FLOOD RISK ASSESSMENT
FOR RESIDENTIAL DEVELOPMENT AT
CLAY DROVE, WEST PINCHBECK

FINAL REPORT

ECL1435/SWANN EDWARDS ARCHITECTURE

DATE JANUARY 2025

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 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 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 Risk

5.0 FLOOD RISK MITIGATION
- 5.1 Summary of Risks
- 5.2 Mitigation Measures

6.0 CONCLUSIONS

ATTACHMENT 1 – Floor Plans & Elevations, Site & Location Plans (Dwg SE-2188 PP1000)

DISCLAIMER

This document has been prepared solely as a Flood Risk for a residential development at Clay Drove, West Pinchbeck. "Ellingham Consulting Ltd" accepts no responsibility or liability whatsoever for any use made of this document other than by the client "Mr Smith" 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 Smith in respect of a development that consists of a change of use of an agricultural building to form a dwelling at Clay Drove, West Pinchbeck.

A planning application for the proposed development is to be submitted by Swann Edwards Architecture.

2.0 SITE LOCATION AND DESCRIPTION

2.1 Site Location

The site is located at 4 Clay Drove, West Pinchbeck, Spalding, Lincs, PE11 3NB. The National Grid Reference of the site is 52131/32245.

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 northern side of Clay Drove. The site consists of an agricultural building which is within the curtilage of 4 Clay Drove. There is an undeveloped plot to the east of the site, dwellings to the west and agricultural land to the north. The area of development is approximately 0.04 hectares.

Environment Agency LiDAR shows that the site is flat with ground levels around the barn to be converted of +1.7m OD. The agricultural land in the vicinity of the site is typically between +1.0m OD and +1.8m OD. The carriageway level of Clay Drove adjacent to the site is +2.4m OD.

The site is in the Welland & Deepings Internal Drainage Board's (IDB) district. Surface water at the site would naturally drain through soakaway and hence to the IDB drain system. There is a riparian drain 130m north of the site and the nearest IDB main drain, Blue Gowt No 2, is 200m east 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 Development

The development consists of the conversion of an outbuilding to a dwelling. The dwelling will be single storey. The Site and Location Plan for the development is in Attachment 1.

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 3. 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:

- from rivers and the sea the outbuilding has a very low chance of flooding (annual probability less than 0.1%) there is no depth data available;
- from rivers and the sea between 2036 and 2069 there is no data available;
- from surface water the site has a very low risk of flooding (annual probability less than 0.1%)
- from surface water between 2040 and 2060 the site has a very low risk of flooding (annual probability less than 0.1%); and
- the outbuilding is outside the area at risk of reservoir flooding.

Table 1 shows the level of residual risk at the outbuilding to be converted as identified within the South East Lincolnshire SFRA.

SFRA Map	Present Day	2116
Residual Flood Hazard Map for the 0.1% fluvial and tidal event	The outbuilding is in the 'Danger for Most' area	The outbuilding is in the 'Danger for Most' area
Residual Peak Depth Map for the 0.1% fluvial and tidal event	The peak flood depth is 0.5m to 1.0m	The peak flood depth is 1.0m to 2.0m

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, 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 the need for more housing.

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 3.0m north west of the River Welland and the Cowbit Wash. Cowbit Wash is the floodplain to the River Welland and the site is protected from the River Welland by the Welland Bank.

The site is 2.5km south of the River Glen. The risk of flooding at the site is reduced by an embankment on the southern bank of the River Glen.

The Cowbit Wash, the River Glen, and River Welland 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 Welland and Deepings IDB. The nearest IDB main drain, Blue Gowt No 2, is 200m east of the site. The site and the surrounding land are within the Fourth District catchment and drain in a southerly direction to Fourth District Pumping Station. Fourth District Pumping Station discharges to Vernatts Drain which flows into the River Welland at Surfleet.

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 Welland and Deepings 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 assessed in Section 4.3 and Section 4.5.
Tidal Flooding	The risk is assessed in Section 4.3 and Section 4.5.
Reservoir Flooding	The risk of a breach is considered in Section 4.6.
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 Welland and Deepings 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 Welland and Deepings 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 levels in excess of +5.0m 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 the 1% annual probability (1 in 100 chance each year) with climate change flood level in the River Glen is +4.76m OD. This represents a 0.30m increase on the present day 1% annual probability level. This increase is less that the freeboard provided by the existing defences and therefore the site is protected from overtopping during the life of the development.

