

**FLOOD RISK ASSESSMENT
FOR RESIDENTIAL DEVELOPMENT AT
PENNY HILL ROAD, HOLBEACH**

FINAL REPORT

ECL0446-2/ROBERT DOUGHTY CONSULTANCY

DATE SEPTEMBER 2024

ELLINGHAM CONSULTING LTD

Email: tim@ellinghamconsulting.co.uk

CONTENTS

1.0 INTRODUCTION

2.0 SITE LOCATION AND DESCRIPTION

- 2.1 Site Location
- 2.2 Existing Site
- 2.3 Proposed Development
- 2.4 Local Development Documents
- 2.5 Available Flood Risk Information

3.0 FLOOD RISK VULNERABILITY

- 3.1 The Sequential and Exception Test
- 3.2 Vulnerability Classification
- 3.3 Application of the Sequential Test and Exception Test

4.0 SITE SPECIFIC FLOOD RISK

- 4.1 Local Flood Assets
- 4.2 Sources of Flooding
- 4.3 Probability of Flooding
- 4.4 Historic Flooding
- 4.5 Climate Change
- 4.6 Residual Risks

5.0 FLOOD RISK MITIGATION

- 5.1 Summary of Risks
- 5.2 Mitigation Measures

6.0 CONCLUSIONS

ATTACHMENT 1 – Topographic Survey of Land at Penny Hill, Holbeach
(Dwg G-Penny Hill - 240121)

ATTACHMENT 2 – Proposed Site Plan
(Dwg 1514-6_FP_SP02)

DISCLAIMER

This document has been prepared solely as a Flood Risk Assessment in support of a planning application for proposed residential development at Penny Hill Road, Holbeach. "Ellingham Consulting Ltd" accepts no responsibility or liability whatsoever for any use made of this document other than by the client "Mr B Dawson" for the purposes it was originally commissioned and prepared. All comments and opinions made are based upon information available to "Ellingham Consulting Ltd" during the necessary investigative process, and the conclusions and recommendations, could therefore, differ in the event of material subsequently being found erroneous, incomplete, or misleading. "Ellingham Consulting Ltd" therefore, accepts no liability should this prove to be the case.

1.0 INTRODUCTION

This Flood Risk Assessment has been prepared in accordance with National Planning Policy Framework (NPPF) and supporting planning practice guidance (PPG) on Flood Risk and Coastal Change.

In areas at risk of flooding or for sites of 1 hectare or more, developers are required to undertake a site-specific Flood Risk Assessment to accompany an application for planning permission. This Flood Risk Assessment has been produced on behalf of Mr B Dawson in respect of a residential development that consists of six dwellings on Penny Hill Road, Holbeach.

A planning application for the proposed development is to be submitted by Robert Doughty Consultancy. Approval was granted in March 2021 for five dwellings at the site. The mitigation measures proposed within this Flood Risk Assessment are consistent with those from 2021.

2.0 SITE LOCATION AND DESCRIPTION

2.1 Site Location

The site is at Penny Hill Road, Holbeach, Lincolnshire, PE12 8DN. The National Grid Reference of the site is 53615/32569.

The location of the site is shown in Figure 1.



Figure 1 – Location Plan (© OpenStreetMap contributors)

2.2 Existing Site

The site is on the eastern side of Penny Hill Road approximately 100m north of the junction with A17. The site, which was agricultural land, has a recreational field to the north and dwellings to the south. The area of development is approximately 0.45 hectares.

A topographic survey has been undertaken which is provided in Attachment 1. Ground levels typically range between +3.3m OD and +3.7m OD. The higher ground levels are generally towards the north eastern corner of the site. The Penny Hill Road carriageway alongside the site is typically between +3.0m OD and +3.1m OD.

The site is in the South Holland Internal Drainage Board (IDB) District. Surface water at the site naturally drains through soakaway and hence to the IDB drain system. An IDB High Priority Watercourse forms the eastern boundary of the site.

The online British Geological Survey maps indicate that the site is likely to be underlain by West Walton Formation Mudstone and Siltstone. The bedrock is shown to be overlain with superficial deposits of clay and silt.

