

FLOOD RISK ASSESSMENT

Proposed Residential Development

Lumley Fields

Skegness

RM ASSOCIATES

10 Main Street
Thorpe on the Hill
Lincoln
LN6 9BG
Tel 01522 681728
Mobile 07967 304737
Email: ray.rmassociates@gmail.com
June 2020 Version 1

RMA

CONTENTS

	Page
Introduction	3
Application Site	3
Development Proposal	3
Flood Zone Definition	4
Flood Risk Vulnerability	4
Site Levels	4
Drainage Authorities	5
Environment Agency	5
Flood Zones	5
River & Sea Flooding	5
Breach Analysis	6
Hazard Ratings	6
East Lindsey District Council	7
Lindsey Marsh Internal Drainage Board	8
Surface Water Flooding	9
Flooding from Other Sources	9
Pluvial	9
Groundwater	9
Sewers	9
Reservoirs	10
Historic Flooding	10
Sequential Approach	10
Sequential & Exception Test	10
Climate Change	11
River Flow Allowances	11
Peak Rainfall Intensity Allowances	11
Sea level Allowances	11
Ground Conditions	12
British Geological Survey Superficial Deposits Map	13
British Geological Survey Bedrock Map	13
Drainage Statement	13
Surface Water Drainage	13
Foul Water Drainage	15
Flood protection	15
Conclusions	16
Figures	
Map 1	Environment Agency Flood Map.
Map 2	Risk of Flooding from Rivers & Sea Map
Map 3	Lincolnshire & Northamptonshire Area Tidal Model Analysis Map
Map 4	Environment Agency Breach Hazard Map 2006
Map 5	Environment Agency Breach Hazard Map 2115
Map 6	Environment Agency Overtopping Map 2006.
Map 7	Environment Agency Overtopping Map 2115.
Map 8	Surface Water Flood Map
Map 9	Historic Flood Map
Plan 1	Location Plan
Plan 2	Site Plan & Topographical Survey

FLOOD RISK ASSESSMENT FOR RESIDENTIAL DEVELOPMENT LUMLEY FIELDS, SKEGNESS.

INTRODUCTION

The Government has placed increasing priority on the need to take full account of the risk 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 Feb 2019, (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.

This document has been prepared solely as a flood risk assessment and drainage statement on behalf of the client, Manorcrest Homes Ltd. RM Associates accepts no responsibility or liability for any use of this document other than by the client, for the purposes for which it was originally commissioned and prepared. If any unauthorised Third Party comes into possession of this report; they rely on it at their own risk and RM Associates owe them no duty of care or skill. All comments contained in this report, including any conclusions are based upon information available at the time of writing the report. RM Associates accepts no liability if additional information exists or becomes available after the time of writing this report. This document is the copyright of RM Associates. The reproduction or transmission of all or part of this document, whether by photocopying or storing in any medium by electronic means or otherwise, without the prior written consent of RM Associates is prohibited.

This report contains public sector information licensed under the Open Government Licence v3.0.

APPLICATION SITE

The site is located at Lumley Fields, Skegness within the administrative area of East Lindsey District Council. The National Grid Reference at the centre is TF 55828 65096 and the site area is 9.92 Ha or thereabouts.

Plan 1

This flood risk assessment has been prepared for a planning application for residential development. **Plan 2**

The Site would be classed as Major Development applying the National Planning Policy Guidance (NPPG) as the site is to be developed for more than 10 dwellings.

The National Planning Policy Guidance (NPPG) 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%)

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

Table 1: Flood Zones Definition

Flood Zone 3- High Probability
<p>Definition 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>The water-compatible and less vulnerable uses of land are appropriate in this zone. The highly vulnerable uses should not be permitted in this zone. The more vulnerable and essential infrastructure uses 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 uses in times of flood</p> <p>Flood Risk Assessments requirements All proposals in this zone should be accompanied by a Flood Risk Assessment.</p> <p>Policy aims 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 techniques; • relocate existing development to land with a lower probability of flooding; • create space for flooding to occur by allocating and safeguarding open space for flood storage.

Applying the Flood Risk Vulnerability Classification in Table 2 of NPPG, the proposed residential use for the site is classified as “More Vulnerable,” Table 1 of NPPG states that such uses are permitted in this zone subject to the exception test.

Table 2: Flood Risk Vulnerability Classification

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 caravan and camping, subject to a specific warning and Evacuation Plan.

The site is situated at land to the north of Beacon Park Drive and west of Churchill Avenue Skegness. The site has an area totalling 0.92 Hectares or thereabouts. The topographical survey reveals that the site is

reasonably flat with levels varying from 2.50mODn in the southern part to a low area of 1.70mODN. Belton Park Road is circa 1.65m ODN and David Drive is circa 2.00mODN. **Plan 2**

DRAINAGE AUTHORITIES

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 has been identified as:

- From the East Coast
- Lindsey Marsh IDB watercourses

There are no fluvial Main Rivers in the vicinity of the site.

The Flood Zone Maps identify river catchments over 3 sq. km. These maps are a theoretical estimate of areas of land that could be inundated by floodwater during a flooding event was it not for the presence of flood defences. In practice, current standards of protection would result in flood envelopes substantially less than shown by these maps. The maps make no allowance for local site-specific features.

The Flood Map represents areas at risk of flooding for present day only and does not take account of climate change. The tidal defences consist of earth embankments and concrete floodwalls which are supplemented by beach nourishment to maintain foreshore levels. They are in good condition and reduce the risk of flooding to a 0.5% (1 in 200) chance of occurring in any year. The Environment Agency inspect these defences routinely to ensure potential defects are identified.

These maps indicate that the area would be flooded without flood defences, which are in place along the coast (with an annual probability of more than 0.5% return frequency of less than 1 in 200 years for tidal flooding). The proposed development site is shown to be within Flood Zone3 'High Probability' **Map 1**

The Environment Agency Risk of flooding from Rivers and Sea Map shows that the site is at a Low risk of flooding **Low risk** means that each year this area has a chance of flooding of between 0.1% and 1%. This takes into account the effect of any flood defences in the area. This takes into account the effect of any flood defences in the area. These defences reduce but do not completely stop the chance of flooding as they can be overtopped or fail. **Map 2**

In this area the main risk of flooding is from a breach to the tidal defences along the coastline that could affect the site, and these are approximately 1390m to the east of the site.

Coastal flooding may be caused by seasonal high tides such as those driven by the spring neap tide cycle,

storm surges and where increase in water level above the astronomical tide level is created by strong on shore winds or by storm driven wave action and a deep atmospheric low pressure. Extreme conditions leading to coastal flooding are most commonly a result of a combination of two or more of these mechanisms.

Breach Analysis to East Coast Tidal Defences

From Lincolnshire & Northamptonshire Area Tidal Modal Analysis Map 3

Peak tide levels Present Day (2006) the tide level is 5.05mODN at Burgh Sluice.

Peak tide levels (2115) tide level a is 5.05mODN plus climate change of 1143mm would be 6.19mODN.

Taking the precautionary approach, the Hazard Rating following a breach which in Flood Risk Assessment (FD 2320) 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.

Flood Hazard		Description
<0.75	Low	Caution – Flood Zone with shallow flowing water or deep standing water.
0.75 – 1.25	Moderate	Danger for Some - (i.e. children) Danger Flood Zone with deep or fast flowing water.
1.25 – 2.0	Significant	Danger for Most – Danger Flood Zone with deep fast flowing water.
>2.0	Extreme	Danger for All – Extreme Danger Flood Zone with deep fast flowing water.

HR = d x (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.

The Environment Agency has prepared Tidal Hazard Mapping for the East Coast following a breach to the sea defences. The Lincolnshire & Northamptonshire Area Tidal Hazard Maps for Scenario year 2006 for the 1 in 200-year event show that the site is within a Hazard Rating Area greater than 2 (Danger for All), depth 1.0 – 1.6m and velocity 0.3 – 1.0m/sec. With climate change, up to year 2115 the 1 in 200-year scenario maps show that the site is within a Hazard Rating Area greater than 2.0 (Danger for All), depth 1.6+m and velocity 0.3 – 1.0m/sec.

Map 4 shows the results for the hazard rating, depth, and velocity for The East Coast, for scenario year 2006.

Map 5 shows the results for the hazard rating, depth, and velocity for The East Coast, for scenario year 2115 taken from the Environment Agency Lincolnshire & Northamptonshire Area Tidal Breach Hazard Mapping.

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. The outputs are based on computer modelling of simulated overtopping of the main coastal defences for specific tidal scenarios. They do not include overtopping along the following tidal rivers which are currently being investigated the Witham Haven upstream of Hobhole and Welland upstream of Fosseydyke Bridge.

For the scenario year 2006 the 1 in 200-year annual chance from overtopping, the site is not affected.

Map 6.

With climate change for scenario year 2115 the 1 in 200-year annual over-topping the site is within a Hazard area of Greater than 2.0 (Danger for All), depth, 1.0 – 1.6+m and velocity of 0.3 – 1.5m/sec. **Map 7**

The Environment Agency recommends that appropriate mitigation measures / flood resilience techniques are incorporated in the design of the development. For proposals for single storey developments or developments that include ground floor sleeping accommodation they should be informed by the flood depths arising from the 2115 0.1% breach scenario. Any proposals that do not include ground floor sleeping the proposal can be informed by the flood depths arising from the 2115 0.5% breach scenario. For areas where depths of flooding are 1.6m+ it is unlikely that mitigation measures can be taken to prevent flood water entering the building at ground floor level. The proposals must be a minimum of two storeys with no ground floor habitable accommodation. The first floor must be above the highest predicted flood level.

It is proposed that the ground floor for the residential development will be in accordance with the Environment Agency's recommendations with no ground floor habitable accommodation. The proposed properties will be a mixture of 2, 2½ and 3 storey.

East Lindsey District Council

East Lindsey District Council appointed JBA Consulting to prepare a Strategic Flood Risk Assessment for the whole District. This was updated by the Council in 2017

The Environment Agency Flood Hazard Maps categorise the degree of risk from tidal flooding as Danger to All, Danger to Most, Danger to Some and Low Risk. That distinction will provide an initial, sequential test to guide any future development that is deemed necessary to sustain the communities along the coast.

To that end the Hazard Maps will be used in accordance with Council policy. The levels of danger categorised by the Hazard Mapping is also used to provide the basis for establishing a risk minimisation strategy within that area.

The Environment Agency Hazard maps have been used in this assessment.

Lindsey Marsh Drainage Board

The proposed development site is located within the catchment area of the Lindsey Marsh Drainage Board. The Board is therefore responsible to operate and maintain the arterial fluvial system. The whole of the area has a network of drains/ dykes which connect into the Board's drainage system, which play a significant part of the local drainage

The Lindsey Marsh IDB aims to maintain their drains to a standard of flood protection of between 1 in 10 years (10%) for agricultural land and 1 in 75 years (1.3%) for urban areas.



The site has IDB maintained watercourses along the eastern and northern boundary of the site.

The Board's prior written consent will be required for any of the following works:

- No person without the previous consent of the Board shall erect any building or structure, whether temporary or permanent, or plant any tree, shrub, willow or other similar growth within 9 metres of the landward toe of the bank where there is an embankment or wall or within 9 metres of the top of the batter where there is no embankment or wall, or where the watercourse is enclosed within 9 metres of the enclosing structure.
- No person shall, without the previous consent of the Board, for any purpose, by means of any channel, siphon, pipeline or sluice or by any other means whatsoever, introduce any water into the District or, whether directly or indirectly, increase the flow or volume of water in any watercourse in the District.

- The erection or alteration of any mill dam, weir or other like obstruction to the flow, or erection or alteration of any culvert within the channel of a riparian watercourse.

When planning approval has been obtained an application to discharge the attenuated surface water into the Drain will be submitted to the Board.

SURFACE WATER FLOODING

The Surface Water, Low Risk Scenario, Flood Depth Map (1 in 1000-year) indicates that the existing site is generally at Very Low risk from surface water flooding. Very low risk means that each year this area has a chance of flooding of less than 0.1%. Flooding from surface water is difficult to predict as rainfall location and volume are difficult to forecast. **Map 8**

Unlike the fluvial mapping, which is based on a detailed hydraulic model, this mapping is based purely on applying rainfall to a digital terrain model. As such this mapping serves to represent a worst-case scenario which may well overstate the actual probability of flooding in this area.

