FLOOD RISK ASSESSMENT

Proposed Change of Use of Annexe to a Single Storey Dwelling
Willow Lea Barn,
Mill Green Road,
Pinchbeck,
Spalding,
PE11 3PY



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RMA

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FLOOD RISK ASSESSMENT PROPOSED CHANGE OF USE OF ANNEXE TO A SINGLE STOREY DWELLING, WILLOW LEA BARN, MILL GREEN ROAD, PINCHBECK, SPALDING, PE11 3PY

INTRODUCTION

The Government has placed increasing priority on the need to take full account of the risk associated with flooding at all stages of the planning and development process. This seeks to reduce the future damage to property and the risk to life from incidents of flooding. Their expectations relating to flooding are contained in the National Planning Policy Framework December 2023, (NPPF), which identifies how the issue of flooding is dealt with in the drafting of planning policy and the consideration of planning applications by avoiding inappropriate development in areas at risk from flooding and to direct development away from areas at highest risk.

The NPPF provides that development in areas at risk of flooding should be avoided and seeks to direct development away from areas at highest risk. There is a sequential, risk-based approach to the location of development avoiding where possible, flood risk to people and property managing any residual risk and taking account of the impacts of climate change.

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APPLICATION SITE

The site is located at Willow Lea Barn, Mill Green Road, Pinchbeck, Spalding, PE11 3PY within the South Holland District Council's administrative area. The National Grid Reference is TF 22299 23234**. Plan 1**

This flood risk assessment has been prepared for a planning application for a change of use, of an existing self-contained annexe to the main residence, to a self-supportive single storey dwelling. **Plan 2**

The National Planning Policy Framework Guidance NPPG defines three levels of flood risk depending upon the annual probability of fluvial flooding occurring.

Zone 1 – Low Probability (<0.1%)

Zone 2 – Medium Probability (0.1 – 1.0%)

Zone 3 – High Probability (>1.0%)

The proposed development site is shown mainly to be within Flood Zone 3 “High Probability” as detailed on the Environment Agency's Flood Zone Maps **without defences**, and as defined in Table 1 of NPPG**.**

Table 1: Flood Zones Definition

Flood Zone 3- High Probability
Definition Land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year. The water-compatible and less vulnerable uses of land are appropriate in this zone. The highly vulnerable uses should not be permitted in this zone. The more vulnerable and essential infrastructure uses should only be permitted in this zone if the Exception Test is passed. Essential Infrastructure permitted in this zone should be designed and constructed to remain operational and safe for uses in times of flood. **Flood Risk Assessments requirements** All proposals in this zone should be accompanied by a Flood Risk Assessment. **Policy aims.** Developers and local authorities should seek opportunities to: • reduce the overall level of flood risk in the area through the layout and form of the development and the appropriate application of sustainable drainage techniques. • relocate existing development to land with a lower probability of flooding. • create space for flooding to occur by allocating and safeguarding open space for flood storage.

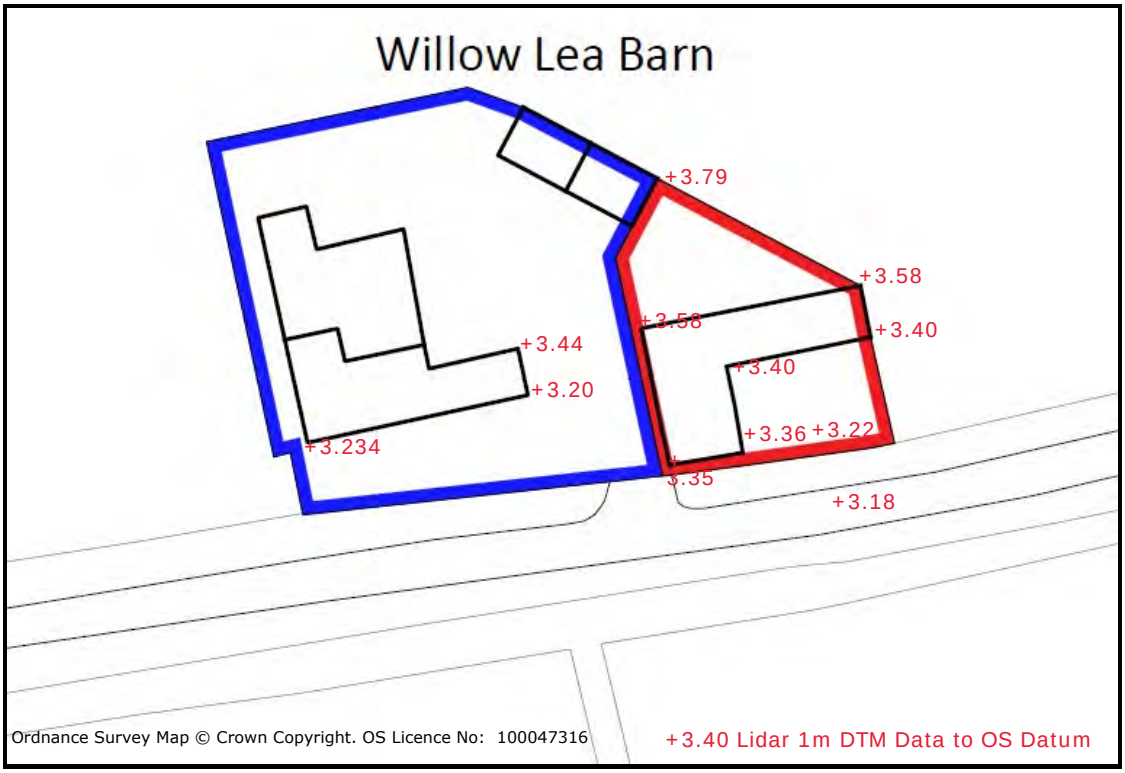
Applying the Flood Risk Vulnerability Classification in Table 2 of NPPG, both the existing and proposed use are classified as “More Vulnerable,” Table 1 of NPPG states that such uses are permitted in this zone subject to the exception test.

