FLOOD RISK ASSESSMENT
FOR RESIDENTIAL DEVELOPMENT AT
BLACK HOLE DROVE, WEST PINCHBECK

FINAL REPORT

ECL0993/OGLESBY & LIMB LTD

DATE MARCH 2023

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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 Oglesby & Limb in respect of a development that consists of a change of use of an agricultural building to form a dwelling at Black Hole Drove, West Pinchbeck.

A planning application for the proposed development is to be submitted by Oglesby & Limb Ltd.

2.0 SITE LOCATION AND DESCRIPTION

2.1 Site Location

The site is located at the barn to the east of Chesterton, Black Hole Drove, West Pinchbeck, Spalding, PE11 3QL. The National Grid Reference of the site is 51792/32528.

The location of the site is shown in Figure 1.

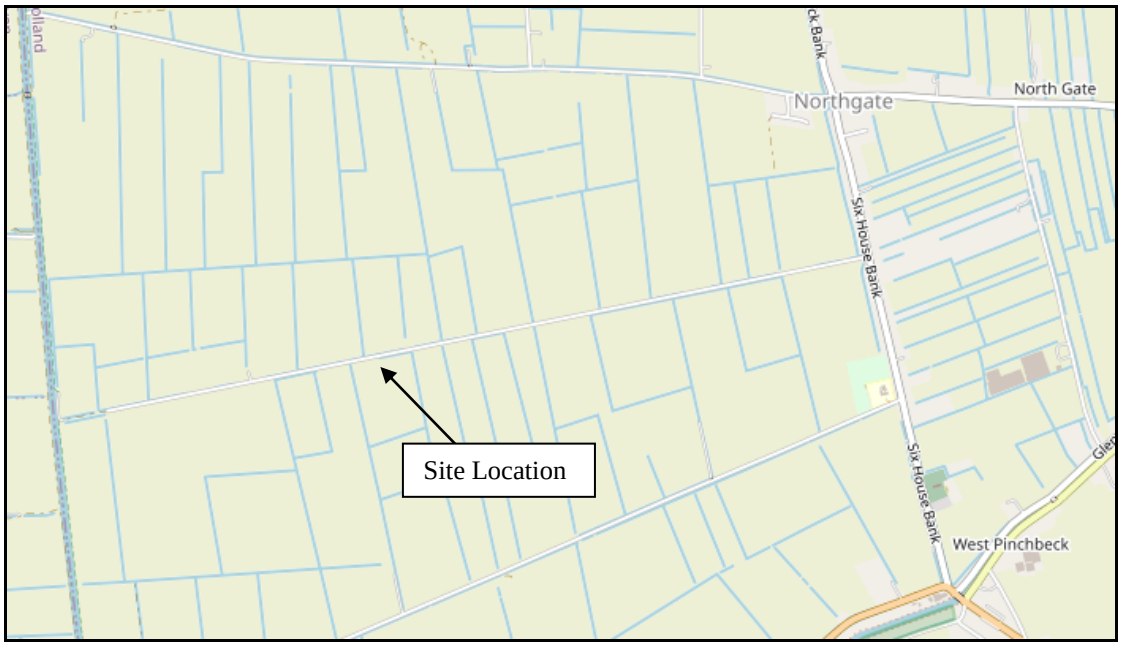


Figure 1 – Location Plan (© OpenStreetMap contributors)

2.2 Existing Site

The site is on the southern side of Black Hole Drove. The agricultural building to be developed is on land on the eastern side of Chesterton. The site is surrounded by agricultural land. The area of development is approximately 0.04 hectares.

A topographic survey of the site has been undertaken and is provided in Attachment 1. Ground levels around the agricultural building are between +2.6m OD and +2.7m OD. The agricultural land to the south of the site is typically +2.1m OD. The carriageway level of Black Hole Drove adjacent to the site is between +2.9m OD and +3.1m OD.

The site is in the Black Sluice Internal Drainage Board's (IDB) district. Surface water at the site drains through the network of local drains and hence to the IDB drain system. There is a riparian drain on the southern side of Black Hole Drove to the east of the site and Leaves Lake Drain, an IDB Main Drain, is 900m south of the site.

