

FLOOD RISK ASSESSMENT

Residential Development,
Land at Keston Fields,
Pinchbeck,
Spalding.



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November 2025 Version 1

RMA

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FLOOD RISK ASSESSMENT FOR RESIDENTIAL DEVELOPMENT LAND AT KESTON FIELDS, PINCHBECK, SPALDING.

EXECUTIVE SUMMARY

Summary of Possible Sources of Flooding		
Source	Significant	Comment
Fluvial (Main River)	Low	The site may be at risk from the fluvial River Glen in the form of residual risk due to the failure of flood management infrastructure such as a breach of a raised flood defence. scenario, today or with an allowance for climate change
Tidal	Medium	The site may be at risk from the tidal River Welland in the form of residual risk due to the failure of flood management infrastructure such as a breach of a raised flood defence. scenario, today or with an allowance for climate change
Pluvial	Low	Parts of the site shown on Flooding from Surface Water to be affected for the 0.1% event
Ground Water	No	Unlikely due to ground conditions
Overland flow	No	No high ground surrounding the site
Blockage	Low	Welland & Deepings IDB Watercourse to the north of the site
Infrastructure	Low	Public sewers in the vicinity of the site
Reservoirs	No	Site not at Risk in the Dry or Wet Day scenario from an reservoir.
Lakes & Canals	No	No lakes or canals close to the site

INTRODUCTION

The Government has placed increasing priority on the need to take full account of the risk associated with flooding at all stages of the planning and development process. This seeks to reduce the future damage to property and the risk to life from incidents of flooding. Their expectations relating to flooding are contained in the National Planning Policy Framework December 2024, (NPPF), which identifies how the issue of flooding is dealt with in the drafting of planning policy and the consideration of planning applications by avoiding inappropriate development in areas at risk from flooding and to direct development away from areas at highest risk.

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

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APPLICATION SITE

The site is located at Keston Fields, Pinchbeck, Spalding PE12 6JP within the administrative area of South Holland District Council. The National Grid Reference at the centre of the site is TF23552 24827. (what3words /// bricks.height.masks). Total site area of approximately 2.3 hectares. **Plan 1**

This flood risk assessment has been prepared for a planning application for residential development. The proposal includes for the construction of a network of adopted and private access roads, serving 40 detached, semi-detached, single and 2 storey dwellings. **Plan 2**

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

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

Zone 1 – Low Probability (<0.1%)

Zone 2 – Medium Probability (0.1 – 1.0%)

Zone 3 – High Probability (>1.0%)

Most of the proposed development site is shown to be within an area of Flood Zone 3 “High Probability” as detailed on the Environment Agency's Flood Zone Maps **without defences**, and as defined in Table 1 of NPPG.

Table 1: Flood Zones Definition

Flood Zone 3- High Probability
Definition Land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year. The water-compatible and less vulnerable uses of land are appropriate in this zone. The highly vulnerable uses should not be permitted in this zone. The more vulnerable and essential infrastructure uses should only be permitted in this zone if the Exception Test is passed. Essential Infrastructure permitted in this zone should be designed and constructed to remain operational and safe for uses in times of flood Flood Risk Assessments requirements All proposals in this zone should be accompanied by a Flood Risk Assessment. Policy aims Developers and local authorities should seek opportunities to: • reduce the overall level of flood risk in the area through the layout and form of the development and the appropriate application of sustainable drainage techniques; • relocate existing development to land with a lower probability of flooding; • create space for flooding to occur by allocating and safeguarding open space for flood storage.

Applying the Flood Risk Vulnerability Classification in Table 2 of NPPG, the proposed residential development is classified as “More Vulnerable,” Table 1 of NPPG states that such use is permitted in this zone subject to the Exception Test.

Table 2: Flood Risk Vulnerability Classification

More Vulnerable
• Hospitals • Residential institutions such as residential care homes, children’s homes, social services homes, prisons, and hostels. • Buildings used for: dwelling houses; student halls of residence; drinking establishments; nightclubs; and hotels • Non-residential uses for health services, nurseries, and educational establishments • Landfill and sites used for waste management facilities for hazardous waste. • Sites used for holiday or short-let caravan and camping, subject to a specific warning and Evacuation Plan.

Site Levels

The topographical survey, to OS datum, reveals that the site is reasonably level site, The natural ground levels for the site fall from the south to the north ranging from approximate levels of 4.0mODN down to, 3.35mODN with an average level of 3.50mODN. **Plan 3**

DRAINAGE AUTHORITIES

Environment Agency

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

The following potential sources of flooding affecting the development site are.

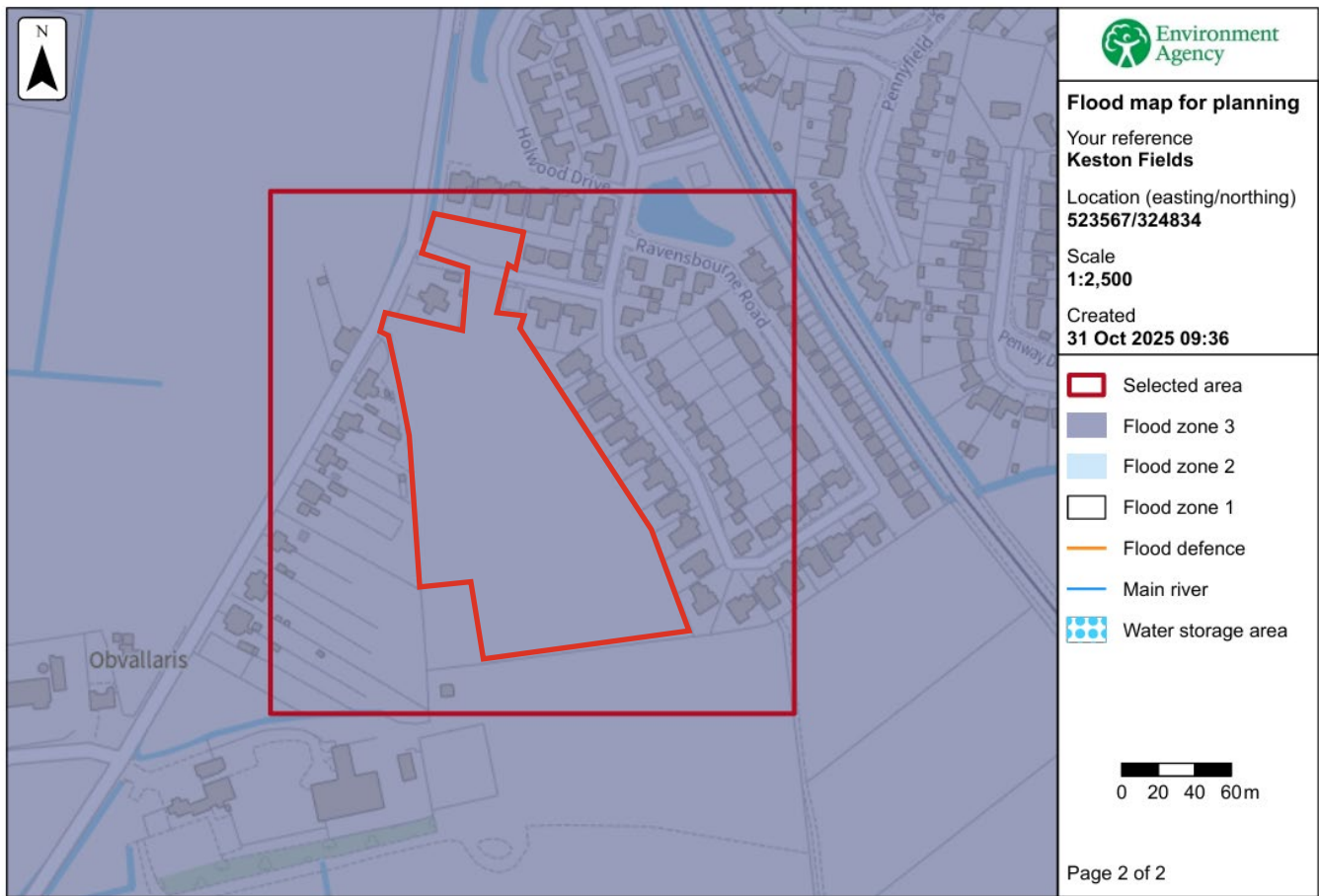
- The River Welland (Tidal)
- River Glen (Fluvial)
- Welland & Deepings Internal Drainage Board system.
-

