

## **Flood Risk Assessment Extension / Alterations**

**Site Location:-** 81 South Parade, Boston. PE21 7PN

**Client:-** Miss E Faux.

**Date :-** April 2021 Revision A 01-07-65.



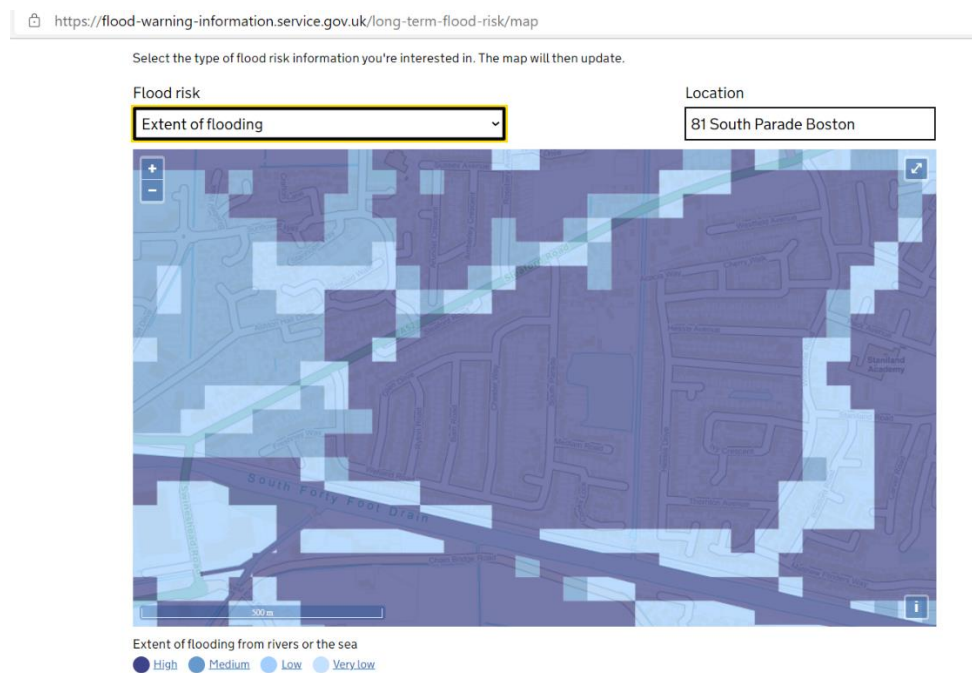
Front Elevation.

The development site lies within an area designated as Flood Zone 3 as detailed on the Environment Agency's Flood Maps. It is noted as a 'Dangerous for Most,' given the proposed use, with a 'Medium' probability of flooding in the Boston Borough Strategic Flood Risk Assessment.



Rear Elevation

## 1.0 Environment Agency Flood Maps for Planning:



Extent of flooding Map



[View the flood risk information for another location](#)

This information meets the requirements of the EU Floods Directive 2007/60/EC

Extent of flood map

2



[View the flood risk information for another location](#)

This information meets the requirements of the EU Floods Directive 2007/60/EC

Extent Of High Risk

3



### Surface water flood risk Map

The site is located within area 12 – Boston West of the Black Sluice Internal Drainage Board area and is shown to be within the indicative flood risk area as indicated by the Environment Agency's flood plain maps.

Early consultation with the Environment Agency suggests that the site would suffer from flooding with water depths of up to 1.0m if a breach of the defences were to occur. (Based upon the 2006 (1 in 200yr) Tidal Breach Hazard Mapping, with the 2115 (1 in 1000yr) Tidal Breach Hazard Mapping suggesting depths of 1-1.6m.

The proposed development incorporates the construction over a single garage on a detached two storey dwelling between at 81 South Parade.