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

2.3 Proposed Development

The proposed development consists of the change of use of an agricultural building to form a dwelling. The dwelling will be single storey. Details of the proposed development are shown 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 Available Flood Risk Information

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.

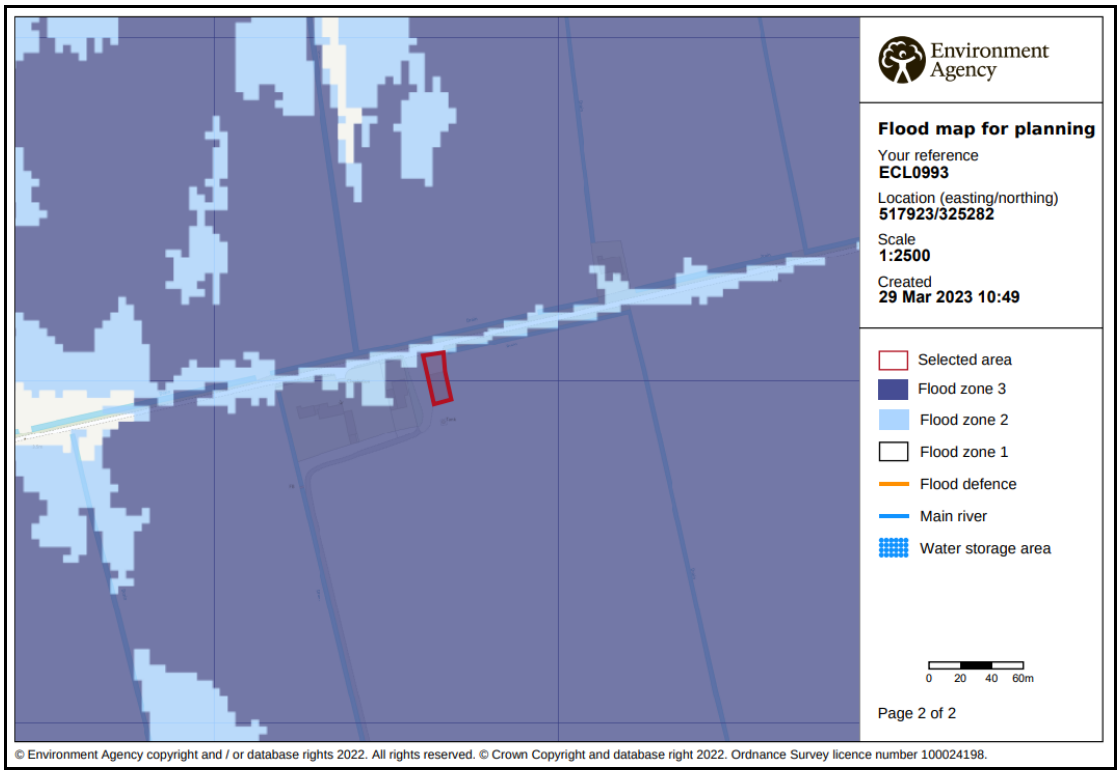


Figure 2 – Environment Agency Flood Map for Planning

The Environment Agency Long Term Flood Risk maps show that:

- the site has a medium risk of flooding (annual probability between 1% and 3.3%);
- the site is in an area with 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 residual risk at the site as identified 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 in the 'Danger For Some' area	Part of the site is in the 'Danger for Most' area
Residual Peak Depth Map for the 1% fluvial and 0.5% tidal	The site is at risk with a depth between 0.25m and 0.5m.	Part of the site is at risk with a depth between 0.5m and 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 and Exception Test

It is for the Local Planning Authority, using the evidence provided and taking advice from the Environment Agency as appropriate, to consider whether an application passes the Sequential Test.

Paragraph 033 of planning practice guidance (PPG) on Flood Risk and Coastal Change states that 'The Sequential Test does not need to be applied for applications for Change of Use (except for a change of use to a caravan, camping or chalet site, or to a mobile home or park home site)'.

