

FLOOD RISK ASSESSMENT

**PROPOSED SEASONAL AGRICULTURAL WORKERS
ACCOMMODATION
VICKERS FARM
WASHWAY ROAD
MOULTON SEAS END
SPALDING**



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April 2017 Version 1

FLOOD RISK ASSESSMENT FOR PROPOSED SEASONAL AGRICULTURAL WORKERS ACCOMMODATION, VICKERS FARM, MOUTON SEAS END, SPALDING.

INTRODUCTION

The Government has placed increasing priority on the need to take full account of the risks associated with flooding at all stages of the planning and development process. This seeks to reduce the future damage to property and the risk to life from incidents of flooding. Their expectations relating to flooding are contained in the National Planning Policy Framework March 2012, (NPPF), which identifies how the issue of flooding is dealt with in the drafting of planning policy and the consideration of planning applications by avoiding inappropriate development in areas at risk from flooding and to direct development away from areas at highest risk.

The NPPF provides that development in areas at risk of flooding should be avoided and seeks to direct development away from areas at highest risk. There is a sequential, risk-based approach to the location of development avoiding where possible, flood risk to people and property managing any residual risk, and taking account of the impacts of climate change.

The Environment Agency's flood maps show areas that are at risk, from fluvial and tidal flooding. These maps show the limits of the flood plain of the area which could be affected by flood events, over topping or breaching of flood defences. They are based on the approximate extent of floods with a 1% annual probability of exceedance (1 in 100-year flood) for rivers and 0.5% annual probability of exceedance (1 in 200-year flood) for coastal areas under present expectations or the highest known flood. However, they do not consider of the presence of defences or the likelihood that flood return intervals will be reduced by climate change.

This Flood Risk Assessment and Drainage Statement has been prepared in support of a planning application and considers the risk of flooding from fluvial and tidal sources in accordance with National Planning Policy Framework (NPPF). It also considers the risks of localised flooding due to inadequate Foul and Surface Water Sewers, Failure of Reservoirs, Water Main pipe bursts, Sewer Blockages, Pump Failures or High Ground Water Table etc.

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APPLICATION SITE

The site is located on land at Vickers Farm, Washway Road, Moulton Seas End, Spalding, PE12 6LP, within the administrative area of South Holland District Council. The National Grid Reference is TF33065 29751, the site area is 0.95 Ha. or thereabouts. **Plan 1**

This is a Full Planning Application for the stationing of 10 No Log cabins, 13 No static caravan accommodation close to Vickers Farm, Moulton Seas End, to house seasonal agricultural workers, employed by Naylor Flowers Ltd. The business grows cut flowers and potatoes on approximately 202 hectares of land in a 16km radius of Moulton Seas End. **Plans 2, 3 & 4**

The Site would be classed as Non-Major Development applying the National Planning Policy Guidance (NPPG) as the site is to be developed for less than 1 hectare.

The site lies approximately 2.95km from the primary sea defence embankments bordering “The River Welland” and 9.38km from “The Wash” estuary in an area that is protected from tidal flooding to a very high standard by the primary defences, maintained by the Environment Agency. These primary defences protect an extensive area of valuable fenland and numerous properties from flooding.

The rectangular-shaped, level site, set close to the “Vickers Farm” yard area, bordering the A 17, that provides access to and from the site, substantially surrounded by arable farmland that is predominantly utilised in connection with the applicant’s business.

The National Planning Policy Framework Technical Guidance NPPF defines three levels of flood risk depending upon the annual probability of fluvial flooding occurring.

Zone 1 – Low Probability (<0.1%)

Zone 2 – Medium Probability (0.1 – 1.0%)

Zone 3 – High Probability (>1.0%)

Flood Zone	Shading	Risk	Flood Risk Probability
1	Clear	Low	Less than 0.1% (1 in 1000 yrs)
2	Light blue	Medium	Rivers: between 1% (1 in 100 yrs) and 0.1% (1 in 1000 yrs) Sea: between 0.5% (1 in 200 yrs) and 0.1% (1 in 1000 yrs)
3	Dark Blue	High	Rivers: greater than 1% (1 in 100 yrs) Sea: greater than 0.5% (1 in 200 yrs)

The proposed development site is shown to be within Flood Zone 3a ‘High Probability’ as detailed on the Environment Agency’s Flood Zone Maps without defences, and as defined in Table 1 of NPPF. **Map1**

Table 1: Flood Zones Definition (Ignoring the presence of defences)

Flood Zone 3 – High Probability
<p>Definition</p> <p>This zone comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.</p> <p>Appropriate uses</p> <p>The water-compatible and less vulnerable uses of land (Table 2) are appropriate in this zone. The highly vulnerable uses should not be permitted in this zone. The more vulnerable uses and essential infrastructure should only be permitted in this zone if the Exception Test is passed. Essential infrastructure permitted in this zone should be designed and constructed to remain operational and safe for users in times of flood.</p> <p>Flood Risk Assessment requirements</p> <p>All development proposals in this zone should be accompanied by a Flood Risk Assessment.</p> <p>Policy aims</p> <p>In this zone, developers and Local Authorities should seek opportunities to:</p> <ul style="list-style-type: none"> • Reduce the overall level of flood risk in the area through the layout and form of the development and the appropriate application of sustainable drainage systems; • Relocate existing development to land in zones with a lower probability of flooding; and • Create space for flooding to occur by restoring functional floodplain and flood flow pathways and by identifying, allocating and safeguarding open space for flood storage.

Applying the Flood Risk Vulnerability Classification in Table 2 of NPPF the proposed residential is classified as “Highly Vulnerable” however, it is contended, that with the site use for the seasonal workers, not occupying the site from the 1st November to 31st January in the following year, the proposed residential use should be classified as “More Vulnerable”, with Table 1 of NPPF stating that such uses are appropriate in this zone. The residential units do not provide, or intended to provide, permanent residential accommodation, as defined in the “Highly Vulnerable” classification but are more in line with short lets as defined in the “More Vulnerable” classification. A Flood Warning and Evacuation Plan will be prepared. The site is also not affected by flooding from a breach to the tidal defences for the 1 in 200-year event for year 2115.

This seasonal variation in labour demand will mean that the accommodation will not be required during the time of year when a flooding incident is most likely. Accordingly, the requirement by the Environment Agency for this type of accommodation to be vacant during winter months can be complied with. The site is also not shown on the Breach Hazard maps for scenario year 2015, 1 in 200-year event to be affected by flooding

Table 2: Flood Risk Vulnerability Classification

Highly Vulnerable
<ul style="list-style-type: none"> • Police stations, ambulance stations and fire stations and command centres and telecommunications installations required to be operational during flooding. • Emergency dispersal points. • Basement dwellings. • Caravans, mobile homes and park homes intended for permanent residential use. • Installations requiring hazardous substances consent. (Where there is a demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities, or such installations with energy infrastructure or carbon capture and storage installations that require coastal or water-side locations, or need to be located in other high flood risk areas; in these instances the facilities should be classified as “essential infrastructure”).

More Vulnerable
<ul style="list-style-type: none"> • Hospitals. • Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels. • Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels. • Non-residential uses for health services, nurseries and educational establishments. • Landfill and sites used for waste management facilities for hazardous waste. • Sites used for holiday or short-let caravans and camping, subject to a specific warning and Evacuation Plan.

From the topographical survey the land levels for the residential units, which is reasonably flat, vary from 3.55mODN to 3.95mODN, with the road level on Washway Road, (A17), at the site entrance, at 3.84mODN.

Plan 5

Environment Agency

The Environment Agency has permissive powers for reducing the risk of flooding from designated main rivers and from the sea.

The following potential sources of flooding affecting the development site have been identified as:

- The River Welland and The Wash Estuary

The flood zone maps indicate that the area would be flooded without flood defences. The Flood Map indicates the area at risk of flooding, **assuming no flood defences exist**, for a flood event with a 0.5% chance of occurring in any year for flooding from the sea, or a 1% chance of occurring for fluvial (river) flooding. It also 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.

The Flood Map only indicates the extent and likelihood of flooding from rivers or the sea. It should also be remembered that flooding may occur from other sources such as surface water sewers, road drainage, etc.

In fenland areas, such as Moulton, this can give a slightly misleading picture in that if there were no flood defences the fens would revert to their natural wetland state, with water spreading out across the whole fens. This flooding would cover large areas of land but to relatively shallow depths and would leave the slightly higher land as isolated dry islands.

Flood defences are, however, present throughout the fenlands and these do reduce the risk of flooding. Whilst the defences are generally in a good condition there is always a chance they can be overtopped or fail during extreme floods. With the water level in the river being above the adjacent ground level a failure of the defence could lead to flooding spreading further than identified on the flood map.

These maps show that the site of the proposed development is within the extreme flood outline. The maps indicate that the area would be flooded without flood defences, which are in place along the river/ coastal edge (with an

annual probability of more than 0.5% i.e. return frequency of less than 1 in 200 years for tidal flooding or more than 1.33% return frequency of less than 1 in 100 years for fluvial flooding). **Map 1**

The risk of flooding from Rivers and Sea shows that the site is at a Low risk of flooding. Low means that each year this area has a chance of flooding less than 1 in 100 (1%) but greater or equal to 1 in 1000 (0.1%). This considers the effect of any flood defences that may be in this area. Flood defences reduce, but do not completely stop the chance of flooding as they can be overtopped or fail. **Map 2**

The majority of the site is not shown on the Surface Water flood maps to be affected by surface water flooding. Very low risk means that each year this area has a chance of flooding of less than 1 in 1000 (0.1%). Flooding from surface water is difficult to predict as rainfall location and volume are difficult to forecast. **Map 3**

River Welland

The River Welland is approximately 2950m to the north of the site. The flood defence to the right bank of the river consists of an earth embankment. The crest level, of the earth embankment is 7.46mODN and the 1% (1 in 200-year with Climate Change (2115) modelled level is circa 7.39mODN.