The site clearly stands in an area where water depths may reach up to 1.6 metres on the 1 in 1000-year cycle, when allowing for climate change, but will only be up to 1.0 metres deep on the 1 in 200-year cycle (current risks). No risk is implied from overtopping. Existing ground levels of the site have been measured back to a known MODN of 2.7m on Sleaford Road. These place the average site level at 2.6m across the proposed footprint.

### FLOOD SOURCES AND EXISTING DEFENCES

The proposed site is potentially at risk, to a greater or lesser degree, from failure of any of the existing flood alleviation/defence measures in the area. The defences come in the form of 'hard' floodwalls and raised embankments lining the potential flood sources.

The following main sources of flooding affecting the development site are identified.

a) The River Witham, and b) The Haven (Tidal River).



The tidal defences protecting the area consist of earth embankments and concrete floodwalls. They are in good or fair condition and provide protection against a flood event with a 0.66% chance of occurring in any year (1in150). These defences are regularly inspected by the EA to ensure that any potential defects are identified early.

Maps in appendix A show the results for the Haven taken from the Environment Agency Northern Area Tidal Hazard Mapping,

The sea's high-water mark is approximately 7.0km to the South East of the site.

The primary tidal flooding source is the North Sea/Wash to the south east. The defences along the Lincolnshire coastline include beaches, groynes, dune systems, salt marshes, seawalls and promontories.

The tidal Haven is located approximately 100m to the east of the site, as is the non-tidal River Witham. Both water courses meet at The Grand Sluice where river embankments/flood protection is well reinforced by hard construction and raised banks. The flood zone maps show that the site of the proposed development is considered at risk from tidal flooding, in particular of breaching whereas the risk of overtopping is considered very low. These maps, however, indicate the risk of flooding without taking into account the flood defences which are in place along the coastline (with an annual probability of more than 0.5% i.e., return frequency of less than 1 in 200 years for tidal flooding or more than 1.33% return frequency of less than 1 in 100 years for fluvial flooding).

The Haven has embankments for its complete length from The Grand Sluice to its outfall into the Wash.

As mentioned above the tidal defences protecting the proposed site consist of raised embankments & concrete floodwalls. They are in good/fair condition and provide protection against a flood event with a 0.66% chance of occurring in any year. The Environment Agency inspects these defences regularly and improves them when required to ensure that any potential defects are identified and rectified early.

The area is not, and has not, been affected by any flooding from the fluvial River Witham on the west side of the river, this close to The Grand Sluice, albeit that regular over toppings occur only 200 metres away on the east side of the river. The site would, therefore, only be affected by tidal flooding from the Haven. The Haven Banks constitute the first line of defence against any tidal flooding, but there is less of a hazard from wave action here than there is on the North Sea coastline. These existing embankments have a crest level circa 6.50m ODN with a 1 in 200-year tide level of 5.93m ODN.

With climate change, the increase in tide levels would overcome the present level of defence and would cause widespread flooding to the centre of Boston, therefore, it will be necessary for these defences to be improved. The Environment Agency has now commenced work on the provision of a tidal barrier downstream of the Black Sluice outfall to address this problem in the very near future. Clearly if weather conditions (such as the Spring/neap tide cycle, storm surges, strong on shore winds etc.) were to change such that they caused significant rises in high tide level above the existing maintained defence standards, overtopping will result until the tide levels dropped again.

The table below illustrates the tidal flood levels for sluices at three locations along the coastline taken from Environment Agency data

Location	Easting	Northing	Annual Exceedance Probability – Maximum Water levels (mODN)						
			(1in1)	(1in10)	(1in25)	(1in50)	(1in100)	(1in200)	(1in1000)
<b>Hobhole</b>	536610	339940	4.82	5.30	5.49	5.64	5.78	5.93	6.27
<b>Boygrift</b>	553300	379800	3.84	4.24	4.41	4.53	4.65	4.77	5.05
<b>Burgh Sluice</b>	555190	358620	4.26	4.45	4.63	4.76	4.90	5.03	5.34

If a breach in the nearest point of the Wash tidal defences occurred in the Freiston Low area (8.0km from the SE of the site area) most of the land would be in Danger to All categories with some pockets in the Danger to Most categories. If a breach were to occur on the Haven bank, south of The Grand Sluice, it is clear that flood water would initially fill into the lower areas southwest of the Haven and east of the railway line, as far as Liquor Pond Street/Queen Street, before there would be any significant effect on the site and the areas to the west.