Paragraph 048 of the PPG states that 'A Change of Use may involve an increase in flood risk if the vulnerability classification of the development is changed. In such cases, the applicant will need to show in their flood risk assessment that future users of the development will not be placed in danger from flood hazards throughout its lifetime.' The mitigation measures proposed in Section 5.2 of this flood risk assessment are such that risks to future users are mitigated.

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 and the provision of rural housing is a benefit.

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 site is approximately 1.9km north west of the River Glen. The risk of flooding is reduced by an embankment on the left bank of the River Glen. The site is approximately 1,200m east of the South Forty Foot Drain. The South Forty Foot Drain is an embanked high-level carrier conveying run off from south Lincolnshire to the River Witham. The risk of flooding at the site is reduced by an embankment on the right bank of the South Forty Foot Drain.

The South Forty Foot Drain to the north of Black Hole Drove and the River Glen are main river and 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 Black Sluice IDB. There is an IDB maintained watercourses, Leaves Lake Drain, 900m south of the site. The site is within the Morton, Leaves Lane and Bourne catchment and drains in a westerly direction to discharge to the South Forty Foot Drain.

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.

The maintenance standards of the Black Sluice IDB 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 assessed in Section 4.3.
Tidal Flooding	The site is in excess of 8km from the tidal River Welland and therefore not at risk.
Reservoir Flooding	Based upon the EA Maps the site is not at risk of reservoir flooding.
Groundwater Flooding	Based upon the local drainage network the risk is low.

Table 2 – Sources of Flooding

4.3 Probability of Flooding

The probability of flooding associated with blockages in the Black Sluice 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 Black Sluice IDB main drains incorporating freeboard. This freeboard provides storage during the exceedance events.

The fluvial defences on the River Glen provide protection against the 1% annual probability (1 in 100 chance each year) event. Flood levels in the Welland Catchment Model show that the 1% annual probability (1 in 100 chance each year) level in the River Glen is +4.46m OD with defence level at +5.50m OD.

4.4 Historic Flooding

During the preparation of this assessment, no evidence was discovered of the site being flooded.

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.

Flood levels taken from the Welland Catchment Model show that during the 1% annual probability (1 in 100 chance each year) with climate change the site is not at risk from the River Glen.

In summary the existing systems and defences are appropriate for the design life of the development (i.e., 100 years).

4.6 Residual Risk

There is a residual risk of flooding at the site should a breach occur in the defences. The South East Lincolnshire SFRA includes maps demonstrating the impact of a breach in 2116. The Residual Peak Depth maps within the SFRA indicate the maximum flood depths associated with a breach and overtopping of defences. An extract from the maps is shown in Figure 3.

