

PROPOSED DEVELOPMENT AT BEACH LANE,
GOSBERTON RISEGATE,
FLOOD RISK ASSESSMENT



Site from southern boundary

S M Hemmings B Sc C Eng MICE MIWEM,
69 Charlotte Way,
Peterborough,
PE3 9ER

This flood risk assessment has been prepared solely to support the planning application for the proposed development alongside Beach Lane, Gosberton Riseigate. 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.

Introduction

A Planning application is due to be submitted to South Holland District Council to build six dwellings at Beach Lane, Gosberton Risegate. The site is 100 metres south of the junction of Beach Lane and Clough Road, and the bridge over Risegate Eau just north of the junction is known as Carter's Bridge.

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

The Planning Application therefore requires a flood risk assessment to be carried out as required in the Technical Guidance to the National Planning Policy Framework Development and Flood Risk. The site is within a defended area as specified in the South Holland District Council's Strategic Flood Risk Assessment and is located in the Black Sluice Internal Drainage Board District.

Application Site

The site is located on the west side of Beach Lane approximately 100 metres south of the junction with Clough Road. The site has in the past been a small agricultural plot but is now waste ground.

The National Grid Reference of the site is 520940 329770 and the extent of the site is shown on the plan at the end of this document.

The proposed development is within Flood Zone 3(a) "High Probability" 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, the development is classified as "more vulnerable" in Table 3 of the Guidance, which states that residential use is only permitted after the sequential and exception tests are followed.

Sequential Test

As the proposed development is located in Flood Zone 3(a) the NPPF requires the sequential test to be applied to determine if there are any reasonably available and suitable alternative sites in a lower flood risk zone for this type of development. The development complies with the South Holland District Council's policies for developments of this type. The whole of this area is within Flood Zone 3(a), and therefore there are no sites in Gosberton Risegate with a lower flood risk.

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

The following information about the flood risk in the location of this development has been sourced from the maps and reports in the South Holland District Council's Strategic Flood Risk Assessment (SHDC SFRA).

Report Maps

Map 3 shows that site is within flood zone 3.

Map 5 shows that the site is at low or medium risk, but reliant on flood defences for this standard.

Map 6 indicates the peak depth is zero for the present day 1% fluvial and 0.5% tidal event probability.

Map 7 indicates the peak velocity is zero for the present day 1% fluvial and 0.5% tidal event probability.

Map 12 indicates the actual risk is low or medium for the year 2055 1% fluvial and 0.5% tidal event probability.

Map 13 indicates the actual risk is low or medium for the year 2115 1% fluvial and 0.5% tidal event probability.

Map 16 shows that the site is not within a rapid inundation zone.

Flood Maps Table D1

The actual flood hazard for the present day and 2115 is as follows:

Depth of flooding.....	zero
Extent of flooding.....	low or medium, reliant on flood defences
Velocity	nil

The residual flood hazard for the present day and 2115 is as follows:

Depth of flooding..... zero

Extent of flooding..... low or medium, reliant on flood defences

Velocity nil

Maximum flood levels in the River Glen at chainage 8.0 km are shown in the reports as follows:

	Present	Present + Climate Change
1 in 100 year	4.51	4.74
1 in 1,000 year	4.81	4.95

There is a road with a wall alongside the River giving a protection level of 5.59m OD at this location. This is higher than recorded bank levels upstream and downstream of this site.

The report shows the following maximum flood levels in the South Forty Foot Drain for a 1 in 100 year event:

2007	3.36m OD
2115	3.40m OD

The crest level of the bank is stated to be 3.95m OD.

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.

Existing Ground Levels and Proposed Levels of Buildings

A few ground levels were taken on the site, but access was extremely difficult due to undergrowth on the site. The lowest level of 2.45m OD was found at the southern end of the site. The levels at the northern end of the site are higher at 2.65m and 2.90m OD. The level of Beach Lane on the east side of the site is approximately 3.00m OD. It is recommended that the new houses should have a ground level of 2.90m OD. A plan showing all the levels is shown on sheet 10 of this report.

Potential Sources of Flooding

The potential sources of flooding to the site are:-

1. Overtopping of the South Forty Foot Drain.
2. Flooding from the River Glen
3. High water levels in IDB drainage channels
4. Surface water flooding

1. Overtopping of the South Forty Foot Drain.

The hazard maps in the SFRA indicate that flooding will occur from the SFFD in a 1 in 100 year event in 2115. However the residual flood depth map indicates the flooding will only encroach 200 or 300 metres into Gosberton Fen. The site is 4.8 km from the SFFD.

The SFRA predicts maximum water levels of 3.40m OD in the SFFD in a 1 in 100 year event in 2115. However these predicted levels were taken from a study carried out in 2004 and has been superseded by further computer modelling undertaken for a more recent study.

Following the 2004 studies by the EA Black Sluice IDB undertook a more detailed investigation of bank levels in the southern part of the SFFD and found long lengths with levels of only 3.00m OD. It was concluded from this that the risk of flood levels in the SFFD rising above 3.00m OD were extremely low.

Flows into the SFFD are by gravity from the highland carriers and pumped discharges from fen areas. Black Sluice IDB have an operational plan which states that pumping stations will be switched off when the water level at Black Hole Drove Pumping Station reaches 2.70m OD. This will limit the rate of increase of the water levels in the SFFD and reduce the risk of breaches occurring in the banks in the southern section of the drain.

