

**FLOOD RISK ASSESSMENT
FOR RESIDENTIAL DEVELOPMENT AT
MIDDLE DROVE, GEDNEY**

FINAL REPORT

ECL0599-2/G R MERCHANT LTD

DATE JULY 2022

ELLINGHAM CONSULTING LTD

Email: tim@ellinghamconsulting.co.uk

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DISCLAIMER

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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 G R Merchant Ltd in respect of a development that consists of one residential dwelling at Middle Drove, Gedney.

A planning application for the proposed development is to be submitted by G R Merchant Ltd.

A planning application (H06-1043-21) for a change of use of an agricultural building to form a residential dwelling was approved November 2021. This application is for the replacement of the barn with a dwelling rather than the change of use.

2.0 SITE LOCATION AND DESCRIPTION

2.1 Site Location

The site is located at Middle Drove, Gedney, Spalding, Lincs, PE12 0AU. The National Grid Reference of the site is 54274/32718.

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 Middle Drove. The site consists of an agricultural building and the surrounding land. The site has an access from Middle Drove. There are paddocks to the east and west of the site and agricultural land to the north. The area of development is approximately 0.15 hectares.

Spot levels taken to a local datum are shown in Attachment 1. The spot levels show that the site is flat. Environment Agency LiDAR shows that ground levels on the southern side of the barn are +3.9m OD. This is 0.5m above the agricultural land to the east and west of the site which is at +3.4m OD.

The site is in the South Holland Internal Drainage Board (IDB) District. Surface water at the site would naturally drain through soakaway and hence to the IDB drain system. There is a riparian drain along the southern boundary of the site and an IDB Ordinary Watercourse 200m east of the site.

The online British Geological Survey maps indicate that the site is likely to be underlain by Ampthill 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 a residential dwelling. The dwelling will have two storeys. The barn at the site will be demolished. Details of the proposed development are provided 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 Flood Zones

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

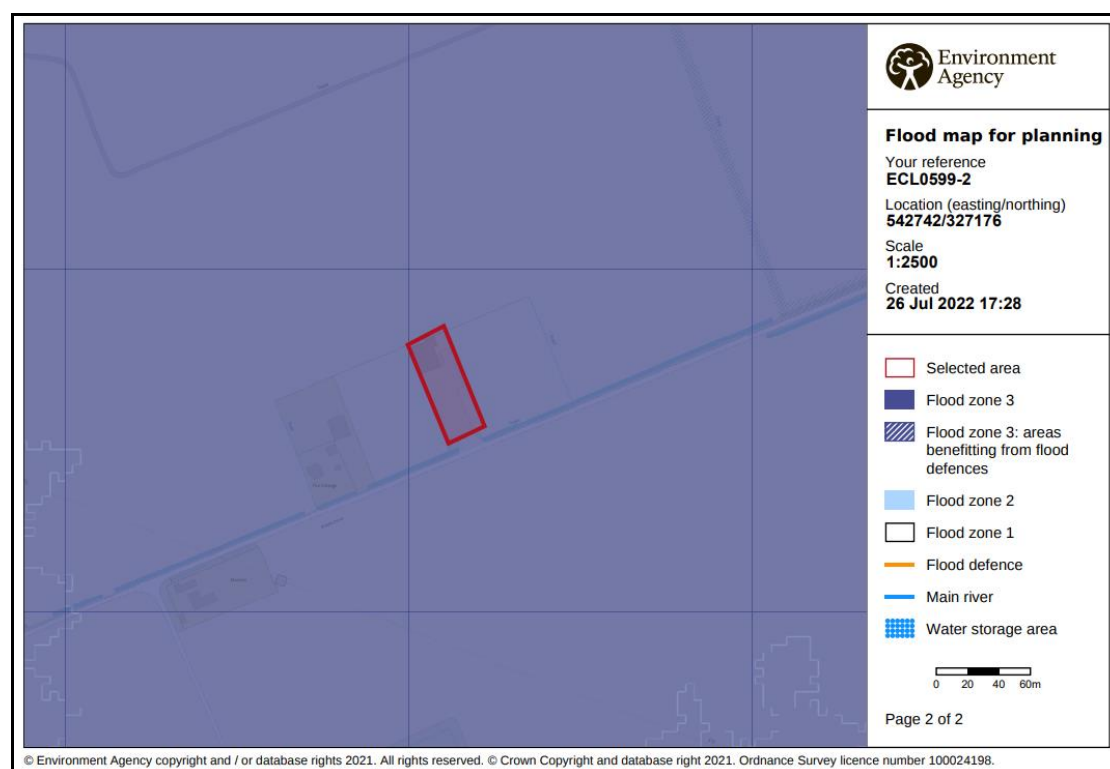


Figure 2 – Environment Agency Flood Map for Planning

The Environment Agency Long Term Flood Risk maps show that:

- the site has a low risk of flooding from rivers or the sea (annual probability between 0.1% and 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 in the 'Danger for Some' area	The site is in the 'Danger to Most' area
Residual Peak Depth Map for the 1% fluvial and 0.5% tidal	The peak flood depth is between 0.25m and 0.5m.	The peak flood depth is 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.

