FLOOD RISK ASSESSMENT
FOR RESIDENTIAL DEVELOPMENT
AT MOORLANDS, BROADGATE, GEDNEY, SPALDING, LINCS.

FINAL REPORT

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GCB/STUDIO CHARRETTE

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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 – UK Planning Map

Fig 2 - Block Plan – UK Planning Map

Fig 3 - Garage Conversion to Annexe Plans & Elevations – Studio Charrette drg. no. 133 -PL-EXT-00B

Fig 4 - Environment Agency Flood Map for Planning

Fig 6 - South East Lincs. Strategic Flood Risk Assessment – Residual Hazard Map (2115)

Fig 7 - South East Lincs. Strategic Flood Risk Assessment Residual Flood Depth Map (2115)

Fig 8 - South Holland Internal Drainage Board District Plan

1.0 INTRODUCTION

1.1 A full planning application is to be submitted by Studio Charrette on behalf of Mr & Mrs Crisp for proposed residential development at Moorlands, Broadgate, Gedney, 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 a "Low Hazard" Zone 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 29th November 2021 to undertake a Flood Risk Assessment.

2.0 LOCATION

2.1 The development site is located at Moorlands, Broadgate, Gedney. The National Grid Reference of the central point of the development is TF 39642138.

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 a "Low Hazard" Zone of the Council's Strategic Flood Risk Assessment Map as defended by Tidal Defences and the Internal Drainage Board system.

3.0 THE SITE AND SEQUENTIAL TEST

3.1 The site is currently a garage at Moorlands.

3.2 The area of development is approximately 0.10 hectare.

3.3 The proposed site layout consists the conversion of the garage to a single storey dwelling for holiday accommodation.

3.4 The Sequential Test is met as whilst shown in Flood Zone 3 of the Environment Agency maps the site is shown in a "Low Hazard" Zone of the Council's Strategic Flood Risk Assessment Residual Hazard Map and 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 meeting the requirements of NPPF.

3.4 Flood mitigation measures have been incorporated into the conversion of the garage by raising finished floor levels 200mm above existing ground level to safeguard against the risk of flooding as a result of the River Nene tidal defences and to ensure the proposals pass Part 2 of the Exception Test with an adequate exclusion strategy.

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 and Practice 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.

4.2 The site is located in the South Holland Internal Drainage Board district which is protected by the River Welland tidal defences, the River Nene tidal defences and the Wash coastal defences against a minimum flood return period of up to 1 in 200 years.

The River Nene tidal defences are located some 7.00kms to the west of the site whilst the Wash coastal defences are located some 9.00kms north of the site.

4.3 The site is located in the South Holland Internal Drainage Board area with the IDB main drain on the opposite side of Broadgate to the site. Land levels are generally at 3.00m aOD and the IDB system drains in a south-easterly direction to the Sutton Bridge Outfall Sluice to discharge into the tidal River Nene.

4.4 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. Design water levels offers freeboard of 900mm to the lowest land levels.

4.5 Current maintenance standards of the Environment Agency for tidal defences and the South Holland Internal Drainage Board are considered to be 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 the IDB main drain
b) storm return period of 1 in 50 years being exceeded
c) failure of Sutton Bridge Outfall Sluice
d) overtopping and breaching of the River Nene tidal defences and/or the Wash Coastal 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 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.

There are many hectares of agricultural land that would flood in such circumstances before the development site was put at risk.

5.3 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".

5.4 Failure of Sutton Bridge Outfall Sluice may occur due to mechanical breakdown or electricity power failure. 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.

5.5 The South Holland Internal Drainage Board district at Gedney is protected against the 1 in 200 year tidal event by the west embankment of the River Nene tidal defences at 6.30m aOD and the Wash coastal defences provide similar protection with embankment level of 7.00m aOD.

5.6 The existing drainage system is to soakaways within the development site which will accommodate the 1 in 100 year rainfall event inclusive of climate change. The drainage system will also include rainwater harvesting with the soakaways designed to BRE365 requirements.

5.7 More recent hydraulic modelling work carried out by consulting engineers on behalf of the Environment Agency has produced Tidal Hazard Mapping.

The Environment Agency has confirmed that part of the site could be affected by floodwaters between 0.00-0.30m as a result of breaching and/or overtopping of the tidal defences to the Wash and River Nene in year 2115. The site is located some 7.00kms from the nearest point of any tidal defence.

