

Flood Risk Assessment

Address

Wrights Garage,
41 Staithes Road
Preston
East Riding of Yorkshire
HU12 8TD

Client

Mr Wright

Date

2 April 2024.



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Document Control

Revision	Remarks	Date
A	Preliminary	02 April 2024

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The client should make the planning application within 3 months of the above date.



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1. Introduction

East Riding Consultants Ltd have been commissioned to prepare a detailed flood risk assessment (FRA) for a proposed extension to the MOT garage building following demolition of the existing buildings at Wrights Garage, Staithes Road, Preston..

A FRA is required because the proposed development is situated in Flood Risk Zone 3a, this means that local and national planning policy requires an assessment which identifies and examines flood risk at the site level that also sets out measures to reduce the risk of flooding to the development and its occupants over the life of the development.

This is a supplementary document to a planning application, the conditions of a planning consent are likely to make reference to this document which means the applicant must comply with specific requirements set out in this FRA and give proper consideration to its recommendations in order to discharge the conditions of the consent.

2. Methodology and Site Information

2.1 Scope of Works

This FRA will:

- Assess the risk of flooding to the development
- Set out specific requirements which the applicant must adhere to
- Set out recommendations that the applicant must properly consider

This FRA will not:

- Set out any detailed design
- Give detailed hydraulic calculations

3. Sources of Data

The following publications and data sources were used in the production of this report:

- *National Flood Risk Map for Planning – Rivers and Sea*
- *National Map for Risk of Flooding from Surface Water*
- *East Riding of Yorkshire Council Strategic Flood Risk Assessment (SFRA)*
- *East Riding of Yorkshire Council Level 2 SFRA for Hedon*
- *East Riding of Yorkshire Council Flood Data Mapping*
- *National Planning Policy Framework (NPPF)*
- *NPPF Technical Guidance*
- *Flood Risk Assessments Guide for New Development (FD2320/TR2)*
- *Humber defence overtopping hazard and depth maps 2014: EA 2015*
- *Water level profile 2014: EA 2015*
- *Humber breach defence scenarios 2011: EA 2011*
- *Flood Risk Assessments: Climate Change Allowances: EA 2016*

3.1 Environment Agency Licence Information

Contains Environment Agency information © Environment Agency and database right.

3.2 Study Area

The study area considered will be Burstwick Drain Catchment Area and the tidal Humber Estuary.

3.3 Location

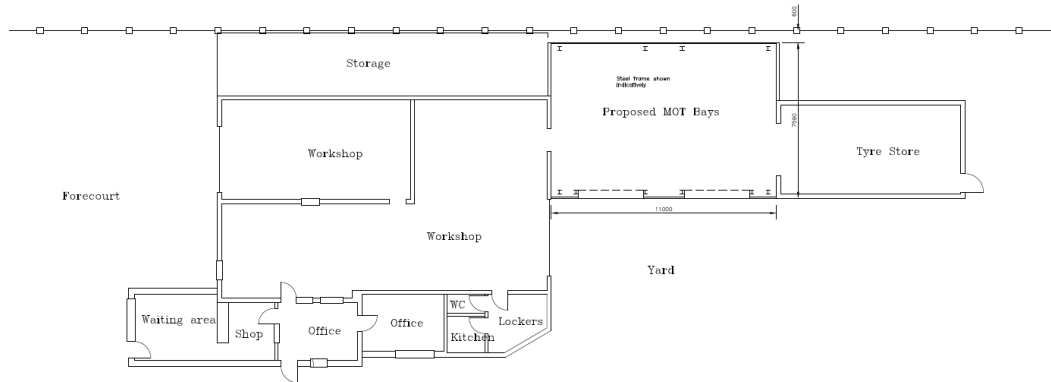


The proposed development is located to the north of the town of Hedon, it is **3,500m** north east of the tidal Humber Estuary at Paull, **106m** north of the Westlands Drain (main River) and **2400m** north of the Burstwick Drain (Main River).

The National Grid Reference for the site is TA 18488 30312.

