FLOOD RISK ASSESSMENT FOR PROPOSED REPLACEMENT DWELLING AT EYE FARM, 168 BROADGATE, SUTTON ST. EDMUND, LINCS.

FINAL REPORT

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GCB/COOPER

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1.0 INTRODUCTION

1.1 A full planning application is to be submitted by Cooper Architectural Design Ltd on behalf of Mr & Mrs C Winch for proposed replacement dwelling at Eye Farm, 168 Broadgate, Sutton St. Edmund, 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 Agency's 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 Hazard Zone of the South Holland District Council's Strategic Flood Risk Assessment Maps (2010).

The site is also located in the North Level IDB drainage district.

1.3 Geoff Beel Consultancy was appointed on 25th September 2013 to undertake a Flood Risk Assessment.

2.0 LOCATION

2.1 The development site is located at Eye Farm, 168 Broadgate, Sutton St. Edmund. The National Grid Reference of the central point of the development is TF36751197.

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 North Level 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 Council's Strategic Flood Risk Assessment Maps (2010) as defended by the Agency's tidal defences and the Internal Drainage Board system.

3.0 THE SITE AND SEQUENTIAL TEST

3.1 The site is currently an agricultural holding.

3.2 The area of development is approximately 0.20 hectare.

3.3 The proposed site layout consists the construction of a replacement two-storey dwelling with access off Broadgate. Existing Broadgate carriageway level is generally at 2.00m aOD.

3.4 The Sequential Test is met as the site is located in Flood Zone 1 of the Council's 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 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 development site within the North Level Internal Drainage Board is protected by the River Nene tidal defences with embankment levels of a minimum of 7.00m aOD.

4.2 The site and the surrounding land drains by gravity to the North Level Main Drain and hence Tydd Pumping Station to discharge into the tidal River Nene at Tydd Gote.

4.3 The existing standard of drainage for the North Level 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 North Level 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 Tydd Pumping Station
d) overtopping and breaching of defences of the 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 North Level 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.

Sustainable drainage system from the development will be via soakaways designed to BRE365 requirements and Building Regulations approval

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".

The Board has confirmed that the North Level IDB Main Drain has a maximum design water level of minus 1.35m aOD. The drains therefore provide protection against the 1 in 100 year return period event with freeboard of some 3.35m above proposed finished floor level.

5.3 Failure of Tydd 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.

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

The site is located 9.00kms west of the River Nene tidal defences which were raised and strengthened after the 1978 surge event.

More recent studies by the Environment Agency have concluded a design water level for the 1 in 200 year tidal event between Sutton Bridge and Wisbech to be below existing tidal defence crest level with sufficient freeboard to take into account sea level rise during the next 100 years.

More recent hydraulic modelling carried out by the Environment Agency indicated the site to be outside any risk of floodwaters arising from a breach of the River Nene tidal defences.

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 and the South Holland Strategic Flood Risk Assessment Hazard Zone Maps show the site to be outside of any floodwaters arising from a breach of defences in 2115.

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 North Level 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 North Level 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 a minimum of the Broadgate carriageway level of 2.00m aOD will be appropriate for the design life of the development (i.e. 100 years). Safe refuge would be available at first floor level of the replacement dwelling with no sleeping accommodation on the ground floor.

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 the Broadgate carriageway level of 2.00m aOD which together with the proposed sustainable 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 North Level 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 a proposed sustainable drainage system will be implemented by way of soakaways designed to BRE365 requirements and Building Regulations approval.

8.5 The developer should ensure that the eventual occupiers of the replacement 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 no: 0845 988 1188 and the occupiers of the replacement dwelling should register with the Floodline Direct Warnings Service to receive 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, within the North Level IDB area and its location 9.00kms from the River Nene tidal defences with secondary defences between the river frontage and the site.

9.2 Although within either fluvial Flood Zone 1 or 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 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. It is also located outside any risk of flooding on the Environment Agency Tidal Hazard Mapping.

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 tidal River Nene and North Level IDB protected by defences to a 1 in 200 year return period, (1.0%)

- Although the site is in either Flood Zone 1 or Flood Zone 3, the actual risk of site flooding from any Environment Agency river system is 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 surface water run-off from the development will be discharged to soakaways designed to BRE365 requirements and Building Regulations approval.

- Floor level of the development will be at a minimum of Broadgate carriageway level of 2.00m aOD with safe refuge and all sleeping accommodation at first floor level.