

**FLOOD RISK ASSESSMENT FOR
PROPOSED RESIDENTIAL DEVELOPMENT
AT MARSH ROAD, GEDNEY DROVE END,
SPALDING, LINCS.**

FINAL REPORT

GEOFF BEEL CONSULTANCY

JULY 2021

GCB/ANFOSS

DISCLAIMER

This document has been prepared solely as a Flood Risk Assessment in support of a planning application for proposed Residential Development at land north west of Sea Breeze, Marsh Road, Gedney Drove End, Spalding, Lincolnshire. "Geoff Beel Consultancy" accepts no responsibility or liability whatsoever for any use made of this document other than by the client "Home Improvements" for the purposes it was originally commissioned and prepared. All comments and opinions made are based upon information available to "Geoff Beel Consultancy" during the necessary investigative process, and the conclusions and recommendations could therefore, differ in the event of material subsequently being found erroneous, incomplete or misleading. "Geoff Beel Consultancy" therefore, accepts no liability should this prove to be the case.

CONTENTS

- 1.0 INTRODUCTION
- 2.0 LOCATION
- 3.0 THE SITE AND SEQUENTIAL TEST
- 4.0 EXISTING FLOOD ALLEVIATION MEASURES
- 5.0 POTENTIAL SOURCE OF FLOODING
- 6.0 EXTENT OF KNOWN FLOODING
- 7.0 PROBABILITIES AND TRENDS OF FLOODING
- 8.0 IMPACTS OF FLOODING
- 9.0 RESIDUAL RISKS – EXTREME EVENTS
- 10.0 CONCLUSIONS AND RECOMMENDATIONS

- Fig 1 - Location Plan – OS Map
- Fig 2 - Site Plan – Anfoss drg. no. Himp/Ged/2021/Ste/1
- Fig 3 - Ground Floor Plan –
Anfoss drg. no. Himp/Ged/2021/Gndpln/1
- Fig 4 - First Floor Plan –
Anfoss drg. no. Himp/Ged/2021/Firtflrpln/1
- Fig 5 - Elevations – Anfoss drg. no. Himp/Ged/2021/ele/1
- Fig 6 - Environment Agency Flood Map for Planning
- Fig 7 - Environment Agency Tidal Hazard Mapping –
1 in 200 year and 1 in 1000 year events (2115) -
CCN/2018/72089
- Fig 8 - South Holland Internal Drainage Board District Plan

1.0 INTRODUCTION

- 1.1 A full planning application is to be submitted by Anfoss Ltd on behalf of Home Improvements for proposed residential development at land north west of Sea Breeze, Marsh Road, Gedney Drove End, Spalding, Lincs.
- 1.2 A Flood Risk Assessment is required to accompany the planning application and meet the requirements and general principles of the Planning Practice Guidance to the National Planning Policy Framework (NPPF) and for approval by the Environment Agency.

The site, as situated, is located within Flood Zone 3, of the Environment Agency's Flood Map for Planning. The latest Agency Flood Maps have been created as a tool to raise awareness of flood risk with the public and our partner organisations, such as Local Authorities, Emergency Services and Drainage Authorities. The Maps do not take into account any flood defences.

The site is also shown in tidal Flood Zone 3 of the South East Lincs. Strategic Flood Risk Assessment Maps

The site is also located in the South Holland IDB drainage district.

- 1.3 Geoff Beel Consultancy was appointed on 21st July 2021 to undertake a Flood Risk Assessment.
- 1.4 A previous Flood Risk Assessment prepared by Argyle Environmental for the development site dated April 2018 accompanied outline planning application H06-0202-18 which was approved with planning conditions 7 and 8 on 14th June 2018.

2.0 LOCATION

- 2.1 The development site is located at land north west of Sea Breeze, Marsh Road, Gedney Drove End. The National Grid Reference of the central point of the development is TF 46492914.
- 2.2 The position and extent of the site is shown on Fig 1 – Location Plan at the end of the document.
- 2.3 The site, located within the South Holland Internal Drainage Board district is shown within Flood Zone 3 as detailed on the Environment Agency Flood Map for planning and in tidal Flood Zone 3 of the South East Lincs. Strategic Flood Risk Assessment Maps.

3.0 THE SITE AND SEQUENTIAL TEST

- 3.1 The site is currently open land within existing residential frontage to Marsh Road.
- 3.2 The area of development is approximately 0.20 hectare.
- 3.3 The proposed site layout consists the construction of a pair of 2 storey dwellings in the existing village development boundary.
- 3.4 The Sequential Test and Exception Test will require to be applied by the Local Planning Authority but the development may be permitted as the site is protected against both the 1 in 200 year return period tidal event and the 1 in 100 year return period fluvial event whilst located in Flood Zone 3 of the Council's Strategic Flood Risk Assessment Map. No other land available for development in Gedney Drove End is at a lower risk of flooding. The Sequential Test is met as outline planning approval is already in place.