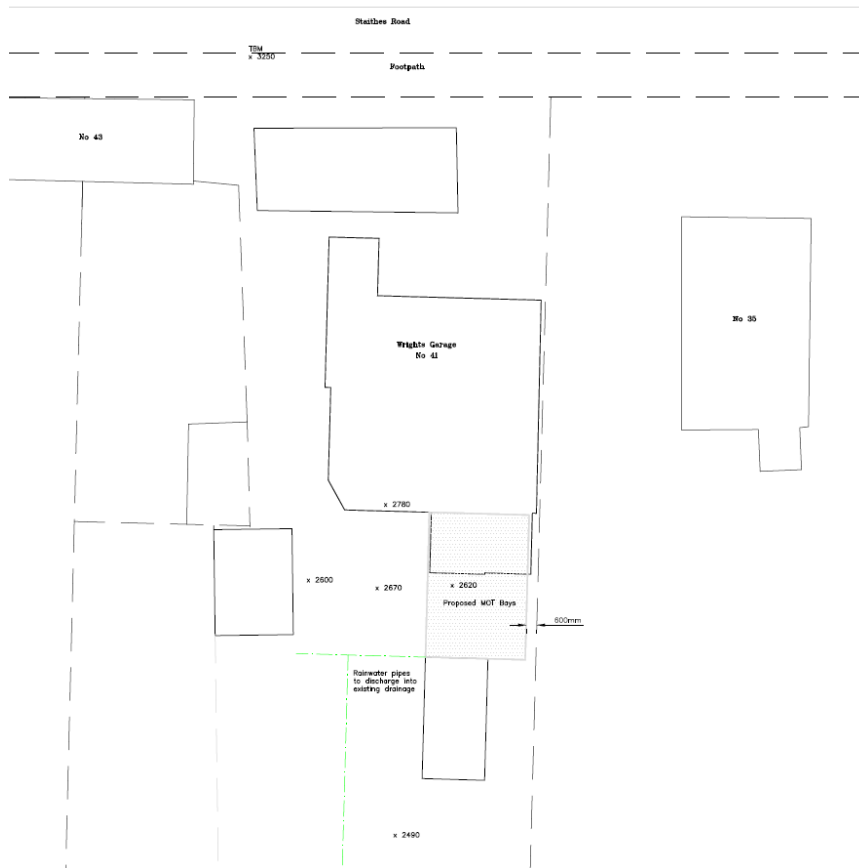
3.4 Description of Proposed Development

The proposal is for the demolition of existing store buildings and construction of an extension of the existing MOT garage