FLOOD RISK ASSESSMENT FOR PROPOSED RESIDENTIAL DEVELOPMENT AT 14 STOCKHOUSE LANE, SURFLEET, SPALDING, LINCS.

FINAL REPORT

GEOFF BEEL CONSULTANCY

DECEMBER 2017

GCB/MERCHANT

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Fig 1 - Location & Site Layout Plans – G R Merchant drg. no. 3212-17-01

Fig 2 - Environment Agency Flood Map for Planning

Fig 3 - South Holland Updated Strategic Flood Risk Assessment Present Day Residual Depths 1 in 100 year Fluvial & 1 in 200 year Tidal Events (2016)

Fig 4 - South Holland Updated Strategic Flood Risk Assessment Residual Depths 1 in 100 year Fluvial and 1 in 200 year Tidal Events (2115)

Fig 5 - Environment Agency Flood Data – CCN-2017-33815

Fig 6 - Welland & Deepings IDB District Plan

1.0 INTRODUCTION

1.1 A full planning application is to be submitted by G R Merchant Ltd on behalf of Mr & Mrs D M Titterton for proposed residential development at 14 Stockhouse Lane, Surfleet, Spalding, Lincs.

1.2 Planning approval requires a Flood Risk Assessment to accompany the application to meet the requirements and general principles contained in the Planning Practice Guidance to the National Planning Policy Framework (NPPF) and for approval by the Environment Agency.

The site is shown partly within Flood Zones 1 & 2 of the Environment Agency's Flood Map for Planning. The latest Flood Zone Maps have been created as a tool to raise awareness of flood risk with the public and partner organisations, such as Local Authorities, Emergency Services and Drainage Authorities. The Maps do not take into account any flood defences.

The site is also shown in Flood Zone 1 (present day) within a flooded area of the South Holland District Council's Updated Strategic Flood Risk Assessment Map and located in the Welland and Deepings Internal Drainage Board district.

1.3 Geoff Beel Consultancy was appointed on 6th December 2017 to undertake a Flood Risk Assessment.

2.0 LOCATION

2.1 The development site is at 14 Stockhouse Lane, Surfleet, Spalding. The National Grid Reference of the central point of the site is TF 26302880.

2.2 The position and extent of the site are shown on Fig 1 – Location & Site Layout Plans at the end of the document.

2.3 The site, located within the Welland and Deepings Internal Drainage Board district is shown partly within Flood Zones 1 & 2 as detailed on the Environment Agency Flood Map for Planning and in Flood Zone 1 of the Council's Updated Strategic Flood Risk Assessment Map.

3.0 THE SITE AND SEQUENTIAL TEST

3.1 The site is open land.

3.2 The area of development is approximately 0.09 hectare.

3.3 The proposed site layout consists the construction of a 2 storey dwelling and garage with access to Stockhouse Lane.

3.4 The Sequential Test and Exception Test will require to be applied by the Local Planning Authority but the development may be permitted as the site may be protected against the 1 in 100 year fluvial event by a combination of existing defences with mitigation measures meeting the requirements of NPPF.

The Sequential Test is met as the site is shown in in Flood Zone 1 of the Council's Updated Strategic Flood Risk Assessment

4.0 EXISTING FLOOD ALLEVIATION MEASURES

4.1 The site is located at Stockhouse Lane with existing land levels generally at 4.00m aOD. The site is also located immediately north of the River Glen.

4.2 The Surfleet Sluice Gate some 1.50 kms downstream of the site with the adjoining flood embankments offering protection against the tidal flood event of the River Welland and the River Glen. The existing 1 in 200 year modelled flood event of the River Welland is 5.99m aOD whilst the 1 in 100 year estimated flood level of the River Glen inclusive of climate change is 5.12m aOD.

4.3 The site is located within the Welland and Deepings Internal Drainage Board district with the nearest 'main drain' the Old Beach Drain East 250m north of the site boundary.

4.4 The existing standard of drainage for the Welland and Deepings Internal Drainage Board is 1 in 50 years return period, compatible with the Department of the Environment, Food and Rural Affairs target level of service for rural drainage and flood defence works. Freeboard of 1.00 metre is provided to the lowest land levels.

4.5 The surrounding land north of the River Glen drains to the Old Beach Drain East and hence to the Surfleet Marsh Pumping Station which discharges into the River Glen some 1.50 kms downstream of the development site.