The risk of tidal flooding of the site is extremely low and would only occur following a rare combination of events such as a breach of the defences at the peak of an extreme tide surge event. A tide surge is dependent on a combination of extreme high tides and weather conditions.

Taking the precautionary approach, the Hazard Rating following a breach which in Flood Risk Assessment (FD2320) Guidance for New Development Phase 2 R & D Technical Report these are classified as low <0.75 moderate 0.75-1.25, significant 1.25-2.50 and extreme >2.50 based upon an empirical measure of velocity and depth.

$$HR = d \times (v + 0.5) + DF$$

Where V = Flood flow velocity (m/sec)

D = Flood depth (m)

DF = A debris factor included to represent the greater damage, or risk of injury to people, that can occur if debris is swept along with the water. = 0.5 for depths <0.25 or 1.0 for depths

Flood depth (m)	All areas (rural and urban)
≤ 0.25	0.5
> 0.25	1

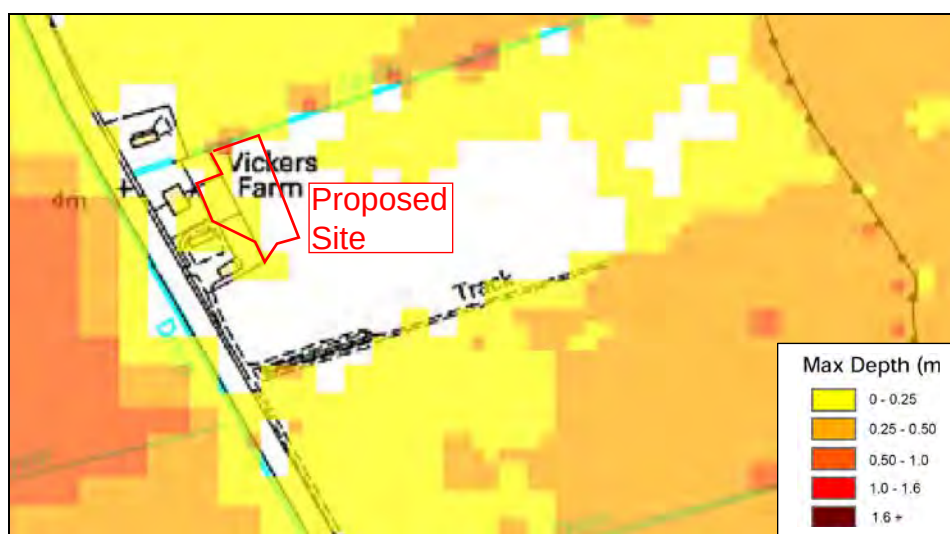
For the degree of Flood Hazard to be classified as low HR must be <0.75

Flood Hazard value	Degree of flood hazard	Description	Indicative depth range
< 0.75	Low	Caution 'Flood zone with shallow flowing water or deep standing water'	Up to 0.25 m
0.75 – 1.25	Moderate	Danger for some (i.e. children) 'Danger: flood zone with deep or fast flowing water'	Up to 0.5 m
1.25 – 2.0	Severe	Danger for most 'Danger: flood zone with deep fast flowing water'	0.5 m to 3 m
> 2.0	Extreme	Danger for all 'Extreme danger: flood zone with deep fast flowing water'	0.5 m to over 3 m

The Environment Agency has recently carried out a Tidal Hazard Mapping for the River Welland downstream of Fossdyke Bridge following a breach to the defences. The Northern Area Breach Tidal Hazard Maps (2009) for Scenario year 2006 for the 1 in 200-year event show that the site is not within a Hazard Rating area. With climate change up to year 2115 the maps show that the site is not within a Hazard Rating area for the 1 in 200-year event.

Map 4 shows the Hazard rating for the present day and **Map 5**; show the results for the 1 in 200-year event for scenario year 2115 taken from the Environment Agency Northern Area Tidal Hazard Mapping.

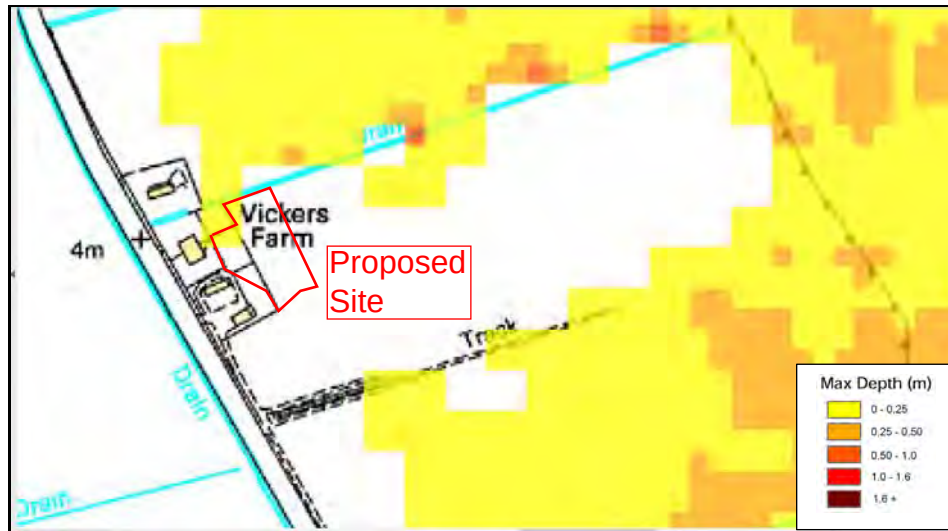
The Northern Area Breach Tidal Hazard Maps (2009) for Scenario year 2006 for the 1 in 1000-year event show that the site is not within a Hazard Rating area. With climate change up to year 2115 the maps show that a small part of the site is within a Hazard Rating area of less than 0.75 (Low Hazard) the remainder not affected. The maximum depth for the affected area is 0 – 0.25m and the velocity 0 – 0.3m/sec.



Extract from Tidal Breach Depth Map 2115 1 in 1000-year event.

The Environment Agency has also produced maps based on computer modelling of simulated overtopping of defences along the coastline for specific tidal scenarios. The maps only consider the consequences of overtopping of defences and do not show the possible consequences of breaches of the tidal defences. For future climate change scenarios, it is assumed that the defences remain at 2006 heights. These maps for the simulated overtopping relate only to the main coastal defences.

For the scenario years 2006 and 2115 the 1 in 200-year and 1 in 1000-year annual chance from overtopping, the site is not affected. For the scenario years 2006, the 1 in 1000-year annual chance from overtopping, the site is not affected. With climate change up to year 2115 the maps show that a small part of the site is within a Hazard Rating area of less than 0.75 (Low Hazard) the remainder not affected. The maximum depth for the affected area is 0 – 0.25m and the velocity 0 – 0.3m/sec.



Extract from Tidal Over-Topping Depth Map 2115 1 in 1000-year event

The minimum mitigation measures required for developments that do have any ground floor sleeping shall be determined by the flood depths arising from the 2115 0.1% breach scenario. The finished floor level (FFL) of any new residential units shall be informed by the flood depths. For flood depths between 0. – 0.25m deep the FFL shall be set at a minimum of 300mm above the ground level. The proposed units are designed to be 600mm above the ground level.

Following the changes to climate changes for river flows in Table 3 issued 19 February 2016 it is considered, that due to the distance from the flooding source (2.95Km) and with the FFL being 600mm above the ground level, that this is sufficient to prevent any flooding of the proposed log cabins and static caravans from the increases in the climate change allowances.

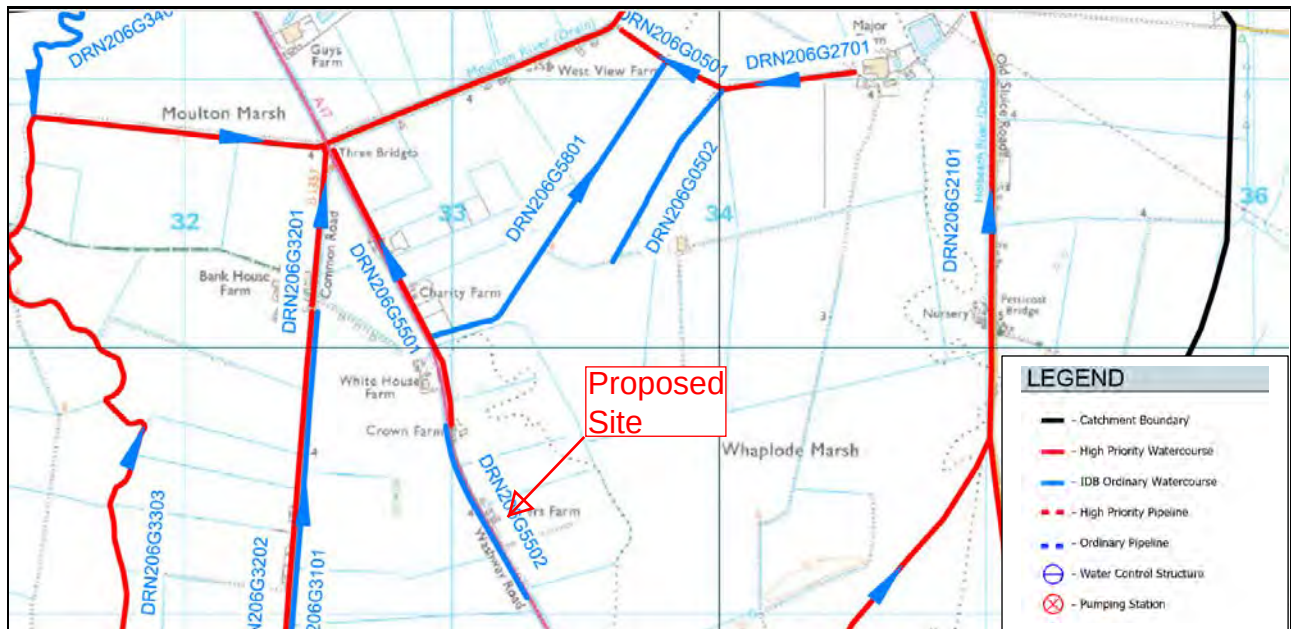
With the main risk to flooding of the site being tidal flooding following a breach to the tidal defences, any flooding from fluvial flooding sources has been mitigated against.

