PROPOSED DEVELOPMENT AT
MARRIOT'S GATE, LUTTON, SPALDING. PE129HN
FLOOD RISK ASSESSMENT



This flood risk assessment has been prepared solely to support the planning application for a conversion of existing agricultural building to residential use, Marriot's Gate, Lutton. The author has made every effort to provide an accurate
assessment of the flood risk but accepts no liability should the information be found to be incorrect or incomplete or if it is used for any other purposes other than for which it was originally commissioned.

Introduction

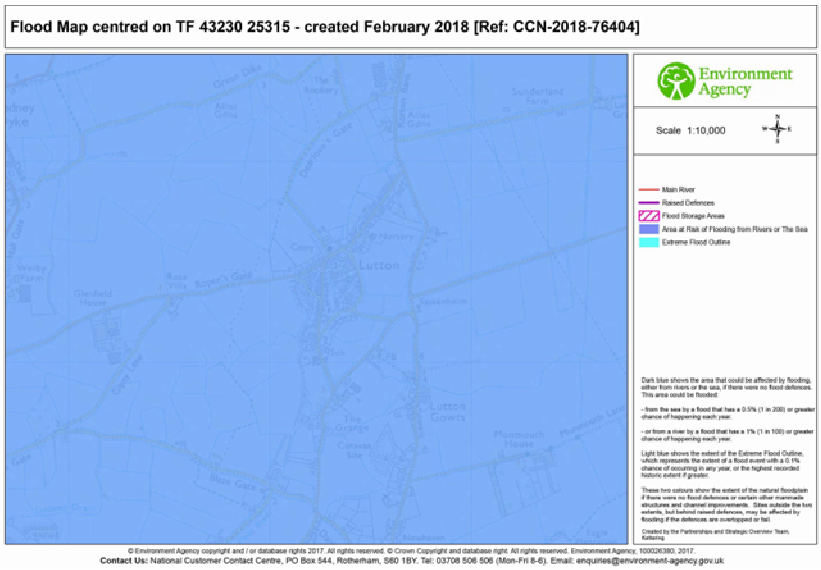
An application is due to be made to South Holland District Council for Planning Permission to convert a former agricultural use building into a single dwelling north east of 'The Grange, Marriot's Gate, Lutton, Spalding, PE12 9HN. The site is at present still minimally used for implement storage etc although not fit for purpose.

The site is within Flood Zone 3 as shown on the Environment Agency's Flood Zone Map. These maps do not take into account existing flood defences.

The Planning Application requires a Flood Risk Assessment to be carried out as specified in thePractice Guidance to the National Planning Policy Framework Development and Flood Risk. The site is shown within the defended area of the South Holland District Council's Strategic Flood Risk Assessment (SHDC SFRA) map and is located in the South Holland Internal Drainage Board district.

Environment Agency (EA) Flood Zones

The map below is taken from the Environment Agency website and shows the flood zones in the area.



Application Site

The development is located in the parish of Lutton and is approximately 2 km north of the central area of Long Sutton. and the National Grid Reference of the site is 543325 324801.

The location of the site is shown on the plan at the end of this document.

The site is within a defended area the proposed development is within Flood Zone 3(a) as detailed on the Environment Agency's flood zone maps without defences, as

defined in Table 1 of the Technical Guidance.

Applying the flood risk vulnerability classification in Table 2 of the Guidance, a development consisting of a dwelling house is classified as “more vulnerable”.

Table 3 of the Guidance is shown below:

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a †	Exception Test required †	X	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	X	X	X	✓*

Therefore it can be seen that for “More vulnerable” development the sequential and the exception tests need to be applied to the development.

Sequential Test

The aim of the Sequential Test, as set out in the Planning Practice Guidance, is to ensure that a sequential approach is followed to steer new development to areas with the lowest probability of flooding. The flood zones as defined in the Strategic Flood Risk Assessment for the area provide the basis for applying the Test. The aim is to steer new development to Flood Zone 1 (areas with a low probability of river or sea flooding). Where there are no reasonably available sites in Flood Zone 1, local planning authorities in their decision making should take into account the flood riskvulnerability of land uses an (areas with a medium probability of river or sea flooding), applying the Exception Test if required, should the suitability of sites in Flood Zone 3 (areas with a high probability of river or sea flooding) be considered, taking into account the flood risk vulnerability of land uses and applying the Exception Test if required.