Table 2: Flood Risk Vulnerability Classification

More Vulnerable
• Hospitals • Residential institutions such as residential care homes, children’s homes, social services homes, prisons, and hostels. • Buildings used for: dwelling houses; student halls of residence; drinking establishments; nightclubs; and hotels • Non-residential uses for health services, nurseries, and educational establishments • Landfill and sites used for waste management facilities for hazardous waste. • Sites used for holiday or short-let caravan and camping, subject to a specific warning and Evacuation Plan.

Site Levels

From Lidar 1mDTM data the site is reasonably level, the ground levels around the existing annexe are around 3.40mODN. The road level at the site entrance, is 3.16mODN. the ground floor level is approximately 150mm higher at 3.55mODN.



Lidar 1m DTM Data to OS Datum

DRAINAGE AUTHORITIES

Environment Agency

The Environment Agency has permissive powers for reducing the risk of flooding from designated main rivers and from the sea.

The following potential sources of flooding affecting the development site have been identified as:

- the River Welland (Tidal)
- Welland & Deepings IDB watercourses

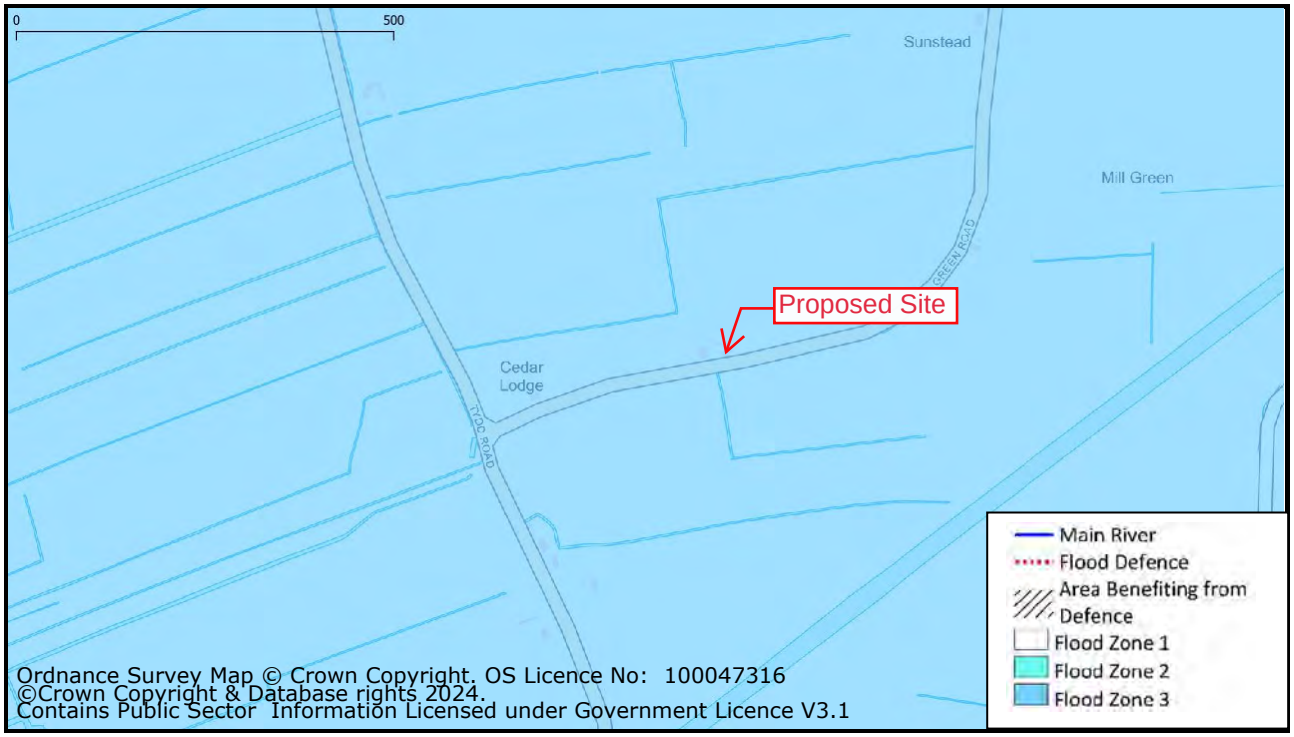
The flood zone maps indicate that the area would be flooded without flood defences.). The Flood Map indicates the area at risk of flooding, **assuming no flood defences exist**, for a flood event with a 0.5% chance of occurring in any year for flooding from the sea, or a 1% chance of occurring for fluvial (river) flooding. It also shows the extent of the Extreme Flood Outline which represents the extent of a flood event with a 0.1% chance of occurring in any year, or the highest recorded historic extent if greater. In some locations, such as around the fens and the large coastal floodplains there are many kilometres of raised flood defences. To meet the requirements of the National Planning Policy Framework, these defences are removed in their entirety to produce the Flood Map for Planning (Rivers and Sea). The map therefore shows the full extent of areas that would be at risk of flooding if no defences existed, and water could spread out across the floodplain.

Fluvial Flooding

The site is not considered to be at risk from fluvial flooding from any Main River.

