FLOOD RISK ASSESSMENT

Winfrey Box

Prepared for: AMP Energy Services Ltd.

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1.0 Introduction

SLR Consulting Limited has been appointed on behalf of AMP Energy Services Limited to prepare this Flood Risk Assessment (FRA) in support of a planning application for a 200kW 800kWhr Energy Storage System (ESS) ('Battery Box') ("the proposed development").

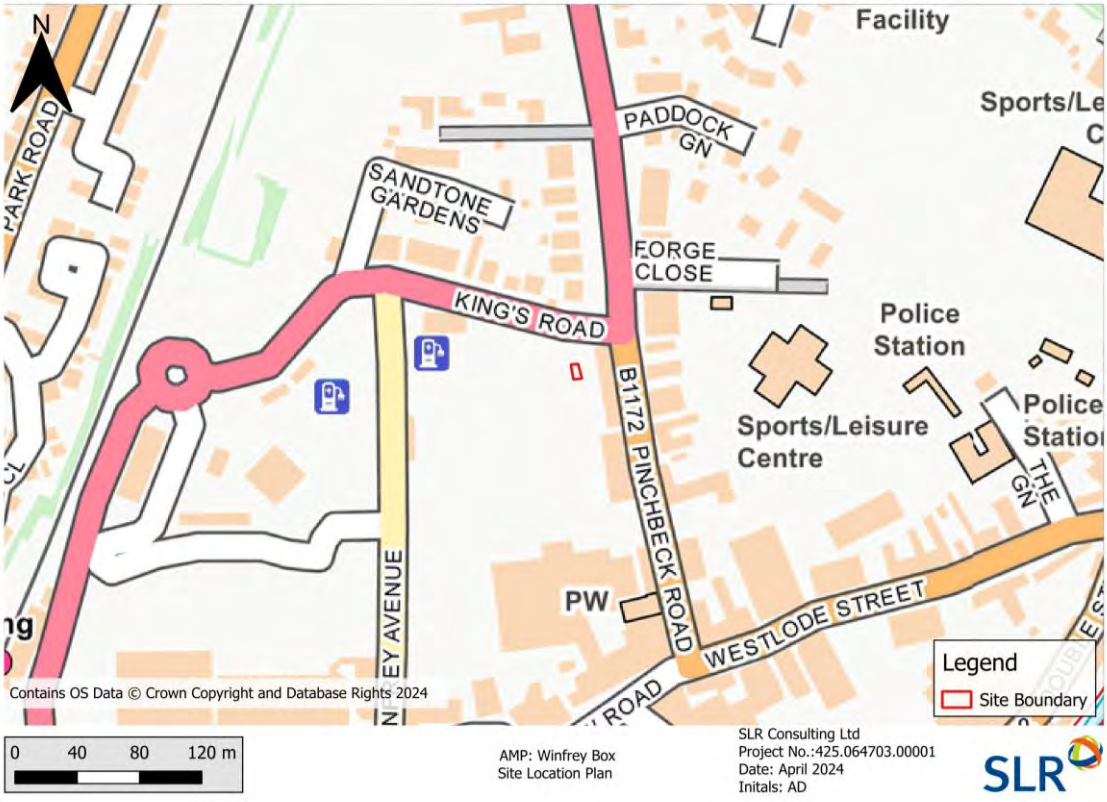
This FRA has been prepared under the direction of a Technical Director of SLR who specialises in flood risk and associated planning matters. The report has been completed in accordance with guidance presented within the National Planning Policy Framework (NPPF)[1] and its associated Planning Practice Guidance (PPG)[2], taking due account of current best practice documents relating to assessment of flood risk published by the British Standards Institution BS8533[3].

1.1 Site Location

The proposed development will be located next to Sir Halley Stewart Playing Field, Winfrey Avenue, Spalding, Lincolnshire, PE11 1DA ("the site"). This site is centred on National Grid Reference (NGR) TF 24746 23028. A site location plan is provided in Figure 1-1 below.

The site is under the planning jurisdiction of South Holland District Council (SHDC) and Lincolnshire County Council (LCC) is the lead local flood authority (LLFA). The site is also located under an area in which drainage matters are managed by the Welland and Deepings Internal Drainage Board (IDB).

Figure 1-1: Site Location Plan



1 National Planning Policy Framework: Communities and Local Government (December 2023)

2 Planning Practice Guidance: Communities and Local Government (last updated May 2022)

3 BS8533:2017, Assessing and managing flood risk in development: Code of Practice (December 2017)

1.2 Development Proposals

A Battery Box is an ESS that imports electricity from the local electricity network when demand for electricity is low or when there are high levels of renewable energy available. It then exports that electricity back to the grid when required in periods of high demand. This provides a solution to the growing need for flexibility and helps address concerns regarding grid reliability prompted by an increased reliance on intermittent generation of the electricity system.

Battery Boxes connect into the low voltage (LV) network, this is the lowest and most local point in the system where there is an increasing demand for electricity with the electrification of transport and heating systems. Stored electricity from the Battery Box will be exported and consumed in the locality of the box (when it is required).

The proposed development covers an area of just 24m^2 and is therefore a minor[4] development which is entirely ancillary to the adjacent commercial land operations. The physical infrastructure will consist of:

- Installation of a concrete plinth foundation;
- Installation of the battery containerised units and associated equipment; and
- The construction of a new fence surrounding the Battery Box.

A plan showing the proposed site layout is included in Appendix 01.

The development will be in place for no more than 30 years; following which all infrastructure will be removed, or fresh permissions would need to be sought.

The concrete plinth will be constructed in an area that has a current ground level of 3.48m above Ordnance datum (aOD) and will be finished with a top surface 0.1m above this level at 3.58m aOD. The battery containerised units and associated equipment will be placed and secured directly onto this surface and will have a further internal freeboard of 0.08m. As such flooding would need to reach an elevation of 3.66m aOD before the operation of the battery box was compromised.

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4 The Town and Country Planning (Development Management Procedure) (England) Order 2015, defines 'Major Development' as development involving any one or more of the following—

(a) the winning and working of minerals or the use of land for mineral-working deposits;
(b) waste development;
(c) the provision of dwellinghouses where—
  (i) the number of dwellinghouses to be provided is 10 or more; or
  (ii) the development is to be carried out on a site having an area of 0.5 hectares or more and it is not known whether the development falls within sub-paragraph (c)(i);
(d) the provision of a building or buildings where the floor space to be created by the development is 1,000 square metres or more; or
(e) development carried out on a site having an area of 1 hectare or more;

Inter alia, everything below these thresholds, including the current application, is 'Minor'.

2.0 Baseline Site Appraisal

2.1 Existing Site Features

The site is a flat unused grass verge situated on the edge of the Sir Halley Stewart Playing Fields. The site is accessed through a gated side entrance off Kings Road (A151).

The River Welland is present 392m to the east of the site whilst Vernatt's Drain is present 1.38km to the west.