The greater part of the area around Lutton, as can be seen from the map on page 2 of this report, is in Flood Zone 3. Taking into account the guidance, it can be seen that there is NO alternative site with a lower flood risk that could be found in Lutton. In addition, this is a conversion of an existing building, and therefore the location of such cannot be relocated either.The safety of the development will be delivered by ensuring the floor level of the proposed new dwelling is above predicted residual flood levels for this area. Additionally, there will be sleeping accommodation at first floor level.

The South Holland District Council call for a requirement for further land to be brought forward and used for residential development in the area around Long Sutton. This site can be considered as a windfall site in the village of Lutton, and is most suitable for residential development.

Therefore I consider that the sequential test has been passed.

Exception Test

The Sequential Test has demonstrated that it is not possible, consistent with wider sustainability objectives, for the development to be located in zones with a lower probability of flooding. Therefore the Exception Test must be applied and for this to be passed:

- It must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risks, informed by the Strategic Flood Risk Assessment; and

- A site-specific flood risk assessment must demonstrate that the development will be safe for its lifetime taking into account of the vulnerability of its users, without increasing flood risk elsewhere, and where possible will reduce flood risk overall.

Both parts of this test must be satisfied in order for the development to be considered appropriate in terms of flood risk. There must be robust evidence in support of every part of the test.

The first section will be demonstrated by the Supporting Planning Statement and compliance with South Holland District Council's planning policies.

This flood risk assessment will demonstrate that the development will be safe for its lifetime and it will not increase flood risk elsewhere.

Strategic Flood Risk Assessment

Consultants have produced a Strategic Flood Risk Assessment (SFRA) for the South Holland District Council (SHDC). This document provides details of the flood risk in the Council's area. Reference to the maps in this document give the following information for the flood risk and hazard at the site for the 1% fluvial event and 0.5% tidal event.

The maps illustrate the actual flood hazard which is as follows:

For the present day	Depth of flooding …	zero
	Extent of flooding ..	Low or medium
	Velocity …….	Nil

For year 2115	Depth of flooding …	zero
	Extent of flooding ..	Low or Medium
	Peak Velocity ……	Nil

The maps showing the residual flood hazard were revised in the 2016 update of the South Holland District Council Strategic Flood Risk Assessment which can be foundon the website of the South East Lincolnshire Joint Planning Committee. The hazards are as follows for the 1% fluvial or 0.5% tidal event probability:

For the present day	Depth of flooding …	zero
	Extent of flooding ..	Low or Medium
	Hazard…….....	Zero
	Peak Velocity ..	Nil

For the year 2115	Depth of flooding …	zero
	Extent of flooding ..	High with(area of low-medium)
	Hazard…….....	Less than 0.75 (low hazard)
	Peak Velocity …….	0 – 0.3 m/sec

Figure 16 of the general maps shows that the site is not within the rapid inundation zone for the present day or in 2115.

Maximum flood level and bank levels in the River Nene

The maximum levels in this tidal section of the River Nene 5.6 km east of the site are as follows:

	2007	2115
Peak 1 in 200 year level	5.89m OD	6.22m OD
Peak 1 in 1000 year level	6.24m OD	7.38m OD

The defence level between chainages 0 km and 1.6 km north of the A17 bridge vary between 6.30m OD and 7.10m OD, and are noted as “Bank with road on crest”.

Information from Environment Agency

The Environment Agency has produced mapping which shows the maximum hazard, depth and velocity predicted following breaching of the tidal defences of the tidal River Nene east of the site. The EA have stated that the site would not be affected by overtopping of the defences.

The maps of breaching show the following predictions for hazard, maximum depth and maximum velocity at the development site:

	Maximum Hazard	Maximum Depth	Maximum Velocity
1 in 200 year in 2006	zero	zero	zero
1 in 1000 year in 2006	zero	zero	zero
1 in 200 year in 2115	Less than 0.75	zero	0 – 0.3 m/sec
1 in 1000 year in 2115	0.75 – 1.25	0 – 0.25m	0 – 0.3 m/sec

Existing Flood Alleviation Measures

The site is within a defended flood plain, as defined in Appendix 1 of the Environment Agency's "Policy and Practice for the Protection of Flood Plains", which is considered to be passive until such time that a flood greater than the defences can withstand occurs. The likelihood of flooding occurring due to overtopping or failures of the defences is considered to be very low.

The site is located approximately 5.6 km from the tidal section of the River Nene, which is maintained by the Environment Agency.

