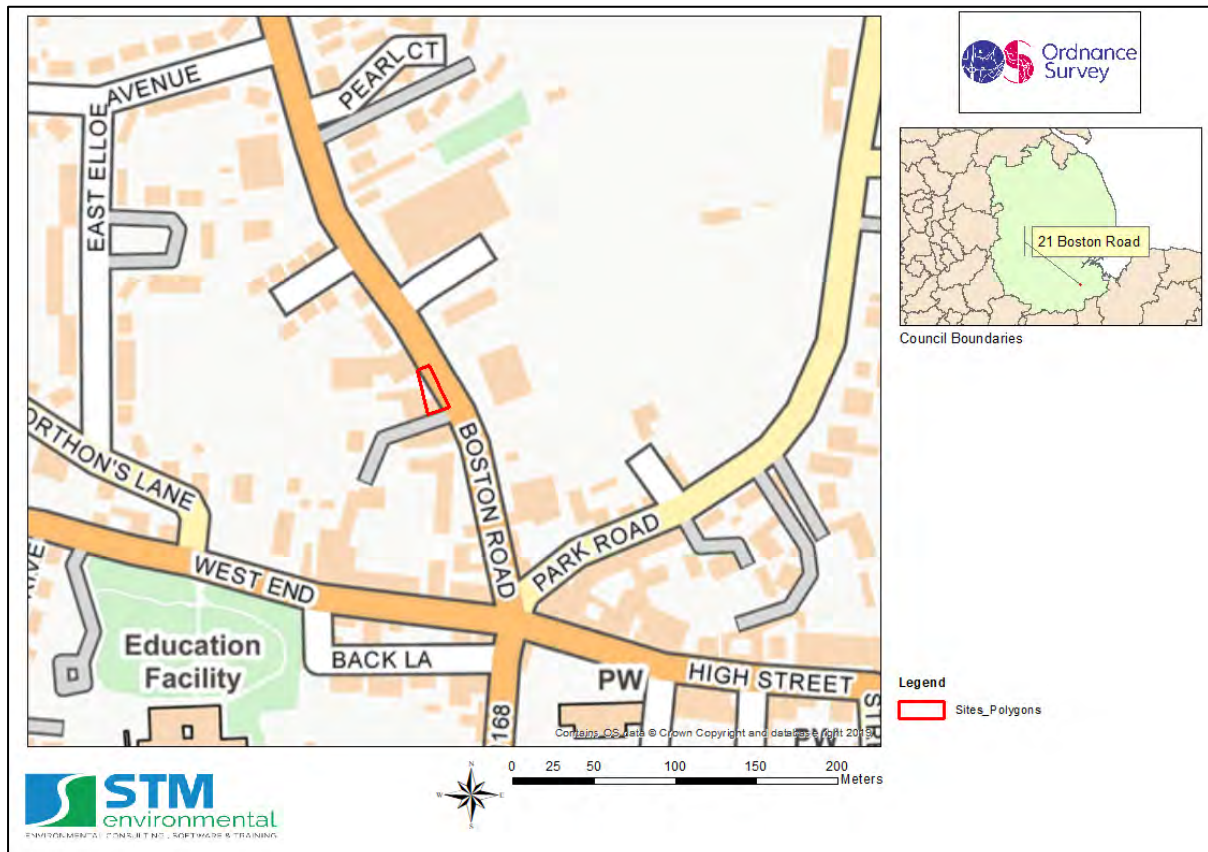
- in flood zone 2 or 3 including minor development and change of use more than 1 hectare (ha) in flood zone 1;
- less than 1 ha in flood zone 1, including a change of use in development type to a more vulnerable class (for example from commercial to residential), where they could be affected by sources of flooding other than rivers and the sea (for example surface water drains, reservoirs);
- in an area within flood zone 1 which has critical drainage problems as notified by the Environment Agency.

10 Site Description and Environmental Characteristics

10.1 Site Location and Area

The site is located at 21 Boston Road, Holbeach, PE12 7LR. It is centred at national grid reference 535807, 324991. The site has an area of approximately 300m².

A site location map and aerial photo are shown below. Photographs of the site are available in [Appendix 1](#).



10.2 Site Access

The site is accessed via Boston Road.

10.3 Local Planning Authority

The site falls within the jurisdiction of South Holland District Council in terms of the planning process.

10.4 Lead Local Flood Authority

Lincolnshire County Council is the Lead Local Flood Authority (LLFA).

10.5 Flood Zone

For planning purposes, the site is located in Flood Zone 3 as defined by the EA and LLFA.

10.6 Site and Surrounding Land Uses

10.6.1 Site Current Land Use

The site is currently used as a veterinary surgery.

10.6.2 Surrounding Land Uses

The current land uses surrounding the boundaries of the site are mainly commercial and residential.

10.7 Hydrology

The nearest waterbodies are the Old and the New Rivers which are drains located approximately 550m to the North East and 710m to the West respectively.

10.8 Geology

Data from the British Geological Survey indicates that the underlying superficial geology is characterised as Tidal Flat Deposits. The underlying bedrock geology is characterized as West Walton Formation.

10.9 Hydrogeology

The site lies upon unproductive superficial and bedrock aquifers.

[Appendix 3](#) provides BGS mapping showing the hydrogeology at the site location.

10.10 Topography

A LIDAR map showing the topology of the site and surrounding area is not available at the site location and a topographic survey has not been conducted.

The approximate elevation of the site is 4mAOD as calculated with OS Maps and Elevation Finder Tool.

11 The Sequential and Exception Tests

11.1 The Sequential Test

The Sequential Test aims to steer developments and redevelopments to areas of lower flood risk. The test compares the proposed development site with other available sites, in terms of flood risk, to aid the steering process. The Sequential Test is not required if the proposed development is a minor development or if it involves a change of use unless the development is a caravan, camping chalet, mobile home or park home site.

Minor development means:

-  minor non-residential extensions: industrial/commercial/leisure etc extensions with a footprint less than 250 square metre.
-  alterations: development that does not increase the size of buildings eg alterations to external appearance.
-  householder development: For example; sheds, garages, games rooms etc within the curtilage of the existing dwelling, in addition to physical extensions to the existing dwelling itself. This definition excludes any proposed

development that would create a separate dwelling within the curtilage of the existing dwelling eg subdivision of houses into flats.

The development is not considered to be minor and as such the Sequential Test may be required by the LLFA.

11.2 The Exception Test

If alternative sites of lower flood risk are not available then the proposed development may require an Exception Test to be granted planning permission. Where the exception test is required, it should be applied as soon as possible to all local development document allocations for developments and all planning applications other than for minor developments. All three elements of the exception test have to be passed before development is allocated or permitted. For the exception test to be passed:

-  It must demonstrate that the development provides wider sustainability benefits to the community that outweigh the flood risk, informed by an SFRA, where one has been prepared;
-  The development should be on developed land or on previously developed land;
-  A flood risk assessment must demonstrate that the development will be safe without increasing flood risk elsewhere, and where possible will reduce the overall flood risk.

The requirements for an Exception Test are given in Table 2 and are defined in terms of Flood Zone and development vulnerability classification.

Table 1: NPPF flood zone vulnerability compatibility (source: NPPF).

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible

Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a	Exception Test required	X	Exception Test required	✓	✓
Zone 3b	Exception Test required	X	X	X	✓

Key:

✓ Development is appropriate

X Development should not be permitted.

Based on its scale and nature, the development is considered to be “more vulnerable”. As such the Exception Test may be required by the LLFA.

12 Site Specific Flood Risk Analysis

The PFRA and Level 1 SFRA produced by the LLFA and maps from the EA provide information regarding historic flooding events and incidents as well as predictions of flood extents and depths during extreme rainfall events.

12.1 Fluvial (River) and Tidal (Sea) Flood Risk

12.1.1 Mechanisms for Fluvial Flooding

Fluvial, or river flooding, occurs when excessive rainfall over an extended period of time or heavy snow melt causes a river to exceed its capacity. The damage from a fluvial flood can be widespread as the overflow may affect downstream tributaries, overtopping defences and flooding nearby inhabited areas. Fluvial flooding consists of two main types:

 Overbank flooding – this occurs when water rises steadily and overflows over the edges of a river or stream;

- Flash flooding – this is characterized by an intense, high velocity torrent of water that occurs in an existing river channel with little to no notice. Flash floods are very dangerous and destructive not only because of the force of the water, but also the hurtling debris that is often swept up in the flow.

12.1.2 Definition of EA Modelled Fluvial Flood Risk Zones

Fluvial flood risk is assessed using flooding maps produced by the Environment Agency. These maps use available historic data and hydraulic modelling to define zones of flood risk. The maps allow a site to be defined in terms of its flood zone (e.g. 1, 2, 3) and in terms of the overall flood risk (very low, low, medium or high). It is important to note that existing flood defences are not taken into account within the models or the maps. The EA fluvial flood zones are defined as follows:

- Flood zone 1: Less than 1 in 1000 (0.1%) annual probability of flooding;
- Flood zone 2: Between 1 in 100 (1%) and 1 in 1000 (0.1%) annual probability of flooding;
- Flood zone 3: Greater than 1 in 100 (1%) annual probability of fluvial flooding.

Flood zone 3 is split into two sub-categories (3a and 3b) by LLFAs depending on whether the land is considered to be a functional flood plain (i.e. an important storage area for flood waters in extreme events).

- Flood zone 3a: Greater than 1 in 100 (1%) annual probability of fluvial flooding and/or greater than 1 in 200 (0.5%) annual probability of tidal flooding;
- Flood zone 3b: Functional flood plain (definition specific to the LLFA). Less than a 1 in 20 (5%) annual probability of fluvial and/or tidal flooding.

12.1.3 Mechanisms for Tidal Flooding

Tidal flooding may be described simply as the inundation of low lying coastal areas by the sea, or the overtopping or breaching of sea defences. Tidal flooding may be

caused by seasonal high tides, storm surges and where increase in water level above the astronomical tide level is created by strong on shore winds or by storm driven wave action.

12.1.4 Definition of EA Tidal Flood Risk Zones

As with fluvial flood risk, tidal flood risk is assessed using flooding maps produced by the Environment Agency. The difference is in the probability return periods used to define tidal flood zones. The EA tidal flood zones are defined as:

-  Flood zone 1: Less than 1 in 1000 (0.1%) annual probability of flooding;
-  Flood zone 2: Between 1 in 200 (0.5%) and 1 in 1000 (0.1%) annual probability of tidal flooding;
-  Flood zone 3: Greater 1 in 200 (0.5%) annual probability of tidal flooding.

