BLI

CONSULTING ENGINEERS

Scoping Report

Flood Risk Assessment

Residential Development

Land west of Frith Way

Great Moulton

Norfolk

Job No: BLI.2018.75

Date: December 2018

Version 1

Revision Schedule

Job No.	Revision	Date	Client	Details	Prepared by
BLI.2018.75	Version 1	13.12.2018	Katie O'Sullivan	SITE ALLOCATION	Richard Martin IEng MICE Director

Limitations

This Report has been prepared by BLI Consulting Engineers Ltd for the sole use of Katie O'Sullivan ("Client") in accordance with the Agreement under which our services were performed [letter dated 27 November 2018]. No other warranty, expressed or implied, is made as to the professional advice included in this Report or any other services provided by BLI Consulting Engineers Ltd. This Report is confidential and may not be disclosed by the Client nor relied upon by any other party without the prior and express written agreement of BLI Consulting Engineers Ltd.

The conclusions and recommendations contained in this Report are based upon information provided by others and upon the assumption that all relevant information has been provided by those parties from whom it has been requested and that such information is accurate. Information obtained by BLI Consulting Engineers Ltd has not been independently verified by BLI Consulting Engineers Ltd, unless otherwise stated in the Report.

The methodology adopted and the sources of information used by BLI Consulting Engineers Ltd in providing its services are outlined in this Report. The work described in this Report was undertaken during December 2018 and is based on the conditions encountered and the information available during the said period of time. The scope of this Report and the services are accordingly factually limited by these circumstances.

Where assessments of works or costs identified in this Report are made, such assessments are based upon the information available at the time and where appropriate are subject to further investigations or information which may become available.

BLI Consulting Engineers Ltd disclaim any undertaking or obligation to advise any person of any change in any matter affecting the Report, which may come or be brought to BLI Consulting Engineers Ltd's attention after the date of the Report.

Certain statements made in the Report that are not historical facts may constitute estimates, projections or other forward-looking statements and even though they are based on reasonable assumptions as of the date of the Report, such forward-looking statements by their nature involve risks and uncertainties that could cause actual results to differ materially from the results predicted. BLI Consulting Engineers Ltd specifically does not guarantee or warrant any estimate or projections contained in this Report.

Copyright

Table of Contents

Appendices

1 Introduction

1.1 BLI Consulting Engineers Ltd have been commissioned by Katie O'Sullivan to prepare a Scoping Report relating to flood risk and surface water drainage in accordance with the:

- National Planning Policy Framework (NPPF).
- Flood Risk and Coastal Change Planning Practice Guidance (PPG).
- Non-Statutory Technical Standards.
- Norfolk County Councils (NCC) Guidance Document.

1.2 This report will form part of the supporting technical documentation to obtain site allocation (residential) as part of the Regulation (Stage B) Consultation of the Greater Norwich Local Plan.

1.3 The application for residential site allocation will be submitted by Bidwells (Planning Department) and the purpose of this report shall be:

- to provide information on the flood risks associated with the application site and to provide early stage mitigation measures for the proposed development where flood risk has been identified.
- to assess the available options for surface water disposal in accordance with the surface water drainage hierarchy.
- to assist where possible with the application of the Sequential Test and Exception Test.

1.4 This is to enable the development to obtain site allocation within the Greater Norwich Local Plan and so that the site, its occupants and the surrounding development will be at the minimum risk of flooding as the site is developed to the detailed planning stages.

2 Development Details

Site Location

2.1 The application site is located:

- **Site Address:** – Land west of Frith Way, Great Moulton, Norfolk, NR15 2HA
- **Grid Reference: –** TM 167 903

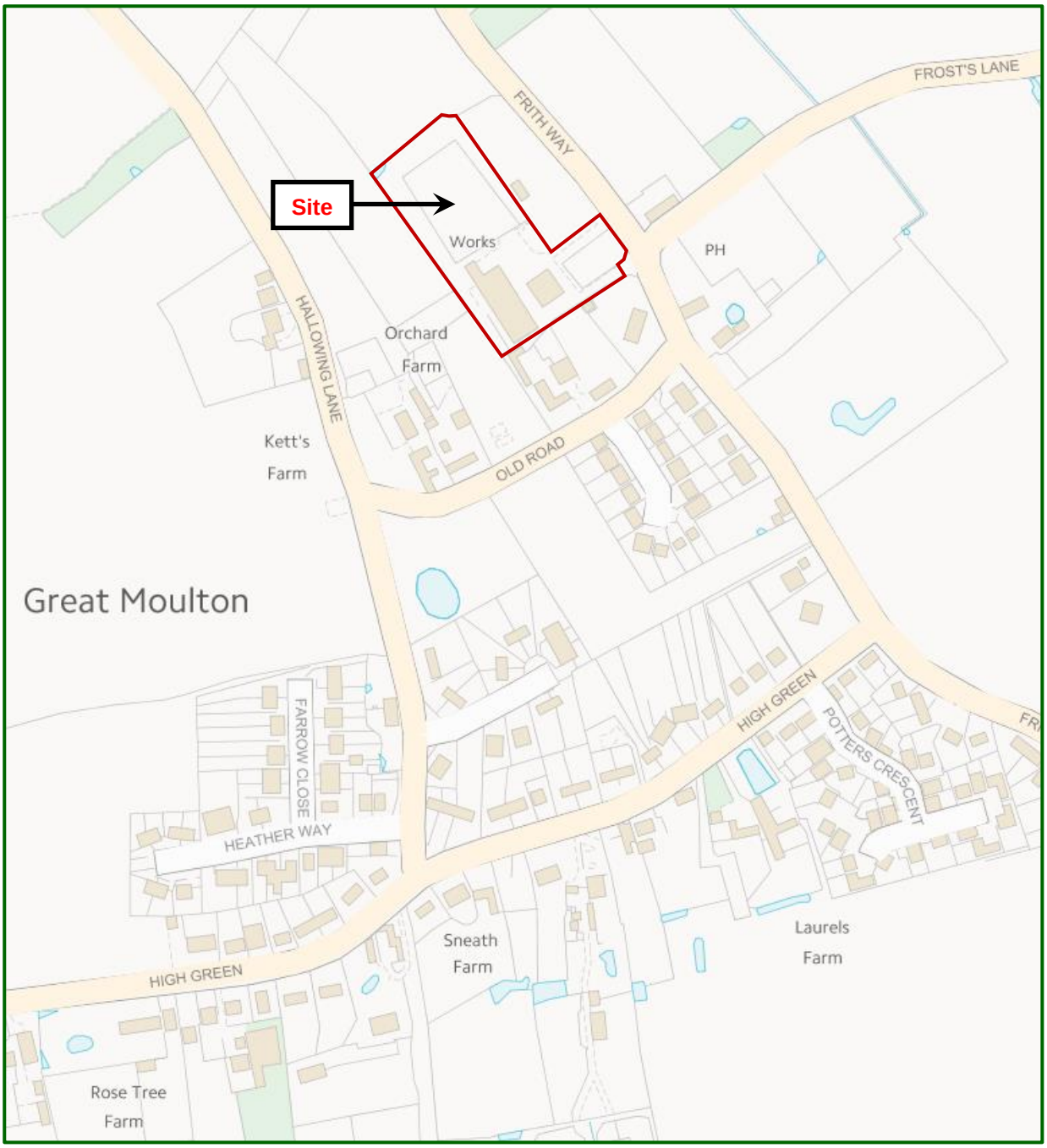


Figure 2.1 – Site Location Plan

Figure 2.2 – Aerial Photo

Existing Site Layout

2.2 The proposed development boundary as indicated in Figure 2.1 and Figure 2.2 above encloses an area of approximately 1.130 ha and is defined by:

- Open farmland to the north and west.
- Residential development to the south.
- Frith Way and dense woodland to the east with open farmland beyond.

2.3 A current Ordnance Survey (OS) extract of the site and the surrounding area has been included within Appendix A.

2.4 The existing site layout currently comprises of a former meat factory together with associated office and storage buildings located to the south. The built development is serve by a large area of concrete hardstanding which also provides access to the north of the site which comprises of dense permeable scrubland.

2.5 Vehicular and pedestrian access to the site is currently achieved off Frith Way (public highway) via a formal junction located to the south-east of the site.