South Holland Internal Drainage Board

The proposed development site is located within the catchment area of South Holland Internal Drainage Board.

The Board are responsible to operate and maintain the arterial fluvial system.

The site lies within the Board's Holbeach River N catchment. The Board maintain the watercourse ref DRN206G5502 the west of the site which is known as P55 Washway Road, length 820m, which flows northwards to eventually discharge into the River Welland.



Extract from South Holland IDB Drainage Map

South Holland District Council

In order to inform the process of risk assessment and site selection the District Council commissioned Haskoning UK Ltd Consultants to prepare a Strategic Flood Risk Assessment in December 2002. They have carried out an update of this report and this report was published in January 2010 and this was further updated in February 2017.

This Flood Risk Assessment has taken the results of the latest Environment Agency Tidal Hazard mapping, into account in its findings.

The whole of the tidal flooding information has been replaced by the mapping from the latest Environment Agency Tidal Hazard mapping. Where the mapping for an area contains both fluvial and tidal components, the more severe of the two has been presented.

FLOODING FROM OTHER SOURCES

Flooding is a natural process and can happen at any time from sources other than watercourses and the sea.

- Flooding from land can occur from intense rainfall, often over short duration of time that is unable to soak into the ground or enter the drainage system. However, with the natural topographic nature of the ground being flat, with no high ground around the site this will not cause any rapid inundation of the site and is likely only lead to local ponding of shallow depth and low velocity following the natural land contours which fall away to the east of the site. Flooding from this source is limited to minor isolated cases and is not of strategic significance with regards to flood risk.

- The area is not known to suffer from any groundwater problems and therefore is taken as having no strategic significance with regards to flood risk.
- Flooding from sewers can occur from over loading from heavy rainfall caused by blockages or having inadequate capacity. However, with the natural topographic nature of the ground being flat, with no high ground around the site this will not cause any rapid inundation of the site and is likely only lead to local ponding of shallow depth and low velocity following the natural land contours, which fall away to the east of the site. Flooding from this source is limited to minor isolated cases and is not of strategic significance with regards to flood risk.
- Non-natural or artificial sources of flooding such as reservoirs, lakes or canals where water is stored above natural ground level could cause flooding if the structure fails or is over topped. There are no known sources within the vicinity of the site.

RESIDUAL RISKS

There is always a possibility of a flood more than that allowed for which might conceivably cause some flooding to the properties. However, such an event would have a very low probability and the risk of flooding to the property would be extremely small. It is therefore considered that the residual risks associated with flooding are not significant.

SEQUENTIAL APPROACH

When applying the sequential approach for flood risk in accordance NPPF the site of the barn would fall into Flood Zone 3 (High Probability) as the site is shown to be within the fluvial flood plain as shown on the Environment Agency's Flood Map without defences in place.

The Environment Agency categorise land into one of three Flood Zones.

- Flood Zone 1 is land outside the 0.1% floodplain (with a chance of flooding of less than 0.1% chance in any given year);
- Flood Zone 2 is land that falls between the 1 in 100-year extent and the 1 in 1000-year extent (a chance of flooding between 1% and 0.1% in any given year);
- Flood Zone 3a is land which falls within the 1 in 100-year flood extent (has a 1% chance of a flood occurring in any given year).

Applying the Flood Risk Vulnerability Classification in Table 2 of NPPF, the proposed development for residential use is classified as, "More Vulnerable" with Table 1 of NPPF stating that such uses are appropriate in Flood Zone 2 (as summarised in Table 3 NPPF).

TABLE 3: Flood risk vulnerability and flood zones 'compatibility'

Flood risk vulnerability classification		Essential infrastructure	Water compatible	Highly vulnerable	More vulnerable	Less vulnerable
Flood Zone	Flood Zone 1	✓	✓	✓	✓	✓
	Flood Zone 2	✓	✓	Exception Test required	✓	✓
	Flood Zone 3a	Exception Test required	✓	✗	Exception Test required	✓
	Flood Zone 3b Functional Floodplain	Exception Test required	✓	✗	✗	✗

NPPF Guidance Paragraphs 100 - 104 requires development within high areas of flood risk be determined using a sequential risk based approach to the location of development to avoid where possible flood risk to people and property and manage any residual risk, taking account the impacts of climate change.

Sequential Test

The aim of the Sequential Test is to steer new development to areas with the lowest probability of flooding. The NPPF states that development should not be permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower probability of flooding. It is important to note that the Sequential Test does not specifically mean that sites such as this cannot be developed, rather that sites at less risk should be developed first.

The Sequential Test will be defined by local circumstances relating to the catchment area for the development., when applying the Sequential Test a pragmatic approach on the availability of alternative sites should be taken in considering for example, planning applications for extensions of existing business premises such as farm holdings, where it might be impracticable to suggest that there are more suitable alternative locations for that development elsewhere

In this case, the farm business is centred on the land of approximately 202 hectares owned and farmed by the applicant and to consider areas outside the farm holding of would not be practical.

This seasonal variation in labour demand will mean that the accommodation will not be required during the time of year when a flooding incident is most likely. Accordingly, the requirement by the Environment Agency for this type of accommodation to be vacant during winter months can be complied with.

The whole of the farm holding is at a similar level within a Flood Zone 3a area, the chosen site for the residential units has been located on higher ground adjacent to the farmhouse.

The Exception Test

The next step is to assess the proposal in relation to the Exception Test, and this requires the development to:

- provide wider sustainability benefits to the community that outweigh the flood risk,
- a site-specific FRA should demonstrate the proposal would be safe and not increase the risk of flooding elsewhere.

In relation to the first element, it has been demonstrated that this proposed development is in connection with a farm holding and that the development is required to provide accommodation for the seasonal workers employed by the applicant.

In relation to the second part this Flood Risk Assessment demonstrates that the proposal is safe in terms of flood risk and would not increase the risk of flooding elsewhere. The floor level of the proposed living units is raised 600mm, which ensures that this would be set above the likely 1 in 1000- year breach flood level.

CLIMATE CHANGE

Global warming is now recognised that it is likely to affect the frequency and severity of extreme events as both tidal and fluvial flooding. The Climate change allowances in the NPPF Guidance was updated on the 19th February 2016.

The site is located within the Humber River Basin, for sites within Flood Zone 2 and for “More vulnerable” land uses the Higher Central and Central river flow allowances figures in Table 1 should be used.

Table 1 Peak river flow allowances by river basin district (1961 to 1990 baseline)				
River basin District	Allowance category	Total potential change anticipated for '2020s' (2015 to 2039)	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%

The effect of global warming on peak rainfall allowances is given in Table 2

Table 2 Peak rainfall intensity allowance in small and urban catchments (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%

The annual sea rise due to climate change is given in NPPF and the recommended contingency allowances are stated in Table 3.

Table 3 Peak sea level allowance for each epoch in (mm) per year with cumulative sea level rise for each epoch in brackets (use 1990 baseline)					
Area of England) (Use River Basin maps	1990 to 2025	2026 to 2050	2051 to 2080	2081 to 2115	Cumulative Rise 1990 to 2115 (m)
East, Midlands, London, South East	4 (140mm)	8.5 (212.5mm)	12 (360mm)	15 (525mm)	1.24m

Using the climate change allowances for Peak Sea Level Allowances in Table 3.

From Northern Area, Tidal Modal Analysis (June 2006) **Map 6**

Peak tide levels Present Day (2006) at Fosdyke Bridge (Tidal River) 0.5% (1 in 200) = 5.99mODN

Peak tide levels (2115) at Fosdyke Bridge (Tidal River) 0.5% (1 in 200) = 5.99mODN plus climate change of 1141mm taken from Climate Change Allowances Table 3 = 7.13mODN

DRAINAGE STATEMENT

Construction on any undeveloped area has the potential to increase the rates and volumes of surface water run-off, due to the replacement of pervious land with impervious surfaces.

All new accesses and parking areas will be constructed using permeable materials i.e. hardcore topped with stone chippings/gravel. Roof water from the proposed residential units and the office will be discharged to soakaways designed to BRE Digest 365.

Foul Water

The new foul drainage from the proposed residential units will be connected into a new foul drainage system within the site, which will be connected to an appropriate sized foul water package treatment unit.

FLOOD PROTECTION

Any impact of damage to the properties can be foreseen and mitigated against by relatively simple design and construction techniques. There are two forms of flood protection works: -

- **Flood-resistance or proofing works:** - these try to reduce the amount of water entering a building.
- **Flood-resilient works:** - these reduce the amount of damage caused by water entering the building.

The proposed residential units will have the following resilient measures incorporated in the construction in accordance with "Improving the flood performance of new buildings" CLG (2007).

- The units will be located on concrete pads, with the units securely anchored by chains to the pad.