The site has received planning permission for a dwelling. This application would be in place of the earlier application and is therefore sequentially preferable to other potential sites. The site 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 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 South Holland IDB district is protected by the Wash tidal defences along the Gedney Marsh frontage with embankment levels at a minimum of +7.0m OD. The Wash tidal defences are 4.8km from the site. The River Nene tidal defences are 6.5km east of the site. These 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 Ordinary Watercourse 200m east of the site. The site and the surrounding land are within the Lutton Leam catchment and which discharges to the tidal River Nene at Lutton Leam Tidal 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

The potential sources of flooding that have been identified during this assessment are:

- local blockages to the South Holland IDB drainage system;
- an event in the local drainage network greater that exceeds the standard of protection;
- failure of Lutton Leam Tidal Sluice; and
- overtopping and/or breaching of the Wash or River Nene tidal defences.

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.

The standard of drainage provided by South Holland IDB is assessed at 2% annual probability (1 in 50 chance each year), compatible with the Department of the Environment, Food and Rural Affairs (DEFRA) target level of service for rural drainage and flood defence works. The risk associated with flooding due to events greater

than 2% annual probability (1 in 50 chance each year) is lowered due to the South Holland IDB high priority watercourses incorporating a freeboard. This provides storage during events greater than 2% annual probability (1 in 50 chance each year).

The site benefits from the River Nene and The Wash tidal defences that provide protection during a 0.5% annual probability (1 in 200 chance each year) tidal event and a 1% annual probability (1 in 100 chance each year) fluvial event. The flood risk from the Wash is lowered further by second line defences and various informal banks constructed during the reclamation of Gedney Marsh.

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 flood levels in the River Nene.

The tidal flood level during the 0.5% annual probability (1 in 200 chance each year) event inclusive of climate change to 2115 is estimated to be 7.2m AOD. The minimum defence level of the Wash and River Nene embankments is 7.0m AOD. During such an event wave and wind action is likely to cause overtopping. However, the second line defences with embankment levels of 6.0m AOD would further reduce the probability of flood water reaching the development site.

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. The South East Lincolnshire SFRA includes maps demonstrating the residual peak depth in 2116. When climate change allowances are applied to the 1% annual probability (1 in 100 chance each year) fluvial event and 0.5% annual probability (1 in 100 chance each year) tidal event the peak depth at the site from direct overtopping together with breach failure is up to 1.0m. An extract from this map is shown in Figure 3 below.

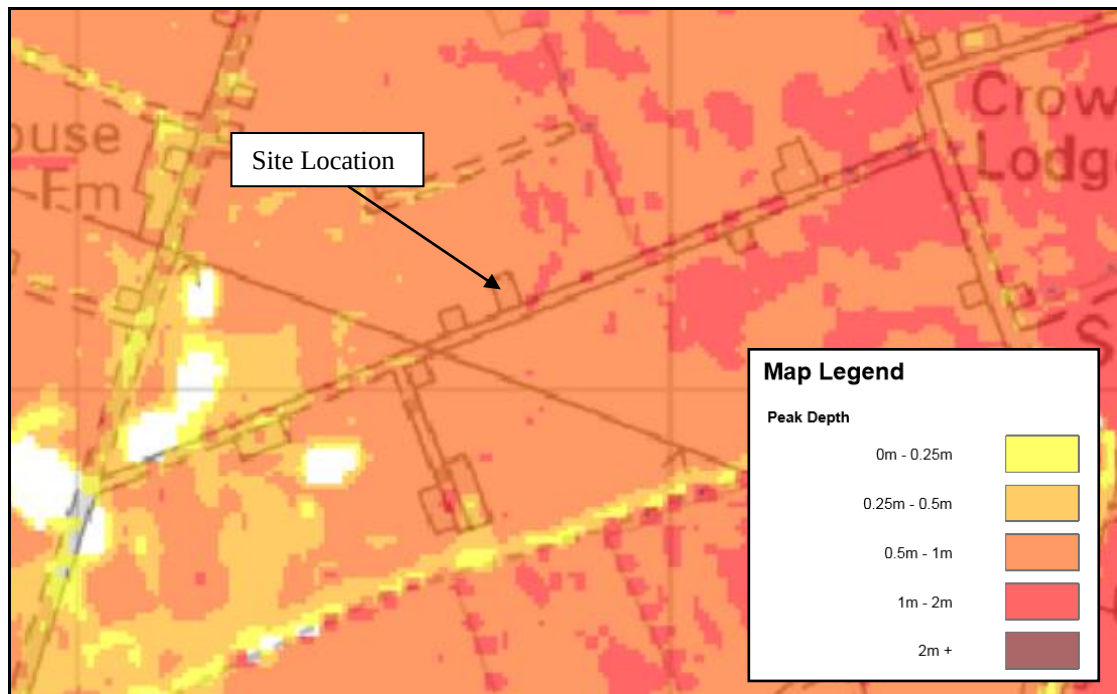


Figure 3 – SFRA 2116 Residual Peak Depth Map

The flood level at the site has been estimated based upon the extent and depth of flooding. The Note within Attachment 3 was provided to support the previous application for the site. Within this Note the flood level is estimated to be +4.3m OD. This is a depth of 0.4m on the southern side of the building and a depth of 0.9m above typical site levels.