4.6 Current maintenance standards within the Welland and Deepings Internal Drainage Board are generally very good. During the operation and maintenance of its pumping stations, associated structures and channel systems, particularly those that could affect property, the Board 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. However, bank slips, blocked culverts etc may occur from time to time and these matters are usually dealt with promptly.

4.7 Maintenance standards of the Environment Agency's main rivers and defences are well maintained and regularly inspected for their asset condition.

5.0 POTENTIAL SOURCES OF FLOODING

5.1 Five potential sources of flooding have been identified as a result of this assessment:

a) local blockages to IDB main drain system
b) storm return period of 1 in 50 years being exceeded
c) failure of Surfleet Marsh Pumping Station
d) failure of Surfleet Sluice
e) overtopping and breaching of the River Glen and River Welland defences

5.2 The probability of flooding from source a) is low due to the maintenance standards already achieved and managed by the IDB.

The probability of flooding from b) is also low due to the Welland & Deepings IDB main drain design standard incorporating a minimum 900mm freeboard to the lowest land level which provides adequate storage in events greater than 1 in 50 years.

5.3 Failure of Surfleet Sluice may occur due to long term mechanical breakdown or power supply being disrupted. However, in these circumstances, if conditions were such to put properties and land at risk of flooding, the Environment Agency would take emergency action to maintain the drainage level of service by utilising temporary pumping equipment. The probability of such an occurrence is also considered to be low.

5.4 Failure of Surfleet Marsh Pumping Station may occur due to long term mechanical breakdown or power supply being disrupted. However, in these circumstances, if conditions were such to put properties and land at risk of flooding, the Drainage Board would take emergency action to maintain the drainage level of service by utilising temporary pumping equipment. The probability of such an occurrence is also considered to be low.

5.5 The possible overtopping and breaching of the fluvial River Glen and tidal River Welland flood defences which may affect the site under extreme conditions is considered to be low. The present standards of defence of 1 in 100 years and 1 in 200 years respectively would most probably have to be exceeded to create such conditions. If a breach, however, did occur, it is estimated that the floodwaters could affect the development site as shown on the South Holland Updated Strategic Flood Risk Assessment and a precautionary approach should be adopted as regards proposed floor levels.

5.6 The South Holland Updated Strategic Flood Risk Assessment (SFRA) shows the site to be affected by floodwaters of between 0.00 and 0.50m as a result of a breach to existing defences. It is recommended that finished floor levels should be 500mm above ground levels at a minimum of 4.50m aOD with flood resilient measures also incorporated into the design and construction of the dwelling up to 300mm above finished floor level. Safe refuge will be provided at first floor level with no sleeping accommodation at ground level.

5.7 The developer will ensure that the eventual occupiers of the dwelling are sufficiently aware of the risk of flooding, and the standard of the existing defences. The Environment Agency provides a Flood Warning Service which includes Flood Warning Codes and uses direct warning methods where the risks and impacts of flooding are high. Indirect warnings are provided to all flood risk areas, even those at low risk of flooding. The main method is media broadcasts via local radio and also by television.

In addition to direct and indirect flood warnings, the Environment Agency operates a 24 hour a day Floodline Service providing advice and information on flooding, contact tel no: 0345 988 1188. All occupiers of the new dwelling should register with the Floodline Warnings Direct Service to receive any future flood warnings.

6.0 EXTENT OF KNOWN FLOODING

6.1 During the preparation of this assessment, no evidence was discovered of the site and adjoining properties being flooded.

7.0 PROBABILITIES AND TRENDS OF FLOODING

7.1 The probability of this development flooding from localised drainage systems is very low. It is also intended to construct floor levels 500mm above existing ground level at a minimum of 4.50m aOD with safe refuge at first floor level.

7.2 The probability of the site flooding with water from any Welland and Deepings river system is less than 1% because of the standards of the existing flood defence systems, storage within existing drainage channels and the location of the site. Similarly the same standard is provided by the Environment Agency's main river and defences of the River Glen.

7.3 If under very extreme events, levels of floodwater from any Environment Agency or Welland and Deepings river or arterial systems rose to such an extent that the site was affected, the situation would not be sudden. It is very probable that sufficient time would be available to take precautionary actions to limit the extent and potential impact of flooding.

7.4 The water levels in the drainage channels will tend to rise as a result of the impacts of climate change. However the existing systems and defences together with the raising of floor levels 500mm above existing ground level at a minimum of 4.50m aOD with flood resilient construction up to 300mm above finished floor level will be appropriate for the design life of the development (i.e. 100 years).