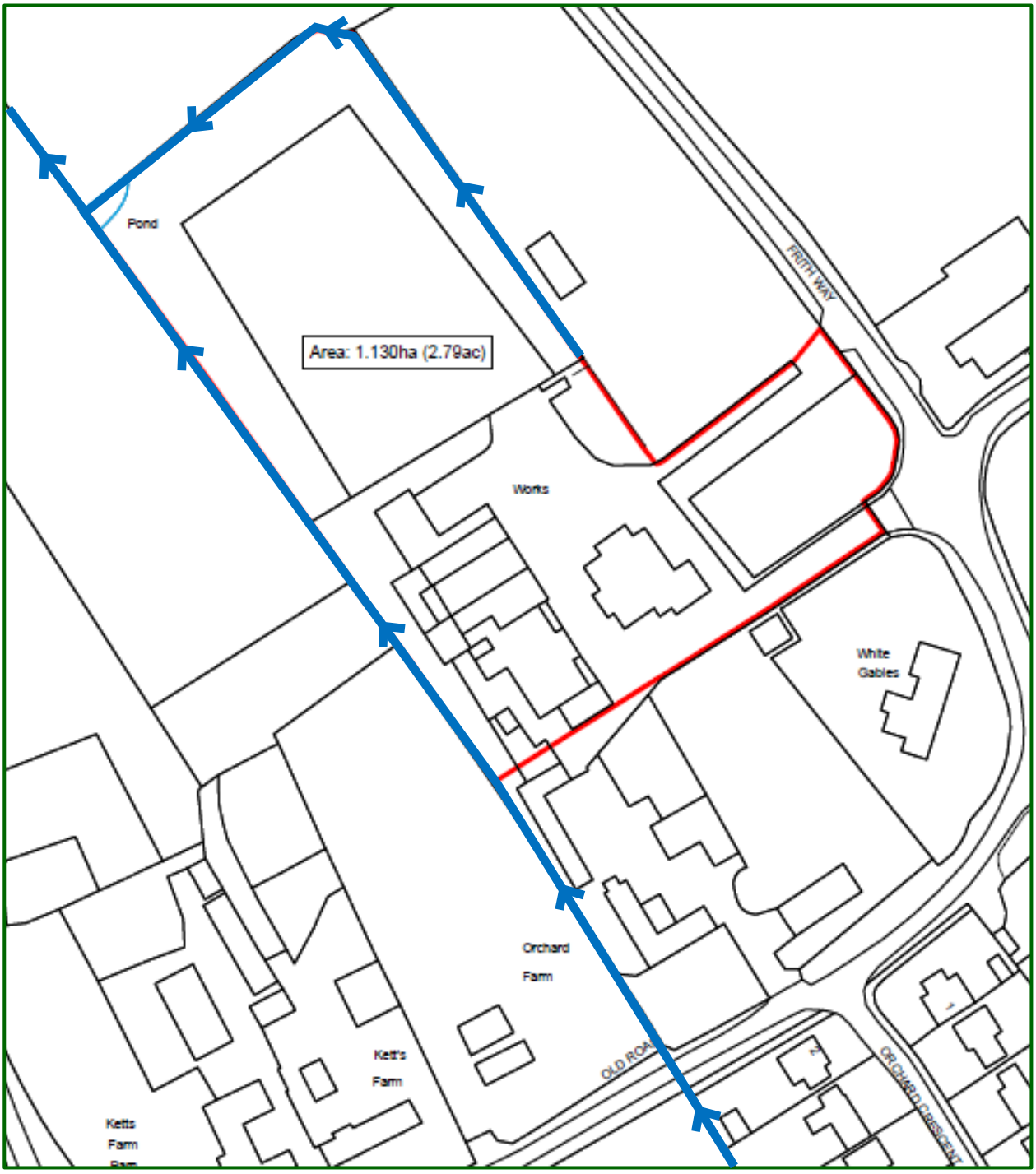


Figure 2.3 – Watercourse Location Plan

2.6 A topographical survey of the existing site layout has not been undertaken at this early stage. However, a walk over of the site suggests that the ground level falls in a north-westerly direction across the site and towards the surrounding network of watercourses as shown in Figure 2.3 above.

2.7 From observations during the site walkover, the impermeable roof area of the existing buildings and the adjacent concrete hardstanding discharges the surface water runoff via the following methods:

- Several outfall pipes were observed discharging into the adjacent watercourse and it is assumed that these outfalls serve the positively drained roof and hardstanding areas to the south of the site.
- Where the building roof areas and concrete hardstanding is not positively drained, the surface water runoff discharges directly onto the adjacent ground and enters the surrounding watercourses via overland flow.

2.8 The remainder of the site to the north comprises of permeable scrubland and is not served by any form of positive drainage system. Therefore, surface water runoff infiltrates into the ground and has a surface water discharge into the adjacent watercourse, equal to the natural greenfield run-off rate.

Development Proposal

2.9 Following demolition of the existing buildings and hardstanding, the proposed site development will comprise of residential dwellings together with associated hard and soft landscaping areas.

2.10 At this early stage (site allocation) a development layout has not been provided.

3 Flood Hazard Review

Source of Flooding

3.1 **Fluvial Flooding -** is caused by rivers and occurs when the river channel capacity is exceeded by the flow. Most rivers have a natural flood plain which in built up areas is sometimes encroached upon by development.

3.2 The fluvial and tidal flood mapping available on the GOV.UK website and as shown in Figure 3.1 below demonstrates that the entire development site is located within Flood Zone 1 in accordance with Table 1 of the Flood Risk and Coastal Change PPG.

3.3 A review of the FEH mapping website suggests the upstream catchment of the watercourse forming the development sites western boundary is less than 0.50 km^2. The fluvial flood mapping only identifies the flood risk associated with watercourses that have an upstream catchment of 3.00 km^2 or greater. Therefore, the fluvial flood risk associate with the smaller watercourses surrounding the development site have not been defined by the flood mapping shown within Figure 3.1 below

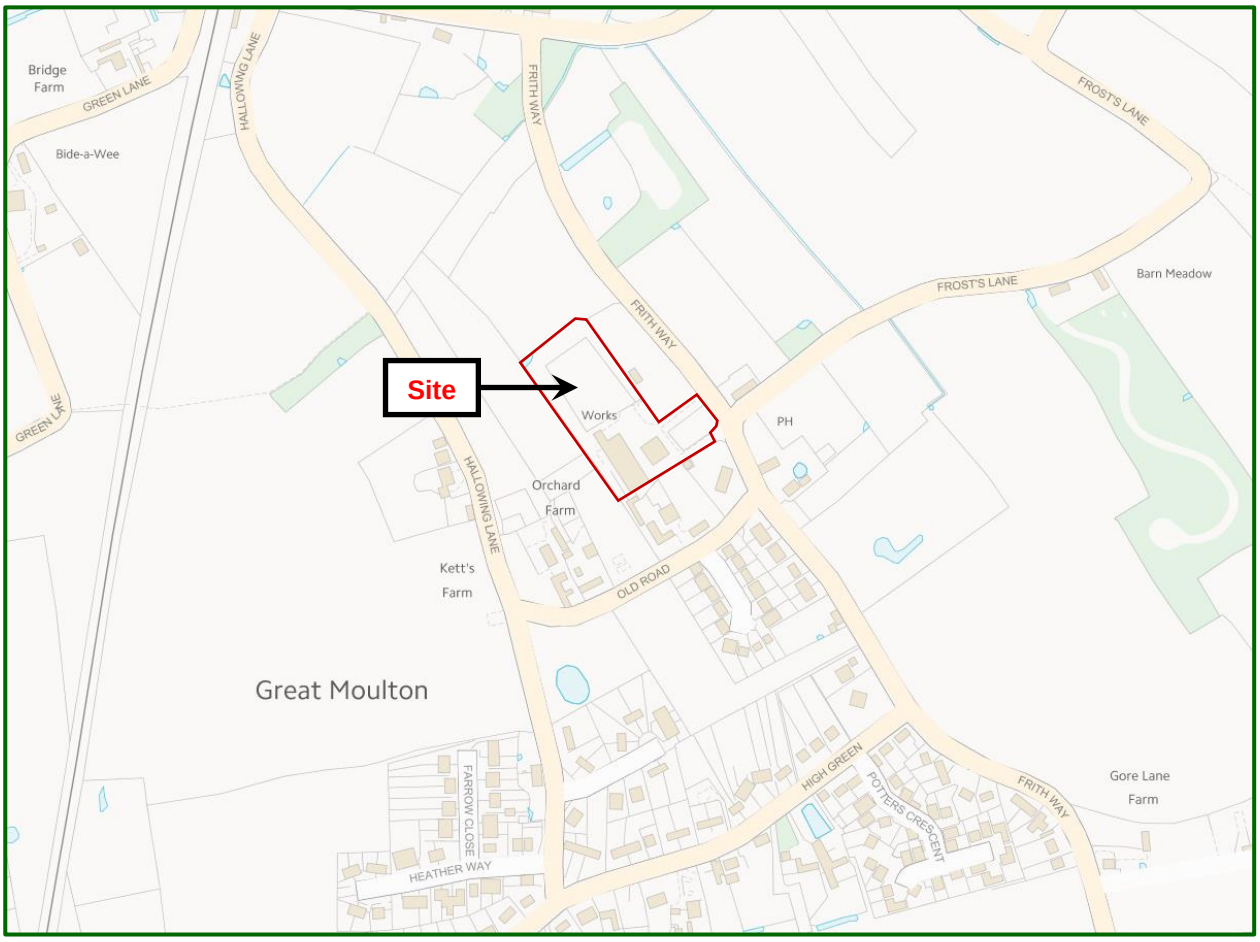


Figure 3.1 – Fluvial and Tidal Indicative Flood Mapping

3.4 Due to the size and rural nature of the upstream catchment, the extent of fluvial flooding is likely to remain in channel and extend across the low-lying land immediately adjacent to the watercourse. This assessment has been further reinforced following a review of the Surface Water Flood Mapping shown within Figure 3.2 to Figure 3.8 below which can also be used as a proxy for the fluvial risk.

