FLOOD RISK ASSESSMENT
FOR RESIDENTIAL DEVELOPMENT AT
STOW ROAD, STOW BRIDGE

FINAL REPORT

ECL0931/TRUNDLEY DESIGN SERVICES

DATE JANUARY 2023

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CONTENTS

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 Mrs J Partridge in respect of a development that consists of the change of use of an animal hydrotherapy centre to a residential dwelling at Stow Road, Stow Bridge.

A planning application for the proposed development is to be submitted by Trundley Design Services.

2.0 SITE LOCATION AND DESCRIPTION

2.1 Site Location

The site is at Edenfield, Stow Road, Stow Bridge, King's Lynn, PE34 3PF. The National Grid Reference of the site is 56017/30761.

The location of the site is shown on Figure 1.

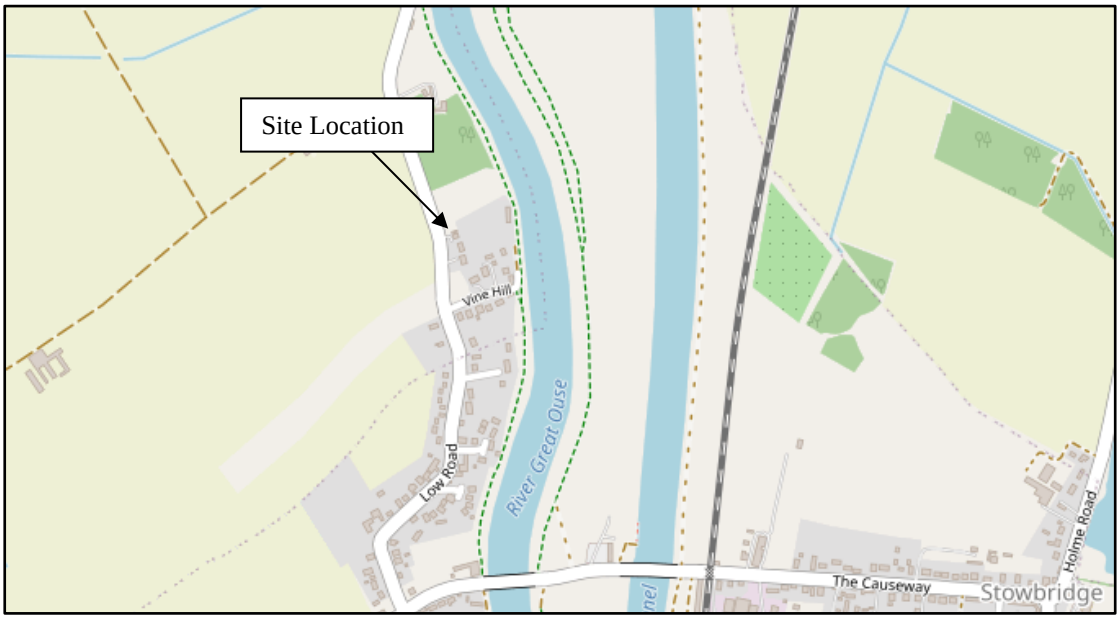


Figure 1 – Location Plan (© OpenStreetMap contributors)

2.2 Existing Site

The site is on the eastern side of Stow Road. The site consists of an animal hydrotherapy centre, kennels, and the surrounding land. There are two buildings, one for the hydrotherapy centre and one for the kennels. The area of development is approximately 0.07 hectares.

A topographic survey has been undertaken and spot levels are shown in Attachment 1. Site levels typically range between +0.4m OD to +1.4m OD. The carriageway level of Stow Road is at a level of +1.4m OD. The finished floor level of the existing buildings is +1.36m OD.

The site is in the King's Lynn Internal Drainage Board's (IDB) area. Surface water at the site would naturally drain through soakaway and hence to the IDB drain system. There are riparian drains close to the northern and eastern boundaries of the site and an IDB watercourses 500m west of the site.