in connection with an existing operational business. This is classed as a less vulnerable development.



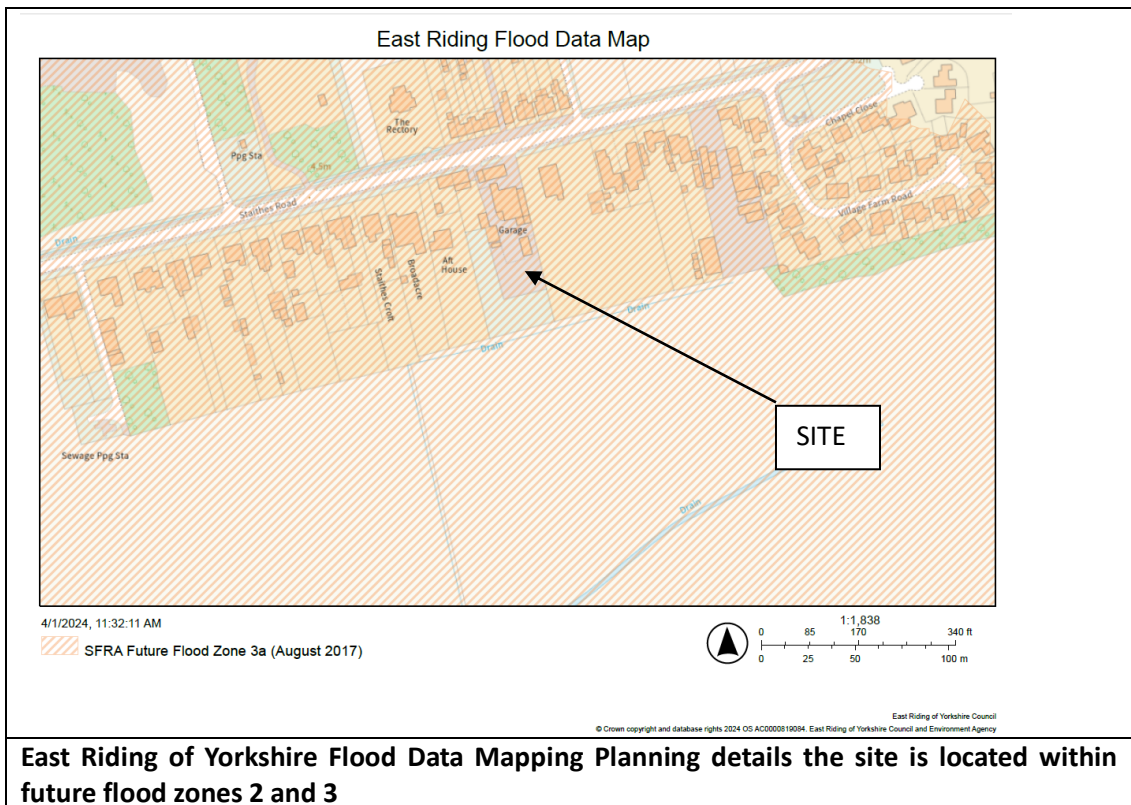
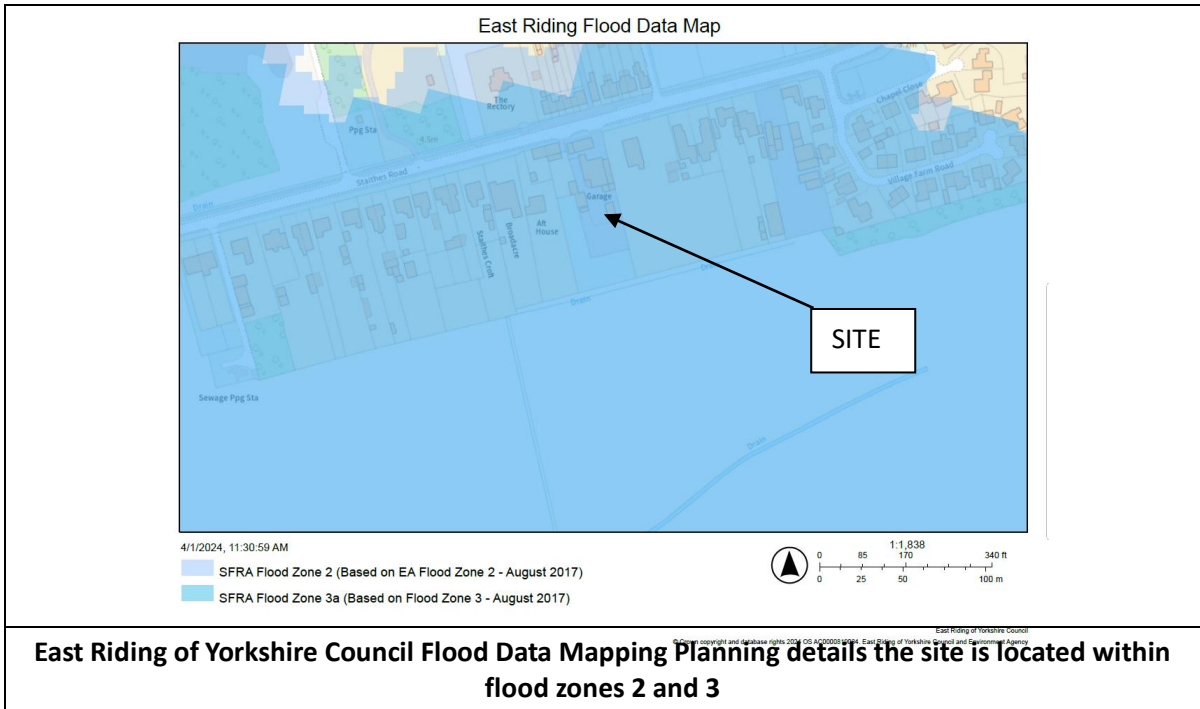
3.5 Topography