Fluvial Flooding

The nearest main fluvial sources are the River Witham (a main drain) & South Forty Foot Drain which runs into the Haven at the Black Sluice to the south and the North Forty Foot to the East. The Witham has not been known to overtop on the west side of the river. The North Forty Foot Drain is located east of the site. This small drain runs north-south to connect into the South Forty Foot drain to the South.

The Black Sluice Internal Drainage Board is an authority set up to control water levels and reduce the risk of flooding within the Board's area Flooding from Groundwater:

Surface water runoff from roofs and paved area within the site area will be disposed of by discharge into the existing combined system via some form of on-site attenuation. Although the site lies within the Black Sluice IDB District the surface water is dealt with by Anglian Water in their surface water and combined systems. The site's position indicates that flooding from groundwater is not likely to present a problem to the proposal since any potential for groundwater flooding would tend to be abated by the land drainage infrastructure (soakaways/combined system).

#### Flooding from Sewers:

Much of Boston town centre's sewerage system, although currently subject to a programme of renewal, is a combined flow system in which surface water run-off from roads, roofs and paved areas is discharged into pipes which also convey foul sewage. The Boston sewerage system relies on a series of sewage pumping stations to pump flows to the town's sewage treatment works. Efficient operation of a modern sewage treatment works relies on a steady flow of sewage of a consistent concentration.

In extreme rainfall events large volumes of surface water runoff enter the town's combined sewerage system. To prevent the treatment works and the pipe network becoming overloaded, the sewerage system has been provided with storm water overflows from which excess runoff is discharged to Boston Haven. At times of high tide these storm overflows may become tide locked and the discharge then has to be pumped to the Haven. There is nothing to indicate that flooding from sewers is a particular problem in the area concerned. Flooding from Climate Change

The effects of climate change, namely a rise in sea levels and/or an increase in rainfall intensity during storms, could also lead to increased flooding from surface water in the area overtopping existing defences.

It is likely that the Environment Agency and Internal Drainage Board would monitor and make improvements in the intervening period to prevent an increase in the occurrence of flooding in response to the predicted effects of climate change.

#### THE RISKS

The Environment Agency's Maps identify river catchments and are a theoretical estimate of areas that could be inundated by floodwater during a flood event if defences were not present. In reality the current standard of protection provided by flood defences and local site-specific features would substantially reduce the area of flood envelopes.

A coastal breach analysis was undertaken for the Boston Borough Strategic Flood Risk Assessment in October 2010, since flooding from the sea is considered to pose the greatest risk to settlements along the North Sea. Up-to-date maps by the Environment Agency are enclosed in Appendix A and were provided by the EA under reference CCN-2018-93940. These maps provide Tidal Breach and Tidal Overtopping Hazard Mapping for 2006 and 2115 scenario years and for both 1in200 and 1in1000 flooding events

The table below highlights the findings from the maps in Appendix A.

<b>Scenario Year</b>	<b>Scenario Annual Chance</b>	<b>Max. Hazard Category</b>	<b>Max. Depth (m)</b>	<b>Max. Velocity (m/s)</b>
<b><i>Northern Area Tidal Breach Hazard Mapping</i></b>				
<b>2006</b>	0.5% (1 in 200)	Danger for some	0.5-0.75 to 0.75-1	Not shown
<b>2006</b>	0.1% (1 in 1000)	Danger for some	0.5-0.75 to 0.75-1	Not shown
<b>2115</b>	0.5% (1 in 200)	Danger for some/most	0.75-1 to 1-1.25	Not shown
<b>2115</b>	0.1% (1 in 1000)	Danger for some/ most	0.75-1 to 1-1.25	Not shown
<b><i>Northern Area Tidal Overtopping Hazard Mapping</i></b>				
<b>2006</b>	0.1% (1 in 1000)	Zero	Zero	Not shown
<b>2115</b>	0.5% (1 in 200)	Zero	Zero	Not shown
<b>2115</b>	0.1% (1 in 1000)	Zero	Zero	Not shown