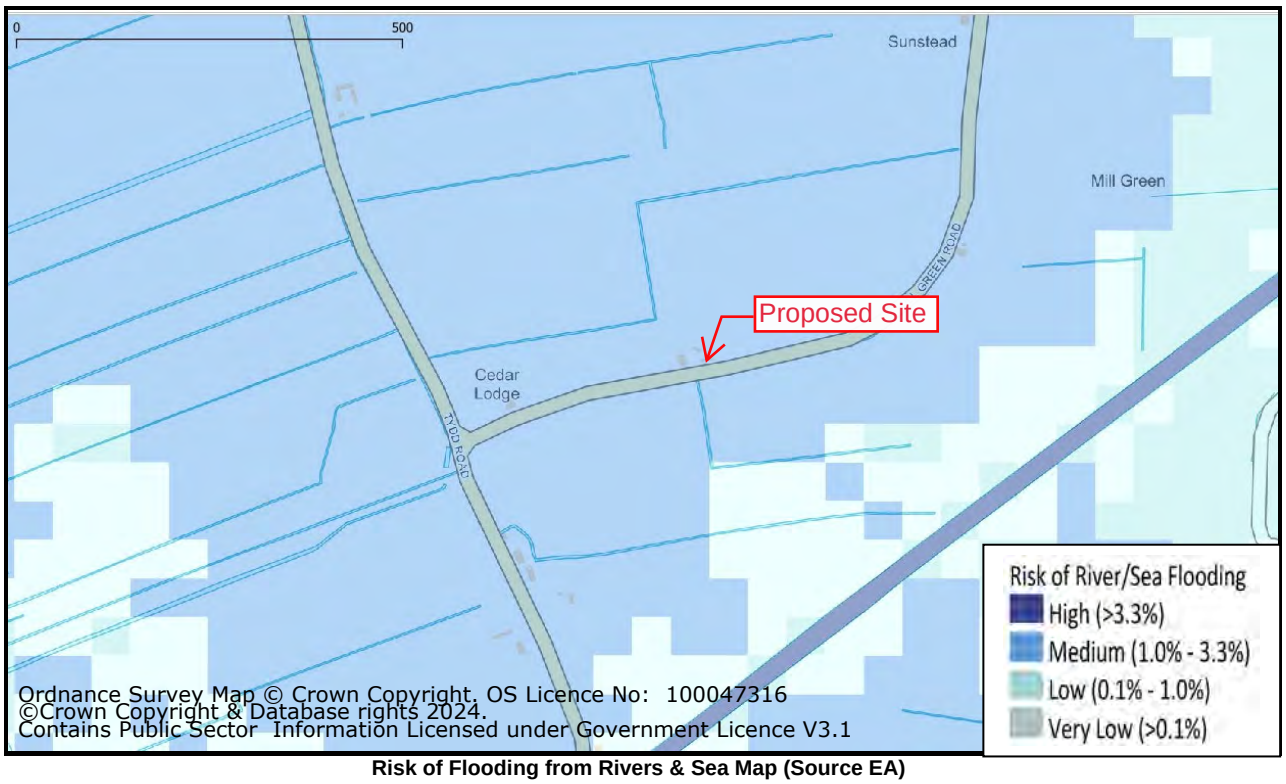
Flood Zones

These maps show that the site is considered at risk from tidal/fluvial flooding as it is all located within an area zoned as Flood Zone 3a.The maps indicate that the area would be flooded, without flood defences, which are in place, (with an annual probability of more than 0.5% i.e., return frequency of less than 1 in 200 years for tidal flooding or more than 1.33% return frequency of less than 1 in 100 years for fluvial flooding).



Flood Map for Planning (Source EA)

Risk of Flooding from Rivers and Sea



Risk of Flooding from Rivers & Sea Map (Source EA)

The Risk of flooding from Rivers and Sea map shows the site for the development, to be at Medium Risk. Medium means that each year, this area has a chance of flooding between 1% and 3.3%. This considers the effect of any flood defences that may be in this area. Flood defences reduce, but do not completely stop the chance of flooding as they can be overtopped or fail.

The River Welland Tidal Defences

The River Welland is located some 2.60Km to the east of the site, and is tidal down stream of Marsh Lane Sluice. The tidal defences protecting this site consist of earth embankments, the crest heights are circa 7.00mODN. They are in good condition and reduce the risk of flooding (at the defence) to a 0.67% (1 in 150) chance of occurring in any year. The Environment Agency inspect these defences routinely to ensure potential defects are identified.

Breach Analysis to River Welland Tidal Defences

Taking the precautionary approach, the Hazard Rating following a breach which in Flood Risk Assessment (FD 2320) Guidance for New Development Phase 2 R& D Technical Report these are classified as low <0.75, moderate 0.75-1.25, significant 1.25-2.50 and extreme >2.50 based upon an empirical measure of velocity and depth.

Flood Hazard			Description
	<0.75	Low	**Caution –** Flood Zone with shallow flowing water or deep standing water.
	0.75 – 1.25	Moderate	**Danger for Some -** (i.e. children) Danger Flood Zone with deep or fast flowing water.
	1.25 – 2.0	Significant	**Danger for Most –** Danger Flood Zone with deep fast flowing water.
	>2.0	Extreme	**Danger for All** – Extreme Danger Flood Zone with deep fast flowing water.

HR = d x (v + 0.5) +DF

Where V = Flood flow velocity (m/sec)

D = Flood depth (m)

DF = A debris factor included to represent the greater damage, or risk of injury to people, that can occur if debris is swept along with the water. = 0.5 for depths <0.25 or 1.0 for depths.

For the degree of Flood Hazard to be classified as low HR must be <0.75

The 2017 Update to SHDC, SFRA has carried out a Tidal & Fluvial Hazard Mapping, for Spalding following a breach to the defences. The Hazard, Velocity and Depth Maps, year 2115, for the 1 in 1000-year event, shows that the site where the proposed development is to be located are not within an area affected by flooding from a breach to the flood defences. **Maps 1, 2 & 3.**

Floor levels

With the site not being affected by a breach to both fluvial and tidal sources, the floor level for the proposed

dwelling will remain at the existing floor level, circa 3.55mODN

South Holland District Council

In order to inform the process of risk assessment and site selection the District Council commissioned Haskoning UK Ltd Consultants to prepare a Strategic Flood Risk Assessment in December 2002.They have carried out an update of this report and this report was published in January 2010, and this was further updated in February 2017.

This Flood Risk Assessment has taken the results of the (2017) updated South Holland Strategic Flood Risk Assessment (SHSFRA) into account in its findings.

