PROPOSED EXTENSION TO EXISTING BUILDING FOR QV FOODS AT MANOR FARM, HOLBEACH HURN, PE12 8LR

FLOOD RISK ASSESSMENT



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This flood risk assessment has been prepared solely to support the planning application for the proposed factory extension at QV Foods at Holbeach Hurn. 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

An application is due to be made to South Holland District Council for planning permission to undertake an extension to an existing building for QV Foods at their site at Holbeach Hurn.

The site is within Flood Zone 3 as shown on the Environment Agency's Flood Zone Map. These maps were first produced in 2004 as an estimate of areas of land that could flood in a 1 in 100 year fluvial event or a 1 in 200 year coastal event if there were no flood defences in place.

The Planning Application therefore requires a Flood Risk Assessment to be carried out as required in the Planning Practice Guidance to the National Planning Policy Framework.

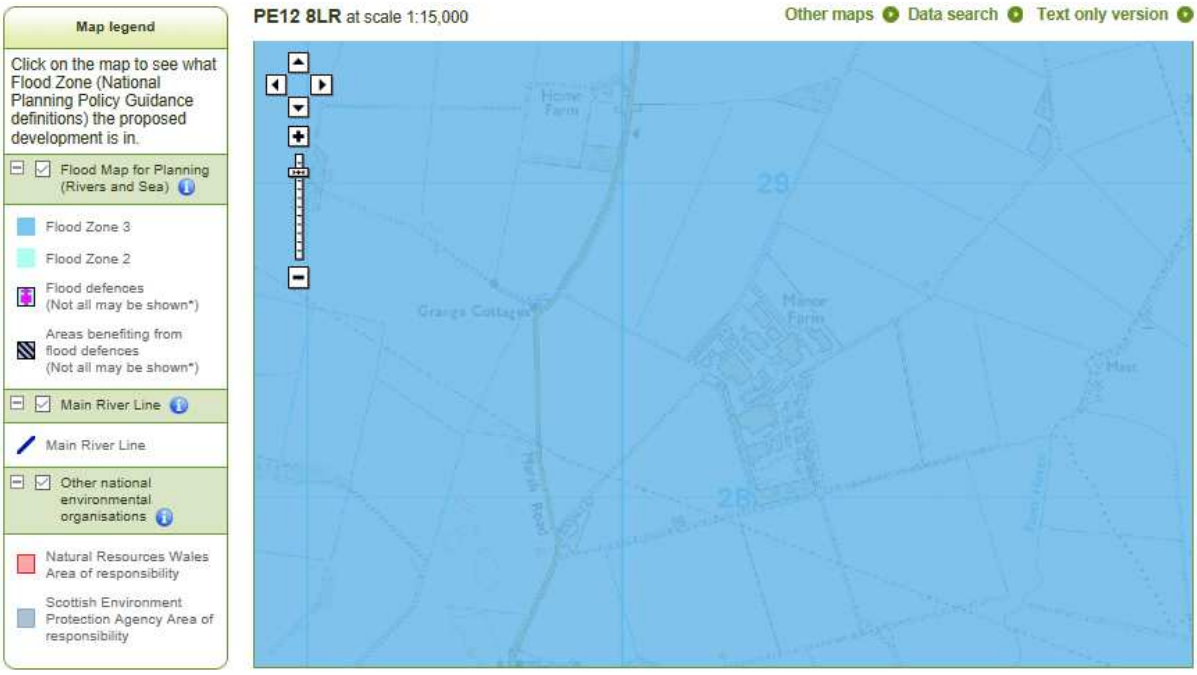
The site is shown within the defended area of the South Holland District Council's Strategic Flood Risk Assessment (NELC SFRA) map and is located in the South Holland Internal Drainage Board district.

Application Site

The development is located within a large food processing factory north of Holbeach and the National Grid Reference of the site is 540400 328500.

The position and extent of the site is shown on the plan at the end of this document.

The proposed development is within Flood Zone 3 as detailed on the Environment Agency's flood zone maps without defences, as defined in Table 1 of the Technical Guidance (see map below).



As the site is within a defended area with tidal defences it can be designated as flood zone 3(a). Applying the flood risk vulnerability classification in Table 2 of the Guidance, a food production building is classified as “less vulnerable”. Reference to Table 3 (shown below) of the Guidance informs us that less vulnerable development is satisfactory in Flood Zone 3(a).