The online British Geological Survey maps indicate that the site is likely to be underlain by the Kimmeridge 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 change of use of a commercial building to a residential dwelling. The dwelling will have two storeys. A Proposed Site Plan is provided in Attachment 1.

2.4 Local Development Documents

The King's Lynn & West Norfolk Borough Council Local Development Framework - Core Strategy is the adopted Local Plan for the district. Policy CS08 for Sustainable Development states the requirements for flood risk reduction.

The King's Lynn and West Norfolk Borough Council Level 1 Strategic Flood Risk Assessment (SFRA) was prepared in November 2018. The Level 2 SFRA was prepared in March 2019.

The Norfolk LLFA Statutory Consultee Guidance Document has been drafted to support the development of Norfolk County Council (NCC) as Lead Local Flood Authority's (LLFA) role as a statutory consultee to planning and to inform stakeholders in this process such as Local Planning Authorities (LPAs) and developers.

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.

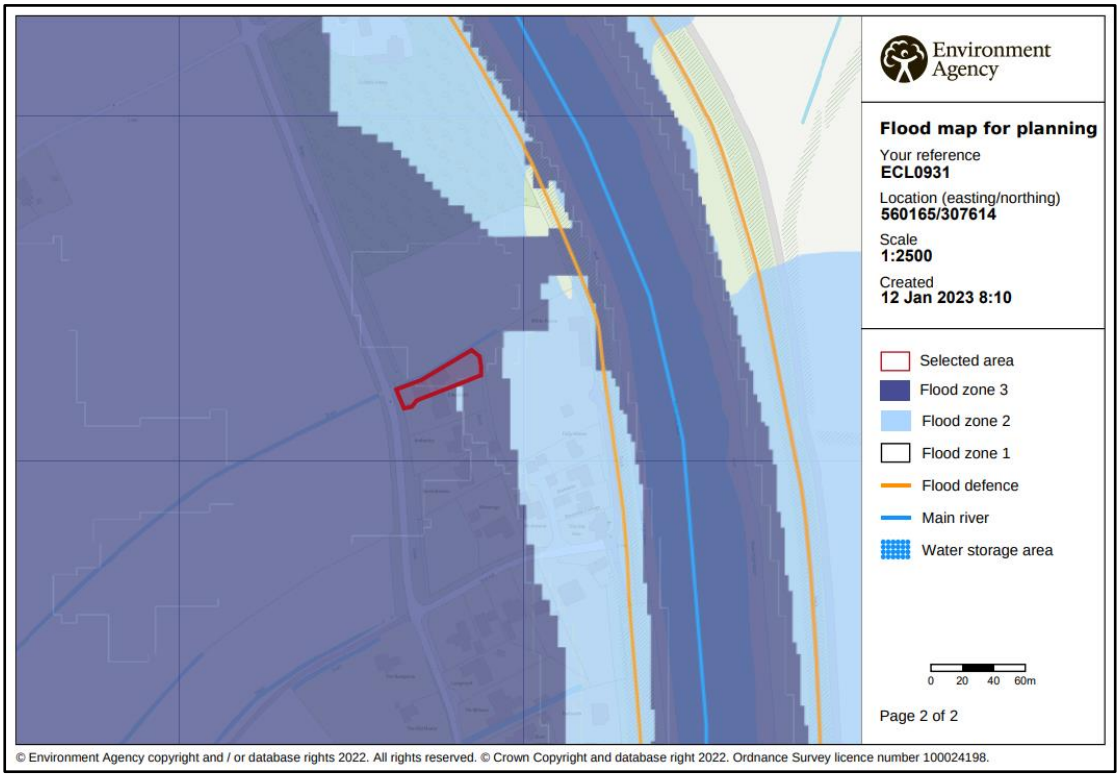


Figure 2 – Environment Agency Flood Map for Planning

The Environment Agency Long Term Flood Risk maps show that:

- the site has a medium risk of flooding from rivers or the sea (annual probability between 1.0% and 3.3%);
- the site has a very low risk of surface water flooding (annual probability less than 0.1%); and
- the site is within an area at risk of reservoir flooding when there is also flooding from rivers.