2.2 Topography

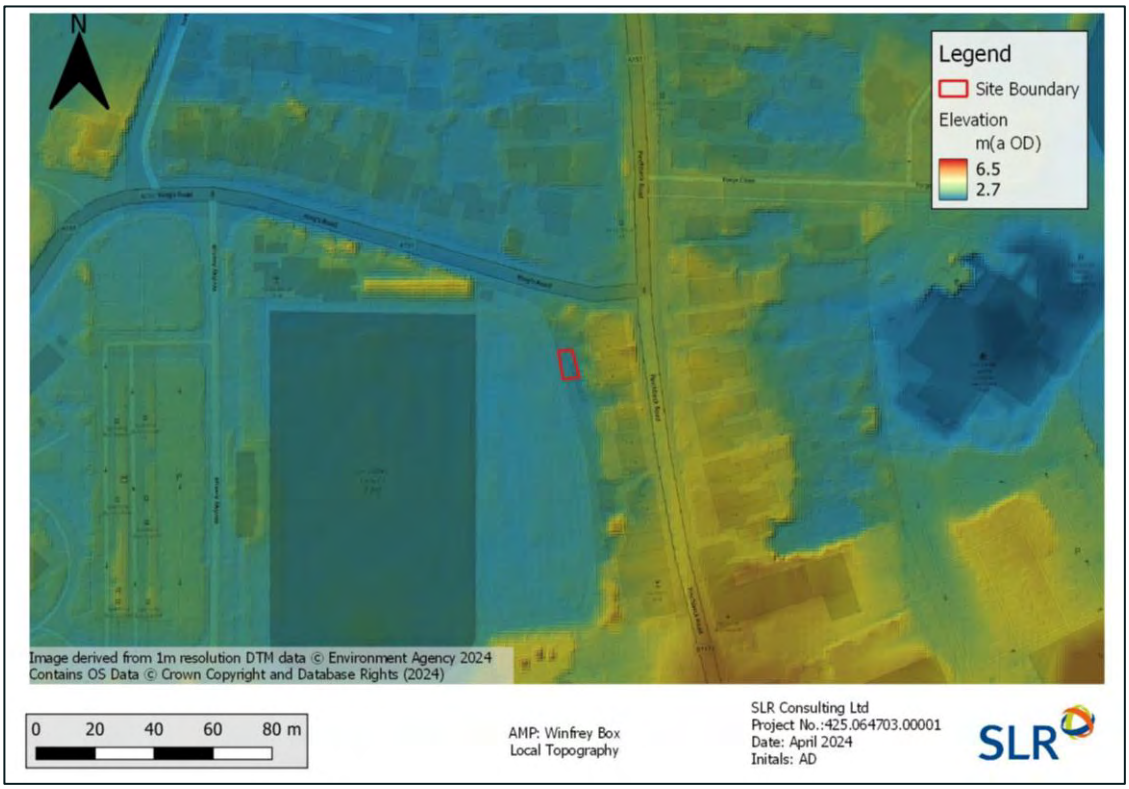
Topographic data from on and around the site, gathered using Light Detection and Ranging (LiDAR) aerial photogrammetric techniques, has been downloaded from the Environment Agency open data website[5]. This data has been used to provide information in relation to the topography of the land on and around the site, refer to Figure 2-1.

The LiDAR topographic data indicates site elevation is 3.48m aOD. This is slightly raised above the park to the west but is lower than the residential areas to the east of the site which is an elevation of approximately 4.23m aOD.

Site levels are c2.0m higher than normal water levels recorded within the River Welland to the east (at Marsh Road Sluice).

The area of land between the site and River Welland is raised with elevations ranging from 5.32m aOD closest to the river and 4.37m aOD closer to the site.

Figure 2-1: Environment Agency LIDAR of the Site



5 Defra open data website, https://environment.data.gov.uk/DefraDataDownload/?Mode=survey

2.3 Hydrology and Drainage

2.3.1 River Welland

The region in which the site is located is low lying with the majority of the rural areas consisting of drained former marshland, while the small areas of naturally higher ground have been developed. The major river system that drains this area towards the Wash is the River Welland (372m to the east).

Water from the low-lying land across the region has been drained and pumped to facilitate agriculture. This has resulted in gradual subsidence of the land, raising the channels of the River Welland above much of the surrounding floodplain. Much of this area is therefore now reliant on pumping and sluices to prevent regular flooding.

The River Welland is fluvial along the reach past the site and then tidal downstream of Fulney Lock (~1.5km downstream of the site). This river is designated by the Environment Agency as a Main River.

2.3.2 Vernatt's Drain

Vernatt's Drain, which is located approximately 1.3km northwest of the site, is designated as an Ordinary Watercourse and is under the control of Wellings and Deeping Internal Drainage Board (IDB). This drain acts to convey gravity flows from the urban areas of Spalding and pumped flows from low-lying agricultural land (former marshland) towards the River Welland.

2.4 Geological and Hydrogeological Features

2.4.1 Geology

The National Soil Resources Institute[6] indicates that soils at the site consist of "*Loamy and clayey soils of coastal flats with naturally high groundwater*".

British Geological Survey (BGS) mapping[7] indicates that the site is underlain by tidal flat deposits comprising of clay and silt deposits, which is underlain by bedrock geology of Oxford Clay Formation comprising of mudstone.

A BGS borehole (TF22SW8) with a total depth of 12.2m observed a sequence of sandy gravel, followed by silty sand and silty clay towards the top. This was situated 65m east of the site.

Another BGS borehole (TF22SW238) with a depth of 4m, observed variations of clay and sand directly beneath made ground; and is located 148m southwest of the site.

Other BGS boreholes within the immediate site vicinity include TF22SW242, TF22SW4, TF22SW5, and TF22SW6 all found a mix of silt and clayey layers (with some sand). This is typical of tidal flat deposits and supports the regional mapped geology.

2.4.2 Hydrogeology

The Environment Agency has designated both the bedrock geology and the drift as unproductive strata[8] which is defined as "*geological strata with low permeability that have negligible significance for water supply or river base flow*".

6 Cranfield Soil and Agrifood Institute, Soilscapes map, http://www.landis.org.uk/soilscapes

7 British Geological Survey, Geoindex onshore, https://mapapps2.bgs.ac.uk/geoindex/home.html

8 Magic Map Application, managed by Natural England, delivered by Landmark, https://magic.defra.gov.uk/MagicMap.aspx

This supports a conceptual understanding that the lithologies present at site of clay and mudstone are typically considered to have low permeability and low porosity, thus groundwater movement beneath the site is likely to be negligible.

3.0 Planning Policy and Guidance

3.1 National Planning Policy

This FRA report has been completed in accordance with guidance presented in NPPF[1] and with reference to the PPG for flood risk and coastal change[2].

3.1.1 Development Sensitivity

Annex 3 of NPPF sets out development sensitivities with respect to flood risk that should be used to help consider the appropriateness of different development types with respect to the prevailing flood risk.

The proposed development consists of an ESS to provide highly localised grid support. This infrastructure is intended to support the immediate land usage and will not serve a wider area. Failure of the installation due to flooding would have little or no consequence beyond the immediate locale of the site.

Under the development sensitivity classifications set out in Annex 3 of NPPF, standalone energy facilities are typically considered as '*Essential Infrastructure'*. This is infrastructure in which *'the loss or compromise of which could result in a major detrimental impact on the availability, integrity or delivery of essential services - including those services whose integrity, if compromised, could result in significant loss of life or casualties - taking into account significant economic or social impacts'*[9].

Clearly a small scale 200kW battery box, intended to serve adjacent land use only (all of which would in fact be subject to similar or higher levels of flood risk), would not fulfil this definition. It is therefore considered that a battery box development should be assessed as more similar to an electrical junction box and classified as "*less vulnerable"* with respect to flood risk. Such development types are allowed within Flood Zone 3a but not Flood Zone 3b.