The flood zone maps indicate that the area would be flooded without flood defences.). The Flood Map indicates the area at risk of flooding, **assuming no flood defences exist**, for a flood event with a 0.5% chance of occurring in any year for flooding from the sea, or a 1% chance of occurring for fluvial (river) flooding. It also shows the extent of the Extreme Flood Outline which represents the extent of a flood event with a 0.1% chance of occurring in any year, or the highest recorded historic extent if greater. To meet the requirements of the National Planning Policy Framework, these defences are removed in their entirety to produce the Flood Map for Planning (Rivers and Sea). The map therefore shows the full extent of areas that would be at risk of flooding if no defences existed, and water could spread out across the floodplain.

Flood Zones

These maps were updated on the 25th March 2025 and show that the site is considered at no risk from tidal/fluvial

flooding as it is all located within an area zoned as Flood Zone 1. The maps indicate that the area would be flooded without flood defences, which are in place, (with an annual probability of more than 0.5% i.e., return frequency of less than 1 in 200 years for tidal flooding or more than 1.33% return frequency of less than 1 in 100 years for fluvial flooding).

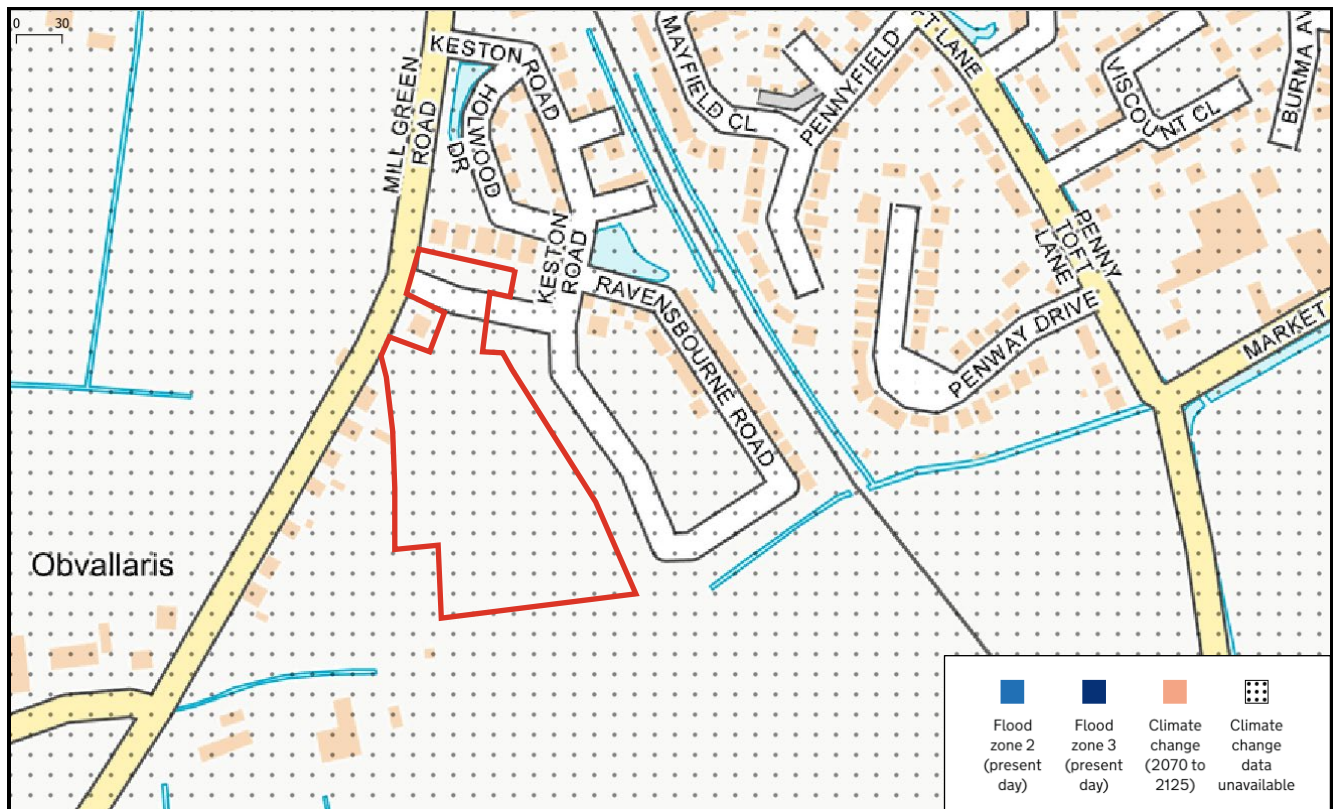


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Flood Map for Planning Present Day (Source EA)

On the 27 August 2025 the Environment Agency added a new layer on “Flood Map for Planning Flood Zones plus Climate Change”, which shows how the combined extent of Flood Zones 2 and 3 could increase with climate change over the next century. Flood zone 1 sites that are within the ‘flood zones plus climate change extent should be treated as if they were in flood zone 2.

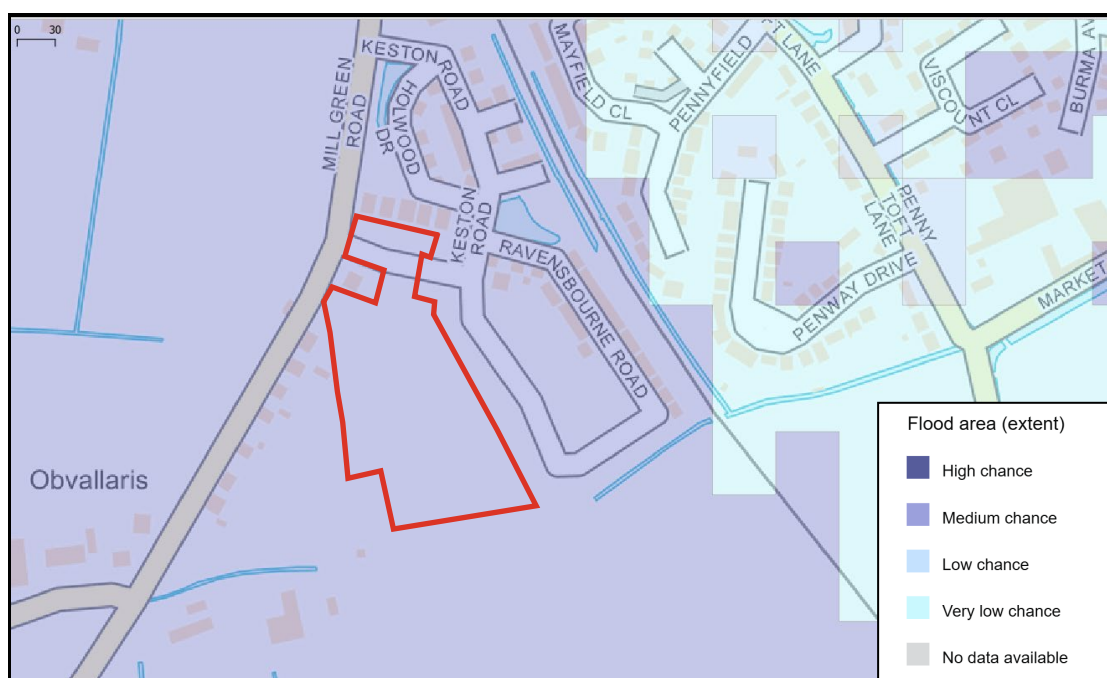
In this location, all or part of the site is included in an area where flood zones plus climate change data is not currently available while the Environment Agency makes important improvements to their data.