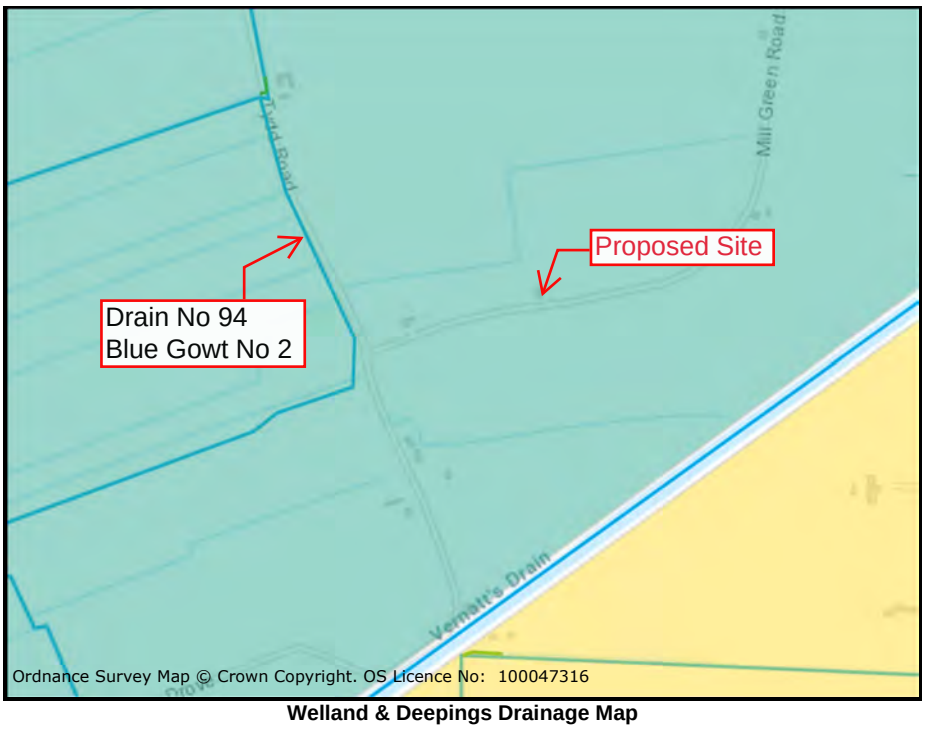
The whole of the tidal flooding information has been replaced by the mapping from the latest Environment Agency Tidal Hazard mapping. Where the mapping for an area contains both fluvial and tidal components, the more severe of the two has been presented.

From the Residual Flood Hazard, Depth and Velocity Spalding - Year 2115 0.1% Tidal Event Probability maps, from the update of strategic flood risk assessment for South Holland District Council, the site is not affected from a breach to the flood defences and has been used in the findings of this assessment.

Welland & Deepings Internal Drainage Board

The proposed development site is located within Catchment area of Welland & Deepings Internal Drainage Board. The Board is responsible to operate and maintain the arterial fluvial system.

The Board's nearest watercourse to the site is the Blue Gowt No 2 some 500m south of the site.



Welland & Deepings Drainage Map

The Board's prior written consent will be required for any of the following works:

- No person without the previous consent of the Board shall erect any building or structure, whether temporary or permanent, or plant any tree, shrub, willow or other similar growth within 9 metres of the landward toe of the bank where there is an embankment or wall or within 9 metres of the top of the batter where there is no embankment or wall, or where the watercourse is enclosed within 9 metres of the enclosing structure.

- No person shall, without the previous consent of the Board, for any purpose, by means of any channel, siphon, pipeline or sluice or by any other means whatsoever, introduce any water into the district or, whether directly or indirectly, increase the flow or volume of water in any watercourse in the district.

- The erection or alteration of any mill dam, weir or other like obstruction to the flow, or erection or alteration of any culvert within the channel of a riparian watercourse.

FLOODING FROM OTHER SOURCES

Flooding is a natural process and can happen at any time from sources other than watercourses and the sea.

- Flooding from land can occur from intense rainfall, often over short duration of time that is unable to soak into the ground or enter the drainage system. However, with the natural topographic nature of the ground being flat, with no high ground around the site this will not cause any rapid inundation of the site and is likely only lead to local ponding of shallow depth and low velocity. The ground floor level for the proposed buildings is to be raised 300mm above the existing ground level. The updated SFRA concluded that flooding from this source is limited to minor isolated cases and is not of strategic significance as regards to flood risk.

- Groundwater flooding occurs when groundwater levels increase sufficiently for the water table to intersect the ground surface. Groundwater flooding can occur in a variety of geological settings including valleys, in areas underlain by chalk, and in river valleys with thick deposits of alluvium and river gravels. The area is not known to suffer from any groundwater problems.

- Flooding from sewers can occur from overloading from heavy rainfall caused by blockages or having inadequate capacity. There are no public sewers close to the site.

- Non-natural or artificial sources of flooding such as reservoirs, lakes, or canals where water is stored above natural ground level could cause flooding if the structure fails or is over topped. There are no known sources within the vicinity of the site.

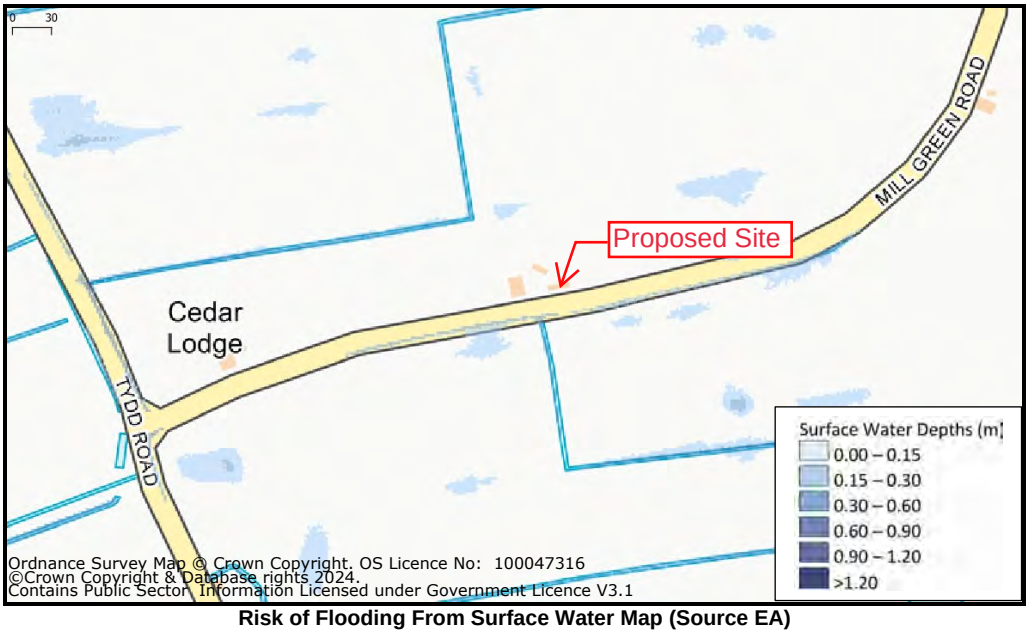
RESIDUAL RISKS

There is always a possibility of a flood more than that allowed for which might conceivably cause some flooding

to the properties. However, such an event would have a very low probability and the risk of flooding to the property would be extremely small. It is therefore considered that the residual risks associated with flooding are not significant.

