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**FLOOD RISK ASSESSMENT
FOR PROPOSED
AGRICULTURAL WORKER'S
DWELLING AT FORTY ACRE
POULTRY UNIT,
GUANOCKGATE ROAD,
SUTTON ST EDMUND,
SPALDING, LINCOLNSHIRE**

**Project Number:
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FLOOD RISK ASSESSMENT FOR PROPOSED AGRICULTURAL WORKER'S DWELLING AT FORTY ACRE POULTRY UNIT, GUANOCKGATE ROAD, SUTTON ST EDMUND, SPALDING, LINCOLNSHIRE

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Signed:

Date: 21 August 2024

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Director



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Date: 21 August 2024

Issue	Revision	Revised by	Approved by	Revised Date

For the avoidance of doubt, the parties confirm that these conditions of engagement shall not and the parties do not intend that these conditions of engagement shall confer on any party any rights to enforce any term of this Agreement pursuant of the Contracts (Rights of third Parties) Act 1999.

The Appointment of Alan Wood & Partners shall be governed by and construed in all respects in accordance with the laws of England & Wales and each party submits to the exclusive jurisdiction of the Courts of England & Wales.



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Appendix A: Site Layout Drawings

1.0 **INTRODUCTION**

1.1 **Background**

- 1.1.1 Alan Wood & Partners were commissioned by C.S. Gent & Sons Ltd to prepare a Flood Risk Assessment for a proposed Poultry Unit on land at Forty Acre Poultry Unit, Guanacaste Road, Sutton St Edmund, Spalding in support of an application for planning consent.
- 1.1.2 A Flood Risk Assessment (FRA) for the proposed development is required to assess the development's risk from flooding.

1.2 **Layout of Report**

- 1.2.1 Section 1 provides an introduction to the FRA, explains the layout of this FRA and provides an introduction to flood risk and the latest guidance on development and flood risk in England.
- 1.2.2 Section 2 provides an introduction to the site. The site description is based upon a desktop study and information provided by the developer. In order to obtain further information on flood risk, consultation was undertaken with the Environment Agency.
- 1.2.3 Section 3 of this report details the development proposals and considers the development proposals in relation to the current planning policy on development and flood risk in England (and what type of development is considered appropriate in different flood risk zones). National Planning Policy Framework (NPPF): and its associated Technical Guidance (Communities and Local Government, July 2021) is the current planning policy on flood risk in England, and an introduction to NPPF is provided below.
- 1.2.5 Section 4 of this report considers the flood risk to site, and the potential for the development proposals to impact on flood risk. The assessment of flood risk is based on the latest planning policy and utilises all the information gathered in the preparation of the report.
- 1.2.7 Section 5 of this report provides details of any recommendations for further work to mitigate against possible flooding.

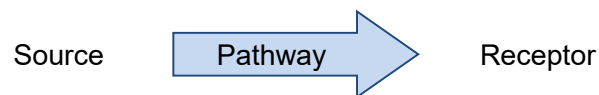
1.2.8 Section 6 of this report provides a summary of the report.

1.3 Flood Risk

1.3.1 Flood risk takes account of both the probability and the consequences of flooding.

1.3.2 Flood risk = probability of flooding x consequences of flooding

1.3.3 Probability is usually interpreted in terms of the return period, e.g. 1 in 100 and 1 in 200 year event, etc. In terms of probability, there is a 1 in 100 (1%) chance of one or more 1 in 100 year floods occurring in a given year. The consequence of flooding depends on how vulnerable a receptor is to flooding. The components of flood risk can be considered using a source-pathway-receptor model.



1.3.4 Sources constitute flood hazards, which are anything with the potential to cause harm through flooding (e.g. rainfall extreme sea levels, river flows and canals). Pathways represent the mechanism by which the flood hazard would cause harm to a receptor (e.g. overtopping and failure of embankments and flood defences, inadequate drainage and inundation of floodplains). Receptors comprise the people, property, infrastructure and ecosystems that could potentially be affected should a flood occur.

1.4 National Planning Policy Framework

1.4.1 General

1.4.1.1 NPPF and its associated Technical Guidance replaces Planning Policy Statement 25 and provides guidance on how to evaluate sites with respect to flood risk.