2.3 Proposed Development

The proposed development consists of six new dwellings. The dwellings will have two storeys. A Site Plan is provided in Attachment 2.

2.4 Local Development Documents

The South East Lincolnshire Local Plan 2011 – 2036, adopted in March 2019, is the Local Plan for the district. Policy 4: Approach to Flood Risk states the requirements for flood risk reduction.

The South East Lincolnshire Level 1 and Level 2 Strategic Flood Risk Assessment (SFRA) was prepared in June 2017.

The Joint Lincolnshire Flood Risk and Drainage Management Strategy has been prepared by Lincolnshire County Council as the Lead Local Flood Authority. The purpose of the Strategy is to increase the safety of people across Lincolnshire by reducing the number of people at risk of flooding, increasing the resilience of local communities, and reducing the impact of flooding.

2.5 Flood Zones

An extract from the Environment Agency Flood Map for Planning is shown in Figure 2. The site is located within Flood Zone 3, an area with a high probability of flooding.

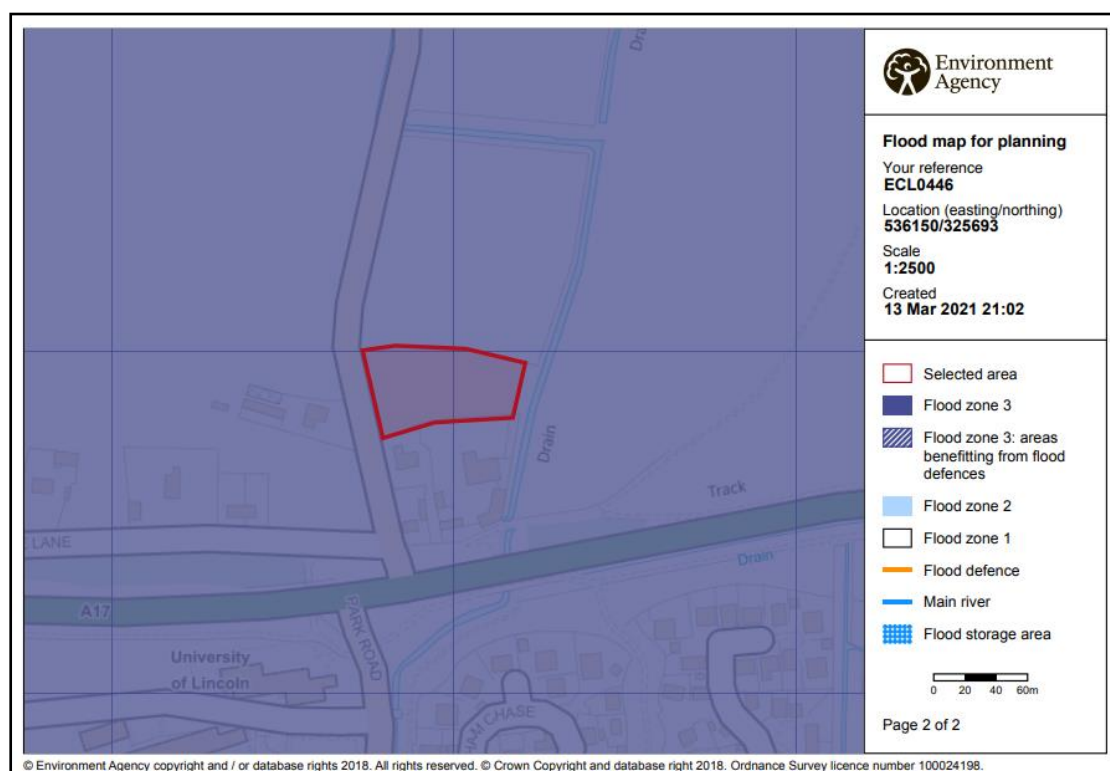


Figure 2 – Environment Agency Flood Map for Planning

The Environment Agency Long Term Flood Risk maps show that:

- part of the site has a low risk of flooding from rivers or the sea (annual probability between 0.1% and 1%) and part of the site has a very low risk of flooding from rivers or the sea (annual probability less than 0.1%);
- the site has a very low risk of surface water flooding (annual probability less than 0.1%); and
- the site is not within an area at risk of reservoir flooding.