5.0 FLOOD RISK MITIGATION

5.1 Summary of Risks

The probability of this development flooding from localised drainage systems is low. Failure of Lutton Leam Tidal 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 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. The estimated breach depth during the 0.5% annual probability (1 in 200 chance each year) event is 0.9m above typical site levels and 0.4m on the southern side of the building.

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

5.2 Mitigation Measures

The site has a low 'actual risk' of flooding. Based upon the potential flood level during a breach it is proposed that the finished floor level of the dwelling is at 4.3m OD. This is 0.4m above existing ground levels on the southern side of the barn and 0.9m above typical site levels. It is proposed that there is 0.3m of flood resilient construction above finished floor level.

The risks during an exceedance event are lowered because the dwelling will have two storeys with the sleeping accommodation on the first floor.

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 provides a Flood Warning Service which includes Flood Warning Codes and uses direct warning methods where the risks and impacts of flooding are high.

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. The occupier of the dwelling should register with the Floodline Direct Warnings Service to receive any future 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 Lutton Leam 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 using 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

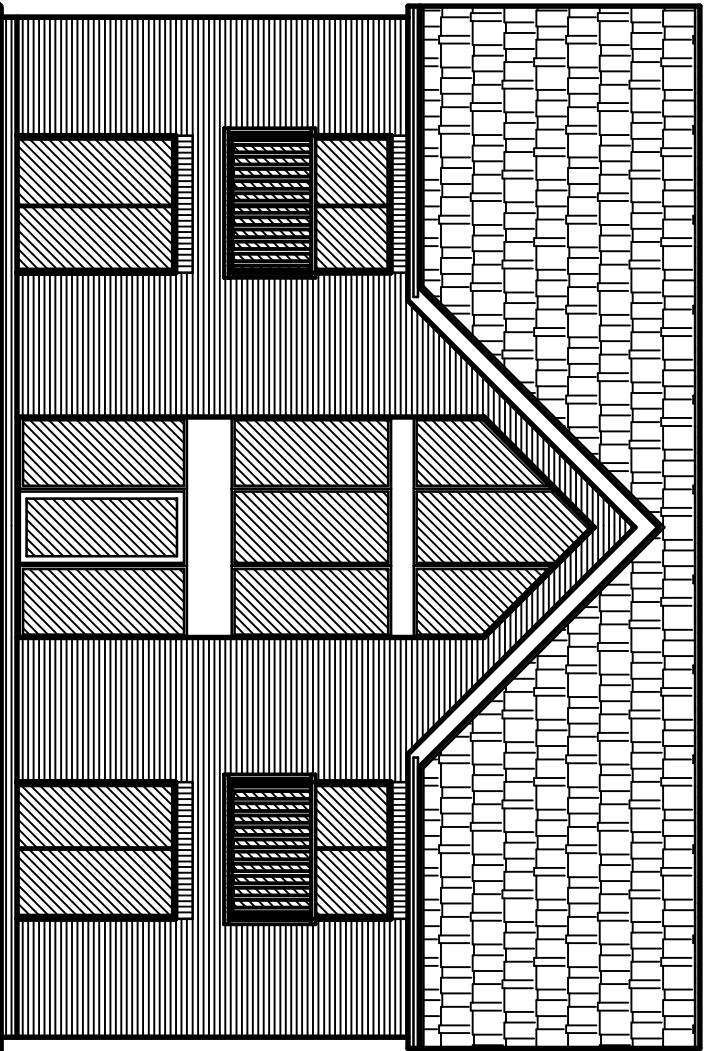
As a result of the assessment, the following conclusions have been reached.

- The proposed development consists of a change of use of an agricultural building to form a 2-storey residential dwelling at Middle Drove, Gedney.
- The proposed development is in Flood Zone 3. The site benefits from the Wash and River Nene tidal defences that provide protection during 0.5% annual probability (1 in 200) tidal event including climate change.
- The site is located within an Internal Drainage Board catchment with a minimum standard of drainage of 2% annual probability (1 in 50 chance each year) which accords with DEFRA guidelines for rural development. The risk of flooding is lowered further due to the South Holland IDB high priority watercourses incorporating a significant freeboard. This provides storage during events greater than 2% annual probability (1 in 50 chance each year).
- There is a residual risk to the site associated with a breach of the tidal defences. To mitigate this risk, it is proposed that the finished floor level is at +4.3m 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.