SURFACE WATER FLOODING

Part of the site is shown on the Low-Risk scenario Surface Water flood maps, for the 1 in 1000-year event, to be not affected from surface water flooding.



Risk of Flooding From Surface Water Map (Source EA)

The maps for surface water and revised maps for river and sea flooding define the risk as High, Medium, Low and Very Low. The chance of flooding for the area defined in any given year is shown below:

- **High:** greater than 1 in 30 (3.3%).
- **Medium:** between 1 in 100 (1%) and 1 in 30 (3.3%).
- **Low:** between 1 in 1000 (0.1%) and 1 in 100 (1%).
- **Very Low:** less than 1 in 1000 (0.1%)

Unlike the fluvial mapping, which is based on a detailed hydraulic model, this mapping is based purely on applying rainfall to a digital terrain model. As such this mapping serves to represent a worst-case scenario which may well overstate the actual probability of flooding in this area.

There is a caveat contained in the Environment Agency "What is the Risk of Flooding from Surface Water Map Report version 2.0, April 2019, as to the use of these maps, which states that:- "*the map does not contain sufficient information for it to be used to determine flood risk to individual properties, but it does give you an indication of whether your area may be affected by surface water flooding and to what extent.*"

SEQUENTIAL APPROACH

When applying the sequential approach for flood risk in accordance NPPF the site would fall into Zone 3a (High

Probability) as the site is shown to be within the tidal/fluvial flood plain as shown on the Environment Agency's Flood Map without defences in place.

However, the results of the updated SHSFRA shows that the site is located within a low/medium probability flood zone, but the area is reliant on protection by flood defences providing a standard of protection of 1 in 100 years return period.

TABLE 3: Flood Risk Vulnerability and Flood Zones 'Compatibility'

Flood Risk Vulnerability Classification		Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	Flood Zone 1	✓	✓	✓	✓	✓
	Flood Zone 2	✓	✓	Exception Test Required	✓	✓
	Flood Zone 3a	Exception Test Required	✓	✘	Exception Test Required	✓
	Flood Zone 3b Functional Floodplain	Exception Test Required	✓	✘	✘	✘

Sequential Test

NPPF Guidance Paragraphs 157 - 179 requires development within high areas of flood risk be determined using a sequential risk-based approach to the location of development to avoid where possible flood risk to people and property and manage any residual risk, taking account the impacts of climate change.

The aim of the Sequential Test is to steer new development to areas with the lowest probability of flooding. The NPPF states that development should not be permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower probability of flooding. It is important to note that the Sequential Test does not specifically mean that sites such as this cannot be developed, rather that sites at less risk should be developed first.

As set out in the National Planning Policy Framework Technical Guidance (para.174), change of use should not be subject to the sequential and exception tests but will still need to meet the requirements of a site-specific flood risk assessment.

CLMATE CHANGE

Global warming is now recognised that it is likely to affect the frequency and severity of extreme events as both tidal and fluvial flooding. The Climate change allowances in the NPPF Guidance was updated on the 20th of July 2021.

Peak River Flow Allowances

For flood risk assessments use the Management Catchment Climate Changes for the peak river flow map.

Management catchments are sub-catchments of River Basin Districts.

The site is located within the Welland Management Catchment within the Anglian River Basin District, for sites within Flood Zone 2 or 3a and for “More Vulnerable” land uses, the Central allowances figures, in the Table below, should be used.

Peak River flow allowances within the Management Catchment Allowances				
River Basin District /Management Catchment	Allowance category	Total potential change anticipated for ‘2020s’ (2015 to2039)	Total potential change anticipated for ‘2050s’ (2040 to2069)	Total potential change anticipated for ‘2080s’ (2070 to2115)
Anglian/ Welland	Upper End	22%	26%	53%
	Higher Central	10%	10%	28%
	Central	5%	4%	17%

The effect of global warming on peak rainfall allowances is given in Table 1.

Table 1 Peak Rainfall Intensity

Table 1 Peak rainfall intensity allowance in small and urban catchments (1961 to1990 baseline)			
Applies across all of England	Total potential change anticipated for 2010 to 2039	Total potential change anticipated for 2040 to 2059	Total potential change anticipated for 2060 to 2115
Upper End	10%	20%	40%
Central	5%	10%	20%

The annual sea rise due to climate change is given in NPPF and the recommended contingency allowances are stated in Table 2.

Table 2 Peak Sea Level Rise

Table 2 Peak Sea level allowance for each epoch in (mm) per year with cumulative sea level rise for each epoch in brackets (use 1981to 2000 baseline)						
Area of England) (Use River Basin	Allowance	2000 to 2035	2036 to 2065	2066 to 2095	2096 to 2125	Cumulative Rise 2000 to 2125 (m)
Anglian	Higher Central	5.8 (203mm)	8.7 (261mm)	11.6 (348mm)	13 (390mm)	1.20m
Anglian	Upper End	7 (245mm)	11.3 (339mm)	15.8 (474mm)	18.1 (543mm)	1.6m

DRAINAGE STATEMENT

Surface Water Drainage

Applications for developments where the proposals will result in the increase the amount of surface water run-off require that an appropriate drainage strategy to be undertaken to ensure that the surface water discharge mimics the existing pre-development regime.

With the application being a change of use of an existing building, with no increase in the footprint, the roof water will continue to be discharged to the existing drainage system which will be cleaned out and repaired as necessary.

Any new access and parking areas will be constructed using permeable materials such as hardcore with gravel topping.

These arrangements are the same as those which have served the existing building for many years, without causing any problems.

Foul Water Drainage

The existing annexe is connected via a gravity private foul drainage network within the curtilage of the properties which discharges to a shared treatment plant. It is proposed that these arrangements continue to be used.