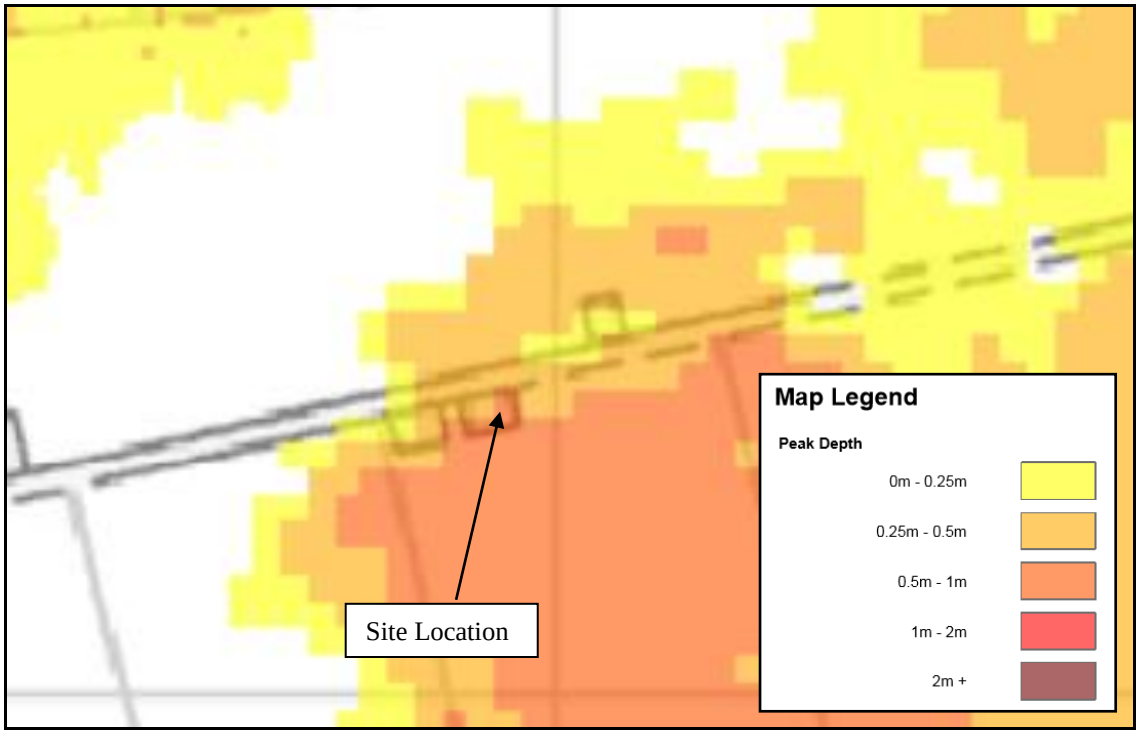


Figure 3 – SFRA 2116 Residual Peak Depth Map during the 1% fluvial and 0.5% tidal Annual Probability Event

The agricultural land to the south of the site is typically between +2.0m OD and +2.2m OD and ground levels around the agricultural building are on average 0.5m above these levels. Based upon a 1m depth of flood water on the agricultural land that is on average +2.1m OD the estimated flood level is +3.1m OD. The maximum flood depth around the proposed dwelling is 0.5m.

5.0 FLOOD RISK MITIGATION

5.1 Summary of Risks

The probability of this development flooding from localised drainage systems is low. Failure of Pinchbeck North Fen Pumping Station could lead to an increase level of risk at the site.

The probability of the site flooding from any Environment Agency system is less than 1% annual probability (1 in 100 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.

The SFRA considers the residual risk associated with overtopping and a breach in the defences in 2116. During the 1% annual probability (1 in 100 chance each year) fluvial breach event including climate change the flood level is estimated to be +3.1m OD. This is 1.0m above the surrounding agricultural land and 0.5m above the levels surrounding the building.

Any increase in impermeable area associated with the development is minimal so there is no potential that flood risk is increased elsewhere due to surface water.

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 proposed that the floor level within the habitable rooms in the dwelling are +3.25m OD. This is 0.15m above the estimated flood level. It is recommended that there should be 0.3m of flood resilient construction above finished floor level.

The developer should ensure that the eventual occupier of the dwelling is 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 occupier of the dwelling should register to receive flood warnings.

If during extreme events, levels of floodwater rose to such an extent that the site was affected, the situation would not be sudden. The maximum flood depth on Black Hole Drove is 0.2m and therefore the site could be accessed during a scenario where there were multiple breaches during an extreme event in 2116.

6.0 CONCLUSIONS

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

- The proposed development consists of the change of use of an agricultural building to form one single storey dwelling at Black Hole Drove, West Pinchbeck.

- 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 benefits from defences on the South Forty Foot Drain and the River Glen that provide protection during the 1% annual probability (1 in 100 chance each year) fluvial event including climate change. During the design life of the development, including an allowance for climate change, it is not anticipated that there would be flooding at the site.

- There is a residual risk during a breach of the fluvial defences with flood depths up to 1.0m on the agricultural land surrounding the site and flood depths up to 0.5m around the building. The estimated flood level is +3.1m OD.

