FLOOD RISK ASSESSMENT FOR PROPOSED RESIDENTIAL DEVELOPMENT OFF MAGELLAN WAY, SPALDING, LINCS.

FINAL REPORT

GEOFF BEEL CONSULTANCY

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GCB/PARSONS & WHITTLEY

CONTENTS

1.0 INTRODUCTION

1.1 An outline planning application is to be submitted by Parsons & Whittley Ltd on behalf of Mr & Mrs J Retchless for proposed residential development at land off Magellan Way, Spalding, Lincs.

1.2 Planning approval requires a Flood Risk Assessment to accompany the application to meet the requirements and general principles contained in the Planning Practice Guidance to the National Planning Policy Framework (NPPF) and for approval by the Environment Agency.

The site is shown within Flood Zone 3 of the Environment Agency's Flood Zone Map. The latest Flood Zone Maps have been created as a tool to raise awareness of flood risk with the public 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 shown within a defended Flood Zone 1 of the South Holland District Council's Strategic Flood Risk Assessment Map and located in the Welland and Deepings Internal Drainage Board district.

1.3 Geoff Beel Consultancy was appointed on 6th March 2017 to undertake a Flood Risk Assessment.

2.0 LOCATION

2.1 The development site is at land off Magellan Way, Spalding. The National Grid Reference of the central point of the site is TF 24302170.

2.2 The position and extent of the site are shown on Fig 1 – Site Plan, Floor Plans and Elevations at the end of the document.

2.3 The site, located within the Welland and Deepings Internal Drainage Board district is shown within Flood Zone 3 as detailed on the Environment Agency Flood Zone Maps and in a defended Flood Zone 1 of the Council's Strategic Flood Risk Assessment Map.

3.0 THE SITE AND SEQUENTIAL TEST

3.1 The site is currently waste ground surrounding a pond.

3.2 The area of development is approximately 0.30 hectare.

3.3 The proposed site layout consists the construction of a new two-storey dwelling with access from Hudson Road.

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 the 1 in 100 year fluvial event by a combination of defences, pumping stations and sluice gates meeting the requirements of NPPF as located in Flood Zone 1 of the Councils' Strategic Flood Risk Assessment and hence the Sequential Test being met.

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 within the Welland and Deepings Internal Drainage Board protected by the River Welland defences to the 1 in 100 year return period flood event. The nearest 'main drain' open watercourse, the Town Drain (Spalding) some 300 metres north west of the site. Land levels at the site are generally at 3.40m aOD.

4.3 The existing standard of drainage for the Welland and Deepings 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 1.00 metre is provided to the lowest land levels.

4.4 The site and surrounding development drains to Anglian Water Services Ltd sewerage and the Boards Town Drain (Spalding) and hence to Pode Hole Pumping Station. The Pode Hole Pumping Station discharges into the Vernatts Drain which ultimately flows into the tidal River Welland.

4.5 The Vernatts Drain is an embanked high level carrier conveying the surface water run-off from some 16165 hectares of land into the tidal River Welland at Surfleet Seas End.

The Welland and Deepings IDB have recently completed a three year programme to raise and strengthen the Vernatts Drain embankments to accommodate with 450mm freeboard, the design flood level of 3.96m aOD, estimated to be a 1 in 100 year return period event.

4.6 Current maintenance standards within the Welland and Deepings Internal Drainage Board 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.

4.7 The fluvial River Welland is located approximately 200 metres to the east of the site with a standard of protection of 1 in 100 years return period. The Crowland and Cowbit Washes are situated upstream of the town on the opposite bank of the River Welland offering integrated protection to Spalding and the surrounding district.

4.8 Fluvial flood levels of the River Welland on the site frontage upstream of Spalding Town Bridge are as follows:

	Present	Present + Climate Change
1%	4.43m	4.68m
0.1%	4.45m	4.68m

4.9 Maintenance standards of the Environment Agency's main rivers and defences are well maintained and regularly inspected for their asset condition.

5.0 POTENTIAL SOURCES OF FLOODING

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

a) local blockages to AWS Ltd sewerage
b) local blockages to existing IDB main drain system.
c) storm return period of 1 in 50 years being exceeded
d) failure of Pode Hole Pumping Station
e) overtopping and breaching of the fluvial River Welland defences

5.2 The probability of flooding from source a) is low due to the standards of sewerage already achieved by Anglian Water Services Ltd. Telemetry systems monitor the performance of the sewerage for any blockage.

5.3 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 Welland and Deepings 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.

5.4 Failure of Pode Hole Pumping Station 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.

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 development. The Boards policy regarding the connection of future developments to the arterial system enables a flexible approach to be adopted and meet the criteria for "sustainable urban drainage".

The probability of the site flooding from this potential source is also considered to be low.

5.5 The possible overtopping and breaching of the fluvial River Welland flood defences which may affect the site under extreme conditions is also considered

to be very low. The standard of defence of 1 in 100 years would have to be exceeded to create such conditions. However, the defences to the site river frontage consist of steel sheet piling and hard defences with no risk of a breach occurring.

5.6 It is therefore recommended that proposed floor levels of the development should be at 4.10m aOD and above existing road level of Hudson Road to safeguard against the remote possibility of overtopping of the River Welland defences. Flood resistant/resilient measures will also be incorporated into the design and construction of the dwelling.

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 levels at 4.10m aOD above Hudson Road carriageway level with flood resistant/resilient measures incorporated.

7.2 The probability of the site flooding with water from any AWS Ltd sewerage system Welland and Deepings river system 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. Similarly the same standard is provided by the Environment Agency's main river and defences.

7.3 If under very extreme events, levels of floodwater from any Environment Agency or Welland and Deepings river 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.

7.4 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 existing floor levels above Hudson Road carriageway level will be appropriate for the design life of the development (i.e. 100 years).

7.5 Safe access and egress to and from the site would be available as land is in Flood Zone 1.

8.0 IMPACTS OF FLOODING

8.1 No significant impacts of flooding are anticipated.

8.2 Floor levels of the development are raised above existing Hudson Road carriageway level offering additional protection against impacts arising from any extreme short duration, localised events. Surface water drainage will be discharged to existing pond.

8.3 The general location of the site within the catchment is such that if flooding occurred from any of the Environment Agency or Welland and Deepings river systems, then probably 2 to 3 days warning time would be available.

8.4 The developer should ensure that the eventual occupiers of the dwelling 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 0345 988 1188.

8.5 No displacement of water from the site will affect any adjoining properties and agricultural land.

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 a pumped sub-catchment of the Welland and Deepings IDB area and its location 200m from the River Welland fluvial defences consisting of vertical steel sheet piling and concrete capping beam and hard defences.

9.2 The site is within Flood Zone 1 according to NPPF classification, with 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.

9.3 South Holland District 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 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 for years 2002 and 2052 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.

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 River Welland and Welland & Deepings IDB defences to a 1 in 100 year return period.

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

- 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.

- Proposed floor levels are above existing Hudson Road carriageway level at 4.10 m aOD with flood resistant/resilient techniques incorporated into the design and construction of the proposed dwelling.

- On site surface water drainage will be discharged to existing pond.