Flood Map for Planning with Climate Change (Source EA)

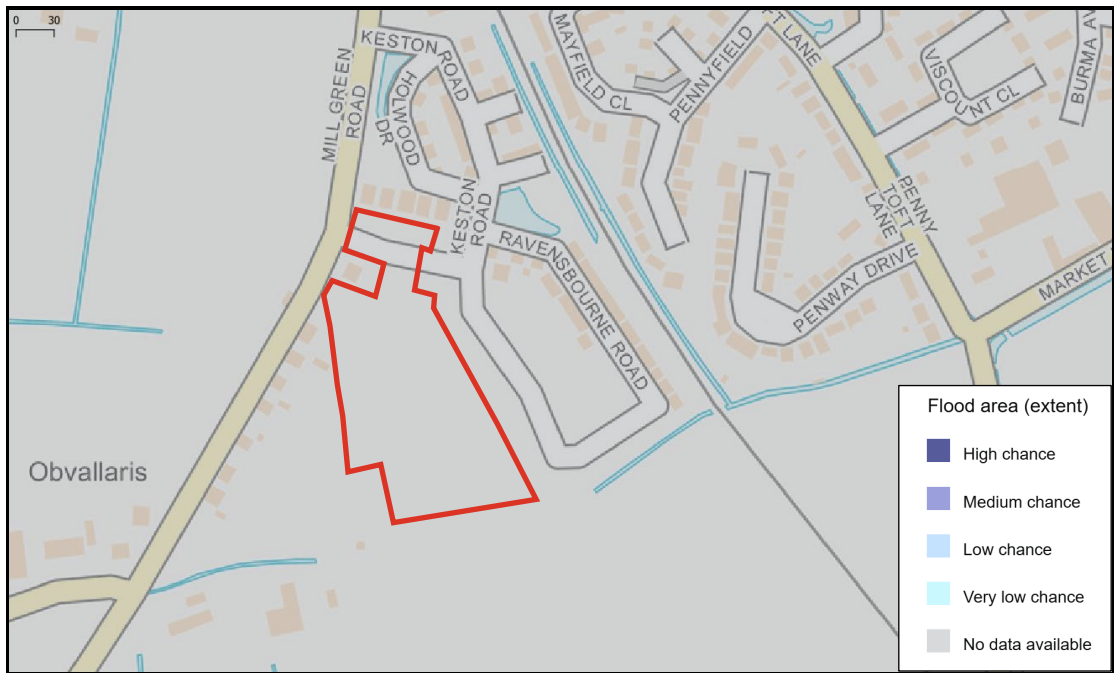
Risk of Flooding from Rivers & Sea

The Risk of flooding from Rivers and Sea map was updated in January 2025 and for the present day shows that the site for the development, to be at no chance of flooding both for the present day and with climate change. This takes into account the effect of any flood defences that may be in this area. Flood defences reduce, but do not completely stop the chance of flooding as they can be overtopped or fail.



Risk of Flooding from Rivers & Sea Map Present Day (Source EA)

In this location, all or part of the site is included in an area where flood zones plus climate change data is not currently available while the Environment Agency makes important improvements to their data.



Risk of Flooding from Rivers & Sea Map With Climate Change (Source EA)

Schemes in the Area

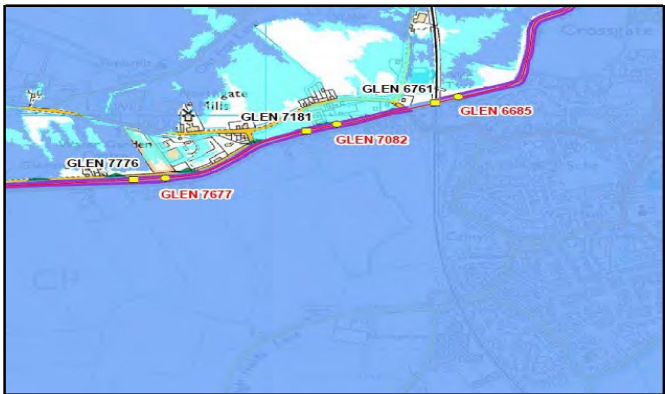
There are no ongoing capital projects to reduce or sustain the current flood risk to this site.

Fluvial Flooding

The site could be at risk from fluvial flooding from the River Glen in the form of residual risk due to the failure of flood management infrastructure such as a breach of a raised flood defence.

River Glen

The River Glen lies some 1.8Km to the north of the site and the present day 1 in 100-year flood level with 20% consist of the B1180 Road which are in good condition and the crest heights for the right bank along this stretch of river are circa 5.90mODN. (SHDC SFRA). climate change is 4.87mODN.



Node Map

The fluvial flood data for the model nodes shown on the map are set out in the tables below.

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)	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
GLEN 6685	523603	326081	4.01	4.16	4.23	4.31	4.34	4.35	4.38	4.84	4.44	4.60	4.94
GLEN 7082	523224	325963	4.04	4.17	4.25	4.32	4.36	4.39	4.41	4.87	4.49	4.70	5.01
GLEN 7677	522687	325733	4.06	4.20	4.28	4.35	4.41	4.43	4.45	4.91	4.54	4.79	5.07

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)	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
GLEN 6761	523531	326057	25.95	29.44	31.06	33.13	34.59	35.32	35.84	43.56	38.87	48.22	56.95
GLEN 7181	523130	325934	25.69	29.20	30.85	32.93	34.37	35.09	35.60	43.18	38.62	48.05	56.90
GLEN 7776	522589	325726	25.40	29.03	30.65	32.71	34.14	34.86	35.37	42.73	38.33	48.07	56.87

This data is taken from the Welland Model (2016) and are the most up-to date currently available. The Environment Agency aim to review the models on a regular basis.

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.

The site lies within the Welland River Catchment, Peak River flows should be adjusted to reflect the latest climate change allowances of 17% increase in river level for ‘More Vulnerable’ uses. It must also be assumed, to provide a worst-case scenario, that flood defences have been raised during this period to cater for the rise in river level.

Given the scale and nature of the proposed development it is considered that additional hydraulic modelling is not appropriate to determine the revised river levels and the 20% Climate Change level has been used in this assessment.

With the crest level of the B1180 road being circa 5.90mODN the climate change river levels for the 1 in 100 year Central (20%) would remain in channel. Based upon the crest heights of the flood defence the proposed site is protected with a freeboard of over 1.0m.

Tidal Flooding

The main risk of flooding at the site would be from Tidal flooding from the River Welland in the form of residual risk due to the failure of flood management infrastructure such as a breach of a raised flood defence.

The River Welland Tidal Defences

The River Welland is located some 2.79Km southeast of the site and is tidal down stream of Marsh Lane Sluice. The tidal defences protecting this site consist of earth embankments, the crest heights are circa 7.50mODN. They are in good condition and reduce the risk of flooding (at the defence) to a 0.67% (1 in 150) chance of occurring in any year. The Environment Agency inspect these defences routinely to ensure potential defects are identified.

Tidal flooding may be caused by seasonal high tides such as those driven by the spring neap tide cycle, storm surges and where increase in water level above the astronomical tide level is created by strong on shore winds or by storm driven wave action and a deep atmospheric low pressure. Extreme conditions leading to coastal flooding are most commonly a result of a combination of two or more of these mechanisms.