There is a caveat on the Defra Data website, as to the use of these maps and that they are not to be used to identify that an individual property will flood. Because of the way they have been produced and the fact that they are indicative, these maps are not appropriate to act as the sole evidence for any specific planning or regulatory decision or assessment of risk in relation to flooding at any scale without further supporting studies or evidence.

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. It is concluded that flooding from this source is limited to minor isolated cases and is not of strategic significance as regards to flood risk.
- The area is not known to suffer from any groundwater problems.
- 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. It is concluded that

flooding from this source is limited to minor isolated cases and is not of strategic significance as 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 other known facilities close by which would affect the site.

HISTORIC FLOODING

The site is shown on the historic flooding map not to have been affected by the 1953 flood event. **Map 9**

SEQUENTIAL APPROACH

When applying the sequential approach for flood risk in accordance with NPPF the site would fall into Flood Zone 3a High Probability as the site is shown to be within the tidal flood plain as shown on the Environment Agency’s Flood Map without defences in place.

The proposed use for residential use is classified as “More Vulnerable” uses of land Table 3 Flood Risk Vulnerability Classification and Table 1 shows that developments of this nature are permitted in Zone 3a is restricted based on Table 3 of NPPG replicated below.

Table 3: Flood risk vulnerability and flood zone ‘compatibility’

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	✓	✗	✗	✗

Sequential Test and Exceptions Test

NPPF Guidance Paragraphs 155 - 165 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.

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.

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 Anglian River Basin, for sites within Flood Zone3 and for “More Vulnerable” land uses the Upper End and Higher Central Peak 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 to2039)	Total potential change anticipated for '2050s' (2040 to2069)	Total potential change anticipated for '2080s' (2070 to2115)
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 to1990 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

Higher Central

Base year 2006 – 2035 @ 5.8mm/year (29 years x 5.8mm) = 783mm

2036 – 2055 @ 8.7mm/year (30 years x 8.7) = 261mm

2066 – 2095 @ 11.6mm/year (30 years x 11.6) = 348mm

2096 – 2120 @ 13mm/year (24 years x 13) = 312mm

Overall total = **1089mm**

Peak tide levels Present Day (2006) at Burgh Sluice 0.5% (1 in 200) = 5.05mODN and for year 2120 = 6.14mODN.

Upper End

Base year 2006 – 2035 @ 7mm/year (29 years x 7mm) = 168mm

2036 – 2055 @ 11.3mm/year (30 years x 11.3) = 339mm

2066 – 2095 @ 15.8mm/year (30 years x 15.8) = 474mm

2096 – 2120 @ 18.1mm/year (24 years x 18.1) = 434mm

Overall total = **1415mm**

Peak tide levels Present Day (2006) at Burgh Sluice 0.5% (1 in 200) = 5.05mODN and for year 2120 = 6.47mODN

The current Hazard Mapping has a Base year 2006 – 2115

Base year 2006 – 2025 @ 4mm/year (29 years x 4mm) = 96mm

2026 – 2050 @ 85mm/year (30 years x 8.7) = 212.5mm

2051 – 2080 @ 11.6mm/year (30 years x 12) = 360mm

2091 – 2115 @ 15mm/year (24 years x 15) = 525mm

Overall total = **1194mm**

Peak tide levels Present Day (2006) at Burgh Sluice 0.5% (1 in 200) = 5.05mODN and for year 2115 Higher Central) = 6.24mODN

It is therefore concluded, that until the Environment Agency undertake new modelling for the Coastal Hazard Mapping, that the present-day breach mapping can be used for determining finished floor levels for residential development which is 1.39Km distant from the defences.

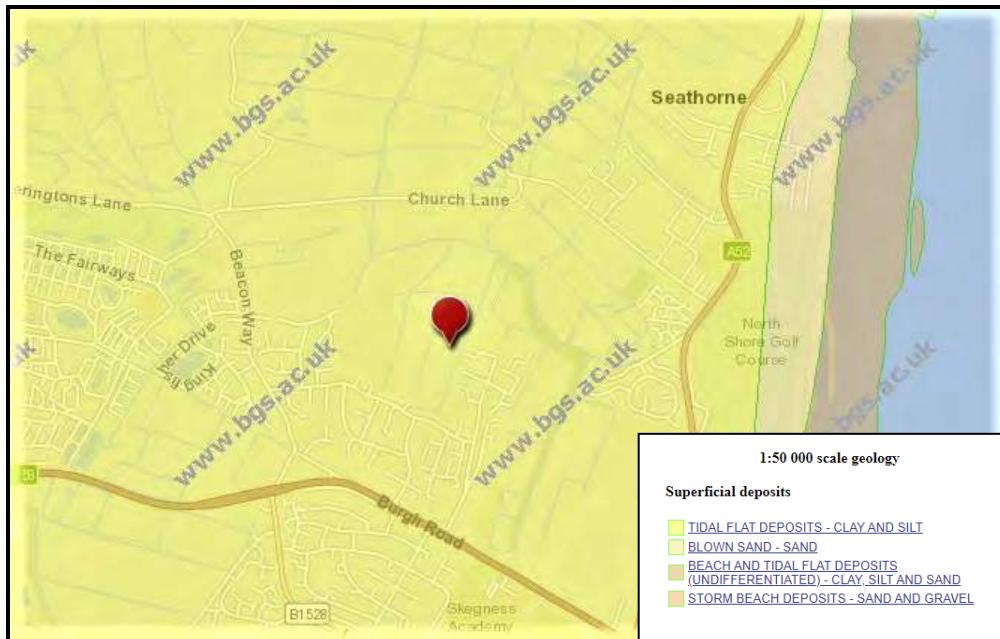
With the main risk of flooding affecting the site being from the tidal source and the development has been designed to cater for the 1 in 200-year climate change from Table 3 for scenario year 2115. Any flooding caused by fluvial flooding has therefore been mitigated against.

GROUND CONDITIONS

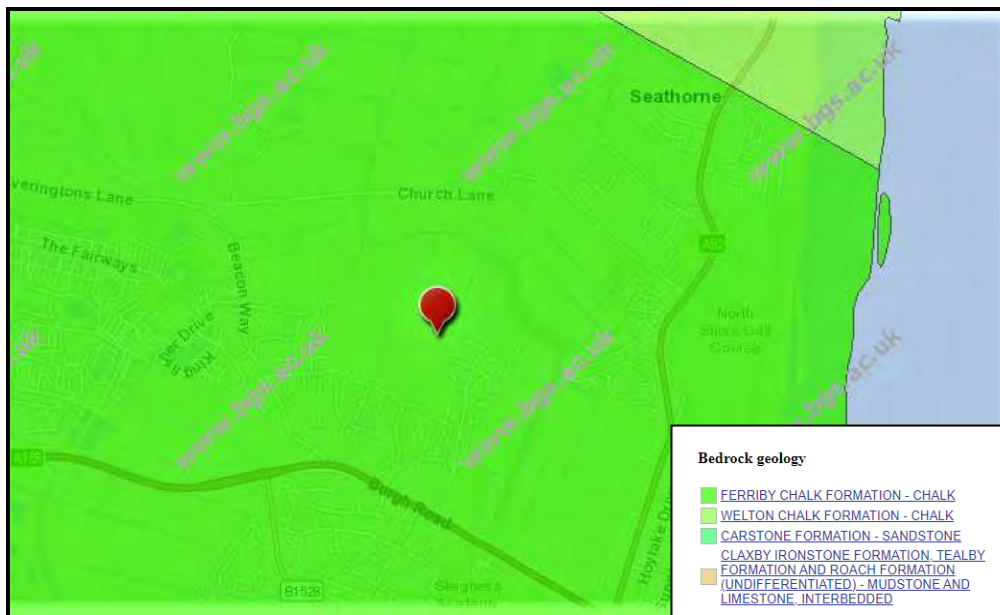
No ground investigation has been carried out on the site, however a desk top study of the British Geological Survey maps for the area around the site shows that the Superficial Deposits are Tidal Flat Deposits Clay & Silt overlaying bedrock of Ferriby Chalk Formation - Chalk as shown on the maps below.

From these maps, the underlying soil conditions shown are relatively impermeable, therefore the infiltration rate may be too low for soakaways to be designed to adequately cope with large storm events from the entire site. It is therefore considered that soakaways will **not be a viable option for dealing with surface water**

from the site.



Extract from BGS Superficial Map



Extract from BGS Bedrock Map

DRAINAGE STATEMENT

Surface Water Drainage

A Drainage Strategy will be prepared by qualified engineers and it is proposed to utilise attenuation techniques to reduce the storm water discharge from the proposed development and to minimise the impact of the development on the surrounding area and to comply with guidelines, which require at least one workable solution for managing surface water. The detailed road and sewer design for the entire development would proceed, following receipt of planning approval

The proposal includes for the construction of adoptable access roads, which are to be accessed from existing accesses into the site,) serving a mixture of detached, semidetached, and terraced 2, 3, 4 and 5-bed houses together with domestic curtilage permeable individual and communal driveways and parking courtyards.

In accordance with recognised guidance, Part H of the Building Regulations 2010 and National Planning Policy Framework, there is a hierarchy of where surface water should discharge. This hierarchy should be followed where practicable, and is as follows: -

- 1) Infiltration
- 2) Watercourse
- 3) Public sewer

Infiltration

There are no proposals for any surface water to discharge by infiltration due to the findings from British Geology Maps. If ground investigation proves that the ground is suitable for infiltration the roof water from the houses will discharge to soakaways designed in accordance with BRE Digest 365.

Watercourse

According to the topographical survey there is an existing shallow field drain running along the eastern boundary of the development.

Surface water from the adoptable roads (which will comprise one footway to the high side and a single cross-fall carriageway) will shed directly into a 300mm deep adjacent under-drained swale to the low side, providing highway water with an initial treatment stage, with domestic curtilage roof areas and domestic curtilage permeable individual and communal driveways and parking courtyards being collected along the way, connected in to the perforated under-drain pipework.

Roof water will be collected in underground pipes, where required, within domestic curtilage with silt traps incorporated prior to connecting to adjacent permeable paved individual driveways wherever practicable by way of proprietary diffusers which in turn are connected to the under-drained swale. Where roof water. This provides an "on-plot" source control treatment stage for all domestic curtilage runoff prior to entering the adoptable system. An on-line surface water detention and attenuation balancing pond provides additional storage and a second treatment stage at the flow control location. A hydrobrake flow control device attenuates flows down to the Qbar for the site which is significantly less than the permitted discharge rates for 2-year, 30 year and up to the 1:100 year plus 40% climate change standard. Flows in excess of these figures are stored in the online detention and attenuation balancing pond where they are stored for a period of time before draining back down again to normal water level.

Public Sewer

There are no proposals for any surface water to discharge to public sewer.

Foul Water Drainage

Foul water drainage from the proposed properties will be collected in underground pipes and chambers and connected into the proposed adoptable sewerage network for the development which will connect either by gravity or by pumping into the Anglian Water Sewers serving the surrounding area. A Section 106 application will be made to Anglian Water for the connection to the sewer. A Section 104 agreement for the adoption of the sewers will also be made. Anglian Water Services Ltd now have an obligation to accept flows in accordance with their new zonal charging policy.

As there is a positive drainage system capable of receiving flows from the development there is no likely impact on neighbouring property.

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 development will have the following resilient measures incorporated in the construction of the ground floor area to aid a quick recovery after a flood, in accordance with "Improving the flood performance of new buildings" CLG (2007).