The site is not within one of the settlements considered within the King's Lynn and West Norfolk Borough Council Level 2 SFRA. As such the Level 1 SFRA maps have been reviewed and they show that:

- part of the site is in Flood Zone 3a;
- the site is not at risk during a 1% annual probability (1 in 100 chance each year) fluvial event including allowance for climate change;
- the site is not at risk during a 0.5% annual probability (1 in 200 chance each year) tidal event including allowance for climate change;
- the site is not at risk of surface water flooding including allowance for climate change however the area to the east of the site is at risk;
- the site is within an area with a susceptibility of groundwater flooding less than 25%;
- the site is at risk from a tidal breach; and
- the site is not at risk from reservoir flooding.

The 2015 Tidal Hazard Mapping merged model extents provided by the Environment Agency have been used to estimate the flood level during a breach.

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 develop 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 Core Strategy defines the housing distribution for new dwellings across the Borough. Small Villages and hamlets have a target of at least 351 new dwellings over the period from 2011 to 2026. The proposed dwelling 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 site is 100m west of the River Great Ouse. The site is protected by the Great Ouse tidal defences. The River Great Ouse is 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 King's Lynn IDB. There is an IDB Watercourse 500 west of the site. The site, and surrounding land, is part of the Magdalen catchment which drains by gravity to the Crabbs Abbey Pumping Station which discharges to the River Great Ouse.

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 site is approximately 4.1km east of the Middle Level Main Drain, an embanked channel which flows to St German Pumping Station to discharge to the tidal River Great Ouse. The Middle Level Main Drain is the responsibility of the Middle Level Commissioners.

Current maintenance standards of the King's Lynn IDB's, the Middle Level Commissioners and the Environment Agency's defences are generally good.

4.2 Sources of Flooding

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

- local blockages in the drainage system;
- an event in the local drainage network that exceeds the standard of protection;
- failure of the outfall to the Crabbe Abbey Pumping Station;
- overtopping and/or breaching of the River Great Ouse tidal defences; and
- overtopping and/or breaching of the Middle Level Main Drain.

The likelihood of overtopping and/or breach of the Middle Level Main Drain is considered less likely and less significant than a tidal breach. As such it has not been considered further in this assessment.

4.3 Probability of Flooding

The probability of flooding associated with blockages in the IDB's drainage system is low due to the maintenance standards already 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.

St Germans Pumping Station offers protection against the 1% annual probability (1 in 100 chance each year) fluvial event with an allowance for climate change. The St German Pumping Station was replaced in 2011 so that a standard of protection against the 1% annual probability (1 in 100 chance each year) event could be maintained.

The site benefits from defences on the River Great Ouse that provide protection during an event with a 0.5% annual probability (1 in 200 chance each year).

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 Great Ouse.

The SFRA maps show that the site is not at risk during the 0.5% annual probability (1 in 200 chance each year) tidal event with climate change. When this event is considered in the River Great Ouse it is likely to lead to some overtopping of the defences. However, the level of overtopping is such that it would not affect the 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

The SFRA indicates that there is a residual risk of flooding at the site during a breach of the tidal defences.

The 2015 Tidal Hazard Mapping merged model extents provided by the Environment Agency have been used to estimate the breach flood level. At three locations which are within the area at risk the tidal hazard mapping model estimated depth and LiDAR ground level have been used to estimate the flood level.

Point	Easting	Northing	Ground Level	Depth	Water Level
1	560170	307640	0.71m OD	0.15m	+0.86m OD
2	560180	307620	0.54m OD	0.32m	+0.86m OD
3	560150	307630	0.79m OD	0.05m	+0.84m OD

Table 1 – Estimated Flood Water Level during a breach

The approximate locations of the Points are shown in Figure 4.

