

**FLOOD RISK ASSESSMENT
FOR PROPOSED
RESIDENTIAL DEVELOPMENT
OFF RECTORY ROAD,
TYDD ST MARY, LINCS.**

FINAL REPORT

GEOFF BEEL CONSULTANCY

MARCH 2017

GCB/MERCHANT

DISCLAIMER

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1.0 INTRODUCTION

- 1.1 An outline planning application is to be submitted by G R Merchant Ltd on behalf of Mr M Worrall for proposed residential development at land off Rectory Road, Tydd St Mary, Lincs.
- 1.2 A Flood Risk Assessment is required to accompany the planning application to meet the requirements and general principles contained in the Planning Practice Guidance of the National Planning Policy Framework (NPPF).

The site is within Flood Zone 3 of the Environment Agency's Flood Map. The likely source of flooding is from the North Level Main Drain which is under the jurisdiction of the North Level IDB. As the site is within their area, the Drainage Board should be consulted regarding surface water drainage and flood risk for the proposal.

The Agency's latest Flood Map for Planning has 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.

- 1.3 Geoff Beel Consultancy was appointed on 21st March 2017 to prepare a Flood Risk Assessment.

2.0 LOCATION

- 2.1 The development site is located at land north of Rectory Road and 1.00km north west of the Middle Level Main Drain and 200m south of School Drain and 2.50kms west of the River Nene. It is also located 1.75kms south of the South Holland Main Drain. The National Grid Reference of the site is TF 44151850.
- 2.2 The position and extent of the site are shown on Fig 1 – Site & Location Plans (Existing) at the end of the document.
- 2.3 The site is located within the North Level Internal Drainage Board district and is shown within Flood Zone 3 as detailed on both the Environment Agency Flood Zone Maps and South Holland Strategic Flood Risk Assessment Residual Flood Depths Map.

3.0 THE SITE AND SEQUENTIAL TEST

- 3.1 The site is currently a disused barn and surrounding land..
- 3.2 The area of development is approximately 0.02 hectare.
- 3.3 The proposed site layout consists the construction of a two-storey dwelling fronting Rectory Road after demolition of the disused barn..
- 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 protected against both the 1 in 200 year return period tidal event and the 1 in 100 year return period fluvial event meeting the requirements of NPPF.

However, the Sequential Test is met as no other land available for development in Tydd St. Mary is at a lower risk of flooding.

4.0 EXISTING FLOOD ALLEVIATION MEASURES

- 4.1 The site is within a defended floodplain, as defined in Appendix 1 of the Environment Agency's 'Policy and Practice for the Protection of Floodplains' and is considered to be passive until such time as a flood greater than that for which the defences were designed occurs. The likelihood of flooding due to overtopping or failure of a flood defence embankment is considered to be small.

- 4.2 The site is located in the North Level Drainage Board area, the nearest main drain the School Drain is located 200m north of the site. Land levels are generally at 3.00m aOD.

The School Drain discharges in a southerly direction to the Shire Drain and hence to the North Level Main Drain at Tydd Gote approximately 1.00kms east from the site.

- 4.3 The existing standard of drainage for the North Level Internal Drainage Board district is 1 in 50 years return period, compatible with the Department of Environment, Food and Rural Affairs target level of service for rural urban drainage and flood defence works. The North Level Main Drain discharges to the tidal River Nene at the Tydd Pumping Station.
- 4.4 Tidal flood protection from the River Nene between Wisbech and Sutton Bridge is estimated to be a 1 in 200 years return period. The Environment Agency has recently carried out the River Nene Tidal Strategic Study which covers the tidal River Nene from the Dog in a Doublet Sluice near Peterborough to its outfall in the Wash at Nene Lighthouses, a distance of some 39.5km.
- 4.5 The Strategic Study has concluded that improvement works are cost effective to meet Department of the Environment, Food and Rural Affairs guidelines in order to sustain the existing tidal defences over the 50 year appraisal period up to a 1 in 200 year standard.
- 4.6 Current maintenance standards of the Environment Agency for tidal defences; and the North Level Internal Drainage Board for surface water and land drainage are considered to be very good.

During the operation and maintenance of its pumping stations, associated structures and channel systems, particularly those that could affect property, the Board seek 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.

5.0 POTENTIAL SOURCES OF FLOODING

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

- a) local blockages to riparian drains and School Drain
- b) storm return period of 1 in 50 years being exceeded
- c) failure of Tydd Pumping Station.
- d) overtopping and breaching of the River Nene, Wisbech to Sutton Bridge tidal defences

5.2 The probability of flooding from source a) is low due to the maintenance standards already achieved and managed by the riparian owners as well as the North Level IDB for the School Drain.

