

**PATRICK
PARSONS**

CREATING PLACES  FOR FUTURE GENERATIONS TO THRIVE

Flood Risk Assessment

Castle Build

Holbeach Road, Spalding PE12 6JP

for

Larkfleet Group Ltd

12078

January 2024

Flood Risk Assessment
Castle Build
for
Larkfleet Group Ltd

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1.0 Introduction

- 1.1 Larkfleet Group Ltd are planning a proposed development on Castle Build Site, Holbeach Road, Spalding, PE12 6JP.
- 1.2 Patrick Parsons has been commissioned by Larkfleet Group Ltd to prepare a Flood Risk Assessment to support their planning application for Castle Build Site, Holbeach Road, Spalding, PE12 6JP (hereinafter referred to as 'Site').
- 1.3 This report aims to demonstrate whether the development is at risk of any form of flooding.
- 1.4 The general limitations of this assessment are that:
 - Several data sources have been used in compiling this report. Whilst Patrick Parsons believes them to be trustworthy; we are unable to guarantee the accuracy of the information that has been provided by others.
 - This report is based on information available at the time of preparation. There is potential for further information to become available, which may create a need to modify conclusions drawn in this report.

2.0 Location of Site

- 2.1 The proposed site is located off Holbeach Road, Spalding. An existing site plan is enclosed in **Appendix A**.
- 2.2 The regional authority is Lincolnshire County Council.
- 2.3 The local planning authority is the South Holland District Council.

3.0 Site Description

3.1 Existing Site

- 3.1.1 The existing site consists of greenfield land covering an area of approximately 0.27 hectares that borders a residual property to the southwest.
- 3.1.2 LIDAR (Light Detection and Ranging) data for the site is enclosed within **Appendix B**.

3.2 Topography

- 3.2.1 The existing topography of the site is shown in figure 1. Areas highlighted orange denote high points while blue denote areas of low points. The site falls gradually from southwest to northwest with gradients varying between 1:10 to 1:200. The carriageway level on Holbeach Road, at the existing entrance to the site, is approximately 3.67m AOD. To the northeast of the site is a surface water ditch that runs along Holbeach Road, with a separate surface water ditch on the opposite side of the road known as Lord's Drain.
- 3.2.2 The highest point of the site (shown within the red outline) is to the northwest with an elevation of approx. 3.79m AOD while the lowest point is to the southeast with an elevation of approx. 2.72m AOD. Levels along Holbeach Road are higher than those on site.

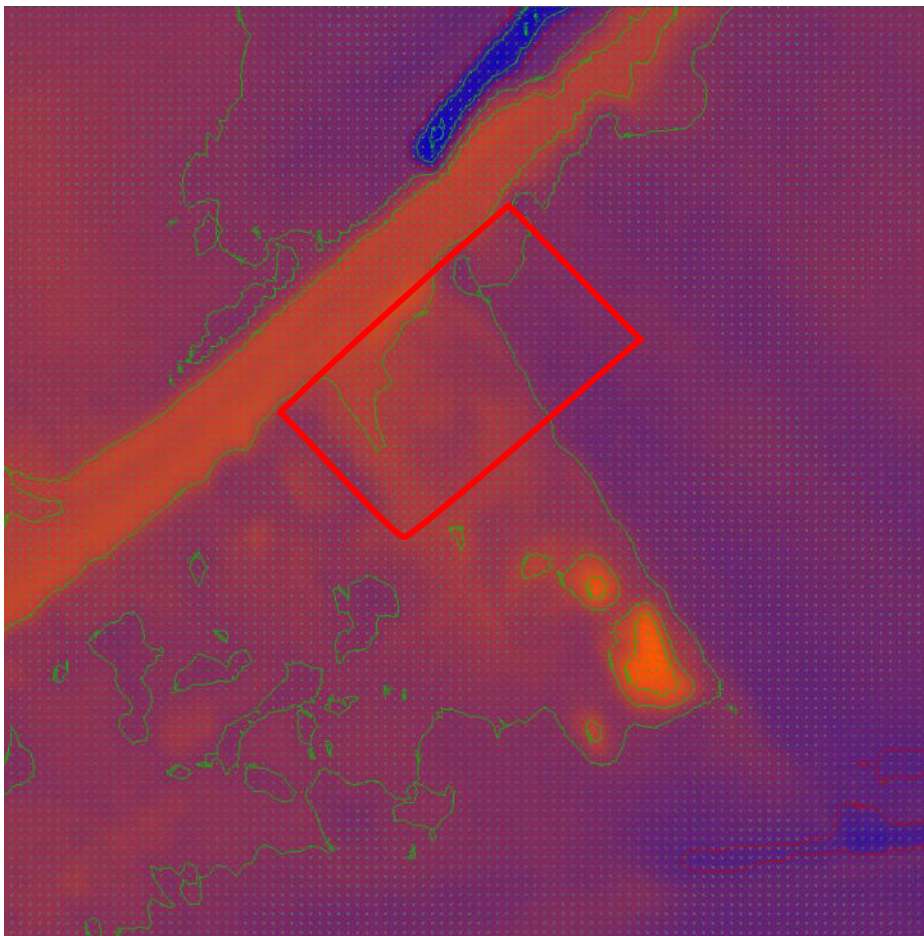


Figure 1 Existing Site Ground Model

3.3 Existing Geology

3.3.1 The geology of the site has been ascertained by reference to the 1:50,000 maps on the British Geological Survey (BGS) website. The data provided on the website indicates the bedrock and superficial drift geology for the site.

3.3.2 The strata of the site (bedrock geology) comprises of Oxford Clay Formation – Mudstone, described as follows:

“Oxford Clay Formation – Mudstone. Sedimentary bedrock formed between 166.1 and 157.3 million years ago during the Jurassic period.”

3.3.3 The strata of the site (superficial drift) comprises of Tidal Flat Deposits – Clay and silt, described as follows:

“Tidal Flat Deposits – Clay and silt. Sedimentary superficial deposit formed between 11.8 thousand years ago and the present during the Quaternary period.”

3.3.4 Historical borehole logs in the local area confirm the presence of silty clay over silty sand and gravel with traces of shells.

3.4 Hydrogeology Setting

3.4.1 The Environment Agency (EA) mapping service, as provided by Magic Map, indicates the aquifer designation for the bedrock and superficial drift geology and the groundwater vulnerability in the area.

3.4.2 The mapping, as included at **Appendix C**, provides the following information for the site:

Geology Map	Site Description
Aquifer Designation (Bedrock)	Unproductive
Aquifer Designation (Superficial Drift)	Unproductive
Groundwater Vulnerability	Unproductive
Groundwater Source Protection Zone	None

Table 1 Hydrogeology Setting

3.4.3 Principal and secondary aquifers provide significant quantities of drinking water, and water for business needs. They may also support rivers, lakes and wetlands. They can be classified as:

- Secondary A aquifers - comprise permeable layers that can support local water supplies and may form an importance source of base flow to rivers.
- Secondary B aquifers - lower permeability layers that may store and yield limited amounts of groundwater through characteristics like thin cracks (called fissures) and openings or eroded layers.
- Secondary undifferentiated - aquifers where it is not possible to apply either a Secondary A or B definition because of the variable characteristics of the rock type. These have only a minor value.
- Unproductive strata - largely unable to provide usable water supplies and are unlikely to have surface water and wetland ecosystems dependent on them.

3.4.4 The groundwater vulnerability shows whether the groundwater has a high, medium or low risk of pollution.

3.4.5 Source protection zones are used to define areas close to drinking water sources where the risk associated with groundwater contamination is greatest. They can be classified as:

- Inner zone (zone 1) – 50-day travel time of pollutant to source with a 50 metres default minimum radius.
- Outer zone (zone 2) – 400-day travel time of pollutant to source. This has a 250 or 500 metres minimum radius around the source depending on the amount of water taken.
- Total catchment (zone 3) – Area around a supply source within which all the groundwater ends up at the abstraction point. This is the point from where the water is taken. This could extend some distance from the source point.
- Zone of special interest (zone 4) – Zone where local conditions require additional protection.

3.4.6 As shown above in table 1, the site is not situated within a groundwater source protection zone.

3.5 Hydrology

3.5.1 The nearest watercourse is Lord's Drain which runs along Holbeach Road. The nearest river is the Coronation Channel approximately 600m to the west of the site which joins onto the River Welland located.

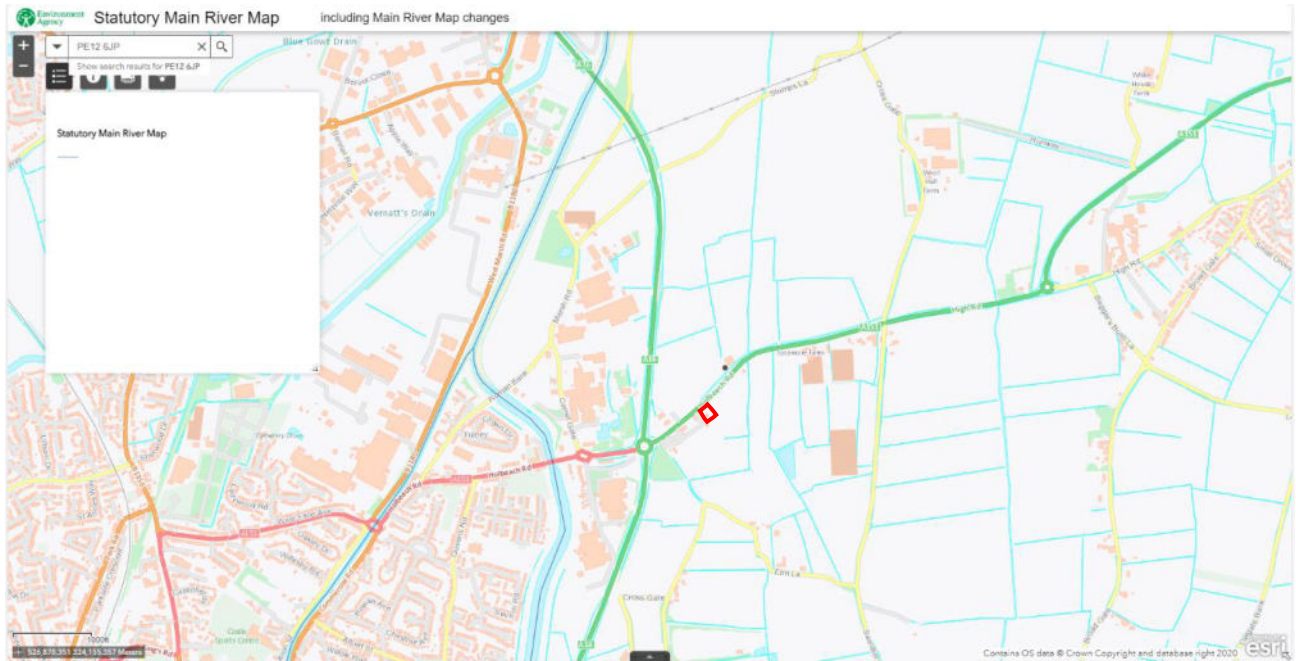


Figure 2 Statutory Main River Map

4.0 Proposed Development

- 4.1 The proposal is for an extension to the yard at the existing Castlebuild Scaffolding site along Holbeach Road as well as the erection of 3 KODA pods to be used for office, training, and storage space etc. The development will also include a new storage unit as well as the addition of solar PV panels placed on the existing store barn roof and scaffolding roof, including the storage unit itself.
- 4.2 A site plan is included in **Appendix D**.

5.0 Flooding Information

- 5.1 As set out in the National Planning Policy Framework (NPPF), inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere. For these purposes:
- “areas at risk of flooding” means land within Flood Zones 2 and 3; or land within Flood Zone 1 which has critical drainage problems, and which has been notified to the local planning authority by the Environment Agency;
 - “flood risk” means risk from all sources of flooding - including from rivers and the sea, directly from rainfall on the ground surface and rising groundwater, overwhelmed sewers and drainage systems, and from reservoirs, canals and lakes and other artificial sources.
- 5.2 Flooding information for planning from the EA has indicated the site is located within Flood Zone 3a, as found in the map at **Appendix E**.
- 5.3 As the site is within Flood Zone 3a (an area of land with a greater than 1% annual probability of fluvial flooding or a 0.5% annual probability of sea flooding), sequential tests and a site-specific FRA are required to demonstrate how the development will be safe for its lifetime, without increasing flood risk elsewhere and, where possible, reducing flood risk overall.
- 5.4 As part of the data capture, data and mapping from Lincolnshire County Council’s Preliminary Flood Risk Assessment (PFRA) (June 2011) and the Southeast Lincolnshire Strategic Flood Risk Assessment (SFRA) (March 2017) were used. This has been included and referenced in the relevant sections below.
- 5.5 Lincolnshire County Council’s PFRA (June 2011) contains information on the risk of flooding from different sources in the district. This includes historical, surface water and groundwater flooding.

6.0 Flood Risk

- 6.1 The data on the EA's website, in their updated mapping, shows that the site has a "very low risk" of surface water flooding and a "medium risk" from rivers and the sea.
- 6.2 Data from the EA's website has also confirmed that the proposed development is located in Flood Zone 3 for Planning.
- 6.3 According to Table 2 of National Planning Policy Framework (NPPF), the development, consisting of offices/storage, is classed as "less vulnerable".
- 6.4 According to NPPF Table 3 'Flood Risk Vulnerability and Flood Zone Compatibility', the development is appropriate (see below).

Table 3: Flood risk vulnerability and flood zone 'compatibility'

Flood risk vulnerability classification (see table 2)		Essential infrastructure	Water compatible	Highly vulnerable	More vulnerable	Less vulnerable
Flood zone (see table 1)	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test required	✓	✓
	Zone 3a	Exception Test required	✓	✗	Exception Test required	✓
	Zone 3b functional floodplain	Exception Test required	✓	✗	✗	✗

Key: ✓ Development is appropriate.
 ✗ Development should not be permitted.