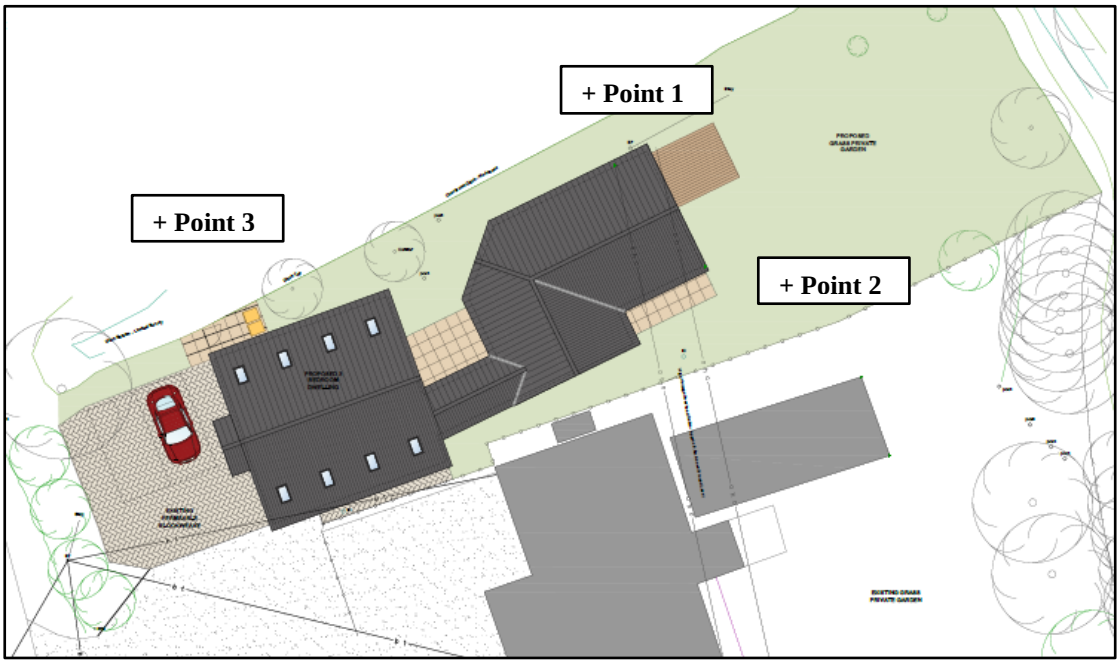


Figure 4 – Locations Used to Estimate Flood Water Level During a Breach

The analysis shows that a conservative estimate of the flood level at the site is +0.9m OD.

The 2015 Tidal Hazard Mapping merged model extents consider breaches at specific locations. The tidal River Great Ouse is 100m from the site however should a breach occur adjacent to the site there is the potential for a greater depth of flooding 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 Crabbe Abbey Pumping Station 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 defence systems. 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.

There is a residual risk to the site should there be a breach of the Environment Agency tidal defences. The peak flood level that could occur at the site due to combined breaches is +0.9m OD, however it is noted that this could be greater is a breach were to occur adjacent to the site.

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

5.2 Mitigation Measures

Based upon the information available during the preparation of this flood risk assessment, it is recommended that the finished floor level of the dwelling is not less than +1.4m OD. The floor level would be above the surrounding ground and 0.5m above the breach level indicated by the 2015 Tidal Hazard Mapping. It is recommended there is 0.3m of flood resilient construction above finished floor level.

The risks during a flood are lowered because the dwelling has 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 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.

Failure of Crabbe Abbey Pumping Station may occur. However, in these circumstances, if 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 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 a commercial building to form a two-storey residential dwelling at Stow Road, Stow Bridge.

- 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 Tidal River Great Ouse that provide protection against the 0.5% annual probability (1 in 200 chance each year) event including climate change.

- The site is at risk during a breach with a flood level of +0.9m OD.