1.4.1.2 A summary of the requirements of the NPPF is provided below.

1.4.2 Sources of Flooding

1.4.2.1 The NPPF requires an assessment to flood risk to consider all forms of flooding and lists six forms of flooding that should be considered as part of a flood risk assessment. These forms of flooding are listed in Table 1, along with an explanation of each form of flooding.

Table 1: Forms of flooding

Flooding from Rivers (Fluvial Flooding)
Watercourses flood when the amount of water in them exceeds the flow capacity of the river channel. Flooding can either develop gradually or rapidly, depending on the characteristics of the catchment. Land use, topography and the development can have a strong influence on flooding from rivers.
Flooding from the Sea (Tidal Flooding)
Flooding to low-lying land from the sea and tidal estuaries is caused by storm surges and high tides. Where tidal defences exist, they can be overtopped or breached during a severe storm, which may be more likely with climate change.
Flooding from Land (Pluvial Flooding)
Intense rainfall, often of short duration, that is unable to soak into the ground or enter drainage systems can run quickly off land and result in local flooding. In developed areas this flood water can be polluted with domestic sewage where foul sewers surcharge and overflow. Local topography and built form can have a strong influence on the direction and depth of flow. The design of development down to a micro-level can influence or exacerbate this. Overland flow paths should be taken into account in spatial planning for urban developments. Flooding can be exacerbated if development increases the percentage of impervious area.

Flooding from Groundwater
Groundwater flooding occurs when groundwater levels rise above ground levels (i.e. groundwater issues). Groundwater flooding is most likely to occur in low-lying areas underlain by permeable rocks (aquifers). Chalk is the most extensive source of groundwater flooding.
Flooding from Sewers
In urban areas, rainwater is frequently drained into sewers. Flooding can occur when sewers are overwhelmed by heavy rainfall and become blocked. Sewer flooding continues until the water drains away.
Flooding from Other Artificial Sources (i.e. reservoirs, canals, lakes and ponds)
Non-natural or artificial sources of flooding can include reservoirs, canals and lakes. Reservoir or canal flooding may occur as a result of the facility being overwhelmed and /or as a result of dam or bank failure.

1.4.3 Flood Zones

- 1.4.3.1 For river and sea flooding, the NPPF uses four Flood Zones to characterise flood risk. These Flood Zones refer to the probability of river and sea flooding, ignoring the presence of defences, and are detailed in Table 2.

Table 2: Flood zones

Flood Zone	Definition
1	Low probability (less than 1 in 1,000 annual probability of river or sea flooding in any year (<0.1%).
2	Medium probability (between 1 in 100 and 1 in 1,000 annual probability of river flooding (1%-0.1%) or between 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5%-0.1%) in any year).
3a	High probability (1 in 100 or greater annual probability of river flooding (>1%) in any year or 1 in 200 or greater annual probability of sea flooding (>0.5%) in any given year).
3b	This zone comprises land where water has to flow or be stored in times flood. Land which would flood with an annual probability of 1 in 20 (5%) or is designed to flood in an extreme flood (0.1%) should provide a starting point for discussions to identify functional floodplain.

1.4.4 Vulnerability

1.4.4.1 NPPF classifies the vulnerability of developments to flooding into five categories. These categories are detailed in Table 3.

Table 3: Flood risk vulnerability classification

Flood Risk Vulnerability Classification	Examples of Development Types
Essential Infrastructure	- Essential utility infrastructure including electricity generating power stations and grid and primary substations - Wind turbines
Highly Vulnerable	- Police stations, ambulance stations, fire stations, command centres and telecommunications installations required to be operational during flooding. - Emergency dispersal points. - Basement dwellings. - Caravans, mobile homes and park homes intended for permanent residential use.
More Vulnerable	- Hospitals. - Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels. - Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels. - Non-residential uses for health services, nurseries and educational establishments. - Sites used for holiday or short-let caravans and camping.
Less Vulnerable	- Building used for shops, financial, professional and other services, restaurants and cafes, hot foot takeaways, offices, general industry, storage and distribution, non-residential institutions not included in "more vulnerable" and assembly and leisure. - Land and buildings used for agriculture and forestry.
Water Compatible	- Docks, marinas and wharves. - Water based recreation (excluding sleeping accommodation). - Lifeguard and coastguard stations. - Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms.