Taking the precautionary approach, the Hazard Rating following a breach which in Flood Risk Assessment (FD 2320) Guidance for New Development Phase 2 R& D Technical Report these are classified as low <0.75, moderate 0.75-1.25, significant 1.25-2.50 and extreme >2.50 based upon an empirical measure of velocity and depth.

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

Where V = Flood flow velocity (m/sec) D = Flood depth (m), DF = A debris factor included to represent the greater damage, or risk of injury to people, that can occur if debris is swept along with the water. = 0.5 for depths <0.25 or 1.0 for depths.

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

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

South Holland District Council

In order to inform the process of risk assessment and site selection the District Council commissioned Haskoning UK Ltd Consultants to prepare a Strategic Flood Risk Assessment in December 2002. They have carried out an Update in 2017.

This Flood Risk Assessment has taken the results of the (2017) updated South Holland Strategic Flood Risk Assessment (SHSFRA) into account in its findings. This update included new flood risk information from River Welland (Fluvial), River Glen (Fluvial) and Tidal hazard mapping (River Welland, River Nene and the Wash sea defence).

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

The present-day for the Residual Flood Hazard, Depth and Velocity Spalding – 0.1% fluvial and tidal event probability maps show that the site where the proposed development is to be located is not within hazard area.

Map 1

With climate change (2115) the Residual Flood Hazard, Depth and Velocity Spalding –0.1% fluvial and tidal event probability maps show that the site where the proposed development is to be located is still not within hazard area. **Map 2**

Finished Floor Levels

The proposed residential development is classified as “More Vulnerable” therefore it can be considered in accordance with details contained in the Standard Advice Matrix in the South East Lincolnshire Local Plan. With the site being within Flood Zone 3 (with no defences), but within a no hazard zone following a breach to the defences, the site can be considered within in cell G9.

The South East Lincolnshire flood risk advice matrix for Cell G9 requires that single storey buildings should use the 0.1% event 2115 scenario for setting the FFL.

With the 0.1% Tidal Breach hazard map showing that the site is not affected by a breach to the tidal defences, it is proposed that the minimum ground floor level for the proposed development be raised 300mm above the existing ground level.

Welland & Deepings Internal Drainage Board

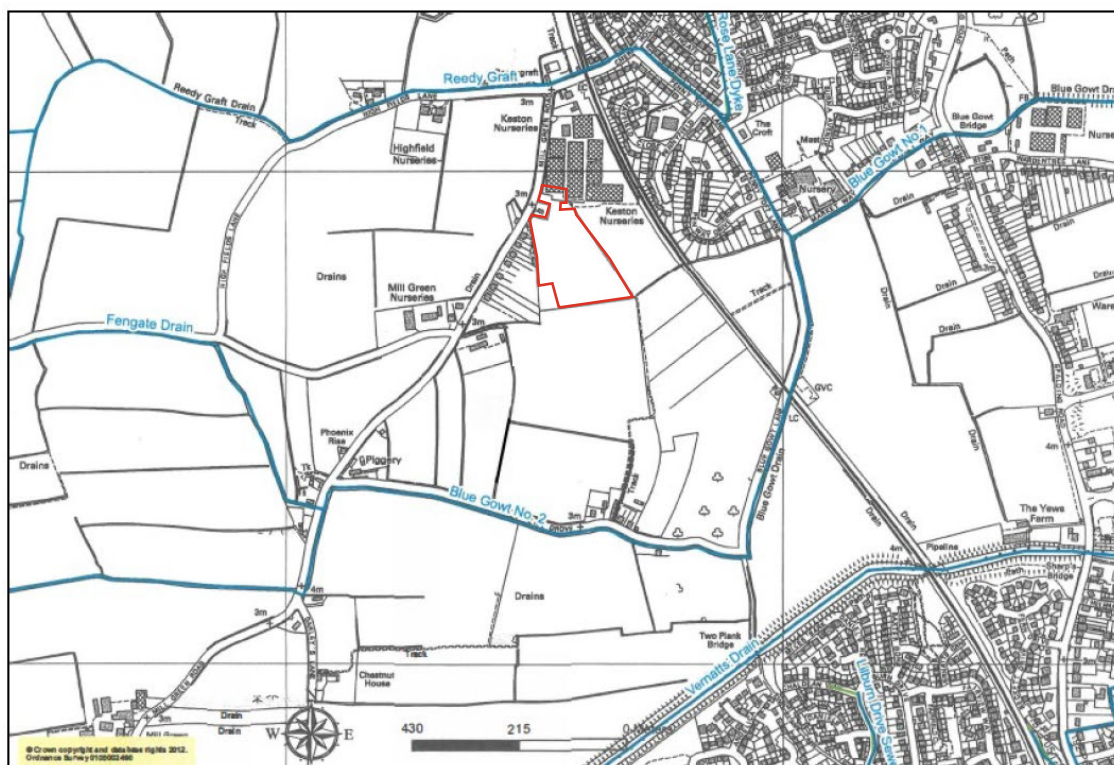
The proposed development site is located within Catchment area of Welland & Deepings Internal Drainage Board. The Board is responsible to operate and maintain the arterial fluvial system

The Board’s nearest watercourse to the site is the Reedy Graft to the north and the Blue Gowt No 2 some 500m south of the site.

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

- No person without the previous consent of the Board shall erect any building or structure, whether temporary or permanent, or plant any tree, shrub, willow or other similar growth within 9 metres of the landward toe of the bank where there is an embankment or wall or within 9 metres of the top of the batter where there is no embankment or wall, or where the watercourse is enclosed within 9 metres of the enclosing structure.

- No person shall, without the previous consent of the Board, for any purpose, by means of any channel, siphon, pipeline or sluice or by any other means whatsoever, introduce any water into the district or, whether directly or indirectly, increase the flow or volume of water in any watercourse in the district.
- The erection or alteration of any mill dam, weir or other like obstruction to the flow, or erection or alteration of any culvert within the channel of a riparian watercourse.



Welland & Deepings Drainage Map

FLOODING FROM OTHER SOURCES

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

- Flooding from land can occur from intense rainfall, often over short duration of time that is unable to soak into the ground or enter the drainage system. However, with the natural topographic nature of the ground being flat, with no high ground around the site this will not cause any rapid inundation of the site and is likely only lead to local ponding of shallow depth and low velocity. The ground floor level for the dwellings is raised 300mm above the existing ground level. The proposed development would result in a significant percentage of the site becoming impervious - house roofs, highways, driveways, paths etc. - and therefore the surface water that hitherto has had to find its way slowly by infiltration into the sub-soil and post development would be captured, conditioned and conveyed in a controlled and managed fashion. Furthermore, the trenches required for gas, water, electricity and telecoms service connections to each property would effectively provide conduits to convey away and disperse any localised build-up of surface water. It is concluded that

flooding from this source is limited to minor isolated cases and is not of strategic significance as regards to flood risk.

- Groundwater flooding occurs when groundwater levels increase sufficiently for the water table to intersect the ground surface. Groundwater flooding can occur in a variety of geological settings including valleys, in areas underlain by chalk, and in river valleys with thick deposits of alluvium and river gravels.
- Flooding from sewers can occur from overloading from heavy rainfall caused by blockages or having inadequate capacity. However, with the natural topographic nature of the ground being flat, with no high ground around the site this will not cause any rapid inundation of the site and is likely only lead to local ponding of shallow depth and low velocity. The ground floor level for the dwellings is raised 300mm above the existing ground level. It is concluded that flooding from this source is limited to minor isolated cases and is not of strategic significance as regards to flood risk.
- Non-natural or artificial sources of flooding such as reservoirs, lakes, or canals where water is stored above natural ground level could cause flooding if the structure fails or is over topped.