The River Welland defences provide protection during the 1% annual probability (1 in 100 chance each year) tidal event including climate change.

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.

The proposed development is for a single storey dwelling and therefore the mitigation needs to consider the 0.1% annual probability (1 in 1000 chance each

year) event in 2115. The South East Lincolnshire SFRA includes 0.1% annual probability (1 in 1000 chance each year) maps for Spalding. An extract from this map is shown in Figure 3.

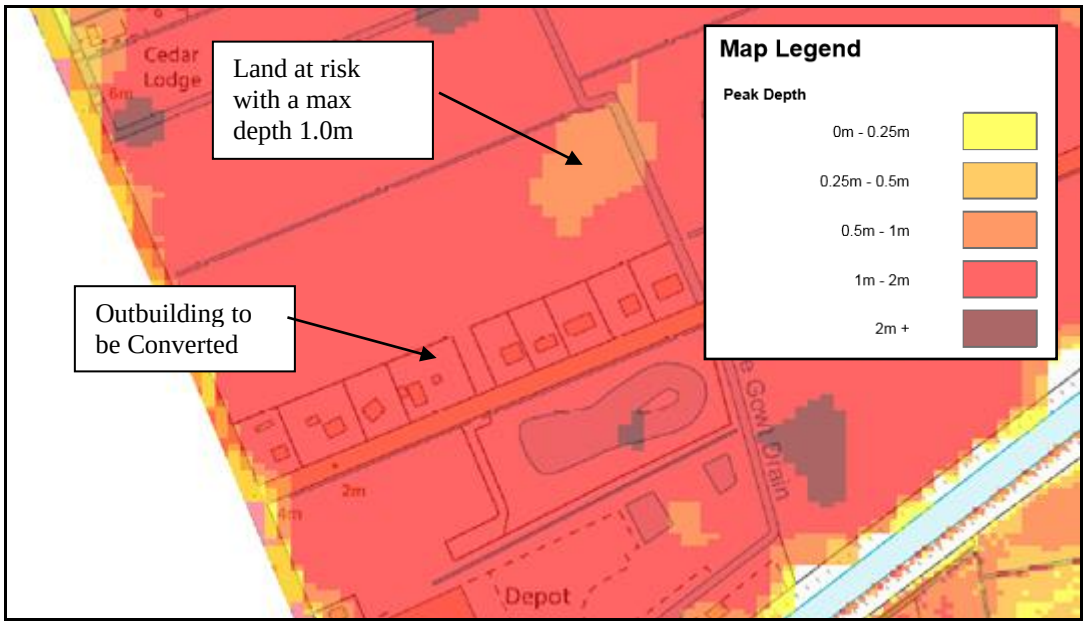


Figure 3 – SFRA 2115 Residual Peak Depth Map during the 0.1% Annual Probability Event

Through a comparison of the flood depths in Figure 3 and Environment Agency LiDAR the flood level has been estimated. An area of agricultural land to the north east of the site is at risk with depths up to 1.0m. LiDAR shows that ground levels in this area generally above +2.0m OD. The flood level during the 0.1% annual probability (1 in 1000 chance each year) event in 2115 is estimated to be +3.0m OD, a depth of up to 1.3m at the site.

5.0 FLOOD RISK MITIGATION

5.1 Summary of Risks

The probability of this development flooding from localised drainage systems is low. Failure of Fourth District Pumping Station could lead to an increase level of risk within the IDB catchment.

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 a breach in the defences. The site is at risk during a breach of defences with a flood depth up to 1.3m.

There will be no increase in impermeable area associated with the development so there is no potential that flood risk will be increased elsewhere.

5.2 Mitigation Measures

The proposed mitigation against the residual risk of flooding has considered the maximum height to which floor levels can be raised. The development utilises an existing building and therefore floor raising is constrained by the buildings height.

It is proposed that the floor level of the dwelling is 0.3m above ground level with 0.6m of flood resistant construction and 1.0m 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.

Should there be a failure of Fourth District Pumping Station and conditions were such to put properties and land at risk of flooding, the IDB would take emergency action to maintain the drainage level of service by using temporary pumping equipment.

It is recommended that surface water run-off is managed so that stormwater from the site 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 development consists of the conversion of an outbuilding to form a single storey dwelling at 4 Clay Drove, West Pinchbeck, Spalding.

- 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 partly 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 chance each year) tidal event. 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.