- 1.4.4.2 Based on the vulnerability of a development, NPPF states within what Flood Zones(s) the development is appropriate. The flood risk vulnerability and Flood Zone 'compatibility' of developments is summarised in Table 4.

Table 4: Flood risk vulnerability and flood zone compatibility

Flood Risk Vulnerability Classification		Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	1	✓	✓	✓	✓	✓
	2	✓	✓	Exception Test	✓	✓
	3a	Exception Test	✓	x	Exception Test	✓
	3b	Exception Test	✓	x	x	x

1.4.5 The Sequential Test, Exception Test and Sequential Approach

- 1.4.5.1 The Sequential Test is a risk-based test that should be applied at all stages of development and aims to steer new development to areas with the lowest probability of flooding (Zone 1). This is applied by the Local Planning Authority by means of a Strategic Flood Assessment (SFRA).
- 1.4.5.2 The SFRA and NPPF may require the Exception Test to be applied to certain forms of new development. The test considers the vulnerability of the new development to flood risk and, to be passed, must demonstrate that:
- There are sustainability benefits that outweigh the flood risk and;
 - The new development is safe and does not increase flood risk elsewhere.
- 1.4.5.3 The Sequential Approach is also a risk-based approach to development. In a development site located in several Flood Zones or with other flood risk, the sequential approach directs the most vulnerable types of development towards areas of least risk within the site.

1.4.6 Climate Change

- 1.4.6.1 There is a planning requirement to account for climate change in the proposed design. The recommended allowances should be based on the most relevant guidance from the Environment Agency and the Lead Local Flood Authority.

2.0 EXISTING SITE DESCRIPTION

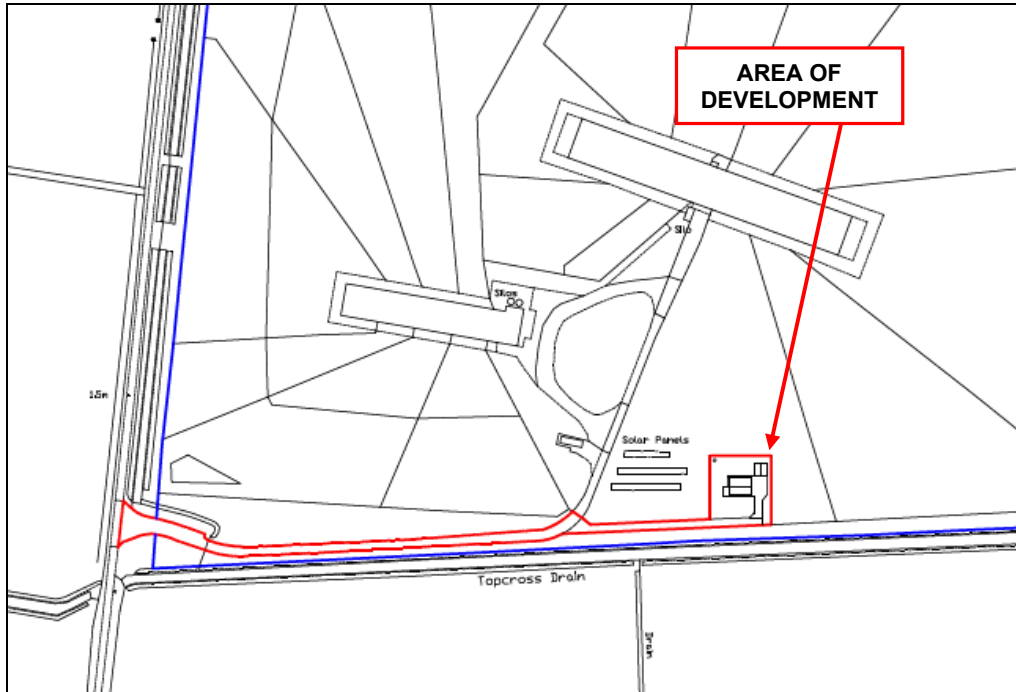
2.1 Location

- 2.1.1 The proposed development site is located to the east of Guanockgate Road within the Forty Acre poultry unit site
- 2.1.2 The application site lies approximately 1.4 km to the north of the village of Parsons Drove, approximately 2.4km to the north east of the hamlet of Throckenholt, approximately 3.2km to the south of Sutton St Edmund and approximately 8.6km to the west of Wisbech
- 2.1.3 An aerial photograph and location plan are included in Figures 1 and 2 below, which identify the location of the site.