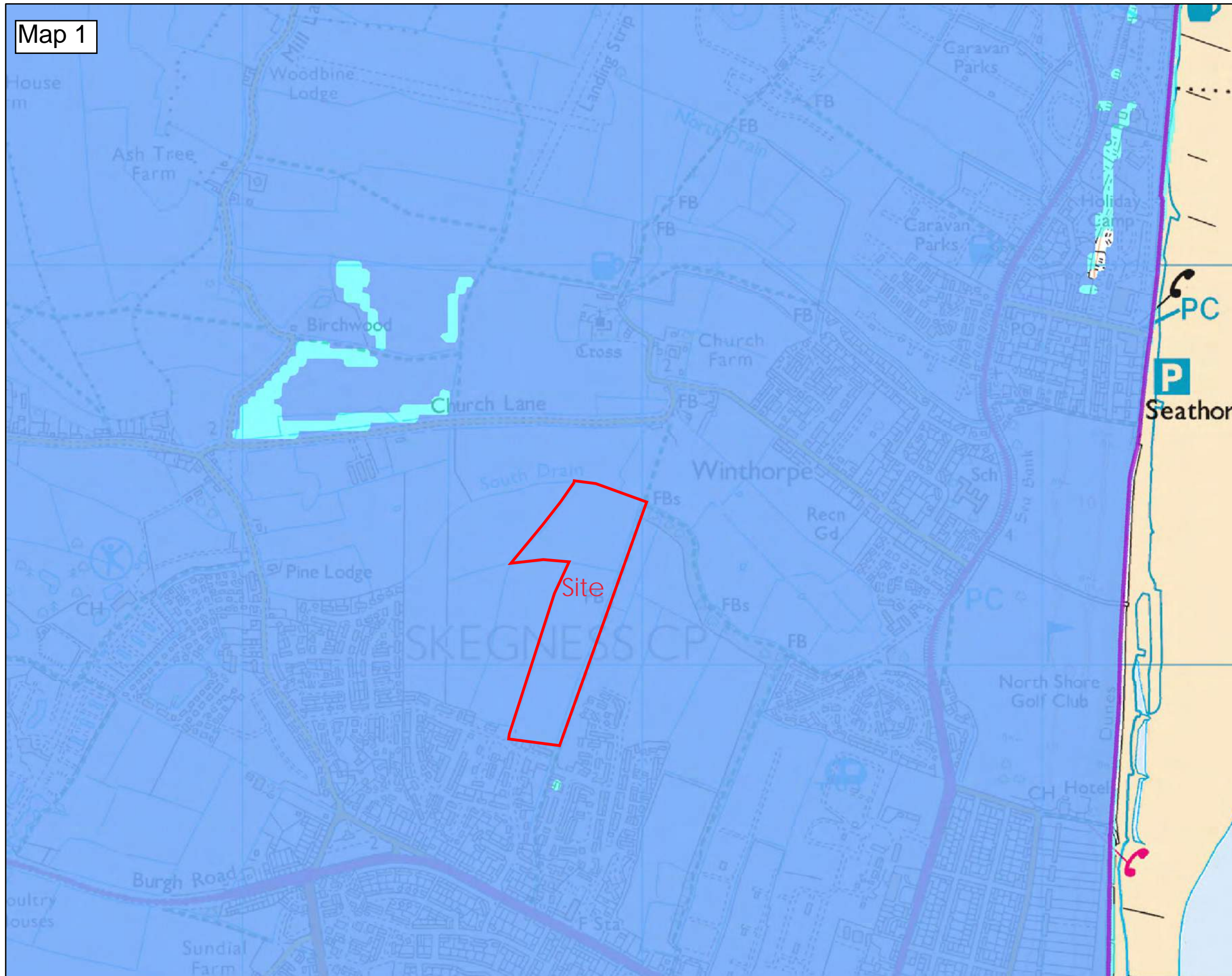
- The design of the properties is such that the ground floor contains no habitable accommodation.
- Avoid the use of absorbent cavity insulation to the ground floor level and use the closed cell type and provide concrete ground floors.
- Arrange for all service circuits, boilers etc. to be located at first floor level, the circuits for the ground floor level to be routed at high level and fed downwards.
- 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 warning 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

- The site does have the benefit of protection from tidal flooding by the existing defences which are properly maintained to a 1 in 200 standard of protection from flooding both now and for the lifetime of the development.
- The site lies within the High Probability Zone 3a without defences land assessed as having a less than 1 in 100 annual probability of river or sea flooding (0.5%) in any year, as shown on the Environment Agency Flood Maps, without the presence of flood defences. Applying the Flood Risk Vulnerability Classification in Table 2 of NPPG. The proposed use of the land and buildings for residential use falls within the 'More Vulnerable' uses of land shown in Table 2 Flood Risk Vulnerability Classification and this use is appropriate in Flood Zone 3a subject to the exception test.
- The Lincolnshire & Northamptonshire Area Tidal Hazard Maps for Scenario year 2006 for the 1 in 200-year event show that the site is within a Hazard Rating Area greater than 2 (Danger for All), depth 1.0 – 1.6m and velocity 0.3 – 1.0m/sec. With climate change, up to year 2115 the 1 in 200-year scenario maps show that the site is within a Hazard Rating Area greater than 2.0 (Danger for All), depth 1.6+m and velocity 0.3 – 1.0m/sec.
- With the depth of flooding following a breach to the defences the proposed dwellings will not have any habitable accommodation on the ground floor
- The Environment Agency Risk of flooding from Rivers and Sea Map shows that the site is at a Low risk of flooding **Low risk** means that each year this area has a chance of flooding of between 0.1% and 1%. This takes into account the effect of any flood defences in the area. These defences reduce but do not completely stop the chance of flooding as they can be overtopped or fail.
- Flooding from other sources is unlikely to affect the site and therefore this risk is considered to be low.
- 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.

Flood Map centred on TF 55953 65433 - created January 2020 [Ref: CCN-2020-158496]

Map 1



Scale 1:10,000



- Main River
- Raised Defences
- Flood Storage Areas
- 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

Extent of flooding



Lumley Fields

Map 2



Extent of flooding from rivers or the sea

- High
- Medium
- Low
- Very low

Tidal Level Location Map Lincolnshire & Northamptonshire Area

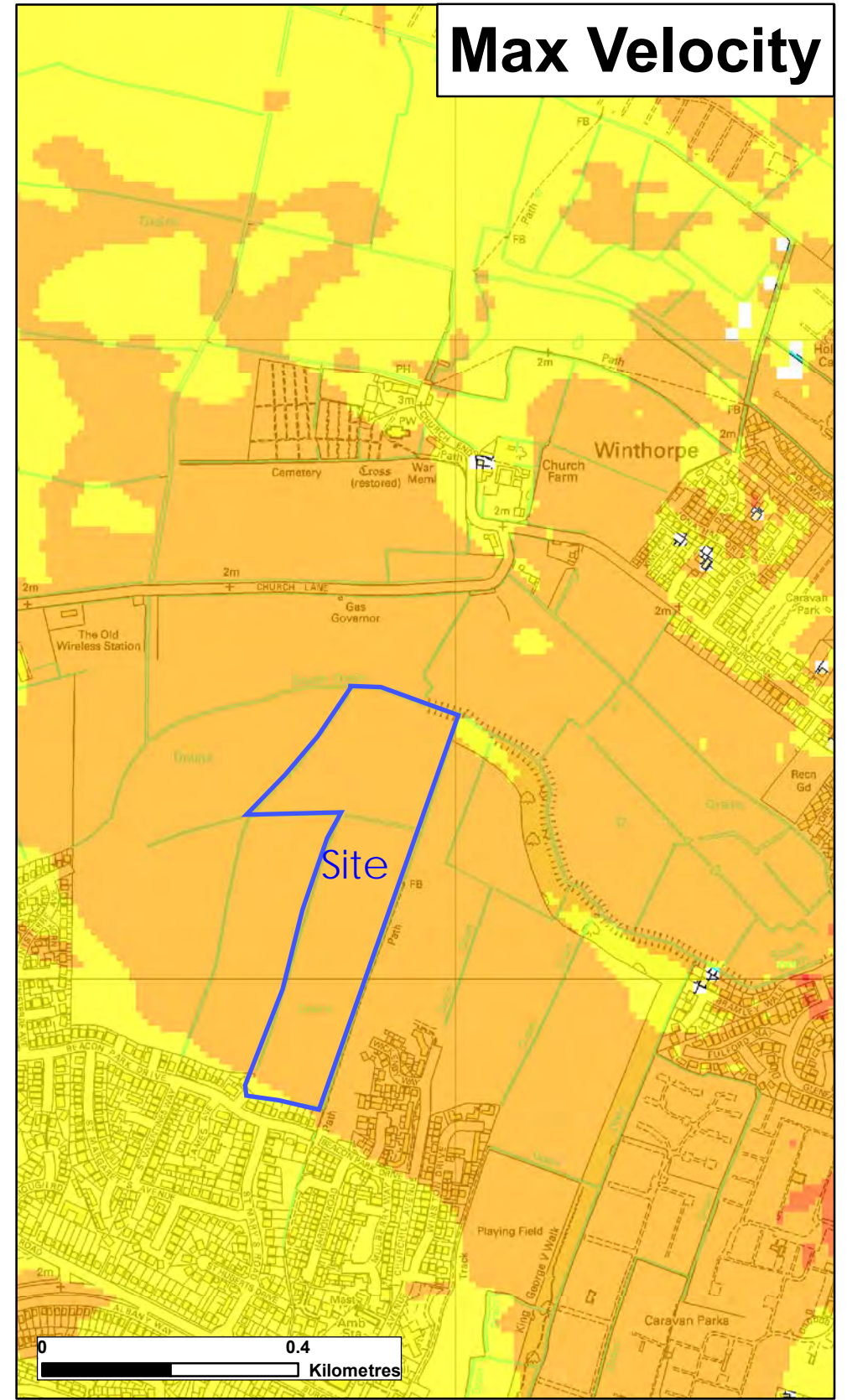
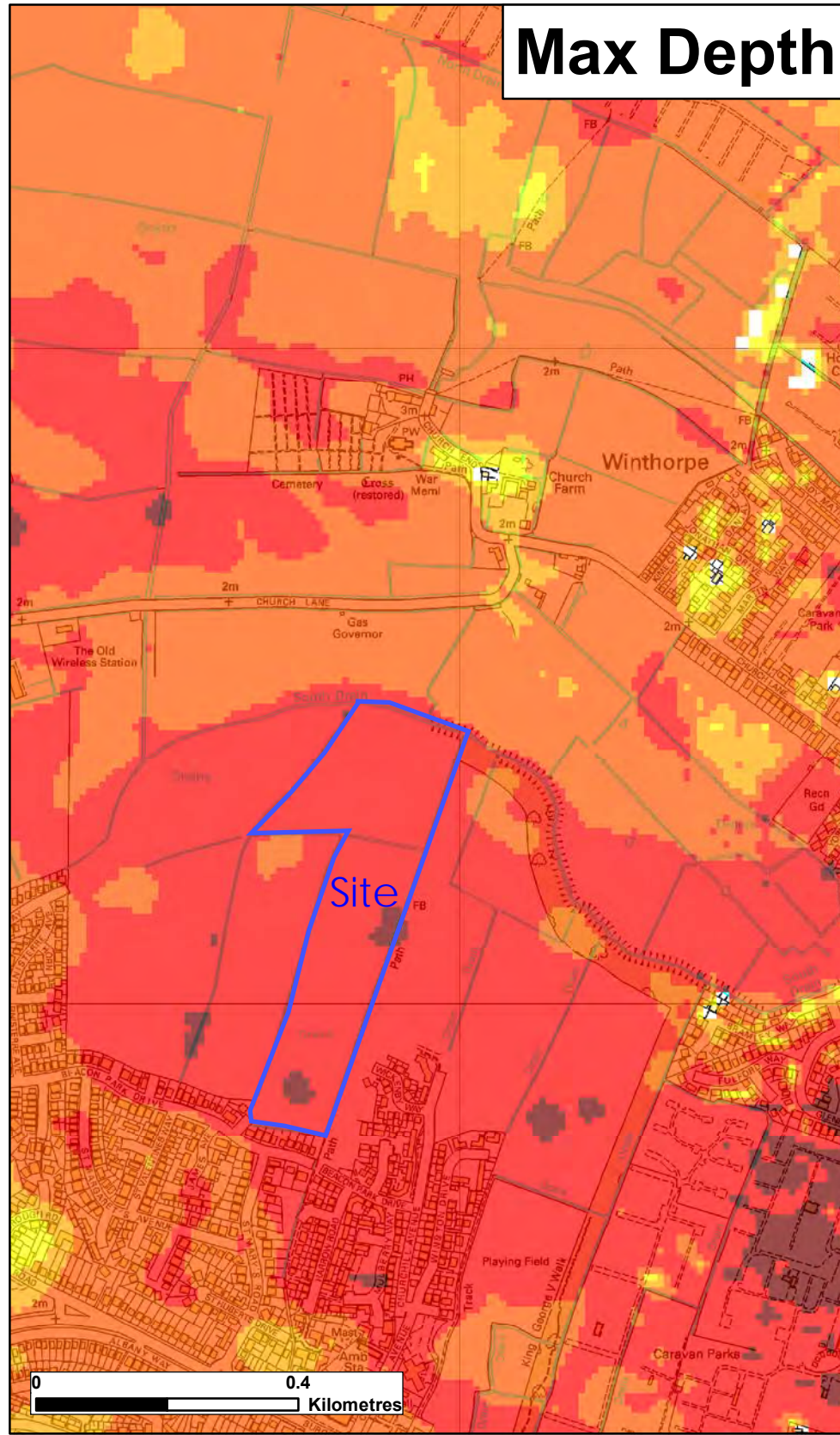
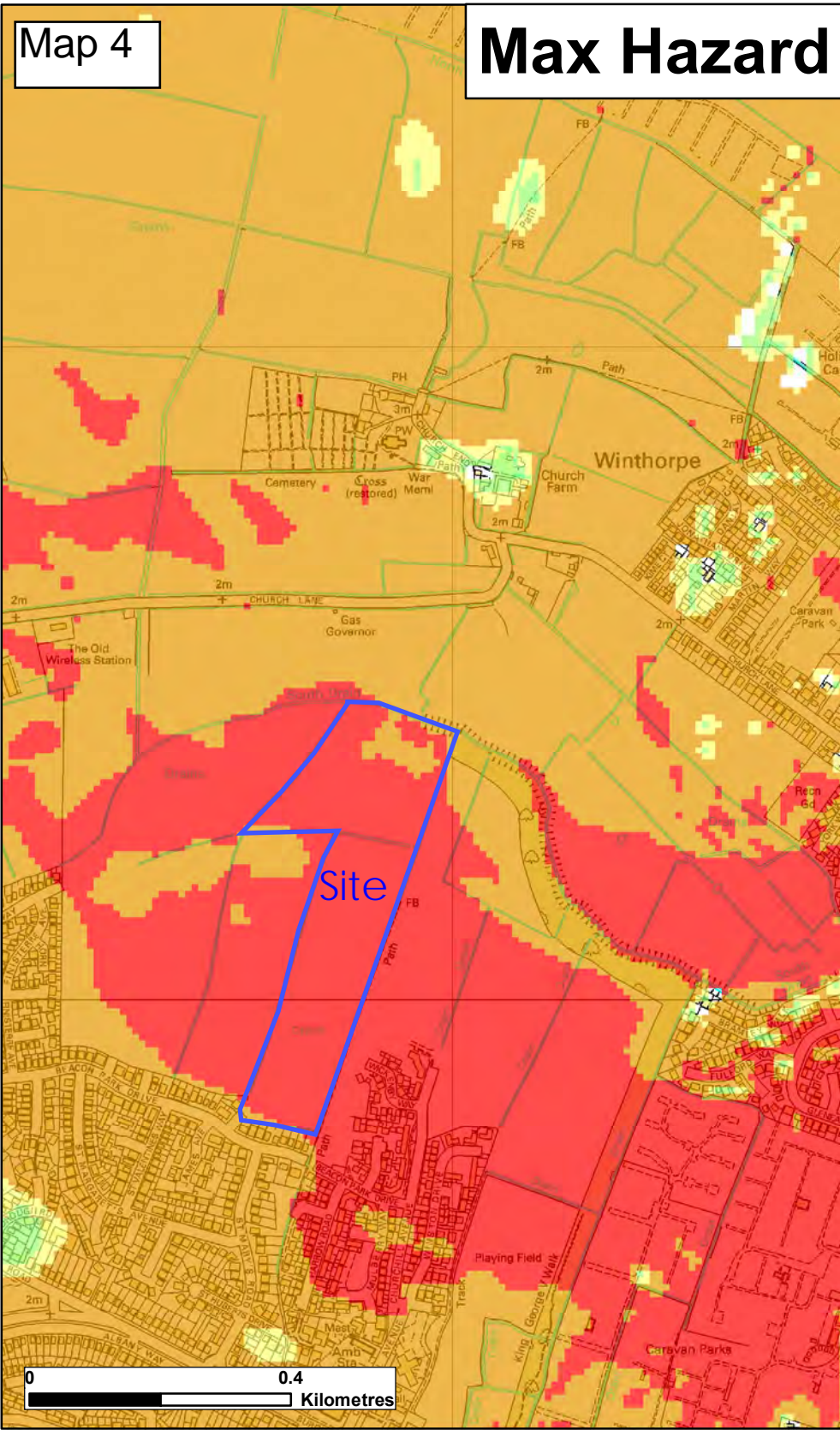