The Hazard Mapping Data (enclosed in Appendix A) confirms that our proposed development is in an area of the town where there is a slightly lower level of risk posed by breached floodwater than in surrounding areas. Clearly if tidal surges cause a significant rise in high tide level above the existing flood defence levels, there would be some overtopping, or potentially a breach, however, the Environmental Agency has stated that the site is not affected by overtopping for the 0.5% and 0.1% chance event in 2006, or 2115.

Given the generally level nature of the site and the distance and obstacles between the proposed site and the sources of flooding, we would suggest that the risk and inherent damage caused at the site would be minimal if breached water ever did become an issue.

The Environmental Agency's maps suggest that the risk of overtopping is minimal on this site. Considering the distance of the site from possible flood sources, the mixture of permeable catchment areas beyond the urban envelope together with obstacles in between (houses and gardens) and height of land in relation to the surroundings, the effect of flooding is likely to be minimal if at all.

We would consider that any potential flood risks to the proposed site would be minimised by the recommendations in section 8 of this document.

It is proposed that a Flood Warning and Evacuation Plan would be in place (see Appendix C). In the event of an extreme event causing a real threat to the property it is unlikely that there would be any risk to life since the site should already be evacuated.

The risk of rising groundwater and over spilling drains is unlikely to have an adverse effect upon the site in a high intensity storm. Any overflow is likely to be intercepted by the existing drainage system and controlled by the IDB pumps and defence systems.

The NPPF requires consideration of the effects of climate change on the flood risk at the proposed site. The predicted increase of rainfall intensities from 5% by 2025 to 30% by 2115 means that surface run-off may increase. However, given the level and potential improvement of existing defences, this predicted increase should not significantly increase the flood risk at the site.

The Environment Agency's Coastal Hazard Mapping (based on modelled breach locations) for the Northern Area show that with climate change up to the year 2115 (1in200 year scenario) the area of the site is within a hazard zone classed as Danger for Most.

In the event of floodwater encroaching on the proposed site dry access will be available to higher levels within the property.

#### EFFECT UPON THE FLOOD PLAIN

The construction of extensions/buildings within the flood plain can potentially have an adverse effect upon other properties. However, but the fact that we are dealing with an existing building/developed site there should be no adverse effect upon the flood plain by extending the building/site. The level of impermeable surfaces surrounding the buildings would not be increased and where necessary if new surface areas are created then, measures would be taken to assist effective surface water control.

#### RECOMMENDATIONS

The existing property is connected into the existing Anglian water public sewer system (combined) serving the area. Surface water from the property is and will be connected into the existing surface water drains or if required soakaways designed to BRE Digest 363. All hard landscaping is to be of permeable construction. If results from ground percolation tests prove that the ground is not suitable for soakaways the surface water will need to be discharged into the existing sewer at an agreed rate approved with Anglian Water.