6.5 Sequential Test

- 6.5.1 Local Planning Authorities (LPA) are encouraged to take a risk-based approach to proposals for development in or affecting flood risk areas through the application of the Sequential Test and the objectives of this test are to steer new development away from high-risk areas towards those at lower risk of flooding.
- 6.5.2 However, in some areas where developable land is in short supply, there can be an overriding need to build in areas that are at risk of flooding. In such circumstances, the application of the Sequential Test is used to ensure that the lower risk sites are developed before the higher risk ones.
- 6.5.3 NPPF states that the Sequential Test should be applied at all stages of the planning process and the starting point is generally the EA's flood zone maps.
- 6.5.4 These maps and the associated information are intended for guidance and cannot provide details for individual properties. They do not consider other considerations such as existing flood defences, alternative flooding mechanisms and detailed site-based surveys. They do, however, provide high level information on the type and likelihood of flood risk in any area of the country.
- 6.5.5 The site is located within Flood Zone 3a and so does require a sequential test.
- 6.5.6 In the Southeast Lincolnshire SFRA (March 2017), the report acknowledges that large stretches of the South Holland district, as well as the majority of the neighbouring Boston Borough area, are located within Flood Zone 3a.
- 6.5.7 Subsequently, the SFRA recommends using the provided Hazard and Depth maps to identify which flood hazard category the site is located within in both a present day (based on 2006 baseline) and a 2115-year scenario. The maps assess the residual risk posed to a site in a 1 in 100-year (1%) fluvial flooding and 1 in 200-year (0.5%) tidal flooding scenario in the event of flood defences being overtopped together with breach failure.
- 6.5.8 In the hazard mapping for the present day (based on 2006 baseline) (see **Appendix F**), the proposed site is located within an area of high hazard (*'danger for all'*) while in a 2115-year scenario, this is reduced to an area of medium hazard (*'danger for most'*).
- 6.5.9 Further mapping within the Southeast Lincolnshire SFRA (March 2017) (see **Appendix G**) shows that the high hazard rating for the site is due to a high peak depth of over 2m, reducing to a peak depth of 0.5m – 1m in the 2115-year scenario. The high peak depth in a 'present-day' scenario (based on 2006 baseline) is likely due to the site's proximity to two surface water ditches that run along both sides of Holbeach Road as areas directly adjacent to the site have a low residual peak depth of 0m – 0.25m.

- 6.5.10 Residual peak velocity mapping (see **Appendix H**) also shows the site to have a low peak velocity in a present-day scenario (based on 2006 baseline) of between 0 – 0.3m per second, increasing to between 0.3m – 1m per second in a 2115-year scenario. It can therefore be assumed that in the event of defences being overtopped or breached, occupants on site will have enough time to evacuate the area before the inundation of flood waters.
- 6.5.11 While there is a residual risk of flooding posed to the site in the event of flood defences being breached or overtopped, the probability of this occurring is low following the routine inspection and maintenance of fluvial and tidal defences.
- 6.5.12 As part of the Southeast Lincolnshire SFRA (March 2017), the EA and Local Planning Authorities (LPA) have produced flood risk mitigation requirements depending on the flood risk vulnerability of the proposed development.
- 6.5.13 As the proposed development is classified as ‘less vulnerable’ and located within an area of high hazard (*‘danger for all’*) in a present-day scenario (based on 2006 baseline), we will consult with the EA as to our proposals for the Finished Floor Levels (FFLs) of the KODA pods. As the KODA pods will be single storey, the FFLs will be raised above the maximum residual peak depth during a 1% fluvial / 0.5% tidal event in the year 2115. If this is not feasible, the FFLs will be raised 300mm above the surrounding ground levels, which will be above the existing adjacent levels, and an area of safe refuge will be provided on top of the pods.
- 6.5.14 Given the above information the site is deemed as passing the sequential test.

6.6 Exception Test

- 6.6.1 The Exception Test is an additional test to be applied by decision-makers following application of the Sequential Test. The Exception Test has two elements as shown below, both of which must be satisfied for development in a flood risk area to be considered acceptable.
- 6.6.2 The Exception Test is only appropriate for use when there are large areas in Flood Zone 2 and 3, where the Sequential Test alone cannot deliver acceptable sites, but where some continuing development is needed for wider sustainable development reasons, considering the need to avoid social or economic blight and the need for essential civil infrastructure to remain operational during floods.
- 6.6.3 For the Exception Test to be passed:
- It must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk, informed by a SFRA; and,
 - A site-specific FRA must demonstrate that the development will be safe for its lifetime, without increasing flood risk elsewhere and, where possible, reducing flood risk overall.
- 6.6.4 An exception test is not required, in accordance with NPPF Table 3, as the development is appropriate.

6.7 Fluvial Flooding Risk

- 6.7.1 The EA flooding information indicates that the site lies within Flood Zone 3 and is therefore at a high (greater than 1% annual probability) risk of flooding from fluvial sources.
- 6.7.2 However, information provided by the EA (see **Appendix J**) confirms that the site is located within an area benefitting from fluvial defences. The defences are in a fair condition and reduce the risk of fluvial flooding up to a 1 in 50 (2%) year event. Therefore, the risk of flooding from fluvial sources is reduced to medium (between 1% and 3.3% annual probability).

6.8 Tidal Flooding Risk

- 6.8.1 The EA flooding information also indicates that the site is considered to be at risk from tidal flooding.
- 6.8.2 However, information provided by the EA (see **Appendix J**) confirms that the site is located within an area benefitting from tidal defences. The defences are in a good condition and reduce the risk of flooding from tidal sources up to 1 in 100-year event. Therefore, the risk of flooding from tidal sources is reduced to medium (between 1% and 3.3% annual probability).

6.9 Historic Flood Data

- 6.9.1 The Lincolnshire County Council's PFRA (June 2011) contains historic flood data on serious fluvial and surface water flooding between 1977 to 2007. In June/July 2007, approximately 2,000 properties were flooded across Lincolnshire of which 59 of these were within the South Holland District. Mapping provided by the Boston and South Holland Flood Risk and Drainage Management Group (FR&DMG) indicates that there have been no recorded incidents of historical flooding on site.

6.10 Groundwater

- 6.10.1 Groundwater flooding is caused by the emergence of water originating from sub-surface permeable strata. A ground water flood event results from a rise in ground water level, sufficient for the water table to intersect the ground surface and inundate low lying land. Groundwater floods may emerge from either a single point or diffuse locations.
- 6.10.2 The underlying strata throughout the area and investigations into the SFRA geology data suggest that there is a risk of groundwater emergence which is likely to relate to the geology of the area. However, groundwater flooding risks are often highly localised and dependent upon geological interfaces between permeable and impermeable subsoils. Therefore, sustainable construction techniques for surfacing will minimise any potential groundwater risk.
- 6.10.3 The Lincolnshire County Council's PFRA (June 2011) contains mapping showing the susceptibility to groundwater flooding across the district. The site is not identified as being at risk of groundwater flooding. EA data also states that "Flooding from groundwater is unlikely in this area". Therefore, the risk of groundwater flooding to the site is very low.

6.11 Flooding from Sewers

- 6.11.1 Flooding from sewers can occur because of different reasons; if sewers are blocked during heavy rainfall, or if a sewer cannot provide adequate capacity, then flooding can cause a large amount of damage.
- 6.11.2 Neither the Lincolnshire County Council's PFRA (June 2011) or The Southeast Lincolnshire SFRA (March 2017) contain information relating to the risk of flooding from sewers within the county/district.
- 6.11.3 However, due to the location of the proposed development and the lack of surrounding properties, the risk of flooding from sewers is considered to be low.

6.12 Flooding from Reservoirs

6.12.1 Reservoir flooding is extremely unlikely to happen. There has been no loss of life in the UK from reservoir flooding since 1925. All large reservoirs must be inspected and supervised by reservoir panel engineers. As the enforcement authority for the Reservoirs Act 1975 in England, the Environment Agency ensures that reservoirs are inspected regularly, and essential safety work is carried out.

6.12.2 However, in the unlikely event that a reservoir dam failed, a large volume of water would escape at once and flooding could happen with little or no warning. If the site is within a risk area, plans should be made for safe evacuation and escape. Residents may need to evacuate immediately, know the safest route to safety, and be ready to follow the advice of emergency services.

6.12.3 Data from the EA's website indicates that area to the northeast of the site is at risk from reservoir flooding, as shown in figure 3 below.



6.13 Surface Water Flooding

- 6.13.1 Overland flow / surface water flooding typically arise because of intense rainfall, often of short duration, that is unable to soak into the ground or enter drainage systems. It can run quickly off land and result in localised flooding.
- 6.13.2 The EA has produced illustrative mapping (Flood Map for Surface Water) relating to flooding risks from surface water. They are classified as Flood Hazard Maps for the purpose of the Flood Risk Regulations 2009. These maps are the next generation on from the previous “Area Susceptible to Surface Water Flooding” maps, which are contained within the SFRA.
- 6.13.3 The EA maps show high resolution image and indicative flow paths for pluvial events. The maps are based on coarse level data and indicate ridges, valleys and flat spots where water would collect. Typically, the flow paths follow valleys, rivers and watercourses.
- 6.13.4 The surface water maps and the associated information are intended for guidance only and cannot provide details for individual properties. They do, however, provide high level information and indicate areas in which surface water flooding issues should be investigated further. The risk categories are classified as follows:
- Very low probability of flooding – This zone is assessed as having less than a 1 in 1000 annual probability of surface water flooding.
 - Low probability of flooding – This zone comprises land assessed as having between a 1 in 100 and 1 in 1000 annual probability of surface water flooding.
 - Medium probability of flooding - This zone comprises land assessed as having between a 1 in 30 and 1 in 100 annual probability of surface water flooding.
 - High probability of flooding – This zone is assessed as having greater than a 1 in 30 annual probability of surface water flooding.
- 6.13.5 The Southeast Lincolnshire SFRA (March 2017) uses the updated Flood Map for Surface Water (uFMfSW), published by the EA, to determine the risk of surface water flooding to sites within the district.
- 6.13.6 A review of the EA mapping indicates that there is a “very low” risk of surface water flooding to the site.

6.13.7 An assessment of the “low” risk scenario (up to 1 in 1000-year event), indicates that there would be no surface water flooding on site.



6.13.8 An assessment of the “medium” risk scenario (up to 1 in 100-year event), indicates that there would be no surface water flooding on site.



Figure 5 EA Surface Water Flood Map Medium Risk



6.13.9 An assessment of the “high” risk scenario (greater than 1 in 30-year event), indicates that there would be no surface water flooding on site.



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

Flood depth (millimetres)

Over 900mm 300 to 900mm Below 300mm

Figure 6 EA Surface Water Flood Map High Risk

6.14 Flood Warning

6.14.1 The EA is responsible for monitoring flood events and for issuing warnings to people in properties and businesses at risk of flooding. To fulfill their responsibilities, the EA operates a coded warning system. This is a four-stage warning system and each stage will trigger a set of procedures for various organizations.

 FLOOD ALERT	 FLOOD WARNING	 SEVERE FLOOD WARNING	Warning no longer in force
What it means Flooding is possible. Be prepared.	What it means Flooding is expected. Immediate action required.	What it means Severe flooding. Danger to life.	What it means No further flooding is currently expected for your area.
When it's used Two hours to two days in advance of flooding.	When it's used Half an hour to one day in advance of flooding.	When it's used When flooding poses a significant risk to life or significant disruption to communities.	When it's used When a flood warning or severe flood warning is no longer in force.
Triggers • Forecasts that indicate that flooding from rivers may be possible. • Forecast intense rainfall for rivers that respond very rapidly. • Forecasts of high tides, surges or strong winds.	Triggers • High tides, surges coupled with strong winds. • Heavy rainfall forecast to cause flash flooding of rivers. • Forecast flooding from rivers.	Triggers • Actual flooding where the conditions pose a significant risk to life and/or widespread disruption to communities. • On-site observations from flooded locations. • A breach in defences or failure of a tidal surge barrier or dam that is likely to cause significant risk to life. • Discussions with partners.	Triggers • Risk of flooding has passed. • River or sea levels have dropped back below severe flood warning or flood warning levels and no further flooding is expected. • Professional judgment and discussions with partners agree that a severe flood warning status is no longer needed.
Impact on the ground • Flooding of fields, recreation land and car parks. • Flooding of minor roads. • Flooding of farmland. • Spray or wave overtopping on the coast.	Impact on the ground • Flooding of homes and businesses. • Flooding of rail infrastructure. • Flooding to roads with major impacts. • Significant waves and spray on the coast. • Extensive flood plain inundation (including caravan parks or campsites). • Flooding of major tourist/recreational attractions.	Impact on the ground • Deep and fast flowing water. • Debris in the water causing danger. • Potential or observed collapse of buildings and structures. • Communities isolated by flood waters. • Critical infrastructure for communities disabled. • Large number of evacuees. • Military support.	Impact on the ground • No new impacts expected from flooding, however there may still be: • Standing water following flooding; • Flooded properties; • Flooded or damaged infrastructure.
Advice to the public/media • Be prepared to act on your flood plan. • Prepare a flood kit of essential items. • Avoid walking, cycling or driving through flood water. • Farmers should consider moving livestock and equipment away from areas likely to flood. • Call Floodline on 0845 988 1188 for up-to-date flooding information. • Monitor local water levels on the Environment Agency website www.environment-agency.gov.uk.	Advice to the public/media • Protect yourself, your family and help others. • Move family, pets and valuables to a safe place. • Turn off gas, electricity and water supplies if safe to do so. • Put flood protection equipment in place. • If you are caught in a flash flood, get to higher ground. • Call Floodline on 0845 988 1188 for up-to-date information.	Advice to the public/media • Stay in a safe place with a means of escape. • Be ready should you need to evacuate from your home. • Co-operate with the emergency services. • Call 999 if you are in immediate danger. • Call Floodline on 0845 988 1188 for up-to-date flooding information.	Advice to the public/media • Be careful. Flood water may still be around for several days and could be contaminated. • If you've been flooded, ring your insurance company as soon as possible.
Advice to operational organisations • Check your flood response plans to see how your organisation needs to respond. • Speak to your local Environment Agency Flood Warning Duty Officer for the latest forecast information. • Dial into Flood Advisory Service teleconferences. • Advise the public to call Floodline on 0845 988 1188 for up-to-date flooding information. • Please report any flooding in your area to your local Environment Agency office.	Advice to operational organisations • Check flood response plans for actions required at this stage. • Speak to your local Environment Agency Flood Warning Duty Officer for the latest forecast information. • Advise the public to call Floodline on 0845 988 1188 for up-to-date flooding information. • Please report any flooding in your area to your local Environment Agency office.	Advice to operational organisations • Check flood response plans for actions required at this stage. • Advise the public to put their safety first and to be ready to evacuate should the authorities decide it's needed. • Develop clear messages for local communities and the public.	Advice to operational organisations • Recovery phase will have started. • Advise the public to call Floodline on 0845 988 1188 for advice on what to do if they have been affected by flooding.