8.0 IMPACTS OF FLOODING

8.1 No significant impacts of flooding are anticipated due to the mitigation measures being proposed.

8.2 Floor levels of the development will be raised 500mm above existing ground levels at a minimum of 4.50m aOD offering additional protection against impacts arising from any extreme short duration, localised events. Surface water drainage will be discharged to soakaway designed to BRE365 specification and Building Regulations approval.

8.3 The general location of the site within the catchment is such that if flooding occurred from any of the Environment Agency or Welland and Deepings river systems, then sufficient warning time would be available.

9.0 RESIDUAL RISK – EXTREME EVENTS

9.1 The residual risk from extreme events is low on this site, because of its location with protection from both the River Glen fluvial and River Welland tidal defences.

9.2 The site is within Flood Zone 1 according to NPPF classification with a very low risk of flooding due to the current standards of drainage and flood defence and land levels. The site is not located within a Functional Flood Plain of any 'main river' or 'main drain'. The Environment Agency Flood Map for Planning has been produced irrespective of existing flood defences and standards of protection.

9.3 South Holland District Council in conjunction with the Environment Agency and the local IDB's within the Council area have carried out an Updated Strategic Flood Risk Assessment of the whole District by appointed Consulting Engineers.

The Updated Strategic Flood Risk Assessment has produced more definitive Flood Risk Maps similar to those published by the Environment Agency and at the same time has analysed flood return periods of all tidal and fluvial defences for years 2016 and 2116 to account for the effects of climate change.

Breach scenarios of embankments failing and/or being overtopped have also been carried out to establish Flood Risk Zones.

9.4 Safe access and egress to the site is available via Stockhouse Lane onto the B1356 road in a northerly direction to land in Flood Zone 1.

9.5 Safe refuge is provided at first floor level of the new dwelling with no sleeping accommodation at ground level.

10.0 CONCLUSIONS AND RECOMMENDATIONS

10.1 As a result of the assessment, the following conclusions have been reached:-

- The proposed development is not in a Functional Floodplain. It is located in the Passive Floodplain of the River Welland and River Glen defences as well as the Welland & Deepings IDB.

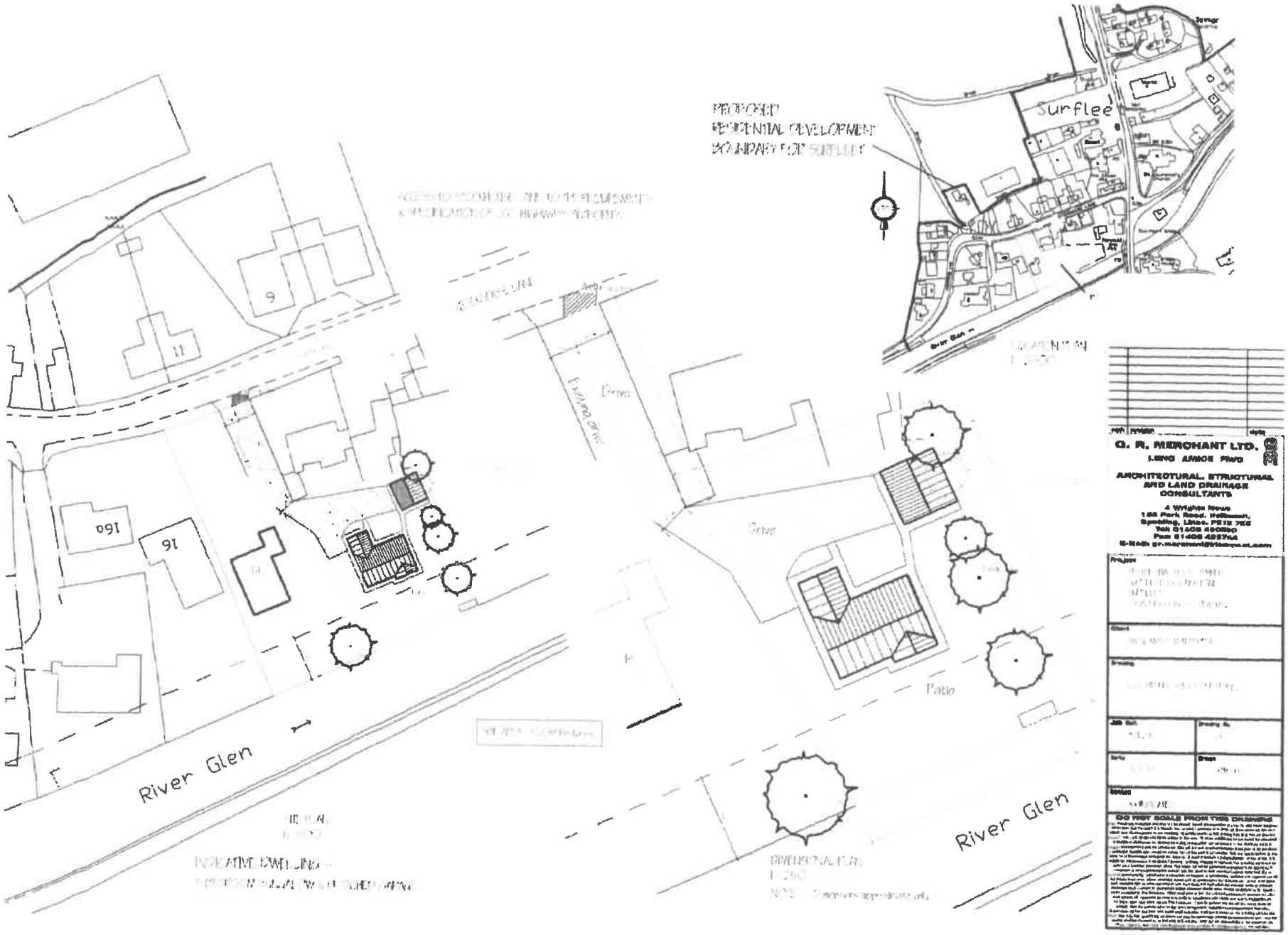
- The site is in Flood Zone 1 with the actual risk of flooding from the River Glen system being low.