Tidal Water Levels for the South Humber, East Coast and The Wash

The table below shows still water levels for locations, from the above location map, around the South Humber Estuary, East Coast and The Wash. It is important to note the following:

- The base date for the data is 2014 for the South Humber and 2006 for the East Coast and The Wash.
- The data are still water levels. Depending on the use of the data it may be necessary to consider wave heights and / or joint probability analysis of water level and other variables.
- The water level quoted is the 'Best Estimate' water level. Depending on the use of the data it may be necessary to carry out sensitivity testing. Upper and Lower 95% confidence bandings are available upon request.
- Levels for other annual chance scenarios are available if required.

Ref	Location	Easting	Northing	Annual Chance (1 in x) of Tide Level					
				metres ODN					
				1	10	50	100	200	1000
HUMBER									
H030	Tetney	535420	403180	3.94	4.29	4.56	4.69	4.82	5.15
H050	Buck Beck	532700	406580	4.03	4.36	4.62	4.74	4.87	5.18
H060	Grimsby	527878	411346	4.10	4.43	4.70	4.82	4.95	5.27
H080	Haborough Marsh	520790	415740	4.26	4.61	4.88	5.01	5.14	5.47
H090	Immingham	519141	417449	4.26	4.61	4.88	5.01	5.14	5.47
H100	South Killingholme	518700	417120	4.41	4.77	5.05	5.18	5.32	5.66
H130	North Killingholme	516530	420000	4.51	4.87	5.15	5.28	5.42	5.77
H150	East Halton	514450	422870	4.59	4.96	5.25	5.39	5.53	5.89
H170	Goxhill	511970	425440	4.67	5.04	5.34	5.47	5.61	5.95
H200	New Holland	508020	424330	4.87	5.26	5.55	5.68	5.81	6.12
H210	Barrow Haven	506380	422620	4.92	5.31	5.60	5.73	5.86	6.17
H220	Ferriby	497550	421150	5.04	5.42	5.67	5.77	5.86	6.04
H230	Winterton	493420	422830	5.14	5.51	5.74	5.83	5.90	6.02
H250	Blacktoft	484247	424190	5.25	5.62	5.83	5.90	5.96	6.04
H270	Goole	474857	422960	5.46	5.85	6.07	6.15	6.21	6.29
East Coast									
~	Great Eau	545500	393800	3.80	4.19	4.46	4.57	4.69	4.96
~	Boygriff	553300	379800	3.84	4.24	4.53	4.65	4.77	5.05
~	Burgh Sluice	555190	358620	4.26	4.45	4.76	4.90	5.03	5.34
Wash									
~	Hobhole	536610	339940	4.82	5.30	5.64	5.78	5.93	6.27
~	Lawyers Sluice	540750	334550	4.84	5.32	5.66	5.80	5.95	6.29
~	West Lighthouse	549150	325750	4.88	5.37	5.71	5.86	6.01	6.35
~	Grand Sluice	532400	344500	4.88	5.33	5.65	5.78	5.93	~
~	Fosdyke Bridge	531700	332200	4.91	5.38	5.71	5.85	5.99	~
~	Marsh Road	526000	324000	5.04	5.44	5.73	5.85	5.98	~
~	Wisbech	546100	310000	4.83	5.25	5.53	5.66	5.78	~
~	Dog In Doublet	527300	299300	3.67	4.00	4.22	4.32	4.42	~



★ **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)	1.0 - 1.6	1.0 - 1.5
Greater than 2.0 (Danger for All)	1.6 +	1.5 - 2.5
		2.5 +

Date Printed	January 2020	Scenario year	2006	Scenario Annual Chance	0.5% (1 in 200)	CCN Number	CCN-2020-65433
---------------------	--------------	----------------------	------	-------------------------------	-----------------	-------------------	----------------

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



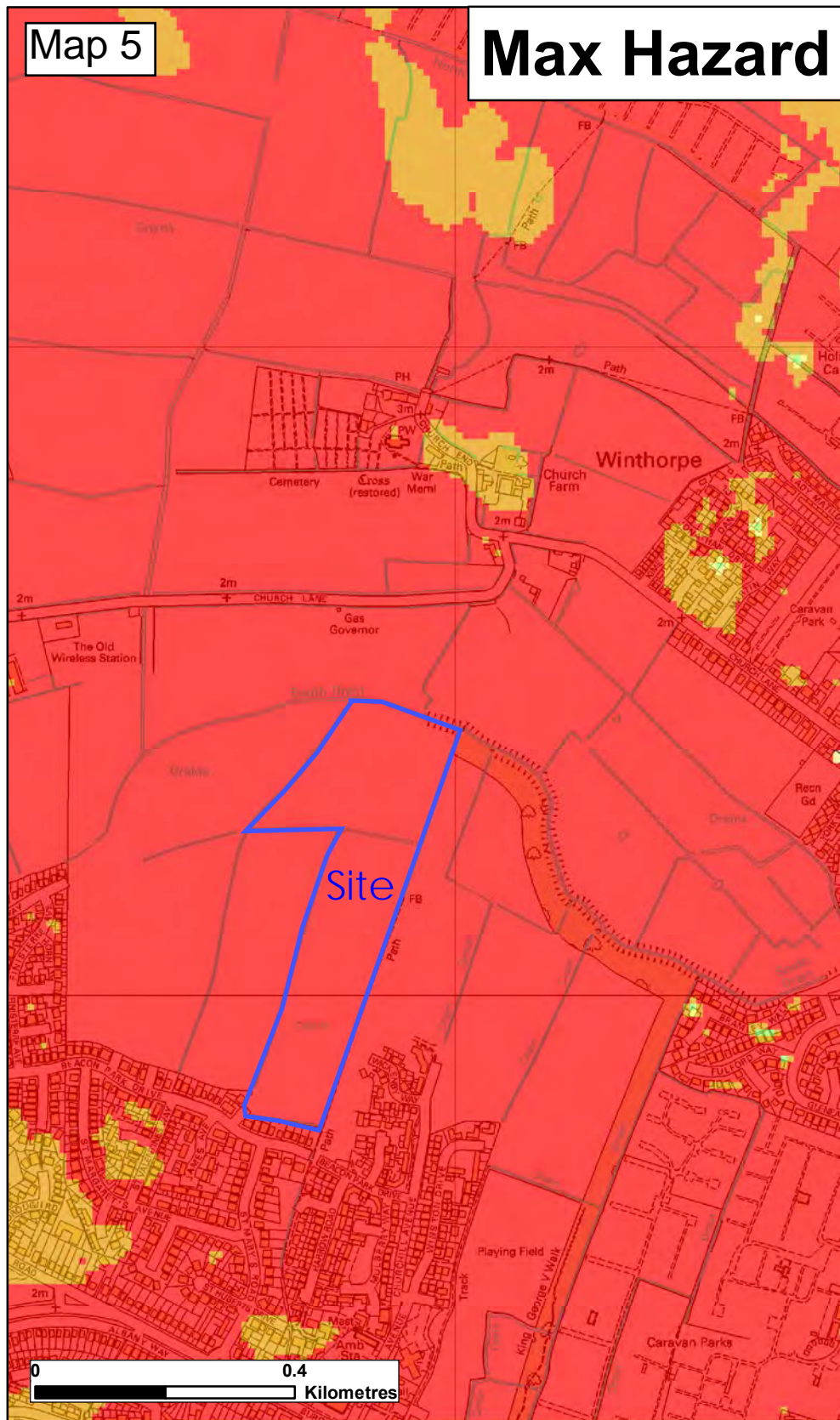
Lincolnshire and Northamptonshire Tidal Hazard mapping