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 †	✗	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	✗	✗	✗	✓*

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 risk vulnerability of land uses and consider reasonably available sites in Flood Zone 2 (areas with a medium probability of river or sea flooding), applying the Exception Test if required. Only where there are no reasonably available sites in Flood Zones 1 or 2 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.

All of this area north of the A17, as can be seen from the map on page 2 of this report, is in Flood Zone 3. Therefore it would be difficult to find a similar site for the development in the vicinity of the existing factory in a lower flood zone.

As this development is an extension to a large existing food processing factory it is not realistic to consider locating anywhere except adjacent to the existing factory. The guidance states that in such instances, where the extension is not going to significantly change the number of workers that could be at risk from a flooding event, the development should be considered satisfactory.

Therefore I consider that the sequential test has been passed.

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 the 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

Tables in the SFRA show the following details of the defence bank on the north side of the Wash north of Holbeach St Matthew

	2007	2055	2115
Peak 1 in 200 year extreme tide level	5.96m OD	6.27m OD	7.08m OD
Peak 1 in 1,000 year extreme tide level	6.30m OD	6.63m OD	7.44m OD

The SFRA states the defence type at this point is an earth bank with defence crest levels of between 7.55m and 7.88m 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". The area is considered to be passive until such time that a flood greater than the defences can withstand occurs. The likelihood of flooding due to overtopping or failures of the tidal defences is very low.

Potential Sources of Flooding

The potential sources of flooding to the site are:-

1. Failure or overtopping of tidal defences of the Wash
2. High water levels in IDB drainage channels.
3. Localised flooding in the area.

1. Failure or overtopping of tidal defences of the Wash

The earth banks protecting this area north of the A17 are approximately 7.0km north of the site of the proposed development. The SFRA indicates that the earth banks are an average of 250mm above the predicted sea level of 1 in 200 year tidal event in 2115.

The SFRA maps indicate that the site would not be flooded if a breach occurred in the earth tidal banks in a 1 in 200 event in 2115.

The breach mapping 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 this area north of the A17.

2. High Water Levels in IDB drains

Although the whole of this area is below high tide level and levels in the rivers, 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, the Wash and the River Welland and control water levels throughout the South Holland IDB area.

The development site is located north of the village of Holbeach Hurn which is in the Fleet Haven Catchment area. Surface water and land drainage is discharged into IDB channels which flow northwards to Fleet Haven Pumping Station situated on the Wash defences. The pumping station controls the water levels in the catchment by pumping the water into the Wash.

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 pumping stations and 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. South Holland IDB watercourses generally state that their watercourses provide a standard of 1 in 100 years with a freeboard of 300mm in urban areas. 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.

3. **Localised Flooding in the area**

The levels of the buildings on the site are generally approximately 300mm above the surrounding farmland which will prevent any large accumulations of surface water on the site.

Extent of known Flooding

During the preparation of this assessment, no evidence was discovered of the existing house or garden 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 recommendations on flood depths for this flood risk assessment use information supplied by the Environment Agency which were produced in 2006. The EA have issued new guidance on recommended contingency allowances for predicted sea rises, fluvial flows and rainfall intensities which from 19th February 2016 needs to be considered in the FRA. The effects of these new recommendations are considered in

Appendix A of this report (pages 11 to 14). It is concluded that no extra mitigation measures are necessary to comply with the new guidance on climate change.

Conclusions

The proposed development is not in a functional flood plain as defined by PPS 25.

Although the site is in flood zone 3(a), the actual risk of the site flooding from a breach in the tidal defences of the Wash or IDB watercourse is very low.

The maps in the SFRA do not predict any residual flooding on the site in a 1 in 200 year event in 2115.

The IDB systems are adequate for the present day but with climate change these probably will not provide an adequate protection for a 1 in 100 year event in 2115. However the IDB will regularly update predicted 1 in 100 year flood levels and will produce a long term plan of improvements should this be required.

Most of the predictions for the highest flood depths are for 2115, 100 years from the present day. However the life of this type of development is unlikely to be greater than 50 years.