Figure 1: Aerial Photograph



Figure 2: Site Location Plan



2.1.4 The Ordnance Survey grid reference for the centre of the site development is approximately 537415, 310075

2.2 Site Description

2.2.1 The area of the proposed development currently comprises agricultural land.

2.3 Surrounding Features

2.3.1 The application site lies within an extensive area of agricultural land, with the existing poultry building situated to the north west of the site.

2.3.2 There is a large open drainage ditch (North Level Main Drain) situated to the south east of the site in close proximity to the development.

2.3.3 There are a large number of agricultural ditches present within the surrounding agricultural land, which drain the low-lying land towards the River Nene and the coast.

2.3.4 The River Nene is situated approximately 8km to the east and 8km to the south of the development.

2.3.5 The coastline of the North Sea lies to the east of the site, with The Wash lying approximately 25km to the north east of the site.

2.4 Topography

2.4.1 LIDAR data has been obtained which shows that the existing ground levels over the area of the proposed development vary from approximately 0.20m to 0.53m OD(N)

2.4.2 The existing ground level over the footprint of the proposed dwelling is shown to be 0.35m OD(N).

2.5 Ground Conditions

2.5.1 A desktop study of the British Geological Survey map shows that the local geology comprises of superficial deposits of Tidal Flats Deposits – Clay and Silt overlaying bedrock comprising West Walton Formation and Amptill Clay Formation - Mudstone

2.5.2 A study of the local groundwater maps show that the site does not overlay an aquifer and lies in an area where the groundwater vulnerability classification is unproductive.

3.0 PROPOSED DEVELOPMENT

3.1 Development Proposals

- 3.1.1 The proposed development comprises the construction of a two--storey agricultural worker's dwelling together with a domestic garage and an access driveway.
- 3.1.2 Drawings showing details of the proposed development are included in Appendix A.

3.2 Flood Risk

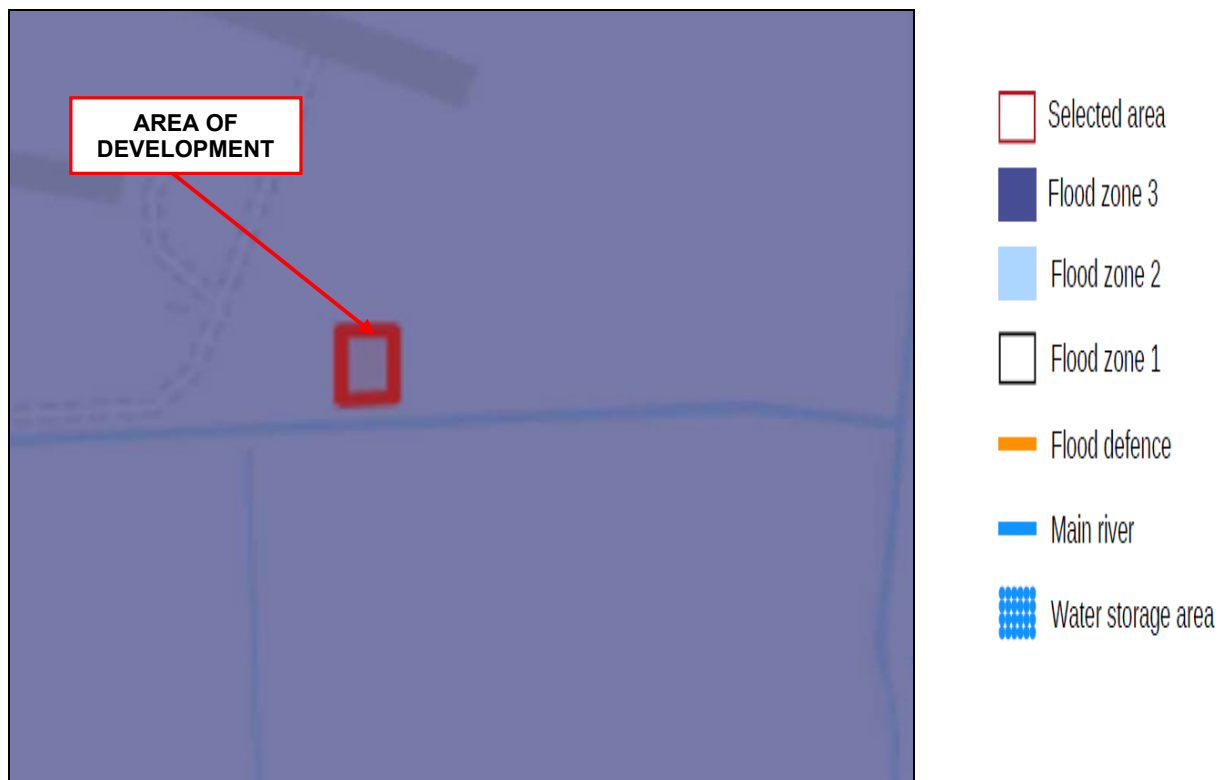
- 3.2.1 In terms of flood risk vulnerability, the construction of buildings for residential use is classed as 'More Vulnerable' development (Table 3).
- 3.2.2 In terms of flood zone compatibility, the development will require an Exception Test to justify the construction of 'More Vulnerable' development in Flood Zone 3 (Table 4).