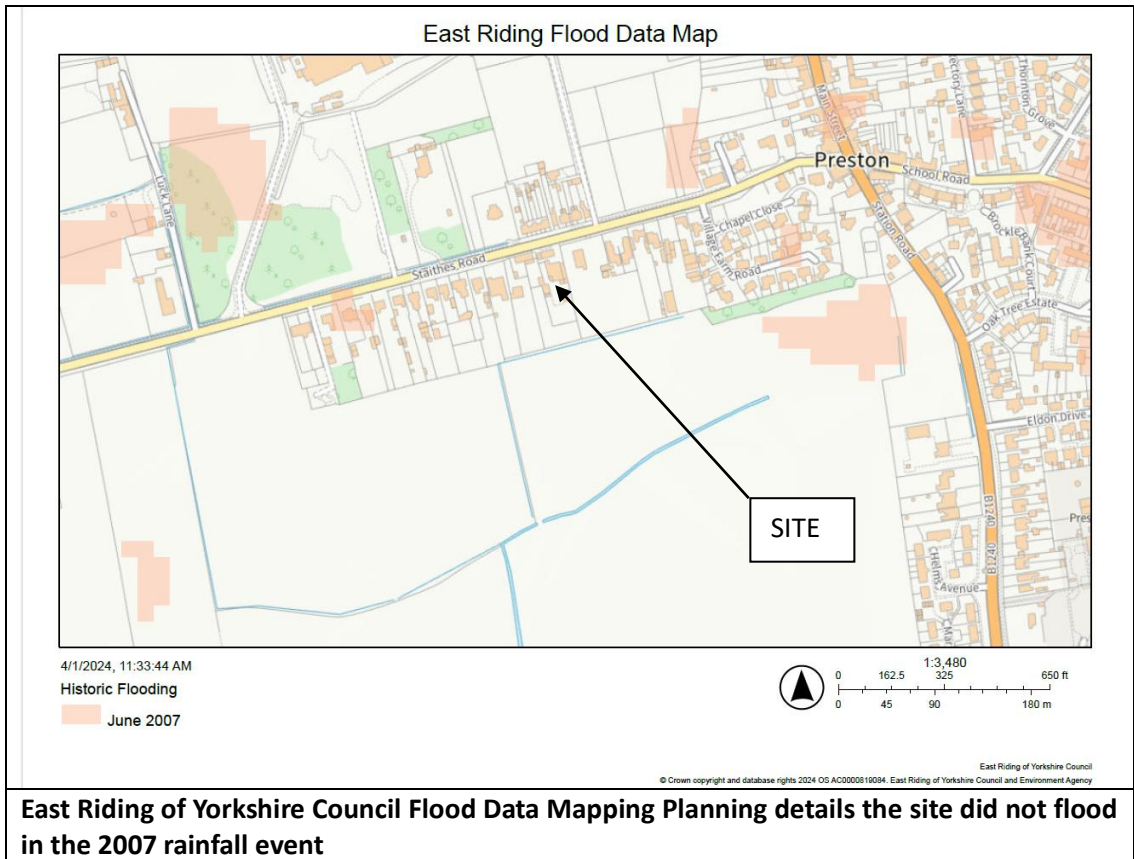
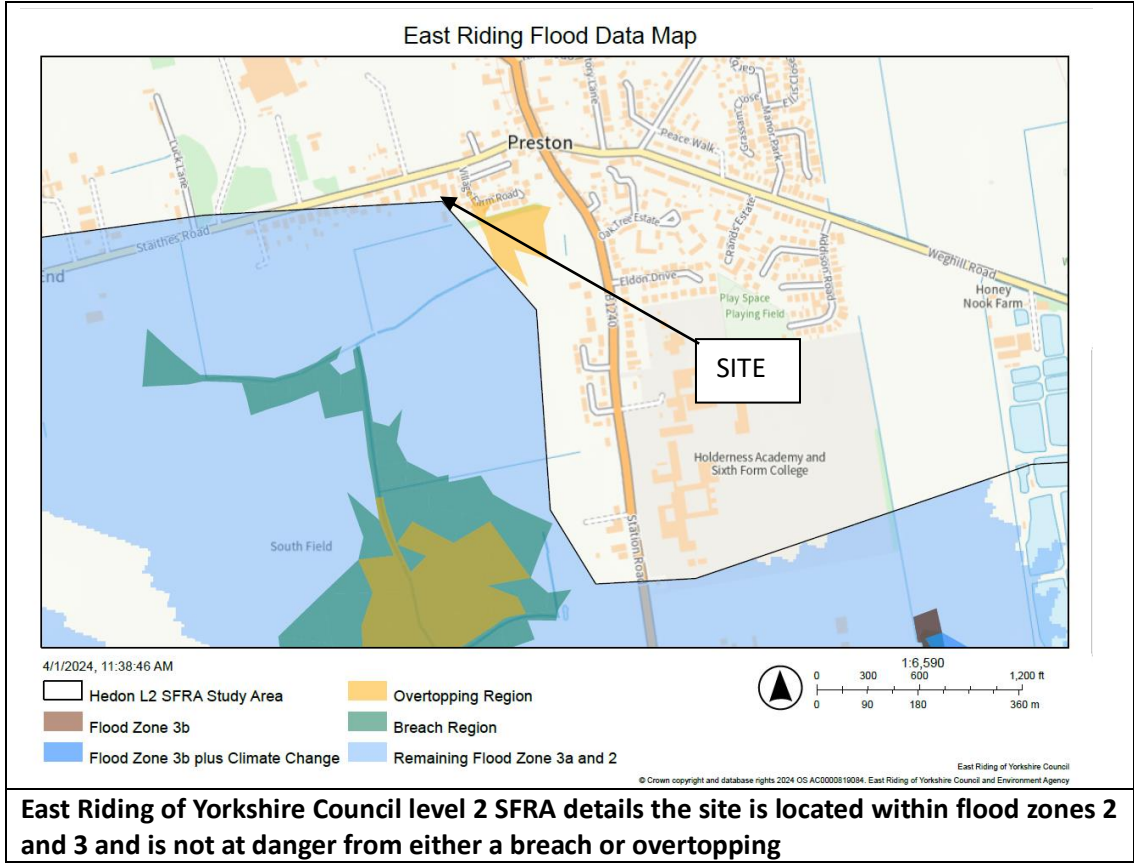
A topographical survey to Newlyn Ordnance Datum (mAOD) has been undertaken. Staithes Road is at a level of 2.350m AOD. The average site level is around **2.65mAOD**