3.1.2 Flood Zone Classification

PPG Table 1 defines Flood Zones as follows:

- *Zone 1 - Low Probability (Flood Zone 1): Land having a less than 0.1% annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map for Planning – all land outside Zones 2, 3a and 3b).*
- *Zone 2 - Medium Probability (Flood Zone 2): Land having between a 1% and 0.1% annual probability of river flooding; or land having between a 0.5% and 0.1% annual probability of sea flooding. (Land shown in light blue on the Flood Map).*
- *Zone 3a - High Probability (Flood Zone 3a): Land having a 1% or greater annual probability of river flooding; or Land having a 0.5% or greater annual probability of sea. (Land shown in dark blue on the Flood Map).*
- *Zone 3b - the Functional Floodplain (Flood Zone 3b): his zone comprises land where water from rivers or the sea has to flow or be stored in times of flood. The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. Functional floodplain will normally comprise:*
    - *land having a 3.3% or greater annual probability of flooding, with any existing flood risk management infrastructure operating effectively; or*
    - *land that is designed to flood (such as a flood attenuation scheme), even if it would only flood in more extreme events (such as 0.1% annual probability of flooding).*

9 Critical National Infrastructure, National Protective Security Agency, https://www.npsa.gov.uk/critical-national-infrastructure-0

Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)

The Environment Agency publish mapping[10] showing the Flood Zones across England. In assessing the boundary between Flood Zones 1, 2 and 3, the protection afforded by a flood defence structures, and other local circumstances, is not considered.

Based upon the Flood Map for Planning (Figure 3-1) the site lies within Flood Zone 3. The delineation between Flood Zone 3a and Flood Zone 3b is not shown by the flood Map for planning. This is normally defined within the local Strategic Flood Risk Assessment.

Figure 3-1: Extract of Flood Map for Planning

The Strategic Flood Risk Assessment[11] sets out that within the South Holland District, the functional floodplain (Flood Zone 3b) is restricted to the designated flood storage reservoirs of the Crowland and Cowbit Washes and the Surfleet Reservoir. All other areas of Flood Zone 3 are considered to be Flood Zone 3a.

On this basis the area of the proposed development is classified as Flood Zone 3a.

10 Flood Map for Planning Service: Website https://flood-map-for-planning.service.gov.uk/

11 South East Lincolnshire Strategic Flood Risk Assessment, Southeast Lincolnshire Joint Planning Committee, March 2017, https://www.sholland.gov.uk/media/7937/South-East-Lincolnshire-SFRA-Report-March-2017-including-guidance-on-applying-the-Sequential-Test-for-planning-applications-/pdf/SE_Lincolnshire_SFRA_2017_v6.pdf

3.1.3 Flood Risk Compatibility

As discussed in Section 3.1.2, the site lies wholly within Flood Zone 3a and, as detailed in Section 3.1.1, the development proposals are considered a *'less vulnerable*' development type.

PPG Table 2: Flood risk vulnerability and flood zone 'compatibility' (reproduced as Table 3-1) confirms that, with respect to flood risk, '*less vulnerable*' development types are considered appropriate in Flood Zone 3a.

Table 3-1: Flood Risk Vulnerability and Flood Zone 'Compatibility'

Flood Risk Vulnerability Classification (PPG Table 2)		Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
Flood Zone (PPG Table 1)	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	Exception Test Required	✓	✓	✓
	Zone 3a	Exception Test Required	x	Exception Test Required	✓	✓
	Zone 3b (functional floodplain)	Exception Test Required	x	x	x	✓

Key: ✓ Development is appropriate x Development should not be permitted

3.1.4 Sequential Test

With reference to the NPPF, the Sequential Test gives preference to locating new development in areas that are at lowest risk of flooding.

In paragraph 168 of NPPF the Sequential Test sets out that:

> "*Development should not be allocated or permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower risk of flooding.*"

Paragraph 167 confirms that this process should take into account;

> *"all sources of flood risk and the current and future impacts of climate change".*

Paragraph 174 of NPPF confirms that *"Applications for some minor development and changes of use should not be subject to the sequential or exception tests but should still meet the requirements for site-specific flood risk assessments set out in footnote 59".* The proposed battery box is a minor development[12] which is entirely ancillary to an existing commercial site and, on that basis, the Sequential Test does not need to be applied. Indeed, the proposals should be treated as a '*small non-residential extension (with a footprint of less than 250m^2)*' to the existing industrial site as defined within Footnote 59 to Paragraph 174.

Irrespective of this we note that suitable available land on which to site a battery box is not easy to find. A suitable site must be within 50m of an existing substation or a large 3 phase low voltage cable to allow for a viable electrical connection. Sites must also have available space and a landowner who is prepared to host a battery box.

12 As defined by the Town and Country Planning (Development Management Procedure) (England) Order 2015

This site has been carefully selected for the following reasons:

- Proximity to local grid.
- Development land available.
- Suitable flat industrial land.
- Near local electricity demand.

Furthermore, while the development proposed is located within an area that is designated a Flood Zone 3a, the extent of Flood Zone 3a locally is extensive. Given that the proposed battery box is intended to support the immediate land usage, it could not reasonably be located in any areas designated as Flood Zone 1 or 2 as these are all remote from the area of commercial and residential land that this infrastructure would support.

In Section 4.0 this assessment confirms that, given the local flood defences that are present, the risk of flooding at the site is low. In the event of a failure of the flood defence, due to local topography, the residual risk at this site will also be very low.

It is therefore concluded that there are no reasonably available alternative locations for the proposed battery box that are subject to a lower level of flood risk, and which could serve the surrounding area.

On this basis it is considered that, even if it were to be applied to this application (which as a minor non-residential extension it shouldn't) the Sequential Test would be passed.

3.1.5 Exception Test

The Exception Test, as set out in paragraph 170 of NPPF, states that;

> *"To pass the exception test it should be demonstrated that:*
>
> *(a) the development would provide wider sustainability benefits to the community that outweigh the flood risk; and*
>
> *(b) the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.*
>
> *Both elements of the exception test should be satisfied for development for be allocated or permitted".*

As outlined in the Table 3-1, PPG identifies that '*less vulnerable'* development located within Flood Zone 3a does not need to pass the Exception Test.

Irrespective of this we note that as renewable power generation does not always match demand, the UK requires a more flexible energy system that allows 'excess' renewable electricity to be stored and used later when low carbon sources are unable to generate enough electricity (i.e., when it isn't windy and sunny). ESS's are a major part of the process of achieving this and thereby help prevent the need to turn on fossil fuel generators and allow the UK to maximise the use of renewable power and to facilitate the UK's transition to net-zero.

Whilst the amount of carbon saved each year will vary with changing weather and demand patterns, AMP Clean Energy expect each Battery Box will save 80 tonnes of Carbon each year and 2,400 tonnes of carbon throughout the project Lifecyle. On this basis it is clear that the proposals are highly sustainable and will be an important contributor to helping local land users move towards zero carbon.

Furthermore, as discussed in Section 4.0 this assessment confirms that, given the local flood defences that are present, the risk of flooding at the site is low. The scheme will also be unmanned and will not exacerbate flood risk locally.

On this basis it is considered that, even if it were to be applied to this application (which as a *'less vulnerable'* development type it shouldn't) the Exception Test would be passed.

3.2 Local Planning Policy

The South East Lincolnshire Joint Strategic Planning Committee is comprised of South Holland District Council, Boston Borough Council and Lincolnshire County Council. Together they have produced a new Local Plan[13] which was adopted on 8th March 2019. This document provides a framework for development locally for the period from 2011 through to 2036.

As a major issue locally, consideration of flood risk is embedded throughout the plan; however, of key relevance is Policy 4 which is reproduced below.