- It is proposed that the floor level of the habitable rooms within the dwelling are +3.25m OD and 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
(DWG O & L – PBECK 001)

North.
(Indicative)

325300 N

325200 N

517850 E

517950 E

518050 E



tree (indicative)

tree (Surveyed)

Fir tree

Planting - indicative

Dia:0.000 Tree - bole diameter
Spr:0000 Tree - Canopy spread
Text: Tree - Species

W.Mtr Water meter
SV Sluice Valve
W.O. Wash out
A.V. Air Valve
CBL T.V.x3 cable tv box (x number in group)
gas Gas meter box or service entry
CL=0.00 Manhole cover level
INV= 0.00 Invert of pipe
FFL Finished floor level
Bollard Bollard
BT BT Box
sign Road sign / street sign
Bench Bench
LP Lamp post
EP Electricity Pole
Edge of Tarmac (no kerb set) - 6.137
Pin Kerb Level (back) - 6.14
Top of Kerb Level (back of kerb) - 6.22
Road Channel Level (face of kerb) - 6.09
Spot Level 5.93
GLY 5.97 Gully

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Job Title : Site survey - Land at Black Hole Drove - Pinchbeck - Spalding - Lincolnshire

Client : Oglesby & Limb Ltd

Drawn : MDS Date : 27th March 2023

Drawing number: O & L - Pbeck 001 Scale 1:500 on A1 sheet

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Drainage information is as a result of surface inspection only, no chambers have been accessed.
Manhole and pipe diameters should be checked before design and construction

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All dimensions should be checked on site prior to design and construction.

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All tree heights and spreads are approximate
We have tried to identify tree types, however, if tree species is critical specialist advise should be sought.

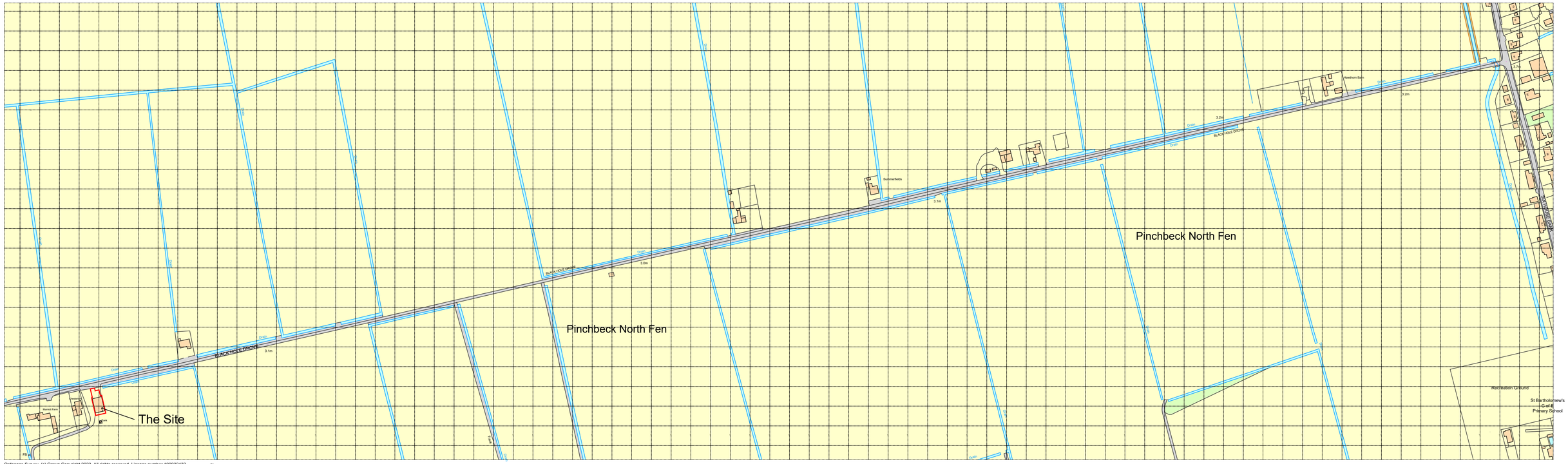
The data used for the computation of horizontal & vertical control for this survey was recorded using survey grade GPS receivers and corrected data from Trimble VRS Services using Geoid model OSTN15 with OSGM 15 .
Station establishment was carried out in accordance with best practice guidelines issued by The Survey Association.