If the surface water from the roofs is to be discharged into an existing surface water system on the site some extra roof water storage facility should be considered.

It is unlikely that the latest climate change recommendations will change the projected depths of flooding from tidal flooding.

One would expect, given the value of the farmland and associated industrial facilities protected by the tidal defences, that the Environment Agency and the Drainage Board, together with the County Council (the lead flood authority) and the District Councils would fund (also seeking contributions from the relevant industrial and farming companies in the area) further improvements to the sea banks within the next 50 to 100 years to ensure the standard of service remains the same as present.

Recommendations

The ground floor level of the proposed extension should be 3.75m OD, which is the same level as the existing building.

The development should incorporate flood resilient construction to a minimum height of 500mm above ground level, so that it can be quickly be put back into service following a flood. Details of the measures required are to be found in the document “Improving Flood Performance of New Buildings – Flood resilient Construction (Department for Communities and Local Government 2007).

Q V Foods should register with the Environment Agency’s Floodline Warnings Direct Service. The company is likely to be already reqistered for this service.

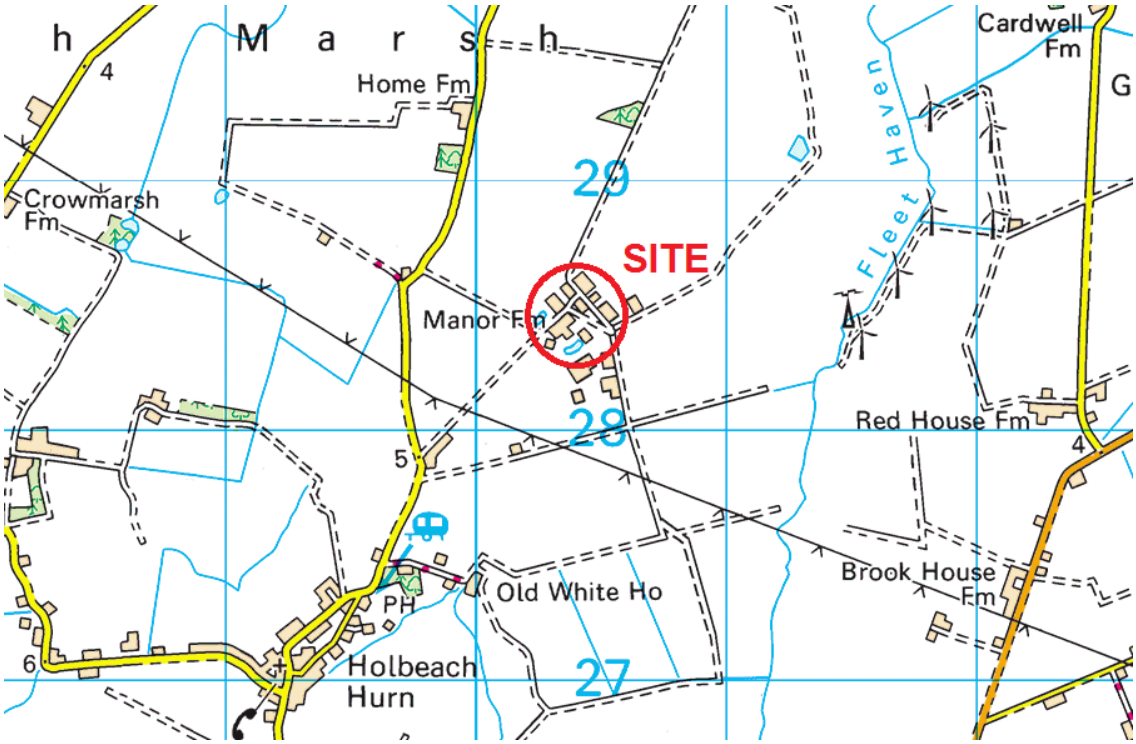
The company should review any existing flood evacuation plans to ensure that it has adequate plans in place to evacuate the premises and ensure that employees are not put in danger should there be a risk of flooding be advised by the Environment Agency.