Table 1 shows the level of risk at the site within the South East Lincolnshire SFRA.

SFRA Map	Present Day	2116
Residual Flood Hazard Map for the 1% fluvial and 0.5% tidal event	The site is outside the 'Low Hazard' area	The site is in the 'Low Hazard' area and the 'Danger for Some' area
Residual Peak Depth Map for the 1% fluvial and 0.5% tidal event	The site is outside the area at risk of flooding.	The peak flood depth across the site is between 0.0m - 0.25m. The road and access to the site has a peak depth of 0.5m – 1.0m.

Table 1 – Flood Risk within SFRA Maps

3.0 FLOOD RISK VULNERABILITY

3.1 The Sequential and Exception Test

The NPPF requires the application of a Sequential Test to ensure that new development is in areas with the lowest probability of flooding.

The Exception Test is a method to demonstrate and help ensure that flood risk to people and property will be managed, while allowing necessary development to go ahead in situations where suitable sites at lower risk of flooding are not available.

3.2 Vulnerability Classification

Table 2 of the PPG Flood Risk and Coastal Change categorises different types of uses and development according to their vulnerability to flood risk. The proposed development is covered by the description of buildings used for dwellings and is classified as 'More Vulnerable'.

Table 3 of the PPG Flood Risk and Coastal Change sets out Flood Risk Vulnerability and flood zone 'compatibility'. The site is in Flood Zone 3 and the development is 'More Vulnerable' therefore it is necessary to complete the Exception Test.

PPG Flood Risk and Coastal Change defines that the lifetime of the development in terms of flood risk and coastal change is 100 years.

3.3 Application of the Sequential Test and Exception Test

It is for the Local Planning Authority, taking advice from the Environment Agency as appropriate, to consider the Sequential Test.

Large parts of the South Holland district between the River Welland and River Nene lie within Flood Zone 3. As such, opportunities to undertake the development at an alternative site with a lower flood risk are limited.

The SFRA states that as it is necessary to use the refined flood risk information (hazard and depth maps) to assist with the application of the sequential test. The refined flood risk information contained within the SFRA demonstrates the site is not at risk during the present day 1% fluvial and 0.5% tidal event. The site therefore has a low probability of flooding and is considered to pass the Sequential Test.

The Exception Test requires consideration of the wider sustainability benefits of a development and that the development would be safe and residual risks managed.

The Local Plan has a target of a net increase of at least 11,681 dwellings in South Holland over the 25-year local plan period. The Plan considers this new housing is required to ensure the sustainability of the Local Plan area. The proposed development will contribute to this target.

Section 5 of this Flood Risk Assessment describes the flood mitigation measures and the management of the residual risks, demonstrating that this development will be safe and not increase flood risk elsewhere. The development is considered to pass the Exception Test.

4.0 SITE SPECIFIC FLOOD RISK

4.1 Local Flood Assets

The South Holland IDB district is protected by the Wash tidal defences along the Holbeach Marsh frontage with embankment levels at a minimum of +7.0m OD. The Wash tidal defences are approximately 9.5km from the site.

The River Welland tidal defences are approximately 7.7km to the north west of the site. The tidal defences between Spalding and Fosdyke also have minimum embankment levels of +7.0m OD.

Both defences are the responsibility of the Environment Agency. There is a long-term strategy for the maintenance of the Environment Agency defences which is reviewed and updated periodically.

There is an extensive local drainage network managed by South Holland IDB. There is an IDB High Priority Watercourse on the eastern boundary of the site. The site and the surrounding land are within the Holbeach River catchment and drain in a northerly direction to discharge to the tidal River Welland at the Holbeach River Outfall Sluice.

During the operation and maintenance of its pumping stations, associated structures, and channel systems, the IDB 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.

Current maintenance standards of the South Holland Internal Drainage Board and the Environment Agency are generally good.

4.2 Sources of Flooding

A summary of the sources of flooding is provided in Table 2.

