RIDA
FLOOD RISK ASSESSMENTS & DRAINAGE STRATEGIES

FLOOD RISK ASSESSMENT

11 Malting Lane, Donington, PE114XA

Reference: 350 FRA- 001

Apr-22

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FLOOD RISK ASSESSMENTS &
DRAINAGE STRATEGIES

Flood Risk Assessment

11 Malting Lane, Donington, PE114XA

Reference: 350 FRA- 001

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Introduction 1

Purpose of this report

1.1 RIDA Reports Ltd has been appointed to undertake a Level 2 – Scoping Study Flood Risk Assessment for a development located at PE114XA.

Objectives

1.2 The objectives of this FRA are to demonstrate the following:

* Whether the proposed development is likely to be affected by current or future flooding.
* Whether the proposed development will increase flood risk elsewhere.
* Whether the flood risks associated with the proposed development can be satisfactorily managed.
* Whether the measures proposed to deal with the flood risk are sustainable.

Documents Consulted

1.3 To achieve these objectives the following documents have been consulted and/or referenced:

The National Planning Policy Framework (NPPF)
CIRIA C753 document The SuDS Manual, 2015
Local Flood Risk Management Strategy (LFRMS)
Level 1 Strategic Flood Risk Assessment (SFRA)
Aerial photographs and topographical survey of the site
British Geological Society Records
Local Council flood Maps
Environment Agency flood maps
The CIRIA publication 'C635 Designing for exceedance in urban drainage— Good practice'

Development Site and Location

2.1 The site is located at Malting Lane, Donington. The nearest post code is PE114XA. Refer to appendix A for site location plan.

2.2 The current use of the site is one-story ancillary building within the garden. The current use vulnerability clasification of the site is Water compatible. The site is located in the River Flood Zone 3. Refer to Appendix B for more details.

Development Proposals

2.3 The proposed development includes the change of use of the building for temporary sleeping accommodation. The total development area is approximately 1000 sqm. Refer to Appendix B for layout of the proposed development.

2.4 The vulnerability classification of the proposed development is More vulnerable with an estimated lifetime between 50 and 100 years.

Site Hydrology and Hydrogeology

Hydrology 2.5 The South Forty Foot Drain is located approximately 100 m away from the development.

Aquifer 2.6 The development is located within an unproductive strata. These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.

Source Protection Zone 2.7 The site is not located within a Source Protection Zone.

Groundwater Levels 2.8 The ground water levels for this site are unknown.

Site Geology

Bedrock 2.9 The British Geological Society records of the site show that it is located within the Oxford Clay Formation - Mudstone.

Superficial Deposits 2.10 The British Geological Society records show that the superficial deposits are Tidal Flat Deposits - Clay and Silt.

National and Local Planning Policy 3

National Planning Policy Framework (NPPF)

3.1 The NPPF and its technical guidance is a set of planning policies with the key objective to contribute to the achievement of sustainable development. As part of it, they ensure that flood risk and sustainability are taken into account during the planning process. This ensures that developments are not located in flood risk areas and directs developments to lower risk areas. The NPPF applies a sequential risk-based approach to determining the suitability of land for development in flood risk areas. The NPPF also encourages developers to seek opportunities to reduce the overall level of flood risk through the layout of the development and the application of Sustainable Drainage Systems (SuDS).

The Flood and Water Management Act (2010)

3.2 The Flood and Water Management Act aims to reduce the flood risk associated with extreme weather events. It provides a robust management of flood risk for people, homes and businesses and also encourages the use of SuDS for developments. A robust SuDS strategy should take into account the recommendations given in this Flood Risk Assessment.

Strategic Flood Risk Assessment (SFRA)

3.3 Planning policy with regard to development and flood risk in the area is detailed in the Strategic Flood Risk Assessment (SFRA) which was published in 2017.The proposed development site is located within the administrative boundary of the South East Lincolnshire.

3.4 The SFRA commits to direct new development to locations at lowest flood risk. The SFRA provides information on the levels and flood hazards that could result from flooding. The Environment Agency flood zone maps and the SFRA ignore the presence of existing flood defences when defining the potential extent of flooding.

3.5 This report follows the guidance given in the Strategic Flood Risk Assessment by evaluating the flood risk and providing relevant flood mitigation.

The Sequential and Exception Test 4

4.1 The flood risks were determined by identifying the sources of flooding and assessing their possible impact and likelihood to the development.

Fluvial Flood Risk Assessment

4.2 Fluvial flood risk was assessed using the Environment Agency Flood Zone Maps and the sequential risk-based approach recommended in the NPPF. The sequential test takes into account the flood risk vulnerability of land uses in relation to the flood zone categorisation. These parameters are assessed in order to determine whether the development is appropriate. Under certain circumstances the exception test is applicable.

Sequential Approach

Step 1
Flood Zone categorisation

4.3 The proposed development falls within The Environment Agency Flood Zone 3. The Flood Zone 3 is considered to have a high probability of flooding with a 100 years or less annual probability or >1%AEP.

Step 2
Flood risk vulnerability

4.4 Within Table 2 (Flood Risk Vulnerability Classification) of the NPPF Planning Practice Guide, the proposed development is classified as 'More vulnerable '.

Step 3
Sequential Test Results

4.5 The Flood Risk vulnerability and Flood Zone Compatibility table of the NPPF Planning Practice Guide states that More vulnerable developments are required to pass the Exception Test in this area.

The Exception Test

4.6 The development requires to pass the Exception Test. For the Exception Test to be passed the following conditions must be met:

a. It must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk, informed by a Strategic flood risk Assessment (SFRA) where one has been prepared.
b. the development should be on previously-developed land or, if It is not on previously developed land, there should be no reasonably alternative sites on developable previously-developed land.
c. A FRA must demonstrate that the development will be safe, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

4.7 The current building is empty and the new dwellings will enhance the character of the site.

4.8 The development is in an already developed area and therefore the impact to the flood zone is minimal. There is also no toer plalce in which it can be located as the area owned has not space to relocate the building outside of the flood zone.

4.9 The development provides wider sustainability as it makes a contribution to the additional housing required in the Borough.

4.10 The following sections of this flood risk assessment demonstrate that the proposed development can be safely established with an adequate standard of flood protection, including allowance for climate change, and that proposed surface water management provisions may make a contribution to reduction in flood risk elsewhere. On this basis it is concluded that the proposed development passes the Exception Test.

Flood hazard assessment 5

5.1 The development has been assessed for all potential flood risks such as river and tidal flood risk, surface water flooding, flooding from groundwater, reservoir flood risk and drainage systems.

Historic Flooding

5.2 The site does not benefit from flood defences. The Environment Agency records show that the area around the site has not been flooded in the past.

Flooding from river and sea

5.3 The proposed development falls within The Environment Agency Flood Zone 3. The Flood Zone 3 is considered to have a high probability of flooding with a 100 years or less annual probability or >1%AEP.

5.4 Tidal flood level data for the river has been requested from the Environment Agency. This flood risk assessment will be updated once these levels are available.

5.5 Due to extent of the flood zone, it is not possible to infer the flood levels using the LIDAR data and the outline of the flood zone.

5.6 It has been assumed that the water depth for this site is above the existing ground level.

5.7 The assumed flood depth for this site is 0.6m. This depth of water will be used for the purpose of this assessment.

Surface water (overland flows) flood risk

5.10 The Environment Agency maps show that the flood risk from surface water is medium. The residual risk of localised ponding remains likely. The Environment Agency surface water flood risk maps are defined through application of a specific procedure based on digital terrain models and assumptions regarding losses to infiltration and/or urban drainage. The surface water flood maps is defined by the Environment Agency as follows.

