FLOOD RISK ASSESSMENT FOR PROPOSED RESIDENTIAL DEVELOPMENT AT BALMORAL WAY, HOLBEACH, LINCS.

FINAL REPORT

GEOFF BEEL CONSULTANCY

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GCB/STUDIO 11
ARCHITECTURE

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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 ï EXTREME EVENTS

10.0 CONCLUSIONS AND RECOMMENDATIONS

Fig 1 - Location Plan ï OS Map

Fig 2 - Proposed Site Layout ï
Studio 11 Architecture drg. no. 203.SL.01

Fig 3 - Topographical Survey ï Axis Surveys Ltd drg. no.AS1961/1

Fig 4 - Environment Agency Flood Zone Map

Fig 5 - South Holland District Council Strategic Flood Risk Assessment (2010) Residual Flood Depths - District 2115

Fig 6 - Environment Agency Tidal Hazard Mapping ï 1 in 200 and 1 in 1000 year events (2115) ï CCN-2014-37888

Fig 7 - South Holland Internal Drainage Board district plan

1.0 INTRODUCTION

1.1 A full planning application is to be submitted by Studio 11 Architecture Ltd on behalf of Benchmark Properties for proposed residential development at land off Balmoral Way, Holbeach, Spalding, Lincs.

1.2 A Flood Risk Assessment is required to accompany the planning application and meet the requirements and general principles contained in Paragraph 9 of the Technical Guidance to the National Planning Policy Framework (NPPF).

The site, as situated, is located within Flood Zone 3, of the Environment Agencyôs Flood Zone Maps. 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 however is also shown in Flood Zone 1 and outside of any present day Hazard Zone of the South Holland District Councilôs Strategic Flood Risk Assessment Maps (2010).

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

1.3 Geoff Beel Consultancy was appointed on 17th December 2014 to undertake a Flood Risk Assessment.

2.0 LOCATION

2.1 The development site is located at land off Balmoral Way and north of Foxws Low Road, Holbeach. The National Grid Reference of the central point of the development is TF 37252455.

2.2 The position and extent of the site is shown on Fig 1 ï 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 Zone Maps and in Flood Zone 1 of the Councilôs Strategic Flood Risk Assessment Maps (2010) as defended by the Agencyôs tidal defences and the Internal Drainage Board system.

3.0 THE SITE AND SEQUENTIAL TEST

3.1 The site is currently agricultural land and redundant buildings.

3.2 The area of development is approximately 1.13 hectare.

3.3 The proposed site layout consists the construction of some 47 two-storey dwellings.

3.4 The Sequential Test is met as the site is located in Flood Zone 1 of the Councilôs Strategic Flood Risk Assessment Maps (2010) and protected against both the 1 in 100 year fluvial event and the 1 in 200 year tidal event.

4.0 EXISTING FLOOD ALLEVIATION MEASURES

4.1 The site is within a defended floodplain, as defined in Appendix 1 of the Environment Agencyôs óPolicy for the Protection of Floodplainsô 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 development site within the South Holland Internal Drainage Board is protected by the Wash tidal defences to the Holbeach Marsh frontage with embankment levels of a minimum of 7.00m aOD. Existing land levels at the site are generally between 3.10m and 4.10m aOD.

4.2 The site and the surrounding land drains by gravity to the Foxes Low Drain on the southern boundary of the site and hence via other drains in the Holbeach River catchment to discharge into the Wash at Holbeach River Outfall.

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 Holbeach River Outfall Sluice
d) overtopping and breaching of the Wash and River Nene tidal 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 ñsustainable urban drainageò.

5.3 Failure of Holbeach River Outfall Sluice may occur due to long term mechanical breakdown or power supply being disrupted. However, in these circumstances, if conditions were such 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.

5.4 The flood embankments to the Wash and River Nene tidal defences provide a 1 in 200 year return period level of protection.

The 1 in 200 year tidal event to the tidal River Nene and the Holbeach Marsh frontage inclusive of climate change to 2115 is estimated to be 7.20m aOD as against existing embankment levels of a minimum of 7.00m aOD.

There is a low risk during such an event for wave and wind action to cause overtopping and/or breaching of the first line defences. However, the site is further protected by second line defences with embankment levels of 6.00m aOD.

5.5 More recently the Environment Agency has published Tidal Hazard mapping as shown in Fig 6. The mapping shows the site to be effected by floodwaters varying between 0.00 ï 0.5om if the secondary defences also breached and it is necessary to mitigate against this remote risk.

Finished floor level has been raised 500mm above existing ground level at a minimum of 3.60m aOD.

Flood resilient construction will be incorporated up to a minimum level of 300mm above finished floor level with no sleeping accommodation at ground floor level.

5.6 The Environment Agency has recently 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.

5.7 Surface water drainage from the development site will be to soakaways designed to BRE365 requirements and Building Regulations approval. Highway drainage will be discharged to the Foxes Low Drain with Consent to Discharge from the South Holland Drainage Board.

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 tidal 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 proposed floor levels at 500mm above lowest surrounding ground level will be appropriate 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 development will be a 500mm above lowest surrounding ground levels, which together with the flood resilient construction and proposed soakaway 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 as existing soakaway drainage system will be utilised.

8.5 The developer should ensure that the eventual occupiers of the properties 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, contact tel no: 0845 988 1188 and the occupiers of the new development should register with the Floodline Direct Warning Service to receive future flood warnings.

9.0 RESIDUAL RISK ï EXTREME EVENTS

9.1 The residual risk from extreme events is very low on this site, because of its location, within the South Holland IDB area and its location 11.00 kms from The Wash and River Nene tidal defences with secondary defences between the marsh frontage and the site.

9.2 Located within fluvial Flood Zone 1 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 ómain riverô or ómain drainô. The Environment Agency Flood Zone Maps have been produced irrespective of existing flood defences and standards of protection.

9.3 South Holland District Council in conjunction with the Environment Agency and the local IDBôs within the Council area have carried out a Strategic Flood Risk Assessment (2010) of the whole District by appointed Consulting Engineers.

The Strategic Flood Risk Assessment (2010) 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. As a result of the Strategic Flood Risk Assessment (2010) the site is outside any Hazard Zone and defended by tidal defences and tidal doors.

10.0 CONCLUSIONS AND RECOMMENDATIONS

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

- The proposed development is in a Defended Floodplain. It is located in the Passive Floodplain of The Wash and tidal River Nene and the South Holland IDB protected by defences to a 1 in 200 year return period (1.0%).

- The site is in Flood Zone 1 with the actual risk of site flooding from any Environment Agency river system being very low (less than 0.5%).

- 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 be discharged via soakaway drainage to BRE365 design requirements. Highway drainage will discharge to the adjoining Foxes Low Drain with Consent to Discharge from the South Holland Drainage Board.

- Floor level of the new dwellings will be 500mm above ground level at a minimum of 3.60m aOD with safe refuge and sleeping accommodation at first floor level. Flood resilient construction will be incorporated up to 300mm above finished floor level.

- Land Drainage Byelaw Consent will be required for any development within 9.00m of the Foxes Low Drain on the site southern boundary.