3.5 Therefore, with the provision of an easement along the length of the surrounding watercourses and the sequential design of the development layout outside of the identified flood risk extents (Figure 3.2 to Figure 3.8) the proposed development is considered to be at a 'Low Risk' of flooding from this source.

3.6 ***Tidal Flooding -*** from the sea occurs when high tides and storm surges raise the level of tidal waters above the level of the shore or river bank. They can be sudden and severe but are dependent on a number of factors.

3.7 As shown within Figure 3.1 above the proposed development site is located within Flood Zone 1 in accordance with Table 1 of the Flood Risk and Coastal Change PPG.

3.8 Therefore, the development is also considered to be at a 'Low Risk' of flooding from this source.

3.9 **Surface Water Flooding –** commonly occurs within highly dense urban areas where there are large areas of impermeable surfacing e.g. roof areas, car parking and roads. It is possible during high intensity rainfall storms events for surface water run-off to be unable to soak into the ground, or enter the man-made drainage systems at a quick enough rate. Where this occurs, the excess water can flow across land and potentially cause flooding.

3.10 The indicative Surface Water Flood Mapping associated with the proposed development site has been included within Figure 3.2 – 3.8 below during the 'High Risk', 'Medium Risk' and 'Low Risk' flood scenarios.

30-Year Storm Event

3.11 Figure 3.2 and 3.3 below represents the 'High Risk' flood scenario which equates to flooding of greater than 3.3% probability (30-year event).

3.12 The mapping demonstrates that:

- The proposed development site is located outside of the anticipated flood extents and has a risk rating of 'Very Low'.
- An area of surface water flooding has been identified to the north of the site and appears to be associated with the watercourse which crosses the land in a north-easterly direction. The modelled flood depth has been confirmed as less than 300mm and a flow velocity of greater than 0.25 m/s.

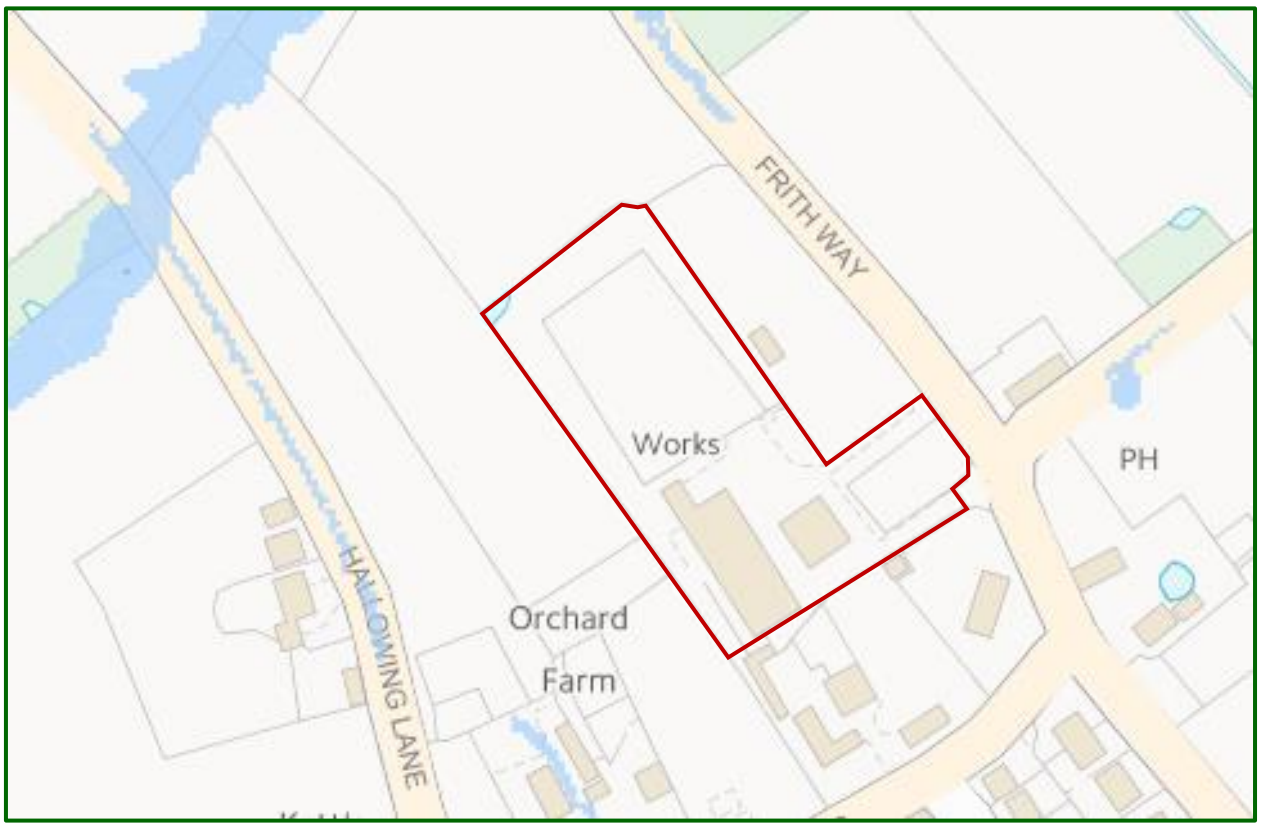


Figure 3.2 – Surface Water Indicative Flood Mapping (High Risk Flood Extents/Depth)

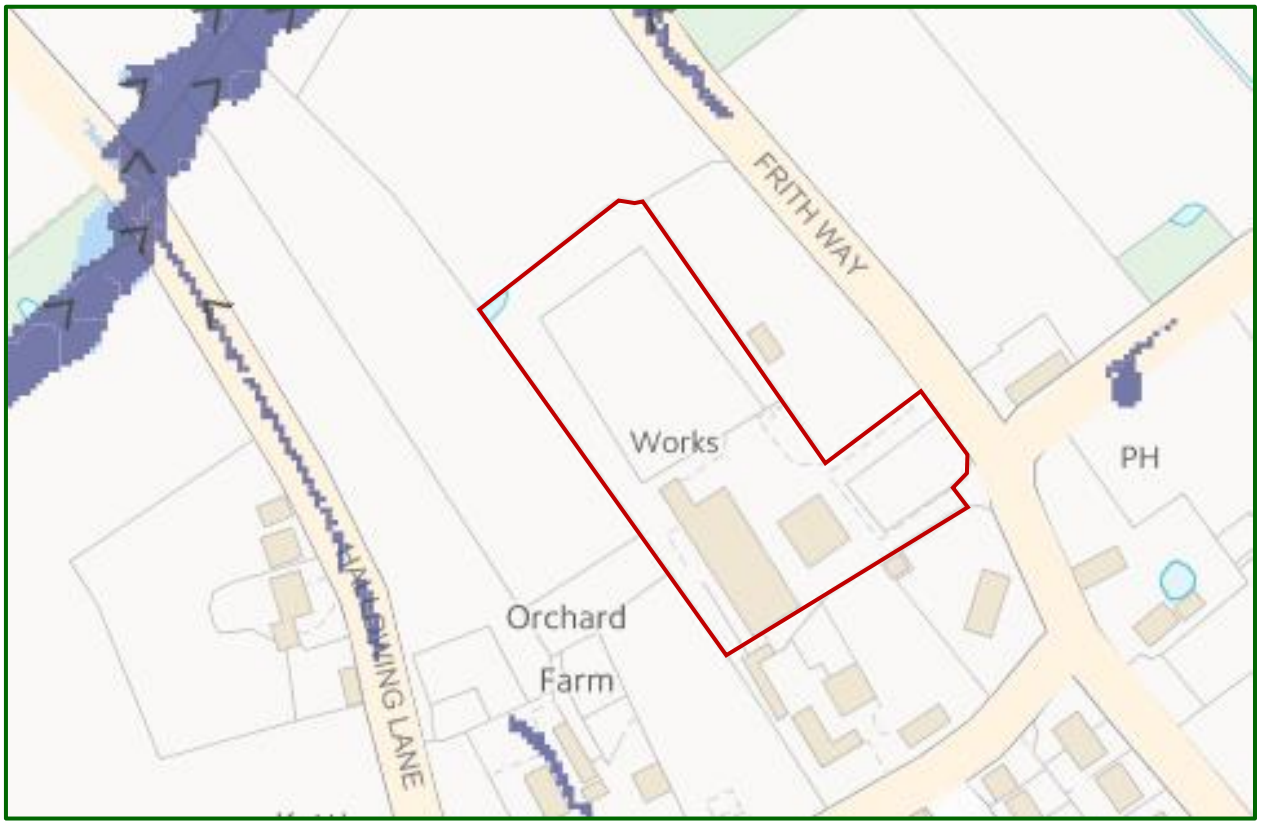


Figure 3.3 – Surface Water Indicative Flood Mapping (High Risk Flood Velocity)

100-Year Storm Event

3.13 Figure 3.4 and 3.5 below represents the 'Medium Risk' flood scenario which equates to flooding between the 1.0% and 3.3% probability (30-year event to 100-year event).