As there is a positive drainage system capable of receiving flows from the development there is no likely impact on neighbouring property.

CONCLUSION

- The site does have the protection of fluvial/ tidal flood defences which are well maintained by the Environment Agency.

- The site is shown to be within Flood Zone 3 'High Probability' as detailed on the Environment Agency's Flood Zone Maps without defences. 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 is also at no risk of surface water flooding (annual probability less than 0.1%); the site is not within a risk of reservoir flooding.

- The Flood Risk Vulnerability Classification in Table 2 of NPPG the proposed residential development is classified as "More Vulnerable", with Table 1 of NPPG stating that such uses are appropriate in this zone subject to the Exception Test.

- As set out in the National Planning Policy Framework Technical Guidance (para.174), change of use should not be subject to the sequential and exception tests but will still need to meet the requirements of a site-specific flood risk assessment.

- The maps from the SHDC updated SFRA Breach Hazard Maps, for scenario year present day, for the 1 in 1000-year event, shows that the site is not within a Hazard rating area. With climate change 2115, for the 1 in 1000-year event, the site is also not within a Hazard rating area,

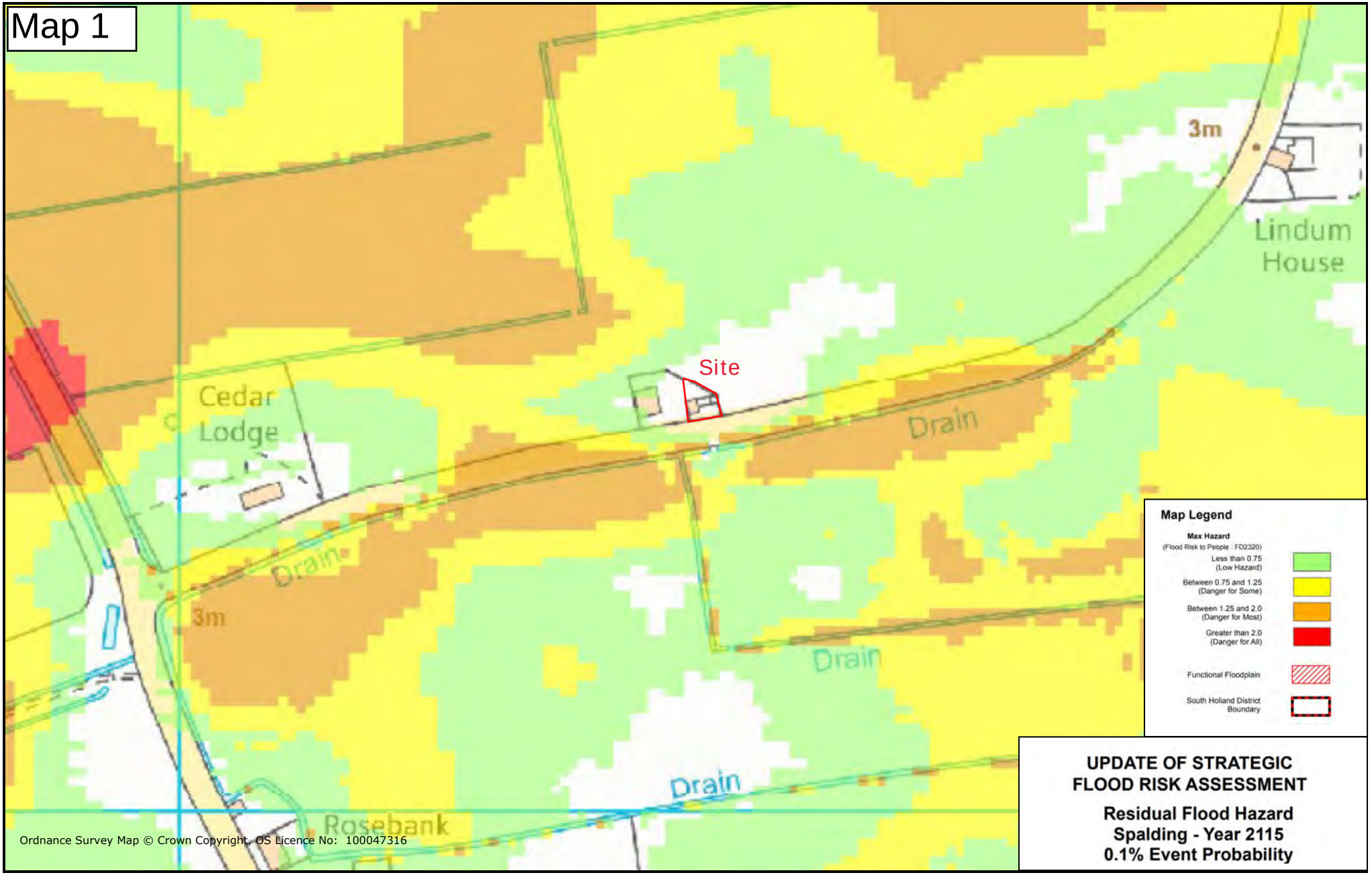
- The ground floor level will remain as existing.

- Flooding from other sources is unlikely to affect the site.

- No obvious constraints have been identified that may impact the proposed development and the type of mitigation measures that can be used to reduce the flood risk, there is no increase in the flood risk to others.

- It is therefore concluded that the proposed development can be constructed, safely and sustainably, to meet the requirements of the South Holland District Council Development Plan Policies, and the National Planning Policy Framework.