- The units, by their construction, offer a natural ground clearance of approximately 600mm.
- Arrange for all service circuits to be routed at high level where practical socket outlets, boilers etc. to be a minimum of 0.5m above the ground floor level of the residential units and office.
- As this site is in an area that can receive flood warnings from the Environment Agency Floodline Warning Direct system. It is recommended that the property Owner contact the Environment Agency's Floodline on 0845 988 1188 to register the property to receive advance warnings of flooding by telephone, mobile, fax, SMS text, email or pager. The Environment Agency aim to issue a 'severe flood warning' approximately 2 hours before existing defences are overtopped.

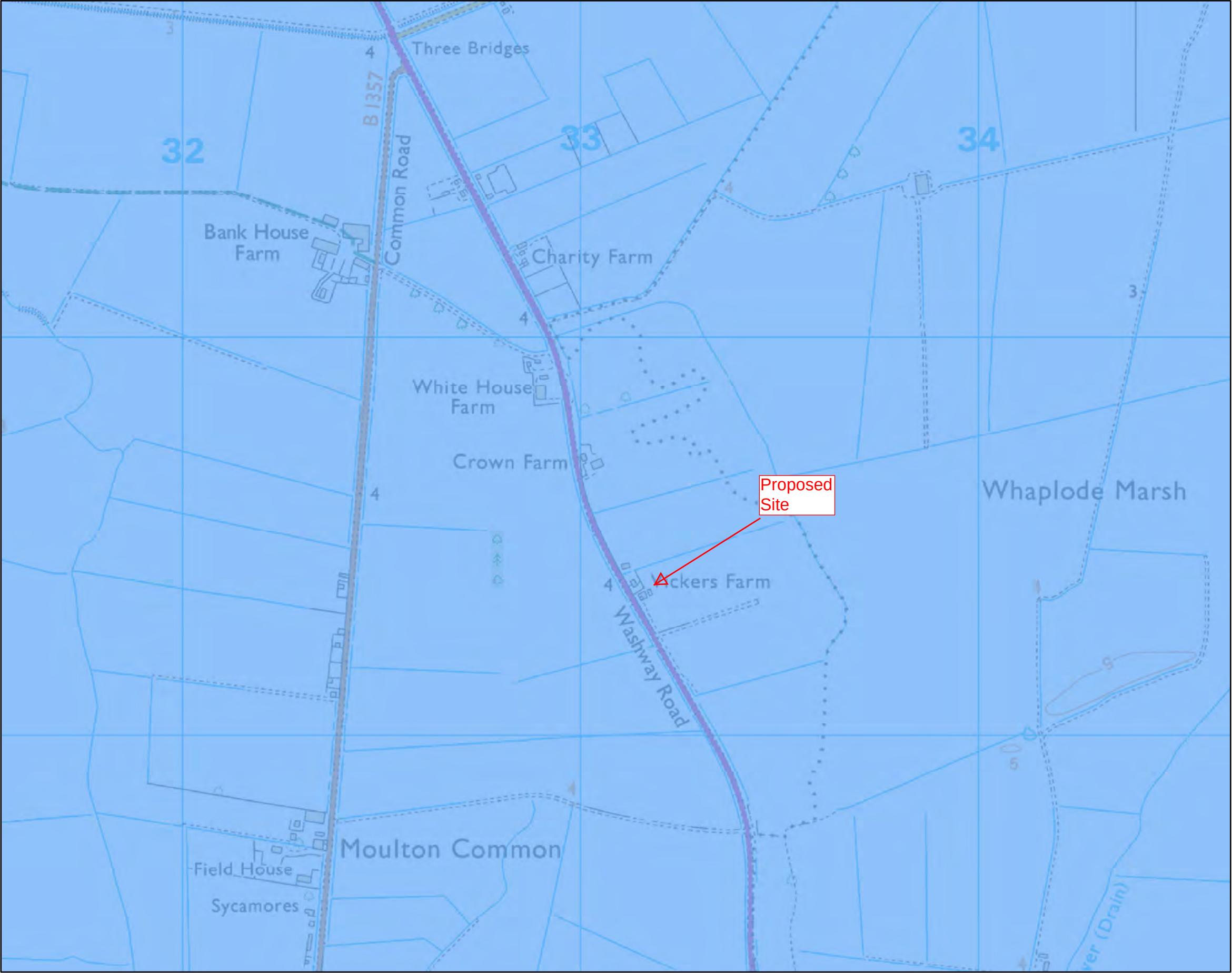
CONCLUSION

- o The site for the proposed site is located within Flood Zone 3a– “High Probability” risk of flooding if no flood defences existed.
- o The site is protected from flooding by the presence of flood defences provided to the River Welland and to the Wash Estuary. The tidal defences protecting this site consist of earth embankments. They are in good condition and provide protection against a flood event with a 0.67% chance of occurring in any year (1 in 150). The Environment Agency inspect these defences regularly to ensure that any potential defects are identified early. The Breach Hazard Map 1 in 200-year event, scenario year 2006 & 2115, shows that the site is not affected from a breach to the flood banks. For the 1 in 1000-year event 2115 the majority of the site is not affected from a breach, with an area flooded to a depth between 0 -0.25m
- o The ground floor level, of the proposed residential units are set 600mm above the ground level, which are above the predicted flood level following a breach to the tidal defences.
- o Applying the Flood Risk Vulnerability Classification in Table 2 of NPPF. The proposed use of the land and buildings for residential use falls within the ‘Highly Vulnerable’ uses of land shown in Table 2 Flood Risk Vulnerability Classification. Applying the Flood Risk Vulnerability Classification in Table 2 of NPPF the proposed residential is classified as “Highly Vulnerable” however, it is contended, that with the site use for the seasonal workers, not occupying the site from the 1st November to 31st January in the following year, the proposed residential use should be classified as “More Vulnerable”, with Table 1 of NPPF stating that such uses are appropriate in this zone. The residential units do not provide, or intended to provide, permanent residential accommodation, as defined in the “Highly Vulnerable” classification but are more in line with short lets as defined in the “More Vulnerable” classification.
- o A Flood Warning and Evacuation Plan will be prepared. The site is also not affected by flooding from a breach to the tidal defences for the 1 in 200-year event for year 2115.
- o No obvious constraints have been identified that may impact the proposed development and the type of mitigation measures that can be used to reduce the flood risk.

APPENDIX

Map 1	Environment Agency Flood Plain Map.
Map 2	Flooding from Rivers and Sea Map
Map 3	Surface Water Flood Map
Map 4	Northern Area Tidal Breach Hazard Mapping 2006 1 in 200-year event
Map 5	Northern Area Tidal Breach Hazard Mapping 2115 1 in 200-year event
Map 6	Northern Area Tidal Model Analysis Map
Plan 1	Location Plan
Plan 2	Site layout
Plan 3	Proposed Log Cabin Details.
Plan 4	Proposed Static Caravan Details.
Plan 5	Topographical Survey

Basic FRA Map centred on TF3309029625 - created December 2016 [Ref: CCN-2016-30754]





Scale 1:10,000



- Main River
- 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, Lincoln

 Flood risk from rivers or the sea

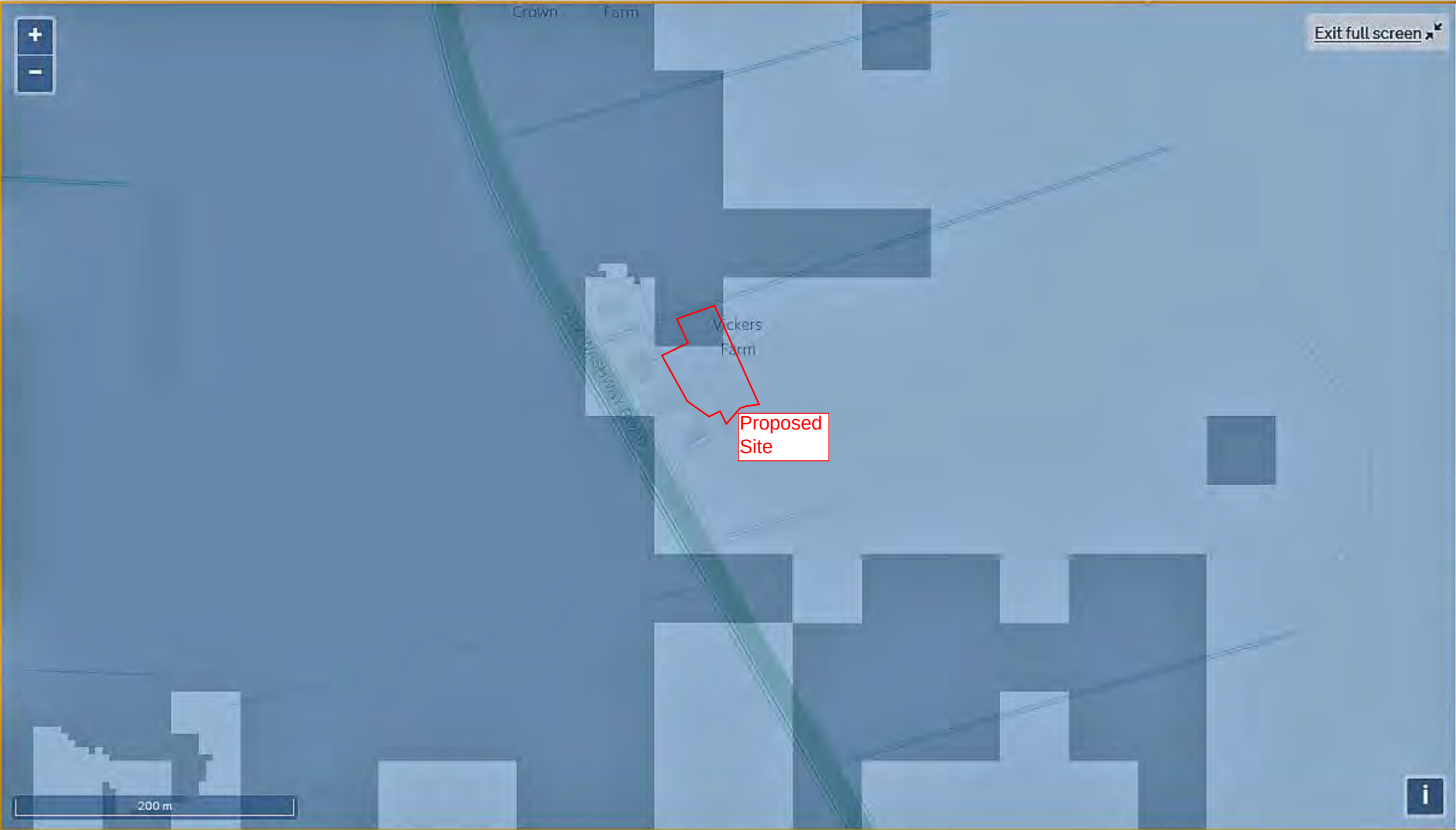
- ☒ Extent of flooding
- ☐ Depth and flow estimates at monitoring stations