12.1.5 Main Potential Sources of Local Fluvial/Tidal Flooding

The nearest potential source of flooding to the site is considered to be the sea.

12.1.6 Records of Historic Fluvial/Tidal Flooding Incidents

The EA informed that they do not have any information on recorded flood incidents in the vicinity of the site.

12.1.7 Designated Fluvial/Tidal Flood Risk Zone for the Site

The site is considered to be located within flood zone 3 as defined by the Environment Agency and the LLFA indicating that it has greater than 1 in 100 annual probability of fluvial flooding and/or greater than 1 in 200 annual probability of tidal flooding.

12.1.8 Flood Defences

The tidal defences protecting this site consist of earth embankments. They are in fair condition and reduce the risk of flooding (at the defence) to a 0.67% (1 in 150) chance of occurring in any year.

12.1.9 Climate Change - EA Modelled Predictions of Fluvial and Tidal Flood Levels and Extents

The EA Product 4 dataset which is presented in [Appendix 10](#) provides maps with the maximum values of flood depth, velocity and hazard rating (danger to people) resulting from breaching of the defences at specific locations for the 1 in 200 and 1 in 1000-year 2115 scenarios. The site is not affected by breaching of the defences for the present day (2006) scenarios nor during the 2115 scenarios.

As well the flood hazard and depths maps provided by the South East Lincolnshire SFRA show that the site will remain dry during the 1 in 200-year 2115 scenario, with shallow flood depths up to 0.25m just north of the site.

12.1.10 Long Term Fluvial Flood Risk Considering Flood Defences

The EA's [long term flood risk maps](#) give an indication of the actual risk associated with flooding after taking into account the effect of any flood defences in the area. Copies of maps for the site which are available in [Appendix 8](#) indicate that the long-term risk from fluvial flooding to the site is low.

12.2 Pluvial (Surface Water) Flood Risk

A pluvial, or surface water flood, is caused when heavy rainfall creates a flood event independent of an overflowing water body. Surface water flooding occurs when high intensity rainfall leads to run-off which flows over the ground surface, causing ponding in low-lying areas when the precipitation rate or overland flow rate is greater than the rate of infiltration, or return into watercourses. Surface water flooding can be exacerbated when the underlying soil and geology is saturated (as a result of prolonged precipitation or a high-water table) or when the drainage network has insufficient capacity.

12.2.1 Mechanisms of Pluvial Flooding

The chief mechanisms for surface water flooding can be divided into the following categories:

-  Runoff from higher topography;
-  Localised surface water runoff – as a result of localised ponding of surface water;
-  Sewer Flooding – areas where extensive and deep surface water flooding is likely to be influenced by sewer flooding. Where the sewer network has reached capacity, and surcharged, this will exacerbate the flood risk in these areas;
-  Low Lying Areas – areas such as underpasses, subways and lowered roads beneath railway lines are more susceptible to surface water flooding;
-  Railway Cuttings – railway infrastructure cut into the natural geological formations can cause extra surface run off and pooling disrupting service and potentially affecting adjacent structures;
-  Railway Embankments – discrete surface water flooding locations along the up-stream side of the raised network rail embankments where water flows are interrupted and ponding can occur;
-  Failure of artificial sources (i.e. man-made structures) such as such as canals and reservoirs.

12.2.2 Main Potential Sources of Local Pluvial Flooding

The site is unlikely to be impacted by pluvial flooding.

12.2.3 Records of Historic Pluvial Flooding Incidents

Examination of the LLFA's Level 1 SFRA revealed no evidence of records of pluvial flooding on or in the vicinity of the site.

12.2.4 Surface Water Flood Risk from Artificial Sources (Reservoirs and Canals)

An examination of OS mapping and the EA's mapping revealed no indications of significant reservoirs or canals in the area of the site.

The EA's reservoir flood risk map indicates that the site does not lie within an area that is at risk of reservoir flooding.

12.2.5 Sewer Flooding

A map showing recorded incidents of sewer flooding is not available.

12.2.6 Climate Change - Modelled Predictions of Surface Water Run-off Flooding

Mapping of the predicted extent and depth of surface water flooding for the 1 in 100-year and 1 in 1000-year rainfall return periods provided by the EA are available in [Appendix 6](#).

The maps show that the site would remain dry during both precipitation events.

12.2.7 Long Term Surface Water Flood Risk

The EA's [long term flood risk maps](#) which are available in [Appendix 8](#) indicate that the long term risk of flooding from surface water is also considered to be very low.

12.3 Risk of Flooding from Multiple Sources (ROFMS)

The Environment Agency provides a map which gives an indication the overall flood risk from fluvial, tidal and surface water sources considering the presence of river defences. This map indicates that there is between 0.1% and 1% chance of flooding at the majority of the site in any year, with the north west corner having up to 3.3% chance of flooding. A copy of the map is presented in [Appendix 8](#).

12.4 Groundwater Flood Risk

Groundwater flooding occurs when water rises from the underlying aquifer at the location of a spring – where the underlying impermeable geology meets the ground surface. This tends to occur after much longer periods of intense precipitation, in often low-lying areas where the water table is likely to be at a shallow depth. Groundwater flooding is known to occur in areas underlain by principal aquifers, although increasingly it is also being associated with more localised floodplain sands and gravels. A high groundwater table also has the potential to exacerbate the risk of

surface water and fluvial flooding by reducing rainfall infiltration capacity, and to increase the risk of sewer flooding through sewer/groundwater interactions.

12.4.1 Historic Records of Groundwater Flooding

A map showing the locations of historic groundwater flooding incidents is not available.

12.4.2 Susceptibility to Groundwater Flooding

The Groundwater Flood Susceptibility Map provided by BGS, which is available in [Appendix 9](#) indicates that the potential for groundwater flooding to occur at the surface does not exist. The Groundwater Depth map also provided by BGS indicates that the groundwater level may be at less than 3mbgl.

12.5 Critical Drainage Area

A Critical Drainage Area (CDA) may be defined as “a discrete geographic area (usually a hydrological catchment) where multiple and interlinked sources of flood risk (surface water, groundwater, sewer, main river and/or tidal) cause flooding in one or more Local Flood Risk Zones during severe weather thereby affecting people, property or local infrastructure”. A CDA is defined in the Town and Country Planning (General Development Procedure) (Amendment) (No. 2) (England) Order 2006 as “an area within Flood Zone 1 which has critical drainage problems and which has been notified... [to]...the local planning authority by the Environment Agency”.

The LLFA's SFRA does not provide information on CDAs within the Council.

13 Potential Impacts of the Development on Local Flood Risk

13.1 Impacts on Flood Storage

13.1.1 Changes to Impermeable Area and Building Footprint

As the proposal is for a change of use, it will not affect the site impermeable area. As such, the development will not impact upon surface water runoff rates nor will decrease the local flood plain storage capacity.

13.2 Impacts on Flood Flow Routes

As the development does not involve the significant redesign of buildings at the site, it will not alter flood flow paths.

14 Flood Risk Mitigation Measures

14.1 SuDS

Planning practice guidance (PPG) which is prepared by the Ministry of Housing, Communities and Local Government (DCLG) states that developers and Local Authorities should seek opportunities to reduce the overall level of flood risk in the area through the layout and form of the development, and the appropriate application of sustainable drainage techniques.

As such, the developer should implement a SuDS strategy in line with the drainage hierarchy as outlined in Table 2 below to reduce surface water discharges from the site.

Table 2: SuDs Options

	Store rainwater for later use;
	Use infiltration techniques, such as porous surfaces in non-clay areas;
	Attenuate rainwater in ponds or open water features for gradual release;

- Attenuate rainwater by storing in tanks or sealed water features for gradual release;
- Discharge directly to a water course;
- Discharge rainwater directly to a surface water sewer/drain;
- Discharge to a combined sewer.

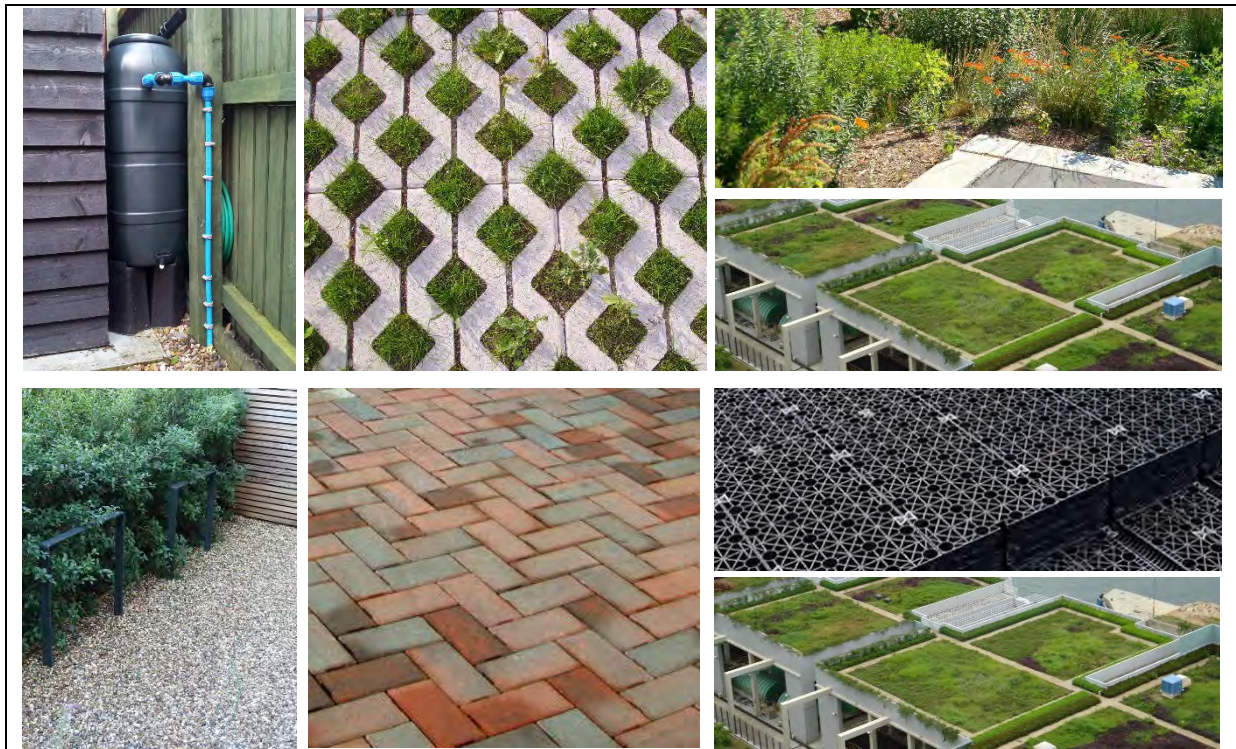


Figure 1: Surface water storage facilities and potential SuDS features - rainwater harvesting, on-site tank storage, rain garden soak-away and green roofs. (Source: UK SuDS Manual)

Given the nature of the development and the size of the site, it is considered that there are limited opportunities for implementing SuDS. Measures such as green roofs, rainwater harvesting, infiltration (soakaways, permeable paving, rain gardens) or attenuation storage tanks should be considered. If required, the SuDS strategy will be detailed in a separate report as is outside the scope of works of this FRA.