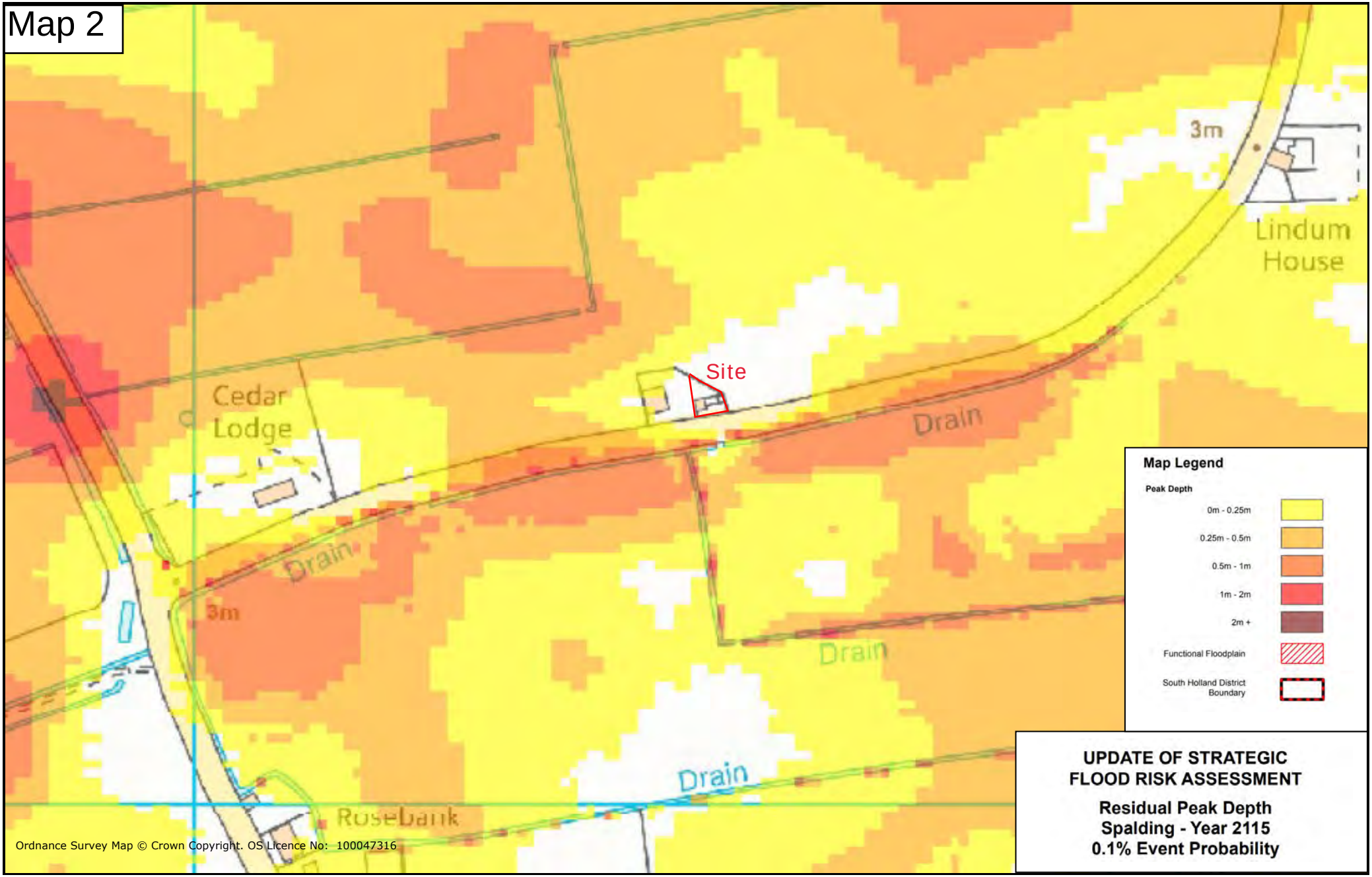
Map 1



UPDATE OF STRATEGIC FLOOD RISK ASSESSMENT

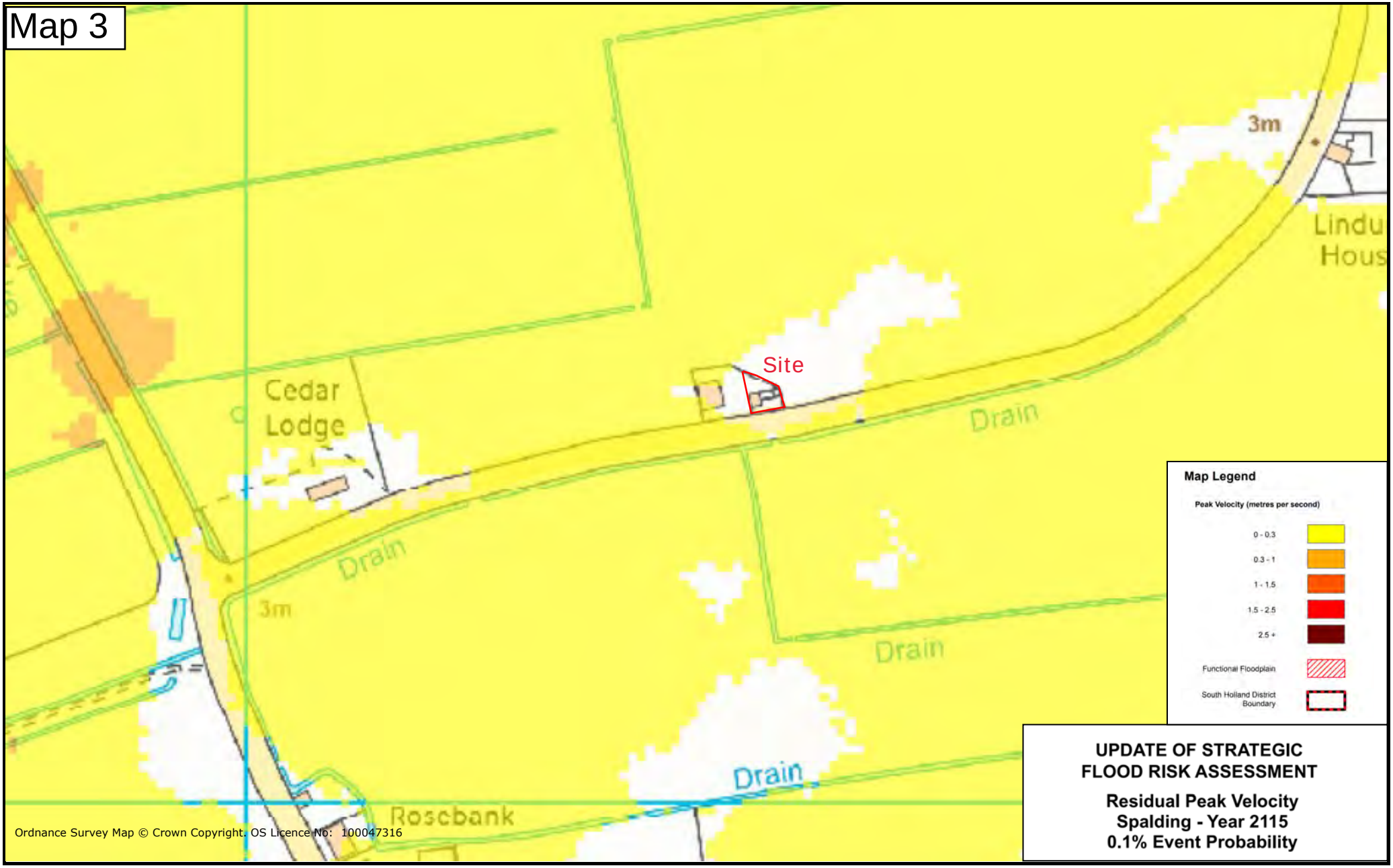
Residual Flood Hazard
Spalding - Year 2115
0.1% Event Probability