It is therefore necessary to mitigate against such risks and flood resilient construction should be incorporated into the proposed garage conversion with floor levels raised 200mm above existing ground level with a further 300 mm of flood resilient construction above finished floor level.

5.8 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 (PLZ) 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.

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. It is also intended to construct floor level 300mm above existing ground level.

7.2 The probability of the site flooding with water from the River Nene and/or The Wash tidal system is less than 0.5% because of the standards of the existing flood defences.

7.3 If under very extreme events, levels of floodwater from the IDB main drain system 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.

7.4 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 raising of floor levels 200mm above existing ground level will be appropriate for the design life of the development (i.e. 100 years).

7.5 The developer should ensure that the eventual occupiers of the garage conversion are sufficiently aware of the risk of flooding, and the standard of the existing defences. The Environment Agency provides a Flood Warning Service which includes Flood Warning Codes and uses direct warning methods where the risks and impacts of flooding are high. Indirect warnings are provided to all flood risk areas, even those at low risk of flooding. The main method is media broadcasts via local radio and also by television.

In addition to direct and indirect flood warnings, the Environment Agency operates a 24 hour a day Floodline Service providing advice and information on flooding contacting tel: 0345 988 1188 and the occupiers of the new dwelling should register with the Floodline Direct Warnings Services to receive any future flood warnings.

8.0 IMPACTS OF FLOODING

8.1 No significant impacts of flooding are anticipated.

8.2 Floor levels of the development are to be 200mm above existing ground level with a further 300 mm of flood resilient construction above finished floor level offering additional protection against impacts arising from any extreme short duration, localised events. Safe refuge should be located in the roof space with veluxe windows for any need of evacuation.

8.3 The general location of the site within the catchment is such that if flooding occurred from any of the IDB main drain or the River Nene tidal system sufficient warning time would be available.

8.4 No displacement of water from the site will affect any adjoining properties as the site is provided with soakaway drainage designed to BRE365 requirements and to Building Regulations approval.

8.5 Safe access and egress is available initially in a north westerly direction to Holbeach where land is in Flood Zone 1.

9.0 RESIDUAL RISK – EXTREME EVENTS

9.1 The residual risk from extreme events is low on this site, because of its location within the internal drainage system existing levels of fluvial defences and proposed floor levels compared to surrounding land level.

9.2 The site is in a “Low Hazard” Zone according to NPPF classification, the site actually has a 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. The risk of flooding to adjoining properties in the vicinity is not increase in terms of probability by the proposed development.

9.3 South Holland District Council and Boston Borough Council in conjunction with the Environment Agency and the local IDB's within the Council area have carried out a Strategic Flood Risk Assessment of the whole District 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 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 IDB areas has been determined as providing protection against a 1 in 100 year return period event whilst the River Nene tidal defences at Sutton Bridge and the Wash coastal defences provide protection against a 1 in 200 year return period event.

9.5 In the extreme event of a serious pumping station failure occurring to the IDB main drain system, or the overtopping/breaching of tidal defences, protection will be afforded by the proposed raising of floor levels 200mm above ground level.

10.0 CONCLUSIONS AND RECOMMENDATIONS

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

- The proposed residential development is not in a Functional Floodplain as defined in NPPF. It is located in the Passive Floodplain protected by fluvial defences to a 1 in 100 year and tidal defences of a 1 in 200 year standard.

- The site is in a "Low Hazard" Zone with the actual risk of site flooding being low (less than 0.5%). The site is shown as defended by the South Holland IDB system, the River Nene and the Wash tidal defences in the South East Lincs. Strategic Flood Risk Assessment.

- Although the site is located within an Internal Drainage District with a standard of drainage of 1 in 50 years, this accords with Defra guidelines for rural development. A minimum of 900mm freeboard is provided within the main drain design to the lowest land level which provides further storage to cater for events greater than 1 in 50 years.

- On site surface water drainage will be discharged to soakaways designed to BRE365 and Building Regulations requirements.

- Floor level of the garage conversion will be raised 200mm above existing ground level with 300mm of flood resilient construction above finished floor level to withstand the depth and velocity of floodwaters which could occur as a result of a breach to the Wash/River Nene tidal defences in 2115.