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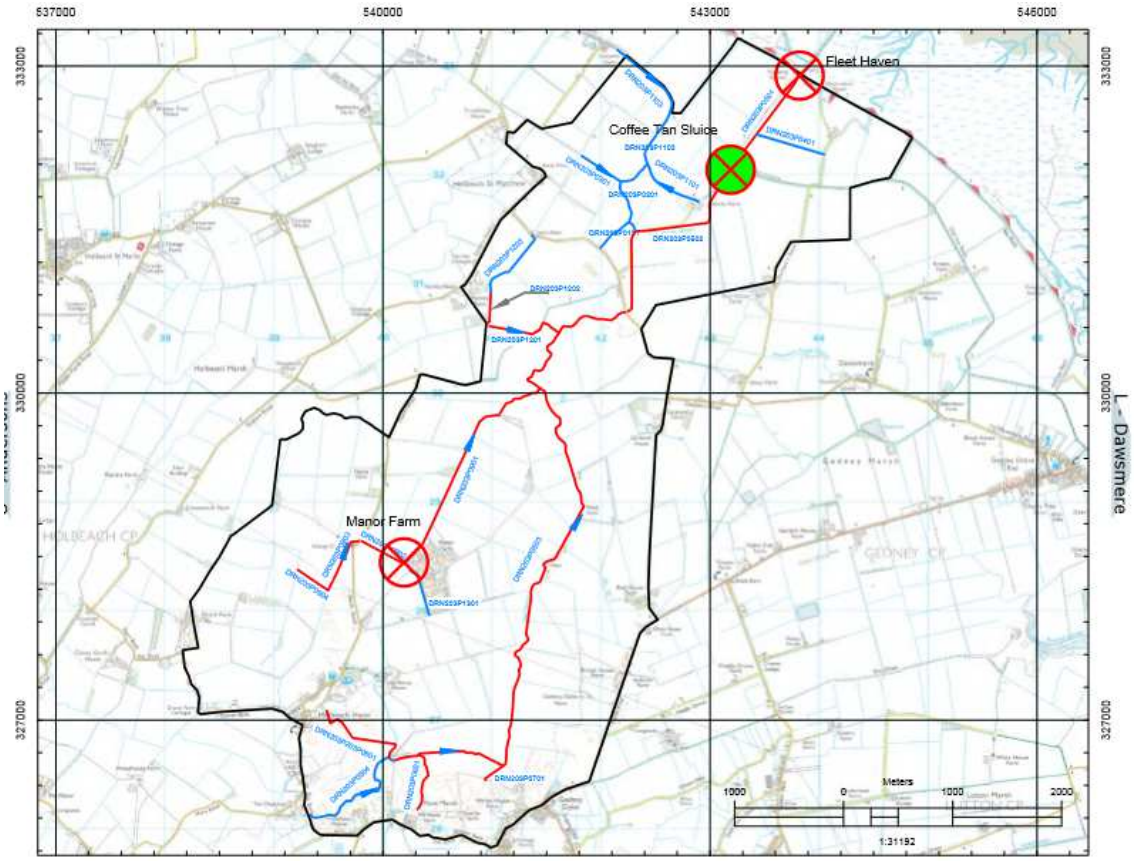
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28th September 2016