14.2 Flood Resilience

Flood resilient construction uses methods and materials that reduce the impact from a flood, ensuring that structural integrity is maintained, and the drying out and cleaning required, following inundation and before reoccupation, is minimised.

14.2.1 Finished Floor Levels

For vulnerable developments, EA Standing Advice states that finished floor level of the lowest habitable room in any building Ground floor levels should be a minimum of 300millimetres (mm) above the general ground level of the site or 600mm above the estimated river or sea flood level whichever is higher.

As the site will remain dry during all modelled scenarios, it is reasonable to set finished floor levels 300mm above general ground levels.

14.2.2 Flood displacement storage

All new development within Flood Zone 3 must not result in a net loss of flood storage capacity. Where possible, opportunities should be sought to achieve an increase in the provision of floodplain storage.

Where proposed development results in a change in building footprint, the developer must ensure that it does not impact upon the ability of the floodplain to store water, and should seek opportunities to provide a betterment with respect to floodplain storage.

As the proposal will not change the site's built up area, flood displacement storage is not considered to be required.

14.2.3 Flood Resilience Measures

In terms of achieving resilience, there are two main strategies, whose applicability is dependent on the water depth the property is subjected to. These are:

-  Water exclusion strategy - where emphasis is placed on minimising water entry whilst maintaining structural integrity, and on using materials and construction techniques to facilitate drying and cleaning. This strategy is favoured when low flood water depths are involved (not more than 0.3m);
-  Water entry strategy - buildings are at significant risk of structural damage if there is a water level difference between outside and inside of about 0.6m or

more. This strategy is therefore favoured when high flood water depths are involved (greater than 0.6m).

Given that flood depths less than 0.3m are predicted in extreme scenarios, the water exclusion strategy is considered most applicable for this site.

Flood resilience design and measures that will be implemented are outlined below. Water-resistant and resilient materials will be utilized through the construction to minimize the flood risk and potential impacts.

Floor construction:

-  Use of a concrete slab 150mm thick;
-  Use of ceramic tiles or stone floor finishes is recommended;
-  Maintain existing under floor ventilation by UPVC telescopic vents above 400 mm to external face of extension.

Wall construction:

-  Include in the external face of the extension a damp – proof course, 250 mm above ground level, to prevent damp rising through the wall;
-  Use rigid closed – cell material for insulation above the DPC;
-  Spread hardcore over the site within the external walls of the building to such thickness as required to raise the finished surface of the site concrete. The hardcore should be spread until it is roughly level and rammed until it forms a compact bed for the oversite concrete. This hardcore bed will be 100 mm thick and composed by well compacted inert material, blinded with fine inert material.

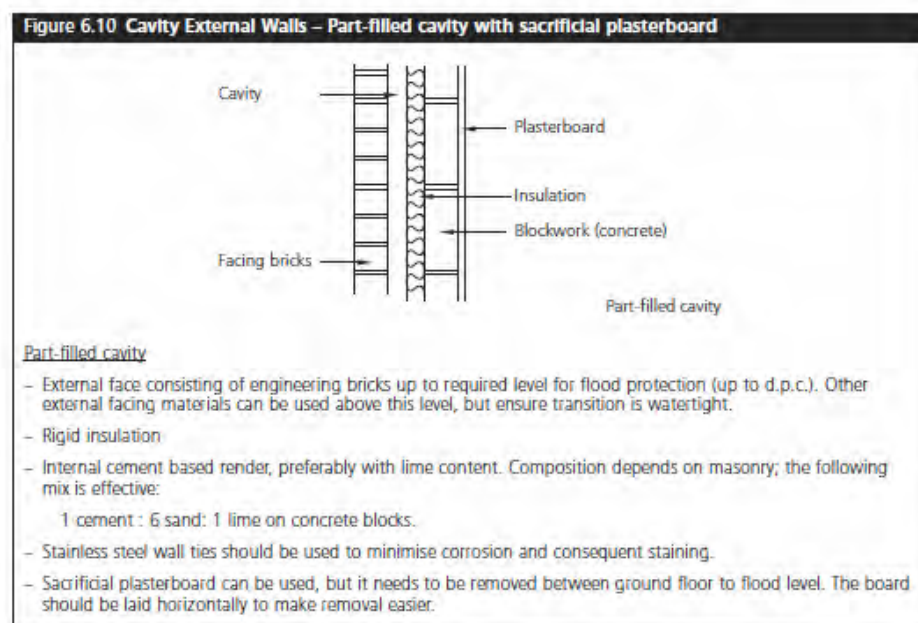
Doors:

-  Seal doors around edges and openings. UPVC or composite material will be used with passive protection meaning that minimal intervention will be required in the event of flooding.

Underground drainage:

-  Avoid use of metal for any underground piping;
-  Use closed cell insulation for pipes that are below the predicted flood level;
-  Provide non – return valves for the drainage system to prevent back water flow;
-  Use UPVC or clay pipework for foul and surface water drainage.

Improving the flood performance of new buildings



As well as the above the following flood resilience features should be applied as part of the development:

-  Electrical sockets should be installed above flood level for the ground floor;
-  Utility services such as fuse boxes, meters, main cables, gas pipes, phone lines and sockets will be positioned as high as practicable;
-  All external openings for pipes or vents below 400mm to be sealed around pipe or vent with expanding foam and mastic.

14.3 Emergency Plan

The dangers associated with flood water to people are possible injury and/or death. This can occur as a result of drowning or being carried along by the waters into hard objects or vice versa.

The risk to life is largely a function of the depth and velocity of the floodwater as it crosses the floodplain. Fast flowing deep water that contains debris would represent the greatest hazard.

The assessment of danger to people from walking in floodwater is described in the Flood Risks to People guidance documents (FD2321_TR1 and FD2321_TR2) by DEFRA/EA. Danger can be estimated by the simple formula:

$$HR = d \times (v + 0.5) + DF$$

where, HR = (flood) hazard rating; d = depth of flooding (m); v = velocity of floodwaters (m/sec); and DF = debris factor.

The scoring methodology and calculation matrix for this is summarised in [Appendix 12](#).

The EA Product 4 data indicates that the site will remain dry during all modelled scenarios. As such, the flood hazard is classified as low.

The use of a flood emergency plan is therefore sufficient for the proposed development. The key elements of the emergency plan are described below.

14.3.1 EA Flood Warnings Direct Service Subscription

The occupants will subscribe to the EA Flood Warnings Direct Service which is a free service offered by the EA providing flood warnings direct to people by telephone, mobile, email, SMS text message and fax. The EA aims to provide 2 hours' notice of flood, day or night, allowing timely evacuation of the site.

The agency operates a 24-hour telephone service on 0345 988 1188 that provides frequently updated flood warnings and associated floodplain information. In addition, this information can also be found at <https://fwd.environment-agency.gov.uk/app/olr/home> along with recommendations on what steps should be taken to prepare for floods, what to do when warnings are issued, and how best to cope with the aftermath of floods.

14.3.2 Access and Safe Egress

Safe egress to Flood Zone 1 is available by a 1-min walk on Boston Road to the south of the site. Directions of this route are presented in [Appendix 11](#). This area however represents a dry-island.

Lincolnshire County Council has prepared an evacuation plan for East Coast Flooding which includes signed evacuation routes. The plan is not available online at the time of writing.

14.3.3 Safe Refuge

The ground floor flats will not have internal connections to upper floors in the property.

15 Conclusions and Recommendations

This assessment has considered the potential risks to the application site associated with flooding from fluvial, tidal, surface water, artificial and groundwater sources and the potential impacts of climate change.

A review of LLFA's PFRA and SFRA as well as data provided by the EA was undertaken. The main findings of the review and assessment are provided below:

 The site is classified as a more vulnerable minor development and therefore may require sequential and exception tests to be undertaken;
--

-  The main source of potential flooding to the site is the sea;
-  The EA define the site as being within flood zone 3; however, it will remain dry during all modelled scenarios;
-  EA mapping indicates that the site is in an area that benefits from flood defences;
-  No records of fluvial, tidal, surface water or artificial flooding incidents were identified at or in the vicinity of the site;
-  The development will not result in a significant change in the impermeable area of the site and therefore is unlikely to increase local flood risk;
-  There is limited opportunity for implementing SuDS mitigation measures. Consideration should be given to use of rainwater harvesting and permeable paving where possible;
-  Flood resilient materials and construction methods will be used so as to ensure that the impacts of any potential flooding are minimised as much as possible;
-  Occupants will subscribe to the EA Flood Warnings Direct Service;
-  Safe egress route to flood zone 1 is easily accessible;
-  In the event that evacuation is not possible, safe refuge is not available in the upper floors of the building for the ground floor flats.

Based on the information reviewed and taking into account the proposed mitigation measures, it is considered that overall flood risk to the proposed development is low and the proposal is unlikely to have a significant impact on local flood risk.