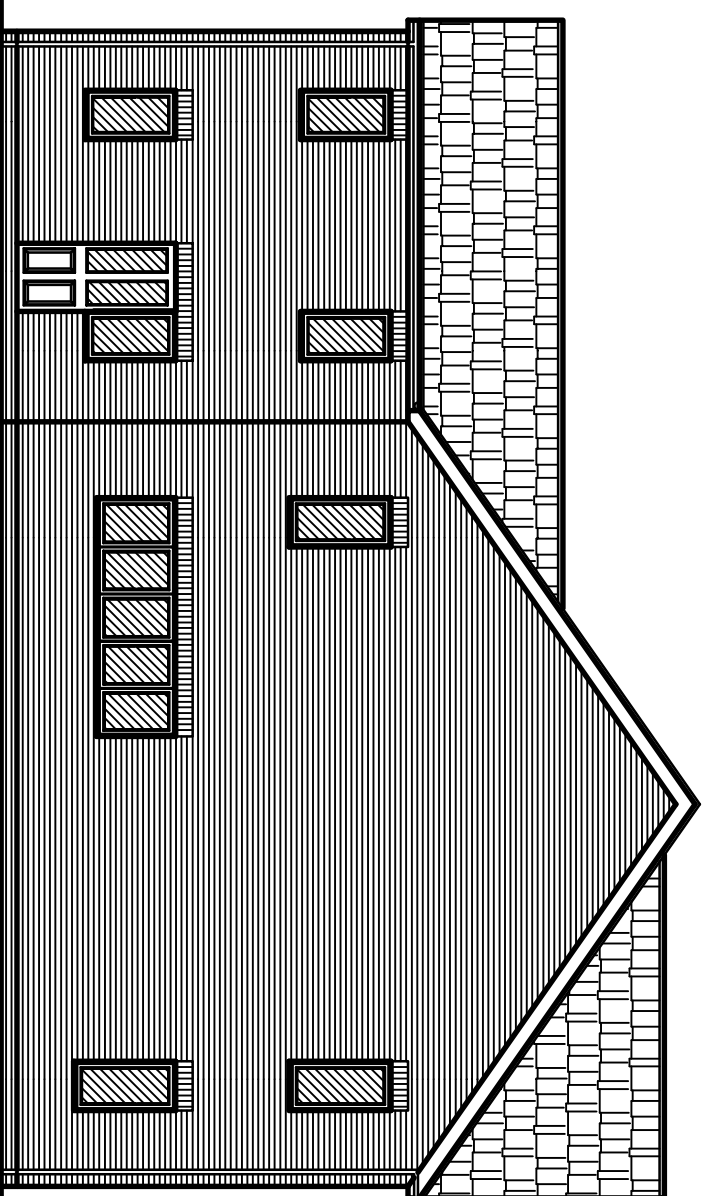
ATTACHMENT 1

**FLOOR PLANS & ELEVATIONS
(DWG 3897-21 05A)**

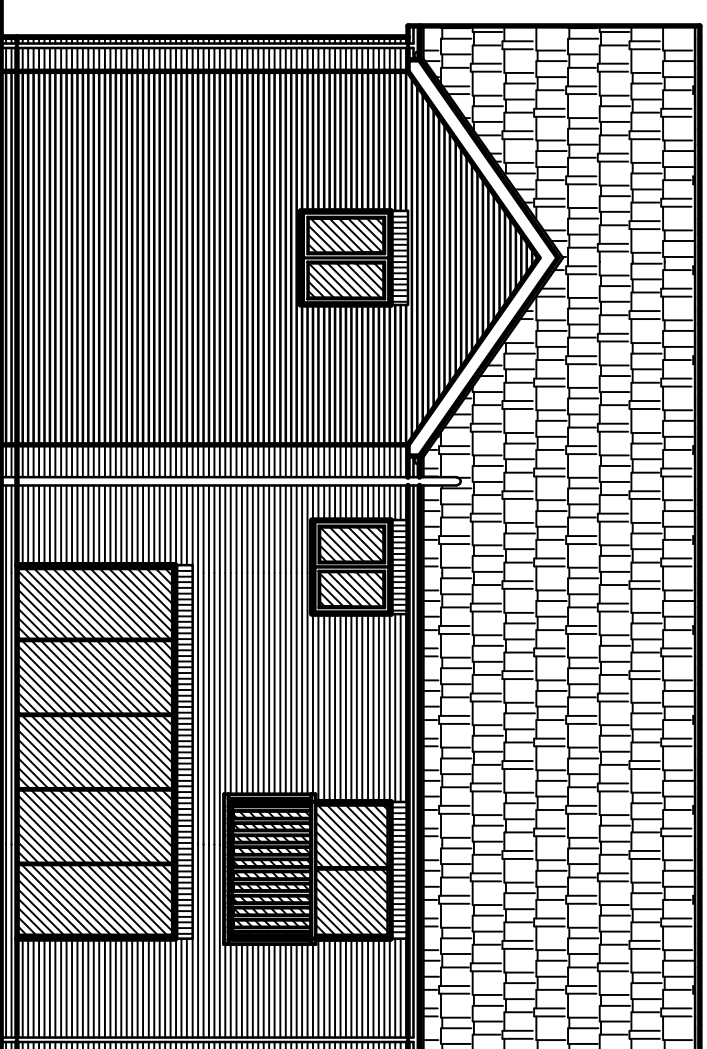
**SITE & LOCATION PLAN
(Dwg 3897-21-06)**