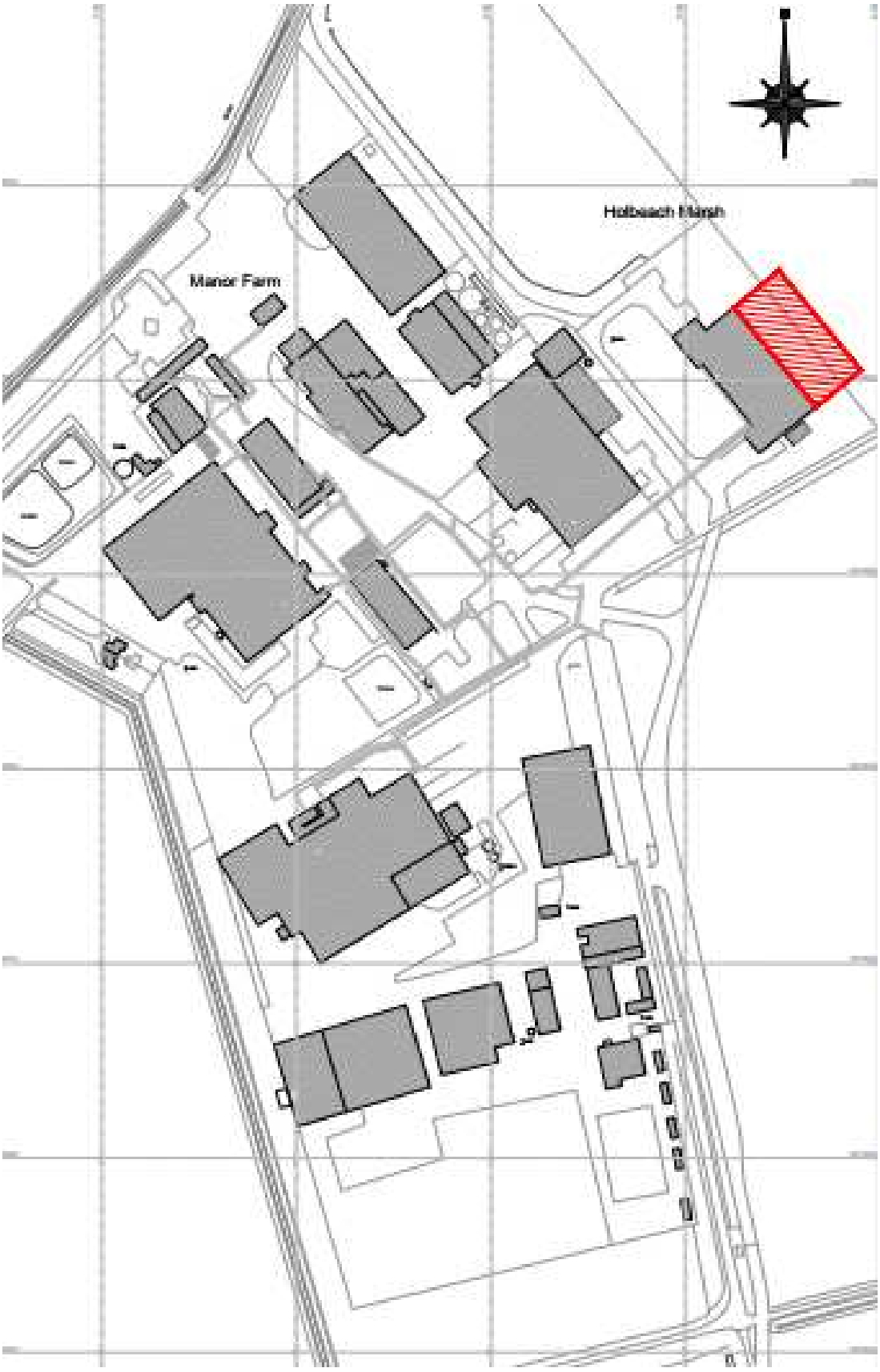
LOCATION PLAN



IDB WATERCOURSES



PROPOSED PLAN OF SITE



APPENDIX A CLIMATE CHANGE

The Environment Agency has issued revised guidance on climate change and have now stated that the new predictions should be considered and incorporated into all flood risk assessments produced after 19th February 2016.

Listed below are the climate change allowances in three documents:

- South Holland SFRA
- EA guidance (2013)
- Revised EA guidance

The recommendations in each document are shown below.

2010 South Holland DC SFRA

The SHDC SFRA states that the the following allowances have been made for climate change:

4.4 Climate Change

Scenarios for the years 2055 and 2115 include for climate change contingency allowances to the amount suggested by PPS25[1]. These allowances are expressed in *Table 2.* Percentage increases are relative to the present-day.

Table 2 – Adopted Climate change contingency allowances

Parameter	Year 2055	Year 2115
Sea level rise (m)	+ 0.33	+ 1.14
Extreme wave height	+ 10%	+ 10%
Peak river flow and volume	+ 20%	+ 20%
Peak rainfall intensity	+ 20%	+30%

Where flows arise from pumping rather than natural run-off, notably in the Vernatt's Drain and for the Fenland subcatchments of the South Forty Foot Drain, peak flow rates for future eras have been taken as equal to current rates since this SFRA assumes all flood risk management measures will remain in their current state.

