FLOOD RISK ASSESSMENT FOR RESIDENTIAL DEVELOPMENT AT PETERBOROUGH ROAD, CROWLAND, LINCS.

FINAL REPORT

GEOFF BEEL CONSULTANCY

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GCB/STUDIO 11 ARCHITECTURE

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Fig 1 - Location Plan –
Studio 11 Architecture drg. no. 163.LP.01

Fig 2 - Proposed Site Layout –
Studio 11 Architecture drg. no. 163.SL.01

Fig 3 - Site Survey –
Ratcliffe Land & Engineering Surveys drg. no. 4676-1

Fig 4 - Environment Agency Flood Zone Map

Fig 5 - South Holland Strategic Flood Risk Assessment - 2115

Fig 6 - North Level Internal Drainage Board District Plan

Fig 7 - North Level IDB letter – 22nd April 2014.

1.0 INTRODUCTION

1.1 A full planning application is to be submitted by Studio 11 Architecture on behalf of Ashley King Developments Ltd for residential development at Peterborough Road, Crowland.

1.2 Planning approval requires a Flood Risk Assessment to be submitted to the Environment Agency and to meet the requirements and general principles contained in Paragraph 9 of the Technical Guidance to the National Planning Policy Framework (NPPF) as the site is shown as situated in Flood Zone 3 of the Environment Agency Flood Zone Maps.

The latest Agency Maps have been created as a tool to raise awareness of flood risk with the public sector and 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 located in the North Level IDB district and shown in Flood Zone 1 of the South Holland Strategic Flood Risk Assessment in year 2115.

1.3 Geoff Beel Consultancy was appointed on 10 April 2014 to undertake a Flood Risk Assessment.

2.0 LOCATION

2.1 The development site is located at the southern limits of Peterborough Road, Crowland. The National Grid Reference of the central point of the site is TF 23800910.

2.2 The position and extent of the site are shown on Fig 1 – Location Plan at the end of the document.

2.3 The site is shown within Flood Zone 3 as detailed on the Environment Agency Flood Zone Maps and is located within the North Level Internal Drainage Board district.

2.4 The site is also shown in Flood Zone 1 of the South Holland Strategic Flood Risk Assessment in year 2115.

3.0 THE SITE AND SEQUENTIAL TEST

3.1 The site is agricultural land.

3.2 The area of the site is approximately 1.80 hectares with proposed access onto the Peterborough Road.

3.3 The site layout consists the creation of an estate layout off Peterborough Road for 49 two-storey houses.

3.4 The Sequential Test and Exception Test will require to be applied by the Local Authority but the development may be permitted as the site is protected against the 1 in 100 year return period fluvial event and meets the requirements of NPPF.

The Sequential Test is met as the site is located in Flood Zone 1 of the South Holland Strategic Flood Risk Assessment.

4.0 EXISTING FLOOD ALLEVIATION MEASURES

The site is within a defended floodplain, as defined in Appendix 1 of the Environment Agency's 'Policy and Practice for the Protection of Flooodplains' 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 North Level drainage area is protected by flood embankments of the Folly River, the River Welland and the Crowland and Cowbit Washes against a flood return period event of 1 in 100 years plus climate change.

4.2 The site and adjoining agricultural land is located within the North Level Internal Drainage Board district with the nearest 'main drain' open watercourse immediately on the north-west boundary of the site. Land level at the site varies between 0.30m and 1.00m aOD.

4.3 The existing standard of drainage for the Newborough district of the North Level Internal Drainage Board area is a minimum of 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 a minimum 900mm is provided to the lowest land levels offering further storage in channel against higher return period flood events.

The site and surrounding land drains by gravity to the Board's Newborough Pumping Station to discharge into the River Welland.

4.4 Current maintenance standards within the North Level Internal Drainage Board district are 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.

4.5 The flood defences of the Folly River and River Welland are similarly well maintained by the Environment Agency and their asset condition regularly inspected.

The Crowland & Cowbit Washes are located some 1.00km north west of the site and provide protection against the 1 in 100 year flood event.

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
b) Storm return period of 1 in 50 years being exceeded
c) Failure of Newborough Pumping Station
d) Breaching of fluvial flood embankments to the River Welland

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 Newborough 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.