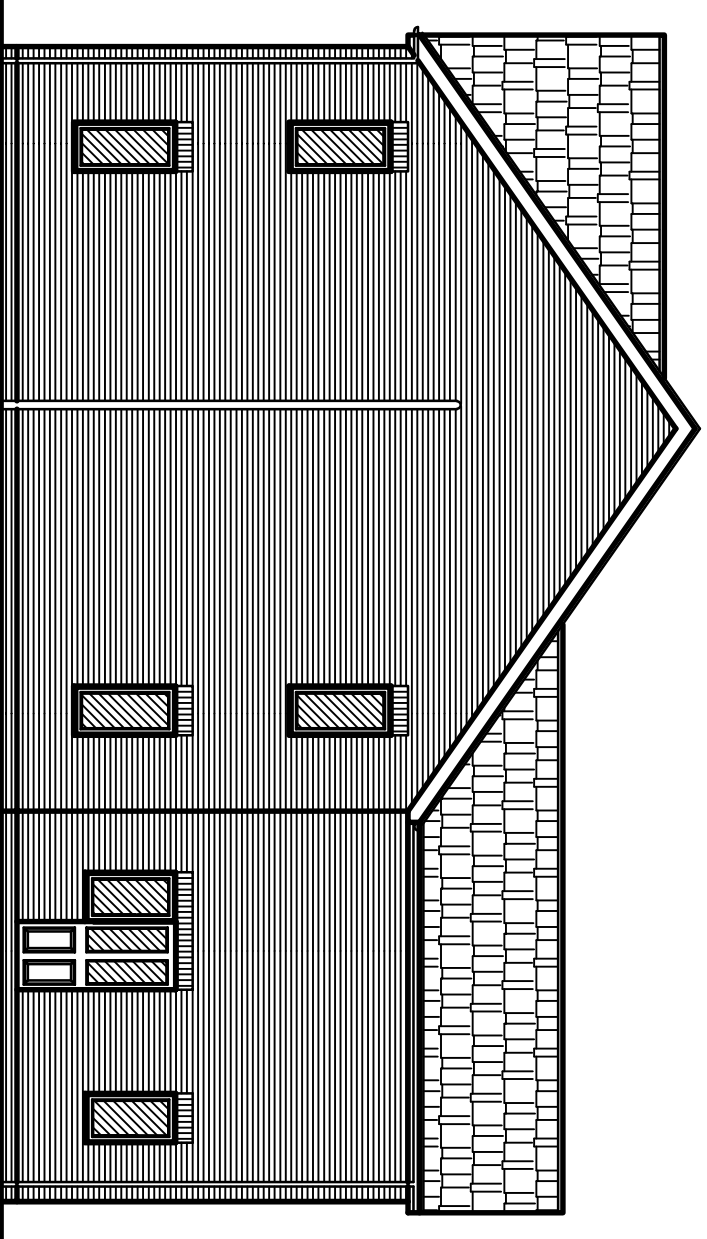
FRONT ELEVATION (SOUTH)



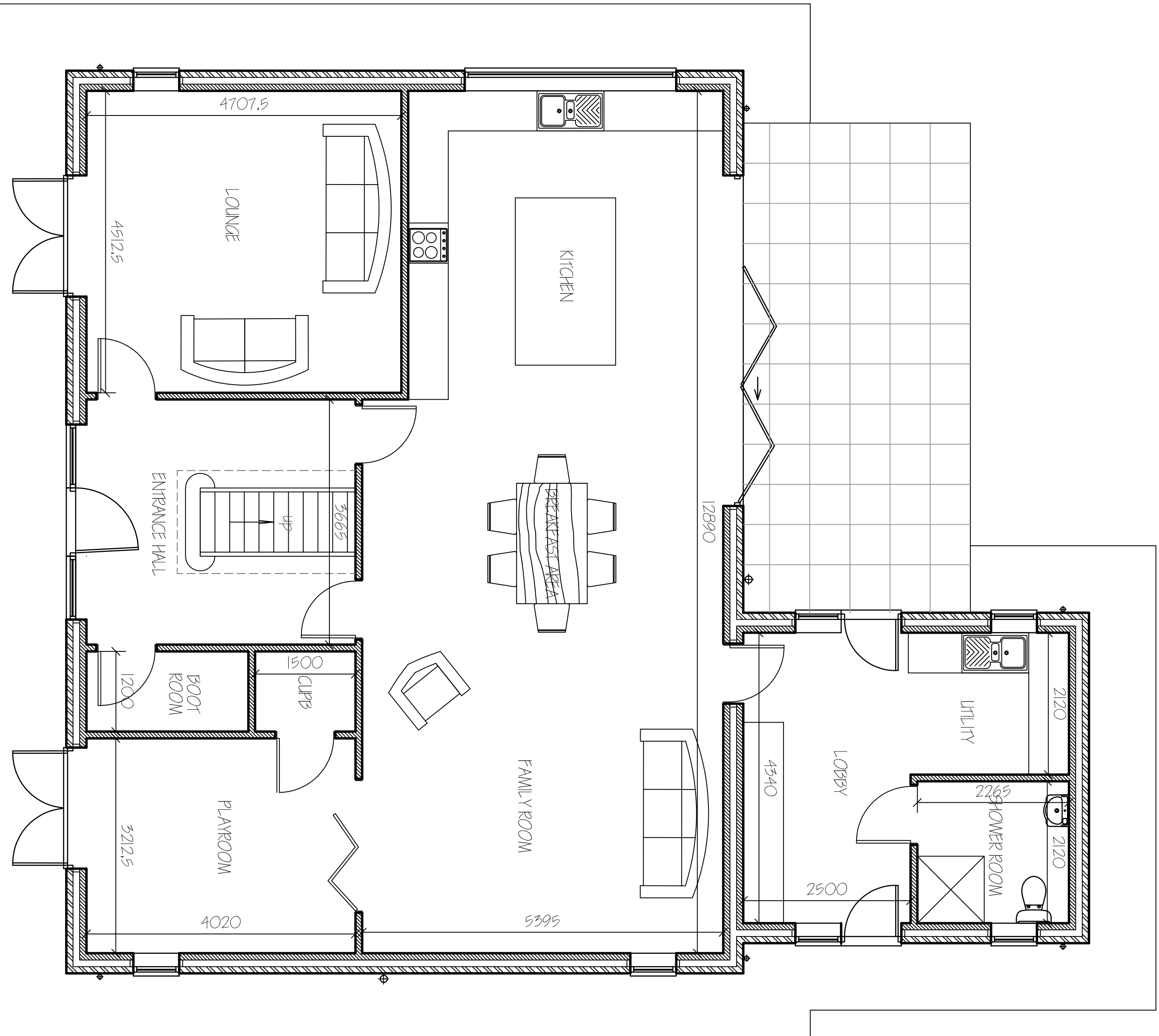
SIDE ELEVATION (WEST)