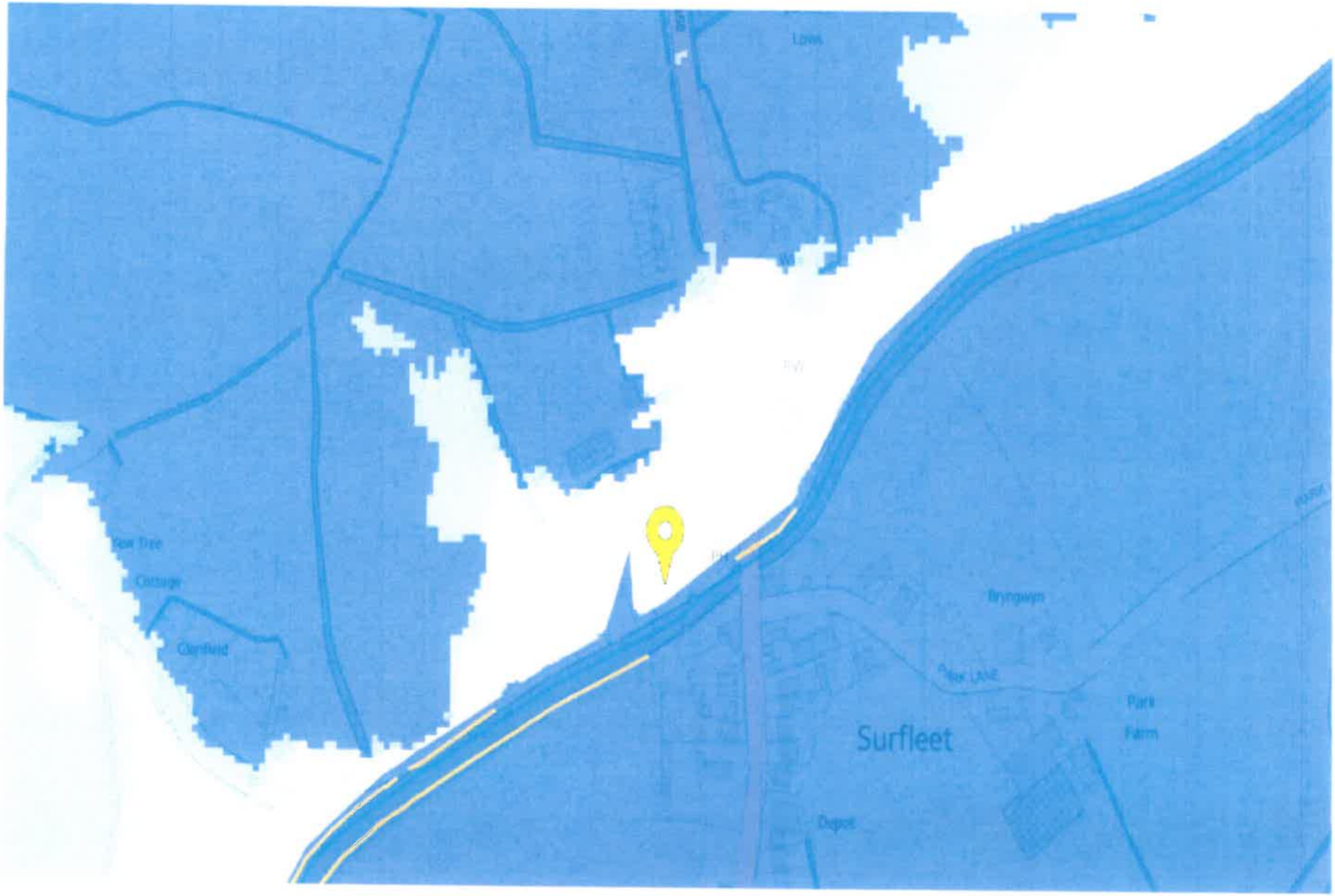
- Although the site is located within an Internal Drainage District with a minimum standard of drainage of 1 in 50 years, this accords with Defra guidelines for rural development. Freeboard to design water level of 900mm to lowest land level is available for events greater than 1 in 50 years providing further storage within the drainage channels.