16 References

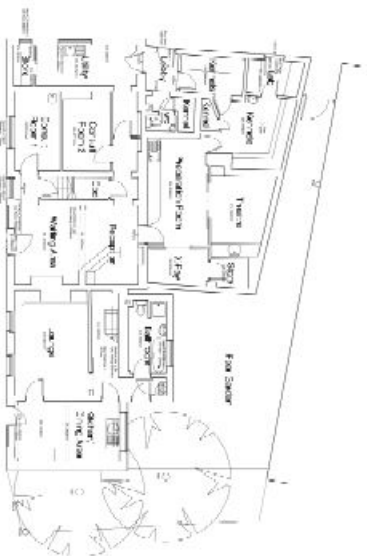
1. Communities and Local Government - National Planning Policy Framework NPPF, March 2012.
2. Communities and Local Government - Planning Practice Guidance: Flood Risk and Coastal Change, Updated 06 March 2014.
3. Strategic Flood Risk Assessment – South East Lincolnshire 2016 & 2017.
4. Local Plan, South East Lincolnshire, 2019.
5. CIRIA, Defra, Environment Agency – UK SuDS Manual, 2015.
6. Google Maps accessed April 20.

17 Appendices

17.1 Appendix 1 – Site Photographs



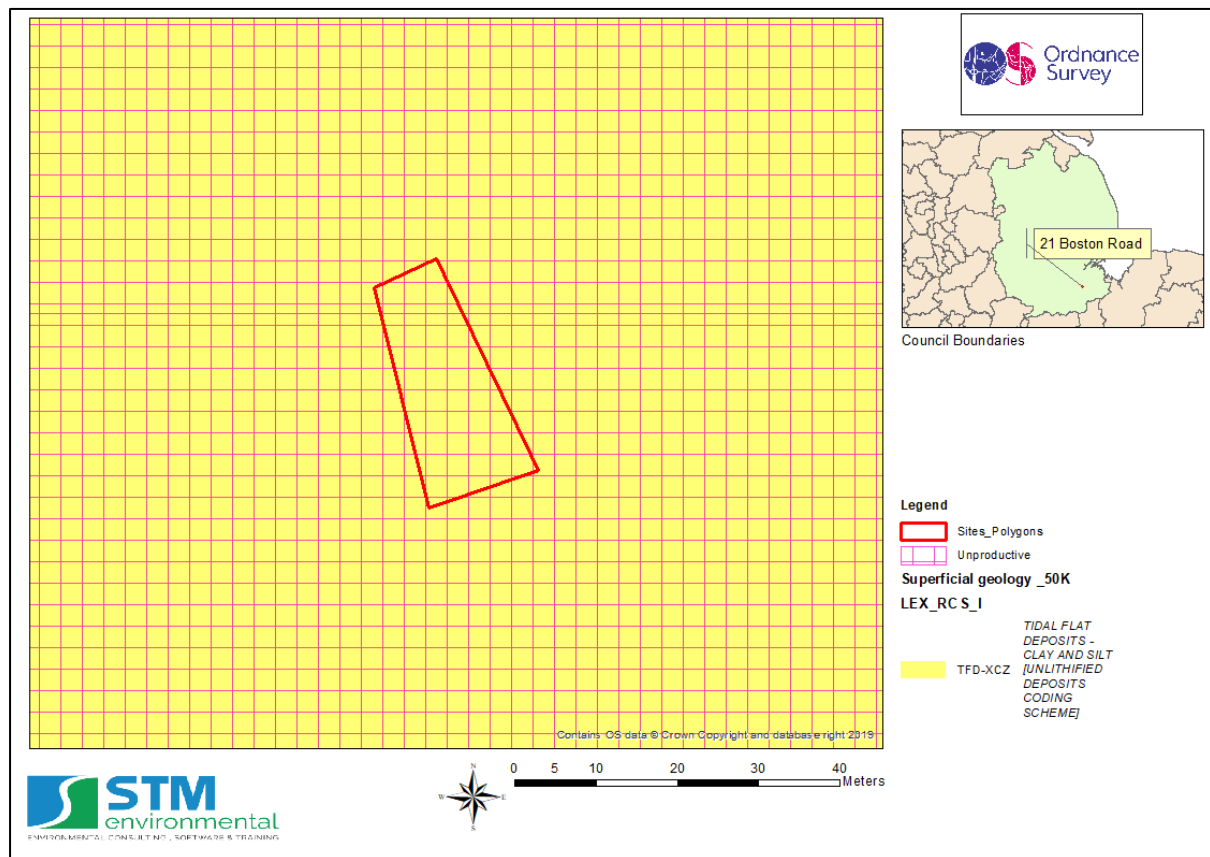
17.2 Appendix 2 – Development Plans



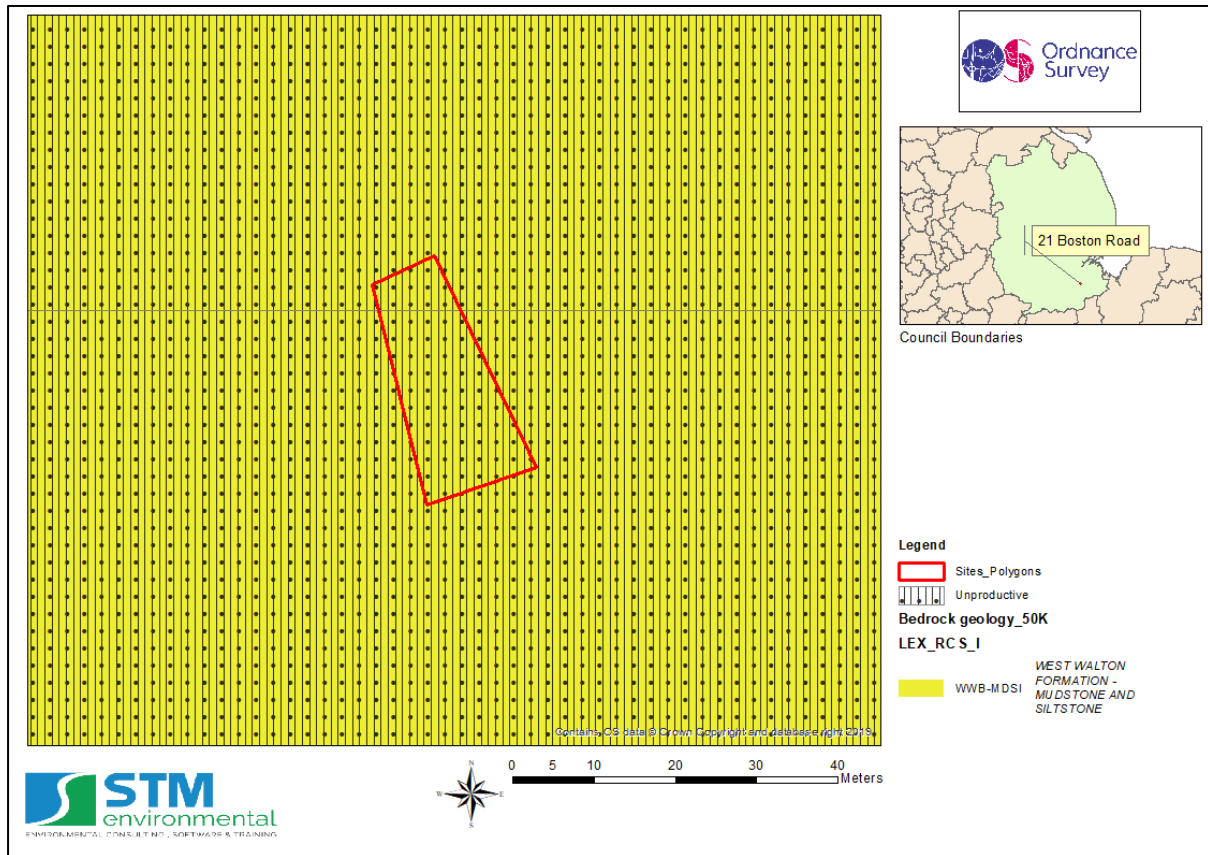
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17.3 Appendix 3 – Environmental Characteristics