Source of Flooding	Level of Risk
Drainage Network Flooding	The risk is assessed in Section 4.3.
Surface Water Flooding	Based upon the EA maps the risk is very low.
Fluvial Flooding	The risk is not at risk of fluvial flooding.
Tidal Flooding	The risk is assessed in Section 4.3, 4.5 and 4.6.
Reservoir Flooding	Based upon the EA maps the site is not at risk of flooding from reservoirs.
Groundwater Flooding	There is no evidence to suggest the site is at risk of groundwater flooding.

Table 2 – Sources of Flooding

4.3 Probability of Flooding

The probability of flooding associated with blockages in the South Holland IDB drainage system is low due to the maintenance standards achieved and managed by the IDB.

Through the operation and maintenance of the pumping stations and the channel system the Board seek to maintain a general standard capable to providing flood protection to agricultural land and developed areas of 1 in 20 years and 1 in 100 years, respectively. The risk associated with flood events that exceed the standard of protection provided is lowered due to the South Holland IDB main drains incorporating freeboard. This freeboard provides storage during the exceedance events.

The site is within an area benefitting from defences. The flood embankments to the Wash and the River Welland tidal defences provide protection during a 0.5% annual probability (1 in 200 chance each year) event. The flood risk from the Wash is lowered further by second line defences and various informal banks constructed during the reclamation of Holbeach Marsh.

4.4 Historic Flooding

During the preparation of this assessment, no evidence was discovered of the site being flooded. Previous historic rainfall events of 1968 and 1978, estimated to be greater than 1% annual probability (1 in 100 chance each year), caused no flooding to any residential properties.

4.5 Climate Change

Climate change is likely to impact the site through increased rainfall intensity and duration affecting the local drainage network and increased tide levels.

The flood level in the River Welland at Fosdyke during the 0.5% annual probability (1 in 200 chance each year) event inclusive of climate change to 2069 is estimated to be 6.41m AOD. The minimum defence level of the River Welland embankments is 7.0m AOD.

In summary the site is not at risk for the design life of the development (i.e., 100 years).

4.6 Residual Risk

The South East Lincolnshire SFRA includes maps demonstrating the impact of climate change in 2116. The Residual Peak Depth maps within the SFRA indicate the maximum flood depths associated with a breach of the tidal defences. These show that when the climate change allowances are applied to the combination of a 1% annual probability (1 in 100 chance each year) fluvial event and a 0.5% annual probability (1 in 200 chance each year) tidal event the peak flood depth at the site is between 0.0m

and 0.25m. Penny Hill Road and the access to the site are shown as having a peak flood depth of 0.5m to 1.0m.



Figure 3 – SFRA 2115 Residual Peak Depth Map during the 1% fluvial and 0.5% tidal Annual Probability Event

Based upon a comparison between the topographic survey, Environment Agency LiDAR data and the extent and depth of flooding shown in Figure 3 a breach level of +3.7m OD has been estimated.

5.0 FLOOD RISK MITIGATION

5.1 Summary of Risks

The probability of this development flooding from localised drainage systems is low. Failure of Holbeach River Outfall Sluice could lead to an increased level of risk at the site.

The probability of the site flooding from any Environment Agency system is less than 0.5% annual probability (1 in 200 chance each year) because of the standards of the existing flood defences. Over time there will be a gradual increase in risk to the site due to climate change. During the design life of the development, it is not anticipated that the site would flood from overtopping of the defences.

The SFRA considers the residual risk associated with a breach in the defences. From the maps the flood level during the 0.5% annual probability (1 in 200 chance each year) tidal event is estimated to be +3.7m.

The proposed arrangement increases the impermeable area and therefore there will be an increased volume of surface water that has the potential to increase flood risk.

5.2 Mitigation Measures

The site has a low 'actual risk' of flooding. Based upon the information available during the preparation of this flood risk assessment, it is recommended that:

- the floor level of the dwellings is 0.3m above surrounding ground level and not less than +3.7m OD; and
- there is flood resilient construction to a height 0.3m above finished floor level.

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 operates a flood warning system for properties at risk of flooding to enable householders to protect life or take actions to manage the effect of flooding on property. Floodline Warnings Service is a national system run by the Environment Agency for broadcasting flooding warnings. The occupiers of the dwellings should register to receive flood warnings.

During an exceedance event it is anticipated that sufficient time would be available to take precautionary actions to limit the potential impact of flooding.