 Flood risk from surface water

- ☐ Extent of flooding
- ☐ High risk: depth
- ☐ High risk: velocity
- ☐ Medium risk: depth
- ☐ Medium risk: velocity
- ☐ Low risk: depth
- ☐ Low risk: velocity

 Flood risk from reservoirs

- ☐ Extent of flooding
- ☐ Flood depth
- ☐ Flood speed



Flood risk



High



Medium



Low



Very low



Location of the postcode you entered



 Flood risk from rivers or the sea

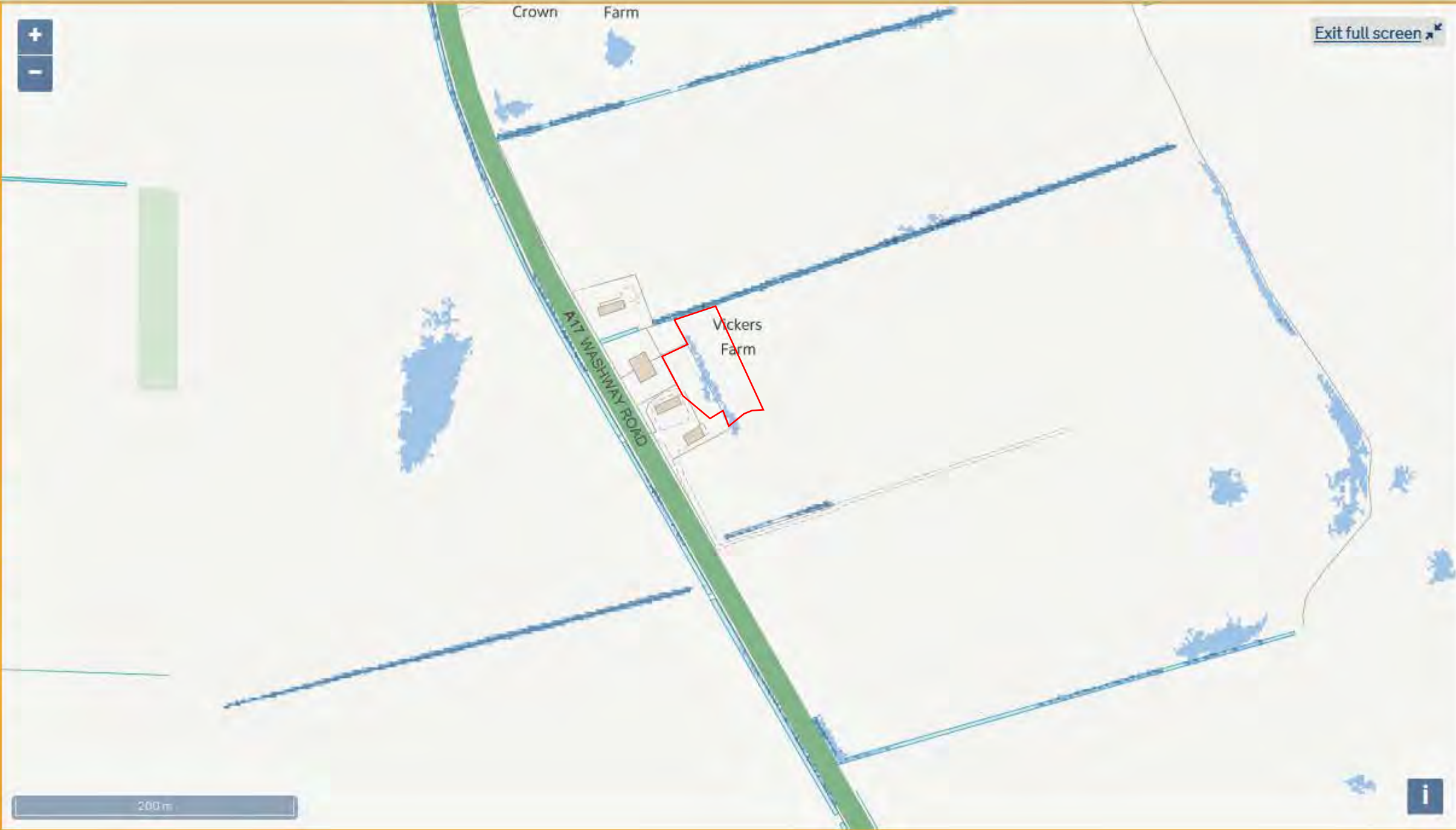
- ☐ Extent of flooding
- ☐ Depth and flow estimates at monitoring stations

 Flood risk from surface water

- ☐ Extent of flooding
- ☐ High risk: depth
- ☐ High risk: velocity
- ☐ Medium risk: depth
- ☐ Medium risk: velocity
- ☒ Low risk: depth
- ☐ Low risk: velocity