3.14 The mapping demonstrates that:

- The proposed development site is primarily located outside of the anticipated flood extents and has a risk rating of 'Very Low'.
- An area of surface water flooding has been identified along the development sites western boundary and is likely to be associated with the watercourse located within this area of the site. The majority of the surface water flood extents is located on the western side of the boundary (off-site) and the modelled flood depth has been confirmed as less than 300mm and a flow velocity of greater than 0.25 m/s.
- A small isolated area of surface water flooding has been identified midway along the development site's northern boundary with a modelled flood depth of less than 300mm and a flow velocity of greater than 0.25 m/s.
- The extent of surface water flooding previously identified beyond the sites northern boundary has increased. The modelled flood depth has been confirmed as less than 300mm and a flow velocity of greater than 0.25 m/s.

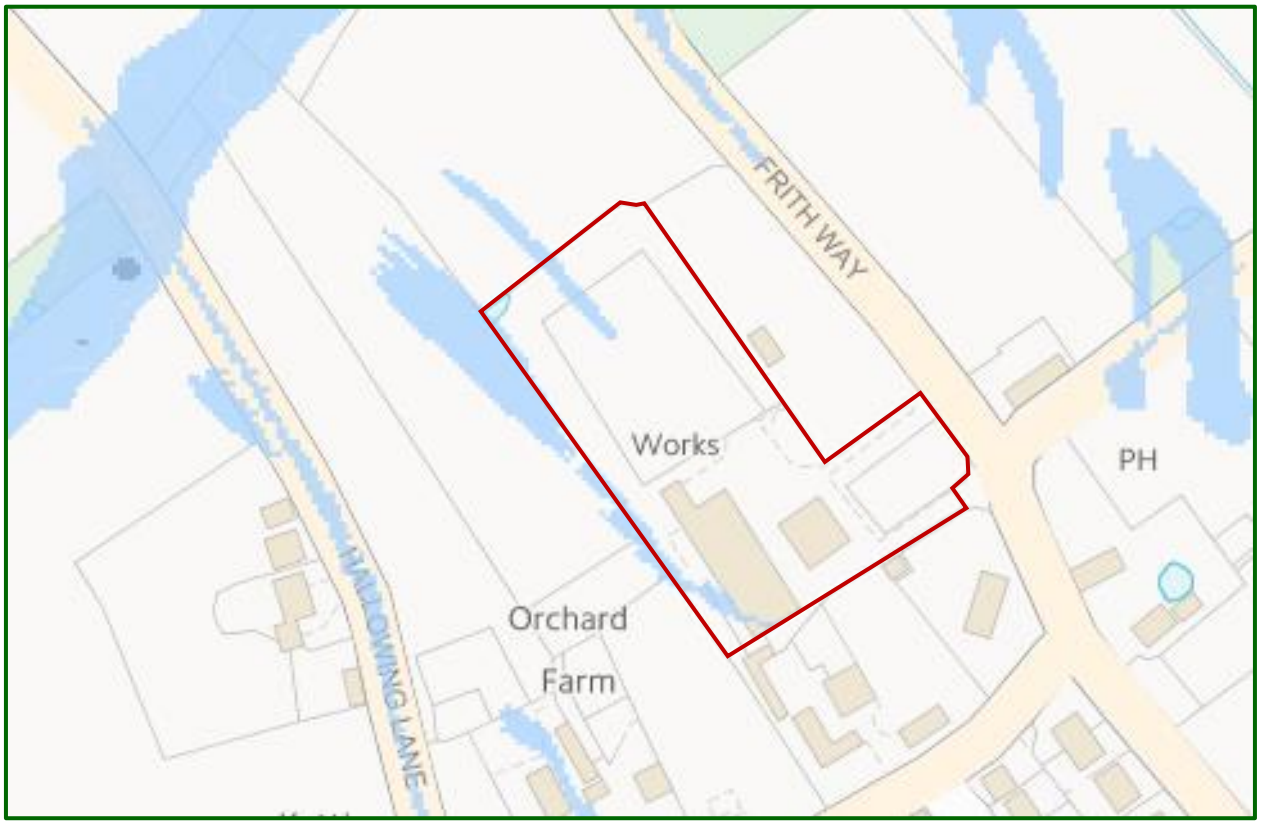


Figure 3.4 – Surface Water Indicative Flood Mapping (Medium Risk Flood Extents/Depth)

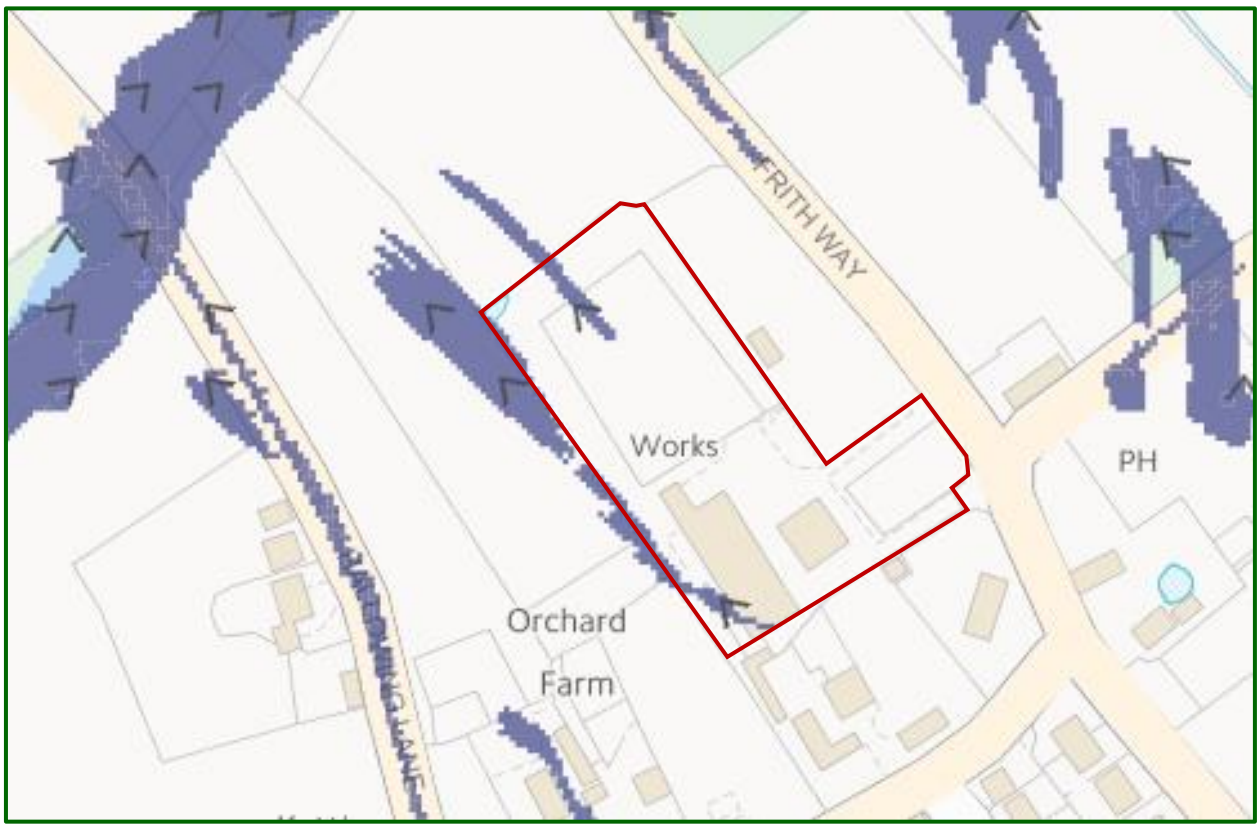


Figure 3.5 – Surface Water Indicative Flood Mapping (Medium Risk Flood Velocity)

100-Year Plus Climate Change Storm Event

3.15 The extract shown within Figure 3.6 below has been obtained from the South Norfolk Council Level 1 Strategic Flood Risk Assessment (November 2017) and represents the 'Medium Risk' plus climate change flood scenario. This equates to flooding with a 1.0% probability (100-year event) with a 40% increase in rainfall intensity to allow for the effects of climate change.

3.16 The mapping demonstrates that:

- The proposed development site is primarily located outside of the anticipated flood extents and has a risk rating of 'Very Low'.
- The extent of surface water flooding identified along the development sites western boundary has increased when compared to the 'Medium Risk' flood scenario (100-year). The increased flood extents is primarily located on the western side of the boundary (off-site) and has minimal impact to the development site.
- The extent of the small isolated area of surface water flooding midway along the development site's northern boundary has increased when compared to the 'Medium Risk' flood scenario (100-year).
- A small isolated area of surface water flooding has been identified midway along the development site's southern boundary.