5.11 *"The nationally produced surface water flood mapping only indicates where surface water flooding could occur as a result of local rainfall. It does not fully represent flooding that occurs from:*

- Ordinary watercourses
- Drainage systems or public sewers caused by catchment-wide rainfall events
- Rivers
- Groundwater

Due to the modelling techniques used, the mapping picks out depressions in the ground surface and simulates some flow along natural drainage channels, rivers, low areas in floodplains, and flow paths between buildings. Although the maps appear to show flooding from ordinary watercourses, they should not be taken as definitive mapping of flood risk from these as the conveyance effect of ordinary watercourses or drainage channels is not explicitly modelled. Also, structures (such as bridges, culverts and weirs) and flood risk management infrastructure (such as defences) are not represented.

The nationally produced surface water flood mapping does not take account of the effect of pumping stations in catchments with pumped drainage. No allowance is made for tide locking, high tidal or fluvial levels where sewers cannot discharge in to rivers or the sea."

5.12 The strategic flood risk for the South East Lincolnshire confirms that the flood risk for the site is Medium.

5.13 On the basis of Environment Agency and the Strategic flood risk assessment's surface water mapping, it is concluded that the site is at Medium risk of flooding from surface water sources. The depth of water is potentially below 300mm. For the purpose of this assessment a depth of water of 0.15m has been taken as the most relevant depth to the site.

Flooding from drainage systems in adjacent areas

5.14 The council records have been reviewed. The flooding from drainage incidents maps were not found in the Strategic Flood Risk Assessment. Therefore, for the purpose of this report, it has been assumed that the risk of flooding from drainage systems is low.

Reservoirs Risks

5.15 The Reservoir Flood Map (RFM) produced by the Environment Agency do not show the risk to individual properties of dam breach flooding. The maps do not indicate or relate to any particular probability of dam breach flooding. The maps were prepared for emergency planning purposes and can be used to help reservoir owners produce on-site plans and the Local Resilience Forum produce off-site plans, and to prioritise areas for evacuation/early warning in the event of a potential dam failure. The RFM shows that the development could be within the possible dam breach flooding path. See Appendix C.

Groundwater flood risk

5.16 The development has limited susceptibility to ground water flooding. The risk from groundwater flood to the site is considered very low. Refer to appendix C for record drawings.

Critical Drainage Areas

5.17 The Strategic Flood Risk Assessment was reviewed as part of this assessment. However, it does not show the critical drainage areas within the council. For the purpose of this report, it has been assumed that the site is outside of a notified critical drainage area.

6.1 The Flood hazard assessment has demonstrated that the site is:

- In Flood Zone 3
- At Medium risk of surface flooding
- At very low risk of groundwater flooding
- Outside of a critical drainage area
- Outside of an area with sewer flooding

6.2 Under the NPPF it is necessary to demonstrate that, for any new development on the site, it is possible to provide an adequate level of flood protection for personnel working or living at the development.

Flood Protection

6.3 Where possible, flood protection for this development is typically provided by establishing development floor levels 300mm above the 1:200 year tidal flood level, including allowance for climate change.

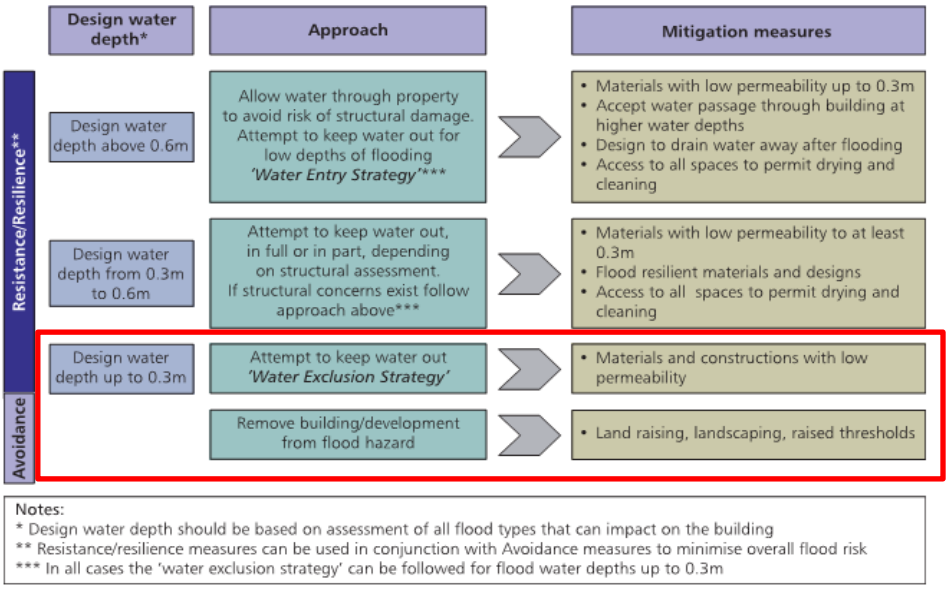
6.4 The flood levels have been requested from the Environment Agency. This assessment has been made on an assumed depth of water.

6.5 Since this is an existing building and the change of use will not include increasing the FFL of the building or changes to the structural fabric of the building.

6.6 As a depth of flood level has been assumed. The following flood protection interventions should be provided.

6.7 The flood resilience strategy for the development has been based on the CLG 2007 Improving the Flood Performance of New Buildings. See figure below. The strategy is based on the water level within the proximity to the building.

Rationale for flood resilient and/or resistant design strategies.



6.8 The design water depth for this site is 0.6m. The development should utilise building materials that are suitable for a 'water exclusion strategy'. Materials classified as "Good" (highlighted in red) in the Figure below shall be used for construction upto the water depth.

Figure 2: Flood resilience characteristics of building materials (based on laboratory testing)

Material	Resilience characteristics*		
	Water penetration	Drying ability	Retention of pre-flood dimensions, integrity
Bricks			
Engineering bricks (Classes A and B)	Good	Good	Good
Facing bricks (pressed)	Medium	Medium	Good
Facing bricks (handmade)	Poor	Poor	Poor
Blocks			
Concrete (3.5N, 7N)	Poor	Medium	Good
Aircrete	Medium	Poor	Good
Timber board			
OSB2, 11mm thick	Medium	Poor	Poor
OSB3, 18mm thick	Medium	Poor	Poor
Gypsum plasterboard			
Gypsum Plasterboard, 9mm thick	Poor	Not assessed	Poor
Mortars			
Below d.p.c. 1:3(cement:sand)	Good	Good	Good
Above d.p.c. 1:6(cement:sand)	Good	Good	Good

* Resilience characteristics are related to the testing carried out and exclude aspects such as ability to withstand freeze/thaw cycles, cleanability and mould growth

6.9 Where floors are being replaced use ground-bearing solid concrete slabs; use ceramic, stone or concrete-based tiled surfaces to floors and skirtings (with cement-based adhesive and water-resistant grout) ideally draining to a floor sump pump; paint timber skirtings on the reverse before fitting; avoid concrete screeds above insulation; damp-proof courses and membranes should be durable (minimum 1200 gauge for polythene) with laps, and use closed-cell insulation.

6.10 In areas where new walls are being installed – use closed-cell insulation below predicted flood level in external walls; specify water-resistant walling materials such as pressed-face or engineering brick or rendered blockwork.