Figure 7 EA Flood Warning System

6.14.2 The owners will register with the EA to receive flood warnings and will be able to warn individuals well in advance of any potential flooding event.

6.14.3 The Planning Authority must be in consultation with the emergency services as to the appropriate access and safe routes for the site during an extreme storm event. In accordance with Section 13.S3.3 of the FRA Guidance for New Developments. Emergency Response Plans for the local area are available on the council website. It is not envisaged that there will be any additional burden on emergency services during a flood event.

6.15 General Evacuation Advice:

- Avoid walking or driving through flood water, as only 150mm of fast flowing flood water is able to knock a person over and 600mm is able to float a car. Flooding can cause manhole covers to come off, leaving hidden dangers.
- Do not walk on sea defences or riverbanks.
- Take care or avoid crossing bridges when water levels are high.
- Take care crossing culverts as they are dangerous when flooded.
- Look out for other hazards such as fallen power lines and trees.
- Keep Children away from flood water.
- Wash hands thoroughly if you come into contact with flood water as it may be contaminated with sewage.
- Always follow the advice provided at the time by the Emergency Services. The Emergency Services may direct you to a Local Authority Evacuation Centre, which has been specially prepared for people being evacuated from their homes. Free food and bedding are provided, however spare clothing should be taken, essential medication and any baby care products should an infant be involved in the evacuation.

6.16 Climate Change

- 6.16.1 The current EA Climate Change Guidance (2022) advises that a 1% annual rainfall exceedance should have an upper end climate change allowance of 40% for a development within the Welland Management Catchment with a lifetime between 2061 and 2125.
- 6.16.2 The current EA Climate Change Guidance (2022) also recommends a 17% central allowance increase in river flow within the Welland Management Catchment be used for a 'less vulnerable' development in Flood Zone 3a.

6.17 Flood Compensation

- 6.17.1 The proposed development lies within Flood Zone 3a and so there is a statutory requirement to assess the need for flood compensation.
- 6.17.2 In-order to mitigate the need for flood compensation on site, it is proposed that the Koda pods on site be elevated 300mm above the ground, with open steps formed to the front of each pod to allow the space below to flood.

7.0 Summary and Conclusions

- 7.1 Larkfleet Group Ltd are planning a proposed development on Castle Build Site, Holbeach Road, Spalding, PE12 6JP.
- 7.2 Patrick Parsons has been instructed by Larkfleet Group Ltd to produce a Flood Risk Assessment under the NPPF to support the Planning Application.
- 7.3 A review of the existing topography shows the elevation of the site to be the greatest to the northwest, gradually falling towards the southeast.
- 7.4 The Environment Agency indicates that the site is within Flood Zone 3a and has a very low risk of surface water flooding and a medium risk from rivers and the sea. The site also benefits from being situated within an area protected by fluvial and tidal defences up to a 1 in 50 and 1 in 100-year event respectively.
- 7.5 Peak depth mapping within the Southeast Lincolnshire SFRA (March 2017) shows that in the event of flood defences being breached or overtopped, there would be a high residual peak depth of over 2m. However, this is likely to be as a result of the site's proximity to two surface water ditches that run adjacent to Holbeach Road on both sides as land directly adjacent to the site has a low residual peak depth. Further mapping provided as part of the Southeast Lincolnshire SFRA shows that in the event of flood defences failing, the peak flood velocity on site would be relatively low in both a present day and 2115-year scenario.
- 7.6 While there is a residual risk of flooding to the site in the event of flood defences being breached or overtopped, the probability of this occurring is low following the routine inspection and maintenance of fluvial and tidal defences.
- 7.7 As the proposed development is classed as 'less vulnerable' and based on flood mitigation framework produced by the EA and LPA as part of the Southeast Lincolnshire SFRA (March 2017), the finished floor levels of the planned KODA pods will be raised above the maximum residual peak depth during a 1% / 0.5% tidal event in the year 2115. Where this is not feasible, the finished floor levels will be raised 300mm above the surrounding ground levels, which will be above the existing adjacent levels, with an area of safe refuge provided on top of the pods.
- 7.8 The proposed development is appropriate and sustainable in terms as set out in NPPF.



APPENDIX A – Site Location Plan



InstaVolt
Charging Station

McDonald's
Fast food

Gulf

Woodhouse Farm Lodge

A151

Holbeach Rd

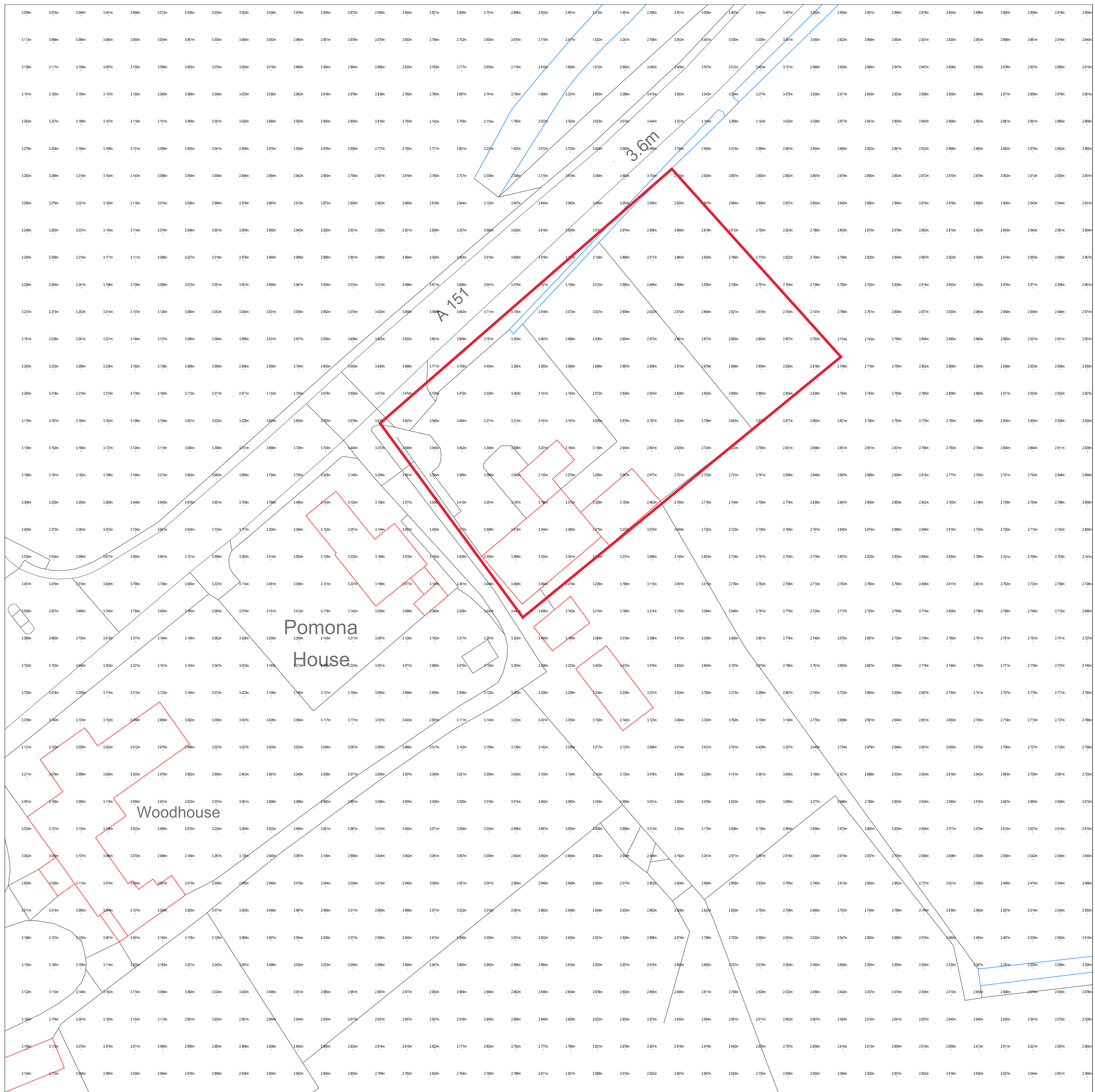
A151

Holbeach Rd

Lord's



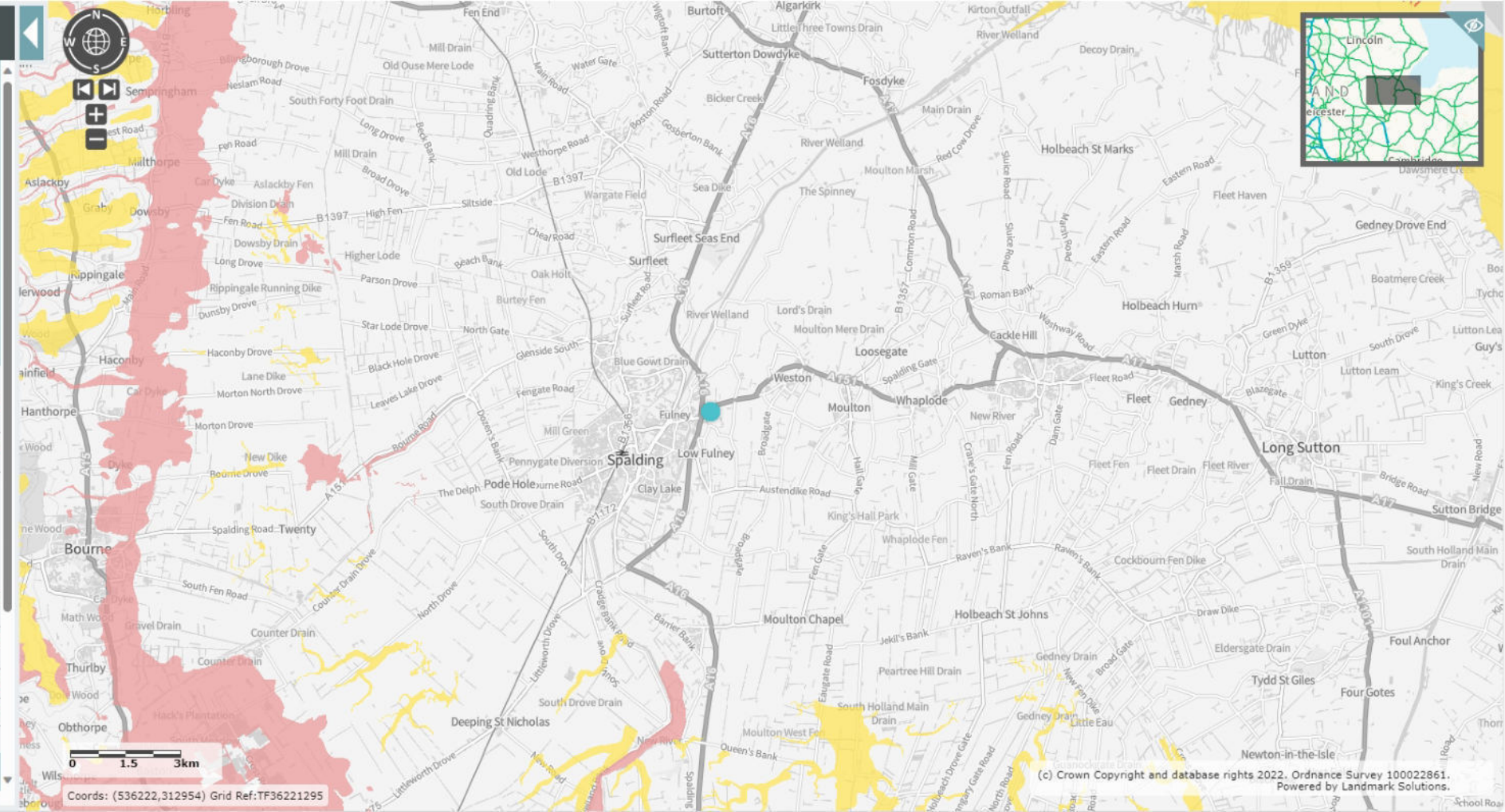
APPENDIX B – LIDAR Data





APPENDIX C – Magic Map Geology Information

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☐	Countryside Stewardship Targeting & Scoring Layers
☐	Designations
☐	Habitats and Species
☐	Land Based Schemes
☒	Landscape
☒	Geology and Soils
☐	☐ Aquifer Designation Map (Bedrock) (England)
☒	☐ Aquifer Designation Map (Superficial Drift) (England) ☒ Principal ☐ Secondary A ☐ Secondary B ☐ Secondary (undifferentiated) ☐ Unknown (lakes+landslip) ☐ Unproductive
☐	☐ Groundwater Vulnerability Map (England)
☐	☐ Geological Places to Visit (England)
☐	☐ Geological Descriptions (England)
☐	☐ Soilscape (England)
☐	Landscape Classifications
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- ☒ Landscape

☒ **Geology and Soils**

- ☐ Aquifer Designation Map (Bedrock) (England)
- ☐ Aquifer Designation Map (Superficial Drift) (England)
- ☒ Groundwater Vulnerability Map (England)
 - Local Information
 - Soluble Rock Risk
 - High
 - Medium - High
 - Medium
 - Medium - Low
 - Low
 - Unproductive
- ☐ Geological Places to Visit (England)
- ☐ Geological Descriptions (England)
- ☐ Soilscape (England)
- ☐ Landscape Classifications