Reservoirs

The EA has prepared reservoir failure flood risk mapping to show the largest area that might be flooded if a reservoir were to fail and release the water it holds. The mapping displays two scenarios as follows:

- Dry this is the extent when the river levels are normal,
- Wet this is the extent when there is also flooding from rivers.

The mapping displays a worst-case scenario and is only intended as a guide. The site is shown to be at no risk of flooding due to the failure of a large, raised reservoir in both the dry and or wet day scenario. All large reservoirs must be inspected and supervised by reservoir panel engineers as detailed by the enforcement authority for the Reservoirs Act 1975 in England. The EA are responsible to ensure that reservoirs are inspected regularly, and essential safety work is carried out. As such, the risk of flooding from this source is relatively low.

Canals and or Artificial Water Bodies.

The site is not at risk of flooding from canals and or Artificial Water Bodies.

RESIDUAL RISKS

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

SURFACE WATER FLOODING

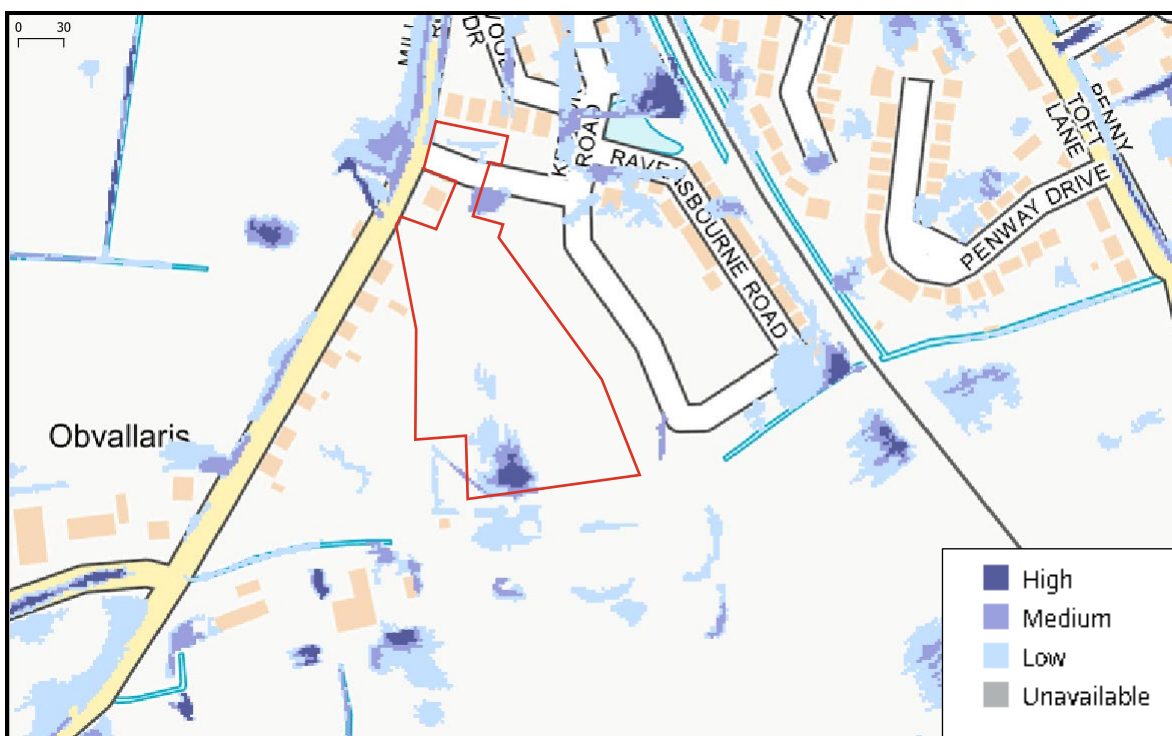
The chance of flooding from surface water was updated in January 2025 and for the climate change scenario the map shows the proposed site with some pockets at a high chance of surface water flooding, with climate change this remains the same.

The maps for surface water and the maps for river and sea flooding define the risk as High, Medium, Low and Very Low. The chance of flooding for the area defined in any given year is shown below:

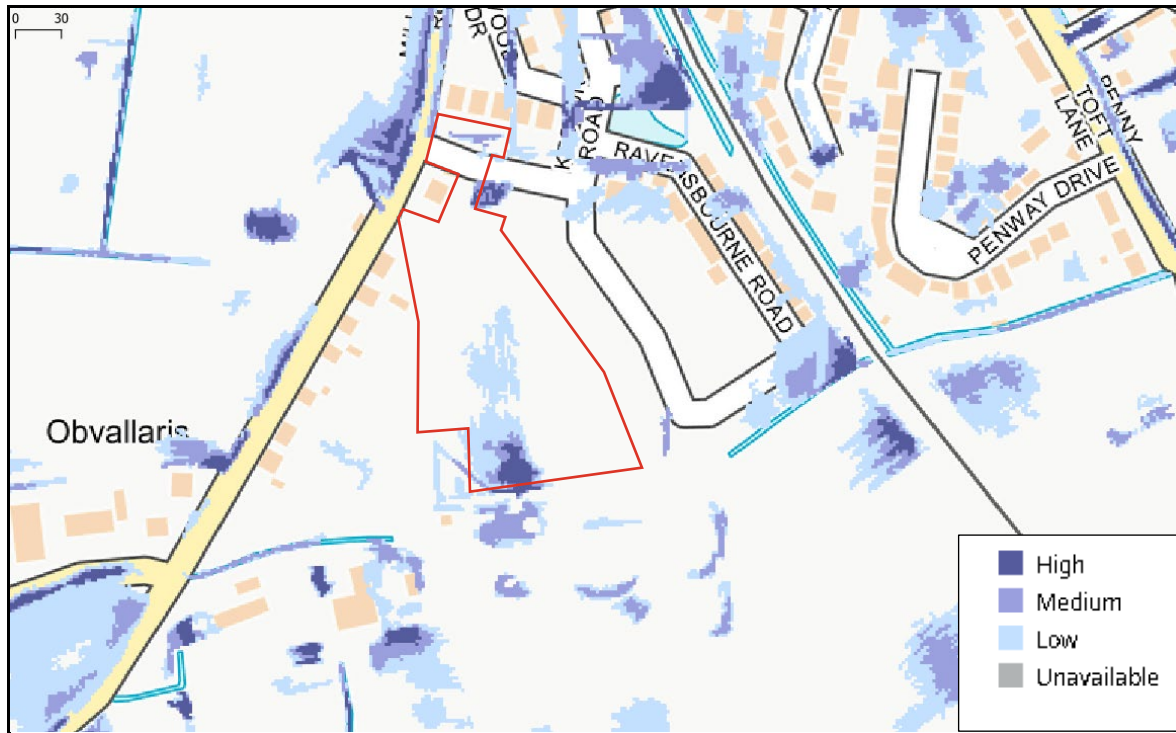
- **High:** greater than 1 in 30 (3.3%).
- **Medium:** between 1 in 100 (1%) and 1 in 30 (3.3%).
- **Low:** between 1 in 1000 (0.1%) and 1 in 100 (1%).
- **Very Low:** less than 1 in 1000 (0.1%)

The RoFSW products are an assessment of where surface water flooding may occur when rainwater does not drain away through the normal drainage systems or soak into the ground but lies on or flows over the ground instead. It includes information about flooding extents and depths.

The development for the site would substantially alter its drainage characteristics by the provision of a positive surface water drainage system thus reducing the chance of flooding. Instead of uncontrolled dispersal, water could face multiple impervious barriers and multiple primary and secondary drainage channels. The low spots on the site will be removed by the development and the proposed landscaping thus removing the chance of surface water flooding.