Policy 4: Approach to Flood Risk

Development proposed within an area at risk of flooding (Flood Zones 2 and 3 of the Environment Agency's flood map or at risk during a breach or overtopping scenario as shown on the flood hazard and depths maps in the Strategic Flood Risk Assessment) will be permitted, where:

1. *It can be demonstrated that there are no other sites available at a lower risk of flooding (i.e. that the sequential test is passed). The sequential test will be based on a Borough or District wide search area of alternative sites within the defined settlement boundaries, unless local circumstances relating to the catchment area for the development justify a reduced search area, i.e. there is a specific need for the development in that location. The sequential test is not required for sites allocated in the Local Plan, minor development[1] or change of use (except for a change of use to a caravan, camping or chalet site, or to a mobile home or park home site).*
2. *It can be demonstrated that essential infrastructure in FZ3a & FZ3b, highly vulnerable development in FZ2 and more vulnerable development in FZ3 provide wider sustainability benefits to the community that outweigh flood risk.*
3. *The application is supported with a site-specific flood risk assessment, covering risk from all sources of flooding including the impacts of climate change and which:*
    a. *demonstrate that the vulnerability of the proposed use is compatible with the flood zone;*
    b. *identify the relevant predicted flood risk (breach/overtopping) level, and mitigation measures that demonstrate how the development will be made safe and that occupants will be protected from flooding from any source;*
    c. *propose appropriate flood resistance and resilience measures (following the guidance outlined in the Strategic Flood Risk Assessment), maximising the use of passive resistance measures (measures that do not require human intervention to be deployed), to ensure the development maintains an appropriate level of safety for its lifetime;*
    d. *include appropriate flood warning and evacuation procedures where necessary (referring to the County's evacuation routes plan), which have been undertaken in consultation with the authority's emergency planning staff;*
    e. *incorporates the use of Sustainable Drainage Systems (SuDS) (unless it is demonstrated that this is not technically feasible) and confirms how these will be maintained/managed for the lifetime of development (surface water connections to the public sewerage network will only be permitted in exceptional circumstances where it is demonstrated that there are no feasible alternatives);*

13 South East Lincolnshire Local Plan 2011-2036 Adopted March 2019, http://www.southeastlincslocalplan.org/wp-content/uploads/2019/02/Local-Plan-text-March-2019.pdf

f. demonstrates that the proposal will not increase risk elsewhere and that opportunities through layout, form of development and green infrastructure have been considered as a way of providing flood betterment and reducing flood risk overall;

g. demonstrates that adequate foul water treatment and disposal already exists or can be provided in time to serve the development;

h. ensures suitable access is safeguarded for the maintenance of water resources, drainage and flood risk management infrastructure.

Development in all flood zones, and development over 1 hectare in size in Flood Zone 1, will need to demonstrate that surface water from the development can be managed and will not increase the risk of flooding to third parties.

Change of use of existing buildings will be supported providing they do not pose an increase in risk to people. Change of use that would result in self-contained ground floor residential accommodation in areas of hazard rating 'danger for some', 'danger for most' and 'danger for all' will not be supported. In these areas unrestricted access to a habitable room above the flood level and an emergency evacuation plan will be required. Caravans, mobile homes and park homes intended for permanent residential use will not be permitted in areas at risk of flooding. Caravan, chalet, log cabin, camping and touring sites at risk of fluvial flooding where there is a 'danger for most' and 'danger for all' will not be permitted. Occupancy of caravan, chalet, log cabin, camping and touring sites at risk of tidal flooding will not be permitted to open between 1st November in any one year and the 14th March in the succeeding year.

No development will be permitted within a 50m buffer from the toe of the raised Witham Haven Banks (flood defences), as shown on the indicative Plan contained in Appendix 10, to allow access for construction and maintenance.

Flood risk management infrastructure shall be provided at the strategic level, where development opportunities allow, to reduce the hazard and probability of flooding.

Where applicable to this development these local policy requirements are all either reflected in the discussion of national policy set out in Section 3.1 or are considered in the assessment of flood risk detailed in Section 4.0.

3.3 Climate Change

In February 2016 the Environment Agency issued guidance on the impacts of climate change on flood risk in the UK to support the NPPF. This was most recently updated in May 2022[14]. This advice sets out that peak rainfall intensity, sea level, peak river flow, offshore wind speed and extreme wave heights are all expected to increase in the future as a result of climate change.

PPG recommends that considerations for future climate change are included in FRA's for proposed developments. Consideration of wave heights and offshore wind speed are only of relevance in areas immediately adjacent to open areas of water. As such the consideration of climate change in this assessment only considers possible changes to peak river flows, sea levels and peak rainfall intensity.

3.3.1 Sea Level Change

Sea Level Allowances, published by the Environment Agency for the Anglian Region, are presented in Table 3-2. This shows the estimated annual uplifts to mean sea level which increase over time.

14 Environment Agency, Flood Risk Assessments: Climate Change Allowances, February 2016 (Updated May 2022), https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances

Table 3-2
Sea level allowances by river basin district for each epoch in mm for each year (based on a 1981 to 2000 baseline) – the total sea level rise for each epoch is in brackets

Area of England	Allowance	2000 to 2035 (mm)	2036 to 2065 (mm)	2066 to 2095 (mm)	2096 to 2125 (mm)	Cumulative rise 2000 to 2125 (metres)
Anglian	Higher Central	5.8 (203)	8.7 (261)	11.6 (348)	13.0 (390)	1.20
	Upper end	7.0 (245)	11.3 (339)	15.8 (474)	18.1 (543)	1.60

Taking a base date of 2006[15], the anticipated sea level rise throughout the 30-year anticipated lifetime of development, up until 2054, is 0.33m using the higher central allowance and up to 0.42m using the upper end allowance.

In reality these uplifts relate to areas of open sea and the site is located on a tidally influenced river system. In such situations best practice is to apply the projected sea level rise at the downstream boundary of a tidal flood model and then use the model to assess how this impacts water levels extending up the tidal reaches. Where available the outputs of such modelling should be used in preference to simply uplifting current day estimates of extreme flood levels.

3.3.2 Peak Fluvial Flows

Peak River Flow Allowances, published by the Environment Agency for the Welland Management Catchment, are presented in Table 3-3. This shows the anticipated changes to peak fluvial flow rates.

Table 3-3
Peak River Flow Allowances

Management Catchment	Allowance Category	2020s	2050s	2080s
Welland	Central	5%	4%	17%
	Higher	10%	10%	28%
	Upper	22%	26%	53%

Guidance states that for "*less vulnerable*" development located in Flood Zone 3a the "central" allowance should be considered. For the 30-year anticipated lifetime of development, up until 2054, this equates to maximum uplift in peak fluvial flow of 5%.

15 Base data for flood level estimates provided by the Environment agency at Marsh Lane (Appendix 02), East Coast and Wash: Immingham to the West Lighthouse 2018 Coastal Flood Boundary Extreme Sea Levels

3.3.3 Peak Rainfall Intensity

Peak Rainfall Intensity Allowances, published by the Environment Agency for the Welland Management Catchment, are presented in Table 3-4. This shows the anticipated changes to extreme rainfall intensity or depth.

Table 3-4
Peak Rainfall Intensity Allowance

Management Catchment	Annual Exceedance Rainfall Event	Allowance	2050s	2070s
Welland	3.3%	Upper End	35%	35%
		Central	20%	25%
	1%	Upper End	40%	40%
		Central	25%	40%

Guidance states that flood risk assessments should assess the 'Upper End' allowance to understand the range of impact for both the 1% and 3.3% annual exceedance events. For the 30-year anticipated lifetime of development, up until 2054, this equates to maximum uplift in rainfall intensity of 40%.

4.0 Potential Sources of Flooding

4.1 Methodology and Best Practice

This report has been prepared in accordance with the advice and requirements prescribed in current best practice documents relating to management of flood risk in development published by the Construction Industry Research and Information Association (CIRIA)[16], and BS85333[3].

This includes a screening study to identify whether there are any potential sources of flooding at the site and, where warranted further consideration refencing available flood model data.

The following potential sources of flooding are highlight within guidance:

- Flooding from the sea or tidal flooding;
- Flooding from rivers or fluvial flooding;
- Flooding from surface water and overland flow;
- Flooding from groundwater;
- Flooding from sewers;
- Flooding from reservoirs, canals, and other artificial sources; and
- Flood from infrastructure failure.

The flood risk from each of these potential sources is discussed below.