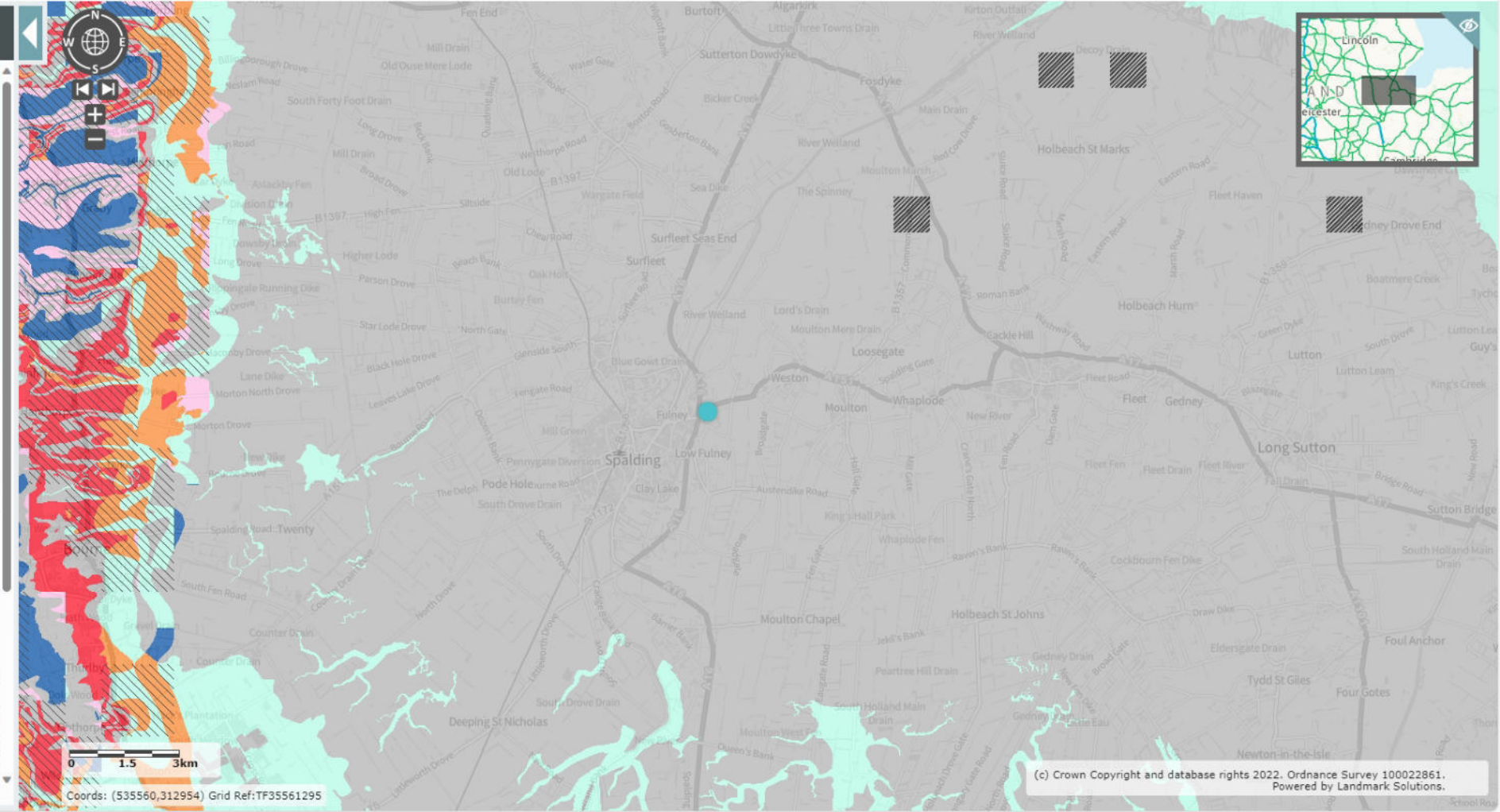


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- ☐ Land Management Initiatives (England) (i)
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- ☐ **RSPB Reserves (GB)**
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- ☒ ☐ Source Protection Zones merged (England) (i)

 Zone I - Inner Protection Zone

 Zone I - Subsurface Activity

 Zone II - Outer Protection

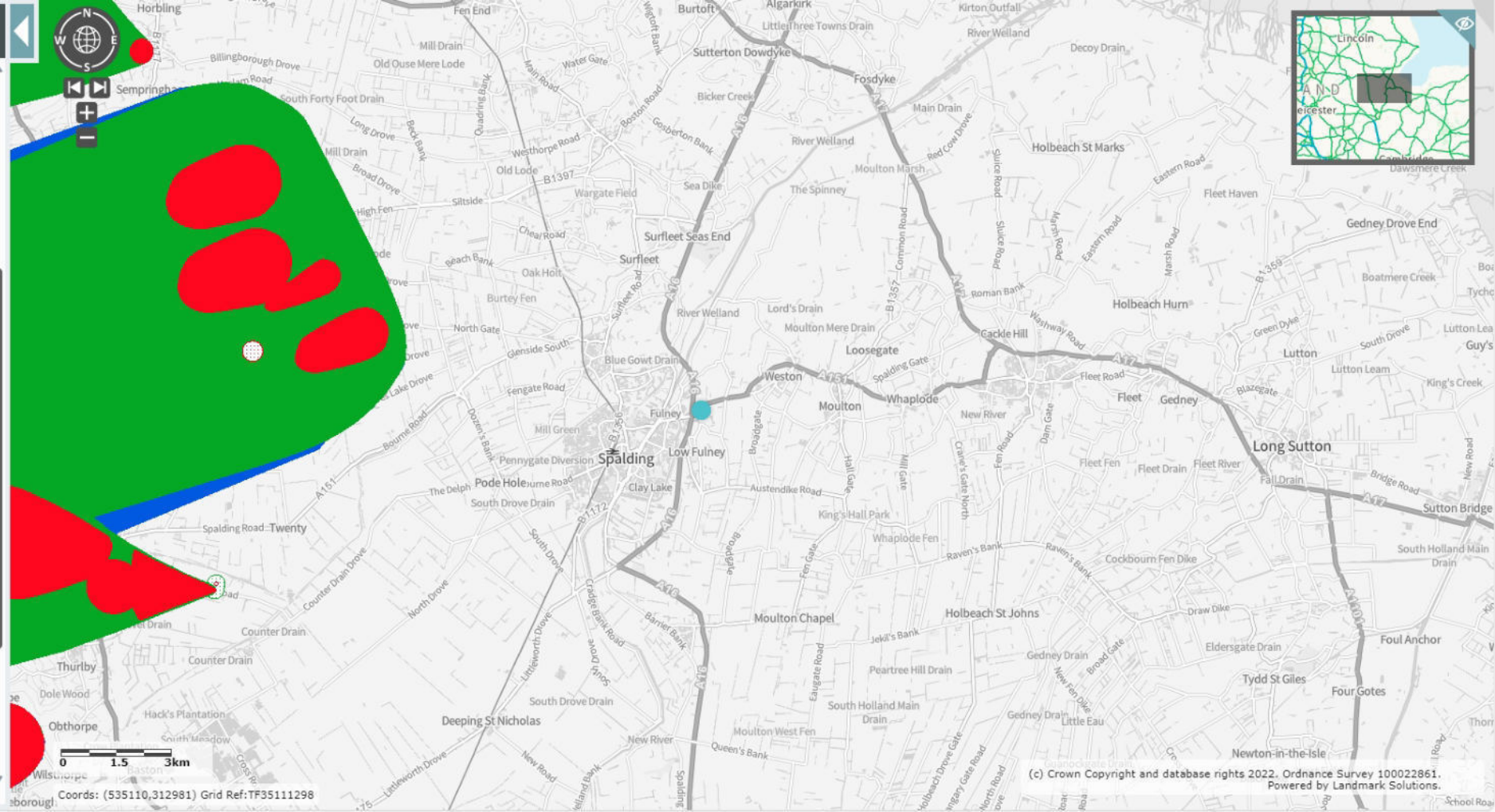
 Zone II - Subsurface Activity

 Zone III - Total Catchment

 Zone III - Subsurface Activity

 Zone of Special Interest

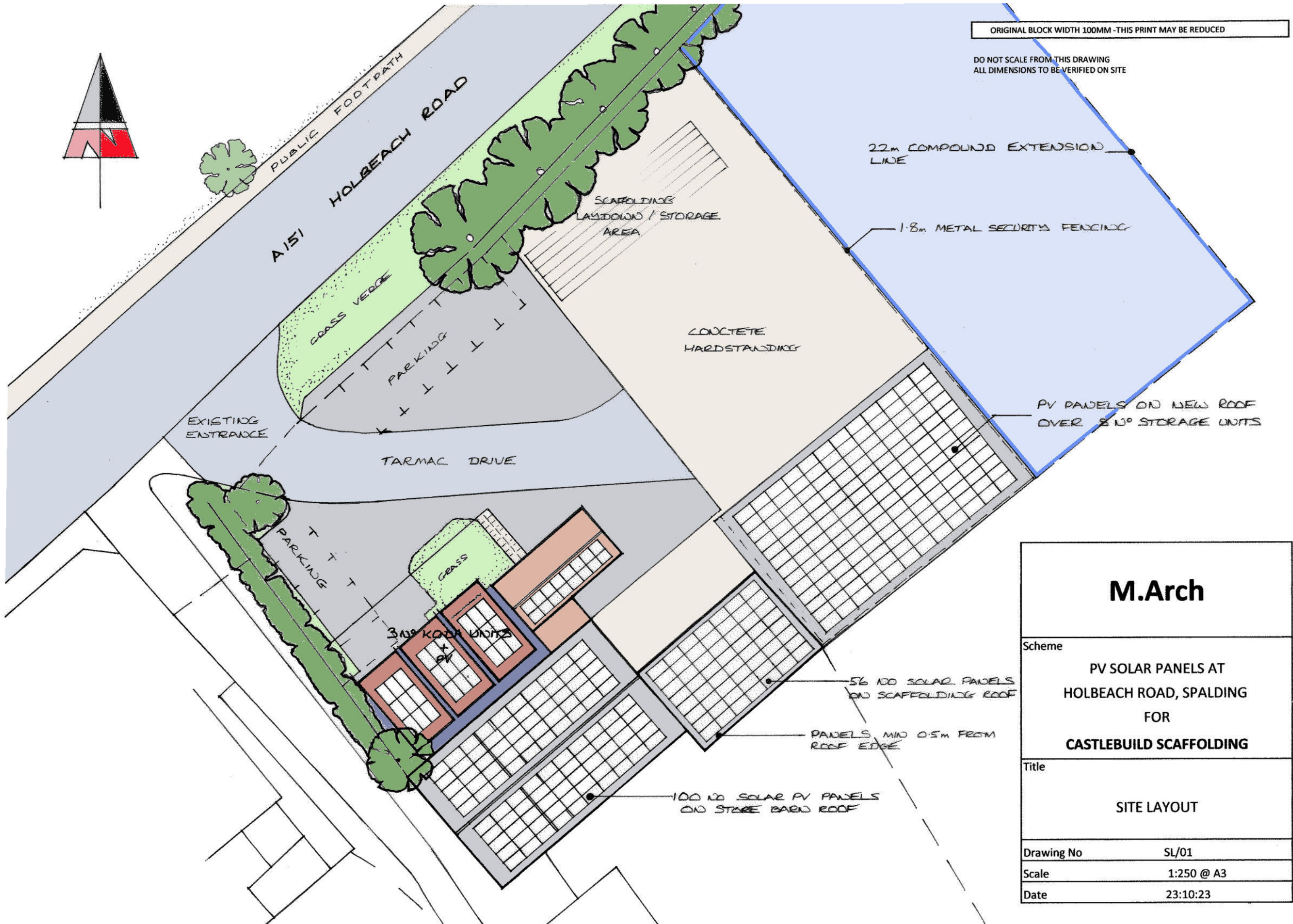
- ☐ ☐ **Marine Designations**
- ☐ **Habitats and Species**
- ☐ **Land Based Schemes**
- ☐ **Landscape**
- ☐ **Marine**



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APPENDIX D – Proposed Site Layout



ORIGINAL BLOCK WIDTH 100MM -THIS PRINT MAY BE REDUCED

DO NOT SCALE FROM THIS DRAWING
ALL DIMENSIONS TO BE VERIFIED ON SITE

M.Arch

Scheme
PV SOLAR PANELS AT
HOLBEACH ROAD, SPALDING
FOR
CASTLEBUILD SCAFFOLDING

Title
SITE LAYOUT

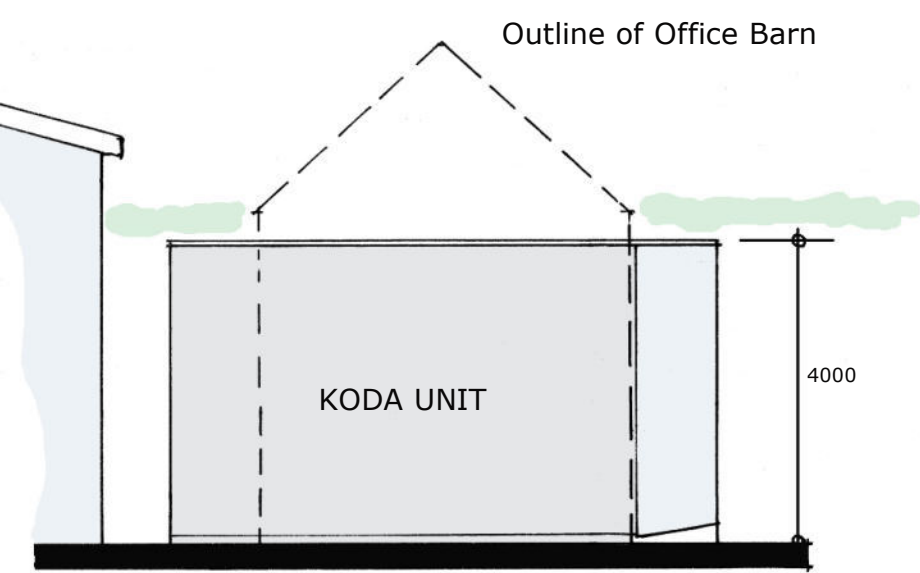
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Date	23:10:23