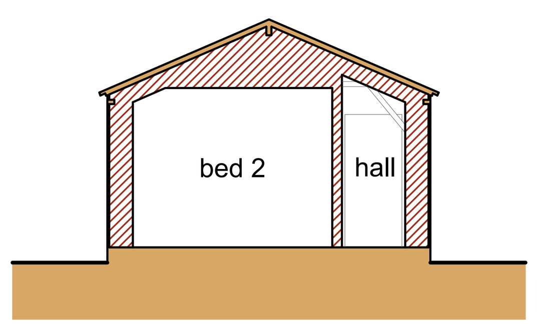
- The site is at risk during a breach of the defences with a flood depth up to 1.3m.

- It is proposed that the finished floor level of the dwelling is 0.3m above surrounding ground level with 0.6m of flood resistant and 1.0m 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.

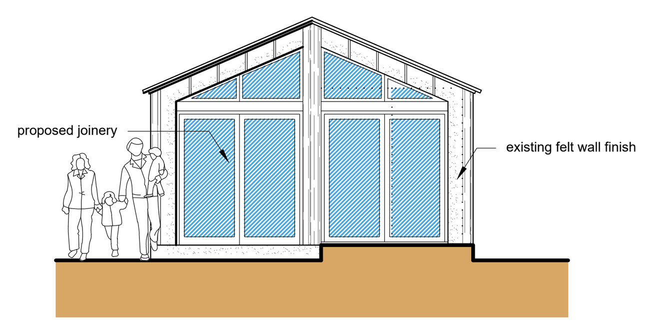
ATTACHMENT 1

FLOOR PLANS & ELEVATIONS, SITE & LOCATION PLANS (DWG SE-2188 PP1000)