REAR ELEVATION (NORTH)

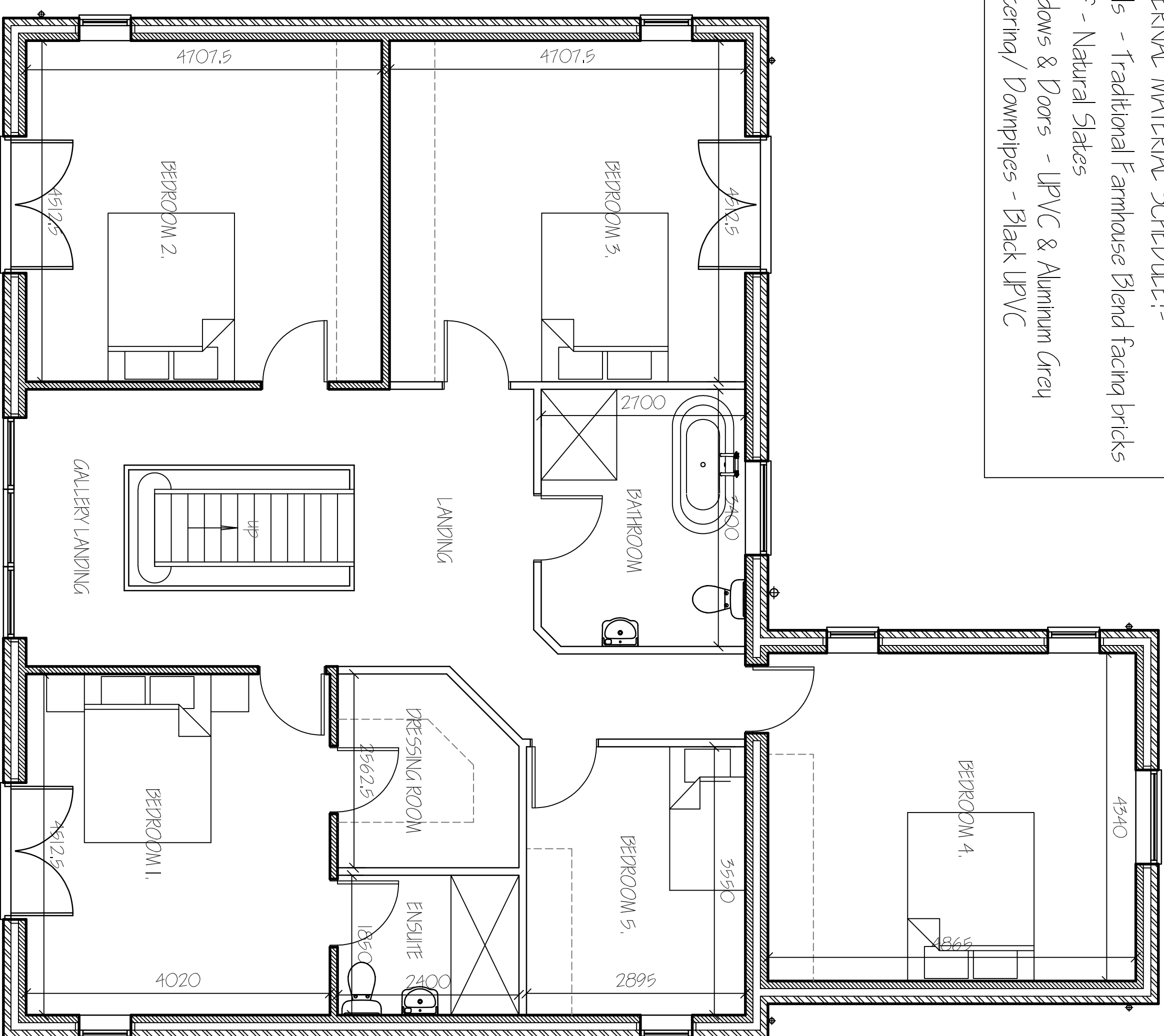


SIDE ELEVATION (WEST)