5.3 Failure of Newborough Pumping Station 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.

5.4 The River Welland between Peakirk and Spalding is protected by fluvial embankments as part of the Environment Agency 'main river' under the terms of the Water Resources Act 1991. The Crowland and Cowbit Washes are also located alongside the River Welland and combined together offer protection of a minimum 1 in 100 year return period plus climate change.

The last time any breaching of flood defences occurred in this particular section of river was 1947, since when substantial investment has been made to improve the standard of protection.

The Crowland and Cowbit Washes flood embankment is a designated structure under the Reservoirs Act 1975. A flood study has been carried out by the Environment Agency to meet the legislation requirements and one small recommendation to review and update the current flood operational procedures has been completed.

The Folly River upstream of Peakirk Pumping Station is similarly protected by fluvial embankments. The Pumping Station operated by the Environment Agency is part electrical, part diesel powered and with the fluvial embankments offer protection against a 1 in 100 year return period event.

The risk of a breach or overtopping occurring to the River Welland and Folly River defences is considered remote.

6.0 EXTENT OF KNOWN FLOODING

6.1 During the preparation of this assessment, no evidence was discovered of the site being flooded.

7.0 PROBABILITIES AND TRENDS OF FLOODING

7.1 The probability of this brownfield development flooding from localised drainage systems is very low because of the existing standards of drainage within the IDB system. A sustainable drainage system will be designed to meet the requirements of North Level IDB and Building Regulations approval.

7.2 The probability of the site flooding with water from any main river system or from the arterial drainage system is less than 0.5% because of the standards of the existing flood defence systems and the location of the site.

7.3 If under very extreme events, levels of floodwater from main river or arterial systems rose to such an extent that the site was affected, the situation would not be sudden. It is highly probable that sufficient time would be available to take precautionary actions to limit the extent and potential impacts of flooding.

7.4 The water levels in the drainage channels and main river systems will tend to rise as a result of the impacts of climate change. However, the existing systems and defences are such that the standard of protection to the site will be appropriate for the design life of the development (100 years). Finished floor levels will be at a minimum of 300mm above existing ground levels.

7.5 The site is located some 1.00km distance from the main river flood embankments and any overtopping or breaching of the defences is considered to have little effect on the development site. The site is shown in Flood Zone 1 of the South Holland Strategic Flood Risk Assessment in year 2115.

8.0 IMPACTS OF FLOODING

8.1 No significant impacts of flooding are anticipated.

8.2 Floor level of the development will be at a minimum of 300mm above existing ground level offering additional protection against impacts arising from any extreme short duration, localised events.

8.3 The developer will ensure that the occupiers of the dwellings 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 including teletext. 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.

The occupiers of the dwellings should register with the Environment Agency Floodline Direct Warnings Service to receive any future flood warnings.

8.4 Safe access and egress to the site is available onto Peterborough Road and hence in a southerly direction to Eye village. Safe refuge is available at first floor level of all the dwellings with no sleeping accommodation at ground floor level.

9.0 RESIDUAL RISK – EXTREME EVENTS

9.1 The residual risk from extreme events is very low on this site, because of its location within an IDB drainage area and protection offered by existing flood defences.

9.2 Although shown in either Flood Zone 1 or Flood Zone 3 according to NPPF classification, the site has a very low risk of flooding due to the current standards of flood defence and surface water drainage with existing land levels. The site is not located within a Functional Flood Plain of any ‘main river’ or ‘main drain’. The Environment Agency Flood Zone Maps have been produced irrespective of existing flood defences and standards of protection. The risk of flooding is not increased in terms of probability by the proposed development.

9.3 In the extreme event of a serious blockage occurring to the IDB main drains coinciding with a high intensity, short duration storm, protection will be afforded by the finished floor levels being at a minimum of 300mm above existing ground level.

10.0 CONCLUSIONS AND RECOMMENDTIONS

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 in the Passive Floodplain of the River Welland and North Level IDB protected by defences to meet the 1 in 100 year return period fluvial event plus climate change.

- Although the site is shown in either Flood Zone 1 or Flood Zone 3 the actual risk of the site flooding from main river is very low (less than 0.5%).

- The site will drain to the arterial system of the North Level Internal Drainage Board via a sustainable drainage scheme approved by the Board – see IDB letter of 24th April 2014.

- Finished floor level of the new dwellings will be at a minimum of 300mm above existing ground level with safe refuge at first floor level and no sleeping accommodation at ground floor.