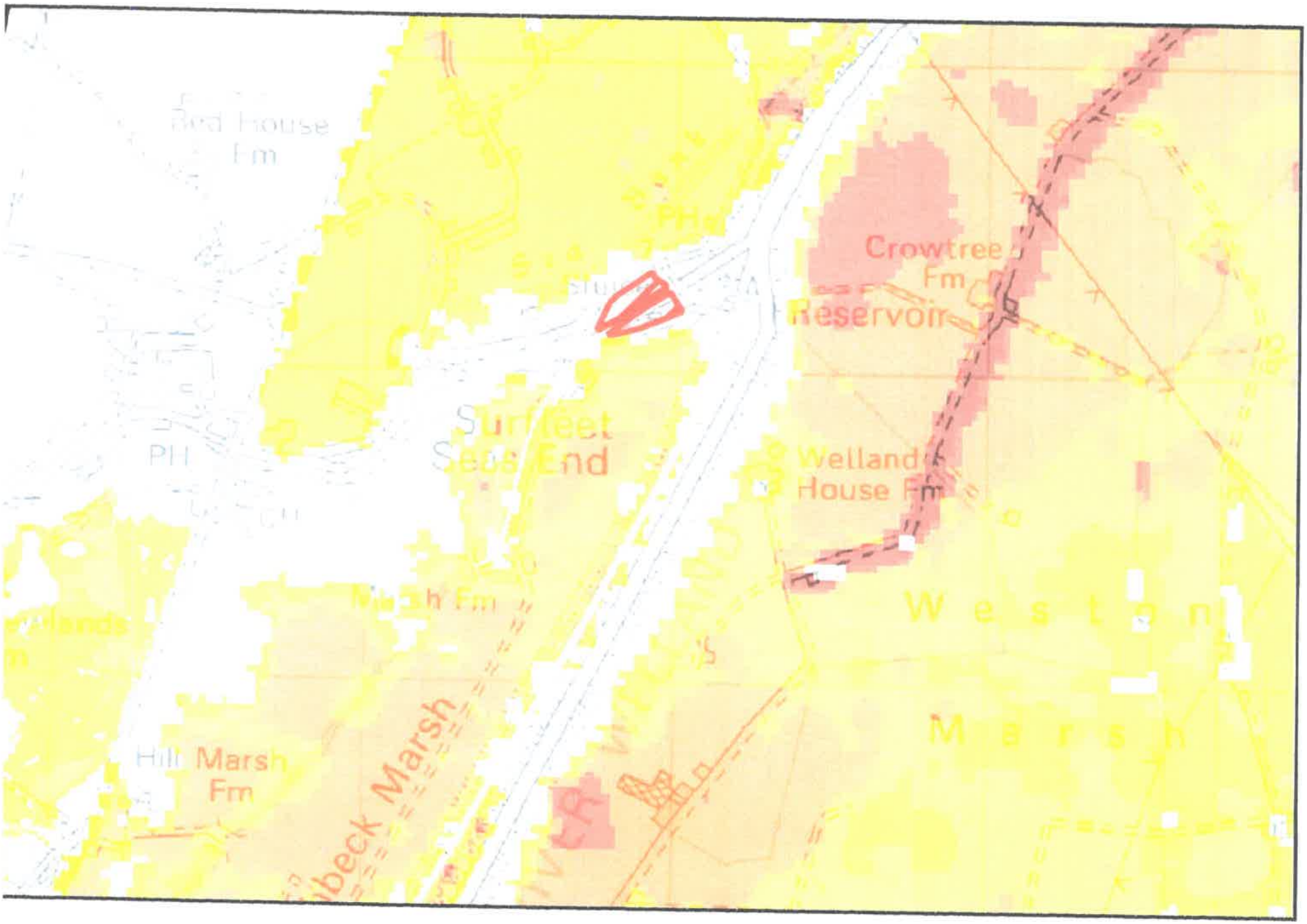
- Floor levels will be raised 500mm above existing ground level at a minimum of 4.50m aOD and flood resilient measures incorporated into the design and construction of the proposed dwelling 300mm above finished floor level. Safe refuge will be provided at first floor level.