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ATTACHMENT 2

SITE LOCATION AND BLOCK PLANS
(DWG A1531-01)

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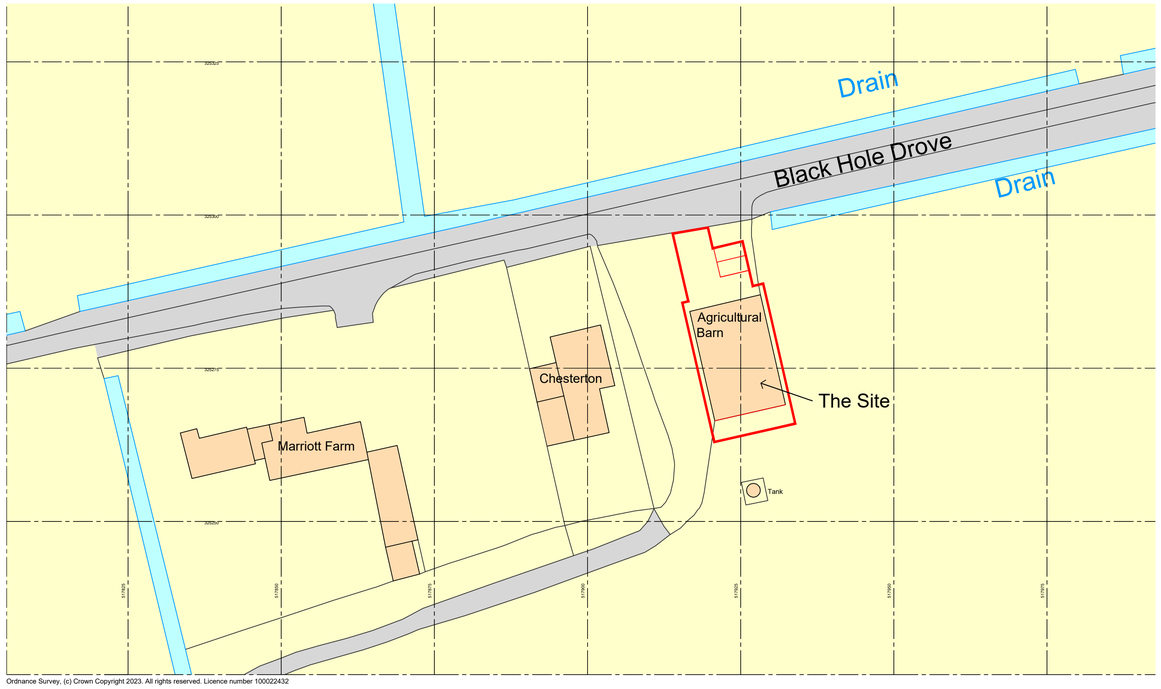


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Site Location Plan

Scale 1:2500 @ A1
Site of works proposal outlined in red.
Other land in same ownership/control outlined in blue.

SCALE 1 : 2500 0m 20m 40m 80m 120m 160m 200m 240m
SCALE 1 : 1 0m 8mm 16mm 40mm 56mm 80mm 100mm



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Site Block Plan

Scale 1:500 @ A1
Site of proposed works outlined in red

SCALE 1 : 500 0m 5m 10m 20m 30m 40m 50m
SCALE 1 : 1 0m 10mm 20mm 40mm 60mm 80mm 100mm

Ref.	Date	Description	Initial
X	xx.xx.xx	Xxxxx	xxx

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Client:
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Project:
Proposed Conversion of agricultural barn to dwelling
Black Hole Drove
West Pinchbeck
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Drawing Title:
Site Location and Block Plans as existing

PRELIMINARY

Date:	Scale:
05.03.23	as shown @ A1
Drawn by: cad	Checked by: ajo

Drawing Number:	Rev:
A1531-01	pr