Should there be a failure of Holbeach River Outfall Sluice and 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.

It is recommended that surface water run-off is managed so that stormwater from the development will not affect any adjoining properties or increase the flood risk elsewhere.

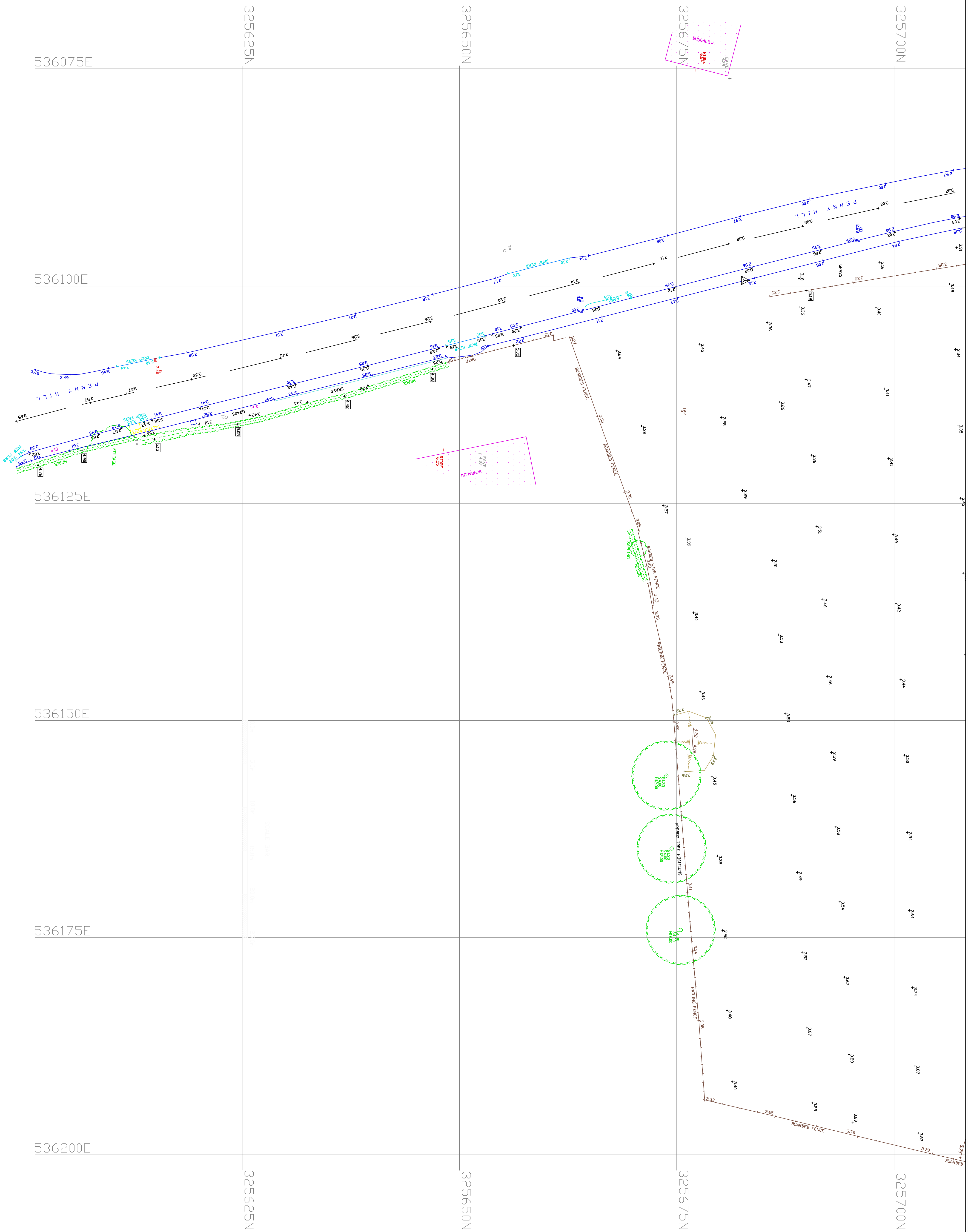
6.0 CONCLUSIONS

As a result of the assessment, the following conclusions have been reached.