Given the assessed potential for flooding on the site and the classification of use under NPPF it would be prudent to adopt a precautionary approach regarding the proposed development to minimise structural damage and to safeguard human life. Such aspects can be addressed by implementing:

- Flood proofing and flood resilience measures to at least 300mm above indicated highest water level such as: within New dwellings
- The installation of electrical fittings (including consumer units and meters) at least 1.1m above the finished floor levels. (On Ground Floor for new dwellings)
- Constructing in masonry and consideration of moisture resistant coatings to lower-level walls.
- The fitting of non- return valves to drains and water outlet pipes. (New Dwellings)
- Provision of a Flood Kit to include items such as important documents and contact numbers, torches and batteries, first aid kits, bottled water, blankets etc. (New Dwellings)
- An effective surface water drainage system including limiting impermeable surfaces and consideration of permeable paving, water retention systems etc. (New Dwellings)
- Commitment to the production of an Emergency Plan at the detailed design stage outlining the procedures to be followed in the event of a flooding event.
- This will include instructions for the owner/occupier on how to register with the Environment Agency's Automated flood warning system (contact 01522 785877).

#### CONCLUSIONS

According to information sought from the Boston Borough Council Strategic Flood Risk Assessment, the Environment Agency and Internal Drainage Board, the standard of tidal and fluvial defences appropriate to the



proposed site will provide adequate protection against flooding to a 1 in 200-year standard of protection both now and for the lifetime of the development.

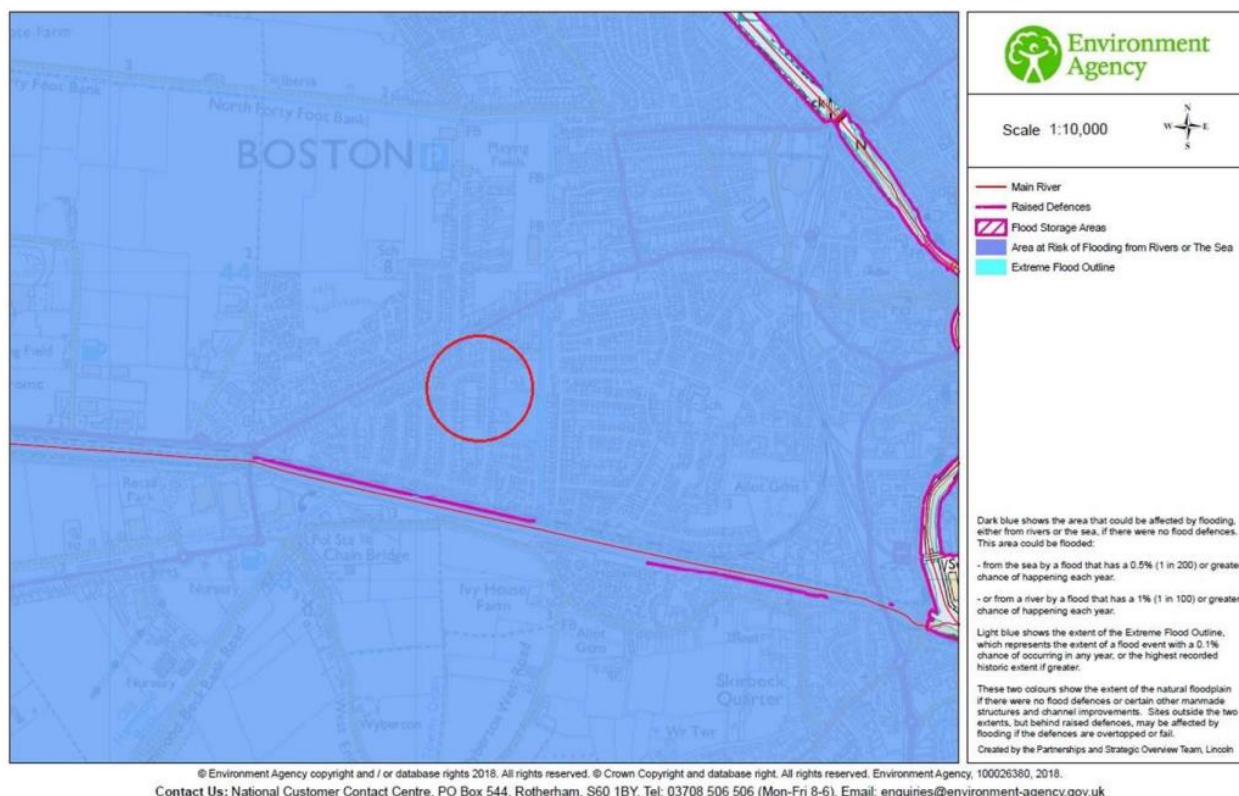
We have no reason to believe that the appropriate organisations will not continue to monitor, maintain, and improve the existing drainage network in the prevention of flooding and in response to the predicted effects of climate change. Such organisations have a responsibility to inform the public if these circumstances change.