4.2 Flooding from the Sea or Tidal Flooding

The River Welland is present 392m east of the site. The river is fluvial along the reach past the site, however it is tidal further northwards past Fulney Lock.

Environment Agency flood mapping (Figure 3-1) places the site in Flood Zone 3 with the SFRA confirming that this is not the functional floodplain. This indicates that if flood defences were not present, the annual probability of tidal flooding may be greater than 1 in 200.

4.2.1 Flood Defences

The Fulney Lock Tidal Defence Doors are located 1.5km northeast of the site. These manage the flows between the fluvial and tidal sections of the River Welland and prevent tidal water progressing upstream along the channel towards the site.

North of the river and downstream of Fulney Lock, raised embankment are present along the river channel. The Environment Agency asset database reports that the minimum crest level for the tidal defence embankments closest to the site are at 6.97m aOD.

The Environment Agency indicates that currently no capital projects are scheduled to alter the defences.

4.2.2 Flood Level Data

Tidal flood levels within the River Welland north of the site and downstream of Fulney Lock (Marsh Road – NGR 525988 324065) have been provided by the Environment Agency. These are taken from the 2018 Coastal Flood

16 CIRIA Report C624, Development and flood risk: guidance for the construction industry

Boundary Extreme Sea Levels dataset and indicates a current day (2006) 1 in 200 annual probability (0.5% AEP) flood level of 5.98m aOD.

Uplifting this flood elevation by 0.42m (See Section 3.3.1) to account for climate change through to 2054 increases the 1 in 200 annual probability flood level to **6.40m aOD**.

4.2.3 Tidal Risk

The future in channel flood height (6.40m aOD) is lower than the crest of the tidal flood embankments past the site (6.97m aOD). As such direct over topping from the tidal reach of the River Welland downstream of the site is unlikely for the present day or for the future scenario. On this basis the flood risk posed to the battery box from the Sea or Tidal Flooding is assessed to be **very low**.

The Environment Agency advise (Appendix 02) that when considered holistically the wider system of defences (i.e. extending down to the Wash) reduce the risk of over topping (i.e. not necessarily at the site) to a 1 in 100 chance of occurring in any year (1% AEP). Such flooding would however be remote from the site and would not affect the proposed development. In reality, over topping of the embankments would likely cause erosion, resulting in flood breaches. This would exacerbate flooding and result in impacts across a larger area than might occur as a result over topping in isolation. The risk posed from a breach of the defences is assessed together in Section 4.8.

4.3 Flooding from River or Fluvial Flooding

The reach of the River Welland closest to the site is a fluvial[17] and extends northwards up to the Fulney Lock Tidal Doors. At its closest the river channel is located 392m east from site. This section of the river runs parallel to Albion Street.

As discussed in Section 2.3, there is also a large drain (Vernatt's Drain) situated 1.3km to the west of the site.

4.3.1 Flood Defences

The Environment Agency advise that natural high ground is present along the fluvial reaches of the River Welland. These are reported to provide a standard of protection (annual probability) of at least 1 in 100.

The Environment Agency asset database reports a downstream crest level for the fluvial flood defences the river channel closest to the site of 5.68m aOD. Slightly further downstream the raised ground drops to a minimum of 5.09m aOD.

4.3.2 Fluvial Risk from River Welland

Environment Agency flood model data (Appendix 2) indicates that the maximum in-channel water levels within River Welland to the east of site are:

- 4.53m aOD for the 1 in 100 annual probability (0.5% AEP), and;
- 4.56m aOD for the 1 in 1000 annual probability (0.1% AEP).

Modelling has also been undertaken for scenarios where peak fluvial flows have been uplift by 20% to simulate the possible impacts of climate change. This 20% allowance is significantly greater than the required climate change allowance for peak fluvial flows discussed in Section 3.3.2. With this uplift the maximum in-channel water levels within River Welland to the east of site are:

- 4.56m aOD for the 1 in 100 annual probability (0.5% AEP), and;

17 Environment Agency Briefing Note, Fulney Lock (River Welland), 399_13_SD01 Blue one column template (moderngov.co.uk)

- 4.68m aOD for the 1 in 1000 annual probability (0.1% AEP).

This modelling specifically accounts for periods of high downstream tidal level when free discharge through Fulney Lock Tidal Door would not be possible.

As the extreme model flood levels are significantly lower than the crest of the raised ground along the river it can be concluded that the probability of flooding resulting from over topping of the flood defences is **very low**.

4.3.3 Fluvial Risk from Vernatt's Drain

Vernatt's drain receives some gravity flows from Spalding, but is predominantly receiving pumped inflows and conveying water from land to the south-west and just outside of the South Lincolnshire parish of Pinchbeck. Pode Hole Pumping Station[18] is responsible for draining the surrounding fenland into River Welland via Vernatt's Drain.

During periods of high-water levels on the River Welland, water from this drain (and other nearby) will not be able to discharge as normal into the tidal reach resulting in an upstream increase in water level in the drains (Backwater effect), which may cause localised flooding. Any flooding that did occur would preferentially impact the low-lying agricultural land and not the urban areas (including the site) which are significantly raised.

4.4 Flooding from Surface Water or Overland Flow

The proposed development is sited on a verge slightly raised from the adjacent playing field level and this elevation difference will be increased through the development process. The general topography of the immediate local is flat but with slightly higher land to the east. The area of higher ground to the east is small and significant runoff from this area is considered unlikely.

Long Term Flood Risk Information (LTFRI)[19] provided by the Environment Agency includes mapping of surface water flood risk. Surface water modelling has been undertaken in order to seek to establish areas at risk of surface water flooding based upon latest hydrological techniques and surface terrain data.

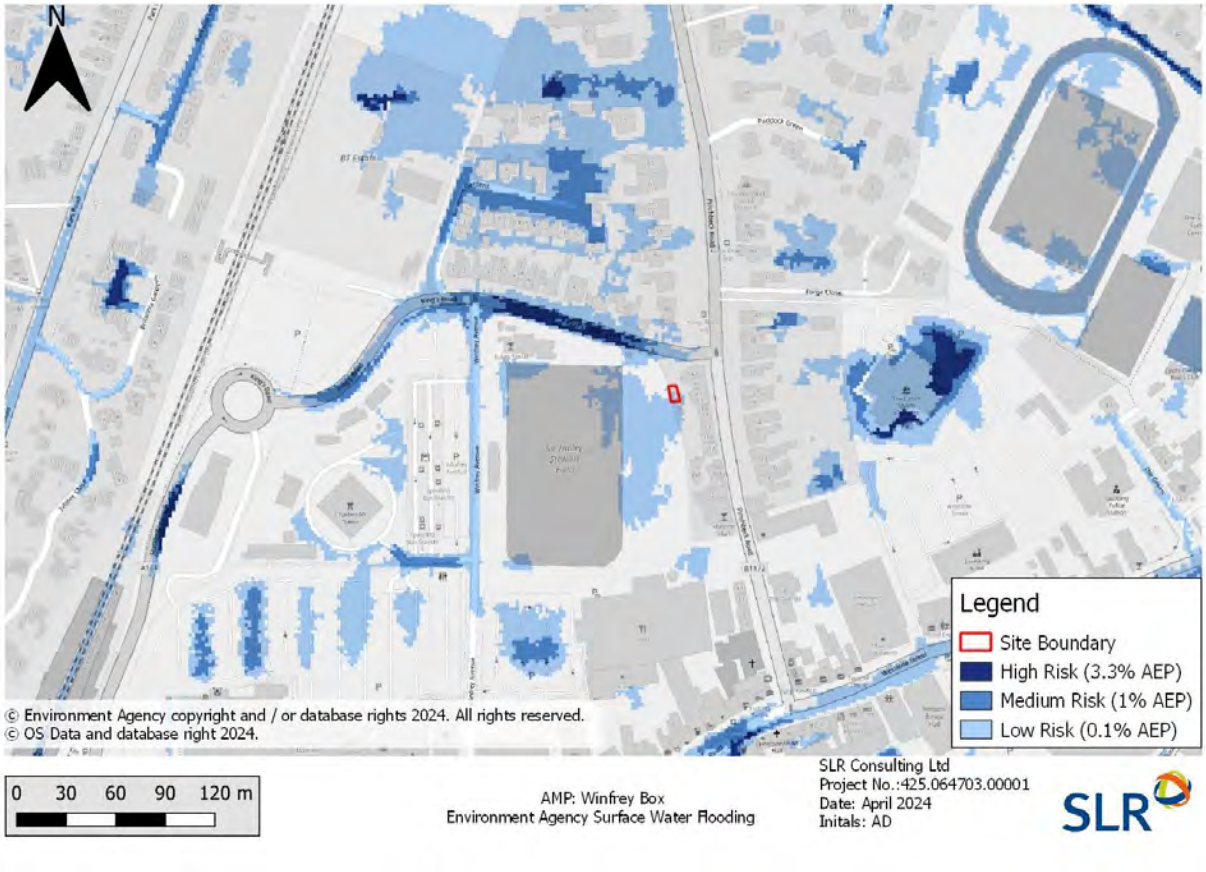
An extract of the map for the site and surrounding area is presented in Figure 4-1 where the Environment Agency define the surface water flood risk categories as:

- Very Low: less than 1 in 1,000 (0.1% AEP) chance of flooding in any given year;
- Low: less than 1 in 100 (1% AEP) but greater than or equal to 1 in 1,000 (0.1% AEP) chance of flooding in any given year;
- Medium: between 1 in 100 (1% AEP) and 1 in 30 (3.3% AEP) chance of flooding in any given year; and
- High: greater than 1 in 30 (3.3% AEP) chance of flooding in any given year.

18 South Holland Heritage, Pode Hole, https://www.heritagesouthholland.co.uk/location/pode-hole/

19 Long Term Flood Risk Information Service, https://www.gov.uk/check-long-term-flood-risk

Figure 4-1: Extract of Environment Agency Surface Water Flood Map



The mapping in Figure 4-1 confirms the conceptual understanding and shows that part of the site is located within an area of low to very low risk. A small uplift (0.1m) is proposed to the development platform level which will further protect the battery box from localised flood risk.

On this basis the flood risk from Surface Water and Overland Flows is assessed to be **very low**.

4.5 Flooding from Groundwater

Groundwater flooding can be defined as flooding caused by the emergence of water originating from subsurface strata. Groundwater flooding can occur where sites are located on permeable ground. After a prolonged period of rainfall and groundwater recharge, a considerable rise in the water table can result in inundation for extended periods of time.

As discussed in Section 2.4, the site is underlain by bedrock geology of the Oxford Clay Formation which is overlain by superficial deposits that are described as Tidal Flat Deposits of clay and silt. These are low permeability units and groundwater flows at and around the site are likely to be negligible.

On this basis the flood risk posed to the battery box from Groundwater is assessed to be **very low**.

4.6 Flooding from Sewers and Water Mains

Flooding from sewers or water mains inherently poses a risk at any site. The site's location bordering a residential street indicates that there is a high likelihood of adopted sewerage and mains networks locally; however, a utility search has confirmed that no systems are present either on or immediately adjacent to the development footprint.

In the event of a failure or surcharge the areas vulnerable to flooding would mirror the surface water flood outline with excess flows draining across the playing field to the west which is lower than the development.

On this basis the flood risk posed to the battery box from Sewers and Water Mains is assessed to be **very low**.

4.7 Flooding from Reservoirs, Canals, and other Artificial Sources

Environment Agency mapping[19] indicates that the site does not lie within a flood risk zone due to a breach scenario of any reservoirs. No other artificial sources of flooding have been identified in the vicinity of the site.

On this basis the flood risk posed to the battery box from Reservoirs, Canals, and other Artificial Sources is assessed to be **very low**.

4.8 Flooding from Infrastructure Failure

During an extreme fluvial or tidal flood event over topping of the flood defences remote from the site is possible. Such over topping would significantly increase the potential for scour and erosion of flood embankments and this could result in major breaches through which significant quantities of flood water would enter the floodplain.

The Strategic Flood Risk Assessment flags this as a major concern locally and extensive modelling has been undertaken with the aim of quantifying this risk. This breach and over topping modelling includes a series of breach locations along the embankment of the River Welland past the site including both the tidal and fluvial reaches.

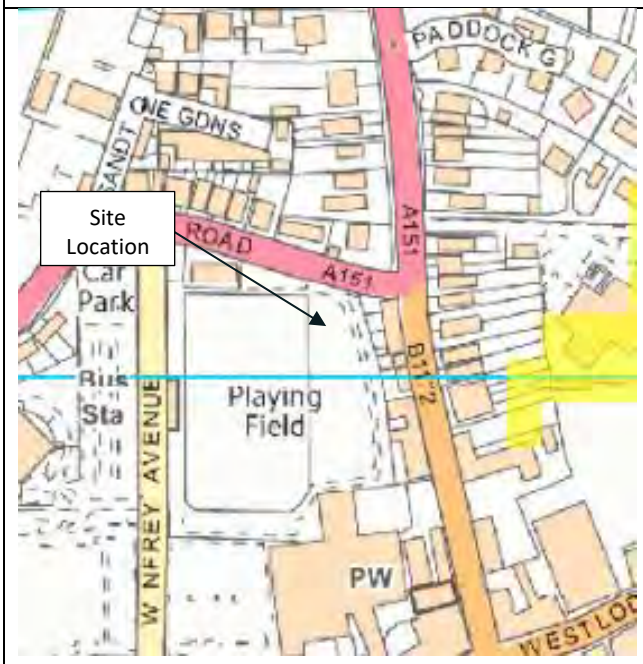
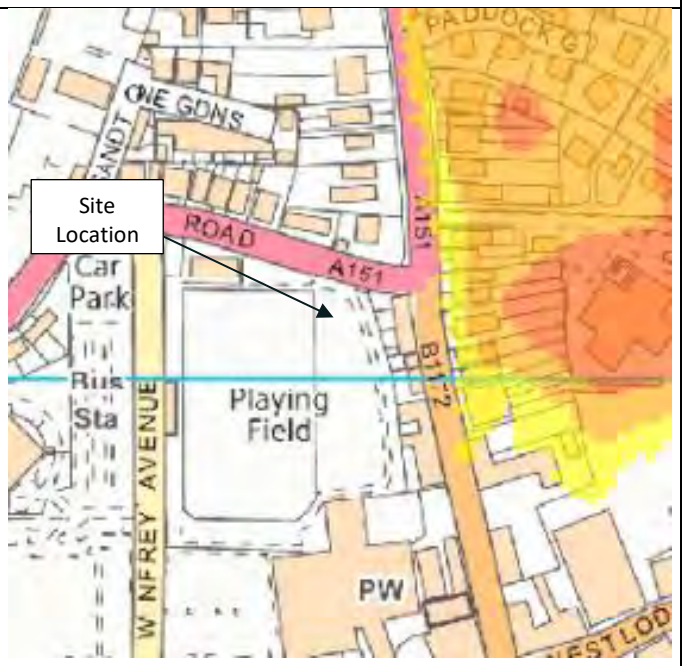
Excerpts from this modelling are presented in Figure 4-2 below and confirm that the area of the proposed development is not currently within the breach flood outline (current day).

Changes in flood severity associated with climate change will increase risks; however, even with these changes by 2115 (i.e. significantly beyond the project development lifetime) the site is still no predicted to be in an area where breach flooding is possible.