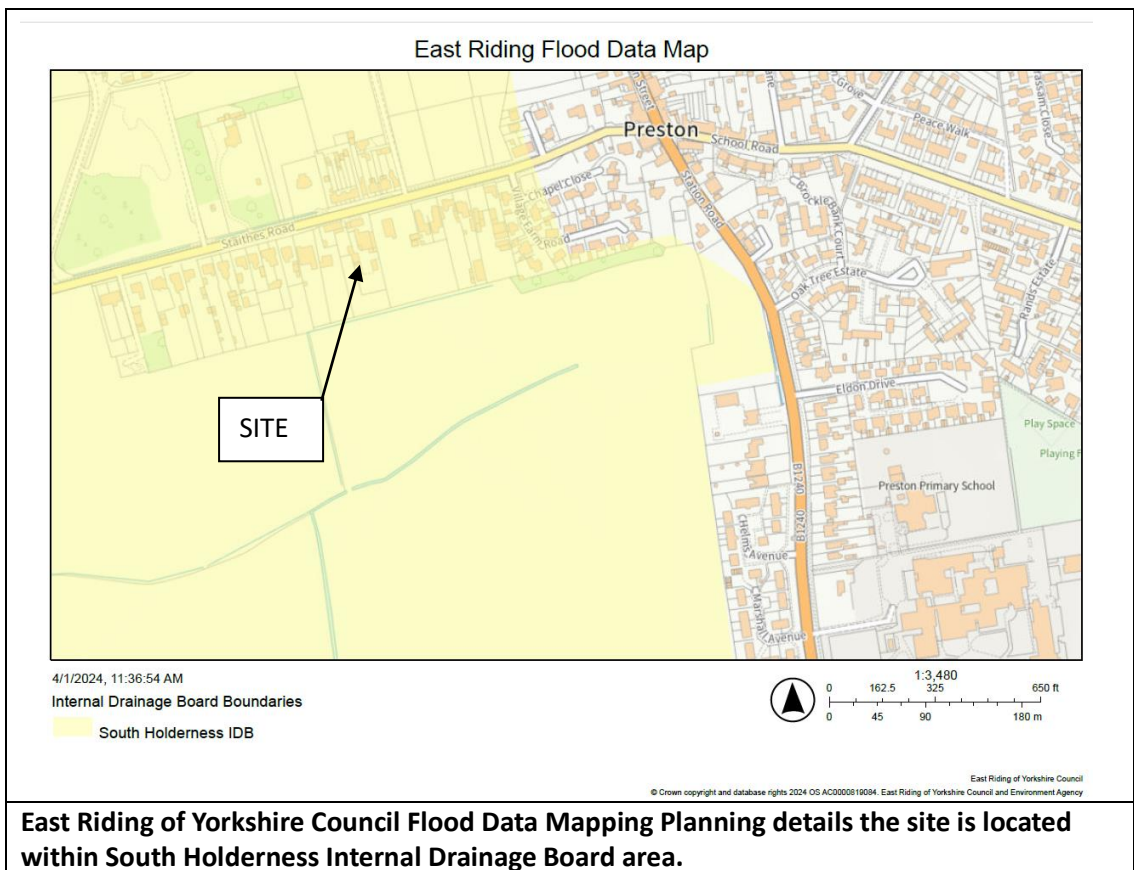
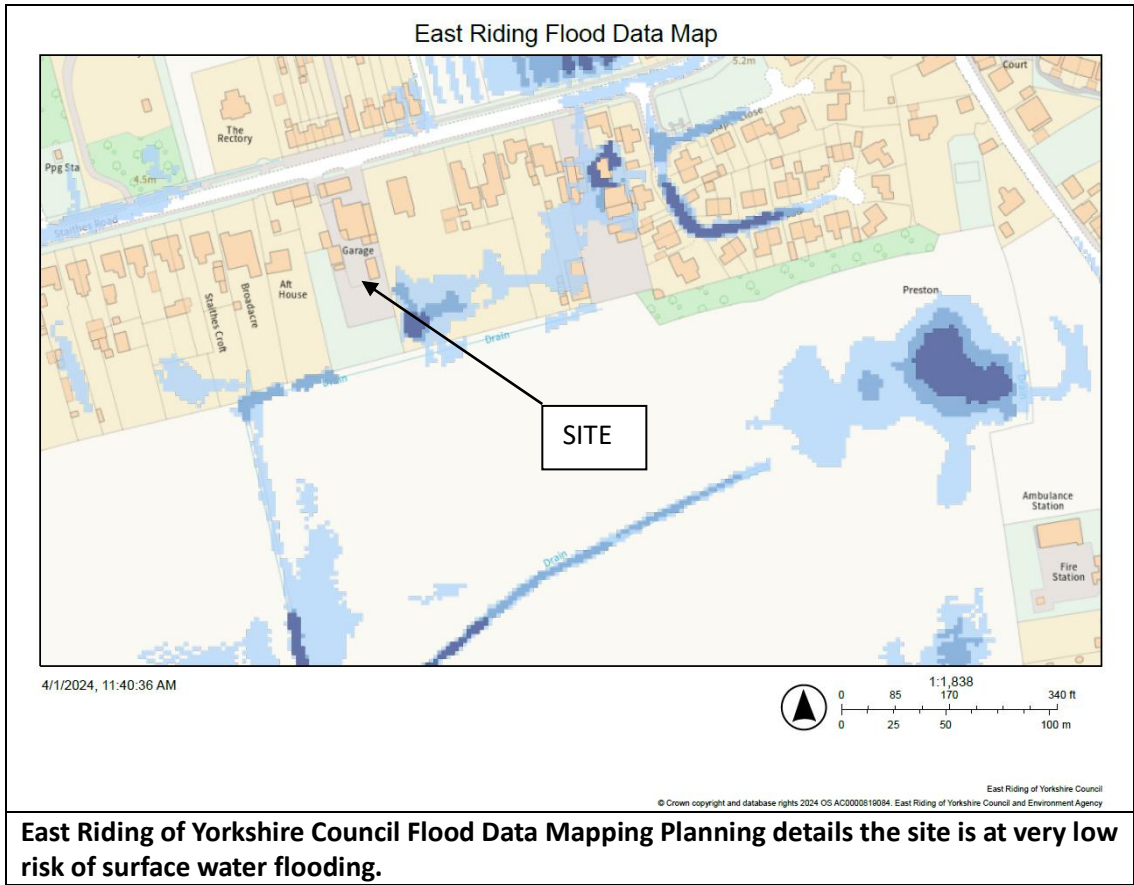