Map Centred on TF 55953 65433

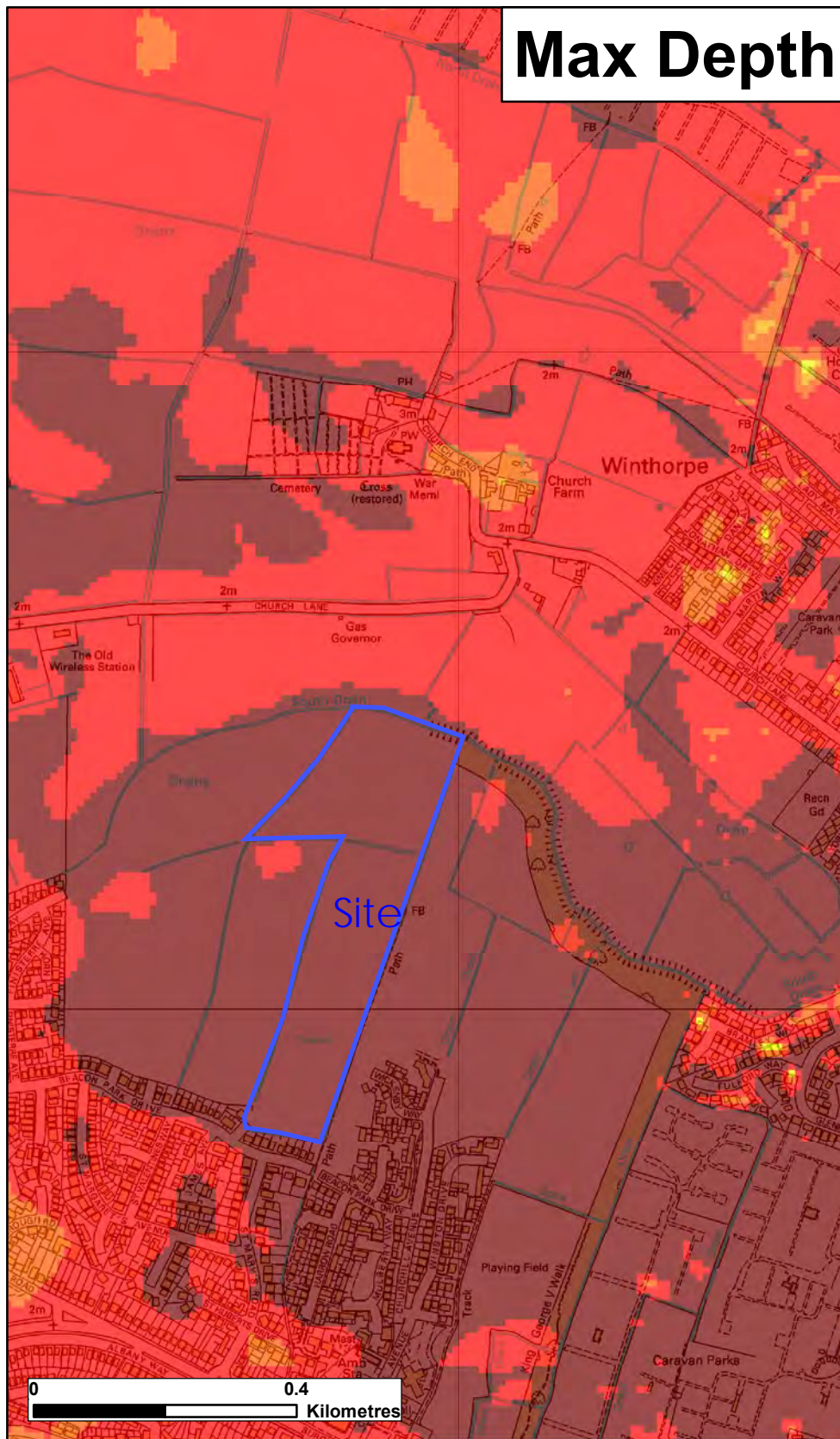
This map is reproduced by permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationary Office. Crown copyright. All rights reserved. Environment Agency 100026380, 2020. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings.

Map 5

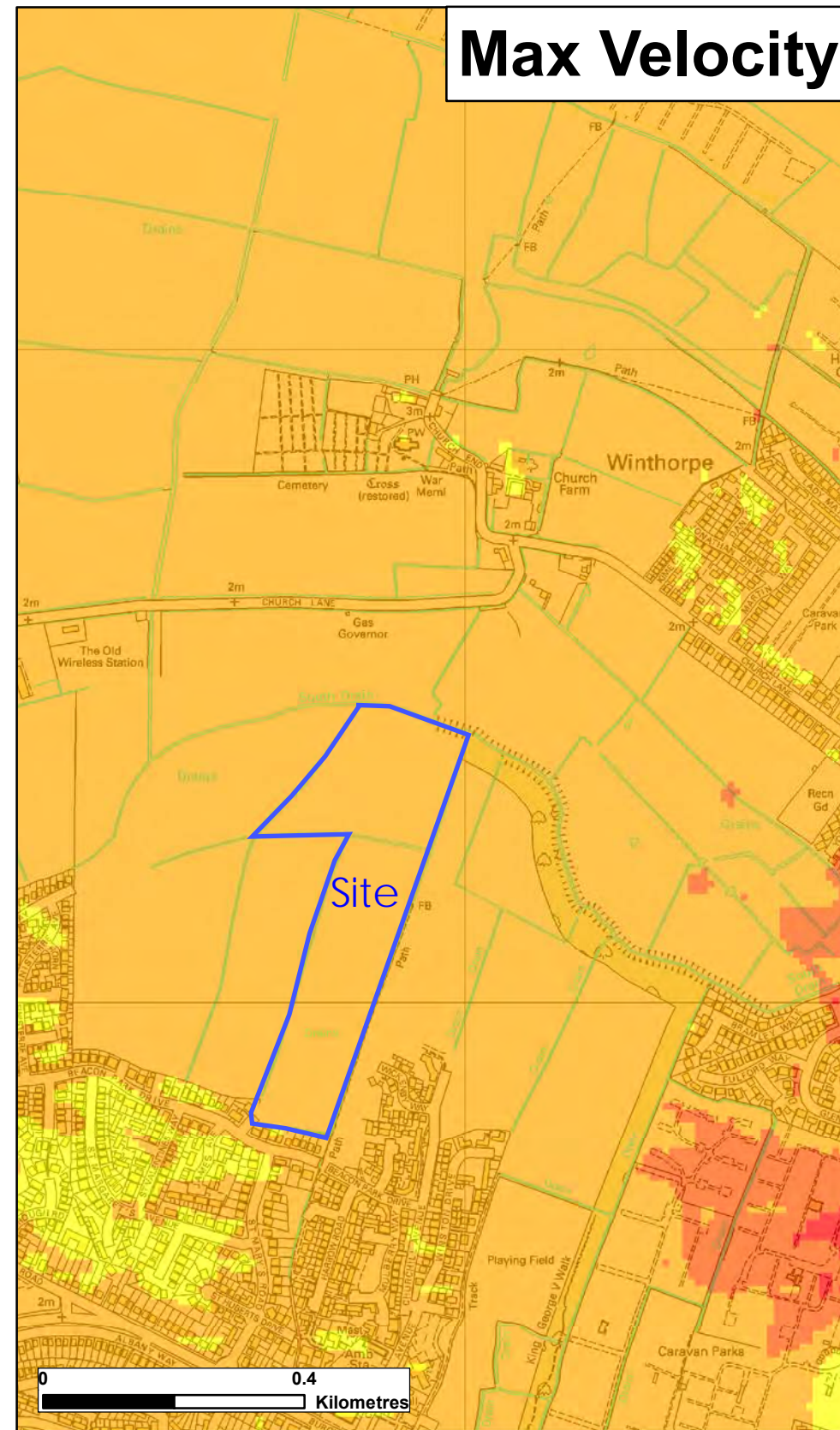
Max Hazard



Max Depth



Max Velocity



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

Max Hazard

(Flood Risk to People : FD2320)

- Less than 0.75 (Low Hazard)
- Between 0.75 and 1.25 (Danger for Some)
- Between 1.25 and 2.0 (Danger for Most)
- Greater than 2.0 (Danger for All)

Max Depth (m)

- 0 - 0.25
- 0.25 - 0.50
- 0.50 - 1.0
- 1.0 - 1.6
- 1.6 +

Max Velocity (m/s)

- 0 - 0.3
- 0.3 - 1.0
- 1.0 - 1.5
- 1.5 - 2.5
- 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.



Lincolnshire and Northamptonshire Tidal Hazard mapping

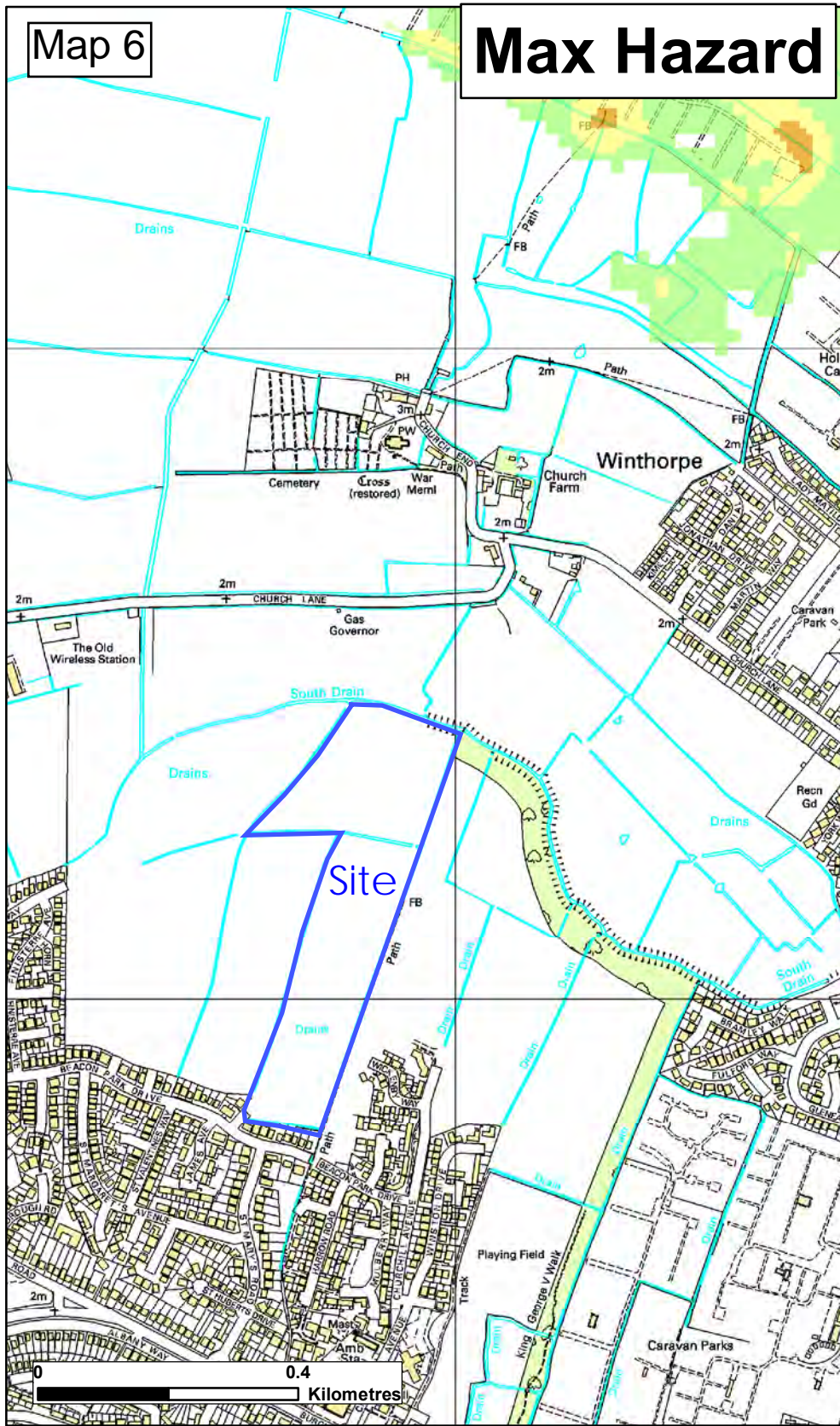
Map Centred on TF 55953 65433

This map is reproduced by permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationary Office. Crown copyright. All rights reserved. Environment Agency 100026380, 2020. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings.