4.0 FLOOD RISK ASSESSMENT

4.1 Flood Zone

- 4.1.1 A copy of the Environment Agency Flood Map for Planning is included in Figure 3 below, which shows that the site lies in Flood Zone 3, (high probability of flooding), comprising land assessed as having a 1 in 100 or greater annual probability of river flooding or a 1 in 200 year or greater annual probability of flooding from the sea.

Figure 3: Environment Agency Flood Map for Planning dated August 2024



4.2 Fluvial Flooding

- 4.2.1 The River Nene is situated approximately 8km to the east and 8km to the south of the application site.
- 4.2.2 At this distance from the site. The river is not considered to pose any risk of flooding to the development should there be a failure of the river defences.

4.2.3 The risk to the development from fluvial flooding is therefore considered to be low and acceptable.

4.2.4 However, the river outfalls into The Wash to the north east of the site and is therefore tidally influenced. The discharge becomes restricted at periods of high tidal levels in The Wash, which can result in the river overtopping its' banks during periods of excessive rainfall.

4.3 Tidal Flooding

4.3.1 The application site lies approximately 25km from the coastline of the North Sea. Due to the low-lying nature of the land in this region, the application site lies within an extensive area of land which is shown to be at risk from tidal flooding should the sea defences be breached or overtopped during a future flood event.

4.3.2 Flood risk data previously obtained from the Environment Agency shows that the predicted 1 in 200 tidal flood level in the River Nene, including climate change, is approximately 5.78m OD(N), whilst the predicted coastal water level is 6.21m(OD9N)

4.3.3 The anticipated sea level rise over the 100-year lifetime of the development is shown to be 1.60m on the data produced by the Environment Agency, which would result in a future flood level of 6.21m OD(N).

4.3.4 The site is located approximately 25 km from the nearest coastline and consequently the flood waters will have dissipated, spreading out over a considerable area of land before reaching the development site during a tidal flood event.

4.3.5 The water level is therefore expected to be significantly lower after the flooding has dissipated before reaching the site, generally reaching a shallow ponding level.

4.3.6 Once the tidal levels have fallen the flood waters would begin to be channelled back into the sea, with further flooding then ensuing on the next high tide.

-
- 4.3.7 As the area is prone to tidal flooding the local rivers and watercourses are tidally influenced and their discharge is restricted, which can result in them overtopping during a tidal flood situation exacerbating the overall flood situation.
- 4.3.8 At a distance of 25km from the coastline it is considered unlikely that the resultant depth of flooding at the location of the development could exceed 300mm
- 4.3.9 A copy of the flood map produced from the Environment Agency showing the extent of flooding from rivers or the sea is included in Figure 4 below.