- It is recommended that the finished floor level of the dwelling is not less than +1.4m 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

EXISTING PLANS, ELEVATIONS, SITE AND LOCATION PLAN (DWG 22-P28-PL001)

PROPOSED SITE PLAN (DWG 22-P28-PL003)

1:50 SCALE BAR (m)

0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0

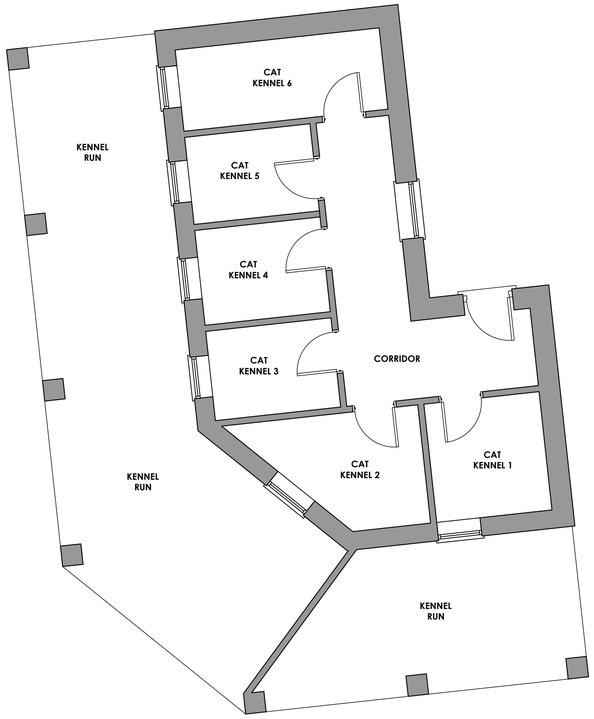
1:1250 SCALE BAR (m)

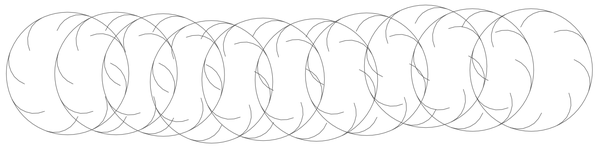
0 10 20 30 40 50 60 70 80 90 100 110 120

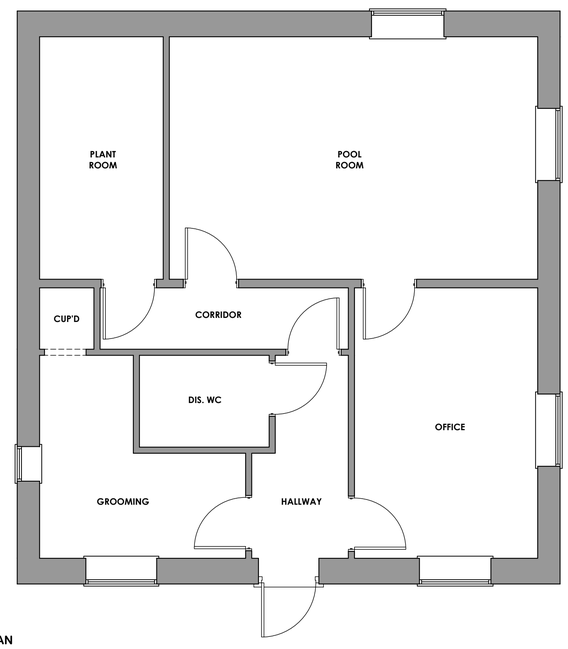
1:100 SCALE BAR (m)

0 1 2 3 4 5 6 7 8 9 10

*** NB: ALL PROPOSED SITE AND FLOOR LEVELS TO MATCH EXISTING LEVEL HEIGHTS. ALL LEVELS ABOVE GROUND LEVEL WILL MATCH EXISTING.**