GROUND FLOOR PLAN

EXTERNAL MATERIAL SCHEDULE:-
Walls - Traditional Farmhouse Blend Facing bricks
Roof - Natural Slates
Windows & Doors - UPVC & Aluminum Grey
Guttering/ Downpipes - Black UPVC



FIRST FLOOR PLAN

refr.	revision	date
A	CLEIN-AMERIS & ELEVATIONS	JULY 2022

G. R. MERCHANT LTD.
I.ENG AMICE FIMO

**ARCHITECTURAL, STRUCTURAL
AND LAND DRAINAGE
CONSULTANTS**

4 Wrights Mews
12A Park Road, Holbeach,
Spalding, Lincs. PE12 7EE
Tel: 01406 480800
Fax: 01406 425744

E-Mail: gr.merchant@btconnect.com



Project
DEMOLISH BARN & ERECTION DWELLING
PARSONS YARD
MIDDLE DROVE, GEDNEY
SPALDING, LINC.S. PE12 6BP.

MR & MRS G. MERRISON

Drawn

FLOOR PLANS & ELEVATIONS.

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3897-21 O5A.

Date	Drawn
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1/50 1/100 (unless otherwise stated)

DO NOT SCALE FROM THIS DRAWING

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ATTACHMENT 2

BREACH LEVEL ESTIMATE

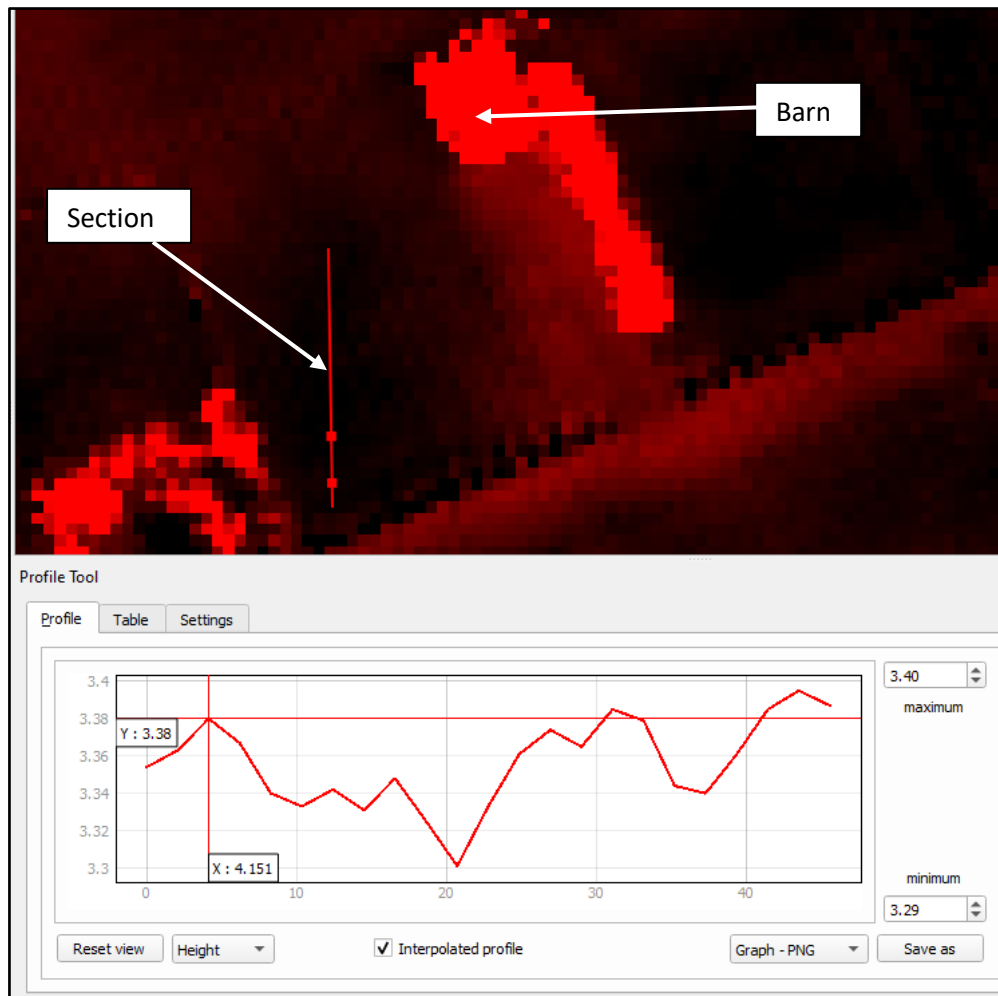
Ellingham Consulting Ltd

Tim Ellingham, Director
074 25061503
tim@ellinghamconsulting.co.uk

Residential Development, Middle Drove, Gedney (Environment Agency ref AN/2021/132382/01-L01)

This note has been prepared to respond to the Environment Agency letter of 21 October 2021. We provide the details demonstrating how a breach level of +4.3m OD has been estimated and a cross-section of the site.