6.11 In new walls use extended periscope subfloor ventilators or fit removable airbrick covers; fix plasterboard sheets horizontally rather than vertically, or split sheets mid-height with a dado rail, to reduce the extent of replacement; specify lime- or cement-based renovating plasters or renders rather than gypsum-based, with water-resistant paint finishes. The use of water-proof, water-resistant or micro-porous surface coatings on masonry should be avoided as they can inhibit the drying-out of the building fabric.

6.12 Services and fittings (communications wiring, hearing systems, electrical services, water, electricity and gas meters) should be placed at above the flood level. 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 levels. Sealed PVC external framed doors should be used. Should wooden doors be used then a good fit and sealed to the frames must be obtained. Hollow core timber internal doors should not be used unless sufficient flood warning is given, butt hinges, can be used to allow internal doors to be easily removed and stored.

6.13 Fittings should be designed to be replaced after a flood, it is advisable to specify durable fittings that are not appreciably affected by water and can be easily cleaned (e.g. use of plastic materials or stainless steel). The cost of these units may need to be balanced against the predicted frequency of flooding. Avoid wood fibre based carcases and use easily removable solid wood doors and drawers.

Off-site Impacts 7

7.1 The NPPF specifically stipulates that consideration should be given to potential off-site flood impacts of any proposed development. These off-site impacts are in relation to:

- Surface water management

- Flood flow conveyance, storage and climate change

Surface Water Management

7.2 The surface water run-off is not being increase by the development as this is a change of use in which no etensions or changes to the external areas are proposed. As such it is concluded the the proposed development do not increase the off-site risks.

Flood Flow conveyance and storage

7.1 In tidal flooding environments, the volume of available on-shore flood storage is usually not a material consideration as the volume of flood water is usually too large to be attenuated.

7.2 The proposed development will have no effect on flood flow conveyance through the site or surrounding area in relation to either defence overtopping or a defence breach. Similarly,
although the development would reduce the volume of flood storage available, as the flooding mechanism is tidal, there will be no impact on flood risk in the surrounding area.

Residual Risk 8

8.1 This flood risk assessment has identified the potential flooding mechanisms that could affect the site. This assessment has concluded that the development site requires additional flood risk mitigation strategies so all the flood risk can addressed.

Site access and public safety

8.2 This assessment has demonstrated that the proposed development will have no adverse impact on flood risk in the area surrounding the site. Available evidence indicates that the development would result in no change in surface water generation. There is therefore no basis to indicate that, with respect to flood risk, the proposed development would have adverse impact on public safety.

8.3 It will be necessary to ensure that all building users are fully informed of procedures to be implemented during threat of imminent flooding.

Flood Warning and evacuation

8.4 The site is located within an area that is covered by the Environment Agency Flood Alert service. It is recommended that the proposed development is registered with this service to receive early warning of imminent flood hazard.

8.6 The occupants of the site are encouraged to sign up to the alerts and should use these to form an appropriate Flood Management and Evacuation Plan tailored to their operations prior to occupation of the site. Table 4 below shows the actions that will be taken for each flood warning.

8.7 Action to be taken in the event of Alarm being Raised or Flood Warning Received:

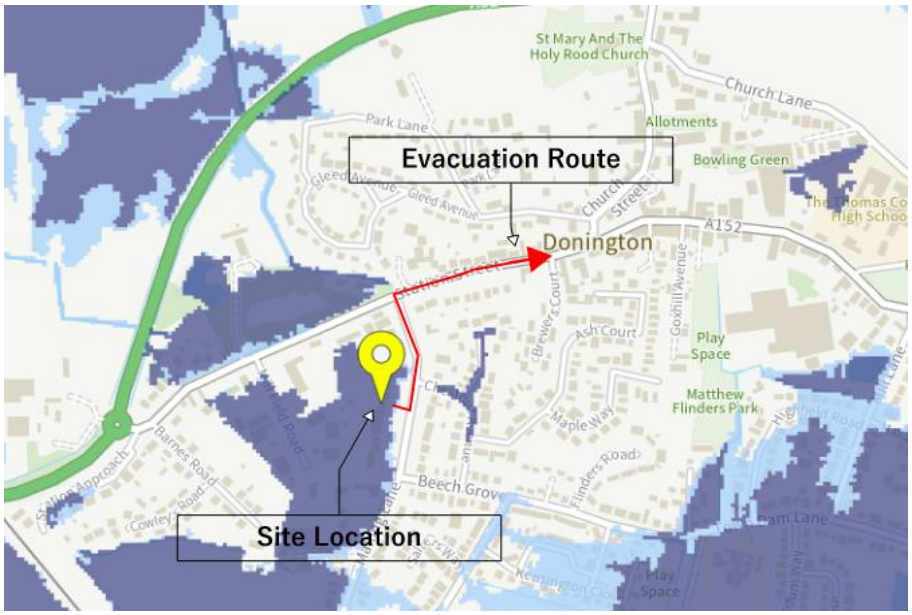
a. Raise the alarm and evacuate the site following the established Fire Drill procedures. The main assembly as per the main house fire drill assembly point.
b. Contact Emergency Fire Services (999) if necessary and/or Environment Agency Floodline: (0845 988 1188) if event was not expected.
c. If safe to do so, locate and turn off key services e.g. water, gas & electricity.
d. Follow the routes below to evacuate the site completely.

8.8 Safe egress is achievable by Malting Lane to A152 Station St, which is shown to be beyond the extent of flooding. See figure 3 below for details.

Actions that will be taken for each flood warning

Warning	Message	Timing	Action
 FLOOD ALERT	Flooding is possible. Be prepared.	2 hours to 2 days in advance of flooding.	- Be prepared for flooding. - Prepare a flood kit.
 FLOOD WARNING	Flooding is expected. Immediate action required.	Half an hour to 1 day in advance of flooding.	- Act now to protect your property. - Block doors with flood boards or sandbags and cover airbricks and other ventilation holes. - Move pets and valuables to a safe place. - Keep a flood kit ready. - Move any critical equipment and information to a safe location
 SEVERE FLOOD WARNING	Severe flooding. Danger to life.	When flooding poses a significant threat to life and different actions are required.	- Be ready should you need to evacuate from the property. - Co-operate with the emergency services and call 999 if you are in immediate danger.
Warning Removed	No further flooding is currently expected for your area.	Issued when a flood warning is no longer in force.	- Flood water may still be around and could be contaminated. - If you've been flooded, ring your buildings and contents insurance company as soon as possible.