Figure 4: Environment Agency map dated August 2024 showing the extent of flooding from rivers or the sea



4.3.6 The map shows that the site is considered to be at “low risk” of flooding.

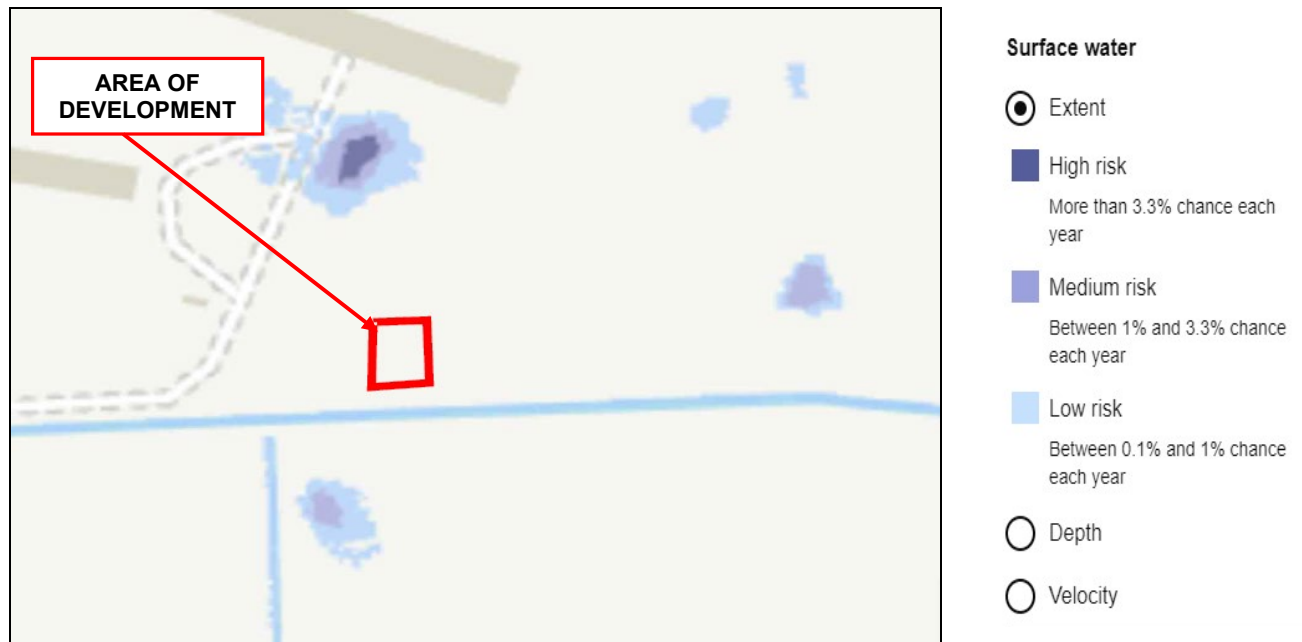
4.3.7 As the site lies in an area which is considered to be at risk from tidal flooding, mitigation measures will need to be incorporated within the design of the development.

4.3.8 Details of such measures are set out in Section 5 below

4.4 Surface Water Flooding

4.4.1 A copy of the Environment Agency map showing the extent of flooding from surface water is included in Figure 5 below.

Figure 5: Environment Agency map dated August 2024 showing the extent of flooding from surface water



4.4.2 The map shows that the application site lies in an area which is not considered to be at risk from surface water flooding.

4.4.3 As the location of the proposed development is not shown to be prone to flooding, the risk from surface water flooding is considered to be low and acceptable.

4.5 Flooding from Open Drainage Ditches

4.5.1 There are a large number of open agricultural drainage ditches situated within the vicinity of the application site, with North Level Main Drain located approximately 25m from the proposed development.

4.5.2 As the network of drainage ditches generally outfall into the River Nene which is tidally influenced, there is a risk of the ditches overtopping their banks during an extreme rainfall event and flooding the surrounding land

4.5.3 Flood mitigation measures will need to be included within the design of the development to address this risk of flooding (see Section 5 of this report)

4.6 Groundwater Flooding

4.6.1 Groundwater flooding can occur when the sub-surface water levels are high and emerges above ground level.

4.6.2 It is not anticipated that the proposed development will involve deep excavation works and consequently the risk to the development from this potential flood source is considered to be low and acceptable.

4.7 Flood Risk from Existing Water Mains

4.7.1 There are no existing water mains in the location of the proposed development.

4.7.2 The risk of flooding to the development from this potential flood source is therefore considered to be low and acceptable.

4.8 Flooding from Existing Drainage Services

4.8.1 There are no existing drainage services present in the location of the proposed development.

4.8.2 The risk of flooding to the development from this potential flood source is therefore considered to be low and acceptable.