On this basis, the residual flood risk posed to the battery box from Infrastructure Failure is assessed to be **very low**.

It is noted that areas around the site and locally could be impacted by flooding in the event that the flood defences fail and that this would impede access to the site. We would however emphasise that the site will only take a few weeks to constructed and following this will be unmanned.

Figure 4-2: Extract of SFRA Residual Risk Mapping

Residual Peak Depth, Spalding – Present Day, 1% Fluvial / 0.5% Tidal event probability	Residual Peak Depth, Spalding – Year 2115, 1% Fluvial / 0.5% Tidal event probability
	

Map Legend

Peak Depth

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

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.
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

4.9 Summary

A summary of potential sources of flooding and the flood risk arising from them is presented in Table 4-1.

Table 4-1: Potential Risk Posed by Flooding Sources

Potential Source	Flood Risk at Site
Sea or Tidal Flooding	Very Low
Rivers or Fluvial Flooding	Very Low
Surface Water and Overland Flow	Very Low
Groundwater	Very Low
Sewers and Water Mains	Very Low
Reservoirs, Canals and other Artificial Sources	Very Low
Infrastructure Failure	Very Low

5.0 Conclusion

SLR Consulting Limited has been appointed on behalf of AMP Energy Services Ltd to prepare this Flood Risk Assessment (FRA) in support of a planning application for a 200kW (800kWhr) Energy Storage System (ESS) ('Battery Box') ("the proposed development").

The proposed development will be located within Sir Halley Stewart Playing Field, Winfrey Avenue, Spalding, Lincolnshire, PE11 1DA ("the site"). The flood risk posed to this development has been assessed in line with BS8533 and national policy and guidance and taking into account Policy 4 of South-East Lincolnshire Local Plan.

The assessment has concluded that:

1. The site is located in Flood Zone 3a. This indicates that if no flood defences existed the probability of tidal flooding at the site would be greater than 1 in 200 and / or the probability of fluvial flooding would be greater than 1 in 100.
2. As a minor and '*less vulnerable'* development the Sequential Test and the Exception Test do not apply to this scheme. Irrespective of this, even if they were applied, given the context of the site and the nature of the development proposed, these would be passed.
3. A system of raised embankments is present along the tidal reach of the River Welland and raised ground is present along the fluvial reach. With reference to flood model data the probability of the embankments or raised ground being over topped is low.
4. Water flowing over embankments could cause erosion and scouring of the flood defences, resulting in flood breaches. This would exacerbate flooding and result in impacts across a larger area. The Strategic Flood Risk Assessment flags this as a major concern locally and extensive modelling has been undertaken with the aim of quantifying this risk. The modelling indicates that the area of the proposed development is not within the breach flood outline and that even with changes in flood severity through to 2115 the site would not be impact in the event of flooding of this type.
5. A review of other potential flood sources, including flooding from Vernatt's Drain, surface water, sewers, groundwater and reservoirs has confirmed that the flood risk from these is all very low.

The technical assessment of risk presented within this flood assessment demonstrates that the flood risks present at the site are very low and that development on the site will be 'safe' in flood risk terms throughout its lifetime without increasing flood risk elsewhere.

APPENDIX 01: PROPOSED SITE LAYOUT

Key: = POS | --- Freehold Border | --- Battery Box Compound
Site Name: Winfrey Box
Site Address: Sir Halley Stewart Playing Field, Winfrey Avenue, Spalding, PE11 1DA
Grid Reference: TF 24746 23028
What3Words: mile.tables.likes

BATTERY BOX
LEADING THE CHARGE

APPENDIX 02: ENVIRONMENT AGENCY DATA RESPONSE

Zainab Jarmajo
zjarmajo@slrconsulting.com

Our ref: CCN-2024-346806
Date: 15/02/2024

Dear Zainab,

Provision of Flood Risk Information for Winfrey Avenue, 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.

Please note, our Recorded Flood Outlines do not reflect the latest (October 2023-present) flood incidents. Due to the scale of the events, it will take time to gather the information and verify the extent of the flooding before we are able to provide this information.

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

This site is considered to be at risk of flooding from main rivers.

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

There are no formal flood defences reducing the risk of flooding to this site.

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 not considered to be at risk from tidal flooding.

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 Christopher using the email address below and quoting our CCN reference number above.

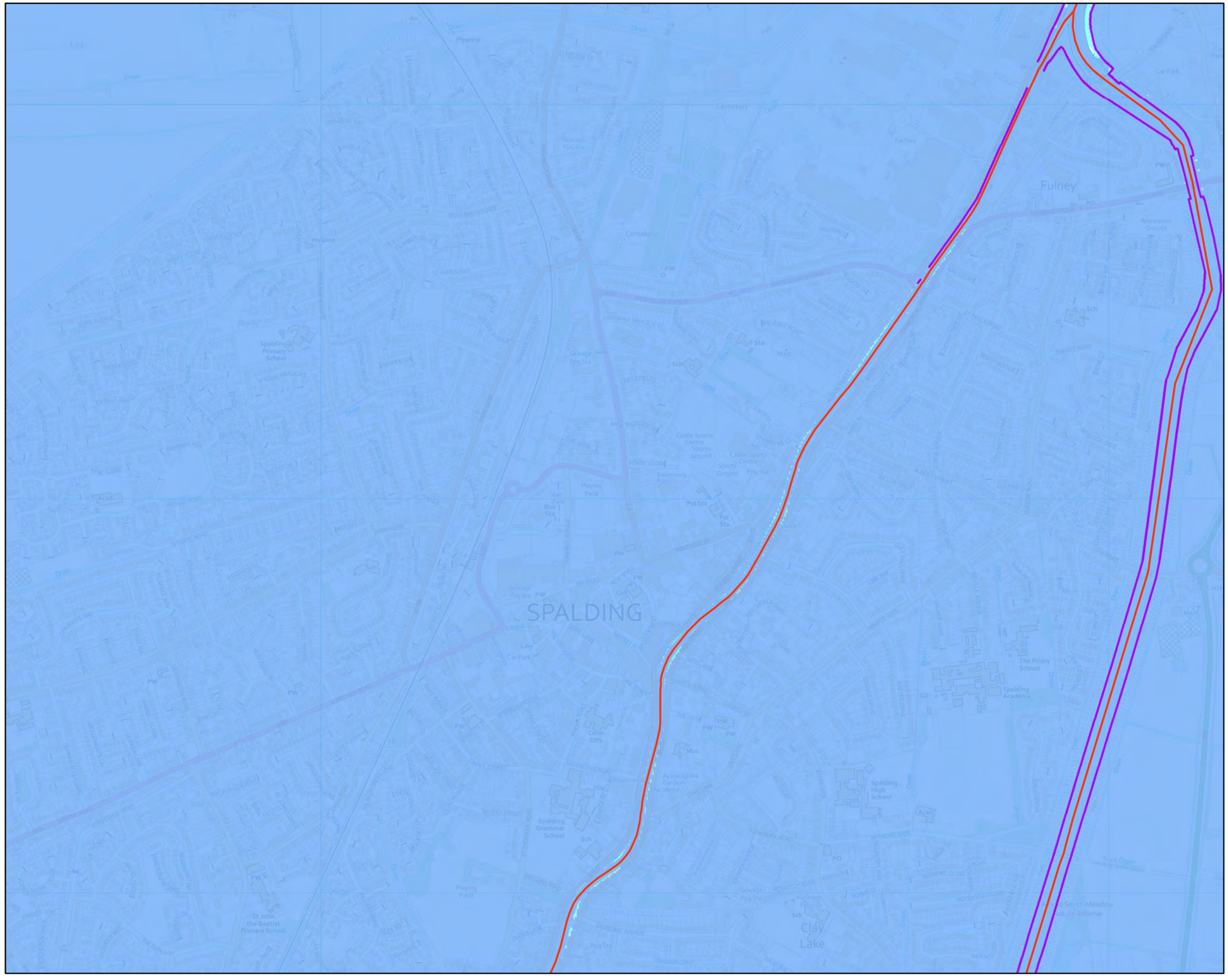
Yours sincerely,

+44 7385226602

for Ben Thornely
Area Flood and Coastal Risk Manager
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 TF 24746 23028 - created February 2024 [Ref: CCN-2024-346806]



Environment Agency

Scale 1:10,000

N

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.