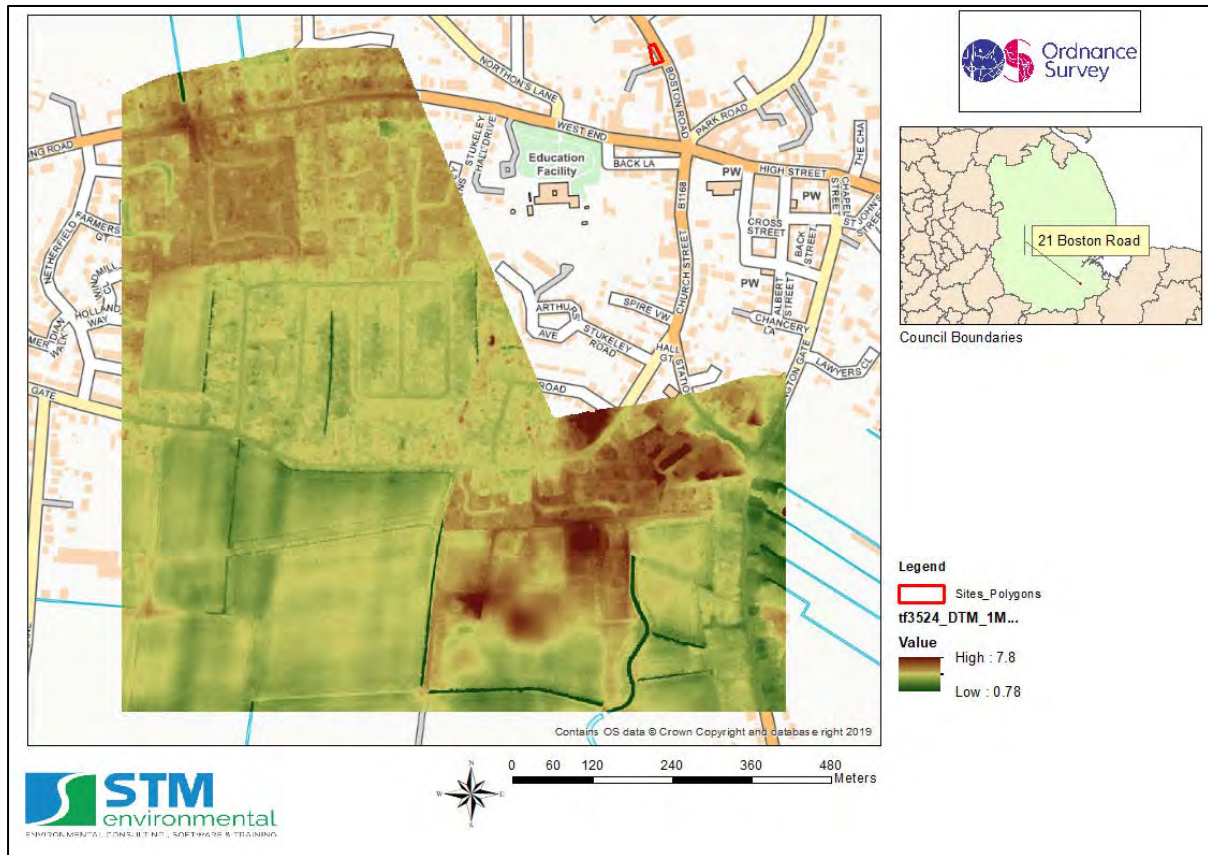
17.3.1 Superficial Hydrogeology Map



17.3.2 Bedrock Hydrogeology Map



17.3.3 Topology Map

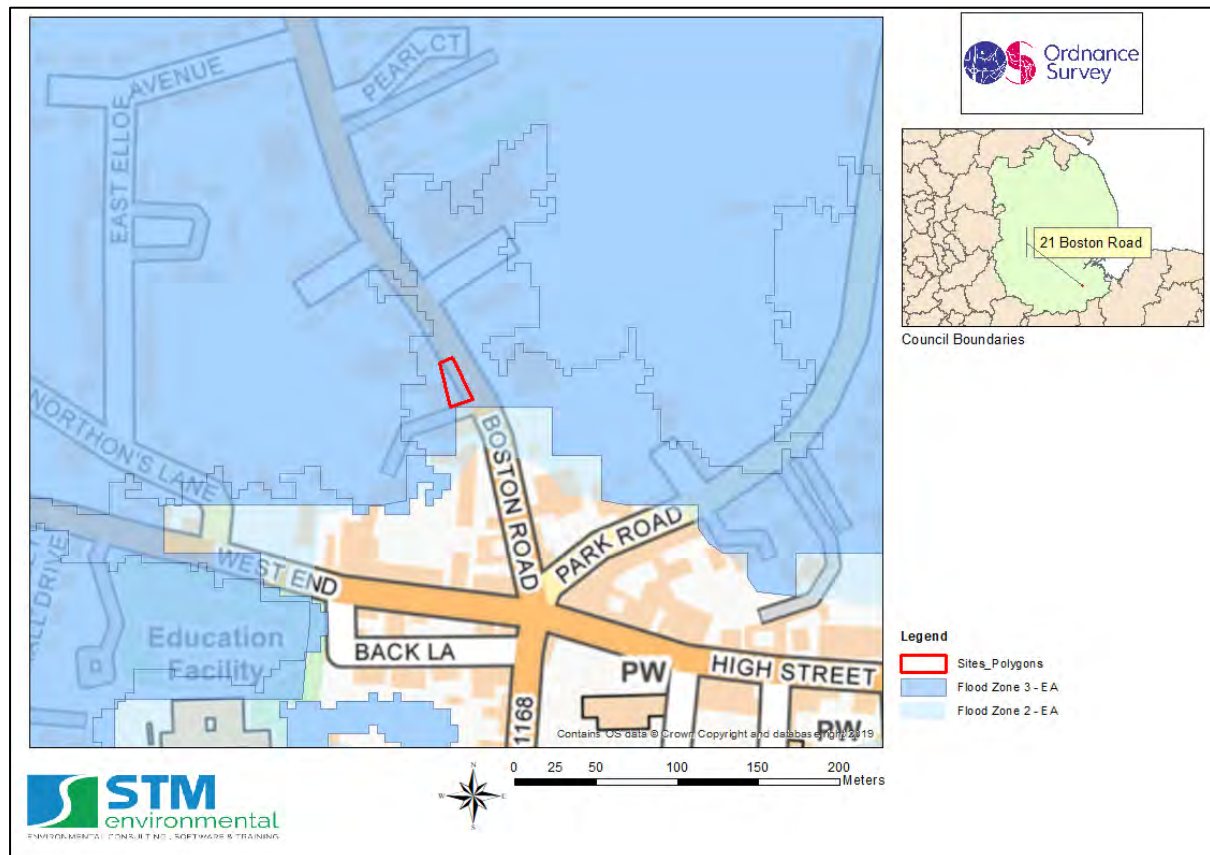


17.4 Appendix 4 – Historical Flood Incident Maps

17.4.1 EA Historic Flood Outlines

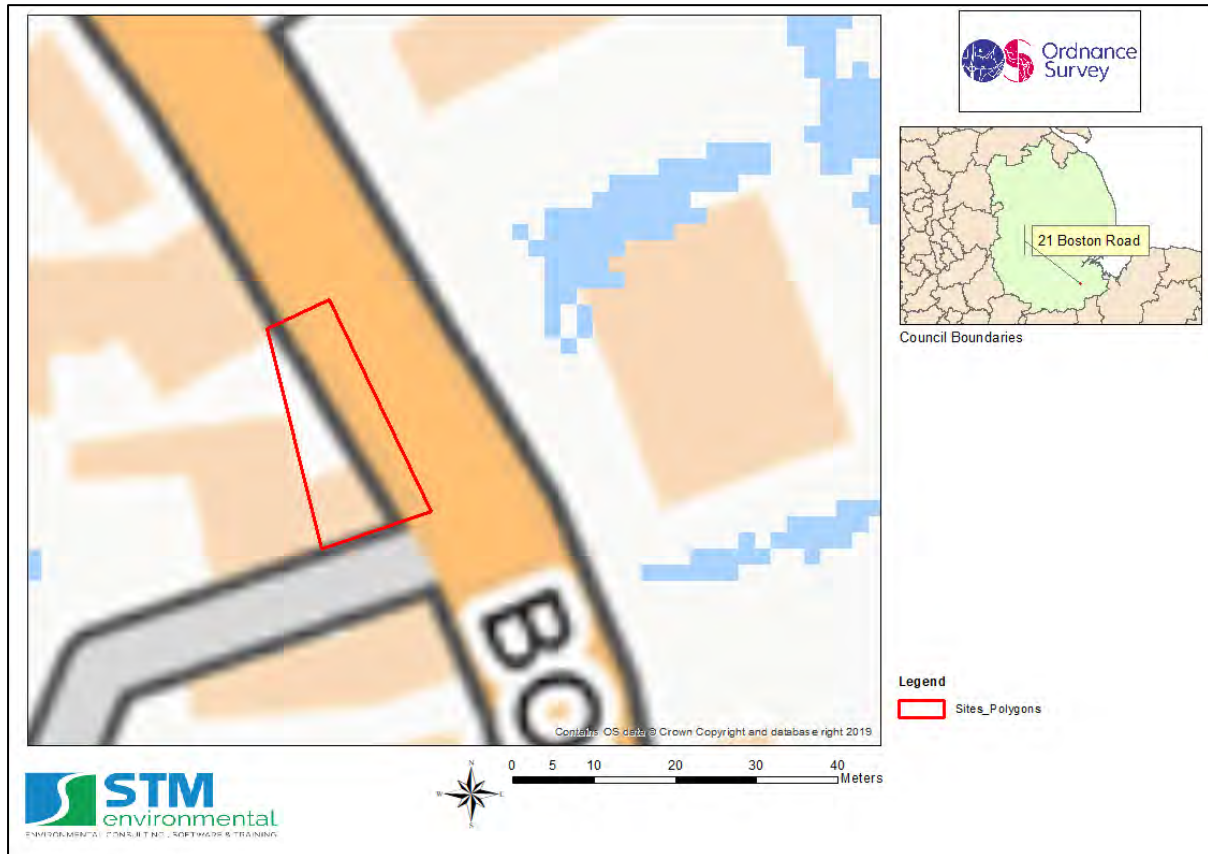
None

17.5 Appendix 5 - EA Flood Zone Map

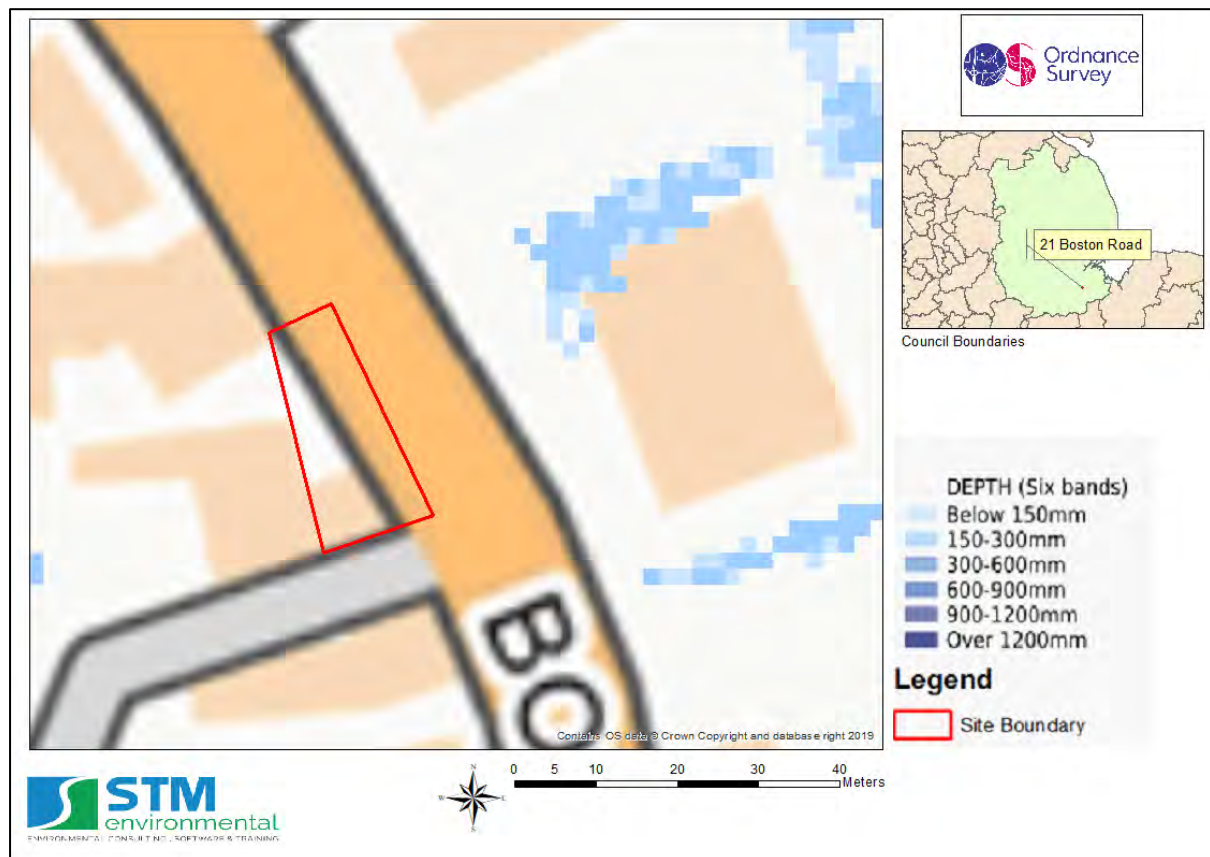


17.6 Appendix 6 – Surface Water Flood Extent and Depth Maps