There are watercourses in the area that are maintained by South Holland IDB.

Existing Ground Levels

The floor level in the existing building is approximately 3.50m OD.

The development site slopes downwards towards Marriots Gate. The site of the building is a minimum of 350mm higher than the level of Marriotsgate .

Potential Sources of Flooding

The potential sources of flooding to the site are:-

1. Failure or overtopping of tidal defences of the River Nene.
2. High water levels in IDB drainage channels.
3. Localised flooding due to failure of highway drainage

1. Failure or overtopping of tidal defences of the River Nene

The west bank of the River Nene is approximately 5.6 km east of the site of the proposed development, and the Wash Banks are a similar distance north of Gedney Drove End. All of these defences are earth banks, with the Wash banks being slightly higher to withstand the wave action from a wind blown tide.

The maps in the updated SFRA do not predict any actual or residual flooding to this area for the present day, but in 2115 in a 1 in 200 year event the maps

showing residual flood depths predict flood depth between 0 and 0.25m on this site.

The maps are taken from EA breach mapping which assumes no attempt is made to immediately repair the breach. It is also likely that the EA will undertake further bank raising within the next 100 years to ensure that there is a continuing 1 in 200 year defence to Long Sutton and Sutton Bridge.

The risk of this source of flooding can be considered low, but it will be mitigated by raising ground floor level 150mm above the current floor level of the building.

2. High Water Levels in IDB drains

Although the whole of this area is below high tide level in the Wash and the River Nene, the retained water levels in the drainage channels ensure that the risk of flooding is extremely low. South Holland IDB maintains a system of sluices, pumping stations, and drainage channels which convey surface water into the River Nene and the wash and control water levels throughout the South Holland IDB area.

The village of Lutton is drained by a watercourse (IDB drain) which flows southwards and into a drain which flows eastwards into the Lutton Leam. The latter is the main drainage channel which conveys water eastwards to Lutton Leam Sluice where the water discharges into the tidal River Nene during low tide periods.

The channels maintained by South Holland IDB in urban areas are classified as high priority watercourses and as such receive a higher maintenance priority.

There are possibilities of failure of outfall sluices, but these are mitigated by the high level of maintenance given to these structures by the IDB. If a failure did occur the IDB would immediately be warned of the problem by their telemetry system and take action to repair the fault or to bring in temporary pumps to reduce the risk of any flooding in the area. Similarly any failures of culverts or other blockages would be dealt with immediately.

IDB systems are designed to provide a freeboard of between 600mm and 1000mm to all land in a 1 in 10 year return period rainfall event. This normally provides a standard of service of between 1 in 50 years and 1 in 100 years against flooding. In an extreme event water levels will rise but this will be a slow process and it would be at least 24 hours before levels were high enough to begin to flood low land in the area, and after this the level of the flood water would need to rise another 1.0 metre before the development site would be affected.

Therefore the risk of flooding from IDB drainage channels can be considered to be extremely low, and can be discounted as the floor levels of the proposed property will be raised significantly to mitigate the risk of flooding from a breach in the tidal defences of the River Nene.

3. Localised Flooding due to failure of highway drainage

There seems to be an adequate highway drainage system in the adjoining roads in the area of the development site. If for some reason there was a blockage in these it would not affect the proposed dwelling as the existing ground level is at least 350mm above the level of Marriotsgate and this report will recommend that the ground floor level should be raised just above the existing ground level. This will provide adequate mitigation from this source of flooding.

Extent of known Flooding

During the preparation of this assessment, no evidence was discovered of the site or any of the adjoining properties having been flooded in the past.

Probabilities and Trends of Flooding

The probability of this development flooding from Environment Agency main river is very low. In an extreme event any effect on this location would not be sudden and there would be time for residents to take precautionary measures to limit the impact of any flooding that may occur.

Residual Risk – Extreme Events

The residual risk from extreme events is very low on this site. The major risk to the site is from a breach or overtopping of the tidal defences

The risk of this happening in this case is low and the hazard from any flooding is also low.