- The extent of surface water flooding to the north of the site has also increased when compared to the 'Medium Risk' flood scenario (100-year).

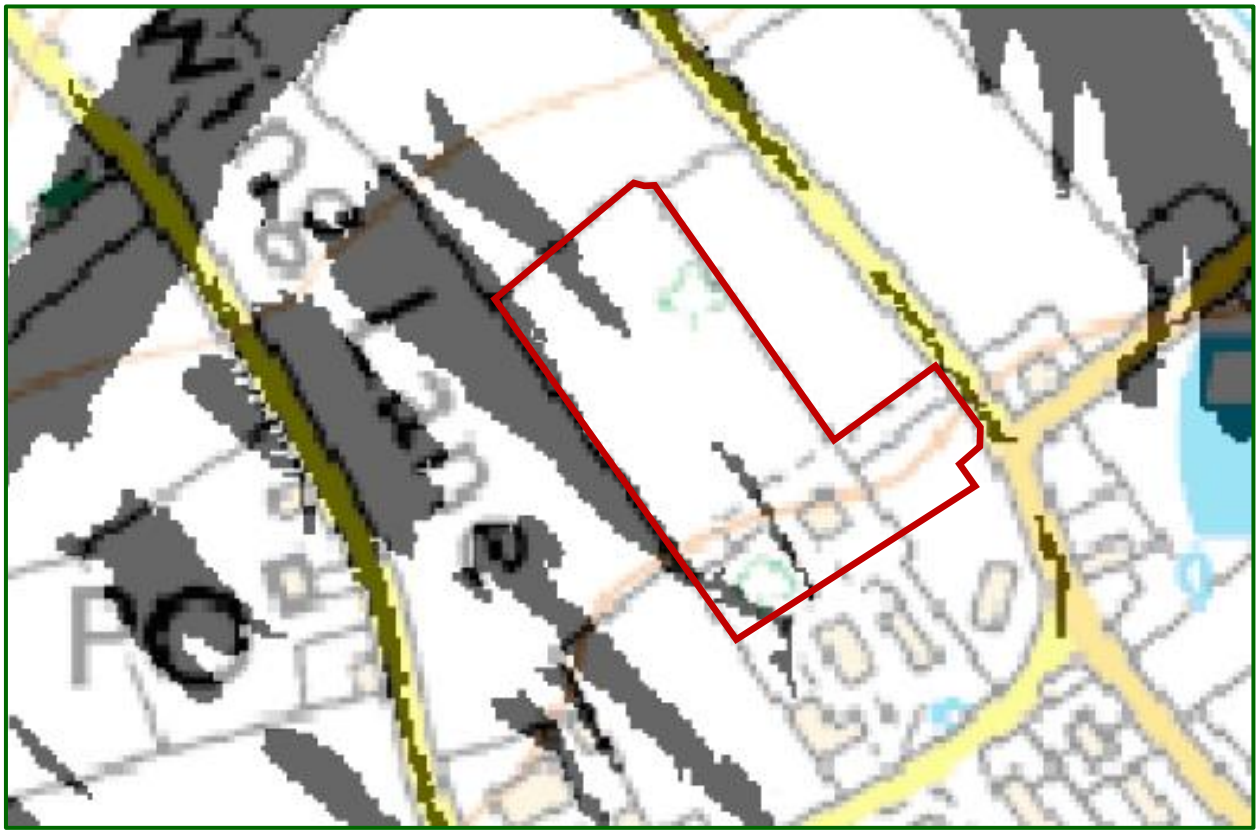


Figure 3.6 – Surface Water Indicative Flood Mapping (Medium Risk Flood Extents Plus 40% Climate Change)

1000-Year Storm Event

3.17 Figure 3.7 and 3.8 below represents the 'Low Risk' flood scenario which equates to flooding between the 0.1% and 1.0% probability (100-year event to 1000-year event).

3.18 The mapping demonstrates that:

- The proposed development site is primarily located outside of the anticipated flood extents and has a risk rating of 'Very Low'.
- The extent of surface water flooding identified along the development sites western boundary has increased when compared to the 'Medium Risk' plus climate change flood scenario (100-year + 40%) and joins with the area of surface water flooding identified midway along the development site's northern boundary. The modelled flood depth has been confirmed as less than 300mm and a flow velocity of greater than 0.25 m/s.

- An area of surface water flooding has been identified along the development sites eastern boundary and is likely to be associated with the watercourse located within this area of the site. The extent of surface water flooding connects with the surface water flood extents along the northern site boundary as described above. The modelled flood depth has been confirmed as less than 300mm and a flow velocity of greater than 0.25 m/s.

- The extent of the small isolated area of surface water flooding located midway along the development site's southern boundary has increased when compared to the 'Medium Risk' plus climate change flood scenario (100-year + 40%). The modelled flood depth has been confirmed as less than 300mm and a flow velocity of greater than 0.25 m/s.

- The extent of surface water flooding to the north of the site has also increased when compared to the 'Medium Risk' plus climate change flood scenario (100-year + 40%) and connects within the on-site flood extents described above. The modelled flood depth has primarily been confirmed as less than 300mm and a flow velocity of greater than 0.25 m/s.

Figure 3.7 – Surface Water Indicative Flood Mapping (Low Risk Flood Extents/Depth)

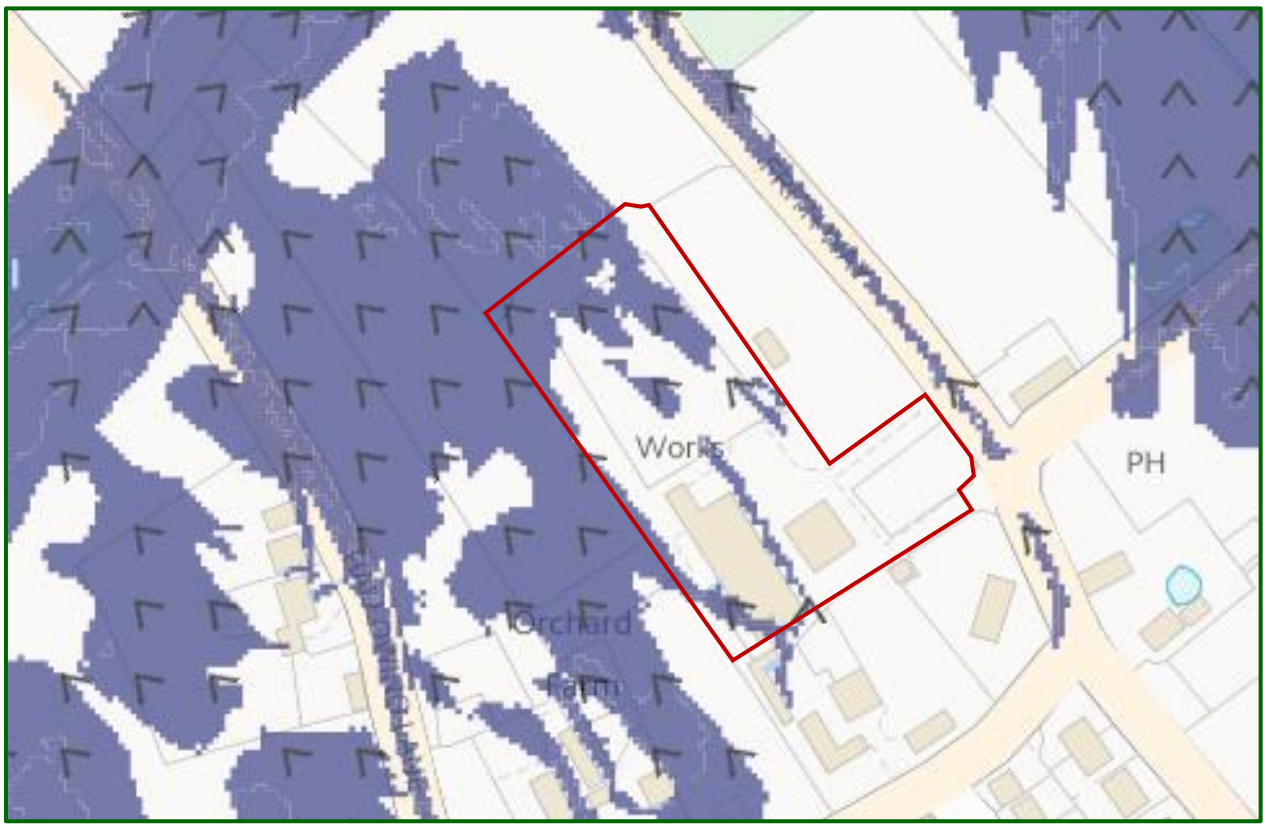


Figure 3.8 – Surface Water Indicative Flood Mapping (Low Risk Flood Velocity)

3.19 To further reduce the risk of surface water flooding to the site and existing downstream development:

- The development layout shall sequentially locate all residential dwellings and associated access roads within Flood Zone 1 and outside the extent of surface water flooding with a risk rating of 'Low' (1000-year) or greater.
- An appropriate site level design as detailed within Section 4 of this report will be required to channel flow away from the proposed and existing development in the event of a surcharging manhole or overland flow flood event across the site;
- An appropriate Surface Water Drainage Strategy should be incorporated into the development design as detailed within Sections 5 of this report. This will include the sequential location of all open surface water drainage infrastructure such as attenuation ponds and swales etc, outside the extent of surface water flooding with a risk rating of 'Medium' (100-year+CC) plus 40% climate change.