17.6.1 Map showing surface water flood extent for the 1 in 1000-year rainfall return period (Source: EA, 2016).



17.6.2 Predicted surface water flood depth for the 1 in 1000-year return period
(Source: EA, 2016).

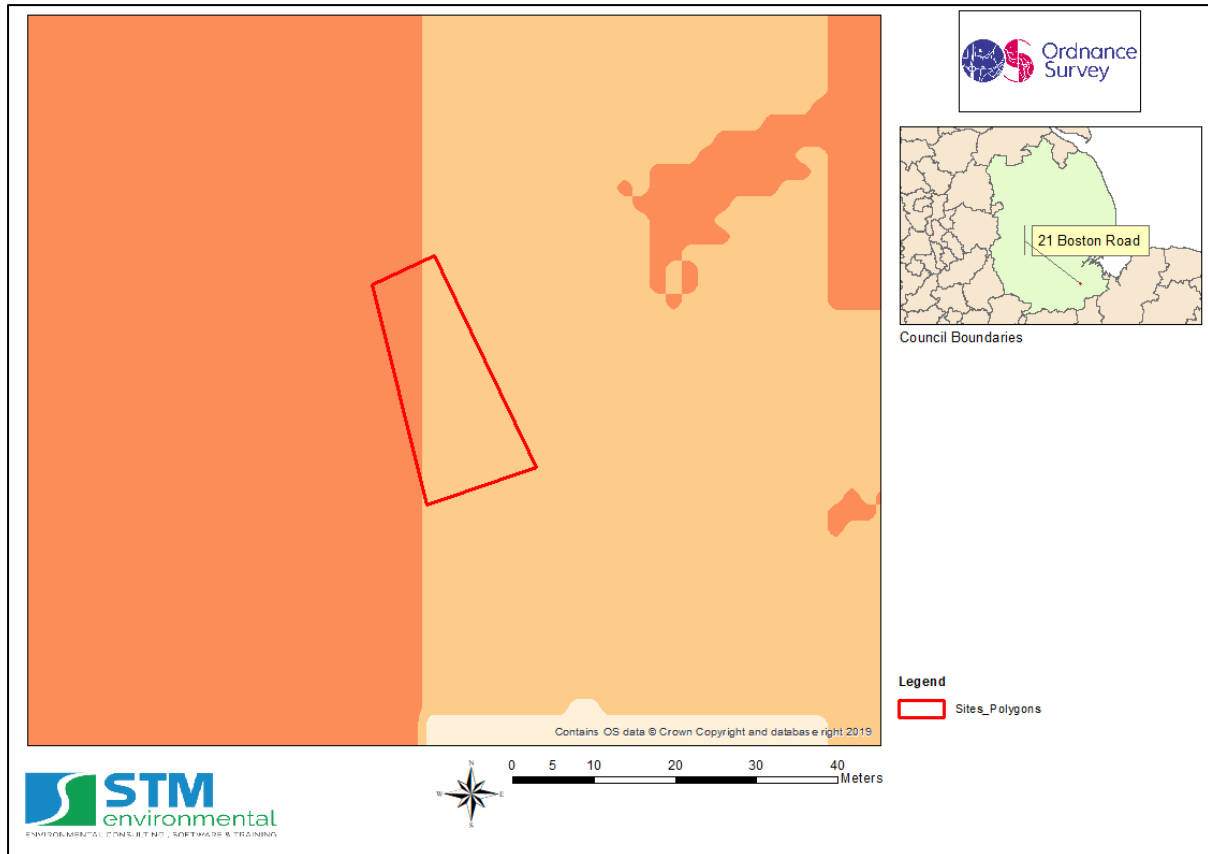


17.7 Appendix 7 –Flood Defence and Reservoir Flood Risk Maps

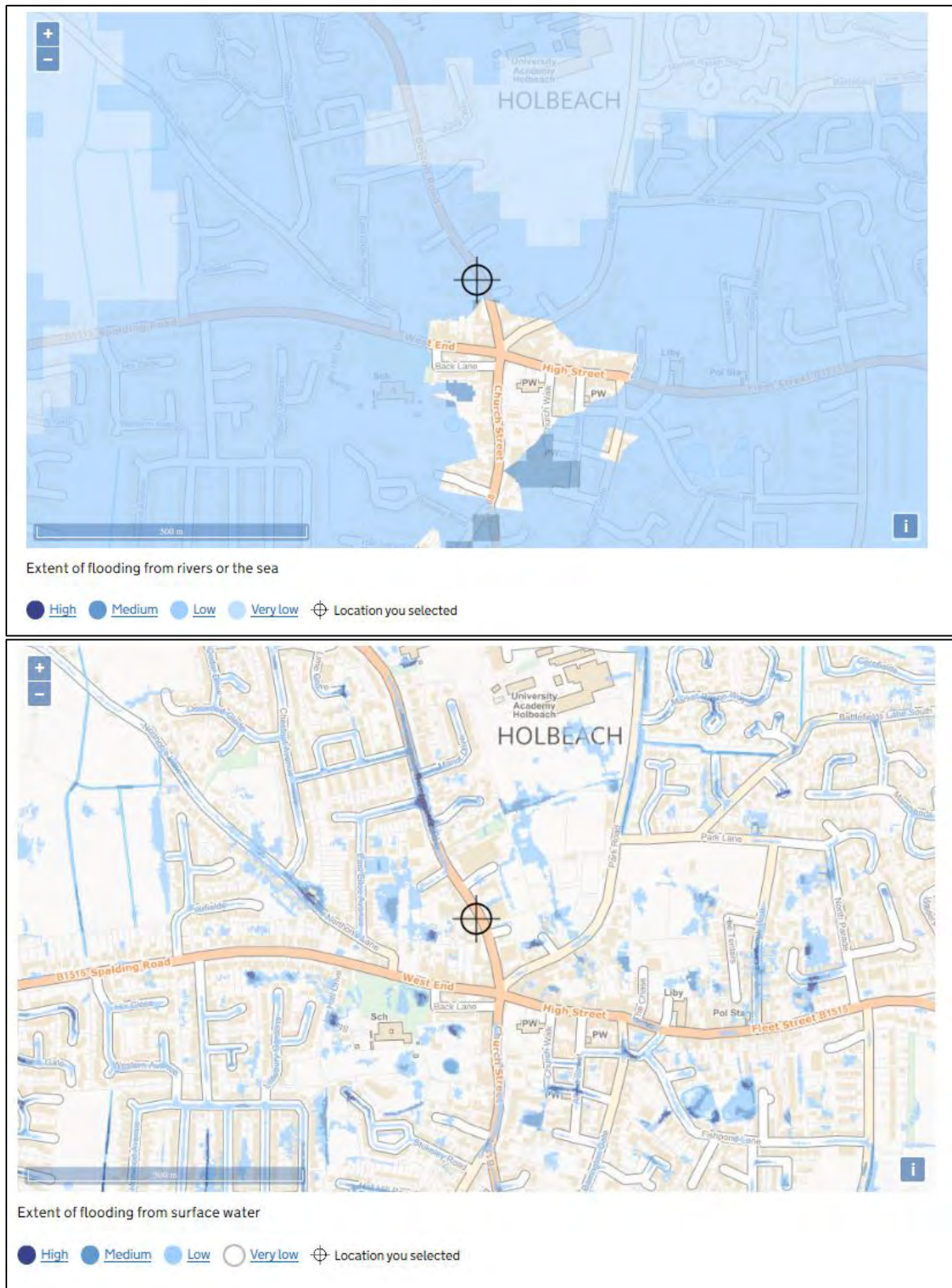
N.A.

17.8 Appendix 8 – Flood Risk Maps

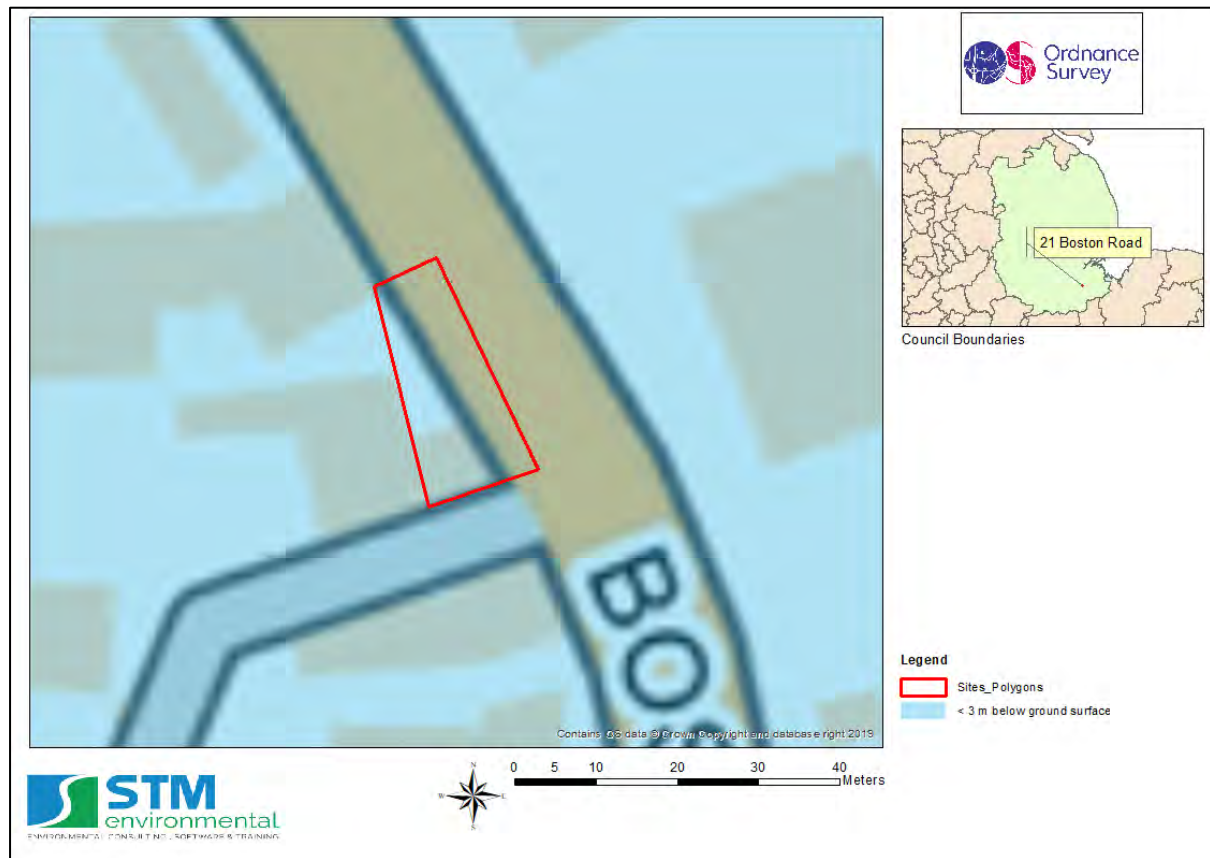
17.8.1 Risk of Flooding from Multiple Sources Map