The water in the SFFD is discharged into the Haven through the two sluices at Black Sluice Pumping Station and a gradient is formed along the drain. As the maximum water level at the upstream end of the SFFD at Black Hole Drove Pumping Station is 3.00m OD then the water level in the SFFD adjacent to the site and at Black Sluice Pumping Station will always be lower than 3.00m OD, and recent studies indicate the maximum level at Black Sluice Pumping Station would be approximately 2.65m OD.

In the recent studies carried out by the EA and published in the Black Sluice Catchment Consultation no flooding will occur to the site in a 1 in 100 year flood event.

To conclude the risk of flood water from the SFFD reaching the site and rising to a level of 2.90m OD and causing flooding to the proposed development is extremely low and the above predictions indicate it will not occur in a 1 in 100 year event in 2115.

2. Flooding from River Glen

The River Glen, which is EA main river, is 4.2 km south of the site. The maps in the SFRA predict that if a breach were to occur in the River Glen in a 1 in 100 year event in 2115 the flood water would extend to within 400 metres of the site. The level of this flood water would be approximately 2.50m OD.

Therefore as the proposed ground floor level of the houses is 2.90m OD the risk of flooding from this source is extremely low.

3. High Water Levels in IDB Drainage Channels

The area of the proposed development is drained by a dyke on the west side which flows northwards and discharges into a culvert maintained by Black Sluice IDB under Clough Road. This discharges into the Risegate Eau Drain (IDB) which flows in a westerly direction to Gosberton Pumping Station, which controls water levels in this fen and discharges water into the South Forty Foot Drain.

It flows in westerly direction to Six House Bank where it discharges into the larger drain flowing north and then to Gosberton Pumping Station. Black Sluice IDB have carried out computer modelling of this catchment in 2011 and the predicted levels in Risegate Eau at Carter's Bridge are:

1 in 100 years	1.69m OD
1 in 100 years + climate change	1.81m OD

Black Sluice IDB have a regular maintenance programme on all of their open and piped drains which reduces the risk of blockages of failures at pumping stations occurring.

Gosberton Pumping Station has three electrically driven pumps. Should the electricity supply fail one of these pumps can be operated with a tractor through a PTO and there are facilities for driving all the pumps with a large generator.

The proposed floor level of 2.90m OD is 1100mm higher than the predicted 1 in 100 water level with climate change, and therefore the risk of flooding from IDB drainage channels or the dyke alongside the site is extremely low.

4. Surface Water Flooding

Surface water from Beach Lane could flow onto the site which is at a lower level, but amounts would be small. Any accumulations from the road and the hardstandings on the site would flow into the dyke on the west side of the site before it reached the proposed level of the houses.

Therefore any risk from this source is extremely low.

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.

Conclusions

The risk of the level of the South Forty Foot Drain north of the site reaching a level above 3.00m OD has been shown to be extremely low, and the risk of flooding to the property in a 1 in 100 year event is not predicted.

The SFRA indicates that if a breach were to occur in a 1 in 100 year event in 2115 the maximum predicted level of the flood water would be 2.50m OD, which is 400mm below the recommended ground floor level.

There is no risk of water from IDB systems rising to a level above 2.90m OD and flooding the proposed development.

Recommendations

In any area at risk of flooding, even though in this case the risk is extremely low, it is preferable that proposed buildings in a defended area should be of two story construction with all bedrooms at first floor level. This will provide a refuge for residents if the building were to become flooded and ensure there is no danger to residents when they are asleep.

All the houses on the proposed development should have a ground floor level of 2.90m OD.

If the surface water from the roofs and hardstandings are to be discharged into soakaways, these should be designed to conform with BRE Digest 365 and approved under the Building Regulations.

Occupiers of the property should register to receive automatic telephone flood warnings from the Environment Agency's Floodline Warnings Direct Service.

S M HEMMINGS B Sc C Eng MICE MIWEM

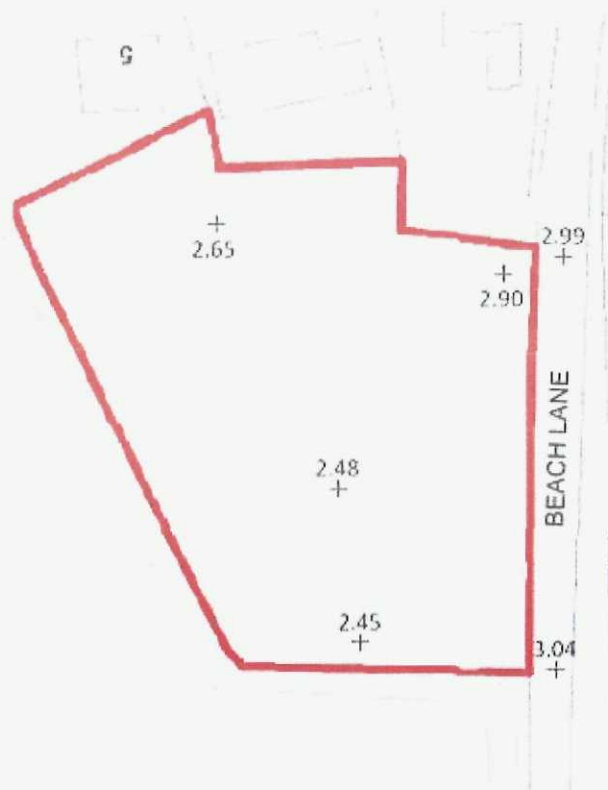
stuart.hemmings@btinternet.com

24th August 2015

PLAN OF AREA



LOCATION PLAN WITH SITE LEVELS



PLAN OF IDB DRAINS IN LOCALITY