3.20 **Groundwater Flooding -** occurs in areas where the level of groundwater is high. Rainfall that soaks into the ground can raise it to a level where structures within the ground are at a risk of flooding. Structures such as basements or detention ponds can be at risk, although this is dependent upon the ground conditions of the site.

3.21 A review of the ground water susceptibility mapping included within the South Norfolk Council Strategic Flood Risk Assessment (November 2017) has been undertaken and an extract of the mapping has been included within Figure 3.9 below.

3.22 The areas susceptible to groundwater flooding is a strategic scale map showing the proportion of each 1km grid square where geological and hydrogeological conditions show groundwater might emerge. It does not show the likelihood of groundwater flooding and only isolated locations within the overall susceptible area are actually likely to suffer the consequences of groundwater flooding.

3.23 The mapping demonstrates that the site is located within a 1.0km grid square with a less than 25% proportion of the grid identified as an area where ground water might emerge.

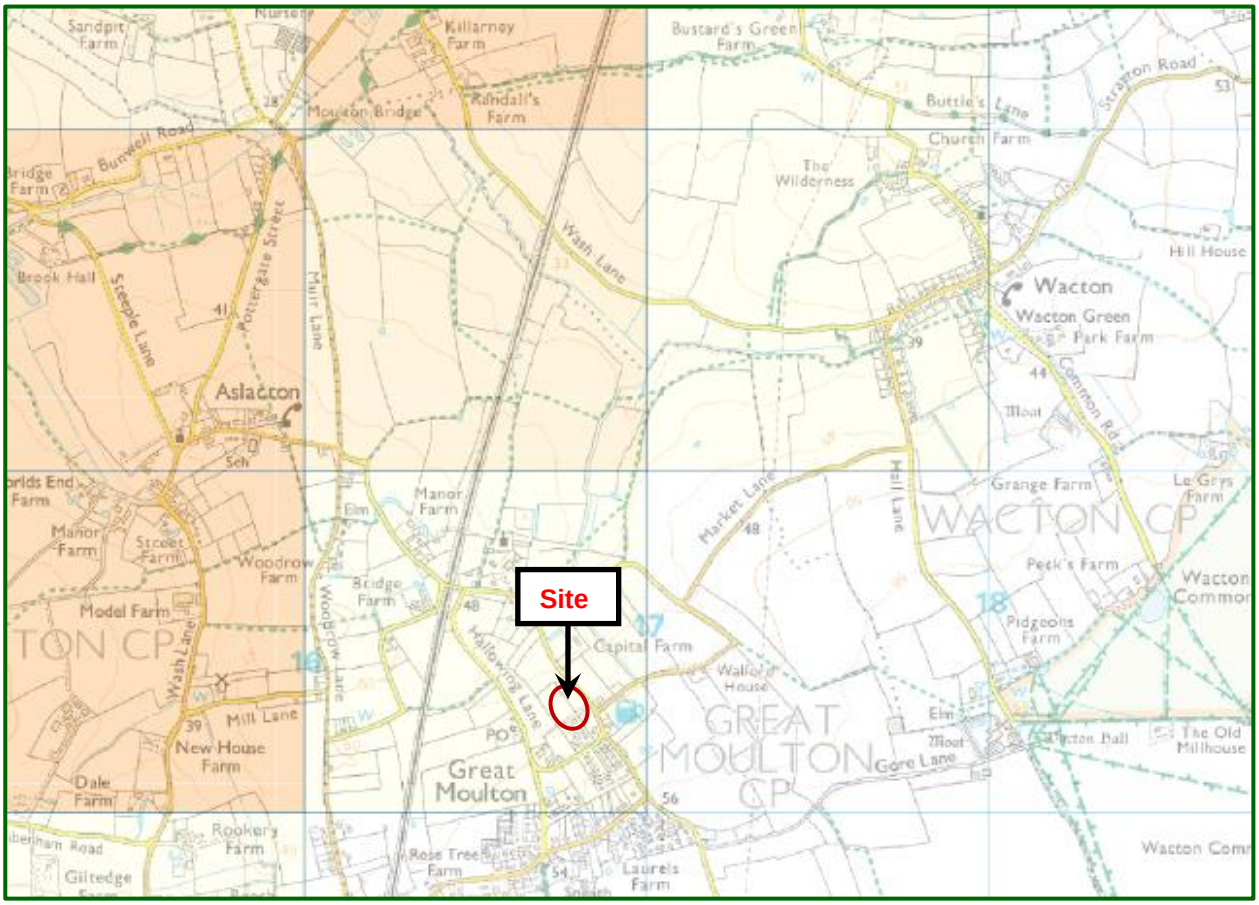


Figure 3.9 – Groundwater Flooding Susceptibility Mapping (Greater Norwich Area Strategic Flood Risk Assessment)

3.24 In addition to the above assessment:

- The existing on-site buildings do not currently show any evidence of flood damage from any source of flooding.
- the development proposal will incorporate raised Finished Floor Level's as part of the surface water flood mitigation measures as detailed within Section 4 of this report.
- the development proposal does not include any basement construction.

3.25 Therefore, at this stage the risk of flooding from this source is considered to be 'Low'.

3.26 **Non-natural or Artificial Flooding -** can include reservoirs, canals and lakes where water is retained above the natural ground level and flooding may occur as a result of the facility becoming overwhelmed or as a result of dam or bank failure. The potential effects of flood risk management infrastructure should also be considered.

3.27 The reservoir flood mapping available on the GOV.UK website and as shown in Figure 3.10 below demonstrates that the proposed development site is located outside of the extent of any reservoir breach flooding scenario.

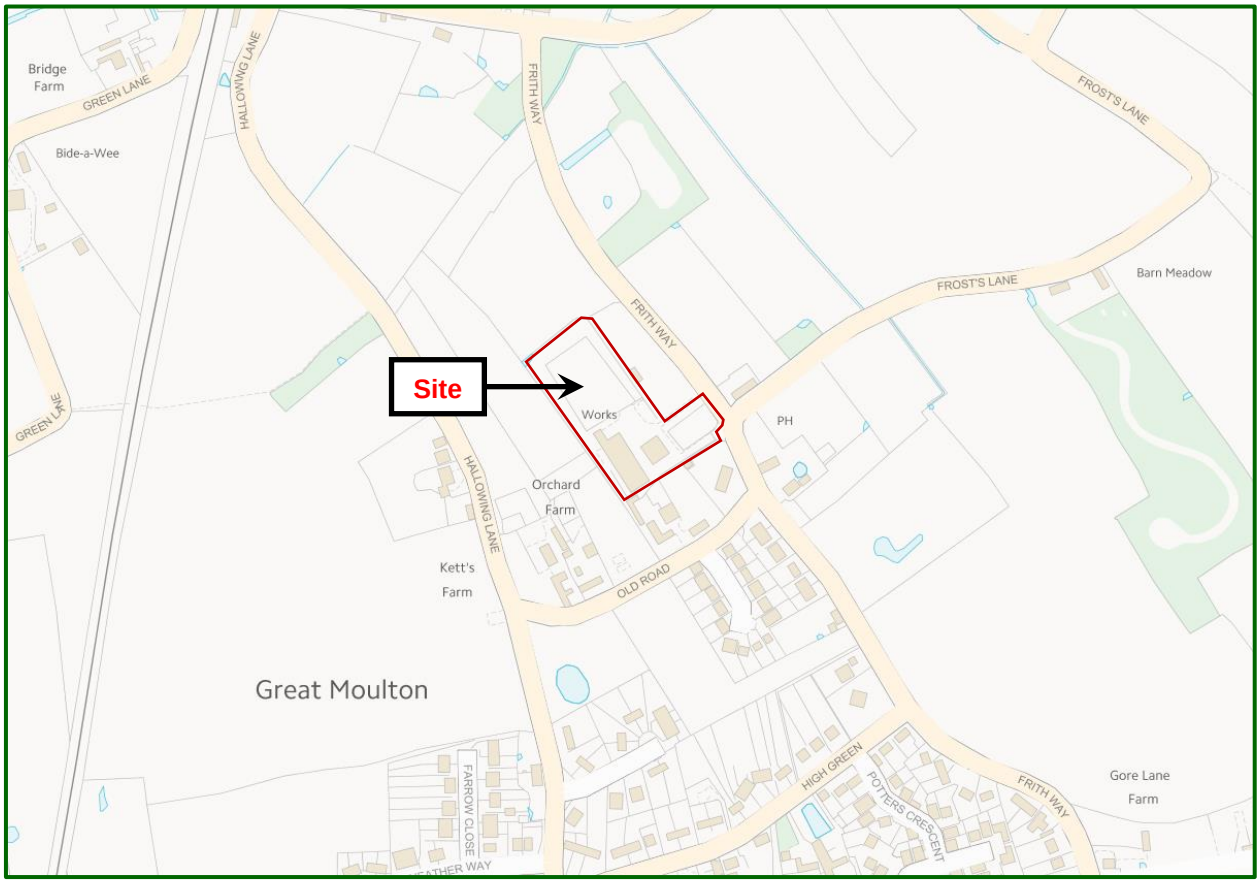


Figure 3.10 – Reservoir Indicative Flood Mapping

3.28 In addition to the above flood mapping, a review of the OS mapping and a walkover survey of the site and surrounding area did not identify any artificial sources of flooding which could affect the proposed development.