4.9 Flooding from New Drainage

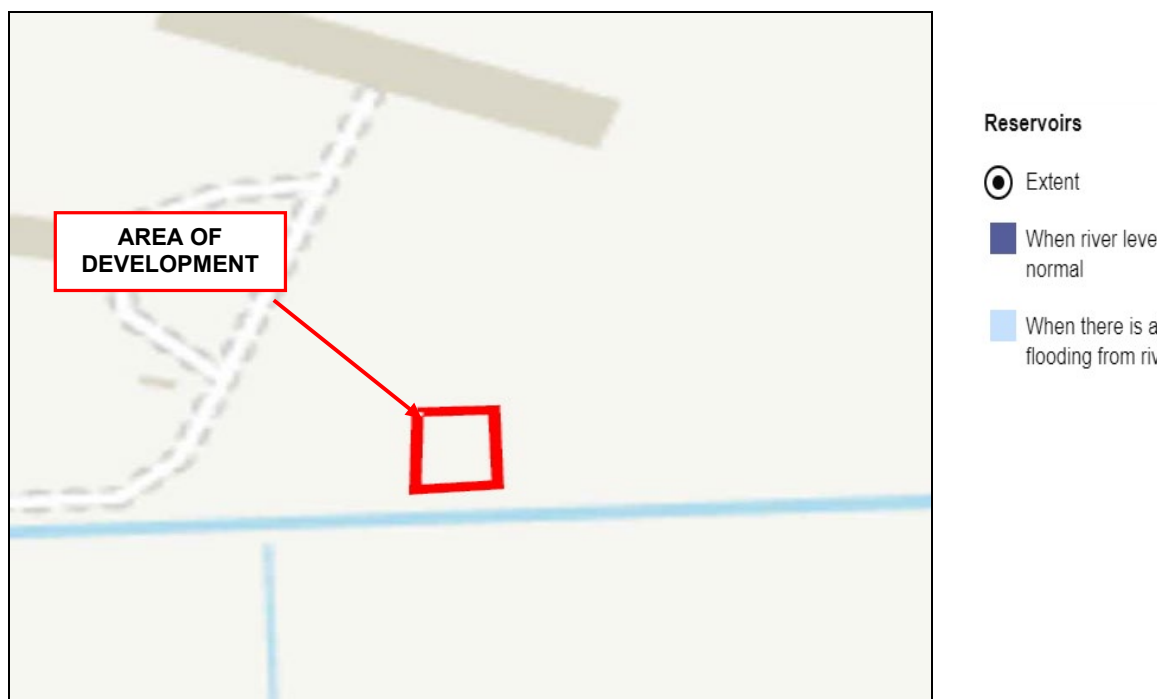
4.9.1 The drainage will be designed to the required standards and therefore the risk of flooding to the development or to other parties beyond the curtilage of the site will be adequately addressed.

4.9.2 The risk to the development from this potential source is therefore considered to be low and acceptable.

5.2 Flooding from Reservoirs, Canals and Other Artificial Sources

- 5.2.1 A study of the local region has shown that there are no artificial water features in the vicinity of the application site which could pose a risk of flooding to the development
- 5.2.2 The risk of flooding from this potential flood source is therefore considered to be low and acceptable.
- 5.2.3 A copy of the map produced by the Environment Agency showing the extent of flooding from reservoirs is included in Figure 6 below.

Figure 6: Environment Agency map dated August 2024 showing the Extent of Flooding from Reservoirs



- 5.2.4 The map shows that the development site is not considered to be at risk from reservoir flooding.
- 5.2.5 The risk to the development from reservoir flooding is therefore considered to be low and acceptable.

5.2.6 The risk of flooding to the development from any such potential flood source is considered to be low and acceptable

5.0 FLOOD MITIGATION MEASURES

5.1 Passive Flood Protection

- 5.1.1 For developments shown to lie in Flood Zone 3, the normal requirement is to elevate the ground floor construction by 600mm above the existing ground level or 300mm above the predicted flood level when flood data is available
- 5.1.2 For this development it is considered that the ground floor construction level should be raised by a minimum of 600mm above ground level, which would provide the required 300mm of freeboard above the predicted likely depth of flooding
- 5.1.3 The existing ground level over the area of the proposed dwelling is shown to be approximately 0.35m OD(N) on the LIDAR data, which would result in a minimum floor construction level of 0.95m OD(N) for this development.
- 5.1.4 At this level of construction it is considered that the risk from flooding has been adequately addressed. At this level of construction, it is considered that the risk to the development from surface water flooding has also been adequately addressed.