17.8.2 Long Term Flood Risk Maps



17.9 Appendix 9 – Groundwater Flood Susceptibility Map



17.10 Appendix 10 - EA Product 4 (Detailed Flood Risk) Data

Francesca Caggiano
info@stmenvironmental.co.uk

Our ref: CCN/2020/167148

Date: 2 April 2020

Dear Francesca

Provision of Flood Risk Information for Boston Road Holbeach

Thank you for your request to use our flood risk information in the development of the Flood Risk Assessment (FRA) for the above site. The information is set out below and attached. It is important you read any contextual notes on the maps provided.

We aim to review our information on a regular basis, so if you are using this data more than twelve months from the date of this letter, please contact us again to check it is still valid.

Flood Map

The attached map includes the current Flood Map for your area. The Flood Map indicates the area at risk of flooding, **assuming no flood defences exist**, for a flood with a 0.5% chance of occurring in any year for flooding from the sea, or a 1% chance of occurring for fluvial (river) flooding. It also shows the extent of the Extreme Flood Outline which represents the extent of a flood with a 0.1% chance of occurring in any year, or the highest recorded historic extent if greater.

In some locations, such as around the fens and the large coastal floodplains, showing the area at risk of flooding assuming no defences may give a slightly misleading picture in that if there were no flood defences, water would spread out across these large floodplains. This flooding could cover large areas of land but to relatively shallow depths and could leave pockets of locally slightly higher land as isolated dry islands. It is important to understand the actual risk of the flooding to these dry islands, particularly in the event of defence failure.

The Flood Map also shows the location of formal raised flood defences and flood storage reservoirs. It represents areas at risk of flooding for present day only and does not take account of climate change.

The Flood Map only indicates the extent and likelihood of flooding from rivers or the sea. It should also be remembered flooding may occur from other sources such as surface water sewers, road drainage, etc.

History of Flooding

With regards to the history of flooding I can advise we do not have any records of flooding in this area. It is possible other flooding may have occurred we do not have records for, and other organisations, such as the Local Authority or Internal Drainage Boards, may have records.

Tidal Flood Risk Information

Tidal Defence Information

The tidal defences protecting this site consist of earth embankments. They are in fair condition and reduce the risk of flooding (at the defence) to a 0.67% (1 in 150) chance of occurring in any year. We inspect these defences routinely to ensure potential defects are identified.

Tidal Flood Levels

The attached table shows our current best estimate for extreme tide levels.

Levels for the Humber Estuary have an assessment date of 2014, with others having an assessment date of 2006, which should be used in any consideration of future increases due to climate change.

Modelled Hazard Mapping

For certain locations we have carried out modelling to map the maximum values of flood depth, velocity and hazard rating (danger to people) resulting from overtopping and / or breaching of defences at specific locations for a number of scenarios.

At present this information is available along the full coastal / tidal floodplain, except the tidal Witham Haven in Boston (upstream of Hobhole) where only breaching and not overtopping has been modelled and the tidal River Welland upstream of Fosdyke Bridge where neither breaching nor overtopping are available. Hazard mapping is also available for fluvial flood risk in Northampton, Lincoln, Wainfleet and some isolated rural locations.

The number of locations we have this information for is expected to increase in time.

Hazard Mapping – Breaching

The attached maps show the maximum values of flood depth, velocity and hazard rating (danger to people) resulting from breaching of the defences at specific locations for the scenarios below. For some locations the breach mapping also includes flooding from overtopping if this is expected in that scenario. The location of modelled tidal breaches is shown on a separate attached map.

- Year 2115 0.5% (1 in 200) chance
- Year 2115 0.1% (1 in 1000) chance

Your site is not affected by breaching of the defences for the present day (2006) scenarios.

Detailed Hazard Mapping is available within the 2017 Update of South Holland Strategic Flood Risk Assessment. This can be downloaded via the following link:

<http://www.southeastlincslocalplan.org/south-east-lincolnshire-strategic-flood-risk-assessment-march-2017>

Development Planning

If you would like local guidance on preparing a flood risk assessment for a planning application, please contact our Sustainable Places team at lnplanning@environment-agency.gov.uk. It will help if you mention this data request and attach your site location plan.

We provide free preliminary advice; additional/detailed advice, review of draft FRAs and meetings are chargeable at a rate set to cover our costs, currently £100 (plus VAT) per hour of staff time. Further details are available on our website at <https://www.gov.uk/guidance/developers-get-environmental-advice-on-your-planning-proposals>.

General advice on flood risk assessment for planning applications can be found on GOV.UK at <https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications>

Climate change will increase flood risk due to overtopping of defences. Please note the climate change data included has an allowance for 20% increase in flow. Updated guidance on how climate change could affect flood risk to new development - 'Flood risk assessments: climate change allowances' was published on GOV.UK in February 2016. The appropriate updated climate change allowance should be applied in a Flood Risk Assessment.

You should also consult the Strategic Flood Risk Assessment produced by your local planning authority.

Supporting Information

Please see the Standard Notice or licence for details of permitted use. The Standard Notice can be found at the link below.

<http://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

We respond to requests for recorded information we hold under the Freedom of Information Act 2000 (FOIA) and the associated Environmental Information Regulations 2004 (EIR).

Further information on flood risk can be found on the GOV.UK website at:

<https://www.gov.uk/browse/environment-countryside/flooding-extreme-weather>

Other Flood Risk Management Authorities

The information provided with this letter relates to flood risk from main river or the sea. Additional information may be available from your Lead Local Flood Authority (i.e. county council or unitary authority) or, where they exist, the Internal Drainage Board.

Further Contact

I hope we have correctly interpreted your request. If you are not satisfied with our response to your request for information, you can contact us within two calendar months to ask for our decision to be reviewed.

If you have any queries or would like to discuss the content of this letter further please contact Sarah Curl using the details below.

Yours sincerely,

p.p. 

Alastair Windler

Partnerships and Strategic Overview Team Leader - Welland and Nene

Direct dial 020 302 53535

Direct e-mail PSOWN@environment-agency.gov.uk

Enc.
Flood Map
Estimated Tide Levels
Tidal Breach Locations Map
Hazard Mapping – Breaching (2 maps)

Flood Map centred on TF 35807 24992- created April 2020 [Ref: CCN-2020-167148]



Scale 1:10,000



Legend

- Main River
- Raised Defences
- Flood Storage Areas
- 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, Kettering

Lincolnshire & Northamptonshire Area



Tidal Water Levels for the South Humber, East Coast and The Wash

The table below shows still water levels for locations, from the above location map, around the South Humber Estuary, East Coast and The Wash. It is important to note the following:

- The base date for the data is 2014 for the South Humber and 2006 for the East Coast and The Wash.
- The data are still water levels. Depending on the use of the data it may be necessary to consider wave heights and / or joint probability analysis of water level and other variables.
- The water level quoted is the ‘Best Estimate’ water level. Depending on the use of the data it may be necessary to carry out sensitivity testing. Upper and Lower 95% confidence bandings are available upon request.
- Levels for other annual chance scenarios are available if required.

Ref	Location	Easting	Northing	Annual Chance (1 in x) of Tide Level					
				metres ODN					
				1	10	50	100	200	1000
HUMBER									
H030	Tetney	535420	403180	3.94	4.29	4.56	4.69	4.82	5.15
H050	Buck Beck	532700	406580	4.03	4.36	4.62	4.74	4.87	5.18
H060	Grimsby	527878	411346	4.10	4.43	4.70	4.82	4.95	5.27
H080	Haborough Marsh	520790	415740	4.26	4.61	4.88	5.01	5.14	5.47
H090	Immingham	519141	417449	4.26	4.61	4.88	5.01	5.14	5.47
H100	South Killingholme	518700	417120	4.41	4.77	5.05	5.18	5.32	5.66
H130	North Killingholme	516530	420000	4.51	4.87	5.15	5.28	5.42	5.77
H150	East Halton	514450	422870	4.59	4.96	5.25	5.39	5.53	5.89
H170	Goxhill	511970	425440	4.67	5.04	5.34	5.47	5.61	5.95
H200	New Holland	508020	424330	4.87	5.26	5.55	5.68	5.81	6.12
H210	Barrow Haven	506380	422620	4.92	5.31	5.60	5.73	5.86	6.17
H220	Ferriby	497550	421150	5.04	5.42	5.67	5.77	5.86	6.04
H230	Winterton	493420	422830	5.14	5.51	5.74	5.83	5.90	6.02
H250	Blacktoft	484247	424190	5.25	5.62	5.83	5.90	5.96	6.04
H270	Goole	474857	422960	5.46	5.85	6.07	6.15	6.21	6.29
East Coast									
~	Great Eau	545500	393800	3.80	4.19	4.46	4.57	4.69	4.96
~	Boygrift	553300	379800	3.84	4.24	4.53	4.65	4.77	5.05
~	Burgh Sluice	555190	358620	4.26	4.45	4.76	4.90	5.03	5.34
Wash									
~	Hobhole	536610	339940	4.82	5.30	5.64	5.78	5.93	6.27
~	Lawyers Sluice	540750	334550	4.84	5.32	5.66	5.80	5.95	6.29
~	West Lighthouse	549150	325750	4.88	5.37	5.71	5.86	6.01	6.35
~	Grand Sluice	532400	344500	4.88	5.33	5.65	5.78	5.93	~
~	Fosdyke Bridge	531700	332200	4.91	5.38	5.71	5.85	5.99	~
~	Marsh Road	526000	324000	5.04	5.44	5.73	5.85	5.98	~
~	Wisbech	546100	310000	4.83	5.25	5.53	5.66	5.78	~
~	Dog In Doublet	527300	299300	3.67	4.00	4.22	4.32	4.42	~



^ Modelled Breach Locations



This map indicates the location of where we have modelled the consequence of breaches along the coastline and tidal rivers. We have mapped the the maximum values of Hazard Rating (Danger to People), Depth and Velocity.