The probability of flooding from source b) is also low due to the North Level 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. The maximum design water level of the North Level Main Drain and Shire Drain is minus 1.35m aOD which offers freeboard of 4.35m against the land level at the site.

There are many hectares of agricultural land that would flood in such circumstances before the development site was put at risk.

5.3 Failure of the Tydd Pumping Station may occur due to mechanical breakdown or electricity power failure. However, in these circumstances, if conditions were such to put properties and land at risk of flooding, the Internal 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.

5.4 The existing tidal defences between Wisbech and Sutton Bridge consist generally of strengthened and heightened earth embankments with a riverside berm. Crest levels are at 7.00m aOD. The highest recorded tidal surge level reached 5.60m aOD at Wisbech on 11th January 1978 when extensive areas of the town were flooded. More recent tidal surge event of December 2013 reached a level of 6.10m aOD and the town and surrounding areas were protected by the improved defences.

The site is located 2.50kms west of the River Nene tidal defences which were raised and strengthened after the 1978 surge event.

More recent studies by the Environment Agency have concluded a design water level for the 1 in 200 year tidal event between Sutton Bridge and Wisbech to be below existing tidal defence crest level with sufficient freeboard to take into account sea level rise during the next 100 years.

- 5.5 Hydraulic modelling by the Environment Agency has produced Tidal Hazard Mapping shown in Fig 5 which identifies the site to be outside the effects of any floodwaters from possible breaching of the River Nene Tidal Defences in both the 1 in 200 year and 1 in 1000 year events in 2115.
- 5.6 The developer should 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 and the occupants of the new dwellings should register with the Floodline Direct Warnings Service to receive any future flood warnings

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 contacting 0345 988 1188.

6.0 EXTENT OF KNOWN FLOODING

- 6.1 During the preparation of this assessment, the site did not flood during the tidal surge events of February 1978 and December 2013 with the defences between Sutton Bridge and Wisbech at the 1 in 200 year standard.

No flooding of this site has been experienced from the adjoining IDB main drains.

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 finished floor levels of the new dwelling 300mm above the existing Rectory Road carriageway level with a further 300mm of flood resilient construction above finished floor level.
- 7.2 The probability of the site flooding with water from the River Nene tidal river system is less than 0.5% because of the standards of the existing flood defences.
- 7.3 If under very extreme events, levels of floodwater from the North Level Main Drain or South Holland Main Drain or other IDB 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 proposed floor levels 300mm above existing Rectory Road carriageway ground level with a further 300mm of flood resilient construction above finished floor level will be appropriate for the design life of the development (i.e. 100 years).
- 7.5 Safe access and egress from the site is available in a southerly direction to Tydd St Giles village where land is located in Flood Zone 1.

8.0 IMPACTS OF FLOODING

- 8.1 No significant impacts of flooding are anticipated.
- 8.2 Finished floor level of the development has been raised 300mm above existing Rectory Road level offering additional protection against impacts arising from any extreme short duration, localised events.
- 8.3 The general location of the site within the catchment is such that if flooding occurred from the IDB main drains or the River Nene tidal system sufficient warning time would be available.
- 8.4 No displacement of water from the site will affect any adjoining properties as the site will be provided with soakaway drainage designed to BRE365 requirements and Building Regulations approval.

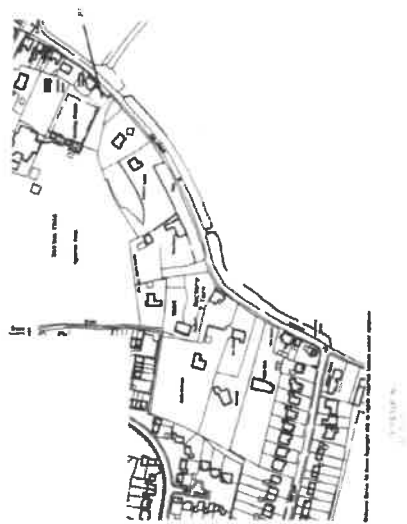
9.0 RESIDUAL RISK – EXTREME EVENTS

- 9.1 The residual risk from extreme events is very low on this site, because of its location within the internal drainage system, existing levels of tidal defences and proposed finished floor level 300mm above surrounding land and road levels.
- 9.2 Whilst the site is within Flood Zone 3 it has 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 Zone maps have been produced irrespective of existing flood defences and standards of protection. The risk of flooding to adjoining properties in the vicinity is not increased in terms of probability by the proposed development.
- 9.3 In the extreme event of a serious pumping station failure occurring to the IDB main drain system, or the overtopping of tidal defences, protection will be afforded by the finished floor level being 300mm above existing Rectory Road carriageway level with flood resilient construction incorporated into the new dwelling up to 300mm above finished floor level.