2013 Guidance to Planners

Guidance to planners was issued by EA in September 2013

Table 1: Recommended contingency allowances for net sea level rises (Net sea level rise (mm per year) relative to 1990)

	1990 to 2025	2025 to 2055	2055 to 2085	2085 to 2115
East of England, east midlands, London, south-east England (south of Flamborough Head)	4.0	8.5	12.0	15.0
South-west England	3.5	8.0	11.5	14.5
North-west England, north-east England (north of Flamborough Head)	2.5	7.0	10.0	13.0

document is out of date

Table 2: Recommended national precautionary sensitivity ranges for peak rainfall intensity, peak river flow, offshore wind speed and wave height

Parameter	1990 to 2025	2025 to 2055	2055 to 2085	2085 to 2115
Peak rainfall intensity	+5%	+10%	+20%	+30%
Peak river flow	+10%	+20%		
Offshore wind speed	+5%		+10%	
Extreme wave height	+5%		+10%	

s been withdrawn (19

Revised 2016 EA Guidance

Table 1 peak river flow allowances by river basin district (use 1961 to 1990 baseline)

River basin district	Allowance category	Total potential change anticipated for '2020s' (2015 to 39)	Total potential change anticipated for '2050s' (2040 to 2069)	Total potential change anticipated for '2080s' (2070 to 2115)
Anglian	Upper end	25%	35%	65%
	Higher central	15%	20%	35%
	Central	10%	15%	25%

For more vulnerable development in flood zone 3(a) the higher central and upper end should be used to assess the range of allowances.

Table 2 peak rainfall intensity allowance in small and urban catchments (use 1961 to 1990 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%

Table 3 sea level allowance for each epoch in millimetres (mm) per year with cumulative sea level rise for each epoch in brackets (use 1990 baseline)

Area of England	1990 to 2025	2026 to 2050	2051 to 2080	2081 to 2115	Cumulative rise 1990 to 2115 / metres (m)
East, east midlands, London, south east	4 (140 mm)	8.5 (212.5 mm)	12 (360 mm)	15 (525 mm)	1.24 m

Table 4 offshore wind speed and extreme wave height allowance (use 1990 baseline)

Applies around all the English coast	1990 to 2050	2051 to 2115
Offshore wind speed allowance	+5%	+10%
Offshore wind speed sensitivity test	+10%	+10%
Extreme wave height allowance	+5%	+10%
Extreme wave height sensitivity test	+10%	+10%

Effects on Predictions of Flood Risk in FRA

The FRA has identified two sources of flooding where the new climate change recommendations could affect the predictions of flood levels in 2115 at the development site:

1) Flooding from the Wash estuary
2) Flooding from fluvial systems (IDB drains)

1) Tidal flooding from the Wash Estuary

The contingency allowance in metres for the years 2055 and 2115 using 1990 as a baseline in the SFRA compared with the guidelines is as follows

Year	2006 guidance	Revised 2016 guidance
2055	0.395	0.412
2115	1.205	1.24

It is unlikely that an increase of 35mm in maximum levels in the Wash will have a significant impact on the predicted flood levels on the SFRA maps. The SFRA does not predict any flooding on this site and a 35mm increase in flood levels is unlikely to change the map of predicted residual flooding for the 1 in 200 year event in 2115.

Flooding from IDB drainage system

As the development is in flood zone 3 and is classed as less vulnerable, the advice is that the central climate change allowance, which is 25% for a period up to 2115. However if a life of only 50 years is considered the allowance in the new guidance is 15%. The SFRA considers situations up to 2115 and uses a climate change allowance of 20%.

No predicted maximum levels with climate change have been given for the IDB systems. Therefore the only conclusion that can be drawn is that the new guidance on climate change indicates that risk of flooding from these sources will be slightly greater than indicated in the SFRA in the future.

South Holland IDB, and all IDB's, are aware that climate change will affect the operations of pumping stations, sluices and drainage channels. Pumping stations and sluices only have a 30 year life and will need to be refurbished or rebuilt within this timespan. It is assumed that South Holland IDB will continue to review the modelling they have already carried out and when the Board consider these refurbishments adequate arrangements will be made to incorporate the latest climate change projections in order that the Board continues to provide the same standard of service as the present day.

Therefore it is considered that the mitigation proposed for the development, with the recommendation that the floor levels should be a minimum level of 3.75m OD is satisfactory.