 Flood risk from reservoirs

- ☐ Extent of flooding
- ☐ Flood depth
- ☐ Flood speed



Low risk scenario

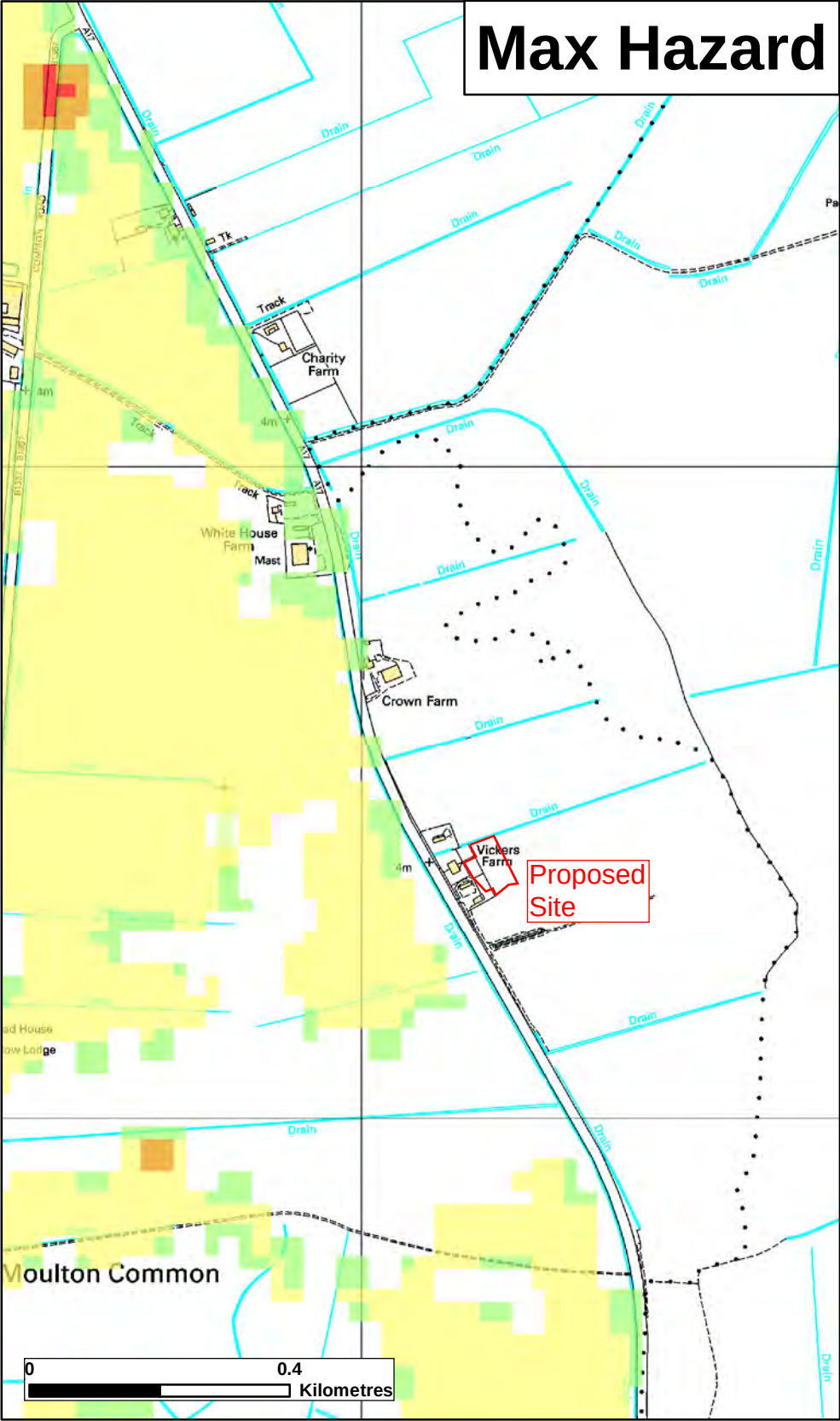
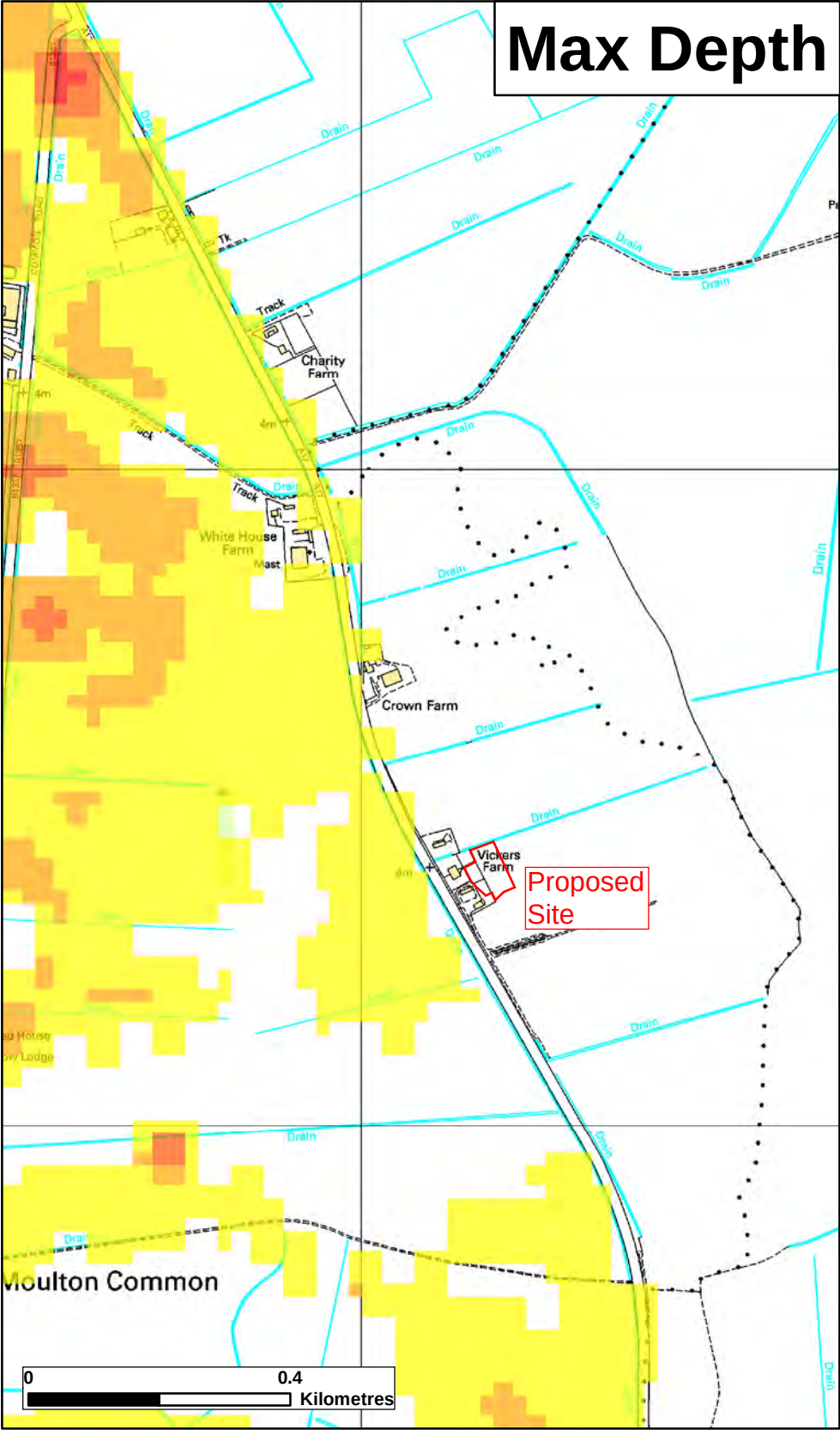
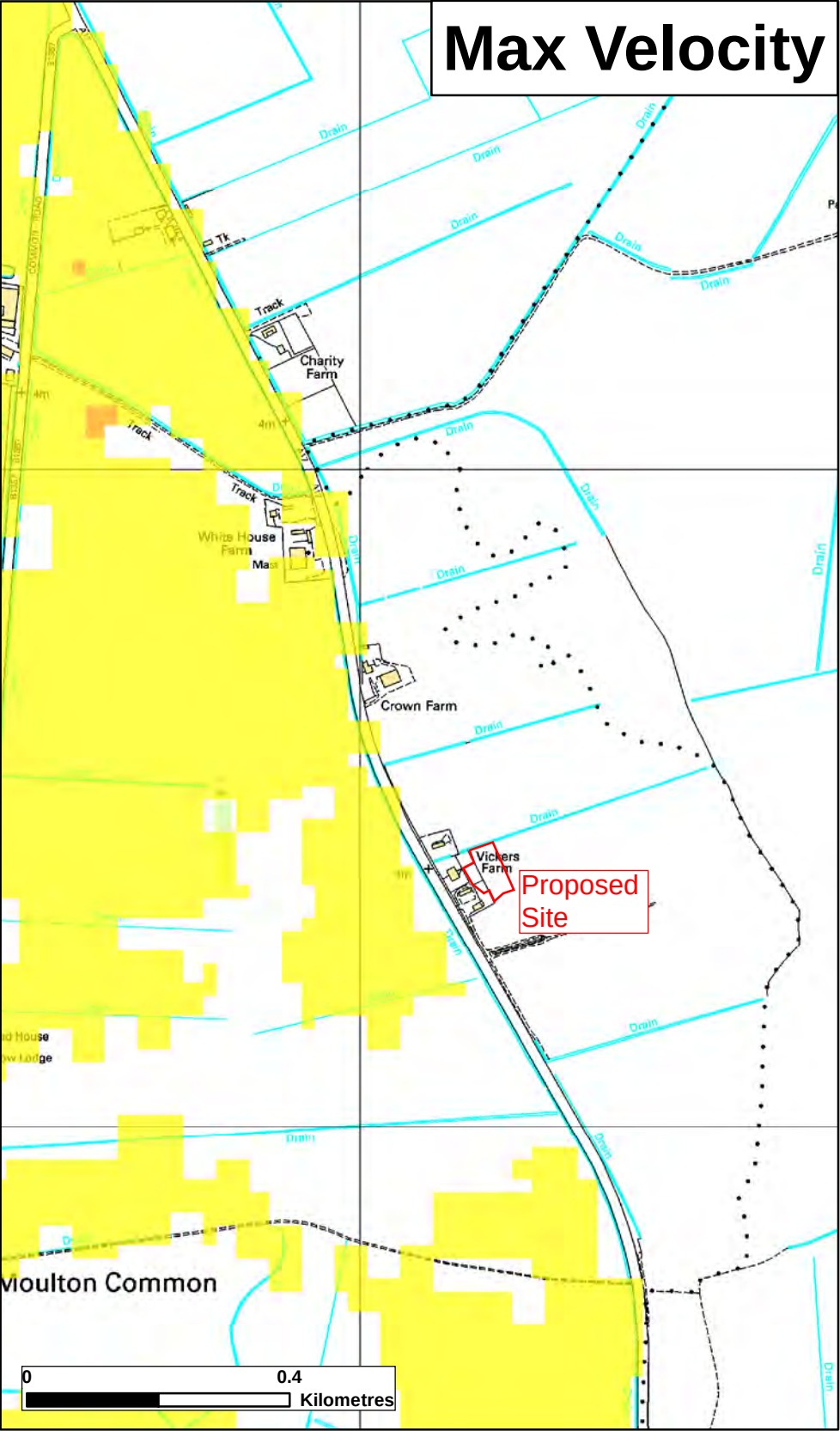
Flood depth (millimetres)

 Over 900mm

 300 to 900mm

 Below 300mm

 Location of the postcode you entered



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

Max Hazard (Flood Risk to People : FD2320)	Max Depth (m)	Max Velocity (m/s)
Less than 0.75 (Low Hazard)	0 - 0.25	0 - 0.3
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 - 1.6	1.5 - 2.5
	1.6 +	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 506 506. Weekday Daytime calls cost 5p plus up to 6p per minute from BT Weekend Unlimited. Mobile and other providers' charges may vary