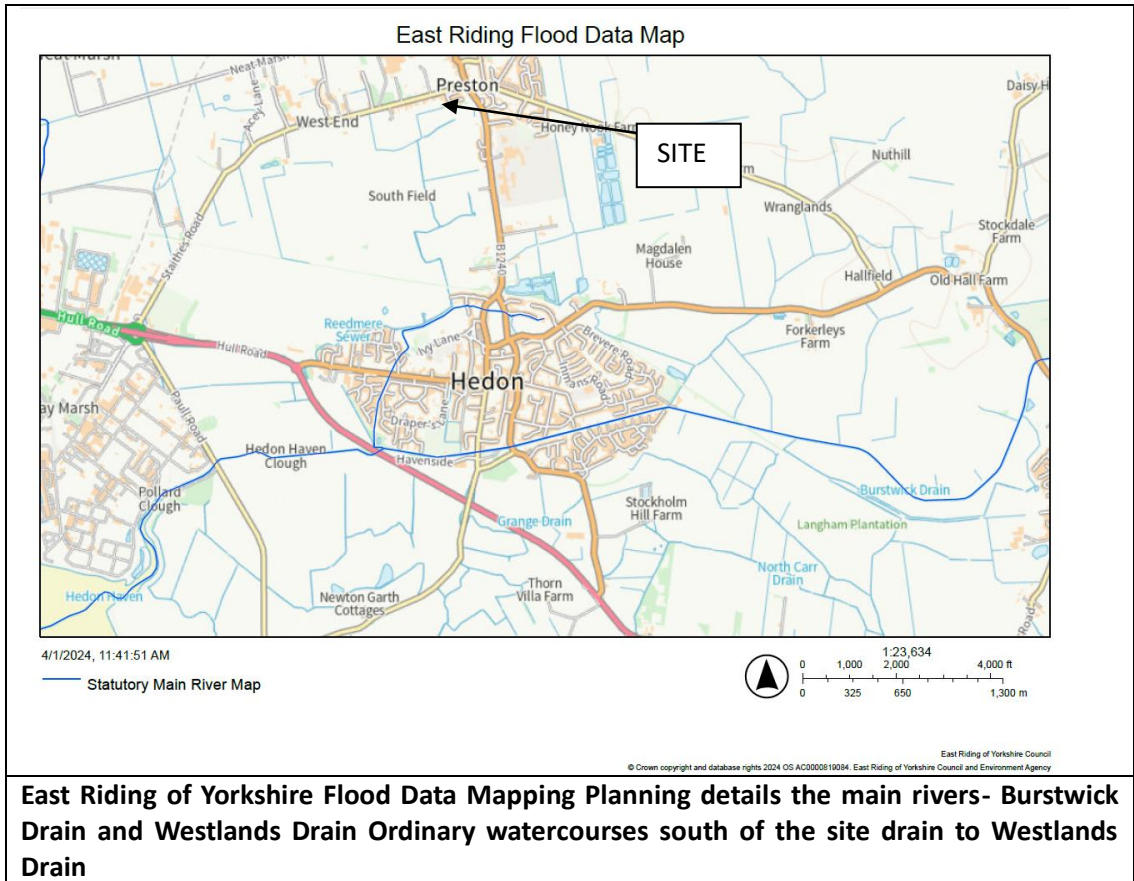
4. Flood Risk

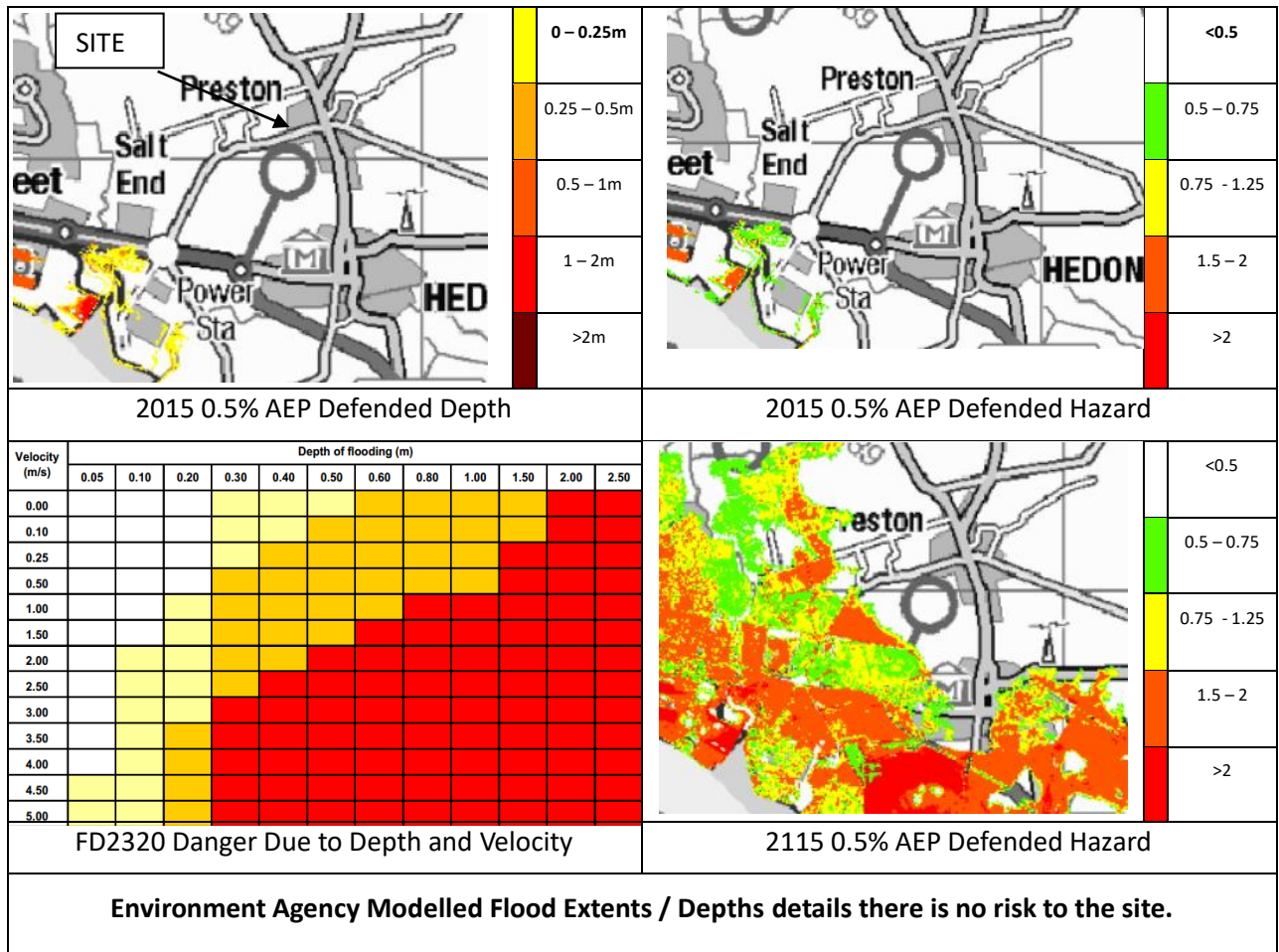
4.1 Flood Risk Maps











4.2 Flood Risk Map Commentary

The National flood risk map for planning – River and Sea concurs with the East Riding of Yorkshire Strategic Flood Risk Assessment as identifying the development in a tidally dominated flood risk zone 3a.

The National map for flood risk from surface water indicates that the development site is at a **very low risk** of flooding.

4.3 The Sequential and Exceptions Test

This is an extension to an existing business within the same site, as the development is **“operationally linked to an existing business”** the area of search is limited to the land in which an operational link can be maintained. Therefore sequentially this is the most appropriate location.

This site has wider sustainability benefits as it provides for improved commercial opportunities which strengthens the local economy and is likely to increase employment. There are currently no other planned allocations for new businesses in the ERYC Local Plan draft allocations document for this settlement.

This detailed FRA will go onto to demonstrate the development and its users can be made safe during the lifetime of the development.

5. Detailed Analysis of Flood Risk

5.1 Hedon Level 2 Strategic Flood Risk Assessment.

The mapping from the Level 2 SFRA details that the site is located within flood zone 3a but not at danger from either overtopping or a breach.

5.2 Tidal or Sea Flooding due to Failure of Flood Defences

The **0.5% Annual Exceedance Probability (AEP)** event including climate change gives a sea level of **6.649m AOD** in **2117**. The height of the existing defences is **5.74m AOD** at Paull. Assuming a flood plain of around **3m AOD** this means that a breach would result in a flood depth of **2.74m** at the defence. Using the simple method the lookup tables in FD2320 suggest '**Danger to Some**' however the Level 2 SFRA details there is little risk to the site.

5.3 Tidal or Sea Flooding due to Overtopping of Flood Defences