Evacuation Route



Conclusions 9

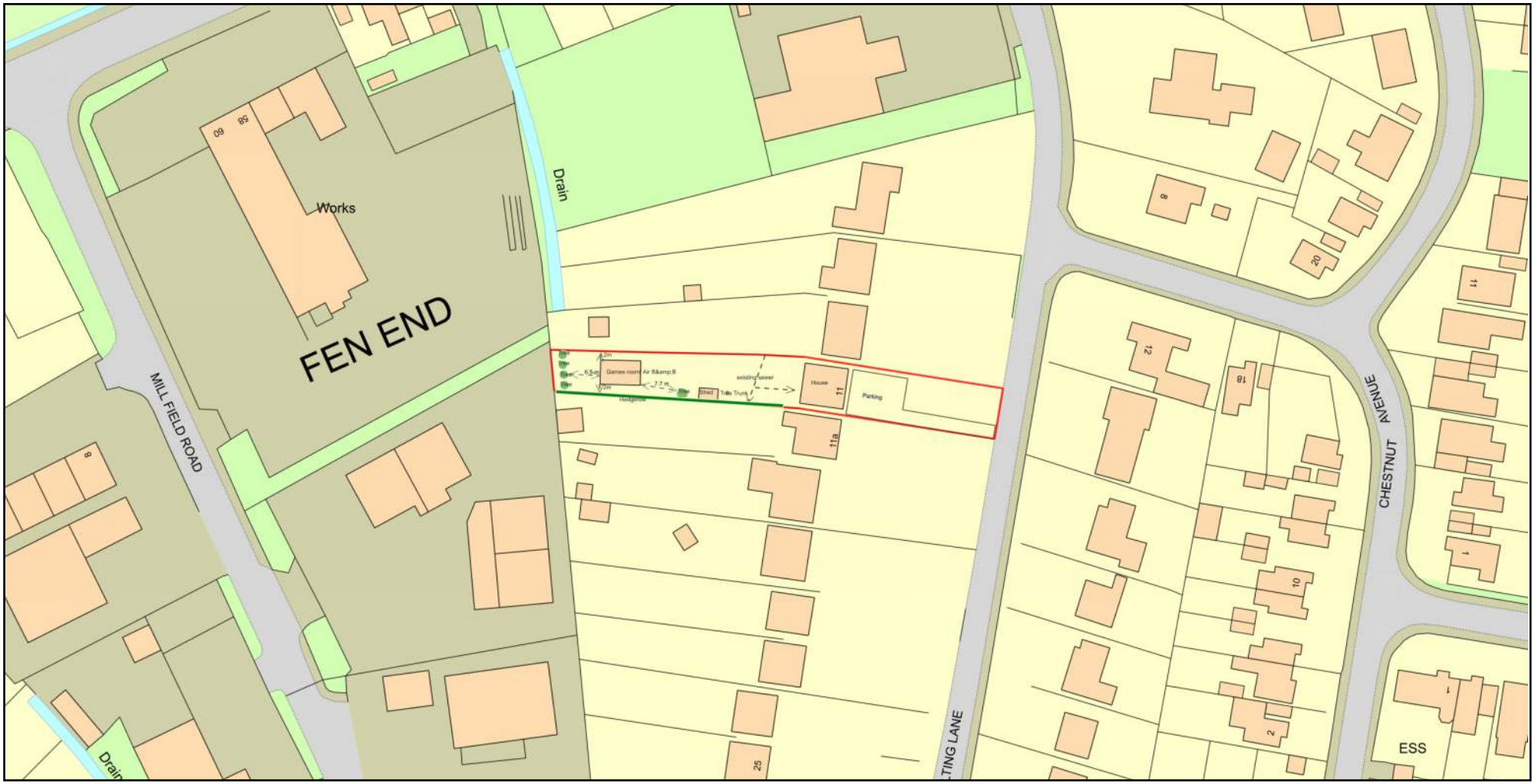
9.1 It is concluded that subject to the proposed mitigation measures, the site can be developed in accordance with the provisions of the NPPF and the requirements of the Environment Agency and the local planning authority.

9.2 It is proposed that a formal Flood Warning and Emergency Response Plan is developed for the proposed development to communicate flood emergency response procedures to all the occupants of the site.

9.3 This report demonstrates that the proposal will be safe, in terms of flood risk, for its design life and will not increase the flood risk elsewhere.

Appendix A

11 Malting lane Block Plan - Location Plan



0 50
Metres

N

ReQuestaPlan

Plan Produced for: south holland council

Date Produced: 22 Feb 2022

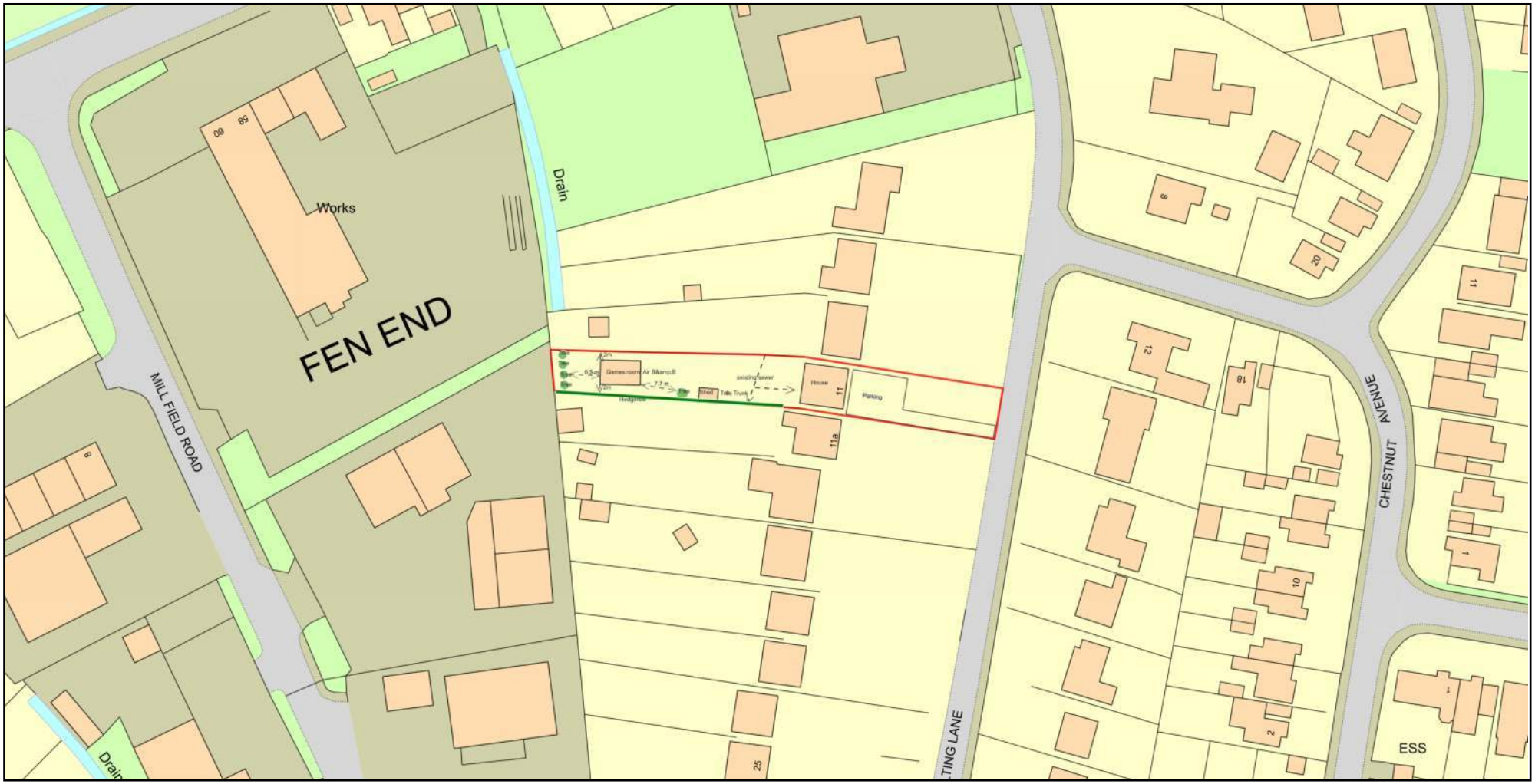
Plan Reference Number: TQRQM22053104831968