Risk of flooding From Surface Water Map Present Day (Source EA)



Risk of flooding From Surface Water Map with Climate Change (Source EA)

There is a caveat contained in the Environment Agency's "Product description for the risk of flooding from surface water." RoFSW outputs are generally not suitable for property level assessment; instead, they estimate flood risk to an area of land. The method used does not provide information relating to when the floodwater may be deep enough to start causing damage or disruption to homes, roads or other infrastructure.

A near-term epoch (2040 – 2060 "2050s" epoch) and central allowances are being used initially, to support short and medium-term decisions informed by the highest flood likelihood projections.

SEQUENTIAL APPROACH

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

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

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

occurring in any given year).

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

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

Flood Risk Vulnerability Classification		Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	Flood Zone 1	✓	✓	✓	✓	✓
	Flood Zone 2	✓	✓	Exception Test Required	✓	✓
	Flood Zone 3a	Exception Test Required	✓	✗	Exception Test Required	✓
	Flood Zone 3b Functional Floodplain	Exception Test Required	✓	✗	✗	✗

Sequential & Exception Test

NPPF Guidance Paragraphs 170 - 186 requires development within high areas of flood risk be determined using a sequential risk-based approach to the location of development to avoid where possible flood risk to people and property and manage any residual risk, taking account the impacts of climate change.

The aim of the Sequential Test is to steer new development to areas with the lowest probability of flooding.

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

A sequential and exception test has been prepared by others and for the purpose of this FRA they are deemed to have been satisfied.

CLIMATE CHANGE

Global warming is now recognised that it is likely to affect the frequency and severity of extreme events for both tidal and fluvial flooding. The Climate change allowances in the NPPF Guidance was updated, for sea level rise on the 17 December 2019, the peak river flows on the 20th of July 2021 and peak rainfall allowances 10th of May 2022.

For flood risk assessments use the Management Catchment Climate Changes for the peak river flow map.

Management catchments are sub-catchments of River Basin Districts.

Peak River Flow Allowances

The site is located within the Welland Management Catchment within the Anglian River Basin District, for sites within Flood Zone 2 or 3a and for “More Vulnerable” land uses, the Central allowances figures, in the Table below, should be used.

Peak River flow allowances within the Management Catchment Allowances				
River Basin District /Management Catchment	Allowance category	Total potential change anticipated for '2020s' (2015 to2039)	Total potential change anticipated for '2050s' (2040 to2069)	Total potential change anticipated for '2080s' (2070 to2115)
Anglian/ Welland	Upper End	22%	26%	53%
	Higher Central	10%	10%	28%
	Central	5%	4%	17%

The effect of global warming on peak rainfall allowances is given in Table 1.

Table 1 Peak Rainfall Intensity

Table 1 Peak rainfall intensity allowance in small and urban catchments (1961 to1990 baseline)			
Applies across all of England	Total potential change anticipated for 2010 to 2039	Total potential change anticipated for 2040 to 2059	Total potential change anticipated for 2060 to 2115
Upper End	10%	20%	40%
Central	5%	10%	20%

The annual sea rise due to climate change is given in NPPF and the recommended contingency allowances are stated in Table 2.

Table 2 Peak Sea Level Rise

Table 2 Peak Sea level allowance for each epoch in (mm) per year with cumulative sea level rise for each epoch in brackets (use 1981to 2000 baseline)						
Area of England) (Use River Basin	Allowance	2000 to 2035	2036 to 2065	2066 to 2095	2096 to 2125	Cumulative Rise 2000 to 2125 (m)
Anglian	Higher Central	5.8 (203mm)	8.7 (261mm)	11.6 (348mm)	13 (390mm)	1.20m
Anglian	Upper End	7 (245mm)	11.3 (339mm)	15.8 (474mm)	18.1 (543mm)	1.6m

SUSTAINABLE DRAINAGE STRATEGY

A drainage strategy and has been prepared, by Jackson Consultant Engineers, in general accordance with “CIRIA’s C753 – the SUDS Manual”, where appropriate. **Plans 3 & 4**

Surface Water Drainage

In summary, the surface water drainage will be to the following.

- Domestic roofwater will discharge into a piped system before discharging into the

attenuation basin.

- Domestic drives will discharge into a piped system before discharging into the attenuation basin.
- The highways will drain into filter strip and swale to the side of the roads before discharging into the attenuation basin.
- There is a very small section of highways which cannot drain via swales, and will need to have gullies to discharge this element. This will still eventually pass through the basin so achieves a compliant SUDS scheme.
- The basin will discharge into the IDB drain to the north of the site. This will require a pump – a similar strategy to the earlier phases.

Foul Water Drainage

- It is proposed to connect into the existing pumping station serving the earlier development pumping station via gravity. It is proposed that the main adoptable foul sewer will run through the main road, and adoptable laterals provided at strategic positions within the private plots.

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

FLOOD RESILIENCE CONSTRUCTION

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

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

The proposed development will have the following resilient measures incorporated in the construction, in accordance with “Improving the flood performance of new buildings” CLG (2007).

- The ground floor level for the dwellings will be raised a minimum of 300mm above the existing ground level.
- Avoid the use of mineral fibre insulation to the ground floor and use a rigid closed cell material as these retain integrity and have low moisture take-up.
- Where possible, all service entries should be sealed (e.g., with expanding foam or similar closed cell material). Closed cell insulation should be used for pipes which are below the predicted flood level.
- Water, electricity, and gas meters: should be located above the predicted flood level. Electrical

services: electrical sockets, heating systems: boiler units and ancillary devices should be installed at least 500mm above the ground floor level to minimise damage to electrical services Electric ring mains should be installed at high level with drops to ground floor sockets and switches.

- As this site is in an area that is capable of receiving flood warnings from the Environment Agency Floodline Warning Direct system. It is recommended that the property owners contact the Environment Agency's Floodline on **0345 988 1188** to register the property to receive advance warning of flooding by telephone, mobile, fax, SMS text, email or pager. The Environment Agency aim to issue a 'severe flood warning' approximately 2 hours before existing defences are overtopped.

CONCLUSION

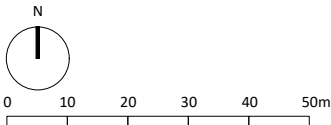
- The area of the site falls within Flood Zone 3 of Table 1 of NPPF and as shown on the Environment Agency Flood Maps without defences and the vulnerability class of the proposed residential development in Table 2 is 'More Vulnerable'. Table 3 of NPPF indicates that Flood Zone 3 is suitable subject to the Exception test.
- However, the site is located within an area which is not affected by flooding a breach/overtopping from any watercourse or the sea, for the present day and for climate change up to 2115.
- The ground floor level for the proposed dwellings will be raised a minimum of 300mm above the existing ground level which complies with Cell G9 of the SEL Standing Advice Matrix.
- Any impact of damage to the property can be foreseen and mitigated against by relatively simple design and construction techniques. They will be constructed using materials which are flood resilient construction as outlined in the report.
- Flooding from other sources is unlikely to affect the site.
- There are no local site-specific risks that would adversely affect the flood risk categorisation of the site. Similarly, there are considered to be no increased risk of offsite flooding risks as a result of the development. The site is therefore considered suitable for the type of development proposed.
- It is therefore concluded that the proposed development can be constructed, safely and sustainably, to meet the requirements of the South Holland District Council Development Plan Policies, and the National Planning Policy Framework.