The inclusion of appropriate mitigation measures will ensure that the development passes Part 2 of the NPPF Exception Test by ensuring that the development has an adequate water exclusion strategy for the design flood and breach event

4.0 EXISTING FLOOD ALLEVIATION MEASURES

- 4.1 The site is within a defended floodplain, as defined in Appendix 1 of the Environment Agency's 'Policy for the Protection of Floodplains' and is considered to be passive until such time as a flood greater than that for which the defences were designed occurs. The likelihood of flooding due to overtopping or failure of a flood defence embankment is considered to be small.

The South Holland Internal Drainage Board is protected by a combination of the River Welland tidal defences downstream of Spalding, the River Welland fluvial embankments as well as the Wash Estuary and River Nene tidal defences downstream of Foul Anchor.

- 4.2 The site and the surrounding land drains by gravity to IDB main drains some 200m west of Marsh Road and hence in a south easterly direction to the Lutton Leam outfall to discharge into the tidal River Nene. Land level at the site is generally at 4.00m aOD.
- 4.3 The existing standard of drainage for the South Holland Internal Drainage Board is 1 in 50 years return period, compatible with the Department of the Environment, Food and Rural Affairs target level of service for rural drainage and flood defence works. Freeboard of 900mm is provided to the lowest land levels.

- 4.4 Current maintenance standards within the South Holland Internal Drainage Board and of the Environment Agency defences are generally very good.

During the operation and maintenance of its pumping stations, associated structures and channel systems, particularly those that could affect property, the Board seeks to maintain a general standard capable of providing flood protection to its district. A routine maintenance programme is in place to ensure that the Boards assets are commensurate with the standard of protection that is sought. However, bank slips, blocked culverts etc may occur from time to time and these matters are usually dealt with promptly.

5.0 POTENTIAL SOURCES OF FLOODING

- 5.1 Four potential sources of flooding have been identified as a result of this assessment:

- a) local blockages to IDB main drain system.
- b) storm return period of 1 in 50 years being exceeded
- c) failure of Lutton Leam Outfall Sluice
- d) overtopping and breaching of defences of the Wash Estuary defences

- 5.2 The probability of flooding from source a) is low due to the maintenance standards already achieved and managed by the IDB.

The probability of flooding from b) is also low due to the South Holland IDB main drain design standard incorporating a minimum 900mm freeboard to the lowest land level which provides adequate storage in events greater than 1 in 50 years.

Previous historic rainfall events of 1968 and 1978, estimated to be greater than 1 in 100 year events, caused no flooding to any residential properties at the time and the Boards policy is to provide a standard of drainage which satisfies (NPPF) requirements of a 1 in 100 year return period for fluvial protection inclusive of the effects of climate change and developments to the arterial system enables a flexible approach to be adopted and meet the criteria for "sustainable urban drainage".

- 5.3 Failure of Lutton Leam Outfall Sluice may occur due to long term mechanical breakdown or power supply being disrupted. However, in these circumstances, if conditions were such as to put properties and land at risk of flooding, the Internal Drainage Board would take emergency action to maintain the drainage level of service by utilising temporary pumping equipment. The probability of such an occurrence is also considered to be low.

A secondary defence is located 500m east of the site offering additional protection against any overtopping floodwaters from the first line defences.

- 5.4 The Environment Agency has published The Wash Shoreline Management Plan 2 from Gibraltar Point to Old Hunstanton. The summary of the plan

between Gibraltar Point and Wolferton Creek is as follows:-

The intent of management for this Policy Development Zone (PDZ) is to sustain flood defence for the communities and their hinterland on the low-lying areas around The Wash. This includes an increase of management as needed to sustain the current level of flood risk in the face of climate change.

- 5.5 The drainage system will be to soakaways within the development site, which will accommodate the 1 in 100 year rainfall event inclusive of climate change and soakaways designed to BRE365 requirements.
- 5.6 More recent hydraulic modelling work carried out by consulting engineers on behalf of the Environment Agency has produced Tidal Hazard Mapping – see Fig 7.

The Environment Agency has confirmed that the site could be affected by floodwaters of up to 1.60m depth as a result of breaching of the tidal defences to the Wash Estuary and River Nene in year 2115. The site is located some 1.00km from the nearest point of any first line tidal defence.

In the event of a breach occurring to the tidal defences of the Wash Estuary or the River Nene, with the site being located only 1.00km inland, albeit, further protected by the secondary defences, any floodwaters would quickly reach the site. Before any occurrence, the residents of the property would have received a warning from the Agency's Floodline Direct Warnings Service and made preparations to evacuate the premises via the B1359 and A17 roads to Holbeach where land is in Flood Zone 1 and not affected by the results of the Tidal Hazard Mapping.

It is necessary to mitigate against such extreme events of flooding and the Environment Agency has established the following protocol for development in such locations.

Where flood depths are up to 1.60m

Therefore, proposals must be a minimum 2 storey with no ground floor habitable accommodation. The first floor living accommodation shall be above the highest predicted flood depth and the Environment Agency would secure the requirements of non-habitable uses such as access lobby, utility and garaging at ground floor through planning conditions 7 and 8 of the outline planning approval..

An evacuation plan should also be prepared in the extreme circumstances of floodwaters reaching the site before safe egress could be achieved.