Scale: 1:1250 @ A4

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Appendix B

11 Malting lane Block Plan - Location Plan



0 50
Metres

N

ReQuestaPlan

Plan Produced for: south holland council

Date Produced: 22 Feb 2022

Plan Reference Number: TQRQM22053104831968

Scale: 1:1250 @ A4

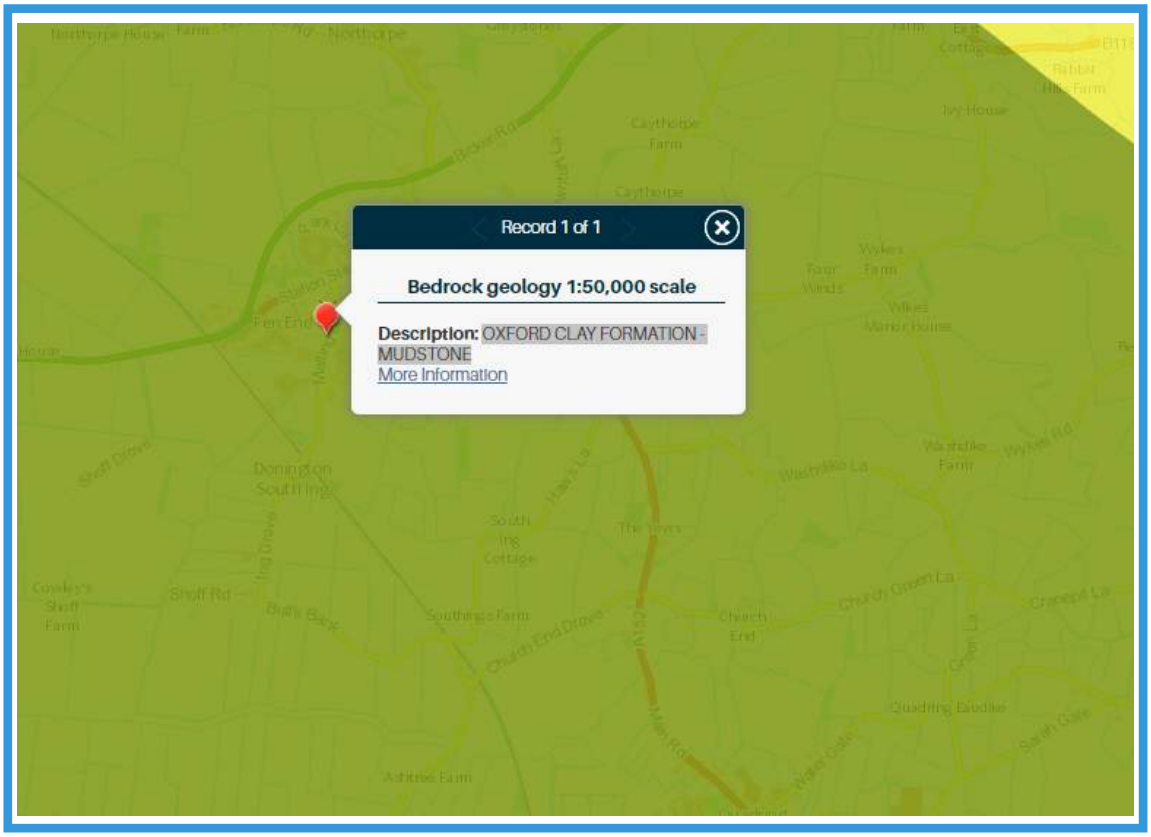
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Appendix C