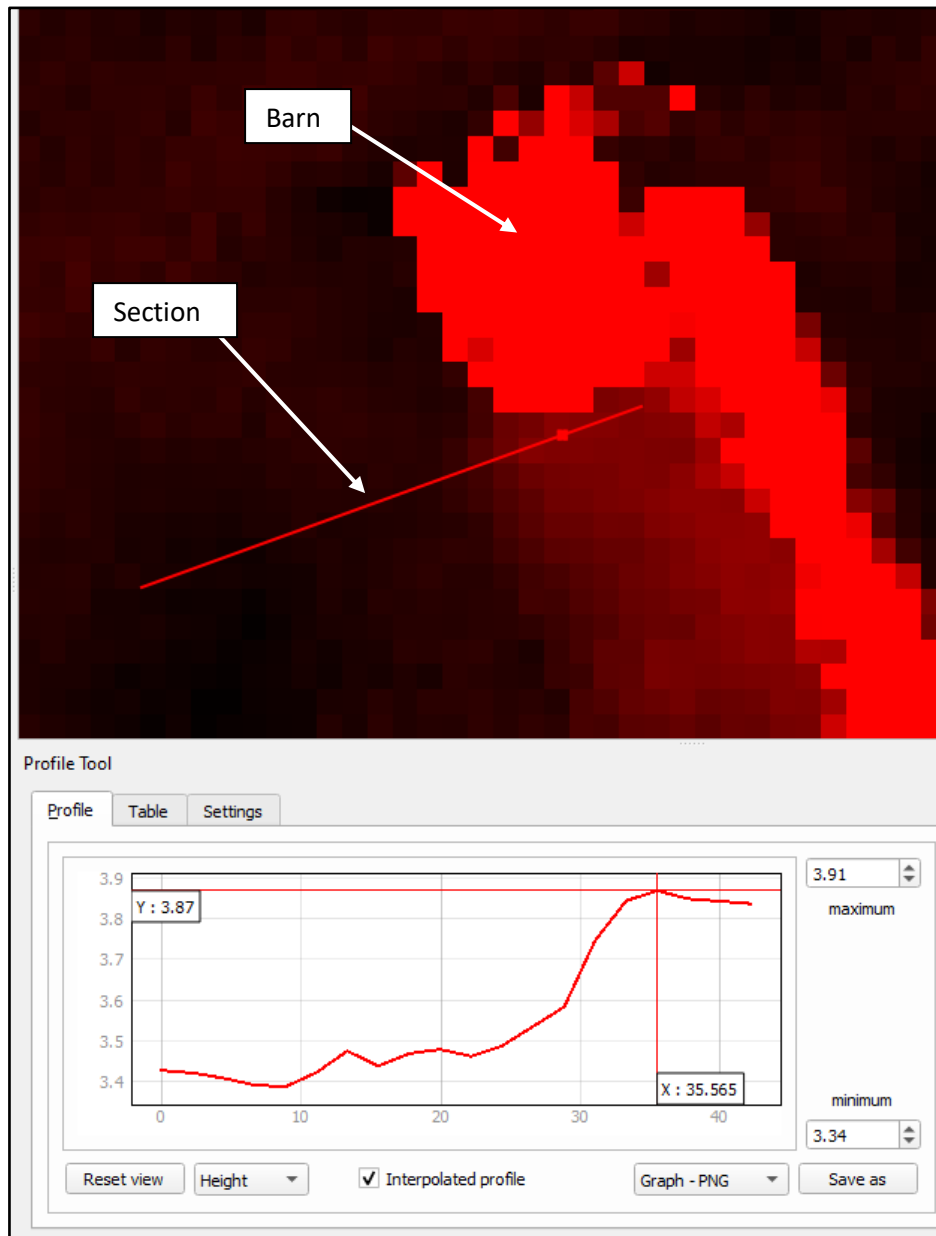
Figure 3 within the Flood Risk Assessment shows that the land to the west of the site has a residual peak depth of between 0.5m and 1.0m. The image below has been prepared using EA LiDAR and shows the profile of the land to the west of the site. Based upon ground levels between +3.3m and +3.4m OD a residual flood level of +4.3m OD was estimated.



A similar cross section has been taken on the southern side of the barn. This shows that ground levels on the southern side of the barn are typically +3.9m OD and indicates that the typical site level is +3.4m OD.

Ellingham Consulting Ltd

Tim Ellingham, Director
074 25061503
tim@ellinghamconsulting.co.uk



Based upon the residual flood level of +4.3m OD a flood depth of 0.4m has been estimated on the southern side of the barn. Due to the existing structure the maximum height that the floor can be raised is estimated to be 0.2m above ground levels on the southern side of the barn. This is a level of approximately +4.1m OD.

We trust that this Note provides sufficient information to overcome the Environment Agency objection.

Tim Ellingham
2 November 2021