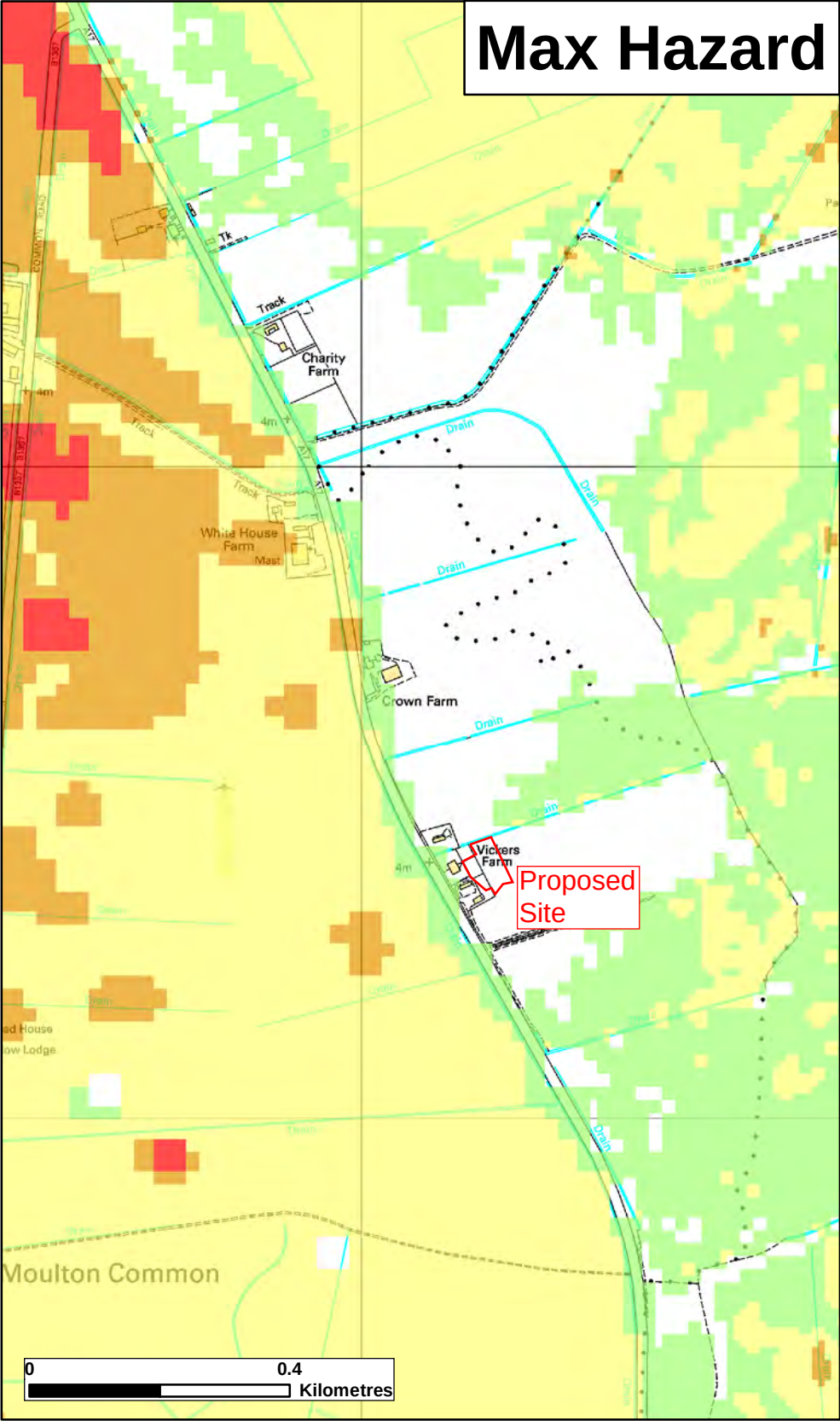
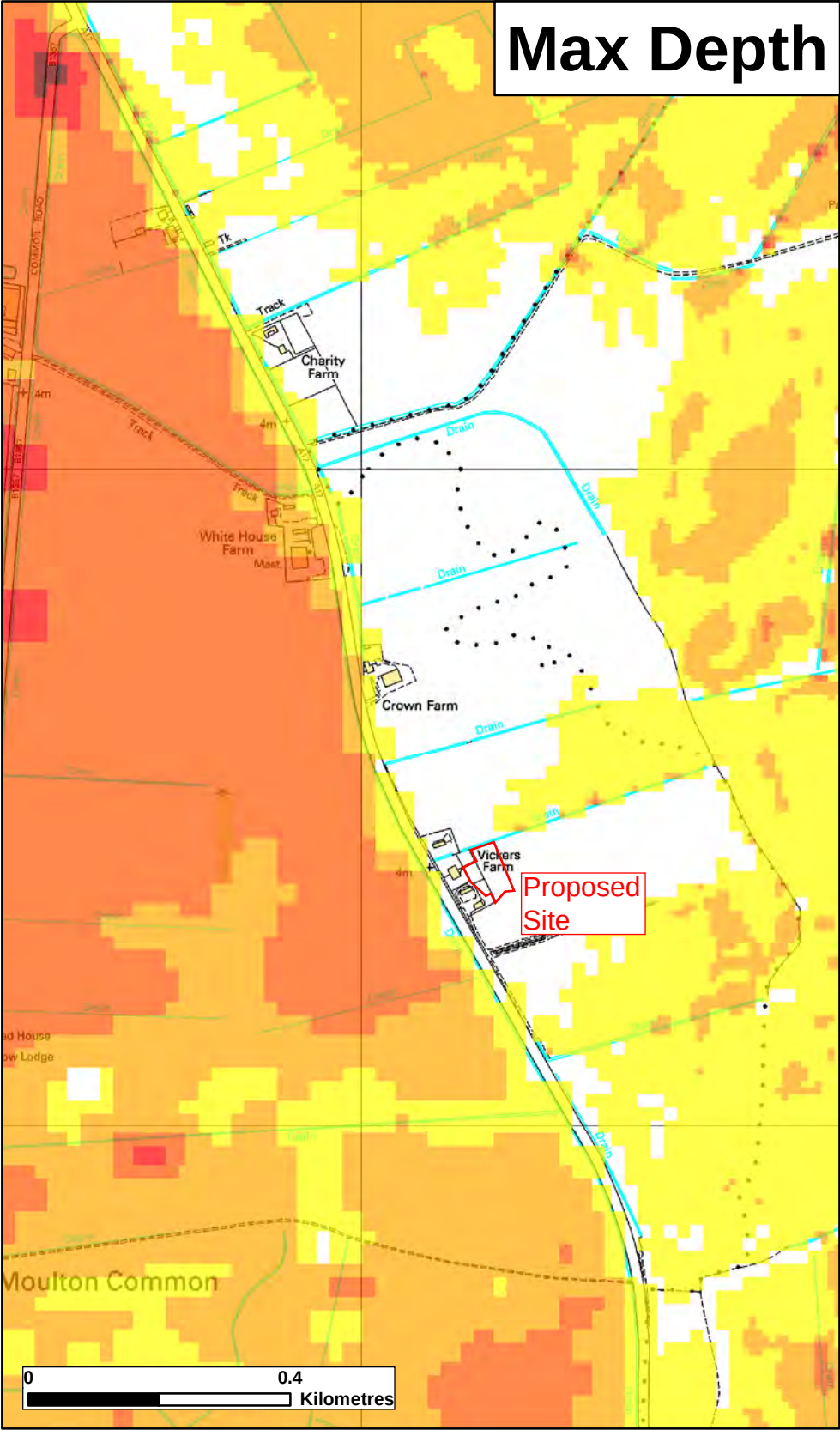
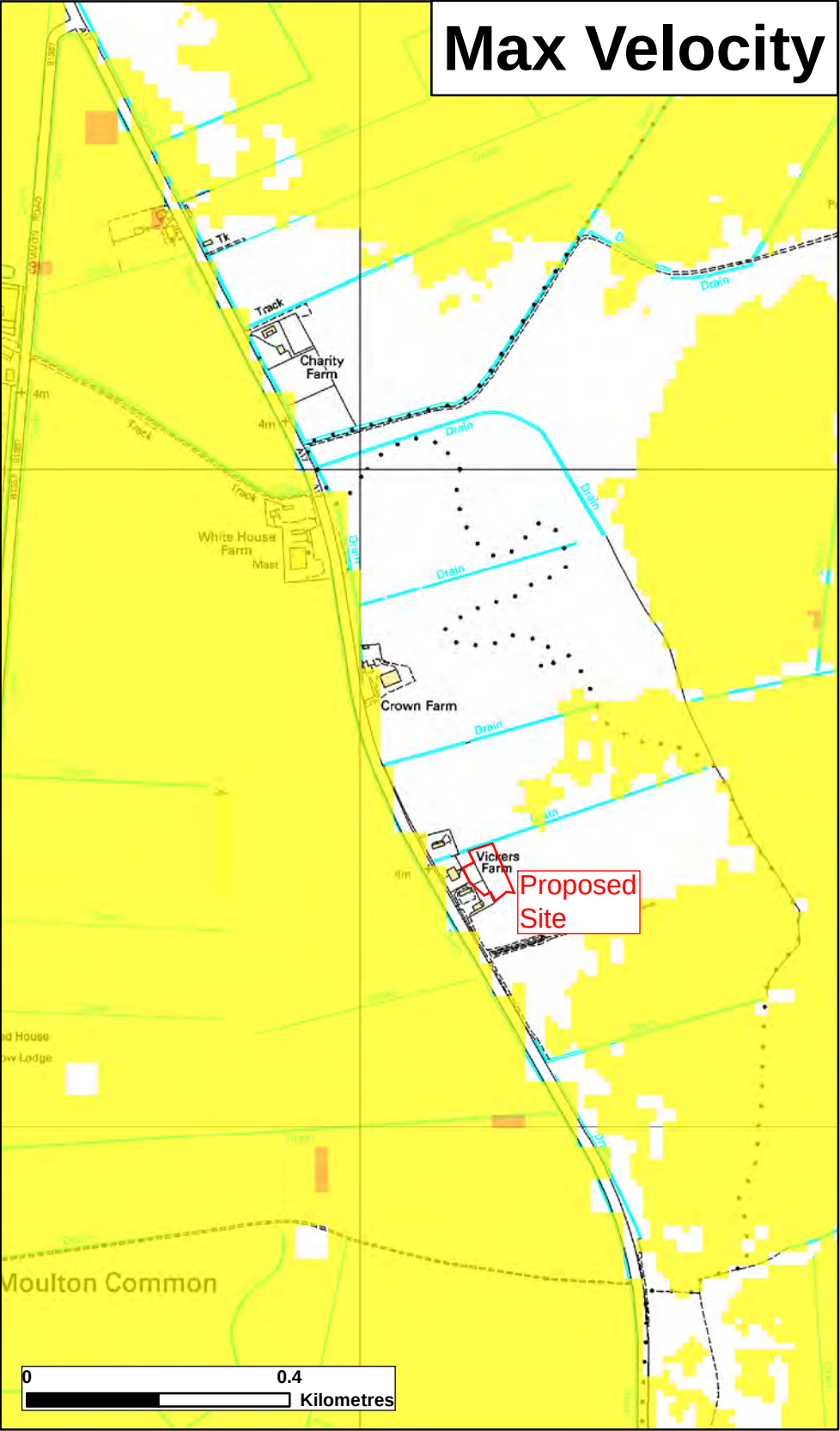
**Lincolnshire and Northamptonshire
Tidal Breaching Hazard
Mapping**