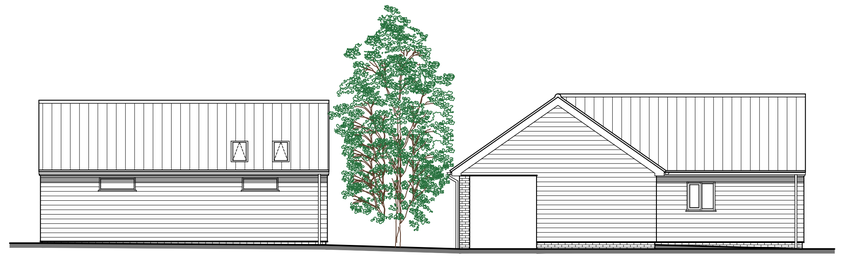






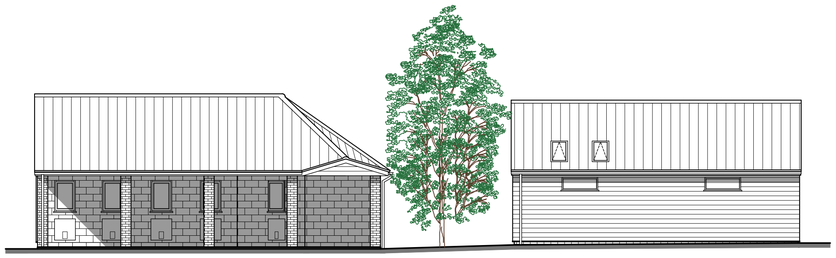
EXISTING FLOOR PLAN
SCALE: 1:50

EXISTING FRONT ELEVATION
SCALE: 1:100



EXISTING SIDE ELEVATION
SCALE: 1:100

EXISTING REAR ELEVATION
SCALE: 1:100



EXISTING SIDE ELEVATION
SCALE: 1:100

EXISTING SITE PLAN
SCALE: 1:200

Notes:

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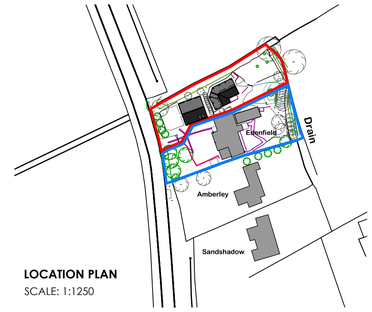
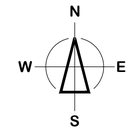
The works contain no extraordinary hazards or risks that are not present during routine construction operations that would not readily be apparent to a competent contractor.

This information should be included as part or commencement of the Health and safety file for the project.



LOCATION PLAN
SCALE: 1:1250



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no	date	amendment description

Revisions

Drawing Status: **PLANNING**

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Project Title:

JANE PARTRIDGE
EDENFIELD,
STOW ROAD
STOWBRIDGE
KING'S LYNN, PE34 3PF

CONVERT EXISTING ANIMAL HYDROTHERAPY / CATTERY CENTRE INTO RESIDENTIAL DWELLING

Drawing Title:

EXISTING PLANS, ELEVATIONS, SITE & LOCATION PLAN

Scale:	Date:	Drawn:
AS STATED @ A1	DECEMBER 2022	TN

Drawing Number: **22-P28-PL001**

Revision:

Checked by: Date:

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1:100 SCALE BAR (m)