3.29 Therefore, the proposed development is considered to be at a 'Low Risk' of flooding from this source.

Desk Top Study

3.30 As part of the site assessment, a desk top review of the following documents has been undertaken.

- South Norfolk Council Level 1 Strategic Flood Risk Assessment – January 2008 (Millard Consulting Engineers)
- Great Norwich Area Level 1 Strategic Flood Risk Assessment – November 2017 (JBA Consulting)

3.31 The above reports did not provide any site-specific comments or reference to the village of Great Moulton in relation to flood risk and surface water drainage. However, all reports heavily promoted the use of Sustainable Drainage techniques.

On-site Observations

3.32 During the site walkover, no additional observations were made in relation to flood risk and surface water drainage which would appear to affect the development of the site.

Description of Flooding

3.33 The site is considered to be a low risk of flooding from all sources except:

- Fluvial flooding which is considered to present a 'Low' to 'Medium' risk of flooding due to the location of the watercourses along the western, northern and eastern boundaries.
- Surface water flooding which is considered to present a 'Low' to 'Medium' risk due to the increased amount of impermeable area created by the development of the site and the sites partial location within the surface water flood extents as identified by the Environment Agency mapping exercise.

3.34 Therefore, the focus of this report will be to mitigate the flood risks posed from these sources by:

- The sequential location of all residential dwellings and associated access roads within Flood Zone 1 and outside the extent of surface water flooding with a risk rating of 'Low' (1000-year) or greater
- Incorporating the Finished Floor Levels (FFL's) and site level design parameters as detailed within Section 4 of this report, which will be developed further during the detailed design stage.
- Implementing an appropriate surface water drainage strategy using sustainable drainage techniques as detailed within Section 5 of this report.

3.35 However, flood risk from other sources will not be overlooked and the measures put forward to mitigate the risk of surface water flooding will also further reduce the already low risk from other potential sources of flooding.

Access and Egress

3.36 In accordance with the NPPF and the Flood Risk and Coastal Change PPG, access and egress to the site during a range of storm events should be considered with preference being over dry land, however where this is not possible evacuation should fall within the white cells as classified within Table 13.1 of FD2320_TR2.

3.37 The proposed development shall be sequentially located within Flood Zone 1 and has also been shown to be at a low risk of flooding from all other sources with the appropriate mitigation implement into the site design. Therefore, the access and egress conditions for the site have been classified as safe and unlikely to require the assistance of the emergency services.

Vulnerability Classification

3.38 Table 2 of the Flood Risk and Coastal Change PPG provides a list of different development types which fall into the vulnerability classifications also defined within the Flood Risk and Coastal Change PPG.

3.39 The proposed development is intended for residential use and therefore the flood risk classification indicates that this falls within the "***More Vulnerable"*** classification.

Sequential and Exception Tests

3.40 The proposed development is classified as More Vulnerable and the proposed development layout shall sequentially located all built development, including dwellings, garages driveways and adoptable access roads within Flood Zone 1.

3.41 Therefore, in accordance with Table 3 of the Flood Risk and Coastal Change PPG, it is considered that the Sequential and Exception Tests are not required to be undertaken by the Local Planning Authority as part of the planning process.

4 Flood Risk Mitigation Measures

4.1 To enable the site to be considered in line with the NPPF, the Flood Risk and Coastal Change PPG and the NCC's Guidance Document, appropriate flood mitigation measures need to be set in place. The measures laid out below, are put forward as those that will be incorporated within the detailed design of the proposed development and should be developed further during the undertaking of any potential future planning application.

Sequential Layout Design

4.2 During the design of the proposed development layout, the sequential approach should be undertaken as detailed below.

- all residential dwellings and associated access roads shall be located within Flood Zone 1 and outside the extent of surface water flooding with a risk rating of 'Low' (1000-year) or greater as identified within Figure 3.7 and Figure 3.8.
- all open surface water drainage infrastructure such as attenuation ponds and swales etc, shall be located outside the extent of surface water flooding with a risk rating of 'Medium' (100-year+CC) plus 40% climate change as identified within Figure 3.6.

4.3 At this stage the surface water flood mapping has been used as a proxy for the fluvial flood risk. During the planning stage it may be prudent to undertake some site specific flood modelling of the surrounding watercourses to accurately define the extent of Flood Zone 1, 2, 3a and 3b.

Watercourse Network Mitigation Strategy

4.4 The adjacent watercourses which form the development sites western, northern and eastern boundaries shall be subject to the following mitigation and improvement works as detailed.

- The watercourse adjacent to the site shall be inspected and cleared. Where required the profile of the watercourse shall also be reinstated to provide improvement to the network's overall performance.
- A 10.0m easement from the top bank of the watercourse shall be provided along the length of the watercourse adjacent to the proposed development. The easement shall provide sufficient access to ensure the watercourse can continue to be inspected and maintained as require over the lifetime of the development.

4.5 The above mitigations measures will also reduce fluvial and surface water flood risk by:

- Improving the capacity of the watercourse to convey runoff within the channel.
- Sequentially locating the built development away from the watercourse.

Level Regime

4.6 Generally the Finished Floor Levels (FFL's) of the residential dwellings will be set at a minimum of 150mm – 300mm above the surrounding ground levels and adjacent highway/private drives. The above design should also ensure disability access is achievable in accordance with Part M of the Building Regulations and other relevant design requirements for social housing.

4.7 Where possible and land topography permits, all external hard and soft landscaping areas should be designed to fall away from the proposed dwellings so that in the event of a sewer surcharging or overland flow flood event, the flood water will not enter the buildings, but will instead flood/pond external hardstanding/landscaping areas or become flood routed towards the drainage infrastructure / open grassland.

Surface Water Drainage Strategy

4.8 The surface water drainage strategy for the proposed development will be carried out in accordance with Section 5 of this report.

Detailed Design

4.9 It is proposed that the mitigation measures set out above are progressed as part of a detailed Flood Risk Assessment undertaken in support of any future planning application.

5 Surface Water Drainage Strategy

5.1 The proposed development will increase the impermeable area of site when compared to the existing site layout. This additional area will increase the discharge rate and volume of surface water runoff and increase flood risk to the site and existing downstream development. In addition to the increased flood risk, the quality of surface water discharge will be reduced and the risk of pollution to the ground water table and surrounding water bodies increased.

5.2 Therefore, to mitigate the identified flood and pollution risk, a sustainable surface water drainage strategy shall be incorporated into the development design. The proposed drainage strategy shall comprise of either an infiltration design and/or an attenuation strategy as detailed below.

Infiltration Drainage Strategy

5.3 In accordance with the surface water drainage hierarchy, infiltration drainage is the preferred method of surface water disposal and this should be investigated during the early stages of the development's drainage strategy.

5.4 A review of the British Geological Survey (BGS) mapping website has identified the site geology as follows:

- Superficial Deposits – Lowestoft Formation (Diamicton)
- Bedrock Geology – Lewes Nodular, Seaford, Newhaven, Culver and Portsdown Chalk Formation

5.5 The above geological description is unlikely to support the use of infiltration drainage techniques. However, during the planning stage and as part of the detailed Flood Risk Assessment, percolation testing in accordance BRE 365 shall be undertaken to determine the soil infiltration rates across the development site.

5.6 In the unlikely event that the results of the percolation tests show that soil conditions are suitable for infiltration drainage then a drainage strategy should be designed to meet the following design criteria:

- The infiltration drainage system should contain the critical 1 in 100-year storm event with a 40% increase in rainfall intensity to allow for the effect of climate change.
- The infiltration drainage system should have a half drain time of less than 1440-minute (1 day) unless additional storage is provided to contain subsequent storm events.
- The ownership and maintenance strategy for the drainage system should be established.

5.7 In the event that an infiltration drainage system is not suitable to serve the proposed development for reasons such as poor infiltration, high water table or contamination risk, then an alternative method of surface water disposal will be required as detailed below.

Attenuated Drainage Strategy

5.8 In accordance with the surface water drainage hierarchy, a restricted discharge into an adjacent watercourse would be the next preferred method of surface water disposal when infiltration drainage techniques are considered inappropriate.

5.9 The surrounding watercourses currently receives brownfield and greenfield runoff from the application site. Therefore, it is intended to discharge the surface water runoff from the proposed development into the surrounding watercourses at a restricted discharge rate and provide onsite attenuation storage.