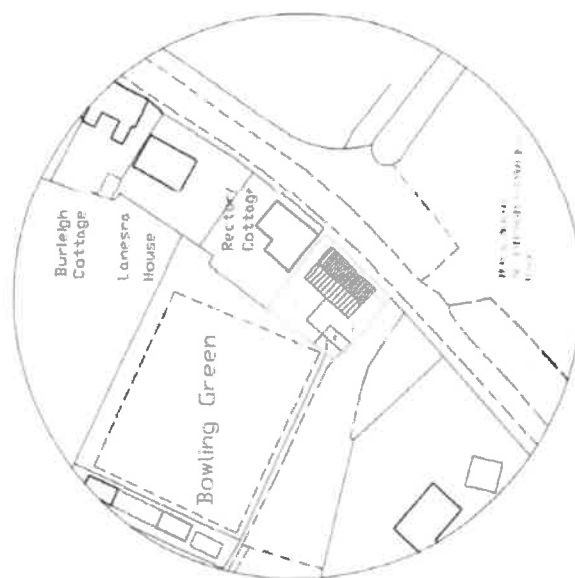
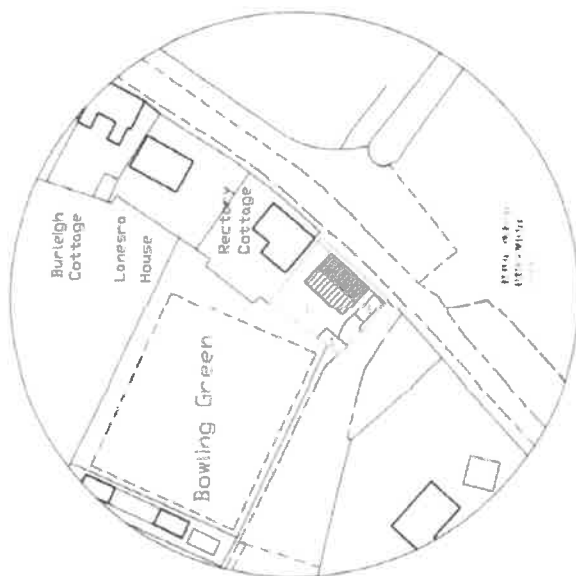
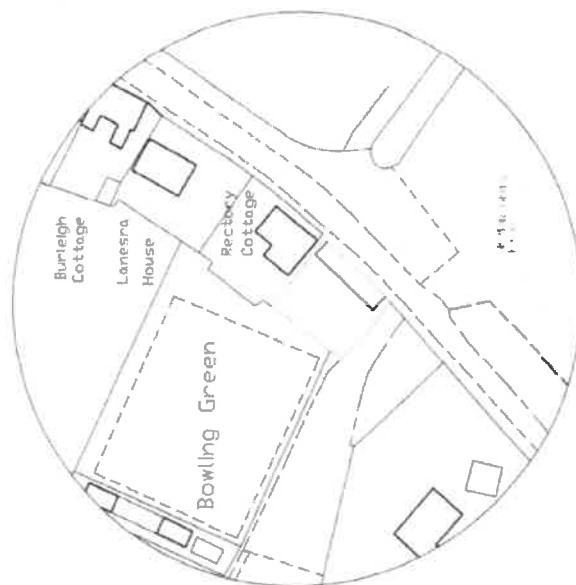
10.0 CONCLUSIONS AND RECOMMENDATIONS

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 protected by existing tidal defences to a standard of 1 in 200 years and fluvial defences to a standard of 1 in 100 years.
- The site is in Flood Zone 3 but with the actual risk of flooding from the tidal River Nene being very low (less than 0.5%).
- Although the site is located within an Internal Drainage District with a standard of drainage of 1 in 50 years, this accords with Defra guidelines for rural development. A minimum of 900mm freeboard is provided within the main drain design standard to the lowest land level which provides further storage to cater for events greater than 1 in 50 years.
- On site surface water drainage will be discharged to soakaways to BRE365 design requirements and Building Regulations approval.
- Finished floor level will be raised 300mm above existing Rectory Road carriageway with flood resilient construction incorporated into the new dwelling up to 300mm above finished floor level.