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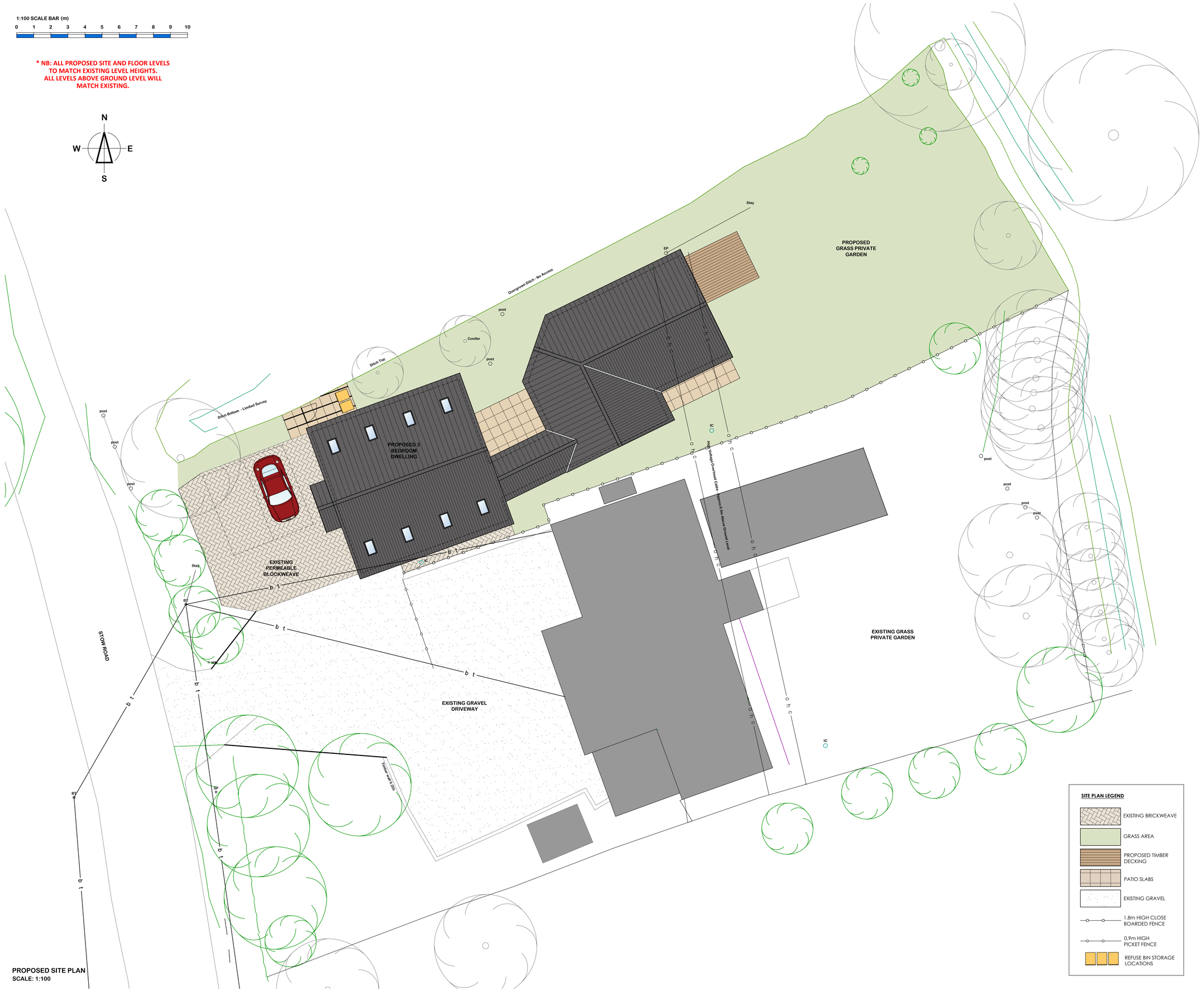
N W E S



PROPOSED SITE PLAN
SCALE: 1:100

SITE PLAN LEGEND

- EXISTING BRICKWEAVE
- GRASS AREA
- PROPOSED TIMBER DECKING
- PATIO SLABS
- EXISTING GRAVEL
- 1.8m HIGH CLOSE BOARDED FENCE
- 0.9m HIGH PICKET FENCE
- REFUSE BIN STORAGE LOCATIONS

Notes:

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no	date	amendment description
B	07.12.2022	PROPOSED SITE PLAN UPDATED TO SUIT CLIENTS COMMENTS
A	29.11.2022	PROPOSED SITE PLAN UPDATED TO SUIT CLIENTS COMMENTS

Revisions

Drawing Status: **PLANNING**

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Project Title:

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CONVERT EXISTING ANIMAL HYDROTHERAPY CENTRE INTO RESIDENTIAL DWELLING

Drawing Title:

PROPOSED SITE PLAN

Scale:	Date:	Drawn:
AS STATED @ A1	DECEMBER 2022	TN

Drawing Number: **22-P28-PL003** Revision:

Checked by: Date:

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