Map 2

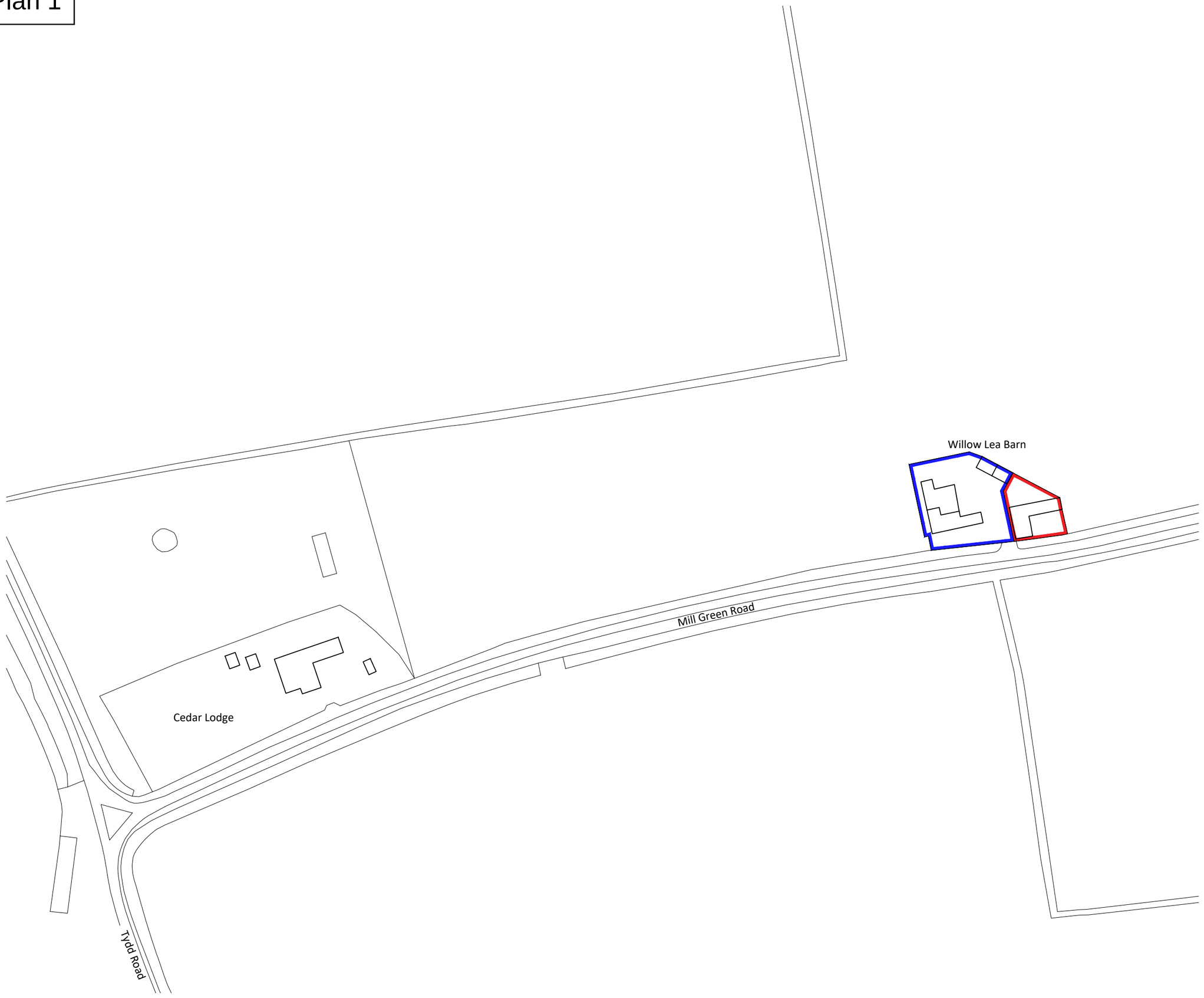


UPDATE OF STRATEGIC FLOOD RISK ASSESSMENT

Residual Peak Depth
Spalding - Year 2115
0.1% Event Probability


Map 3
3m
Lindu
Hous
Site
Cedar
Lodge
Drain
Drain
3m
Drain
Drain
Roscbank
Map Legend
Peak Velocity (metres per second)
0 - 0.3
0.3 - 1
1 - 1.5
1.5 - 2.5
2.5 +
Functional Floodplain
South Holland District Boundary
UPDATE OF STRATEGIC
FLOOD RISK ASSESSMENT
Residual Peak Velocity
Spalding - Year 2115
0.1% Event Probability
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Plan 1



Notes

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Rev	By	Description	Date
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Current revision checked by: -

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Project
Change of use
Willow Lea Barn, Pinchbeck

Drawing
Location Plan

Scale @ A3	Date
1: 1250	11/09/24

Drawn By	Checked By
WW	-

Job Number	Status	Purpose of Issue
823-32	FP	Planning

Drawing No.	Rev
823-23_FP_LP01	-