G. W. INDEPENDENT LTD. ARCHITECTURAL, STRUCTURAL, AND CIVIL ENGINEERING CONSULTANTS 4, Wyndham House 145, Regent Street, W.1.B. 3RD Tel. 01 492 0000 Telex 91 000 00000 Cable: G.W. INDEPENDENT LTD.		Date: 19.12.77 Drawn: J.M. Checked: J.M. Scale: 1/1000 Project No: 1000	Title: RESIDENTIAL DEVELOPMENT Location: 145, Regent Street, W.1.B. 3RD Client: G. W. INDEPENDENT LTD. Architect: G. W. INDEPENDENT LTD. Engineer: G. W. INDEPENDENT LTD. Surveyor: G. W. INDEPENDENT LTD. Planner: G. W. INDEPENDENT LTD. Designer: G. W. INDEPENDENT LTD. Contractor: G. W. INDEPENDENT LTD. Other: G. W. INDEPENDENT LTD.
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5/2016

Rectory Rd - Google Maps

Google Maps Rectory Rd

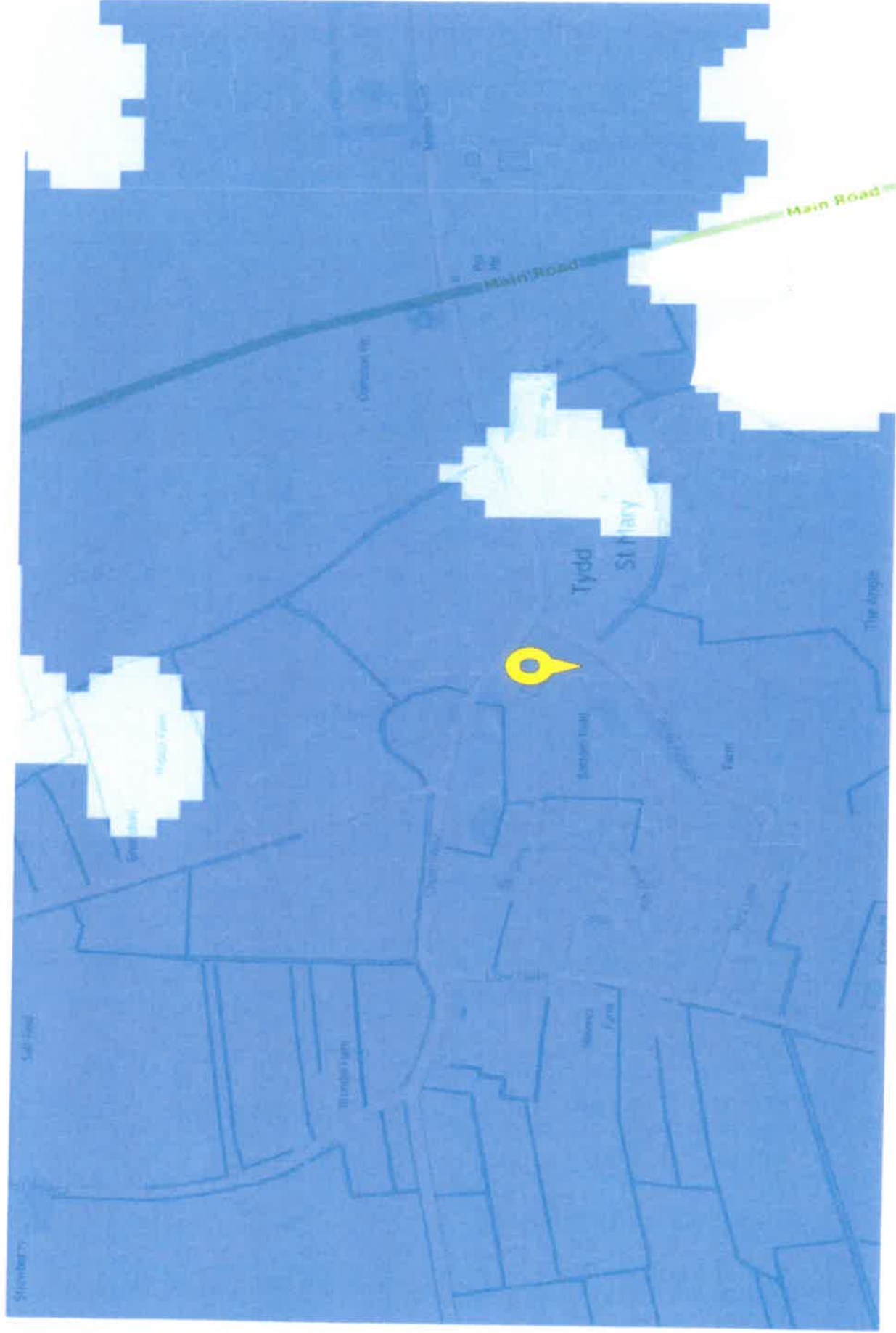


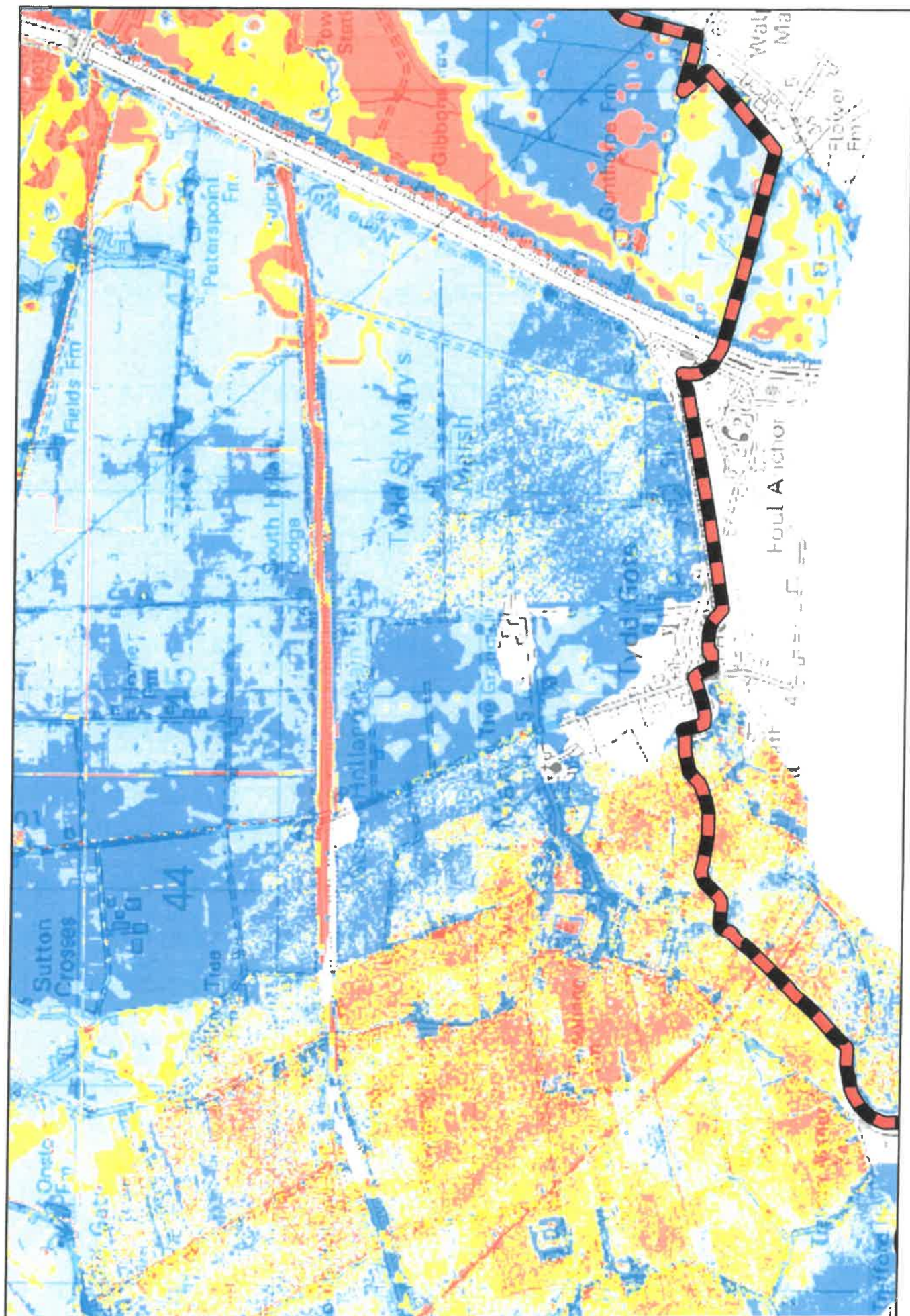
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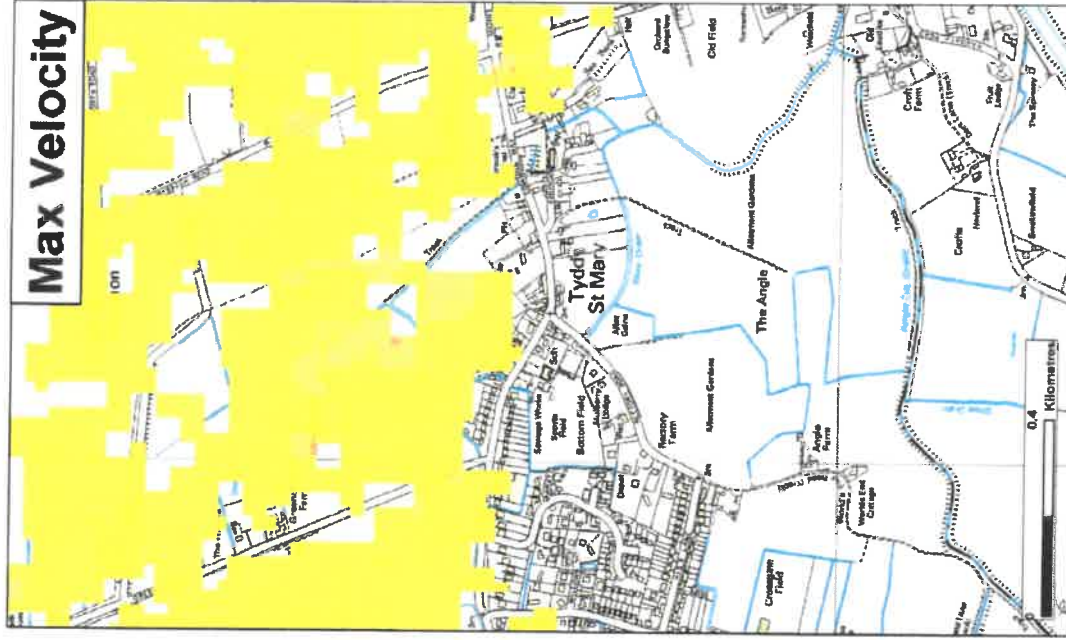
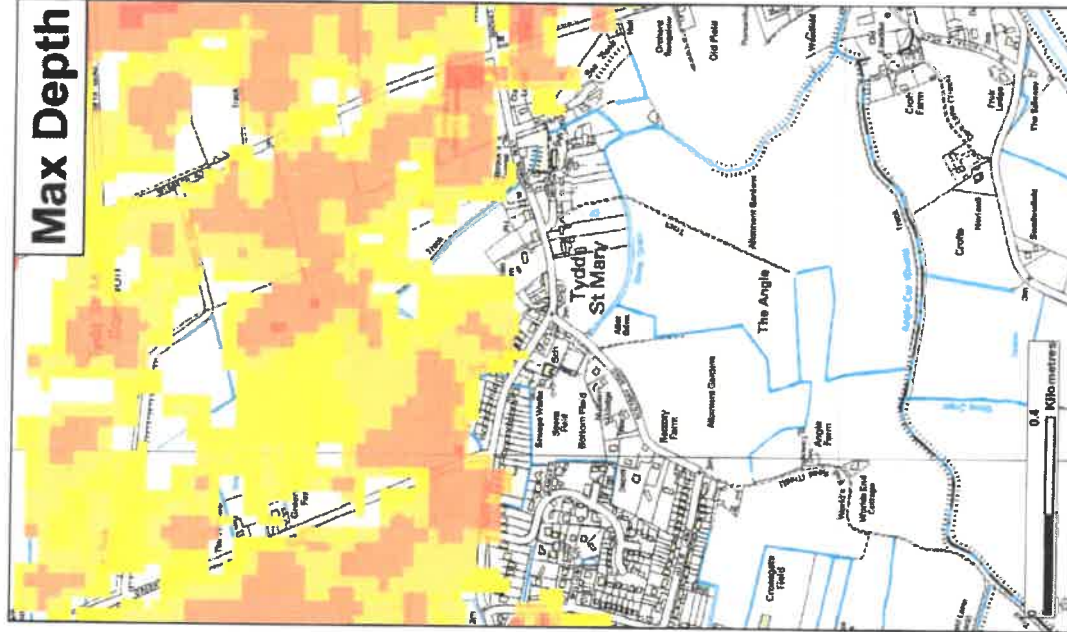
Street View - Jun 2009