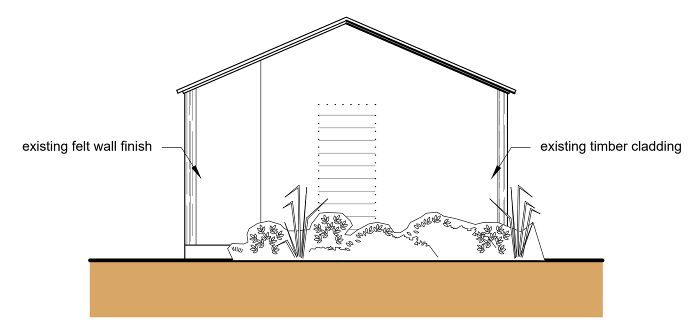
Section A-A
Scale: 1:100

0 1 2 3 4
metres

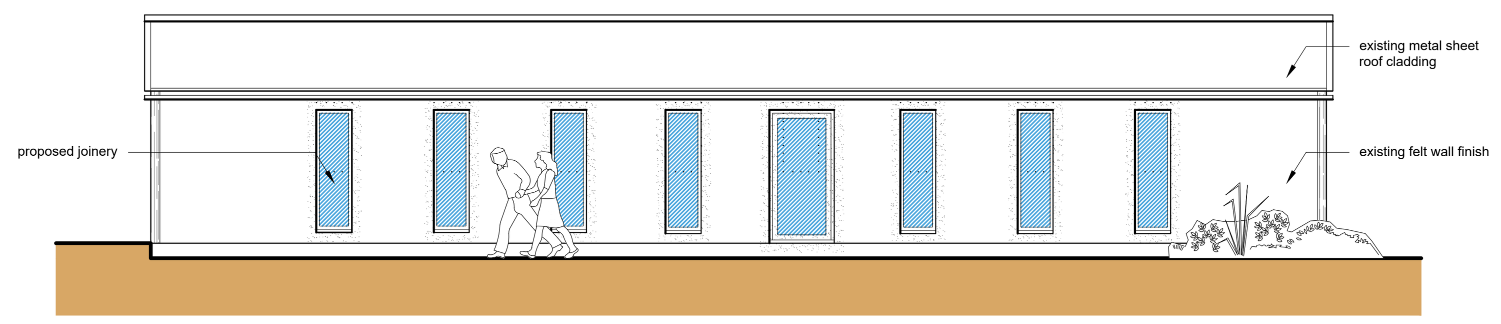


Side Elevation (SW)
Scale: 1:100

0 1 2 3 4
metres

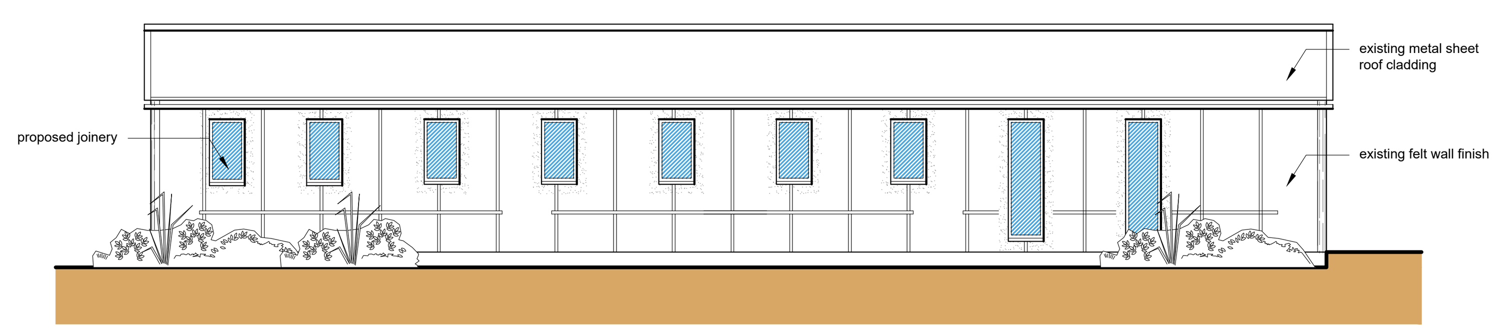


Side Elevation (NE)
Scale: 1:100



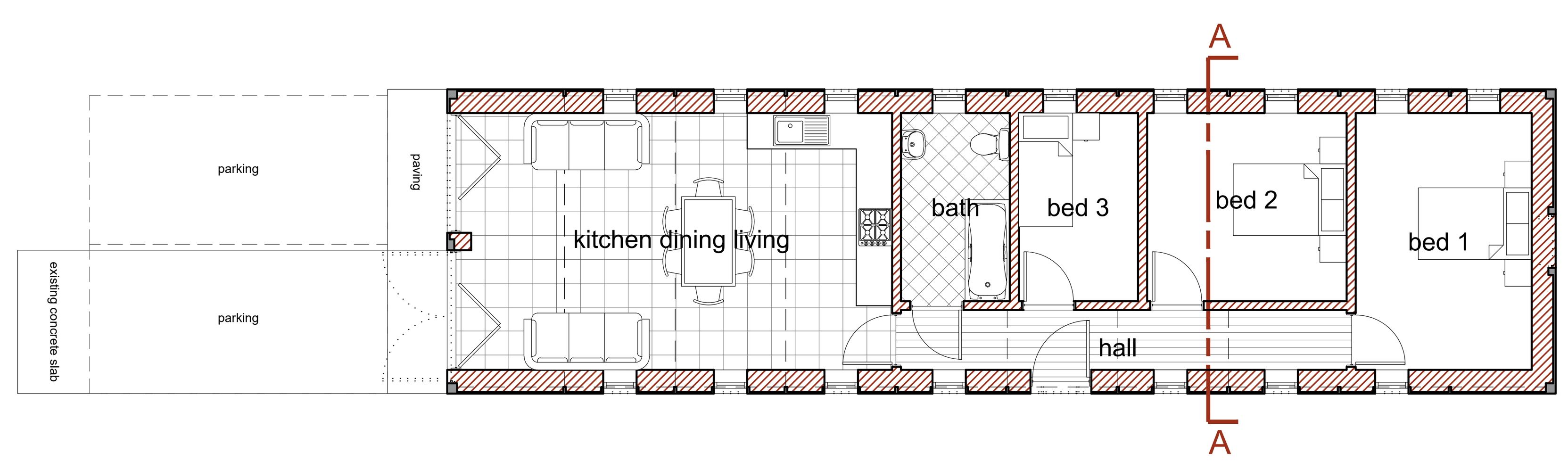
Front Elevation (SE)
Scale: 1:100

0 1 2 3 4
metres



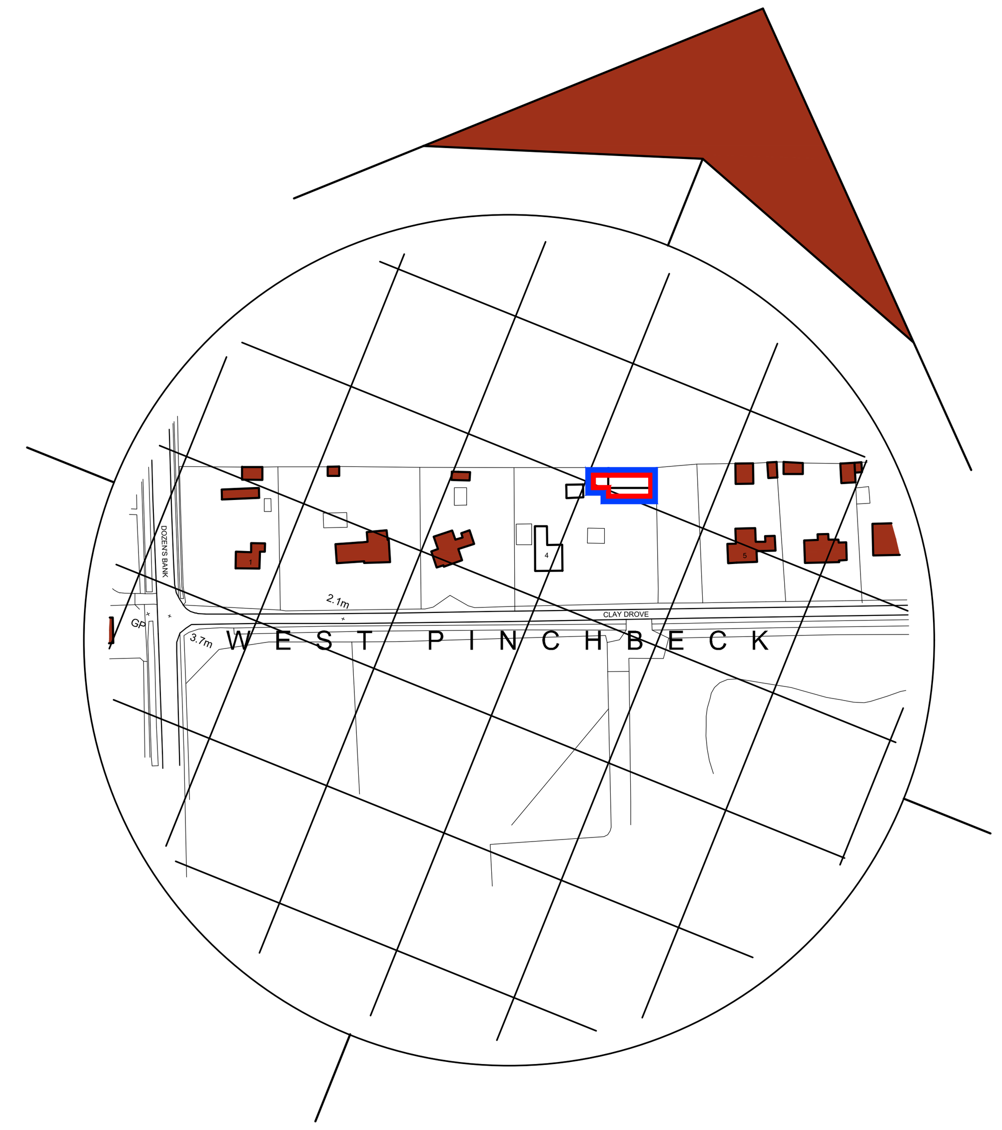
Rear Elevation (NW)
Scale: 1:100

0 1 2 3 4
metres



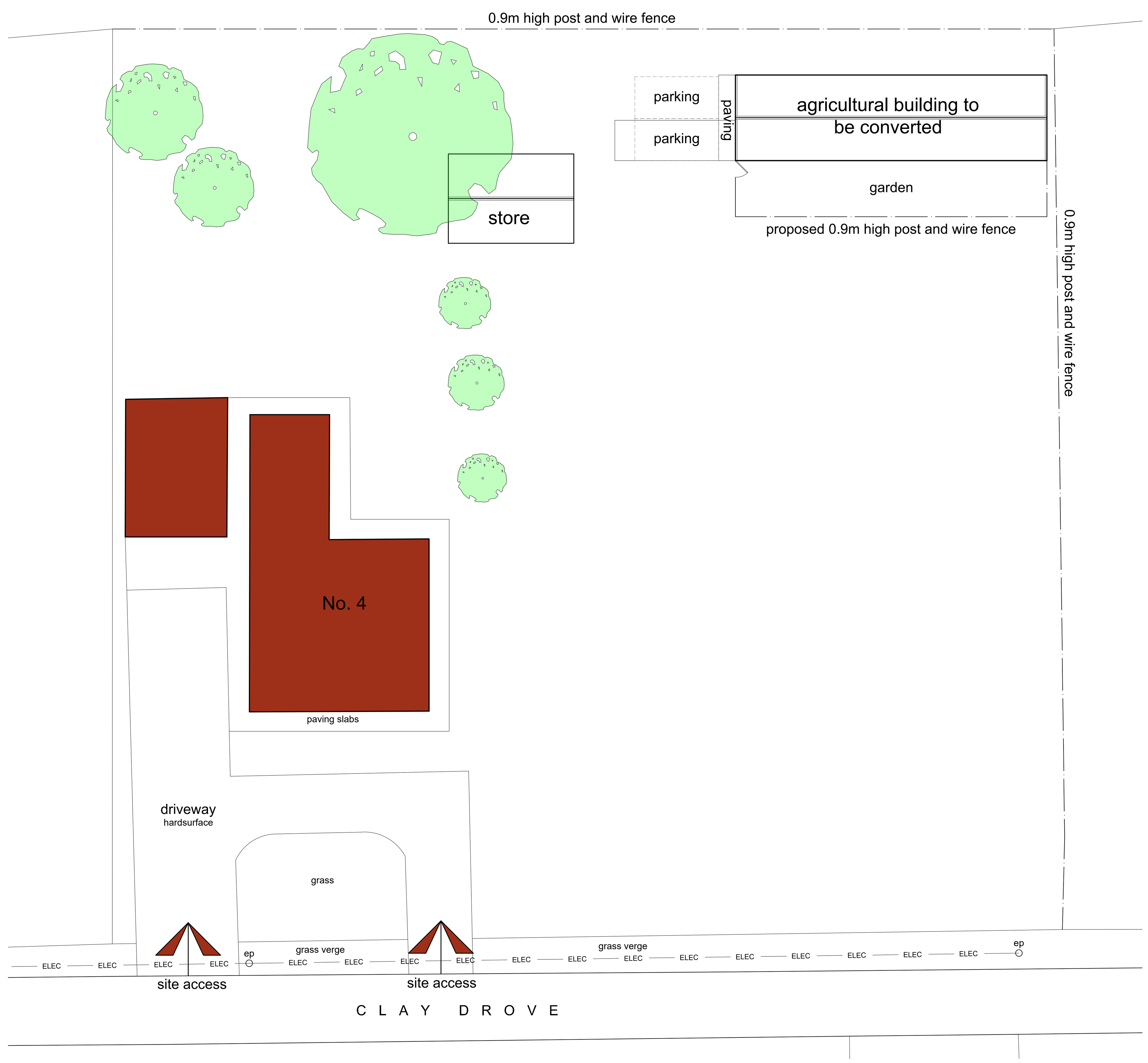
Floor Plan
Scale: 1:100

0 1 2 3 4
metres



Location Plan
Scale: 1:2500

0 25 50 75 100
metres



Site Plan