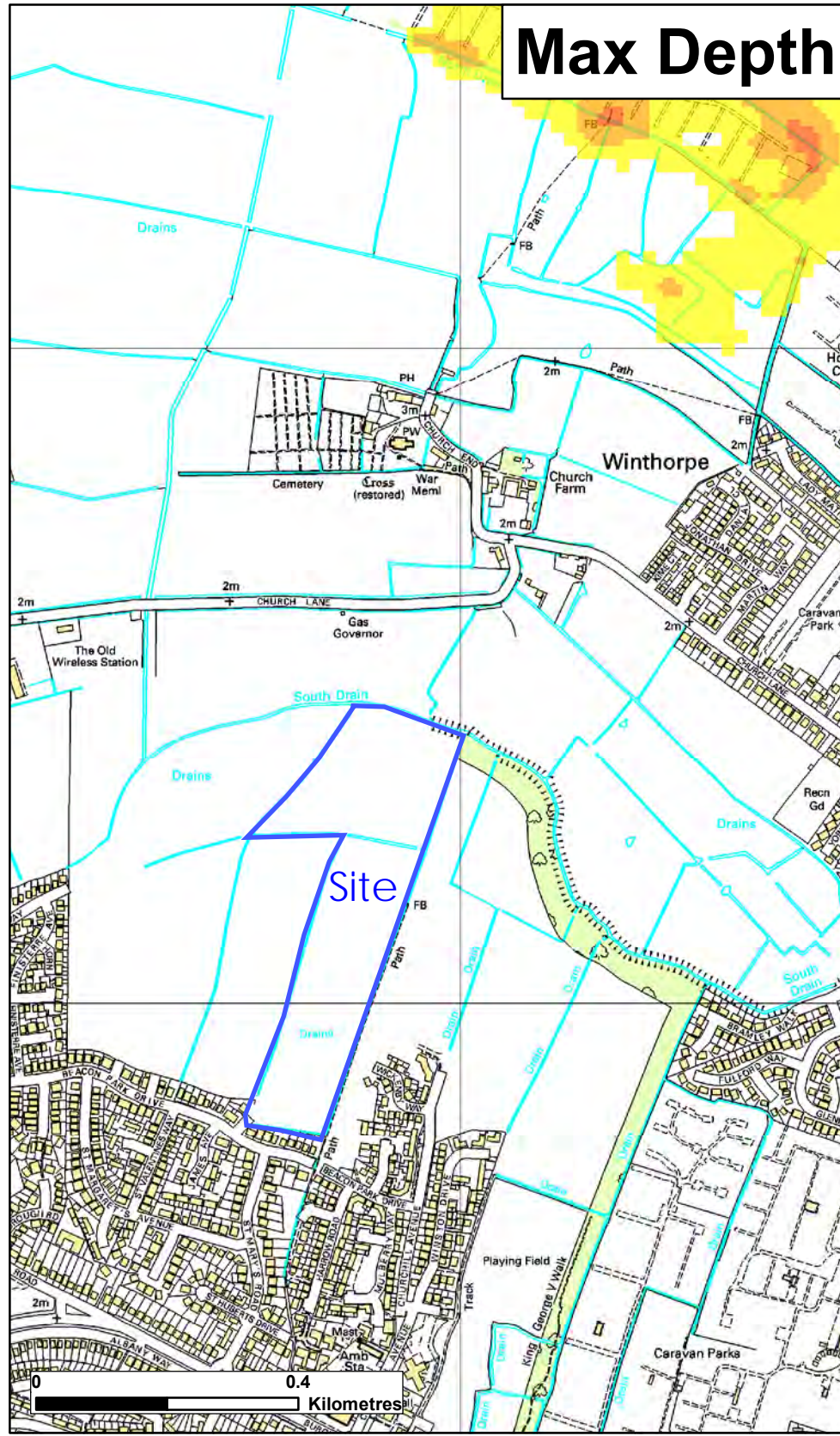
Date Printed	January 2020	Scenario year	2115	Scenario Annual Chance	0.5% (1 in 200)	CCN Number	CCN-2020-65433
--------------	--------------	---------------	------	------------------------	-----------------	------------	----------------

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

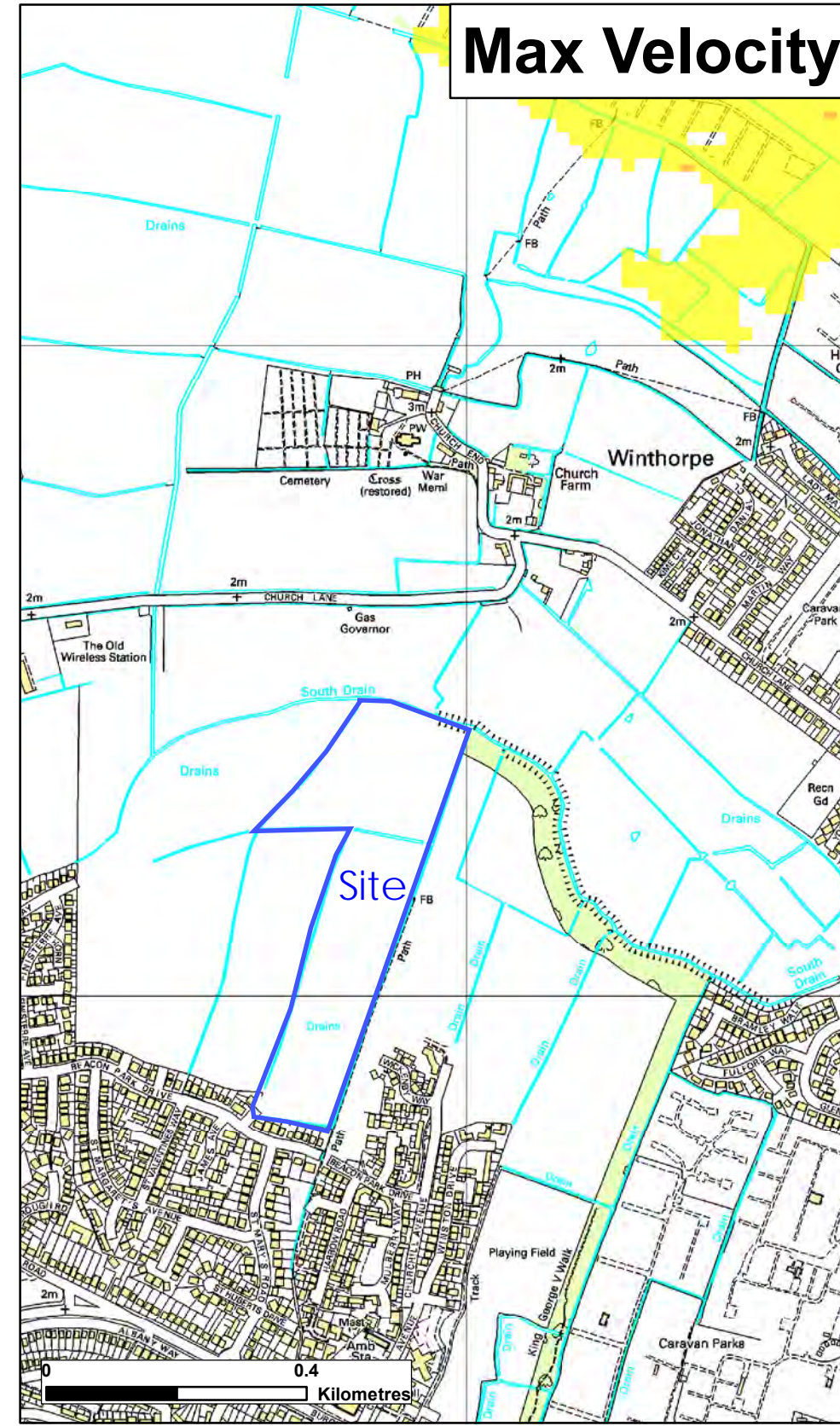
Max Hazard



Max Depth



Max Velocity



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 +

The map is based on computer modelling of simulated overtopping of the main coastal defences for specific tidal scenarios. It does not include overtopping along the following tidal rivers which are currently being investigated: Witham Haven (upstream of Hobhole), and Welland (upstream of Fosdyke Bridge)

The map only considers the consequences of overtopping of the defences, and does not show the possible consequences of breaches of the tidal defences. Separate maps of the flood extent from just breaching of the defences are available.

For future climate change scenarios it is assumed that defences remain at 2006 heights.

These maps do not replace the flood zone maps used in the National Planning Policy Framework (NPPF)

Date Printed	January 2020	Scenario year	2006	Scenario Annual Chance	0.5% (1 in 200)	CCN Number	CCN-2020-158496
---------------------	--------------	----------------------	------	-------------------------------	-----------------	-------------------	-----------------