The 0.5% Annual Exceedance Probability (AEP) event including climate change gives a sea level of 6.649m AOD in 2117. The height of the existing defences is 5.74m AOD at Paull.

Although flood water will crest to depth of 909mm at the defence analysis of detailed modelling undertaken by the EA for the 0.5%AEP event suggests this site is not at risk from flooding due to overtopping of the defences in 2115. This does not mean the site will not flood, this means that the depth and velocity of the flood water is not considered to present a risk to the development or its users. This is confirmed within the Level 2 SFRA mapping.

5.4 Flooding from Rivers and Large Watercourses (Fluvial Flooding)

There are two principal watercourses that pass through the town of Hedon, Burstwick Drain and Westlands Drain. Both have previously been classified as 'critical' so now appear on the statutory records as being 'Main River'.

The Burstwick Drain is cut to drain a catchment area extending north-west toward the coast, the watercourse is dyked on both banks in several places in order to achieve an engineered gradient acting as a high level carrier. Due to urban encroachment this watercourse now passes through the middle of Hedon with a number of residential properties situated below the bank level. The Burstwick Drain relies on a twice daily discharge to the Humber through a large tidally controlled clough structure at Hedon Haven adjacent to the Saltend Site.

In 2010 works were carried out by the Environment Agency to improve channel conveyance which including the raising of defences locally through the town at low spots. The highest recorded level on the Burstwick Drain is **2.64m AOD**.

The most significant flood risk presented by the Burstwick Drain is not through overtopping but due to the inability of flapped urban drainage systems, the Westlands Drain and other ordinary watercourses to discharge when levels are high, this has been seen on a number of occasions with the most serious incident occurring in June 2007 when a large part of the town was severely affected by this mechanism.