Scale: 1:200

0 2 4 6 8
metres

General Notes

1. All dimensions are shown in 'mm' unless otherwise stated.
2. The contractor, sub-contractors and suppliers must verify all dimensions on site prior to the commencement of any work.
3. This drawing is to be read in conjunction with all relevant engineers and specialist sub-contractors drawings and specifications.
4. Any discrepancies are to be brought to the designers attention.

SITE PLAN KEY

Indicates existing buildings taken from OS map

Indicates surveyed existing buildings on site

Indicates approximate position of existing vegetation

Indicates existing site access

WALL KEY

Indicates existing walls

Indicates proposed walls

Indicates features to be demolished

Status
FOR APPROVAL

SWANN EDWARDS
A R C H I T E C T U R E

Swann Edwards Architecture Limited, Black Barn, Fen Road, Guyhirn, Wisbech, Cambs. PE13 4AA
t 01945 450694 e info@swannedwards.co.uk w www.swannedwards.co.uk

Job Title
Proposed Barn Conversion at 4 Clay Drove, West Pinchbeck, PE11 3NB
For: Mr Smith

Date: November 2024	Drawn by: BR
	Checked by: GE

Drawing Title
Planning Drawing

Job No.: SE-2188	Sheet Size: A1
Dwg No.: PP1000	Revision:

Swann Edwards Architecture Limited ©