Map Centred on TF3309029625

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Date Printed	December 2016	Scenario year	2006	Scenario Annual Chance	0.5% (1 in 200)	CCN Number	CCN-2016-30754
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Map 4



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

Max Hazard (Flood Risk to People : FD2320)	Max Depth (m)	Max Velocity (m/s)
<div></div> Less than 0.75 (Low Hazard)	<div></div> 0 - 0.25	<div></div> 0 - 0.3
<div></div> Between 0.75 and 1.25 (Danger for Some)	<div></div> 0.25 - 0.50	<div></div> 0.3 - 1.0
<div></div> Between 1.25 and 2.0 (Danger for Most)	<div></div> 0.50 - 1.0	<div></div> 1.0 - 1.5
<div></div> Greater than 2.0 (Danger for All)	<div></div> 1.0 - 1.6	<div></div> 1.5 - 2.5
	<div></div> 1.6 +	<div></div> 2.5 +

Date Printed December 2016

Scenario year 2115

Scenario Annual Chance 0.5%
(1 in 200)

CCN Number CCN-2016-30754

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.

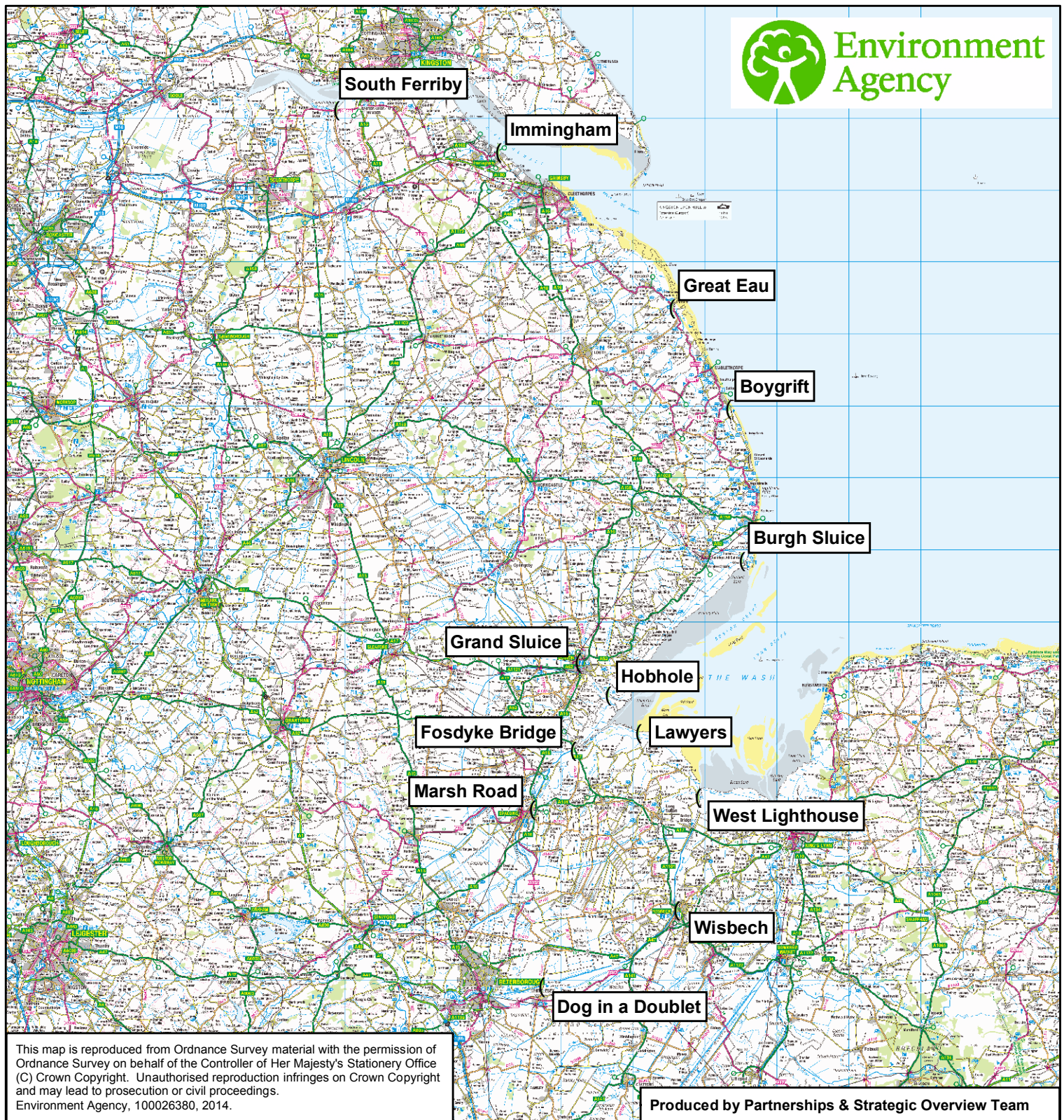
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**Lincolnshire and Northamptonshire
Tidal Breaching Hazard
Mapping**

Map Centred on TF3309029625

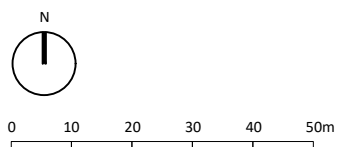
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Still Water Tidal Levels mODN - Tidal Model Analysis 2006

Location	Easting	Northing	100% (1 in 1)	10% (1 in 10)	4% (1 in 25)	2% (1 in 50)	1% (1 in 100)	0.5% (1 in 200)	0.1% (1 in 1000)
South Ferriby									
Immingham									
Great Eau	545500	393800	3.80	4.19	4.34	4.46	4.57	4.69	4.96
Boygriff	553300	379800	3.84	4.24	4.41	4.53	4.65	4.77	5.05
Burgh Sluice	555190	358620	4.26	4.45	4.63	4.76	4.90	5.03	5.34
Hobhole	536610	339940	4.82	5.30	5.49	5.64	5.78	5.93	6.27
Lawyers	540750	334550	4.84	5.32	5.51	5.66	5.80	5.95	6.29
West Lighthouse	549150	325750	4.88	5.37	5.57	5.71	5.86	6.01	6.35
Grand Sluice	532400	344500	4.88	5.33	5.51	5.65	5.78	5.93	~
Fosdyke Bridge	531700	332200	4.91	5.38	5.56	5.71	5.85	5.99	~
Marsh Road	526000	324000	5.04	5.44	5.60	5.73	5.85	5.98	~
Wisbech	546100	310000	4.83	5.25	5.41	5.53	5.66	5.78	~
Dog in a Doublet	527300	299300	3.67	4.00	4.13	4.22	4.32	4.42	~

Ordinance Survey Map
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Rev	By	Notes	Date
<div>  <div> <p>32 High Street, Helpingham © Sleaford, Lincolnshire NG34 0RA</p> <p>Tel: 01529 421646 Fax: 01529 421358 Email: admin@rdc-landplan.co.uk Web: www.rdc-landplan.co.uk</p> </div> </div>			
Client Naylor Flowers Limited			
Project Proposed workers accommodation			
Drawing title Location Plan			
Drawing No 1246-1_SK_LP01		Rev -	Drawn WW
Scale 1:1250 @ A3		Date 23.03.17	Checked LMS

Notes

Measurements
All measurements should be checked against on site conditions and any discrepancies should be brought to the attention of the Robert Doughty Consultancy.

Ordnance Survey Map
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CDM 2015
This drawing is for illustrative purposes and/or obtaining the relevant planning permission only. It should not be used for construction and accordingly, risk identification under the Construction (Design & Management) Regulations 2015 has not been undertaken.



Rev	By	Notes	Date
<div><div><div>rdc</div><div>Robert Doughty Consultancy</div></div><div>32 High Street, Helpringham © Sleaford, Lincolnshire NG34 0RA Tel: 01529 421646 Fax: 01529 421358 Email: admin@rdc-landplan.co.uk Web: www.rdc-landplan.co.uk</div></div>			
Client Naylor Flowers Limited			
Project Proposed agricultural workers accommodation			
Drawing title Proposed block plan			
Drawing No 1246-1_SK_BP01	Rev -	Drawn WW	
Scale 1:500 @ A2	Date 24.03.17	Checked LMS	

Measurements

Ordnance Survey Map

CDM 2015

Rev	By	Notes	Date
<div>  <div> <p>32 High Street, Helpingham Sleaford, Lincolnshire NG34 0RA</p> <p>Tel: 01529 421646 Fax: 01529 421358 Email: admin@rdc-landplan.co.uk Web: www.rdc-landplan.co.uk</p> </div> </div>			
Client Naylor Flowers Limited			
Project Proposed workers accommodation			
Drawing title Cabin elevations & plans			
Drawing No 1246-1_SK_GA01	Rev -	Drawn WW	
Scale 1:100 @ A3	Date 23.03.17	Checked LMS	

Measurements

Ordnance Survey Map

CDM 2015