Although the site has been classified as being a high flood risk area, the site has a relatively low risk of flooding from tidal breaching and fluvial sources due to the location and topography, with a minimal risk of overtopping of existing defences. The site is not within a functional flood plain of the coast or a main river.

It has been established that if a breach of the sea defences were to occur it would take a couple hours or more for the flood waters to reach the site by which time the evacuation plan (Appendix B) would have been employed and if necessary, the site evacuated. If a breach of the defences on the Haven were to occur, notice would be shorter, which leads to the need for the proposed property being registered with the Environment Agencies automated flood warning system. The plan should be held within the dwelling so that all occupants are aware of the correct procedures to follow.

However, the proximity to the Haven must be recognised and it must be accepted that flooding, even of a magnitude greater than envisaged by this FRA, can never be discounted.

Where depths are 1.0-1.6m, the standing advice from the council is that dwellings must have a minimum of 2 storeys, with finished floor levels set a minimum of 1m above existing ground level, flood resilient construction to a height 300mm above the predicted flood depth, and demountable defences to 600mm above finished floor level.



## Proposed Flood Evacuation Plan

- The Homeowner is prepared to sign up to the Environment Agency's free Warnings Direct System. Flooding from tidal events is predictable and if a flooding event is imminent the EA would advise the site owner accordingly.
- Upon the designated telephone number receiving the warning that the site is at risk of flooding, the assigned person will inform all/any visitors of the situation within the shortest time possible or would shut the facility until it is deemed safe to re-open.
- When arriving at the site, visitors should familiarise themselves with the site and surroundings and take note of the proposed evacuation plan. Ensure that the site owner has a contact mobile number for emergency contact.
- There are four stages of warning which will be issued:
  1. Flood Watch – Flooding expected to low lie land and roads. Warning given two hours to two days in advance of flood. Be aware of local water levels and prepared to act on FWEP.
  2. Flood Warning – Flooding expected of homes and businesses. Issued ½ hour to one day in advance. Act now and prepare for evacuation. Turn off gas, water and electricity supplies if safe to do so.
  3. Severe Flood Warning – severe flooding. Danger to life
  4. All Clear
- If the 'Severe Flood Warning' is issued the dwelling should not be occupied. If for any reason, the dwelling is occupied during a severe flood warning then the occupier/occupiers will evacuate to safe ground as recommended by the appropriate authority who will direct the evacuation towards Council operated centres outside the floodplain.
- Regular contact will be made with the Environment Agency flood control centre to ensure that all current information is available to those affected. (EA Flood line – 24hr service – 0845 988 1188)

**Your selected location is in flood zone 3, an area with a high probability of flooding.**

### This means:

- you must complete a flood risk assessment for development in this area
- you should follow the Environment Agency's standing advice for carrying out a flood risk assessment (see [www.gov.uk/guidance/flood-risk-assessment-standing-advice](http://www.gov.uk/guidance/flood-risk-assessment-standing-advice))

### Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

The Open Government Licence sets out the terms and conditions for using government data.  
<https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

## Conclusion

The property is in Flood Zone 3, an area with a high probability of flooding The property will be registered for flood warnings

The property already has sleeping accommodation on both floors

The proposal will see the lower floor level new extension at the back of the raised raised to match the existing floor levels of the dwelling.

The proposal does not increase the flood risk on the site or elsewhere