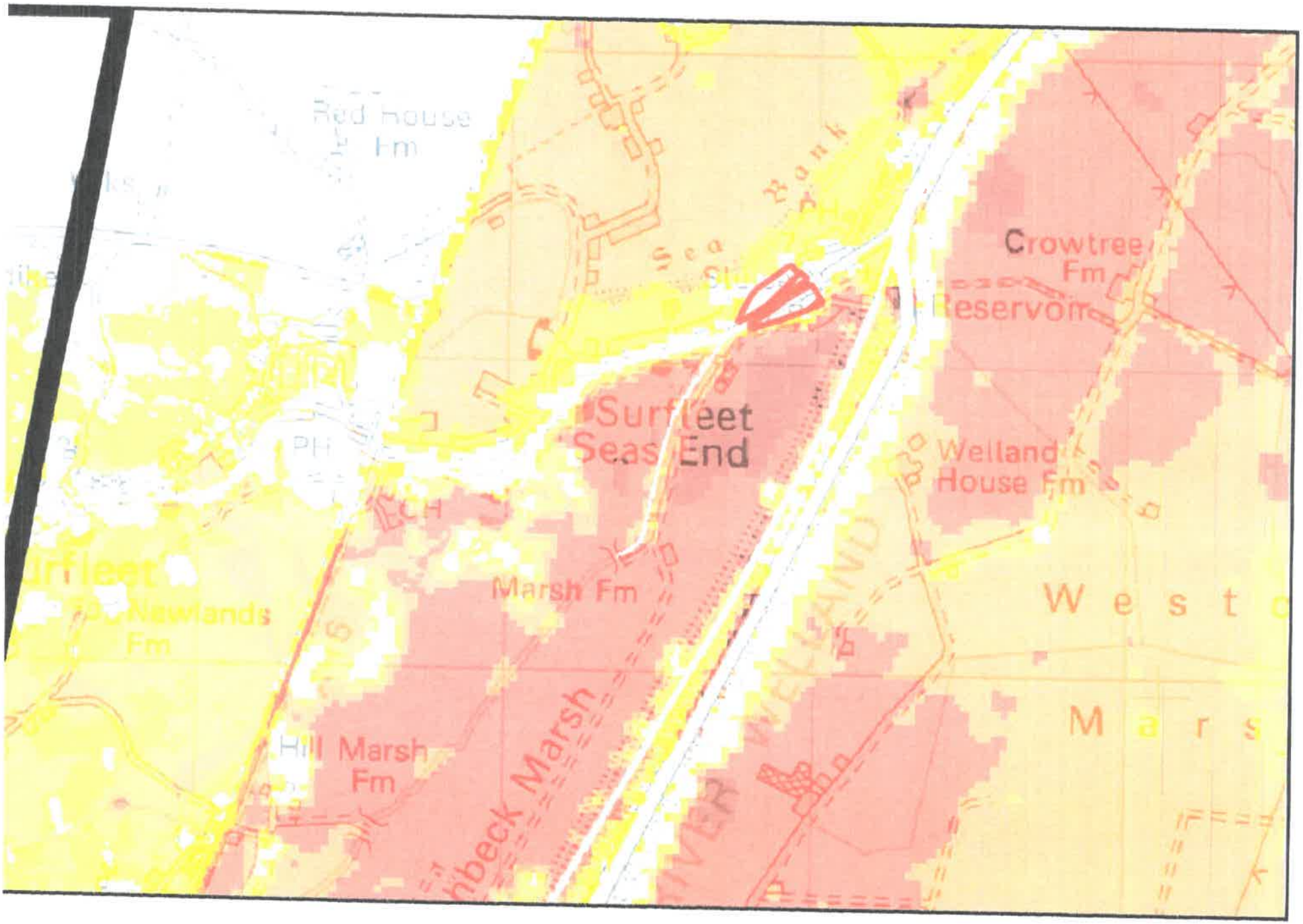
- On site surface water drainage will be discharged to soakaway to BRE365 specification and Building Regulations approval.