We have not assumed that all breaches occur at the same time, but have modelled each breach individually and overlaid the results to find the maximum values.

Our modelling only considers the consequences of a breach, it does not make any assumption about the likelihood of a breach occurring. Our defences generally provide a good standard of flood defence but a risk of breaching remains.

Please contact the Environment Agency for information on how these maps are used in the management of flood risk.

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



Produced by the Partnership and Strategic Overview Team, Lincoln
General Enquiries No: 03708 506 506

Northern Area Tidal Hazard Mapping

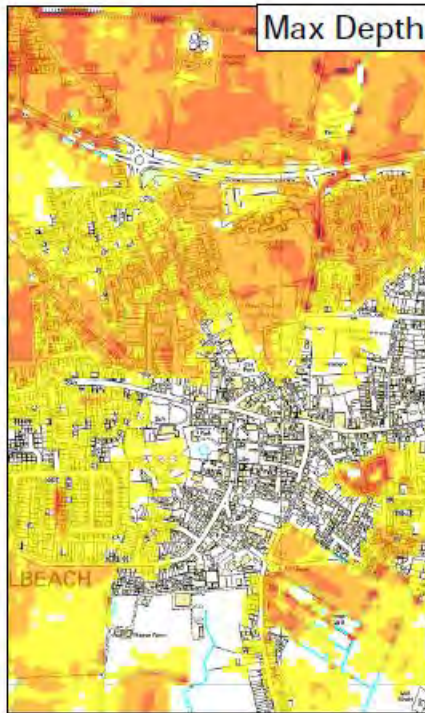
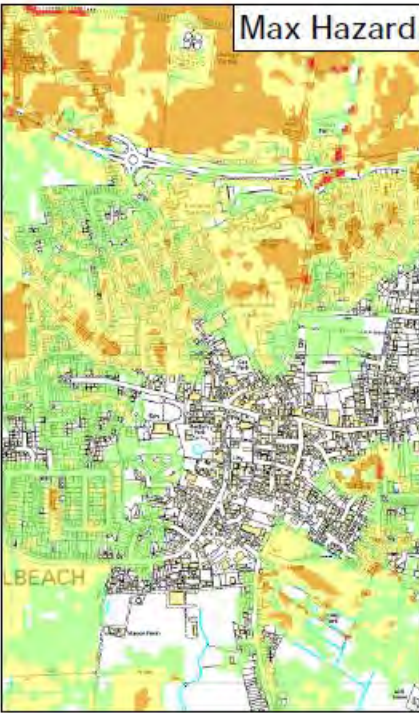
Location of Modelled Breaches

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Max Hazard

Max Depth

Max Velocity



★ Modelled Breach Locations

Max Hazard

(Flood Risk to People - F02330)



Max Depth (m)



Max Velocity (m/s)



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.



Lincolnshire and Northamptonshire
Tidal Breaching Hazard
Mapping

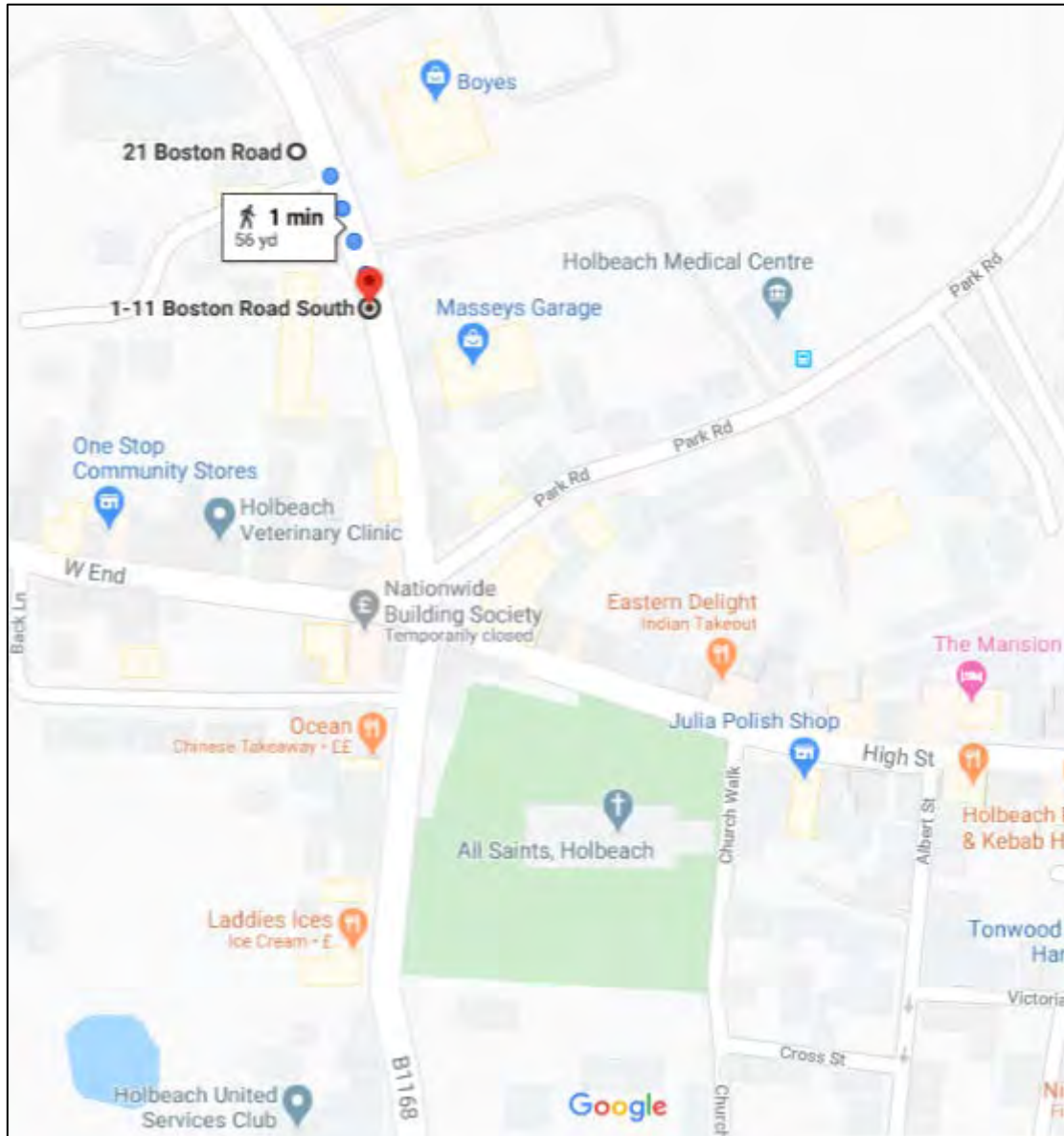
Map Centred on TF 35807 24982

Date Printed	April 2020	Scenario year	2115	Scenario Annual Chance	0.5% (1 in 200)	CCN Number	CCN-2020-167148
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General Enquiries No: 03708 506 506. Weekday Daytime calls cost 5p plus up to 5p per minute from BT Weekend, Unlimited, Mobile and other providers' charges may vary.

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17.11 Appendix 11 – Safe Egress to Flood Zone 1 Map



17.12 Appendix 12 – Calculation of Flood Hazard Rating

Table 3: Flood Hazard Rating Scores – based on DF score of 0

Depth/ Velocity	0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.0	2.25	2.50
0.0	0.13	0.25	0.38	0.50	0.63	0.75	0.88	1.00	1.13	1.25
0.5	0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50
1.0	0.38	0.75	1.13	1.50	1.88	2.25	2.63	3.00	3.38	3.75
1.5	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00
2.0	0.63	1.25	1.88	2.50	3.13	3.75	4.38	5.00	5.63	6.25
2.5	0.75	1.50	2.25	3.00	3.75	4.50	5.25	6.00	6.75	7.50
3.0	0.88	1.75	2.63	3.50	4.38	5.25	6.13	7.00	7.88	8.75
3.5	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00
4.0	1.13	2.25	3.38	4.50	5.63	6.75	7.88	9.00	10.13	11.25
4.5	1.25	2.50	3.75	5.00	6.25	7.50	8.75	10.00	11.25	12.50
5.0	1.38	2.75	4.13	5.50	6.88	8.25	9.63	11.00	12.38	13.75

Table 4: Summary of Scores

	Score From	Score To	Flood Hazard	Description
	<0.75	0.75	Low	Exercise Caution
Class 1	0.75	1.5	Moderate	Danger for some
Class 2	1.5	2.5	Significant	Danger for most
Class 3	2.5	20.0	Extreme	Danger for all

Table 5: Values for Debris Factor for different flood depths

Depths	Pasture/Arable Land	Woodland	Urban
0 to 0.25	0	0	0
0.25 to 0.75	0.5	1	1
d>0.75 and/or v > 2	0.5	1	1

-  The “danger to some” category includes vulnerable groups such as children, the elderly and infirm. “Danger: Flood zone with deep or fast flowing water”
-  The “danger to most” category includes the general public.
-  The danger to all category includes the emergency services.

A flood emergency plan is considered to be an acceptable way of managing flood risk where the flood hazard has been given a “very low hazard” rating. In some instances, flood emergency plans may also be acceptable where the rating is “danger for some”. However, it is unlikely to be an acceptable way of managing residual flood risk where the hazard to people classification is “danger for most” or “danger for all”.