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

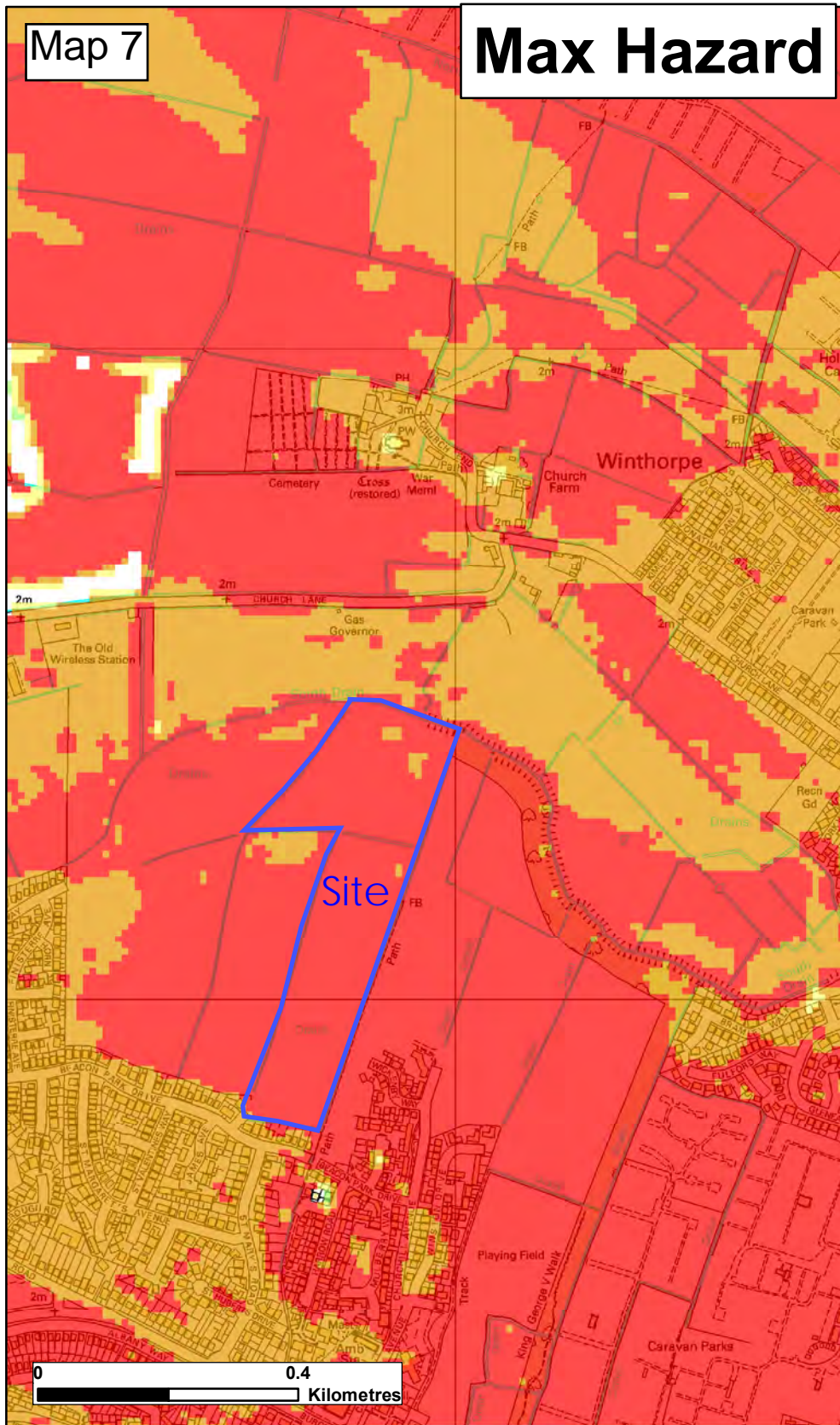


Lincolnshire and Northamptonshire Overtopping Hazard Mapping

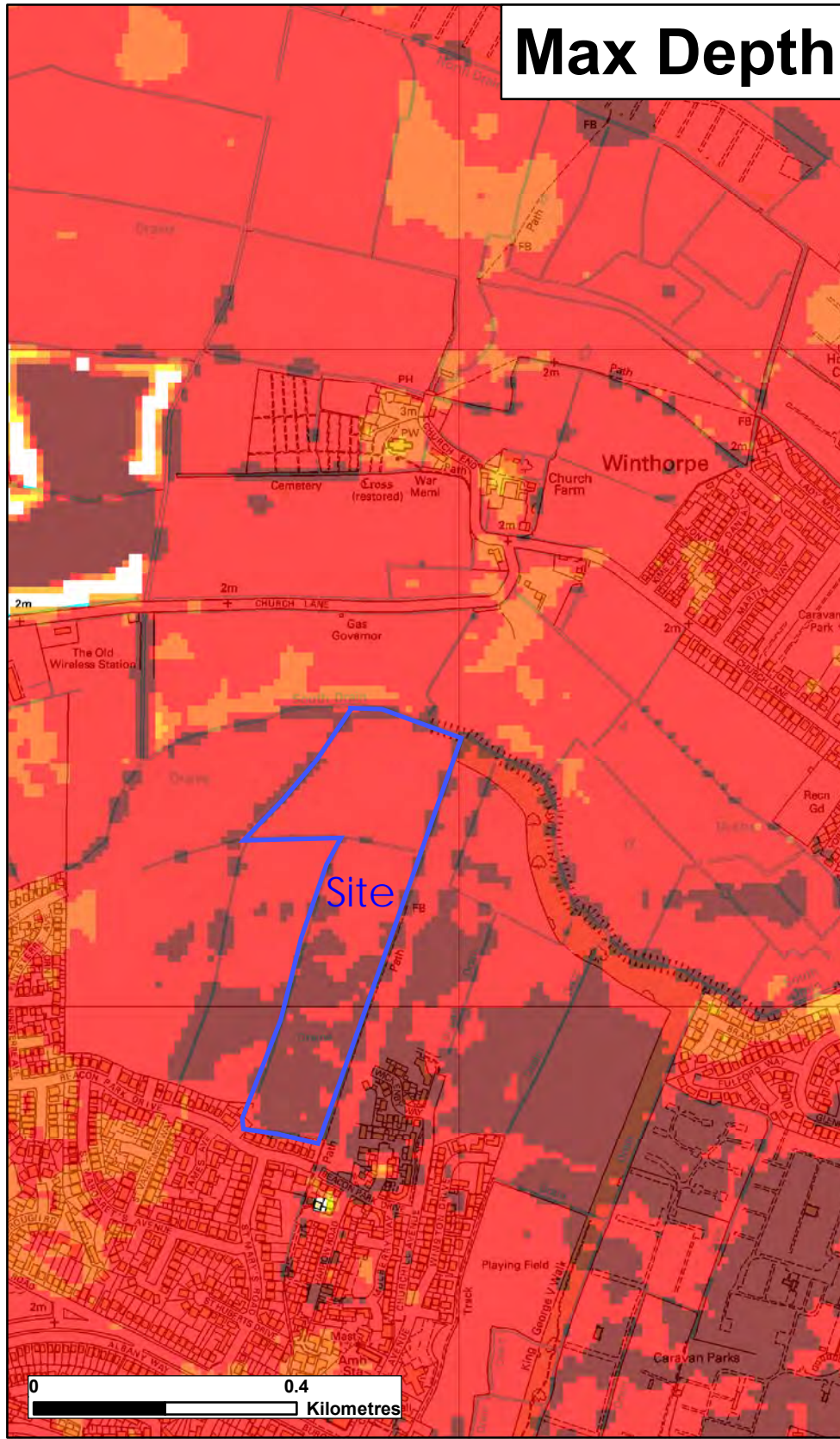
Map Centred on TF 55953 65433

This map is reproduced by permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationary Office. Crown copyright. All rights reserved. Environment Agency 10026380, 2020. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings.

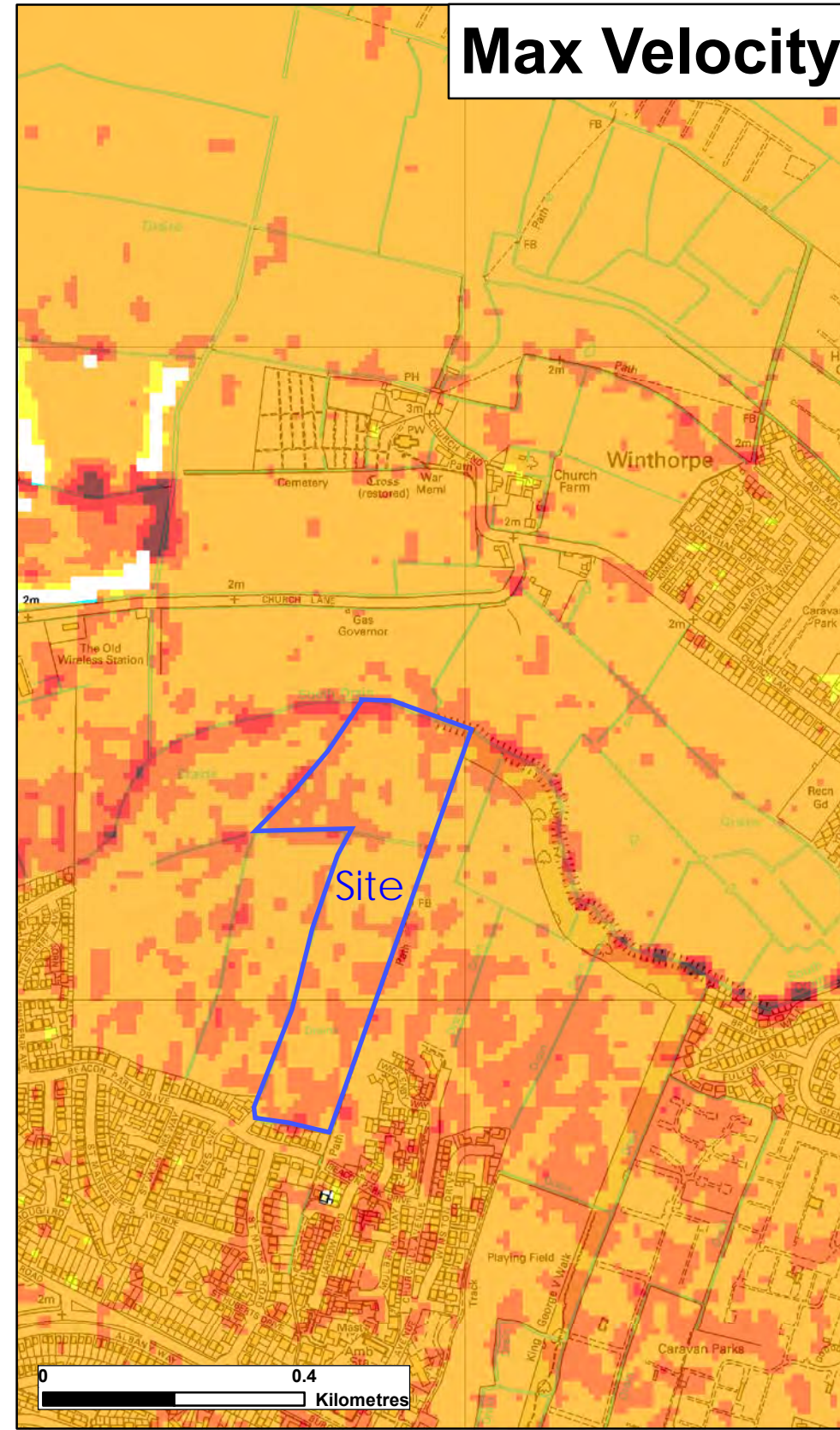
Max Hazard



Max Depth



Max Velocity



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 +

Date Printed	January 2020	Scenario year	2115	Scenario Annual Chance	0.5% (1 in 200)	CCN Number	CCN-2020-158496
---------------------	--------------	----------------------	------	-------------------------------	-----------------	-------------------	-----------------

The map is based on computer modelling of simulated overtopping of the main coastal defences for specific tidal scenarios. It does not include overtopping along the following tidal rivers which are currently being investigated: Witham Haven (upstream of Hobhole), and Welland (upstream of Fosdyke Bridge)

The map only considers the consequences of overtopping of the defences, and does not show the possible consequences of breaches of the tidal defences. Separate maps of the flood extent from just breaching of the defences are available.

For future climate change scenarios it is assumed that defences remain at 2006 heights.

These maps do not replace the flood zone maps used in the National Planning Policy Framework (NPPF)

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 Overtopping Hazard Mapping

Map Centred on TF 55953 65433

This map is reproduced by permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationary Office. Crown copyright. All rights reserved. Environment Agency 100026380, 2020. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings.

Low risk: depth

Lumley Fields

Map 8

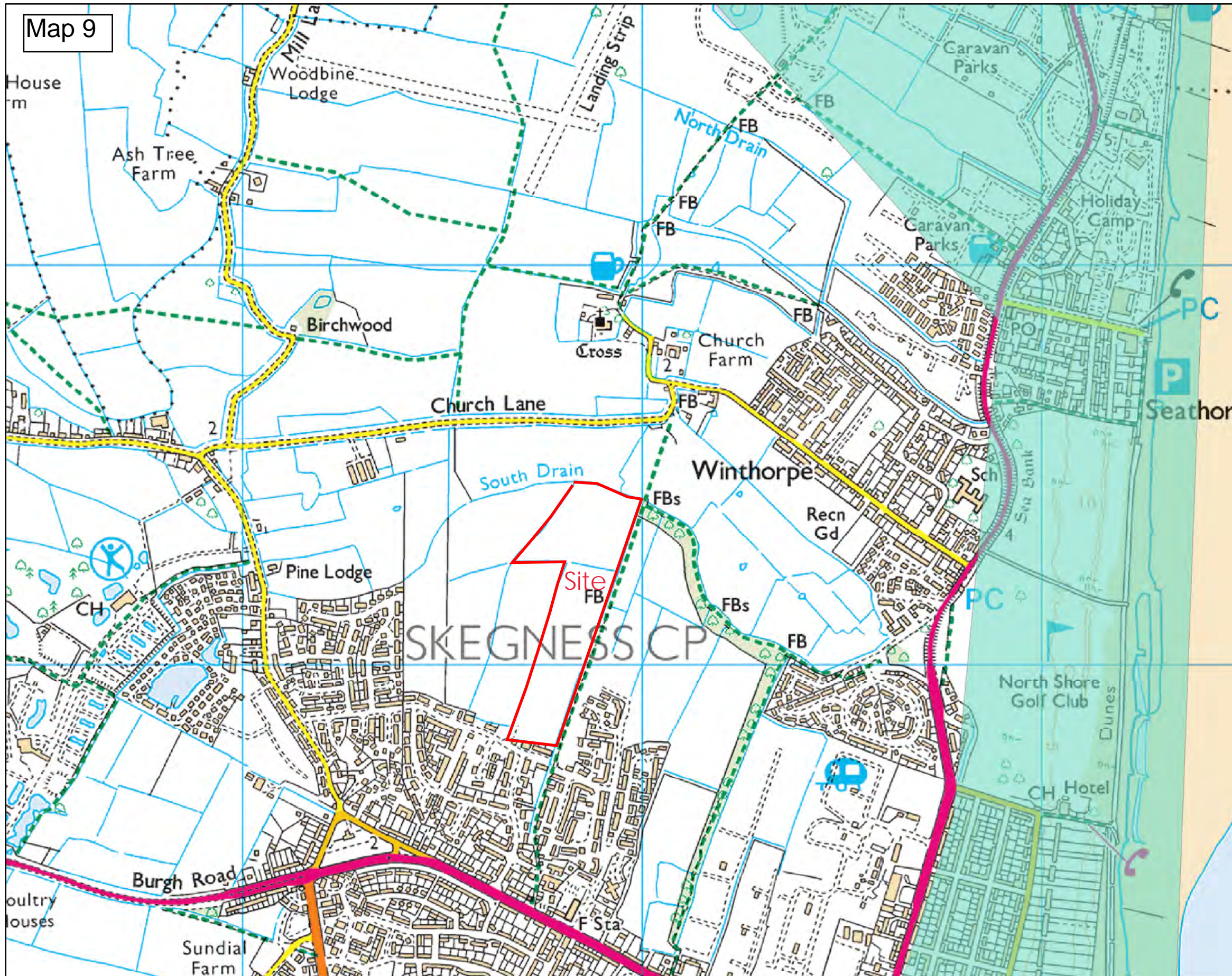


Surface water flood risk: water depth in a low risk scenario

Flood depth (millimetres)