Notes

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-	-	-	-
Rev	By	Description	Date
Current revision checked by: -			

rdc
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Client
Keston Fields Limited

Project
Keston Fields
Pinchbeck, Spalding

Drawing
Location Plan

Scale @ A3 1: 1250	Date 29/10/25
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Drawn By WW	Checked By -
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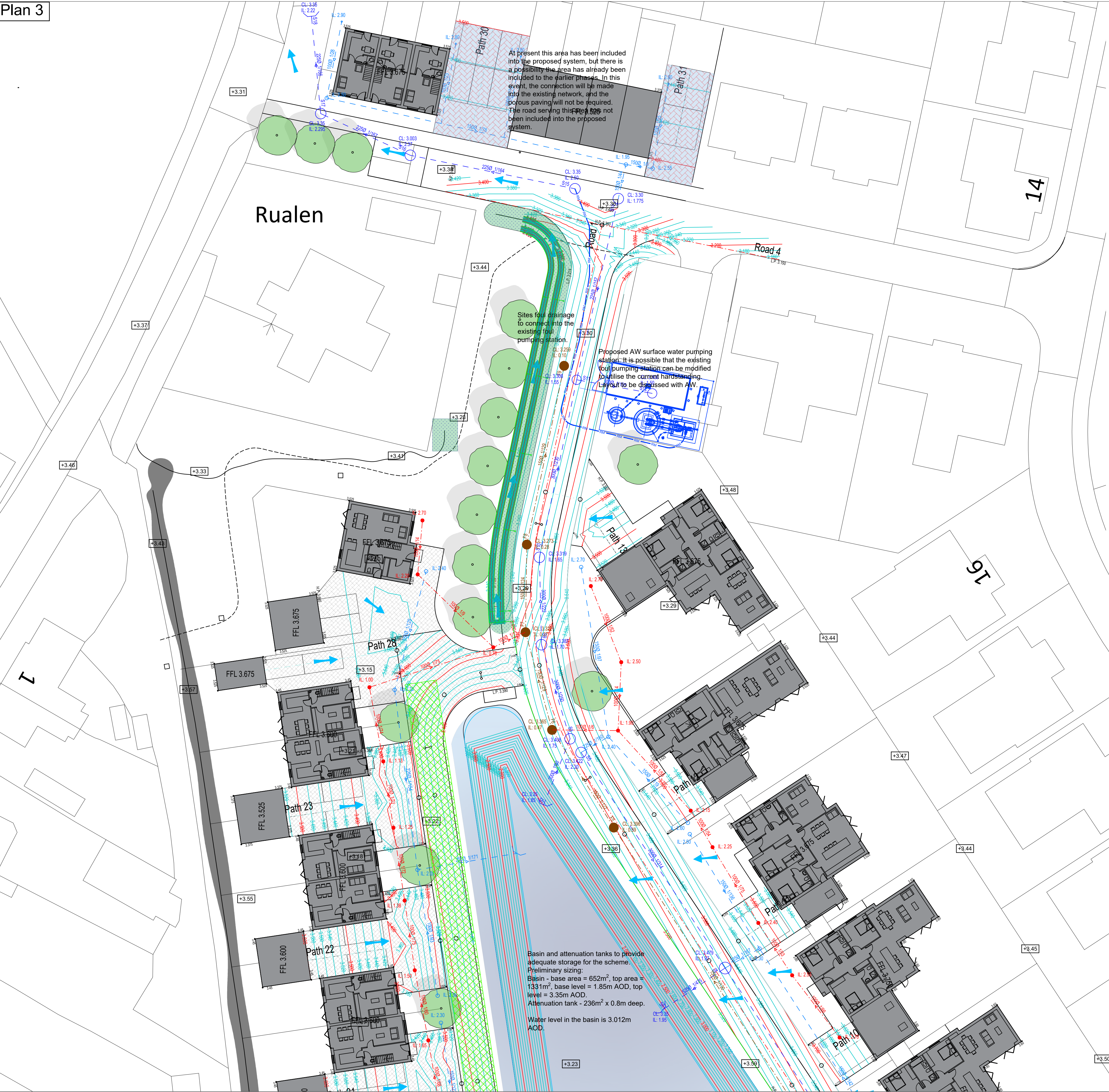
Job Number 1662-1	Status SK	Purpose of Issue Discussion
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Drawing No. 1662-1_SK_LP01	Rev -
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House Type Schedule

Unit Type	Tenure	Type	No.	Beds	Gross internal areas EXCLUDING garages			
					GIA m2 per unit	GIA ft2 per unit	Total GIA m2	Total GIA ft2
A	Market	Bungalow	3	3	136.8	1,472.5	410.4	4,417.5
B	Market	Bungalow	7	3	129.4	1,392.9	905.8	9,750.0
C	Market	Bungalow	4	3	138.0	1,485.4	552.0	5,941.7
D	Market	Two storey	14	3	97.2	1,046.3	1,360.8	14,647.5
E	Market	Two storey	1	3	138.0	1,485.4	138.0	1,485.4
H	Market	Two storey	3	3	102.2	1,100.1	306.6	3,300.2
			32				3,673.6	39,542.3
D	Affordable	Two storey	1	3	97.2	1,046.3	97.2	1,046.3
F	Affordable	Two storey	4	2	72.0	775.0	288.0	3,100.0
G	Affordable	Two storey (flats)	0	1	53.0	570.5	0.0	0.0
I	Affordable	1.5 storey	3	1	52.9	569.4	158.7	1,708.2
			8				543.9	5,854.5
		Site Total	40				4,217.5	45,396.8



Drainage Key

Private Surface Water Sewer

Private Surface Water PPIC, with invert level on outgoing pipe. For pipes up to 150 dia. the PPIC to be 450mm dia., and for 225/300 dia., the PPIC to be 600mm dia.

Private Surface Water rodding eye, with invert level on outgoing pipe. Dia. to match the pipe size.

Private attenuation tank - to be placed in a management company,

Adoptable attenuation basin.

ACO channel with outlet box, connected to the nearest surface water drain/sewer

Private Foul Water Sewer (100mm dia. laid at a min. 1 in 80 - if connected to a WC or 1 in 40 otherwise unless noted)

Private Foul Water PPIC, with invert level on outgoing pipe. PPIC to be 450mm dia.

Proposed finished floor level, coursed to 75mm

Adoptable Surface Water Sewer

Adoptable Surface Riser Main

Adoptable Surface Water manhole, refer to schedule for type and size. Invert level on outgoing pipe.

Adoptable Foul Water Sewer

Adoptable Foul Water manhole, refer to schedule for type and size. Invert level on outgoing pipe.

S38 highways gully

Private External Works Key

Minor Contour (0.02m)

Major Contour (0.1m)

Proposed Contours

Existing spot levels

Porous Paving

Primarily in private areas. Being used to offer storage or water quality.

Swale

Assumed to be adopted by LCC, and to generally be under-drained. The swale will be installed with filter strip to act as pre-treatment.