Image capture: Jun 2009 © 2016 Google

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★ Modelled Breach Locations - see also the accompanying plan 'Location of Modelled Breaches'

Max Hazard of Risk to People F02320	Max Depth (m)	Max Velocity (m/s)	Scenario Annual Chance	Scenario year	CCN Number	CCN-2017-38044
Less than 0.75 (Low Hazard)	0 - 0.25	0 - 0.3		2115	0.5% (1 in 200)	
Between 0.75 and 1.25 (Danger for Some)	0.25 - 0.50	0.3 - 1.0				
Between 1.25 and 2.0 (Danger for Most)	0.50 - 1.0	1.0 - 1.5				
Greater than 2.0 (Danger for All)	1.0 - 1.5	1.5 - 2.5				
	1.5 +	2.5 +				

This map shows the level of flood hazard to people (called a hazard rating) if our flood defences are breached at certain locations, for a range of scenarios. The hazard rating depends on the depth and velocity of floodwater, and maximum values of these are also mapped.

The map is based on computer modelling of simulated breaches at specific locations. Each breach has been modelled individually and the results combined to create this map. Multiple breaches, other combinations of breaches, different sized tidal surges or flood flows may all give different results.

The map only considers the consequences of a breach, it does not make any assumption about the likelihood of a breach occurring. The likelihood of a breach occurring will depend on a number of different factors, including the construction and condition of the defences in the area. A breach is less likely where defences are of a good standard but a risk of breaching remains.