- 5.7 Finished floor level of the dwellings will be at 4.60m aOD and the following flood resistant and/or resilient measures incorporated into the development design:

- Using water resistant building materials
- High priority doors and ground floor windows and vents to be fitted with demountable defences
- All sleeping areas should be located at first floor level to reduce the vulnerability to the residents of the dwellings
- Interior design considerations including raised electric sockets, water compatible flooring materials (stone/tiles), painted walls and water resistant materials on the ground floor and storage of valuable or sentimental possessions above the ground floor.

6.0 EXTENT OF KNOWN FLOODING

- 6.1 During the preparation of this assessment, no evidence was discovered of the site being flooded or of any adjoining properties.

7.0 PROBABILITIES AND TRENDS OF FLOODING

- 7.1 The probability of this development flooding from localised drainage systems is very low.
- 7.2 The probability of the site flooding with water from any South Holland IDB main drain is less than 1% because of the standards of the existing flood defence systems, storage within existing drainage channels and the location of the site.
- 7.3 The probability of the site flooding with fluvial waters from any main river system is less than 1% because of the standards of the existing flood defences and the location of the site.
- 7.4 If under very extreme events, levels of floodwater from the South Holland IDB main drains or arterial systems rose to such an extent that the site was affected, the situation would not be sudden. It is very probable that sufficient time would be available to take precautionary actions to limit the extent and potential impact of flooding.
- 7.5 The water levels in the drainage channels will tend to rise as a result of the impacts of climate change. However the existing systems and defences together with the habitable floor levels a minimum of 2.00m above existing ground level and flood resistant and/or resilient construction as described in paragraph 5.7 will be acceptable for the design life of the development (i.e. 100 years).

8.0 IMPACTS OF FLOODING

- 8.1 No significant impacts of flooding are anticipated.
- 8.2 Floor levels of the habitable accommodation within the development are at 2.0mm above existing ground levels which together with the flood resistant and/or resilient construction and the proposed drainage system will offer additional protection against impacts arising from any extreme short duration, localised events.
- 8.3 The general location of the site within the catchment is such that if flooding occurred from any of the South Holland IDB main drain systems, then probably 2 to 3 days warning time would be available.
- 8.4 No displacement of water from the site will affect any adjoining properties. The site will have a soakaway drainage system such that surface water drainage is attenuated before discharging to the IDB main drain system at no greater rate than the existing greenfield rate of area run-off.
- 8.5 Safe and dry access/egress is available after receipt of a flood warning onto Marsh Road and hence via the B1359 and the A17 roads to Holbeach where land is in Flood Zone 1.

9.0 RESIDUAL RISK – EXTREME EVENTS

- 9.1 The residual risk from extreme events is medium on this site, because of its location, within the South Holland IDB area and its location 1.00km from the Wash Estuary tidal defences.
- 9.2 Although within Flood Zone 3, the site actually has a present day very low risk of flooding due to the current standards of drainage and flood defence and land levels. The site is not located within a Functional Flood Plain of any 'main river' or 'main drain'. The Environment Agency Flood Map for Planning has been produced irrespective of existing flood defences and standards of protection.
- 9.3 South Holland District Council and Boston Borough Council in conjunction with the Environment Agency and the local IDB's within the Council's area have carried out a Strategic Flood Risk Assessment of the whole area by appointed Consulting Engineers.

The South East Lincs. Strategic Flood Risk Assessment has produced more definitive Flood Risk Maps than those published by the Environment Agency and at the same time has analysed flood return periods of all tidal and fluvial defences up to 2115 to account for the effects of climate change.

Breach scenarios of embankments failing and/or being overtopped have also been carried out to establish Flood Risk Zones.

- 9.4 As a result of the South East Lincs. Strategic Flood Risk Assessment; the South Holland Main Drain and associated IDB main drains have been determined as providing protection against a 1 in 100 year return period event up to 2115 inclusive of the effects of climate change.

10.0 CONCLUSIONS AND RECOMMENDATIONS

10.1 As a result of the assessment, the following conclusions have been reached:-

- The proposed development is not in a Functional Floodplain. It is located in the Passive Floodplain protected by the Wash tidal defences to a 1 in 200 year return period, (1.0%)
- Although the site is in Flood Zone 3, the actual risk of site flooding from any Environment Agency river system is low (less than 0.5%). The site is also identified in Flood Zone 3 of the South East Lincs. Strategic Flood Risk Assessment Maps (2115).
- Although the site is located within an Internal Drainage District with a minimum standard of drainage of 1 in 50 years, this accords with Defra guidelines for rural development. Freeboard to design water level of 900mm to lowest land level is available for events greater than 1 in 50 years providing further storage within the drainage channels.
- On site rainwater from the development will discharge to soakaway designed to BRE 365 requirements and Building Regulations approval.
- Habitable floor levels are a minimum of 2.00m above existing land level and flood resistant and/or resilient construction will be incorporated into the proposed dwellings to safeguard against the risk of flooding from tidal defences being breached in year 2115.
- Upon receipt of a flood warning from the Agency's Floodline Direct Warnings Service preparations to evacuate the premises would take place to Holbeach town centre in Flood Zone 1. A Flood Warning and Evacuation Plan should be prepared