During the 2007 flood event it is understood that the Burstwick Drain DID overtop at low points that were remediated in 2010. Estimates of the scale of this event range from **0.6%**

AEP through to **0.25% AEP** (where antecedent conditions are taken into account). Based on vulnerability classification and consideration of vulnerability at the site level the latest climate change guidance suggests that the higher central estimate of climate change should be used which is **30%** for the Humber area

In order to check water levels, as a way of comparison, assuming that a present **1% AEP** baseline would translate to the **AEP of 0.5% - 0.3%** range to account for the **30%** climate change allowance, this would place the future AEP at TODAY'S values in a similar range to that experienced in 2007.

This means that whilst overtopping cannot be ruled out due to other exceptional factors, overtopping is 'less likely' to occur presently and with the effect of climate change.

The Westlands Drain is a tributary of the Burstwick Drain and has a flapped outfall at its confluence. The Westlands Drain Catchment area extends northwards towards the village of Preston. The watercourse is maintained by the Environment Agency through the majority of the own following an enmainment extension in 2010. Significant improvement works have been undertaken since 2007 along its entire length including remedial works to the upper section when it was enmained improving its capacity. There are two risks at this site;

- flooding is caused by the knock-on effect of locking from the Burstwick Drain.
- flooding is caused to the north of the town of Hedon due to hydraulic restriction in the railway culvert. This action is the likely cause of confirmed flooding at this site on 25 June 2007.

5.5 *Flooding from Surface Water (Pluvial Flooding)*

The national map for surface water flooding indicates this site at very low risk.

In this area it is difficult to describe the effect of surface water flooding separately from fluvial flooding. Of note is the fact that all the surface water drainage disposal systems in the town are reliant on free discharge to the Burstwick Drain or tributary watercourses, should the Burstwick Drain or its tributaries become backed up for prolonged periods surface water systems can surcharge.

No other significant local sources of flooding are identified.

5.6 *Flooding from Groundwater*

Groundwater flooding is not considered to be a risk in this area.

5.7 *Flooding from other Local Sources*

There are no other significant risks from other local sources identified.

5.8 *Flooding from the Development Site Itself*

As the proposed development is an extension, following the demolition of existing store buildings, there will be no significant increase of surface water discharge from the site, meaning there is no increased risk of flooding as a result of this development. Surface water will drain to the watercourse to the south. The existing brownfield run off rate should be calculated and the discharge limited to 70% of the original 1 in 1 year rainfall run off rate.

The drainage should be designed to cater for a 1 in 100 year event + 30% climate change and the required storage provided to cater for the restricted discharge.

6 Conclusion

Analysis suggests that the most significant risk is due to overtopping of existing defences at the end of the lifetime of the development to a level of **3.209mAOD**. This however should be considered a conservative estimate. Flooding may occur if the local land drainage systems are not maintained.

6.1 Finished Floor Level (FFL)

Level access is required due to the nature of the business. Vehicles must be able to enter the building. Normally, to comply with the SFRA the FFL shall be a minimum of **600mm** above the adjacent highway level or site level with a further **300mm** of flood proofing. In this case it is recommended that the building is constructed in water resistant materials so that flood recovery can be undertaken, in the event of a flood. It is recommended that the floor is raised to a level 200mm above site level, giving a FFL of $2.650 + 0.200 = \mathbf{2.850mAOD}$. Gradual ramps can be installed to provide vehicular access.

6.2 Flood Proofing and Protection Measures

Flood protection and flood proofing measures at the property level must be included to comply with the Strategic Flood Risk Assessment. In the first instance the applicant should refer to the following publications:

- www.kitemark.com/products-and-services/building/flood-protection.php
- www.bluepages.org.uk
- www.communities.gov.uk/publications/planningandbuilding/improvingflood
www.ciria.com/flooding

The following measures are required:

- The proposed building should be constructed with water resistant materials so that in the event of a flood, the building can soon be brought back into use.
- *All new floors should be solid with appropriate waterproofing between oversight concrete and internal floors.*
- *If required, Use cement, lime and aggregate plaster on all ground floor internal walls. A premixed dry product such as "Tarmac Limelite" or similar approved should be used. Walls should be backed and skimmed with a lime plaster product and not be dry lined. Dry lined partition walls should be avoided. Use aerated concrete blocks such as "Thermalite" or similar approved product for partitions.*
- *Incoming utility supply pipes and cables should be terminated (with master switches and valves) at least **900mm** above FFL with all pipes and ducting sealed at entry points with flexible duct sealants. Internal electrical distribution systems and sockets should be wired down from the ceiling and sited at least **900mm** above FFL.*



- *Do not use composite materials such as MDF and chipboard in the construction*

6.3 Flood Emergency

Upon receiving news of a flood, it is recommended that the occupant should consider evacuation or take direction based on advice from the authorities.

It is important to consider evacuation routes in the event of a flood. The site is located in a large low-lying area, most of which is subject to flood risk. The applicant should examine local routes and topography and consider the most appropriate route for evacuation so the occupant is not directed toward the flood or a 'dry island' but to safe dry land above the maximum flood or breach level.

The employer should sign up to the Environment Agency Flood Warning Service, more details can be found here:

- <https://fwd.environment-agency.gov.uk>

Report Ends