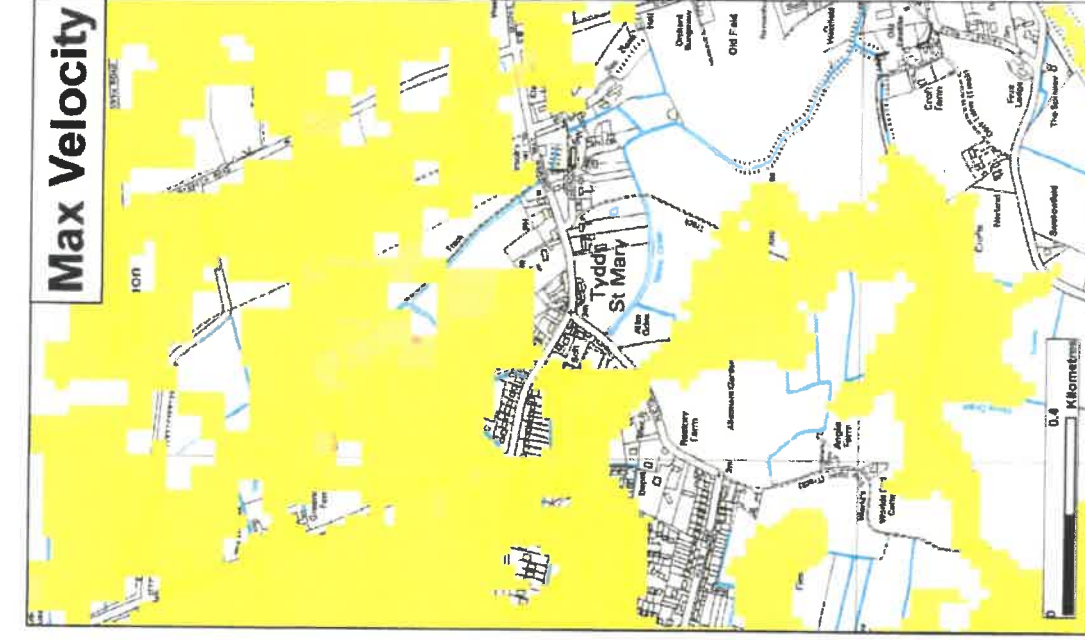
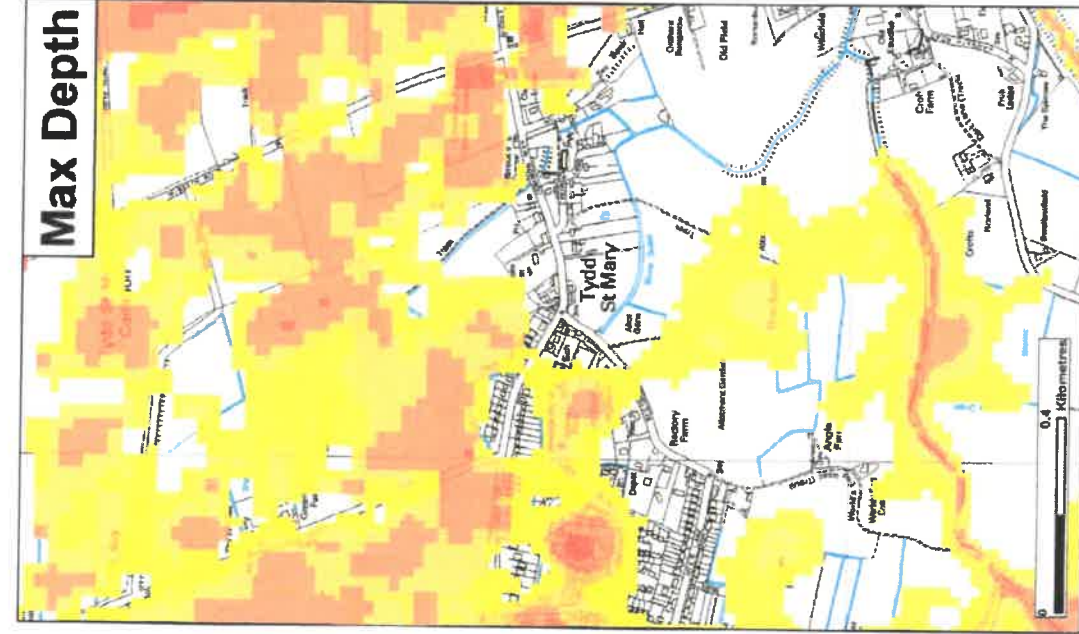
General Enquiries No: 03708 500 506. Weekday Daytime calls cost 5p plus up to 6p per minute from BT Weekend Unlimited. Mobile and other providers' charges may vary.