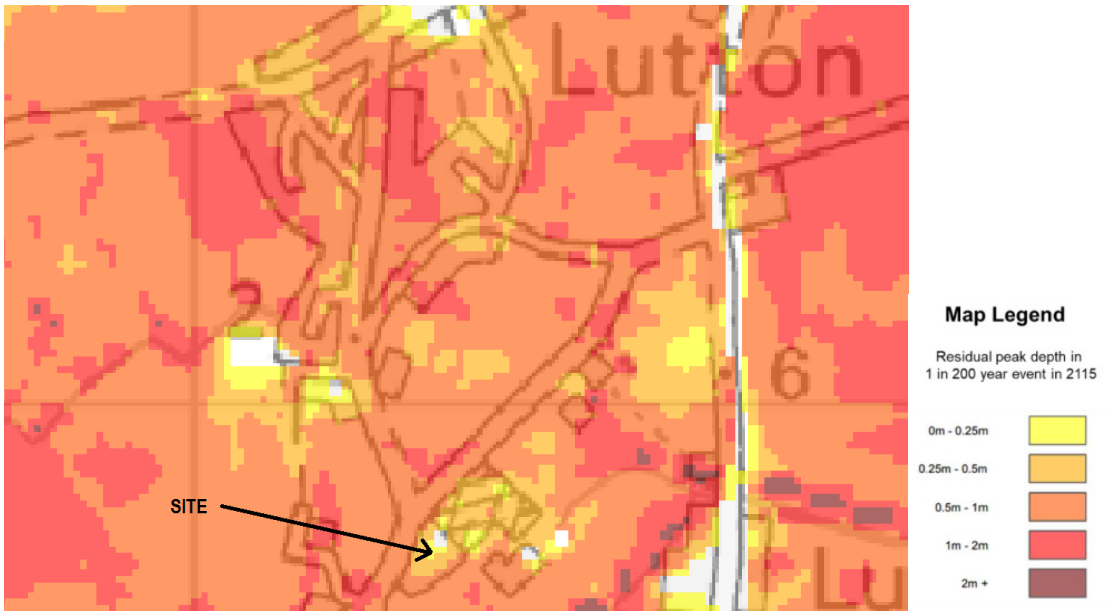
Climate Change

The predictions of flood depths for this flood risk assessment use information provided by the Environment Agency which was produced in 2006. The EA have issued new guidance on recommended contingency allowances for predicted sea level rises, fluvial flows and rainfall intensities which from 19th February 2016 needs to beconsidered in the FRA. The effects of these new recommendations are considered inAppendix A of this report . It is concluded that no extra mitigation measures are necessary to comply with the new guidance on climate change.

Summary of Risk of Flooding to the Site

The main risk of flooding to the site is if a breach were to occur in the west bank of the tidal River Nene or the tidal defences of the Wash. The risk of this happening along this section of bank can be considered to be low.

The relevant part of the map in the SFRA of predicted residual flood depths in 2115 in a 1% fluvial and 0.5% tidal event probability is shown below:



The map above predicts zero flood depth at the building position, with other parts of the site between 0m and 0.25m.

The relevant part of the Environment Agency map showing the predicted peak depths in this area if a breach occurred in the west bank of the River Nene in 2115 in a 1% fluvial and 0.5% tidal event probability is shown below:



The above map is more exact and again predicts flood depths of between zero (for the barn complex including those already converted) to 0.25m. It should be noted that floor levels will be consistent with the already converted element, therefore a consideration of this FRA.

It can be concluded that the predicted flood level in a 1 in 200 year tidal event in 2115 is 3.65m OD.

Recommendations

In any area at risk of flooding it is recommended that new dwellings should be of two story construction with bedrooms at first floor level. This will provide a refuge for residents if the building becomes flooded after a major breach of the tidal bank, and ensure there is no danger to residents when they are asleep.

The ground floor level of the proposed dwelling should be a minimum of 3.65m OD which is approximately between zero and 0.25m above the existing ground level.

Flood resilient construction should be incorporated to a minimum height of 300mm above the predicted flood level, and all of the electrical installation should be a similar height above finished floor level.

Occupiers of the property should register with the Environment Agency's Floodline Warnings Direct Service.

On site surface water drainage should be discharged into soakaways and these should be designed to BRE Digest 365 and approved under Building regulations.

All future owners and occupiers of the building should be given a copy of the Flood Risk Assessment so that they are fully aware of the risk of flooding in this area.

LOCATION PLAN



Appendix: Flood Risk Data taken from EA

Flood Hazard Map-

Modelled Breaches
- 2006 0.5% (1in200)
- 2006 0.1% (1in1000)
- 2115 0.5% (1in200)
- 2115 0.5% (1in200)
- 2115 0.5% (1in200) Tidal Breach Hazard

Surface water flooding