- Over 900mm
- 300 to 900mm
- Below 300mm

Flood Map centred on TF 55953 65433 - created January 2020 [Ref: CCN-2020-158496]

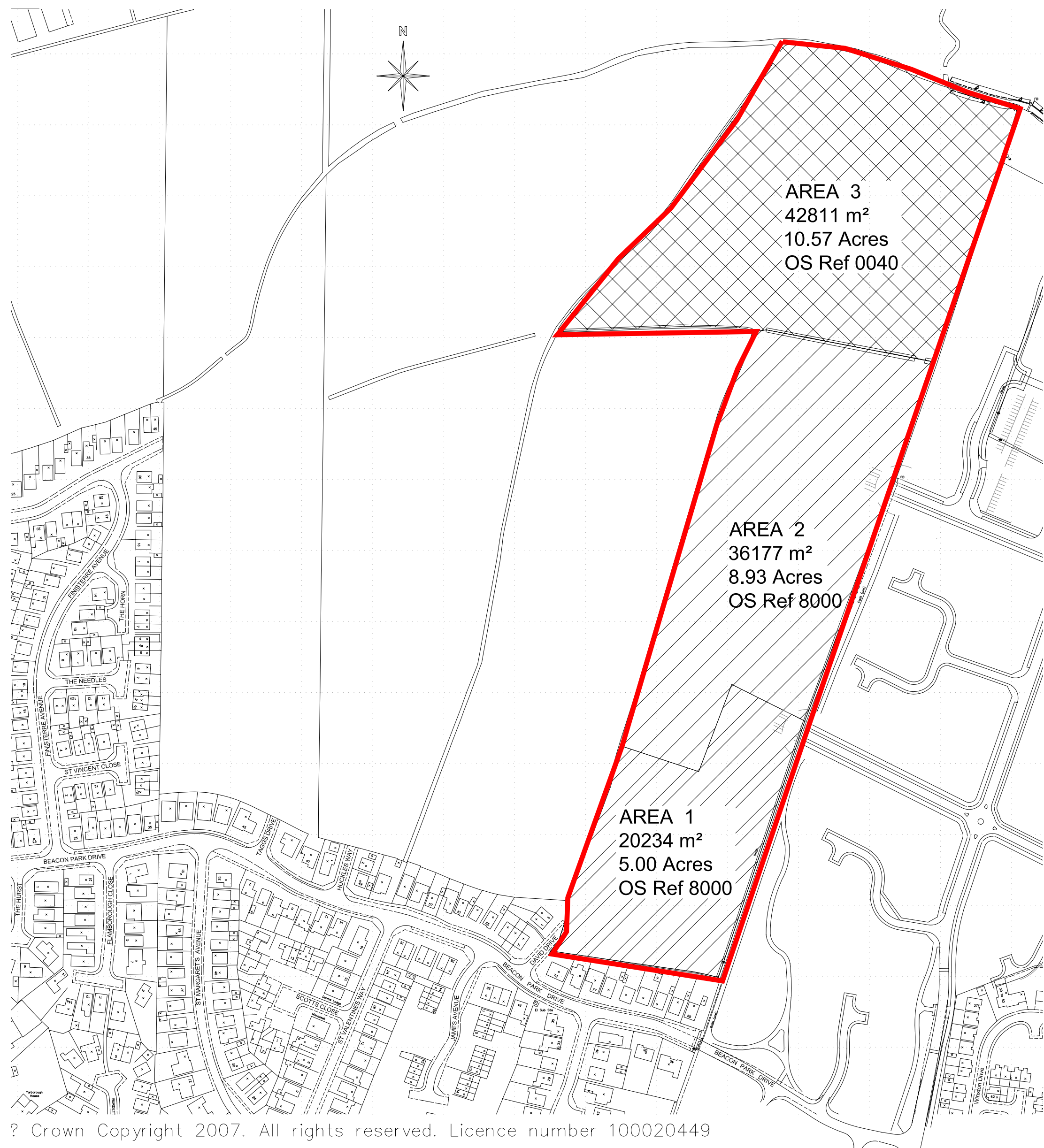


Scale 1:10,000



-  Main River
-  January 1953 along the Lincolnshire Coastline

Created by the Partnerships and Strategic Overview Team, Lincoln



AREA 3
42811 m²
10.57 Acres
OS Ref 0040

AREA 2
36177 m²
8.93 Acres
OS Ref 8000

AREA 1
20234 m²
5.00 Acres
OS Ref 8000

? Crown Copyright 2007. All rights reserved. Licence number 100020449

Drawing Status Preliminary <input type="checkbox"/> Comments <input type="checkbox"/> Construction <input type="checkbox"/>				PROJECT Proposed Residential Development at Land off Churchill Avenue, Skegness			
				TITLE LOCATION PLAN (Showing Site Areas)			
				SCALE 1:2500 @ A3		SCALE Dec 2007	
B	19-02-08	North point, field No.s & road names added	DC	DW			
A	2-01-08	Boundary between Area 1 & 2 revised	DC	DW			
Rev	Date	Description	Drawn	Chkd	DRAWN BY DC	CHECKED BY DW	DRAWING No. SK-P10-03
						REV B	

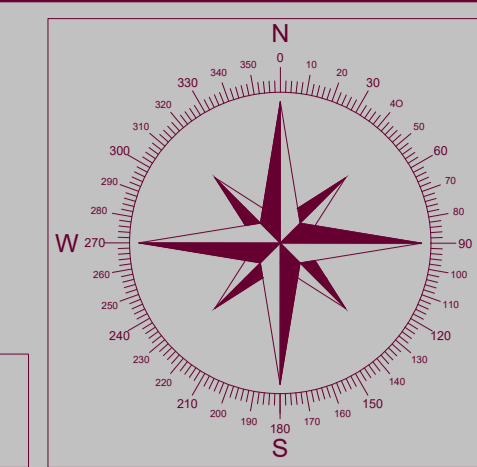
manorcrest

Manorcrest Homes Ltd
Churchill Avenue
Skegness
Lincolnshire
PE25 2AN

Tel: 01754 767742
Fax: 01754 760692
www.manorcrest.co.uk

Proposed Development | Belton Park Road | Skegness | PE25 2AF

Ordnance Survey Site Plan Drawing



This Drawing is the property of Ryland Design. Copyright is reserved by them and the Drawing is issued on the condition that it is not copied, reproduced, retained or disclosed to any unauthorised person either wholly or in part without the written consent of Ryland Design.

Notes

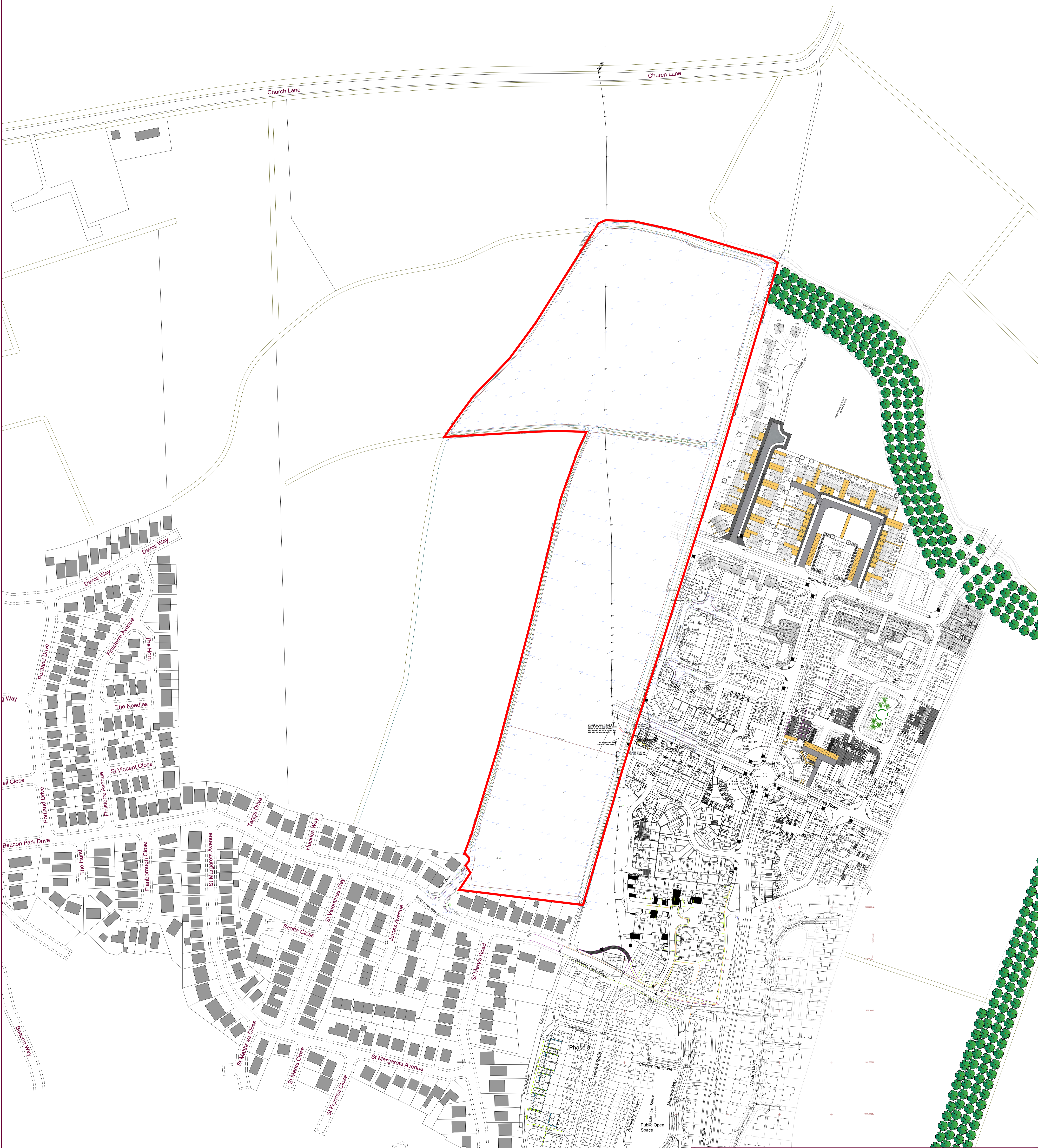
1. All dimensions to be verified on site prior to any fabrication or site works being commenced.
2. Any discrepancies to be reported to Ryland Design before any work is put in hand.
3. Do not scale from this Drawing, use figured dimensions only, contractors are responsible for taking and checking all site dimensions.
4. All dimensions are in millimetres unless stated otherwise.
5. This Drawing is to be read in conjunction with relevant Consultant and Specialist Drawings.
6. This Drawing is to be read in conjunction with Drawing Nos.

Reproduced from Ordnance plan 1:1250 Scale by permission of Ordnance Survey on Crown copyright ©. All rights behalf of the Controller of Her Majesty's Stationary Office reserved. Licence Number AR100036881.

Exclusion: Ryland Design Are NOT Principal Designer Unless Appointed Otherwise

0m 1250m
Scale 1:1250 @ A0

Plan 2



Ryland Design
| architecture

Scale | 1:1250 @ A0

D.B | A.A

C.B | A.R.A

Ryland Design Services Ltd
Architecture & Planning Practice

Title	Ordnance Survey Site Plan Drawing
Date	April 2020
Client	Manorcrest Homes Ltd
Project	Proposed Development, Belton Park Road, Skegness, PE25 2AF
Drawing Number	RDS 11539 / 01 ()

Tel | 01673 860100 Tel | 01522 899 296 Tel | 01472 730 987 Tel | 01507 389 057
Web | www.rylanddesign.co.uk E-mail | studio@rylanddesign.co.uk
Find Us On | Facebook | Twitter | Instagram | Pinterest | Blogspot | Google + | Youtube
Located | Woodlands Business Centre, Lincoln Road, Walton, Lincoln, LN2 3PZ
Pavilion Way, New Waltham, Grimsby, DN36 4WT