- Any development within 9.00 m of the River Glen will require Flood Consent from the Environment Agency.


PROPOSED
RESIDENTIAL DEVELOPMENT
BOUNDARY FOR SURFLEET
Surflee
9
11
160
16
Drive
Patio
River Glen
River Glen
Q. R. MERCHANT LTD.
LONG ARROW PARK
ARCHITECTURAL, STRUCTURAL
AND LAND DRAINAGE
CONSULTANTS
4 Wrights Row
148 Park Road, Holbeach,
Spalding, Lincs. PE12 7EE
Tel: 01406 426080
Fax 01406 425744
DO NOT SCALE FROM THIS DRAWING


Lows
New Tree
Cottage
Glenfield
Bryngwyn
Surfleet
Park
Farm
Depot


Red House Fm
PH
Crowtree Fm
Reservoir
Surfleet Seas End
PH
Welland House Fm
Marsh Fm
Hill Marsh Fm
Marsh


Red House Fm
Sea Bank
Crowtree Fm
Reservoir
Surfleet Seas End
Welland House Fm
Marsh Fm
Newlands Fm
Hill Marsh Fm
West
Mars

asic FRA Map centred on TF 24916 28154 - created January 2017 [Ref: CCN-2017-33815]



Environment Agency

Scale 1:10,000

N W E S

- Model Nodes
- Main River
- Raised Defences
- Area at Risk of Flooding from Rivers or The Sea
- Extreme Flood Outline

Dark blue shows the area that could be affected by flooding, either from rivers or the sea, if there were no flood defences. This area could be flooded:

- from the sea by a flood that has a 0.5% (1 in 200) or greater chance of happening each year.

- or from a river by a flood that has a 1% (1 in 100) or greater chance of happening each year.

Light blue 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.

These two colours show the extent of the natural floodplain if there were no flood defences or certain other manmade structures and channel improvements. Sites outside the two extents, but behind raised defences, may be affected by flooding if the defences are overtopped or fail

Created by the Partnerships and Strategic Overview Team Northamptonshire

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Environment Agency

Datasheet [Ref: CCN-2017-33815]

Fluvial Flood Levels (mODN)

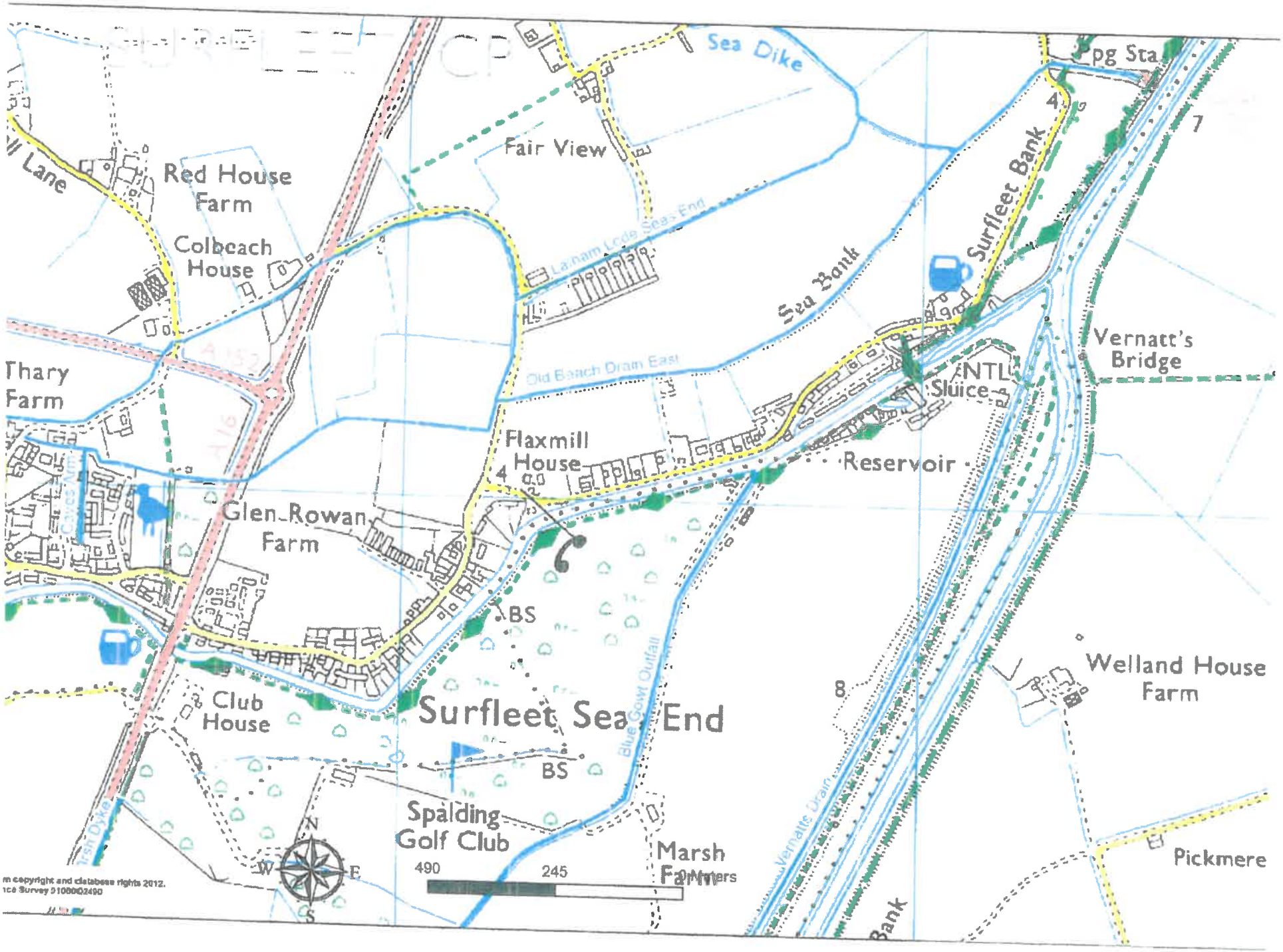
The fluvial flood levels for the model nodes shown on the attached map are set out in the table below. They are measured in metres above Ordnance Datum Newlyn (mODN).