Lincolnshire and Northamptonshire Tidal Breaching Hazard Mapping

Map Centred on TF 4290 18607

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★ Modelled Breach Locations - see also the accompanying plan "Location of Modelled Breaches"

Max Hazard	Max Depth (m)	Max Velocity (m/s)
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Between 1.25 and 2.0 (Danger for Most)	0.50 - 1.0	1.0 - 1.5
Greater than 2.0 (Danger for All)	1.0 - 1.6	1.5 - 2.5
	1.6 +	2.5 +

id	March 2017	Scenario year	2115	Scenario Annual Chance	0.1% (1 in 1000)	GCN Number	GCN-2017-38044
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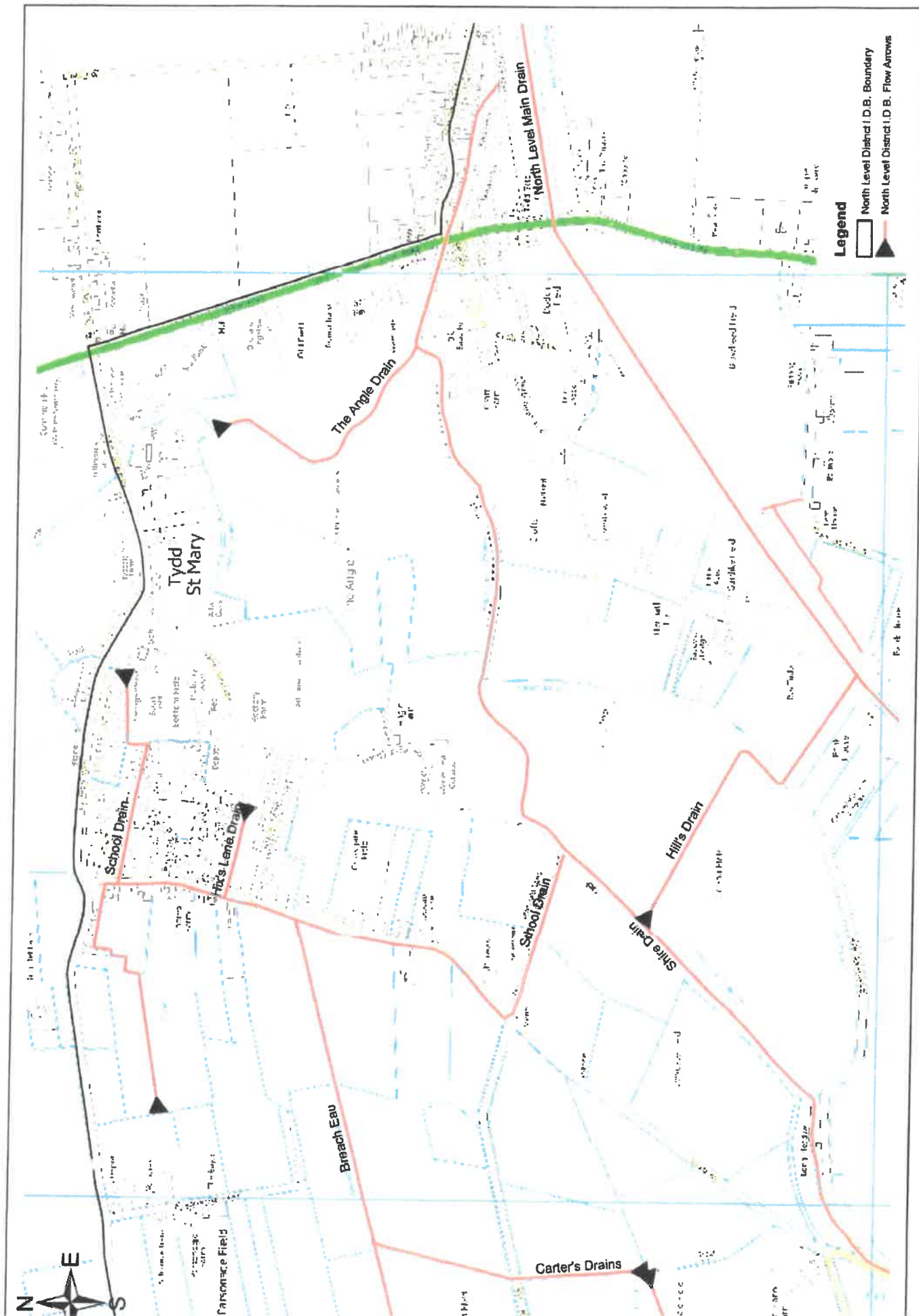
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Lincolnshire and Northamptonshire Tidal Breaching Hazard Mapping

Map Created on 17/04/2017

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