SITE GEOLOGY

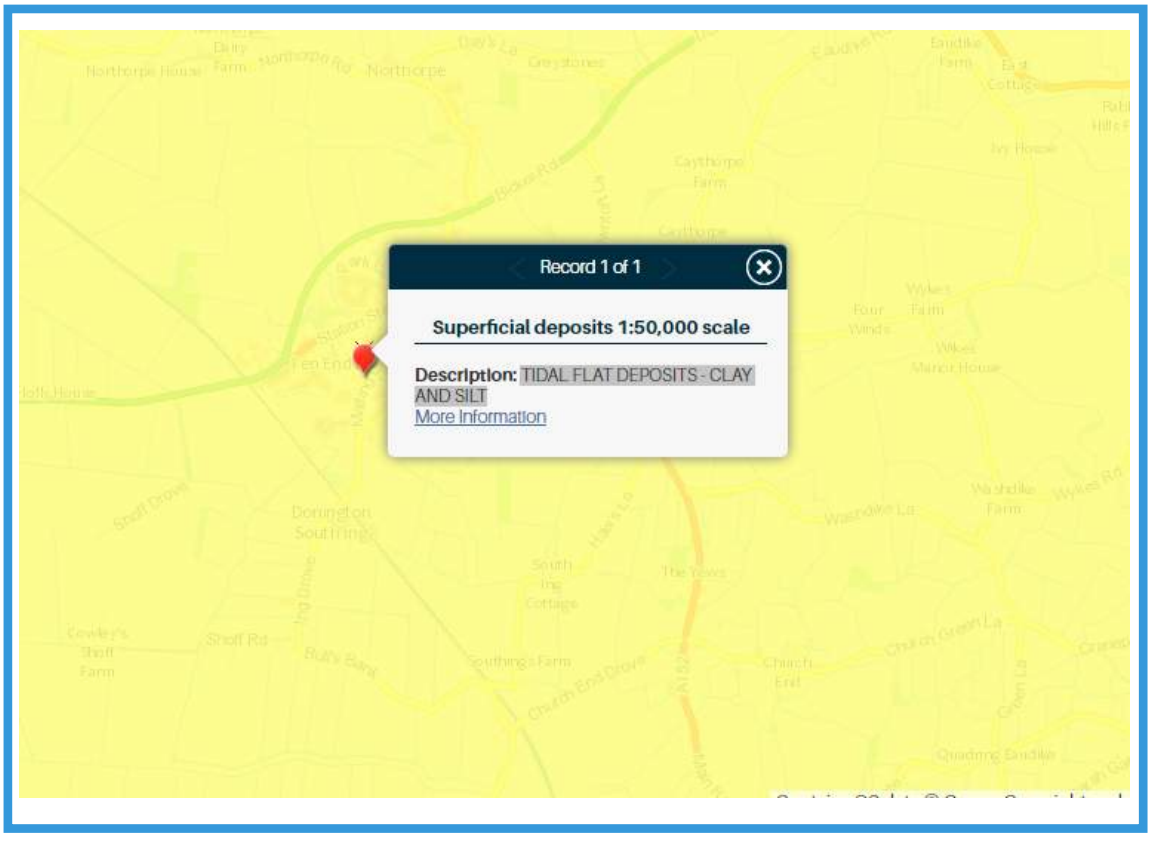
GEOINDEX ONSHORE

GEOLOGY - BEDROCK - OXFORD CLAY FORMATION - MUDSTONE



GEOINDEX ONSHORE

GEOLOGY - SUPERFICIAL DEPOSITS - TIDAL FLAT DEPOSITS - CLAY AND SILT

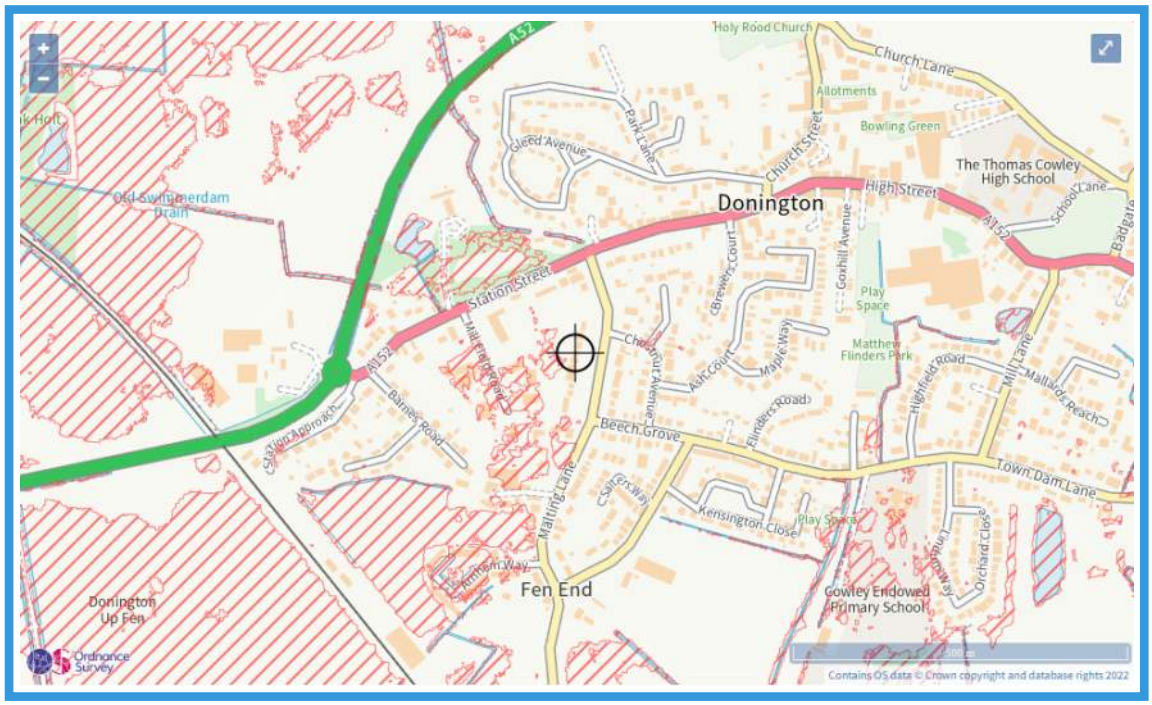


SITE HYDROGEOLOGY

Environment Agency Main River Map







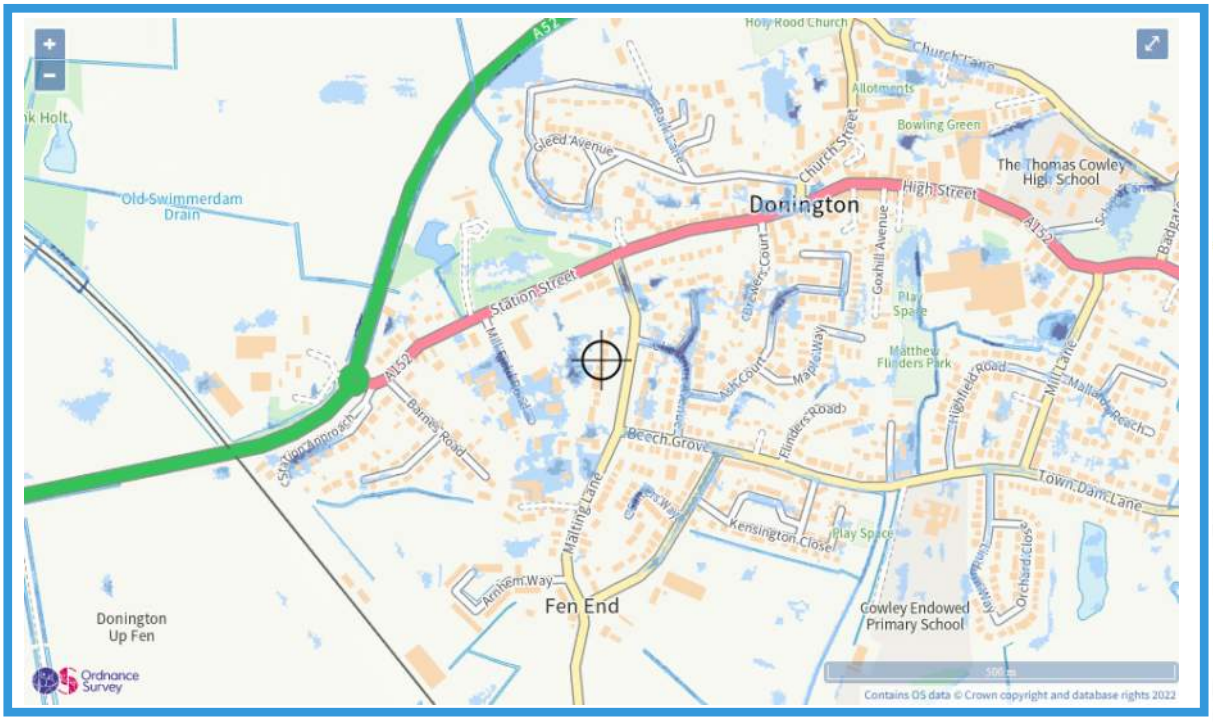
when river levels are normal when there is also flooding from rivers