			Annual Exceedance Probability - Maximum Water Levels (mODN)										
Node Label	Easting	Northing	50% (1 in 2)	20% (1 in 5)	10% (1 in 10)	4% (1 in 25)	2% (1 in 50)	1.33% (1 in 75)	1% (1 in 100)	1% (1 in 100) inc 20% Climate Change	0.5% (1 in 200)	0.1% (1 in 1000)	0.1% (1 in 1000) inc 20% Climate Change
GLEN 3817	525080	328118	3.75	4.01	4.11	4.17	4.19	4.21	4.23	5.12	4.26	4.35	5.26
GLEN 3910	524998	328075	3.75	4.01	4.12	4.18	4.20	4.22	4.24	5.12	4.27	4.36	5.27
GLEN 4108	524821	327987	3.75	4.02	4.12	4.18	4.21	4.23	4.25	5.12	4.28	4.38	5.27

Fluvial Flood Flows (m^3/s)

The fluvial flood flows for the model nodes shown on the attached map are set out in the table below. They are measured in metres cubed per second (m^3/s).

			Annual Exceedance Probability - Maximum Flows (m^3/s)										
Node Label	Easting	Northing	50% (1 in 2)	20% (1 in 5)	10% (1 in 10)	4% (1 in 25)	2% (1 in 50)	1.33% (1 in 75)	1% (1 in 100)	1% (1 in 100) inc 20% Climate Change	0.5% (1 in 200)	0.1% (1 in 1000)	0.1% (1 in 1000) inc 20% Climate Change
GLEN 3817	525080	328118	20.00	24.57	27.92	30.58	31.67	32.59	33.72	44.09	35.09	40.21	50.34
GLEN 3910	524998	328075	19.95	24.52	27.87	30.53	31.62	32.54	33.67	44.01	35.05	40.21	50.26
GLEN 4108	524821	327987	19.78	24.37	27.72	30.38	31.47	32.38	33.51	43.65	34.90	40.22	50.06


Sea Dike
Fair View
Red House Farm
Colbeach House
Lane
Thary Farm
Sea Bank
Surfleet Bank
Pg Sta
Vernatt's Bridge
NTL Sluice
Reservoir
Flaxmill House
Glen Rowan Farm
Old Beach Drain East
BS
Club House
Surfleet Sea End
Blue Gowt Outfall
Welland House Farm
Spalding Golf Club
Marsh Farm
Vernatts Drain
Pickmere
Bank
490
245
N
S
E
W