- The proposed development consists of six number two storey dwellings on land on the eastern side of Penny Hill Road, Holbeach.
- The site is located within an Internal Drainage Board catchment and through the operation and maintenance of the pumping stations and the channel system the Board seek to maintain a general standard capable to providing flood protection to agricultural land and developed areas of 1 in 20 and 1 in 100 years, respectively.
- The proposed development is in Flood Zone 3. The site is protected during the 1% annual probability (1 in 100 chance each year) fluvial event and 0.5% annual probability (1 in 200) tidal event including climate change by the Wash tidal defences and River Welland tidal defences.
- There is a residual risk associated with a breach of the defences.
- It is recommended that the finished floor level of dwellings is 0.3m above surrounding ground levels and not less than +3.7m OD. It is recommended that there is 0.3m of flood resilient construction above finished floor level.
- The development passes the Sequential Test and Exception Test and is therefore suitable for the proposed location.

ATTACHMENT 1

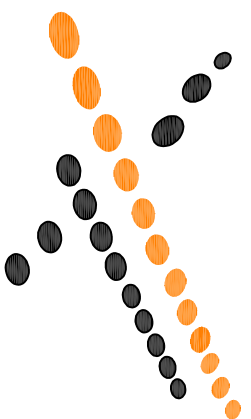
**TOPOGRAPHIC SURVEY OF LAND AT
PENNY HILL, HOLBEACH
(Dwg G-Penny Hill – 240121)**



SURVEY RELATED TO DSG836(15) ORDINANCE SURVEY GRID CO-ORDINATES

NOTES

1. GRID AND LEVELS RELATED TO BROWNE SURVEY OPS NETWORK.
2. ALL LEVELS ON KEROZ LINES AND CHANNEL, LEVELS UNLESS NOTED OTHERWISE.
3. SERVICE ROUTES HAVE BEEN IDENTIFIED BY LITTING OF INSPECTION CORNERS 1 VISIBLE, INSPECTION FROM THE SURFACES.
4. FUR SAFETY RISERS, BROWNE PIPE SIZES HAVE BEEN RETAINED FROM THE SURVEY, BUT NOT INDICATED ON THE PLAN.
5. BROWNE PIPE SIZES ARE DIMETERS AND ARE SHOWN IN MILLIMETERS.
6. RISES, RISERS ARE NOT INDICATED UNLESS A LEVEL IS PROVIDED, WHICH IS IDENTIFIED BY A BOX.
7. LEVELS IDENTIFIED WITH A BOX WITHIN THE SURVEY ARE FUR RISERS OR BROWNE RISERS, USUALLY FOR VISIBILITY SURVEY PURPOSES.



CHRIS GOLD
LAND SURVEYOR

TOPOGRAPHICAL SURVEY OF LAND
AT PENNY HILL,
HOLBEACH.

Revisions	
A	
B	
C	
Drawing No: G-PENNY HILL-240121	
SURVEYOR: CK-GOLD	DATE 24/01/2021

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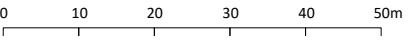
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ATTACHMENT 2

**PROPOSED SITE PLAN
(DWG 1514-6_FP-SP02)**



Extent of visibility splays



Proposed site plan



Notes

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Dimensions
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CDM 2015
This drawing is for illustrative purposes and/or obtaining the relevant planning permission only. It should not be used for construction and accordingly, risk identification under the Construction (Design & Management) Regulations 2015 has not been undertaken.

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Rev	By	Description	Date
Current revision checked by: -			

rdc
Robert Doughty
Consultancy

32 High Street, Helpringham
Sleaford, Lincolnshire, NG34 0RA

Tel: 01529 421646
Email: admin@rdc-landplan.co.uk
Web: www.rdc-landplan.co.uk

Client
Ben Dawson

Project
Residential Development
Penny Hill Road

Drawing
Proposed Site Plan

Scale @ A3 As shown		Date 29/08/24
Drawn By WW		Checked By LMS
Job Number 1514-6	Status FP	Purpose of Issue Planning

Drawing No. 1514-6_FP_SP02	Rev -
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