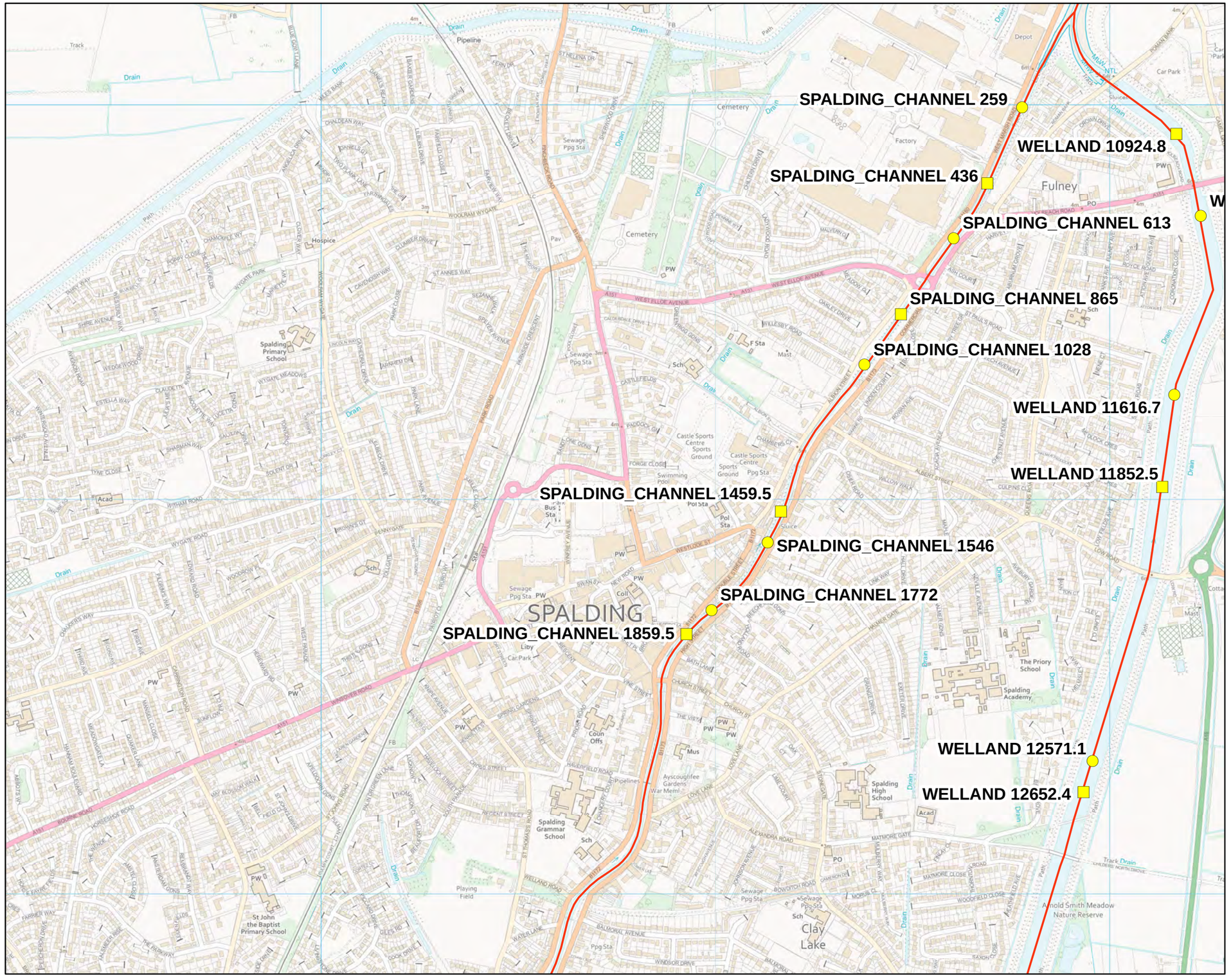
Light blue shows the extent of the Extreme Flood Outline, which represents the extent of a flood event with a 0.1% chance of occurring in any year, or the highest recorded historic extent if greater.

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

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Modelled Nodes Map centred on TF 24746 23028 - created February 2024 [Ref: CCN-2024-346806]



Environment Agency

Scale 1:10,000

N

Legend

- Modelled Nodes - Levels
- Modelled Nodes - Flows
- Main Rivers

Created by the Partnerships and Strategic Overview Team, Kettering

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Fluvial Flood Levels (mODN)

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

			Annual Exceedance Probability - Maximum Water Levels (mODN)											
Node Label	**Easting**	**Northing**	**50% (1 in 2)**	**20% (1 in 5)**	**10% (1 in 10)**	**5% (1 in 20)**	**3.33% (1in 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**
SPALDING_CHANNEL 259	525779	323995	3.70	4.00	4.17	4.45	4.50	4.51	4.52	4.52	4.68	4.53	4.56	4.68
SPALDING_CHANNEL 613	525605	323662	3.70	4.00	4.17	4.45	4.50	4.51	4.52	4.52	4.68	4.53	4.55	4.68
SPALDING_CHANNEL 1028	525379	323342	3.70	3.99	4.17	4.45	4.50	4.51	4.52	4.52	4.68	4.53	4.55	4.68
SPALDING_CHANNEL 1546	525133	322892	3.70	3.98	4.17	4.44	4.49	4.51	4.52	4.52	4.67	4.53	4.55	4.67
SPALDING_CHANNEL 1772	524991	322719	3.69	3.98	4.17	4.44	4.49	4.51	4.51	4.51	4.67	4.53	4.55	4.67
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
WELLAND 12571.1	525957	322337	3.66	3.94	4.11	4.36	4.42	4.42	4.43	4.45	4.68	4.47	4.48	4.68

Fluvial Flood Flows (m^3/s)

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

			Annual Exceedance Probability - Maximum Flows (m^3/s)											
Node Label	**Easting**	**Northing**	**50% (1 in 2)**	**20% (1 in 5)**	**10% (1 in 10)**	**5% (1 in 20)**	**3.33% (1in 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**
SPALDING_CHANNEL 436	525690	323802	0.71	1.06	0.91	1.06	1.02	1.03	1.15	1.17	1.65	1.10	1.07	1.93
SPALDING_CHANNEL 865	525471	323470	1.75	2.69	2.48	2.87	2.86	2.70	3.13	3.25	4.56	3.10	2.86	5.02
SPALDING_CHANNEL 1459.5	525167	322971	3.04	4.34	4.55	5.22	5.29	4.98	5.59	5.90	7.95	5.74	5.27	8.01
SPALDING_CHANNEL 1859.5	524928	322659	3.69	4.97	5.86	6.68	6.87	6.45	7.03	7.47	9.83	7.43	6.90	9.44
WELLAND 10924.8	526170	323927	74.06	89.60	100.87	115.72	117.75	118.85	119.81	121.38	123.20	120.56	120.49	119.34
WELLAND 11852.5	526134	323032	71.70	86.88	98.22	113.15	114.96	116.37	117.40	118.90	119.52	118.10	118.11	117.34
WELLAND 12652.4	525934	322259	69.30	84.57	95.88	109.05	112.81	114.54	116.06	117.54	117.04	116.95	116.73	116.17

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