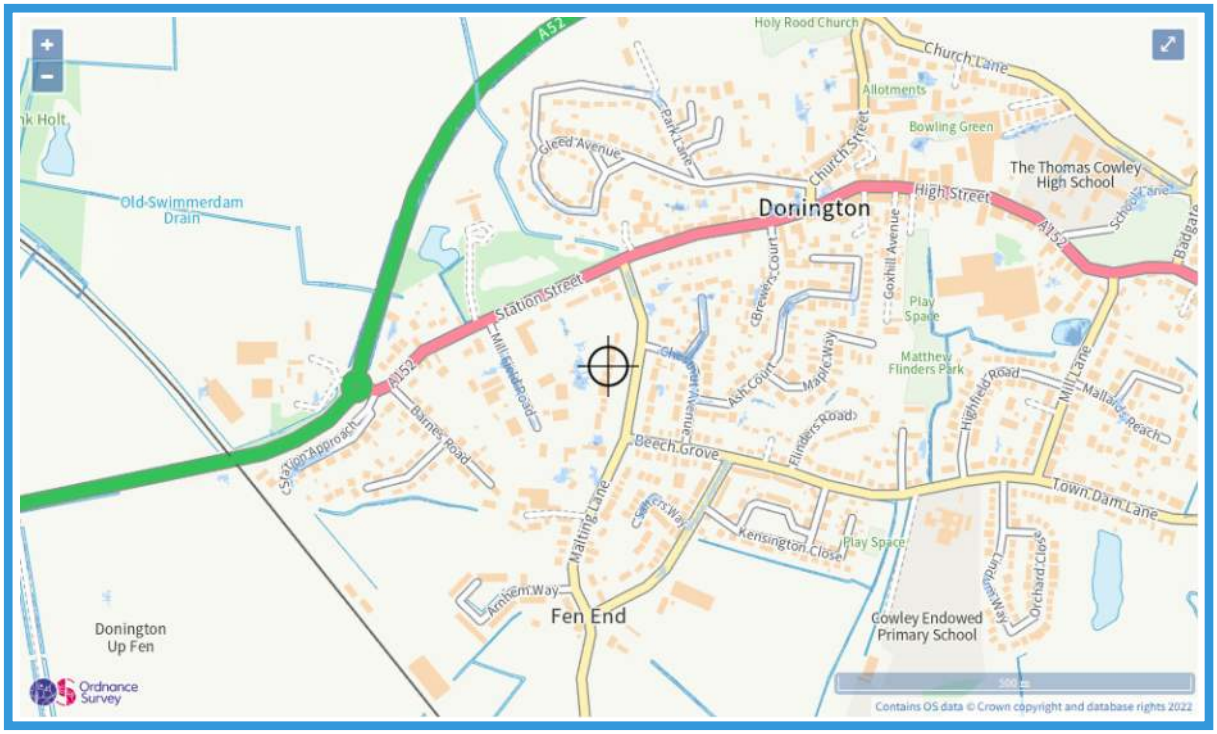
SITE SURFACE WATER FLOOD RISK

Flood risk from surface water

Extent of flooding

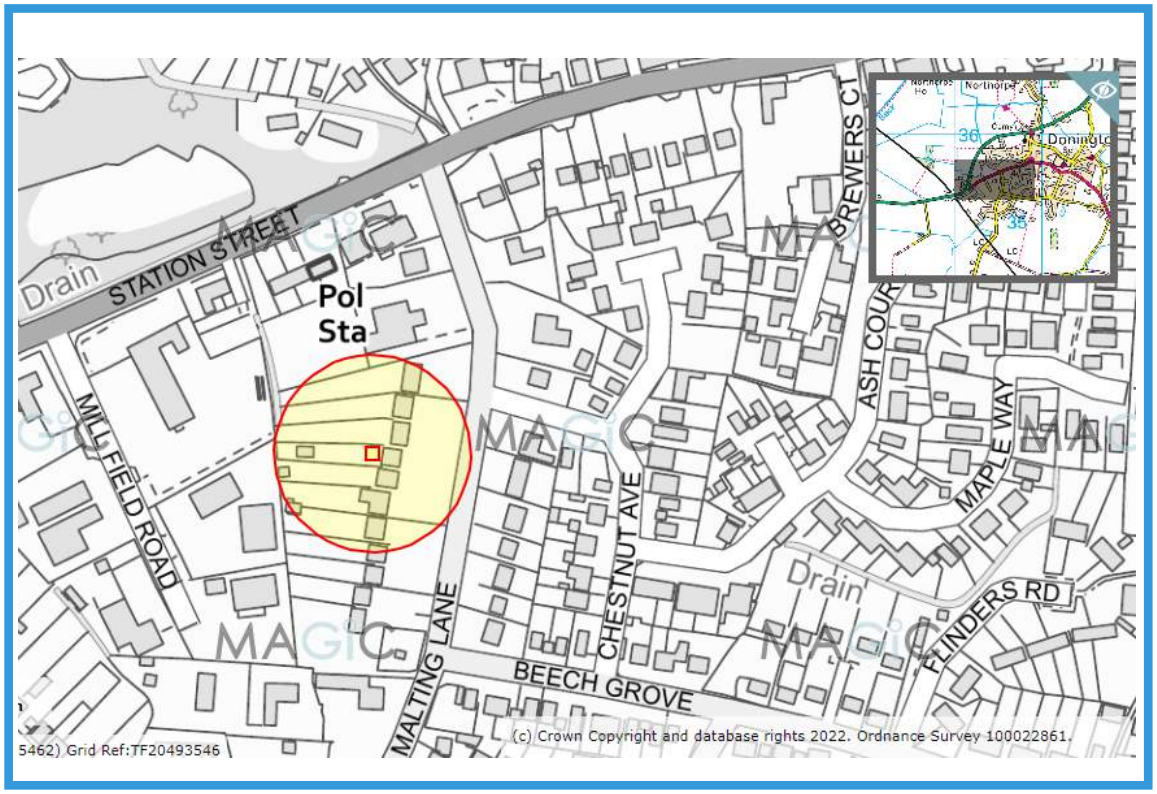
Low risk means that each year this area has a chance of flooding of between 0.1% and 1%. Flooding from surface water is difficult to predict as rainfall location and volume are difficult to forecast. In addition, local features can greatly affect the chance and severity of flooding.





Over 900mm 300 to 900mm Below 300mm

MAGIC RESULTS



Site Check Results

Site Check Report Report generated on Thu Mar 31 2022
You selected the location: Centroid Grid Ref: TF20503544
The following features have been found in your search area:

Aquifer Designation Map (Bedrock) (England)

Typology	Unproductive

Aquifer Designation Map (Superficial Drift) (England)