ORIGINAL BLOCK WIDTH 100MM -THIS PRINT MAY BE REDUCED

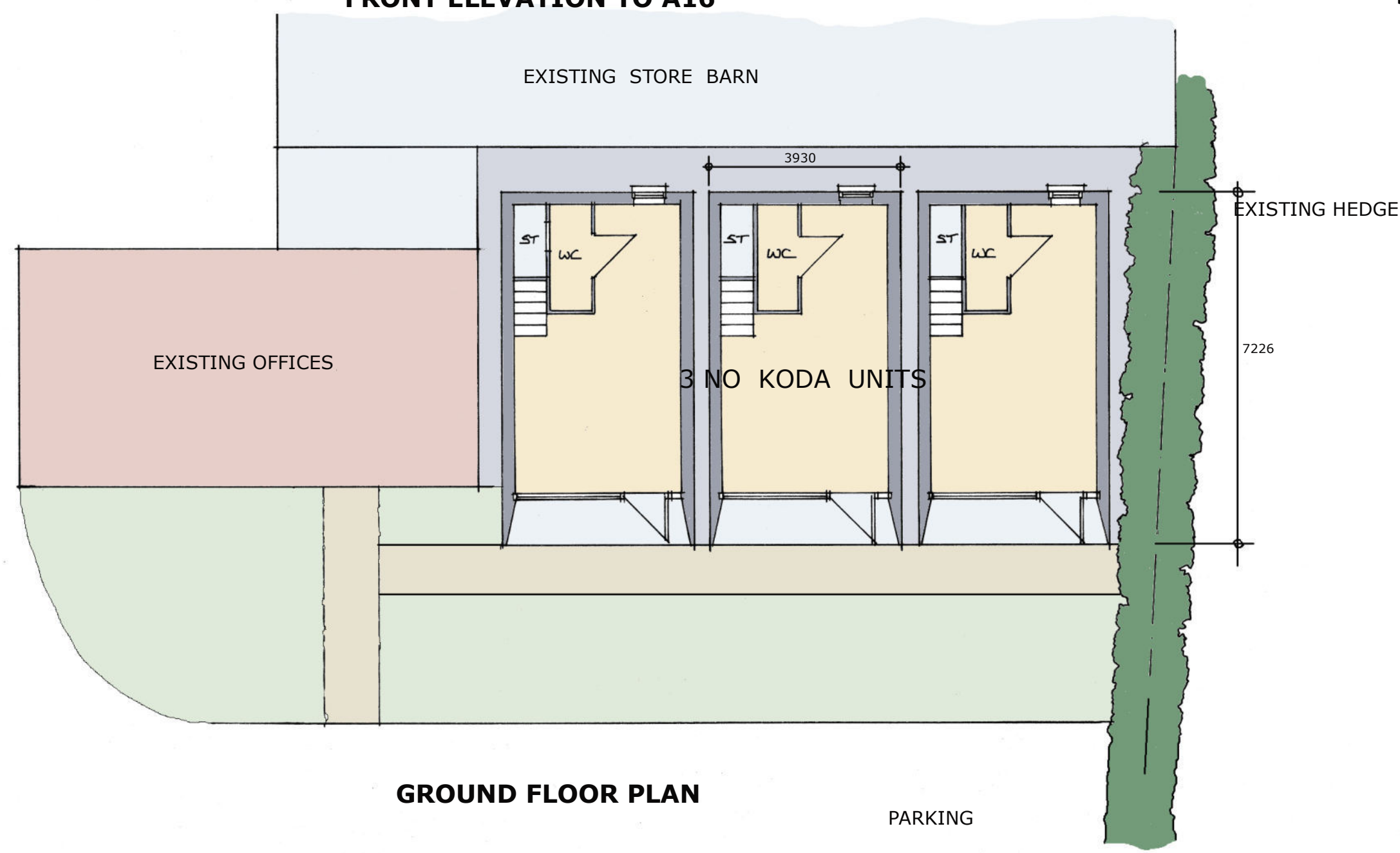
DO NOT SCALE FROM THIS DRAWING
ALL DIMENSIONS TO BE VERIFIED ON SITE



FRONT ELEVATION TO A16



SIDE ELEVATION



GROUND FLOOR PLAN

M.Arch

Scheme	
3no KODA UNITS AT HOLBEACH ROAD, SPALDING FOR CASTLEBUILD SCAFFOLDING	
Title	
BLOCK ELEVATION AND PLANS	
Drawing No	SD/01
Scale	1:100 @ A3
Date	10:11:23

APPENDIX E – Environment Agency Flood Map

Flood map for planning

Your reference
<Unspecified>

Location (easting/northing)
526832/324012

Created
12 Dec 2023 12:55

**Your selected location is in flood zone 3
– an area with a high probability of flooding.**

This means:

- you may need to complete a flood risk assessment for development in this area
- you should ask the Environment Agency about the level of flood protection at your location and request a Flood Defence Breach Hazard Map (You can email the Environment Agency at: enquiries@environment-agency.gov.uk)
- you should follow the Environment Agency's standing advice for carrying out a flood risk assessment (find out more at www.gov.uk/guidance/flood-risk-assessment-standing-advice)

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Flood risk data is covered by the Open Government Licence which sets out the terms and conditions for using government data. <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2022 OS 100024198. <https://flood-map-for-planning.service.gov.uk/os-terms>

Flood map for planning

Your reference
<Unspecified>

Location (easting/northing)
526832/324012

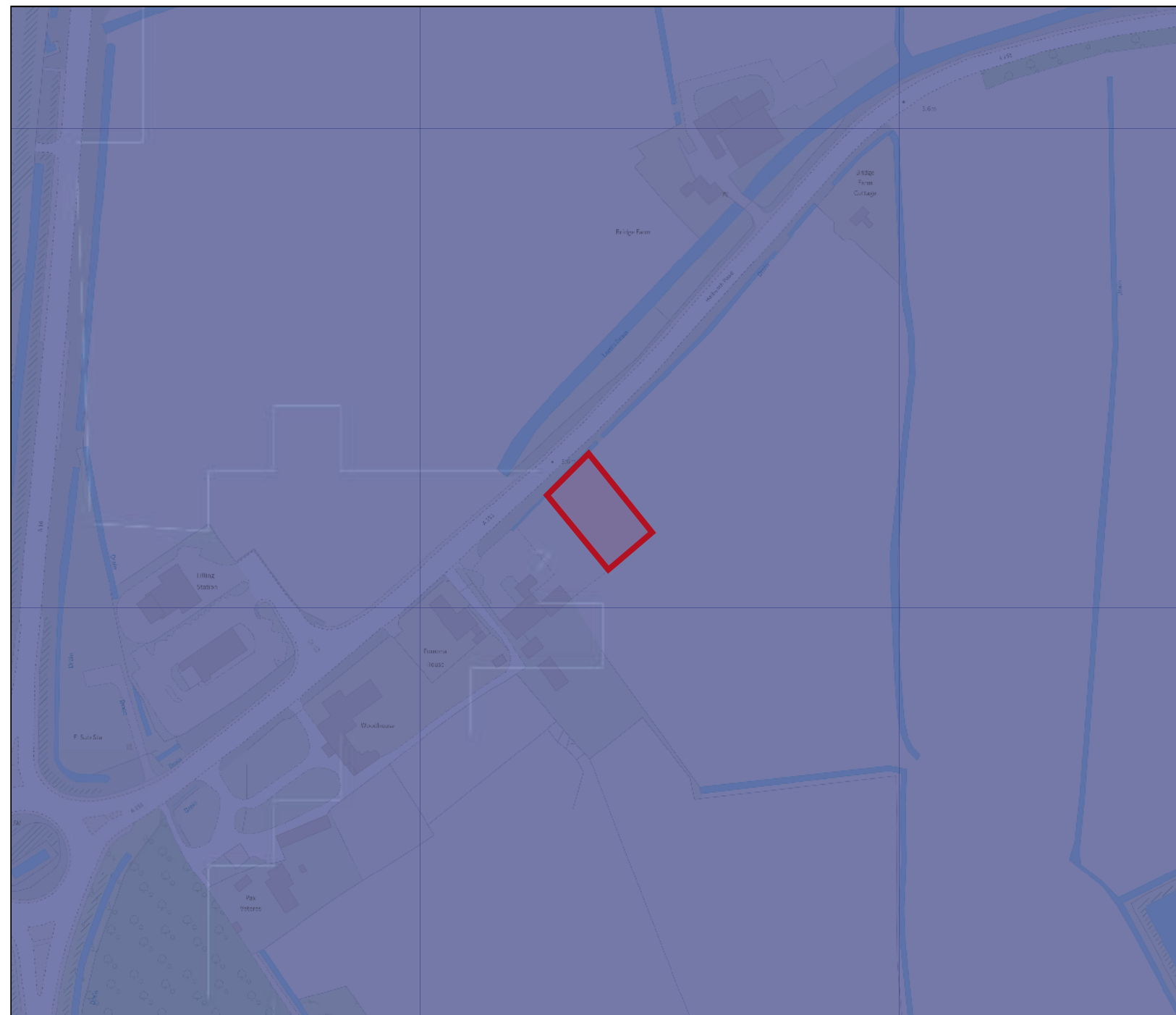
Scale
1:2500

Created
12 Dec 2023 12:55

-  Selected area
-  Flood zone 3
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Water storage area

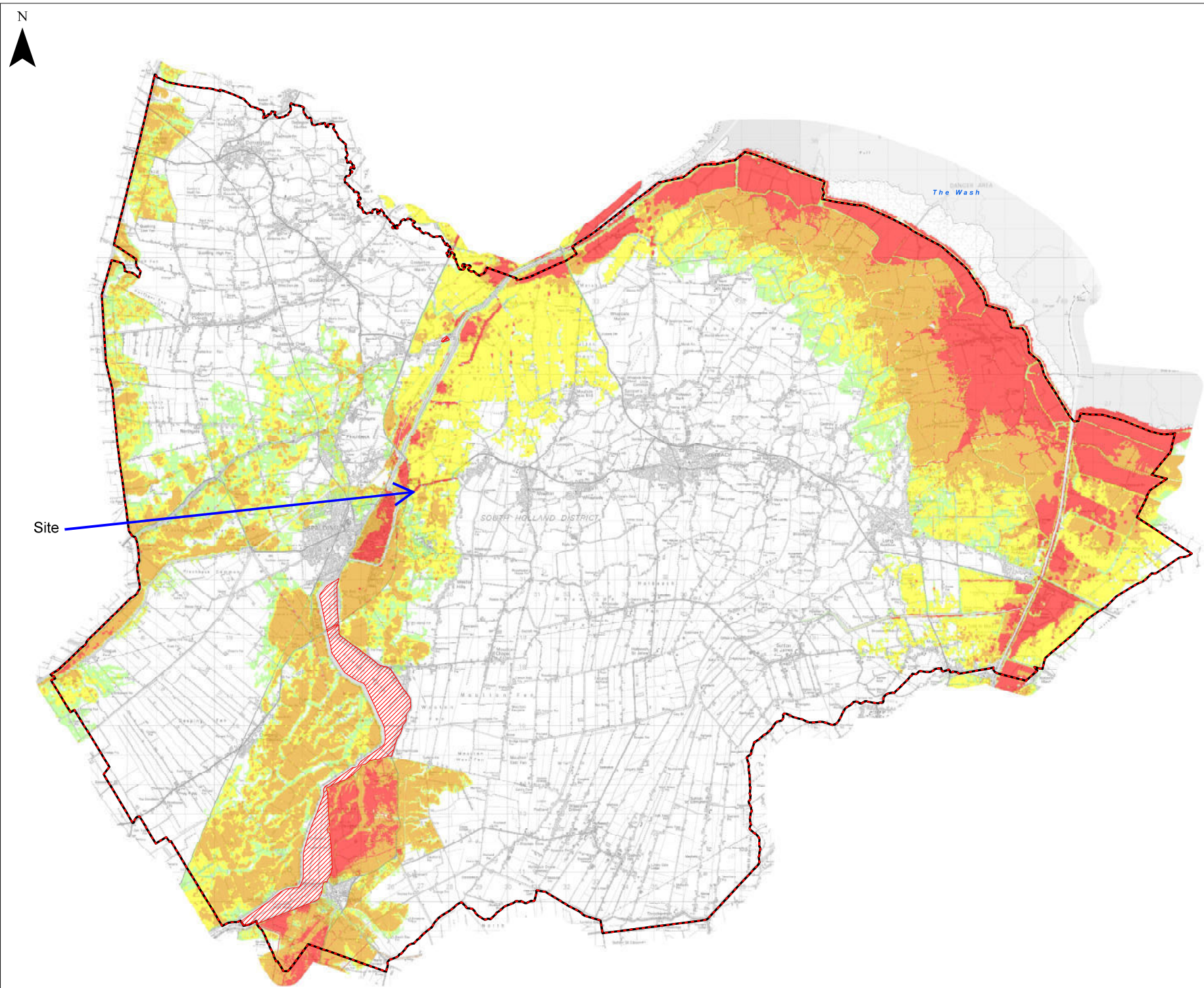
0 20 40 60m

Page 2 of 2





APPENDIX F – Residual Hazard Mapping



NOTES

- 1. The potential flooding consequences shown on this map primarily relate to flooding from the sea and main rivers taking into account the presence of current flood risk management measures such as flood defences.
- 2. This update only included new flood risk information from River Willand (Fluvial), River Glen (Fluvial) and Tidal hazard mapping (River Willand, River Nene and the Wash sea defences). No new information from the Internal Drainage Boards and associated systems was used for this update.
- 3. In addition to the potential flood extents shown on this map, there may be shallow flooding in low-lying rural areas.
- 4. The consequences designated as being a Residual Risk arise from direct overtopping of defences, where this would occur, together with breach failure which is assumed could occur at any point along the defences.
- 5. Functional Floodplain encompasses areas where water is intended to flow or be stored in times of flood.
- 6. Land outside South Holland District is not considered.
- 7. This map shows the extents only of the flooding probability bands relevant to the map title.

