

**FLOOD RISK ASSESSMENT FOR
PROPOSED RESIDENTIAL DEVELOPMENT
AT TWENTY PENCE ROAD,
COTTENHAM, CAMBS.**

FINAL REPORT

GEOFF BEEL CONSULTANCY

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GCB/GREEN PLANNING

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1.0 INTRODUCTION

- 1.1 A full planning application is to be submitted by Green Planning Studio Ltd on behalf of Messrs D Price & J Ball for proposed residential development of land south of Chear Fen Boat Club, Twenty Pence Road, Cottenham, Cambs.
- 1.2 Planning approval requires a Flood Risk Assessment to be submitted to the Environment Agency to meet the requirements and general principles contained in the Planning Practice Guidance of the National Planning Policy Framework (NPPF).

The majority of the site is situated within Flood Zone 1 with a small area in defended Flood Zone 3 as shown on the Agency's Flood Maps for Planning. The latest Environment Agency Maps have been created as a tool to raise awareness of flood risk with the public and their partner organisations, such as Local Authorities, Emergency Services and Drainage Authorities. The Maps take into account existing flood defences and standards of protection..

The site is also within the Old West Internal Drainage Board's area

- 1.3 Geoff Beel Consultancy was appointed on 9th May 2022 to undertake a Flood Risk Assessment.

2.0 LOCATION

- 2.1 The development site is located on land south of Chear Fen Boat Club, Twenty Pence Road, Cottenham. The National Grid Reference of the central point of the site is TL 48157115.
- 2.2 The position and extent of the site is shown on Fig 1 – Location Plan and Fig 2 – Proposed Block Plan.
- 2.3 The majority of the site is located in Flood Zone 1 with a small area in defended Flood Zone 3 of the River Ely Ouse and within the catchment area of the Old West Internal Drainage Board.

3.0 THE SITE AND SEQUENTIAL TEST

- 3.1 The site is currently waste ground.
- 3.2 The area of development is approximately 5.25 hectares with existing vehicular access off the Twenty Pence Road.
- 3.3 The proposed site layout consists of a central access road off Twenty Pence Road to service a 9 pitch travellers site with a package treatment plant and drainage field to discharge foul drainage with soakaway drainage for surface water run-off.
- 3.4 The Sequential Test and Exception Test should be applied but the development may be permitted as the majority of the site is in Flood Zone 1 and is protected against the 1 in 100 year return period fluvial event and in a defended flood zone.

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 very small.
- 4.2 The site is located within the catchment of the Old West Internal Drainage Board with an existing Board's main drain located on the northern boundary to the development. Land level at the site is generally at 2.00m aOD.
- 4.3 The existing standard of drainage for the Old West 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 Chear Fen Engine Pumping Station to discharge into the Old West River and hence to the River Ely Ouse.
- 4.5 The Old West River and the River Ely Ouse 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 30.0kms 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 River Ely Ouse System and the Old West River extending from Bottisham Lock on the River Cam downstream of Cambridge to the Wash downstream of Kings Lynn.

As a result of this study, the River Ely Ouse 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 River 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 River Ely Ouse defences.

- 4.7 Current maintenance standards of the Old West IDB main drains 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 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 IDB system
- b) storm return period of 1 in 50 years being exceeded
- c) failure of Chear Fen Engine Pumping Station
- d) overtopping and breaching of the River Ely Ouse flood 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 Old West 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 Chear Fen Engine 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 Ely Ouse flood defences is also considered to be a low risk as a result of the River 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.

- 5.5 The occupiers of the travellers site should be made 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.

- 5.6 The standard of protection provided by the existing IDB main drain system 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 retain ground levels as existing at 2.00m aOD. The present proposals will not have any adverse impact or increase the risk of flooding to adjoining land and property.
- 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 existing land level of the site.
- 7.3 If under very extreme events, levels of floodwater from the River Ely Ouse and the Old West 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 development proposals will be appropriate for the design life of the development (i.e. 60 years). No adverse effect will be suffered at the site.
- 7.5 Safe access and egress is available in a southerly direction via the Twenty Pence Road and hence to Cottenham where facilities are in Flood Zone 1.

8.0 IMPACTS OF FLOODING

- 8.1 No significant impacts of flooding are anticipated due to the existing standards of drainage provided by the Internal Drainage Board.
- 8.2 The general location of the site within the catchment is such that if flooding occurred from the River Ely Ouse and Old West IDB main drain systems, then probably sufficient warning time would be available.
- 8.3 Displacement of water from the site will not affect any adjoining properties and agricultural land due to the existing standard of drainage provided by the Internal Drainage Board.

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 Ely Ouse and the Old West IDB defences to surrounding land and road levels.
- 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 storage available within the IDB system and only affect existing agricultural land.

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 Old West River and River Ely Ouse.
- 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 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.
- Development will be at existing ground level of 2.00m aOD with the permanent caravans positioned some 400mm above ground level.
- Surface water run-off will be discharged via soakaways to BRE365 design requirements and Building Regulations approval.