Typology	Unproductive

Source Protection Zones merged (England)
No Features found

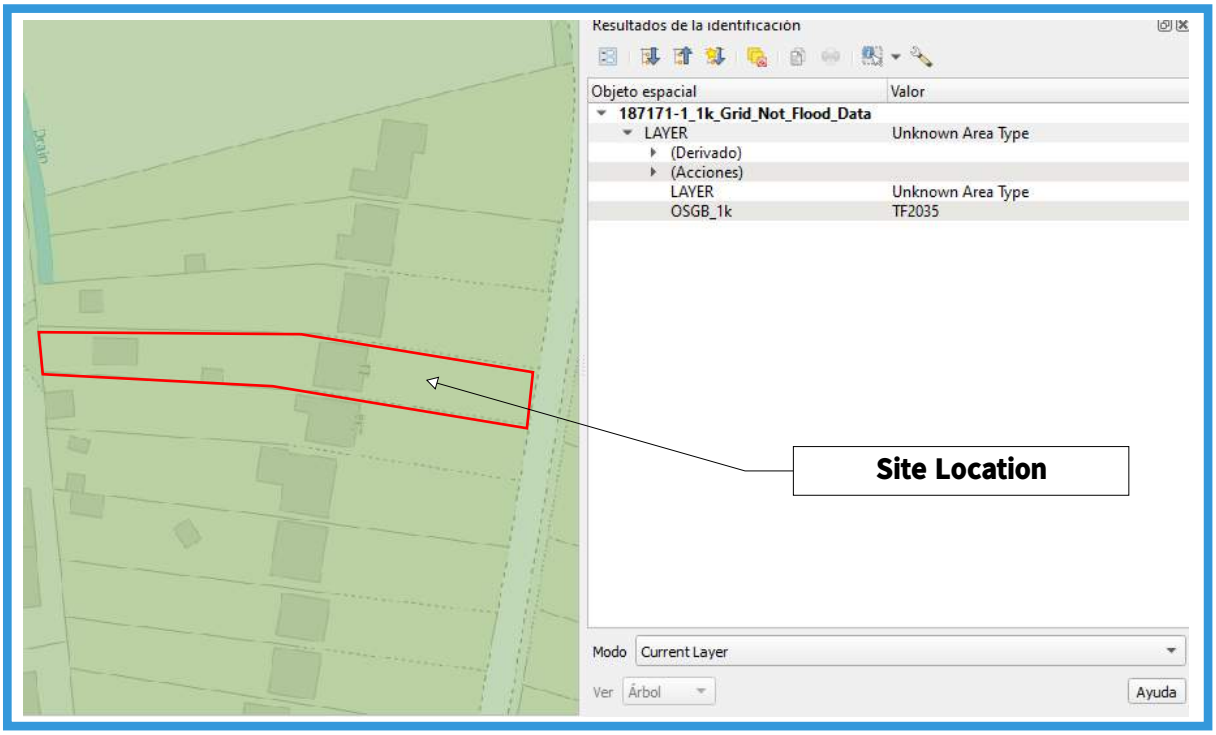
OK | Cancel | Export to CSV | Print

FLOOD WARNING AREA

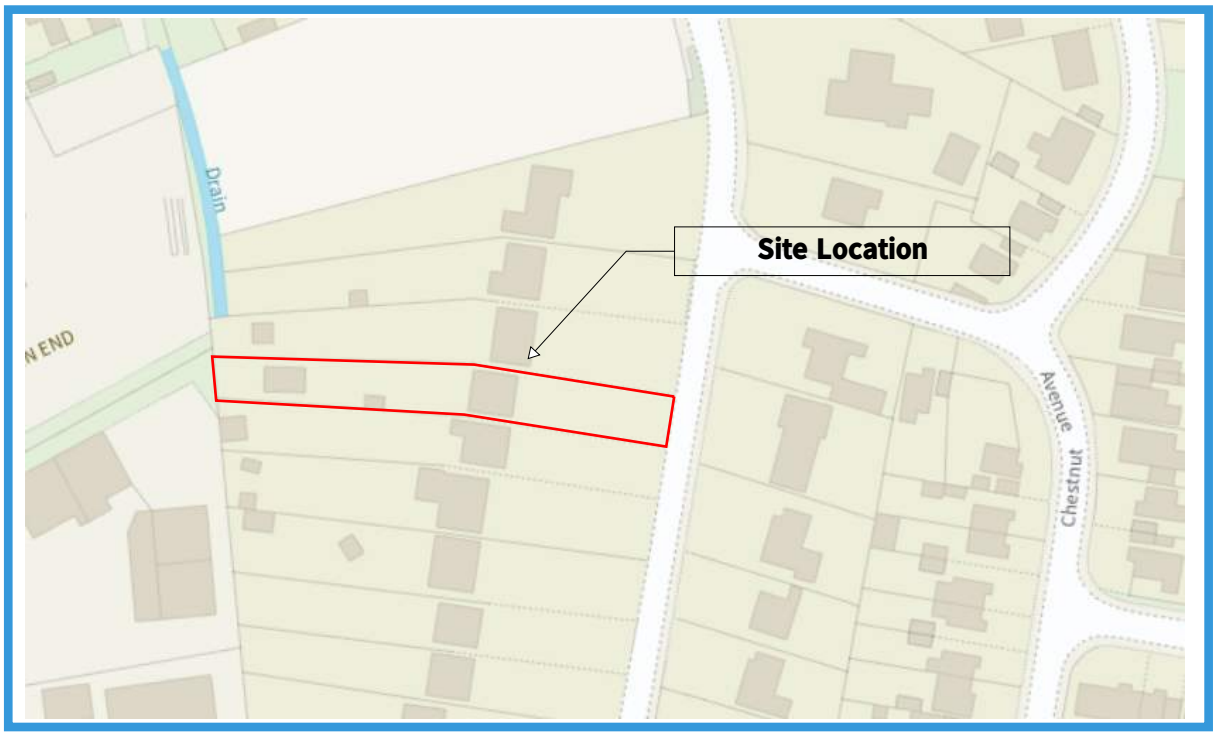


Flood Warning areas

GROUND WATER FLOOD RISK



HISTORIC FLOOD MAP



Historic Flood Outline

Flood map for planning

Your reference	Location (easting/northing)	Created
PE114XA	**520515/335444**	**31 Mar 2022 12:27**

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

This means:

- you must complete a flood risk assessment for development in this area
- you should follow the Environment Agency's standing advice for carrying out a flood risk assessment (see www.gov.uk/guidance/flood-risk-assessment-standing-advice)

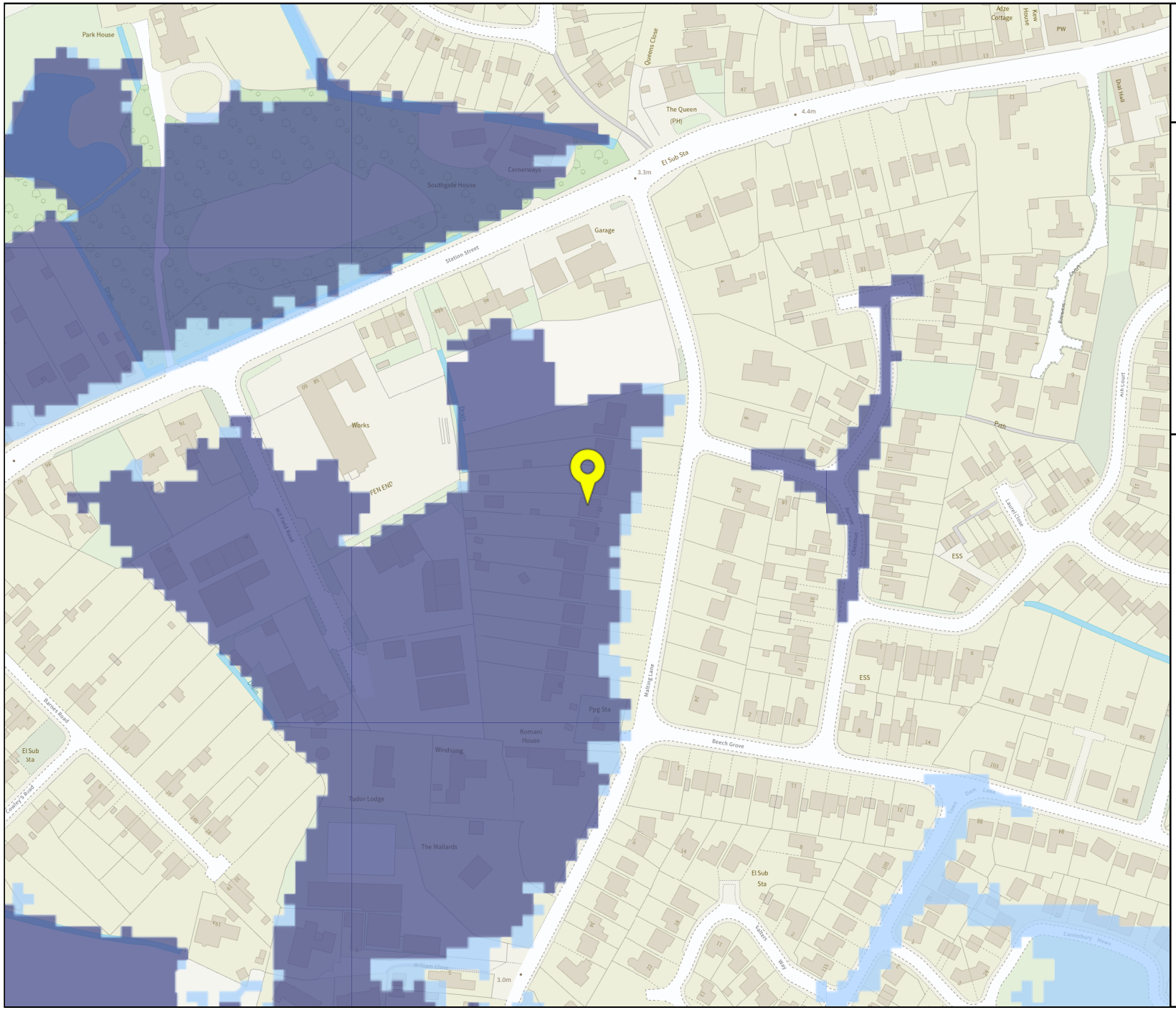
Notes

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

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

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Environment Agency

Flood map for planning

Your reference
PE114XA

Location (easting/northing)
520515/335444

Scale
1:2500

Created
31 Mar 2022 12:27

- Selected point
- Flood zone 3
- Flood zone 3: areas benefitting from flood defences
- Flood zone 2
- Flood zone 1
- Flood defence
- Main river
- Flood storage area

0 20 40 60m

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