Map Legend

- 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)
- Functional Floodplain**
- South Holland District Boundary**

2	Feb 17	Modelling and Mapping Update
1	Dec 16	Modelling and Mapping Update
REV	DATE	REMARKS

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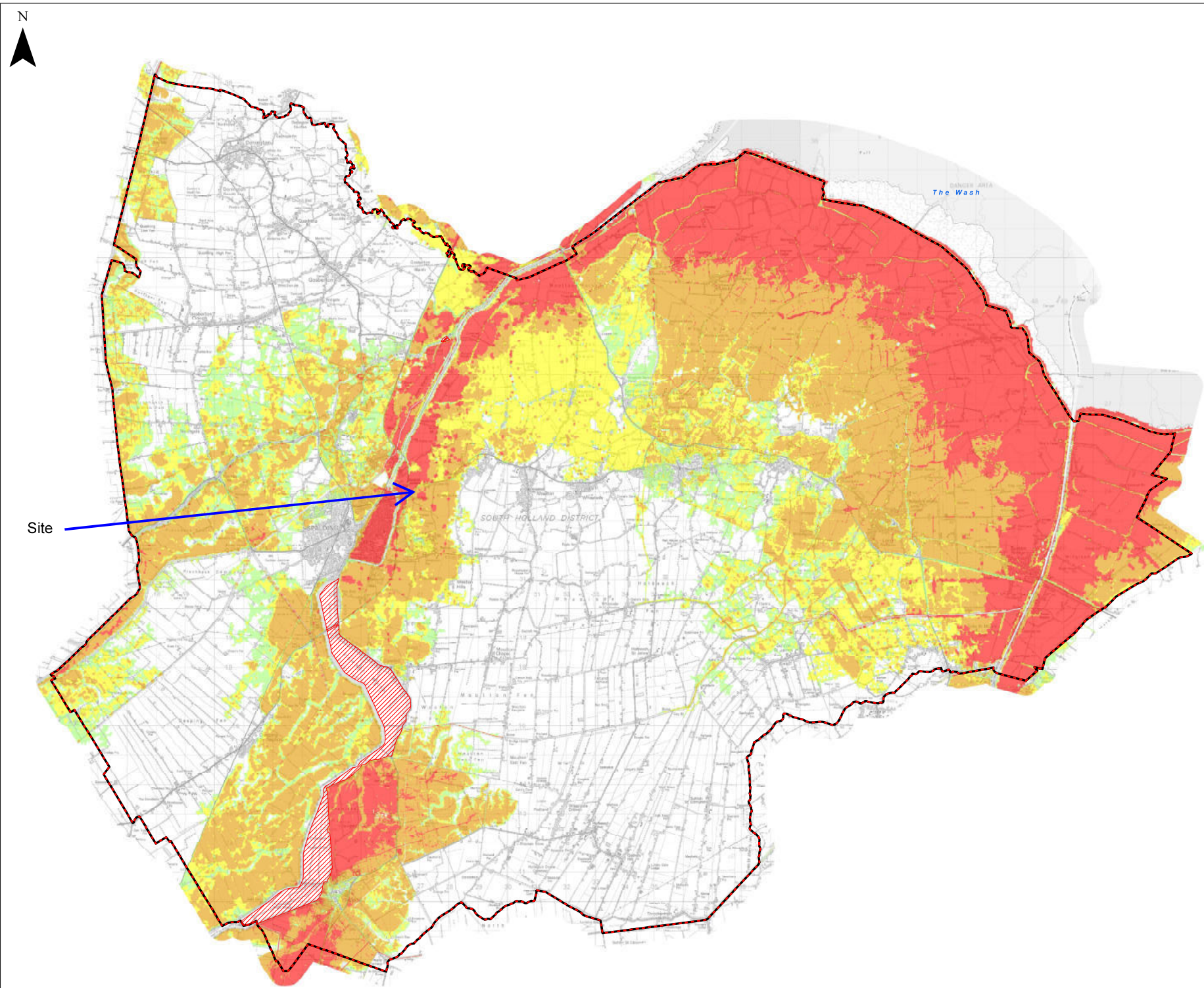
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UPDATE OF STRATEGIC
FLOOD RISK ASSESSMENT
Residual Flood Hazard
District - Present Day
1% Fluvial / 0.5% Tidal Event Probability

DATE OF ISSUE: Feb 2017	REV NO: 2
SCALE: 1 : 60,000 @ A1	MAP NO:



- NOTES**
1. The potential flooding consequences shown on this map primarily relate to flooding from the sea and main rivers taking into account the presence of current flood risk management measures such as flood defences.
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 7. This map shows the extents only of the flooding probability bands relevant to the map title.

Map Legend

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)

Functional Floodplain

South Holland District Boundary

2	Feb 17	Modelling and Mapping Update
1	Dec 16	Modelling and Mapping Update
REV	DATE	REMARKS
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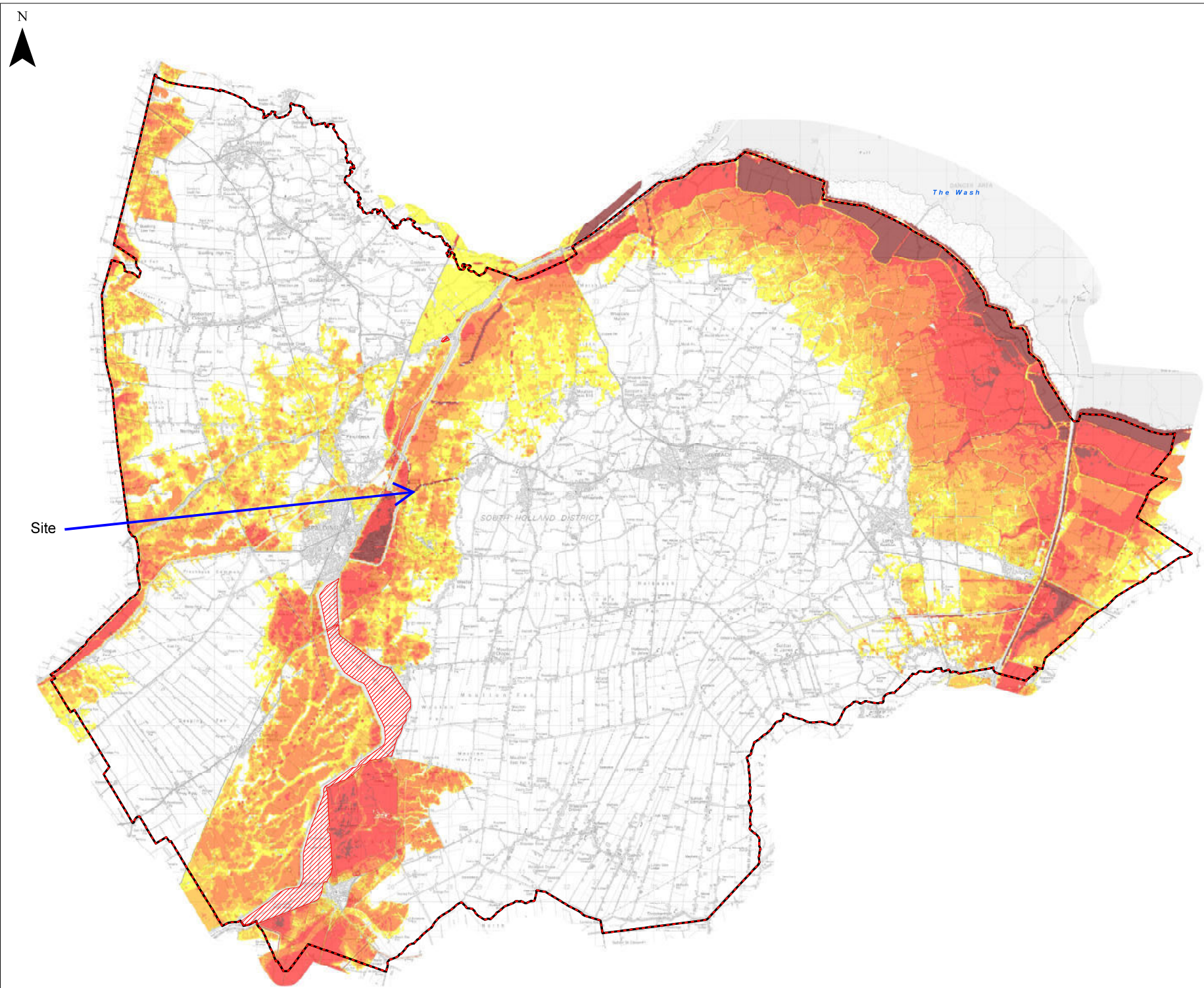


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**UPDATE OF STRATEGIC
FLOOD RISK ASSESSMENT**
Residual Flood Hazard
District - Year 2115
1% Fluvial / 0.5% Tidal Event Probability

DATE OF ISSUE: Feb 2017	REV NO: 2
SCALE: 1 : 60,000 @ A1	MAP NO:

APPENDIX G – Residual Peak Depth Mapping

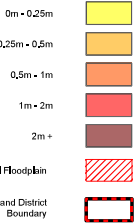


NOTES

1. The potential flooding consequences shown on this map primarily relate to flooding from the sea and main rivers taking into account the presence of current flood risk management measures such as flood defences.
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Map Legend

Peak Depth



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1	Dec 16	Modelling and Mapping Update

REV	DATE	REMARKS
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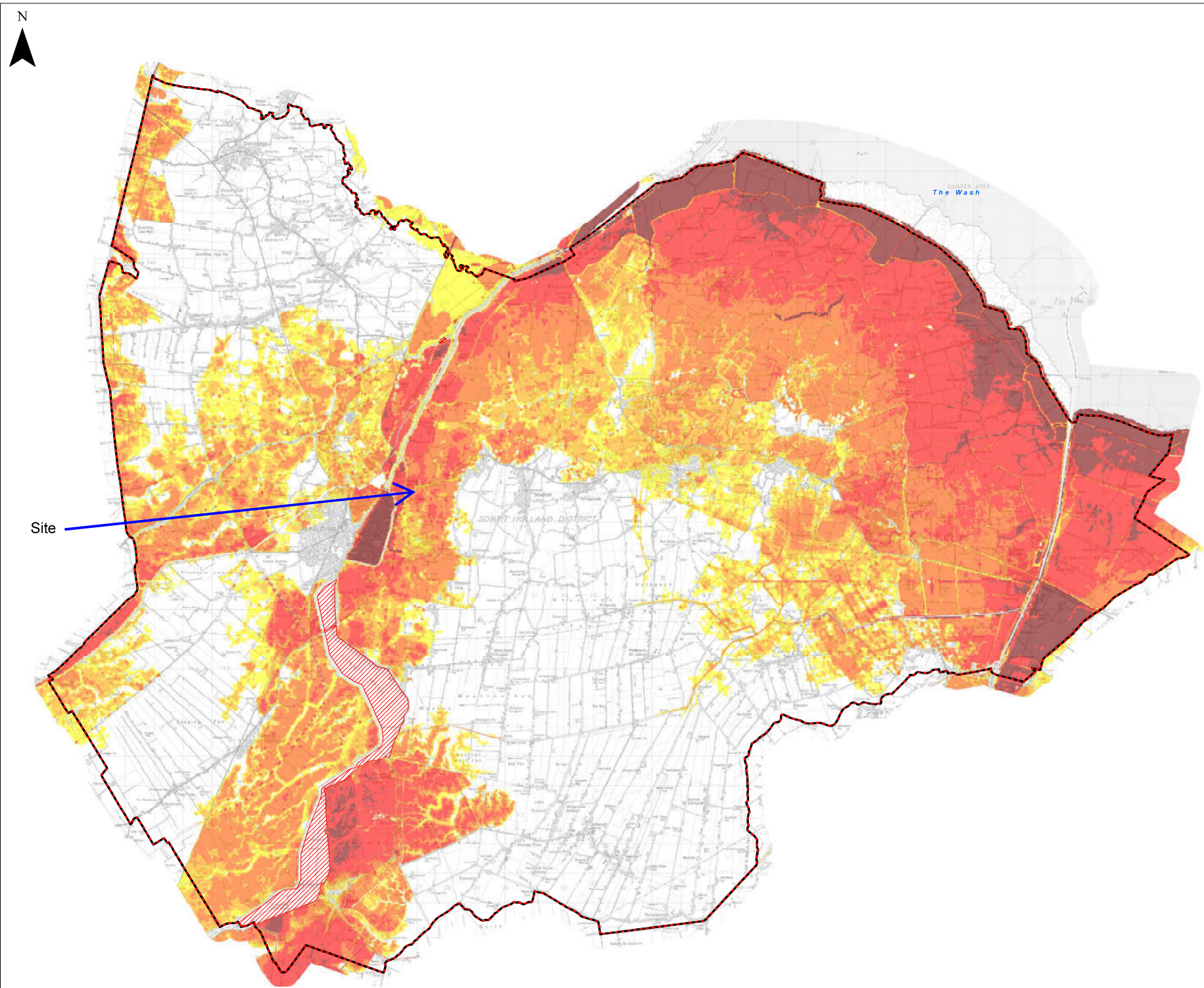
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UPDATE OF STRATEGIC
FLOOD RISK ASSESSMENT
Residual Peak Depth
District - Present Day
1% Fluvial / 0.5% Tidal Event Probability

DATE OF ISSUE: Feb 2017	REV NO: 2
SCALE: 1 : 60,000 @ A1	MAP NO:



NOTES

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7. This map shows the extents only of the flooding probability bands relevant to the map Title

Map Legend

Peak Depth	
0m - 0.25m	
0.25m - 0.5m	
0.5m - 1m	
1m - 2m	
2m +	
Functional Floodplain	
South Holland District Boundary	

