

**FLOOD RISK ASSESSMENT
FOR RESIDENTIAL DEVELOPMENT
AT 101 BRIDGE ROAD,
SUTTON BRIDGE, LINCS.**

FINAL REPORT

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GCB/WRIGHT

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1.0 INTRODUCTION

- 1.1 An outline planning application is to be submitted by Andrew M Wright Chartered Architect on behalf of Mr Brian Pratt for proposed residential development at 101 Bridge Road, Sutton Bridge, Lincs.
- 1.2 Planning approval requires a Flood Risk Assessment to accompany the planning application for approval by the Environment Agency and meet the requirements and general principles contained in the Planning Practice Guidance to the National Planning Policy Framework (NPPF).

The site, as situated is shown within Flood Zone 3 of the Environment Agency Flood Zone Maps. The latest Agency Maps have been created 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 existing flood defences.

The site is also shown within a defended area of the South Holland District Council's Strategic Flood Risk Assessment Maps and located in the South Holland Internal Drainage Board district.

- 1.3 Geoff Beel Consultancy was appointed on 9th May 2016 to undertake the Flood Risk Assessment.

2.0 LOCATION

- 2.1 The development site is located at 101 Bridge Road being west of the River Nene tidal defences at Sutton Bridge.
- 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 Zone Maps and in a defended area of the Council's Strategic Flood Risk Assessment.

3.0 THE SITE AND SEQUENTIAL TEST

- 3.1 The site is currently garden to 101 Bridge Road.
- 3.2 The area of development is approximately 0.074 hectare with existing access to Bridge Road. Ground levels through the site vary between 3.70m and 4.14m aOD with Bridge Road carriageway at 4.32m aOD.
- 3.3 The proposed site layout consists the construction of two chalet bungalows.
- 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 100 year fluvial and 1 in 200 year tidal events meeting the requirements of NPPF.

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 area at Sutton Bridge is protected by the west embankment of the River Nene tidal defences at a level of 6.30m aOD.

- 4.2 The site and surrounding areas of development drain in a generally southerly direction to the Sutton Bridge Main Drain to discharge into the tidal River Nene as part of the South Holland Main Drain catchment of the Internal Drainage Board.
- 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 tidal 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 Board's 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 existing sewerage
- b) local blockages to IDB main drain
- c) storm return period of 1 in 50 years being exceeded
- d) overtopping of River Nene tidal defences at Sutton Bridge

- 5.2 The probability of flooding from sources a) and b) is low due to the maintenance standards already achieved and managed by Anglian Water Services Ltd and the IDB.

The probability of flooding from c) 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.

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 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”.

5.4 The possible overtopping and breaching of the tidal River Nene defences at Sutton Bridge is also considered to be low. The Environment Agency has carried out the River Nene Strategic Study Report (1995) and concluded that the defences provide a level of protection against 1 in 200 years period tidal event.

Breach and overtopping analysis has been obtained from the South Holland District Council Strategic Flood Risk Assessment and the Environment Agency Tidal Hazard mapping to satisfy the requirements of NPPF.

5.5 The latest published Maps of the South Holland District Council Strategic Flood Risk Assessment (January 2010) indicate that the site could be flooded with up to 500mm of water during modelled events inclusive of climate change.

5.6 The latest Tidal Hazard Mapping produced by the Environment Agency also shows part of the site as liable to flooding between 0.25-0.50m and the remainder between 0.50–1.00m and it is necessary to mitigate against this remote risk by raising finished floor levels minimum of 620mm above existing ground level at carriageway level of Bridge Road of 4.32m aOD with flood resilient construction 300mm above finished floor levels.

6.0 EXTENT OF KNOWN FLOODING

6.1 During the preparation of this assessment, no evidence was discovered of the site being flooded and adjoining properties during the tidal surge event of January 1978 since when tidal defences have been raised and strengthened to a 1 in 200 year standard of protection.

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 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 0.5% 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 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 raising of floor level a minimum of 620mm above existing ground level with flood resilient construction incorporated will be appropriate for the design life of the development (i.e. 100 years).
- 7.6 Safe and dry access is available onto Bridge Road and hence in a north westerly direction to Long Sutton where land is located in Flood Zone 1.

8.0 IMPACTS OF FLOODING

- 8.1 No significant impacts of flooding are anticipated.
- 8.2 Floor level of the development will be a minimum of 620mm above existing ground level offering additional protection against impacts arising from any extreme short duration, localised events. No displacement of water from the site will affect any adjoining properties.
- 8.3 The general location of the site within the catchment is such that if flooding occurred from any of the South Holland main drain systems, then probably 2 to 3 days warning time would be available.
- 8.4 The developer should ensure that the eventual 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 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 dwellings should register with the Floodline Direct Warnings Service to receive any future flood warnings.

9.0 RESIDUAL RISK – EXTREME EVENTS

- 9.1 The residual risk from extreme events is very low on this site, because of its location, existing land level and tidal flood defences with the standard of surface water drainage already provided.
- 9.2 Although within Flood Zone 3 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 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 IDB's within the Council area have recently completed a Level 2 Strategic Flood Risk Assessment of the whole District.

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 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 Strategic Flood Risk Assessment the South Holland IDB area has been determined as providing protection against a 1 in 100 year return period event whilst the River Nene tidal defences at Sutton Bridge provide protection against a 1 in 200 year return period event.

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 tidal defences to a 1 in 200 year return period, (0.5%) and fluvial defences of 1 in 100 year return period (1.0%).
- As a result of the South Holland District Council Strategic Flood Risk Assessment the site is in a defended area, the actual risk of site flooding from any South Holland IDB main drain system is 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. The Boards policy is to continue to provide a standard of drainage of 1 in 100 year return.
- On site surface water drainage will be discharged via existing sewerage of Anglian Water Services Ltd and hence to a South Holland IDB main drain.
- Floor level of the dwellings will be raised 620mm above existing ground level at 4.32m aOD with flood resilient measures incorporated into the design and construction of the dwelling up to 300mm above finished floor level.
- Safe refuge is available at first floor level of the new dwellings with no sleeping accommodation on the ground floor.