5.10 The proposed drainage strategy shall comply with the following design criteria:

- The greenfield runoff rate will be calculated using the IH 124 method and the discharge rate restricted to QBar. By restricting the discharge rate to QBar, the proposed drainage strategy will not increase the surface water discharge rate into the surrounding watercourses and will provide adequate mitigation against the increased volume of surface water runoff.
- The attenuation design should contain the critical 1 in 100-year storm event with a 40% increase in rainfall intensity to allow for the effect of climate change.
- The ownership and maintenance strategy for the drainage system should be established.

5.11 The infiltration and attenuated drainage strategies describe above will ensure flood risk to the site and existing surrounding development will not be increased.

Pollution Control

5.12 As the surface water drainage strategy is developed during the planning process and as part of the detailed Flood Risk Assessment, sustainable drainage techniques will be incorporated into the layout design and could include some of those listed below:

- Permeable Paving
- Filter Strips
- Swales
- Attenuation Lagoons
- Infiltration Basins
- Soakaways
- Attenuation Tanks

5.13 A water quality assessment will be undertaken as part of the detailed Flood Risk Assessment in accordance with Section 26 of the SuDS Manual. The water quality assessment will demonstrate that adequate levels of pollution control (SuDS) are included into the proposed drainage strategy for the various areas of impermeable hardstanding being drained.

5.14 Therefore, the risk of pollution effecting the ground water table or surrounding water bodies is considered to be ‘Low’.

Drainage Ownership & Maintenance

5.15 **Existing Drainage Network** - The maintenance and repair of the existing public sewer network surrounding the site is the responsibility of Anglian Water and/or the Highways Authority and is outside the control of the developer or the future occupants.

5.16 **Adoptable Drainage Network -** Where possible the proposed surface and foul water drainage network will be offered for adoption to a responsible authority. At this stage of the drainage strategy, the following authorities are likely to be engaged in further discussion during the detailed design stage:

- Anglian Water (AW) is the Local Water Authority for this area and parts of the foul and surface water drainage system could be offered to AW for adoption under a Section 104 agreement;
- Norfolk County Council (NCC) is the Local Highways Authority for this area and parts of the surface water drainage system could be offered to NCC for adoption under a Section 38 agreement;
- South Norfolk Council (SNC) is the Local Planning Authority for this area and parts of the surface water drainage system could be offered for adoption to SNC as part of the Public Open Space provision.

5.17 **Private Drainage Network -** Where the surface water drainage system is not offered for adoption, it will remain in the private ownership of the future residents and the likely maintenance responsibility will be as detailed below:

- Where the surface water drainage system serves a single property, the future occupant of that property will be solely responsible for the maintenance of that part of the drainage system.
- Where the surface water drainage system serves two or more properties then a private management company will be set up to ensure the future maintenance and repair of that system. The regime put in place should be in accordance with the SuDS Manual CIRIA 753.

6 Offsite Impact

Impact of the Development on Hydrological Morphology

6.1 The proposed development layout shall sequentially located all built development within Flood Zone 1 and therefore the proposed development will not be located within the fluvial flow path of any watercourse and will not occupy any critical floodplain storage.

6.2 Therefore, the development will have no significant impact on the hydrological morphology of the surrounding area.

Impact of Surface Water Drainage

6.3 The proposed surface water drainage strategy as detailed within Section 5 of this report incorporates the use of infiltration drainage techniques and/or a restricted discharge into an adjacent watercourse with onsite attenuation. The design will be undertaken to accommodate the critical 100-year plus climate change storm event in accordance with the NPPF, the Flood Risk and Coastal Change PPG and the NCC's Guidance Document.

6.4 Therefore, there will be no significant increase in the risk of surface water flooding to the site, its occupants or existing surrounding development.

7 Discussion and Conclusion

7.1 This Flood Risk and Surface Water Drainage Assessment (Scoping Report) has been undertaken in accordance with the National Planning Policy Framework (NPPF), the Flood Risk and Coastal Change Planning Practice Guidance (PPG) and the NCC's Guidance Document.

7.2 The report demonstrates that:

- the sequential approach should be utilised during the design of the development layout.
- with the sequential design of the development layout and the implementation of appropriate mitigation measures, the site has been shown to be at a low risk of flooding from all sources.
- with the sequential design of the development layout, the site is not considered to be subject to the Sequential and Exception Tests during the planning process.
- a Sustainable Surface Water Drainage Strategy shall be utilised (infiltration and/or attenuated discharge) to drain the proposed development's impermeable area and ensure flood and pollution risk is not increased.

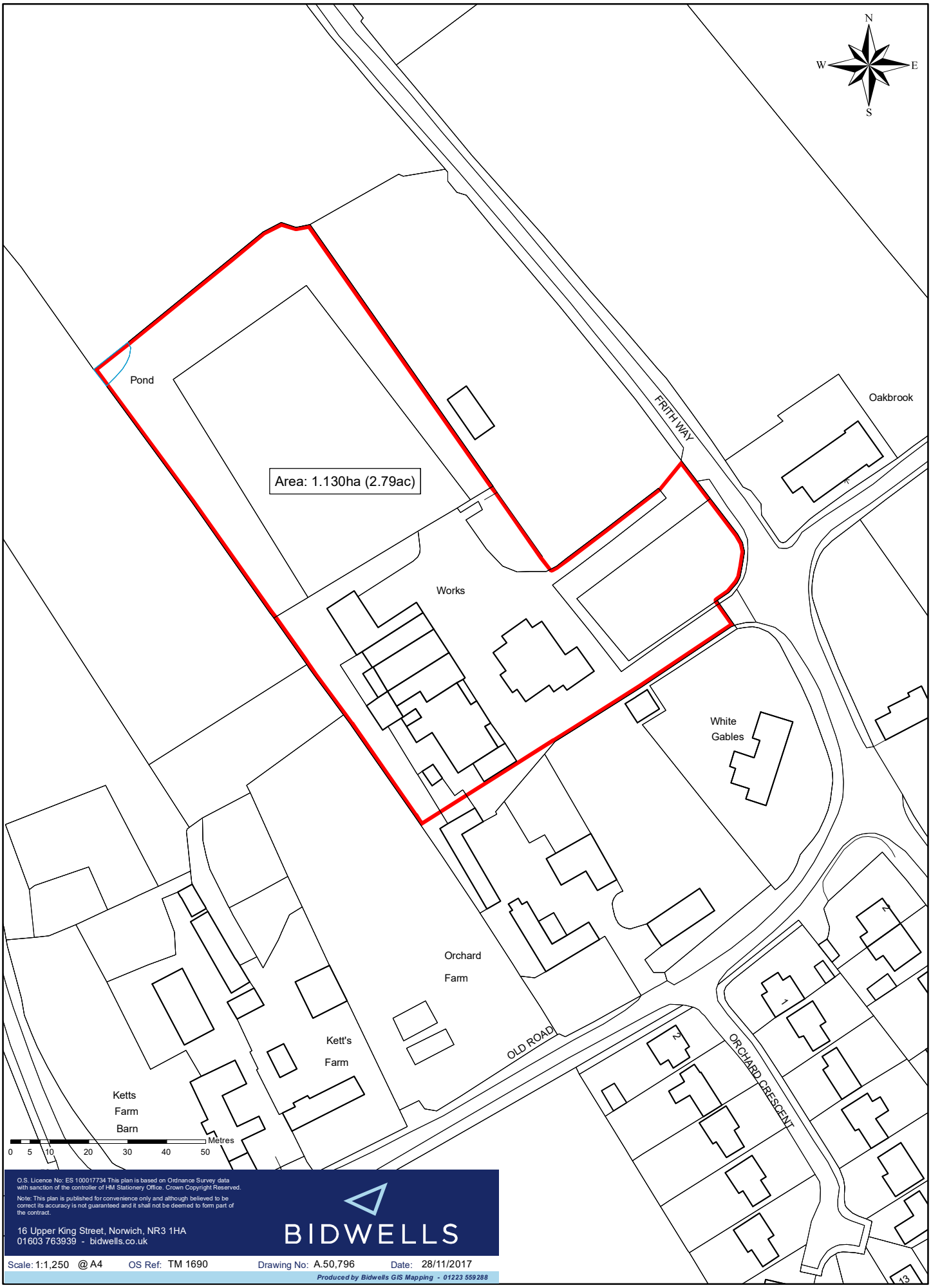
7.3 Therefore, the proposed development is considered appropriate from a flood risk and surface water drainage perspective subject to the implementation of the recommended mitigation measures put forward as part of this report which should be developed further during the planning stages as part of a detailed Flood Risk Assessment.

Appendices

Appendix A

Existing Site Layout (OS Mapping Extract)

Land at Former Meat Factory, Great Moulton



16 Upper King Street, Norwich, NR3 1HA
01603 763939 - bidwells.co.uk

BIDWELLS

Scale: 1:1,250 @ A4 OS Ref: TM 1690 Drawing No: A.50,796 Date: 28/11/2017