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REV	DATE	REMARKS
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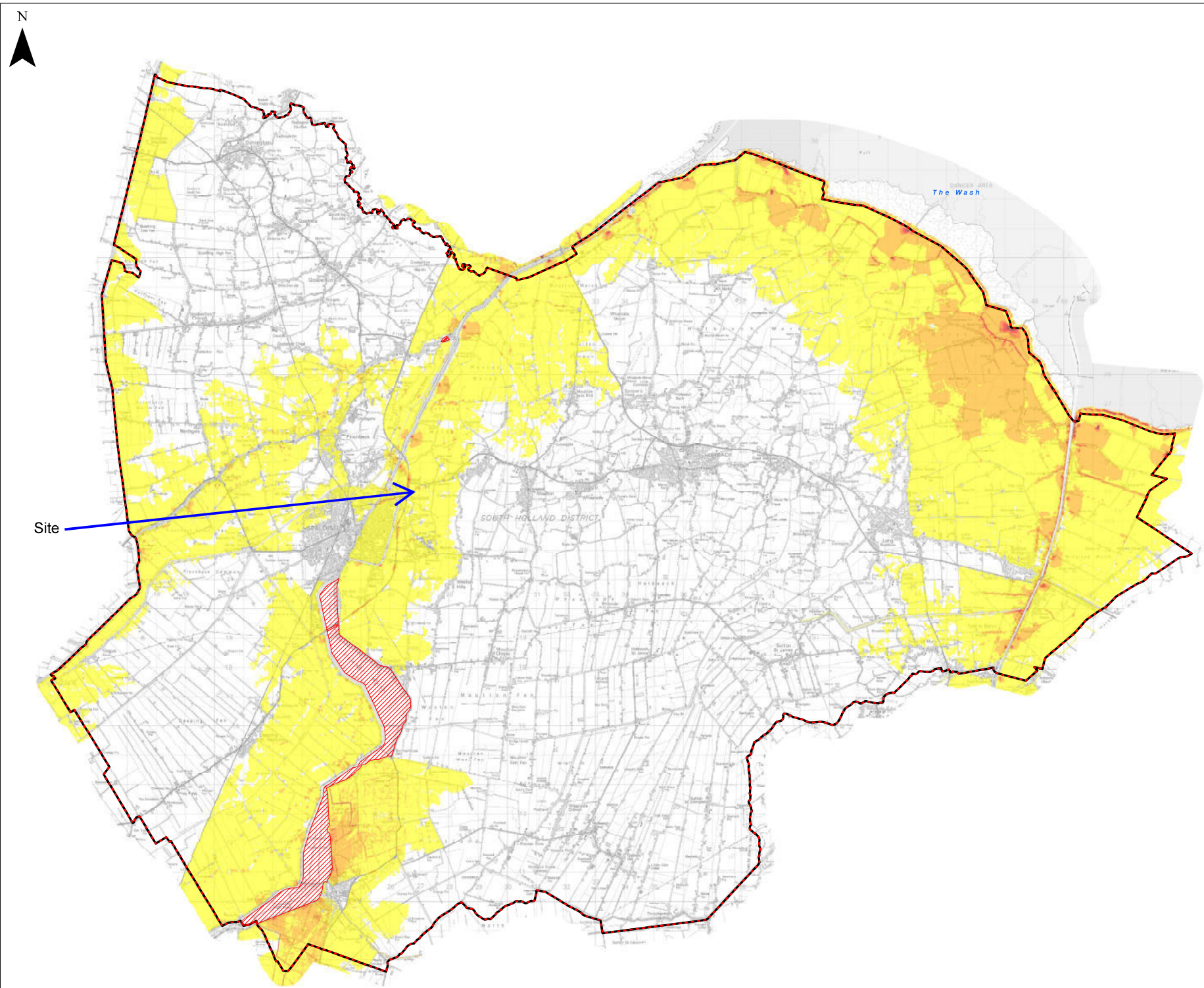
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UPDATE OF STRATEGIC
FLOOD RISK ASSESSMENT
Residual Peak Depth
District - Year 2115
1% Fluvial / 0.5% Tidal Event Probability

DATE OF ISSUE: Feb 2017	REV NO: 2
SCALE: 1 : 60,000 @ A1	MAP NO:



APPENDIX H – Residual Peak Velocity Mapping



NOTES

- 1. The potential flooding consequences shown on this map primarily relate to flooding from the sea and main rivers taking into account the presence of current flood risk management measures such as flood defences.
- 2. This update only included new flood risk information from River Welland (Fluvial), River Glen (Fluvial) and Tidal hazard mapping River Welland, River Nene and the Wash sea defences. No new information from the Internal Drainage Boards and associated systems was used for this update.
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- 5. Functional Floodplain encompasses areas where water is intended to flow or be stored in times of flood.
- 6. Land outside South Holland District is not considered.
- 7. This map shows the extents only of the flooding probability bands relevant to the map title

Map Legend

Peak Velocity (metres per second)

- 0 - 0.3
- 0.3 - 1
- 1 - 1.5
- 1.5 - 2.5
- 2.5 +

- Functional Floodplain
- South Holland District Boundary

2	Feb 17	Modelling and Mapping Update
1	Dec 16	Modelling and Mapping Update

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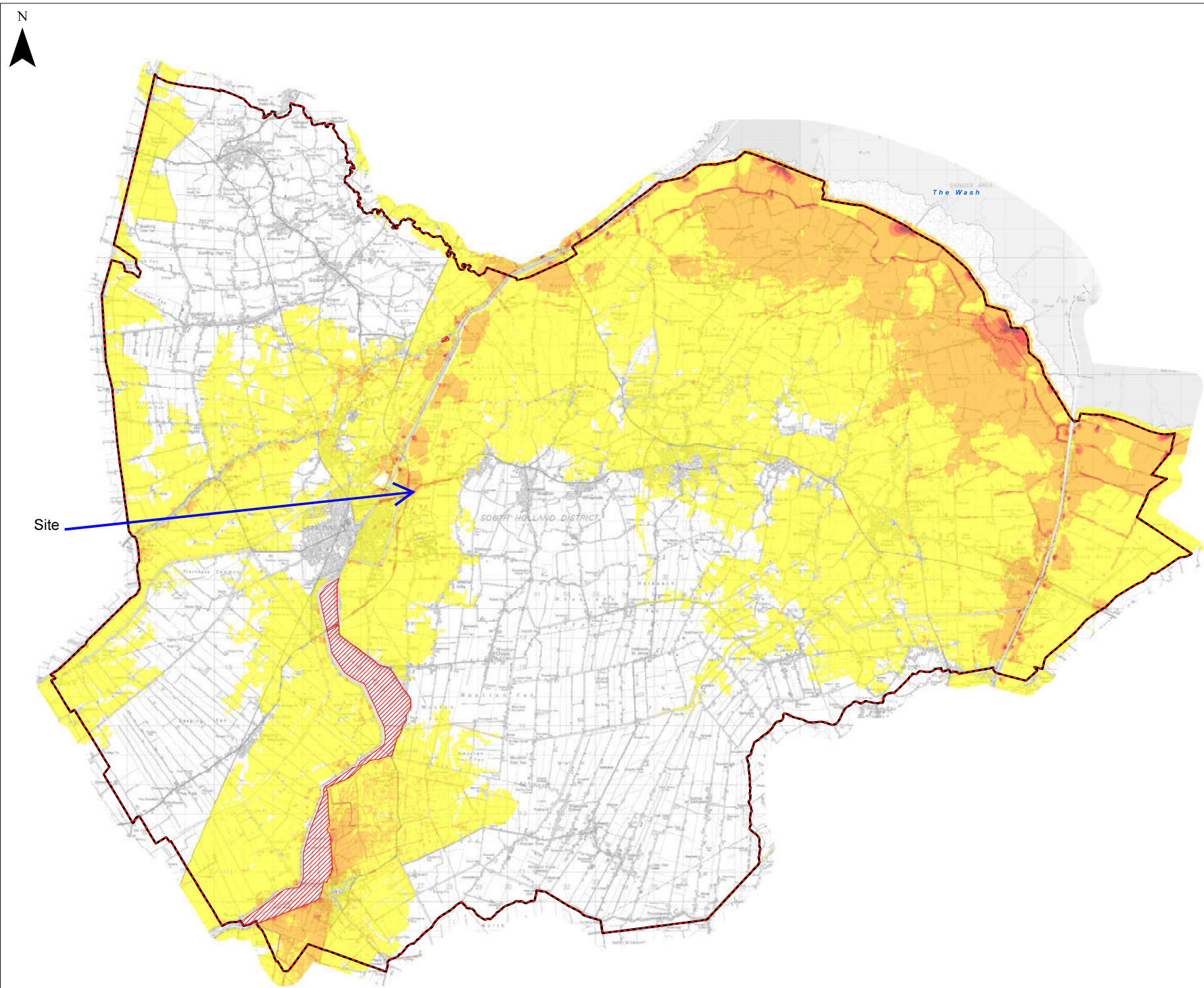
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UPDATE OF STRATEGIC
FLOOD RISK ASSESSMENT
Residual Peak Velocity
District - Present Day
1% Fluvial / 0.5% Tidal Event Probability

DATE OF ISSUE: Feb 2017	REV NO: 2
SCALE: 1 : 60,000 @ A1	MAP NO:



NOTES

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5. Functional Floodplain encompasses areas where water is intended to flow or be stored in times of flood.
6. Land outside South Holland District is not considered.
7. This map shows the extents only of the flooding probability bands relevant to the map title

Map Legend

Peak Velocity (metres per second)



2	Feb 17	Modelling and Mapping Update
1	Dec 16	Modelling and Mapping Update

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UPDATE OF STRATEGIC
FLOOD RISK ASSESSMENT
Residual Peak Velocity
District - Year 2115
1% Fluvial / 0.5% Tidal Event Probability

DATE OF ISSUE: Feb 2017	REV NO: 2
SCALE: 1 : 60,000 @ A1	MAP NO:

APPENDIX J – EA Flood Risk Information

Oliver Tily
oliver.tily@patrickparsons.co.uk

Our ref: CCN-2023-328263

Date: 10/10/2023

Dear Oliver,

Provision of Flood Risk Information for Land south of Holbeach Road, Spalding.

Thank you for your request for our flood risk information for the above site. The information is set out below and attached. It is important you read any contextual notes on the maps provided.

If you are preparing a Flood Risk Assessment (FRA) for this site, please note this information may not be sufficient by itself to produce an adequate FRA to demonstrate the development is safe over its lifetime. Additional information may be required to carry out an appropriate assessment of all risk, such as consequence of a breach in defences.

We aim to review our information on a regular basis, so if you are using this data more than twelve months from the date of this letter, please contact us again to check it is still valid.

Please read the letter in full as the information covered has been updated in **June 2023**.

1. Flood Map for Planning

The attached map includes the current Flood Map for Planning for your area. The map indicates the area at risk of flooding, **assuming no flood defences exist**, for a flood 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 with a 0.1% chance of occurring in any year, or the highest recorded historic extent if greater.

In some locations, such as around the fens and the large coastal floodplains, showing the area at risk of flooding assuming no defences may give a slightly misleading picture in that if there were no flood defences, water would spread out across these large floodplains. This flooding could cover large areas of land but to relatively shallow depths and could leave pockets of locally slightly higher land as isolated dry islands. It is important to understand the actual risk of the flooding to these dry islands, particularly in the event of defence failure.

The Flood Map for Planning also shows the location of formal raised flood defences and flood storage reservoirs. It represents areas at risk of flooding for present day only and does not take account of climate change.

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

2. Recorded Flood Outlines

With regards to the history of flooding I can advise we do not have any records of flooding in this area. It is possible recent flooding may have occurred which we are currently investigating, therefore this information may be subject to change. It is possible other flooding may have occurred which other risk management authorities, such as the Lead Local Flood Authority (ie top tier council) or Internal Drainage Board (where they exist) have responsibility.

3. Schemes in the area

There are no ongoing capital projects to reduce or sustain the current flood risk to this site.

4. Fluvial Flood Risk Information

The site may be at risk from main rivers in the form of residual risk due to the failure of flood management infrastructure such as a breach of a raised flood defence. You may need to undertake further assessment of this residual risk using the data provided.

The site may also be at risk from local ordinary watercourses for which other risk management authorities, such as the Lead Local Flood Authority (ie top tier council) or Internal Drainage Board (where they exist) have responsibility.

4.1 Fluvial Defence Information

The existing fluvial defences reducing the risk of flooding from main river to this site consist of embankments and upstream flood storage reservoirs. They are in fair condition and reduce the risk of flooding (at the defence) to a 2% (1 in 50) chance of occurring in any year. We inspect these defences routinely to ensure potential defects are identified.

4.2 Fluvial Modelled Levels and Flows

Available modelled fluvial flood levels and flows for the model nodes shown on the attached map are set out in the data table attached. This data is taken from the model named on the data table, which is the most up-to-date model currently available.

Please note these levels are “in-channel” levels and therefore may not represent the flood level on the floodplain, particularly where the channel is embanked or has raised defences.

Our models may not have the most up to date climate change allowances. In time we will update our models for the latest allowances. You should refer to '[Flood risk assessments: climate change allowances](#)' to check if the allowances modelled are appropriate for the type of development you are proposing and its location. You may need to undertake further assessment of future flood risk using different allowances to ensure your assessment of future flood risk is based on best available evidence.

4.3 Fluvial Modelled Flood Extents

Our modelled flood extents, which take into account flood defences, do not impact this site.

There may still be a residual risk of fluvial flooding to your site due to the failure of flood management infrastructure such as a breach of a raised flood defence. You may need to undertake further assessment of this residual risk using the data provided.

4.4 Fluvial Hazard Mapping

For certain locations we have carried out modelling to map the maximum values of flood depth, velocity and hazard rating (danger to people) resulting from overtopping and / or breaching of defences at specific locations for a number of scenarios.

At present this information is available for fluvial flood risk in Northampton, Lincoln, Wainfleet and some isolated rural locations.

The number of locations we have this information for is expected to increase in time.

At present this site is not covered by any Environment Agency hazard mapping.