5.2 Flood Resilience

- 5.2.1 For developments lying in Flood Zone 3 the normal requirement is to provide 300mm of flood resilience within the building above the elevated floor level in order to prevent flood damage occurring and enable the building to be brought back into use more readily should flood waters enter the building.
- 5.2.2 This would result in a flood protection level of 1.25m OD(N) for this development.
- 5.2.3 The following measures should therefore be incorporated within the new development construction: -
- There should be no voids, other than doorways, in the external walls of the building within 300mm of the floor construction level which could allow flood waters to enter the building.

- Any internal partition walls at ground level should be of suitable robust construction or metal stud partitions fixed with plasterboard, with the lower boarding laid horizontally for ease of replacement.
- All electrical apparatus within the building should be elevated to a minimum height of 300mm above floor level in order to prevent damage occurring should flood waters enter the buildings.
- All cables should be routed at high level with vertical drops to the fittings.
- All other flood sensitive equipment should be similarly elevated.
- Floor finishes provided at ground level should be appropriate, allowing for ease of cleaning after flooding without incurring damage, to ensure the building can easily be brought back into use

5.2.4 On this basis it should therefore be possible for the building to be readily cleaned down and brought back into use should a flood situation occur.

5.3 Safe Refuge

5.3.1 The development incorporates accommodation at first floor level and therefore safe refuge is available within the building should a severe flood situation arise and safe evacuation measures cannot be implemented.

5.3.2 On this basis, the requirement for safe refuge will be met.

5.4 Access/Egress

5.4.1 The public road network in the local vicinity of the development is shown to lie in Flood Zone 3 (high probability of flooding) and consequently access to or egress from the development could be affected during the peak time of a major flood scenario.

5.4.2 However, the flooding in this area is tidal and consequently restrictions will not be for an extensive period of time. Access will therefore be predominantly available.

5.4.3 The site will be made aware of any likely flood event which will enable safe evacuation measures to be put in place if so required.

- 5.4.4 Safe refuge is available within the development if safe evacuation cannot be implemented and there should therefore be no requirements for evacuation of occupants of the development by the Emergency Services during a major flood situation.

5.5 Management

- 5.5.1 The development should be registered with the Environment Agency's 'Flood Direct' flood warning system. This would then ensure that there is sufficient time available for safe evacuation measures to be put in place should this prove necessary.
- 5.5.2 The development should have a Flood Warning Evacuation Plan in place to ensure all occupants understand the procedures in place in the event of a flood situation and where to escape to safety, should this prove necessary.

6.0 SUMMARY

- 6.1 This report has been prepared to assess the flood risk implications for a proposed agricultural worker's dwelling which is located at Forty Acre Poultry Unit, Guanockgate Road, Sutton St Edmund, Spalding.
- 6.2 The site falls in Flood Zone 3 (high probability of flooding) on the Environment Agency Flood Map for Planning. The proposed development is classified as 'More Vulnerable' in terms of flood risk vulnerability, which will require an Exception Test to be passed to justify locating the project in Flood Zone 3
- 6.3 This report has considered potential sources of flooding to the site, including fluvial, tidal, surface water, groundwater, existing sewers, water mains and other artificial sources.
- 6.4 The primary risk to the site is considered to be from tidal flooding from the North Sea during a future flood situation.
- 6.5 The primary focus for flood risk assessment is to protect life, and then consideration should be given to buildings, contents, operation and re-use
- 6.6 Mitigation measures are proposed which it is considered will reduce the risk of flooding to the development to an acceptable level, will ensure the building is safe for the lifetime of the development and will not increase the risk of flooding to others
- 6.7 Overall, this report demonstrates that the flood risk to the proposed development is reasonable and acceptable providing the mitigation measures detailed in Section 5 of this report are incorporated into the design of the development
- 6.8 Based on the details incorporated within our report it is considered that planning consent for the proposed development can be granted in terms of the flood risk aspects of the project.

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