Exceedence flow routes

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- Notes:
- All drawings to be read in conjunction with Structural Engineers Drawings.
 - If in doubt - ASK!
 - Any discrepancies are to be reported back to the engineer immediately.
 - This drawing is not to be scaled.
 - Drawings marked Preliminary, Information, Approval or Tender are for guidance/ approval only, i.e. NOT for Construction.
 - All dimensions are in metres unless noted otherwise (pipe diameters are generally shown in millimetres, unless noted otherwise).
 - It is likely that existing services will be present within the existing site. Contractor to ensure all necessary precautions have been taken before any excavation takes place.
 - It is the contractors responsibility to locate existing services where they may be affected by proposed works and protect them as necessary and agreed by the utility provider.
 - Drawings to be read in conjunction with all relevant drawings.
 - The drainage design does not allow for any land drainage. Developer to ensure that all existing land drainage is fully surveyed and properly diverted. If land drainage is added to rear gardens it must not be connected to any designed drainage.
 - Setting out to be in accordance with the Architectural plans.
 - All proprietary items to be installed in strict accordance with the manufacturers instructions and recommendations.
 - All works to be carried out in accordance with the current British Standards, Codes for practice and Building Regulations.
 - Manhole covers are to be D400 in adoptable areas and the main access way, C250 for shared parking areas, S125 for private domestic car parking and A15 for soft landscaped and non-vehicle areas.
 - For private drainage, the pipework does not need concrete pipe protection if the following cover depths are exceeded:
 - 15.1. For PVC - 0.9m in vehicular areas or 0.6m in soft landscaping.
 - 15.2. For clayware or concrete - 1.2m in vehicular areas or 0.6m in soft landscaping.
 - Private pipe materials to be the following:
 - 16.1. Clayware to be Class 120
 - 16.2. Concrete to be Class M
 - 16.3. Thermoplastic to have a nominal ring stiffness of SN4.
 - PPICs deeper than 1.2m are to be fitted with a non-access cover.
 - Excavations near foundations need to be carefully considered. Refer to building regulations, and consult with the structural engineer where appropriate.
 - No work is to be started until all necessary approvals have been obtained.
 - Final foul connection is subject to Section 106 approval from Anglian Water.
 - Drainage has been design to store all storms up to and including the 1 in 100 year + 40% climate change event with no flooding offset.
 - All RWP's, to be fitted with rodding access.
 - Unless noted, rain water pipes (R's) and below ground foul drainage pipes (F's) to be 100mmØ. R's to have a minimum fall of 1:100, and F's to have a minimum fall of 1:40, unless a WC is connected when the minimum fall shall be 1:80.
 - The internal pop up positions have not been shown, but a PPIC has been added per plot - this number might need to increase in some instances subject to final M&E design.
 - Cover levels are approximate only and must suit the finished external levels.
 - Threshold drains are to the Architect's details and to be included to each level threshold.
 - Rear patios to fall towards soft landscaped areas.
 - Any adoptable sewer pipes with less than 1.2m of cover to the top of pipe in the adopted carriageway, less than 1.2m under adopted vehicular crossovers are to receive a concrete cover slab.
 - Adopted laterals with less than 1.2m cover in the adopted highways or other vehicle access areas are to receive concrete protection.
 - Outside of manhole construction and pipelines to be at least 0.5m and 1.0m respectively, from the kerbside.
 - Adoptable plastic pipes to be Polypipe Civils - 100-300mm pipes to be Polysewer and 400-900mm pipes to be Ridgisewer. 100-600mm pipes to be UL TRA3
 - Adoptable clay pipes to be Hepworth SuperSleeve.
 - Adoptable pipework to be in accordance with DCG.
 - The developer must confirm all third party access rights for any connections/offset works.
 - This sketch is preliminary only and subject to full detailed design. The drawing is intended to set out the general principle of the scheme and nothing else.

Rev	Description	Dwn	Ckd	Date
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Client:

JACKSON
CONSULTING ENGINEERS

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Project Title:
Proposed Residential Development,
Keston Fields,
Pinchbeck

Drawing Title:
Proposed Drainage Strategy

Drawing Status: Preliminary		
Scale: 1:250	Paper size: A1	Date: 01/10/2025
Drawn: BJ	Checked: JCE	Approved: JCE
Drawing Number: 0422-JCE-00-SI-SK-C-3000		Rev -



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- S38 highways gully

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- Major Contour (0.1m)
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Project Title:
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Scale: 1:250	Paper size: A1	Date: 01/10/2025
Drawn: BJ	Checked: JCE	Approved: JCE
Drawing Number: 0422-JCE-00-SI-SK-C-3001		Rev -

[illegible]

Point	Easting	Northing	Elevation
s1	523536.873	324937.806	3.436
s2	523566.224	324931.816	3.272
s3	523612.405	324924.337	3.109

SURVEY DATE		JUNE 2025		INITIALS		SRW	
REC	MEDICATIONS					QPN	DATE

Client:

ROBERT DOUGHTY CONSULTANCY

Project Title:

LAND EAST OF MILL GREEN LANE
PINCHBECK, SPALDING, Lincs

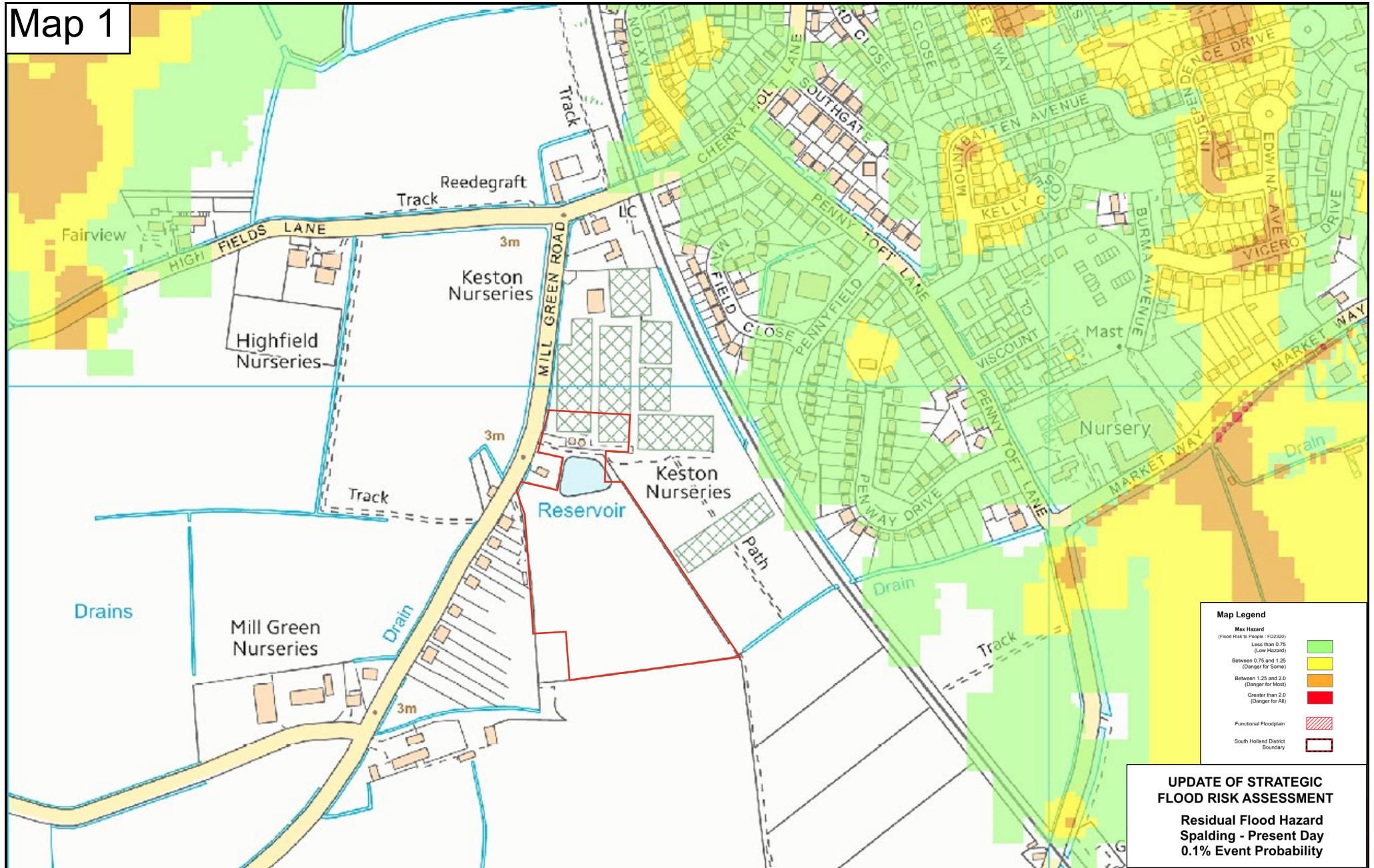
Drawing Title:

TOPOGRAPHICAL SURVEY

Scale (if A2): 1 : 250	Date: 05 / 06 / 2025
Drawing No: CHS 25-114-01	Rev:

Drawn By: SRW	Checked By: WW
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Map 1



Map 2

