FLOOD RISK ASSESSMENT FOR PROPOSED AGRICULTURAL DEVELOPMENT AT THE MAPLES, 37b GREAT FEN ROAD, SOHAM, ELY, CAMBS.

FINAL REPORT

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GCB/CANTAB

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1.0 INTRODUCTION

1.1 A planning application for agricultural development is to be submitted by Cantab. Design Ltd on behalf of Mr & Mrs M Hill at The Maples,37b Great Fen Road, Soham, Ely, Cambs.

1.2 A Flood Risk Assessment is required to accompany the planning application and 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, as situated, is located within Flood Zone 3 of the Environment Agency's Flood Map for Planning. 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 existing flood defences. The site is also within the Middle Fen & Mere Internal Drainage Boards area.

1.3 Geoff Beel Consultancy was appointed on 14th November 2023 to undertake a Flood Risk Assessment.

1.4 A previous Flood Risk Assessment prepared by the author in January 2021 received approval from the Environment Agency as part of planning application 20/01486/VAR approved on 14th April 2021.

2.0 LOCATION

2.1 The development site is located at The Maples, 37b Great Fen Road, Soham. The site is 4.00kms east of the River Ely Ouse and 2.00kms west of the River Lark.

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

2.3 The site is located in Flood Zone 3 of the River Ely Ouse and River Lark and within the catchment area of the Middle Fen & Mere Internal Drainage Board.

3.0 THE SITE AND SEQUENTIAL TEST

3.1 The site is currently agricultural land.

3.2 The area of development is approximately 0.04 hectare with vehicular access off Great Fen Road and the proposed layout consists a shed for storage of agricultural machinery.

3.3 The Sequential Test and Exception Test will require to be applied but the development may be permitted as protected against the 1 in 100 year fluvial event inclusive of climate change, meeting the requirements of the National Planning Policy Framework (NPPF). The Sequential Test is met as adjacent residential development planning approval is already in place.

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 catchment area of the Middle Fen & Mere Internal Drainage Board with the nearest main drain 600 metres north-west of the site. Level of Great Fen Road carriageway is generally at zero OD.

4.3 The existing standard of drainage for the Middle Fen & Mere IDB is assessed at 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 The site and surrounding land drains by gravity to the Prickwillow Pumping Station to discharge into the River Lark.

4.5 The River Ely Ouse and the River Lark are embanked main rivers, the responsibility of the Environment Agency, with operating water levels controlled by the sluices and weirs of the Denver Complex, some 25.00kms downstream of the development site.

4.6 The Environment Agency has commissioned in recent years the Ely Ouse Flood Defences Strategy; carried out by its Consulting Engineers. This Strategy included a hydraulic model of the Ely Ouse System extending from Bottisham Lock on the River Cam to the Wash downstream of Kings Lynn.

As a result of this study, the Ely Ouse and River Lark flood defences have a minimum protection of 1 in 100 years return period against a fluvial event. There is a long-term strategy for the maintenance of the defences, which is reviewed and updated every 5 years. The main element of the strategy is the development of a programme for protecting the river-banks from erosion.

The study also took into account the consequences of a combined tidal and fluvial event occurring at the Denver Complex. The probability of such extreme events occurring at the same time is negligible and would not affect the Ely Ouse defences.

Likewise the study analysed the impacts of climate change which the hydraulic model identified as a 250mm increase in sea level on fluvial flooding. This was found to have little effect on the 1 in 100 year fluvial flood event and well within the freeboard allowances of the Ely Ouse defences.

Current maintenance standards of the Middle Fen & Mere IDB and the Environment Agency's flood embankments are generally 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 Five potential sources of flooding have been identified as a result of this assessment:

a) local blockages to proposed soakaway drainage and IDB system
b) storm return period of 1 in 50 years being exceeded
c) failure of Prickwillow Pumping Station
d) overtopping and breaching of the River Lark flood defences
e) overtopping and breaching of the River Ely Ouse flood defences

5.2 The probability of flooding from source a) is low due to the standards of proposed soakaway drainage to BRE365 design and meeting Building Regulations approval and to the maintenance standards already achieved and managed by IDB.