Detailed Hazard Mapping is available within the 2017 Update of South Holland Strategic Flood Risk Assessment. This can be downloaded via the following link:

<http://www.southeastlincslocalplan.org/water/>

5. Tidal Flood Risk Information

This site is considered to be at risk from tidal flooding.

5.1 Tidal Defence Information

The existing tidal defences protecting this site consist of earth embankments.

They are in good condition and reduce the risk of flooding (at the defence) to a 1% (1 in 100) chance of occurring in any year. We inspect these defences routinely to ensure potential defects are identified.

Refer to paragraph 3 for details of any ongoing capital projects to reduce the flood risk to this site.

5.2 Tidal Hazard Mapping

For certain locations we have carried out modelling to map the maximum values of flood depth, velocity and hazard rating (danger to people) resulting from overtopping and / or breaching of defences at specific locations for a number of scenarios.

At present this information is available along the full coastal / tidal floodplain, except the tidal Witham Haven in Boston (upstream of Hobhole) where only breaching and not overtopping has been modelled and the tidal River Welland upstream of Fosdyke Bridge where neither breaching nor overtopping are available.

The number of locations we have this information for is expected to increase in time.

At present this site is not covered by any Environment Agency hazard mapping.

Detailed Hazard Mapping is available within the 2017 Update of South Holland Strategic Flood Risk Assessment. This can be downloaded via the following link:

<http://www.southeastlincslocalplan.org/water/>

6. Development Planning

If you would like local guidance on preparing a flood risk assessment for a planning application, please contact our Sustainable Places team at LNplanning@environment-agency.gov.uk. It will help if you mention this data request and attach your site location plan.

We provide free preliminary advice; additional/detailed advice, review of draft FRAs and meetings are chargeable at a rate set to cover our costs, currently £100 (plus VAT) per hour of staff time. Further details are available on our website at <https://www.gov.uk/guidance/developers-get-environmental-advice-on-your-planning-proposals>.

General advice on flood risk assessment for planning applications can be found on GOV.UK at <https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications>

Climate change will increase flood risk due to overtopping of defences. Please note, unless specified otherwise, the climate change data included has an allowance for 20% increase in flow. Updated guidance on how climate change could affect flood risk to new development - 'Flood risk assessments: climate change allowances' was published on GOV.UK in **July 2021**. The appropriate updated climate change allowance should be applied in a Flood Risk Assessment.

You should also consult the Strategic Flood Risk Assessment produced by your local planning authority.

7. Data Licence and Other Supporting Information

We respond to requests for recorded information we hold under the Freedom of Information Act 2000 (FOIA) and the associated Environmental Information Regulations 2004 (EIR).

This information is provided in accordance with the Open Government Licence which can be found here: <http://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

Further information on flood risk can be found on the GOV.UK website at: <https://www.gov.uk/browse/environment-countryside/flooding-extreme-weather>

8. Other Flood Risk Management Authorities

The information provided with this letter relates to flood risk from main river or the sea. The Flood Map for Surface Water can be viewed at <https://www.gov.uk/check-long-term-flood-risk>

Additional information may be available from other risk management authorities, such as the Lead Local Flood Authority (ie top tier council) or Internal Drainage Board (where they exist).

I hope we have correctly interpreted your request. If you have any queries or would like to discuss the content of this letter further please contact Jacob Lowe using the email address below and quoting our CCN reference number above.

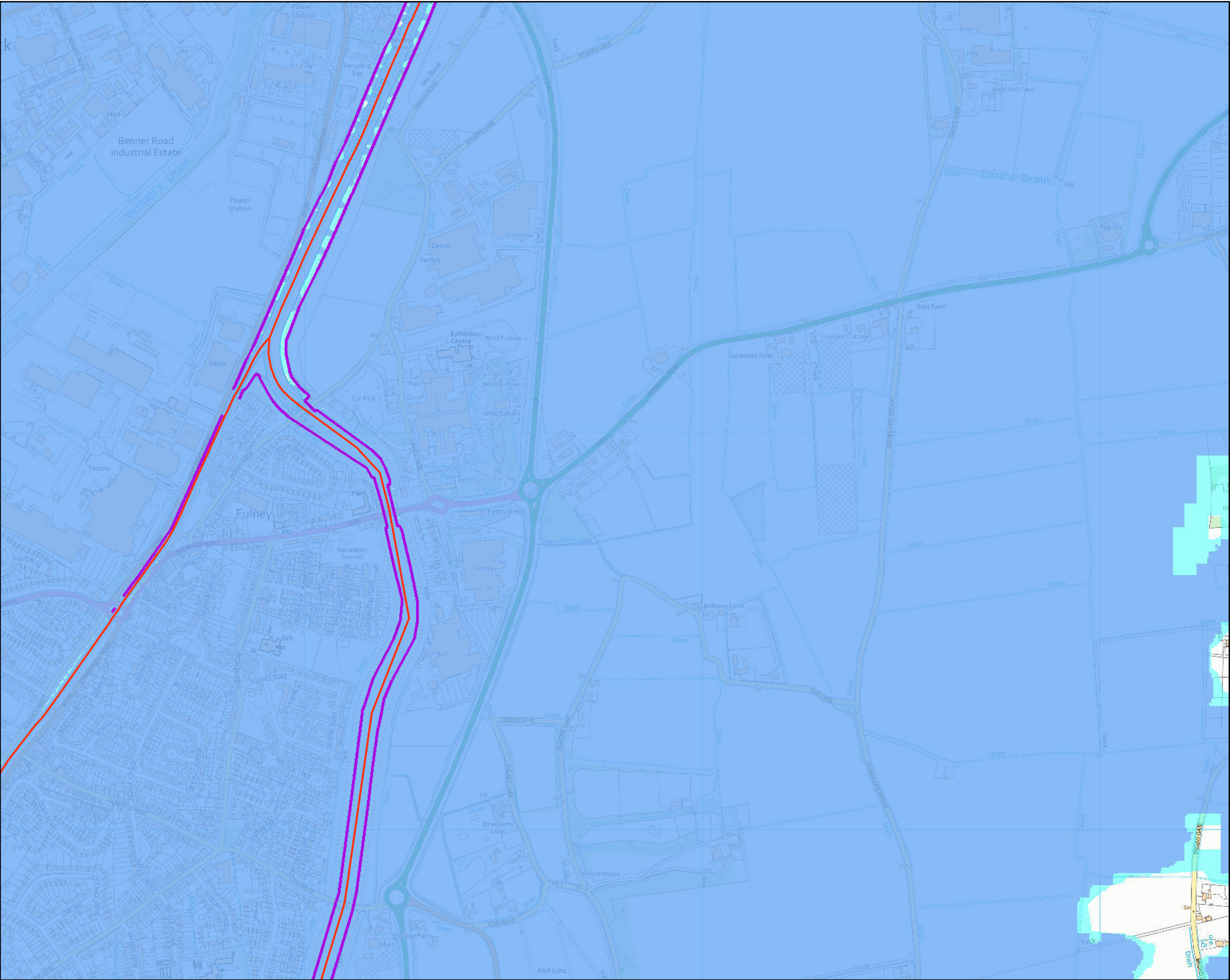
Yours sincerely,

Jacob Lowe
Tel: 07788 596786

for Alastair Windler
Welland and Nene Partnerships and Strategic Overview Team Leader
e-mail PSOWN@environment-agency.gov.uk

Enc.
Flood Map for Planning
Modelled Node Points Map
Modelled Fluvial Levels and Flows Data Sheet

Flood Map centred on TF2678023852 - created October 2023 [Ref: CCN-2023-328263]



Scale 1:10,000



- Legend**
- Main Rivers
 - Raised Defences
 - Flood Storage Areas
 - Areas 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:

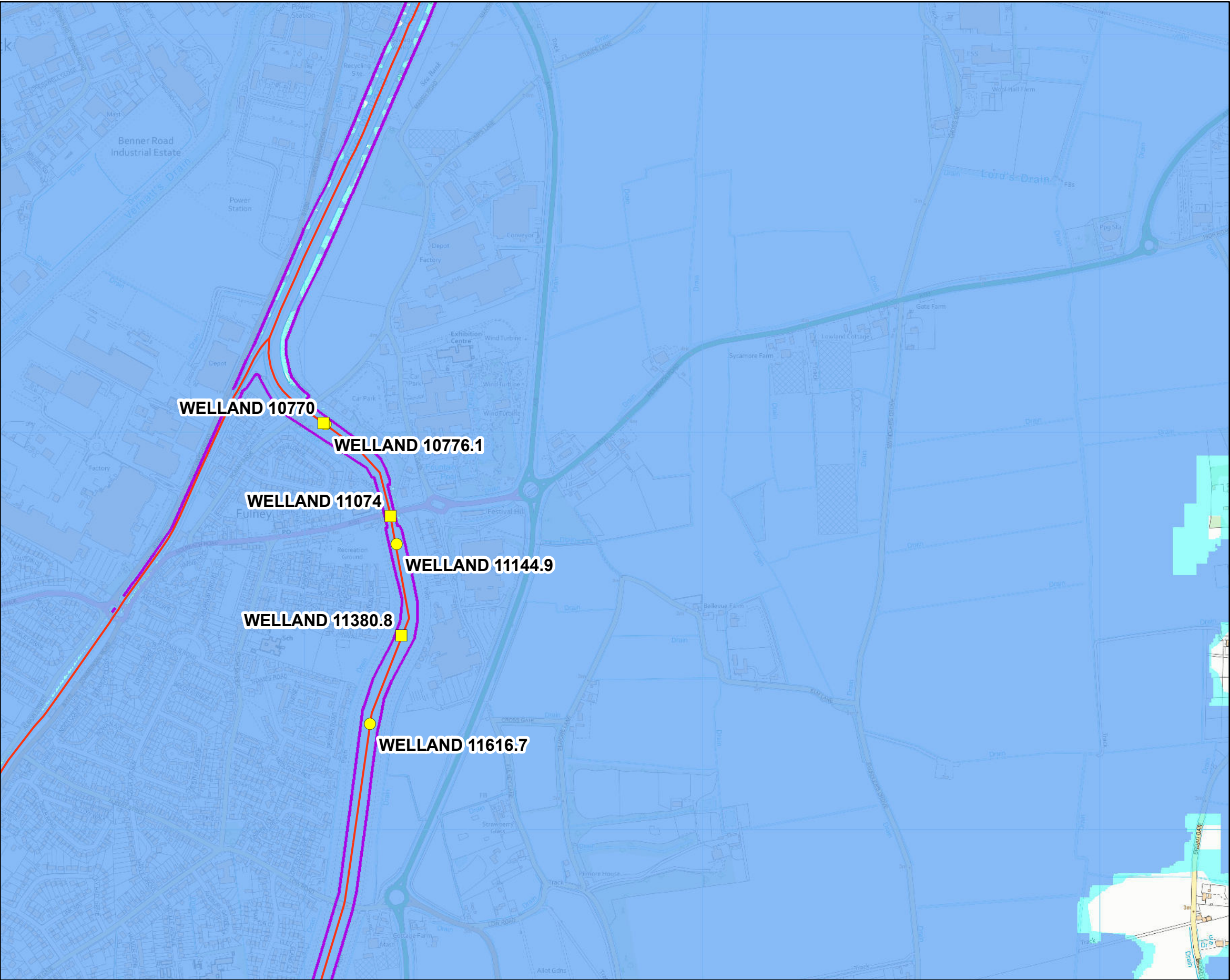
- from the sea by a flood that has a 0.5% (1 in 200) or greater chance of happening each year.
- or from a river by a flood that has a 1% (1 in 100) or greater chance of happening each year.

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, Kettering

Flood Map with Nodes centred on TF2678023852 - created October 2023 [Ref: CCN-2023-328263]



Scale 1:10,000



- Legend**
- Modelled Flows
 - Modelled Levels
 - Main Rivers
 - Raised Defences
 - Flood Storage Areas
 - Areas 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, Kettering

Datasheet [Ref: CCN-2023-328263]
Model Name: Welland Glen
Model Date: 2016

Fluvial Flood Levels (mODN)

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

Node Label	Easting	Northing	Annual Exceedance Probability - Maximum Water Levels (mODN)											
			50% (1 in 2)	20% (1 in 5)	10% (1 in 10)	5% (1 in 20)	3.33% (1 in 30)	2% (1 in 50)	1.33% (1 in 75)	1% (1 in 100)	1% (1 in 100) inc 20% Climate Change	0.5% (1 in 200)	0.1% (1 in 1000)	0.1% (1 in 1000) inc 20% Climate Change
WELLAND 10776.1	526053	324019	3.64	3.90	4.10	4.36	4.37	4.38	4.41	4.43	4.68	4.44	4.45	4.68
WELLAND 11144.9	526232	323719	3.65	3.91	4.10	4.36	4.39	4.39	4.42	4.44	4.68	4.45	4.46	4.68
WELLAND 11616.7	526165	323266	3.66	3.92	4.11	4.36	4.40	4.41	4.42	4.45	4.68	4.46	4.47	4.68

Fluvial Flood Flows (m³/s)

The fluvial flood flows for the model nodes shown on the attached map are set out in the table below. They are measured in metres cubed per second (m³/s).

Node Label	Easting	Northing	Annual Exceedance Probability - Maximum Flows (m³/s)											
			50% (1 in 2)	20% (1 in 5)	10% (1 in 10)	5% (1 in 20)	3.33% (1 in 30)	2% (1 in 50)	1.33% (1 in 75)	1% (1 in 100)	1% (1 in 100) inc 20% Climate Change	0.5% (1 in 200)	0.1% (1 in 1000)	0.1% (1 in 1000) inc 20% Climate Change
WELLAND 10770	526048	324023	74.58	91.64	102.46	116.08	120.26	121.43	121.70	123.79	124.12	122.86	123.37	236.17
WELLAND 11074	526216	323788	73.88	89.28	100.54	115.25	119.36	118.58	119.51	123.31	124.59	121.86	124.52	119.07
WELLAND 11380.8	526243	323488	73.26	88.29	99.60	113.62	116.57	117.69	118.52	120.34	123.53	119.44	119.22	118.30

UK Locations

Ash Vale
Birmingham
London
Wakefield