The probability of flooding from b) is also low due to the Middle Fen & Mere 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 Failure of Prickwillow 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 Overtopping and breaching of the River Lark flood defences is also considered to be a low risk as a result of the Ely Ouse Flood Defences Strategy which identified a minimum protection of 1 in 100 years allowing for climate change and the effect of a tidal event combining with a fluvial event. Existing River Lark defence level upstream of Prickwillow Pumping Station is 3.52m aOD.

The site is approximately 2.00kms from the River Lark defence embankment if a breach occurred and it is advisable to adopt a sequential based precautionary approach to cater for the catastrophic event and floor level has been raised 300mm above ground level with flood resilient construction up to 300mm above finished floor level.

5.5 Overtopping and breaching of the Ely Ouse flood defences is also considered to be a low risk as a result of the Ely Ouse Flood Defences Strategy which identified a minimum protection of 1 in 100 years allowing for climate change and the effect of a tidal event combination with a fluvial event. Existing defence level of the River Ely Ouse bank is 4.28m aOD.

The development is of a shed for storage of agricultural machinery in case of breaching or overtopping of the flood defences. The site is located in Flood Zone 3 but may be considered to be safe from effects of any flooding.

5.6 More recent Flood Data obtained from the Environment Agency shows the site could be flooded by between 0.25 – 0.50m of floodwaters. It is necessary to mitigate against this remote risk of flooding and floor level has been raised 300mm above ground level with a further 300mm of flood resilient construction above finished floor level.

5.7 The developer should ensure that the eventual occupiers of the agricultural shed 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 contacting 0345 988 1188 and the occupants should register with the Floodline Direct Warning Service to receive future flood warnings.

5.8 The standard of protection provided by the proposed soakaway surface water drainage and existing standard of IDB drainage gives a low risk of flooding due to high groundwater, overland flow and any surcharging of systems due to prolonged or intense rainfall.

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 development flooding from localised drainage systems is very low. It is also intended to construct floor level 300mm above existing land level with flood resilient construction incorporated.

7.2 The probability of the site flooding with water from any Environment Agency system is less than 1% because of the standards of the existing flood defence systems, storage within existing drainage channels and proposed floor level of the development.

7.3 If under very extreme events, levels of floodwater from the River Lark or the River Ely Ouse and the Middle Fen & Mere IDB main drain 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 raising of floor level 300mm above ground level with a further 300mm of flood resilient construction above finished floor level will be appropriate for the design life of the development (i.e. 60 years). No adverse effect will be suffered at the site.

8.0 IMPACTS OF FLOODING

8.1 No significant impacts of flooding are anticipated due to the existing standards of drainage and the proposals for soakaway drainage and rainwater harvesting.

8.2 Floor level of the development will be 300mm above existing land level with flood resilient construction incorporated.

8.3 The general location of the site within the catchment is such that if flooding occurred from the River Lark or the River Ely Ouse and Middle Fen & Mere IDB main drain systems, then probably sufficient warning time would be available.

8.4 Displacement of water from the site will not affect any adjoining properties and agricultural land due to the proposed soakaway drainage being designed to BRE365 standard and approved as part of Building Regulations.

8.5 Safe access/egress is available onto Great Fen Road and hence in a southerly direction to Soham where land is in Flood Zone 1.

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 catchment and the level of protection offered by the River Lark and the River Ely Ouse defences and standard of drainage within the IDB area with proposed floor level compared to surrounding land and road level.

9.2 In the extreme event of a serious blockage or pumping station failure occurring to the arterial drainage system, protection will be afforded by the proposed raising of floor level to 300mm above ground level with flood resilient construction up to 300mm above finished floor level.

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 of the River Lark and River Ely Ouse and within a defended Flood Zone 3 but may be considered as being safe from flooding.

- Although the site is located within a Internal Drainage Board catchment with a minimum standard of drainage of 1 in 50 years, this accords with Defra guidelines for rural development. Freeboard of 900mm to lowest land level is available for events greater than 1 in 50 years providing further storage within the drainage channels.

- Floor level will be raised to 300mm above existing land level with flood resilient construction up to 300mm above finished floor level.

- Surface water drainage from the development will be by rainwater harvesting and soakaway drainage to BRE365 design and Building Regulations approval.